LAND SOUTH OF CHISWELL GREEN LANE,
CHISWELL GREEN, ST ALBANS

PROOF OF EVIDENCE APPENDICES – TRANSPORT
CD 3.23B

Anthony Jones BSc MCIHT

SECTION 78 APPEAL REFERENCE: APP/B1930/W/22/3313110
PLANNING APPLICATION REFERENCE: 5/2022/0927

Prepared for: Alban Developments Limited and Alban Peter Pearson,
CALA Homes (Chiltern) Ltd and Redington Capital Ltd
Ref: 001_8230258_AJ
Issue 1: 20 March 2023

Glanville

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Appendix AHJ/1

Minutes of the Pre-application Meeting held on the 14/12/2021

Carter Jonas

MEETING NOTE

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LAND WEST OF CHISWELL GREEN, ST ALBANS

Held on:	14 December 2021
Present:	James Dale (JDa) – HCC Highways Oliver Sowerby – HCC Highways Paul McCann – CALA Homes John Birch (JBi) – Glanville David Kemp – Glanville Justin Kenworthy – Barton Willmore John Boyd (JBo) – Carter Jonas James Delafield (JDe) – Carter Jonas
Apologies:	Andrew Holloway – Taylor Wimpey David Burne – Redington Capital

1. Introduction	JBo noted that JD will be familiar with the site as it had been identified as an allocation in the St Albans Local Plan, which was withdrawn during the Examination in 2020. JBo noted that a meeting had also previously taken place with JDa in August 2019 to discuss access arrangements for the southern part of the site, controlled by CALA Homes.	
2.	JDa requested that a note of the meeting be prepared that can be agreed and constitute the Highway Authority's pre-application advice.	**Actions:** JDe to prepare note JDa to input/agree note
3. Development Proposals	JBi ran through the Scoping Report provided in advance of the meeting. Starting with the Development Proposals, JBi highlighted that an outline application for approximately 370 dwellings was proposed, although the final development quantum is still under consideration [*and an EIA screening opinion has been determined by SACDC for up to 450 dwellings – no EIA required*]. A 2FE primary school is also proposed in the northwest corner of the site.	
4.	JBi noted that the proposal remains to split the site into two parcels, with only pedestrian/cycle and emergency vehicle access between the two. The intention being to spread traffic between the two vehicular access points proposed and aid in dispersing traffic to the local road network.	
5.	JDa noted the approach had its benefits in terms of providing more certainty as to the quantum of traffic that is expected to use either Chiswell Green Lane or Forge End, however the result is two cul-de-sacs that do not offer a natural flow for vehicular traffic. That so, JDa added	

	that it is right to be focusing more on pedestrian and cycle permeability through the site since the convenience of a car driver should not be prioritised.	
6.	JDa suggested that to justify the approach it may be useful to model the traffic flows if there was vehicular connectivity through the site. This may prove useful in demonstrating to residents living on Forge End and Chiswell Green Lane that they are no worse off as a result of the chosen approach.	**Actions:** JBi/DK to review
7. Vehicular Access	JBi noted that two access points had currently been identified to serve the northern part of the site from Chiswell Green Lane, although these may be reduced to one as the layout develops. A parking layby is proposed between the two junctions to replace the existing on-street parking along this section of road.	
8.	JDa highlighted that there is a live application with St Albans for the development of 330 Affordable Dwellings on land to the north of Chiswell Green Lane. Highways has advised the Applicant that they need to upgrade Chiswell Green Lane, and suggested JBi/DK review the access proposals for the application.	**Actions:** JBi/DK to review
9.	JDa added that as it is not a committed development, he does not expect it to be considered as part of Glanville’s Transport Assessment. JDa noted that this would only change should it receive planning permission in advance of our application being determined.	
10.	JBi turned to the access to the southern parcel from Forge End and noted it hadn’t changed significantly from that agreed in principle with JDa in 2019.	
11.	JDa queried why the other potential access point on Forge End was not included in the proposals? JBo explained that there is a triangular shaped group of trees which enclose the potential access, and these are subject to a Tree Preservation Order. The proposed access strategy seeks to avoid impacting on these trees.	
12.	JBo reminded JDa that the other potential access point from Long Fallow had been the subject of discussions at the previous meeting in 2019, and that due to its width, it should function as a pedestrian/cycle link and potentially a small private drive for up to 5 dwellings.	
13. Parking	In relation to parking, JBi confirmed that the proposals would seek to comply with standards with the detail provided at Reserved Matters stage. JDa advised that this was an acceptable approach.	
14. Trip generation and distribution	JBi noted that surveys had been completed in 2016 when the TA was prepared to support the site promotion. JBi added that the intention was not to re-do the surveys as traffic conditions are unlikely to be representative due to the impacts of COVID and reintroduction of restrictions. The proposal is therefore to use the 2016 data and growth it up. This is seen as a robust approach representing a worst-case scenario	

	as home working is more common post-pandemic.	
15.	JDa confirmed that this approach was acceptable, adding that he can review the trip rate information with his data team and provide feedback.	**Actions:** JDa to review
16. Highway Impact	JDa advised that when considering highway impact it was important to consider the requirements of para 110 of the NPPF alongside para 111 before concluding on whether the impact is ‘severe’. Para 111 considers ‘residual impact’ and applies after considering opportunities to promote sustainable travel and highway safety and capacity improvements.	
17.	JBi queried if the Highway Authority was already considering any improvements to the Watford Road/Chiswell Green Lane/Tippendell Lane junction? JDa advised that he doesn’t believe it has, although work is ongoing on the LCWIP for St Albans and Watford Road is identified as a key route. The junction could be looked at eventually by the HA but it’s likely to take a further 2 years before the LCWIP is complete.	
18.	JBi advised that Glanville has a plan identifying the extent of public highway around this junction. It could be that some minor interventions are sufficient to increase the capacity of the junction and that this can be combined with pedestrian improvements to promote sustainable travel.	
19.	JDa suggested that Glanville should not waste time considering tweaks to junction geometry. Instead, the focus should be on HCC’s LTP1 and improvements which favour pedestrians and cyclists even if this is at the expense of traffic capacity. Where will residents of development want to travel to, how are they going to get there in a sustainable way, what facilities exists, and what improvements are required? This is a key piece of work that needs to be covered in the TA.	**Actions:** JBi/DK to review
20. Sustainable transport	JDa noted that parts of the development had the potential to be further than 400m to the nearest bus stop, and suggested consideration may need to be given to proposing to divert one of the frequent existing services along Chiswell Green Lane which could loop around the northern part of the site and then back to Watford Road. The public transport strategy needs to be covered in the TA.	**Actions:** JBi/DK
21.	JDa added that HCC has suggested to the Applicant of the proposed development to the north of Chiswell Green Lane that there should be an upgrade along it to include an off-carriageway cycle route. JDa suggested that CALA/Redington need to think along those lines as well and consider the locations that residents of its development are likely to want to reach by foot/cycle. This assessment needs to be front and centre of the TA work. The guidance in LCM 120 needs to be considered.	**Actions:** JBi/DK to review
22. AOB	JBi queried HCC’s requirements for road safety audits at the outline application stage? JDa advised that these may not be required for the two proposed vehicular accesses, but a junction upgrade at Watford Road/Chiswell Green Lane would likely need one. JDa confirmed that HCC has an inhouse Audit Team or Glanville could carry out the audit or arrange via another consultant if required.	

23.	JDa agreed to review the Transport Scoping Note again and provide any further feedback on the assessments proposed.	**Actions:** JDa to review
24.	JDa noted that HCC has published a new Developer Contributions document that is worth considering.	**Actions:** JBi/DK to review

Appendix AHJ/2

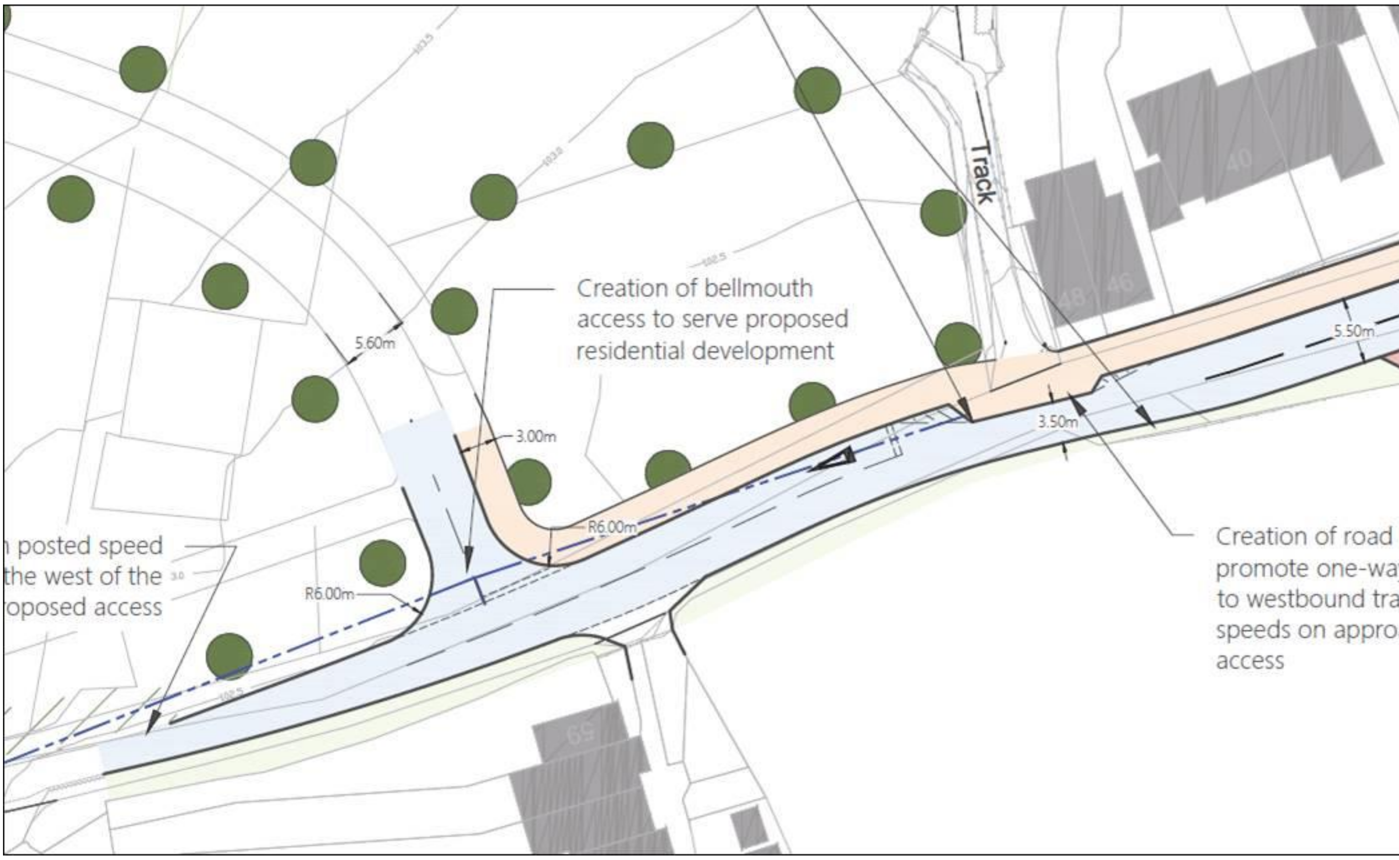
HCC Highways Comments on the Planning Application

Hi Andrew,

Planning Application Numbers 5/2022/0927 and 5/2021/3194

Further to our meeting, I wanted to set out the Highway Authority's view with respect to the proposed access(es) and off-site highways works on Chiswell Green Lane for both planning application numbers 5/2022/0927 (Land south of Chiswell Green Lane) and 5/2021/3194 (St Stephens Green Farm Chiswell Green Lane) in terms of how they both may be determined.

For the St Stephens Green Farm application, as shown on Drawing No. 21-086 / 001 Rev B, the geometric design of the access is proposed to take the form of a simple junction with 6.0-metre kerb radii and a 5.5-metre-wide access road, sufficient to accommodate the simultaneous entry and exit movements of various sized vehicles. The proposed access is satisfactory in itself.

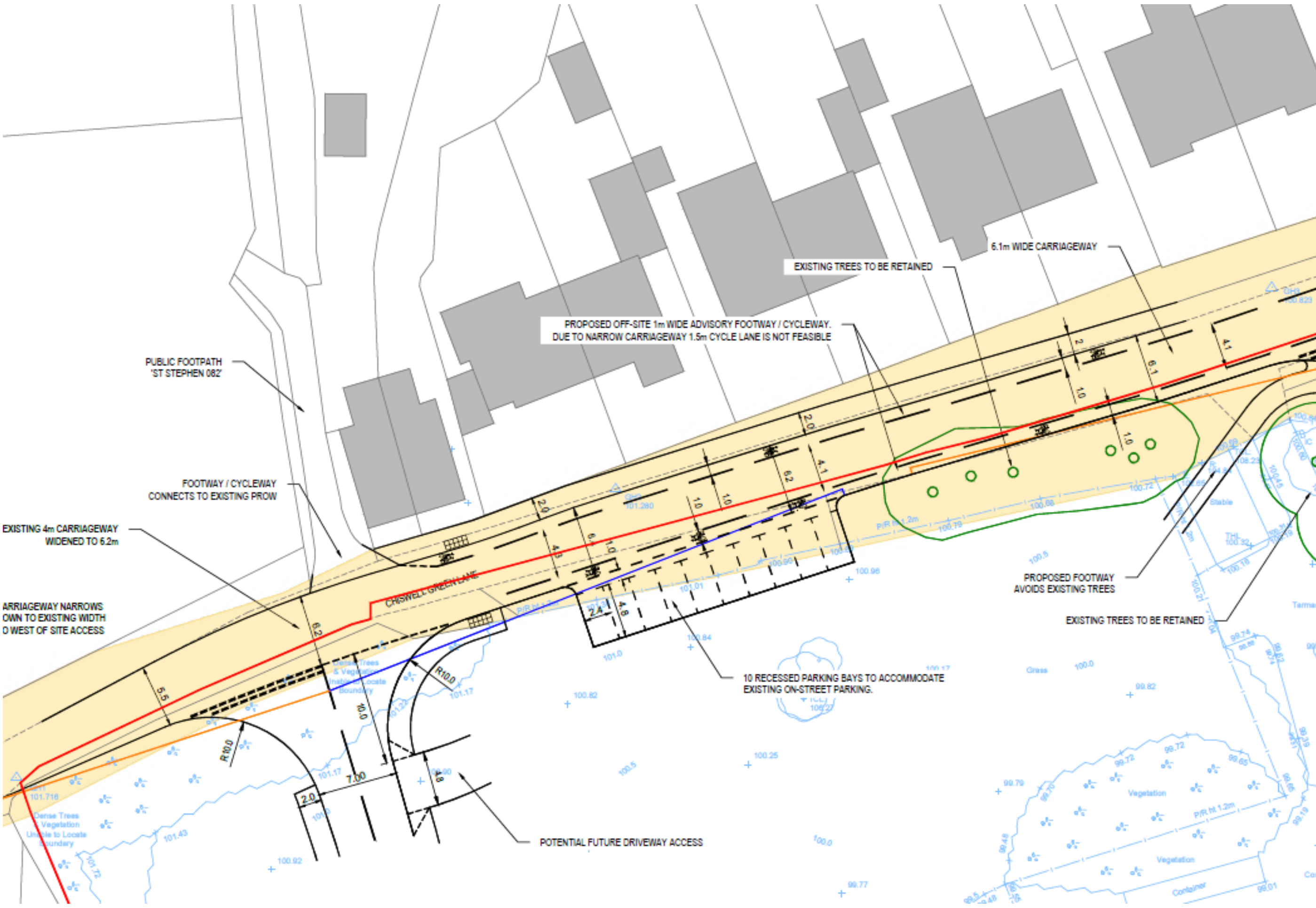


With respect to the site south of Chiswell Green Lane, I note from the submitted TA that two access points are proposed to serve the northern land parcel, as noted in paragraphs 5.12 and 5.13, reproduced below:

5.12 " The proposed site access arrangement for the northern parcel is shown within Appendix G and will consist of two priority T-junctions. These junctions will serve the northern half of the residential development and the primary school."

5.13 “These junctions will be formed as priority T-junctions and will incorporate localised widening of the existing carriageway on Chiswell Green Lane to 6.1m to accommodate the additional flows associated with the development. In addition to this, the northern footway will be widened to 2m outside of numbers 46 and 48 Chiswell Green Lane.”

Drawing number 8210856-1001 Rev I6 illustrates the proposed access points:



I note that for the above drawing, the western access is situated nearest to the proposed access for the St Stephens Green Farm site. The length of stagger between the two junctions may be considered acceptable.

However, I do note that consideration will need to be given in terms of how the planning applications may work together. For example, the St Stephens Green Farm application shows a narrowing opposite the proposed southern site access point. This would mean that the southern site would need to accommodate (within the site curtilage) such an arrangement, although is feasible in principle. We would seek as a preference for the northern site to deliver their proposals, as set out within paragraph 5.21 of the TA.

5.21 “The design of the proposed access would also incorporate a shared foot / cycleway measuring 3.0-metres in width on the eastern side of the proposed access road. This would connect to a new shared foot / cycleway running in an easterly direction along the full length of the northern side of Chiswell Green Lane and tie into existing infrastructure either side of the double mini-roundabout junction of the B4630 Watford Road / Tippendell Lane.”

The off-site proposals for cycling as presented by the Land south of Chiswell Green Lane site are considered substandard and do not meet the requirements of Local Transport Note 1/20.

I wanted to draw these matters to your attention and also place this note on the formal record, applicable to both planning applications. I note that both planning applications are still to be determined. As per the submitted drawings, should the northern site be determined, the off-site highways works would mean that the southern site could not deliver their proposals as they currently stand. However, this notwithstanding, the southern site would need to make changes to their plans in terms of the cycling infrastructure as presently shown. We are in discussion with the southern site about their off-site cycling proposals to align with the northern site's plans for Chiswell Green Lane (and HCC's longer term proposals for the southern end of Watford Road (towards Watford)). Naturally, two major planning applications that include primary accesses in close proximity, and share similar off-site commitments to infrastructure provision will require clear understanding of how, in practice, each development will be implemented both separately and together.

I would be grateful for your thoughts on this matter.

Many thanks,

Oliver

Hertfordshire

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Update me

Appendix AHJ/3

Minutes of Post Application Meeting with HCC Highways on the 17/07/2022

Land South of Chiswell Green Lane, Chiswell Green

Minutes of Meeting with Hertfordshire County Council

Held on Thursday 07th July 2022 at 12:00pm via MS Teams

Attendance:

James Dale (JDa)	Hertfordshire County Council (HCC)
Oliver Sowerby (OS)	Hertfordshire County Council (HCC)
James Delafield (JDe)	Carter Jonas (CJ)
John Birch (JB)	Glanville Consultants (GC)
David Kemp (DK)	Glanville Consultants (GC)

Apologies were received from John Boyd (Carter Jonas), Justin Kenworthy (Barton Willmore), David Burne (Redington Capital) and Paul McCann (Cala Homes).

Summary of Actions

Action		Relevant Item	Responsibility
a)	GC to prepare a plan showing how the access arrangements for the Polo Club site and land south of Chiswell Green Lane could work together.	3.4	GC
b)	GC to confirm with HCC whether a reduced 5.5m carriageway is acceptable for the bus service.	4.3	GC
c)	CJ to obtain a copy of the Polo Club's Transport Assessment Addendum from SADC.	5.2	CJ
d)	HCC to issue a copy of the HCC cycle proposals along Watford Road.	5.5	HCC
e)	HCC to confirm with their Public Transport Officer as to whether an improved bus frequency is preferred over a 400m distance between the bus stops and each dwelling.	5.7	HCC

Action

1.0 Introduction

1.1 JB welcomed everyone to the meeting and thanked them for their attendance. He set out that the intention of the meeting was two-fold, namely, to discuss the comments provided by OS on the interaction of the proposed site access junction with the Polo Club's proposed site access and to identify if HCC were likely to have any additional comments on the Transport Assessment.

2.0 Planning Application Update

2.1 JDa confirmed that the Polo Club application is still to be determined but there have been changes to the sustainable transport improvements that will be discussed later during the meeting. He suggested that the development to the south of Chiswell Green Lane is more acceptable to the Planning Officer, but he considered that the Polo Club will appeal if planning permission is refused.

Action

3.0 Interaction with Polo Club Site Access

3.1 It was understood that HCC had queries on how the proposed western site access on Chiswell Green Lane would operate with the Polo Club access if both applications received planning consent.

3.2 DK talked through a drawing which showed the Polo Club site access and the proposed western site access superimposed. The differences between the site access arrangements are as follows:

a) the junctions have a separation of 45m which accords with Table 4.1.1.1 of Roads in Hertfordshire Section 4;
b) between the junctions, the Polo Club proposed to widen Chiswell Green Lane to the north as the land was within their control, whilst the development to the south of Chiswell Green Lane proposes widening to the south as the required land was within the site boundary; and
c) the Polo Club site access incorporated a buildout opposite the proposed access to land south of Chiswell Green Lane to provide a suitable width and alignment for the proposed footway / cycleway.

3.3 JDa confirmed that he was happy with the proposed site access junction arrangement for land to the south of Chiswell Green Lane if the Polo Club application is refused but not if both applications receive planning consent as the junction arrangements would not be compatible.

3.4 It was identified that a suitable alignment could potentially be provided which would move the southern kerbline slightly further south but retain the buildout to allow for the footway / cycleway alignment. GC will consider the junction arrangements and prepare a drawing showing how both development accesses could work together. GC

3.5 HCC recognised that there was a potential conflict of interest because CALA Homes and Redington Capital have objected to the Polo Club scheme and may not wish to facilitate its delivery. Consequently, it was agreed that further thought would be given to this by all parties, whilst HCC suggested that it was ultimately a matter for SADC to resolve.

4.0 Chiswell Green Lane Cycle Route

4.1 OS and JDa raised concerns about the advisory cycle lane on Chiswell Green Lane and stated a preference for an off-carriageway combined 3m footway / cycleway on the northern side of the road as proposed by the Polo Club application. HCC therefore would want Redington Capital and CALA Homes to commit to this provision.

		Action
4.2	DK stated that to provide a footway / cycleway along Chiswell Green Lane, footway widening into the carriageway would be required due to the existing utilities & telegraph poles on Chiswell Green Lane and the significant level differences between the carriageway and the adjacent driveways to individual properties, particularly at the eastern end of the road. This would reduce the carriageway width to 5.5m, which could be considered too narrow for the diverted bus route. HCC acknowledged this issue, noting that this may be something the Polo Club have not considered, and will revisit this with the Polo Club's highway consultant.	
4.3	JDa considered that a compromise with a reduced carriageway width may be an acceptable solution. GC will follow this up with HCC to confirm that this is acceptable.	GC
5.0	**Wider Sustainable Transport Improvements**	
5.1	JDa confirmed that his original objection to the Polo Club application was based on their sustainable accessibility provision being below an acceptable level. The applicants have since submitted a Transport Assessment Addendum which: a) provides additional off-site works, including a Toucan on Watford Road and environmental improvements at the double mini roundabout; b) improved Travel Plan initiatives; c) a public transport subsidy to increase the bus frequencies on Watford Road; and d) puts financial values on the sustainable improvements based on the HCC S106 toolkit.	
5.2	JDa confirmed that the information in this addendum addresses HCC's objections to the Polo Club application but the deliverability of the footway / cycleway will need to be checked in light of previous comments (see item 4.2). JDe confirmed that he will try to get a copy of the report from SADC as it has not been added to the planning website as yet (see post meeting note).	CJ
	<u>Cycle improvements on Watford Road</u>	
5.3	JDa stated that HCC had previously identified cycle improvements along Watford Road between St Albans and the M25 Junction 21 and had reviewed its feasibility to ensure they are deliverable. However, HCC do not have the funding to deliver the scheme. Therefore, HCC would want to see this route delivered through the two planning applications with any gaps funded by HCC. Similarly, he stated that whichever scheme goes first, would need to provide the improvements along Chiswell Green Lane.	

Action

5.4 JDa stated that the Polo Club would be responsible for implementing the cycle route to the north of Chiswell Green Lane as their updated proposals in the latest Transport Assessment Addendum match HCC's proposals. Redington Capital and CALA Homes would therefore be responsible for providing the route to the south, between Chiswell Green Lane and the petrol station, replacing their previous proposals. The applicants would therefore be required to commit to HCC's scheme.

5.5 HCC's proposals are currently not in the public domain but JDa and OS confirmed that they will seek permission to release the proposals so that the sustainable transport mitigation can be updated accordingly. HCC

Bus Diversion

5.6 Consideration was then given to the bus diversion into the site. HCC's Public Transport Officer considers that either increased bus frequency on Watford Road or an all-new service into the site are preferred over a diversion due to the impact on the timetable of existing services. The cost of a new service would be circa £150kper annum for 5 years.

5.7 JB queried whether the improved frequency would take precedence over the distance between the bus stops and the dwellings exceeding 400m and JDa considered that, whilst borderline, an improved frequency may take precedence but that he would check with the Public Transport Officer. HCC

6.0 S106 Contribution

6.1 JDe enquired whether the sustainable transport mitigation would be deductible from the standard S106 charge of £6,826 per dwelling identified within the HCC Developer Contribution toolkit. JDa confirmed that the off-site sustainable transport improvements and bus contributions that will be directly funded would be deductible from the total standard S106 charge for the whole development. Therefore, either through the delivery of physical works or developer contributions, the development would be expected to provide funding of around £2.6m (i.e. £6,286 x 391 units)

7.0 Any Other Business

7.1 JDe asked if there are any other comments on the Transport Assessment but OS confirmed that they had no further comments.

Post Meeting Note:

A copy of the new Polo Club Transport Assessment Addendum has been obtained from the SADC Planning Officer.

Appendix AHJ/4

Post Planning Email from HCC Highways, dated 18/08/2022

David Kemp

From: Oliver Sowerby <[redacted]>
Sent: 18 August 2022 13:58
To: David Kemp
Cc: James Dale; Delafield, James; John Birch
Subject: RE: Land South of Chiswell Green Lane
Attachments: Transport Assessment Addendum June 2022.pdf

David,

Thanks for this. I am content with the drawings.

With respect to the bus service, after some consideration (and in conjunction with the wider mitigation package), we have decided to opt for an increased frequency for existing services on Watford Road. I will seek to work this out with our bus planner, but in the first instance, a S106 contribution of £175k p.a. for five years may be fitting.

I note the polo club site to the north and James has recently provided comments. They issued the attached TAA.

In terms of Chiswell Green Lane, we would seek (for whichever site comes forward first), the off carriageway cycle route.

For the double mini roundabout, we are content with your scheme (similar to the polo club) and wouldn't need much adjustment to reflect the cycle route on Chiswell Green Lane.

For the Watford Road (cycle route) scheme that I sent over, we are seeking that your development delivers the improvements to the south of Chiswell Green Lane down to the Shell Garage, ideally via S278. Could you please let us know your thoughts on this?

We would ideally like this information to be presented in a TAA (similar to the polo club) and submitted back to the LPA. However, we can certainly review this before submission.

If anything isn't clear, I'm happy to schedule a meeting.

Thanks,

Oliver

Hertfordshire

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Update me

Appendix AHJ/5

No Objection Letter from HCC Highways, dated 22/09/2022

Mark Youngman
Development Management Group Manager
Hertfordshire County Council
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County Hall
Pegs Lane
Hertford
SG13 8DE

Response to Planning application from Hertfordshire County Council (T and CP GDP Order 2015)

Director of Planning
St Albans City & District Council
St Peters Street
St Albans
Hertfordshire
AL1 3JE

District ref: 5/2022/0927
HCC ref: SA/12145/2022
HCC received: 22 September 2022
Area manager: James Dale
Case officer: Oliver Sowerby

Location
Land South Of Chiswell Green Lane St Albans Hertfordshire

Application type
Full Application

Proposal
AMENDED PROPOSAL
Outline application (access sought) - Demolition of existing structures and construction of up to 391 dwellings (Use Class C3), provision of land for a new 2FE primary school, open space provision and associated landscaping. Internal roads, parking, foot

Recommendation
Notice is given under article 22 of the Town and Country Planning (Development Management Procedure) (England) Order 2015 that Hertfordshire County Council as Highway Authority does not wish to restrict the grant of permission subject to the following conditions:

CONDITIONS:

New Access

Prior to the commencement of the development hereby permitted, the vehicular accesses(es) shall be provided and thereafter retained at the position shown on the approved plan drawing numbers 8210856-1001 Rev I9, 8210856-1002 Rev I4 and 8210856-1021 Rev I3.

Arrangement shall be made for surface water drainage to be intercepted and disposed of separately so that it does not discharge from or onto the highway carriageway.

Reason:

To ensure satisfactory access into the site and avoid carriage of extraneous material or surface water from or onto the highway in accordance with Policy 5 of Hertfordshire's Local Transport Plan (adopted 2018).

Construction Traffic Management Plan

Prior to the commencement of the development for which full planning permission is granted, a detailed Construction Traffic Management Plan relating shall be submitted to and approved in writing by the Local Planning Authority. Thereafter, the construction of the development for which full planning permission has been granted shall only be carried out in accordance with the approved CTMP unless otherwise agreed in writing by the local planning authority. The plan shall be prepared in accordance with the Construction Logistics and Community Safety (CLOCS) Standard.

Pursuant to the above, prior to the commencement of any Parcel/Phase or Sub-Phase, a detailed Construction Traffic Management Plan (CTMP) for that Parcel/Phase or Sub-Phase, shall be submitted to and approved in writing by the Local Planning Authority. Thereafter, the construction of any Parcel/Phase or Sub-Phase shall only be carried out in accordance with the approved CTMP for that Parcel/Phase or Sub-Phase unless otherwise agreed in writing by the local planning authority.

The plan shall include the following:

i. The construction programme;
ii. Clear access strategy for construction vehicles that avoids conflicts with pedestrians, cyclists, public transport and existing and future residents;
iii. Hours of operation;
iv. Phasing of the development of the site, including all highway works;
v. Construction vehicle numbers, type, routing;
vi. Traffic management requirements;
vii. Cleaning of site entrances, site tracks and the adjacent public highway;
viii. Provision of sufficient on-site parking prior to commencement of construction activities;
ix. Details of any highway works necessary to enable construction to take place, including temporary access works;
x. Details of any works to or affecting Public Rights of Way within and in the vicinity of the site. These shall demonstrate how safe and unobstructed access will be maintained at all times or be temporarily closed or extinguished.
xi. Details of servicing and delivery, including details of site access, compound, welfare facilities, hoarding, construction related parking, loading, unloading, turning areas and materials storage areas;
xii. Where works cannot be wholly contained within the site, a plan should be submitted showing the site layout on the highway, including extent of hoarding, pedestrian routes and remaining road width for vehicle movements and proposed traffic management;
xiii. Management of construction traffic and deliveries to reduce congestion and avoid school pick up/drop off times, including numbers, type and routing;
xiv. Control of dust and dirt on the public highway, including details of wheel washing facilities and cleaning of site entrance adjacent to the public highway;
xv. Details of public contact arrangements and complaint management;
xvi. Construction waste management proposals;
xvii. Mechanisms to deal with environmental impacts such as noise and vibration, air quality and dust, light and odour;
xviii. Post construction restoration/reinstatement of the working areas and temporary access to the public highway; and
xix. Measures to be implemented to ensure wayfinding for both occupiers of the site and or those travelling through it.

Reason:

In order to protect highway safety and the amenity of other users of the public highway and rights of way in accordance with Policies 5, 12, 17 and 22 of Hertfordshire's Local Transport Plan (adopted 2018).

Highway Improvements – Offsite (Design Approval) – Part A

Notwithstanding the details indicated on the submitted drawings, no on-site works above slab level shall commence until a detailed scheme for the offsite highway improvement works as indicated on drawing(s) numbers set out below have been submitted to and approved in writing by the Local Planning Authority.

8210856-1012 Rev I5 PROPOSED SUSTAINABLE TRAVEL IMPROVEMENTS - CHISWELL GREEN LANE

8210856-1013 Rev I4 PROPOSED SUSTAINABLE TRAVEL IMPROVEMENTS - WATFORD ROAD / CHISWELL GREEN LANE

Drawing numbers 8210856_1028 Rev I1 through to 8210856_1033 Rev I1 HERTFORDSHIRE COUNTY COUNCIL'S WATFORD ROAD CYCLE IMPROVEMENTS, (Sheets 1 to 6)

Drawing number 8210856-1014 Rev I3 IMPROVEMENTS - LONG FALLOW PROPOSED SUSTAINABLE TRAVEL

Reason:

To ensure construction of a satisfactory development and that the highway improvement works are designed to an appropriate standard in the interest of highway safety and amenity and in accordance with Policy 5, 13 and 21 of Hertfordshire's Local Transport Plan (adopted 2018).

Highway Improvements – Offsite (Implementation / Construction) – Part B

Prior to the first occupation of the development hereby permitted the offsite highway improvement works referred to in Part A of this condition shall be completed in accordance with the approved details.

Reason:

To ensure construction of a satisfactory development and that the highway improvement works are designed to an appropriate standard in the interest of highway safety and amenity and in accordance with Policy 5, 13 and 21 of Hertfordshire's Local Transport Plan (adopted 2018).

Estate Roads - Outline

No development shall commence until full details have been submitted to and approved in writing by the Local Planning Authority in relation to the proposed arrangements for future management and maintenance of the proposed streets within the development. (The streets shall thereafter be maintained in accordance with the approved management and maintenance details until such time as an agreement has been entered into under Section 38 of the Highways Act 1980 or a Private Management and Maintenance Company has been established).

Reason:

To ensure satisfactory development and to ensure estate roads are managed and maintained thereafter to a suitable and safe standard in accordance with Policies 5 and 22 of Hertfordshire's Local Transport Plan (adopted 2018).

Detailed Highways Plans – Outline

Prior to the commencement of the development, full details in relation to the design of estate roads (in the form of scaled plans and / or written specifications for each phase) shall be submitted to and approved in writing by the Local Planning Authority to detail the following:

a. Roads;
b. Footways
c. Cycleways (compliant with LTN 1/20);
d. External public lighting;
e. Minor artefeacts, structures and functional services;
f. Foul and surface water drainage;
g. Visibility splays;
h. Access arrangements including temporary construction access
i. Hard surfacing materials;
j. Parking areas for vehicles and cycles;
k. Loading areas; and
l. Turning and circulation areas.

The development shall be implemented in accordance with those approved plans.

Reason:

To ensure suitable, safe and satisfactory planning and development of the site in accordance with Policy 5 of Hertfordshire's Local Transport Plan 2018.

Monitoring - Outline

Prior to commencement of any development the submission and agreement of a mechanism of continual review of the transport impacts of the development to include (but not be restricted to) the installation of traffic counters upon each access, travel plan monitoring and regular dialogue between Developer, Local Planning Authority and Highway Authority. The findings of this work shall be shared between all interested parties with a view to remedying any problems arising directly from the construction or occupation of the development.

Reason:

To ensure that sustainable travel options associated with the development are promoted and maximised to be in accordance with Policies 3, 5, 7, 8, 9 and 10 of Hertfordshire's Local Transport Plan (adopted 2018).

Phasing Plan - Outline

Notwithstanding the information contained in the Transport Assessment, no development shall Commence in respect of any Development Parcel or Strategic Engineering Element until a Site Wide Phasing Plan, which accords with agreed Section 106 triggers has been submitted to the local planning authority for approval. The Phasing Plan shall include the sequence of providing the following elements:

a) Development parcels;
b) Major distributor roads/routes within the site, including timing of provision and opening of access points into the site;
c) The local centre, or for example, mobility hubs, convenience store and community facilities
d) Strategic foul surface water features and SUDS;
e) Open space;
f) Strategic electricity and telecommunications networks;
g) Environmental mitigation measures.
No development shall commence apart from enabling works and strategic engineering elements, unless, agreed in writing by the Local Planning Authority until such time as the phasing plan has been approved in writing by the Local Planning Authority. The development shall be carried out in accordance with the approved phasing contained within the phasing plan unless otherwise agreed in writing by the Local Planning Authority.

Reason:

To ensure suitable, safe and satisfactory planning and development of the site in accordance with Policy 5 of Hertfordshire's Local Transport Plan 2018.

Travel Plan - Outline

No part of the development hereby permitted shall be occupied prior to the implementation of the approved Travel Plan and dated (March 2022) (or implementation of those parts identified in the approved Travel Plan as capable of being implemented prior to occupation). Those parts of the approved Travel Plan that are identified therein as being capable of implementation after occupation shall be implemented in accordance with the timetable contained therein and shall continue to be implemented as long as any part of the development is occupied.

Reason:

To ensure that sustainable travel options associated with the development are promoted and maximised to be in accordance with Policies 3, 5, 7, 8, 9 and 10 of Hertfordshire's Local Transport Plan (adopted 2018).

School Travel Plan - Outline

Within three months of the first use of a school opening, a Modeshift STARS School Travel Plan should be prepared and submitted to Hertfordshire County Council, and fully approved by the School Travel Plan Team (the team can be contacted at: activeandsafertravel@hertfordshire.gov.uk). Thereafter the Travel Plan shall be implemented in full throughout the life of the school.

Reason:

To ensure that sustainable travel options associated with the development are promoted and maximised to be in accordance with Policies 3, 5, 7, 8, 9 and 10 of Hertfordshire's Local Transport Plan (adopted 2018).

Cycle Parking - Outline

Prior to the first occupation /use of the development hereby permitted a scheme for the parking of cycles including details of the design, level and siting of the proposed parking shall be submitted to and approved in writing by the Local Planning Authority

The approved scheme shall be fully implemented before the development is first occupied or brought into use and thereafter retained for this purpose.

Reason:

To ensure the provision of adequate cycle parking that meets the needs of occupiers of the proposed development and in the interests of encouraging the use of sustainable modes of transport in accordance with Policies 1, 5 and 8 of Hertfordshire's Local Transport Plan (adopted 2018).

HIGHWAY INFORMATIVES:

HCC as Highway Authority recommends inclusion of the following Advisory Note (AN) to ensure that any works within the highway are carried out in accordance with the provisions of the Highway Act 1980.

AN1) Storage of materials: The applicant is advised that the storage of materials associated with the construction of this development should be provided within the site on land which is not public highway, and the use of such areas must not interfere with the public highway. If this is not possible, authorisation should be sought from the Highway Authority before construction works commence. Further information is available via the website:
https://www.hertfordshire.gov.uk/services/highways-roads-and-pavements/business-and-developer-information/development-management/highways-development-management.aspx

AN2) Obstruction of public highway land: It is an offence under section 137 of the Highways Act 1980 for any person, without lawful authority or excuse, in any way to wilfully obstruct the free passage along a highway or public right of way. If this development is likely to result in the public highway or public right of way network becoming routinely blocked (fully or partly) the applicant must contact the Highway Authority to obtain their permission and requirements before construction works commence. Further information is available via the website:
https://www.hertfordshire.gov.uk/services/highways-roads-and-pavements/business-and-developer-information/development-management/highways-development-management.aspx

AN3) Road Deposits: It is an offence under section 148 of the Highways Act 1980 to deposit mud or other debris on the public highway, and section 149 of the same Act gives the Highway Authority powers to remove such material at the expense of the party responsible. Therefore, best practical means shall be taken at all times to ensure that all vehicles leaving the site during construction of the development are in a condition such as not to emit dust or deposit mud, slurry or other debris on the highway. Further information is available via the website:
https://www.hertfordshire.gov.uk/services/highways-roads-and-pavements/business-and-developer-information/development-management/highways-development-management.aspx

AN4) S106 Agreement. A Section 106 agreement will be required for the following
:

i. Approved Travel Plan(s), with individual monitoring fees, in accordance with the current HCC Travel Plan Guidance for Business and Residential Development;
ii. Funds to increase the service pattern of bus route 321; and
iii. Introductory bus pass provision for residents.

The above contributions will come under the auspices of the Planning Obligations Guidance Toolkit for Hertfordshire (2021) for schemes in the local area that accord with the three CIL tests.

AN5) Construction standards for works within the highway: The applicant is advised that in order to comply with this permission it will be necessary for the developer of the site to enter into an agreement with Hertfordshire County Council as Highway Authority under Sections 38 and 278 of the Highways Act 1980 to ensure the satisfactory completion of the access and associated road improvements. The construction of such works must be undertaken to the satisfaction and specification of the Highway Authority, and by a contractor who is authorised to work in the public highway. Before works commence the applicant will need to apply to the Highway Authority to obtain their permission and requirements. Further information is available via the website: https://www.hertfordshire.gov.uk/services/highways-roads-and-pavements/business-and-developer-information/development-management/highways-development-management.aspx

COMMENTS:

The applicant seeks planning permission for the following development:

Outline application (access sought) - Demolition of existing structures and construction of up to 391 dwellings (Use Class C3), provision of land for a new 2FE primary school

Introduction

The proposed development is located to the west of Chiswell Green locality in the Saint Albans district. To the east of the site is the existing urban area. The site is situated on the periphery of the urban area with the adjoining rural areas to the site's western boundary.

To the north, the site is bounded by Chiswell Green Lane which is an unclassified local access road. On the site's western extent, the national speed limit is in force and on the site frontage itself and extending into Chiswell Green, 30 m.p.h. applies. To the east and south, the site is bounded by residential roads.

The Highway Authority note the submission of materials in support of the planning application including the Illustrative Masterplan, Planning Statement, Transport Assessment and Travel Plans.

The Highway Authority also note the pre-application engagement initiated by the applicant, including the submission of a Scoping Note and follow up meetings on highways and transportation matters with the transport consultant and planning consultant. The resulting Transport Assessment is considered to reflect the discussions held at the pre-application stage including agreement on the scope of the assessment works.

Post submission, the Highway Authority has held meetings with the transport consultant regarding ensuring that an appropriate access strategy may be secured should the third-party site to the north of Chiswell Green Lane come forward for development first.

Discussions have also been held with the transport consultant regarding the off-site works on Chiswell Green Lane and how to ensure a scheme that can be delivered in conjunction with any potential funding from the polo club development site. The transport consultant has also sought to illustrate and fund and implement (at a level to be agreed, in accordance with the HCC planning obligations toolkit), cycle infrastructure improvements on Chiswell Green Lane and Watford Road that are consistent with a wider Hertfordshire County Council scheme to improve cycling infrastructure on a corridor level between St Albans and Watford. The Highway Authority note that this detail is contained within the post submission Transport Assessment Addendum (TAA) dated September 2022.

Sustainability

The site is located on the edge of the urban area of Chiswell Green.

Some limited local facilities and amenities are available to the site within approximately 0.6km of the site at the Chiswell Green Lane/Watford Road junction, including convenience shop, public house, bakery and take-away outlets.

Bus services, numbers 321 and 724 may be joined in both directions at The Three Hammers public house bus stops on Watford Road. A further bus route, number 361 may be joined on Tippendell Lane, also in the vicinity of the public house stops.

The Highway Authority note that all applications are assessed against policies contained within the adopted Local Transport Plan 4 (LPT4). There are a number of policies contained within the document, but underpinning all other policies is Policy 1, as below:

To support the creation of built environments that encourage greater and safer use of sustainable transport modes, the county council will in the design of any scheme and development of any transport strategy consider in the following order:

• Opportunities to reduce travel demand and the need to travel
• Vulnerable road user needs (such as pedestrians and cyclists)
• Passenger transport user needs
• Powered two wheeler (mopeds and motorbikes) user needs
• Other motor vehicle user needs

The Highway Authority has assessed the Transport Assessment against the policies contained within LPT4.

Public Transport

As noted above, the nearest bus routes are the numbers 321, 361 and 724 services. This is outlined in Section 4 of the TA.

The bus services available to Chiswell Green are considered to provide a good level of access to key destinations including Watford town centre and railway station and St Albans centre.

This notwithstanding, it is noted that the majority of the dwellings within the site would be above a distance of 400m to access public transport.

Given the site's proximity to good quality bus routes which provide access into adjoining local service centres within a reasonable journey time, the overall sustainability of the site is considered satisfactory.

The Highway Authority has discussed with the applicant the proposal to route bus service 321 into the site. However, it is noted that although buses run frequently through the village (3 buses per hour in each direction), the diversion would probably require a bespoke service due to the time penalty in running into the estate.

As such, the Highway Authority and further to detailed consideration by HCC's Passenger Transport Unit, it is considered most fitting to seek through Section 106 agreement, funds to allow enhancements to the existing bus services on Watford Road.

Access

The Highway Authority has discussed the access strategy with the applicant's transport consultant through pre-application advice.

It is noted that the site is split into two with respect to vehicular access.

Paragraph 5.11 of the TA notes that "It is proposed to provide three vehicular accesses to the development. Two of these accesses will be provided on Chiswell Green Lane and will provide access to the northern parcel and the primary school. The southern land parcel will be accessed from a new junction onto the Forge End cul-de-sac."

Drawing number 8210856-1001 Rev I9 illustrates the proposed northern site access junctions.

Drawing number 8210856-1002 Rev I4 illustrates the proposed southern access junction.

Finally, drawing number 8210856-1021 illustrates the PROPOSED FORGE END & LONG FALLOW PEDESTRIAN / CYCLE ACCESSES.

The Highway Authority note the proposed two access points on Chiswell Green Lane. The site is to be split in terms of vehicular access into two separate parts.

The indicative Masterplan indicates off-road connections between the two parts. The Highway Authority in the development of the Masterplan would seek routes that are consistent with the principles set out in LTN 1/20. This may be discussed prior to the reserved matters application which would detail the internal layout and consider any request for adoption of the estate roads within the site.

In summary, the Highway Authority is content in principle with the access strategy as illustrated, subject to a Section 278 agreement being entered into between the applicant and the Highway Authority.

Off-Site Highway Works

The Highway Authority note the post application discussions with respect to the off-site highways works. The material as contained within the September 2022 TAA is an accurate reflection of both these discussions and the draft plans issued to the transport consultant which show the Highway Authority's wider aspirations for cycling on Watford Road.

Drawing number 8210856-1012 Rev I5 PROPOSED SUSTAINABLE TRAVEL IMPROVEMENTS - CHISWELL GREEN LANE, illustrates the proposals on Chiswell Green Lane. The proposal seeks to facilitate an off road footway/cycleway.

8210856-1013 Rev I4 PROPOSED SUSTAINABLE TRAVEL IMPROVEMENTS - WATFORD ROAD / CHISWELL GREEN LANE illustrates the proposals at the Chiswell Green Lane and Watford Road junction.

Drawing numbers 8210856_1028 Rev I1 through to 8210856_1033 Rev I1 HERTFORDSHIRE COUNTY COUNCIL'S WATFORD ROAD CYCLE IMPROVEMENTS, (Sheets 1 to 6)

Drawing number 8210856-1014 Rev I3 IMPROVEMENTS - LONG FALLOW PROPOSED SUSTAINABLE TRAVEL illustrates the proposed mitigation on Long Fallow.

The Highway Authority is content with the off-site highways works as shown in the TAA.

Trip Generation/Distribution

The Highway Authority note the trip generation and distribution exercise as presented within Chapter 8 of the TA.

The Highway Authority is content with the methodology and outputs of this exercise, having been agreed as part of the Scoping Study.

Assessment

Section 9 of the TA outlines the junctions that are subject to detailed assessment, as below:
"The percentage impact shown in Table 15 indicates that only the off-site junctions within central Chiswell Green would experience increases in traffic flows of greater than 5%. These junctions are as follows"

1. Watford Road / Long Fallow – ghost island / right turn lane priority T-junction;
2. Watford Road / Forge End – priority T-junction; and
3. Watford Road / Chiswell Green Lane / Tippendell Lane – double mini-roundabout"

The Highway Authority is content to accept that the site access junctions and Junction 1 and Junction 2, as shown above, can operate satisfactorily with the development.

However, Junction 3, as noted above, which is a double mini roundabout is subject to some capacity concerns.

9.24 "The ARCADY results shown in Table 20 indicate that the northern mini-roundabout junction would exceed capacity in the 2027 'without development' scenario on the Watford Road north and Tippendell Lane approaches during both peak hours. Similarly, the Watford Road South approach at the southern roundabout would slightly exceed capacity in the PM peak hour."

9.25 "When the development flows are added, both mini-roundabouts would continue to exceed capacity during both peak hours. During the pre-application consultation with HCC, it was understood, however, that rather than making capacity improvements, HCC's preference is for sustainable transport improvements to reduce both development related single car use and to reduce the volume of background traffic. This is in accordance with paragraphs 110 and 112 of the NPPF and Policy 1 of the Hertfordshire Local Transport Plan 4."

Whilst the Highway Authority does not necessarily seek highway capacity enhancements as a principal mitigation measure, in this instance, sustainable transport improvements are necessary in order to ensure that the impact is mitigated in a manner consistent with LTP4. As discussed within this response, the Highway Authority is content to accept a mitigation scheme that is not highway capacity focused but seeks to promote travel by sustainable modes.

Contributions

Saint Albans District Council does not presently have an adopted Community Infrastructure Levy (CIL). Therefore, contributions would be sought via the S106 agreement using HCC's Guide to Developer Infrastructure Contributions (2021).

HCC's Guide to Developer Infrastructure Contributions (2021) implements a two-strand approach to planning obligations in order to address the immediate impacts of the new development (first strand), and the cumulative impacts of all development on non-car networks (second strand). The Highway Authority uses the toolkit in conjunction with the three CIL tests, noted below:

i. necessary to make the development acceptable in planning terms

ii. directly related to the development; and
iii. fairly and reasonably related in scale and kind to the development.

The Highway Authority will seek, wherever possible, to secure highway works via planning Condition and Section 278 agreement. The HCC Guide to Developer Infrastructure Contributions used by the Highway Authority may be accessed via the below link:

Guide to Developer Contributions (hertfordshire.gov.uk)

https://www.hertfordshire.gov.uk/about-the-council/freedom-of-information-and-council-data/open-data-statistics-about-hertfordshire/who-we-are-and-what-we-do/property/planning-obligations-guidance.aspx#developercontributions

First strand (works to be undertaken under s278):

- Site access works to Chiswell Green Lane, Forge End and Long Fallow; and
- Sustainable transport improvement works on Chiswell Green Lane and Watford Road.

First strand (works to be undertaken under s106):

Bus Service Improvements

HCC would seek a contribution towards the enhancement of existing bus routes operating on Watford Road. The total cost for this development would be up to £875,000. (£175,000 X 5= £875,000)

The first instalment of £175,000 should be paid prior to the first occupation and henceforth on the anniversary of the first payment for 4 years.

Travel Plan

Approved Travel Plan(s), with individual monitoring fees in accordance with the current HCC Travel Plan guidance, as linked below:

https://www.hertfordshire.gov.uk/media-library/documents/highways/development-management/travel-plan-guidance.pdf

The above guidance was published in March 2020 and includes fees for evaluation and support of both residential and workplace Travel Plans and also School Travel Plans.

For residential and workplace Travel Plans, the Evaluation and Supporting Fee is £6,000 (per use) or £1,200 p.a. over five years and for School Travel Plans, £1,500 p.a. over five years. Detailed information regarding these costs is provided in the aforementioned HCC guidance document.

Bus vouchers

Arriva (as an example of a typical Hertfordshire operator) - £70 per month x 3 = £210
£210 x 391 = £82,100

Voucher printing cost @ £1 per booklet (each booklet is the value of £70 – 3 booklets per household)
3 x 391= £1,173

Reimbursement process/design time: £4,000

Travel Awareness campaigns/PT information: £10,000

Total £97,273

Second Strand (s106):

As per the Hertfordshire County Council Guide to Developer Infrastructure Contributions, issued 2021, the guidance notes that based on current evidence, that each non-car driver trip should contribute £2,133 to S106 Strand 2 contributions, which translates to £6,826 per each average residential dwelling and £422 per job.

• 391 x £6,826 = £ 2,668,966 (excluding indexation)

The Highway Authority is content that the cost of the Strand 1 schemes, particularly as this includes off-site infrastructure works that are consistent with HCC plans on Watford Road and Chiswell Green Lane to be deducted from the aforementioned headline figure.

Approach to Strand 2 Contributions

It is noted that the figures for Strand 2 are set out as a headline figure, as calculated from HCC's Guide to Infrastructure Contributions which is an adopted document.

It should be noted that HCC will not seek the application of this figure in addition to the Section 106 contributions and the implementation of off-site works via Section 278 as outlined for Strand 1.

For any given development, the contributions payable for Strand 1 will be taken into account when considering the required figures for Strand 2 works. However, for this particular development, given that the off-site highways works to Chiswell Green Lane and Watford Road are being undertaken preferably by S278 and the bus service funding will also be taken from this headline figure, no wider Strand 2 contributions are likely to be applicable. This is also explained within paragraphs 4.2 and 4.3 of the TAA, referenced below:

4.2 "Following discussions with HCC, it is understood that the cost of undertaking off-site sustainable transport improvements and bus contributions that will be directly funded will be deductible from the total Section 106 contribution. Consequently, the contribution required to increase the bus frequency on Watford Road (£175k per year for five years) equates to a total bus contribution of £875k, which leaves around £1.7m available to fund the remaining footway / cycleway improvements on both Chiswell Green Lane and Watford Road and the identified Travel Plan measures, although this figure will vary based on final dwelling numbers."

4.3 "It should be noted, however, that the total cost of the off-site works will be dependant on whether the development to the north of Chiswell Green Lane also receives planning consent. Milestone's Transport Assessment Addendum identifies that the applicant of the site to the north will also provide contributions towards improving the frequency of the Watford Road bus service and the 3m footway / cycleway on Chiswell Green Lane. Therefore, if both applications receive planning consent, one development would likely be responsible for providing the footway / cycleway and one development the improved bus frequency. Alternatively, the costs would be split 50:50. Either way, there would be additional funding available for improving the cycling links to St Albans to the north and Watford to the south if both applications were to receive consent."

It is noted that depending on the outcome of any planning consent for the site to the north of Chiswell Green Lane that a joint scheme and funding may be sought via a legal agreement in order to deliver the off-site highways works.

Schemes

HCC have identified schemes from the South Central Hertfordshire Growth and Transport Plan document which are of relevance for the development site. The Highway Authority has ranked this in order of importance in terms of how such interventions will promote sustainable modes of travel to and from the site in accordance with LTP4.

As discussed within this section, the Chiswell Green Corridor Active Travel Improvements is a scheme that the developer is seeking to deliver via S278 works.

The details from the Growth and Transport Plan are included for ease of reference.

Package 35 –Chiswell Green Corridor Active Travel Improvements

The overarching aim of Package 35 is:

To improve connectivity between Chiswell Green, Park Street and St Albans and reduce through traffic on the Watford Road corridor.

The Package consists of:

i. Improvements along the B4630Watford Road with the aim of discouraging through traffic (i.e. trips which neither begin nor end in Chiswell Green), ensuring capacity is given to other modes of transport; and
ii. Improvements along the A405, including roundabout upgrades at the A414/A405/A5183 Park Street Roundabout and at the B4630Watford Road/A405 Noke Roundabout.

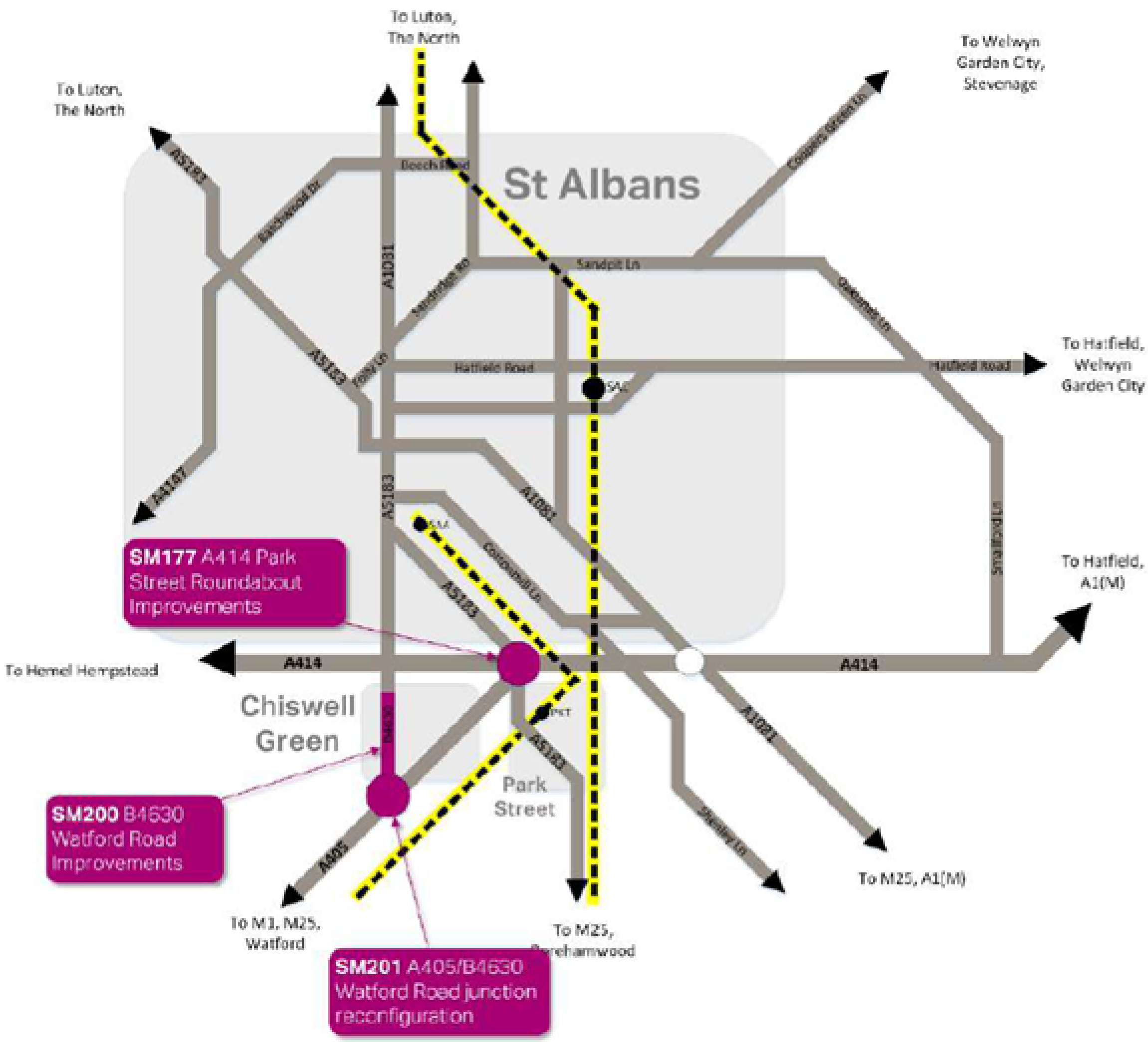

Figure 44 - Package 35 Chiswell Green Corridor Active Travel Improvements

Appendix B of the document sets out that intervention SM200 is estimated to have a value of works of between £2.5m to £5m.

Summary

The Highway Authority has reviewed the Transport Assessment (dated March 2022) in support of a residential led development on land to the south of Chiswell Green Lane. The Highway Authority has also considered the addendum document dated September 2022 prepared by the transport consultant. The Highway Authority has also conducted a number of meetings with the applicant's transport consultant.

The Highway Authority is content with the principle of the development and the junction access strategy.

A key element of making the development acceptable in planning terms and compliant with LTP4 is the package of mitigation works on Chiswell Green Lane, Watford Road and enhancements to existing bus services between St Albans/Watford. The Highway Authority note that the proposed package of off-site highways works is set out within the TAA.

In summary, the Highway Authority does not wish to restrict the grant of planning permission, subject to the aforementioned planning conditions and Advisory Notes.

Signed
Oliver Sowerby

10 October 2022

Appendix: AHJ/6

National Highways Holding Objection

National Highways Planning Response (NHPR 21-09)
Formal Recommendation to an Application for Planning Permission

From: Martin Fellows (Regional Director)
Operations Directorate
East Region
National Highways
PlanningEE@nationalhighways.co.uk

To: St Albans City and District Council

CC: transportplanning@dft.gov.uk
spatialplanning@highwaysengland.co.uk

Council's Reference: 5/2022/0927

Location: Land South Of Chiswell Green Lane St Albans Hertfordshire

Proposal: Outline application (access sought) - Demolition of existing structures and construction of up to 391 dwellings (Use Class C3), provision of land for a new 2FE primary school, open space provision and associated landscaping. Internal roads, parking, footpaths, cycleways, drainage, utilities and service infrastructure, new access arrangements, and offsite highway works including new car parking, footpath, cycle path and highway arrangement works to Chiswell Green Lane, Watford Road, Long Fallow, Forge End and Farringford Close.

Referring to the consultation on a planning application dated referenced above, in the vicinity of the A414/M25 that forms part of the Strategic Road Network, notice is hereby given that National Highways' formal recommendation is that we:

~~a) offer no objection (see reasons at Annex A);~~

~~b) recommend that conditions should be attached to any planning permission that may be granted (see Annex A – National Highways recommended Planning Conditions & reasons);~~

c) recommend that planning permission not be granted for a specified period (see reasons at Annex A);

~~d) recommend that the application be refused (see reasons at Annex A)~~

Highways Act 1980 Section 175B ~~is~~/is not relevant to this application.[1]

This represents National Highways' formal recommendation and is copied to the Department for Transport as per the terms of our Licence.

Should the Local Planning Authority not propose to determine the application in accordance with this recommendation they are required to consult the Secretary of State for Transport, as set out in the Town and Country Planning (Development Affecting Trunk Roads) Direction 2018, via transportplanning@dft.gov.uk and may not determine the application until the consultation process is complete.

Signature: EW	**Date:** 14/07/2022
Name: Emma Wood	**Position:** Spatial Planner
National Highways Highways England | Woodlands | Manton Lane | Bedford | MK41 7LW	

Annex A National Highway's assessment of the proposed development

National Highways has been appointed by the Secretary of State for Transport as a strategic highway company under the provisions of the Infrastructure Act 2015 and is the highway authority, traffic authority and street authority for the Strategic Road Network (SRN). The SRN is a critical national asset and as such we work to ensure that it operates and is managed in the public interest, both in respect of current activities and needs as well as in providing effective stewardship of its long-term operation and integrity.

The site is being promoted through the current St Albans City and District Local Plan Review which has been a protracted review period. The site lies between the A414/M1/M25. The A414/North Orbital Road/ Watling Street Roundabout is of particular interest. National Highways have begun discussions with Glanville, having completed a review of the TA, who are considering our Technical Note at present. Therefore, we request that the application is not determined before 16th September 2022 to allow the discussions to conclude. If we are in a position to respond earlier than this, we will withdraw this recommendation accordingly.

[1] Where relevant, further information will be provided within Annex A.

Appendix: AHJ/7

Technical Note Responding to National Highways

Glanville

RESPONSE TO NATIONAL HIGHWAYS

Land South of Chiswell Green Lane

Prepared for: Alban Developments Ltd and Alban Peter Pearson,
CALA Homes (Chiltern) Ltd & Redington Capital Ltd
Ref: 019_8210856_DK
Issue 1: 10 August 2022

Document History

Issue	Date	Description	Prepared By	Checked By
1	10 Aug 2022	First Issue	David Kemp	John Birch

Glanville

Glanville Consultants is a multi-disciplinary engineering, design and surveying consultancy with the following expertise:

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Civil Engineering | Geomatics | Building Surveying

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Contents

Appendices

1.0 Introduction

1.1 Glanville is providing transport support for the redevelopment of land to the south of Chiswell Green Lane to provide up to 391 dwellings and the allocation of land for a 2 Form Entry Primary School. An Outline planning application was submitted in May 2022 (St Albans District Council reference number 5/2022/0927) which was accompanied by a Transport Assessment, a Residential Travel Plan and a School Travel Plan.

1.2 National Highways has submitted a holding objection to the application following a review of the Transport Assessment and Travel Plan by its consultant, AECOM.

1.3 The comments provided by AECOM requested that the impact of the development on the Strategic Road Network (SRN) junctions are assessed to determine if there is a material impact. In particular, AECOM has requested that the impact is assessed at the M25 Junction 21A, the Park Street roundabout (A405 North Orbital Road / A414 / Watling Street) and at the A405 North Orbital Road / Watford Road roundabout, hereafter referred to as the Noke Hotel roundabout.

1.4 This Technical Note therefore provides a response to the comments received from AECOM on behalf of National Highways.

2.0 National Highways Comments

2.1 A detailed Technical Note has been produced by AECOM which summarises the results of the review and has been provided to Glanville by National Highways. This Technical Note provided various comments which were classed as either 'critical recommendations' required to allow the removal of the holding objection or 'non-critical recommendations' which are desirable but are not required for the removal of the objection.

2.2 The comments comprised the following:

Critical Recommendations

1. Consideration should be given to quantifying the potential impact of the development on the two Strategic Road Network (SRN) junctions within the vicinity of the proposed development.

2. Consideration should be given to widening the study area to include any SRN junctions that are expected to experience a material increase in vehicle trips, in particular the M25 Junction 21a.

3. A capacity assessment should be undertaken for the A405 North Orbital Road / A414 / Watling Street junction (the Noke Hotel Roundabout).

Non-critical Recommendations

a) Reference should be made to 'DfT Circular 02/2013' and Highways England's 'The Strategic Road Network: Planning for the Future (A guide to working with Highways England on planning matters)'.

b) The assessment of the collision data should be expanded to any SRN junction with a material increase in flows.

c) More information / justification is required to support the primary school trip distribution.

d) A 2038 future year should be assessed along with an appropriate opening year.

e) Committed development should be included within the junction capacity assessments and be shown within appropriate flow diagrams.

f) The junction assessments should incorporate any infrastructure changes on the SRN required to support the committed developments.

g) More impactful and significant measures should be included within the Travel Plan and that funding is secured for a period of 5 years after full build out.

h) More concrete suggestions for further promotion of the Travel Plan should be set out in the event that targets are not met.

2.3 This Technical Note focuses on providing a response to the three critical recommendations to determine whether there is a material impact on the SRN and to allow the removal of the holding objection. When addressing these critical comments, responses to some of the desirable comments (namely d, e & f) have also been incorporated within this Technical Note.

3.0 Strategic Traffic Network Flows & Committed Development

3.1 This chapter sets out baseline traffic flows on the SRN and flows from committed developments.

Base Traffic Flows

3.2 As outlined within the Transport Assessment, traffic surveys were undertaken in 2016 for a number of junctions in the vicinity of the site and these surveys were used within the original assessment to avoid the effect of any temporary changes in traffic volume or trip distribution resulting from the COVID pandemic. These traffic surveys included surveys at the following SRN junctions:

- A405 North Orbital Road / Tippendell Lane
- A405 North Orbital Road / Watford Road (Noke Hotel roundabout)
- A405 North Orbital Road / A414 / Watling Street (Park Street roundabout)

3.3 Consequently, the 2016 traffic counts at the above junctions have been used within this assessment. The turning counts are shown within Appendix A.

M25 Junction 21a

3.4 As the 2016 traffic surveys did not include the M25 junction, detailed turning counts are not available. Furthermore, traffic counts cannot be collected until after the school holidays have finished in September 2022. Therefore, link flows for the M25 Junction 21A roundabout approaches have been extracted from WebTRis, the National Highways Traffic Survey database (https://webtris.highways england.co.uk).

3.5 The resultant base traffic flows for the day of the other traffic surveys on Watford Road (19 January 2016) are shown in Table 1 and reflect the approach to the grade separated roundabout but exclude the M25 mainline flow. The traffic flows for the A405 North Orbital Road southbound approach have been taken from the aforementioned turning counts for the A405 North Orbital Road / Watford Road / Noakes Hotel roundabout.

Table 1: M25 Junction 21a Link Counts (19 January 2016)

Link	WebTRis Site Reference	AM Peak	PM Peak
A405 North Orbital Road Southbound	-	1,235	1,577
M25 Anti-clockwise Off-slip	M25/5241L	522	1,084
A405 North Orbital Road Northbound	6133/1	2095	2,096
M25 Clockwise Off-slip	M25/5232J	864	1,152

3.6 The 2016 base traffic has been factored to reflect assessment years of 2027 and 2038. The growth factors have been extracted from TEMPRO 7.2b using the NTM AF15 dataset for area 'E02004943 : St Albans 020'. The Watford Road, Tippendell Lane, and Watling Street traffic flows have been increased using growth factors for a Principal Road as set out within Table 14 of the original Transport Assessment.

3.7 In a change to the Transport Assessment, the A405 traffic flows have been increased using the growth factors for a Trunk Road for the same area outlined within paragraph 3.6. The M25 junction flows have also utilised growth factors for a trunk road. The growth factors used within this assessment are shown in Table 2.

Table 2: Proposed Growth Factors

	Principal Road		Trunk Road (A405 & M25)	
	AM Peak	PM Peak	AM Peak	PM Peak
2016 to 2027	1.0957	1.0977	1.1274	1.1233
2016 to 2038	1.1519	1.1502	1.1775	1.1757

3.8 The factored M25 Junction 21A flows are shown in Table 3 whilst updated traffic flow diagrams have been provided within Appendix A.

Table 3: M25 Junction 21a Link Counts (19 January 2016)

Link	2016		2027		2038	
	AM	PM	AM	PM	AM	PM
A405 North Orbital Road Southbound	1,235	1,577	1,371	1,756	1,437	1,839
M25 Anti-clockwise Off-slip	522	1,084	589	1,218	615	1,274
A405 North Orbital Road Northbound	2,095	2,096	2,362	2,354	2,467	2,464
M25 Clockwise Off-slip	864	1,152	974	1,294	1,017	1,354

3.9 The proposed development flows have been distributed at this junction based on the 2011 Census origin / destination data provided within the Transport Assessment.

Committed Development

3.10 AECOM requested that committed development is included within the junction capacity assessment. It is understood that there are two significant developments in the vicinity of the site which have received planning consent but are yet to be constructed. These are as follows:

- A 150-bed hotel (ref. 5/2012/2055 & 5/2015/0722) at the A405 North Orbital Road / Watford Road roundabout; and
- the Rail Freight Terminal (ref. 5/2009/0708 and appeal ref. 14/07/2014) situated to the east of Park Street and accessed via the A414.

3.11 A review of the above developments has been undertaken based on the information provided as part of the individual planning applications. This is summarised below.

150 Bed Hotel

3.12 The new hotel is proposed for a site to the south-east of the Noke Hotel roundabout on land abutting the A405 North Orbital Road. Vehicular access to the development would be achieved via a new arm onto an enlarged Noke Hotel roundabout. The proposed junction arrangement is shown in Appendix B.

3.13 The development was included within the planning application for the land to the north of Chiswell Green Lane (ref. 5/2021/3194) and so the traffic flows have been extracted from Figures 5 and 6 of the Transport Assessment. The proposed flows and their distribution onto the highway network are shown within Appendix A.

Rail Freight Terminal

3.14 The Rail Freight Terminal is proposed to be located to the east of Park Street and How Wood with access onto the A414 via a new roundabout between the Park Street roundabout and the London Colney roundabout. The proposals include the part signalisation of the Park Street Roundabout (see Appendix B).

3.15 The trip distribution from the Transport Assessment (Tables 7.6 and 7.8) indicates the following:

- 54% of HGVs will be heading to / from the Park Street roundabout as follows:
  - 27% of HGVs will be heading towards the M25 Junction 21A via the A405 North Orbital Road
  - 27% to the M1 via the A414
- 39% of light vehicles will be travelling to / from the Park Street Roundabout as follows:
  - 1% to / from Park Street
  - 19% via the A405 North Orbital Road
  - 18% to / from M1 via the A414
  - 1% to / from St Albans

3.16 The trip generation has been taken from Tables 7.3 to 7.5 of the Rail Freight Transport Assessment and has been distributed to the highway network based on the above distribution. The resultant traffic flow distribution is shown within Appendix A.

3.17 The committed development was not incorporated within the original Land South of Chiswell Green Lane Transport Assessment as the new hotel results in minimal traffic on Watford Road, whilst the rail freight terminal only impacts the Strategic Road Network which was scoped out of the original assessment.

3.18 The two committed developments have been subject to several planning applications over the past 13 years, including the discharge of conditions, and currently there is no indication as to if or when the developments will commence. Consequently, the highway assessment within this Technical Note has been undertaken both with and without the committed development to assess the impact on the existing junctions if the developments do not come forward.

Development Traffic

3.19 The development flows used within this assessment have been taken from Table 8 of the Transport Assessment produced for the Land to the South of Chiswell Green Lane and produced by Glanville.

3.20 To provide a worst-case assessment, the sensitivity test outlined within the Transport Assessment to reflect the anticipated reduction in vehicular trips resulting from the sustainable transport improvements has not been used. Consequently, the assessment uses the higher trip generation and distribution outlined within Tables 10 and 13 respectively of the Transport Assessment with the trip distribution being shown in Appendix A.

4.0 Strategic Road Network Impact – No Committed Development

4.1 This chapter assesses the impact of the proposed development on the SRN. As outlined within paragraph 3.17, this chapter assumes that the two committed developments and their associated junction mitigation measures do not come forward.

4.2 AECOM has suggested that a material increase in traffic occurs when there is an increase in traffic flows in excess of 30 vehicles. DfT Circular 02/2013, its draft 2022 update, and Highways England's 'The Strategic Road Network: Planning for the Future' have been reviewed and such a requirement is not included within these documents. Consequently, it is therefore considered that the impact should be judged based on severity in accordance with paragraph 111 of the National Planning Policy Framework (NPPF) 2021.

Percentage Impact Assessment

4.3 To understand the impact of the increase in traffic flows and whether there is liable to be a material impact, the percentage increase in traffic at each of the junctions within the assessment area has been identified. The 2027 percentage impact assessment is shown in Table 4.

Table 4: Increase in Two-way Traffic at Local Junctions in 2027 (No Committed Development)

		Without Dev. (Vehs)	With Dev. (Vehs)	Two-way Increase (Vehs)	Two-way Increase (%)
AM Peak (07:15 to 08:15)					
1.	Watford Road / Long Fallow	1,454	1,537	83	5.7%
2.	Watford Road / Forge End	1,512	1,734	222	14.7%
3a.	Watford Road / Chiswell Green Lane	1,707	2,050	343	20.1%
3b	Watford Road / Tippendell Lane	2,016	2,168	152	7.5%
4.	A405 North Orbital Road / Tippendell Lane	2,084	2,142	58	2.8%
5.	A405 North Orbital Road / Watford Road	2,731	2,814	83	3.0%
6.	A405 North Orbital Road / A414	4,730	4,776	46	1.0%
7.	M25 Junction 21A	5,295	5,378	83	1.6%
PM Peak (17:00 to 18:00)					
1.	Watford Road / Long Fallow	1,472	1,541	69	4.7%
2.	Watford Road / Forge End	1,511	1,626	115	7.6%
3a.	Watford Road / Chiswell Green Lane	1,658	1,791	133	8.0%
3b	Watford Road / Tippendell Lane	1,928	2,010	82	4.3%
4.	A405 North Orbital Road / Tippendell Lane	2,762	2,804	42	1.5%
5.	A405 North Orbital Road / Watford Road	3,553	3,622	69	1.9%
6.	A405 North Orbital Road / A414	5,571	5,617	46	0.8%
7.	M25 Junction 21A	6,622	6,691	69	1.0%

4.4 Table 4 indicates that in 2027 without the committed development, there would be an increase of between 1.0% and 2.8% on the Strategic Road Network junctions during the AM peak hour. During the PM peak hour, there would be an increase of between 0.8% and 1.5%.

4.5 As requested by AECOM, local junction modelling has been undertaken for the A405 North Orbital Road junctions to assess the impact on the junctions, with the exception of the M25 Junction 21A as traffic data from turning count surveys are not available.

4.6 The M25 Junction 21A would experience an increase in traffic of up to 1.6% in the AM peak hour and 1.0% in the PM peak hour. This is due to the increase of between 69 and 83 two-way flows. The proposed development flows on each arm of the junction are shown within Table 5.

Table 5: Increase in Two-way Traffic at the M25 Junction 21A in 2027 (No Committed Development)

	Without Dev. (Vehs)	With Dev. (Vehs)	Two-way Increase (Vehs)	Two-way Increase (%)
AM Peak (07:15 to 08:15)				
A405 North Orbital Road Southbound	1,371	1431	60	4.4%
M25 Anti-clockwise Off-slip	589	589	0	0.0%
A405 North Orbital Road Northbound	2,362	2376	14	0.6%
M25 Clockwise Off-slip	974	983	9	0.9%
M25 Junction 21A	**5,295**	**5,378**	**83**	**1.6%**
PM Peak (17:00 to 18:00)				
A405 North Orbital Road Southbound	1,756	1778	22	1.3%
M25 Anti-clockwise Off-slip	1218	1220	2	0.2%
A405 North Orbital Road Northbound	2,354	2381	27	1.1%
M25 Clockwise Off-slip	1,294	1312	18	1.4%
M25 Junction 21A	**6,622**	**6,691**	**69**	**1.0%**

4.7 Table 5 shows that the majority of the development flows are using the A405 southbound. In total there would be 60 additional vehicles using this approach across the peak hour which would equate to one vehicle per minute, on average. Similarly, there is a three-lane entry on the A405 southbound approach with two lanes on each exit. The majority of these flows (85%) would be heading south to Watford (55%) or to the M25 clockwise carriageway (30%). Consequently, these traffic flows would be spread across two lanes, whilst 15% of the flows would be using the nearside lane, leaving at the first exit. It is therefore considered that the flows would be spread across the approach to the junction and when combined with the low number of additional vehicles per minute, it is considered that there would not be a material impact on the operation of the junction.

4.8 It should be noted that the Travel Plan aims to reduce the number of vehicle trips associated with the development and therefore the number of development trips on this approach is expected to reduce from 60 to 45 vehicles. Consequently, the impact of the development is anticipated to be lower than that shown in Table 5 as a result of the Travel Plan measures.

4.9 During the PM peak hour, the development traffic is spread across each of the four approaches at the junction with the highest increase of 1.4% being experienced on the M25 clockwise off-slip. It is therefore considered that there is not a material impact on any of the junction approaches in the PM peak hour.

4.10 The percentage impact has been updated to reflect the 2038 future year scenario and is shown within Table 6.

Table 6: Increase in Two-way Traffic at Local Junctions in 2038 (No Committed Development)

		Without Dev. (Vehs)	With Dev. (Vehs)	Two-way Increase (Vehs)	Two-way Increase (%)
AM Peak (07:15 to 08:15)					
1.	Watford Road / Long Fallow	1,529	1,612	83	5.4%
2.	Watford Road / Forge End	1,590	1,812	222	14.0%
3a.	Watford Road / Chiswell Green Lane	1,794	2,137	343	19.1%
3b	Watford Road / Tippendell Lane	2,118	2,270	152	7.2%
4.	A405 North Orbital Road / Tippendell Lane	2,183	2,241	58	2.7%
5.	A405 North Orbital Road / Watford Road	2,863	2,946	83	2.9%
6.	A405 North Orbital Road / A414	4,955	5,001	46	0.9%
7.	M25 Junction 21A	5,536	5,619	83	1.5%
PM Peak (17:00 to 18:00)					
1.	Watford Road / Long Fallow	1,544	1,613	69	4.5%
2.	Watford Road / Forge End	1,583	1,698	115	7.3%
3a.	Watford Road / Chiswell Green Lane	1,737	1,870	133	7.7%
3b	Watford Road / Tippendell Lane	2,021	2,103	82	4.1%
4.	A405 North Orbital Road / Tippendell Lane	2,891	2,933	42	1.5%
5.	A405 North Orbital Road / Watford Road	3,722	3,791	69	1.9%
6.	A405 North Orbital Road / A414	5,835	5,881	46	0.8%
7.	M25 Junction 21A	6,932	7,000	69	1.0%

4.11 Table 6 indicates that in 2038 without the committed development, there would be an increase of between 0.9% and 2.9% on the Strategic Road Network junctions during the AM peak hour. During the PM peak hour, there would be an increase of between 0.8% and 1.5%.

4.12 The M25 Junction 21A would experience an increase in traffic of up to 1.5% in the AM peak hour and 1.0% in the PM peak hour. This is due to the increase in trips of between 69 and 83 two-way flows. The proposed development impact on each arm of the junction is shown within Table 7.

Table 7: Increase in Two-way Traffic at the M25 Junction 21A in 2038 (No Committed Development)

	Without Dev. (Vehs)	With Dev. (Vehs)	Two-way Increase (Vehs)	Two-way Increase (%)
AM Peak (07:15 to 08:15)				
A405 North Orbital Road Southbound	1,437	1,497	60	4.2%
M25 Anti-clockwise Off-slip	615	615	0	0.0%
A405 North Orbital Road Northbound	2,467	2,481	14	0.6%
M25 Clockwise Off-slip	1,017	1,026	9	0.9%
M25 Junction 21A	5,536	5,619	83	1.5%
PM Peak (17:00 to 18:00)				
A405 North Orbital Road Southbound	1,839	1,861	22	1.2%
M25 Anti-clockwise Off-slip	1,274	1,276	2	0.2%
A405 North Orbital Road Northbound	2,464	2,491	27	1.1%
M25 Clockwise Off-slip	1,354	1,372	18	1.3%
M25 Junction 21A	6,931	7,000	69	1.0%

4.13 Table 7 shows that the impact at the M25 Junction 21A is similar to the 2027 scenario and consequently the assessment outlined in paragraphs 4.7 to 4.9 remains valid and the impact is not material.

Junction Capacity Assessment

4.14 To assess the full impact of the development at the SRN junctions for which turning counts are available, junction capacity models have been produced using Junctions 9. As the junctions are roundabouts, the models have been developed using the ARCADY module. Geometric parameters have been determined from Ordnance Survey digital mapping.

4.15 The 2016 traffic surveys did not include queue length surveys and so the junctions cannot be validated against queue lengths. However, it is considered that the difference between the 'with' and 'without' development scenarios would remain constant, with or without queue length validation and therefore valid comparisons can be made between the scenarios.

4.16 The ARCADY modelling software presents the key results in terms of the Ratio of Flow to Capacity (RFC), queue lengths and predicted delay. It is generally accepted that RFC values of 0.85 or less indicate that a junction is operating within capacity as this gives some margin for error in the prediction of capacity and variations in traffic flow. Therefore, junctions are only identified as operating over capacity if this value is exceeded.

Park Street Roundabout

4.17 The roundabout has been modelled within ARCADY. Whilst the roundabout is relatively large, it is less than 130m in diameter, is not a grade separated roundabout, and does not serve a motorway. Consequently, in accordance with Section 13.3 of the Junctions 9 user manual, the roundabout has not been modelled as a large roundabout.

4.18 The roundabout has been assessed for both the 2027 and 2038 scenarios without the committed development flows. The ARCADY results are shown within Table 8 and the ARCADY outputs have been provided within Appendix D.

Table 8: Park Street Roundabout – Existing Layout ARCADY Results (No Committed Development)

Scenario	Approach	AM Peak			PM Peak		
		RFC	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)
2016 Survey	A414 East	0.67	2.0	4.25	0.88	7.2	12.06
	Watling Street South	0.54	1.2	7.04	0.69	2.2	14.90
	A405 North Orbital Road	0.58	1.4	6.81	0.74	2.8	11.46
	A414 West	0.36	0.6	2.29	0.46	0.9	2.74
	Watling Street North	0.69	2.2	10.85	0.77	3.2	16.57
	Junction Delay (s)	5.65			10.90		
2027 without Dev't	A414 East	0.76	3.1	5.94	1.00	36.4	51.42
	Watling Street South	0.66	1.9	10.52	0.90	7.0	46.18
	A405 North Orbital Road	0.71	2.4	10.50	0.89	7.2	27.72
	A414 West	0.42	0.7	2.64	0.54	1.2	3.33
	Watling Street North	0.84	4.7	22.29	0.96	12.8	61.56
	Junction Delay (s)	9.09			38.45		
2027 with Dev't	A414 East	0.76	3.2	6.08	1.01	39.6	54.95
	Watling Street South	0.66	1.9	10.76	0.91	7.3	47.81
	A405 North Orbital Road	0.74	2.8	11.75	0.93	9.5	35.30
	A414 West	0.43	0.8	2.69	0.55	1.2	3.40
	Watling Street North	0.85	5.2	24.76	0.98	15.4	72.53
	Junction Delay (s)	9.76			42.65		
2038 without Dev't	A414 East	0.80	3.9	7.25	1.05	79.1	96.65
	Watling Street South	0.73	2.6	13.75	0.97	12.1	73.43
	A405 North Orbital Road	0.77	3.3	13.96	0.95	12.3	44.62
	A414 West	0.45	0.8	2.85	0.57	1.3	3.66
	Watling Street North	0.92	8.9	40.75	1.07	36.0	144.41
	Junction Delay (s)	13.38			72.79		
2038 with Dev't	A414 East	0.81	4.1	7.43	1.05	83.0	100.74
	Watling Street South	0.73	2.7	14.11	0.97	12.3	74.95
	A405 North Orbital Road	0.80	3.9	16.18	0.98	17.4	59.24
	A414 West	0.47	0.9	2.99	0.58	1.4	3.74
	Watling Street North	0.95	12.3	55.45	1.09	41.2	163.53
	Junction Delay (s)	15.99			79.32		

4.19 The junction capacity results shown in Table 8, indicates that the junction would exceed capacity in the 'without development' scenarios as a result of background traffic growth. When the development flows are added, there would be small increases in RFC values, queue lengths and delay but these increases would be minimal. It is therefore considered that the impact of the proposed development on the Park Street roundabout cannot be considered as severe in accordance with the NPPF paragraph 111 and is acceptable.

A405 North Orbital Road / Tippendell Lane Roundabout

4.20 The existing A405 North Orbital Road / Tippendell Lane has been modelled within Junctions 9 using the ARCADY module. As with the previous junction, the roundabout has been assessed for both the 2027 and 2038 scenarios without the committed development. The ARCADY results are shown within Table 9 and the ARCADY outputs have been provided within Appendix D.

Table 9: A405 North Orbital Road / Tippendell Lane – Existing Layout ARCADY Results (No Committed Development)

Scenario	Approach	AM Peak			PM Peak		
		RFC	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)
2016 Survey	A405 North	0.32	0.5	2.49	0.54	1.2	3.69
	Tippendell Lane East	0.46	0.9	6.96	0.44	0.8	8.66
	A405 South	0.35	0.5	2.83	0.45	0.8	3.12
	Tippendell Lane West	0.22	0.3	4.33	0.33	0.5	5.79
	Junction Delay	3.74			4.31		
2027 without Dev't	A405 North	0.36	0.6	2.67	0.61	1.6	4.46
	Tippendell Lane East	0.53	1.1	8.46	0.54	1.1	11.70
	A405 South	0.40	0.7	3.11	0.51	1.0	3.54
	Tippendell Lane West	0.25	0.3	4.78	0.40	0.7	6.94
	Junction Delay	4.25			5.24		
2027 with Dev't	A405 North	0.37	0.6	2.71	0.63	1.7	4.63
	Tippendell Lane East	0.55	1.2	8.75	0.56	1.2	12.51
	A405 South	0.41	0.7	3.15	0.52	1.1	3.62
	Tippendell Lane West	0.30	0.4	5.08	0.41	0.7	7.13
	Junction Delay	4.38			5.46		
2038 without Dev't	A405 North	0.38	0.6	2.77	0.65	1.8	4.91
	Tippendell Lane East	0.58	1.3	9.49	0.59	1.4	14.01
	A405 South	0.43	0.7	3.27	0.54	1.2	3.76
	Tippendell Lane West	0.27	0.4	5.03	0.43	0.8	7.67
	Junction Delay	4.58			5.86		
2038 with Dev't	A405 North	0.39	0.6	2.81	0.66	1.9	5.12
	Tippendell Lane East	0.59	1.4	9.85	0.62	1.6	15.17
	A405 South	0.43	0.7	3.31	0.54	1.2	3.86
	Tippendell Lane West	0.32	0.5	5.35	0.45	0.8	7.91
	Junction Delay	4.73			6.15		

4.21 The junction capacity results shown in Table 9, indicates that the junction would operate within capacity in both the 'with' and 'without' development scenarios. When the development flows are added, there would be small increases in RFC values, queue lengths and delay but these increases would be minimal, and the junction would continue to operate within capacity. It is therefore considered that the impact of the proposed development on the A405 / Tippendell Lane roundabout cannot be considered as severe in accordance with the NPPF paragraph 111 and is acceptable.

Noke Hotel Roundabout (A405 North Orbital Road / Watford Road)

4.22 The existing Noke Hotel roundabout has been modelled within ARCADY. It is understood that queueing typically extends back from the M25 Junction 21A which impacts on the operation of this roundabout, but this cannot be replicated within a standalone ARCADY model.

4.23 As with the previous junctions, the roundabout has been assessed for both the 2027 and 2038 scenarios without the committed development. The ARCADY results are shown within Table 10 and the ARCADY outputs have been provided within Appendix D.

Table 10: A405 North Orbital Road / Watford Road – Existing Layout ARCADY Results (No Committed Development)

Scenario	Approach	AM Peak			PM Peak		
		RFC	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)
2016 Survey	Watford Road	0.54	1.2	5.48	0.54	1.2	6.41
	A405 North	0.43	0.7	4.00	0.67	2.0	6.58
	A405 South	0.59	1.4	4.13	0.81	4.0	8.61
	Noakes Hotel	0.02	0.0	12.10	0.00	0.0	0.00
	Junction Delay	4.50			7.55		
2027 without Dev't	Watford Road	0.62	1.6	6.78	0.64	1.7	8.52
	A405 North	0.49	1.0	4.66	0.77	3.3	9.71
	A405 South	0.66	1.9	4.95	0.90	8.0	15.74
	Noakes Hotel	0.03	0.0	15.13	0.00	0.0	0.00
	Junction Delay	5.40			12.46		
2027 with Dev't	Watford Road	0.66	1.9	7.74	0.66	1.9	9.02
	A405 North	0.51	1.0	4.92	0.78	3.5	10.13
	A405 South	0.67	2.0	5.12	0.92	10.2	19.68
	Noakes Hotel	0.03	0.0	15.81	0.00	0.0	0.00
	Junction Delay	5.85			14.66		
2038 without Dev't	Watford Road	0.66	1.9	7.71	0.68	2.1	10.12
	A405 North	0.52	1.1	5.04	0.82	4.4	12.38
	A405 South	0.69	2.2	5.45	0.94	12.8	24.38
	Noakes Hotel	0.03	0.0	17.14	0.00	0.0	0.00
	Junction Delay	6.00			17.87		
2038 with Dev't	Watford Road	0.71	2.4	8.98	0.70	2.3	10.78
	A405 North	0.54	1.2	5.35	0.83	4.6	13.07
	A405 South	0.70	2.3	5.66	0.96	17.7	32.71
	Noakes Hotel	0.03	0.0	18.01	0.00	0.0	0.00
	Junction Delay	6.57			22.37		

4.24 The junction capacity results shown in Table 10, indicates that the junction would exceed capacity in the 'without development' scenarios as a result of the background traffic. When the development flows are added, there would be small increases in RFC values, queue lengths and delay but these increases would be minimal. It is therefore considered that the impact of the proposed development on the Noke Hotel roundabout cannot be considered as severe in accordance with the NPPF paragraph 111 and is acceptable.

5.0 Highway Impact Assessment Plus Committed Development

5.1 As outlined within paragraph 3.17, a highway impact assessment has been undertaken to assess the impact on the SRN junctions if the committed development outlined in Chapter 3 is constructed. Both committed developments identified will incorporate junction mitigation and this is discussed further within this chapter.

Percentage Impact Assessment

5.2 The percentage impact assessment has been updated to include the committed development flows and this updated assessment for 2027 is shown within Table 11.

Table 11: Increase in Two-way Traffic at Local Junctions in 2027 (With Committed Development)

		Without Dev. (Vehs)	With Dev. (Vehs)	Two-way Increase (Vehs)	Two-way Increase (%)
AM Peak (07:15 to 08:15)					
1.	Watford Road / Long Fallow	1,458	1,541	83	5.7%
2.	Watford Road / Forge End	1,516	1,738	222	14.6%
3a.	Watford Road / Chiswell Green Lane	1,711	2,054	343	20.0%
3b	Watford Road / Tippendell Lane	2,020	2,172	152	7.5%
4.	A405 North Orbital Road / Tippendell Lane	2,288	2,346	58	2.5%
5.	A405 North Orbital Road / Watford Road	3,065	3,148	83	2.7%
6.	A405 North Orbital Road / A414	5,087	5,133	46	0.9%
7.	M25 Junction 21A	5,573	5656	83	1.5%
PM Peak (17:00 to 18:00)					
1.	Watford Road / Long Fallow	1,477	1,546	69	4.7%
2.	Watford Road / Forge End	1,516	1,631	115	7.6%
3a.	Watford Road / Chiswell Green Lane	1,663	1,796	133	8.0%
3b	Watford Road / Tippendell Lane	1,933	2,015	82	4.2%
4.	A405 North Orbital Road / Tippendell Lane	2,950	2,992	42	1.4%
5.	A405 North Orbital Road / Watford Road	3,846	3,915	69	1.8%
6.	A405 North Orbital Road / A414	5,886	5,932	46	0.8%
7.	M25 Junction 21A	6,866	6,935	69	1.0%

5.3 Table 11 indicates that in 2027 there would be an increase of between 0.9% and 2.7% on the Strategic Road Network junctions during the AM peak hour. During the PM peak hour, there would be an increase of between 0.8% and 1.8%. When compared to the 'without committed development' shown within Table 4 there would be a slight reduction in percentage impact when compared to the assessment without the committed development as the base flows are slightly higher.

5.4 As requested by AECOM, local junction modelling has been undertaken for the A405 North Orbital Road junctions with the exception of the M25 Junction 21A as turning count surveys are not available.

5.5 The M25 Junction 21A would experience an increase in traffic of up to 1.6% in the AM peak hour and 1.0% in the PM peak hour. This is due to the increase in trips of between 69 and 83 two-way flows. The proposed development on each arm of the junction is shown within Table 12.

Table 12: Increase in Two-way Traffic at the M25 Junction 21A in 2027 (With Committed Development)

	Without Dev. (Vehs)	With Dev. (Vehs)	Two-way Increase (Vehs)	Two-way Increase (%)
AM Peak (07:15 to 08:15)				
A405 North Orbital Road Southbound	1,465	1525	60	4.1%
M25 Anti-clockwise Off-slip	625	625	0	0.0%
A405 North Orbital Road Northbound	2,457	2471	14	0.6%
M25 Clockwise Off-slip	1026	1035	9	0.9%
M25 Junction 21A	**5,573**	**5,656**	**83**	**1.5%**
PM Peak (17:00 to 18:00)				
A405 North Orbital Road Southbound	1,914	1936	22	1.1%
M25 Anti-clockwise Off-slip	1246	1248	2	0.2%
A405 North Orbital Road Northbound	2,382	2409	27	1.1%
M25 Clockwise Off-slip	1,324	1342	18	1.4%
M25 Junction 21A	**6,866**	**6,935**	**69**	**1.0%**

5.6 Table 12 shows that the majority of the development flows are using the A405 southbound. In total there would be 60 additional vehicles using this approach across the peak hour which would equate to one vehicle per minute. As outlined within paragraph 4.7, the flows would be spread over three lanes on the approach to the junction and when combined with the low number of vehicles per minute, it is considered that there would not be a material impact on the operation of the junction.

5.7 Similarly, the number of development trips on the A405 southbound are expected to reduce to 45 as a result of the Travel Plan measures and so the impact will in reality be lower than shown in Table 12.

5.8 During the PM peak hour, the development traffic is spread over each of the four approaches at the junction and therefore it is not considered that there is a material impact on any of the approaches.

5.9 The percentage impact has been updated to reflect the 2038 future year scenario and is shown within Table 13.

Table 13: Increase in Two-way Traffic at Local Junctions in 2038 (With Committed Development)

		Without Dev. (Vehs)	With Dev. (Vehs)	Two-way Increase (Vehs)	Two-way Increase (%)
AM Peak (07:15 to 08:15)					
1.	Watford Road / Long Fallow	1,533	1,616	83	5.4%
2.	Watford Road / Forge End	1,594	1,816	222	13.9%
3a.	Watford Road / Chiswell Green Lane	1,798	2,141	343	19.1%
3b	Watford Road / Tippendell Lane	2,122	2,274	152	7.2%
4.	A405 North Orbital Road / Tippendell Lane	2,386	2,444	58	2.4%
5.	A405 North Orbital Road / Watford Road	3,197	3,280	83	2.6%
6.	A405 North Orbital Road / A414	5,312	5,358	46	0.9%
7.	M25 Junction 21A	5,814	5,897	83	1.4%
PM Peak (17:00 to 18:00)					
1.	Watford Road / Long Fallow	1,549	1,618	69	4.5%
2.	Watford Road / Forge End	1,588	1,703	115	7.2%
3a.	Watford Road / Chiswell Green Lane	1,742	1,875	133	7.6%
3b	Watford Road / Tippendell Lane	2,026	2,108	82	4.0%
4.	A405 North Orbital Road / Tippendell Lane	3,080	3,122	42	1.4%
5.	A405 North Orbital Road / Watford Road	4,014	4,083	69	1.7%
6.	A405 North Orbital Road / A414	6,150	6,196	46	0.7%
7.	M25 Junction 21A	7,176	7,245	69	1.0%

5.10 Table 13 indicates that in 2038 there would be an increase of between 0.9% and 2.6% on the Strategic Road Network junctions during the AM peak hour. During the PM peak hour, there would be an increase of between 0.8% and 1.8%. As with the 2027 assessment, when compared to the 'without committed development' shown within Table 5, there would be a slight reduction in percentage impact when compared to the assessment without the committed development as the base flows are slightly higher.

5.11 The M25 Junction 21A would experience an increase in traffic of up to 1.4% in the AM peak hour and 1.0% in the PM peak hour. This is due to the increase in trips of between 69 and 83 two-way flows. The proposed development impact on each arm of the junction is shown within Table 14.

Table 14: Increase in Two-way Traffic at the M25 Junction 21A in 2038 (With Committed Development)

	Without Dev. (Vehs)	With Dev. (Vehs)	Two-way Increase (Vehs)	Two-way Increase (%)
AM Peak (07:15 to 08:15)				
A405 North Orbital Road Southbound	1,531	1,591	60	3.9%
M25 Anti-clockwise Off-slip	651	651	0	0.0%
A405 North Orbital Road Northbound	2,562	2,576	14	0.5%
M25 Clockwise Off-slip	1,069	1,078	9	0.8%
M25 Junction 21A	**5,813**	**5,896**	**83**	**1.4%**
PM Peak (17:00 to 18:00)				
A405 North Orbital Road Southbound	1,997	2,019	22	1.1%
M25 Anti-clockwise Off-slip	1,303	1,305	2	0.2%
A405 North Orbital Road Northbound	2,492	2,519	27	1.1%
M25 Clockwise Off-slip	1,384	1,402	18	1.3%
M25 Junction 21A	**7,176**	**7,245**	**69**	**1.0%**

5.12 Table 14 shows that the impact at the M25 Junction 21A is similar to the 2027 scenario and consequently the assessment outlined in paragraphs 5.6 to 5.8 remains valid.

Junction Capacity Assessment

Park Street Roundabout

5.13 As part of the consented Rail Terminal development, it is proposed to upgrade the existing unsignalised Park Street Roundabout to part signalisation. It is understood that it is proposed to signalise the two A414 approaches and the A405 approach.

5.14 The planning application documents have been reviewed but no detailed junction modelling outputs have been found. Consequently, a LinSig model has been developed based on the junction arrangement shown in David Tucker Associates' drawing 6035-23 Rev. D (see Appendix C). It should be noted, however, that no information has been identified online which confirms the saturation flows, phasing, staging and cycle time used and so various assumptions have been made based on past experience with similar large part signalised roundabout that may not reflect the modelling provided within the consented application in every respect. It should be noted, however, that the slope and intercept for the two give way approaches have been calculated using ARCADY.

5.15 Whilst the model may not reflect the consented layout and LinSig model in every respect, it is considered that the model still provides an accurate comparison of the impact of the proposed development traffic as the same assumptions have been used for both the 'with' and 'without' development scenarios.

5.16 As the junction incorporates traffic signals, the junction is considered to be operating over capacity when the Degree of Saturation (DoS) exceeds 90%. To model the junction within LinSig, the traffic flows have been converted to Passenger Car Units (PCUs) by double counting the Heavy Vehicles. The PCU flows are shown within Appendix A.

5.17 The 2027 Base + Committed scenario both 'with' and 'without' the proposed development flows has been assessed within LinSig and the results are shown within Table 15 for the AM peak hour and Table 16 for the PM peak hour. The LinSig outputs have been provided within Appendix E.

5.18 The AM peak hour modelling results in Table 15 show that the improved junction would exceed capacity in the 'without development' scenario particularly on the A405 circulatory. The A414 East approach would be approaching capacity with a Degree of Saturation of 84.7% and 84%. When development flows are included, these approaches would exceed capacity, however, there are only small increases in queue length and delay and so the development is not considered to result in a severe impact. It is also possible that once the junction is refined to remove the assumptions made (see paragraph 5.13) then this will improve the operation of these links.

5.19 In addition to the above, when the Practical Reserve Capacity and the total delay is compared between the scenarios, the difference is small therefore confirming that the impact can not be considered as severe.

5.20 It is considered, however that the mitigated junction would incorporate MOVA (Microprocessor Optimised Vehicle Actuation) which would adjust the signal timings in real time based on queueing observed on site. This is liable to improve the operation of the junction further but cannot be modelled within LinSig.

Table 15: Park Street Roundabout – 2027 AM Peak Hour

Link Number	Approach	2027 Base + Committed (without Development)			2027 Base + Committed + Development		
		DoS (%)	MMQ (pcu)	Delay (s/pcu)	DoS (%)	MMQ (pcu)	Delay (s/pcu)
1/1 &1/2	A414 East (NS & Middle)	48.1	3.9	7.5	41.8	3.1	6.7
1/3	A414 East (OS)	84.7	18.1	17.7	90.9	22.6	22.7
2/1	Watling Street South (NS)	5.7	0.0	1.8	5.7	0.0	1.8
2/2	Watling Street South (OS)	27.6	0.2	1.2	27.5	0.2	1.2
3/1 & 3/2	A405 (NS)	70.6	7.5	27.3	69.5	7.7	25.8
3/3	A405 (OS)	74.2	8.1	30.9	71.7	8.0	28.5
4/1 & 4/2	A414 West (NS & Middle)	68.4	6.8	24.0	67.7	6.6	23.8
4/3	A414 West (OS)	47.9	4.4	23.5	49.5	4.6	23.8
5/1 & 5/2	Watling Street North	45.2	2.2	3.3	45.6	2.2	3.3
6/1	A414 East Circulatory (NS)	84.0	8.5	40.7	90.0	9.9	54.1
6/2	A414 East Circulatory (Middle)	0.0	0.0	0.0	1.4	0.0	5.4
6/3	A414 East Circulatory (OS)	60.8	4.5	25.4	64.3	4.6	28.0
7/1	Watling South Circulatory (NS)	41.9	0.4	1.6	40.1	0.3	1.6
7/2	Watling South Circulatory (Middle)	23.0	0.1	1.2	19.6	0.1	1.2
7/3	Watling South Circulatory (OS)	75.8	3.3	5.1	81.8	4.4	6.8
8/1	A405 Exit Circulatory (NS)	13.6	0.1	1.1	11.8	0.1	1.1
8/2	A405 Exit Circulatory (Middle)	8.1	0.3	1.5	36.1	0.3	1.5
8/3	A405 Exit Circulatory (OS)	90.2	11.2	13.8	94.6	10.6	18.0
9/1	A405 Circulatory (NS)	59.4	6.7	9.1	59.3	7.1	12.1
9/2	A405 Circulatory (Middle)	60.5	6.7	10.6	61.1	7.7	12.8
9/3	A405 Circulatory (OS)	47.3	5.8	11.5	51.6	6.0	11.4
10/1	A414 West Exit Circulatory (NS)	45.0	1.2	2.1	43.5	1.2	2.1
10/2	A414 West Exit Circulatory (Middle)	51.3	1.0	2.1	52.4	1.1	2.1
10/3	A414 West Exit Circulatory (OS)	51.2	1.0	2.1	53.4	1.1	2.2
11/1	A414 West Circulatory (NS)	21.7	1.8	8.2	18.9	1.4	8.1
11/2	A414 West Circulatory (Middle)	64.8	4.7	8.0	71.1	11.3	10.3
11/3	A414 West Circulatory (OS)	54.0	2.2	6.1	53.1	2.2	5.8
12/1	Watling North Circulatory (NS)	32.0	0.2	1.4	32.2	0.2	1.4
12/2	Watling North Circulatory (Middle)	31.3	0.6	1.6	32.7	0.6	1.6
12/3	Watling North Circulatory (OS)	46.7	0.6	1.8	46.7	0.7	1.8
13/1	A414 East Circulatory (NS)	39.9	0.3	1.6	40.3	0.3	1.6
13/2	A414 East Circulatory (Middle)	49.3	5.3	1.9	50.5	5.3	1.9
13/3	A414 East Circulatory (OS)	60.1	0.8	2.4	60.1	0.8	2.4
Practical Reserve Capacity – All Lanes (%)		-0.2			-5.1		
Total Delay (pcuHr)		52.51			60.69		
Cycle Time (S)		60			60		

Table 16: Park Street Roundabout – 2027 PM Peak Hour

Link Number	Approach	2027 Base + Committed (without Development)			2027 Base + Committed + Development		
		DoS (%)	MMQ (pcu)	Delay (s/pcu)	DoS (%)	MMQ (pcu)	Delay (s/pcu)
1/1 &1/2	A414 East (NS & Middle)	73.8	7.1	9.8	74.4	7.2	9.9
1/3	A414 East (OS)	96.2	30.3	35.6	96.2	30.3	35.6
2/1	Watling Street South (NS)	1.9	0.0	3.0	1.9	0.0	3.1
2/2	Watling Street South (OS)	28.0	0.2	1.3	28.0	0.2	1.3
3/1 & 3/2	A405 (NS)	78.5	9.0	30.9	77.5	9.1	29.1
3/3	A405 (OS)	79.9	9.3	34.3	76.5	8.9	30.8
4/1 & 4/2	A414 West (NS & Middle)	78.1	8.6	25.0	78.4	8.6	26.0
4/3	A414 West (OS)	50.3	5.0	22.0	54.8	5.5	23.8
5/1 & 5/2	Watling Street North	41.3	2.1	3.4	41.6	2.1	3.5
6/1	A414 East Circulatory (NS)	91.8	10.9	61.4	91.8	11.1	65.8
6/2	A414 East Circulatory (Middle)	0.0	0.0	0.0	0.2	0.0	9.7
6/3	A414 East Circulatory (OS)	84.8	8.6	45.2	85.0	8.7	44.0
7/1	Watling South Circulatory (NS)	54.9	0.6	2.1	55.2	0.6	2.1
7/2	Watling South Circulatory (Middle)	35.0	0.3	1.5	35.4	0.3	1.5
7/3	Watling South Circulatory (OS)	90.5	7.1	11.4	90.6	7.1	11.5
8/1	A405 Exit Circulatory (NS)	25.7	0.2	1.3	25.9	0.2	1.3
8/2	A405 Exit Circulatory (Middle)	55.2	0.8	2.2	54.9	0.8	2.2
8/3	A405 Exit Circulatory (OS)	98.2	22.4	33.0	98.8	26.0	37.1
9/1	A405 Circulatory (NS)	69.4	8.2	13.1	70.5	9.3	13.3
9/2	A405 Circulatory (Middle)	70.6	9.9	14.7	72.4	10.4	15.5
9/3	A405 Circulatory (OS)	42.0	4.7	8.9	44.5	5.4	10.4
10/1	A414 West Exit Circulatory (NS)	51.9	1.5	2.5	52.7	1.9	2.9
10/2	A414 West Exit Circulatory (Middle)	58.9	1.3	2.5	58.8	1.3	2.5
10/3	A414 West Exit Circulatory (OS)	49.9	1.1	2.1	50.9	1.1	2.2
11/1	A414 West Circulatory (NS)	21.3	1.3	7.3	19.5	1.1	6.6
11/2	A414 West Circulatory (Middle)	65.7	3.6	8.1	67.3	3.7	8.0
11/3	A414 West Circulatory (OS)	58.5	2.3	7.0	57.0	2.5	7.1
12/1	Watling North Circulatory (NS)	32.8	0.2	1.4	32.5	0.2	1.4
12/2	Watling North Circulatory (Middle)	36.4	0.8	1.7	37.6	0.8	1.8
12/3	Watling North Circulatory (OS)	50.0	0.8	1.9	50.7	0.8	2.0
13/1	A414 East Circulatory (NS)	40.5	0.3	1.6	40.4	0.3	1.6
13/2	A414 East Circulatory (Middle)	50.6	6.3	1.9	51.6	1.6	2.0
13/3	A414 East Circulatory (OS)	65.9	1.0	2.8	66.7	1.0	2.8
Practical Reserve Capacity – All Lanes (%)		-9.1			-9.8		
Total Delay (pcuHr)		87.60			91.01		
Cycle Time (S)		60			60		

5.21 The PM peak modelling results shown in Table 16 indicates that the improved junction would exceed capacity in the 'without development' scenario particularly on the A414 approaches and the A405 circulatory. When the development flows are included, these approaches would continue to exceed capacity, however, there are only small increases in Degree of Saturation, queue length and delay and so it is not considered to be a severe impact.

5.22 In addition to the above, when the Practical Reserve Capacity and the total delay is compared between the two scenarios, the difference is small, therefore confirming that the impact can not be considered as severe.

5.23 The 2038 Base + Committed scenario both 'with' and 'without' development has been assessed within LinSig and the results are shown within Table 17 for the AM peak hour and Table 18 for the PM peak hour.

Table 17: Park Street Roundabout – 2038 AM Peak Hour

Link Number	Approach	2038 Base + Committed (without Development)			2038 Base + Committed + Development		
		DoS (%)	MMQ (pcu)	Delay (s/pcu)	DoS (%)	MMQ (pcu)	Delay (s/pcu)
1/1 &1/2	A414 East (NS & Middle)	50.1	4.2	7.7	50.8	4.2	7.7
1/3	A414 East (OS)	88.4	20.3	20.6	88.4	20.3	20.6
2/1	Watling Street South (NS)	6.2	0.0	1.9	6.2	0.0	1.9
2/2	Watling Street South (OS)	29.2	0.2	1.3	29.2	0.2	1.3
3/1 & 3/2	A405 (NS)	75.4	8.3	29.2	71.4	7.9	26.4
3/3	A405 (OS)	78.4	9.0	33.2	75.1	8.7	30.1
4/1 & 4/2	A414 West (NS & Middle)	70.6	7.0	24.5	71.6	7.1	24.8
4/3	A414 West (OS)	52.2	4.9	24.3	49.4	4.5	23.8
5/1 & 5/2	Watling Street North	49.2	2.5	3.7	49.2	2.5	3.7
6/1	A414 East Circulatory (NS)	88.4	10.0	48.2	88.4	9.8	48.1
6/2	A414 East Circulatory (Middle)	0.2	0.0	5.3	2.1	0.1	4.8
6/3	A414 East Circulatory (OS)	63.4	4.7	26.2	61.9	4.6	26.1
7/1	Watling South Circulatory (NS)	43.9	0.4	1.7	44.2	0.4	1.7
7/2	Watling South Circulatory (Middle)	23.9	0.2	1.2	24.8	0.2	1.3
7/3	Watling South Circulatory (OS)	79.1	3.9	5.9	78.7	3.8	5.9
8/1	A405 Exit Circulatory (NS)	14.3	0.1	1.1	14.5	0.1	1.1
8/2	A405 Exit Circulatory (Middle)	40.1	0.3	1.6	39.1	0.3	1.6
8/3	A405 Exit Circulatory (OS)	93.8	16.0	18.8	95.3	12.2	20.2
9/1	A405 Circulatory (NS)	63.3	7.9	10.6	66.4	8.7	14.3
9/2	A405 Circulatory (Middle)	63.9	7.5	12.0	66.6	8.6	13.1
9/3	A405 Circulatory (OS)	47.1	5.9	11.0	47.1	5.5	11.2
10/1	A414 West Exit Circulatory (NS)	47.4	1.3	2.3	47.7	1.4	2.4
10/2	A414 West Exit Circulatory (Middle)	54.9	1.1	2.3	56.1	1.1	2.3
10/3	A414 West Exit Circulatory (OS)	52.7	1.1	2.2	51.9	1.1	2.2
11/1	A414 West Circulatory (NS)	25.0	1.8	7.6	27.0	2.8	10.9
11/2	A414 West Circulatory (Middle)	67.0	10.6	8.0	66.5	6.4	8.2
11/3	A414 West Circulatory (OS)	56.8	2.3	5.9	56.0	2.5	6.6
12/1	Watling North Circulatory (NS)	33.1	0.2	1.4	32.7	0.2	1.4
12/2	Watling North Circulatory (Middle)	32.8	0.6	1.6	34.5	0.7	1.6
12/3	Watling North Circulatory (OS)	49.7	0.7	1.9	48.4	0.7	1.9
13/1	A414 East Circulatory (NS)	41.4	0.4	1.6	41.3	0.4	1.6
13/2	A414 East Circulatory (Middle)	51.6	5.3	2.0	52.8	5.3	2.0
13/3	A414 East Circulatory (OS)	63.8	0.9	2.6	62.6	0.9	2.5
Practical Reserve Capacity – All Lanes (%)		-4.2			-5.8		
Total Delay (pcuHr)		61.46			62.94		
Cycle Time (S)		60			60		

Table 18: Park Street Roundabout – 2038 PM Peak Hour

Link Number	Approach	2038 Base + Committed (without Development)			2038 Base + Committed + Development		
		DoS (%)	MMQ (pcu)	Delay (s/pcu)	DoS (%)	MMQ (pcu)	Delay (s/pcu)
1/1 &1/2	A414 East (NS & Middle)	78.6	8.3	10.9	79.2	8.5	11.1
1/3	A414 East (OS)	100.4	43.6	63.1	100.4	43.6	63.1
2/1	Watling Street South (NS)	2.2	0.0	3.4	2.3	0.0	3.5
2/2	Watling Street South (OS)	29.6	0.2	1.4	29.7	0.2	1.4
3/1 & 3/2	A405 (NS)	83.2	10.2	34.2	80.8	9.9	31.0
3/3	A405 (OS)	82.0	9.9	36.0	79.7	9.7	32.8
4/1 & 4/2	A414 West (NS & Middle)	83.8	9.8	29.7	81.3	9.1	27.3
4/3	A414 West (OS)	64.5	6.5	27.2	60.4	6.2	25.0
5/1 & 5/2	Watling Street North	46.9	2.7	4.1	46.2	2.4	3.9
6/1	A414 East Circulatory (NS)	95.2	12.9	72.9	95.2	12.9	74.0
6/2	A414 East Circulatory (Middle)	17.1	1.3	20.6	15.8	1.2	20.0
6/3	A414 East Circulatory (OS)	71.5	6.1	33.5	73.3	6.3	34.5
7/1	Watling South Circulatory (NS)	58.5	0.7	2.3	58.8	0.7	2.3
7/2	Watling South Circulatory (Middle)	39.1	0.3	1.6	39.0	0.3	1.6
7/3	Watling South Circulatory (OS)	90.2	7.3	11.6	90.6	7.5	12.0
8/1	A405 Exit Circulatory (NS)	28.1	0.2	1.3	28.4	0.2	1.3
8/2	A405 Exit Circulatory (Middle)	61.2	0.9	2.5	61.6	1.0	2.5
8/3	A405 Exit Circulatory (OS)	97.2	16.5	27.4	97.2	16.5	27.4
9/1	A405 Circulatory (NS)	70.0	8.6	13.6	74.9	9.5	15.4
9/2	A405 Circulatory (Middle)	70.7	9.9	15.0	77.2	11.8	17.8
9/3	A405 Circulatory (OS)	49.0	5.5	9.8	43.1	4.7	9.6
10/1	A414 West Exit Circulatory (NS)	53.0	1.7	2.6	54.8	1.7	2.8
10/2	A414 West Exit Circulatory (Middle)	59.5	1.4	2.6	63.2	1.5	2.8
10/3	A414 West Exit Circulatory (OS)	54.6	1.2	2.3	51.2	1.2	2.2
11/1	A414 West Circulatory (NS)	16.1	0.6	4.3	23.7	1.6	8.0
11/2	A414 West Circulatory (Middle)	71.7	5.0	8.2	71.5	7.7	8.2
11/3	A414 West Circulatory (OS)	55.5	2.5	6.7	55.0	2.5	7.1
12/1	Watling North Circulatory (NS)	33.3	0.2	1.4	35.3	0.3	1.5
12/2	Watling North Circulatory (Middle)	38.3	0.8	1.8	29.2	0.8	1.8
12/3	Watling North Circulatory (OS)	52.8	0.9	2.1	51.5	0.9	2.0
13/1	A414 East Circulatory (NS)	42.4	0.4	1.6	43.5	0.4	1.7
13/2	A414 East Circulatory (Middle)	53.5	6.4	2.0	54.5	6.4	2.1
13/3	A414 East Circulatory (OS)	68.2	1.1	3.0	67.6	1.1	2.9
Practical Reserve Capacity – All Lanes (%)		-11.5			-11.5		
Total Delay (pcuHr)		101.61			102.26		
Cycle Time (S)		60			60		

5.24 As with the 2027 modelling, the 2038 junction capacity results shown in Tables 17 and 18 indicates that some of the approaches would exceed capacity (above 90% Degree of Saturation) in the 'without development' scenario. When the proposed development flows are added, the impact would be minimal and therefore the development would not have a severe impact on the operation of the junction in 2038. This is confirmed through the small differences in Practical Reserve Capacity and Total Delay during both peak hours.

5.25 As outlined within paragraph 5.19, the implementation of MOVA will further improve the operation of the junction but this cannot be modelled within LinSig.

A405 North Orbital Road / Tippendell Lane Roundabout

5.26 The committed development flows have been added to the ARCADY model representing the A405 North Orbital Road / Tippendell Lane roundabout. No mitigation was proposed at this junction as part of the consented applications and so the modelling is based on the existing junction layout.

5.27 The capacity results are shown in Table 19, whilst the ARCADY outputs have been provided within Appendix E.

Table 19: A405 North Orbital Road / Tippendell Lane – Existing Layout ARCADY Results (With Committed Development)

Scenario	Approach	AM Peak			PM Peak		
		RFC	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)
2016 Survey	A405 North	0.32	0.5	2.49	0.54	1.2	3.69
	Tippendell Lane East	0.46	0.9	6.96	0.44	0.8	8.66
	A405 South	0.35	0.5	2.83	0.45	0.8	3.12
	Tippendell Lane West	0.22	0.3	4.33	0.33	0.5	5.79
	Junction Delay	3.74			4.31		
2027 without Dev't	A405 North	0.42	0.7	2.99	0.69	2.2	5.56
	Tippendell Lane East	0.58	1.3	10.00	0.62	1.6	16.43
	A405 South	0.49	0.9	3.70	0.56	1.3	4.03
	Tippendell Lane West	0.28	0.4	5.56	0.43	0.7	7.94
	Junction Delay	4.80			6.41		
2027 with Dev't	A405 North	0.42	0.7	3.04	0.70	2.3	5.82
	Tippendell Lane East	0.59	1.4	10.39	0.65	1.8	18.05
	A405 South	0.49	1.0	3.75	0.57	1.3	4.14
	Tippendell Lane West	0.33	0.5	5.94	0.45	0.8	8.20
	Junction Delay	4.95			6.77		
2038 without Dev't	A405 North	0.43	0.8	3.10	0.72	2.5	6.26
	Tippendell Lane East	0.62	1.6	11.45	0.69	2.1	21.26
	A405 South	0.51	1.0	3.90	0.59	1.4	4.31
	Tippendell Lane West	0.30	0.4	5.87	0.47	0.9	8.91
	Junction Delay	5.22			7.44		
2038 with Dev't	A405 North	0.44	0.8	3.15	0.73	2.7	6.59
	Tippendell Lane East	0.63	1.7	11.97	0.72	2.4	24.01
	A405 South	0.51	1.0	3.96	0.59	1.4	4.43
	Tippendell Lane West	0.35	0.5	6.32	0.49	0.9	9.23
	Junction Delay	5.42			7.96		

5.28 The modelling results shown in Table 19 indicates that the roundabout would continue to operate within capacity with minimal queues and delay if both the consented developments and the proposed development on Chiswell Green Lane are built.

Noke Hotel Roundabout (A405 North Orbital Road / Watford Road)

5.29 As part of the consented Hotel development, it is proposed to provide mitigation at the Noke Hotel roundabout and provide a fifth arm onto the roundabout to provide vehicular access to the new hotel. This mitigation comprises changes to the roundabout including enlarging the central island and making changes to the flare length and entry widths at each of the junction approaches.

5.30 The planning application documents have been reviewed but no detailed junction modelling outputs have been found. Consequently, an ARCADY model has been developed based measuring the geometric parameters from the junction arrangement shown in Stride Treglown Bell's drawing 20913 P201 Rev. B (see Appendix B).

5.31 It should be noted, however, that these parameters have been measured from a pdf and therefore may not accurately reflect the consented layout / modelling provided as part of the planning application. It is considered, however, that the model still provides an accurate comparison to assess the impact of the proposed development traffic as the same assumptions have been used for both the 'with' and 'without development scenarios.

5.32 The 2027 Base + Committed scenario both 'with' and 'without' development has been assessed within ARCADY and the results are shown within Table 20 and the ARCADY outputs have been provided within Appendix E.

Table 20: A405 North Orbital Road / Watford Road – Proposed Layout ARCADY Results (With Committed Development)

Scenario	Approach	AM Peak			PM Peak		
		RFC	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)
2027 without Dev't	Watford Road	0.64	1.7	7.35	0.62	1.6	7.90
	A405 North	0.49	0.9	4.11	0.74	2.8	7.36
	New Hotel Access	0.07	0.1	3.36	0.11	0.1	4.68
	A405 South	0.70	2.3	5.31	0.87	6.6	12.19
	Noakes Hotel	0.05	0.1	30.29	0.00	0.0	0.00
	Junction Delay	5.50			9.73		
2027 with Dev't	Watford Road	0.50	1.0	3.86	0.64	1.7	8.33
	A405 North	0.50	1.0	4.31	0.75	2.9	7.60
	New Hotel Access	0.08	0.1	3.50	0.11	0.1	4.77
	A405 South	0.71	2.5	5.49	0.90	8.0	14.58
	Noakes Hotel	0.01	0.0	7.84	0.00	0.0	0.00
	Junction Delay	5.96			11.06		
2038 without Dev't	Watford Road	0.68	2.1	8.43	0.66	1.9	9.20
	A405 North	0.51	1.0	4.37	0.78	3.5	8.78
	New Hotel Access	0.08	0.1	3.52	0.12	0.1	5.08
	A405 South	0.73	2.7	5.84	0.91	9.4	16.90
	Noakes Hotel	0.07	0.1	39.29	0.00	0.0	0.00
	Junction Delay	6.10			12.69		
2038 with Dev't	Watford Road	0.70	2.3	8.67	0.68	2.1	9.41
	A405 North	0.51	1.0	4.29	0.78	3.4	8.59
	New Hotel Access	0.08	0.1	3.67	0.12	0.1	5.10
	A405 South	0.74	2.8	6.06	0.91	9.1	15.93
	Noakes Hotel	0.05	0.1	30.31	0.00	0.0	0.00
	Junction Delay	6.70			12.19		

5.33 The junction capacity results shown in Table 20 indicates that the junction would exceed capacity without the proposed development flows due to the increase in background traffic. This may be because the roundabout layout received planning consent in 2013 and may therefore need to be amended to accommodate the increase in traffic since planning consent was received whilst the creation of the ARCADY model from the scanned pdf drawing may also have reduce the capacity of the proposed junction model.

5.34 The 'with development' scenario, however, indicates that the impact of the proposed development would be minimal. There are small increases in RFC values, queue lengths and delay but it is considered that these can not be classed as severe in accordance with NPPF paragraph 111 and are acceptable.

6.0 Summary and Conclusions

6.1 This Technical Note has been prepared by Glanville to provide a response to the comments received from AECOM on behalf of National Highways on the proposed residential development on land to the south of Chiswell Green Lane in Chiswell Green (ref. 5/2022/0927).

6.2 National Highways requested that a holding objection is placed on the application until an assessment is undertaken to determine the impact of the proposed development on the Strategic Road Network (SRN). In particular, National Highways wanted to understand the impact on the M25 Junction 21A to the south of the development and the Park Street roundabout (A405 North Orbital Road / A414) to the north.

6.3 A summary of the findings of this assessment is outlined below:

- Traffic surveys had previously been undertaken in 2016 for all of the SRN junctions except for the M25 Junction 21A. Link flows for the motorway junction were obtained from the National Highways online database for the same day as the turning count surveys.

- The 2016 flows were increased to 2027 and 2038 using TEMPRO growth factors for a Trunk Road (A405, A414 and M25 slip roads) and a Principal Road (all non trunk roads).

- Local committed developments have been identified and the associated traffic flows added to the base flows. The committed development includes a new 150-bed hotel at the Noke Roundabout and the proposed rail freight terminal to the east of Park Street. The committed developments included improvements at both the Noke Roundabout and the Park Street Roundabout which have been taken into account.

- Two assessments were undertaken for each junction, one with the committed development and one without.

- The percentage impact assessment shows that the SRN junctions would experience increases in flow of between 1.0% and 3.0%. This is considered to be a non-material impact and was why the junctions were scoped out of the original Transport Assessment. Junction capacity assessments have therefore been undertaken for the three SRN junctions except for the M25 Junction 21A where turning counts are currently not available.

- The existing Park Street Roundabout would exceed capacity in the 2027 and 2038 'without development' without committed development scenarios. When the development flows are added, the junction would continue to exceed capacity but the increases in queue length and delay would be small and so the impact cannot be considered as severe. When the junction mitigation is undertaken to accommodate committed development flows, the junction would exceed capacity in the 'without development' scenario, which would continue once the development flows are added, but again it is considered that the impact would not be severe.

- The existing A405 / Tippendell Lane junction would operate within capacity both with and without committed development and with the addition of the proposed development flows.

- The existing Noke Hotel Roundabout would exceed capacity in the 2027 and 2038 'without development' without committed development scenarios in the PM peak hour. When the development flows are added, the junction would continue to exceed capacity but the increases in queue length and delay would be small and so the impact cannot be considered as severe. When the junction mitigation is undertaken to accommodate committed development flows, the junction would exceed capacity in the 'without development' PM peak scenario, which would continue once the development flows are added, but again it is considered that the impact would not be severe.

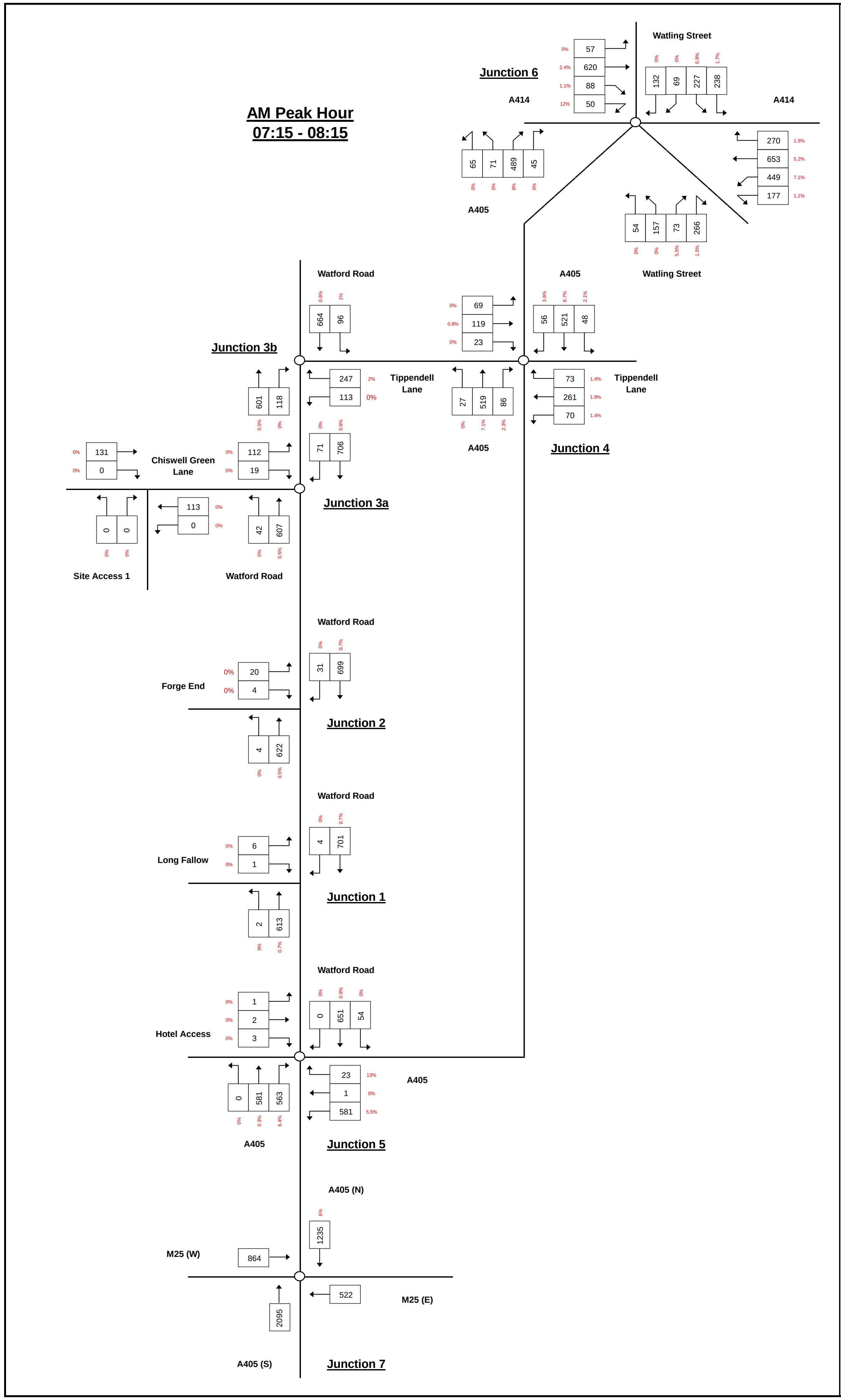
- The A405 Southbound would experience the largest increase in flows at the M25 Junction 21A. There would be an increase of one vehicle every minute, on average, but these flows would be spread over a three-lane entry. It is therefore considered that there would not be a material impact on this approach. Similarly, the implementation of the proposed Travel Plan measures will reduce the trip on this approach from 60 to 45 in the AM peak thereby further reducing the impact on the junction.

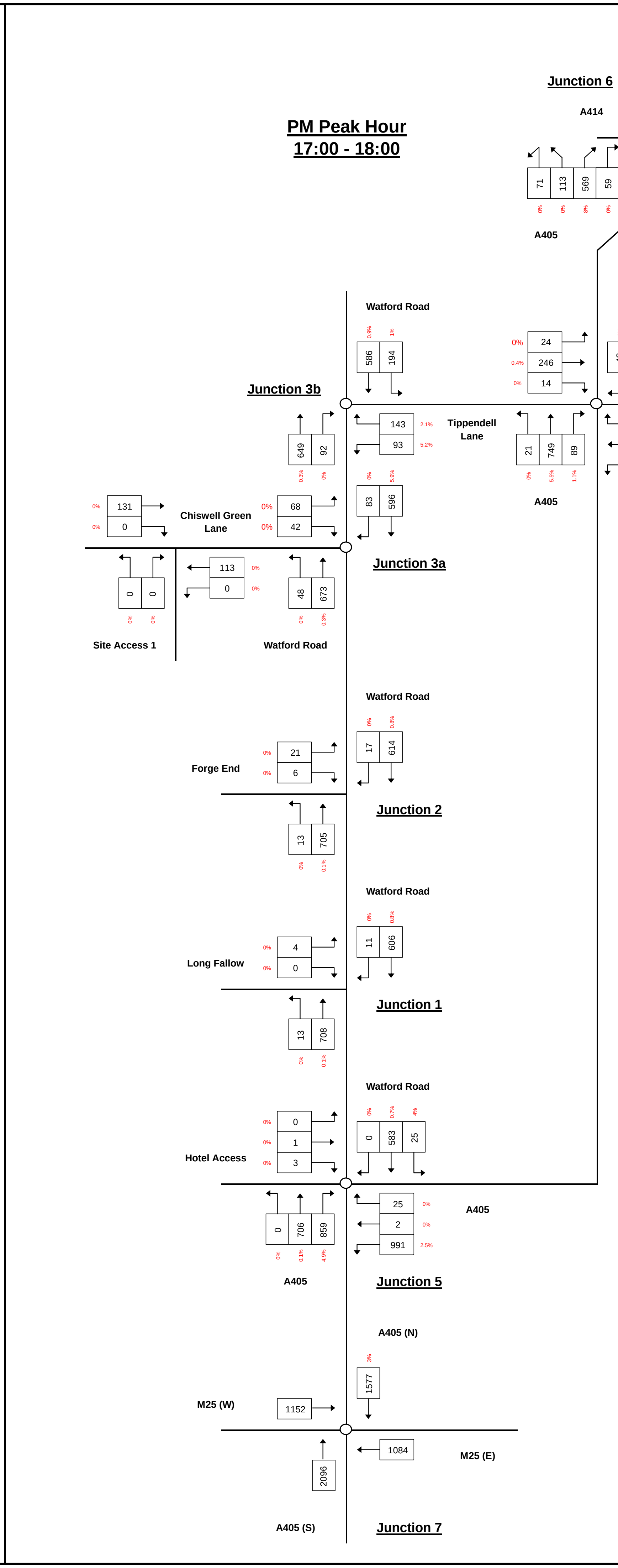
6.4 Given the above, it is concluded that the impact of the development proposals on the Strategic Road Network and its associated junctions would fall short of severe in the context of paragraph 111 of the NPPF and is therefore considered acceptable in transport terms. Therefore, National Highways should be able to remove its holding objection and make a positive recommendation to the Local Planning Authority in respect of the Outline application for the proposed development.

Appendices

Appendix A

Traffic Flow Diagrams





KEY:

Roundabout

1000 Traffic flows

10.0% Percentage of HGV's

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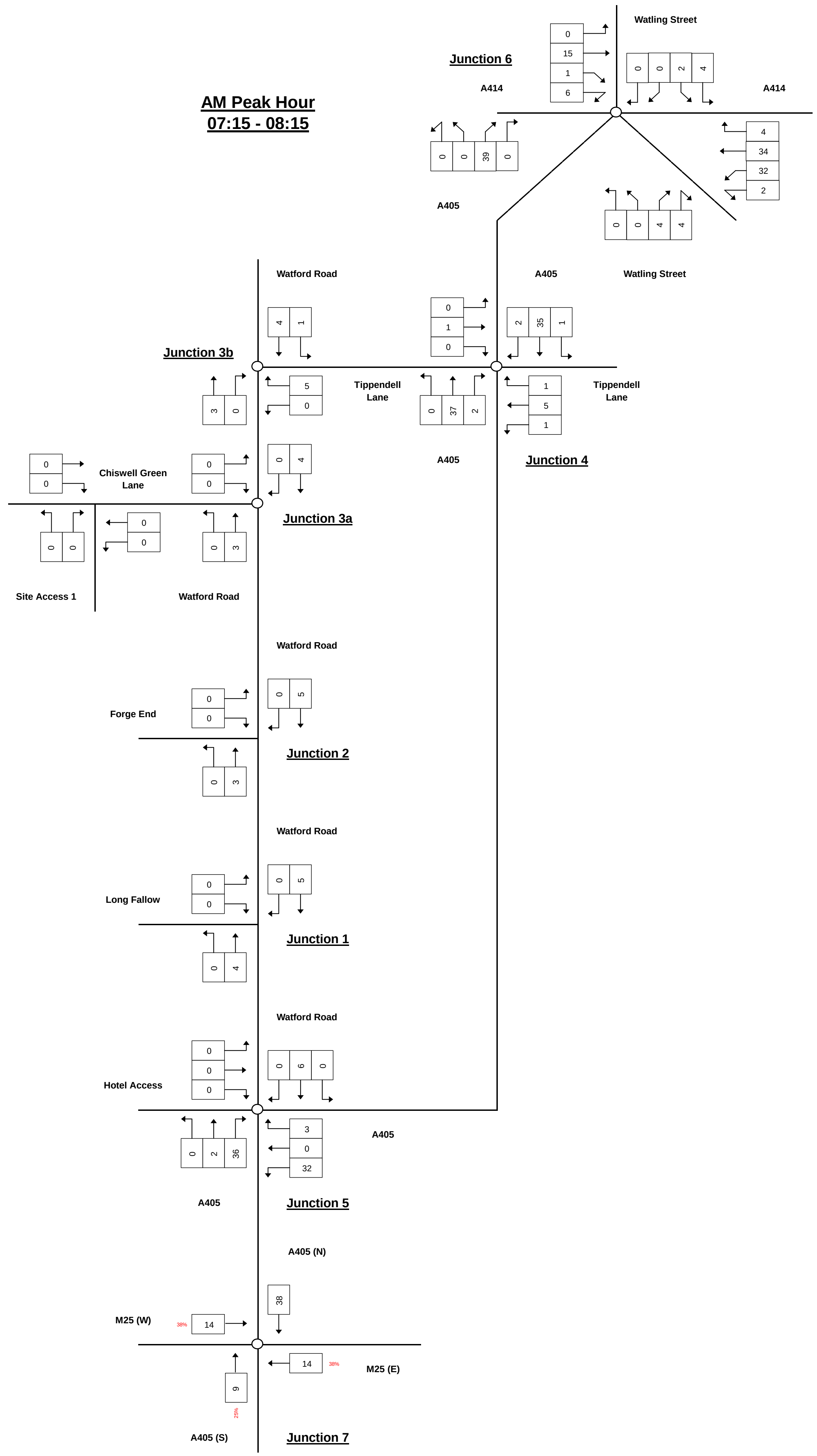
Client:	CALA Homes & Redington Capital
Project:	Land at Chiswell Green St Albans
Title:	2016 Traffic Flows "Surveyed"

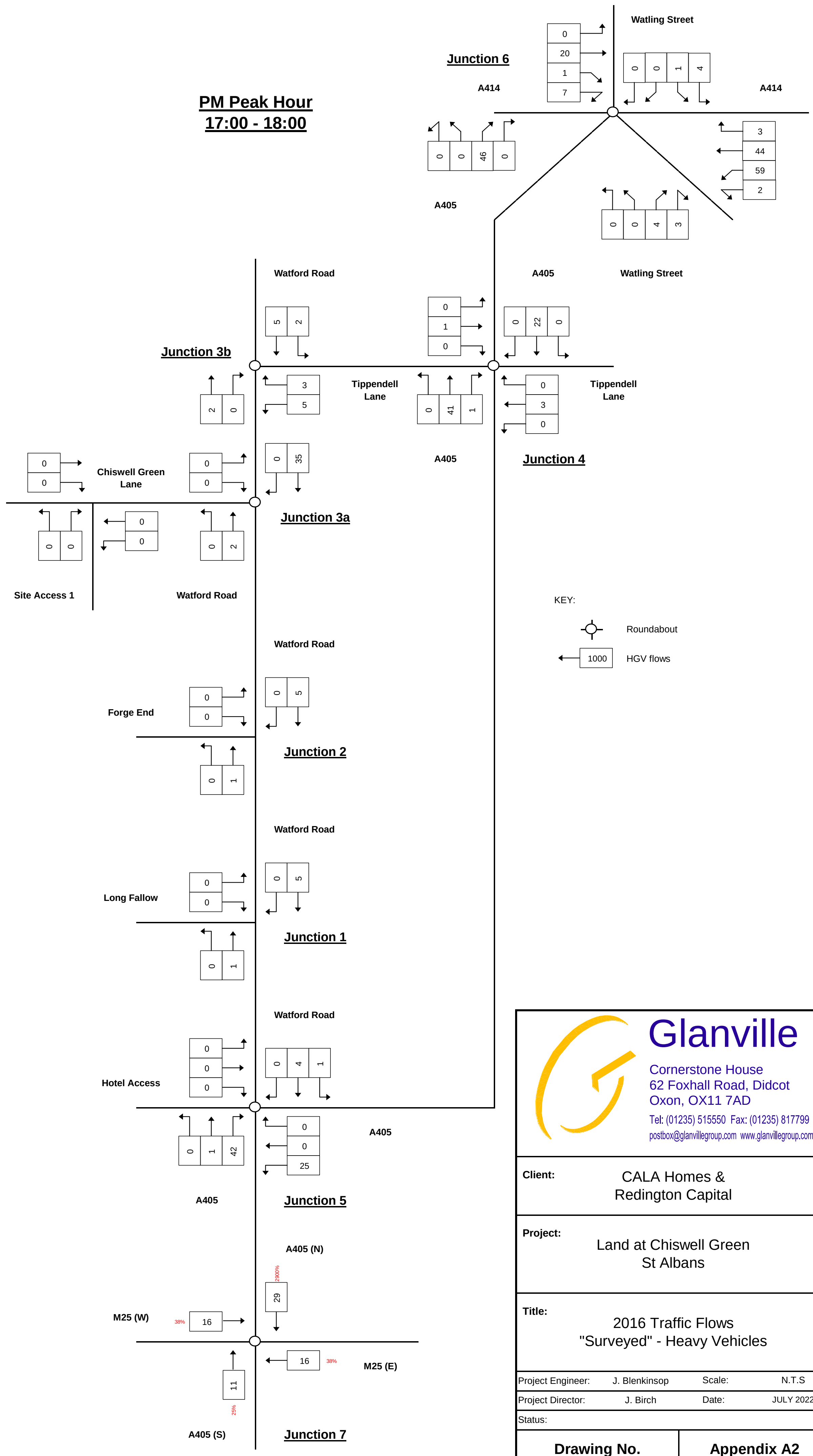
Project Engineer:	J. Blenkinsop	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			

Drawing No.	Appendix A1

AM Peak Hour
07:15 - 08:15



PM Peak Hour
17:00 - 18:00



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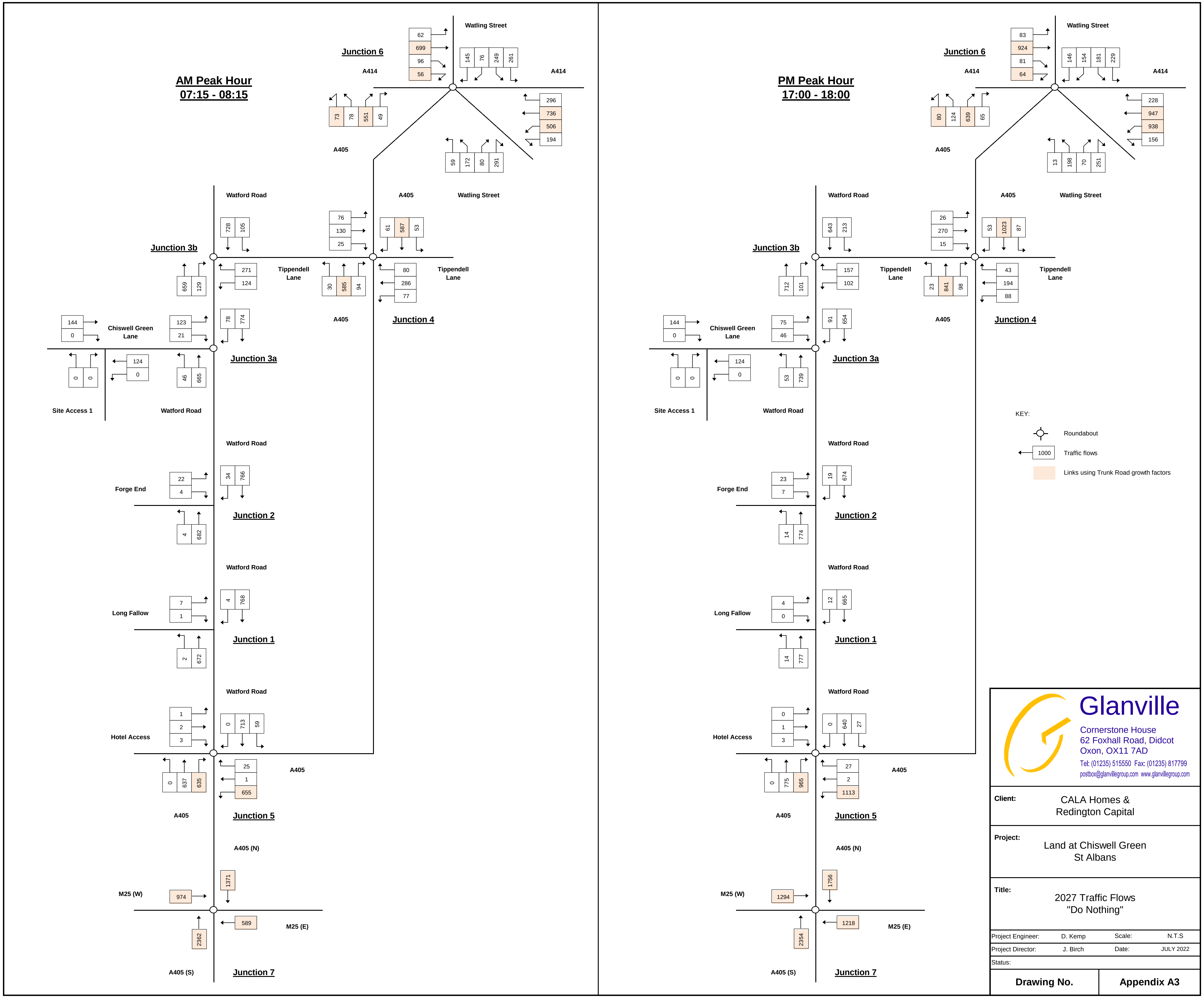
Client: CALA Homes & Redington Capital

Project: Land at Chiswell Green St Albans

Title: 2016 Traffic Flows "Surveyed" - Heavy Vehicles

Project Engineer:	J. Blenkinsop	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			

Drawing No.	**Appendix A2**



AM Peak Hour
07:15 - 08:15
PM Peak Hour
17:00 - 18:00
Junction 6
Watling Street
A414
A405
Junction 3b
Watford Road
Tippendell Lane
Junction 4
Chiswell Green Lane
Junction 3a
Site Access 1
Forge End
Junction 2
Long Fallow
Junction 1
Hotel Access
Junction 5
A405 (N)
M25 (W)
M25 (E)
A405 (S)
Junction 7
KEY:
Roundabout
1000
Traffic flows
Links using Trunk Road growth factors
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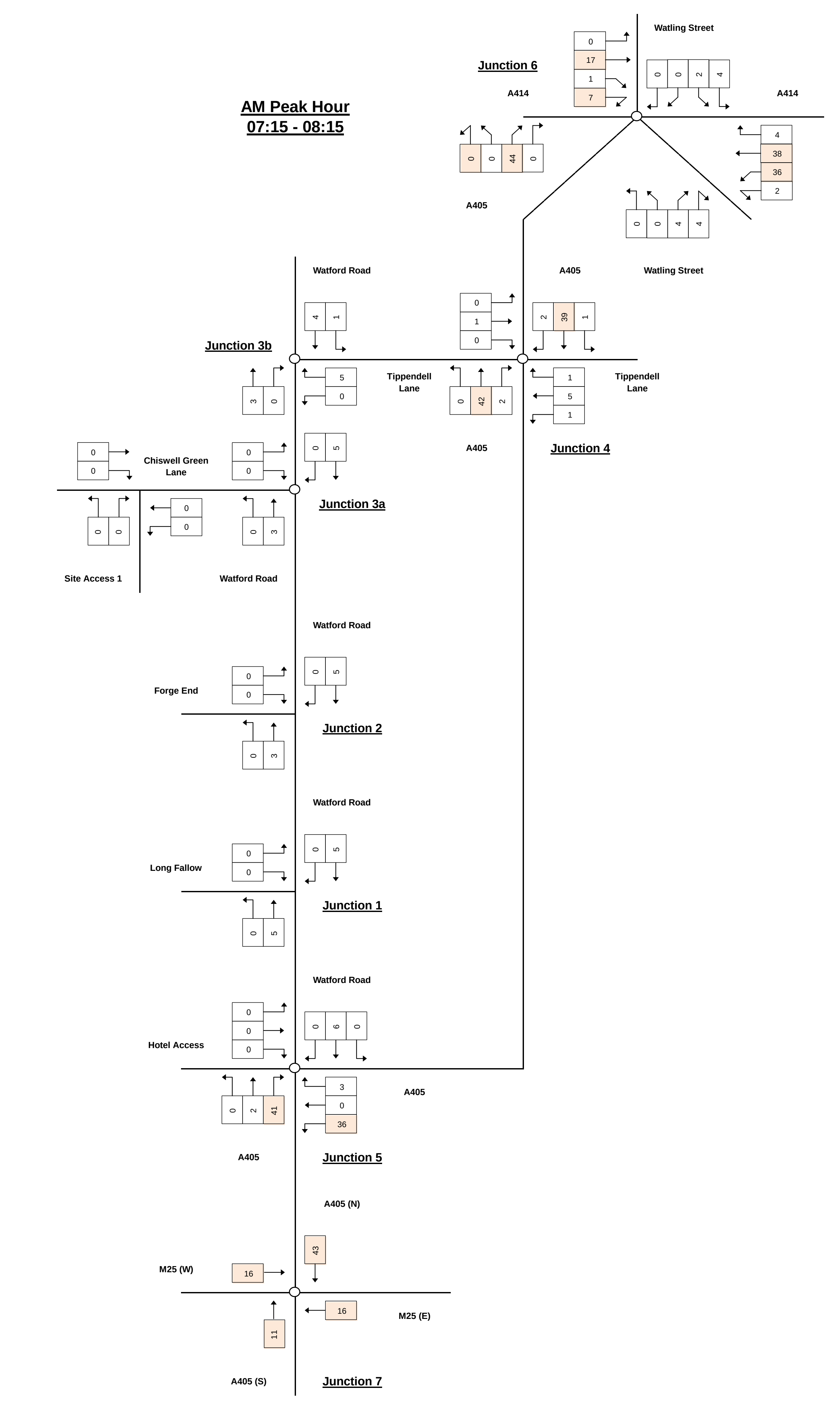
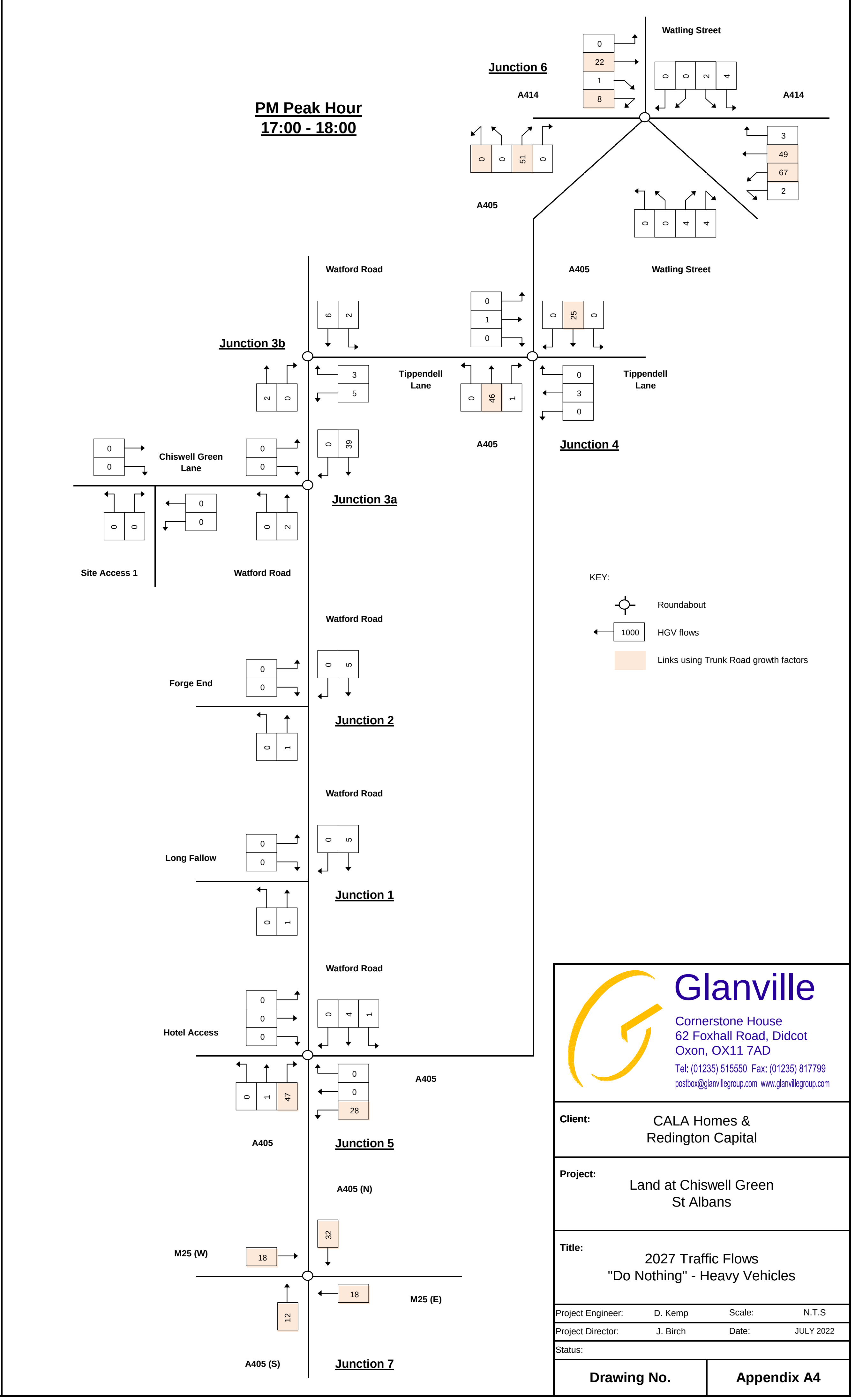
Client:
CALA Homes &
Redington Capital
Project:
Land at Chiswell Green
St Albans
Title:
2027 Traffic Flows
"Do Nothing"
Project Engineer: D. Kemp
Scale: N.T.S
Project Director: J. Birch
Date: JULY 2022
Status:
Drawing No.
Appendix A3





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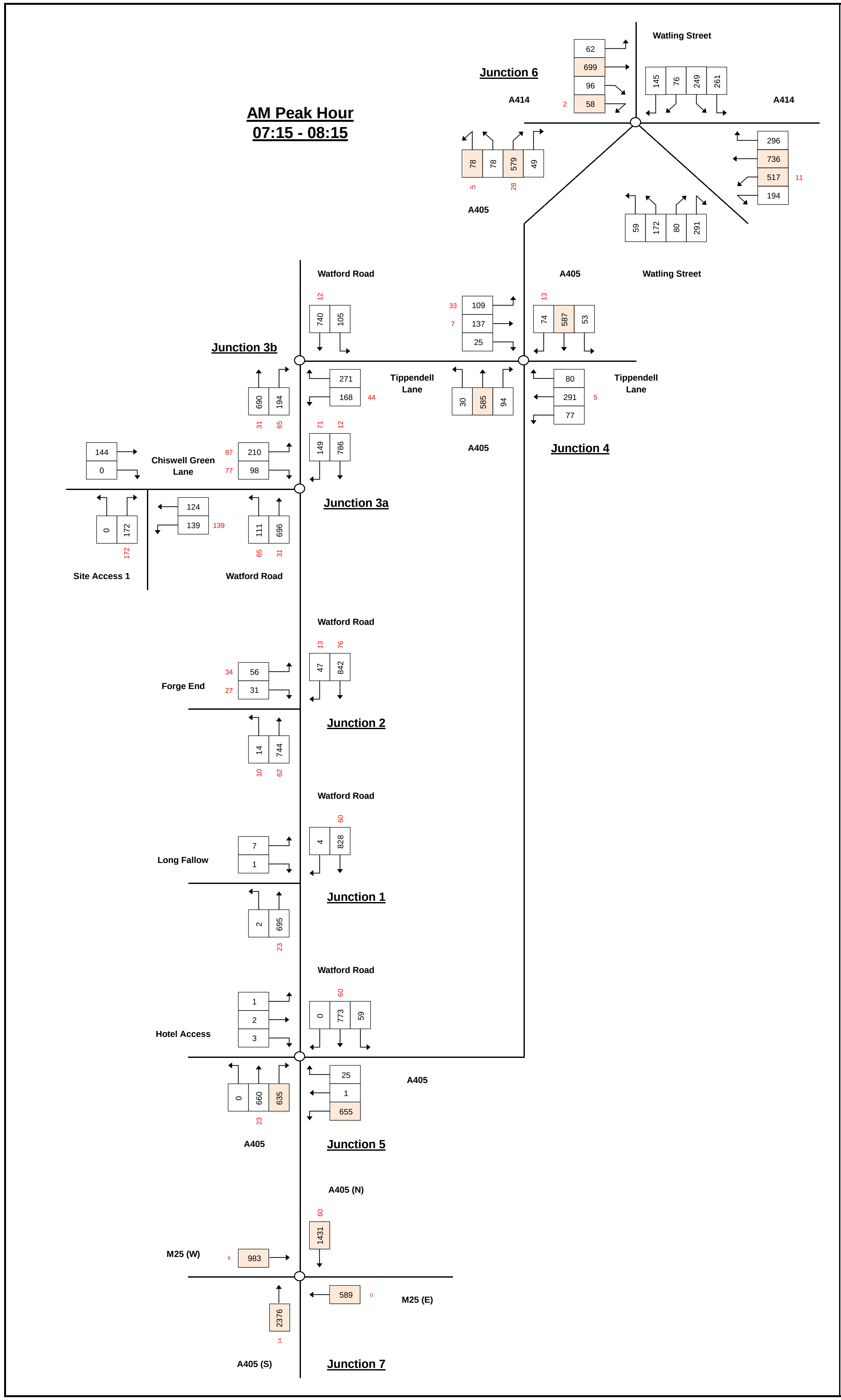
Client: CALA Homes & Redington Capital

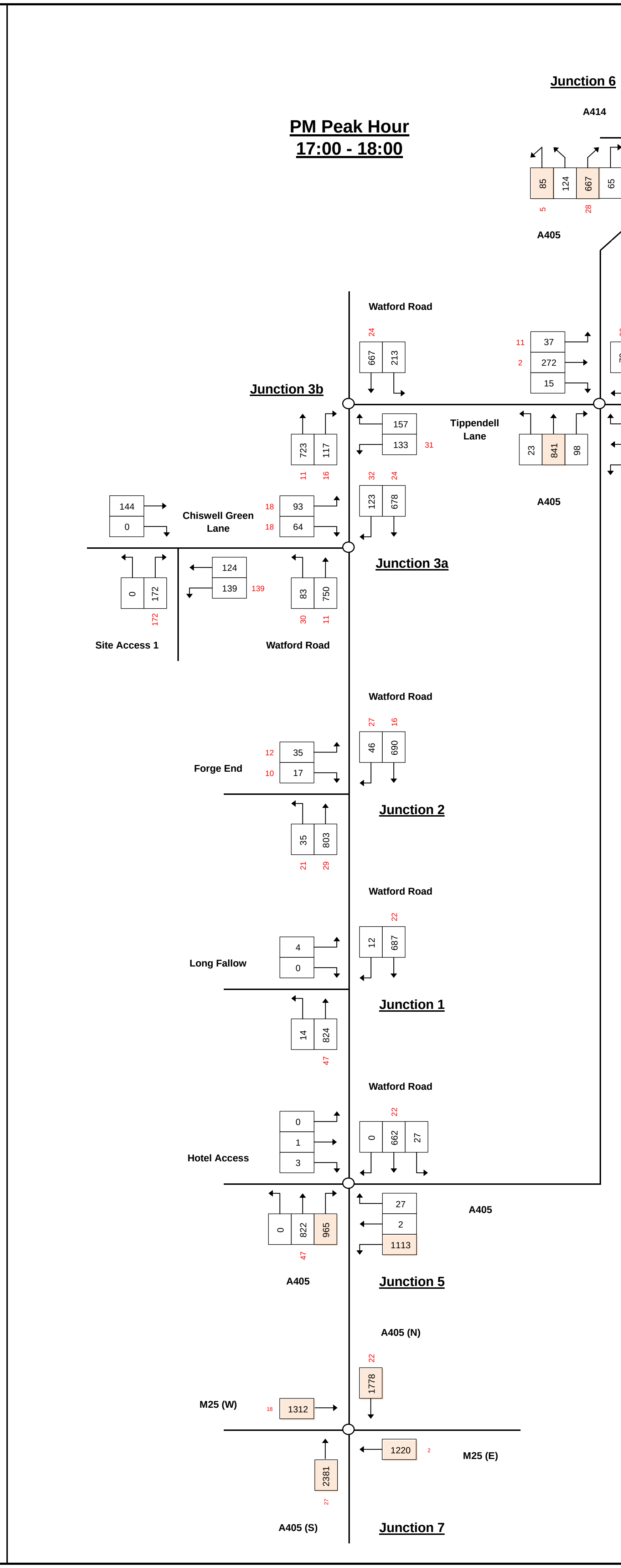
Project: Land at Chiswell Green St Albans

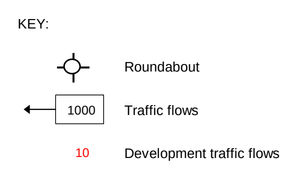
Title: 2027 Traffic Flows "Do Nothing" - Heavy Vehicles

Project Engineer:	D. Kemp	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			

Drawing No. **Appendix A4**







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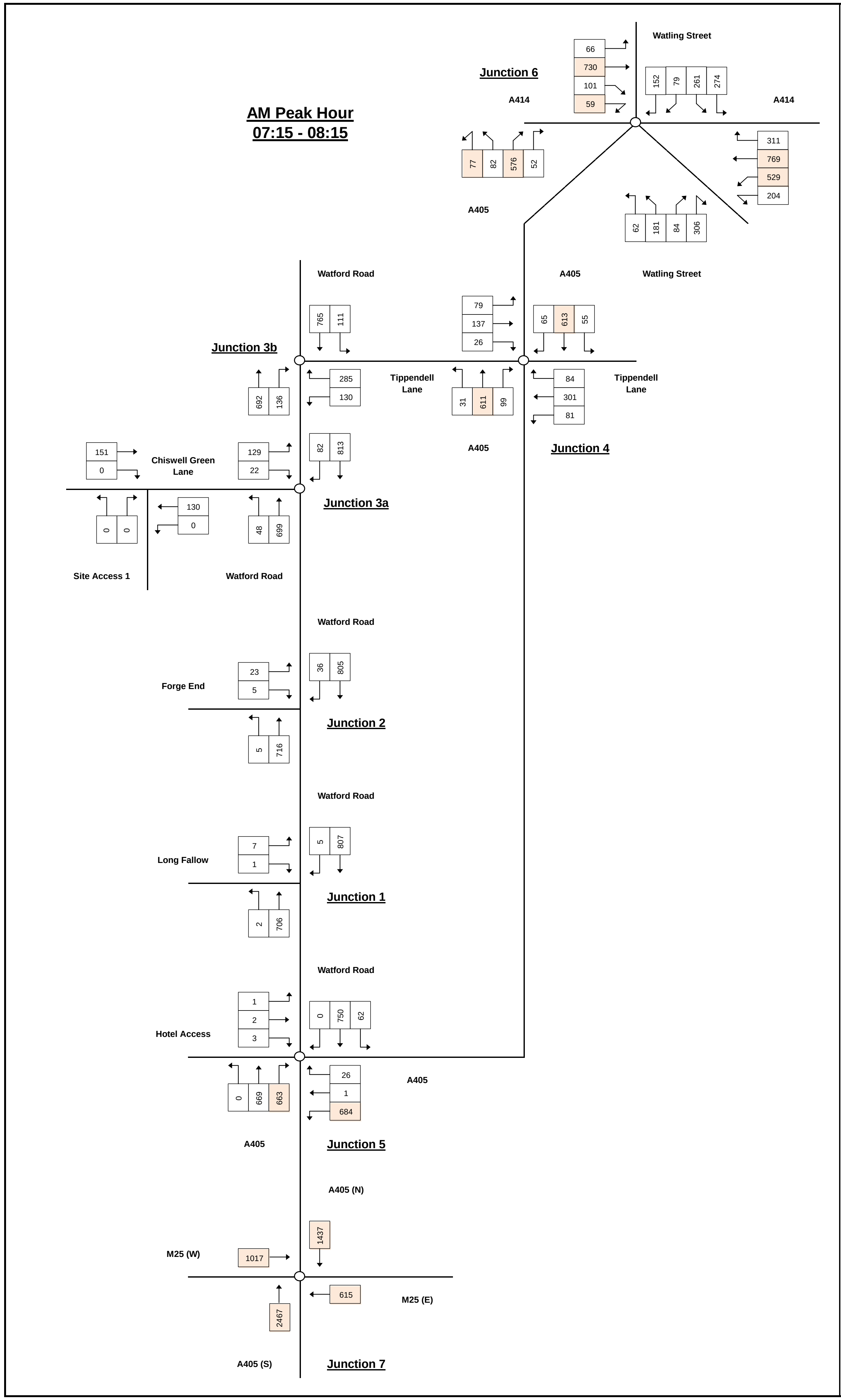
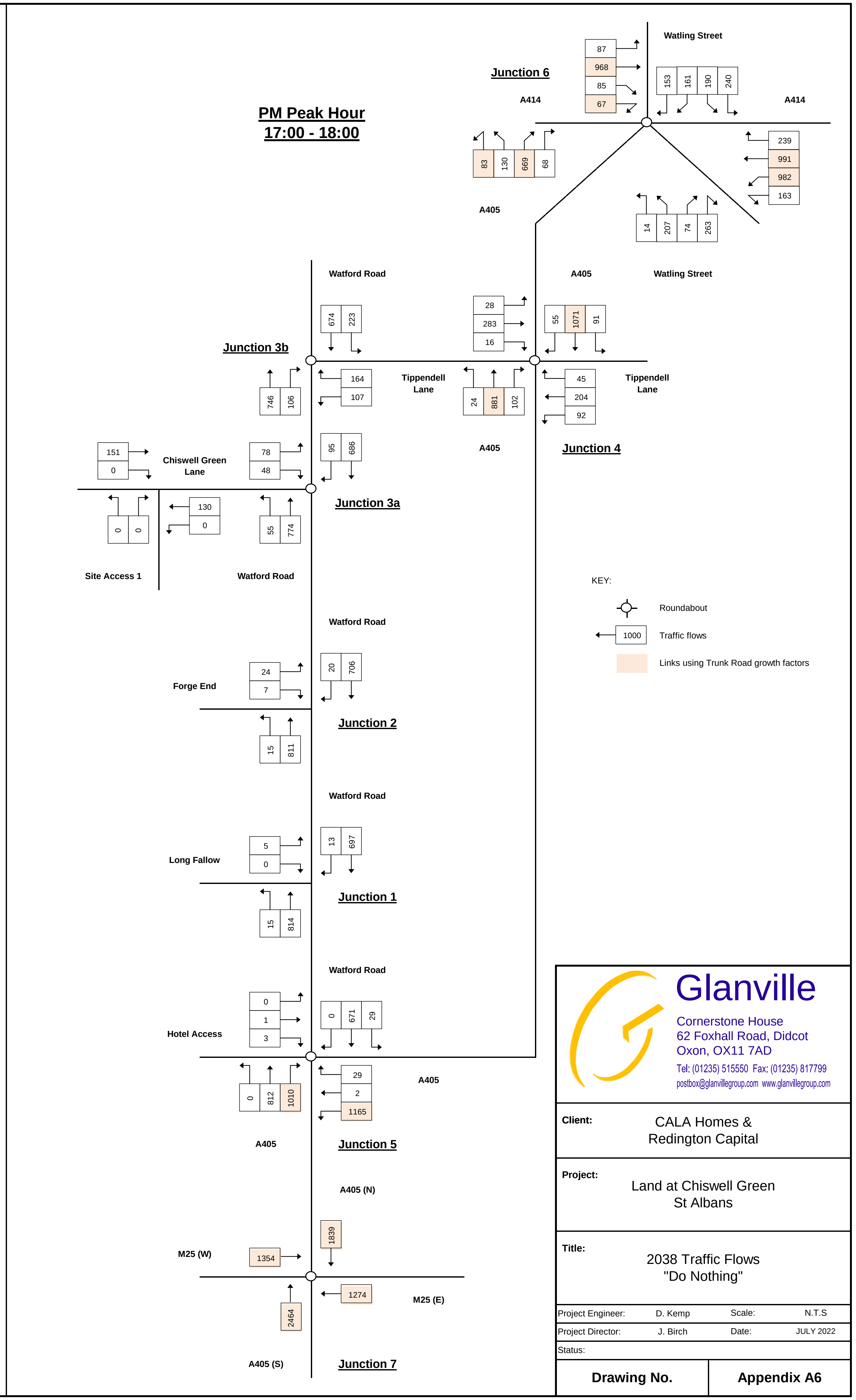
Project:	Land at Chiswell Green St Albans
Title:	2027 Traffic Flows "Do Something" (Vehicles)

Project Engineer:	D. Kemp	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			

Drawing No.	Appendix A5





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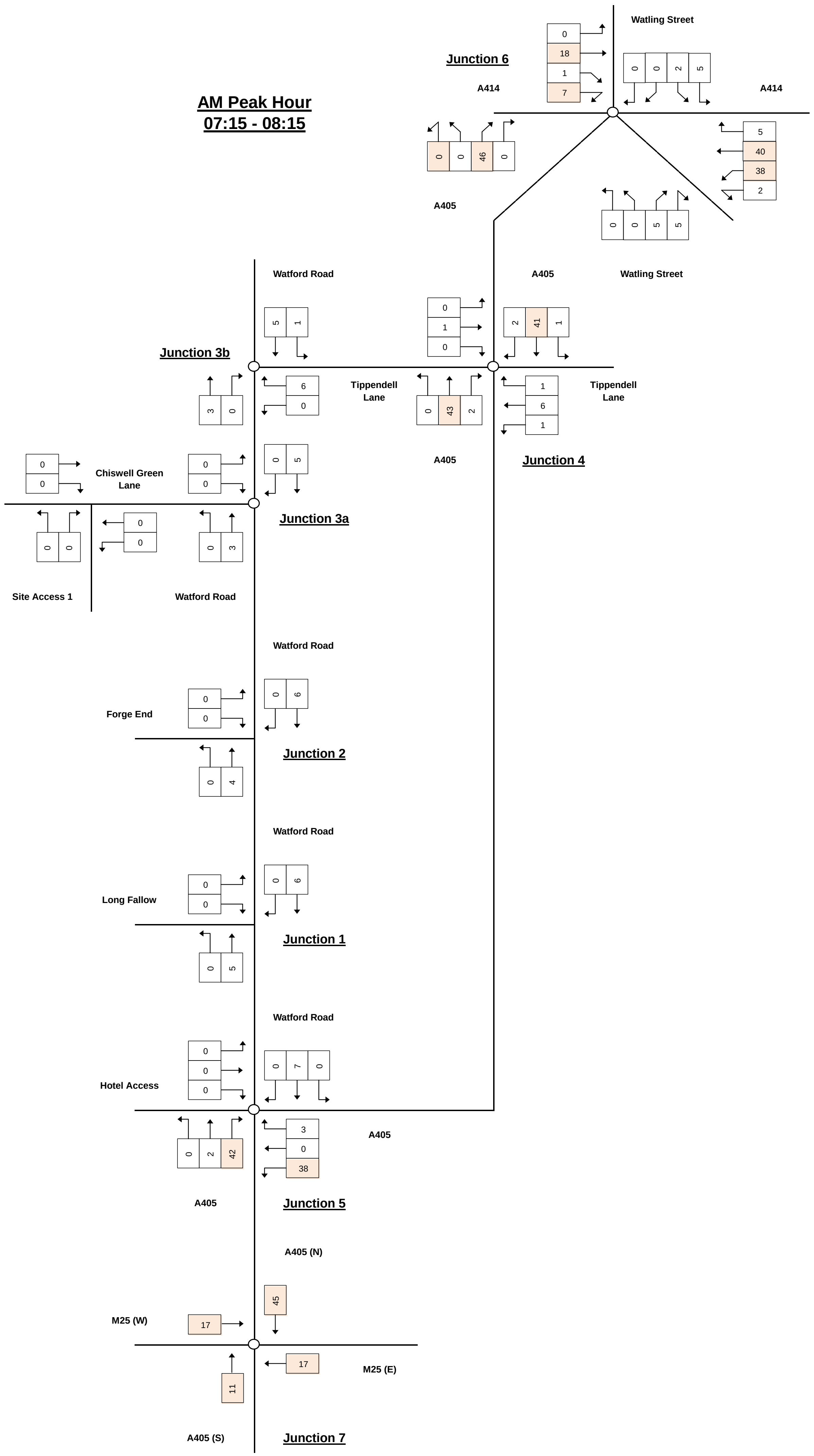
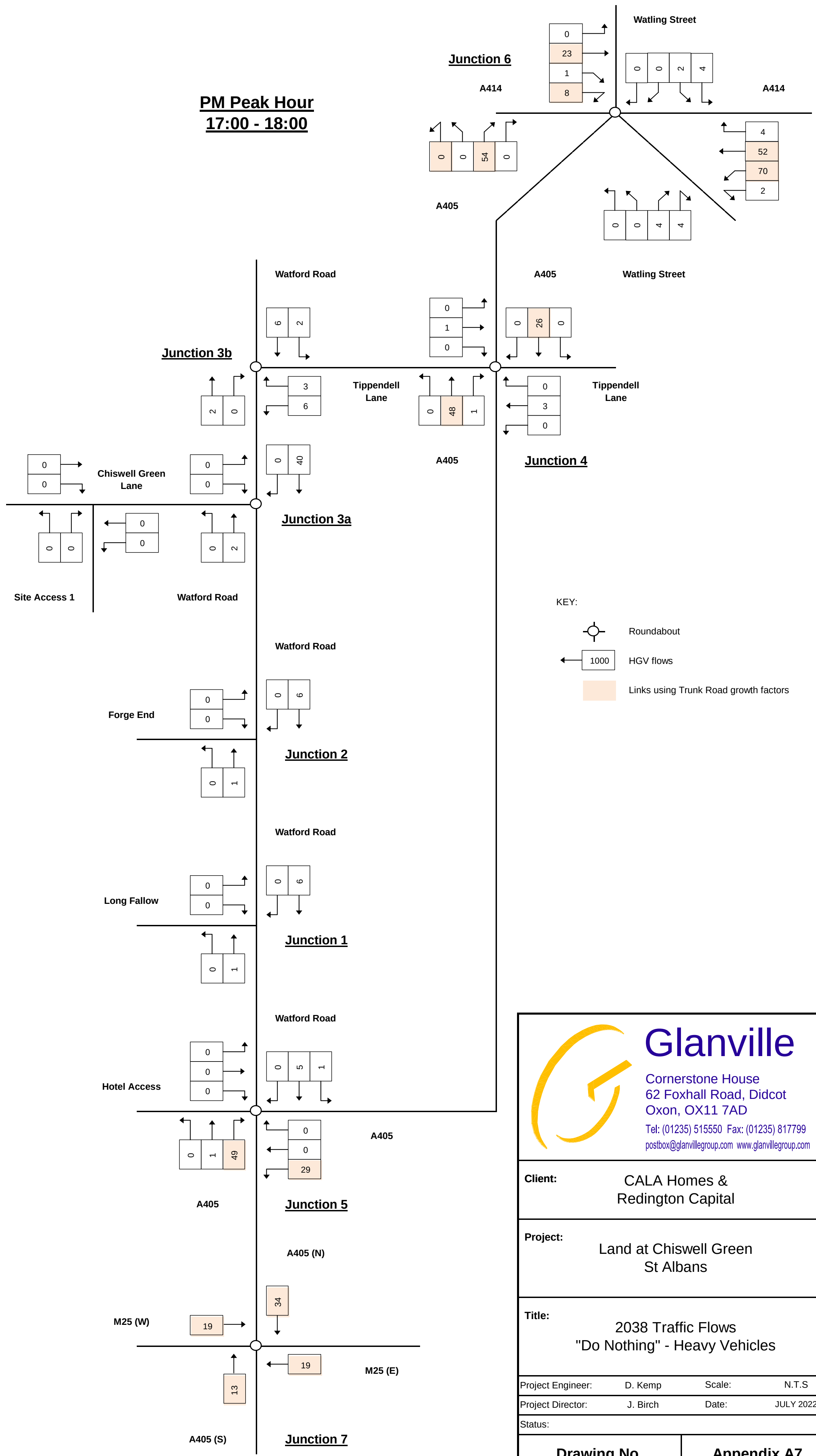
Client:	CALA Homes & Redington Capital
Project:	Land at Chiswell Green St Albans
Title:	2038 Traffic Flows "Do Nothing"

Project Engineer:	D. Kemp	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			

Drawing No.	**Appendix A6**





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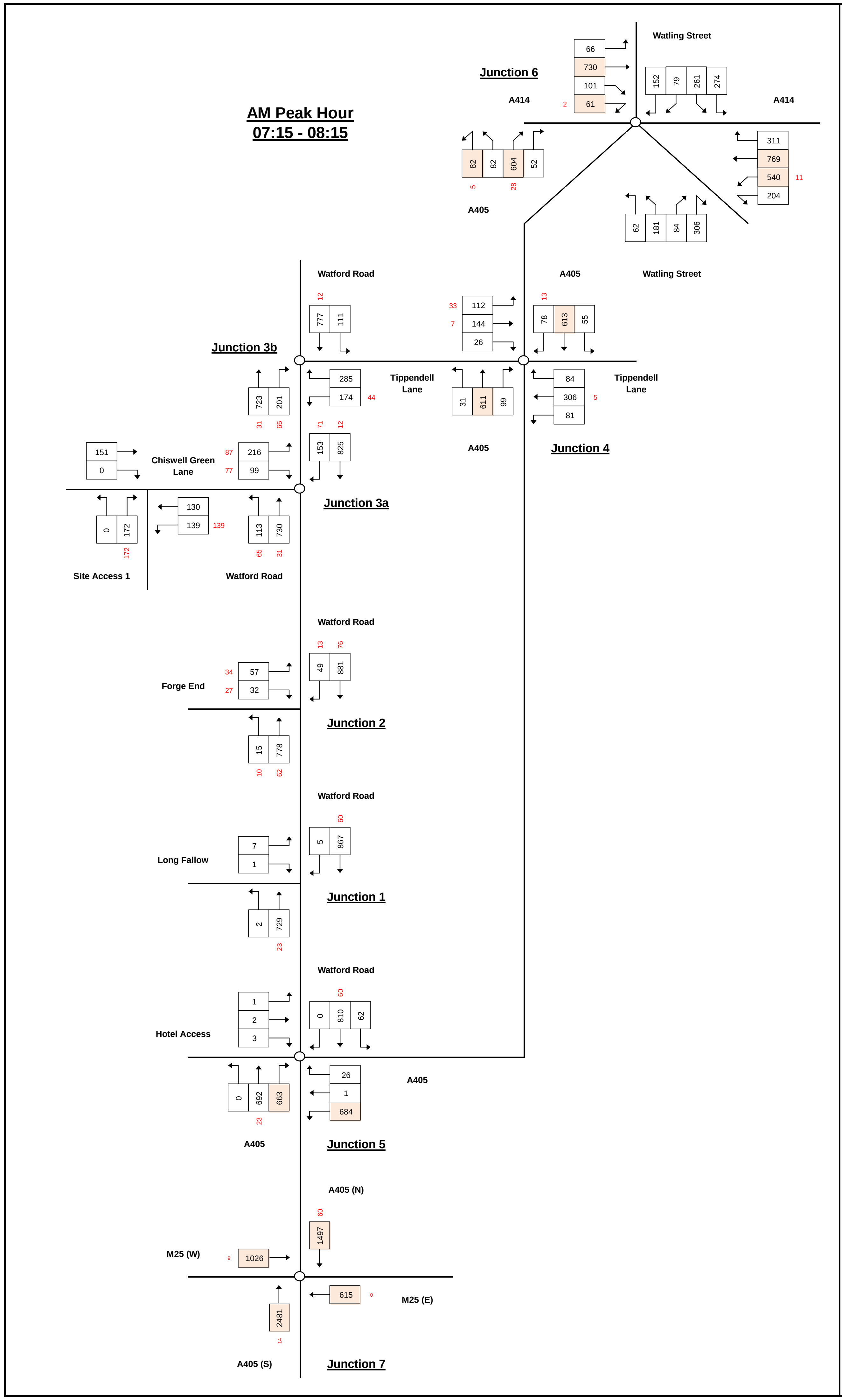
Client: CALA Homes & Redington Capital

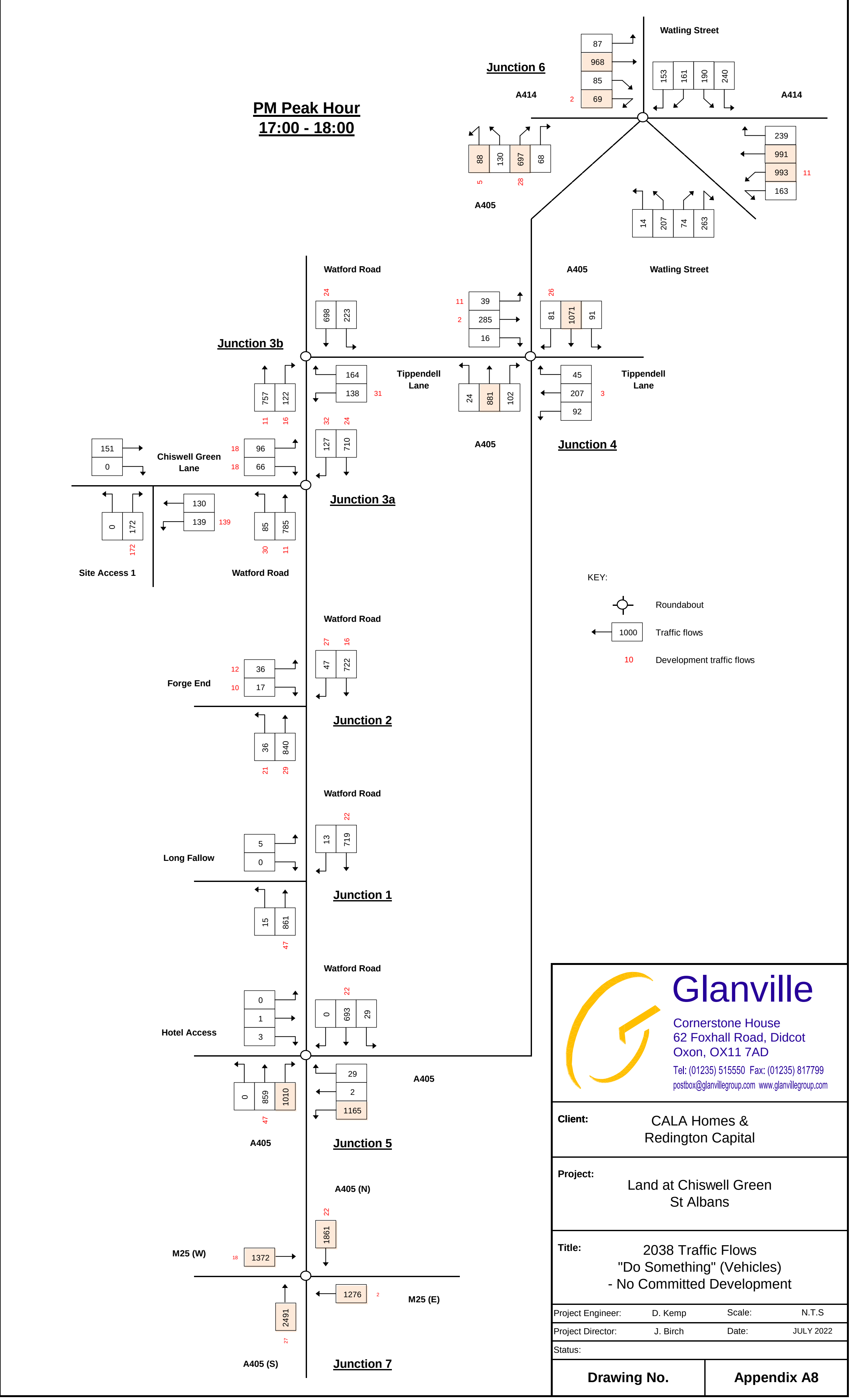
Project: Land at Chiswell Green St Albans

Title: 2038 Traffic Flows "Do Nothing" - Heavy Vehicles

Project Engineer:	D. Kemp	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			

Drawing No.	**Appendix A7**





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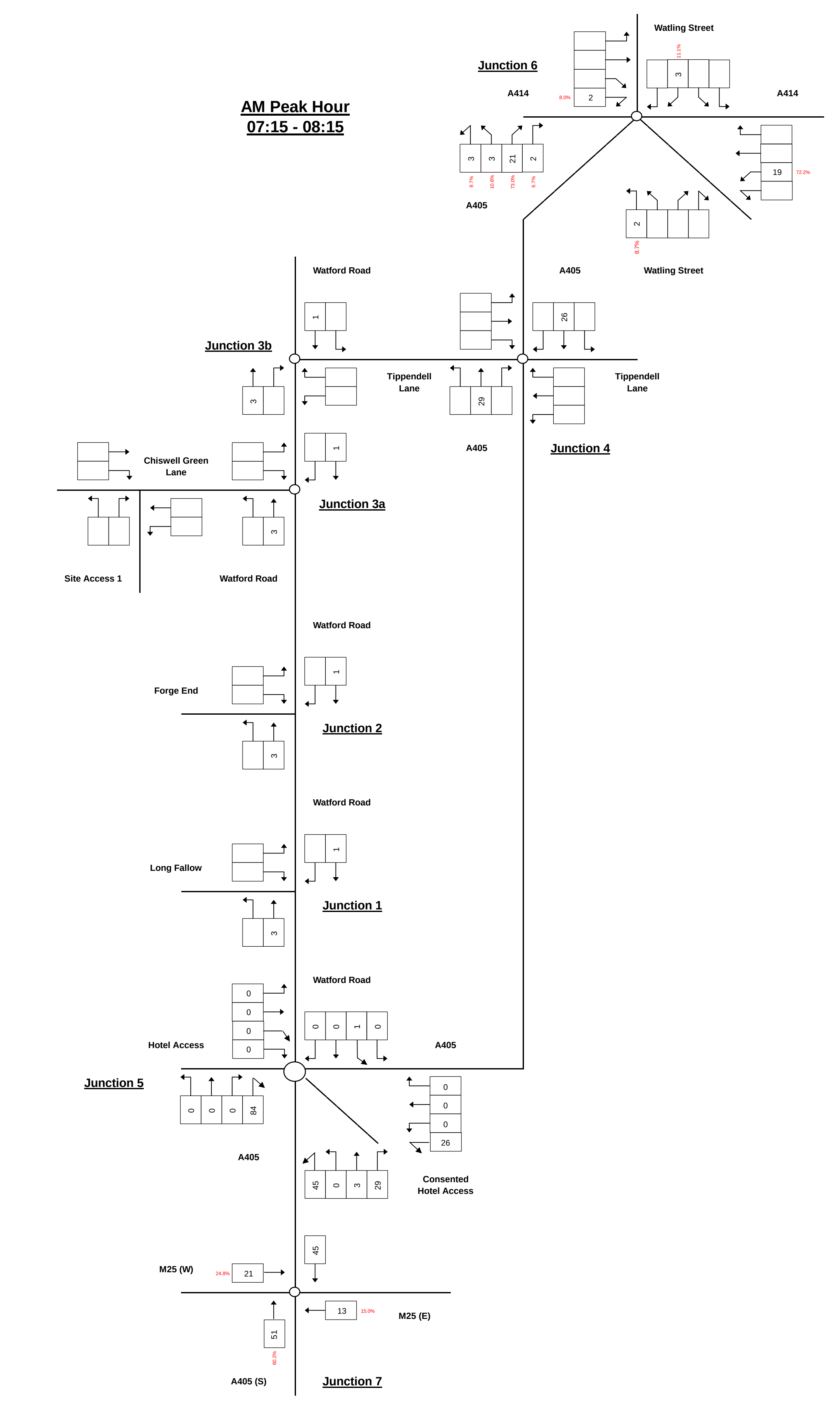
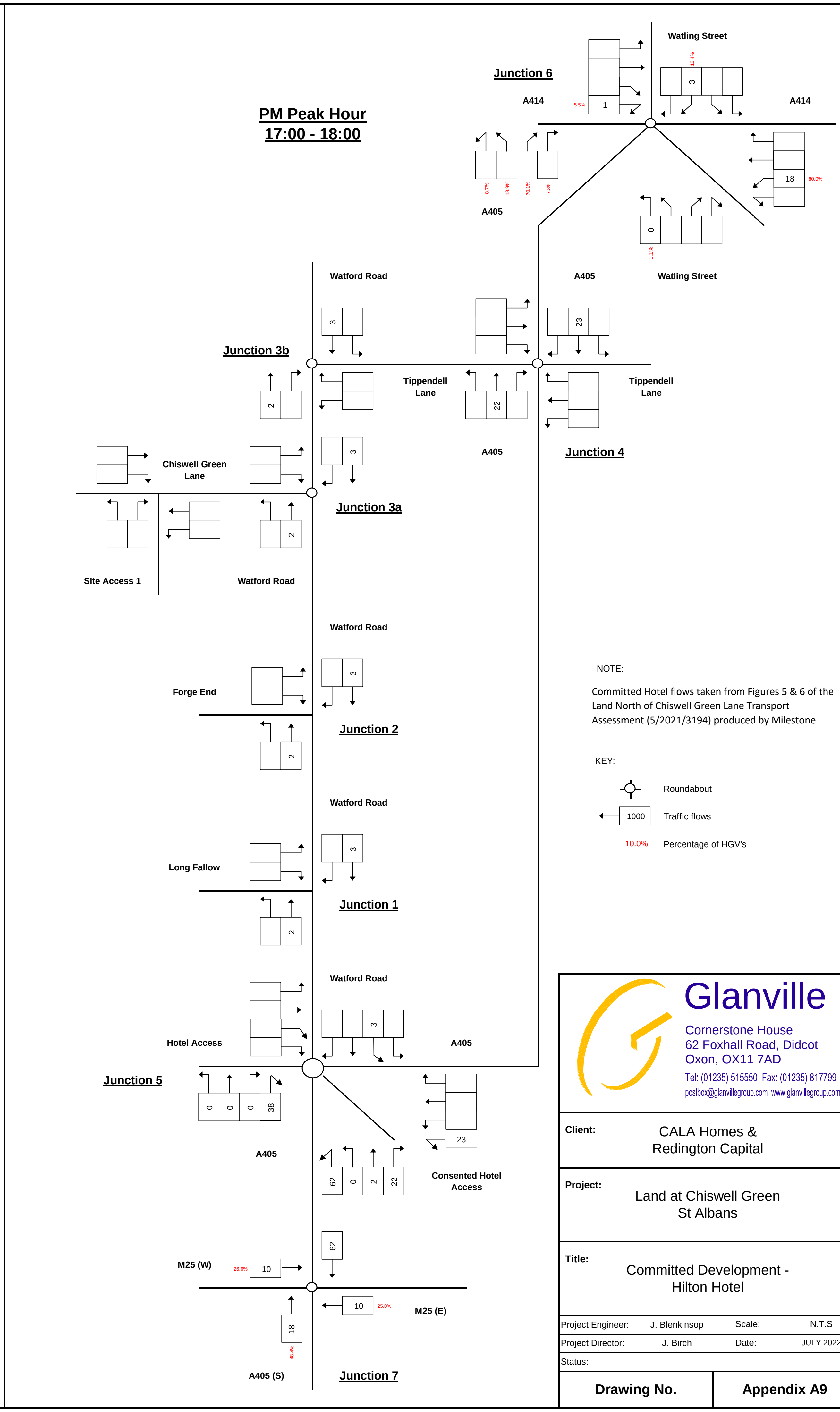
Client:	CALA Homes & Redington Capital
Project:	Land at Chiswell Green St Albans
Title:	2038 Traffic Flows "Do Something" (Vehicles) - No Committed Development

Project Engineer:	D. Kemp	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			
Drawing No.		Appendix A8	





NOTE:

Committed Hotel flows taken from Figures 5 & 6 of the Land North of Chiswell Green Lane Transport Assessment (5/2021/3194) produced by Milestone

KEY:

Roundabout

1000 Traffic flows

10.0% Percentage of HGV's

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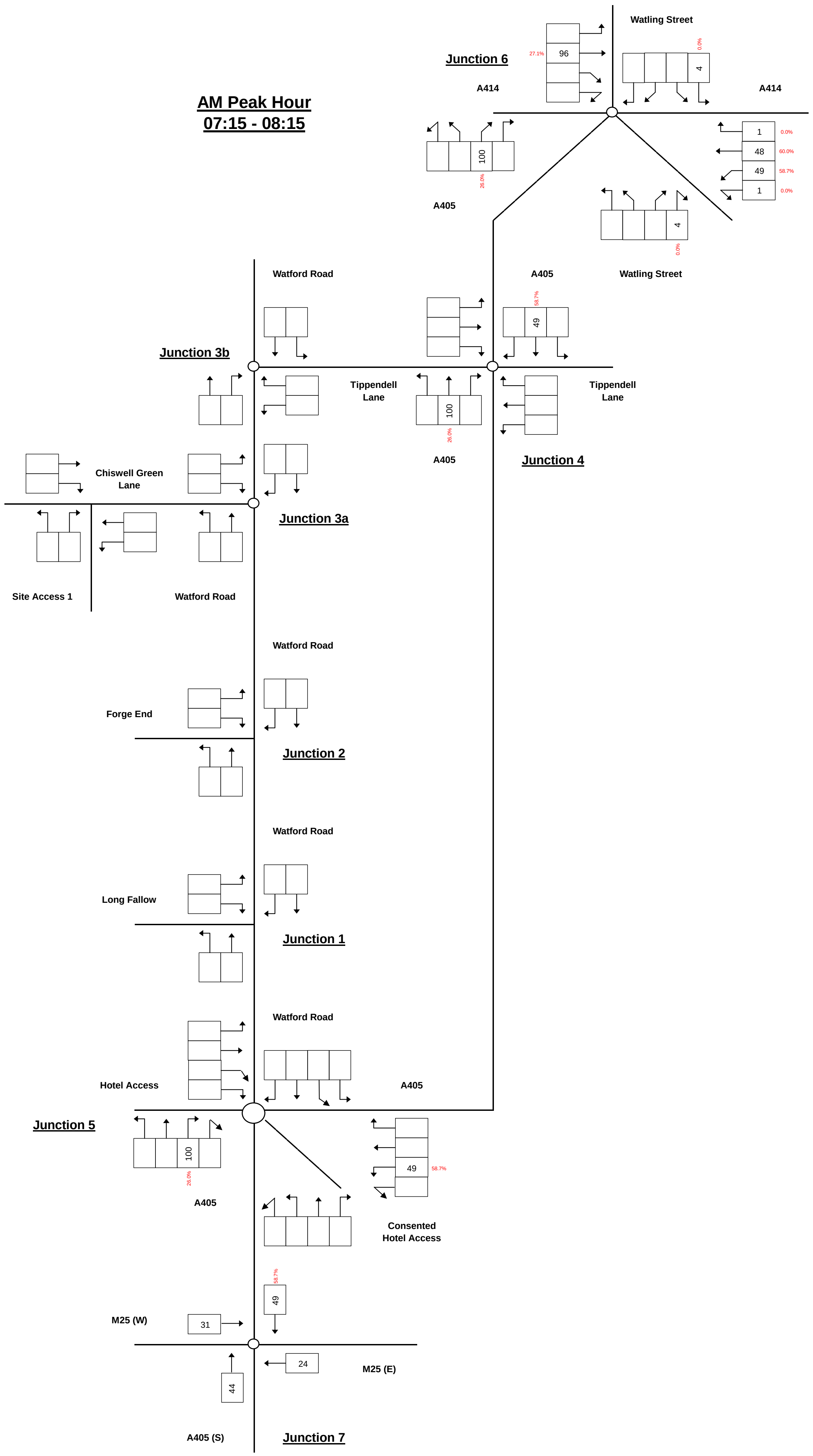
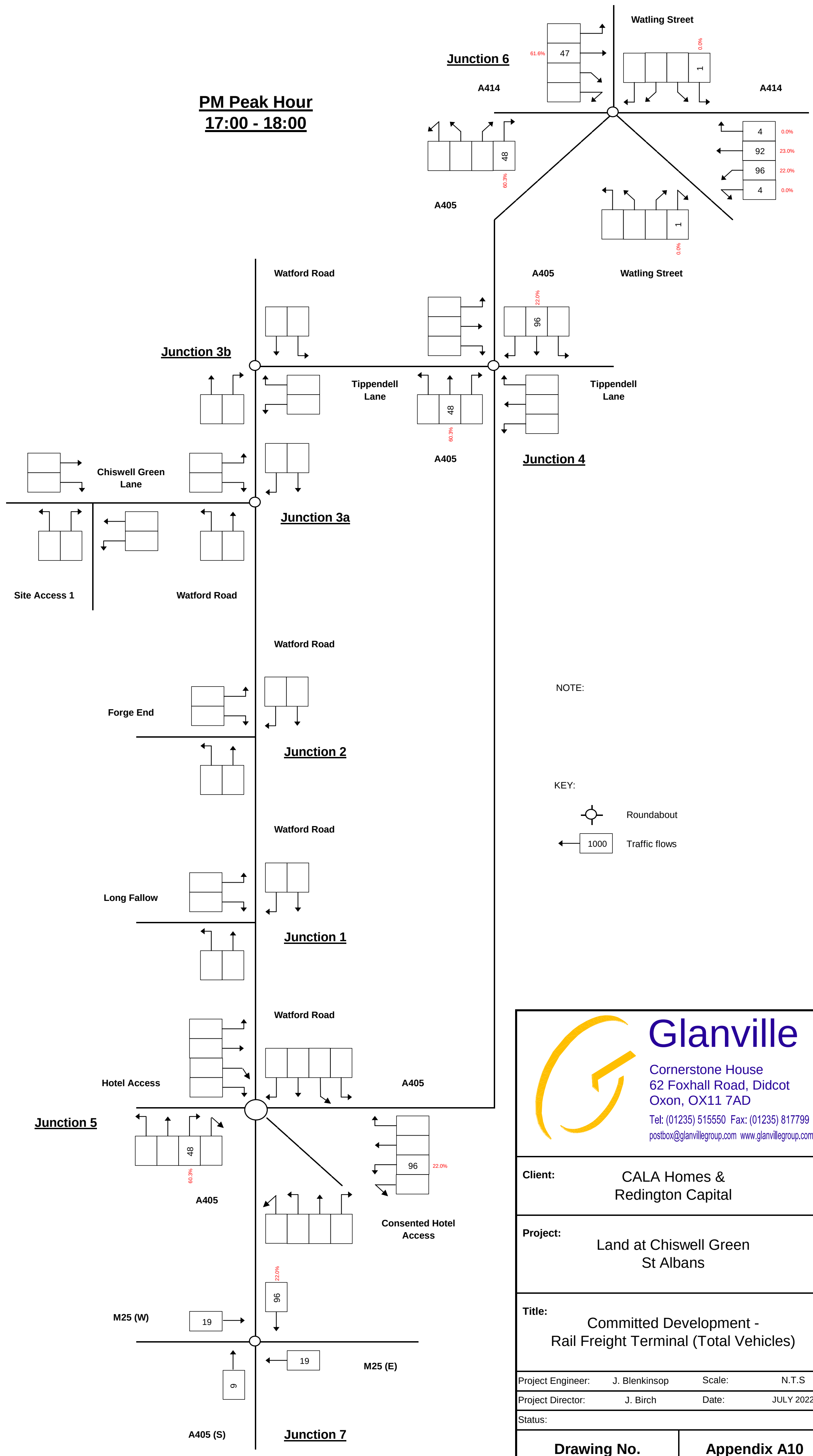
Client:	CALA Homes & Redington Capital
Project:	Land at Chiswell Green St Albans
Title:	Committed Development - Hilton Hotel

Project Engineer:	J. Blenkinsop	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			

Drawing No.	Appendix A9





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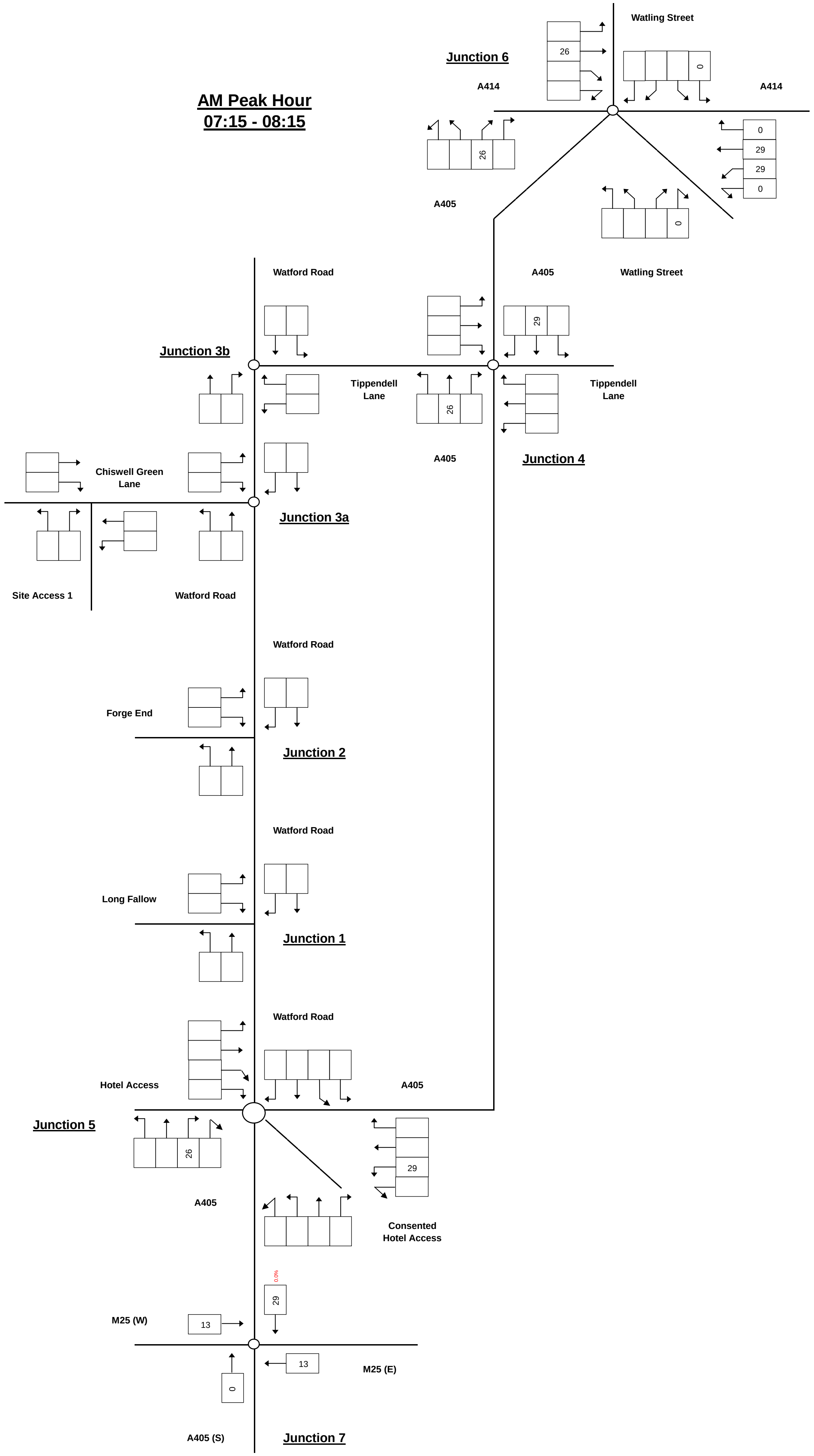
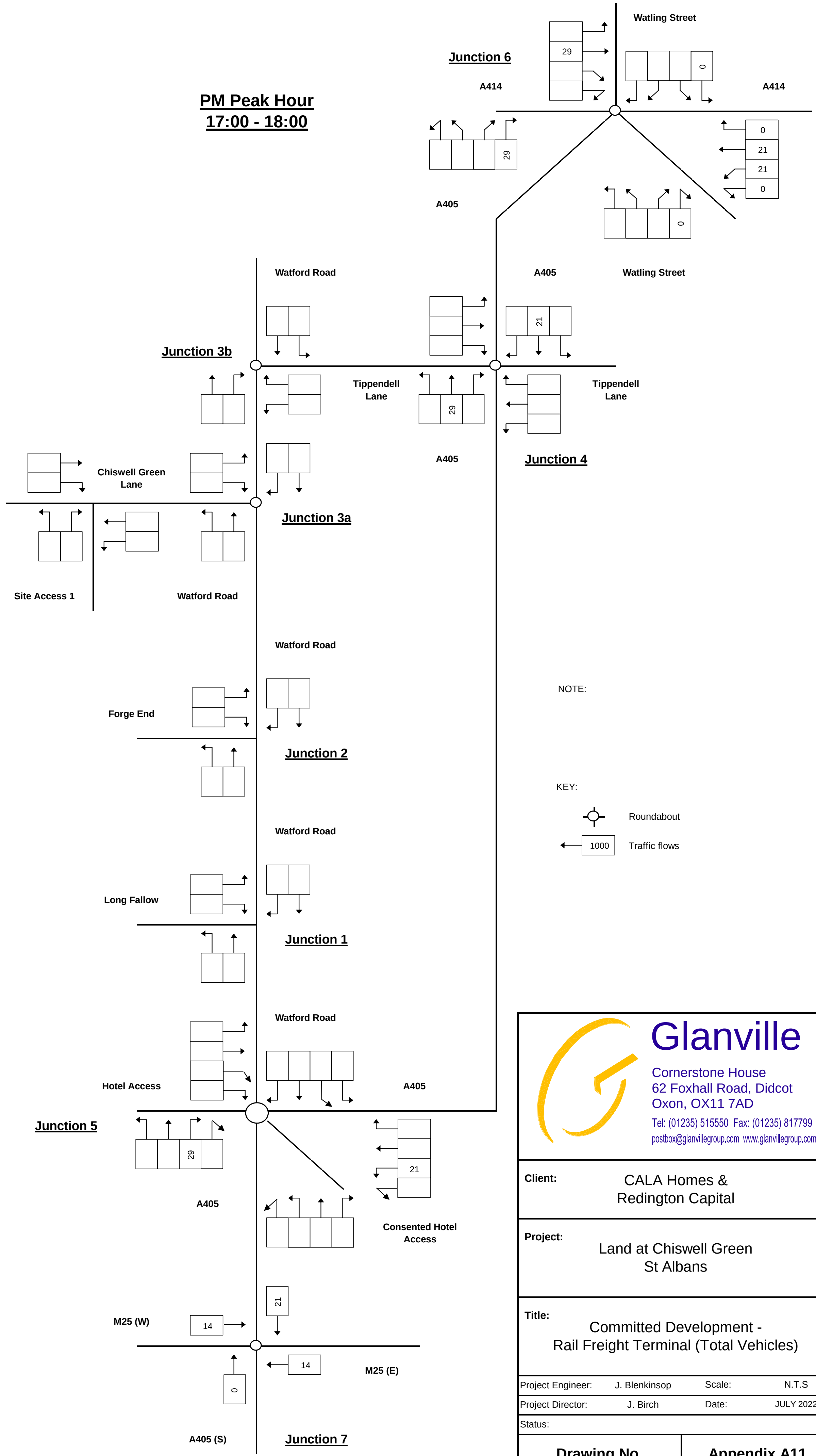
Client:	CALA Homes & Redington Capital
Project:	Land at Chiswell Green St Albans
Title:	Committed Development - Rail Freight Terminal (Total Vehicles)

Project Engineer:	J. Blenkinsop	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			

Drawing No.	Appendix A10





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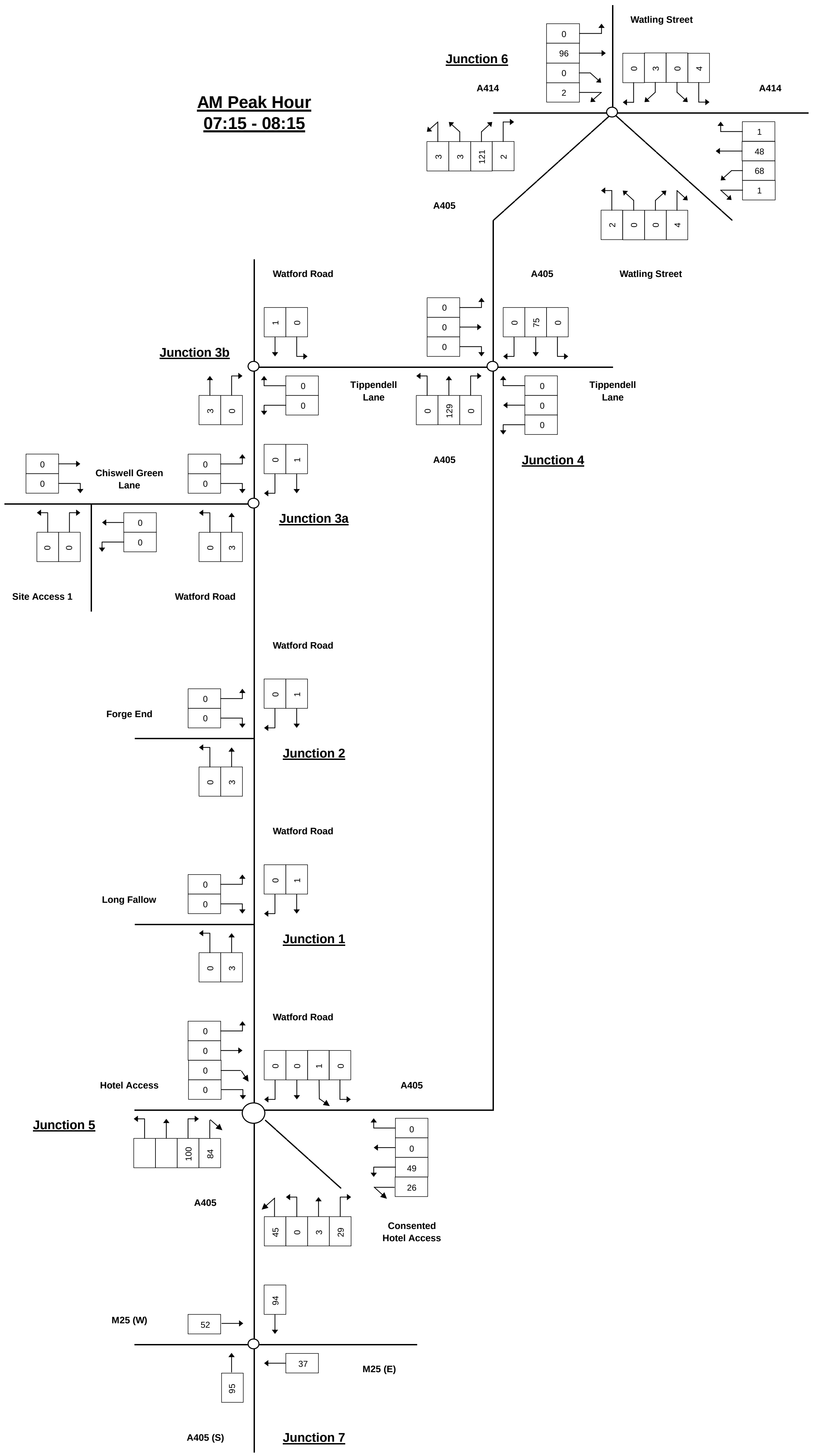
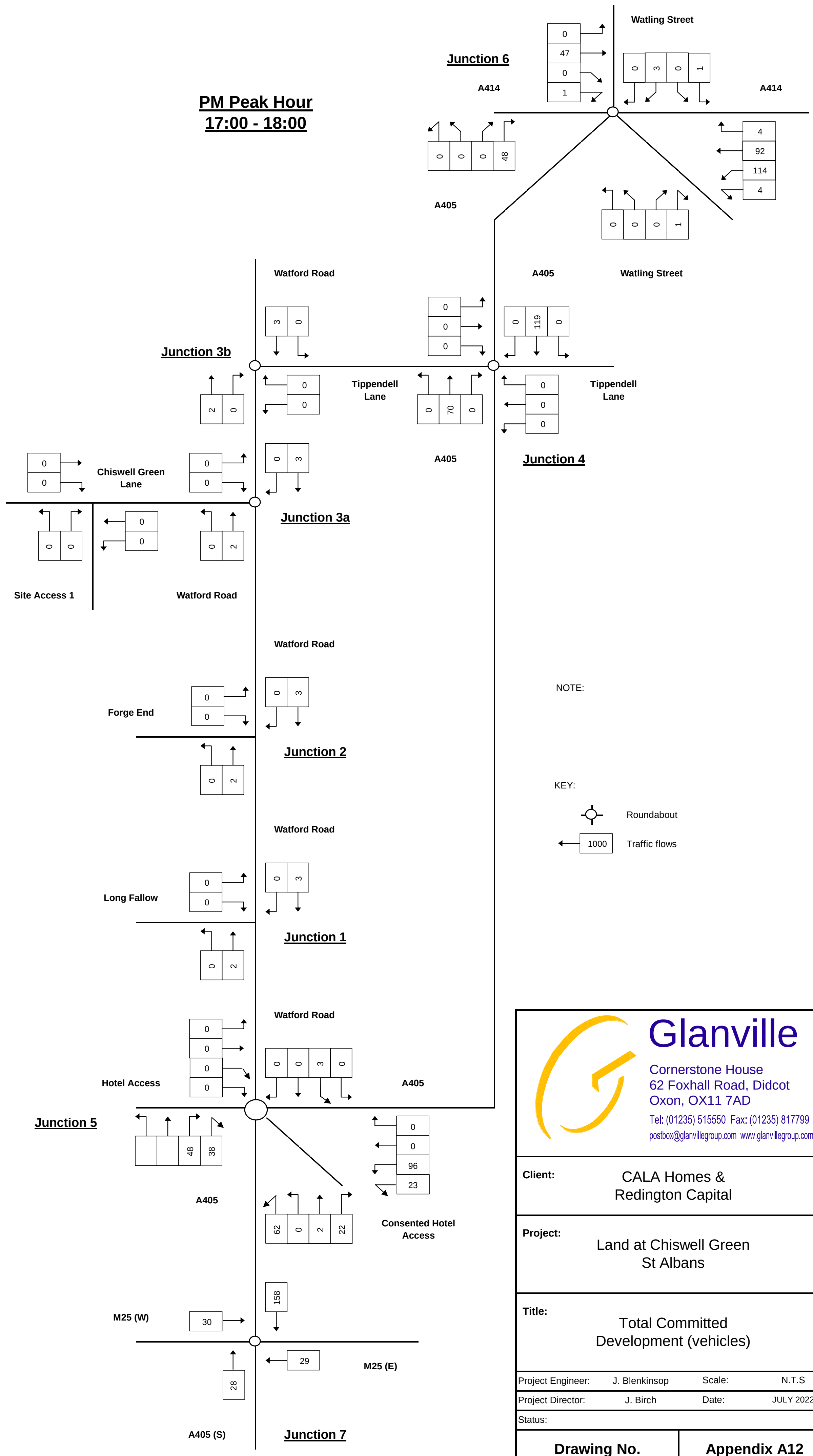
Client:	CALA Homes & Redington Capital
Project:	Land at Chiswell Green St Albans
Title:	Committed Development - Rail Freight Terminal (Total Vehicles)

Project Engineer:	J. Blenkinsop	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			

Drawing No.	Appendix A11





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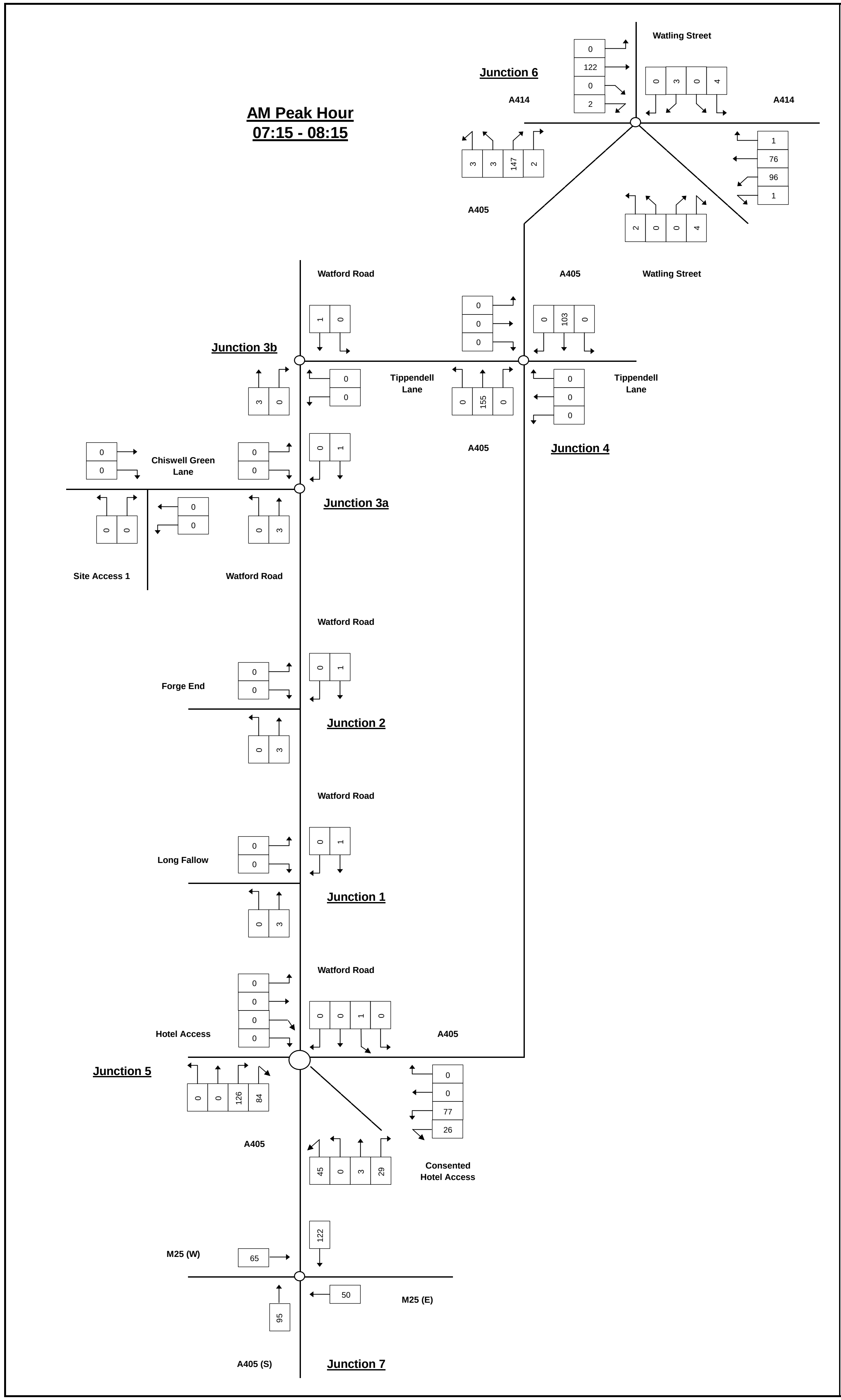
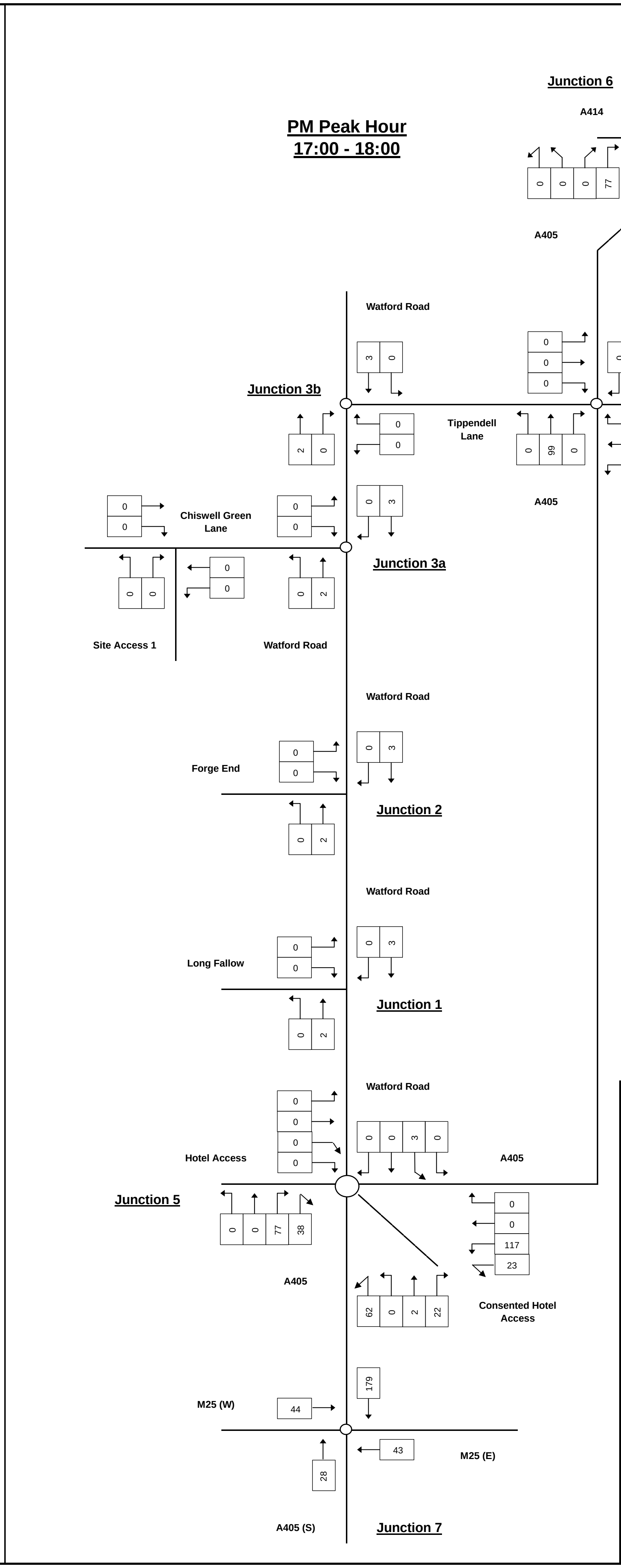
postbox@glanvillegroup.com www.glanvillegroup.com

Client:	CALA Homes & Redington Capital
Project:	Land at Chiswell Green St Albans
Title:	Total Committed Development (vehicles)

Project Engineer:	J. Blenkinsop	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			

Drawing No.	Appendix A12





NOTE:

KEY:

Roundabout

1000 Traffic flows

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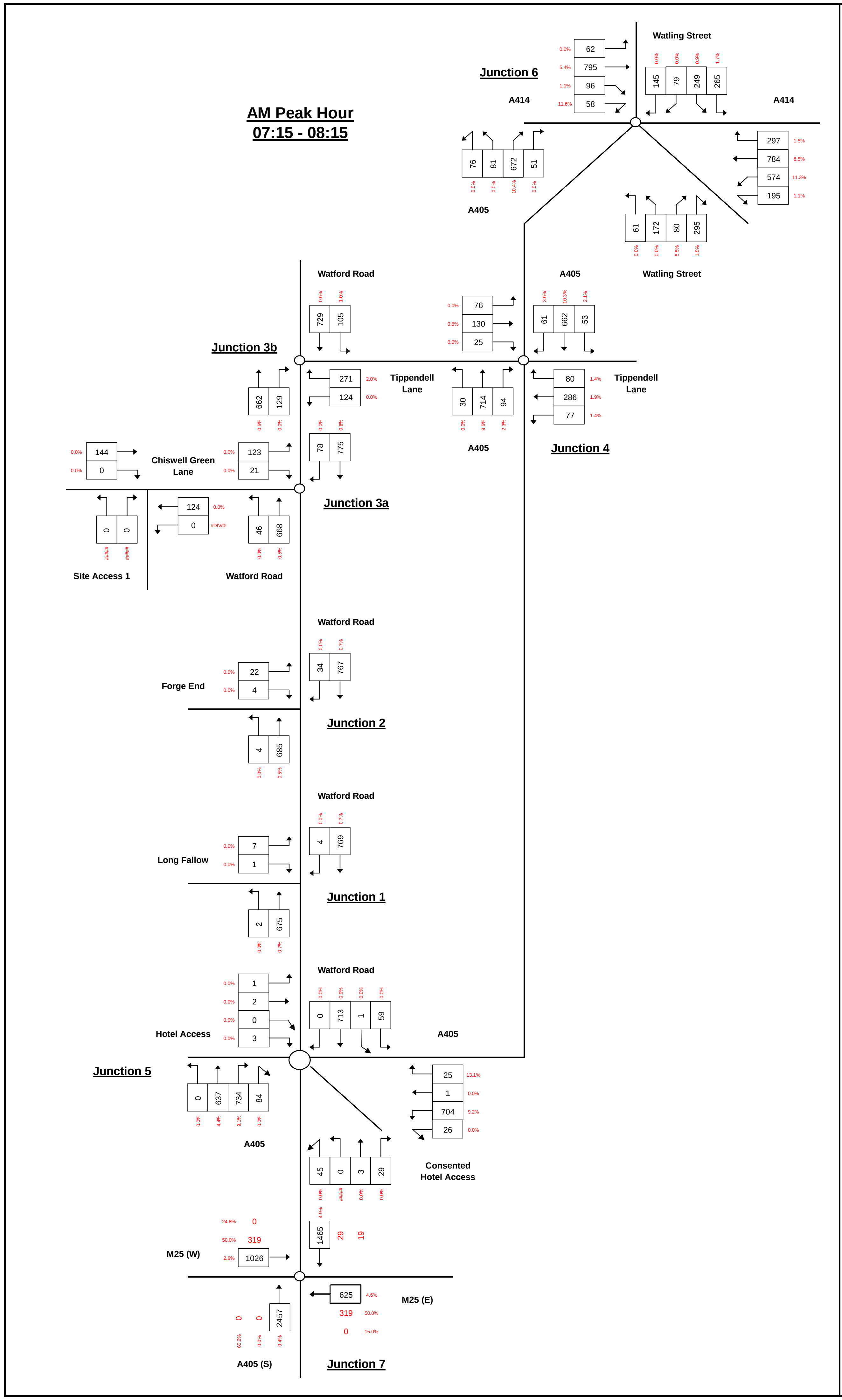
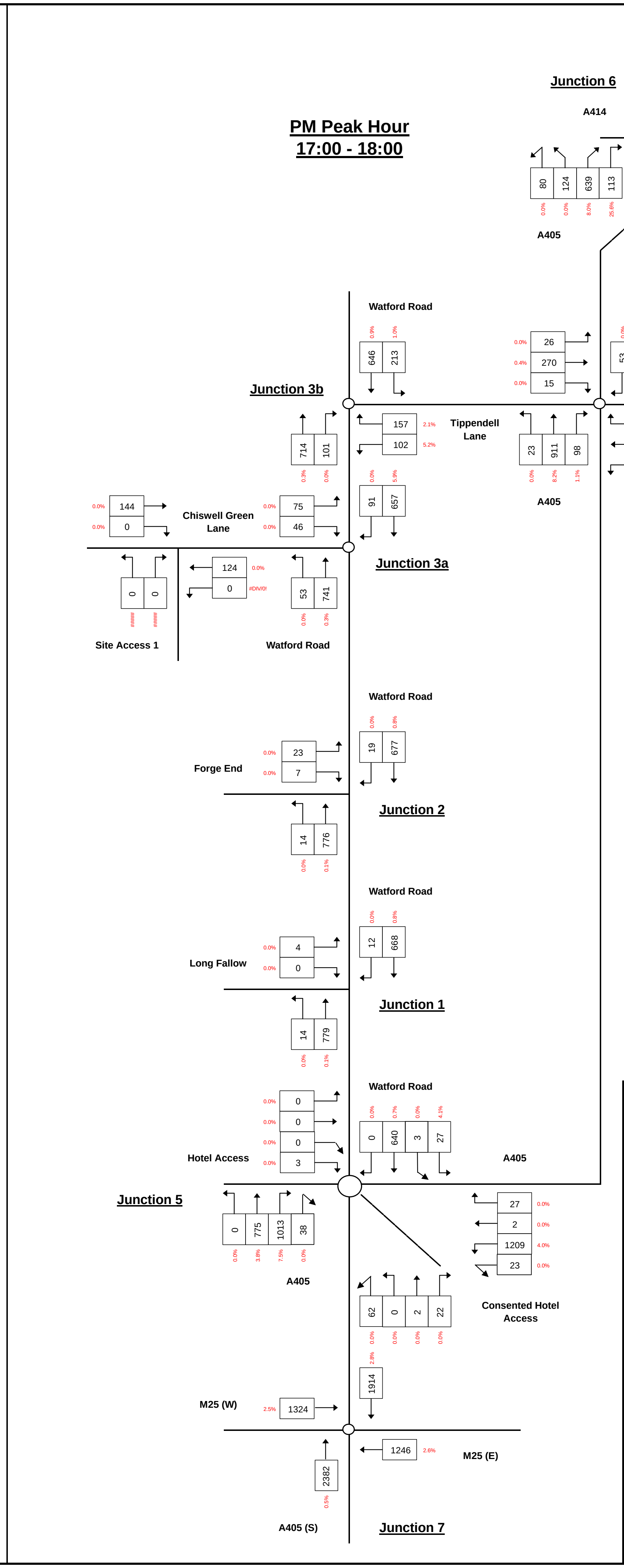
Client:	CALA Homes & Redington Capital
Project:	Land at Chiswell Green St Albans
Title:	Total Committed Development (pcus)

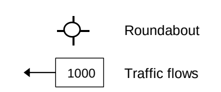
Project Engineer:	J. Blenkinsop	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			
Drawing No.		Appendix A13	





NOTE:

KEY:



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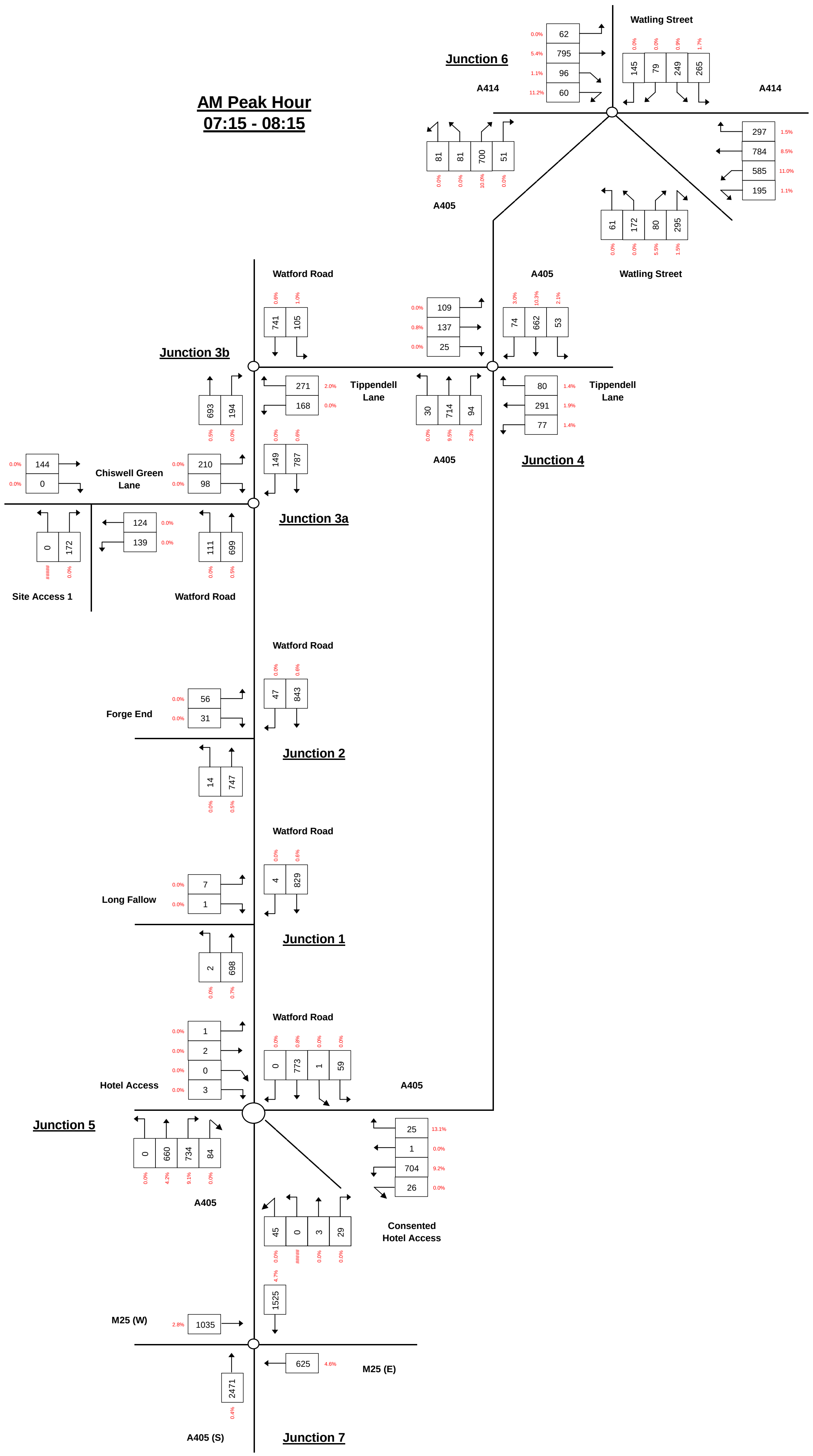
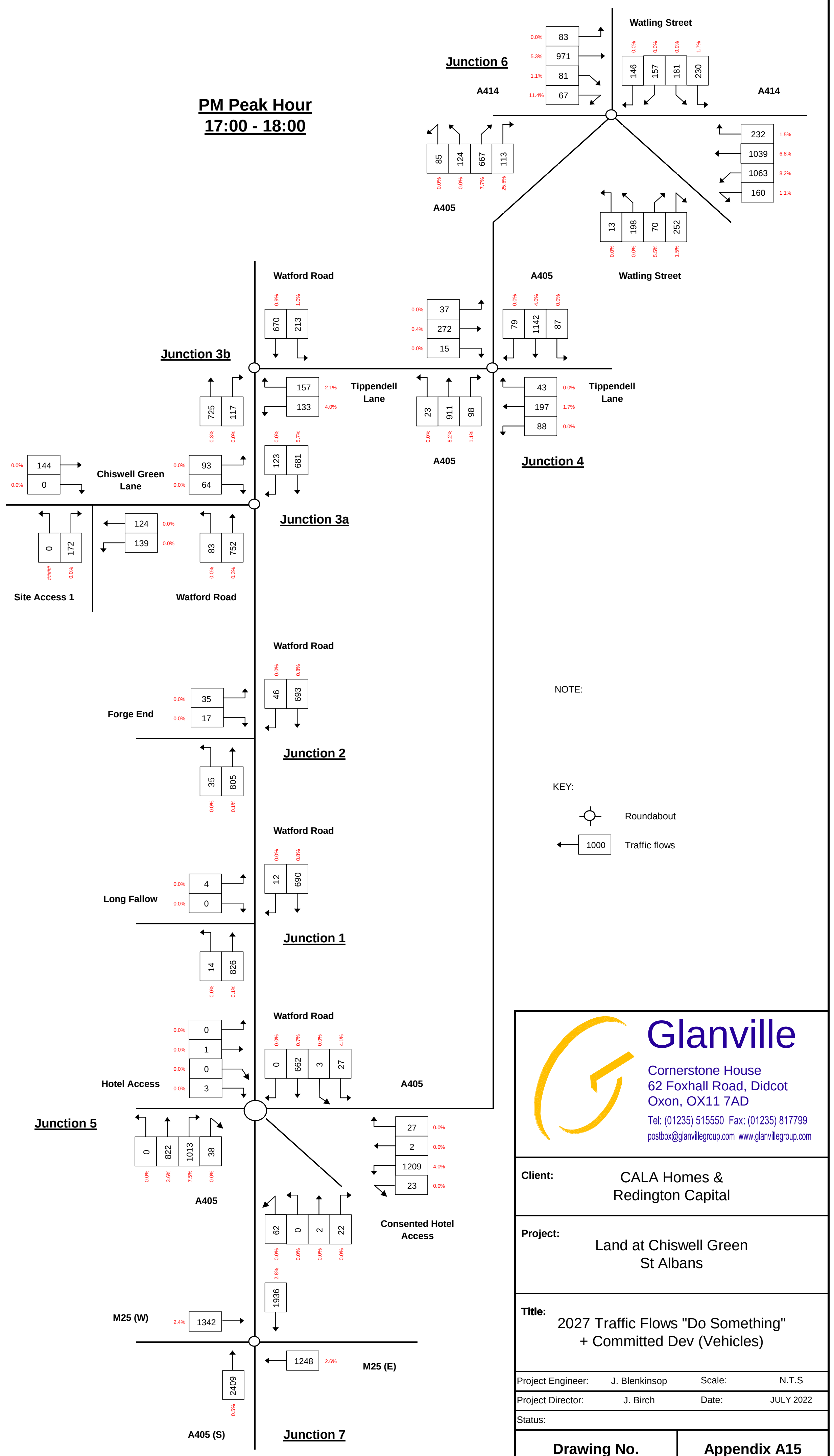
Client:	CALA Homes & Redington Capital
Project:	Land at Chiswell Green St Albans
Title:	2027 Traffic Flows "Do Nothing" + Committed Dev (Vehicles)

Project Engineer:	J. Blenkinsop	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			
Drawing No.		Appendix A14	





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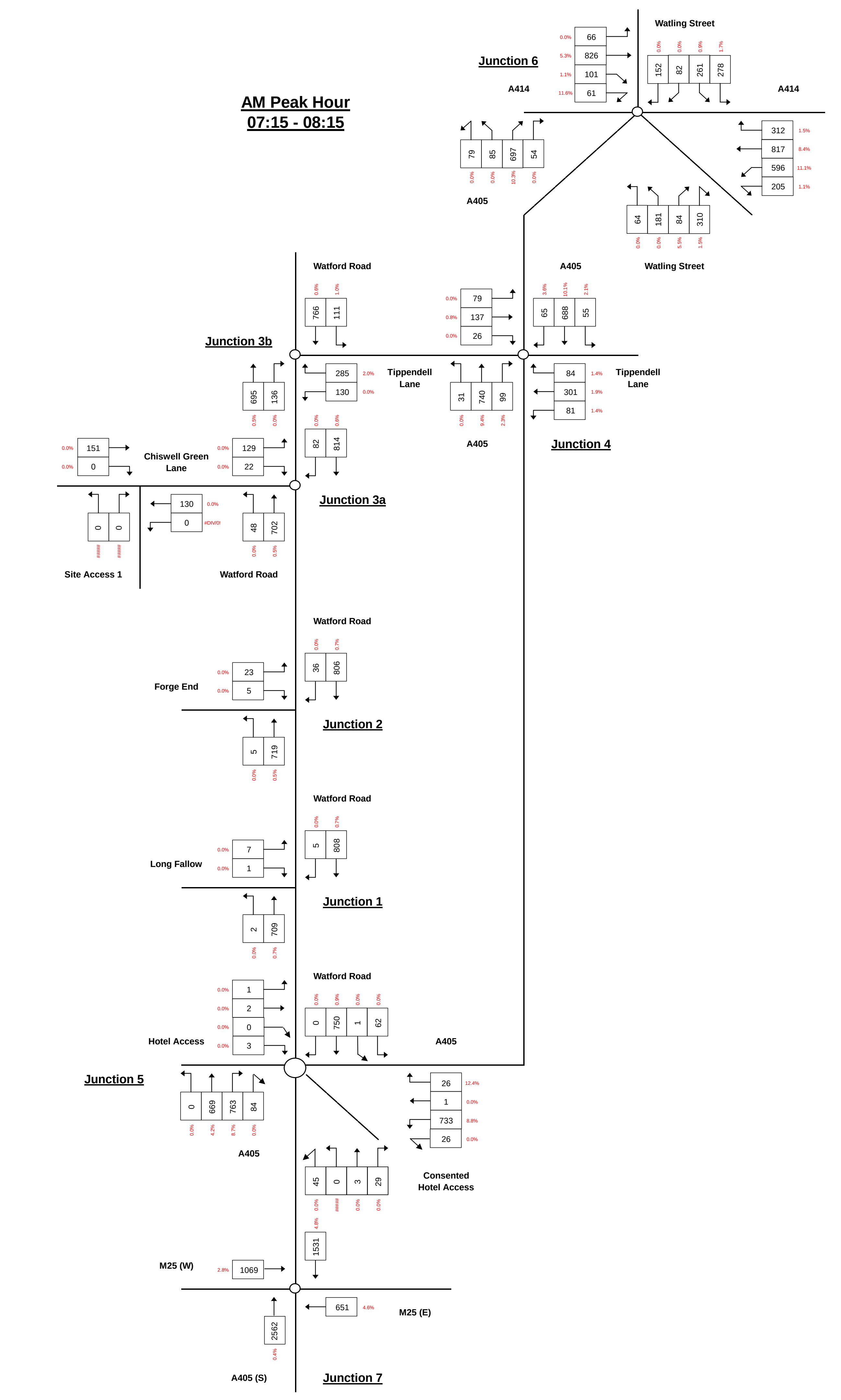
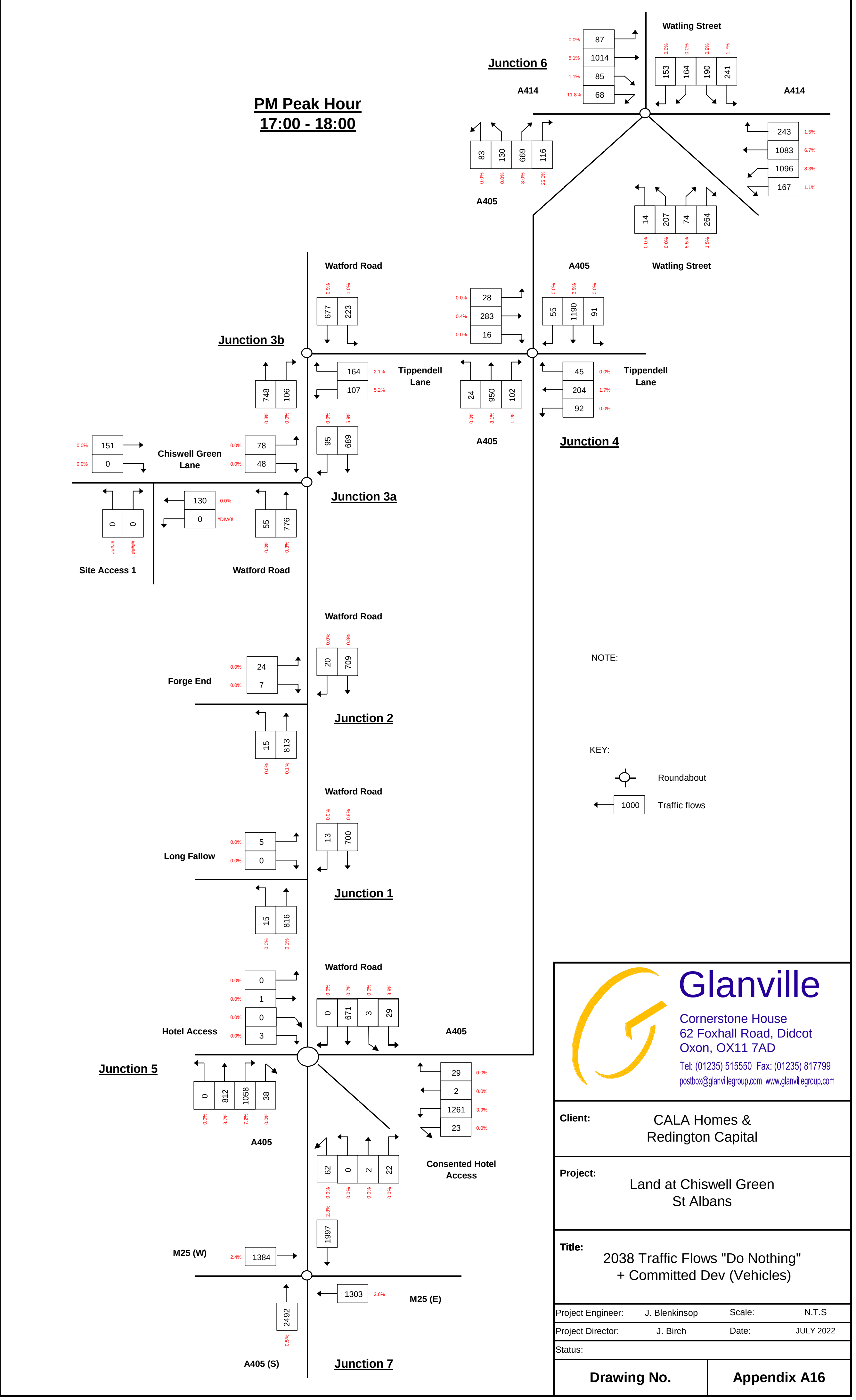
Client:	CALA Homes & Redington Capital
Project:	Land at Chiswell Green St Albans
Title:	2027 Traffic Flows "Do Something" + Committed Dev (Vehicles)

Project Engineer:	J. Blenkinsop	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			

Drawing No.	Appendix A15





NOTE:

KEY:

Roundabout

1000 Traffic flows

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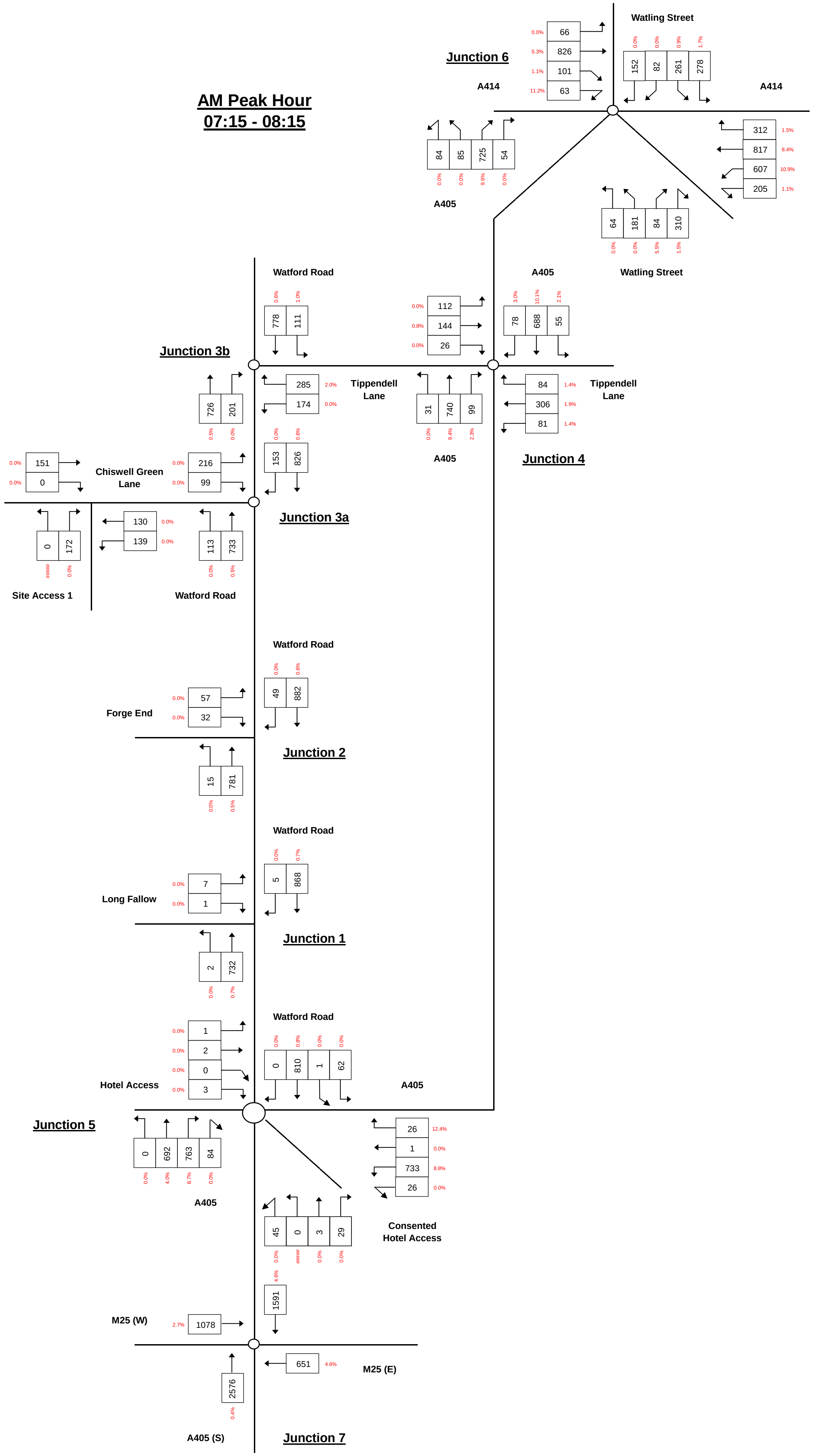
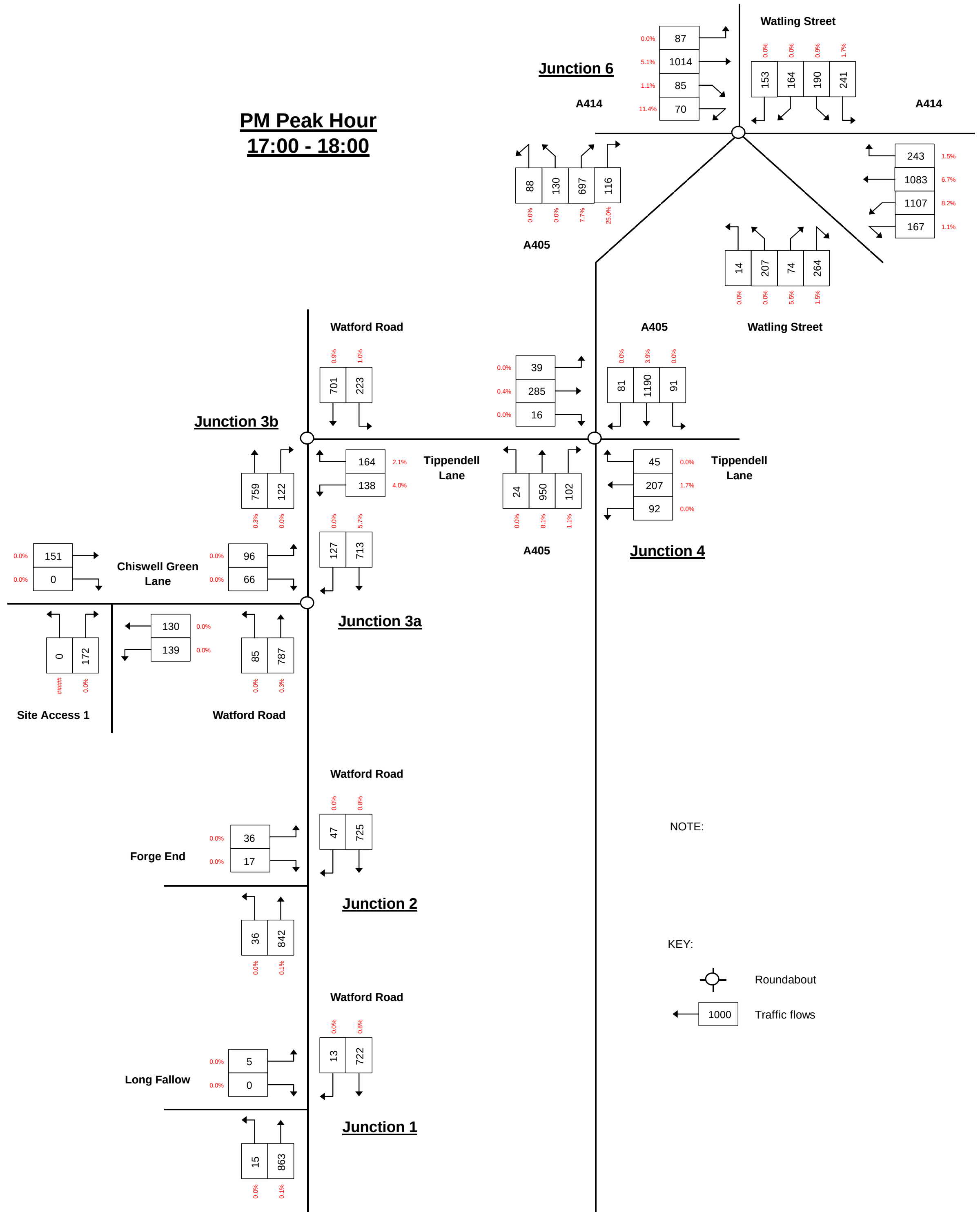
Client:	CALA Homes & Redington Capital
Project:	Land at Chiswell Green St Albans
Title:	2038 Traffic Flows "Do Nothing" + Committed Dev (Vehicles)

Project Engineer:	J. Blenkinsop	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			
Drawing No.		Appendix A16	





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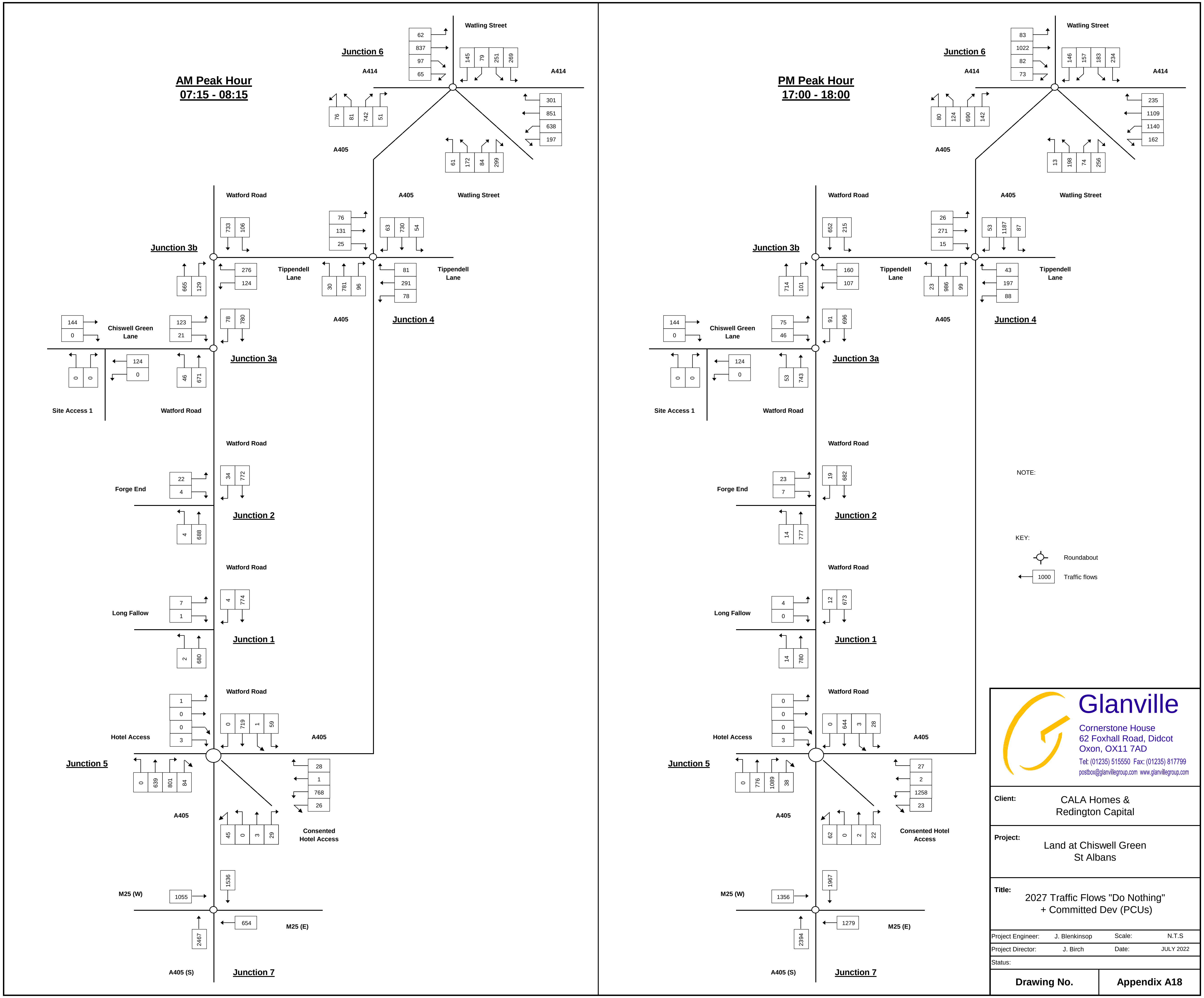
Client:	CALA Homes & Redington Capital
Project:	Land at Chiswell Green St Albans
Title:	2038 Traffic Flows "Do Something" + Committed Dev (Vehicles)

Project Engineer:	J. Blenkinsop	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			
Drawing No.		**Appendix A17**	



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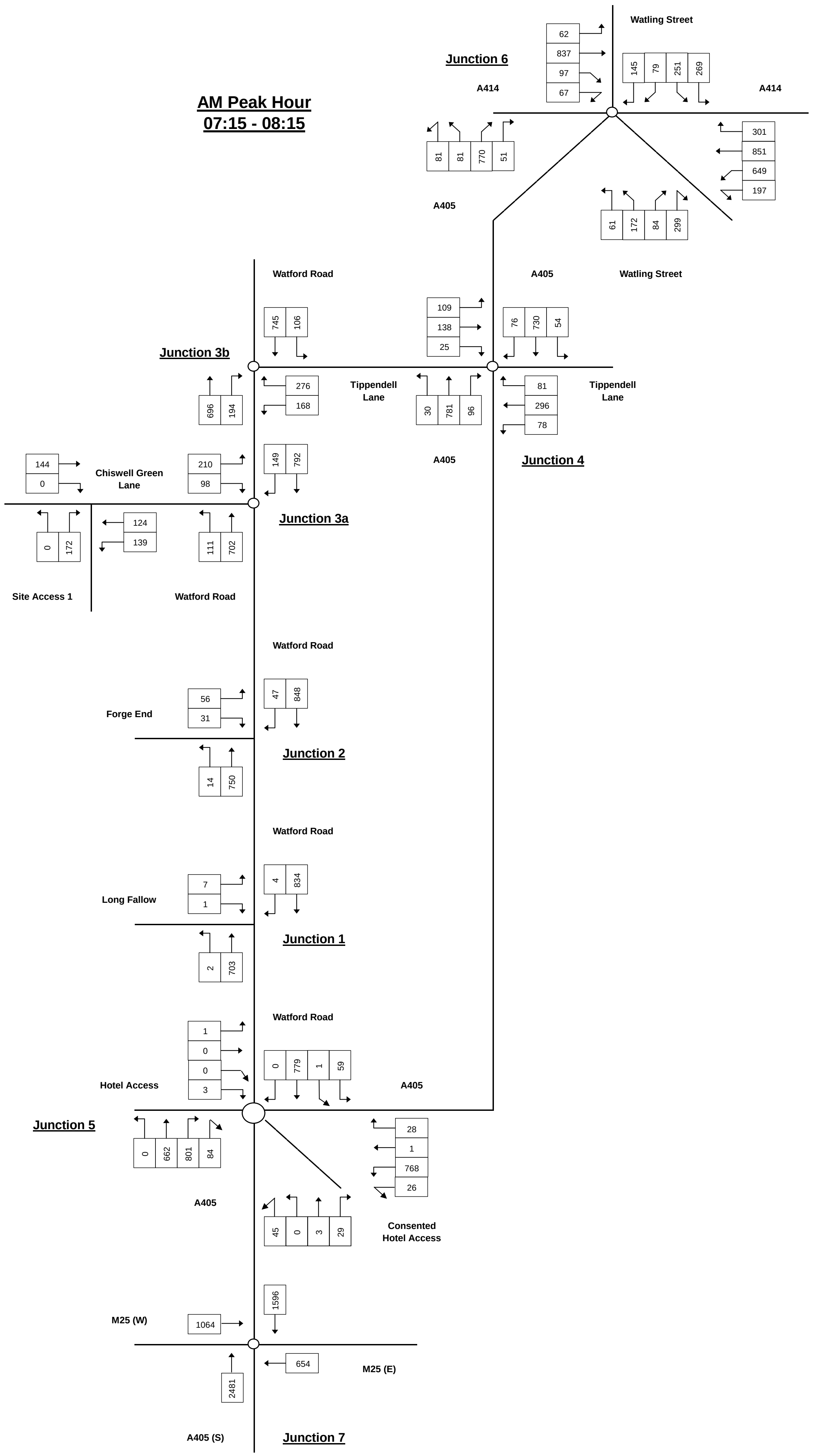
postbox@glanvillegroup.com www.glanvillegroup.com

Client:	CALA Homes & Redington Capital
Project:	Land at Chiswell Green St Albans
Title:	2027 Traffic Flows "Do Nothing" + Committed Dev (PCUs)

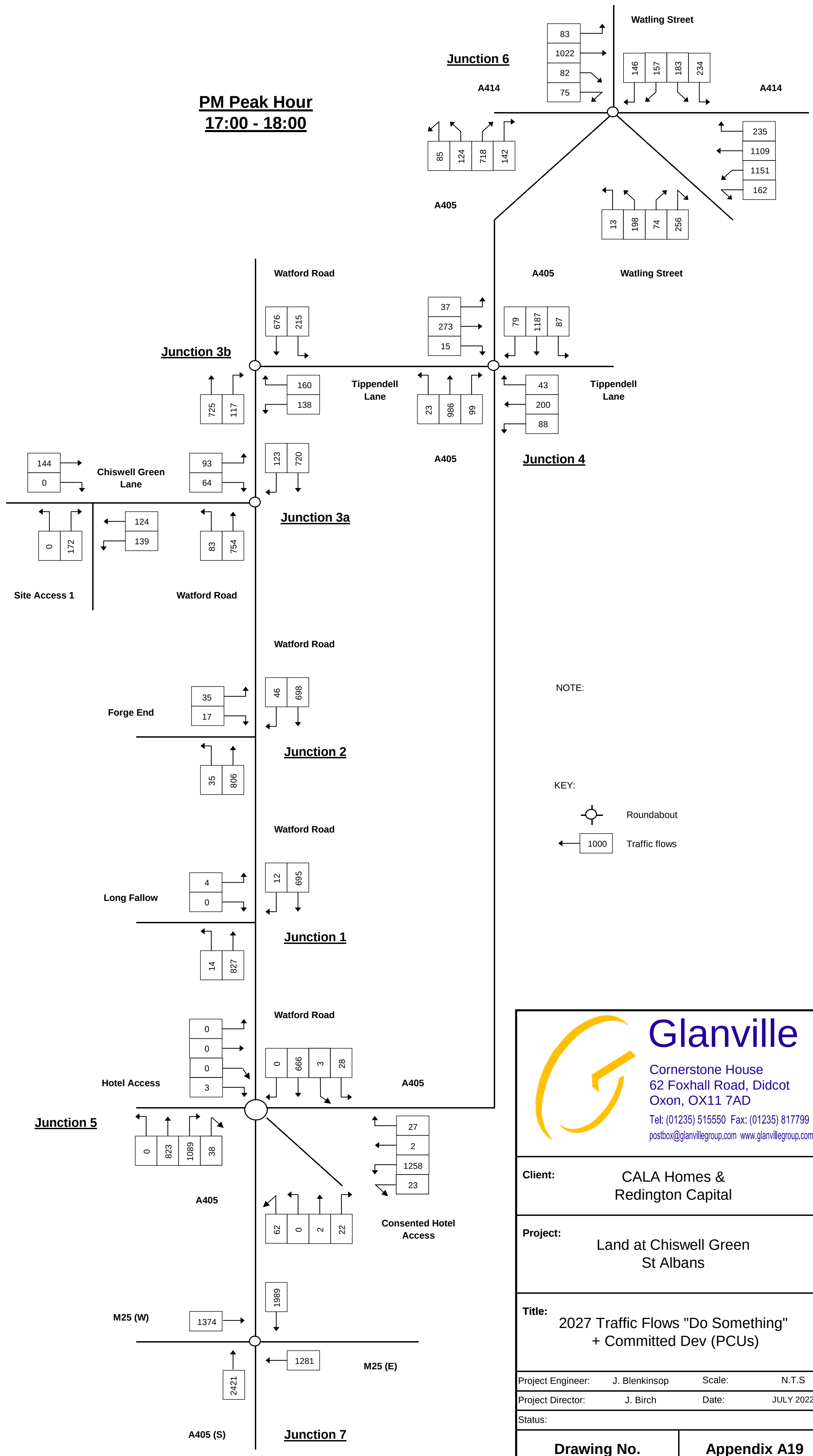
Project Engineer:	J. Blenkinsop	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			

Drawing No.	Appendix A18

AM Peak Hour
07:15 - 08:15



PM Peak Hour
17:00 - 18:00



NOTE:

KEY:

Roundabout

1000 Traffic flows

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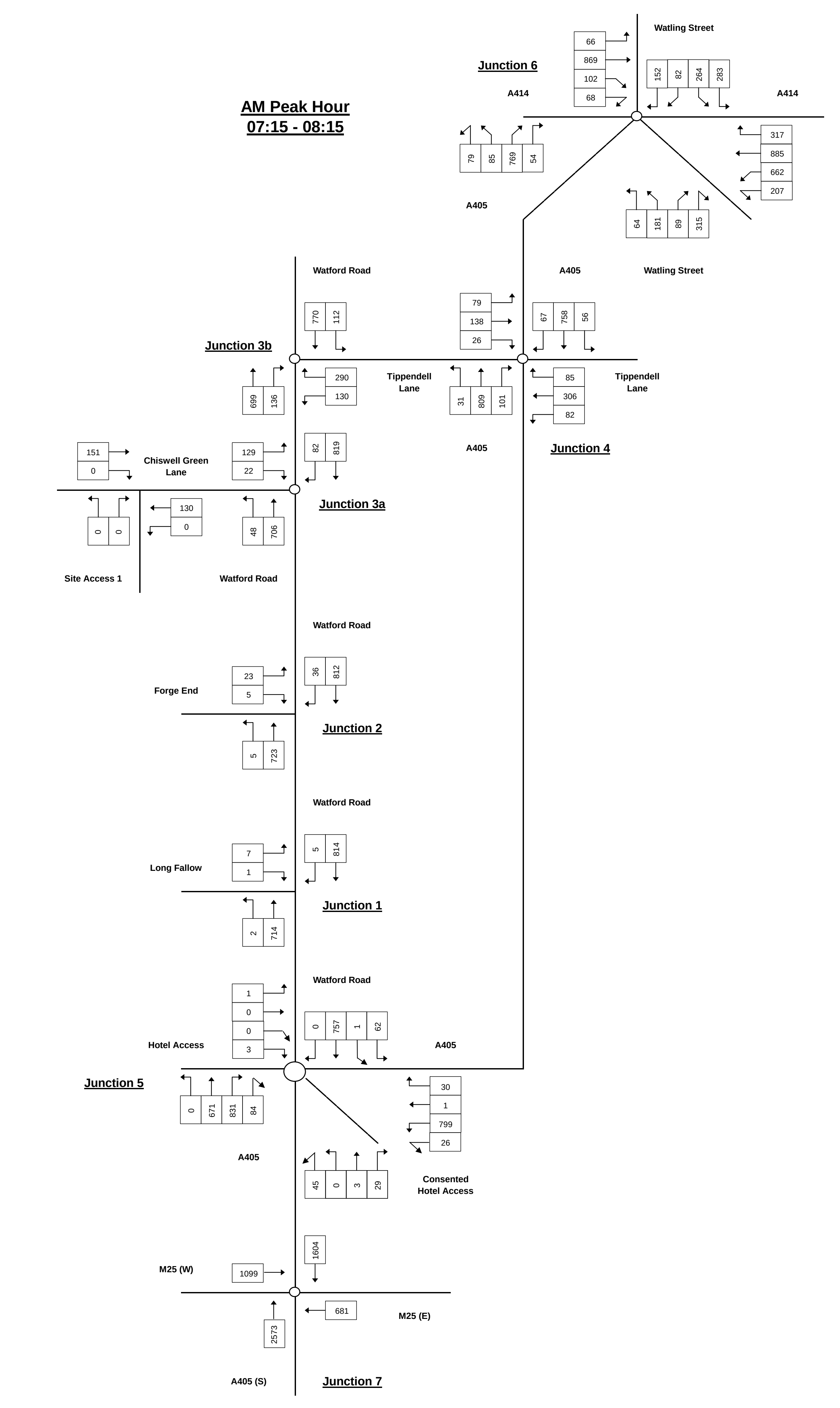
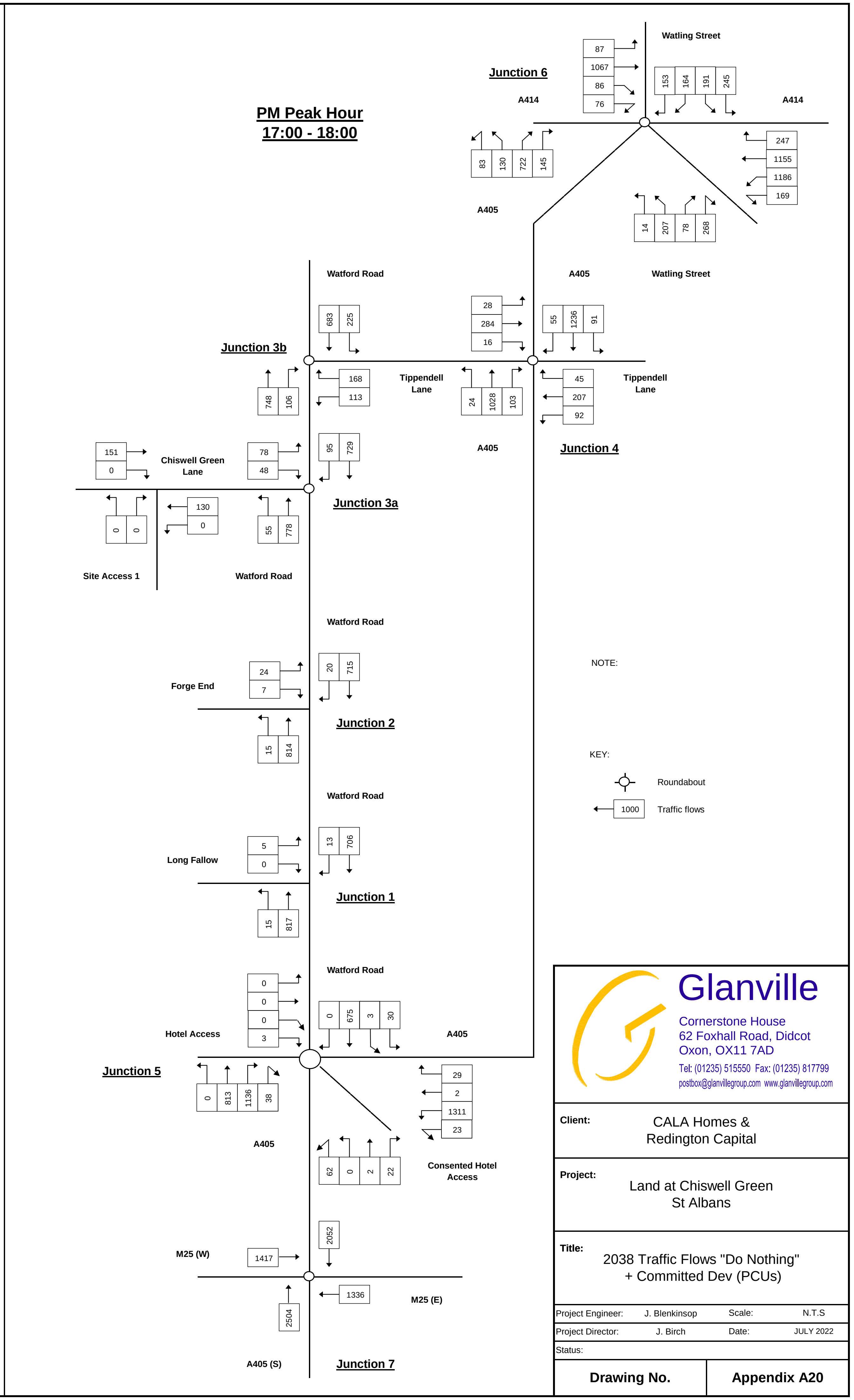
Client: CALA Homes & Redington Capital

Project: Land at Chiswell Green St Albans

Title: 2027 Traffic Flows "Do Something" + Committed Dev (PCUs)

Project Engineer:	J. Blenkinsop	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			
Drawing No.		**Appendix A19**	





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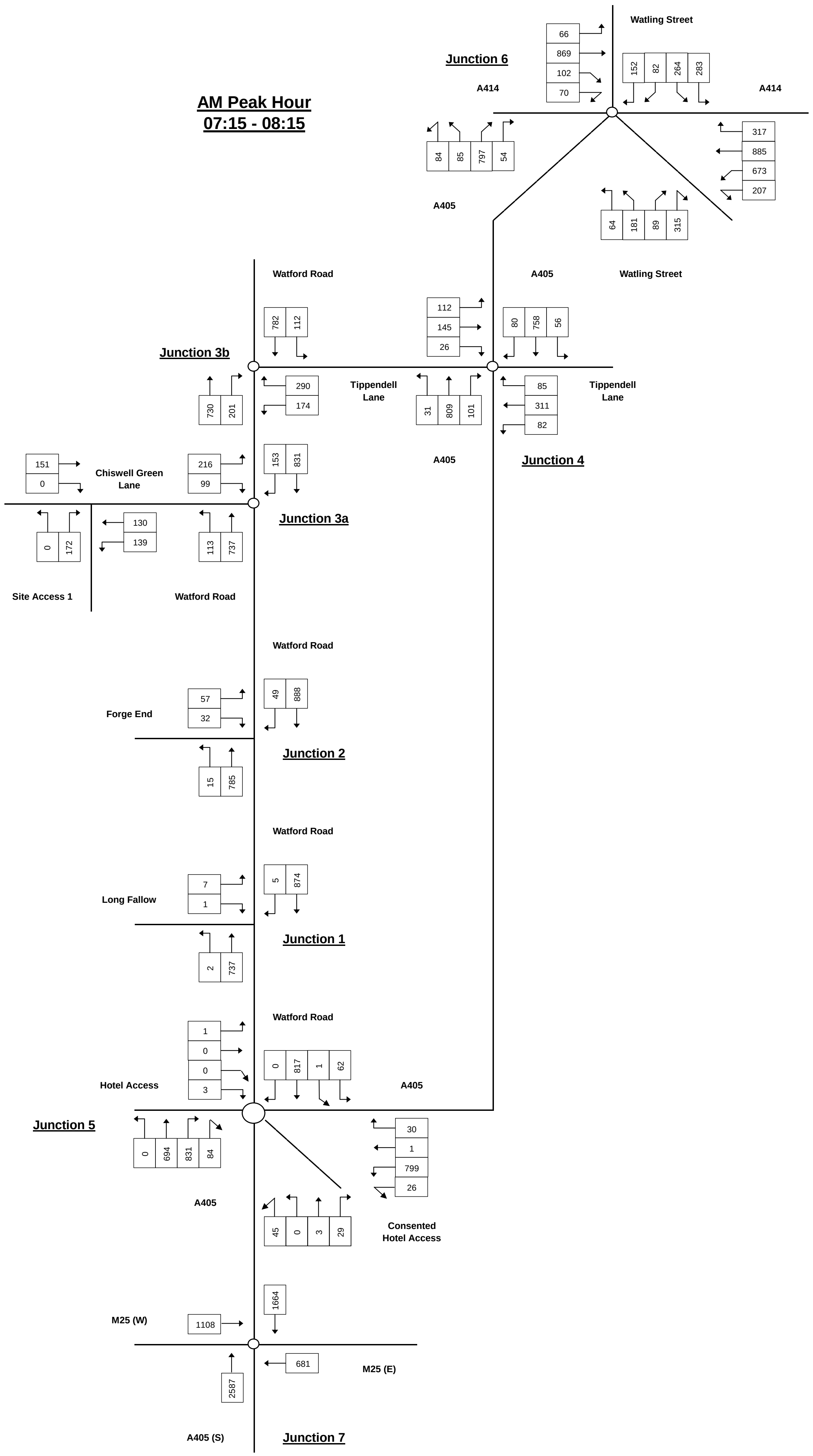
Client:	CALA Homes & Redington Capital
Project:	Land at Chiswell Green St Albans
Title:	2038 Traffic Flows "Do Nothing" + Committed Dev (PCUs)

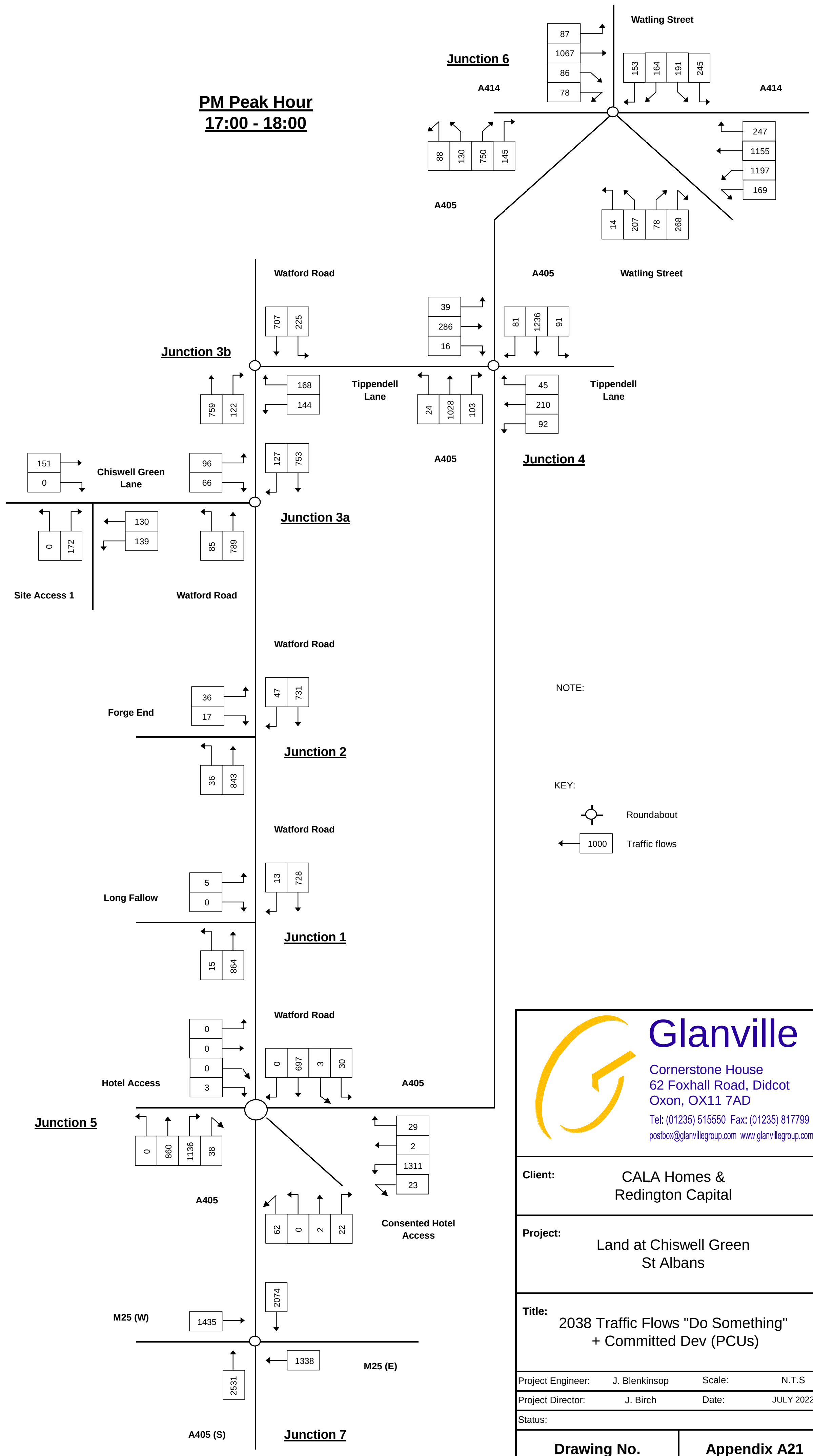
Project Engineer:	J. Blenkinsop	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			

Drawing No.	**Appendix A20**

AM Peak Hour
07:15 - 08:15



PM Peak Hour
17:00 - 18:00



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postbox@glanvillegroup.com www.glanvillegroup.com

Client: CALA Homes & Redington Capital

Project: Land at Chiswell Green St Albans

Title: 2038 Traffic Flows "Do Something" + Committed Dev (PCUs)

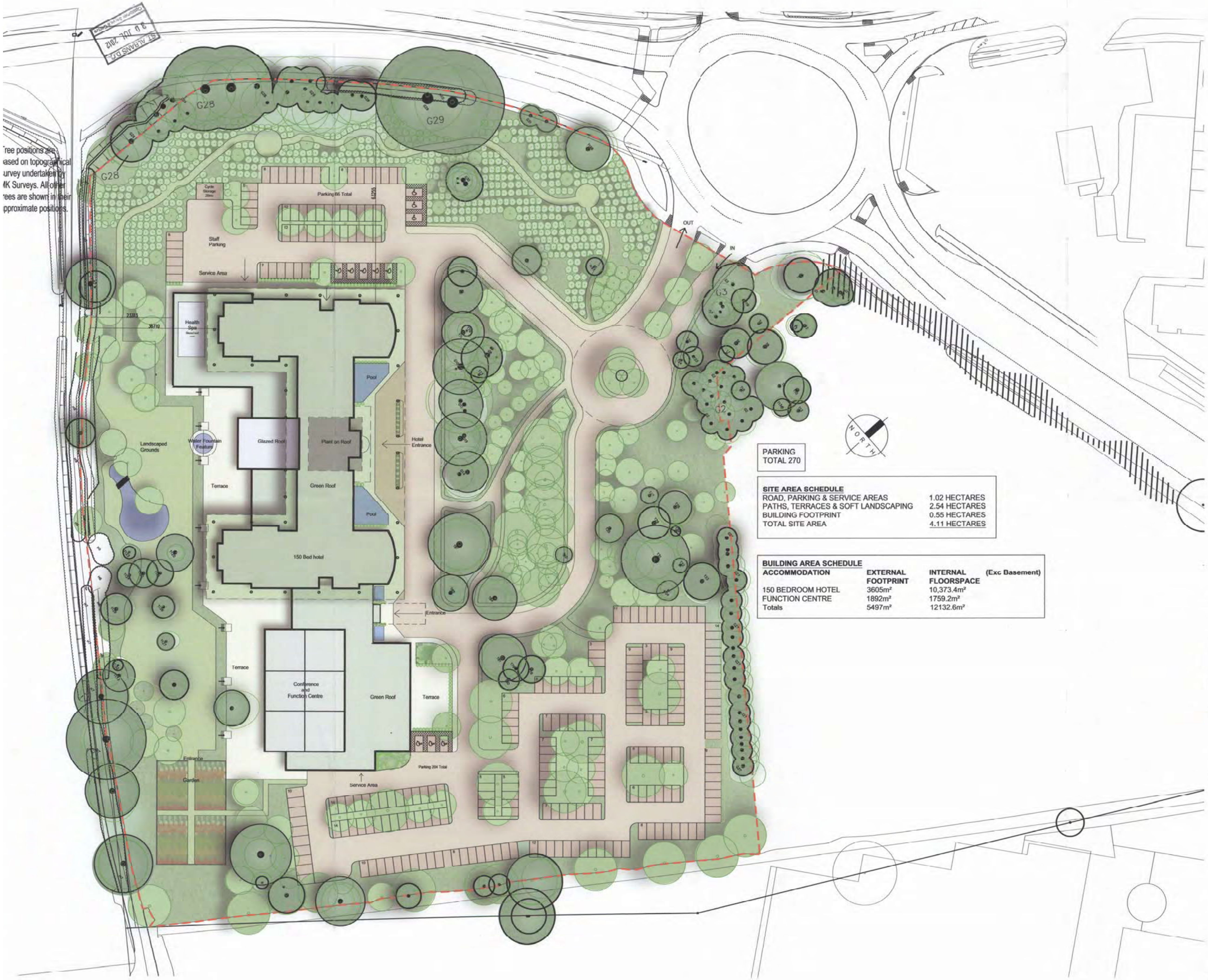
Project Engineer:	J. Blenkinsop	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			

Drawing No. **Appendix A21**

Appendix B

Noke Hotel Roundabout Improvements

this drawing. All construction information should be taken from figured dimensions only.



PARKING TOTAL 270

SITE AREA SCHEDULE

ROAD, PARKING & SERVICE AREAS	1.02 HECTARES
PATHS, TERRACES & SOFT LANDSCAPING	2.54 HECTARES
BUILDING FOOTPRINT	0.55 HECTARES
TOTAL SITE AREA	4.11 HECTARES

BUILDING AREA SCHEDULE

ACCOMMODATION	EXTERNAL FOOTPRINT	INTERNAL FLOORSPACE	(Exc Basement)
150 BEDROOM HOTEL	3605m²	10,373.4m²	
FUNCTION CENTRE	1892m²	1759.2m²	
Totals	5497m²	12132.6m²	

A1

date	rev	name	chk	note
04/07/2012	B	JBL	AB	Additional soft landscaping and tree's added, Labeling added, column position modified. Roof plant shown.
27/06/2012	A	JBL	AB	Additional soft landscaping and tree's added to match DCCLA landscape masterplan

CLIENT

51PEGASUS

Stride Treglown Bell

Architecture Town Planning Interior Design Building Surveying Landscape Architecture Graphic Design

3 Cosser Street, London, SE1 7BU
T 020 7401 0700 F 020 7401 0701 www.stridetreglown.co.uk

PROJECT

4- Star Hotel and Conference/Function Centre
Copsewood
St. Albans

DRAWING TITLE

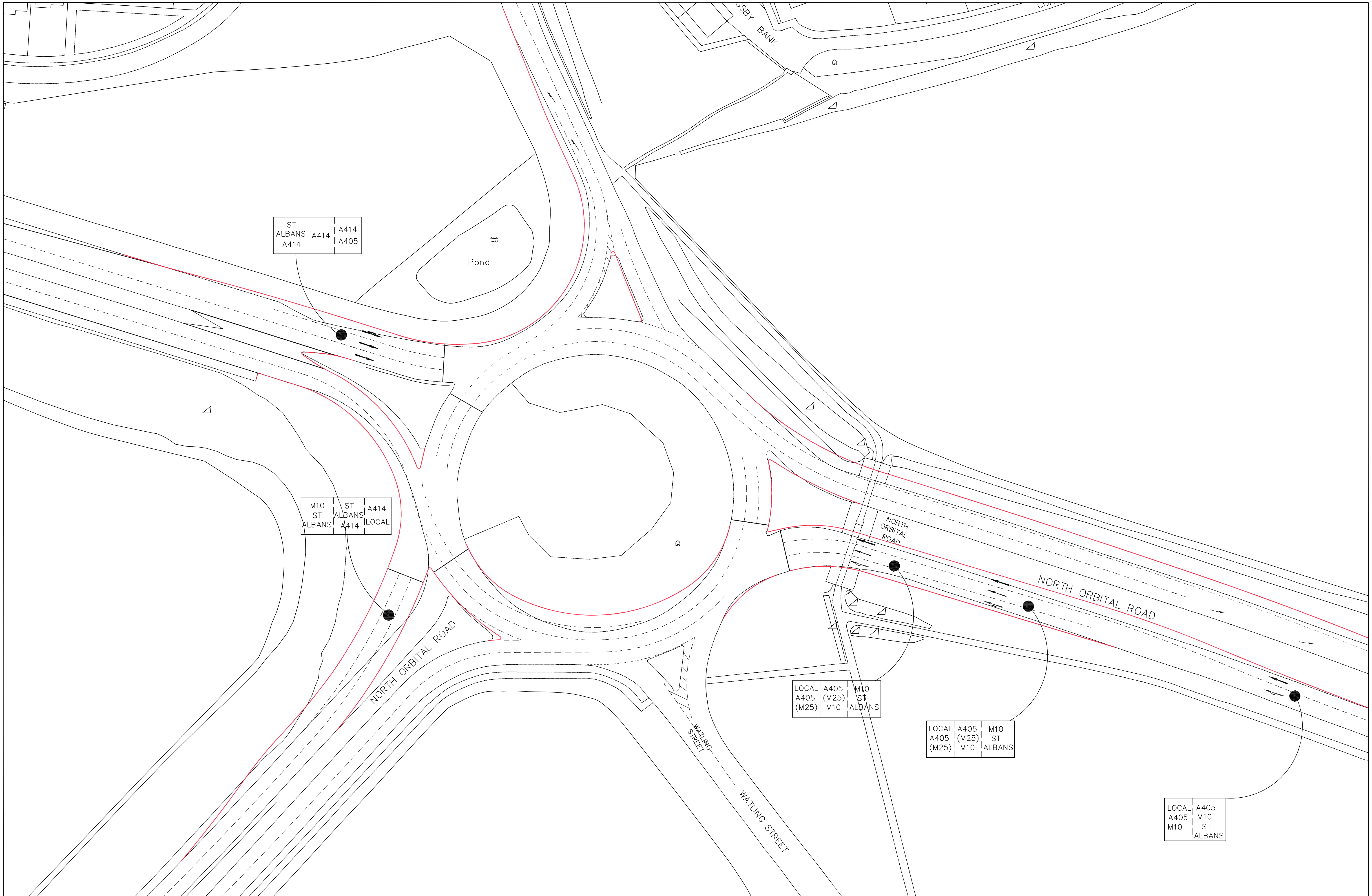
Proposed Site Plan

DATE	SCALE	DRAWN BY	CHECKED BY
14/06/2012	1:500 @A1	JBL	AB

DRAWING NUMBER	REVISION NO.
20913 P201	B

Appendix C

Park Street Roundabout Improvements



REV	DESCRIPTION	DRAWN	INITIALS	DATE
A	Revised A414/St Albans exit layouts		RJM	Oct07
B	Revised roundabout lane markings		RJM	Nov07
C	Revised M10/St Albans exit layouts		RJM	Nov07
D	Revised M10/St Albans exit layouts		RJM	Nov07

DRAWING STATUS	CHECKED BY	DATE

dta

david tucker associates
transport planning consultants

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Henley-in-Arden
Warwickshire B95 5AW
Tel: +44(0)1564 793598
Fax: +44(0)1564 793983
www.dtatransportation.co.uk

JOB TITLE: Former Aerodrome, North Orbital Rd

CLIENT: Helioslough

DRAWING TITLE: Proposed Park Street Roundabout

SCALE	DRAWN BY	DATE	DRAWING No	REVISION
1:500	MJH	June 2006	6035-23	D

Appendix D

**'Without Committed Development'
Junction Modelling Outputs**

Junctions 9
ARCADY 9 - Roundabout Module
Version: 9.0.2.5947 © Copyright TRL Limited, 2017
For sales and distribution information, program advice and maintenance, contact TRL: +44 (0)1344 770558 software@trl.co.uk www.trlsoftware.co.uk
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: A405_Watford Road.j9
Path: \\gc-did-fs01\CAD\2021\8210856\(6)_Transport\(1)_Planning\(4)_Modelling\SRN
Report generation date: 10/08/2022 12:07:49

Summary of junction performance

	AM					PM				
	Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)	Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)
	Existing Layout - 2016 Base									
Arm 1	1.2	5.48	0.54	A	4.50	1.2	6.41	0.54	A	7.55
Arm 2	0.7	4.00	0.43	A		2.0	6.58	0.67	A	
Arm 3	1.4	4.13	0.59	A		4.0	8.61	0.81	A	
Arm 4	0.0	12.10	0.02	B		0.0	0.00	0.00	A	
	Existing Layout - 2027 without Dev									
Arm 1	1.6	6.78	0.62	A	5.40	1.7	8.52	0.64	A	12.46
Arm 2	1.0	4.66	0.49	A		3.3	9.71	0.77	A	
Arm 3	1.9	4.95	0.66	A		8.0	15.74	0.90	C	
Arm 4	0.0	15.13	0.03	C		0.0	0.00	0.00	A	
	Existing Layout - 2027 with Dev									
Arm 1	1.9	7.74	0.66	A	5.85	1.9	9.02	0.66	A	14.66
Arm 2	1.0	4.92	0.51	A		3.5	10.13	0.78	B	
Arm 3	2.0	5.12	0.67	A		10.2	19.68	0.92	C	
Arm 4	0.0	15.81	0.03	C		0.0	0.00	0.00	A	
	Existing Layout - 2038 without Dev									
Arm 1	1.9	7.71	0.66	A	6.00	2.1	10.12	0.68	B	17.87
Arm 2	1.1	5.04	0.52	A		4.4	12.38	0.82	B	
Arm 3	2.2	5.45	0.69	A		12.8	24.38	0.94	C	
Arm 4	0.0	17.14	0.03	C		0.0	0.00	0.00	A	
	Existing Layout - 2038 with Dev									
Arm 1	2.4	8.98	0.71	A	6.57	2.3	10.78	0.70	B	22.37
Arm 2	1.2	5.35	0.54	A		4.6	13.07	0.83	B	
Arm 3	2.3	5.66	0.70	A		17.7	32.71	0.96	D	
Arm 4	0.0	18.01	0.03	C		0.0	0.00	0.00	A	

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages.

File summary

File Description

Title	J5 - A405 / Watford Road
Location	Chiswell Green
Site number	J5
Date	24/07/2022
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	8210856
Enumerator	UK\dkemp
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	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2016 Base	AM	ONE HOUR	07:00	08:30	15
D2	2016 Base	PM	ONE HOUR	16:45	18:15	15
D3	2027 without Dev	AM	ONE HOUR	07:00	08:30	15
D4	2027 without Dev	PM	ONE HOUR	16:45	18:15	15
D5	2027 with Dev	AM	ONE HOUR	07:00	08:30	15
D6	2027 with Dev	PM	ONE HOUR	16:45	18:15	15
D7	2038 without Dev	AM	ONE HOUR	07:00	08:30	15
D8	2038 without Dev	PM	ONE HOUR	16:45	18:15	15
D9	2038 with Dev	AM	ONE HOUR	07:00	08:30	15
D10	2038 with Dev	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	Existing Layout	100.000

Existing Layout - 2016 Base, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Watford Road	Standard Roundabout	1, 2, 3, 4	4.50	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Watford Road	
2	A405 (North)	
3	A405 (South)	
4	Hotel Access	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1	4.00	8.10	15.0	24.0	53.0	35.0	
2	7.40	8.20	0.7	11.0	53.0	39.0	
3	7.05	7.50	1.3	24.0	48.0	30.0	
4	3.00	3.90	1.7	6.5	48.0	50.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.621	1857
2	0.654	2131
3	0.719	2219
4	0.402	838

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2016 Base	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	705	100.000
2		✓	605	100.000
3		✓	1144	100.000
4		✓	6	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	54	651	0
	2	23	0	581	1
	3	581	563	0	0
	4	1	2	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	1	0
	2	13	0	6	0
	3	0	6	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.54	5.48	1.2	A
2	0.43	4.00	0.7	A
3	0.59	4.13	1.4	A
4	0.02	12.10	0.0	B

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	531	426	1563	0.340	529	0.5	3.473	A
2	455	490	1708	0.267	454	0.4	2.868	A
3	861	18	2137	0.403	859	0.7	2.810	A
4	5	876	474	0.010	4	0.0	7.668	A

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	634	510	1508	0.420	633	0.7	4.111	A
2	544	587	1648	0.330	543	0.5	3.257	A
3	1028	22	2134	0.482	1027	0.9	3.249	A
4	5	1048	402	0.013	5	0.0	9.067	A

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	776	624	1433	0.542	774	1.2	5.451	A
2	666	718	1566	0.425	665	0.7	3.991	A
3	1260	26	2130	0.591	1258	1.4	4.116	A
4	7	1283	305	0.022	7	0.0	12.062	B

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	776	625	1432	0.542	776	1.2	5.484	A
2	666	720	1565	0.426	666	0.7	4.004	A
3	1260	26	2130	0.591	1260	1.4	4.134	A
4	7	1285	304	0.022	7	0.0	12.099	B

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	634	512	1507	0.421	636	0.7	4.140	A
2	544	590	1647	0.330	545	0.5	3.272	A
3	1028	22	2134	0.482	1030	0.9	3.267	A
4	5	1051	401	0.013	5	0.0	9.099	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	531	428	1562	0.340	532	0.5	3.499	A
2	455	493	1707	0.267	456	0.4	2.881	A
3	861	18	2137	0.403	862	0.7	2.826	A
4	5	880	472	0.010	5	0.0	7.696	A

Existing Layout - 2016 Base, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Watford Road	Standard Roundabout	1, 2, 3, 4	7.55	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2016 Base	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	608	100.000
2		✓	1018	100.000
3		✓	1565	100.000
4		✓	4	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	25	583	0
	2	25	0	991	2
	3	706	859	0	0
	4	0	1	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	4	1	0
	2	0	0	3	0
	3	0	5	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.54	6.41	1.2	A
2	0.67	6.58	2.0	A
3	0.81	8.61	4.0	A
4	0.00	0.00	0.0	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	458	644	1426	0.321	456	0.5	3.705	A
2	766	437	1799	0.426	763	0.7	3.466	A
3	1178	20	2146	0.549	1173	1.2	3.682	A
4	0	1192	346	0.000	0	0.0	0.000	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	547	771	1344	0.407	546	0.7	4.505	A
2	915	523	1744	0.525	914	1.1	4.331	A
3	1407	24	2144	0.656	1404	1.9	4.851	A
4	0	1427	249	0.000	0	0.0	0.000	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	669	941	1234	0.543	667	1.2	6.334	A
2	1121	640	1669	0.672	1117	2.0	6.487	A
3	1723	30	2140	0.805	1715	4.0	8.309	A
4	0	1742	119	0.000	0	0.0	0.000	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	669	946	1231	0.544	669	1.2	6.408	A
2	1121	642	1667	0.672	1121	2.0	6.583	A
3	1723	30	2140	0.805	1723	4.0	8.610	A
4	0	1750	116	0.000	0	0.0	0.000	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	547	777	1340	0.408	549	0.7	4.560	A
2	915	526	1742	0.525	919	1.1	4.394	A
3	1407	24	2144	0.656	1415	1.9	4.999	A
4	0	1438	245	0.000	0	0.0	0.000	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	458	648	1423	0.322	459	0.5	3.734	A
2	766	440	1797	0.426	768	0.7	3.503	A
3	1178	20	2146	0.549	1181	1.2	3.742	A
4	0	1200	343	0.000	0	0.0	0.000	A

Existing Layout - 2027 without Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Watford Road	Standard Roundabout	1, 2, 3, 4	5.40	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2027 without Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	772	100.000
2		✓	681	100.000
3		✓	1272	100.000
4		✓	6	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	59	713	0
	2	25	0	655	1
	3	637	635	0	0
	4	1	2	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	1	0
	2	13	0	6	0
	3	0	6	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.62	6.78	1.6	A
2	0.49	4.66	1.0	A
3	0.66	4.95	1.9	A
4	0.03	15.13	0.0	C

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	581	480	1528	0.380	579	0.6	3.785	A
2	513	537	1680	0.305	511	0.4	3.077	A
3	958	20	2135	0.449	954	0.8	3.043	A
4	5	973	433	0.010	4	0.0	8.394	A

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	694	575	1466	0.474	693	0.9	4.652	A
2	612	643	1614	0.379	612	0.6	3.591	A
3	1144	23	2132	0.536	1142	1.1	3.633	A
4	5	1165	354	0.015	5	0.0	10.330	B

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	850	703	1382	0.615	847	1.6	6.701	A
2	750	786	1524	0.492	748	1.0	4.632	A
3	1400	29	2128	0.658	1398	1.9	4.909	A
4	7	1425	246	0.027	7	0.0	15.046	C

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	850	705	1381	0.616	850	1.6	6.781	A
2	750	788	1523	0.492	750	1.0	4.657	A
3	1400	29	2128	0.658	1400	1.9	4.950	A
4	7	1428	244	0.027	7	0.0	15.132	C

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	694	577	1464	0.474	697	0.9	4.708	A
2	612	646	1611	0.380	614	0.6	3.612	A
3	1144	23	2132	0.536	1146	1.2	3.666	A
4	5	1169	352	0.015	5	0.0	10.387	B

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	581	483	1526	0.381	582	0.6	3.818	A
2	513	540	1678	0.306	513	0.4	3.093	A
3	958	20	2135	0.449	959	0.8	3.067	A
4	5	978	431	0.010	5	0.0	8.435	A

Existing Layout - 2027 without Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Watford Road	Standard Roundabout	1, 2, 3, 4	12.46	B

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	2027 without Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	667	100.000
2		✓	1142	100.000
3		✓	1740	100.000
4		✓	4	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	27	640	0
	2	27	0	1113	2
	3	775	965	0	0
	4	0	1	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	4	1	0
	2	0	0	3	0
	3	0	5	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.64	8.52	1.7	A
2	0.77	9.71	3.3	A
3	0.90	15.74	8.0	C
4	0.00	0.00	0.0	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	502	723	1375	0.365	500	0.6	4.103	A
2	860	480	1772	0.485	856	0.9	3.916	A
3	1310	22	2145	0.611	1304	1.6	4.249	A
4	0	1324	291	0.000	0	0.0	0.000	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	600	865	1283	0.467	598	0.9	5.249	A
2	1027	574	1711	0.600	1024	1.5	5.228	A
3	1564	26	2142	0.730	1560	2.6	6.138	A
4	0	1584	184	0.000	0	0.0	0.000	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	734	1052	1163	0.632	731	1.7	8.280	A
2	1257	702	1629	0.772	1250	3.2	9.338	A
3	1916	32	2138	0.896	1896	7.5	13.901	B
4	0	1926	43	0.000	0	0.0	0.000	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	734	1061	1156	0.635	734	1.7	8.522	A
2	1257	705	1627	0.773	1257	3.3	9.707	A
3	1916	32	2138	0.896	1914	8.0	15.743	C
4	0	1944	36	0.000	0	0.0	0.000	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	600	879	1274	0.471	603	0.9	5.390	A
2	1027	578	1708	0.601	1034	1.5	5.393	A
3	1564	26	2142	0.730	1585	2.8	6.697	A
4	0	1610	174	0.000	0	0.0	0.000	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	502	729	1371	0.366	503	0.6	4.155	A
2	860	483	1769	0.486	862	1.0	3.978	A
3	1310	22	2145	0.611	1315	1.6	4.363	A
4	0	1335	287	0.000	0	0.0	0.000	A

Existing Layout - 2027 with Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Watford Road	Standard Roundabout	1, 2, 3, 4	5.85	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D5	2027 with Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	832	100.000
2		✓	681	100.000
3		✓	1295	100.000
4		✓	6	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	59	773	0
	2	25	0	655	1
	3	660	635	0	0
	4	1	2	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	1	0
	2	13	0	6	0
	3	0	6	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.66	7.74	1.9	A
2	0.51	4.92	1.0	A
3	0.67	5.12	2.0	A
4	0.03	15.81	0.0	C

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	626	480	1528	0.410	624	0.7	3.971	A
2	513	582	1652	0.310	511	0.4	3.156	A
3	975	20	2136	0.456	972	0.8	3.083	A
4	5	990	426	0.011	4	0.0	8.530	A

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	748	575	1466	0.510	747	1.0	4.998	A
2	612	696	1580	0.387	611	0.6	3.715	A
3	1164	23	2133	0.546	1163	1.2	3.706	A
4	5	1185	346	0.016	5	0.0	10.581	B

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	916	703	1382	0.663	912	1.9	7.617	A
2	750	851	1483	0.505	748	1.0	4.887	A
3	1426	29	2129	0.670	1423	2.0	5.074	A
4	7	1450	236	0.028	7	0.0	15.711	C

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	916	705	1380	0.664	916	1.9	7.745	A
2	750	854	1481	0.506	750	1.0	4.919	A
3	1426	29	2129	0.670	1426	2.0	5.120	A
4	7	1453	234	0.028	7	0.0	15.809	C

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	748	577	1464	0.511	752	1.1	5.076	A
2	612	701	1577	0.388	614	0.6	3.741	A
3	1164	23	2133	0.546	1167	1.2	3.739	A
4	5	1190	344	0.016	5	0.0	10.647	B

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	626	483	1526	0.410	628	0.7	4.014	A
2	513	586	1649	0.311	513	0.5	3.171	A
3	975	20	2136	0.456	976	0.8	3.108	A
4	5	995	424	0.011	5	0.0	8.573	A

Existing Layout - 2027 with Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Watford Road	Standard Roundabout	1, 2, 3, 4	14.66	B

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D6	2027 with Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	689	100.000
2		✓	1142	100.000
3		✓	1787	100.000
4		✓	4	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	27	662	0
	2	27	0	1113	2
	3	822	965	0	0
	4	0	1	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	4	1	0
	2	0	0	3	0
	3	0	5	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.66	9.02	1.9	A
2	0.78	10.13	3.5	B
3	0.92	19.68	10.2	C
4	0.00	0.00	0.0	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	519	723	1375	0.377	516	0.6	4.180	A
2	860	496	1761	0.488	856	0.9	3.961	A
3	1345	22	2146	0.627	1339	1.7	4.421	A
4	0	1359	277	0.000	0	0.0	0.000	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	619	865	1283	0.483	618	0.9	5.402	A
2	1027	594	1698	0.605	1024	1.5	5.324	A
3	1606	26	2143	0.750	1601	2.9	6.581	A
4	0	1626	167	0.000	0	0.0	0.000	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	759	1049	1165	0.651	755	1.8	8.715	A
2	1257	725	1614	0.779	1250	3.4	9.705	A
3	1968	32	2139	0.920	1942	9.3	16.455	C
4	0	1972	25	0.000	0	0.0	0.000	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	759	1061	1157	0.656	758	1.9	9.025	A
2	1257	729	1611	0.780	1257	3.5	10.128	B
3	1968	32	2139	0.920	1964	10.2	19.679	C
4	0	1994	16	0.000	0	0.0	0.000	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	619	883	1272	0.487	623	1.0	5.581	A
2	1027	599	1695	0.606	1034	1.6	5.507	A
3	1606	26	2143	0.750	1635	3.1	7.453	A
4	0	1659	154	0.000	0	0.0	0.000	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	519	729	1371	0.378	520	0.6	4.240	A
2	860	500	1759	0.489	862	1.0	4.025	A
3	1345	22	2146	0.627	1351	1.7	4.558	A
4	0	1371	272	0.000	0	0.0	0.000	A

Existing Layout - 2038 without Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Watford Road	Standard Roundabout	1, 2, 3, 4	6.00	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D7	2038 without Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	812	100.000
2		✓	711	100.000
3		✓	1332	100.000
4		✓	6	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	62	750	0
	2	26	0	684	1
	3	669	663	0	0
	4	1	2	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	1	0
	2	13	0	6	0
	3	0	6	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.66	7.71	1.9	A
2	0.52	5.04	1.1	A
3	0.69	5.45	2.2	A
4	0.03	17.14	0.0	C

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	611	501	1514	0.404	609	0.7	3.965	A
2	535	564	1662	0.322	533	0.5	3.183	A
3	1003	20	2134	0.470	999	0.9	3.163	A
4	5	1019	414	0.011	4	0.0	8.779	A

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	730	600	1449	0.504	729	1.0	4.986	A
2	639	676	1593	0.401	638	0.7	3.767	A
3	1197	24	2131	0.562	1196	1.3	3.842	A
4	5	1219	331	0.016	5	0.0	11.048	B

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	894	734	1362	0.657	891	1.9	7.588	A
2	783	826	1499	0.522	781	1.1	5.003	A
3	1467	30	2127	0.689	1463	2.2	5.390	A
4	7	1491	218	0.030	7	0.0	17.007	C

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	894	735	1360	0.657	894	1.9	7.713	A
2	783	829	1497	0.523	783	1.1	5.038	A
3	1467	30	2127	0.690	1466	2.2	5.448	A
4	7	1495	217	0.030	7	0.0	17.137	C

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	730	602	1448	0.504	733	1.0	5.064	A
2	639	680	1590	0.402	641	0.7	3.800	A
3	1197	24	2131	0.562	1201	1.3	3.886	A
4	5	1224	329	0.016	5	0.0	11.126	B

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	611	504	1512	0.404	613	0.7	4.008	A
2	535	568	1660	0.322	536	0.5	3.207	A
3	1003	20	2134	0.470	1004	0.9	3.192	A
4	5	1024	412	0.011	5	0.0	8.829	A

Existing Layout - 2038 without Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Watford Road	Standard Roundabout	1, 2, 3, 4	17.87	C

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D8	2038 without Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	700	100.000
2		✓	1196	100.000
3		✓	1822	100.000
4		✓	4	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	29	671	0
	2	29	0	1165	2
	3	812	1010	0	0
	4	0	1	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	4	1	0
	2	0	0	3	0
	3	0	5	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.68	10.12	2.1	B
2	0.82	12.38	4.4	B
3	0.94	24.38	12.8	C
4	0.00	0.00	0.0	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	527	756	1353	0.389	524	0.6	4.331	A
2	900	503	1757	0.513	896	1.0	4.163	A
3	1372	23	2144	0.640	1365	1.8	4.579	A
4	0	1386	266	0.000	0	0.0	0.000	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	629	905	1257	0.500	628	1.0	5.706	A
2	1075	602	1693	0.635	1073	1.7	5.775	A
3	1638	28	2141	0.765	1632	3.2	7.003	A
4	0	1658	154	0.000	0	0.0	0.000	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	771	1094	1135	0.679	766	2.0	9.655	A
2	1317	735	1608	0.819	1307	4.2	11.593	B
3	2006	34	2136	0.939	1974	11.3	19.149	C
4	0	2005	10	0.000	0	0.0	0.000	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	771	1109	1126	0.685	770	2.1	10.116	B
2	1317	738	1605	0.820	1316	4.4	12.383	B
3	2006	34	2136	0.939	2000	12.8	24.378	C
4	0	2032	0	0.000	0	0.0	0.000	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	629	929	1242	0.507	634	1.0	5.960	A
2	1075	607	1690	0.636	1086	1.8	6.060	A
3	1638	28	2140	0.765	1675	3.4	8.333	A
4	0	1702	136	0.000	0	0.0	0.000	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	527	764	1348	0.391	529	0.6	4.398	A
2	900	507	1754	0.513	903	1.1	4.244	A
3	1372	23	2144	0.640	1378	1.8	4.740	A
4	0	1400	260	0.000	0	0.0	0.000	A

Existing Layout - 2038 with Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Watford Road	Standard Roundabout	1, 2, 3, 4	6.57	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D9	2038 with Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	872	100.000
2		✓	711	100.000
3		✓	1355	100.000
4		✓	6	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	62	810	0
	2	26	0	684	1
	3	692	663	0	0
	4	1	2	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	1	0
	2	13	0	6	0
	3	0	6	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.71	8.98	2.4	A
2	0.54	5.35	1.2	A
3	0.70	5.66	2.3	A
4	0.03	18.01	0.0	C

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	656	501	1514	0.434	653	0.8	4.170	A
2	535	609	1634	0.328	533	0.5	3.264	A
3	1020	20	2136	0.478	1016	0.9	3.206	A
4	5	1036	408	0.011	4	0.0	8.930	A

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	784	600	1449	0.541	782	1.2	5.385	A
2	639	729	1559	0.410	638	0.7	3.905	A
3	1218	24	2132	0.571	1216	1.3	3.923	A
4	5	1240	323	0.017	5	0.0	11.335	B

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	960	734	1362	0.705	955	2.3	8.767	A
2	783	891	1459	0.537	781	1.1	5.299	A
3	1492	30	2128	0.701	1488	2.3	5.588	A
4	7	1517	208	0.032	7	0.0	17.854	C

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	960	735	1360	0.706	960	2.4	8.982	A
2	783	895	1456	0.538	783	1.2	5.346	A
3	1492	30	2128	0.701	1492	2.3	5.655	A
4	7	1520	207	0.032	7	0.0	18.009	C

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	784	602	1447	0.542	789	1.2	5.503	A
2	639	735	1556	0.411	641	0.7	3.942	A
3	1218	24	2132	0.571	1222	1.3	3.972	A
4	5	1245	321	0.017	5	0.0	11.424	B

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	656	504	1512	0.434	658	0.8	4.224	A
2	535	614	1632	0.328	536	0.5	3.290	A
3	1020	20	2135	0.478	1022	0.9	3.239	A
4	5	1041	405	0.011	5	0.0	8.983	A

Existing Layout - 2038 with Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Watford Road	Standard Roundabout	1, 2, 3, 4	22.37	C

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D10	2038 with Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	722	100.000
2		✓	1196	100.000
3		✓	1869	100.000
4		✓	4	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	29	693	0
	2	29	0	1165	2
	3	859	1010	0	0
	4	0	1	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	4	1	0
	2	0	0	3	0
	3	0	5	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.70	10.78	2.3	B
2	0.83	13.07	4.6	B
3	0.96	32.71	17.7	D
4	0.00	0.00	0.0	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	544	756	1353	0.402	541	0.7	4.417	A
2	900	519	1746	0.516	896	1.1	4.214	A
3	1407	23	2145	0.656	1400	1.9	4.781	A
4	0	1421	252	0.000	0	0.0	0.000	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	649	904	1258	0.516	648	1.1	5.884	A
2	1075	622	1680	0.640	1072	1.7	5.893	A
3	1680	28	2142	0.784	1674	3.5	7.580	A
4	0	1700	137	0.000	0	0.0	0.000	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	795	1088	1139	0.698	790	2.2	10.182	B
2	1317	758	1592	0.827	1306	4.4	12.142	B
3	2058	34	2138	0.963	2013	14.6	23.284	C
4	0	2045	0	0.000	0	0.0	0.000	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	795	1106	1128	0.705	795	2.3	10.777	B
2	1317	763	1590	0.828	1316	4.6	13.067	B
3	2058	34	2138	0.963	2046	17.7	32.712	D
4	0	2078	0	0.000	0	0.0	0.000	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	649	938	1236	0.525	654	1.1	6.235	A
2	1075	628	1676	0.641	1086	1.8	6.214	A
3	1680	28	2142	0.784	1736	3.8	9.999	A
4	0	1762	111	0.000	0	0.0	0.000	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	544	764	1348	0.403	545	0.7	4.493	A
2	900	523	1744	0.516	903	1.1	4.299	A
3	1407	23	2145	0.656	1415	1.9	4.975	A
4	0	1436	245	0.000	0	0.0	0.000	A

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.0.2.5947

For sales and distribution information, program advice and maintenance, contact TRL:
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Filename: A405_Tippendell Lane.j9
Path: \\gc-did-fs01\CAD\2021\8210856\(6)_Transport\(1)_Planning\(4)_Modelling\SRN
Report generation date: 10/08/2022 12:10:11

Summary of junction performance

	AM					PM				
	Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)	Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)
	Existing Layout - 2016 Base									
Arm 1	0.5	2.49	0.32	A	3.74	1.2	3.69	0.54	A	4.31
Arm 2	0.9	6.96	0.46	A		0.8	8.66	0.44	A	
Arm 3	0.5	2.83	0.35	A		0.8	3.12	0.45	A	
Arm 4	0.3	4.33	0.22	A		0.5	5.79	0.33	A	
	Existing Layout - 2027 without Dev									
Arm 1	0.6	2.67	0.36	A	4.25	1.6	4.46	0.61	A	5.24
Arm 2	1.1	8.46	0.53	A		1.1	11.70	0.54	B	
Arm 3	0.7	3.11	0.40	A		1.0	3.54	0.51	A	
Arm 4	0.3	4.78	0.25	A		0.7	6.94	0.40	A	
	Existing Layout - 2027 with Dev									
Arm 1	0.6	2.71	0.37	A	4.38	1.7	4.63	0.63	A	5.46
Arm 2	1.2	8.75	0.55	A		1.2	12.51	0.56	B	
Arm 3	0.7	3.15	0.41	A		1.1	3.62	0.52	A	
Arm 4	0.4	5.08	0.30	A		0.7	7.13	0.41	A	
	Existing Layout - 2038 without Dev									
Arm 1	0.6	2.77	0.38	A	4.58	1.8	4.91	0.65	A	5.86
Arm 2	1.3	9.49	0.58	A		1.4	14.01	0.59	B	
Arm 3	0.7	3.27	0.43	A		1.2	3.76	0.54	A	
Arm 4	0.4	5.03	0.27	A		0.8	7.67	0.43	A	
	Existing Layout - 2038 with Dev									
Arm 1	0.6	2.81	0.39	A	4.73	1.9	5.12	0.66	A	6.15
Arm 2	1.4	9.85	0.59	A		1.6	15.17	0.62	C	
Arm 3	0.7	3.31	0.43	A		1.2	3.86	0.54	A	
Arm 4	0.5	5.35	0.32	A		0.8	7.91	0.45	A	

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages.

File summary

File Description

Title	J4 - A405 / Tippendell Lane
Location	Chiswell Green
Site number	J4
Date	24/07/2022
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	8210856
Enumerator	UK\dkemp
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	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2016 Base	AM	ONE HOUR	07:00	08:30	15
D2	2016 Base	PM	ONE HOUR	16:45	18:15	15
D3	2027 without Dev	AM	ONE HOUR	07:00	08:30	15
D4	2027 without Dev	PM	ONE HOUR	16:45	18:15	15
D5	2027 with Dev	AM	ONE HOUR	07:00	08:30	15
D6	2027 with Dev	PM	ONE HOUR	16:45	18:15	15
D7	2038 without Dev	AM	ONE HOUR	07:00	08:30	15
D8	2038 without Dev	PM	ONE HOUR	16:45	18:15	15
D9	2038 with Dev	AM	ONE HOUR	07:00	08:30	15
D10	2038 with Dev	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	Existing Layout	100.000

Existing Layout - 2016 Base, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	3.74	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	A405 (North)	
2	Tippendell Lane (East)	
3	A405 (South)	
4	Tippendell Lane (West)	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1	7.40	8.00	18.6	31.0	44.0	28.0	
2	3.20	5.10	10.3	23.0	44.0	20.0	
3	7.50	8.00	2.3	43.0	44.0	29.0	
4	3.20	6.10	16.0	17.0	44.0	23.5	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.789	2465
2	0.582	1386
3	0.783	2432
4	0.605	1547

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2016 Base	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	625	100.000
2		✓	404	100.000
3		✓	632	100.000
4		✓	211	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	48	521	56
	2	73	0	70	261
	3	519	86	0	27
	4	69	119	23	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	2	7	4
	2	1	0	1	2
	3	7	2	0	0
	4	0	1	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.32	2.49	0.5	A
2	0.46	6.96	0.9	A
3	0.35	2.83	0.5	A
4	0.22	4.33	0.3	A

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	471	171	2196	0.214	469	0.3	2.084	A
2	304	451	1089	0.279	303	0.4	4.568	A
3	476	292	2071	0.230	475	0.3	2.254	A
4	159	509	1215	0.131	158	0.1	3.403	A

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	562	205	2170	0.259	562	0.3	2.237	A
2	363	539	1036	0.351	363	0.5	5.345	A
3	568	350	2027	0.280	568	0.4	2.466	A
4	190	609	1152	0.165	189	0.2	3.741	A

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	688	251	2136	0.322	688	0.5	2.486	A
2	445	660	962	0.462	444	0.8	6.925	A
3	696	428	1968	0.354	695	0.5	2.826	A
4	232	746	1064	0.218	232	0.3	4.321	A

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	688	251	2135	0.322	688	0.5	2.487	A
2	445	661	962	0.462	445	0.9	6.962	A
3	696	429	1968	0.354	696	0.5	2.830	A
4	232	746	1064	0.218	232	0.3	4.328	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	562	205	2170	0.259	562	0.4	2.239	A
2	363	540	1035	0.351	364	0.5	5.379	A
3	568	352	2026	0.280	569	0.4	2.472	A
4	190	610	1151	0.165	190	0.2	3.750	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	471	172	2195	0.214	471	0.3	2.089	A
2	304	452	1088	0.279	305	0.4	4.598	A
3	476	294	2069	0.230	476	0.3	2.261	A
4	159	511	1214	0.131	159	0.2	3.411	A

Existing Layout - 2016 Base, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	4.31	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2016 Base	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	1038	100.000
2		✓	296	100.000
3		✓	859	100.000
4		✓	284	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	79	911	48
	2	39	0	80	177
	3	749	89	0	21
	4	24	246	14	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	2	0
	2	0	0	0	2
	3	6	1	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.54	3.69	1.2	A
2	0.44	8.66	0.8	A
3	0.45	3.12	0.8	A
4	0.33	5.79	0.5	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	781	262	2212	0.353	779	0.5	2.510	A
2	223	730	942	0.236	222	0.3	4.987	A
3	647	198	2169	0.298	645	0.4	2.361	A
4	214	658	1129	0.189	213	0.2	3.924	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	933	313	2172	0.430	932	0.7	2.903	A
2	266	874	858	0.310	266	0.4	6.073	A
3	772	237	2139	0.361	772	0.6	2.631	A
4	255	788	1047	0.244	255	0.3	4.541	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1143	384	2118	0.540	1141	1.2	3.680	A
2	326	1070	743	0.439	325	0.8	8.587	A
3	946	290	2099	0.451	945	0.8	3.115	A
4	313	964	935	0.334	312	0.5	5.770	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1143	384	2117	0.540	1143	1.2	3.694	A
2	326	1071	742	0.439	326	0.8	8.657	A
3	946	291	2098	0.451	946	0.8	3.122	A
4	313	966	935	0.335	313	0.5	5.788	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	933	314	2171	0.430	935	0.8	2.915	A
2	266	876	856	0.311	267	0.5	6.123	A
3	772	238	2138	0.361	773	0.6	2.639	A
4	255	790	1046	0.244	256	0.3	4.561	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	781	263	2211	0.353	782	0.5	2.523	A
2	223	733	941	0.237	223	0.3	5.025	A
3	647	199	2168	0.298	647	0.4	2.370	A
4	214	661	1128	0.190	214	0.2	3.941	A

Existing Layout - 2027 without Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	4.25	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2027 without Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	701	100.000
2		✓	443	100.000
3		✓	709	100.000
4		✓	231	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	53	587	61
	2	80	0	77	286
	3	585	94	0	30
	4	76	130	25	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	2	7	4
	2	1	0	1	2
	3	7	2	0	0
	4	0	1	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.36	2.67	0.6	A
2	0.53	8.46	1.1	A
3	0.40	3.11	0.7	A
4	0.25	4.78	0.3	A

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	528	187	2183	0.242	526	0.3	2.172	A
2	334	505	1056	0.316	332	0.5	4.959	A
3	534	320	2050	0.260	532	0.4	2.370	A
4	174	570	1177	0.148	173	0.2	3.586	A

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	630	224	2156	0.292	630	0.4	2.359	A
2	398	605	996	0.400	397	0.7	6.010	A
3	637	383	2002	0.318	637	0.5	2.637	A
4	208	682	1105	0.188	207	0.2	4.009	A

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	772	274	2118	0.364	771	0.6	2.671	A
2	488	740	913	0.534	486	1.1	8.385	A
3	781	469	1938	0.403	780	0.7	3.107	A
4	254	835	1008	0.252	254	0.3	4.775	A

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	772	274	2118	0.364	772	0.6	2.674	A
2	488	741	913	0.534	488	1.1	8.462	A
3	781	470	1937	0.403	781	0.7	3.113	A
4	254	836	1007	0.253	254	0.3	4.783	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	630	224	2155	0.292	631	0.4	2.362	A
2	398	606	995	0.400	400	0.7	6.070	A
3	637	385	2000	0.319	638	0.5	2.643	A
4	208	683	1104	0.188	208	0.2	4.021	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	528	188	2183	0.242	528	0.3	2.175	A
2	334	507	1055	0.316	334	0.5	5.002	A
3	534	322	2048	0.261	534	0.4	2.380	A
4	174	572	1175	0.148	174	0.2	3.596	A

Existing Layout - 2027 without Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	5.24	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	2027 without Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	1163	100.000
2		✓	325	100.000
3		✓	962	100.000
4		✓	311	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	87	1023	53
	2	43	0	88	194
	3	841	98	0	23
	4	26	270	15	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	2	0
	2	0	0	0	2
	3	6	1	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.61	4.46	1.6	A
2	0.54	11.70	1.1	B
3	0.51	3.54	1.0	A
4	0.40	6.94	0.7	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	876	287	2192	0.399	873	0.7	2.723	A
2	245	819	890	0.275	243	0.4	5.551	A
3	724	217	2154	0.336	722	0.5	2.511	A
4	234	737	1079	0.217	233	0.3	4.248	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1046	344	2148	0.487	1044	0.9	3.258	A
2	292	980	796	0.367	291	0.6	7.128	A
3	865	260	2121	0.408	864	0.7	2.862	A
4	280	882	988	0.283	279	0.4	5.078	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1280	421	2089	0.613	1278	1.6	4.427	A
2	358	1199	666	0.537	356	1.1	11.498	B
3	1059	318	2078	0.510	1058	1.0	3.524	A
4	342	1080	862	0.397	341	0.7	6.897	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1280	422	2088	0.613	1280	1.6	4.458	A
2	358	1201	665	0.538	358	1.1	11.704	B
3	1059	319	2077	0.510	1059	1.0	3.537	A
4	342	1081	861	0.398	342	0.7	6.938	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1046	345	2147	0.487	1048	1.0	3.284	A
2	292	983	794	0.368	294	0.6	7.243	A
3	865	262	2120	0.408	866	0.7	2.877	A
4	280	884	986	0.284	281	0.4	5.110	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	876	289	2191	0.400	877	0.7	2.741	A
2	245	822	888	0.276	246	0.4	5.610	A
3	724	219	2152	0.336	725	0.5	2.522	A
4	234	740	1078	0.217	235	0.3	4.273	A

Existing Layout - 2027 with Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	4.38	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D5	2027 with Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	714	100.000
2		✓	448	100.000
3		✓	709	100.000
4		✓	271	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	53	587	74
	2	80	0	77	291
	3	585	94	0	30
	4	109	137	25	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	2	7	4
	2	1	0	1	2
	3	7	2	0	0
	4	0	1	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.37	2.71	0.6	A
2	0.55	8.75	1.2	A
3	0.41	3.15	0.7	A
4	0.30	5.08	0.4	A

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	538	192	2180	0.247	536	0.3	2.187	A
2	337	515	1050	0.321	335	0.5	5.023	A
3	534	333	2039	0.262	532	0.4	2.386	A
4	204	570	1177	0.173	203	0.2	3.692	A

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	642	230	2152	0.298	641	0.4	2.383	A
2	403	616	989	0.407	402	0.7	6.125	A
3	637	399	1990	0.320	637	0.5	2.661	A
4	244	682	1106	0.220	243	0.3	4.174	A

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	786	281	2113	0.372	785	0.6	2.710	A
2	493	755	905	0.545	491	1.2	8.661	A
3	781	488	1923	0.406	780	0.7	3.148	A
4	298	835	1008	0.296	298	0.4	5.066	A

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	786	282	2113	0.372	786	0.6	2.712	A
2	493	755	904	0.545	493	1.2	8.750	A
3	781	490	1922	0.406	781	0.7	3.154	A
4	298	836	1007	0.296	298	0.4	5.077	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	642	231	2151	0.298	643	0.4	2.388	A
2	403	617	988	0.408	405	0.7	6.189	A
3	637	402	1988	0.321	638	0.5	2.670	A
4	244	683	1105	0.221	244	0.3	4.188	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	538	193	2180	0.247	538	0.3	2.192	A
2	337	517	1049	0.321	338	0.5	5.070	A
3	534	336	2038	0.262	534	0.4	2.394	A
4	204	572	1176	0.174	204	0.2	3.709	A

Existing Layout - 2027 with Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	5.46	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D6	2027 with Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	1189	100.000
2		✓	328	100.000
3		✓	962	100.000
4		✓	324	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	87	1023	79
	2	43	0	88	197
	3	841	98	0	23
	4	37	272	15	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	2	0
	2	0	0	0	2
	3	6	1	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.63	4.63	1.7	A
2	0.56	12.51	1.2	B
3	0.52	3.62	1.1	A
4	0.41	7.13	0.7	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	895	289	2192	0.408	892	0.7	2.764	A
2	247	838	879	0.281	245	0.4	5.668	A
3	724	239	2138	0.339	722	0.5	2.540	A
4	244	737	1079	0.226	243	0.3	4.296	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1069	346	2148	0.498	1068	1.0	3.330	A
2	295	1003	782	0.377	294	0.6	7.365	A
3	865	286	2102	0.411	864	0.7	2.907	A
4	291	882	988	0.295	291	0.4	5.163	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1309	423	2088	0.627	1306	1.7	4.590	A
2	361	1227	650	0.556	359	1.2	12.251	B
3	1059	349	2054	0.516	1058	1.1	3.608	A
4	357	1079	862	0.414	356	0.7	7.089	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1309	424	2087	0.627	1309	1.7	4.626	A
2	361	1230	649	0.557	361	1.2	12.509	B
3	1059	351	2053	0.516	1059	1.1	3.622	A
4	357	1081	861	0.414	357	0.7	7.135	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1069	347	2147	0.498	1072	1.0	3.358	A
2	295	1007	780	0.378	297	0.6	7.499	A
3	865	289	2100	0.412	866	0.7	2.920	A
4	291	885	986	0.295	292	0.4	5.198	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	895	290	2191	0.409	896	0.7	2.785	A
2	247	842	877	0.282	248	0.4	5.733	A
3	724	241	2136	0.339	725	0.5	2.554	A
4	244	740	1078	0.226	244	0.3	4.325	A

Existing Layout - 2038 without Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	4.58	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D7	2038 without Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	733	100.000
2		✓	466	100.000
3		✓	741	100.000
4		✓	242	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	55	613	65
	2	84	0	81	301
	3	611	99	0	31
	4	79	137	26	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	2	7	4
	2	1	0	1	2
	3	7	2	0	0
	4	0	1	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.38	2.77	0.6	A
2	0.58	9.49	1.3	A
3	0.43	3.27	0.7	A
4	0.27	5.03	0.4	A

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	552	197	2176	0.254	550	0.3	2.212	A
2	351	529	1042	0.337	349	0.5	5.180	A
3	558	337	2037	0.274	556	0.4	2.429	A
4	182	596	1160	0.157	181	0.2	3.678	A

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	659	235	2147	0.307	659	0.4	2.418	A
2	419	632	979	0.428	418	0.7	6.408	A
3	666	404	1987	0.335	666	0.5	2.725	A
4	218	713	1085	0.201	217	0.2	4.147	A

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	807	288	2107	0.383	806	0.6	2.765	A
2	513	774	893	0.575	511	1.3	9.368	A
3	816	493	1919	0.425	815	0.7	3.257	A
4	266	873	983	0.271	266	0.4	5.016	A

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	807	288	2107	0.383	807	0.6	2.768	A
2	513	775	892	0.575	513	1.3	9.487	A
3	816	495	1918	0.425	816	0.7	3.266	A
4	266	874	982	0.271	266	0.4	5.028	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	659	236	2146	0.307	660	0.4	2.423	A
2	419	634	978	0.428	421	0.8	6.491	A
3	666	407	1985	0.336	667	0.5	2.733	A
4	218	715	1084	0.201	218	0.3	4.161	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	552	197	2175	0.254	552	0.3	2.218	A
2	351	530	1041	0.337	352	0.5	5.233	A
3	558	340	2035	0.274	558	0.4	2.440	A
4	182	598	1158	0.157	182	0.2	3.692	A

Existing Layout - 2038 without Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	5.86	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D8	2038 without Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	1217	100.000
2		✓	341	100.000
3		✓	1007	100.000
4		✓	327	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	91	1071	55
	2	45	0	92	204
	3	881	102	0	24
	4	28	283	16	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	2	0
	2	0	0	0	2
	3	6	1	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.65	4.91	1.8	A
2	0.59	14.01	1.4	B
3	0.54	3.76	1.2	A
4	0.43	7.67	0.8	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	916	301	2182	0.420	913	0.7	2.833	A
2	257	857	868	0.296	255	0.4	5.861	A
3	758	228	2146	0.353	756	0.5	2.590	A
4	246	772	1058	0.233	245	0.3	4.424	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1094	360	2136	0.512	1093	1.0	3.446	A
2	307	1025	769	0.399	306	0.7	7.759	A
3	905	273	2112	0.429	904	0.7	2.980	A
4	294	923	961	0.306	293	0.4	5.385	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1340	440	2074	0.646	1337	1.8	4.866	A
2	375	1254	634	0.592	372	1.4	13.624	B
3	1109	332	2067	0.536	1107	1.1	3.745	A
4	360	1130	830	0.434	359	0.8	7.615	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1340	441	2073	0.647	1340	1.8	4.913	A
2	375	1257	632	0.594	375	1.4	14.005	B
3	1109	335	2065	0.537	1109	1.2	3.763	A
4	360	1132	829	0.434	360	0.8	7.674	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1094	362	2134	0.513	1097	1.1	3.479	A
2	307	1029	766	0.400	310	0.7	7.934	A
3	905	276	2110	0.429	907	0.8	2.998	A
4	294	926	960	0.306	295	0.4	5.428	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	916	302	2180	0.420	918	0.7	2.853	A
2	257	861	865	0.297	258	0.4	5.935	A
3	758	230	2144	0.354	759	0.5	2.599	A
4	246	775	1055	0.233	247	0.3	4.454	A

Existing Layout - 2038 with Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	4.73	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D9	2038 with Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	746	100.000
2		✓	471	100.000
3		✓	741	100.000
4		✓	282	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	55	613	78
	2	84	0	81	306
	3	611	99	0	31
	4	112	144	26	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	2	7	4
	2	1	0	1	2
	3	7	2	0	0
	4	0	1	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.39	2.81	0.6	A
2	0.59	9.85	1.4	A
3	0.43	3.31	0.7	A
4	0.32	5.35	0.5	A

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	562	202	2173	0.258	560	0.3	2.230	A
2	355	538	1036	0.342	353	0.5	5.251	A
3	558	350	2027	0.275	556	0.4	2.446	A
4	212	596	1160	0.183	211	0.2	3.790	A

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	671	242	2143	0.313	670	0.5	2.444	A
2	423	644	972	0.436	422	0.8	6.539	A
3	666	420	1974	0.337	666	0.5	2.749	A
4	254	713	1086	0.234	253	0.3	4.325	A

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	821	296	2102	0.391	821	0.6	2.807	A
2	519	789	884	0.586	516	1.4	9.714	A
3	816	513	1904	0.428	815	0.7	3.302	A
4	310	873	984	0.316	310	0.5	5.339	A

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	821	296	2102	0.391	821	0.6	2.810	A
2	519	789	884	0.587	519	1.4	9.851	A
3	816	515	1902	0.429	816	0.7	3.312	A
4	310	874	983	0.316	310	0.5	5.354	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	671	242	2143	0.313	671	0.5	2.449	A
2	423	645	971	0.436	426	0.8	6.630	A
3	666	423	1972	0.338	667	0.5	2.762	A
4	254	715	1084	0.234	254	0.3	4.341	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	562	203	2172	0.259	562	0.3	2.237	A
2	355	540	1035	0.343	356	0.5	5.308	A
3	558	353	2025	0.276	558	0.4	2.457	A
4	212	598	1159	0.183	213	0.2	3.805	A

Existing Layout - 2038 with Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	6.15	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D10	2038 with Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	1243	100.000
2		✓	344	100.000
3		✓	1007	100.000
4		✓	340	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	91	1071	81
	2	45	0	92	207
	3	881	102	0	24
	4	39	285	16	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	2	0
	2	0	0	0	2
	3	6	1	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.66	5.12	1.9	A
2	0.62	15.17	1.6	C
3	0.54	3.86	1.2	A
4	0.45	7.91	0.8	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	936	302	2182	0.429	933	0.7	2.875	A
2	259	877	856	0.302	257	0.4	5.991	A
3	758	249	2130	0.356	756	0.6	2.616	A
4	256	772	1058	0.242	255	0.3	4.470	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1117	362	2135	0.523	1116	1.1	3.527	A
2	309	1049	755	0.410	308	0.7	8.037	A
3	905	299	2092	0.433	904	0.8	3.029	A
4	306	923	961	0.318	305	0.5	5.481	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1369	442	2073	0.660	1365	1.9	5.065	A
2	379	1283	617	0.614	375	1.5	14.677	B
3	1109	364	2043	0.543	1107	1.2	3.839	A
4	374	1130	830	0.451	373	0.8	7.846	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1369	444	2072	0.661	1368	1.9	5.118	A
2	379	1286	616	0.615	379	1.6	15.168	C
3	1109	367	2041	0.543	1109	1.2	3.860	A
4	374	1132	829	0.452	374	0.8	7.915	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1117	364	2134	0.524	1121	1.1	3.566	A
2	309	1053	753	0.411	313	0.7	8.245	A
3	905	302	2090	0.433	907	0.8	3.049	A
4	306	926	959	0.319	307	0.5	5.528	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	936	304	2180	0.429	937	0.8	2.901	A
2	259	881	854	0.303	260	0.4	6.071	A
3	758	252	2128	0.356	759	0.6	2.633	A
4	256	775	1055	0.243	257	0.3	4.509	A

Junctions 9

ARCADY 9 - Roundabout Module

Filename: Park Street Rbt.j9
Path: \\gc-did-fs01\CAD\2021\8210856\(6)_Transport\(1)_Planning\(4)_Modelling\SRN
Report generation date: 10/08/2022 12:08:38

Summary of junction performance

	AM					PM				
	Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)	Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)
	Existing Layout - 2016 Base									
Arm 1	2.0	4.25	0.67	A	5.65	7.2	12.06	0.88	B	10.90
Arm 2	1.2	7.04	0.54	A		2.2	14.90	0.69	B	
Arm 3	1.4	6.81	0.58	A		2.8	11.46	0.74	B	
Arm 4	0.6	2.29	0.36	A		0.9	2.74	0.46	A	
Arm 5	2.2	10.85	0.69	B		3.2	16.57	0.77	C	
	Existing Layout - 2027 without Dev									
Arm 1	3.1	5.94	0.76	A	9.09	36.4	51.42	1.00	F	38.45
Arm 2	1.9	10.52	0.66	B		7.0	46.18	0.90	E	
Arm 3	2.4	10.50	0.71	B		7.2	27.72	0.89	D	
Arm 4	0.7	2.64	0.42	A		1.2	3.33	0.54	A	
Arm 5	4.7	22.29	0.84	C		12.8	61.56	0.96	F	
	Existing Layout - 2027 with Dev									
Arm 1	3.2	6.08	0.76	A	9.76	39.6	54.95	1.01	F	42.65
Arm 2	1.9	10.76	0.66	B		7.3	47.81	0.91	E	
Arm 3	2.8	11.75	0.74	B		9.5	35.30	0.93	E	
Arm 4	0.8	2.69	0.43	A		1.2	3.40	0.55	A	
Arm 5	5.2	24.76	0.85	C		15.4	72.53	0.98	F	
	Existing Layout - 2038 without Dev									
Arm 1	3.9	7.25	0.80	A	13.38	79.1	96.65	1.05	F	72.79
Arm 2	2.6	13.75	0.73	B		12.1	73.43	0.97	F	
Arm 3	3.3	13.96	0.77	B		12.3	44.62	0.95	E	
Arm 4	0.8	2.85	0.45	A		1.3	3.66	0.57	A	
Arm 5	8.9	40.75	0.92	E		36.0	144.41	1.07	F	
	Existing Layout - 2038 with Dev									
Arm 1	4.1	7.43	0.81	A	15.99	83.0	100.74	1.05	F	79.32
Arm 2	2.7	14.11	0.73	B		12.3	74.95	0.97	F	
Arm 3	3.9	16.18	0.80	C		17.4	59.24	0.98	F	
Arm 4	0.9	2.99	0.47	A		1.4	3.74	0.58	A	
Arm 5	12.3	55.45	0.95	F		41.2	163.53	1.09	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. Junction LOS and Junction Delay are demand-weighted averages.

File summary

File Description

Title	J6 - Park Street Roundabout
Location	Chiswell Green, St Albans
Site number	J6
Date	24/07/2022
Version	v1
Status	(new file)
Identifier	
Client	
Jobnumber	8210856
Enumerator	UK\dkemp
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	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2016 Base	AM	ONE HOUR	07:00	08:30	15
D2	2016 Base	PM	ONE HOUR	16:45	18:15	15
D3	2027 without Dev	AM	ONE HOUR	07:00	08:30	15
D4	2027 without Dev	PM	ONE HOUR	16:45	18:15	15
D5	2027 with Dev	AM	ONE HOUR	07:00	08:30	15
D6	2027 with Dev	PM	ONE HOUR	16:45	18:15	15
D7	2038 without Dev	AM	ONE HOUR	07:00	08:30	15
D8	2038 without Dev	PM	ONE HOUR	16:45	18:15	15
D9	2038 with Dev	AM	ONE HOUR	07:00	08:30	15
D10	2038 with Dev	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	Existing Layout	100.000

Existing Layout - 2016 Base, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 2 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 4 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 5 - 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	Arm order	Junction Delay (s)	Junction LOS
1	Park Street Roundabout	Standard Roundabout	1, 2, 3, 4, 5	5.65	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	A414 (East)	
2	Watling Street (South)	
3	A405	
4	A414 (West)	
5	Watling Street (North)	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1	7.75	11.20	30.0	35.0	101.0	36.0	
2	3.00	7.50	80.0	31.0	101.0	34.0	
3	7.20	7.50	4.5	26.0	101.0	31.0	
4	7.90	12.50	33.0	47.0	101.0	23.0	
5	3.90	7.00	35.0	51.0	101.0	34.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.647	3113
2	0.502	2072
3	0.531	2274
4	0.717	3533
5	0.487	1944

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2016 Base	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	1549	100.000
2		✓	550	100.000
3		✓	670	100.000
4		✓	815	100.000
5		✓	666	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	177	449	653	270
	2	266	0	54	157	73
	3	489	45	0	65	71
	4	620	88	50	0	57
	5	238	227	69	132	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	1	7	5	2
	2	2	0	0	0	6
	3	8	0	0	0	0
	4	2	1	12	0	0
	5	2	1	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.67	4.25	2.0	A
2	0.54	7.04	1.2	A
3	0.58	6.81	1.4	A
4	0.36	2.29	0.6	A
5	0.69	10.85	2.2	B

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1166	458	2688	0.434	1163	0.8	2.356	A
2	414	1218	1411	0.293	412	0.4	3.599	A
3	504	1164	1547	0.326	502	0.5	3.440	A
4	614	911	2779	0.221	612	0.3	1.661	A
5	501	1170	1339	0.375	499	0.6	4.275	A

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1393	548	2631	0.529	1391	1.1	2.901	A
2	494	1457	1287	0.384	494	0.6	4.531	A
3	602	1392	1429	0.421	601	0.7	4.342	A
4	733	1090	2649	0.277	732	0.4	1.877	A
5	599	1399	1223	0.489	597	0.9	5.737	A

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1705	669	2555	0.668	1702	2.0	4.204	A
2	606	1782	1119	0.541	603	1.2	6.955	A
3	738	1703	1269	0.581	735	1.4	6.713	A
4	897	1332	2472	0.363	897	0.6	2.283	A
5	733	1712	1066	0.688	729	2.1	10.514	B

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1705	673	2553	0.668	1705	2.0	4.247	A
2	606	1787	1117	0.542	606	1.2	7.043	A
3	738	1708	1266	0.583	738	1.4	6.806	A
4	897	1337	2469	0.363	897	0.6	2.289	A
5	733	1715	1064	0.689	733	2.2	10.847	B

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1393	553	2628	0.530	1396	1.1	2.931	A
2	494	1464	1284	0.385	497	0.6	4.585	A
3	602	1399	1426	0.422	605	0.7	4.401	A
4	733	1096	2644	0.277	733	0.4	1.886	A
5	599	1404	1221	0.490	604	1.0	5.876	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1166	461	2686	0.434	1168	0.8	2.373	A
2	414	1224	1408	0.294	415	0.4	3.629	A
3	504	1170	1544	0.327	505	0.5	3.470	A
4	614	916	2775	0.221	614	0.3	1.667	A
5	501	1175	1336	0.375	503	0.6	4.327	A

Existing Layout - 2016 Base, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 2 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 4 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 5 - 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	Arm order	Junction Delay (s)	Junction LOS
1	Park Street Roundabout	Standard Roundabout	1, 2, 3, 4, 5	10.90	B

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2016 Base	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	2028	100.000
2		✓	485	100.000
3		✓	812	100.000
4		✓	1030	100.000
5		✓	647	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	142	835	843	208
	2	229	0	12	180	64
	3	569	59	0	71	113
	4	823	74	57	0	76
	5	209	165	140	133	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	1	7	5	2
	2	2	0	0	0	6
	3	8	0	0	0	0
	4	2	1	12	0	0
	5	2	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.88	12.06	7.2	B
2	0.69	14.90	2.2	B
3	0.74	11.46	2.8	B
4	0.46	2.74	0.9	A
5	0.77	16.57	3.2	C

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1527	471	2663	0.573	1521	1.3	3.140	A
2	365	1662	1178	0.310	363	0.4	4.410	A
3	611	1242	1508	0.405	609	0.7	3.990	A
4	775	931	2763	0.281	774	0.4	1.810	A
5	487	1359	1248	0.390	485	0.6	4.703	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1823	563	2606	0.700	1819	2.3	4.555	A
2	436	1988	1009	0.432	435	0.8	6.262	A
3	730	1486	1382	0.528	728	1.1	5.495	A
4	926	1114	2630	0.352	925	0.5	2.112	A
5	582	1626	1113	0.522	580	1.1	6.726	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	2233	686	2530	0.883	2215	6.8	10.863	B
2	534	2420	784	0.681	529	2.0	13.848	B
3	894	1808	1214	0.736	888	2.7	10.823	B
4	1134	1357	2452	0.462	1133	0.9	2.725	A
5	712	1986	932	0.765	705	3.0	15.352	C

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	2233	691	2526	0.884	2231	7.2	12.062	B
2	534	2438	774	0.690	534	2.2	14.901	B
3	894	1823	1207	0.741	894	2.8	11.465	B
4	1134	1367	2445	0.464	1134	0.9	2.745	A
5	712	1993	928	0.768	712	3.2	16.571	C

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1823	571	2601	0.701	1842	2.4	4.863	A
2	436	2014	995	0.438	441	0.8	6.562	A
3	730	1507	1371	0.532	736	1.2	5.729	A
4	926	1128	2619	0.353	927	0.5	2.128	A
5	582	1637	1108	0.525	590	1.1	7.062	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1527	474	2661	0.574	1531	1.4	3.196	A
2	365	1673	1172	0.311	366	0.5	4.474	A
3	611	1251	1504	0.407	613	0.7	4.052	A
4	775	938	2758	0.281	776	0.4	1.819	A
5	487	1366	1244	0.392	489	0.6	4.780	A

Existing Layout - 2027 without Dev, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 2 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 4 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 5 - 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	Arm order	Junction Delay (s)	Junction LOS
1	Park Street Roundabout	Standard Roundabout	1, 2, 3, 4, 5	9.09	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2027 without Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	1732	100.000
2		✓	602	100.000
3		✓	751	100.000
4		✓	913	100.000
5		✓	731	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	194	506	736	296
	2	291	0	59	172	80
	3	551	49	0	73	78
	4	699	96	56	0	62
	5	261	249	76	145	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	1	7	5	2
	2	2	0	0	0	6
	3	8	0	0	0	0
	4	2	1	12	0	0
	5	2	1	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.76	5.94	3.1	A
2	0.66	10.52	1.9	B
3	0.71	10.50	2.4	B
4	0.42	2.64	0.7	A
5	0.84	22.29	4.7	C

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1304	503	2660	0.490	1300	1.0	2.640	A
2	453	1362	1333	0.340	451	0.5	4.076	A
3	565	1290	1481	0.382	563	0.6	3.912	A
4	687	1008	2714	0.253	686	0.3	1.775	A
5	550	1307	1268	0.434	547	0.8	4.973	A

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1557	602	2598	0.599	1555	1.5	3.444	A
2	541	1629	1195	0.453	540	0.8	5.489	A
3	675	1543	1350	0.500	674	1.0	5.313	A
4	821	1207	2569	0.320	820	0.5	2.059	A
5	657	1564	1140	0.577	655	1.3	7.392	A

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1907	730	2517	0.758	1901	3.0	5.783	A
2	663	1989	1009	0.657	659	1.9	10.164	B
3	827	1884	1174	0.705	822	2.3	10.082	B
4	1005	1473	2374	0.423	1004	0.7	2.626	A
5	805	1911	966	0.834	792	4.4	19.568	C

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1907	738	2512	0.759	1907	3.1	5.940	A
2	663	1998	1004	0.660	663	1.9	10.523	B
3	827	1893	1169	0.707	827	2.4	10.501	B
4	1005	1480	2369	0.424	1005	0.7	2.640	A
5	805	1918	962	0.837	804	4.7	22.294	C

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1557	612	2591	0.601	1563	1.5	3.526	A
2	541	1641	1188	0.455	545	0.8	5.634	A
3	675	1556	1343	0.503	680	1.0	5.478	A
4	821	1218	2561	0.321	822	0.5	2.071	A
5	657	1573	1135	0.579	671	1.4	7.972	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1304	507	2657	0.491	1306	1.0	2.668	A
2	453	1369	1329	0.341	455	0.5	4.124	A
3	565	1298	1477	0.383	567	0.6	3.963	A
4	687	1015	2709	0.254	688	0.3	1.783	A
5	550	1314	1265	0.435	553	0.8	5.073	A

Existing Layout - 2027 without Dev, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 2 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 4 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 5 - 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	Arm order	Junction Delay (s)	Junction LOS
1	Park Street Roundabout	Standard Roundabout	1, 2, 3, 4, 5	38.45	E

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	2027 without Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	2269	100.000
2		✓	532	100.000
3		✓	908	100.000
4		✓	1152	100.000
5		✓	710	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	156	938	947	228
	2	251	0	13	198	70
	3	639	65	0	80	124
	4	924	81	64	0	83
	5	229	181	154	146	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	1	7	5	2
	2	2	0	0	0	6
	3	8	0	0	0	0
	4	2	1	12	0	0
	5	2	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	1.00	51.42	36.4	F
2	0.90	46.18	7.0	E
3	0.89	27.72	7.2	D
4	0.54	3.33	1.2	A
5	0.96	61.56	12.8	F

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1708	517	2636	0.648	1701	1.8	3.822	A
2	401	1857	1074	0.373	398	0.6	5.308	A
3	684	1378	1437	0.476	680	0.9	4.736	A
4	867	1031	2697	0.322	865	0.5	1.964	A
5	535	1518	1167	0.458	531	0.8	5.632	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	2040	619	2573	0.793	2032	3.7	6.570	A
2	478	2218	886	0.540	476	1.1	8.723	A
3	816	1647	1297	0.629	813	1.7	7.393	A
4	1036	1233	2549	0.406	1035	0.7	2.377	A
5	638	1815	1018	0.627	635	1.6	9.334	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	2498	738	2499	1.000	2414	24.8	29.044	D
2	586	2635	670	0.874	569	5.3	31.479	D
3	1000	1959	1135	0.881	982	6.1	21.423	C
4	1268	1481	2366	0.536	1267	1.1	3.267	A
5	782	2205	821	0.952	750	9.6	39.598	E

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	2498	752	2490	1.003	2452	36.4	51.423	F
2	586	2679	648	0.904	579	7.0	46.184	E
3	1000	1993	1118	0.894	995	7.2	27.723	D
4	1268	1503	2350	0.540	1268	1.2	3.326	A
5	782	2222	813	0.962	769	12.8	61.560	F

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	2040	653	2552	0.799	2169	4.2	12.665	B
2	478	2366	810	0.590	500	1.5	12.412	B
3	816	1752	1243	0.657	837	2.0	9.318	A
4	1036	1283	2512	0.412	1037	0.7	2.446	A
5	638	1848	1001	0.638	682	1.8	12.827	B

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1708	523	2632	0.649	1717	1.9	3.974	A
2	401	1875	1064	0.376	404	0.6	5.480	A
3	684	1394	1429	0.479	688	0.9	4.887	A
4	867	1044	2688	0.323	868	0.5	1.981	A
5	535	1529	1161	0.460	538	0.9	5.812	A

Existing Layout - 2027 with Dev, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 2 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 4 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 5 - 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	Arm order	Junction Delay (s)	Junction LOS
1	Park Street Roundabout	Standard Roundabout	1, 2, 3, 4, 5	9.76	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D5	2027 with Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	1743	100.000
2		✓	602	100.000
3		✓	784	100.000
4		✓	915	100.000
5		✓	731	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	194	517	736	296
	2	291	0	59	172	80
	3	579	49	0	78	78
	4	699	96	58	0	62
	5	261	249	76	145	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	1	7	5	2
	2	2	0	0	0	6
	3	8	0	0	0	0
	4	2	1	12	0	0
	5	2	1	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.76	6.08	3.2	A
2	0.66	10.76	1.9	B
3	0.74	11.75	2.8	B
4	0.43	2.69	0.8	A
5	0.85	24.76	5.2	C

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1312	504	2658	0.494	1308	1.0	2.659	A
2	453	1372	1327	0.341	451	0.5	4.100	A
3	590	1290	1480	0.399	588	0.7	4.022	A
4	689	1029	2697	0.255	687	0.3	1.791	A
5	550	1330	1256	0.438	547	0.8	5.057	A

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1567	603	2596	0.604	1565	1.5	3.483	A
2	541	1641	1188	0.455	540	0.8	5.541	A
3	705	1543	1349	0.522	703	1.1	5.557	A
4	823	1232	2549	0.323	822	0.5	2.084	A
5	657	1591	1126	0.584	655	1.4	7.607	A

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1919	732	2516	0.763	1913	3.1	5.906	A
2	663	2003	1001	0.662	659	1.9	10.372	B
3	863	1883	1173	0.736	857	2.7	11.157	B
4	1007	1502	2351	0.428	1006	0.7	2.673	A
5	805	1943	949	0.848	791	4.8	21.217	C

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1919	740	2510	0.764	1919	3.2	6.079	A
2	663	2012	997	0.665	663	1.9	10.758	B
3	863	1893	1168	0.739	863	2.8	11.748	B
4	1007	1511	2345	0.430	1007	0.8	2.691	A
5	805	1951	945	0.852	803	5.2	24.758	C

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1567	615	2589	0.605	1573	1.5	3.567	A
2	541	1654	1182	0.458	546	0.9	5.695	A
3	705	1557	1342	0.525	711	1.1	5.765	A
4	823	1244	2540	0.324	824	0.5	2.099	A
5	657	1601	1120	0.587	672	1.4	8.302	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1312	509	2656	0.494	1314	1.0	2.690	A
2	453	1379	1324	0.342	455	0.5	4.149	A
3	590	1298	1476	0.400	592	0.7	4.079	A
4	689	1036	2692	0.256	689	0.3	1.799	A
5	550	1337	1253	0.439	553	0.8	5.161	A

Existing Layout - 2027 with Dev, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 2 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 4 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 5 - 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	Arm order	Junction Delay (s)	Junction LOS
1	Park Street Roundabout	Standard Roundabout	1, 2, 3, 4, 5	42.65	E

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D6	2027 with Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	2280	100.000
2		✓	532	100.000
3		✓	941	100.000
4		✓	1154	100.000
5		✓	710	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	156	949	947	228
	2	251	0	13	198	70
	3	667	65	0	85	124
	4	924	81	66	0	83
	5	229	181	154	146	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	1	7	5	2
	2	2	0	0	0	6
	3	8	0	0	0	0
	4	2	1	12	0	0
	5	2	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	1.01	54.95	39.6	F
2	0.91	47.81	7.3	E
3	0.93	35.30	9.5	E
4	0.55	3.40	1.2	A
5	0.98	72.53	15.4	F

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1716	519	2634	0.652	1709	1.8	3.860	A
2	401	1866	1069	0.375	398	0.6	5.349	A
3	708	1378	1436	0.493	705	1.0	4.895	A
4	869	1052	2680	0.324	867	0.5	1.983	A
5	535	1540	1155	0.463	531	0.9	5.736	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	2050	620	2571	0.797	2042	3.8	6.703	A
2	478	2230	880	0.543	476	1.2	8.851	A
3	846	1647	1297	0.652	842	1.8	7.867	A
4	1037	1258	2529	0.410	1037	0.7	2.410	A
5	638	1842	1004	0.636	635	1.7	9.674	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	2510	736	2499	1.004	2420	26.4	30.313	D
2	586	2642	667	0.879	568	5.5	32.292	D
3	1036	1955	1137	0.911	1013	7.7	25.328	D
4	1271	1506	2347	0.541	1269	1.2	3.332	A
5	782	2233	807	0.969	745	10.9	43.908	E

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	2510	750	2490	1.008	2457	39.6	54.945	F
2	586	2685	645	0.909	579	7.3	47.805	E
3	1036	1988	1120	0.925	1029	9.5	35.298	E
4	1271	1531	2329	0.546	1270	1.2	3.399	A
5	782	2252	797	0.981	764	15.4	72.527	F

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	2050	662	2546	0.805	2191	4.3	14.288	B
2	478	2393	796	0.601	501	1.6	13.106	B
3	846	1760	1238	0.683	875	2.2	10.682	B
4	1037	1318	2486	0.417	1039	0.7	2.491	A
5	638	1882	983	0.649	692	1.9	14.655	B

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1716	525	2631	0.652	1726	1.9	4.022	A
2	401	1886	1059	0.378	404	0.6	5.529	A
3	708	1395	1428	0.496	713	1.0	5.073	A
4	869	1065	2670	0.325	870	0.5	1.999	A
5	535	1553	1149	0.465	539	0.9	5.935	A

Existing Layout - 2038 without Dev, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 2 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 4 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 5 - 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	Arm order	Junction Delay (s)	Junction LOS
1	Park Street Roundabout	Standard Roundabout	1, 2, 3, 4, 5	13.38	B

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D7	2038 without Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	1813	100.000
2		✓	633	100.000
3		✓	787	100.000
4		✓	956	100.000
5		✓	766	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	204	529	769	311
	2	306	0	62	181	84
	3	576	52	0	77	82
	4	730	101	59	0	66
	5	274	261	79	152	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	1	7	5	2
	2	2	0	0	0	6
	3	8	0	0	0	0
	4	2	1	12	0	0
	5	2	1	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.80	7.25	3.9	A
2	0.73	13.75	2.6	B
3	0.77	13.96	3.3	B
4	0.45	2.85	0.8	A
5	0.92	40.75	8.9	E

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1365	527	2644	0.516	1361	1.1	2.795	A
2	477	1425	1300	0.367	474	0.6	4.346	A
3	592	1352	1449	0.409	590	0.7	4.177	A
4	720	1058	2678	0.269	718	0.4	1.837	A
5	577	1369	1237	0.466	573	0.9	5.392	A

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1630	631	2580	0.632	1627	1.7	3.771	A
2	569	1704	1156	0.492	568	1.0	6.101	A
3	707	1617	1312	0.539	706	1.2	5.923	A
4	859	1265	2526	0.340	859	0.5	2.159	A
5	689	1637	1103	0.624	686	1.6	8.565	A

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1996	759	2499	0.799	1988	3.8	6.928	A
2	697	2076	964	0.723	691	2.5	12.913	B
3	867	1970	1129	0.767	859	3.1	12.949	B
4	1053	1541	2324	0.453	1051	0.8	2.826	A
5	843	1998	922	0.915	820	7.5	30.172	D

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1996	772	2491	0.801	1996	3.9	7.251	A
2	697	2089	957	0.728	697	2.6	13.754	B
3	867	1983	1122	0.772	866	3.3	13.965	B
4	1053	1553	2316	0.455	1053	0.8	2.849	A
5	843	2008	917	0.920	838	8.9	40.750	E

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1630	652	2566	0.635	1639	1.8	3.917	A
2	569	1724	1146	0.497	575	1.0	6.379	A
3	707	1638	1301	0.544	716	1.2	6.229	A
4	859	1281	2514	0.342	861	0.5	2.178	A
5	689	1651	1096	0.628	717	1.7	10.202	B

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1365	532	2641	0.517	1368	1.1	2.834	A
2	477	1433	1296	0.368	478	0.6	4.413	A
3	592	1361	1444	0.410	595	0.7	4.246	A
4	720	1066	2672	0.269	720	0.4	1.847	A
5	577	1376	1234	0.468	580	0.9	5.536	A

Existing Layout - 2038 without Dev, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 2 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 4 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 5 - 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	Arm order	Junction Delay (s)	Junction LOS
1	Park Street Roundabout	Standard Roundabout	1, 2, 3, 4, 5	72.79	F

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D8	2038 without Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	2375	100.000
2		✓	558	100.000
3		✓	950	100.000
4		✓	1207	100.000
5		✓	744	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	163	982	991	239
	2	263	0	14	207	74
	3	669	68	0	83	130
	4	968	85	67	0	87
	5	240	190	161	153	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	1	7	5	2
	2	2	0	0	0	6
	3	8	0	0	0	0
	4	2	1	12	0	0
	5	2	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	1.05	96.65	79.1	F
2	0.97	73.43	12.1	F
3	0.95	44.62	12.3	E
4	0.57	3.66	1.3	A
5	1.07	144.41	36.0	F

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1788	542	2620	0.682	1780	2.1	4.239	A
2	420	1943	1029	0.408	417	0.7	5.856	A
3	715	1443	1403	0.510	711	1.0	5.172	A
4	909	1080	2661	0.342	907	0.5	2.049	A
5	560	1590	1131	0.495	556	1.0	6.222	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	2135	647	2555	0.836	2124	4.8	8.160	A
2	502	2319	834	0.601	498	1.5	10.623	B
3	854	1723	1258	0.679	850	2.1	8.739	A
4	1085	1290	2506	0.433	1084	0.8	2.530	A
5	669	1900	975	0.686	664	2.1	11.431	B

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	2615	745	2494	1.049	2453	45.3	44.785	E
2	614	2673	650	0.945	586	8.4	44.586	E
3	1046	1996	1116	0.937	1016	9.4	29.982	D
4	1329	1529	2332	0.570	1327	1.3	3.575	A
5	819	2296	776	1.056	746	20.5	69.692	F

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	2615	754	2488	1.051	2480	79.1	96.649	F
2	614	2703	635	0.967	600	12.1	73.428	F
3	1046	2025	1101	0.950	1035	12.3	44.623	E
4	1329	1556	2311	0.575	1329	1.3	3.663	A
5	819	2318	764	1.072	757	36.0	144.409	F

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	2135	744	2495	0.856	2422	7.4	61.202	F
2	502	2655	661	0.759	536	3.5	34.212	D
3	854	1942	1144	0.747	891	3.1	16.027	C
4	1085	1380	2441	0.444	1087	0.8	2.664	A
5	669	1952	948	0.705	802	2.6	45.415	E

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1788	550	2615	0.684	1809	2.2	4.575	A
2	420	1974	1013	0.415	431	0.7	6.304	A
3	715	1474	1387	0.516	723	1.1	5.486	A
4	909	1103	2644	0.344	910	0.5	2.078	A
5	560	1609	1122	0.499	566	1.0	6.558	A

Existing Layout - 2038 with Dev, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 2 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 4 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 5 - 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	Arm order	Junction Delay (s)	Junction LOS
1	Park Street Roundabout	Standard Roundabout	1, 2, 3, 4, 5	15.99	C

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D9	2038 with Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	1824	100.000
2		✓	633	100.000
3		✓	820	100.000
4		✓	988	100.000
5		✓	766	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	204	540	769	311
	2	306	0	62	181	84
	3	604	52	0	82	82
	4	760	101	61	0	66
	5	274	261	79	152	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	1	7	5	2
	2	2	0	0	0	6
	3	8	0	0	0	0
	4	2	1	12	0	0
	5	2	1	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.81	7.43	4.1	A
2	0.73	14.11	2.7	B
3	0.80	16.18	3.9	C
4	0.47	2.99	0.9	A
5	0.95	55.45	12.3	F

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1373	529	2643	0.520	1369	1.1	2.816	A
2	477	1434	1295	0.368	474	0.6	4.374	A
3	617	1352	1448	0.426	614	0.7	4.302	A
4	744	1079	2662	0.279	742	0.4	1.872	A
5	577	1413	1215	0.475	573	0.9	5.580	A

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1640	632	2578	0.636	1637	1.7	3.814	A
2	569	1715	1150	0.495	567	1.0	6.166	A
3	737	1617	1311	0.562	735	1.3	6.225	A
4	888	1290	2507	0.354	888	0.5	2.221	A
5	689	1691	1076	0.640	685	1.7	9.143	A

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	2008	756	2500	0.803	1999	3.9	7.067	A
2	697	2088	957	0.728	691	2.5	13.194	B
3	903	1968	1130	0.799	893	3.7	14.656	B
4	1088	1570	2302	0.473	1086	0.9	2.959	A
5	843	2062	889	0.948	812	9.6	37.023	E

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	2008	770	2491	0.806	2008	4.1	7.426	A
2	697	2101	950	0.733	696	2.7	14.114	B
3	903	1982	1122	0.804	902	3.9	16.177	C
4	1088	1583	2293	0.474	1088	0.9	2.987	A
5	843	2073	884	0.954	833	12.3	55.452	F

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1640	662	2559	0.641	1649	1.8	3.991	A
2	569	1740	1138	0.500	576	1.0	6.479	A
3	737	1640	1299	0.567	747	1.3	6.641	A
4	888	1308	2494	0.356	890	0.6	2.247	A
5	689	1706	1068	0.645	730	1.9	11.970	B

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1373	534	2640	0.520	1376	1.1	2.854	A
2	477	1443	1291	0.369	478	0.6	4.440	A
3	617	1361	1444	0.428	620	0.8	4.382	A
4	744	1087	2656	0.280	744	0.4	1.886	A
5	577	1422	1211	0.476	581	0.9	5.747	A

Existing Layout - 2038 with Dev, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 2 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 4 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 5 - 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	Arm order	Junction Delay (s)	Junction LOS
1	Park Street Roundabout	Standard Roundabout	1, 2, 3, 4, 5	79.32	F

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D10	2038 with Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	2386	100.000
2		✓	558	100.000
3		✓	983	100.000
4		✓	1209	100.000
5		✓	744	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	163	993	991	239
	2	263	0	14	207	74
	3	697	68	0	88	130
	4	968	85	69	0	87
	5	240	190	161	153	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	1	7	5	2
	2	2	0	0	0	6
	3	8	0	0	0	0
	4	2	1	12	0	0
	5	2	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	1.05	100.74	83.0	F
2	0.97	74.95	12.3	F
3	0.98	59.24	17.4	F
4	0.58	3.74	1.4	A
5	1.09	163.53	41.2	F

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1796	543	2619	0.686	1788	2.1	4.286	A
2	420	1952	1024	0.410	417	0.7	5.906	A
3	740	1443	1403	0.528	736	1.1	5.361	A
4	910	1101	2645	0.344	908	0.5	2.070	A
5	560	1612	1119	0.500	556	1.0	6.347	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	2145	649	2554	0.840	2134	5.0	8.356	A
2	502	2330	828	0.606	498	1.5	10.807	B
3	884	1722	1258	0.703	879	2.3	9.394	A
4	1087	1315	2488	0.437	1086	0.8	2.567	A
5	669	1927	961	0.696	664	2.2	11.933	B

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	2627	741	2496	1.052	2458	47.3	46.246	E
2	614	2677	648	0.948	586	8.6	45.375	E
3	1082	1990	1119	0.967	1042	12.3	36.070	E
4	1331	1549	2316	0.575	1329	1.3	3.641	A
5	819	2321	763	1.074	737	22.8	76.286	F

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	2627	748	2492	1.054	2484	83.0	100.736	F
2	614	2705	634	0.970	600	12.3	74.954	F
3	1082	2018	1104	0.980	1062	17.4	59.239	F
4	1331	1578	2294	0.580	1331	1.4	3.736	A
5	819	2344	751	1.091	745	41.2	163.529	F

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	2145	760	2485	0.863	2442	8.7	69.544	F
2	502	2684	646	0.777	535	3.9	38.706	E
3	884	1950	1139	0.776	938	3.7	21.907	C
4	1087	1422	2409	0.451	1089	0.8	2.730	A
5	669	1993	927	0.722	822	2.9	65.286	F

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1796	552	2614	0.687	1822	2.2	4.694	A
2	420	1989	1005	0.418	433	0.7	6.428	A
3	740	1478	1384	0.535	750	1.2	5.765	A
4	910	1127	2625	0.347	911	0.5	2.103	A
5	560	1634	1108	0.505	568	1.0	6.743	A

Appendix E

'With Committed Development'
Junction Modelling Outputs

Junctions 9

ARCADY 9 - Roundabout Module

Filename: A405_Watford Road + Committed.j9
Path: \\gc-did-fs01\CAD\2021\8210856\(6)_Transport\(1)_Planning\(4)_Modelling\SRN
Report generation date: 10/08/2022 12:07:01

Summary of junction performance

	AM					PM				
	Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)	Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)
	Proposed Layout - 2027 + committed without Dev									
Arm 1	1.7	7.35	0.64	A	5.50	1.6	7.90	0.62	A	9.73
Arm 2	0.9	4.11	0.49	A		2.8	7.36	0.74	A	
Arm 3	0.1	3.36	0.07	A		0.1	4.68	0.11	A	
Arm 4	2.3	5.31	0.70	A		6.6	12.19	0.87	B	
Arm 5	0.1	30.29	0.05	D		0.0	0.00	0.00	A	
	Proposed Layout - 2027 + committed with Dev									
Arm 1	2.1	8.50	0.68	A	5.96	1.7	8.33	0.64	A	11.06
Arm 2	1.0	4.31	0.50	A		2.9	7.60	0.75	A	
Arm 3	0.1	3.50	0.08	A		0.1	4.77	0.11	A	
Arm 4	2.5	5.49	0.71	A		8.0	14.58	0.90	B	
Arm 5	0.1	33.08	0.06	D		0.0	0.00	0.00	A	
	Proposed Layout - 2038 + committed without Dev									
Arm 1	2.1	8.43	0.68	A	6.10	1.9	9.20	0.66	A	12.69
Arm 2	1.0	4.37	0.51	A		3.5	8.78	0.78	A	
Arm 3	0.1	3.52	0.08	A		0.1	5.08	0.12	A	
Arm 4	2.7	5.84	0.73	A		9.4	16.90	0.91	C	
Arm 5	0.1	39.29	0.07	E		0.0	0.00	0.00	A	
	Proposed Layout - 2038 + committed with Dev									
Arm 1	2.6	9.96	0.73	A	6.70	2.1	9.41	0.68	A	12.19
Arm 2	1.1	4.59	0.52	A		3.4	8.59	0.78	A	
Arm 3	0.1	3.67	0.08	A		0.1	5.10	0.12	A	
Arm 4	2.8	6.06	0.74	A		9.1	15.93	0.91	C	
Arm 5	0.1	44.09	0.07	E		0.0	0.00	0.00	A	

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages.

File summary

File Description

Title	J5 - A405 / Watford Road + Committed Development
Location	Chiswell Green
Site number	J5
Date	24/07/2022
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	8210856
Enumerator	UK\dkemp
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	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2027 + committed without Dev	AM	ONE HOUR	07:00	08:30	15
D4	2027 + committed without Dev	PM	ONE HOUR	16:45	18:15	15
D5	2027 + committed with Dev	AM	ONE HOUR	07:00	08:30	15
D6	2027 + committed with Dev	PM	ONE HOUR	16:45	18:15	15
D7	2038 + committed without Dev	AM	ONE HOUR	07:00	08:30	15
D8	2038 + committed without Dev	PM	ONE HOUR	16:45	18:15	15
D9	2038 + committed with Dev	AM	ONE HOUR	07:00	08:30	15
D10	2038 + committed with Dev	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	Proposed Layout	100.000

Proposed Layout - 2027 + committed without Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Watford Road	Standard Roundabout	1, 2, 3, 4, 5	5.50	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Watford Road	
2	A405 (North)	
3	New Hotel Access	
4	A405 (South)	
5	Hotel Access	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1	3.85	9.10	13.0	30.0	64.0	21.5	
2	7.40	8.60	14.0	25.0	64.0	43.0	
3	6.60	8.00	8.4	25.0	60.0	38.0	
4	6.75	8.80	28.6	10.0	60.0	24.5	
5	3.00	3.90	1.7	6.5	48.0	50.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.588	1946
2	0.649	2438
3	0.645	2236
4	0.683	2474
5	0.402	838

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2027 + committed without Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	773	100.000
2		✓	756	100.000
3		✓	77	100.000
4		✓	1455	100.000
5		✓	6	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	59	1	713	0
	2	25	0	26	704	1
	3	3	29	0	45	0
	4	637	734	84	0	0
	5	1	2	0	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	0	0	1	0
	2	13	0	0	9	0
	3	0	0	0	0	0
	4	4	9	0	0	0
	5	0	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.64	7.35	1.7	A
2	0.49	4.11	0.9	A
3	0.07	3.36	0.1	A
4	0.70	5.31	2.3	A
5	0.05	30.29	0.1	D

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	582	639	1528	0.381	580	0.6	3.786	A
2	569	601	1877	0.303	567	0.4	2.746	A
3	58	1085	1500	0.039	58	0.0	2.496	A
4	1095	44	2294	0.478	1092	0.9	2.987	A
5	5	1135	352	0.013	4	0.0	10.351	B

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	695	765	1449	0.480	694	0.9	4.758	A
2	680	719	1806	0.376	679	0.6	3.194	A
3	69	1298	1355	0.051	69	0.1	2.799	A
4	1308	52	2288	0.572	1306	1.3	3.661	A
5	5	1358	257	0.021	5	0.0	14.315	B

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	851	936	1342	0.634	848	1.7	7.244	A
2	832	879	1710	0.487	831	0.9	4.098	A
3	85	1588	1158	0.073	85	0.1	3.352	A
4	1602	64	2280	0.703	1598	2.3	5.249	A
5	7	1661	127	0.052	6	0.1	29.802	D

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	851	938	1340	0.635	851	1.7	7.355	A
2	832	882	1708	0.487	832	0.9	4.112	A
3	85	1592	1156	0.073	85	0.1	3.360	A
4	1602	64	2280	0.703	1602	2.3	5.308	A
5	7	1665	125	0.053	7	0.1	30.288	D

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	695	768	1447	0.480	698	0.9	4.826	A
2	680	723	1803	0.377	681	0.6	3.212	A
3	69	1304	1351	0.051	69	0.1	2.808	A
4	1308	52	2288	0.572	1312	1.3	3.706	A
5	5	1363	254	0.021	6	0.0	14.474	B

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	582	642	1526	0.381	583	0.6	3.825	A
2	569	604	1874	0.304	570	0.4	2.762	A
3	58	1090	1496	0.039	58	0.0	2.503	A
4	1095	44	2293	0.478	1097	0.9	3.015	A
5	5	1140	350	0.013	5	0.0	10.426	B

Proposed Layout - 2027 + committed without Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Watford Road	Standard Roundabout	1, 2, 3, 4, 5	9.73	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	2027 + committed without Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	670	100.000
2		✓	1261	100.000
3		✓	86	100.000
4		✓	1826	100.000
5		✓	4	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	27	3	640	0
	2	27	0	23	1209	2
	3	2	22	0	62	0
	4	775	1013	38	0	0
	5	0	1	0	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	4	0	1	0
	2	0	0	0	4	0
	3	0	0	0	0	0
	4	4	8	0	0	0
	5	0	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.62	7.90	1.6	A
2	0.74	7.36	2.8	A
3	0.11	4.68	0.1	A
4	0.87	12.19	6.6	B
5	0.00	0.00	0.0	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	504	804	1428	0.353	502	0.5	3.881	A
2	949	510	2027	0.468	946	0.9	3.318	A
3	65	1408	1301	0.050	65	0.1	2.910	A
4	1375	40	2314	0.594	1369	1.4	3.787	A
5	0	1407	241	0.000	0	0.0	0.000	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	602	962	1329	0.453	601	0.8	4.938	A
2	1134	611	1964	0.577	1132	1.4	4.317	A
3	77	1685	1118	0.069	77	0.1	3.459	A
4	1642	48	2309	0.711	1638	2.4	5.334	A
5	0	1683	123	0.000	0	0.0	0.000	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	738	1172	1198	0.616	735	1.6	7.717	A
2	1388	747	1878	0.739	1383	2.8	7.181	A
3	95	2059	870	0.109	94	0.1	4.643	A
4	2010	58	2302	0.873	1995	6.3	11.202	B
5	0	2051	0	0.000	0	0.0	0.000	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	738	1181	1193	0.618	738	1.6	7.900	A
2	1388	750	1877	0.740	1388	2.8	7.365	A
3	95	2067	864	0.110	95	0.1	4.677	A
4	2010	58	2302	0.873	2009	6.6	12.191	B
5	0	2065	0	0.000	0	0.0	0.000	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	602	974	1322	0.456	605	0.8	5.043	A
2	1134	615	1961	0.578	1139	1.4	4.410	A
3	77	1697	1110	0.070	78	0.1	3.485	A
4	1642	48	2308	0.711	1658	2.5	5.664	A
5	0	1704	115	0.000	0	0.0	0.000	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	504	810	1424	0.354	506	0.6	3.925	A
2	949	514	2025	0.469	951	0.9	3.361	A
3	65	1417	1296	0.050	65	0.1	2.926	A
4	1375	40	2314	0.594	1379	1.5	3.867	A
5	0	1417	236	0.000	0	0.0	0.000	A

Proposed Layout - 2027 + committed with Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Watford Road	Standard Roundabout	1, 2, 3, 4, 5	5.96	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D5	2027 + committed with Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	833	100.000
2		✓	756	100.000
3		✓	77	100.000
4		✓	1478	100.000
5		✓	6	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	59	1	773	0
	2	25	0	26	704	1
	3	3	29	0	45	0
	4	660	734	84	0	0
	5	1	2	0	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	0	0	1	0
	2	13	0	0	9	0
	3	0	0	0	0	0
	4	4	9	0	0	0
	5	0	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.68	8.50	2.1	A
2	0.50	4.31	1.0	A
3	0.08	3.50	0.1	A
4	0.71	5.49	2.5	A
5	0.06	33.08	0.1	D

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	627	639	1528	0.410	624	0.7	3.972	A
2	569	645	1850	0.308	567	0.4	2.804	A
3	58	1129	1471	0.039	58	0.0	2.548	A
4	1113	44	2296	0.485	1109	0.9	3.024	A
5	5	1152	345	0.013	4	0.0	10.558	B

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	749	765	1449	0.517	747	1.1	5.121	A
2	680	773	1773	0.383	679	0.6	3.288	A
3	69	1352	1320	0.052	69	0.1	2.877	A
4	1329	52	2290	0.580	1327	1.4	3.730	A
5	5	1378	249	0.022	5	0.0	14.795	B

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	917	936	1342	0.684	913	2.1	8.315	A
2	832	944	1670	0.498	831	1.0	4.281	A
3	85	1653	1116	0.076	85	0.1	3.489	A
4	1627	64	2282	0.713	1623	2.4	5.423	A
5	7	1686	117	0.056	6	0.1	32.456	D

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	917	938	1340	0.684	917	2.1	8.498	A
2	832	948	1668	0.499	832	1.0	4.307	A
3	85	1658	1113	0.076	85	0.1	3.501	A
4	1627	64	2282	0.713	1627	2.5	5.492	A
5	7	1690	115	0.057	7	0.1	33.078	D

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	749	768	1447	0.518	753	1.1	5.221	A
2	680	778	1770	0.384	681	0.6	3.310	A
3	69	1359	1315	0.053	69	0.1	2.891	A
4	1329	52	2290	0.580	1333	1.4	3.775	A
5	5	1384	246	0.022	6	0.0	14.977	B

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	627	642	1526	0.411	629	0.7	4.020	A
2	569	650	1847	0.308	570	0.4	2.819	A
3	58	1136	1466	0.040	58	0.0	2.556	A
4	1113	44	2296	0.485	1115	0.9	3.053	A
5	5	1157	343	0.013	5	0.0	10.639	B

Proposed Layout - 2027 + committed with Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Watford Road	Standard Roundabout	1, 2, 3, 4, 5	11.06	B

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D6	2027 + committed with Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	692	100.000
2		✓	1261	100.000
3		✓	86	100.000
4		✓	1873	100.000
5		✓	4	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	27	3	662	0
	2	27	0	23	1209	2
	3	2	22	0	62	0
	4	822	1013	38	0	0
	5	0	1	0	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	4	0	1	0
	2	0	0	0	4	0
	3	0	0	0	0	0
	4	4	8	0	0	0
	5	0	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.64	8.33	1.7	A
2	0.75	7.60	2.9	A
3	0.11	4.77	0.1	A
4	0.90	14.58	8.0	B
5	0.00	0.00	0.0	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	521	804	1428	0.365	519	0.6	3.950	A
2	949	527	2017	0.471	946	0.9	3.351	A
3	65	1425	1291	0.050	65	0.1	2.935	A
4	1410	40	2315	0.609	1404	1.5	3.926	A
5	0	1442	226	0.000	0	0.0	0.000	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	622	962	1329	0.468	621	0.9	5.073	A
2	1134	631	1951	0.581	1132	1.4	4.381	A
3	77	1705	1105	0.070	77	0.1	3.502	A
4	1684	48	2310	0.729	1679	2.6	5.671	A
5	0	1725	106	0.000	0	0.0	0.000	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	762	1170	1200	0.635	759	1.7	8.103	A
2	1388	770	1863	0.745	1383	2.8	7.396	A
3	95	2083	854	0.111	94	0.1	4.737	A
4	2062	58	2303	0.895	2043	7.5	12.952	B
5	0	2099	0	0.000	0	0.0	0.000	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	762	1180	1193	0.639	762	1.7	8.334	A
2	1388	774	1861	0.746	1388	2.9	7.599	A
3	95	2092	849	0.112	95	0.1	4.774	A
4	2062	58	2303	0.896	2060	8.0	14.577	B
5	0	2117	0	0.000	0	0.0	0.000	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	622	976	1321	0.471	625	0.9	5.205	A
2	1134	636	1948	0.582	1140	1.4	4.484	A
3	77	1717	1097	0.070	78	0.1	3.531	A
4	1684	48	2310	0.729	1705	2.8	6.148	A
5	0	1751	95	0.000	0	0.0	0.000	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	521	810	1424	0.366	522	0.6	3.998	A
2	949	531	2014	0.471	951	0.9	3.395	A
3	65	1434	1285	0.050	65	0.1	2.950	A
4	1410	40	2315	0.609	1415	1.6	4.021	A
5	0	1453	221	0.000	0	0.0	0.000	A

Proposed Layout - 2038 + committed without Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Watford Road	Standard Roundabout	1, 2, 3, 4, 5	6.10	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D7	2038 + committed without Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	813	100.000
2		✓	786	100.000
3		✓	77	100.000
4		✓	1516	100.000
5		✓	6	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	62	1	750	0
	2	26	0	26	733	1
	3	3	29	0	45	0
	4	669	763	84	0	0
	5	1	2	0	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	0	0	1	0
	2	12	0	0	9	0
	3	0	0	0	0	0
	4	4	9	0	0	0
	5	0	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.68	8.43	2.1	A
2	0.51	4.37	1.0	A
3	0.08	3.52	0.1	A
4	0.73	5.84	2.7	A
5	0.07	39.29	0.1	E

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	612	661	1516	0.404	609	0.7	3.961	A
2	592	628	1866	0.317	590	0.5	2.816	A
3	58	1135	1467	0.040	58	0.0	2.553	A
4	1141	44	2299	0.496	1137	1.0	3.088	A
5	5	1181	334	0.014	4	0.0	10.934	B

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	731	791	1434	0.510	729	1.0	5.098	A
2	707	752	1792	0.394	706	0.6	3.313	A
3	69	1358	1316	0.053	69	0.1	2.886	A
4	1363	53	2293	0.594	1361	1.4	3.853	A
5	5	1413	235	0.023	5	0.0	15.698	C

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	895	967	1324	0.676	891	2.0	8.245	A
2	865	919	1691	0.512	864	1.0	4.342	A
3	85	1661	1111	0.076	85	0.1	3.505	A
4	1669	65	2285	0.730	1664	2.6	5.753	A
5	7	1728	100	0.066	6	0.1	38.310	E

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	895	970	1322	0.677	895	2.1	8.425	A
2	865	923	1689	0.512	865	1.0	4.370	A
3	85	1666	1108	0.077	85	0.1	3.517	A
4	1669	65	2285	0.730	1669	2.7	5.840	A
5	7	1733	98	0.067	7	0.1	39.288	E

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	731	795	1432	0.511	735	1.1	5.197	A
2	707	757	1789	0.395	708	0.7	3.338	A
3	69	1365	1311	0.053	69	0.1	2.900	A
4	1363	53	2293	0.594	1368	1.5	3.910	A
5	5	1420	232	0.023	6	0.0	15.931	C

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	612	664	1513	0.404	614	0.7	4.007	A
2	592	632	1864	0.317	592	0.5	2.832	A
3	58	1141	1463	0.040	58	0.0	2.561	A
4	1141	44	2299	0.496	1143	1.0	3.119	A
5	5	1187	331	0.014	5	0.0	11.025	B

Proposed Layout - 2038 + committed without Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Watford Road	Standard Roundabout	1, 2, 3, 4, 5	12.69	B

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D8	2038 + committed without Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	703	100.000
2		✓	1315	100.000
3		✓	86	100.000
4		✓	1908	100.000
5		✓	4	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	29	3	671	0
	2	29	0	23	1261	2
	3	2	22	0	62	0
	4	812	1058	38	0	0
	5	0	1	0	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	4	0	1	0
	2	0	0	0	4	0
	3	0	0	0	0	0
	4	4	7	0	0	0
	5	0	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.66	9.20	1.9	A
2	0.78	8.78	3.5	A
3	0.12	5.08	0.1	A
4	0.91	16.90	9.4	C
5	0.00	0.00	0.0	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	529	838	1408	0.376	527	0.6	4.074	A
2	990	534	2014	0.491	986	1.0	3.489	A
3	65	1472	1260	0.051	65	0.1	3.011	A
4	1436	41	2317	0.620	1430	1.6	4.029	A
5	0	1470	215	0.000	0	0.0	0.000	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	632	1002	1306	0.484	631	0.9	5.320	A
2	1182	639	1948	0.607	1180	1.5	4.672	A
3	77	1761	1068	0.072	77	0.1	3.632	A
4	1715	49	2312	0.742	1710	2.8	5.937	A
5	0	1758	93	0.000	0	0.0	0.000	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	774	1217	1172	0.660	770	1.9	8.873	A
2	1448	780	1859	0.779	1440	3.4	8.448	A
3	95	2150	810	0.117	94	0.1	5.028	A
4	2101	60	2305	0.911	2077	8.7	14.513	B
5	0	2135	0	0.000	0	0.0	0.000	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	774	1229	1165	0.665	774	1.9	9.202	A
2	1448	784	1857	0.780	1448	3.5	8.777	A
3	95	2161	803	0.118	95	0.1	5.079	A
4	2101	61	2305	0.911	2098	9.4	16.896	C
5	0	2156	0	0.000	0	0.0	0.000	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	632	1020	1295	0.488	636	1.0	5.496	A
2	1182	644	1945	0.608	1190	1.6	4.815	A
3	77	1776	1058	0.073	78	0.1	3.672	A
4	1715	50	2312	0.742	1741	2.9	6.577	A
5	0	1789	80	0.000	0	0.0	0.000	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	529	845	1404	0.377	531	0.6	4.130	A
2	990	537	2012	0.492	992	1.0	3.541	A
3	65	1482	1254	0.052	65	0.1	3.030	A
4	1436	41	2317	0.620	1442	1.7	4.137	A
5	0	1482	210	0.000	0	0.0	0.000	A

Proposed Layout - 2038 + committed with Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Watford Road	Standard Roundabout	1, 2, 3, 4, 5	6.70	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D9	2038 + committed with Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	873	100.000
2		✓	786	100.000
3		✓	77	100.000
4		✓	1539	100.000
5		✓	6	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	62	1	810	0
	2	26	0	26	733	1
	3	3	29	0	45	0
	4	692	763	84	0	0
	5	1	2	0	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	0	0	1	0
	2	12	0	0	9	0
	3	0	0	0	0	0
	4	4	9	0	0	0
	5	0	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.73	9.96	2.6	A
2	0.52	4.59	1.1	A
3	0.08	3.67	0.1	A
4	0.74	6.06	2.8	A
5	0.07	44.09	0.1	E

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	657	661	1515	0.434	654	0.8	4.166	A
2	592	673	1839	0.322	590	0.5	2.877	A
3	58	1180	1438	0.040	58	0.0	2.607	A
4	1159	44	2302	0.503	1155	1.0	3.128	A
5	5	1198	327	0.014	4	0.0	11.164	B

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	785	791	1434	0.547	783	1.2	5.515	A
2	707	806	1760	0.402	706	0.7	3.415	A
3	69	1412	1281	0.054	69	0.1	2.969	A
4	1384	53	2296	0.603	1382	1.5	3.928	A
5	5	1434	227	0.024	5	0.0	16.274	C

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	961	967	1324	0.726	956	2.6	9.641	A
2	865	983	1652	0.524	864	1.1	4.555	A
3	85	1725	1069	0.079	85	0.1	3.655	A
4	1694	65	2288	0.741	1689	2.8	5.963	A
5	7	1753	90	0.073	6	0.1	42.760	E

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	961	970	1322	0.727	961	2.6	9.958	A
2	865	988	1649	0.525	865	1.1	4.591	A
3	85	1732	1065	0.080	85	0.1	3.671	A
4	1694	65	2288	0.741	1694	2.8	6.061	A
5	7	1758	88	0.075	7	0.1	44.086	E

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	785	795	1431	0.548	790	1.2	5.661	A
2	707	813	1755	0.403	708	0.7	3.443	A
3	69	1421	1275	0.054	69	0.1	2.984	A
4	1384	53	2296	0.603	1389	1.5	3.991	A
5	5	1441	223	0.024	6	0.0	16.543	C

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	657	664	1513	0.434	659	0.8	4.224	A
2	592	678	1836	0.322	593	0.5	2.895	A
3	58	1187	1433	0.040	58	0.0	2.616	A
4	1159	44	2302	0.503	1161	1.0	3.162	A
5	5	1204	324	0.014	5	0.0	11.262	B

Proposed Layout - 2038 + committed with Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Watford Road	Standard Roundabout	1, 2, 3, 4, 5	12.19	B

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D10	2038 + committed with Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	725	100.000
2		✓	1315	100.000
3		✓	86	100.000
4		✓	1955	100.000
5		✓	3	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	29	3	693	0
	2	29	0	23	1261	2
	3	2	22	0	62	0
	4	859	1058	38	0	0
	5	0	0	0	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	4	0	1	0
	2	0	0	0	3	0
	3	0	0	0	0	0
	4	0	5	0	0	0
	5	0	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.68	9.41	2.1	A
2	0.78	8.59	3.4	A
3	0.12	5.10	0.1	A
4	0.91	15.93	9.1	C
5	0.00	0.00	0.0	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	546	838	1419	0.385	543	0.6	4.101	A
2	990	550	2030	0.488	986	0.9	3.435	A
3	65	1488	1258	0.051	65	0.1	3.016	A
4	1472	41	2383	0.618	1465	1.6	3.896	A
5	0	1505	217	0.000	0	0.0	0.000	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	652	1002	1319	0.494	650	1.0	5.377	A
2	1182	658	1961	0.603	1180	1.5	4.596	A
3	77	1781	1066	0.073	77	0.1	3.642	A
4	1758	49	2378	0.739	1753	2.8	5.718	A
5	0	1800	96	0.000	0	0.0	0.000	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	798	1218	1187	0.672	794	2.0	9.069	A
2	1448	804	1868	0.775	1441	3.3	8.278	A
3	95	2174	807	0.117	94	0.1	5.051	A
4	2152	60	2370	0.908	2130	8.5	13.817	B
5	0	2188	0	0.000	0	0.0	0.000	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	798	1230	1180	0.676	798	2.1	9.411	A
2	1448	808	1866	0.776	1448	3.4	8.592	A
3	95	2185	800	0.118	95	0.1	5.102	A
4	2152	61	2370	0.908	2150	9.1	15.927	C
5	0	2208	0	0.000	0	0.0	0.000	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	652	1019	1308	0.498	656	1.0	5.551	A
2	1182	664	1957	0.604	1190	1.5	4.732	A
3	77	1796	1056	0.073	78	0.1	3.679	A
4	1758	50	2377	0.739	1782	2.9	6.285	A
5	0	1830	83	0.000	0	0.0	0.000	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	546	845	1415	0.386	547	0.6	4.158	A
2	990	554	2028	0.488	992	1.0	3.486	A
3	65	1498	1251	0.052	65	0.1	3.033	A
4	1472	41	2383	0.618	1477	1.6	3.995	A
5	0	1517	212	0.000	0	0.0	0.000	A

Junctions 9

ARCADY 9 - Roundabout Module

Filename: A405_Tippendell Lane + Committed.j9
Path: \\gc-did-fs01\CAD\2021\8210856\(6)_Transport\(1)_Planning\(4)_Modelling\SRN
Report generation date: 10/08/2022 12:11:07

Summary of junction performance

	AM					PM				
	Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)	Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)
	Existing Layout - 2016 Base									
Arm 1	0.5	2.49	0.32	A	3.74	1.2	3.69	0.54	A	4.31
Arm 2	0.9	6.96	0.46	A		0.8	8.66	0.44	A	
Arm 3	0.5	2.83	0.35	A		0.8	3.12	0.45	A	
Arm 4	0.3	4.33	0.22	A		0.5	5.79	0.33	A	
	Existing Layout - 2027 + committed without Dev									
Arm 1	0.7	2.99	0.42	A	4.80	2.2	5.56	0.69	A	6.41
Arm 2	1.3	10.00	0.58	A		1.6	16.43	0.62	C	
Arm 3	0.9	3.70	0.49	A		1.3	4.03	0.56	A	
Arm 4	0.4	5.56	0.28	A		0.7	7.94	0.43	A	
	Existing Layout - 2027 + committed with Dev									
Arm 1	0.7	3.04	0.42	A	4.95	2.3	5.82	0.70	A	6.77
Arm 2	1.4	10.39	0.59	B		1.8	18.05	0.65	C	
Arm 3	1.0	3.75	0.49	A		1.3	4.14	0.57	A	
Arm 4	0.5	5.94	0.33	A		0.8	8.20	0.45	A	
	Existing Layout - 2038 + committed without Dev									
Arm 1	0.8	3.10	0.43	A	5.22	2.5	6.26	0.72	A	7.44
Arm 2	1.6	11.45	0.62	B		2.1	21.26	0.69	C	
Arm 3	1.0	3.90	0.51	A		1.4	4.31	0.59	A	
Arm 4	0.4	5.87	0.30	A		0.9	8.91	0.47	A	
	Existing Layout - 2038 + committed with Dev									
Arm 1	0.8	3.15	0.44	A	5.42	2.7	6.59	0.73	A	7.96
Arm 2	1.7	11.97	0.63	B		2.4	24.01	0.72	C	
Arm 3	1.0	3.96	0.51	A		1.4	4.43	0.59	A	
Arm 4	0.5	6.32	0.35	A		0.9	9.23	0.49	A	

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages.

File summary

File Description

Title	J4 - A405 / Tippendell Lane + Committed Development
Location	Chiswell Green
Site number	J4
Date	24/07/2022
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	8210856
Enumerator	UK\dkemp
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	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2016 Base	AM	ONE HOUR	07:00	08:30	15
D2	2016 Base	PM	ONE HOUR	16:45	18:15	15
D3	2027 + committed without Dev	AM	ONE HOUR	07:00	08:30	15
D4	2027 + committed without Dev	PM	ONE HOUR	16:45	18:15	15
D5	2027 + committed with Dev	AM	ONE HOUR	07:00	08:30	15
D6	2027 + committed with Dev	PM	ONE HOUR	16:45	18:15	15
D7	2038 + committed without Dev	AM	ONE HOUR	07:00	08:30	15
D8	2038 + committed without Dev	PM	ONE HOUR	16:45	18:15	15
D9	2038 + committed with Dev	AM	ONE HOUR	07:00	08:30	15
D10	2038 + committed with Dev	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	Existing Layout	100.000

Existing Layout - 2016 Base, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	3.74	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	A405 (North)	
2	Tippendell Lane (East)	
3	A405 (South)	
4	Tippendell Lane (West)	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1	7.40	8.00	18.6	31.0	44.0	28.0	
2	3.20	5.10	10.3	23.0	44.0	20.0	
3	7.50	8.00	2.3	43.0	44.0	29.0	
4	3.20	6.10	16.0	17.0	44.0	23.5	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.789	2465
2	0.582	1386
3	0.783	2432
4	0.605	1547

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2016 Base	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	625	100.000
2		✓	404	100.000
3		✓	632	100.000
4		✓	211	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	48	521	56
	2	73	0	70	261
	3	519	86	0	27
	4	69	119	23	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	2	7	4
	2	1	0	1	2
	3	7	2	0	0
	4	0	1	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.32	2.49	0.5	A
2	0.46	6.96	0.9	A
3	0.35	2.83	0.5	A
4	0.22	4.33	0.3	A

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	471	171	2196	0.214	469	0.3	2.084	A
2	304	451	1089	0.279	303	0.4	4.568	A
3	476	292	2071	0.230	475	0.3	2.254	A
4	159	509	1215	0.131	158	0.1	3.403	A

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	562	205	2170	0.259	562	0.3	2.237	A
2	363	539	1036	0.351	363	0.5	5.345	A
3	568	350	2027	0.280	568	0.4	2.466	A
4	190	609	1152	0.165	189	0.2	3.741	A

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	688	251	2136	0.322	688	0.5	2.486	A
2	445	660	962	0.462	444	0.8	6.925	A
3	696	428	1968	0.354	695	0.5	2.826	A
4	232	746	1064	0.218	232	0.3	4.321	A

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	688	251	2135	0.322	688	0.5	2.487	A
2	445	661	962	0.462	445	0.9	6.962	A
3	696	429	1968	0.354	696	0.5	2.830	A
4	232	746	1064	0.218	232	0.3	4.328	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	562	205	2170	0.259	562	0.4	2.239	A
2	363	540	1035	0.351	364	0.5	5.379	A
3	568	352	2026	0.280	569	0.4	2.472	A
4	190	610	1151	0.165	190	0.2	3.750	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	471	172	2195	0.214	471	0.3	2.089	A
2	304	452	1088	0.279	305	0.4	4.598	A
3	476	294	2069	0.230	476	0.3	2.261	A
4	159	511	1214	0.131	159	0.2	3.411	A

Existing Layout - 2016 Base, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	4.31	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2016 Base	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	1038	100.000
2		✓	296	100.000
3		✓	859	100.000
4		✓	284	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	79	911	48
	2	39	0	80	177
	3	749	89	0	21
	4	24	246	14	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	2	0
	2	0	0	0	2
	3	6	1	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.54	3.69	1.2	A
2	0.44	8.66	0.8	A
3	0.45	3.12	0.8	A
4	0.33	5.79	0.5	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	781	262	2212	0.353	779	0.5	2.510	A
2	223	730	942	0.236	222	0.3	4.987	A
3	647	198	2169	0.298	645	0.4	2.361	A
4	214	658	1129	0.189	213	0.2	3.924	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	933	313	2172	0.430	932	0.7	2.903	A
2	266	874	858	0.310	266	0.4	6.073	A
3	772	237	2139	0.361	772	0.6	2.631	A
4	255	788	1047	0.244	255	0.3	4.541	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1143	384	2118	0.540	1141	1.2	3.680	A
2	326	1070	743	0.439	325	0.8	8.587	A
3	946	290	2099	0.451	945	0.8	3.115	A
4	313	964	935	0.334	312	0.5	5.770	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1143	384	2117	0.540	1143	1.2	3.694	A
2	326	1071	742	0.439	326	0.8	8.657	A
3	946	291	2098	0.451	946	0.8	3.122	A
4	313	966	935	0.335	313	0.5	5.788	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	933	314	2171	0.430	935	0.8	2.915	A
2	266	876	856	0.311	267	0.5	6.123	A
3	772	238	2138	0.361	773	0.6	2.639	A
4	255	790	1046	0.244	256	0.3	4.561	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	781	263	2211	0.353	782	0.5	2.523	A
2	223	733	941	0.237	223	0.3	5.025	A
3	647	199	2168	0.298	647	0.4	2.370	A
4	214	661	1128	0.190	214	0.2	3.941	A

Existing Layout - 2027 + committed without Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	4.80	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2027 + committed without Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	776	100.000
2		✓	443	100.000
3		✓	841	100.000
4		✓	231	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	53	662	61
	2	80	0	77	286
	3	717	94	0	30
	4	76	130	25	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	2	10	4
	2	1	0	1	2
	3	10	2	0	0
	4	0	1	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.42	2.99	0.7	A
2	0.58	10.00	1.3	A
3	0.49	3.70	0.9	A
4	0.28	5.56	0.4	A

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	584	187	2121	0.275	583	0.4	2.338	A
2	334	562	1011	0.330	332	0.5	5.280	A
3	633	320	2008	0.315	631	0.5	2.611	A
4	174	669	1105	0.157	173	0.2	3.860	A

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	698	224	2094	0.333	697	0.5	2.577	A
2	398	672	942	0.423	397	0.7	6.594	A
3	756	383	1962	0.385	755	0.6	2.983	A
4	208	800	1019	0.204	207	0.3	4.433	A

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	854	274	2057	0.415	854	0.7	2.989	A
2	488	823	848	0.575	485	1.3	9.859	A
3	926	468	1899	0.488	925	0.9	3.690	A
4	254	979	903	0.282	254	0.4	5.542	A

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	854	274	2057	0.415	854	0.7	2.992	A
2	488	824	848	0.575	488	1.3	9.998	A
3	926	470	1897	0.488	926	0.9	3.704	A
4	254	981	902	0.282	254	0.4	5.560	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	698	224	2093	0.333	698	0.5	2.583	A
2	398	673	942	0.423	401	0.7	6.682	A
3	756	386	1960	0.386	757	0.6	2.999	A
4	208	803	1018	0.204	208	0.3	4.451	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	584	188	2120	0.276	585	0.4	2.346	A
2	334	564	1010	0.330	334	0.5	5.334	A
3	633	322	2006	0.316	634	0.5	2.623	A
4	174	672	1103	0.158	174	0.2	3.876	A

Existing Layout - 2027 + committed without Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	6.41	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	2027 + committed without Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	1282	100.000
2		✓	325	100.000
3		✓	1032	100.000
4		✓	311	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	87	1142	53
	2	43	0	88	194
	3	911	98	0	23
	4	26	270	15	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	4	0
	2	0	0	0	2
	3	8	1	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.69	5.56	2.2	A
2	0.62	16.43	1.6	C
3	0.56	4.03	1.3	A
4	0.43	7.94	0.7	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	965	287	2161	0.447	962	0.8	2.994	A
2	245	908	830	0.295	243	0.4	6.117	A
3	777	217	2105	0.369	775	0.6	2.701	A
4	234	790	1035	0.226	233	0.3	4.483	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1152	344	2118	0.544	1151	1.2	3.715	A
2	292	1086	723	0.404	291	0.7	8.312	A
3	928	260	2074	0.447	927	0.8	3.134	A
4	280	945	934	0.299	279	0.4	5.490	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1412	420	2060	0.685	1408	2.1	5.490	A
2	358	1329	578	0.619	354	1.6	15.818	C
3	1136	317	2032	0.559	1134	1.3	4.003	A
4	342	1156	797	0.430	341	0.7	7.875	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1412	422	2059	0.686	1411	2.2	5.559	A
2	358	1332	576	0.621	358	1.6	16.429	C
3	1136	319	2030	0.560	1136	1.3	4.028	A
4	342	1158	796	0.430	342	0.7	7.941	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1152	346	2117	0.544	1156	1.2	3.765	A
2	292	1091	720	0.406	296	0.7	8.551	A
3	928	263	2071	0.448	930	0.8	3.158	A
4	280	948	932	0.300	281	0.4	5.540	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	965	289	2160	0.447	967	0.8	3.022	A
2	245	912	827	0.296	246	0.4	6.205	A
3	777	219	2104	0.369	778	0.6	2.716	A
4	234	793	1033	0.227	235	0.3	4.516	A

Existing Layout - 2027 + committed with Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	4.95	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D5	2027 + committed with Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	789	100.000
2		✓	448	100.000
3		✓	838	100.000
4		✓	271	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	53	662	74
	2	80	0	77	291
	3	714	94	0	30
	4	109	137	25	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	2	10	3
	2	1	0	1	2
	3	10	2	0	0
	4	0	1	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.42	3.04	0.7	A
2	0.59	10.39	1.4	B
3	0.49	3.75	1.0	A
4	0.33	5.94	0.5	A

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	594	192	2120	0.280	592	0.4	2.355	A
2	337	571	1006	0.335	335	0.5	5.352	A
3	631	333	1999	0.316	629	0.5	2.625	A
4	204	666	1107	0.184	203	0.2	3.979	A

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	709	230	2092	0.339	709	0.5	2.602	A
2	403	684	936	0.430	402	0.7	6.729	A
3	753	399	1950	0.386	753	0.6	3.005	A
4	244	797	1022	0.238	243	0.3	4.623	A

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	869	281	2055	0.423	868	0.7	3.032	A
2	493	837	840	0.587	491	1.4	10.234	B
3	923	488	1885	0.490	921	1.0	3.732	A
4	298	976	905	0.330	298	0.5	5.918	A

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	869	282	2054	0.423	869	0.7	3.036	A
2	493	838	839	0.588	493	1.4	10.392	B
3	923	490	1883	0.490	923	1.0	3.747	A
4	298	978	904	0.330	298	0.5	5.940	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	709	231	2092	0.339	710	0.5	2.607	A
2	403	685	935	0.431	405	0.8	6.831	A
3	753	402	1948	0.387	755	0.6	3.022	A
4	244	800	1020	0.239	244	0.3	4.644	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	594	193	2119	0.280	594	0.4	2.361	A
2	337	573	1005	0.336	338	0.5	5.410	A
3	631	336	1997	0.316	632	0.5	2.638	A
4	204	669	1105	0.185	204	0.2	4.000	A

Existing Layout - 2027 + committed with Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	6.77	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D6	2027 + committed with Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	1308	100.000
2		✓	328	100.000
3		✓	1032	100.000
4		✓	324	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	87	1142	79
	2	43	0	88	197
	3	911	98	0	23
	4	37	272	15	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	4	0
	2	0	0	0	2
	3	8	1	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.70	5.82	2.3	A
2	0.65	18.05	1.8	C
3	0.57	4.14	1.3	A
4	0.45	8.20	0.8	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	985	289	2162	0.456	981	0.8	3.041	A
2	247	927	819	0.302	245	0.4	6.259	A
3	777	239	2089	0.372	775	0.6	2.733	A
4	244	789	1035	0.236	243	0.3	4.538	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1176	346	2118	0.555	1174	1.2	3.807	A
2	295	1110	710	0.415	294	0.7	8.632	A
3	928	286	2055	0.452	927	0.8	3.188	A
4	291	945	934	0.312	291	0.4	5.590	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1440	422	2059	0.699	1436	2.3	5.734	A
2	361	1357	562	0.642	357	1.7	17.233	C
3	1136	348	2009	0.566	1134	1.3	4.107	A
4	357	1156	797	0.448	355	0.8	8.123	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1440	424	2058	0.700	1440	2.3	5.819	A
2	361	1361	560	0.645	361	1.8	18.048	C
3	1136	351	2007	0.566	1136	1.3	4.136	A
4	357	1158	796	0.448	357	0.8	8.200	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1176	348	2117	0.556	1180	1.3	3.859	A
2	295	1115	706	0.417	299	0.7	8.922	A
3	928	290	2052	0.452	930	0.8	3.213	A
4	291	948	932	0.313	293	0.5	5.642	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	985	290	2160	0.456	986	0.8	3.070	A
2	247	932	816	0.303	248	0.4	6.356	A
3	777	241	2088	0.372	778	0.6	2.750	A
4	244	793	1033	0.236	245	0.3	4.571	A

Existing Layout - 2038 + committed without Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	5.22	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D7	2038 + committed without Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	808	100.000
2		✓	466	100.000
3		✓	870	100.000
4		✓	242	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	55	688	65
	2	84	0	81	301
	3	740	99	0	31
	4	79	137	26	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	2	10	4
	2	1	0	1	2
	3	9	2	0	0
	4	0	1	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.43	3.10	0.8	A
2	0.62	11.45	1.6	B
3	0.51	3.90	1.0	A
4	0.30	5.87	0.4	A

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	608	196	2117	0.287	607	0.4	2.381	A
2	351	585	998	0.352	349	0.5	5.531	A
3	655	337	1998	0.328	653	0.5	2.674	A
4	182	693	1090	0.167	181	0.2	3.960	A

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	726	235	2089	0.348	726	0.5	2.641	A
2	419	700	926	0.453	418	0.8	7.071	A
3	782	404	1948	0.401	781	0.7	3.083	A
4	218	829	1001	0.217	217	0.3	4.589	A

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	890	288	2050	0.434	889	0.8	3.095	A
2	513	857	828	0.620	510	1.6	11.223	B
3	958	493	1882	0.509	956	1.0	3.876	A
4	266	1014	881	0.303	266	0.4	5.849	A

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	890	288	2050	0.434	890	0.8	3.101	A
2	513	858	827	0.620	513	1.6	11.447	B
3	958	495	1880	0.509	958	1.0	3.901	A
4	266	1016	879	0.303	266	0.4	5.872	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	726	236	2088	0.348	727	0.5	2.648	A
2	419	701	925	0.453	422	0.8	7.203	A
3	782	407	1946	0.402	784	0.7	3.100	A
4	218	832	999	0.218	218	0.3	4.611	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	608	198	2117	0.287	609	0.4	2.390	A
2	351	587	996	0.352	352	0.5	5.599	A
3	655	340	1995	0.328	656	0.5	2.688	A
4	182	696	1088	0.168	183	0.2	3.978	A

Existing Layout - 2038 + committed without Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	7.44	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D8	2038 + committed without Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	1336	100.000
2		✓	341	100.000
3		✓	1076	100.000
4		✓	327	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	91	1190	55
	2	45	0	92	204
	3	950	102	0	24
	4	28	283	16	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	4	0
	2	0	0	0	2
	3	8	1	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.72	6.26	2.5	A
2	0.69	21.26	2.1	C
3	0.59	4.31	1.4	A
4	0.47	8.91	0.9	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1006	300	2153	0.467	1002	0.9	3.120	A
2	257	946	808	0.318	255	0.5	6.493	A
3	810	227	2099	0.386	808	0.6	2.783	A
4	246	823	1013	0.243	245	0.3	4.677	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1201	360	2108	0.570	1199	1.3	3.953	A
2	307	1132	697	0.440	305	0.8	9.172	A
3	967	272	2066	0.468	966	0.9	3.270	A
4	294	985	908	0.324	293	0.5	5.846	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1471	440	2047	0.719	1466	2.5	6.153	A
2	375	1384	546	0.687	370	2.1	19.923	C
3	1185	331	2023	0.586	1183	1.4	4.274	A
4	360	1205	766	0.470	358	0.9	8.803	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1471	441	2045	0.719	1471	2.5	6.262	A
2	375	1388	544	0.691	375	2.1	21.261	C
3	1185	334	2020	0.586	1185	1.4	4.308	A
4	360	1208	764	0.471	360	0.9	8.906	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1201	362	2106	0.570	1206	1.3	4.021	A
2	307	1138	693	0.442	312	0.8	9.578	A
3	967	277	2062	0.469	969	0.9	3.299	A
4	294	989	906	0.324	296	0.5	5.914	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1006	303	2151	0.468	1008	0.9	3.151	A
2	257	951	805	0.319	258	0.5	6.605	A
3	810	230	2097	0.386	811	0.6	2.802	A
4	246	827	1011	0.244	247	0.3	4.717	A

Existing Layout - 2038 + committed with Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	5.42	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D9	2038 + committed with Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	821	100.000
2		✓	471	100.000
3		✓	870	100.000
4		✓	282	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	55	688	78
	2	84	0	81	306
	3	740	99	0	31
	4	112	144	26	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	2	10	3
	2	1	0	1	2
	3	9	2	0	0
	4	0	1	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.44	3.15	0.8	A
2	0.63	11.97	1.7	B
3	0.51	3.96	1.0	A
4	0.35	6.32	0.5	A

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	618	202	2116	0.292	616	0.4	2.398	A
2	355	595	992	0.357	352	0.6	5.610	A
3	655	350	1988	0.330	653	0.5	2.694	A
4	212	693	1090	0.195	211	0.2	4.092	A

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	738	242	2087	0.354	738	0.5	2.666	A
2	423	711	919	0.461	422	0.8	7.228	A
3	782	420	1937	0.404	781	0.7	3.115	A
4	254	829	1002	0.253	253	0.3	4.807	A

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	904	296	2047	0.441	903	0.8	3.142	A
2	519	871	820	0.633	515	1.7	11.705	B
3	958	512	1868	0.513	956	1.0	3.942	A
4	310	1014	881	0.352	310	0.5	6.291	A

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	904	296	2047	0.442	904	0.8	3.148	A
2	519	872	819	0.633	518	1.7	11.967	B
3	958	515	1866	0.513	958	1.0	3.963	A
4	310	1016	880	0.353	310	0.5	6.322	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	738	242	2086	0.354	739	0.5	2.675	A
2	423	713	918	0.461	427	0.9	7.372	A
3	782	424	1934	0.404	784	0.7	3.133	A
4	254	832	1000	0.254	254	0.3	4.833	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	618	203	2115	0.292	619	0.4	2.407	A
2	355	597	991	0.358	356	0.6	5.683	A
3	655	353	1985	0.330	656	0.5	2.710	A
4	212	696	1088	0.195	213	0.2	4.115	A

Existing Layout - 2038 + committed with Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	7.96	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D10	2038 + committed with Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	1362	100.000
2		✓	344	100.000
3		✓	1076	100.000
4		✓	340	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	91	1190	81
	2	45	0	92	207
	3	950	102	0	24
	4	39	285	16	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	4	0
	2	0	0	0	2
	3	8	1	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.73	6.59	2.7	A
2	0.72	24.01	2.4	C
3	0.59	4.43	1.4	A
4	0.49	9.23	0.9	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1025	302	2153	0.476	1022	0.9	3.170	A
2	259	965	796	0.325	257	0.5	6.654	A
3	810	249	2083	0.389	808	0.6	2.815	A
4	256	823	1013	0.253	255	0.3	4.737	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1224	362	2108	0.581	1223	1.4	4.059	A
2	309	1155	683	0.453	308	0.8	9.560	A
3	967	298	2047	0.473	966	0.9	3.327	A
4	306	985	908	0.336	305	0.5	5.959	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1500	442	2046	0.733	1494	2.7	6.463	A
2	379	1412	530	0.715	373	2.3	22.127	C
3	1185	362	2000	0.592	1183	1.4	4.392	A
4	374	1205	766	0.489	373	0.9	9.112	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1500	444	2045	0.733	1499	2.7	6.594	A
2	379	1417	527	0.719	378	2.4	24.011	C
3	1185	366	1997	0.593	1185	1.4	4.431	A
4	374	1208	764	0.490	374	0.9	9.231	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1224	364	2106	0.581	1230	1.4	4.132	A
2	309	1162	679	0.455	316	0.9	10.066	B
3	967	304	2043	0.474	969	0.9	3.360	A
4	306	989	906	0.337	307	0.5	6.034	A

18:00 - 18:15

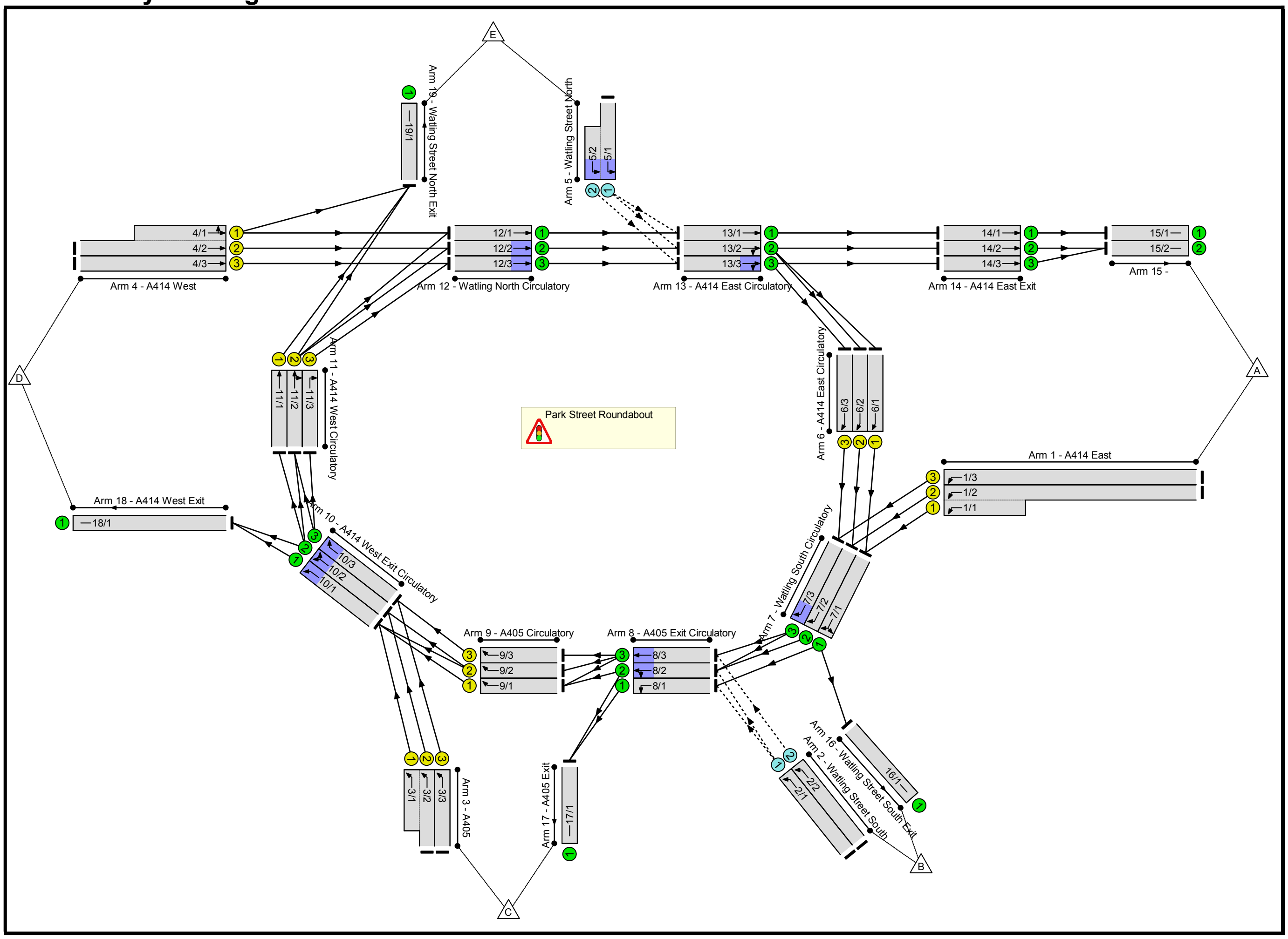
Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1025	304	2152	0.477	1027	0.9	3.209	A
2	259	971	793	0.327	260	0.5	6.777	A
3	810	252	2081	0.389	811	0.6	2.838	A
4	256	827	1011	0.253	257	0.3	4.779	A

Full Input Data And Results
Full Input Data And Results

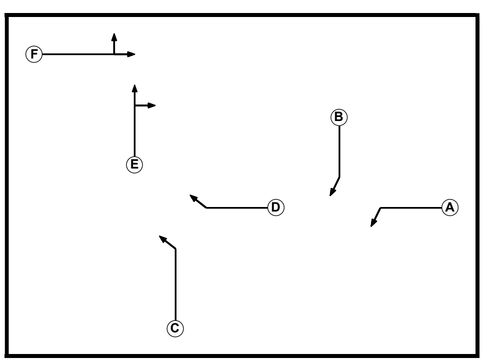
User and Project Details

Project:	**Land South of Chiswell Green Lane**
Title:	**Proposed Park Street Roundabout**
Location:	St Albans
File name:	Park Street Roundabout.lsg3x
Company:	Glanville

Network Layout Diagram



Phase Diagram



Full Input Data And Results

Phase Input Data

Phase Name	Phase Type	Stage Stream	Assoc. Phase	Street Min	Cont Min
A	Traffic	1		7	7
B	Traffic	1		7	7
C	Traffic	2		7	7
D	Traffic	2		7	7
E	Traffic	3		7	7
F	Traffic	3		7	7

Phase Intergreens Matrix

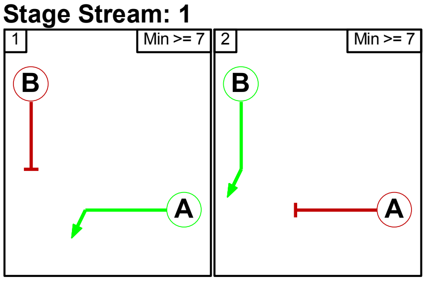
		Starting Phase					
		A	B	C	D	E	F
Terminating Phase	A		5	-	-	-	-
	B	5		-	-	-	-
	C	-	-		5	-	-
	D	-	-	5		-	-
	E	-	-	-	-		5
	F	-	-	-	-	5	

Phases in Stage

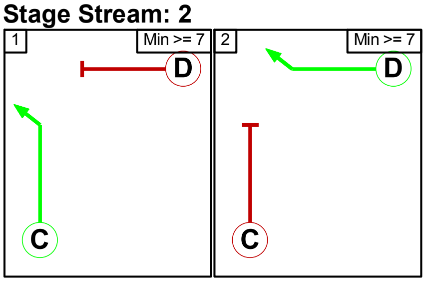
Stream	Stage No.	Phases in Stage
1	1	A
1	2	B
2	1	C
2	2	D
3	1	F
3	2	E

Stage Diagram

Stage Stream: 1

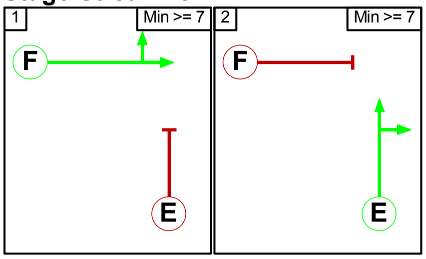


Stage Stream: 2



Full Input Data And Results

Stage Stream: 3



Phase Delays

Stage Stream: 1

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Stage Stream: 2

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Stage Stream: 3

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Prohibited Stage Change

Stage Stream: 1

		To Stage	
		1	2
From Stage	1		5
	2	5	

Stage Stream: 2

		To Stage	
		1	2
From Stage	1		5
	2	5	

Stage Stream: 3

		To Stage	
		1	2
From Stage	1		5
	2	5	

Full Input Data And Results

Give-Way Lane Input Data

Junction: Park Street Roundabout											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
2/1 (Watling Street South)	8/1 (Left)	2159	0	7/1	0.52	To 8/1 (Right)	-	-	-	-	-
				7/2	0.52	All					
				7/3	0.52	All					
	8/2 (Left)	2159	0	7/1	0.52	To 8/1 (Right)					
				7/2	0.52	All					
				7/3	0.52	All					
2/2 (Watling Street South)	8/3 (Left)	2159	0	7/1	0.52	To 8/1 (Right)	-	-	-	-	-
5/1 (Watling Street North)	13/1 (Left)	2086	0	12/1	0.51	All	-	-	-	-	-
				12/2	0.51	All					
				12/3	0.51	All					
	13/2 (Left)	2086	0	12/1	0.51	All					
				12/2	0.51	All					
				12/3	0.51	All					
5/2 (Watling Street North)	13/3 (Left)	2086	0	12/1	0.51	All	-	-	-	-	-
				12/2	0.51	All					
				12/3	0.51	All					

Lane Input Data

Junction: Park Street Roundabout												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (A414 East)	U	A	2	3	8.0	Geom	-	4.00	0.00	Y	Arm 7 Left	36.00
1/2 (A414 East)	U	A	2	3	8.0	Geom	-	4.00	0.00	N	Arm 7 Left	Inf
1/3 (A414 East)	U	A	2	3	60.0	Geom	-	4.50	0.00	N	Arm 7 Left	Inf
2/1 (Watling Street South)	O		2	3	60.0	Geom	-	3.70	0.00	Y	Arm 8 Left	30.00
2/2 (Watling Street South)	O		2	3	60.0	Geom	-	3.70	0.00	N	Arm 8 Left	30.00
3/1 (A405)	U	C	2	3	12.0	Geom	-	3.75	0.00	Y	Arm 10 Left	40.00
3/2 (A405)	U	C	2	3	8.9	Geom	-	3.75	0.00	N	Arm 10 Left	Inf
3/3 (A405)	U	C	2	3	60.0	Geom	-	3.75	0.00	N	Arm 10 Left	Inf
4/1 (A414 West)	U	E	2	3	9.0	Geom	-	3.75	0.00	Y	Arm 12 Ahead Arm 19 Left	Inf 40.00
4/2 (A414 West)	U	E	2	3	5.7	Geom	-	3.75	0.00	N	Arm 12 Ahead	Inf
4/3 (A414 West)	U	E	2	3	60.0	Geom	-	3.75	0.00	N	Arm 12 Ahead	Inf
5/1 (Watling Street North)	O		2	3	60.0	Geom	-	4.30	0.00	Y	Arm 13 Left	60.00
5/2 (Watling Street North)	O		2	3	5.2	Geom	-	4.30	0.00	N	Arm 13 Left	Inf
6/1 (A414 East Circulatory)	U	B	2	3	4.0	User	1900	-	-	-	-	-
6/2 (A414 East Circulatory)	U	B	2	3	4.0	User	1900	-	-	-	-	-
6/3 (A414 East Circulatory)	U	B	2	3	4.0	User	1900	-	-	-	-	-
7/1 (Watling South Circulatory)	U		2	3	60.0	User	1900	-	-	-	-	-
7/2 (Watling South Circulatory)	U		2	3	60.0	User	1900	-	-	-	-	-
7/3 (Watling South Circulatory)	U		2	3	8.9	User	1900	-	-	-	-	-

Full Input Data And Results

8/1 (A405 Exit Circulatory)	U		2	3	60.0	User	1900	-	-	-	-	-
8/2 (A405 Exit Circulatory)	U		2	3	60.0	User	1900	-	-	-	-	-
8/3 (A405 Exit Circulatory)	U		2	3	5.7	User	1900	-	-	-	-	-
9/1 (A405 Circulatory)	U	D	2	3	5.6	User	1900	-	-	-	-	-
9/2 (A405 Circulatory)	U	D	2	3	5.6	User	1900	-	-	-	-	-
9/3 (A405 Circulatory)	U	D	2	3	5.6	User	1900	-	-	-	-	-
10/1 (A414 West Exit Circulatory)	U		2	3	4.5	User	1900	-	-	-	-	-
10/2 (A414 West Exit Circulatory)	U		2	3	4.5	User	1900	-	-	-	-	-
10/3 (A414 West Exit Circulatory)	U		2	3	4.5	User	1900	-	-	-	-	-
11/1 (A414 West Circulatory)	U	F	2	3	4.5	User	1900	-	-	-	-	-
11/2 (A414 West Circulatory)	U	F	2	3	4.5	User	1900	-	-	-	-	-
11/3 (A414 West Circulatory)	U	F	2	3	4.5	User	1900	-	-	-	-	-
12/1 (Watling North Circulatory)	U		2	3	4.2	User	1900	-	-	-	-	-
12/2 (Watling North Circulatory)	U		2	3	4.7	User	1900	-	-	-	-	-
12/3 (Watling North Circulatory)	U		2	3	4.2	User	1900	-	-	-	-	-
13/1 (A414 East Circulatory)	U		2	3	5.2	User	1900	-	-	-	-	-
13/2 (A414 East Circulatory)	U		2	3	5.2	User	1900	-	-	-	-	-
13/3 (A414 East Circulatory)	U		2	3	5.2	User	1900	-	-	-	-	-

14/1 (A414 East Exit)	U		2	3	23.5	Geom	-	3.65	0.00	Y	Arm 15 Ahead	Inf
14/2 (A414 East Exit)	U		2	3	23.5	Geom	-	3.65	0.00	N	Arm 15 Ahead	Inf
14/3 (A414 East Exit)	U		2	3	23.5	Geom	-	3.50	0.00	Y	Arm 15 Ahead	Inf
15/1	U		2	3	60.0	Inf	-	-	-	-	-	-
15/2	U		2	3	60.0	Inf	-	-	-	-	-	-
16/1 (Watling Street South Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
17/1 (A405 Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
18/1 (A414 West Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
19/1 (Watling Street North Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2027 Base + Committed - AM'	07:15	08:15	01:00	
2: '2027 Base + Committed - PM'	17:00	18:00	01:00	
3: '2027 Base + Committed + Dev - AM'	07:15	08:15	01:00	
4: '2027 Base + Committed + Dev - PM'	17:00	18:00	01:00	
5: '2038 Base + Committed - AM'	07:15	08:15	01:00	
6: '2038 Base + Committed - PM'	17:00	18:00	01:00	
7: '2038 Base + Committed + Dev - AM'	07:15	08:15	01:00	
8: '2038 Base + Committed + Dev - PM'	17:00	18:00	01:00	

Scenario 1: '2027 Base + Committed - AM' (FG1: '2027 Base + Committed - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination						
Origin		A	B	C	D	E	Tot.
	A	0	197	638	851	301	1987
	B	299	0	61	172	84	616
	C	742	51	0	76	81	950
	D	837	97	65	0	62	1061
	E	269	251	79	145	0	744
	Tot.	2147	596	843	1244	528	5358

Traffic Lane Flows

Lane	Scenario 1: 2027 Base + Committed - AM
Junction: Park Street Roundabout	
1/1 (short)	398
1/2 (with short)	835(In) 437(Out)
1/3	1152
2/1	61
2/2	555
3/1 (short)	76
3/2 (with short)	502(In) 426(Out)
3/3	448
4/1 (short)	379
4/2 (with short)	772(In) 393(Out)
4/3	289
5/1 (with short)	744(In) 491(Out)
5/2 (short)	253
6/1	399
6/2	0
6/3	289
7/1	797
7/2	437
7/3	1441
8/1	258
8/2	724
8/3	1713
9/1	658
9/2	670
9/3	524
10/1	855
10/2	975
10/3	972
11/1	241
11/2	718
11/3	599
12/1	608
12/2	595
12/3	888
13/1	758

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13/2	936
13/3	1141
14/1	758
14/2	537
14/3	852
15/1	758
15/2	1389
16/1	596
17/1	843
18/1	1244
19/1	528

Lane Saturation Flows

Junction: Park Street Roundabout								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (A414 East)	4.00	0.00	Y	Arm 7 Left	36.00	100.0 %	1934	1934
1/2 (A414 East)	4.00	0.00	N	Arm 7 Left	Inf	100.0 %	2155	2155
1/3 (A414 East)	4.50	0.00	N	Arm 7 Left	Inf	100.0 %	2205	2205
2/1 (Watling Street South)	3.70	0.00	Y	Arm 8 Left	30.00	100.0 %	1890	1890
2/2 (Watling Street South)	3.70	0.00	N	Arm 8 Left	30.00	100.0 %	2024	2024
3/1 (A405)	3.75	0.00	Y	Arm 10 Left	40.00	100.0 %	1918	1918
3/2 (A405)	3.75	0.00	N	Arm 10 Left	Inf	100.0 %	2130	2130
3/3 (A405)	3.75	0.00	N	Arm 10 Left	Inf	100.0 %	2130	2130
4/1 (A414 West)	3.75	0.00	Y	Arm 12 Ahead	Inf	83.6 %	1978	1978
				Arm 19 Left	40.00	16.4 %		
4/2 (A414 West)	3.75	0.00	N	Arm 12 Ahead	Inf	100.0 %	2130	2130
4/3 (A414 West)	3.75	0.00	N	Arm 12 Ahead	Inf	100.0 %	2130	2130
5/1 (Watling Street North)	4.30	0.00	Y	Arm 13 Left	60.00	100.0 %	1995	1995
5/2 (Watling Street North)	4.30	0.00	N	Arm 13 Left	Inf	100.0 %	2185	2185
6/1 (A414 East Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
6/2 (A414 East Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
6/3 (A414 East Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
7/1 (Watling South Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
7/2 (Watling South Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
7/3 (Watling South Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
8/1 (A405 Exit Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
8/2 (A405 Exit Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
8/3 (A405 Exit Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900

9/1 (A405 Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
9/2 (A405 Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
9/3 (A405 Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
10/1 (A414 West Exit Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
10/2 (A414 West Exit Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
10/3 (A414 West Exit Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
11/1 (A414 West Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
11/2 (A414 West Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
11/3 (A414 West Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
12/1 (Watling North Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
12/2 (Watling North Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
12/3 (Watling North Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
13/1 (A414 East Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
13/2 (A414 East Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
13/3 (A414 East Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
14/1 (A414 East Exit)	3.65	0.00	Y	Arm 15 Ahead	Inf	100.0 %	1980	1980
14/2 (A414 East Exit)	3.65	0.00	N	Arm 15 Ahead	Inf	100.0 %	2120	2120
14/3 (A414 East Exit)	3.50	0.00	Y	Arm 15 Ahead	Inf	100.0 %	1965	1965
15/1	Infinite Saturation Flow						Inf	Inf
15/2	Infinite Saturation Flow						Inf	Inf
16/1 (Watling Street South Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
17/1 (A405 Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
18/1 (A414 West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
19/1 (Watling Street North Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 2: '2027 Base + Committed - PM' (FG2: '2027 Base + Committed - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination						
Origin		A	B	C	D	E	Tot.
	A	0	162	1140	1109	235	2646
	B	256	0	13	198	74	541
	C	690	142	0	80	124	1036
	D	1022	82	73	0	83	1260
	E	234	183	157	146	0	720
	Tot.	2202	569	1383	1533	516	6203

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 2: 2027 Base + Committed - PM
Junction: Park Street Roundabout	
1/1 (short)	637
1/2 (with short)	1302(In) 665(Out)
1/3	1344
2/1	13
2/2	528
3/1 (short)	80
3/2 (with short)	554(In) 474(Out)
3/3	482
4/1 (short)	462
4/2 (with short)	921(In) 459(Out)
4/3	339
5/1 (with short)	720(In) 417(Out)
5/2 (short)	303
6/1	407
6/2	0
6/3	376
7/1	1044
7/2	665
7/3	1720
8/1	488
8/2	1048
8/3	1865
9/1	769
9/2	783
9/3	466
10/1	986
10/2	1120
10/3	948
11/1	223
11/2	687
11/3	611
12/1	624
12/2	691
12/3	950
13/1	770

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13/2	962
13/3	1253
14/1	770
14/2	555
14/3	877
15/1	770
15/2	1432
16/1	569
17/1	1383
18/1	1533
19/1	516

Lane Saturation Flows

Junction: Park Street Roundabout								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (A414 East)	4.00	0.00	Y	Arm 7 Left	36.00	100.0 %	1934	1934
1/2 (A414 East)	4.00	0.00	N	Arm 7 Left	Inf	100.0 %	2155	2155
1/3 (A414 East)	4.50	0.00	N	Arm 7 Left	Inf	100.0 %	2205	2205
2/1 (Watling Street South)	3.70	0.00	Y	Arm 8 Left	30.00	100.0 %	1890	1890
2/2 (Watling Street South)	3.70	0.00	N	Arm 8 Left	30.00	100.0 %	2024	2024
3/1 (A405)	3.75	0.00	Y	Arm 10 Left	40.00	100.0 %	1918	1918
3/2 (A405)	3.75	0.00	N	Arm 10 Left	Inf	100.0 %	2130	2130
3/3 (A405)	3.75	0.00	N	Arm 10 Left	Inf	100.0 %	2130	2130
4/1 (A414 West)	3.75	0.00	Y	Arm 12 Ahead	Inf	82.0 %	1977	1977
				Arm 19 Left	40.00	18.0 %		
4/2 (A414 West)	3.75	0.00	N	Arm 12 Ahead	Inf	100.0 %	2130	2130
4/3 (A414 West)	3.75	0.00	N	Arm 12 Ahead	Inf	100.0 %	2130	2130
5/1 (Watling Street North)	4.30	0.00	Y	Arm 13 Left	60.00	100.0 %	1995	1995
5/2 (Watling Street North)	4.30	0.00	N	Arm 13 Left	Inf	100.0 %	2185	2185
6/1 (A414 East Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
6/2 (A414 East Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
6/3 (A414 East Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
7/1 (Watling South Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
7/2 (Watling South Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
7/3 (Watling South Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
8/1 (A405 Exit Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
8/2 (A405 Exit Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
8/3 (A405 Exit Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900

9/1 (A405 Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
9/2 (A405 Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
9/3 (A405 Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
10/1 (A414 West Exit Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
10/2 (A414 West Exit Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
10/3 (A414 West Exit Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
11/1 (A414 West Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
11/2 (A414 West Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
11/3 (A414 West Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
12/1 (Watling North Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
12/2 (Watling North Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
12/3 (Watling North Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
13/1 (A414 East Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
13/2 (A414 East Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
13/3 (A414 East Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
14/1 (A414 East Exit)	3.65	0.00	Y	Arm 15 Ahead	Inf	100.0 %	1980	1980
14/2 (A414 East Exit)	3.65	0.00	N	Arm 15 Ahead	Inf	100.0 %	2120	2120
14/3 (A414 East Exit)	3.50	0.00	Y	Arm 15 Ahead	Inf	100.0 %	1965	1965
15/1	Infinite Saturation Flow						Inf	Inf
15/2	Infinite Saturation Flow						Inf	Inf
16/1 (Watling Street South Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
17/1 (A405 Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
18/1 (A414 West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
19/1 (Watling Street North Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 3: '2027 Base + Committed + Dev - AM' (FG3: '2027 Base + Committed + Dev - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination					
		A	B	C	D	E	Tot.
Origin	A	0	197	649	851	301	1998
	B	299	0	61	172	84	616
	C	770	51	0	81	81	983
	D	837	97	67	0	62	1063
	E	269	251	79	145	0	744
	Tot.	2175	596	856	1249	528	5404

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 3: 2027 Base + Committed + Dev - AM
Junction: Park Street Roundabout	
1/1 (short)	363
1/2 (with short)	729(In) 366(Out)
1/3	1269
2/1	61
2/2	555
3/1 (short)	81
3/2 (with short)	525(In) 444(Out)
3/3	458
4/1 (short)	377
4/2 (with short)	764(In) 387(Out)
4/3	299
5/1 (with short)	744(In) 491(Out)
5/2 (short)	253
6/1	399
6/2	6
6/3	285
7/1	762
7/2	372
7/3	1554
8/1	225
8/2	686
8/3	1797
9/1	638
9/2	658
9/3	556
10/1	826
10/2	995
10/3	1014
11/1	209
11/2	788
11/3	589
12/1	612
12/2	621
12/3	888
13/1	765

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13/2	959
13/3	1141
14/1	765
14/2	554
14/3	856
15/1	765
15/2	1410
16/1	596
17/1	856
18/1	1249
19/1	528

Lane Saturation Flows

Junction: Park Street Roundabout								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (A414 East)	4.00	0.00	Y	Arm 7 Left	36.00	100.0 %	1934	1934
1/2 (A414 East)	4.00	0.00	N	Arm 7 Left	Inf	100.0 %	2155	2155
1/3 (A414 East)	4.50	0.00	N	Arm 7 Left	Inf	100.0 %	2205	2205
2/1 (Watling Street South)	3.70	0.00	Y	Arm 8 Left	30.00	100.0 %	1890	1890
2/2 (Watling Street South)	3.70	0.00	N	Arm 8 Left	30.00	100.0 %	2024	2024
3/1 (A405)	3.75	0.00	Y	Arm 10 Left	40.00	100.0 %	1918	1918
3/2 (A405)	3.75	0.00	N	Arm 10 Left	Inf	100.0 %	2130	2130
3/3 (A405)	3.75	0.00	N	Arm 10 Left	Inf	100.0 %	2130	2130
4/1 (A414 West)	3.75	0.00	Y	Arm 12 Ahead	Inf	83.6 %	1978	1978
				Arm 19 Left	40.00	16.4 %		
4/2 (A414 West)	3.75	0.00	N	Arm 12 Ahead	Inf	100.0 %	2130	2130
4/3 (A414 West)	3.75	0.00	N	Arm 12 Ahead	Inf	100.0 %	2130	2130
5/1 (Watling Street North)	4.30	0.00	Y	Arm 13 Left	60.00	100.0 %	1995	1995
5/2 (Watling Street North)	4.30	0.00	N	Arm 13 Left	Inf	100.0 %	2185	2185
6/1 (A414 East Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
6/2 (A414 East Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
6/3 (A414 East Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
7/1 (Watling South Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
7/2 (Watling South Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
7/3 (Watling South Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
8/1 (A405 Exit Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
8/2 (A405 Exit Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
8/3 (A405 Exit Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900

9/1 (A405 Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
9/2 (A405 Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
9/3 (A405 Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
10/1 (A414 West Exit Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
10/2 (A414 West Exit Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
10/3 (A414 West Exit Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
11/1 (A414 West Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
11/2 (A414 West Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
11/3 (A414 West Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
12/1 (Watling North Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
12/2 (Watling North Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
12/3 (Watling North Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
13/1 (A414 East Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
13/2 (A414 East Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
13/3 (A414 East Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
14/1 (A414 East Exit)	3.65	0.00	Y	Arm 15 Ahead	Inf	100.0 %	1980	1980
14/2 (A414 East Exit)	3.65	0.00	N	Arm 15 Ahead	Inf	100.0 %	2120	2120
14/3 (A414 East Exit)	3.50	0.00	Y	Arm 15 Ahead	Inf	100.0 %	1965	1965
15/1	Infinite Saturation Flow						Inf	Inf
15/2	Infinite Saturation Flow						Inf	Inf
16/1 (Watling Street South Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
17/1 (A405 Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
18/1 (A414 West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
19/1 (Watling Street North Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 4: '2027 Base + Committed + Dev - PM' (FG4: '2027 Base + Committed + Dev - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination						
		A	B	C	D	E	Tot.
Origin	A	0	162	1151	1109	235	2657
	B	256	0	13	198	74	541
	C	718	142	0	85	124	1069
	D	1022	82	75	0	83	1262
	E	234	183	157	146	0	720
	Tot.	2230	569	1396	1538	516	6249

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 4: 2027 Base + Committed + Dev - PM
Junction: Park Street Roundabout	
1/1 (short)	642
1/2 (with short)	1313(In) 671(Out)
1/3	1344
2/1	13
2/2	528
3/1 (short)	85
3/2 (with short)	580(In) 495(Out)
3/3	489
4/1 (short)	450
4/2 (with short)	912(In) 462(Out)
4/3	350
5/1 (with short)	720(In) 417(Out)
5/2 (short)	303
6/1	407
6/2	1
6/3	377
7/1	1049
7/2	672
7/3	1721
8/1	493
8/2	1044
8/3	1877
9/1	759
9/2	780
9/3	479
10/1	1001
10/2	1118
10/3	968
11/1	210
11/2	725
11/3	614
12/1	617
12/2	714
12/3	964
13/1	768

Full Input Data And Results

13/2	980
13/3	1267
14/1	768
14/2	572
14/3	890
15/1	768
15/2	1462
16/1	569
17/1	1396
18/1	1538
19/1	516

Lane Saturation Flows

Junction: Park Street Roundabout								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (A414 East)	4.00	0.00	Y	Arm 7 Left	36.00	100.0 %	1934	1934
1/2 (A414 East)	4.00	0.00	N	Arm 7 Left	Inf	100.0 %	2155	2155
1/3 (A414 East)	4.50	0.00	N	Arm 7 Left	Inf	100.0 %	2205	2205
2/1 (Watling Street South)	3.70	0.00	Y	Arm 8 Left	30.00	100.0 %	1890	1890
2/2 (Watling Street South)	3.70	0.00	N	Arm 8 Left	30.00	100.0 %	2024	2024
3/1 (A405)	3.75	0.00	Y	Arm 10 Left	40.00	100.0 %	1918	1918
3/2 (A405)	3.75	0.00	N	Arm 10 Left	Inf	100.0 %	2130	2130
3/3 (A405)	3.75	0.00	N	Arm 10 Left	Inf	100.0 %	2130	2130
4/1 (A414 West)	3.75	0.00	Y	Arm 12 Ahead	Inf	81.6 %	1976	1976
				Arm 19 Left	40.00	18.4 %		
4/2 (A414 West)	3.75	0.00	N	Arm 12 Ahead	Inf	100.0 %	2130	2130
4/3 (A414 West)	3.75	0.00	N	Arm 12 Ahead	Inf	100.0 %	2130	2130
5/1 (Watling Street North)	4.30	0.00	Y	Arm 13 Left	60.00	100.0 %	1995	1995
5/2 (Watling Street North)	4.30	0.00	N	Arm 13 Left	Inf	100.0 %	2185	2185
6/1 (A414 East Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
6/2 (A414 East Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
6/3 (A414 East Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
7/1 (Watling South Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
7/2 (Watling South Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
7/3 (Watling South Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
8/1 (A405 Exit Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
8/2 (A405 Exit Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
8/3 (A405 Exit Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900

9/1 (A405 Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
9/2 (A405 Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
9/3 (A405 Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
10/1 (A414 West Exit Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
10/2 (A414 West Exit Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
10/3 (A414 West Exit Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
11/1 (A414 West Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
11/2 (A414 West Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
11/3 (A414 West Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
12/1 (Watling North Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
12/2 (Watling North Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
12/3 (Watling North Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
13/1 (A414 East Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
13/2 (A414 East Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
13/3 (A414 East Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
14/1 (A414 East Exit)	3.65	0.00	Y	Arm 15 Ahead	Inf	100.0 %	1980	1980
14/2 (A414 East Exit)	3.65	0.00	N	Arm 15 Ahead	Inf	100.0 %	2120	2120
14/3 (A414 East Exit)	3.50	0.00	Y	Arm 15 Ahead	Inf	100.0 %	1965	1965
15/1	Infinite Saturation Flow						Inf	Inf
15/2	Infinite Saturation Flow						Inf	Inf
16/1 (Watling Street South Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
17/1 (A405 Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
18/1 (A414 West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
19/1 (Watling Street North Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 5: '2038 Base + Committed - AM' (FG5: '2038 Base + Committed - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination					
		A	B	C	D	E	Tot.
Origin	A	0	207	662	885	317	2071
	B	315	0	64	181	89	649
	C	789	54	0	79	85	1007
	D	869	102	68	0	66	1105
	E	283	264	82	152	0	781
	Tot.	2256	627	876	1297	557	5613

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 5: 2038 Base + Committed - AM
Junction: Park Street Roundabout	
1/1 (short)	415
1/2 (with short)	869(In) 454(Out)
1/3	1202
2/1	64
2/2	585
3/1 (short)	79
3/2 (with short)	534(In) 455(Out)
3/3	473
4/1 (short)	393
4/2 (with short)	790(In) 397(Out)
4/3	315
5/1 (with short)	781(In) 513(Out)
5/2 (short)	268
6/1	420
6/2	1
6/3	301
7/1	835
7/2	455
7/3	1503
8/1	272
8/2	761
8/3	1782
9/1	702
9/2	708
9/3	529
10/1	901
10/2	1043
10/3	1002
11/1	277
11/2	743
11/3	629
12/1	629
12/2	624
12/3	944
13/1	786

Full Input Data And Results

13/2	980
13/3	1212
14/1	786
14/2	559
14/3	911
15/1	786
15/2	1470
16/1	627
17/1	876
18/1	1297
19/1	557

Lane Saturation Flows

Junction: Park Street Roundabout								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (A414 East)	4.00	0.00	Y	Arm 7 Left	36.00	100.0 %	1934	1934
1/2 (A414 East)	4.00	0.00	N	Arm 7 Left	Inf	100.0 %	2155	2155
1/3 (A414 East)	4.50	0.00	N	Arm 7 Left	Inf	100.0 %	2205	2205
2/1 (Watling Street South)	3.70	0.00	Y	Arm 8 Left	30.00	100.0 %	1890	1890
2/2 (Watling Street South)	3.70	0.00	N	Arm 8 Left	30.00	100.0 %	2024	2024
3/1 (A405)	3.75	0.00	Y	Arm 10 Left	40.00	100.0 %	1918	1918
3/2 (A405)	3.75	0.00	N	Arm 10 Left	Inf	100.0 %	2130	2130
3/3 (A405)	3.75	0.00	N	Arm 10 Left	Inf	100.0 %	2130	2130
4/1 (A414 West)	3.75	0.00	Y	Arm 12 Ahead	Inf	83.2 %	1978	1978
				Arm 19 Left	40.00	16.8 %		
4/2 (A414 West)	3.75	0.00	N	Arm 12 Ahead	Inf	100.0 %	2130	2130
4/3 (A414 West)	3.75	0.00	N	Arm 12 Ahead	Inf	100.0 %	2130	2130
5/1 (Watling Street North)	4.30	0.00	Y	Arm 13 Left	60.00	100.0 %	1995	1995
5/2 (Watling Street North)	4.30	0.00	N	Arm 13 Left	Inf	100.0 %	2185	2185
6/1 (A414 East Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
6/2 (A414 East Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
6/3 (A414 East Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
7/1 (Watling South Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
7/2 (Watling South Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
7/3 (Watling South Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
8/1 (A405 Exit Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
8/2 (A405 Exit Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
8/3 (A405 Exit Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900

9/1 (A405 Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
9/2 (A405 Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
9/3 (A405 Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
10/1 (A414 West Exit Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
10/2 (A414 West Exit Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
10/3 (A414 West Exit Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
11/1 (A414 West Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
11/2 (A414 West Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
11/3 (A414 West Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
12/1 (Watling North Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
12/2 (Watling North Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
12/3 (Watling North Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
13/1 (A414 East Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
13/2 (A414 East Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
13/3 (A414 East Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
14/1 (A414 East Exit)	3.65	0.00	Y	Arm 15 Ahead	Inf	100.0 %	1980	1980
14/2 (A414 East Exit)	3.65	0.00	N	Arm 15 Ahead	Inf	100.0 %	2120	2120
14/3 (A414 East Exit)	3.50	0.00	Y	Arm 15 Ahead	Inf	100.0 %	1965	1965
15/1	Infinite Saturation Flow						Inf	Inf
15/2	Infinite Saturation Flow						Inf	Inf
16/1 (Watling Street South Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
17/1 (A405 Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
18/1 (A414 West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
19/1 (Watling Street North Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 6: '2038 Base + Committed - PM' (FG6: '2038 Base + Committed - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination						
		A	B	C	D	E	Tot.
Origin	A	0	169	1186	1155	247	2757
	B	268	0	14	207	78	567
	C	722	145	0	83	130	1080
	D	1067	86	76	0	87	1316
	E	245	191	164	153	0	753
	Tot.	2302	591	1440	1598	542	6473

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 6: 2038 Base + Committed - PM
Junction: Park Street Roundabout	
1/1 (short)	689
1/2 (with short)	1355(In) 666(Out)
1/3	1402
2/1	14
2/2	553
3/1 (short)	83
3/2 (with short)	585(In) 502(Out)
3/3	495
4/1 (short)	467
4/2 (with short)	927(In) 460(Out)
4/3	389
5/1 (with short)	753(In) 462(Out)
5/2 (short)	291
6/1	422
6/2	76
6/3	317
7/1	1111
7/2	742
7/3	1719
8/1	534
8/2	1163
8/3	1851
9/1	778
9/2	786
9/3	544
10/1	1010
10/2	1139
10/3	1039
11/1	179
11/2	796
11/3	615
12/1	633
12/2	727
12/3	1004
13/1	805

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13/2	1017
13/3	1295
14/1	805
14/2	519
14/3	978
15/1	805
15/2	1497
16/1	591
17/1	1440
18/1	1598
19/1	542

Lane Saturation Flows

Junction: Park Street Roundabout								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (A414 East)	4.00	0.00	Y	Arm 7 Left	36.00	100.0 %	1934	1934
1/2 (A414 East)	4.00	0.00	N	Arm 7 Left	Inf	100.0 %	2155	2155
1/3 (A414 East)	4.50	0.00	N	Arm 7 Left	Inf	100.0 %	2205	2205
2/1 (Watling Street South)	3.70	0.00	Y	Arm 8 Left	30.00	100.0 %	1890	1890
2/2 (Watling Street South)	3.70	0.00	N	Arm 8 Left	30.00	100.0 %	2024	2024
3/1 (A405)	3.75	0.00	Y	Arm 10 Left	40.00	100.0 %	1918	1918
3/2 (A405)	3.75	0.00	N	Arm 10 Left	Inf	100.0 %	2130	2130
3/3 (A405)	3.75	0.00	N	Arm 10 Left	Inf	100.0 %	2130	2130
4/1 (A414 West)	3.75	0.00	Y	Arm 12 Ahead	Inf	81.4 %	1976	1976
				Arm 19 Left	40.00	18.6 %		
4/2 (A414 West)	3.75	0.00	N	Arm 12 Ahead	Inf	100.0 %	2130	2130
4/3 (A414 West)	3.75	0.00	N	Arm 12 Ahead	Inf	100.0 %	2130	2130
5/1 (Watling Street North)	4.30	0.00	Y	Arm 13 Left	60.00	100.0 %	1995	1995
5/2 (Watling Street North)	4.30	0.00	N	Arm 13 Left	Inf	100.0 %	2185	2185
6/1 (A414 East Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
6/2 (A414 East Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
6/3 (A414 East Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
7/1 (Watling South Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
7/2 (Watling South Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
7/3 (Watling South Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
8/1 (A405 Exit Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
8/2 (A405 Exit Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
8/3 (A405 Exit Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900

9/1 (A405 Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
9/2 (A405 Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
9/3 (A405 Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
10/1 (A414 West Exit Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
10/2 (A414 West Exit Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
10/3 (A414 West Exit Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
11/1 (A414 West Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
11/2 (A414 West Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
11/3 (A414 West Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
12/1 (Watling North Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
12/2 (Watling North Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
12/3 (Watling North Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
13/1 (A414 East Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
13/2 (A414 East Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
13/3 (A414 East Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
14/1 (A414 East Exit)	3.65	0.00	Y	Arm 15 Ahead	Inf	100.0 %	1980	1980
14/2 (A414 East Exit)	3.65	0.00	N	Arm 15 Ahead	Inf	100.0 %	2120	2120
14/3 (A414 East Exit)	3.50	0.00	Y	Arm 15 Ahead	Inf	100.0 %	1965	1965
15/1	Infinite Saturation Flow						Inf	Inf
15/2	Infinite Saturation Flow						Inf	Inf
16/1 (Watling Street South Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
17/1 (A405 Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
18/1 (A414 West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
19/1 (Watling Street North Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 7: '2038 Base + Committed + Dev - AM' (FG7: '2038 Base + Committed + Dev - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination						
		A	B	C	D	E	Tot.
Origin	A	0	207	673	885	317	2082
	B	315	0	64	181	89	649
	C	797	54	0	84	85	1020
	D	859	102	70	0	66	1097
	E	283	264	82	152	0	781
	Tot.	2254	627	889	1302	557	5629

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 7: 2038 Base + Committed + Dev - AM
Junction: Park Street Roundabout	
1/1 (short)	419
1/2 (with short)	880(In) 461(Out)
1/3	1202
2/1	64
2/2	585
3/1 (short)	84
3/2 (with short)	540(In) 456(Out)
3/3	480
4/1 (short)	399
4/2 (with short)	799(In) 400(Out)
4/3	298
5/1 (with short)	781(In) 510(Out)
5/2 (short)	271
6/1	420
6/2	10
6/3	294
7/1	839
7/2	471
7/3	1496
8/1	276
8/2	742
8/3	1810
9/1	715
9/2	717
9/3	507
10/1	906
10/2	1066
10/3	987
11/1	299
11/2	737
11/3	621
12/1	622
12/2	656
12/3	919
13/1	785

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13/2	1003
13/3	1190
14/1	785
14/2	573
14/3	896
15/1	785
15/2	1469
16/1	627
17/1	889
18/1	1302
19/1	557

Lane Saturation Flows

Junction: Park Street Roundabout								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (A414 East)	4.00	0.00	Y	Arm 7 Left	36.00	100.0 %	1934	1934
1/2 (A414 East)	4.00	0.00	N	Arm 7 Left	Inf	100.0 %	2155	2155
1/3 (A414 East)	4.50	0.00	N	Arm 7 Left	Inf	100.0 %	2205	2205
2/1 (Watling Street South)	3.70	0.00	Y	Arm 8 Left	30.00	100.0 %	1890	1890
2/2 (Watling Street South)	3.70	0.00	N	Arm 8 Left	30.00	100.0 %	2024	2024
3/1 (A405)	3.75	0.00	Y	Arm 10 Left	40.00	100.0 %	1918	1918
3/2 (A405)	3.75	0.00	N	Arm 10 Left	Inf	100.0 %	2130	2130
3/3 (A405)	3.75	0.00	N	Arm 10 Left	Inf	100.0 %	2130	2130
4/1 (A414 West)	3.75	0.00	Y	Arm 12 Ahead	Inf	83.5 %	1978	1978
				Arm 19 Left	40.00	16.5 %		
4/2 (A414 West)	3.75	0.00	N	Arm 12 Ahead	Inf	100.0 %	2130	2130
4/3 (A414 West)	3.75	0.00	N	Arm 12 Ahead	Inf	100.0 %	2130	2130
5/1 (Watling Street North)	4.30	0.00	Y	Arm 13 Left	60.00	100.0 %	1995	1995
5/2 (Watling Street North)	4.30	0.00	N	Arm 13 Left	Inf	100.0 %	2185	2185
6/1 (A414 East Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
6/2 (A414 East Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
6/3 (A414 East Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
7/1 (Watling South Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
7/2 (Watling South Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
7/3 (Watling South Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
8/1 (A405 Exit Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
8/2 (A405 Exit Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
8/3 (A405 Exit Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900

9/1 (A405 Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
9/2 (A405 Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
9/3 (A405 Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
10/1 (A414 West Exit Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
10/2 (A414 West Exit Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
10/3 (A414 West Exit Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
11/1 (A414 West Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
11/2 (A414 West Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
11/3 (A414 West Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
12/1 (Watling North Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
12/2 (Watling North Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
12/3 (Watling North Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
13/1 (A414 East Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
13/2 (A414 East Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
13/3 (A414 East Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
14/1 (A414 East Exit)	3.65	0.00	Y	Arm 15 Ahead	Inf	100.0 %	1980	1980
14/2 (A414 East Exit)	3.65	0.00	N	Arm 15 Ahead	Inf	100.0 %	2120	2120
14/3 (A414 East Exit)	3.50	0.00	Y	Arm 15 Ahead	Inf	100.0 %	1965	1965
15/1	Infinite Saturation Flow						Inf	Inf
15/2	Infinite Saturation Flow						Inf	Inf
16/1 (Watling Street South Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
17/1 (A405 Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
18/1 (A414 West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
19/1 (Watling Street North Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 8: '2038 Base + Committed + Dev - PM' (FG8: '2038 Base + Committed + Dev - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination						
		A	B	C	D	E	Tot.
Origin	A	0	169	1197	1155	247	2768
	B	268	0	14	207	78	567
	C	750	145	0	88	130	1113
	D	1067	86	78	0	87	1318
	E	245	191	164	153	0	753
	Tot.	2330	591	1453	1603	542	6519

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 8: 2038 Base + Committed + Dev - PM
Junction: Park Street Roundabout	
1/1 (short)	695
1/2 (with short)	1366(In) 671(Out)
1/3	1402
2/1	14
2/2	553
3/1 (short)	88
3/2 (with short)	604(In) 516(Out)
3/3	509
4/1 (short)	467
4/2 (with short)	932(In) 465(Out)
4/3	386
5/1 (with short)	753(In) 446(Out)
5/2 (short)	307
6/1	422
6/2	70
6/3	325
7/1	1117
7/2	741
7/3	1727
8/1	540
8/2	1170
8/3	1851
9/1	809
9/2	834
9/3	465
10/1	1044
10/2	1203
10/3	974
11/1	256
11/2	770
11/3	592
12/1	671
12/2	745
12/3	978
13/1	827

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13/2	1035
13/3	1285
14/1	827
14/2	543
14/3	960
15/1	827
15/2	1503
16/1	591
17/1	1453
18/1	1603
19/1	542

Lane Saturation Flows

Junction: Park Street Roundabout								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (A414 East)	4.00	0.00	Y	Arm 7 Left	36.00	100.0 %	1934	1934
1/2 (A414 East)	4.00	0.00	N	Arm 7 Left	Inf	100.0 %	2155	2155
1/3 (A414 East)	4.50	0.00	N	Arm 7 Left	Inf	100.0 %	2205	2205
2/1 (Watling Street South)	3.70	0.00	Y	Arm 8 Left	30.00	100.0 %	1890	1890
2/2 (Watling Street South)	3.70	0.00	N	Arm 8 Left	30.00	100.0 %	2024	2024
3/1 (A405)	3.75	0.00	Y	Arm 10 Left	40.00	100.0 %	1918	1918
3/2 (A405)	3.75	0.00	N	Arm 10 Left	Inf	100.0 %	2130	2130
3/3 (A405)	3.75	0.00	N	Arm 10 Left	Inf	100.0 %	2130	2130
4/1 (A414 West)	3.75	0.00	Y	Arm 12 Ahead Arm 19 Left	Inf 40.00	81.4 % 18.6 %	1976	1976
4/2 (A414 West)	3.75	0.00	N	Arm 12 Ahead	Inf	100.0 %	2130	2130
4/3 (A414 West)	3.75	0.00	N	Arm 12 Ahead	Inf	100.0 %	2130	2130
5/1 (Watling Street North)	4.30	0.00	Y	Arm 13 Left	60.00	100.0 %	1995	1995
5/2 (Watling Street North)	4.30	0.00	N	Arm 13 Left	Inf	100.0 %	2185	2185
6/1 (A414 East Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
6/2 (A414 East Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
6/3 (A414 East Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
7/1 (Watling South Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
7/2 (Watling South Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
7/3 (Watling South Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900
8/1 (A405 Exit Circulatory Lane 1)	This lane uses a directly entered Saturation Flow						1900	1900
8/2 (A405 Exit Circulatory Lane 2)	This lane uses a directly entered Saturation Flow						1900	1900
8/3 (A405 Exit Circulatory Lane 3)	This lane uses a directly entered Saturation Flow						1900	1900

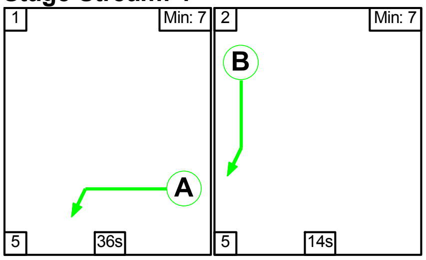
9/1 (A405 Circulatory Lane 1)	This lane uses a directly entered Saturation Flow							1900	1900
9/2 (A405 Circulatory Lane 2)	This lane uses a directly entered Saturation Flow							1900	1900
9/3 (A405 Circulatory Lane 3)	This lane uses a directly entered Saturation Flow							1900	1900
10/1 (A414 West Exit Circulatory Lane 1)	This lane uses a directly entered Saturation Flow							1900	1900
10/2 (A414 West Exit Circulatory Lane 2)	This lane uses a directly entered Saturation Flow							1900	1900
10/3 (A414 West Exit Circulatory Lane 3)	This lane uses a directly entered Saturation Flow							1900	1900
11/1 (A414 West Circulatory Lane 1)	This lane uses a directly entered Saturation Flow							1900	1900
11/2 (A414 West Circulatory Lane 2)	This lane uses a directly entered Saturation Flow							1900	1900
11/3 (A414 West Circulatory Lane 3)	This lane uses a directly entered Saturation Flow							1900	1900
12/1 (Watling North Circulatory Lane 1)	This lane uses a directly entered Saturation Flow							1900	1900
12/2 (Watling North Circulatory Lane 2)	This lane uses a directly entered Saturation Flow							1900	1900
12/3 (Watling North Circulatory Lane 3)	This lane uses a directly entered Saturation Flow							1900	1900
13/1 (A414 East Circulatory Lane 1)	This lane uses a directly entered Saturation Flow							1900	1900
13/2 (A414 East Circulatory Lane 2)	This lane uses a directly entered Saturation Flow							1900	1900
13/3 (A414 East Circulatory Lane 3)	This lane uses a directly entered Saturation Flow							1900	1900
14/1 (A414 East Exit)	3.65	0.00	Y	Arm 15 Ahead	Inf	100.0 %		1980	1980
14/2 (A414 East Exit)	3.65	0.00	N	Arm 15 Ahead	Inf	100.0 %		2120	2120
14/3 (A414 East Exit)	3.50	0.00	Y	Arm 15 Ahead	Inf	100.0 %		1965	1965
15/1	Infinite Saturation Flow							Inf	Inf
15/2	Infinite Saturation Flow							Inf	Inf
16/1 (Watling Street South Exit Lane 1)	Infinite Saturation Flow							Inf	Inf
17/1 (A405 Exit Lane 1)	Infinite Saturation Flow							Inf	Inf
18/1 (A414 West Exit Lane 1)	Infinite Saturation Flow							Inf	Inf
19/1 (Watling Street North Exit Lane 1)	Infinite Saturation Flow							Inf	Inf

Full Input Data And Results

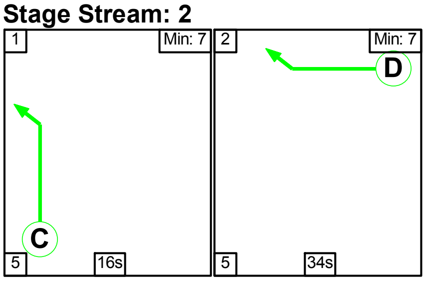
Scenario 1: '2027 Base + Committed - AM' (FG1: '2027 Base + Committed - AM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

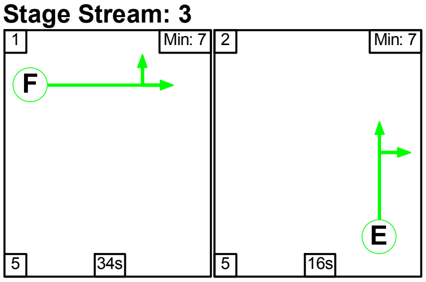
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2
Duration	36	14
Change Point	0	41

Stage Stream: 2

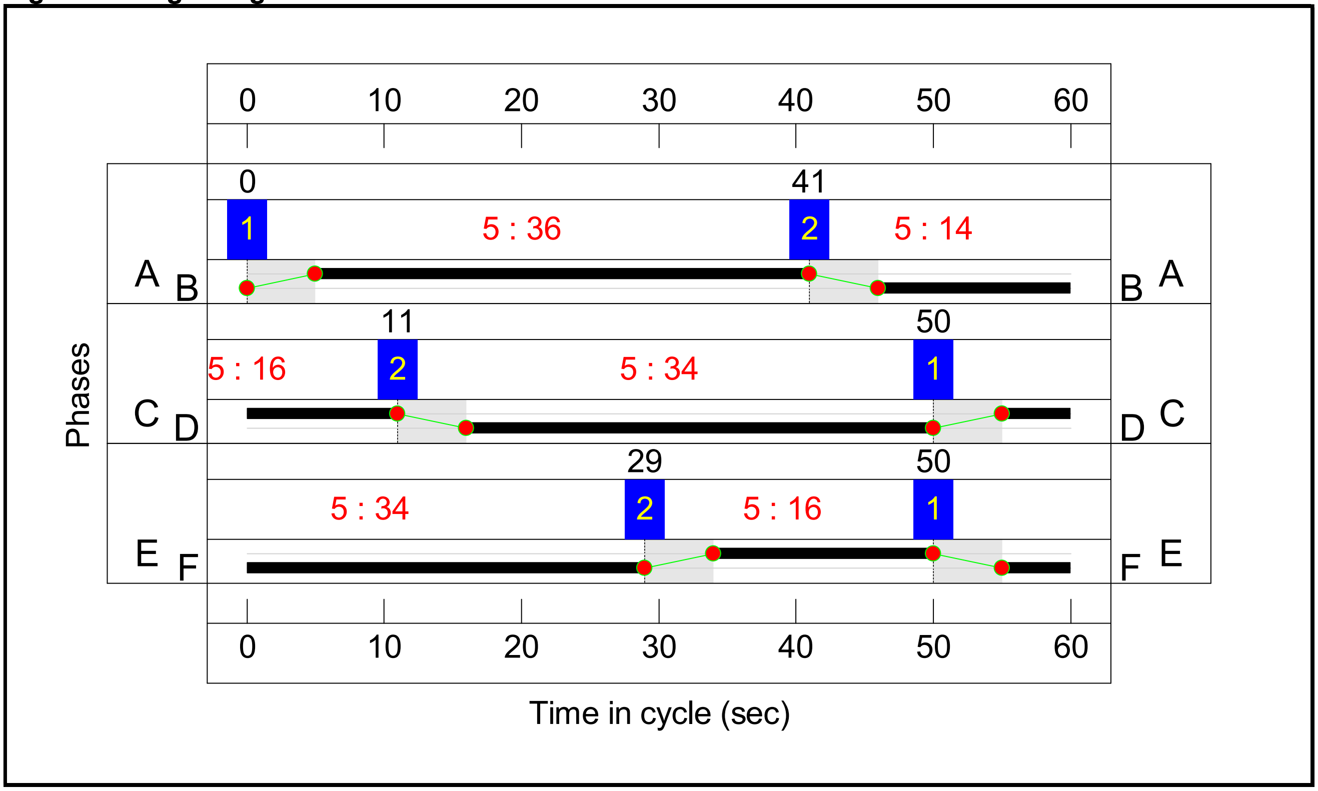
Stage	1	2
Duration	16	34
Change Point	50	11

Stage Stream: 3

Stage	1	2
Duration	34	16
Change Point	50	29

Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Proposed Park Street Roundabout	-	-	**N/A**	-	-		-	-	-	-	-	-	**90.2%**
Park Street Roundabout	-	-	**N/A**	-	-		-	-	-	-	-	-	**90.2%**
1/2+1/1	A414 East Left	U	1	N/A	A		1	36	-	835	2155:1934	908+827	48.1 : 48.1%
1/3	A414 East Left	U	1	N/A	A		1	36	-	1152	2205	1360	84.7%
2/1	Watling Street South Left	O	N/A	N/A	-		-	-	-	61	1890	1076	5.7%
2/2	Watling Street South Left	O	N/A	N/A	-		-	-	-	555	2024	2008	27.6%
3/2+3/1	A405 Left	U	2	N/A	C		1	16	-	502	2130:1918	604+108	70.6 : 70.6%
3/3	A405 Left	U	2	N/A	C		1	16	-	448	2130	604	74.2%
4/2+4/1	A414 West Ahead Left	U	3	N/A	E		1	16	-	772	2130:1978	575+554	68.4 : 68.4%
4/3	A414 West Ahead	U	3	N/A	E		1	16	-	289	2130	604	47.9%
5/1+5/2	Watling Street North Left	O	N/A	N/A	-		-	-	-	744	1995:2185	1087+560	45.2 : 45.2%
6/1	A414 East Circulatory Ahead	U	1	N/A	B		1	14	-	399	1900	475	84.0%
6/2	A414 East Circulatory Ahead	U	1	N/A	B		1	14	-	0	1900	475	0.0%
6/3	A414 East Circulatory Ahead	U	1	N/A	B		1	14	-	289	1900	475	60.8%
7/1	Watling South Circulatory Right Left	U	N/A	N/A	-		-	-	-	797	1900	1900	41.9%
7/2	Watling South Circulatory Right	U	N/A	N/A	-		-	-	-	437	1900	1900	23.0%

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7/3	Watling South Circulatory Right	U	N/A	N/A	-		-	-	-	1441	1900	1900	75.8%
8/1	A405 Exit Circulatory Left	U	N/A	N/A	-		-	-	-	258	1900	1900	13.6%
8/2	A405 Exit Circulatory Ahead Left	U	N/A	N/A	-		-	-	-	724	1900	1900	38.1%
8/3	A405 Exit Circulatory Ahead	U	N/A	N/A	-		-	-	-	1713	1900	1900	90.2%
9/1	A405 Circulatory Ahead	U	2	N/A	D		1	34	-	658	1900	1108	59.4%
9/2	A405 Circulatory Ahead	U	2	N/A	D		1	34	-	670	1900	1108	60.5%
9/3	A405 Circulatory Ahead	U	2	N/A	D		1	34	-	524	1900	1108	47.3%
10/1	A414 West Exit Circulatory Ahead	U	N/A	N/A	-		-	-	-	855	1900	1900	45.0%
10/2	A414 West Exit Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	975	1900	1900	51.3%
10/3	A414 West Exit Circulatory Right	U	N/A	N/A	-		-	-	-	972	1900	1900	51.2%
11/1	A414 West Circulatory Ahead	U	3	N/A	F		1	34	-	241	1900	1108	21.7%
11/2	A414 West Circulatory Right Ahead	U	3	N/A	F		1	34	-	718	1900	1108	64.8%
11/3	A414 West Circulatory Right	U	3	N/A	F		1	34	-	599	1900	1108	54.0%
12/1	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	608	1900	1900	32.0%
12/2	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	595	1900	1900	31.3%
12/3	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	888	1900	1900	46.7%

Full Input Data And Results

13/1	A414 East Circulatory Ahead	U	N/A	N/A	-		-	-	-	758	1900	1900	39.9%
13/2	A414 East Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	936	1900	1900	49.3%
13/3	A414 East Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	1141	1900	1900	60.1%
14/1	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	758	1980	1980	38.3%
14/2	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	537	2120	2120	25.3%
14/3	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	852	1965	1965	43.4%
15/1		U	N/A	N/A	-		-	-	-	758	Inf	Inf	0.0%
15/2		U	N/A	N/A	-		-	-	-	1389	Inf	Inf	0.0%
16/1	Watling Street South Exit	U	N/A	N/A	-		-	-	-	596	Inf	Inf	0.0%
17/1	A405 Exit	U	N/A	N/A	-		-	-	-	843	Inf	Inf	0.0%
18/1	A414 West Exit	U	N/A	N/A	-		-	-	-	1244	Inf	Inf	0.0%
19/1	Watling Street North Exit	U	N/A	N/A	-		-	-	-	528	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Proposed Park Street Roundabout	**-**	**-**	**2104**	**0**	**0**	**26.1**	**26.4**	**0.0**	**52.5**	**-**	**-**	**-**	**-**
Park Street Roundabout	**-**	**-**	**2104**	**0**	**0**	**26.1**	**26.4**	**0.0**	**52.5**	**-**	**-**	**-**	**-**
1/2+1/1	835	835	-	-	-	1.3	0.5	-	1.7	7.5	3.4	0.5	3.9
1/3	1152	1152	-	-	-	3.0	2.7	-	5.7	17.7	15.4	2.7	18.1
2/1	61	61	61	0	0	0.0	0.0	-	0.0	1.8	0.0	0.0	0.0
2/2	555	555	555	0	0	0.0	0.2	-	0.2	1.2	0.0	0.2	0.2
3/2+3/1	502	502	-	-	-	2.6	1.2	-	3.8	27.3	6.3	1.2	7.5
3/3	448	448	-	-	-	2.4	1.4	-	3.8	30.9	6.7	1.4	8.1
4/2+4/1	772	772	-	-	-	4.1	1.1	-	5.1	24.0	5.7	1.1	6.8
4/3	289	289	-	-	-	1.4	0.5	-	1.9	23.5	3.9	0.5	4.4
5/1+5/2	744	744	1488	0	0	0.3	0.4	-	0.7	3.3	1.8	0.4	2.2
6/1	399	399	-	-	-	2.1	2.5	-	4.5	40.7	6.0	2.5	8.5
6/2	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/3	289	289	-	-	-	1.3	0.8	-	2.0	25.4	3.7	0.8	4.5
7/1	797	797	-	-	-	0.0	0.4	-	0.4	1.6	0.0	0.4	0.4
7/2	437	437	-	-	-	0.0	0.1	-	0.1	1.2	0.0	0.1	0.1
7/3	1441	1441	-	-	-	0.5	1.6	-	2.0	5.1	1.8	1.6	3.3
8/1	258	258	-	-	-	0.0	0.1	-	0.1	1.1	0.0	0.1	0.1
8/2	724	724	-	-	-	0.0	0.3	-	0.3	1.5	0.0	0.3	0.3
8/3	1713	1713	-	-	-	2.2	4.4	-	6.6	13.8	6.8	4.4	11.2
9/1	658	658	-	-	-	0.9	0.7	-	1.7	9.1	6.0	0.7	6.7
9/2	670	670	-	-	-	1.2	0.8	-	2.0	10.6	5.9	0.8	6.7
9/3	524	524	-	-	-	1.2	0.4	-	1.7	11.5	5.4	0.4	5.8
10/1	855	855	-	-	-	0.1	0.4	-	0.5	2.1	0.8	0.4	1.2

Full Input Data And Results

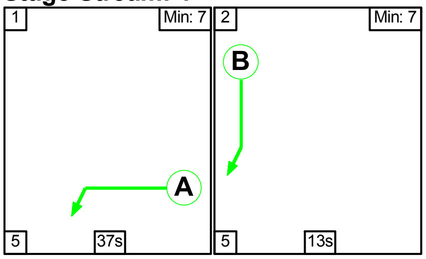
10/2	975	975	-	-	-	0.0	0.5	-	0.6	2.1	0.4	0.5	1.0
10/3	972	972	-	-	-	0.0	0.5	-	0.6	2.1	0.5	0.5	1.0
11/1	241	241	-	-	-	0.4	0.1	-	0.5	8.2	1.6	0.1	1.8
11/2	718	718	-	-	-	0.7	0.9	-	1.6	8.0	3.7	0.9	4.7
11/3	599	599	-	-	-	0.4	0.6	-	1.0	6.1	1.7	0.6	2.2
12/1	608	608	-	-	-	0.0	0.2	-	0.2	1.4	0.0	0.2	0.2
12/2	595	595	-	-	-	0.0	0.2	-	0.3	1.6	0.4	0.2	0.6
12/3	888	888	-	-	-	0.0	0.4	-	0.4	1.8	0.2	0.4	0.6
13/1	758	758	-	-	-	0.0	0.3	-	0.3	1.6	0.0	0.3	0.3
13/2	936	936	-	-	-	0.0	0.5	-	0.5	1.9	4.8	0.5	5.3
13/3	1141	1141	-	-	-	0.0	0.8	-	0.8	2.4	0.0	0.8	0.8
14/1	758	758	-	-	-	0.0	0.3	-	0.3	1.5	0.0	0.3	0.3
14/2	537	537	-	-	-	0.0	0.2	-	0.2	1.1	0.0	0.2	0.2
14/3	852	852	-	-	-	0.0	0.4	-	0.4	1.6	0.0	0.4	0.4
15/1	758	758	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
15/2	1389	1389	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
16/1	596	596	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
17/1	843	843	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
18/1	1244	1244	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
19/1	528	528	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1	Stream: 1 PRC for Signalled Lanes (%):	6.2	Total Delay for Signalled Lanes (pcuHr):	13.96	Cycle Time (s):	60
C1	Stream: 2 PRC for Signalled Lanes (%):	21.2	Total Delay for Signalled Lanes (pcuHr):	12.95	Cycle Time (s):	60
C1	Stream: 3 PRC for Signalled Lanes (%):	31.6	Total Delay for Signalled Lanes (pcuHr):	10.18	Cycle Time (s):	60
	PRC Over All Lanes (%):	-0.2	Total Delay Over All Lanes(pcuHr):	52.51		

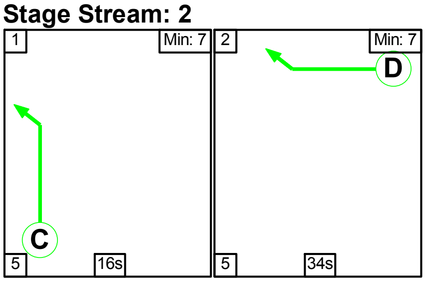
Scenario 2: '2027 Base + Committed - PM' (FG2: '2027 Base + Committed - PM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

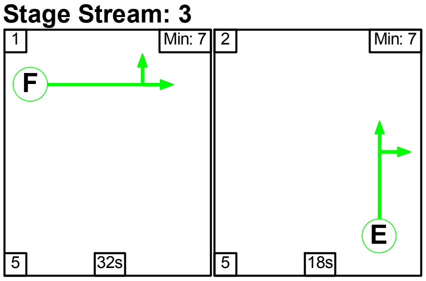
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2
Duration	37	13
Change Point	0	42

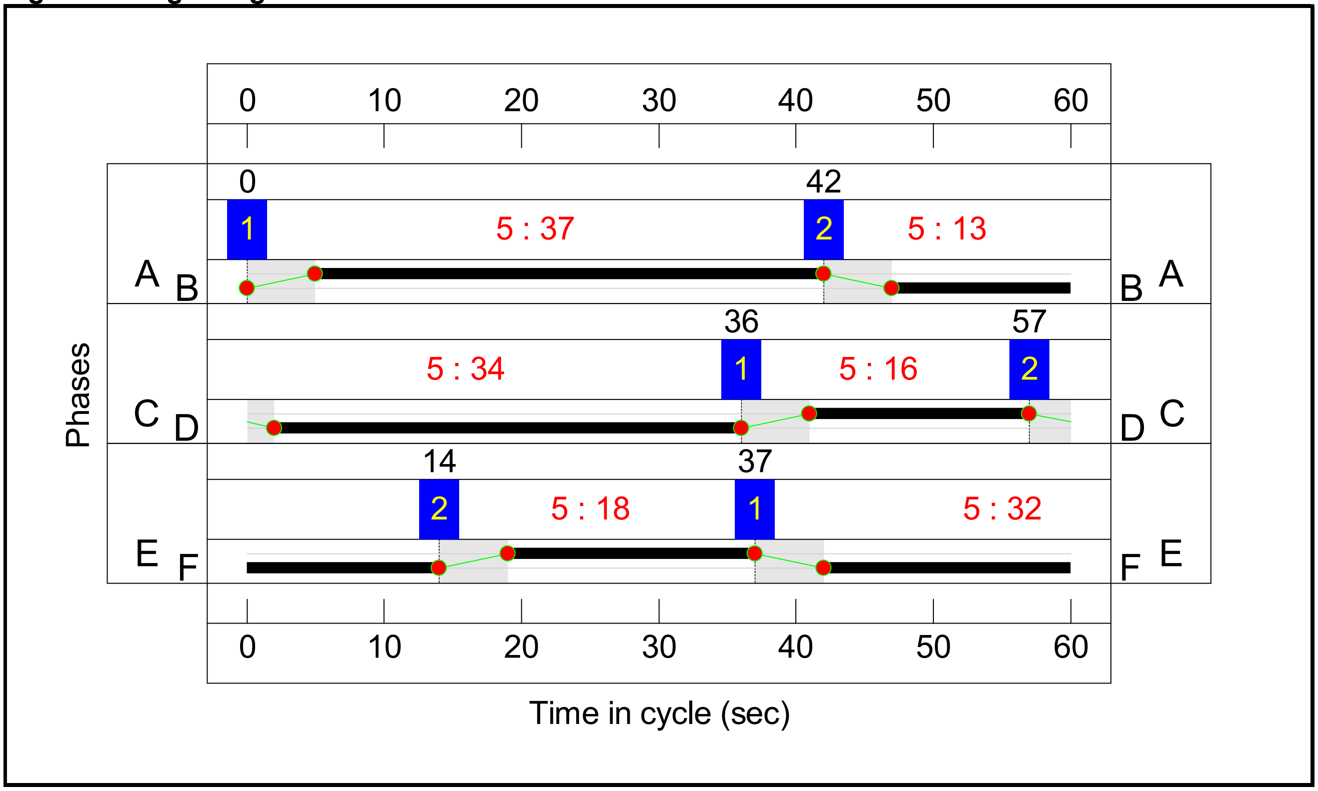
Stage Stream: 2

Stage	1	2
Duration	16	34
Change Point	36	57

Stage Stream: 3

Stage	1	2
Duration	32	18
Change Point	37	14

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Proposed Park Street Roundabout	-	-	**N/A**	-	-		-	-	-	-	-	-	**98.2%**
Park Street Roundabout	-	-	**N/A**	-	-		-	-	-	-	-	-	**98.2%**
1/2+1/1	A414 East Left	U	1	N/A	A		1	37	-	1302	2155:1934	901+863	73.8 : 73.8%
1/3	A414 East Left	U	1	N/A	A		1	37	-	1344	2205	1397	96.2%
2/1	Watling Street South Left	O	N/A	N/A	-		-	-	-	13	1890	680	1.9%
2/2	Watling Street South Left	O	N/A	N/A	-		-	-	-	528	2024	1888	28.0%
3/2+3/1	A405 Left	U	2	N/A	C		1	16	-	554	2130:1918	604+102	78.5 : 78.5%
3/3	A405 Left	U	2	N/A	C		1	16	-	482	2130	604	79.9%
4/2+4/1	A414 West Ahead Left	U	3	N/A	E		1	18	-	921	2130:1977	588+591	78.1 : 78.1%
4/3	A414 West Ahead	U	3	N/A	E		1	18	-	339	2130	674	50.3%
5/1+5/2	Watling Street North Left	O	N/A	N/A	-		-	-	-	720	1995:2185	1011+735	41.3 : 41.3%
6/1	A414 East Circulatory Ahead	U	1	N/A	B		1	13	-	407	1900	443	91.8%
6/2	A414 East Circulatory Ahead	U	1	N/A	B		1	13	-	0	1900	443	0.0%
6/3	A414 East Circulatory Ahead	U	1	N/A	B		1	13	-	376	1900	443	84.8%
7/1	Watling South Circulatory Right Left	U	N/A	N/A	-		-	-	-	1044	1900	1900	54.9%
7/2	Watling South Circulatory Right	U	N/A	N/A	-		-	-	-	665	1900	1900	35.0%

Full Input Data And Results

7/3	Watling South Circulatory Right	U	N/A	N/A	-		-	-	-	1720	1900	1900	90.5%
8/1	A405 Exit Circulatory Left	U	N/A	N/A	-		-	-	-	488	1900	1900	25.7%
8/2	A405 Exit Circulatory Ahead Left	U	N/A	N/A	-		-	-	-	1048	1900	1900	55.2%
8/3	A405 Exit Circulatory Ahead	U	N/A	N/A	-		-	-	-	1865	1900	1900	98.2%
9/1	A405 Circulatory Ahead	U	2	N/A	D		1	34	-	769	1900	1108	69.4%
9/2	A405 Circulatory Ahead	U	2	N/A	D		1	34	-	783	1900	1108	70.6%
9/3	A405 Circulatory Ahead	U	2	N/A	D		1	34	-	466	1900	1108	42.0%
10/1	A414 West Exit Circulatory Ahead	U	N/A	N/A	-		-	-	-	986	1900	1900	51.9%
10/2	A414 West Exit Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	1120	1900	1900	58.9%
10/3	A414 West Exit Circulatory Right	U	N/A	N/A	-		-	-	-	948	1900	1900	49.9%
11/1	A414 West Circulatory Ahead	U	3	N/A	F		1	32	-	223	1900	1045	21.3%
11/2	A414 West Circulatory Right Ahead	U	3	N/A	F		1	32	-	687	1900	1045	65.7%
11/3	A414 West Circulatory Right	U	3	N/A	F		1	32	-	611	1900	1045	58.5%
12/1	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	624	1900	1900	32.8%
12/2	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	691	1900	1900	36.4%
12/3	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	950	1900	1900	50.0%

Full Input Data And Results

13/1	A414 East Circulatory Ahead	U	N/A	N/A	-		-	-	-	770	1900	1900	40.5%
13/2	A414 East Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	962	1900	1900	50.6%
13/3	A414 East Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	1253	1900	1900	65.9%
14/1	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	770	1980	1980	38.9%
14/2	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	555	2120	2120	26.2%
14/3	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	877	1965	1965	44.6%
15/1		U	N/A	N/A	-		-	-	-	770	Inf	Inf	0.0%
15/2		U	N/A	N/A	-		-	-	-	1432	Inf	Inf	0.0%
16/1	Watling Street South Exit	U	N/A	N/A	-		-	-	-	569	Inf	Inf	0.0%
17/1	A405 Exit	U	N/A	N/A	-		-	-	-	1383	Inf	Inf	0.0%
18/1	A414 West Exit	U	N/A	N/A	-		-	-	-	1533	Inf	Inf	0.0%
19/1	Watling Street North Exit	U	N/A	N/A	-		-	-	-	516	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Proposed Park Street Roundabout	**-**	**-**	**1981**	**0**	**0**	**32.4**	**55.2**	**0.0**	**87.6**	**-**	**-**	**-**	**-**
Park Street Roundabout	**-**	**-**	**1981**	**0**	**0**	**32.4**	**55.2**	**0.0**	**87.6**	**-**	**-**	**-**	**-**
1/2+1/1	1302	1302	-	-	-	2.1	1.4	-	3.5	9.8	5.7	1.4	7.1
1/3	1344	1344	-	-	-	3.9	9.4	-	13.3	35.6	20.9	9.4	30.3
2/1	13	13	13	0	0	0.0	0.0	-	0.0	3.0	0.0	0.0	0.0
2/2	528	528	528	0	0	0.0	0.2	-	0.2	1.3	0.0	0.2	0.2
3/2+3/1	554	554	-	-	-	3.0	1.8	-	4.8	30.9	7.2	1.8	9.0
3/3	482	482	-	-	-	2.7	1.9	-	4.6	34.3	7.4	1.9	9.3
4/2+4/1	921	921	-	-	-	4.6	1.8	-	6.4	25.0	6.8	1.8	8.6
4/3	339	339	-	-	-	1.6	0.5	-	2.1	22.0	4.5	0.5	5.0
5/1+5/2	720	720	1440	0	0	0.3	0.4	-	0.7	3.4	1.8	0.4	2.1
6/1	407	407	-	-	-	2.5	4.5	-	6.9	61.4	6.4	4.5	10.9
6/2	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/3	376	376	-	-	-	2.1	2.6	-	4.7	45.2	6.0	2.6	8.6
7/1	1044	1044	-	-	-	0.0	0.6	-	0.6	2.1	0.0	0.6	0.6
7/2	665	665	-	-	-	0.0	0.3	-	0.3	1.5	0.0	0.3	0.3
7/3	1720	1720	-	-	-	0.9	4.5	-	5.5	11.4	2.6	4.5	7.1
8/1	488	488	-	-	-	0.0	0.2	-	0.2	1.3	0.0	0.2	0.2
8/2	1048	1048	-	-	-	0.0	0.6	-	0.6	2.2	0.2	0.6	0.8
8/3	1865	1865	-	-	-	2.6	14.5	-	17.1	33.0	7.8	14.5	22.4
9/1	769	769	-	-	-	1.7	1.1	-	2.8	13.1	7.0	1.1	8.2
9/2	783	783	-	-	-	2.0	1.2	-	3.2	14.7	8.7	1.2	9.9
9/3	466	466	-	-	-	0.8	0.4	-	1.2	8.9	4.3	0.4	4.7
10/1	986	986	-	-	-	0.1	0.5	-	0.7	2.5	1.0	0.5	1.5

Full Input Data And Results

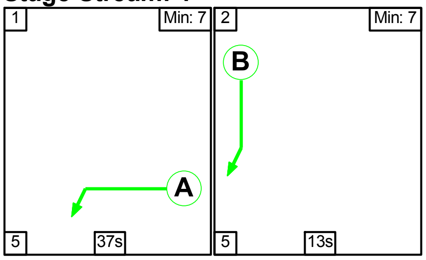
10/2	1120	1120	-	-	-	0.1	0.7	-	0.8	2.5	0.6	0.7	1.3
10/3	948	948	-	-	-	0.1	0.5	-	0.6	2.1	0.6	0.5	1.1
11/1	223	223	-	-	-	0.3	0.1	-	0.5	7.3	1.1	0.1	1.3
11/2	687	687	-	-	-	0.6	1.0	-	1.5	8.1	2.7	1.0	3.6
11/3	611	611	-	-	-	0.5	0.7	-	1.2	7.0	1.6	0.7	2.3
12/1	624	624	-	-	-	0.0	0.2	-	0.2	1.4	0.0	0.2	0.2
12/2	691	691	-	-	-	0.0	0.3	-	0.3	1.7	0.5	0.3	0.8
12/3	950	950	-	-	-	0.0	0.5	-	0.5	1.9	0.3	0.5	0.8
13/1	770	770	-	-	-	0.0	0.3	-	0.3	1.6	0.0	0.3	0.3
13/2	962	962	-	-	-	0.0	0.5	-	0.5	1.9	5.8	0.5	6.3
13/3	1253	1253	-	-	-	0.0	1.0	-	1.0	2.8	0.1	1.0	1.0
14/1	770	770	-	-	-	0.0	0.3	-	0.3	1.5	0.0	0.3	0.3
14/2	555	555	-	-	-	0.0	0.2	-	0.2	1.1	0.0	0.2	0.2
14/3	877	877	-	-	-	0.0	0.4	-	0.4	1.7	0.0	0.4	0.4
15/1	770	770	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
15/2	1432	1432	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
16/1	569	569	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
17/1	1383	1383	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
18/1	1533	1533	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
19/1	516	516	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 Stream: 1 PRC for Signalled Lanes (%): -6.9 Total Delay for Signalled Lanes (pcuHr): 28.49 Cycle Time (s): 60
C1 Stream: 2 PRC for Signalled Lanes (%): 12.7 Total Delay for Signalled Lanes (pcuHr): 16.50 Cycle Time (s): 60
C1 Stream: 3 PRC for Signalled Lanes (%): 15.2 Total Delay for Signalled Lanes (pcuHr): 11.65 Cycle Time (s): 60
PRC Over All Lanes (%): -9.1 Total Delay Over All Lanes(pcuHr): 87.60

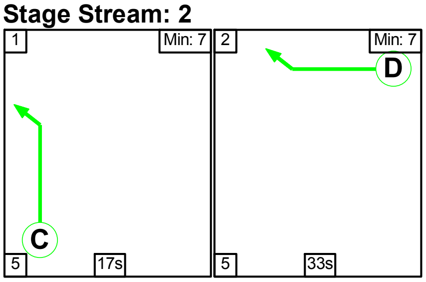
Full Input Data And Results
Scenario 3: '2027 Base + Committed + Dev - AM' (FG3: '2027 Base + Committed + Dev - AM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

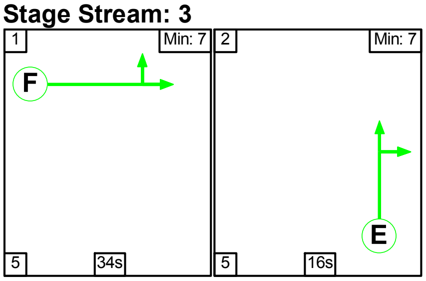
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2
Duration	37	13
Change Point	0	42

Stage Stream: 2

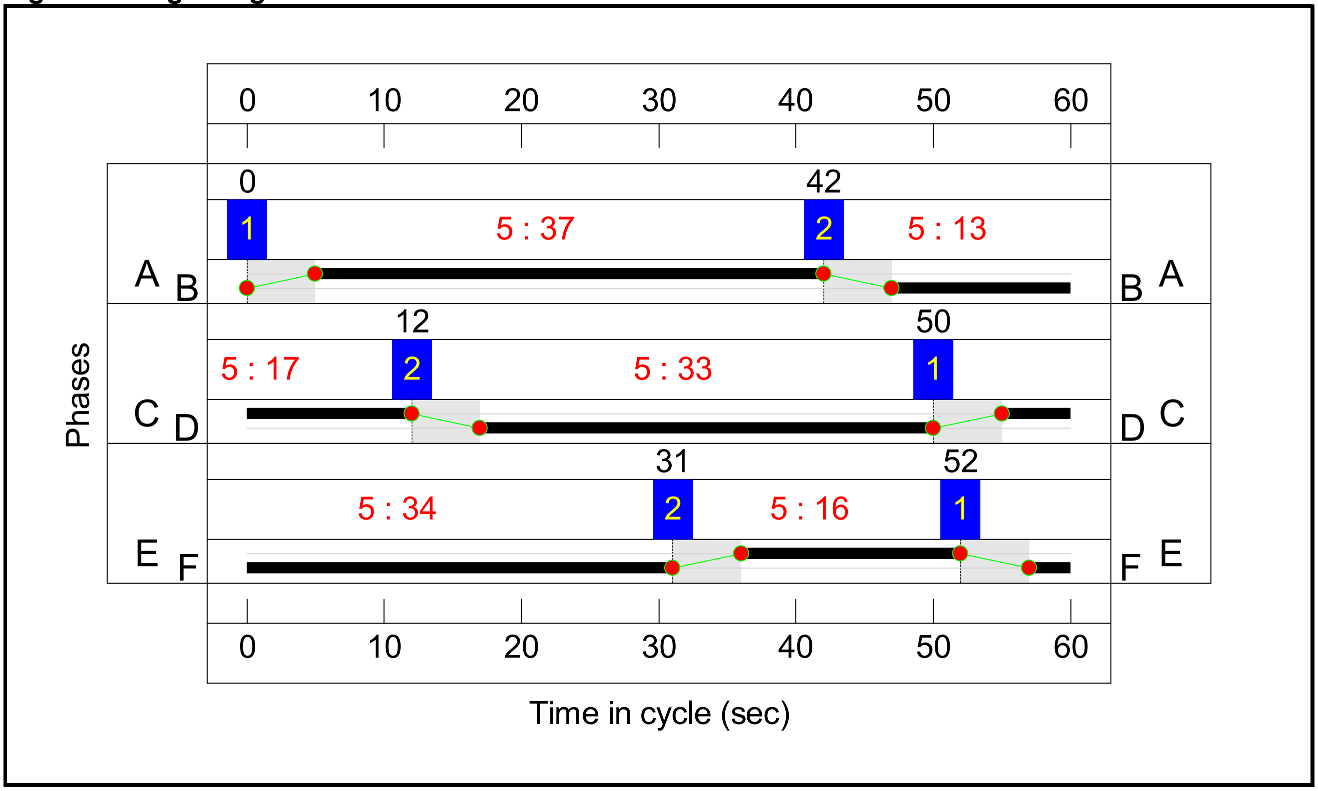
Stage	1	2
Duration	17	33
Change Point	50	12

Stage Stream: 3

Stage	1	2
Duration	34	16
Change Point	52	31

Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Proposed Park Street Roundabout	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**94.6%**
Park Street Roundabout	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**94.6%**
1/2+1/1	A414 East Left	U	1	N/A	A		1	37	-	729	2155:1934	876+869	41.8 : 41.8%
1/3	A414 East Left	U	1	N/A	A		1	37	-	1269	2205	1397	90.9%
2/1	Watling Street South Left	O	N/A	N/A	-		-	-	-	61	1890	1069	5.7%
2/2	Watling Street South Left	O	N/A	N/A	-		-	-	-	555	2024	2017	27.5%
3/2+3/1	A405 Left	U	2	N/A	C		1	17	-	525	2130:1918	639+117	69.5 : 69.5%
3/3	A405 Left	U	2	N/A	C		1	17	-	458	2130	639	71.7%
4/2+4/1	A414 West Ahead Left	U	3	N/A	E		1	16	-	764	2130:1978	572+557	67.7 : 67.7%
4/3	A414 West Ahead	U	3	N/A	E		1	16	-	299	2130	604	49.5%
5/1+5/2	Watling Street North Left	O	N/A	N/A	-		-	-	-	744	1995:2185	1076+554	45.6 : 45.6%
6/1	A414 East Circulatory Ahead	U	1	N/A	B		1	13	-	399	1900	443	90.0%
6/2	A414 East Circulatory Ahead	U	1	N/A	B		1	13	-	6	1900	443	1.4%
6/3	A414 East Circulatory Ahead	U	1	N/A	B		1	13	-	285	1900	443	64.3%
7/1	Watling South Circulatory Right Left	U	N/A	N/A	-		-	-	-	762	1900	1900	40.1%
7/2	Watling South Circulatory Right	U	N/A	N/A	-		-	-	-	372	1900	1900	19.6%

Full Input Data And Results

7/3	Watling South Circulatory Right	U	N/A	N/A	-		-	-	-	1554	1900	1900	81.8%
8/1	A405 Exit Circulatory Left	U	N/A	N/A	-		-	-	-	225	1900	1900	11.8%
8/2	A405 Exit Circulatory Ahead Left	U	N/A	N/A	-		-	-	-	686	1900	1900	36.1%
8/3	A405 Exit Circulatory Ahead	U	N/A	N/A	-		-	-	-	1797	1900	1900	94.6%
9/1	A405 Circulatory Ahead	U	2	N/A	D		1	33	-	638	1900	1077	59.3%
9/2	A405 Circulatory Ahead	U	2	N/A	D		1	33	-	658	1900	1077	61.1%
9/3	A405 Circulatory Ahead	U	2	N/A	D		1	33	-	556	1900	1077	51.6%
10/1	A414 West Exit Circulatory Ahead	U	N/A	N/A	-		-	-	-	826	1900	1900	43.5%
10/2	A414 West Exit Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	995	1900	1900	52.4%
10/3	A414 West Exit Circulatory Right	U	N/A	N/A	-		-	-	-	1014	1900	1900	53.4%
11/1	A414 West Circulatory Ahead	U	3	N/A	F		1	34	-	209	1900	1108	18.9%
11/2	A414 West Circulatory Right Ahead	U	3	N/A	F		1	34	-	788	1900	1108	71.1%
11/3	A414 West Circulatory Right	U	3	N/A	F		1	34	-	589	1900	1108	53.1%
12/1	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	612	1900	1900	32.2%
12/2	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	621	1900	1900	32.7%
12/3	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	888	1900	1900	46.7%

Full Input Data And Results

13/1	A414 East Circulatory Ahead	U	N/A	N/A	-		-	-	-	765	1900	1900	40.3%
13/2	A414 East Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	959	1900	1900	50.5%
13/3	A414 East Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	1141	1900	1900	60.1%
14/1	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	765	1980	1980	38.6%
14/2	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	554	2120	2120	26.1%
14/3	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	856	1965	1965	43.6%
15/1		U	N/A	N/A	-		-	-	-	765	Inf	Inf	0.0%
15/2		U	N/A	N/A	-		-	-	-	1410	Inf	Inf	0.0%
16/1	Watling Street South Exit	U	N/A	N/A	-		-	-	-	596	Inf	Inf	0.0%
17/1	A405 Exit	U	N/A	N/A	-		-	-	-	856	Inf	Inf	0.0%
18/1	A414 West Exit	U	N/A	N/A	-		-	-	-	1249	Inf	Inf	0.0%
19/1	Watling Street North Exit	U	N/A	N/A	-		-	-	-	528	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Proposed Park Street Roundabout	**-**	**-**	**2104**	**0**	**0**	**26.9**	**33.7**	**0.0**	**60.7**	**-**	**-**	**-**	**-**
Park Street Roundabout	**-**	**-**	**2104**	**0**	**0**	**26.9**	**33.7**	**0.0**	**60.7**	**-**	**-**	**-**	**-**
1/2+1/1	729	729	-	-	-	1.0	0.4	-	1.4	6.7	2.7	0.4	3.1
1/3	1269	1269	-	-	-	3.3	4.6	-	8.0	22.7	18.0	4.6	22.6
2/1	61	61	61	0	0	0.0	0.0	-	0.0	1.8	0.0	0.0	0.0
2/2	555	555	555	0	0	0.0	0.2	-	0.2	1.2	0.0	0.2	0.2
3/2+3/1	525	525	-	-	-	2.6	1.1	-	3.8	25.8	6.5	1.1	7.7
3/3	458	458	-	-	-	2.4	1.2	-	3.6	28.5	6.7	1.2	8.0
4/2+4/1	764	764	-	-	-	4.0	1.0	-	5.1	23.8	5.6	1.0	6.6
4/3	299	299	-	-	-	1.5	0.5	-	2.0	23.8	4.2	0.5	4.6
5/1+5/2	744	744	1488	0	0	0.3	0.4	-	0.7	3.3	1.8	0.4	2.2
6/1	399	399	-	-	-	2.2	3.8	-	6.0	54.1	6.0	3.8	9.9
6/2	6	6	-	-	-	0.0	0.0	-	0.0	5.4	0.0	0.0	0.0
6/3	285	285	-	-	-	1.3	0.9	-	2.2	28.0	3.7	0.9	4.6
7/1	762	762	-	-	-	0.0	0.3	-	0.3	1.6	0.0	0.3	0.3
7/2	372	372	-	-	-	0.0	0.1	-	0.1	1.2	0.0	0.1	0.1
7/3	1554	1554	-	-	-	0.7	2.2	-	2.9	6.8	2.2	2.2	4.4
8/1	225	225	-	-	-	0.0	0.1	-	0.1	1.1	0.0	0.1	0.1
8/2	686	686	-	-	-	0.0	0.3	-	0.3	1.5	0.0	0.3	0.3
8/3	1797	1797	-	-	-	1.4	7.6	-	9.0	18.0	3.0	7.6	10.6
9/1	638	638	-	-	-	1.4	0.7	-	2.1	12.1	6.4	0.7	7.1
9/2	658	658	-	-	-	1.6	0.8	-	2.3	12.8	7.0	0.8	7.7
9/3	556	556	-	-	-	1.2	0.5	-	1.8	11.4	5.5	0.5	6.0
10/1	826	826	-	-	-	0.1	0.4	-	0.5	2.1	0.8	0.4	1.2

Full Input Data And Results

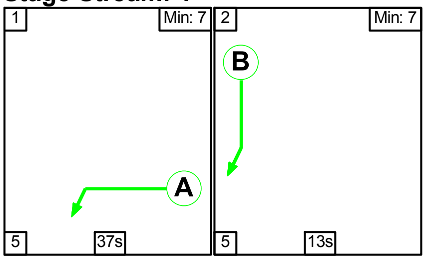
10/2	995	995	-	-	-	0.0	0.5	-	0.6	2.1	0.5	0.5	1.1
10/3	1014	1014	-	-	-	0.0	0.6	-	0.6	2.2	0.5	0.6	1.1
11/1	209	209	-	-	-	0.4	0.1	-	0.5	8.1	1.3	0.1	1.4
11/2	788	788	-	-	-	1.0	1.2	-	2.3	10.3	10.1	1.2	11.3
11/3	589	589	-	-	-	0.4	0.6	-	0.9	5.8	1.7	0.6	2.2
12/1	612	612	-	-	-	0.0	0.2	-	0.2	1.4	0.0	0.2	0.2
12/2	621	621	-	-	-	0.0	0.2	-	0.3	1.6	0.4	0.2	0.6
12/3	888	888	-	-	-	0.0	0.4	-	0.4	1.8	0.3	0.4	0.7
13/1	765	765	-	-	-	0.0	0.3	-	0.3	1.6	0.0	0.3	0.3
13/2	959	959	-	-	-	0.0	0.5	-	0.5	1.9	4.8	0.5	5.3
13/3	1141	1141	-	-	-	0.0	0.8	-	0.8	2.4	0.0	0.8	0.8
14/1	765	765	-	-	-	0.0	0.3	-	0.3	1.5	0.0	0.3	0.3
14/2	554	554	-	-	-	0.0	0.2	-	0.2	1.1	0.0	0.2	0.2
14/3	856	856	-	-	-	0.0	0.4	-	0.4	1.6	0.0	0.4	0.4
15/1	765	765	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
15/2	1410	1410	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
16/1	596	596	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
17/1	856	856	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
18/1	1249	1249	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
19/1	528	528	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 Stream: 1 PRC for Signalled Lanes (%): -1.0 Total Delay for Signalled Lanes (pcuHr): 17.56 Cycle Time (s): 60
C1 Stream: 2 PRC for Signalled Lanes (%): 25.6 Total Delay for Signalled Lanes (pcuHr): 13.63 Cycle Time (s): 60
C1 Stream: 3 PRC for Signalled Lanes (%): 26.6 Total Delay for Signalled Lanes (pcuHr): 10.71 Cycle Time (s): 60
PRC Over All Lanes (%): -5.1 Total Delay Over All Lanes(pcuHr): 60.69

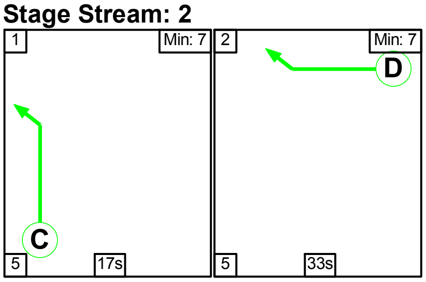
Full Input Data And Results
Scenario 4: '2027 Base + Committed + Dev - PM' (FG4: '2027 Base + Committed + Dev - PM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

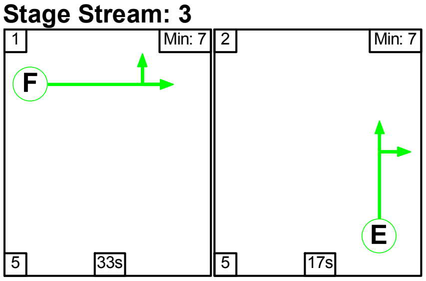
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2
Duration	37	13
Change Point	0	42

Stage Stream: 2

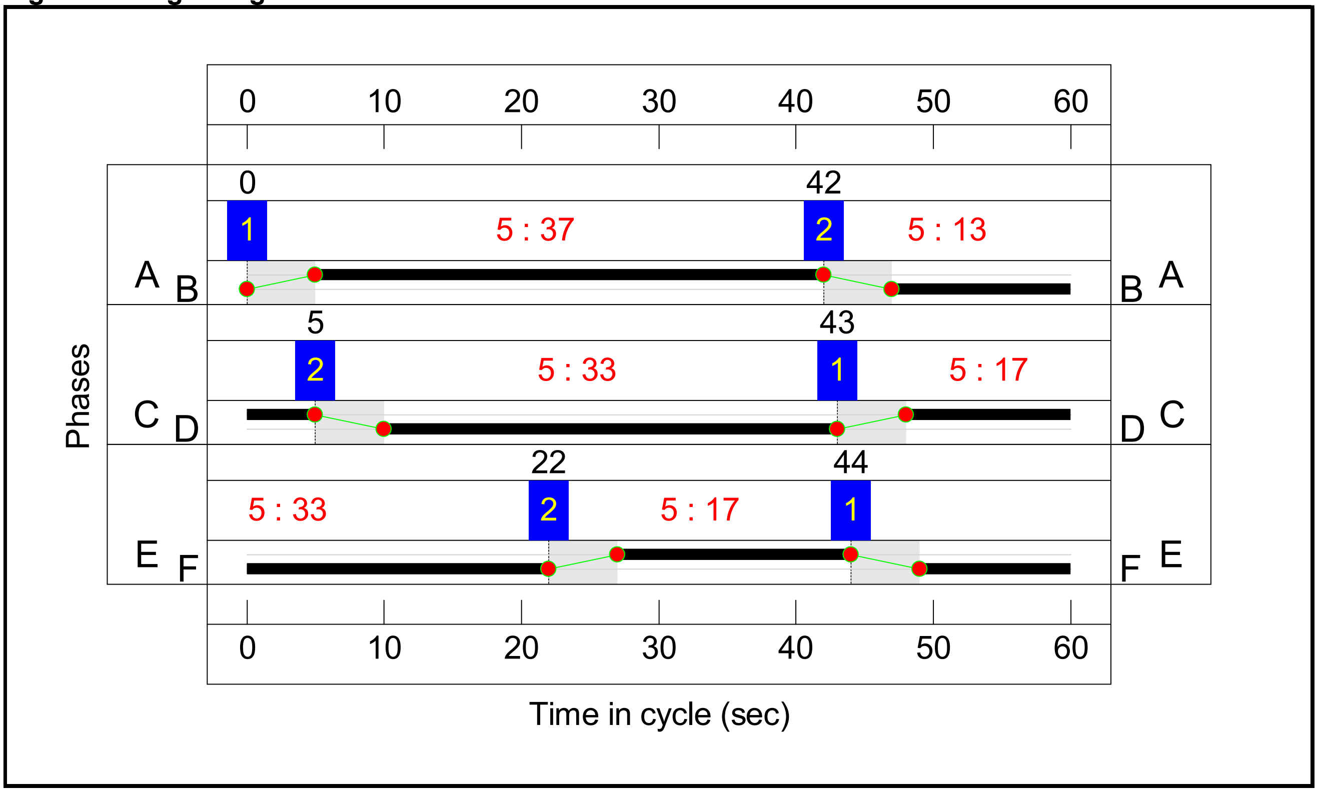
Stage	1	2
Duration	17	33
Change Point	43	5

Stage Stream: 3

Stage	1	2
Duration	33	17
Change Point	44	22

Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Proposed Park Street Roundabout	-	-	**N/A**	-	-		-	-	-	-	-	-	**98.8%**
Park Street Roundabout	-	-	**N/A**	-	-		-	-	-	-	-	-	**98.8%**
1/2+1/1	A414 East Left	U	1	N/A	A		1	37	-	1313	2155:1934	902+863	74.4 : 74.4%
1/3	A414 East Left	U	1	N/A	A		1	37	-	1344	2205	1397	96.2%
2/1	Watling Street South Left	O	N/A	N/A	-		-	-	-	13	1890	674	1.9%
2/2	Watling Street South Left	O	N/A	N/A	-		-	-	-	528	2024	1885	28.0%
3/2+3/1	A405 Left	U	2	N/A	C		1	17	-	580	2130:1918	639+110	77.5 : 77.5%
3/3	A405 Left	U	2	N/A	C		1	17	-	489	2130	639	76.5%
4/2+4/1	A414 West Ahead Left	U	3	N/A	E		1	17	-	912	2130:1976	589+574	78.4 : 78.4%
4/3	A414 West Ahead	U	3	N/A	E		1	17	-	350	2130	639	54.8%
5/1+5/2	Watling Street North Left	O	N/A	N/A	-		-	-	-	720	1995:2185	1002+728	41.6 : 41.6%
6/1	A414 East Circulatory Ahead	U	1	N/A	B		1	13	-	407	1900	443	91.8%
6/2	A414 East Circulatory Ahead	U	1	N/A	B		1	13	-	1	1900	443	0.2%
6/3	A414 East Circulatory Ahead	U	1	N/A	B		1	13	-	377	1900	443	85.0%
7/1	Watling South Circulatory Right Left	U	N/A	N/A	-		-	-	-	1049	1900	1900	55.2%
7/2	Watling South Circulatory Right	U	N/A	N/A	-		-	-	-	672	1900	1900	35.4%

Full Input Data And Results

7/3	Watling South Circulatory Right	U	N/A	N/A	-		-	-	-	1721	1900	1900	90.6%
8/1	A405 Exit Circulatory Left	U	N/A	N/A	-		-	-	-	493	1900	1900	25.9%
8/2	A405 Exit Circulatory Ahead Left	U	N/A	N/A	-		-	-	-	1044	1900	1900	54.9%
8/3	A405 Exit Circulatory Ahead	U	N/A	N/A	-		-	-	-	1877	1900	1900	98.8%
9/1	A405 Circulatory Ahead	U	2	N/A	D		1	33	-	759	1900	1077	70.5%
9/2	A405 Circulatory Ahead	U	2	N/A	D		1	33	-	780	1900	1077	72.4%
9/3	A405 Circulatory Ahead	U	2	N/A	D		1	33	-	479	1900	1077	44.5%
10/1	A414 West Exit Circulatory Ahead	U	N/A	N/A	-		-	-	-	1001	1900	1900	52.7%
10/2	A414 West Exit Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	1118	1900	1900	58.8%
10/3	A414 West Exit Circulatory Right	U	N/A	N/A	-		-	-	-	968	1900	1900	50.9%
11/1	A414 West Circulatory Ahead	U	3	N/A	F		1	33	-	210	1900	1077	19.5%
11/2	A414 West Circulatory Right Ahead	U	3	N/A	F		1	33	-	725	1900	1077	67.3%
11/3	A414 West Circulatory Right	U	3	N/A	F		1	33	-	614	1900	1077	57.0%
12/1	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	617	1900	1900	32.5%
12/2	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	714	1900	1900	37.6%
12/3	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	964	1900	1900	50.7%

Full Input Data And Results

13/1	A414 East Circulatory Ahead	U	N/A	N/A	-		-	-	-	768	1900	1900	40.4%
13/2	A414 East Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	980	1900	1900	51.6%
13/3	A414 East Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	1267	1900	1900	66.7%
14/1	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	768	1980	1980	38.8%
14/2	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	572	2120	2120	27.0%
14/3	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	890	1965	1965	45.3%
15/1		U	N/A	N/A	-		-	-	-	768	Inf	Inf	0.0%
15/2		U	N/A	N/A	-		-	-	-	1462	Inf	Inf	0.0%
16/1	Watling Street South Exit	U	N/A	N/A	-		-	-	-	569	Inf	Inf	0.0%
17/1	A405 Exit	U	N/A	N/A	-		-	-	-	1396	Inf	Inf	0.0%
18/1	A414 West Exit	U	N/A	N/A	-		-	-	-	1538	Inf	Inf	0.0%
19/1	Watling Street North Exit	U	N/A	N/A	-		-	-	-	516	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Proposed Park Street Roundabout	**-**	**-**	**1981**	**0**	**0**	**33.5**	**57.5**	**0.0**	**91.0**	**-**	**-**	**-**	**-**
Park Street Roundabout	**-**	**-**	**1981**	**0**	**0**	**33.5**	**57.5**	**0.0**	**91.0**	**-**	**-**	**-**	**-**
1/2+1/1	1313	1313	-	-	-	2.2	1.4	-	3.6	9.9	5.8	1.4	7.2
1/3	1344	1344	-	-	-	3.9	9.4	-	13.3	35.6	20.9	9.4	30.3
2/1	13	13	13	0	0	0.0	0.0	-	0.0	3.1	0.0	0.0	0.0
2/2	528	528	528	0	0	0.0	0.2	-	0.2	1.3	0.0	0.2	0.2
3/2+3/1	580	580	-	-	-	3.0	1.7	-	4.7	29.1	7.4	1.7	9.1
3/3	489	489	-	-	-	2.6	1.6	-	4.2	30.8	7.3	1.6	8.9
4/2+4/1	912	912	-	-	-	4.8	1.8	-	6.6	26.0	6.8	1.8	8.6
4/3	350	350	-	-	-	1.7	0.6	-	2.3	23.8	4.9	0.6	5.5
5/1+5/2	720	720	1440	0	0	0.3	0.4	-	0.7	3.5	1.8	0.4	2.1
6/1	407	407	-	-	-	3.0	4.5	-	7.4	65.8	6.6	4.5	11.1
6/2	1	1	-	-	-	0.0	0.0	-	0.0	9.7	0.0	0.0	0.0
6/3	377	377	-	-	-	2.0	2.6	-	4.6	44.0	6.0	2.6	8.7
7/1	1049	1049	-	-	-	0.0	0.6	-	0.6	2.1	0.0	0.6	0.6
7/2	672	672	-	-	-	0.0	0.3	-	0.3	1.5	0.0	0.3	0.3
7/3	1721	1721	-	-	-	0.9	4.6	-	5.5	11.5	2.6	4.6	7.1
8/1	493	493	-	-	-	0.0	0.2	-	0.2	1.3	0.0	0.2	0.2
8/2	1044	1044	-	-	-	0.0	0.6	-	0.6	2.2	0.2	0.6	0.8
8/3	1877	1877	-	-	-	2.7	16.7	-	19.4	37.1	9.3	16.7	26.0
9/1	759	759	-	-	-	1.6	1.2	-	2.8	13.3	8.1	1.2	9.3
9/2	780	780	-	-	-	2.1	1.3	-	3.4	15.5	9.1	1.3	10.4
9/3	479	479	-	-	-	1.0	0.4	-	1.4	10.4	5.0	0.4	5.4
10/1	1001	1001	-	-	-	0.3	0.6	-	0.8	2.9	1.3	0.6	1.9

Full Input Data And Results

10/2	1118	1118	-	-	-	0.1	0.7	-	0.8	2.5	0.6	0.7	1.3
10/3	968	968	-	-	-	0.1	0.5	-	0.6	2.2	0.6	0.5	1.1
11/1	210	210	-	-	-	0.3	0.1	-	0.4	6.6	1.0	0.1	1.1
11/2	725	725	-	-	-	0.6	1.0	-	1.6	8.0	2.7	1.0	3.7
11/3	614	614	-	-	-	0.5	0.7	-	1.2	7.1	1.9	0.7	2.5
12/1	617	617	-	-	-	0.0	0.2	-	0.2	1.4	0.0	0.2	0.2
12/2	714	714	-	-	-	0.0	0.3	-	0.4	1.8	0.5	0.3	0.8
12/3	964	964	-	-	-	0.0	0.5	-	0.5	2.0	0.3	0.5	0.8
13/1	768	768	-	-	-	0.0	0.3	-	0.3	1.6	0.0	0.3	0.3
13/2	980	980	-	-	-	0.0	0.5	-	0.5	2.0	1.1	0.5	1.6
13/3	1267	1267	-	-	-	0.0	1.0	-	1.0	2.8	0.0	1.0	1.0
14/1	768	768	-	-	-	0.0	0.3	-	0.3	1.5	0.0	0.3	0.3
14/2	572	572	-	-	-	0.0	0.2	-	0.2	1.2	0.0	0.2	0.2
14/3	890	890	-	-	-	0.0	0.4	-	0.4	1.7	0.0	0.4	0.4
15/1	768	768	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
15/2	1462	1462	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
16/1	569	569	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
17/1	1396	1396	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
18/1	1538	1538	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
19/1	516	516	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

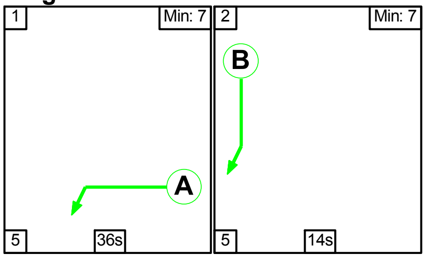
C1 Stream: 1 PRC for Signalled Lanes (%): -6.9 Total Delay for Signalled Lanes (pcuHr): 28.94 Cycle Time (s): 60
C1 Stream: 2 PRC for Signalled Lanes (%): 16.2 Total Delay for Signalled Lanes (pcuHr): 16.44 Cycle Time (s): 60
C1 Stream: 3 PRC for Signalled Lanes (%): 14.7 Total Delay for Signalled Lanes (pcuHr): 12.10 Cycle Time (s): 60
PRC Over All Lanes (%): -9.8 Total Delay Over All Lanes(pcuHr): 91.01

Full Input Data And Results

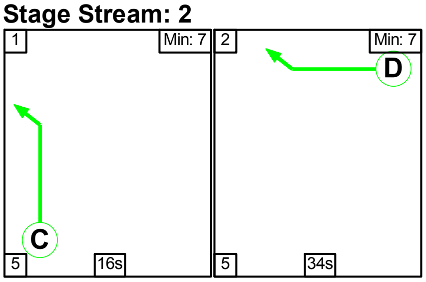
Scenario 5: '2038 Base + Committed - AM' (FG5: '2038 Base + Committed - AM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

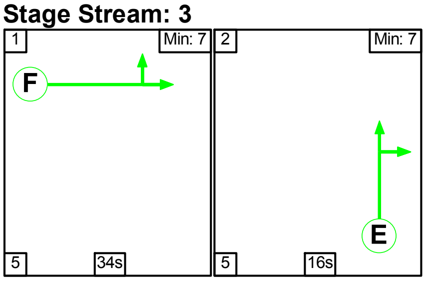
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2
Duration	36	14
Change Point	0	41

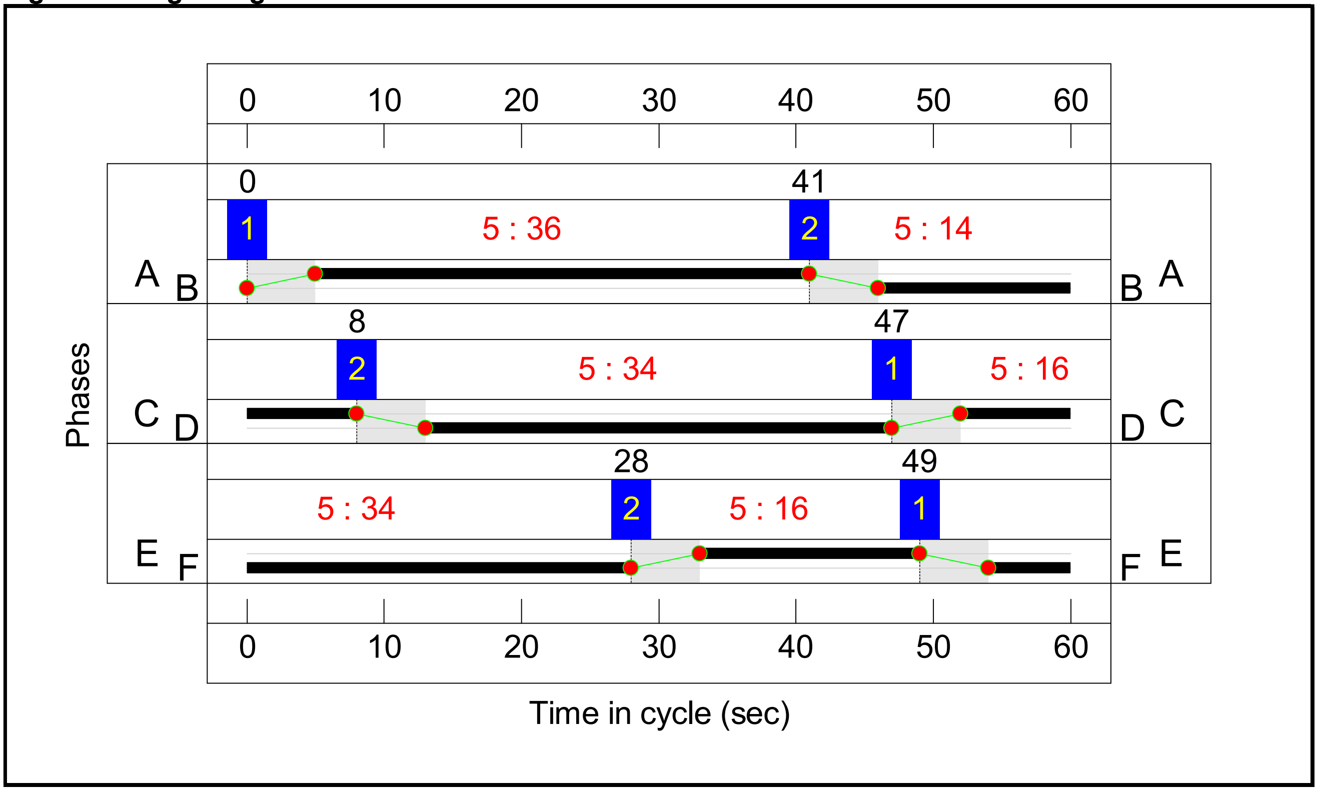
Stage Stream: 2

Stage	1	2
Duration	16	34
Change Point	47	8

Stage Stream: 3

Stage	1	2
Duration	34	16
Change Point	49	28

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Proposed Park Street Roundabout	-	-	**N/A**	-	-		-	-	-	-	-	-	**93.8%**
Park Street Roundabout	-	-	**N/A**	-	-		-	-	-	-	-	-	**93.8%**
1/2+1/1	A414 East Left	U	1	N/A	A		1	36	-	869	2155:1934	907+829	50.1 : 50.1%
1/3	A414 East Left	U	1	N/A	A		1	36	-	1202	2205	1360	88.4%
2/1	Watling Street South Left	O	N/A	N/A	-		-	-	-	64	1890	1031	6.2%
2/2	Watling Street South Left	O	N/A	N/A	-		-	-	-	585	2024	2006	29.2%
3/2+3/1	A405 Left	U	2	N/A	C		1	16	-	534	2130:1918	604+105	75.4 : 75.4%
3/3	A405 Left	U	2	N/A	C		1	16	-	473	2130	604	78.4%
4/2+4/1	A414 West Ahead Left	U	3	N/A	E		1	16	-	790	2130:1978	563+557	70.6 : 70.6%
4/3	A414 West Ahead	U	3	N/A	E		1	16	-	315	2130	604	52.2%
5/1+5/2	Watling Street North Left	O	N/A	N/A	-		-	-	-	781	1995:2185	1042+544	49.2 : 49.2%
6/1	A414 East Circulatory Ahead	U	1	N/A	B		1	14	-	420	1900	475	88.4%
6/2	A414 East Circulatory Ahead	U	1	N/A	B		1	14	-	1	1900	475	0.2%
6/3	A414 East Circulatory Ahead	U	1	N/A	B		1	14	-	301	1900	475	63.4%
7/1	Watling South Circulatory Right Left	U	N/A	N/A	-		-	-	-	835	1900	1900	43.9%
7/2	Watling South Circulatory Right	U	N/A	N/A	-		-	-	-	455	1900	1900	23.9%

Full Input Data And Results

7/3	Watling South Circulatory Right	U	N/A	N/A	-		-	-	-	1503	1900	1900	79.1%
8/1	A405 Exit Circulatory Left	U	N/A	N/A	-		-	-	-	272	1900	1900	14.3%
8/2	A405 Exit Circulatory Ahead Left	U	N/A	N/A	-		-	-	-	761	1900	1900	40.1%
8/3	A405 Exit Circulatory Ahead	U	N/A	N/A	-		-	-	-	1782	1900	1900	93.8%
9/1	A405 Circulatory Ahead	U	2	N/A	D		1	34	-	702	1900	1108	63.3%
9/2	A405 Circulatory Ahead	U	2	N/A	D		1	34	-	708	1900	1108	63.9%
9/3	A405 Circulatory Ahead	U	2	N/A	D		1	34	-	529	1900	1108	47.7%
10/1	A414 West Exit Circulatory Ahead	U	N/A	N/A	-		-	-	-	901	1900	1900	47.4%
10/2	A414 West Exit Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	1043	1900	1900	54.9%
10/3	A414 West Exit Circulatory Right	U	N/A	N/A	-		-	-	-	1002	1900	1900	52.7%
11/1	A414 West Circulatory Ahead	U	3	N/A	F		1	34	-	277	1900	1108	25.0%
11/2	A414 West Circulatory Right Ahead	U	3	N/A	F		1	34	-	743	1900	1108	67.0%
11/3	A414 West Circulatory Right	U	3	N/A	F		1	34	-	629	1900	1108	56.8%
12/1	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	629	1900	1900	33.1%
12/2	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	624	1900	1900	32.8%
12/3	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	944	1900	1900	49.7%

Full Input Data And Results

13/1	A414 East Circulatory Ahead	U	N/A	N/A	-		-	-	-	786	1900	1900	41.4%
13/2	A414 East Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	980	1900	1900	51.6%
13/3	A414 East Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	1212	1900	1900	63.8%
14/1	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	786	1980	1980	39.7%
14/2	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	559	2120	2120	26.4%
14/3	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	911	1965	1965	46.4%
15/1		U	N/A	N/A	-		-	-	-	786	Inf	Inf	0.0%
15/2		U	N/A	N/A	-		-	-	-	1470	Inf	Inf	0.0%
16/1	Watling Street South Exit	U	N/A	N/A	-		-	-	-	627	Inf	Inf	0.0%
17/1	A405 Exit	U	N/A	N/A	-		-	-	-	876	Inf	Inf	0.0%
18/1	A414 West Exit	U	N/A	N/A	-		-	-	-	1297	Inf	Inf	0.0%
19/1	Watling Street North Exit	U	N/A	N/A	-		-	-	-	557	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Proposed Park Street Roundabout	**-**	**-**	**2211**	**0**	**0**	**28.4**	**33.1**	**0.0**	**61.5**	**-**	**-**	**-**	**-**
Park Street Roundabout	**-**	**-**	**2211**	**0**	**0**	**28.4**	**33.1**	**0.0**	**61.5**	**-**	**-**	**-**	**-**
1/2+1/1	869	869	-	-	-	1.4	0.5	-	1.9	7.7	3.7	0.5	4.2
1/3	1202	1202	-	-	-	3.2	3.6	-	6.9	20.6	16.7	3.6	20.3
2/1	64	64	64	0	0	0.0	0.0	-	0.0	1.9	0.0	0.0	0.0
2/2	585	585	585	0	0	0.0	0.2	-	0.2	1.3	0.0	0.2	0.2
3/2+3/1	534	534	-	-	-	2.8	1.5	-	4.3	29.2	6.8	1.5	8.3
3/3	473	473	-	-	-	2.6	1.8	-	4.4	33.2	7.2	1.8	9.0
4/2+4/1	790	790	-	-	-	4.2	1.2	-	5.4	24.5	5.8	1.2	7.0
4/3	315	315	-	-	-	1.6	0.5	-	2.1	24.3	4.4	0.5	4.9
5/1+5/2	781	781	1562	0	0	0.3	0.5	-	0.8	3.7	2.1	0.5	2.5
6/1	420	420	-	-	-	2.2	3.4	-	5.6	48.2	6.6	3.4	10.0
6/2	1	1	-	-	-	0.0	0.0	-	0.0	5.3	0.0	0.0	0.0
6/3	301	301	-	-	-	1.3	0.9	-	2.2	26.2	3.9	0.9	4.7
7/1	835	835	-	-	-	0.0	0.4	-	0.4	1.7	0.0	0.4	0.4
7/2	455	455	-	-	-	0.0	0.2	-	0.2	1.2	0.0	0.2	0.2
7/3	1503	1503	-	-	-	0.6	1.9	-	2.5	5.9	2.0	1.9	3.9
8/1	272	272	-	-	-	0.0	0.1	-	0.1	1.1	0.0	0.1	0.1
8/2	761	761	-	-	-	0.0	0.3	-	0.3	1.6	0.0	0.3	0.3
8/3	1782	1782	-	-	-	2.5	6.8	-	9.3	18.8	9.2	6.8	16.0
9/1	702	702	-	-	-	1.2	0.9	-	2.1	10.6	7.0	0.9	7.9
9/2	708	708	-	-	-	1.5	0.9	-	2.4	12.0	6.6	0.9	7.5
9/3	529	529	-	-	-	1.2	0.5	-	1.6	11.0	5.5	0.5	5.9
10/1	901	901	-	-	-	0.1	0.5	-	0.6	2.3	0.9	0.5	1.3

Full Input Data And Results

10/2	1043	1043	-	-	-	0.1	0.6	-	0.7	2.3	0.5	0.6	1.1
10/3	1002	1002	-	-	-	0.1	0.6	-	0.6	2.2	0.6	0.6	1.1
11/1	277	277	-	-	-	0.4	0.2	-	0.6	7.6	1.7	0.2	1.8
11/2	743	743	-	-	-	0.6	1.0	-	1.6	8.0	9.6	1.0	10.6
11/3	629	629	-	-	-	0.4	0.7	-	1.0	5.9	1.6	0.7	2.3
12/1	629	629	-	-	-	0.0	0.2	-	0.2	1.4	0.0	0.2	0.2
12/2	624	624	-	-	-	0.0	0.2	-	0.3	1.6	0.4	0.2	0.6
12/3	944	944	-	-	-	0.0	0.5	-	0.5	1.9	0.3	0.5	0.7
13/1	786	786	-	-	-	0.0	0.4	-	0.4	1.6	0.0	0.4	0.4
13/2	980	980	-	-	-	0.0	0.5	-	0.5	2.0	4.8	0.5	5.3
13/3	1212	1212	-	-	-	0.0	0.9	-	0.9	2.6	0.0	0.9	0.9
14/1	786	786	-	-	-	0.0	0.3	-	0.3	1.5	0.0	0.3	0.3
14/2	559	559	-	-	-	0.0	0.2	-	0.2	1.2	0.0	0.2	0.2
14/3	911	911	-	-	-	0.0	0.4	-	0.4	1.7	0.0	0.4	0.4
15/1	786	786	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
15/2	1470	1470	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
16/1	627	627	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
17/1	876	876	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
18/1	1297	1297	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
19/1	557	557	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

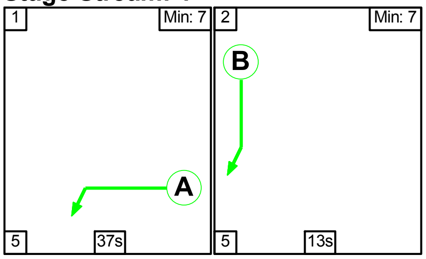
C1 Stream: 1 PRC for Signalled Lanes (%): 1.8 Total Delay for Signalled Lanes (pcuHr): 16.55 Cycle Time (s): 60
C1 Stream: 2 PRC for Signalled Lanes (%): 14.8 Total Delay for Signalled Lanes (pcuHr): 14.74 Cycle Time (s): 60
C1 Stream: 3 PRC for Signalled Lanes (%): 27.6 Total Delay for Signalled Lanes (pcuHr): 10.77 Cycle Time (s): 60
PRC Over All Lanes (%): -4.2 Total Delay Over All Lanes(pcuHr): 61.46

Full Input Data And Results

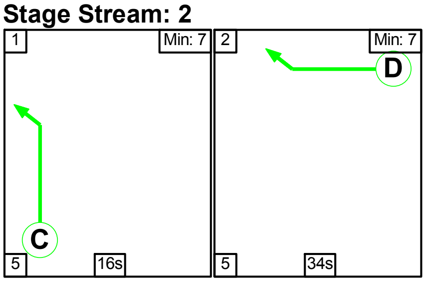
Scenario 6: '2038 Base + Committed - PM' (FG6: '2038 Base + Committed - PM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

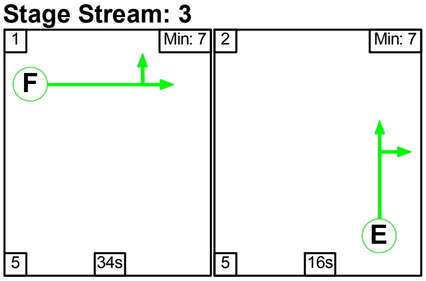
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2
Duration	37	13
Change Point	0	42

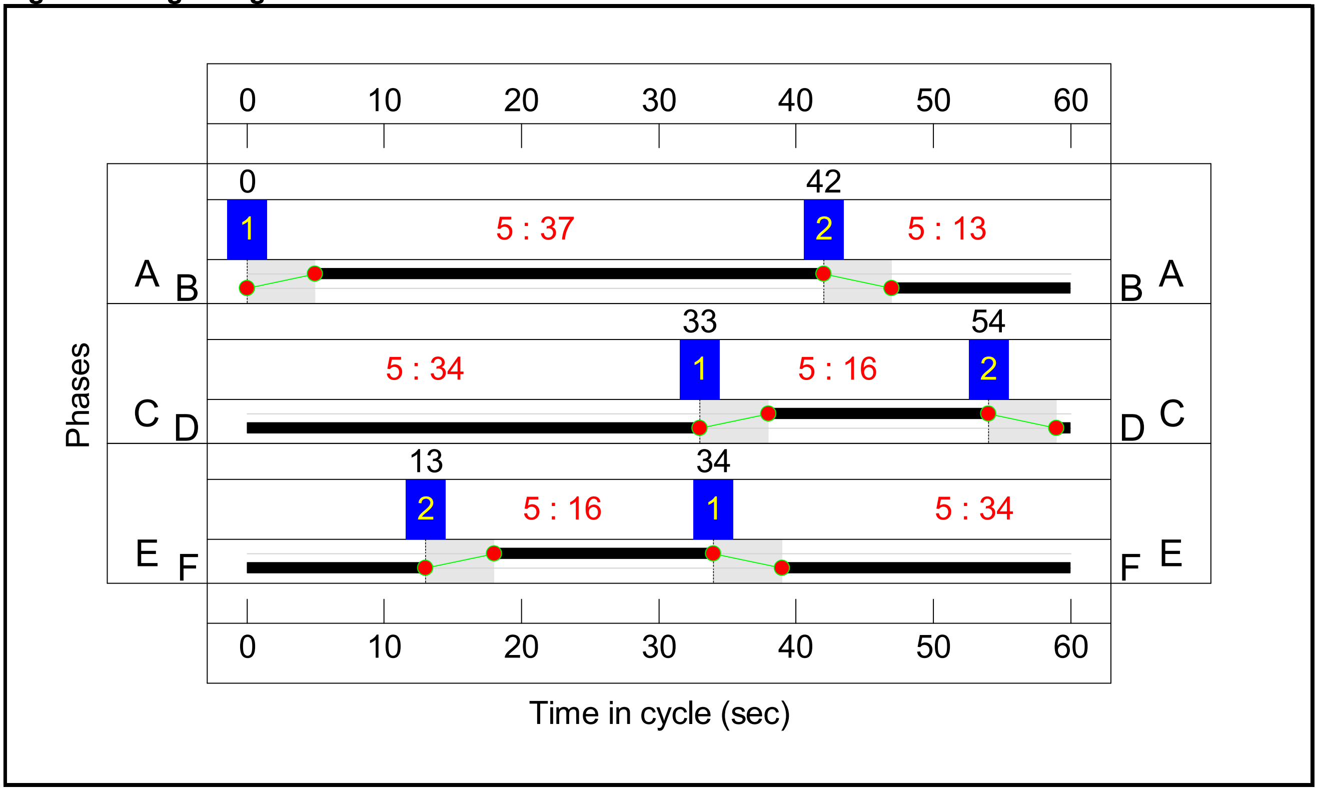
Stage Stream: 2

Stage	1	2
Duration	16	34
Change Point	33	54

Stage Stream: 3

Stage	1	2
Duration	34	16
Change Point	34	13

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Proposed Park Street Roundabout	-	-	**N/A**	-	-		-	-	-	-	-	-	**100.4%**
Park Street Roundabout	-	-	**N/A**	-	-		-	-	-	-	-	-	**100.4%**
1/2+1/1	A414 East Left	U	1	N/A	A		1	37	-	1355	2155:1934	848+877	78.6 : 78.6%
1/3	A414 East Left	U	1	N/A	A		1	37	-	1402	2205	1397	100.4%
2/1	Watling Street South Left	O	N/A	N/A	-		-	-	-	14	1890	624	2.2%
2/2	Watling Street South Left	O	N/A	N/A	-		-	-	-	553	2024	1866	29.6%
3/2+3/1	A405 Left	U	2	N/A	C		1	16	-	585	2130:1918	604+100	83.2 : 83.2%
3/3	A405 Left	U	2	N/A	C		1	16	-	495	2130	604	82.0%
4/2+4/1	A414 West Ahead Left	U	3	N/A	E		1	16	-	927	2130:1976	549+557	83.8 : 83.8%
4/3	A414 West Ahead	U	3	N/A	E		1	16	-	389	2130	604	64.5%
5/1+5/2	Watling Street North Left	O	N/A	N/A	-		-	-	-	753	1995:2185	984+620	46.9 : 46.9%
6/1	A414 East Circulatory Ahead	U	1	N/A	B		1	13	-	422	1900	443	95.2%
6/2	A414 East Circulatory Ahead	U	1	N/A	B		1	13	-	76	1900	443	17.1%
6/3	A414 East Circulatory Ahead	U	1	N/A	B		1	13	-	317	1900	443	71.5%
7/1	Watling South Circulatory Right Left	U	N/A	N/A	-		-	-	-	1111	1900	1900	58.5%
7/2	Watling South Circulatory Right	U	N/A	N/A	-		-	-	-	742	1900	1900	39.1%

Full Input Data And Results

7/3	Watling South Circulatory Right	U	N/A	N/A	-		-	-	-	1719	1900	1900	90.2%
8/1	A405 Exit Circulatory Left	U	N/A	N/A	-		-	-	-	534	1900	1900	28.1%
8/2	A405 Exit Circulatory Ahead Left	U	N/A	N/A	-		-	-	-	1163	1900	1900	61.2%
8/3	A405 Exit Circulatory Ahead	U	N/A	N/A	-		-	-	-	1851	1900	1900	97.2%
9/1	A405 Circulatory Ahead	U	2	N/A	D		1	34	-	778	1900	1108	70.0%
9/2	A405 Circulatory Ahead	U	2	N/A	D		1	34	-	786	1900	1108	70.7%
9/3	A405 Circulatory Ahead	U	2	N/A	D		1	34	-	544	1900	1108	49.0%
10/1	A414 West Exit Circulatory Ahead	U	N/A	N/A	-		-	-	-	1010	1900	1900	53.0%
10/2	A414 West Exit Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	1139	1900	1900	59.8%
10/3	A414 West Exit Circulatory Right	U	N/A	N/A	-		-	-	-	1039	1900	1900	54.6%
11/1	A414 West Circulatory Ahead	U	3	N/A	F		1	34	-	179	1900	1108	16.1%
11/2	A414 West Circulatory Right Ahead	U	3	N/A	F		1	34	-	796	1900	1108	71.7%
11/3	A414 West Circulatory Right	U	3	N/A	F		1	34	-	615	1900	1108	55.5%
12/1	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	633	1900	1900	33.3%
12/2	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	727	1900	1900	38.3%
12/3	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	1004	1900	1900	52.8%

Full Input Data And Results

13/1	A414 East Circulatory Ahead	U	N/A	N/A	-		-	-	-	805	1900	1900	42.4%
13/2	A414 East Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	1017	1900	1900	53.5%
13/3	A414 East Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	1295	1900	1900	68.2%
14/1	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	805	1980	1980	40.7%
14/2	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	519	2120	2120	24.5%
14/3	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	978	1965	1965	49.8%
15/1		U	N/A	N/A	-		-	-	-	805	Inf	Inf	0.0%
15/2		U	N/A	N/A	-		-	-	-	1497	Inf	Inf	0.0%
16/1	Watling Street South Exit	U	N/A	N/A	-		-	-	-	591	Inf	Inf	0.0%
17/1	A405 Exit	U	N/A	N/A	-		-	-	-	1440	Inf	Inf	0.0%
18/1	A414 West Exit	U	N/A	N/A	-		-	-	-	1598	Inf	Inf	0.0%
19/1	Watling Street North Exit	U	N/A	N/A	-		-	-	-	542	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Proposed Park Street Roundabout	**-**	**-**	**2073**	**0**	**0**	**34.3**	**67.3**	**0.0**	**101.6**	**-**	**-**	**-**	**-**
Park Street Roundabout	**-**	**-**	**2073**	**0**	**0**	**34.3**	**67.3**	**0.0**	**101.6**	**-**	**-**	**-**	**-**
1/2+1/1	1355	1355	-	-	-	2.3	1.8	-	4.1	10.9	6.5	1.8	8.3
1/3	1402	1397	-	-	-	4.4	20.1	-	24.6	63.1	23.5	20.1	43.6
2/1	14	14	14	0	0	0.0	0.0	-	0.0	3.4	0.0	0.0	0.0
2/2	553	553	553	0	0	0.0	0.2	-	0.2	1.4	0.0	0.2	0.2
3/2+3/1	585	585	-	-	-	3.2	2.4	-	5.6	34.2	7.8	2.4	10.2
3/3	495	495	-	-	-	2.8	2.2	-	5.0	36.0	7.7	2.2	9.9
4/2+4/1	927	927	-	-	-	5.1	2.5	-	7.6	29.7	7.3	2.5	9.8
4/3	389	389	-	-	-	2.0	0.9	-	2.9	27.2	5.6	0.9	6.5
5/1+5/2	753	753	1506	0	0	0.4	0.4	-	0.9	4.1	2.2	0.4	2.7
6/1	422	422	-	-	-	2.3	6.2	-	8.5	72.9	6.6	6.2	12.9
6/2	76	76	-	-	-	0.3	0.1	-	0.4	20.6	1.2	0.1	1.3
6/3	317	317	-	-	-	1.7	1.2	-	2.9	33.5	4.9	1.2	6.1
7/1	1111	1111	-	-	-	0.0	0.7	-	0.7	2.3	0.0	0.7	0.7
7/2	742	742	-	-	-	0.0	0.3	-	0.3	1.6	0.0	0.3	0.3
7/3	1714	1714	-	-	-	1.1	4.4	-	5.5	11.6	2.9	4.4	7.3
8/1	534	534	-	-	-	0.0	0.2	-	0.2	1.3	0.0	0.2	0.2
8/2	1163	1163	-	-	-	0.0	0.8	-	0.8	2.5	0.2	0.8	0.9
8/3	1846	1846	-	-	-	2.2	11.9	-	14.0	27.4	4.6	11.9	16.5
9/1	776	776	-	-	-	1.8	1.2	-	2.9	13.6	7.4	1.2	8.6
9/2	783	783	-	-	-	2.1	1.2	-	3.3	15.0	8.7	1.2	9.9
9/3	543	543	-	-	-	1.0	0.5	-	1.5	9.8	5.0	0.5	5.5
10/1	1007	1007	-	-	-	0.2	0.6	-	0.7	2.6	1.1	0.6	1.7

Full Input Data And Results

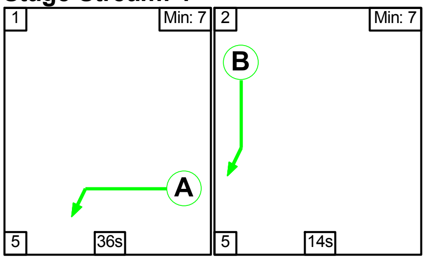
10/2	1137	1137	-	-	-	0.1	0.7	-	0.8	2.6	0.6	0.7	1.4
10/3	1038	1038	-	-	-	0.1	0.6	-	0.7	2.3	0.6	0.6	1.2
11/1	179	179	-	-	-	0.1	0.1	-	0.2	4.3	0.5	0.1	0.6
11/2	795	795	-	-	-	0.5	1.3	-	1.8	8.2	3.7	1.3	5.0
11/3	615	615	-	-	-	0.5	0.6	-	1.1	6.7	1.8	0.6	2.5
12/1	633	633	-	-	-	0.0	0.2	-	0.2	1.4	0.0	0.2	0.2
12/2	727	727	-	-	-	0.1	0.3	-	0.4	1.8	0.5	0.3	0.8
12/3	1004	1004	-	-	-	0.0	0.6	-	0.6	2.1	0.4	0.6	0.9
13/1	805	805	-	-	-	0.0	0.4	-	0.4	1.6	0.0	0.4	0.4
13/2	1017	1017	-	-	-	0.0	0.6	-	0.6	2.0	5.8	0.6	6.4
13/3	1295	1295	-	-	-	0.0	1.1	-	1.1	3.0	0.0	1.1	1.1
14/1	805	805	-	-	-	0.0	0.3	-	0.3	1.5	0.0	0.3	0.3
14/2	519	519	-	-	-	0.0	0.2	-	0.2	1.1	0.0	0.2	0.2
14/3	978	978	-	-	-	0.0	0.5	-	0.5	1.8	0.0	0.5	0.5
15/1	805	805	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
15/2	1497	1497	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
16/1	591	591	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
17/1	1440	1440	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
18/1	1593	1593	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
19/1	541	541	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 Stream: 1 PRC for Signalled Lanes (%): -11.5 Total Delay for Signalled Lanes (pcuHr): 40.59 Cycle Time (s): 60
C1 Stream: 2 PRC for Signalled Lanes (%): 8.2 Total Delay for Signalled Lanes (pcuHr): 18.18 Cycle Time (s): 60
C1 Stream: 3 PRC for Signalled Lanes (%): 7.4 Total Delay for Signalled Lanes (pcuHr): 13.74 Cycle Time (s): 60
PRC Over All Lanes (%): -11.5 Total Delay Over All Lanes(pcuHr): 101.61

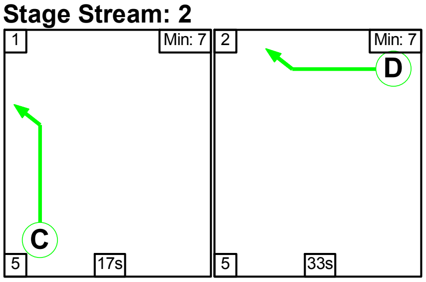
Full Input Data And Results
Scenario 7: '2038 Base + Committed + Dev - AM' (FG7: '2038 Base + Committed + Dev - AM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

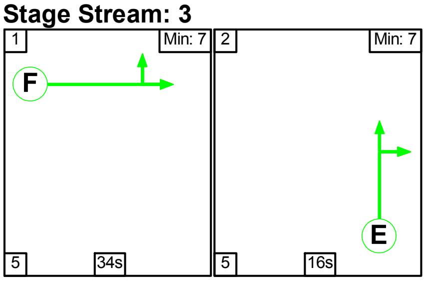
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2
Duration	36	14
Change Point	0	41

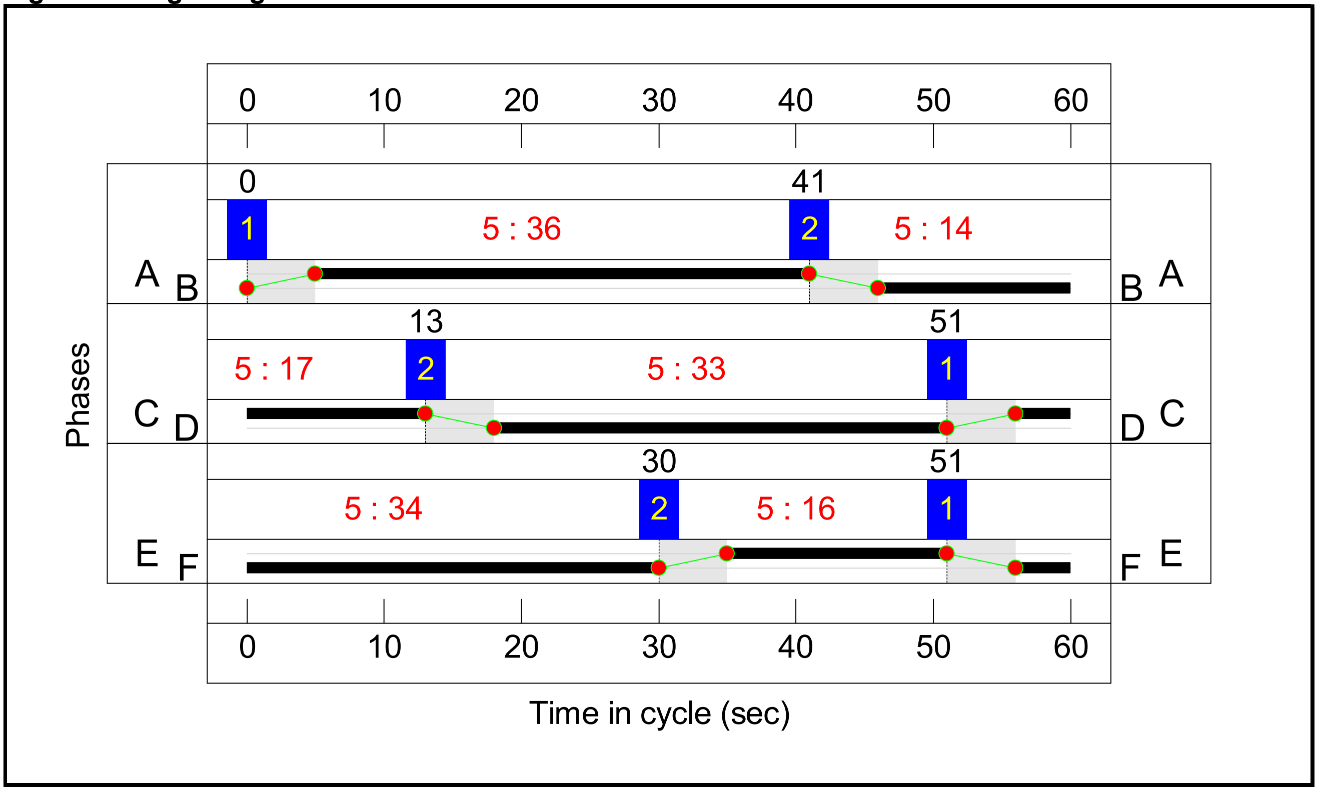
Stage Stream: 2

Stage	1	2
Duration	17	33
Change Point	51	13

Stage Stream: 3

Stage	1	2
Duration	34	16
Change Point	51	30

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Proposed Park Street Roundabout	-	-	**N/A**	-	-		-	-	-	-	-	-	**95.3%**
Park Street Roundabout	-	-	**N/A**	-	-		-	-	-	-	-	-	**95.3%**
1/2+1/1	A414 East Left	U	1	N/A	A		1	36	-	880	2155:1934	908+826	50.8 : 50.8%
1/3	A414 East Left	U	1	N/A	A		1	36	-	1202	2205	1360	88.4%
2/1	Watling Street South Left	O	N/A	N/A	-		-	-	-	64	1890	1025	6.2%
2/2	Watling Street South Left	O	N/A	N/A	-		-	-	-	585	2024	2005	29.2%
3/2+3/1	A405 Left	U	2	N/A	C		1	17	-	540	2130:1918	639+118	71.4 : 71.4%
3/3	A405 Left	U	2	N/A	C		1	17	-	480	2130	639	75.1%
4/2+4/1	A414 West Ahead Left	U	3	N/A	E		1	16	-	799	2130:1978	558+557	71.6 : 71.6%
4/3	A414 West Ahead	U	3	N/A	E		1	16	-	298	2130	604	49.4%
5/1+5/2	Watling Street North Left	O	N/A	N/A	-		-	-	-	781	1995:2185	1037+551	49.2 : 49.2%
6/1	A414 East Circulatory Ahead	U	1	N/A	B		1	14	-	420	1900	475	88.4%
6/2	A414 East Circulatory Ahead	U	1	N/A	B		1	14	-	10	1900	475	2.1%
6/3	A414 East Circulatory Ahead	U	1	N/A	B		1	14	-	294	1900	475	61.9%
7/1	Watling South Circulatory Right Left	U	N/A	N/A	-		-	-	-	839	1900	1900	44.2%
7/2	Watling South Circulatory Right	U	N/A	N/A	-		-	-	-	471	1900	1900	24.8%

Full Input Data And Results

7/3	Watling South Circulatory Right	U	N/A	N/A	-		-	-	-	1496	1900	1900	78.7%
8/1	A405 Exit Circulatory Left	U	N/A	N/A	-		-	-	-	276	1900	1900	14.5%
8/2	A405 Exit Circulatory Ahead Left	U	N/A	N/A	-		-	-	-	742	1900	1900	39.1%
8/3	A405 Exit Circulatory Ahead	U	N/A	N/A	-		-	-	-	1810	1900	1900	95.3%
9/1	A405 Circulatory Ahead	U	2	N/A	D		1	33	-	715	1900	1077	66.4%
9/2	A405 Circulatory Ahead	U	2	N/A	D		1	33	-	717	1900	1077	66.6%
9/3	A405 Circulatory Ahead	U	2	N/A	D		1	33	-	507	1900	1077	47.1%
10/1	A414 West Exit Circulatory Ahead	U	N/A	N/A	-		-	-	-	906	1900	1900	47.7%
10/2	A414 West Exit Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	1066	1900	1900	56.1%
10/3	A414 West Exit Circulatory Right	U	N/A	N/A	-		-	-	-	987	1900	1900	51.9%
11/1	A414 West Circulatory Ahead	U	3	N/A	F		1	34	-	299	1900	1108	27.0%
11/2	A414 West Circulatory Right Ahead	U	3	N/A	F		1	34	-	737	1900	1108	66.5%
11/3	A414 West Circulatory Right	U	3	N/A	F		1	34	-	621	1900	1108	56.0%
12/1	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	622	1900	1900	32.7%
12/2	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	656	1900	1900	34.5%
12/3	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	919	1900	1900	48.4%

Full Input Data And Results

13/1	A414 East Circulatory Ahead	U	N/A	N/A	-		-	-	-	785	1900	1900	41.3%
13/2	A414 East Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	1003	1900	1900	52.8%
13/3	A414 East Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	1190	1900	1900	62.6%
14/1	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	785	1980	1980	39.6%
14/2	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	573	2120	2120	27.0%
14/3	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	896	1965	1965	45.6%
15/1		U	N/A	N/A	-		-	-	-	785	Inf	Inf	0.0%
15/2		U	N/A	N/A	-		-	-	-	1469	Inf	Inf	0.0%
16/1	Watling Street South Exit	U	N/A	N/A	-		-	-	-	627	Inf	Inf	0.0%
17/1	A405 Exit	U	N/A	N/A	-		-	-	-	889	Inf	Inf	0.0%
18/1	A414 West Exit	U	N/A	N/A	-		-	-	-	1302	Inf	Inf	0.0%
19/1	Watling Street North Exit	U	N/A	N/A	-		-	-	-	557	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Proposed Park Street Roundabout	**-**	**-**	**2211**	**0**	**0**	**28.6**	**34.3**	**0.0**	**62.9**	**-**	**-**	**-**	**-**
Park Street Roundabout	**-**	**-**	**2211**	**0**	**0**	**28.6**	**34.3**	**0.0**	**62.9**	**-**	**-**	**-**	**-**
1/2+1/1	880	880	-	-	-	1.4	0.5	-	1.9	7.7	3.7	0.5	4.2
1/3	1202	1202	-	-	-	3.2	3.6	-	6.9	20.6	16.7	3.6	20.3
2/1	64	64	64	0	0	0.0	0.0	-	0.0	1.9	0.0	0.0	0.0
2/2	585	585	585	0	0	0.0	0.2	-	0.2	1.3	0.0	0.2	0.2
3/2+3/1	540	540	-	-	-	2.7	1.2	-	4.0	26.4	6.7	1.2	7.9
3/3	480	480	-	-	-	2.5	1.5	-	4.0	30.1	7.2	1.5	8.7
4/2+4/1	799	799	-	-	-	4.2	1.3	-	5.5	24.8	5.9	1.3	7.1
4/3	298	298	-	-	-	1.5	0.5	-	2.0	23.8	4.1	0.5	4.5
5/1+5/2	781	781	1562	0	0	0.3	0.5	-	0.8	3.7	2.0	0.5	2.5
6/1	420	420	-	-	-	2.2	3.4	-	5.6	48.1	6.4	3.4	9.8
6/2	10	10	-	-	-	0.0	0.0	-	0.0	4.8	0.0	0.0	0.1
6/3	294	294	-	-	-	1.3	0.8	-	2.1	26.1	3.8	0.8	4.6
7/1	839	839	-	-	-	0.0	0.4	-	0.4	1.7	0.0	0.4	0.4
7/2	471	471	-	-	-	0.0	0.2	-	0.2	1.3	0.0	0.2	0.2
7/3	1496	1496	-	-	-	0.6	1.8	-	2.4	5.9	2.0	1.8	3.8
8/1	276	276	-	-	-	0.0	0.1	-	0.1	1.1	0.0	0.1	0.1
8/2	742	742	-	-	-	0.0	0.3	-	0.3	1.6	0.0	0.3	0.3
8/3	1810	1810	-	-	-	1.7	8.5	-	10.2	20.2	3.7	8.5	12.2
9/1	715	715	-	-	-	1.9	1.0	-	2.8	14.3	7.7	1.0	8.7
9/2	717	717	-	-	-	1.6	1.0	-	2.6	13.1	7.6	1.0	8.6
9/3	507	507	-	-	-	1.1	0.4	-	1.6	11.2	5.0	0.4	5.5
10/1	906	906	-	-	-	0.1	0.5	-	0.6	2.4	1.0	0.5	1.4

Full Input Data And Results

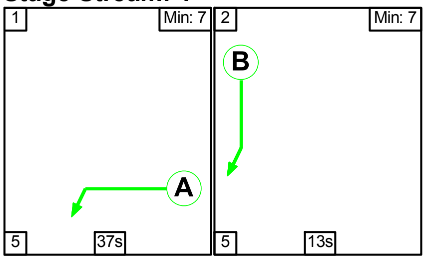
10/2	1066	1066	-	-	-	0.0	0.6	-	0.7	2.3	0.5	0.6	1.1
10/3	987	987	-	-	-	0.1	0.5	-	0.6	2.2	0.6	0.5	1.1
11/1	299	299	-	-	-	0.7	0.2	-	0.9	10.9	2.6	0.2	2.8
11/2	737	737	-	-	-	0.7	1.0	-	1.7	8.2	5.4	1.0	6.4
11/3	621	621	-	-	-	0.5	0.6	-	1.1	6.6	1.9	0.6	2.5
12/1	622	622	-	-	-	0.0	0.2	-	0.2	1.4	0.0	0.2	0.2
12/2	656	656	-	-	-	0.0	0.3	-	0.3	1.6	0.4	0.3	0.7
12/3	919	919	-	-	-	0.0	0.5	-	0.5	1.9	0.2	0.5	0.7
13/1	785	785	-	-	-	0.0	0.4	-	0.4	1.6	0.0	0.4	0.4
13/2	1003	1003	-	-	-	0.0	0.6	-	0.6	2.0	4.8	0.6	5.3
13/3	1190	1190	-	-	-	0.0	0.8	-	0.8	2.5	0.0	0.8	0.9
14/1	785	785	-	-	-	0.0	0.3	-	0.3	1.5	0.0	0.3	0.3
14/2	573	573	-	-	-	0.0	0.2	-	0.2	1.2	0.0	0.2	0.2
14/3	896	896	-	-	-	0.0	0.4	-	0.4	1.7	0.0	0.4	0.4
15/1	785	785	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
15/2	1469	1469	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
16/1	627	627	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
17/1	889	889	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
18/1	1302	1302	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
19/1	557	557	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1	Stream: 1 PRC for Signalled Lanes (%):	1.8	Total Delay for Signalled Lanes (pcuHr):	16.52	Cycle Time (s):	60
C1	Stream: 2 PRC for Signalled Lanes (%):	19.8	Total Delay for Signalled Lanes (pcuHr):	15.01	Cycle Time (s):	60
C1	Stream: 3 PRC for Signalled Lanes (%):	25.7	Total Delay for Signalled Lanes (pcuHr):	11.21	Cycle Time (s):	60
	PRC Over All Lanes (%):	-5.8	Total Delay Over All Lanes(pcuHr):	62.94		

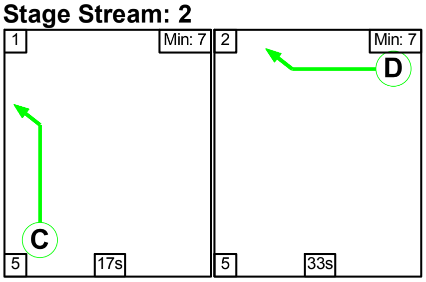
Full Input Data And Results
Scenario 8: '2038 Base + Committed + Dev - PM' (FG8: '2038 Base + Committed + Dev - PM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

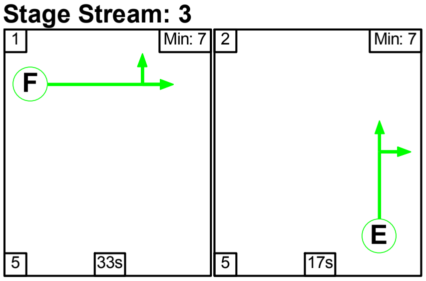
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2
Duration	37	13
Change Point	0	42

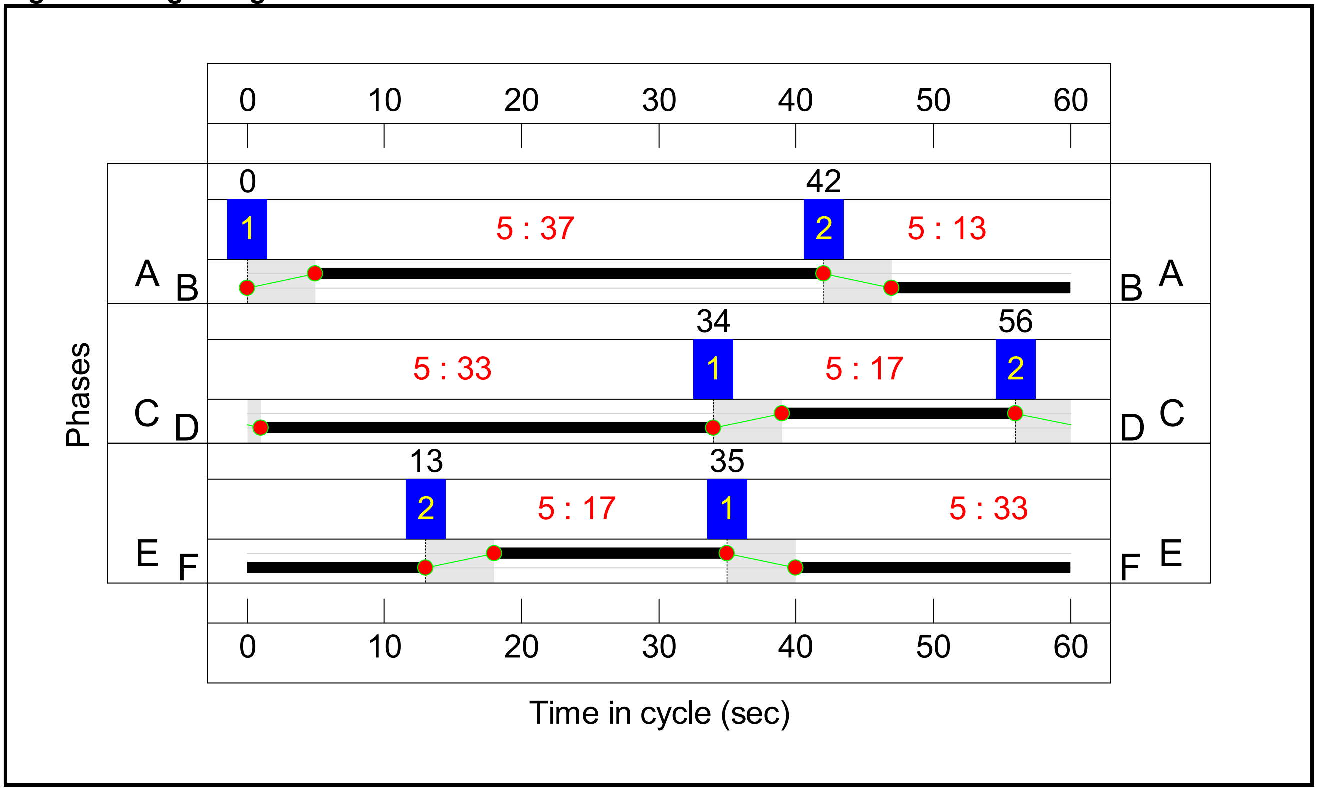
Stage Stream: 2

Stage	1	2
Duration	17	33
Change Point	34	56

Stage Stream: 3

Stage	1	2
Duration	33	17
Change Point	35	13

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Proposed Park Street Roundabout	-	-	**N/A**	-	-		-	-	-	-	-	-	**100.4%**
Park Street Roundabout	-	-	**N/A**	-	-		-	-	-	-	-	-	**100.4%**
1/2+1/1	A414 East Left	U	1	N/A	A		1	37	-	1366	2155:1934	847+877	79.2 : 79.2%
1/3	A414 East Left	U	1	N/A	A		1	37	-	1402	2205	1397	100.4%
2/1	Watling Street South Left	O	N/A	N/A	-		-	-	-	14	1890	618	2.3%
2/2	Watling Street South Left	O	N/A	N/A	-		-	-	-	553	2024	1863	29.7%
3/2+3/1	A405 Left	U	2	N/A	C		1	17	-	604	2130:1918	639+109	80.8 : 80.8%
3/3	A405 Left	U	2	N/A	C		1	17	-	509	2130	639	79.7%
4/2+4/1	A414 West Ahead Left	U	3	N/A	E		1	17	-	932	2130:1976	572+574	81.3 : 81.3%
4/3	A414 West Ahead	U	3	N/A	E		1	17	-	386	2130	639	60.4%
5/1+5/2	Watling Street North Left	O	N/A	N/A	-		-	-	-	753	1995:2185	965+664	46.2 : 46.2%
6/1	A414 East Circulatory Ahead	U	1	N/A	B		1	13	-	422	1900	443	95.2%
6/2	A414 East Circulatory Ahead	U	1	N/A	B		1	13	-	70	1900	443	15.8%
6/3	A414 East Circulatory Ahead	U	1	N/A	B		1	13	-	325	1900	443	73.3%
7/1	Watling South Circulatory Right Left	U	N/A	N/A	-		-	-	-	1117	1900	1900	58.8%
7/2	Watling South Circulatory Right	U	N/A	N/A	-		-	-	-	741	1900	1900	39.0%

Full Input Data And Results

7/3	Watling South Circulatory Right	U	N/A	N/A	-		-	-	-	1727	1900	1900	90.6%
8/1	A405 Exit Circulatory Left	U	N/A	N/A	-		-	-	-	540	1900	1900	28.4%
8/2	A405 Exit Circulatory Ahead Left	U	N/A	N/A	-		-	-	-	1170	1900	1900	61.6%
8/3	A405 Exit Circulatory Ahead	U	N/A	N/A	-		-	-	-	1851	1900	1900	97.2%
9/1	A405 Circulatory Ahead	U	2	N/A	D		1	33	-	809	1900	1077	74.9%
9/2	A405 Circulatory Ahead	U	2	N/A	D		1	33	-	834	1900	1077	77.2%
9/3	A405 Circulatory Ahead	U	2	N/A	D		1	33	-	465	1900	1077	43.1%
10/1	A414 West Exit Circulatory Ahead	U	N/A	N/A	-		-	-	-	1044	1900	1900	54.8%
10/2	A414 West Exit Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	1203	1900	1900	63.2%
10/3	A414 West Exit Circulatory Right	U	N/A	N/A	-		-	-	-	974	1900	1900	51.2%
11/1	A414 West Circulatory Ahead	U	3	N/A	F		1	33	-	256	1900	1077	23.7%
11/2	A414 West Circulatory Right Ahead	U	3	N/A	F		1	33	-	770	1900	1077	71.5%
11/3	A414 West Circulatory Right	U	3	N/A	F		1	33	-	592	1900	1077	55.0%
12/1	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	671	1900	1900	35.3%
12/2	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	745	1900	1900	39.2%
12/3	Watling North Circulatory Ahead	U	N/A	N/A	-		-	-	-	978	1900	1900	51.5%

Full Input Data And Results

13/1	A414 East Circulatory Ahead	U	N/A	N/A	-		-	-	-	827	1900	1900	43.5%
13/2	A414 East Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	1035	1900	1900	54.5%
13/3	A414 East Circulatory Right Ahead	U	N/A	N/A	-		-	-	-	1285	1900	1900	67.6%
14/1	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	827	1980	1980	41.8%
14/2	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	543	2120	2120	25.6%
14/3	A414 East Exit Ahead	U	N/A	N/A	-		-	-	-	960	1965	1965	48.9%
15/1		U	N/A	N/A	-		-	-	-	827	Inf	Inf	0.0%
15/2		U	N/A	N/A	-		-	-	-	1503	Inf	Inf	0.0%
16/1	Watling Street South Exit	U	N/A	N/A	-		-	-	-	591	Inf	Inf	0.0%
17/1	A405 Exit	U	N/A	N/A	-		-	-	-	1453	Inf	Inf	0.0%
18/1	A414 West Exit	U	N/A	N/A	-		-	-	-	1603	Inf	Inf	0.0%
19/1	Watling Street North Exit	U	N/A	N/A	-		-	-	-	542	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Proposed Park Street Roundabout	**-**	**-**	**2073**	**0**	**0**	**34.9**	**67.4**	**0.0**	**102.3**	**-**	**-**	**-**	**-**
Park Street Roundabout	**-**	**-**	**2073**	**0**	**0**	**34.9**	**67.4**	**0.0**	**102.3**	**-**	**-**	**-**	**-**
1/2+1/1	1366	1366	-	-	-	2.3	1.9	-	4.2	11.1	6.6	1.9	8.5
1/3	1402	1397	-	-	-	4.4	20.1	-	24.6	63.1	23.5	20.1	43.6
2/1	14	14	14	0	0	0.0	0.0	-	0.0	3.5	0.0	0.0	0.0
2/2	553	553	553	0	0	0.0	0.2	-	0.2	1.4	0.0	0.2	0.2
3/2+3/1	604	604	-	-	-	3.2	2.0	-	5.2	31.0	7.9	2.0	9.9
3/3	509	509	-	-	-	2.7	1.9	-	4.6	32.8	7.8	1.9	9.7
4/2+4/1	932	932	-	-	-	4.9	2.1	-	7.1	27.3	7.0	2.1	9.1
4/3	386	386	-	-	-	1.9	0.8	-	2.7	25.0	5.5	0.8	6.2
5/1+5/2	753	753	1506	0	0	0.4	0.4	-	0.8	3.9	2.0	0.4	2.4
6/1	422	422	-	-	-	2.4	6.2	-	8.7	74.0	6.6	6.2	12.9
6/2	70	70	-	-	-	0.3	0.1	-	0.4	20.0	1.1	0.1	1.2
6/3	325	325	-	-	-	1.8	1.3	-	3.1	34.5	5.0	1.3	6.3
7/1	1117	1117	-	-	-	0.0	0.7	-	0.7	2.3	0.0	0.7	0.7
7/2	741	741	-	-	-	0.0	0.3	-	0.3	1.6	0.0	0.3	0.3
7/3	1722	1722	-	-	-	1.1	4.6	-	5.7	12.0	2.9	4.6	7.5
8/1	540	540	-	-	-	0.0	0.2	-	0.2	1.3	0.0	0.2	0.2
8/2	1170	1170	-	-	-	0.0	0.8	-	0.8	2.5	0.2	0.8	1.0
8/3	1846	1846	-	-	-	2.2	11.9	-	14.1	27.4	4.7	11.9	16.5
9/1	807	807	-	-	-	2.0	1.5	-	3.4	15.4	8.0	1.5	9.5
9/2	831	831	-	-	-	2.4	1.7	-	4.1	17.8	10.1	1.7	11.8
9/3	464	464	-	-	-	0.9	0.4	-	1.2	9.6	4.3	0.4	4.7
10/1	1041	1041	-	-	-	0.2	0.6	-	0.8	2.8	1.1	0.6	1.7

Full Input Data And Results

10/2	1201	1201	-	-	-	0.1	0.9	-	0.9	2.8	0.6	0.9	1.5
10/3	973	973	-	-	-	0.1	0.5	-	0.6	2.2	0.6	0.5	1.2
11/1	256	256	-	-	-	0.4	0.2	-	0.6	8.0	1.5	0.2	1.6
11/2	769	769	-	-	-	0.5	1.2	-	1.7	8.2	6.5	1.2	7.7
11/3	592	592	-	-	-	0.6	0.6	-	1.2	7.1	1.9	0.6	2.5
12/1	671	671	-	-	-	0.0	0.3	-	0.3	1.5	0.0	0.3	0.3
12/2	745	745	-	-	-	0.1	0.3	-	0.4	1.8	0.5	0.3	0.8
12/3	978	978	-	-	-	0.0	0.5	-	0.6	2.0	0.4	0.5	0.9
13/1	827	827	-	-	-	0.0	0.4	-	0.4	1.7	0.0	0.4	0.4
13/2	1035	1035	-	-	-	0.0	0.6	-	0.6	2.1	5.8	0.6	6.4
13/3	1285	1285	-	-	-	0.0	1.0	-	1.0	2.9	0.0	1.0	1.1
14/1	827	827	-	-	-	0.0	0.4	-	0.4	1.6	0.0	0.4	0.4
14/2	543	543	-	-	-	0.0	0.2	-	0.2	1.1	0.0	0.2	0.2
14/3	960	960	-	-	-	0.0	0.5	-	0.5	1.8	0.0	0.5	0.5
15/1	827	827	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
15/2	1503	1503	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
16/1	591	591	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
17/1	1453	1453	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
18/1	1598	1598	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
19/1	541	541	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 Stream: 1 PRC for Signalled Lanes (%): -11.5 Total Delay for Signalled Lanes (pcuHr): 40.95 Cycle Time (s): 60
C1 Stream: 2 PRC for Signalled Lanes (%): 11.5 Total Delay for Signalled Lanes (pcuHr): 18.62 Cycle Time (s): 60
C1 Stream: 3 PRC for Signalled Lanes (%): 10.7 Total Delay for Signalled Lanes (pcuHr): 13.23 Cycle Time (s): 60
PRC Over All Lanes (%): -11.5 Total Delay Over All Lanes(pcuHr): 102.26

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Appendix AHJ/8

Email from HCC Highways Confirming Timescales for the Park Street Roundabout Improvements

David Kemp

From: James Dale <James.Dale@hertfordshire.gov.uk>
Sent: 27 September 2022 12:07
To: John Birch
Cc: David Kemp
Subject: RE: Land South of Chiswell Green Lane - The Park Street Roundabout

At this stage off site highway works are following the broad provisional programme of…

- Detailed design complete by end of 2023 (s278/38 submission).
- Works start 2024
- Completion of all work, prior to occupation 2026.

From: John Birch <JBirch@glanvillegroup.com>
Sent: 27 September 2022 12:00
To: James Dale <James.Dale@hertfordshire.gov.uk>
Cc: David Kemp <DKemp@glanvillegroup.com>
Subject: RE: Land South of Chiswell Green Lane - The Park Street Roundabout

Thanks James

Are you able to confirm the likely timescale for the implementation of these junction improvements?

Regards

John Birch BEng CEng MICE
Director
JBirch@glanvillegroup.com

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Appendix AHJ/9

M25 Junction 21a Site Visit Findings

M25 Junction 21a Queueing in the AM Peak Hour – 22 September 2022

1.0 M25 Clockwise (Eastbound) Off-slip – AM Peak

Capacity of existing off-slip / approach length with stationary queue:

a) Nearside Lane – 495m or 82 vehicles based on 6m per vehicle
b) Offside Lane – 420m or 70 vehicles based on 6m per vehicle

Pass 1 (07:51)

- The queue does not extend back to the M25 mainline (see photo 1.1).
- Only 1 HGV was queuing in the offside lane (see photo 1.2).
- Around 5 vehicles were queueing in the nearside lane in front of the dashcam vehicle with around 3 behind equating to 9 vehicles in total. Around 1-2 vehicles at the front of the queue were stationary with the rest moving queues (see photo 1.2).

Photo 1.1: Pass 1 – End of Slip Road showing No Queueing

Photo 1.2: Pass 1 – Queueing at Roundabout Entry

Pass 2 (08:27)

- The queue does not extend back to the M25 mainline (see photo 1.3).
- In the nearside lane queue there are two panel vans queueing with the second in a moving queue. There is one car waiting in the offside lane (see photo 1.4). In addition to these vehicles, there was 1-2 cars behind the car with the dashcam.

Photo 1.3: Pass 2 – End of Slip Road showing No Queueing

Photo 1.4: Pass 2 – End of Queue at Roundabout

Pass 3 (09:00)

- The queue does not extend back to the M25 mainline (see Photo 1.5).
- There was no queueing at the roundabout (see photo 1.6).

Additional Observations

- In addition to the above passes, each time the car with the dashcam headed to Junction 22 to turn around, the queue on the off-slip was observed from the clockwise on-slip. This indicated that at no point did the queue extend back to the M25 mainline. On the first two occasions, the queue could not be seen. On the third occasion, at around 09:15, there was around 23 vehicles (estimated based on the point where the slip road is visible from the on-slip) were observed to be queueing, but it is not known which lanes they were in.

Photo 1.5: Pass 3 – End of Slip Road showing No Queueing

Photo 1.6: Pass 3 – End of Queue at Roundabout

2.0 A405 North Orbital Road (Northbound) – AM Peak

Capacity of existing off-slip / approach length with stationary queue:

a) Nearside Lane – 1km or 166 vehicles based on 6m per vehicle
b) Offside Lane – 1km or 166 vehicles based on 6m per vehicle

Pass 1 (07:55)

- When turning left at the roundabout on the first pass, there was a long moving queue in both lanes. The offside queue was around 180m or 30 vehicles long, however, all but 2 vehicles were moving queues (see photos 2.1 and 2.2). This queue dissipates quickly as 2 minutes later the queue had dissipated.

- On the full first pass, the nearside and offside lane queues start around 100m back from the give way line, but the queue is mainly a moving queue with around 10 vehicles in each lane (see photo 2.3).

Photo 2.1: Pass 1 –Queueing on Approach to the Roundabout (taken from opposite carriageway)

Photo 2.2: Pass 1 – End of Queue (taken from opposite carriageway)

Photo 2.3: Pass 1 – End of Queue at the Roundabout

Pass 2 (08:31)

- When turning left at the roundabout for the second pass, there was a long moving in both lanes. The offside queue was around 95m or 15 vehicles long, however, all but 2 vehicles were moving queues (see photos 2.1 and 2.2). This queue dissipates quickly as 3 minutes later the queue had dissipated.

- On the full second pass, the nearside and offside lane queues start around 170m back from the give way line, but the queue is mainly a moving queue with around 10 vehicles in each lane (see photo 2.3).

Photo 2.4: Pass 2 – Queueing on Approach to the Roundabout (taken from opposite carriageway)

Photo 2.5: Pass 1 – End of Queue (taken from opposite carriageway)

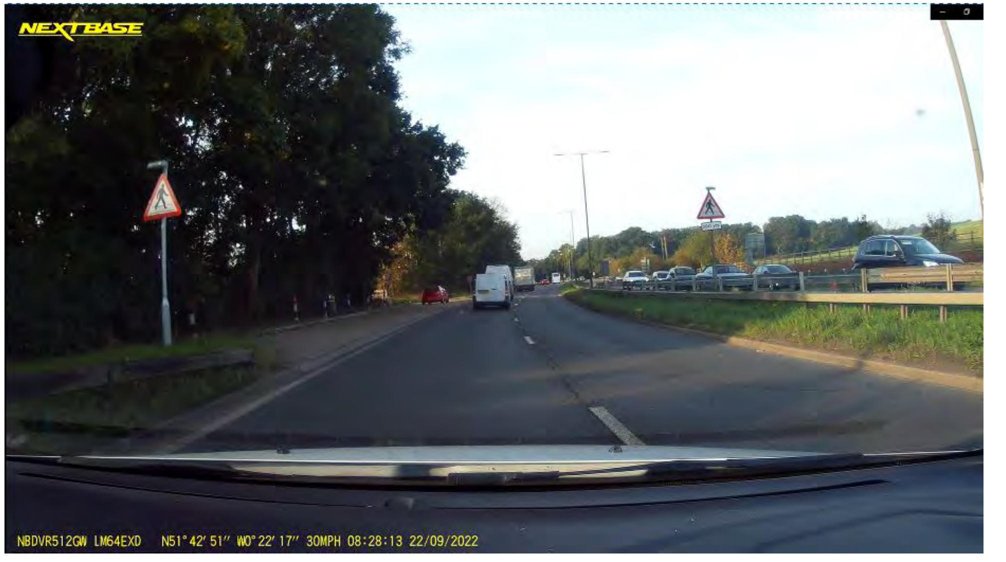

Photo 2.6: Pass 2 – End of Queue at the Roundabout

3.0 M25 Clockwise (Eastbound) Off-slip – AM Peak

Capacity of existing off-slip / approach length with stationary queue:

a) Nearside Lane – 682m or 113 vehicles based on 6m per vehicle
b) Offside Lane – 580m or 96 vehicles based on 6m per vehicle

Pass 1 (08:05)

- The queue does not extend back to the M25 mainline (see photo 3.1).

- The offside lane queue starts around 270m back from give way line at ADS sign and therefore is around 45 vehicles long (see photo 3.2).

- The nearside lane queue starts around 224m back from give way line and therefore is around 37 vehicles long (see photo 3.3).

Photo 3.1: Pass 1 – End of Slip Road showing No Queueing

Photo 3.2: Pass 1 – End of Queue in Offside Lane

Photo 3.3: Pass 1 – End of Queue in Nearside Lane

Pass 2 (08:42)

Photo 3.4: Pass 2 – End of Slip Road showing No Queueing

- The queue does not extend back to the M25 mainline (see photo 3.4).
- The nearside lane queue has around 5 vehicles and there is no queue in offside lane (see photo 3.5).

Photo 3.5: Pass 2 – End of Queue in Nearside Lane

Pass 3 (09:11)

- The queue does not extend back to the M25 mainline (see photo 3.6).
- Offside lane queue has around 6 vehicles and there is no station queue in the nearside lane (see photo 3.6).

Photo 3.6: Pass 3 – End of Queue in Nearside Lane

4.0 A405 North Orbital Road (Southbound) – AM Peak

Capacity of existing off-slip / approach length with stationary queue:

a) Nearside Lane – 682m or 113 vehicles based on 6m per vehicle
b) Offside Lane – 683m or 113 vehicles based on 6m per vehicle

Pass 1 (08:09)

- The nearside lane queue starts at the Noke Hotel roundabout and therefore is around 113 vehicles long (see photo 4.1). It does not, however, block back over the roundabout.

- The offside lane queue starts around 50m from the Noke Hotel roundabout and therefore is around 106 vehicles long (see photo 4.2).

- The queue, however, is a quick moving queue and vehicles moves continuously, therefore ensuring that the Noke Hotel roundabout does not block. This shown by only one vehicle queueing on Watford Road southbound approach (see Photo 4.3) and no queue on the A405 North Orbital Road southbound approach (see photos 4.4). It took around 7 minutes from joining the queue to reaching the give way markings.

- There was no queueing on the left turn lane at the M25 Junction 21A during both passes (see photo 4.5)

Photo 4.1: Pass 1 – End of Queue in Nearside Lane

Photo 4.2: Pass 1 – End of Queue in Offside Lane

Photo 4.3: Pass 1 – Queuing on Watford Road Southbound Approach

Photo 4.4: Pass 1 – Queueing on A405 North Orbital Road Southbound Approach

Photo 4.5: Pass 1 – No Queueing in Left Turn Lane at M25 Jct 21A

Pass 2 (08:44)

Photo 4.6: Pass 2 – End of Queue in Both Lanes Extends Back to Roundabout

- The queue in both lanes extend back to the Noke Hotel Roundabout and therefore there is around 113 vehicles queueing in both lanes, although as the queue is moving the space taken up per vehicle would be more than 6m (see photo 4.6). It takes 4 minutes from joining the back of the queue to reaching the give way markings.

- On this pass, the queue in the nearside lane does pass the roundabout (see Photo 4.7), however the queue is moving very quickly and so 15s later, the queue has already left the circulatory lane (see Photo 4.8). This shows that the queue is very fast moving and has limited impact on the Noke Hotel Roundabout. There is no queueing on Watford Road and 2 vehicles queueing on the North Orbital Road southbound entry, which indicates that the queue does not impact the adjacent links.

Photo 4.7: Pass 2 – Queue Passing Across the Noke Hotel Roundabout

Photo 4.8: Pass 2 – 15s Later the Queue has Already Left the Roundabout

M25 Junction 21a Queueing in the PM Peak Hour – 22 September 2022

1.0 M25 Clockwise (Eastbound) Off-slip – PM Peak

Capacity of existing off-slip / approach length with stationary queue:

a) Nearside Lane – 495m or 82 vehicles based on 6m per vehicle
b) Offside Lane – 420m or 70 vehicles based on 6m per vehicle

Pass 1 (16:46)

- The queue does not extend back to the M25 mainline (see photo 1.1).
- Around 5 vehicles were queueing in the nearside lane in front of the dashcam vehicle with around 2 behind equating to 8 vehicles in total. Around 1-2 vehicles at the front of the queue were stationary with the rest moving queues (see photo 1.2).
- Only 1 vehicle was queuing in the offside lane (see photo 1.3).

Photo 1.1: Pass 1 – End of Slip Road showing No Queueing

Photo 1.2: Pass 1 – Queueing on Nearside Lane at Roundabout Entry

Photo 1.3: Pass 1 – Queueing at Roundabout Entry

Pass 2 (17:18)

- The queue does not extend back to the M25 mainline (see photo 1.4). Whilst the clear slip road cannot be seen in the photo, the van and car in front are freely moving.

- In the nearside lane queue there are 6 vehicles, with the first three vehicles stationary and the rest forming a moving queue. There are two vehicles in a stationary queue in the offside lane (see photo 1.5).

Photo 1.4: Pass 2 – End of Slip Road showing No Queueing

Photo 1.5: Pass 1 – Queueing at Roundabout Entry

Pass 3 (17:56)

- The queue does not extend back to the M25 mainline (see Photo 1.6).
- There were around 5 vehicles queueing in the nearside lane and one in the offside lane at the roundabout (see photo 1.7).

Photo 1.6: Pass 3 – End of Slip Road showing No Queueing

Additional Observations

- In addition to the above passes, each time the car with the dashcam headed to Junction 22 to turn around, the queue on the off-slip was observed from the clockwise on-slip. This indicated that at no point did the queue extend back to the M25 mainline. On the three occasions, the queue could not be seen.

Photo 1.7: Pass 3 – End of Queue at Roundabout

2.0 A405 North Orbital Road (Northbound) – PM Peak

Capacity of existing off-slip / approach length with stationary queue:

a) Nearside Lane – 1km or 166 vehicles based on 6m per vehicle
b) Offside Lane – 1km or 166 vehicles based on 6m per vehicle

Pass 1 (16:49)

- When turning left at the roundabout on the first pass, there was a moving queue in both lanes. The offside queue was around 80m but as it was moving, it only contained 10 vehicles in each lane (see photo 2.1). This queue dissipates quickly as 2 minutes later the queue had dissipated.

- On the full first pass, the nearside lane queues start around 170m back from the give way line, but the queue is mainly a moving queue with around 10 vehicles (see photo 2.3).

- In the offside lane, the queue is shorter at around 8 vehicles in length.

Photo 2.1: Pass 1 – Moving Queue on Approach to the Roundabout (taken from opposite carriageway)

Photo 2.2: Pass 1 – End of Queue at the Roundabout

Pass 2 (17:22)

- On the full second pass, the nearside and offside lane queues are 6 cars long with the first 5 vehicles stationary (see photo 2.3).

Photo 2.3: Pass 2 – End of Queue at the Roundabout

Pass 3 (18:01)

- On the full second pass, the nearside and offside lane queues are around 8 vehicles long, but it was a fully moving queue (see photo 2.4).

Photo 2.4: Pass 3 – End of Queue at the Roundabout

3.0 M25 Clockwise (Eastbound) Off-slip – PM Peak

Capacity of existing off-slip / approach length with stationary queue:

a) Nearside Lane – 682m or 113 vehicles based on 6m per vehicle
b) Offside Lane – 580m or 96 vehicles based on 6m per vehicle

Pass 1 (17:00)

- The queue does not extend back to the M25 mainline (see photo 3.1).
- The offside lane queue is around 8 vehicles long and the queue is stationary (see photo 3.2).
- The nearside lane queue is around 6 vehicles long and is stationary, however, vehicles can pull away one at a time as vehicle flow on the roundabout allows them to (see photo 3.3). It takes around 70s between joining the back of the queue and passing over the give way line.

Photo 3.1: Pass 1 – End of Slip Road showing No Queueing

Photo 3.2: Pass 1 – End of Queue at the Roundabout

Pass 2 (17:36)

- The queue does not extend back to the M25 mainline (see photo 3.3).
- The nearside lane queue has no vehicles in it, whilst the offside queue has 4 vehicles in it (see photo 3.4).

Photo 3.3: Pass 2 – End of Slip Road showing No Queueing

Photo 3.4: Pass 2 – End of Queue at Roundabout

Pass 3 (18:14)

- The queue does not extend back to the M25 mainline (see photo 3.5).
- There is a stationary queue of 2 vehicles in the nearside lane and 4 vehicles in the offside lane (see photo 3.6).

Photo 3.5: Pass 3 – End of Queue in Nearside Lane

Photo 3.6: Pass 2 – End of Queue at Roundabout

4.0 A405 North Orbital Road (Southbound) – PM Peak

Capacity of existing off-slip / approach length with stationary queue:

a) Nearside Lane – 682m or 113 vehicles based on 6m per vehicle
b) Offside Lane – 683m or 113 vehicles based on 6m per vehicle

Pass 1 (17:02)

- The queue does not extend back to the Noke Hotel Roundabout (see photo 4.1) and there is no queueing at the roundabout entries. The queue starts around halfway along the A405 (see photo 4.2). The nearside queue is therefore around 410m long (68 vehicles) in both lanes. The queues are moving queues and move quickly but takes around 4 minutes from back of queue to reach the give way lines.

- The offside queue is around 3-4 vehicles shorter than the nearside queue.

- There was no queueing on the left turn lane at the M25 Junction 21A in each of the passes (see photo 4.3)

Photo 4.1: Pass 1 – No queueing at the Noke Hotel Roundabout

Photo 4.2: Pass 1 – End of the Queue

Photo 4.3: Pass 1 – Queuing at the Give-way Line

Pass 2 (17:37)

- The queue in both lanes does not extend back to the Noke Hotel Roundabout (see photo 4.4) and there is no queueing at the Watford Road roundabout entry. There is a 4-vehicle queue on the North Orbital Road southbound entry, but this is a fast-moving queue. The back of the queue is around halfway along the A405 and is around 410m in length (68 vehicles) in both lanes and the back of the queue is shown in photo 4.5. The queue is fast moving and takes 3 minutes form back of queue to give way markings.

- There was no queueing on the left turn lane at the M25 Junction 21A in each of the passes (see photo 4.6)

Photo 4.4: Pass 2 – No Queueing at the Noke Hotel Roundabout

Photo 4.5: Pass 2 – End of Queue on the A405 (taken from opposite carriageway)

Photo 4.6: Pass 2 – Queueing at the Give Way Line

Pass 3 (18:16)

- The queue in both lanes does not extend back to the Noke Hotel Roundabout (see photo 4.7) and there is no queueing at the roundabout entries. The back of the queue is around halfway along the A405 and is around 365m in length (60 vehicles) in both lanes and the back of the queue is shown in photo 4.8. The queue is fast moving and takes 3 minutes form back of queue to give way markings.

- The offside queue is around 3-4 vehicles shorter than the nearside queue.

- There was no queueing on the left turn lane at the M25 Junction 21A in each of the passes (see photo 4.9)

Photo 4.7: Pass 3 – No Queueing at the Noke Hotel Roundabout

Photo 4.8: Pass 3 – End of Queue on the A405 (taken from opposite carriageway)

Photo 4.9: Pass 3 – Queueing at the Give Way Line

Appendix AHJ/10

No Objection Confirmation from National Highways

National Highways Planning Response (NHPR 21-09)
Formal Recommendation to an Application for Planning Permission

From: Martin Fellows (Regional Director)
Operations Directorate
East Region
National Highways
PlanningEE@nationalhighways.co.uk

To: St Albans City & District Council

CC: transportplanning@dft.gov.uk
spatialplanning@nationalhighways.co.uk

Council's Reference: 5/2022/0927

Location: Land South of Chiswell Green Lane St Albans Hertfordshire

Proposal: Outline application (access sought) - Demolition of existing structures and construction of up to 391 dwellings (Use Class C3), provision of land for a new 2FE primary school, open space provision and associated landscaping. Internal roads, parking, footpaths, cycleways, drainage, utilities and service infrastructure and new access arrangements.

Referring to the consultation on a planning application dated 4 August 2022 referenced above, in the vicinity of the A414 that forms part of the Strategic Road Network, notice is hereby given that National Highways' formal recommendation is that we:

a) offer no objection (see reasons at Annex A).

~~b) recommend that conditions should be attached to any planning~~ permission ~~that may be granted (see Annex A – National Highways recommended Planning Conditions & reasons).~~

~~c) recommend that planning permission not be granted for a specified period (see reasons at Annex A).~~

~~d) recommend that the application be refused (see reasons at Annex A)~~

Highways Act 1980 Section 175B ~~is~~/is not relevant to this application.[1]

[1] Where relevant, further information will be provided within Annex A.

This represents National Highways' formal recommendation and is copied to the Department for Transport as per the terms of our License.

Should the Local Planning Authority not propose to determine the application in accordance with this recommendation they are required to consult the Secretary of State for Transport, as set out in the Town and Country Planning (Development Affecting Trunk Roads) Direction 2018, via transportplanning@dft.gov.uk and may not determine the application until the consultation process is complete.

Signature: J.Searle	**Date: 30/09/2022**
Name: Jen Searle	**Position:** Spatial Planner

National Highways
National Highways | Woodlands | Manton Lane | Bedford | MK41 7LW

Annex A National Highway's assessment of the proposed development

National Highways has been appointed by the Secretary of State for Transport as a strategic highway company under the provisions of the Infrastructure Act 2015 and is the highway authority, traffic authority and street authority for the Strategic Road Network (SRN). The SRN is a critical national asset and as such we work to ensure that it operates and is managed in the public interest, both in respect of current activities and needs as well as in providing effective stewardship of its long-term operation and integrity.

This response represents our formal recommendation with regard to planning application 5/2022/0927 and has been prepared by Jen Searle, Spatial Planner for National Highways.

The proposed planning application seeks to develop 391 dwellings and a 2-form primary school on land south of Chiswell Lane.

NH are responsible for the monitoring, management, and maintenance of the SRN. Within the vicinity of the proposed development, the primary junctions of interest to NH are M25 Junction 21a to the south of the site, and the A414/North Orbital Road/ Watling Street ('Park Street') Roundabout to the northeast of the site.

Glanville provided their Transport Assessment in May 2022 which was reviewed by AEOM in June 2022 and the below comments were listed as critical and needed further information before National Highways could remove the existing holding objection:

1. Consideration should be given to quantifying the potential impact of the development on the two SRN junctions within the vicinity of the proposed development.

2. It is recommended that consideration should be given to widening the study area to include any junctions of the SRN that are expected to experience a material increase in trip numbers as a result of the development, most notably M25 Junction 21a.

3. A capacity assessment should be carried out for the North Orbital Road / Watling Street / A414 junction.

Glanville then submitted a note in response to the above comments dated August 2022. The document presents the percentage impact on the M25 Junction 21 A and a capacity assessment for Park Street roundabout.

M25 Junction 21A
Glanville demonstrate that the development presents a 1.6% increase of traffic in the AM peak and 1% in the PM Peak. This equates to 83 and 69 two-way trips respectively. Without traffic data and queue data it is not possible to understand the impact on the junction. National Highways have concerns on the on and off slip queue lengths during the peak hours.

While no full junction capacity assessment was undertaken, Glanville provided site photos and videos from a drive through of the M25 slips on 26th September. This additional data has provided confidence to National Highways that the proposed development would not have a detrimental impact on the slip roads and therefore has no further comments regarding this matter.

Park Street Roundabout

Glanville have provided an ARCADY assessment using Junctions 9 for the Park Street Roundabout using 2016 flows factored to the assessment years. National Highways are particularly interested in the A414 arm as well as the overall performance of the roundabout. The roundabout typically experiences queues on all arms, most notable on the A414, North Orbital Road South, A414 East and Witling Street. The results presented in Table 8 show the junction is operating over the recommended threshold of 0.85 in 2016 with queues of 7 on A414 East. Queues on A414 West according to the assessment only reach 1 PCU. From site observations and local knowledge of the existing queueing at this junction, this is not representative of current conditions.

National Highways would request updated traffic data with queue surveys as a minimum to clearly assess and understand the development impact on this junction. Recent queue data would allow the model to be calibrated accordingly to fully understand the current operation of the junction but more importantly the operation of the junction with the proposed development traffic.

Glanville have presented a Mitigation assessment based on mitigation works associated with the consented Rail terminal Development. A LinSig has been developed based on the David Tucker Associates drawing 6035-23 RevD which is dated 2006. No LinSig files have been sourced or updated drawing provided which has resulted in a Linsig being built with no phasing, staging or cycle time information. No pedestrian phases are included within the model.

Using a 60 second cycle time, with no pedestrian phases the model operated with a Negative PRC in the assessment year of 2027 without development traffic included. The report claims MOVA would be installed at the junction and would provide an improvement to the overall junction performance.

National Highways have sought information from the Local Roads Authority who has confirmed they do not have any modeling or recent drawings of the proposed mitigation. But are content, the proposed development will have no detrimental impact on the roundabout. As the LRA have responsibility over four of the five arms National Highways will accept their findings.

Considering the above, National Highways offer no further objection to this application.

Appendix AHJ/11

HCC Highways Response Email to Keep Chiswell Green Highways Report, dated 07/11/2022

From: Oliver Sowerby [mailto:Oliver.Sowerby@hertfordshire.gov.uk]
Sent: 07 November 2022 09:55
To: George Burgess <George.Burgess@stalbans.gov.uk>
Subject: RE: Land South of Chiswell Green Lane - 5/2022/0927

Hi George,

I did discuss this with James at the end of last week.

I can confirm that the fundamental principle of accepting a sustainable transport scheme over and above a highway capacity solution (which the report majors on), is one that we remain content with.

I note that a new consultation has been issued for this site. However, I don't think this has any highways/transportation impacts?

Thanks,

Oliver

Oliver Sowerby
Senior Development Officer| Development Management| Environment & Infrastructure
Hertfordshire County Council
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E: oliver.sowerby@hertfordshire.gov.uk

Appendix AHJ/12

Local Community Groups

Local Community and Sports Clubs

1. **Greenwood Park Community Centre**
2. Chiswell Green Third Age Trust U3A: https://u3asites.org.uk/chiswell-green/welcome
3. Greenwood Park Lawn Tennis Club: http://www.greenwoodtennis.com/
4. Salsa Mish: http://www.salsamish.co.uk/
5. Spirit TKD (ITF Taekwon-Do): http://www.spirittkd.co.uk/

6. **Park Street Baptist Church**
7. Grow Chiswell Green: https://www.growchiswellgreen.org/
8. Soroptimist St Albans and District: https://sigbi.org/st-albans-and-district/
9. Green Wood United Reformed Church: https://www.greenwoodurc.org.uk/
10. Chiswell Green Livery Yard and Riding School https://www.chiswellgreenridingschool.com/
11. Booster Cushion Theatre: http://www.boostercushiontheatreforchildren.com/
12. CrossFit Verulamium: http://crossfitverulamium.com/
13. Verulam Explorer Scout Unit: http://www.stalbansscouts.org.uk/
14. 1st St Albans Scout Group: http://firststalbansscouts.org.uk/
15. St. Stephen's Church: http://ststephenandstjulian.org/
16. VAKs | St Albans Tutors: https://vaks.co.uk/locations/st-albans/?utm_source=local&utm_medium=organic&utm_campaign=gmb_StAlbans
17. St Albans & Potters Bar Karate (Tiska): http://www.tiskakarate-stalbans.co.uk/
18. St Bartholomew Church: https://parish.rcdow.org.uk/stalbanssouth/
19. Harpenden Badminton Club: http://www.harpendenbadmintonclub.com/
20. Abbey Theatre: http://www.abbeytheatre.org.uk/

Appendix AHJ/13

National Travel Surveys Extract

Department for Transport statistics
National Travel Survey

Table NTS0303

Average trip time[5] by main mode: England, from 2002

	Average trip duration (minutes)																			
Main mode	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Private:																				
Walk[1]	16	15	16	16	16	16	16	17	16	17	16	17	17	18	16	17	16	17	19	19
of which: walks of over a mile	*30*	*29*	*29*	*29*	*30*	*29*	*30*	*31*	*31*	*31*	*30*	*32*	*30*	*31*	*31*	*32*	*32*	*31*	*33*	*33*
Pedal cycle[2]	18	20	19	20	19	21	20	23	22	22	23	24	23	22	24	23	23	23	30	26
Car / van driver	20	21	21	21	21	22	21	21	21	21	21	21	21	22	22	22	21	22	20	19
Car / van passenger	21	22	22	22	22	22	22	22	22	22	21	22	22	23	22	22	22	23	21	21
Motorcycle	22	25	27	24	28	26	24	27	25	26	28	24	27	27	28	31	31	24	22	33
Other private transport[3]	44	52	46	47	43	43	40	45	43	50	40	50	47	44	40	47	42	40	24	33
Public:																				
Bus in London	38	39	37	37	37	38	37	37	37	38	38	38	38	37	36	39	35	37	35	33
Other local bus	32	32	32	32	33	33	33	34	34	34	35	35	35	35	36	35	37	36	39	39
Non-local bus	175	184	196	191	204	156	177	200	221	222	207	206	157	172	186	158	201	191	297	206
London Underground	50	51	50	52	51	50	49	50	55	49	52	51	51	49	51	54	50	50	54	48
Surface Rail	84	80	77	82	81	81	80	81	81	83	82	80	75	81	76	79	81	82	68	78
Taxi / minicab	17	18	18	19	19	19	18	19	18	19	18	19	19	20	20	21	20	20	16	20
Other public transport[4]	46	47	44	45	47	62	55	55	54	48	43	48	44	49	49	49	46	52	42	39
All modes	22	22	22	22	22	23	23	23	23	23	23	23	23	24	23	23	23	23	22	22
Unweighted sample size:																				
individuals	14,369	16,685	16,487	16,956	16,648	16,858	16,360	17,299	16,553	15,730	16,670	16,192	16,491	15,525	15,840	14,541	14,150	14,356	6,239	9,971
trips ('000s)	279	318	314	324	317	303	295	312	292	273	291	274	280	259	276	256	256	250	86	130

1 There is an apparent under-recording of short walks in 2002 and 2003 and short trips in 2007 and 2008 compared to other years.
2 E-bikes are included within the main mode of pedal cycle.
3 Other private transport includes electric scooters, motorised wheelchairs, ambulances, hospital cars, caravans, dormobiles, quad bikes, minibuses and private hire bus (including school bus).
4 Other public transport includes air, ferries and light rail.
5 Trip times are based on total journey time, therefore includes travelling and waiting time.

The figures in this table are National Statistics.
The results presented in this table are weighted. The base (unweighted sample size) is shown in the table for information.
Weights are applied to adjust for non-response to ensure the characteristics of the achieved sample match the population of Great Britain (1995-2012) or England (2013 onwards) and for the drop off in trip recording in diary data.
The survey results are subject to sampling error.
2020 and 2021 Disclaimer: Due to changes in the methodology of data collection, changes in travel behaviour and a reduction of data collected during 2020 and 2021, as a result of the coronavirus (COVID-19) pandemic, care should be taken when interpreting this data and comparing to other years, due to the small sample sizes. Please see the background documentation for further details of these changes.

Source: National Travel Survey
Last updated: 31 August 2022
Next update: Summer 2023

Email: national.travelsurvey@dft.gov.uk
Notes & definitions

Appendix AHJ/14

Local Bus Timetables

321 Luton to Watford

via Kinsbourne Green, Harpenden and St Albans - Valid from Tuesday, January 3, 2023 to Saturday, April 29, 2023

Monday to Friday - Berry Lane Estate Oakfield

	321 [1]	321 [2]	321 [1]	321 [2]	321 [1]	321 [2]	321 [1]	321 [2]	321 [1]	321 [2]	321 [1]	321 [2]	321 [1]	321 [2]	321 [1]	321 [1]	321 [2]	321 [1]	321 [1]	321 [2]	321 [2]	321 [1]	321 [2]	321 [1]	321 [2]	321 [1]
Luton Station Interchange	--	--	--	--	0508	0508	0528	0528	0548	0548	0605	0609	0612	0622	0627	0641	0645	0648	0701	0705	0725	0726	0742	0751	0756	0810
Luton Town Centre Church Street	--	--	--	--	0512	0512	0532	0532	0552	0552	0609	0613	0616	0626	0631	0645	0649	0652	0708	0709	0729	0734	0747	0758	0801	0817
Stockwood Park Entrance	--	--	--	--	0517	0517	0537	0537	0557	0557	0614	0618	0621	0631	0636	0651	0654	0658	0715	0714	0734	0743	0752	0805	0808	0824
Kinsbourne Green The Common	--	--	--	--	0521	0521	0541	0541	0601	0601	0618	0622	0626	0635	0641	0656	0658	0704	0722	0718	0738	0751	0756	0810	0812	0829
Harpenden The George PH	--	--	--	--	0526	0526	0546	0546	0606	0606	0623	0627	0632	0641	0647	0704	0704	0714	0734	0724	0744	0803	0804	0824	0822	0843
New Greens St Albans Girls School	--	--	--	--	0535	0535	0555	0555	0615	0615	0632	0636	0643	0651	0659	0718	0715	0730	0754	0735	0755	0821	0815	0837	0831	0856
St Albans St Peter's Street	--	--	--	--	0545	0545	0603	0603	0623	0623	0640	0643	0653	0700	0710	0730	0726	0744	0810	0745	0805	0838	0826	0854	0842	0912
St Albans Abbey Railway Station	--	--	--	--	0549	0549	0607	0607	0627	0627	0644	0647	0657	0704	0714	0734	0730	0748	0815	0749	0809	0843	0830	0859	0847	0917
Chiswell Green Three Hammers PH	--	--	--	--	0556	0556	0614	0614	0634	0634	0651	0653	0706	0711	0725	0746	0738	0800	0826	0757	0817	0853	0838	0909	0856	0927
Garston Bus Garage	0511	0511	0541	0541	0604	0604	0622	0622	0642	0642	0701	0702	0720	0725	0742	0805	0752	0821	0844	0811	0829	0907	0850	0920	0907	0936
North Watford Library	0514	0514	0544	0544	0607	0607	0625	0625	0645	0645	0705	0706	0726	0729	0750	0813	0757	0830	0852	0817	0834	0914	0855	0925	0914	0940
Watford Junction Railway Station	0522	0522	0552	0552	0615	0615	0633	0633	0653	0653	0714	0715	0739	0741	0804	0827	0809	0847	0907	0829	0847	0927	0907	0936	0927	0950
Watford Market Street	0531	0531	0601	0601	0623	0623	0641	0641	0703	0703	0725	0725	0750	0752	0815	0838	0819	0858	0918	0840	0858	0938	0918	0942	0938	0958
Watford General Hospital	0536	0536	0606	0606	0628	0628	0646	0646	0708	0708	0730	0730	0755	0757	0820	0843	0824	0903	0923	0845	0903	0943	0923	--	0943	1003
Croxley Green Owens Way	0545	0545	0615	0615	0637	0637	0656	0656	0719	0719	0742	0742	0807	0809	0832	0855	0834	0915	0935	0855	0915	0955	0935	--	0955	1015
Rickmansworth Railway Station	0555	0555	0625	0625	0648	0648	0708	0708	0732	0732	0756	0756	0821	0821	0846	0906	0846	0926	0946	0906	0926	1006	0946	--	1006	1031
Maple Cross Downings Wood Terminus	--	--	--	--	--	--	--	--	0745	0745	--	--	0835	0835	--	--	--	--	0958	--	--	--	0958	--	--	--
Berry Lane Estate Oakfield	0605	0605	0635	0635	0700	0657	0718	0718	--	--	0808	0808	--	--	0858	0918	0858	0938	--	0918	0938	1018	--	--	1018	1043

	321 [2]	321	321		321	321	321		321	321	321	321	321	321	321 [1]	321 [2]	321 [1]	321 [2]	321 [1]	321 [2]	321 [1]	321 [2]	321 [1]	321 [2]	321 [1]	321 [2]
Luton Station Interchange	0815	0835	0900		20	40	00		1240	1300	1320	1340	1400	1420	1435	1443	1455	1503	1515	1523	1535	1543	1555	1603	1615	1623
Luton Town Centre Church Street	0821	0841	0905		25	45	05		1245	1305	1325	1345	1405	1425	1440	1448	1500	1508	1521	1528	1542	1548	1602	1608	1622	1628
Stockwood Park Entrance	0828	0848	0912		32	52	12		1252	1312	1332	1352	1412	1432	1447	1455	1507	1515	1528	1535	1549	1555	1609	1615	1629	1635
Kinsbourne Green The Common	0832	0852	0916		36	56	16		1256	1316	1336	1356	1416	1436	1451	1459	1511	1519	1533	1539	1554	1559	1614	1619	1634	1639
Harpenden The George PH	0844	0904	0926		46	06	26		1306	1326	1346	1406	1426	1446	1501	1509	1521	1529	1543	1549	1603	1609	1623	1629	1643	1649
New Greens St Albans Girls School	0854	0914	0935		55	15	35		1315	1335	1355	1415	1435	1455	1512	1518	1533	1538	1556	1558	1616	1618	1636	1638	1656	1658
St Albans St Peter's Street	0909	0929	0949		09	29	49		1329	1349	1409	1429	1449	1509	1529	1532	1549	1551	1609	1611	1629	1631	1649	1651	1709	1711
St Albans Abbey Railway Station	0914	0934	0954		14	34	54		1334	1354	1414	1434	1454	1514	1534	1537	1554	1556	1614	1616	1634	1636	1654	1656	1714	1716
Chiswell Green Three Hammers PH	0924	0944	1004	Then at these mins	24	44	04	past each hour until	1344	1404	1424	1444	1504	1524	1547	1547	1604	1606	1624	1626	1645	1646	1705	1706	1725	1726
Garston Bus Garage	0933	0953	1013		33	53	13		1353	1413	1433	1453	1513	1533	1557	1557	1616	1616	1636	1636	1657	1656	1717	1716	1737	1736
North Watford Library	0937	0957	1017		37	57	17		1357	1417	1437	1457	1518	1538	1602	1602	1621	1621	1641	1641	1702	1701	1722	1721	1742	1741
Watford Junction Railway Station	0947	1007	1027		47	07	27		1407	1427	1447	1507	1528	1548	1612	1612	1631	1631	1651	1651	1713	1711	1733	1731	1753	1751
Watford Market Street	0958	1018	1038		58	18	38		1418	1438	1458	1518	1539	1559	1623	1623	1643	1643	1700	1700	1723	1723	1743	1743	1803	1803
Watford General Hospital	1003	1023	1043		03	23	43		1423	1443	1503	1523	1544	1604	1628	1628	1648	1648	1708	1708	1728	1728	1748	1748	1808	1808
Croxley Green Owens Way	1015	1035	1055		15	35	55		1435	1455	1515	1535	1556	1616	1640	1640	1700	1700	1720	1720	1740	1740	1759	1759	1819	1819
Rickmansworth Railway Station	1031	1046	1106		31	46	06		1446	1506	1526	1546	1607	1627	1652	1652	1712	1712	1732	1732	1752	1752	1810	1810	1830	1830
Maple Cross Downings Wood Terminus	--	1058	--		--	58	--		1458	--	--	1558	--	--	1704	1704	--	--	1747	1747	--	--	1825	1825	--	--
Berry Lane Estate Oakfield	1043	--	1118		43	--	18		--	1518	1538	--	1619	1639	--	--	1727	1727	--	--	1807	1807	--	--	1841	1841

	321 [1]	321 [2]	321 [1]	321 [2]	321 [1]	321 [1]	321 [2]	321 [2]	321 [1]	321 [2]	321	321	321	321	321	321	321
Luton Station Interchange	1635	1643	1655	1700	1715	1740	1725	1745	1805	1805	1835	1905	1935	2005	2035	2135	2235
Luton Town Centre Church Street	1642	1648	1702	1707	1722	1747	1732	1752	1812	1812	1840	1910	1940	2010	2040	2140	2240
Stockwood Park Entrance	1649	1655	1709	1715	1729	1753	1739	1758	1818	1818	1845	1915	1945	2015	2045	2145	2245
Kinsbourne Green The Common	1654	1659	1714	1719	1734	1758	1744	1803	1823	1823	1850	1919	1949	2019	2049	2149	2249
Harpenden The George PH	1703	1709	1723	1729	1743	1806	1753	1811	1830	1830	1856	1926	1956	2026	2056	2156	2256
New Greens St Albans Girls School	1716	1718	1736	1738	1756	1817	1805	1822	1841	1841	1906	1936	2006	2036	2106	2206	2306
St Albans St Peter's Street	1729	1731	1749	1750	1805	1825	1815	1830	1849	1849	1914	1944	2014	2044	2114	2214	2314
St Albans Abbey Railway Station	1734	1736	1754	1756	1809	1829	1819	1834	1852	1852	1916	1946	2016	2046	2116	2216	2316
Chiswell Green Three Hammers PH	1745	1746	1805	1806	1818	1837	1828	1843	1859	1859	1923	1953	2023	2053	2123	2223	2323
Garston Bus Garage	1757	1756	1816	1816	1829	1846	1838	1852	1906	1906	1930	2000	2030	2100	2130	2230	2330
North Watford Library	1802	1801	1821	1821	1834	1850	1843	1856	1910	1910	1934	2004	2034	2104	2134	2234	2334
Watford Junction Railway Station	1813	1811	1832	1831	1845	1900	1854	1906	1920	1920	1943	2013	2043	2113	2143	2243	2343
Watford Market Street	1823	1823	1840	1840	1900	1905	1905	1911	1930	1930	1950	2018	2050	2118	2150	2250	2348
Watford General Hospital	1828	1828	1845	1845	1905	--	1910	--	1935	1935	1955	--	2055	--	2155	2255	--
Croxley Green Owens Way	1839	1839	1855	1855	1915	--	1920	--	1944	1944	2004	--	2104	--	2204	2304	--
Rickmansworth Railway Station	1850	1850	1904	1905	1924	--	1929	--	1953	1953	2013	--	2113	--	2213	2313	--
Maple Cross Downings Wood Terminus	--	--	1914	1914	--	--	--	--	2003	2003	--	--	--	--	--	--	--
Berry Lane Estate Oakfield	1901	1901	--	--	1933	--	1938	--	--	--	2021	--	2121	--	2221	2321	--

[1] Term Time Only [2] Only During School Holidays

Monday to Friday - Luton Station Interchange

	321[1]	321[2]	321[1]	321[2]	321[1]	321[2]	321[1]	321[2]	321[1]	321[2]	321[1]	321[1]	321[2]	321[1]	321[2]	321[2]	321[1]	321[2]	321[1]	321[2]	321[1]	321[2]	321[1]	321[2]	321	321
Berry Lane Estate Oakfield	--	--	--	--	--	--	--	--	0606	0613	0615	--	--	0642	0645	0702	--	--	0733	0743	--	--	0813	0820	--	0908
Maple Cross Downings Wood Terminus	--	--	--	--	--	--	0554	0558	--	--	--	0624	0634	--	--	--	0710	0717	--	--	0755	0800	--	--	0845	--
Rickmansworth Railway Station	--	--	--	--	--	--	0604	0608	0616	0623	0625	0635	0646	0655	0706	0714	0724	0729	0748	0755	0810	0815	0828	0833	0857	0920
Croxley Green Owens Way	--	--	--	--	--	--	0616	0620	0628	0635	0637	0647	0658	0707	0718	0726	0736	0740	0800	0804	0824	0827	0847	0847	0908	0931
Watford General Hospital	--	--	--	--	--	--	0625	0629	0639	0644	0648	0700	0708	0721	0728	0738	0751	0753	0815	0817	0837	0840	0900	0900	0920	0943
Watford Market Street	0534	0534	0604	0604	0620	0620	0636	0640	0650	0654	0659	0711	0719	0733	0738	0750	0803	0806	0830	0830	0855	0855	0915	0915	0935	0955
Watford Junction Railway Station	0539	0539	0609	0609	0625	0625	0641	0645	0655	0659	0706	0718	0724	0740	0743	0757	0810	0813	0837	0837	0902	0902	0922	0922	0942	1002
North Watford Library	0546	0546	0616	0616	0633	0633	0649	0653	0705	0707	0717	0731	0732	0753	0755	0809	0820	0823	0847	0847	0912	0912	0932	0932	0952	1012
Garston Bus Garage	0551	0551	0621	0621	0638	0638	0654	0658	0711	0711	0723	0739	0736	0801	0759	0815	0826	0828	0853	0853	0916	0916	0936	0936	0956	1016
Chiswell Green Three Hammers PH	0558	0558	0628	0628	0647	0647	0703	0707	0720	0720	0735	0753	0745	0815	0808	0824	0837	0838	0902	0902	0925	0925	0945	0945	1005	1025
St Albans Abbey Railway Station	0605	0605	0635	0635	0655	0655	0711	0715	0730	0730	0749	0809	0755	0831	0818	0836	0850	0850	0913	0913	0935	0935	0955	0955	1015	1035
St Albans St Peter's Street	0613	0613	0643	0643	0705	0705	0721	0723	0741	0741	0804	0824	0806	0845	0829	0848	0905	0905	0925	0925	0945	0945	1005	1005	1025	1045
New Greens St Albans Girls School	0618	0618	0648	0648	0712	0712	0728	0729	0748	0748	0813	0835	0813	0854	0836	0854	0912	0912	0930	0930	0950	0950	1010	1010	1030	1050
Harpenden The George PH	0628	0628	0658	0658	0722	0722	0738	0738	0759	0759	0824	0846	0824	0904	0846	0904	0921	0921	0939	0939	0959	0959	1019	1019	1039	1059
Kinsbourne Green The Common	0635	0635	0705	0705	0729	0729	0745	0745	0807	0807	0832	0855	0832	0914	0855	0914	0931	0931	0949	0949	1009	1009	1029	1029	1049	1109
Stockwood Park Entrance	0639	0639	0709	0709	0733	0733	0749	0749	0812	0812	0837	0859	0837	0918	0859	0918	0935	0935	0953	0953	1013	1013	1033	1033	1053	1113
Luton Town Centre Church Street	0644	0644	0714	0714	0738	0738	0754	0754	0819	0819	0844	0906	0844	0925	0906	0925	0942	0942	1000	1000	1020	1020	1040	1040	1100	1120
Luton Station Interchange	0648	0648	0718	0718	0742	0742	0758	0758	0823	0823	0848	0910	0848	0929	0910	0929	0946	0946	1004	1004	1024	1024	1044	1044	1104	1124

	321	321		321	321	321		321	321	321	321	321	321	321[1]	321[2]	321[1]	321[2]	321[1]	321[2]	321[1]	321[2]	321[1]	321[2]	321[1]	321[2]	321[1]
Berry Lane Estate Oakfield	0928	0948		--	23	48		1123	1148	--	1223	1248	--	1323	1323	1348	1348	--	--	1423	1423	1448	1448	--	--	1523
Maple Cross Downings Wood Terminus	--	--		05	--	--		--	--	1205	--	--	1305	--	--	--	--	1405	1405	--	--	--	--	1505	1505	--
Rickmansworth Railway Station	0940	1000		20	40	00		1140	1200	1220	1240	1300	1320	1340	1340	1400	1400	1420	1420	1440	1440	1500	1500	1518	1518	1538
Croxley Green Owens Way	0951	1011		31	51	11		1151	1211	1231	1251	1311	1331	1351	1351	1411	1411	1431	1431	1451	1451	1511	1511	1531	1530	1551
Watford General Hospital	1003	1023		43	03	23		1203	1223	1243	1303	1323	1343	1403	1403	1423	1423	1443	1443	1503	1503	1525	1523	1545	1542	1603
Watford Market Street	1015	1035		55	15	35		1215	1235	1255	1315	1335	1355	1415	1415	1435	1435	1455	1455	1515	1515	1537	1535	1557	1555	1617
Watford Junction Railway Station	1022	1042		02	22	42		1222	1242	1302	1322	1342	1402	1422	1422	1442	1442	1502	1502	1522	1522	1544	1542	1604	1602	1624
North Watford Library	1032	1052		12	32	52		1232	1252	1312	1332	1352	1412	1432	1432	1452	1452	1512	1512	1532	1532	1556	1553	1616	1613	1636
Garston Bus Garage	1036	1056	Then at these mins	16	36	56	past each hour until	1236	1256	1316	1336	1356	1416	1436	1436	1457	1456	1519	1516	1539	1536	1603	1558	1623	1619	1643
Chiswell Green Three Hammers PH	1045	1105		25	45	05		1245	1305	1323	1345	1405	1425	1445	1445	1506	1505	1529	1525	1549	1545	1613	1607	1634	1628	1653
St Albans Abbey Railway Station	1055	1115		35	55	15		1255	1315	1335	1355	1415	1435	1455	1455	1517	1515	1540	1535	1600	1556	1624	1617	1645	1638	1704
St Albans St Peter's Street	1105	1125		45	05	25		1305	1325	1345	1405	1425	1445	1507	1505	1528	1525	1550	1545	1610	1605	1635	1630	1655	1650	1715
New Greens St Albans Girls School	1110	1130		50	10	30		1310	1330	1350	1410	1430	1450	1512	1510	1533	1530	1555	1550	1615	1610	1640	1635	1700	1655	1720
Harpenden The George PH	1119	1139		59	19	39		1319	1339	1359	1419	1439	1459	1524	1519	1548	1539	1610	1559	1630	1620	1655	1645	1713	1705	1731
Kinsbourne Green The Common	1129	1149		09	29	49		1329	1349	1409	1429	1449	1509	1534	1529	1600	1549	1622	1609	1642	1631	1707	1657	1723	1715	1741
Stockwood Park Entrance	1133	1153		13	33	53		1333	1353	1413	1433	1453	1513	1538	1533	1605	1553	1627	1613	1647	1636	1712	1702	1728	1720	1746
Luton Town Centre Church Street	1140	1200		20	40	00		1340	1400	1420	1440	1500	1520	1545	1540	1612	1600	1634	1620	1654	1643	1719	1709	1735	1727	1753
Luton Station Interchange	1144	1204		24	44	04		1344	1404	1424	1444	1504	1524	1550	1544	1617	1604	1639	1624	1659	1648	1724	1714	1740	1732	1758

	321[2]	321[1]	321[2]	321[1]	321[2]	321[1]	321[2]	321	321	321	321	321	321[1]	321[2]	321[1]	321[2]	321[1]	321[2]	321[1]	321[2]	321	321	321	321
Berry Lane Estate Oakfield	1523	1548	1548	--	--	1628	1628	1648	--	1740	--	1820	--	--	1850	1850	--	--	1955	1955	2026	2126	2226	2326
Maple Cross Downings Wood Terminus	--	--	--	1605	1605	--	--	--	1715	--	1800	--	1835	1835	--	--	1925	1925	--	--	--	--	--	--
Rickmansworth Railway Station	1540	1558	1558	1623	1623	1643	1643	1703	1728	1755	1815	1835	1850	1850	1905	1905	1935	1935	2005	2005	2035	2135	2235	2335
Croxley Green Owens Way	1551	1611	1611	1634	1634	1654	1654	1714	1739	1804	1824	1844	1859	1859	1914	1914	1943	1943	2013	2013	2043	2143	2243	2343
Watford General Hospital	1602	1623	1623	1646	1646	1706	1706	1726	1751	1816	1834	1853	1908	1908	1923	1923	1951	1951	2021	2021	2051	2151	2251	2351
Watford Market Street	1615	1637	1637	1700	1700	1720	1720	1740	1805	1830	1845	1905	1914	1914	1935	1935	2000	2000	2030	2030	2100	2200	2300	2356
Watford Junction Railway Station	1622	1644	1644	1707	1707	1727	1727	1747	1811	1835	1850	1910	--	--	1940	1940	2005	2005	2035	2035	2105	2205	2305	--
North Watford Library	1633	1656	1656	1722	1719	1741	1741	1801	1823	1846	1859	1919	--	--	1949	1949	2013	2013	2043	2043	2113	2213	2313	--
Garston Bus Garage	1639	1703	1703	1730	1726	1749	1749	1808	1830	1852	1905	1925	--	--	1955	1955	2018	2018	2048	2048	2118	2218	2318	--
Chiswell Green Three Hammers PH	1649	1713	1713	1740	1736	1758	1758	1817	1838	1900	1913	1931	--	--	2001	2001	2023	2023	2053	2053	2123	2223	2323	--
St Albans Abbey Railway Station	1659	1724	1724	1751	1747	1809	1809	1826	1847	1908	1921	1939	--	--	2009	2009	2030	2030	2100	2100	2130	2230	2330	--
St Albans St Peter's Street	1710	1735	1735	1802	1800	1819	1819	1840	1855	1915	1926	1945	--	--	2015	2015	2035	2035	2105	2105	2135	2235	2335	--
New Greens St Albans Girls School	1715	1740	1740	1807	1805	1824	1824	1845	1859	1919	--	1949	--	--	2019	2019	2039	2039	2109	2109	2139	2239	2339	--
Harpenden The George PH	1725	1751	1751	1816	1814	1833	1833	1853	1908	1928	--	1958	--	--	2028	2028	2047	2047	2117	2117	2147	2247	2347	--
Kinsbourne Green The Common	1735	1801	1801	1826	1824	1840	1840	1900	1915	1935	--	2005	--	--	2035	2035	2053	2053	2123	2123	2153	2253	2353	--
Stockwood Park Entrance	1740	1806	1806	1831	1829	1845	1845	1905	1920	1940	--	2010	--	--	2040	2040	2058	2058	2128	2128	2157	2257	2357	--
Luton Town Centre Church Street	1747	1813	1813	1838	1836	1851	1851	1911	1925	1945	--	2015	--	--	2045	2045	2103	2103	2133	2133	2203	2303	0003	--
Luton Station Interchange	1752	1818	1818	1842	1840	1855	1855	1915	1929	1949	--	2019	--	--	2049	2049	2107	2107	2137	2137	2207	2307	0007	--

[1] Term Time Only [2] Only During School Holidays

Saturday - Berry Lane Estate Oakfield

	321	321	321	321	321	321	321	321	321	321	321	321		321	321	321		321	321	321	321	321	321	321	321	321
Luton Station Interchange	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--		--	--	--	--	--	--	--	--	--
Challney Thornhill Road	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--		--	--	--	--	--	--	--	--	--
Luton Station Interchange	--	--	0625	--	0705	--	0735	--	0805	--	0845	0900		20	40	00		1440	1500	1520	1540	1600	1620	1640	1700	1720
Luton Town Centre Church Street	--	--	0629	--	0709	--	0739	--	0809	--	0850	0905		25	45	05		1445	1505	1525	1545	1605	1625	1645	1705	1725
Stockwood Park Entrance	--	--	0634	--	0714	--	0744	--	0815	--	0857	0912		32	52	12		1452	1512	1532	1552	1612	1632	1652	1712	1732
Kinsbourne Green The Common	--	--	0638	--	0718	--	0748	--	0819	0840	0901	0916		36	56	16		1456	1516	1536	1556	1616	1636	1656	1716	1736
Harpenden The George PH	--	--	0643	--	0723	--	0753	--	0825	0848	0910	0926		46	06	26		1506	1526	1546	1606	1626	1646	1706	1724	1744
New Greens St Albans Girls School	--	--	0651	--	0731	--	0801	--	0833	0856	0918	0935		55	15	35		1515	1535	1555	1615	1635	1655	1715	1733	1753
St Albans St Peter's Street	--	--	0657	--	0737	0752	0812	0832	0845	0908	0928	0949		09	29	49		1529	1549	1609	1629	1649	1709	1729	1745	1805
St Albans Abbey Railway Station	--	--	0700	--	0740	0755	0815	0835	0849	0913	0933	0954	Then at	14	34	54	past each	1534	1554	1614	1634	1654	1714	1734	1750	1810
Chiswell Green Three Hammers PH	--	--	0708	--	0748	0803	0823	0843	0857	0923	0943	1004	these	24	44	04	hour	1544	1604	1624	1644	1704	1724	1744	1759	1829
Garston Bus Garage	0625	0655	0715	0735	0755	0810	0830	0850	0905	0932	0952	1013	mins	33	53	13	until	1553	1613	1633	1653	1713	1733	1753	1808	1833
North Watford Library	0628	0658	0718	0738	0758	0813	0833	0853	0909	0936	0956	1017		37	57	17		1557	1617	1637	1657	1717	1737	1757	1813	1837
Watford Junction Railway Station	0635	0705	0725	0745	0805	0820	0840	0900	0917	0945	1005	1027		47	07	27		1607	1627	1647	1707	1727	1747	1807	1823	1847
Watford Market Street	0645	0715	0735	0755	0815	0835	0855	0913	0930	0958	1018	1038		58	18	38		1618	1638	1658	1718	1738	1800	1813	1830	1852
Watford General Hospital	0650	0720	0740	0800	0820	0840	0900	0918	0935	1003	1023	1043		03	23	43		1623	1643	1703	1723	1743	1805	--	1835	--
Croxley Green Owens Way	0700	0730	0750	0810	0831	0851	0911	0930	0947	1015	1035	1055		15	35	55		1635	1655	1715	1735	1755	1817	--	1844	--
Rickmansworth Railway Station	0710	0740	0800	0820	0841	0901	0921	0941	1006	1031	1046	1106		31	46	06		1646	1706	1731	1751	1806	1833	--	1853	--
Maple Cross Downings Wood Terminus	0720	--	--	--	0852	--	--	0953	--	--	1058	--		--	58	--		1658	--	--	1758	--	--	--	--	--
Berry Lane Estate Oakfield	--	0750	0810	0830	--	0912	0933	--	1018	1043	--	1118		43	--	18		--	1718	1743	--	1818	1845	--	1903	--

	321	321	321	321	321	321	321	321	321	321
Luton Station Interchange	--	--	--	--	--	--	--	--	--	2315
Challney Thornhill Road	--	--	--	--	--	--	--	--	--	2325
Luton Station Interchange	1740	1805	1835	1905	1935	2005	2035	2135	2235	--
Luton Town Centre Church Street	1745	1810	1840	1910	1940	2010	2040	2140	2240	--
Stockwood Park Entrance	1752	1816	1845	1915	1945	2015	2045	2145	2245	--
Kinsbourne Green The Common	1756	1820	1849	1919	1949	2019	2049	2149	2249	--
Harpenden The George PH	1804	1828	1856	1926	1956	2026	2056	2156	2256	--
New Greens St Albans Girls School	1813	1837	1905	1935	2005	2035	2105	2205	2305	--
St Albans St Peter's Street	1825	1848	1914	1944	2014	2044	2114	2214	2314	--
St Albans Abbey Railway Station	1830	1852	1916	1946	2016	2046	2116	2216	2316	--
Chiswell Green Three Hammers PH	1839	1859	1923	1953	2023	2053	2123	2223	2323	--
Garston Bus Garage	1843	1906	1930	2000	2030	2100	2130	2230	2330	--
North Watford Library	1847	1910	1934	2004	2034	2104	2134	2234	2334	--
Watford Junction Railway Station	1857	1920	1943	2013	2043	2113	2143	2243	2343	--
Watford Market Street	1905	1925	1950	2018	2050	2118	2150	2250	2348	--
Watford General Hospital	1910	--	1955	--	2055	--	2155	2255	--	--
Croxley Green Owens Way	1919	--	2004	--	2104	--	2204	2304	--	--
Rickmansworth Railway Station	1928	--	2013	--	2113	--	2213	2313	--	--
Maple Cross Downings Wood Terminus	--	--	--	--	--	--	--	--	--	--
Berry Lane Estate Oakfield	1938	--	2021	--	2121	--	2221	2321	--	--

Saturday - Luton Station Interchange

	321	321	321	321	321	321	321	321		321	321	321		321	321	321	321	321	321	321	321	321	321	321	321
Maple Cross Downings Wood Terminus	--	--	--	0725	--	0805	--	--		--	05	--		1505	--	--	1605	--	--	1705	--	--	1805	--	--
Berry Lane Estate Oakfield	--	--	0700	--	0755	--	--	0823		48	--	23		--	1523	1548	--	1623	1648	--	1723	1748	--	1825	1855
Rickmansworth Railway Station	--	--	0710	0740	0805	0820	--	0840		00	20	40		1520	1540	1600	1620	1640	1700	1720	1740	1800	1820	1840	1915
Croxley Green Owens Way	--	--	0720	0750	0815	0830	--	0851		11	31	51		1531	1551	1611	1631	1651	1711	1731	1751	1811	1830	1850	1923
Watford General Hospital	--	--	0730	0800	0825	0840	--	0903		23	43	03		1543	1603	1623	1643	1703	1723	1743	1803	1823	1840	1900	1931
Watford Market Street	--	0714	0740	0810	0830	0850	0900	0915		35	55	15		1555	1615	1635	1655	1715	1735	1755	1815	1835	1845	1905	1940
Watford Junction Railway Station	--	0719	0745	0815	0835	0855	0907	0922		42	02	22		1602	1622	1642	1702	1722	1742	1802	1822	1842	--	1910	1945
North Watford Library	--	0725	0752	0822	0842	0902	0917	0932	Then at these mins	52	12	32	past each hour until	1612	1632	1652	1712	1732	1752	1812	1832	1852	--	1918	1953
Garston Bus Garage	--	0728	0756	0826	0846	0906	0921	0936		56	16	36		1616	1636	1656	1716	1736	1756	1816	1836	1856	--	1922	1958
Chiswell Green Three Hammers PH	--	0735	0805	0835	0855	0915	0930	0945		05	25	45		1625	1645	1705	1725	1745	1805	1825	1844	1902	--	1930	2003
St Albans Abbey Railway Station	--	0743	0813	0845	0905	0925	0940	0955		15	35	55		1635	1655	1715	1735	1755	1815	1835	1855	1910	--	1938	2010
St Albans St Peter's Street	0720	0750	0820	0855	0915	0935	0950	1005		25	45	05		1645	1705	1725	1745	1805	1825	1845	1905	1915	--	1945	2014
New Greens St Albans Girls School	0724	0754	0824	0900	0920	0940	0955	1010		30	50	10		1650	1710	1730	1750	1810	1830	1849	1909	--	--	1949	--
Harpenden The George PH	0732	0802	0832	0909	0929	0949	1004	1019		39	59	19		1659	1719	1739	1759	1819	1839	1858	1917	--	--	1957	--
Kinsbourne Green The Common	0741	0811	0841	0919	0939	0959	1014	1029		49	09	29		1709	1729	1749	1809	1829	1847	1905	1923	--	--	2003	--
Stockwood Park Entrance	0745	0815	0845	0923	0943	1003	1018	1033		53	13	33		1713	1733	1753	1813	1833	1851	1909	1927	--	--	2007	--
Luton Town Centre Church Street	0750	0820	0850	0928	0948	1010	1025	1040		00	20	40		1720	1740	1800	1820	1840	1858	1915	1933	--	--	2013	--
Luton Station Interchange	0754	0824	0854	0932	0952	1014	1029	1044		04	24	44		1724	1744	1804	1824	1844	1902	1919	1937	--	--	2017	--

	321		321		321	321
Maple Cross Downings Wood Terminus	--		--		--	--
Berry Lane Estate Oakfield	1926		26		2226	2326
Rickmansworth Railway Station	1935		35		2235	2335
Croxley Green Owens Way	1943		43		2243	2343
Watford General Hospital	1951		51		2251	2351
Watford Market Street	2000		00		2300	2356
Watford Junction Railway Station	2005		05		2305	--
North Watford Library	2013	Then at these mins	13	past each hour until	2313	--
Garston Bus Garage	2018		18		2318	--
Chiswell Green Three Hammers PH	2023		23		2323	--
St Albans Abbey Railway Station	2030		30		2330	--
St Albans St Peter's Street	2035		35		2335	--
New Greens St Albans Girls School	2039		39		2339	--
Harpenden The George PH	2047		47		2347	--
Kinsbourne Green The Common	2053		53		2353	--
Stockwood Park Entrance	2057		57		2357	--
Luton Town Centre Church Street	2103		03		0003	--
Luton Station Interchange	2107		07		0007	--

Sunday - Berry Lane Estate Oakfield

	321	321	321	321	321	321	321	321	321	321	321	321	321	321	321	321	321
Luton Station Interchange	--	0745	0840	0935	1030	1130	1230	1330	1430	1530	1635	1735	1835	1935	2035	2135	2235
Luton Town Centre Church Street	--	0750	0845	0939	1035	1135	1235	1335	1435	1535	1640	1740	1840	1935	2035	2135	2235
Stockwood Park Entrance	--	0755	0850	0944	1040	1140	1240	1340	1440	1540	1645	1745	1845	1945	2045	2145	2245
Kinsbourne Green The Common	--	0759	0854	0948	1044	1144	1244	1344	1444	1544	1649	1749	1849	1949	2049	2149	2249
Harpenden The George PH	--	0805	0900	0954	1052	1152	1252	1352	1452	1552	1657	1756	1856	1956	2056	2156	2256
New Greens St Albans Girls School	--	0813	0908	1002	1101	1201	1301	1401	1501	1601	1706	1805	1905	2005	2105	2205	2305
St Albans St Peter's Street	--	0820	0915	1010	1110	1210	1310	1410	1510	1610	1715	1814	1914	2014	2114	2214	2314
St Albans Abbey Railway Station	--	0825	0920	1015	1115	1215	1315	1415	1515	1615	1718	1816	1916	2016	2116	2216	2316
Chiswell Green Three Hammers PH	--	0830	0925	1021	1121	1221	1321	1421	1521	1621	1724	1823	1923	2023	2123	2223	2323
Garston Bus Garage	0737	0837	0932	1029	1129	1229	1329	1429	1529	1629	1732	1830	1930	2030	2130	2230	2330
North Watford Library	0741	0841	0936	1034	1134	1234	1334	1434	1534	1634	1736	1834	1934	2034	2134	2234	2334
Watford Junction Railway Station	0750	0850	0945	1045	1145	1245	1345	1445	1545	1645	1745	1843	1943	2043	2143	2243	2343
Watford Market Street	0757	0857	0952	1052	1152	1252	1352	1452	1552	1652	1755	1850	1950	2050	2150	2250	2348
Watford General Hospital	0802	0902	0957	1057	1157	1257	1357	1457	1557	1657	1800	1855	1955	2055	2155	2255	--
Croxley Green Owens Way	0810	0910	1006	1106	1206	1306	1406	1506	1606	1706	1808	1904	2004	2104	2204	2304	--
Rickmansworth Railway Station	0818	0918	1018	1118	1218	1318	1418	1518	1618	1718	1818	1913	2013	2113	2213	2313	--
Berry Lane Estate Oakfield	0827	0927	1027	1127	1227	1327	1427	1527	1627	1727	1827	1921	2021	2121	2221	2321	--

Sunday - Luton Station Interchange

	321	321	321	321	321		321		321	321	321	321	321	321		321		321	321
Berry Lane Estate Oakfield	--	--	0850	0940	1038		38		1438	1538	1638	1738	1835	1926		26		2226	2326
Rickmansworth Railway Station	--	--	0859	0949	1048		48		1448	1548	1648	1748	1845	1935		35		2235	2335
Croxley Green Owens Way	--	--	0908	1000	1100		00		1500	1600	1700	1800	1855	1943		43		2243	2343
Watford General Hospital	--	--	0916	1009	1109		09		1509	1609	1709	1809	1903	1951		51		2251	2351
Watford Market Street	0745	0835	0925	1020	1120		20		1520	1620	1720	1820	1910	2000		00		2300	2356
Watford Junction Railway Station	0750	0840	0930	1025	1125		25		1525	1625	1725	1825	1915	2005		05		2305	--
North Watford Library	0758	0848	0938	1035	1135		35		1535	1635	1735	1835	1924	2013		13		2313	--
Garston Bus Garage	0802	0852	0942	1040	1140	Then	40	past	1540	1640	1740	1840	1929	2018	Then	18	past	2318	--
Chiswell Green Three Hammers PH	0809	0859	0949	1048	1148	at these	48	each hour	1548	1648	1748	1847	1935	2023	at these	23	each hour	2323	--
St Albans Abbey Railway Station	0816	0906	0956	1055	1155	mins	55	until	1555	1655	1755	1854	1942	2030	mins	30	until	2330	--
St Albans St Peter's Street	0822	0912	1002	1102	1202		02		1602	1702	1802	1900	1945	2035		35		2335	--
New Greens St Albans Girls School	0826	0916	1006	1106	1206		06		1606	1706	1806	1904	1949	2039		39		2339	--
Harpenden The George PH	0835	0925	1015	1116	1216		16		1616	1716	1815	1912	1957	2047		47		2347	--
Kinsbourne Green The Common	0843	0933	1023	1124	1224		24		1624	1724	1822	1919	2003	2053		53		2353	--
Stockwood Park Entrance	0847	0937	1027	1128	1228		28		1628	1728	1826	1923	2007	2057		57		2357	--
Luton Town Centre Church Street	0852	0942	1032	1134	1234		34		1634	1734	1832	1929	2013	2103		03		0003	--
Luton Station Interchange	0856	0946	1036	1139	1239		39		1639	1738	1836	1933	2017	2107		07		0007	--

724 Green Line Harlow to London Heathrow Airport

via Hertford, Welwyn Garden City, Hatfield, St Albans, Watford and Maple Cross - Valid from Sunday, January 8, 2023 to Thursday, June 15, 2023

Monday to Friday - Heathrow Airport Heathrow Central Bus Station

	724	724	724	724	724	724	724[1]	724[1]	724[2]	724[2]	724[1]	724[1]	724[2]	724[2]	724[1]	724[1]	724[2]	724[2]	724[1]	724[2]	724[1]	724[2]	724	724	724
Harlow Town Centre Bus Station	0110	--	0300	--	0345	--	0430	--	0448	--	0515	--	0552	--	0615	--	0642	--	0715	0742	--	--	0840	--	0945
Great Amwell Amwell Roundabout	0121	--	0311	--	0356	--	0441	--	0459	--	0526	--	0603	--	0626	--	0653	--	0730	0754	--	--	0851	--	0956
Ware Hertford Regional College	0125	--	0315	--	0400	--	0445	--	0503	--	0530	--	0607	--	0630	--	0658	--	0736	0759	--	--	0856	--	1001
Hertford Bus Station	0131	--	0321	--	0409	--	0454	--	0512	--	0540	--	0617	--	0640	--	0709	--	0752	0810	--	--	0907	--	1012
Hertford North Railway Station	0135	--	0325	--	0413	--	0458	--	0516	--	0544	--	0622	--	0644	--	0713	--	0801	0815	--	--	0913	--	1017
Panshanger Windhill	0144	--	0334	--	0422	--	0507	--	0524	--	0554	--	0630	--	0654	--	0722	--	0813	0824	--	--	0923	--	1027
Welwyn Garden City Bus Station	0151	--	0341	--	0429	--	0516	--	0534	--	0604	--	0640	--	0705	--	0732	--	0824	0834	--	--	0933	--	1037
Welwyn Garden City New QEII Hospital	0158	--	0348	--	0438	--	0524	--	0541	--	0612	--	0648	--	0713	--	0741	--	0837	0843	--	--	0942	--	1046
Hatfield Railway Station	0205	--	0355	--	0445	--	0532	--	0548	--	0620	--	0656	--	0724	--	0749	--	0850	0851	--	--	0952	--	1054
Hatfield Town Centre	0208	--	0358	--	0449	--	0536	--	0551	--	0623	--	0659	--	0727	--	0752	--	0854	0854	--	--	0955	--	1057
Hatfield The Galleria	0211	--	0401	--	0451	--	0538	--	0554	--	0626	--	0702	--	0730	--	0755	--	0857	0857	--	--	0958	--	1100
St Albans City Railway Station	0223	--	0413	--	0503	--	0551	--	0606	--	0638	--	0717	--	0748	--	0810	--	0912	0912	--	--	1013	--	1115
St Albans St Peter's Street	0226	0231	0416	0421	0506	0511	0554	0559	0610	0615	0642	0647	0721	0726	0754	0759	0815	0820	0917	0917	0922	0922	1018	1023	1120
Chiswell Green Three Hammers PH	--	0238	--	0428	--	0518	--	0606	--	0622	--	0655	--	0738	--	0811	--	0833	--	--	0931	0930	--	1030	--
Garston Bus Garage	--	0245	--	0435	--	0525	--	0615	--	0631	--	0708	--	0746	--	0825	--	0844	--	--	0940	0938	--	1042	--
Watford Junction Railway Station	--	0256	--	0448	--	0538	--	0629	--	0647	--	0729	--	0803	--	0853	--	0902	--	--	0956	0959	--	1055	--
Watford Town Hall	--	0300	--	0452	--	0542	--	0633	--	0650	--	0735	--	0807	--	0858	--	0906	--	--	1000	1003	--	1059	--
Rickmansworth Railway Station	--	0309	--	0501	--	0553	--	0644	--	0700	--	0757	--	0817	--	0910	--	0916	--	--	1011	1013	--	1110	--
Maple Cross The Cross	--	0315	--	0510	--	0602	--	0654	--	0709	--	0809	--	0826	--	0920	--	0925	--	--	1020	1022	--	1119	--
Denham Station Parade	--	0321	--	0516	--	0608	--	0703	--	0715	--	0822	--	0832	--	0927	--	0931	--	--	1027	1028	--	1125	--
Uxbridge York Road (UB8)	--	0329	--	0524	--	0616	--	0713	--	0723	--	0836	--	0840	--	0937	--	0939	--	--	1036	1036	--	1134	--
Heathrow Airport Terminal 5 Heathrow Terminal 5	--	0345	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Heathrow Airport Heathrow Central Bus Station	--	0355	--	0540	--	0634	--	0739	--	0739	--	0857	--	0857	--	0955	--	0955	--	--	1054	1052	--	1152	--

	724	724	724	724	724	724	724	724[1]	724[1]	724[2]	724[2]	724[1]	724[1]	724[2]	724[2]	724[1]	724[2]	724[1]	724[2]	724[1]	724[2]	724[1]	724[2]	724[1]	724[2]
Harlow Town Centre Bus Station	--	1045	--	1200	--	1300	--	1400	--	1410	--	1500	--	1515	--	1610	1630	--	--	1715	1731	--	--	1830	1830
Great Amwell Amwell Roundabout	--	1056	--	1211	--	1311	--	1411	--	1420	--	1511	--	1526	--	1621	1641	--	--	1729	1741	--	--	1843	1843
Ware Hertford Regional College	--	1101	--	1216	--	1316	--	1416	--	1425	--	1516	--	1531	--	1626	1646	--	--	1734	1746	--	--	1848	1848
Hertford Bus Station	--	1112	--	1227	--	1327	--	1427	--	1436	--	1530	--	1542	--	1637	1657	--	--	1746	1757	--	--	1859	1859
Hertford North Railway Station	--	1117	--	1232	--	1332	--	1433	--	1442	--	1536	--	1548	--	1644	1703	--	--	1753	1803	--	--	1904	1904
Panshanger Windhill	--	1127	--	1242	--	1342	--	1443	--	1452	--	1546	--	1558	--	1654	1713	--	--	1803	1813	--	--	1914	1914
Welwyn Garden City Bus Station	--	1137	--	1252	--	1352	--	1453	--	1502	--	1556	--	1608	--	1704	1723	--	--	1814	1823	--	--	1925	1925
Welwyn Garden City New QEII Hospital	--	1146	--	1301	--	1401	--	1502	--	1511	--	1605	--	1617	--	1715	1727	--	--	1824	1832	--	--	1933	1933
Hatfield Railway Station	--	1154	--	1309	--	1409	--	1511	--	1519	--	1614	--	1625	--	1725	1735	--	--	1833	1840	--	--	1941	1941
Hatfield Town Centre	--	1157	--	1312	--	1412	--	1514	--	1522	--	1618	--	1628	--	1729	1738	--	--	1836	1843	--	--	1944	1944
Hatfield The Galleria	--	1200	--	1315	--	1415	--	1517	--	1525	--	1621	--	1631	--	1732	1741	--	--	1839	1846	--	--	1947	1947
St Albans City Railway Station	--	1215	--	1330	--	1430	--	1534	--	1540	--	1638	--	1646	--	1750	1756	--	--	1856	1901	--	--	2000	2000
St Albans St Peter's Street	1125	1220	1225	1335	1340	1435	1440	1540	1545	1545	1550	1644	1649	1651	1656	1759	1801	1804	1806	1902	1906	1907	1913	2004	2004
Chiswell Green Three Hammers PH	1132	--	1232	--	1347	--	1447	--	1553	--	1557	--	1658	--	1703	--	--	1814	1813	--	--	1915	1920	--	--
Garston Bus Garage	1144	--	1244	--	1359	--	1459	--	1606	--	1609	--	1710	--	1715	--	--	1827	1825	--	--	1925	1929	--	--
Watford Junction Railway Station	1157	--	1257	--	1414	--	1515	--	1622	--	1627	--	1728	--	1733	--	--	1842	1842	--	--	1940	1945	--	--
Watford Town Hall	1201	--	1301	--	1418	--	1519	--	1627	--	1631	--	1733	--	1737	--	--	1847	1847	--	--	1944	1949	--	--
Rickmansworth Railway Station	1212	--	1312	--	1429	--	1531	--	1642	--	1643	--	1748	--	1749	--	--	1859	1859	--	--	1955	1958	--	--
Maple Cross The Cross	1221	--	1321	--	1438	--	1540	--	1652	--	1652	--	1758	--	1758	--	--	1908	1908	--	--	2004	2006	--	--
Denham Station Parade	1227	--	1327	--	1444	--	1546	--	1659	--	1659	--	1805	--	1804	--	--	1914	1914	--	--	2010	2012	--	--
Uxbridge York Road (UB8)	1236	--	1336	--	1453	--	1555	--	1709	--	1709	--	1815	--	1814	--	--	1924	1924	--	--	2019	2020	--	--
Heathrow Airport Terminal 5 Heathrow Terminal 5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Heathrow Airport Heathrow Central Bus Station	1253	--	1353	--	1510	--	1613	--	1727	--	1727	--	1835	--	1832	--	--	1942	1942	--	--	2036	2036	--	--

	724[1]	724[2]	724	724	724	724
Harlow Town Centre Bus Station	--	--	1930	--	2030	--
Great Amwell Amwell Roundabout	--	--	1941	--	2041	--
Ware Hertford Regional College	--	--	1946	--	2045	--
Hertford Bus Station	--	--	1956	--	2054	--
Hertford North Railway Station	--	--	2000	--	2058	--
Panshanger Windhill	--	--	2009	--	2107	--
Welwyn Garden City Bus Station	--	--	2018	--	2115	--
Welwyn Garden City New QEII Hospital	--	--	2026	--	2122	--
Hatfield Railway Station	--	--	2033	--	2129	--
Hatfield Town Centre	--	--	2036	--	2131	--
Hatfield The Galleria	--	--	2038	--	2133	--
St Albans City Railway Station	--	--	2050	--	2143	--
St Albans St Peter's Street	2009	2009	2053	2058	2146	2154
Chiswell Green Three Hammers PH	2016	2016	--	2105	--	2201
Garston Bus Garage	2026	2026	--	2114	--	2210
Watford Junction Railway Station	2038	2038	--	2125	--	2224
Watford Town Hall	2042	2042	--	2128	--	2227
Rickmansworth Railway Station	2053	2053	--	2139	--	2236
Maple Cross The Cross	2102	2102	--	2148	--	2243
Denham Station Parade	2108	2108	--	2154	--	2248
Uxbridge York Road (UB8)	2115	2115	--	2201	--	2255
Heathrow Airport Terminal 5 Heathrow Terminal 5	--	--	--	--	--	--
Heathrow Airport Heathrow Central Bus Station	2132	2132	--	2218	--	2310

[1] Term Time Only [2] Only During School Holidays

Monday to Friday - Harlow Town Centre Bus Station

	724	724	724[1]	724[2]	724[1]	724[2]	724	724[1]	724[2]	724[1]	724[2]	724[1]	724[2]	724[1]	724[2]	724[1]	724[2]	724	724	724	724	724	724	724	724[1]
Heathrow Airport Heathrow Central Bus Station	--	0510	0610	0620	--	--	--	--	--	0645	0710	--	--	0755	0815	--	--	0915	--	1015	--	1115	--	1215	--
Heathrow Airport Terminal 5 Heathrow Terminal 5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uxbridge York Road (UB8)	--	0527	0627	0636	--	--	--	--	--	0703	0727	--	--	0817	0832	--	--	0933	--	1033	--	1133	--	1233	--
Denham Station Parade	--	0536	0636	0644	--	--	--	--	--	0716	0736	--	--	0829	0842	--	--	0942	--	1042	--	1142	--	1245	--
Maple Cross The Cross	--	0542	0642	0650	--	--	--	--	--	0727	0743	--	--	0840	0850	--	--	0952	--	1052	--	1152	--	1255	--
Rickmansworth Railway Station	--	0549	0649	0657	--	--	--	--	--	0742	0752	--	--	0854	0900	--	--	1000	--	1100	--	1200	--	1303	--
Watford Clarendon Road	--	0602	0702	0710	--	--	--	--	--	0809	0807	--	--	0914	0916	--	--	1015	--	1115	--	1215	--	1318	--
Watford Junction Railway Station	--	0608	0708	0715	--	--	--	--	--	0814	0813	--	--	0920	0922	--	--	1020	--	1120	--	1220	--	1323	--
Garston Bus Garage	--	0620	0721	0727	--	--	--	--	--	0827	0826	--	--	0933	0934	--	--	1031	--	1131	--	1231	--	1335	--
Chiswell Green Three Hammers PH	--	0627	0730	0738	--	--	--	--	--	0836	0835	--	--	0941	0942	--	--	1039	--	1139	--	1239	--	1344	--
St Albans St Peter's Street	0201	0635	0743	0750	--	--	0645	0748	0800	0849	0848	0854	0857	0951	0952	0956	0957	1052	1057	1152	1157	1252	1257	1357	1402
St Albans City Railway Station	0205	--	--	--	--	--	0650	0756	0806	--	--	0900	0903	--	--	1002	1002	--	1103	--	1203	--	1303	--	1408
Hatfield The Galleria	0216	--	--	--	--	--	0703	0814	0820	--	--	0915	0917	--	--	1016	1016	--	1117	--	1217	--	1317	--	1424
Hatfield Town Centre	0219	--	--	--	--	--	0706	0817	0823	--	--	0917	0919	--	--	1018	1018	--	1119	--	1219	--	1319	--	1427
Hatfield Railway Station	0222	--	--	--	--	--	0709	0820	0826	--	--	0920	0922	--	--	1021	1021	--	1122	--	1222	--	1322	--	1430
Welwyn Garden City New QEII Hospital	0228	--	--	--	--	--	0720	0830	0834	--	--	0929	0930	--	--	1030	1030	--	1130	--	1230	--	1330	--	1439
Welwyn Garden City Bus Station	0238	--	--	--	--	--	0731	0844	0846	--	--	0941	0945	--	--	1042	1042	--	1142	--	1242	--	1342	--	1451
Panshanger Windhill	0243	--	--	--	--	--	0741	0852	0854	--	--	0949	0952	--	--	1050	1050	--	1150	--	1250	--	1350	--	1459
Hertford North Railway Station	0251	--	--	--	--	--	0751	0902	0902	--	--	0958	1000	--	--	1059	1059	--	1159	--	1259	--	1359	--	1509
Hertford Bus Station	0258	--	--	--	0644	0644	0759	0912	0912	--	--	1008	1008	--	--	1107	1107	--	1207	--	1307	--	1407	--	1518
Ware Hertford Regional College	0304	--	--	--	0651	0651	0808	0921	0921	--	--	1017	1017	--	--	1116	1116	--	1216	--	1316	--	1416	--	1527
Great Amwell Amwell Roundabout	0307	--	--	--	0655	0655	0812	0925	0925	--	--	1021	1021	--	--	1120	1120	--	1220	--	1320	--	1420	--	1531
Harlow Town Centre Bus Station	0317	--	--	--	0705	0705	0825	0935	0935	--	--	1031	1031	--	--	1130	1130	--	1230	--	1330	--	1430	--	1543

	724[2]	724	724[1]	724[2]	724[1]	724[1]	724[2]	724[2]	724[1]	724	724[1]	724[2]	724[2]	724[1]	724[1]	724[2]	724[2]	724[1]	724[1]	724[2]	724[2]	724	724	724[1]	724[2]
Heathrow Airport Heathrow Central Bus Station	--	1315	--	--	1415	--	1430	--	1530	0025	--	1555	--	1635	--	1701	--	1745	--	1800	--	1900	--	2000	2000
Heathrow Airport Terminal 5 Heathrow Terminal 5	--	--	--	--	--	--	--	--	--	0035	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uxbridge York Road (UB8)	--	1333	--	--	1433	--	1448	--	1548	0054	--	1612	--	1654	--	1719	--	1806	--	1818	--	1918	--	2016	2016
Denham Station Parade	--	1345	--	--	1445	--	1500	--	1600	0102	--	1621	--	1707	--	1728	--	1820	--	1827	--	1928	--	2024	2024
Maple Cross The Cross	--	1355	--	--	1455	--	1510	--	1610	0110	--	1628	--	1717	--	1735	--	1828	--	1834	--	1936	--	2032	2032
Rickmansworth Railway Station	--	1403	--	--	1504	--	1518	--	1620	0117	--	1637	--	1727	--	1744	--	1836	--	1843	--	1944	--	2040	2040
Watford Clarendon Road	--	1418	--	--	1519	--	1533	--	1638	0129	--	1652	--	1746	--	1759	--	1851	--	1858	--	1956	--	2052	2052
Watford Junction Railway Station	--	1423	--	--	1524	--	1538	--	1644	0134	--	1658	--	1752	--	1805	--	1857	--	1904	--	2001	--	2057	2057
Garston Bus Garage	--	1435	--	--	1538	--	1550	--	1658	0142	--	1710	--	1809	--	1817	--	1911	--	1916	--	2011	--	2106	2106
Chiswell Green Three Hammers PH	--	1444	--	--	1548	--	1559	--	1708	0149	--	1718	--	1819	--	1825	--	1919	--	1924	--	2018	--	2112	2112
St Albans St Peter's Street	1402	1457	1502	1502	1601	1606	1612	1617	1721	0156	1726	1733	1738	1831	1836	1838	1843	1930	1935	1937	1942	2026	2031	2119	2119
St Albans City Railway Station	1408	--	1508	1508	--	1612	--	1623	--	--	1732	--	1744	--	1842	--	1849	--	1940	--	1947	--	2035	--	--
Hatfield The Galleria	1424	--	1524	1524	--	1630	--	1639	--	--	1752	--	1759	--	1858	--	1903	--	1953	--	2001	--	2048	--	--
Hatfield Town Centre	1427	--	1528	1528	--	1633	--	1643	--	--	1755	--	1801	--	1901	--	1905	--	1956	--	2003	--	2051	--	--
Hatfield Railway Station	1430	--	1531	1531	--	1636	--	1646	--	--	1758	--	1804	--	1904	--	1908	--	1959	--	2006	--	2054	--	--
Welwyn Garden City New QEII Hospital	1439	--	1541	1541	--	1646	--	1656	--	--	1809	--	1812	--	1911	--	1915	--	2006	--	2013	--	2101	--	--
Welwyn Garden City Bus Station	1451	--	1553	1553	--	1659	--	1708	--	--	1821	--	1824	--	1922	--	1926	--	2017	--	2024	--	2112	--	--
Panshanger Windhill	1459	--	1601	1601	--	1707	--	1716	--	--	1829	--	1831	--	1929	--	1933	--	2023	--	2031	--	2118	--	--
Hertford North Railway Station	1509	--	1611	1611	--	1718	--	1726	--	--	1838	--	1839	--	1938	--	1941	--	2032	--	2039	--	2127	--	--
Hertford Bus Station	1518	--	1622	1622	--	1731	--	1737	--	--	1849	--	1847	--	1949	--	1949	--	2039	--	2046	--	2134	--	--
Ware Hertford Regional College	1527	--	1631	1631	--	1740	--	1746	--	--	1856	--	1856	--	1956	--	1956	--	2045	--	2054	--	2140	--	--
Great Amwell Amwell Roundabout	1531	--	1636	1636	--	1745	--	1750	--	--	1900	--	1900	--	2000	--	2000	--	2048	--	2058	--	2143	--	--
Harlow Town Centre Bus Station	1543	--	1649	1649	--	1757	--	1803	--	--	1910	--	1910	--	2010	--	2010	--	2058	--	2108	--	2153	--	--

	724[1]	724[2]	724[1]	724[2]	724[1]	724[2]	724[1]	724[2]	724[1]	724[2]	724	724[3]
Heathrow Airport Heathrow Central Bus Station	--	--	2050	2050	--	--	2140	2140	--	--	2240	--
Heathrow Airport Terminal 5 Heathrow Terminal 5	--	--	--	--	--	--	--	--	--	--	--	--
Uxbridge York Road (UB8)	--	--	2106	2106	--	--	2154	2154	--	--	2254	--
Denham Station Parade	--	--	2114	2114	--	--	2202	2202	--	--	2302	--
Maple Cross The Cross	--	--	2122	2122	--	--	2210	2210	--	--	2310	--
Rickmansworth Railway Station	--	--	2130	2130	--	--	2217	2217	--	--	2317	--
Watford Clarendon Road	--	--	2142	2142	--	--	2229	2229	--	--	2329	--
Watford Junction Railway Station	--	--	2147	2147	--	--	2234	2234	--	--	2334	--
Garston Bus Garage	--	--	2156	2156	--	--	2242	2242	--	--	2342	--
Chiswell Green Three Hammers PH	--	--	2202	2202	--	--	2249	2249	--	--	2349	--
St Albans St Peter's Street	2124	2124	2209	2209	2214	2214	2256	2256	2301	2301	2356	0001
St Albans City Railway Station	2128	2128	--	--	2218	2218	--	--	2305	2305	--	0005
Hatfield The Galleria	2141	2141	--	--	2231	2231	--	--	2316	2316	--	0016
Hatfield Town Centre	2144	2144	--	--	2234	2234	--	--	2319	2319	--	0019
Hatfield Railway Station	2147	2147	--	--	2237	2237	--	--	2322	2322	--	0022
Welwyn Garden City New QEII Hospital	2153	2153	--	--	2243	2243	--	--	2328	2328	--	0028
Welwyn Garden City Bus Station	2203	2203	--	--	2253	2253	--	--	2338	2338	--	0038
Panshanger Windhill	2209	2209	--	--	2259	2259	--	--	2343	2343	--	0043
Hertford North Railway Station	2217	2217	--	--	2307	2307	--	--	2351	2351	--	0051
Hertford Bus Station	2224	2224	--	--	2314	2314	--	--	2358	2358	--	0058
Ware Hertford Regional College	2230	2230	--	--	2320	2320	--	--	0004	0004	--	0104
Great Amwell Amwell Roundabout	2233	2233	--	--	2323	2323	--	--	0007	0007	--	0107
Harlow Town Centre Bus Station	2243	2243	--	--	2333	2333	--	--	0017	0017	--	0117

[1] Term Time Only [2] Only During School Holidays [3] Doesn't run on Mondays

Saturday - Heathrow Airport Heathrow Central Bus Station

	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724
Harlow Town Centre Bus Station	0110	--	0315	--	0415	--	0505	--	0600	--	0645	--	0745	--	0845	--	0945	--	1045	--	1200	--	1300	--	1400
Great Amwell Amwell Roundabout	0121	--	0326	--	0426	--	0516	--	0611	--	0656	--	0756	--	0856	--	0956	--	1056	--	1211	--	1311	--	1411
Ware Hertford Regional College	0125	--	0330	--	0430	--	0520	--	0615	--	0700	--	0800	--	0900	--	1000	--	1100	--	1215	--	1315	--	1415
Hertford Bus Station	0131	--	0336	--	0436	--	0526	--	0625	--	0710	--	0811	--	0913	--	1013	--	1113	--	1228	--	1328	--	1428
Hertford North Railway Station	0135	--	0340	--	0440	--	0530	--	0629	--	0714	--	0816	--	0918	--	1018	--	1118	--	1233	--	1333	--	1433
Panshanger Windhill	0144	--	0349	--	0449	--	0539	--	0639	--	0724	--	0826	--	0928	--	1028	--	1128	--	1243	--	1343	--	1443
Welwyn Garden City Bus Station	0151	--	0356	--	0458	--	0547	--	0647	--	0732	--	0836	--	0938	--	1038	--	1138	--	1253	--	1353	--	1453
Welwyn Garden City New QEII Hospital	0158	--	0402	--	0504	--	0554	--	0654	--	0739	--	0844	--	0946	--	1046	--	1146	--	1301	--	1401	--	1501
Hatfield Railway Station	0205	--	0410	--	0512	--	0602	--	0702	--	0747	--	0853	--	0955	--	1055	--	1155	--	1310	--	1410	--	1510
Hatfield Town Centre	0208	--	0413	--	0515	--	0605	--	0705	--	0750	--	0856	--	0958	--	1058	--	1158	--	1313	--	1413	--	1513
Hatfield The Galleria	0211	--	0416	--	0518	--	0608	--	0708	--	0753	--	0859	--	1001	--	1101	--	1201	--	1316	--	1416	--	1516
St Albans City Railway Station	0223	--	0428	--	0530	--	0621	--	0721	--	0807	--	0913	--	1015	--	1115	--	1215	--	1330	--	1430	--	1530
St Albans St Peter's Street	0226	0231	0431	0436	0533	0538	0626	0631	0725	0730	0811	0816	0918	0923	1020	1025	1120	1125	1220	1225	1335	1340	1435	1440	1535
Chiswell Green Three Hammers PH	--	0238	--	0443	--	0545	--	0638	--	0737	--	0825	--	0932	--	1034	--	1134	--	1234	--	1349	--	1449	--
Garston Bus Garage	--	0245	--	0451	--	0553	--	0645	--	0745	--	0835	--	0942	--	1044	--	1144	--	1244	--	1359	--	1459	--
Watford Junction Railway Station	--	0256	--	0503	--	0605	--	0658	--	0757	--	0848	--	0955	--	1057	--	1157	--	1257	--	1412	--	1512	--
Watford Town Hall	--	0300	--	0507	--	0609	--	0703	--	0802	--	0853	--	1000	--	1102	--	1202	--	1302	--	1417	--	1517	--
Rickmansworth Railway Station	--	0309	--	0516	--	0619	--	0713	--	0812	--	0904	--	1013	--	1115	--	1215	--	1315	--	1430	--	1530	--
Maple Cross The Cross	--	0315	--	0525	--	0628	--	0722	--	0821	--	0913	--	1023	--	1125	--	1225	--	1325	--	1440	--	1540	--
Denham Station Parade	--	0321	--	0531	--	0634	--	0728	--	0827	--	0919	--	1029	--	1131	--	1231	--	1331	--	1446	--	1546	--
Uxbridge York Road (UB8)	--	0329	--	0539	--	0642	--	0736	--	0835	--	0927	--	1038	--	1140	--	1240	--	1340	--	1455	--	1555	--
Heathrow Airport Terminal 5 Heathrow Terminal 5	--	0345	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Heathrow Airport Heathrow Central Bus Station	--	0355	--	0555	--	0703	--	0755	--	0854	--	0946	--	1058	--	1159	--	1259	--	1359	--	1514	--	1614	--

	724	724	724	724	724	724	724	724	724	724	724	724	724
Harlow Town Centre Bus Station	--	1500	--	1620	--	1740	--	1835	--	1930	--	2030	--
Great Amwell Amwell Roundabout	--	1511	--	1631	--	1751	--	1846	--	1941	--	2041	--
Ware Hertford Regional College	--	1515	--	1635	--	1755	--	1850	--	1945	--	2045	--
Hertford Bus Station	--	1528	--	1648	--	1804	--	1859	--	1954	--	2054	--
Hertford North Railway Station	--	1533	--	1653	--	1808	--	1903	--	1958	--	2058	--
Panshanger Windhill	--	1543	--	1703	--	1817	--	1912	--	2007	--	2107	--
Welwyn Garden City Bus Station	--	1553	--	1713	--	1827	--	1922	--	2015	--	2115	--
Welwyn Garden City New QEII Hospital	--	1601	--	1721	--	1836	--	1930	--	2022	--	2122	--
Hatfield Railway Station	--	1610	--	1730	--	1843	--	1937	--	2029	--	2129	--
Hatfield Town Centre	--	1613	--	1733	--	1846	--	1940	--	2032	--	2131	--
Hatfield The Galleria	--	1616	--	1736	--	1849	--	1943	--	2035	--	2133	--
St Albans City Railway Station	--	1630	--	1750	--	1901	--	1953	--	2045	--	2143	--
St Albans St Peter's Street	1540	1635	1640	1755	1800	1905	1910	1957	2002	2049	2054	2146	2154
Chiswell Green Three Hammers PH	1549	--	1649	--	1809	--	1918	--	2009	--	2101	--	2201
Garston Bus Garage	1559	--	1659	--	1819	--	1926	--	2016	--	2111	--	2210
Watford Junction Railway Station	1612	--	1712	--	1832	--	1939	--	2029	--	2124	--	2224
Watford Town Hall	1617	--	1717	--	1837	--	1943	--	2032	--	2127	--	2227
Rickmansworth Railway Station	1630	--	1730	--	1850	--	1952	--	2041	--	2136	--	2236
Maple Cross The Cross	1640	--	1740	--	1900	--	2000	--	2048	--	2143	--	2243
Denham Station Parade	1646	--	1746	--	1906	--	2005	--	2053	--	2148	--	2248
Uxbridge York Road (UB8)	1655	--	1755	--	1915	--	2013	--	2101	--	2156	--	2255
Heathrow Airport Terminal 5 Heathrow Terminal 5	--	--	--	--	--	--	--	--	--	--	--	--	--
Heathrow Airport Heathrow Central Bus Station	1714	--	1814	--	1933	--	2029	--	2117	--	2212	--	2310

Saturday - Harlow Town Centre Bus Station

	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724
Heathrow Airport Heathrow Central Bus Station	--	0530	--	0630	--	0720	--	0810	--	0915	--	1015	--	1115	--	1215	--	1315	--	1415	--	1530	--	1630	1730
Heathrow Airport Terminal 5 Heathrow Terminal 5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uxbridge York Road (UB8)	--	0546	--	0646	--	0736	--	0829	--	0934	--	1034	--	1134	--	1234	--	1334	--	1434	--	1549	--	1647	1747
Denham Station Parade	--	0554	--	0654	--	0745	--	0838	--	0943	--	1043	--	1143	--	1243	--	1343	--	1443	--	1558	--	1656	1755
Maple Cross The Cross	--	0602	--	0702	--	0754	--	0847	--	0952	--	1052	--	1152	--	1252	--	1352	--	1452	--	1607	--	1705	1803
Rickmansworth Railway Station	--	0610	--	0710	--	0802	--	0855	--	1000	--	1100	--	1200	--	1300	--	1400	--	1500	--	1615	--	1712	1810
Watford Clarendon Road	--	0622	--	0722	--	0814	--	0909	--	1014	--	1114	--	1214	--	1314	--	1414	--	1514	--	1629	--	1725	1823
Watford Junction Railway Station	--	0627	--	0727	--	0819	--	0915	--	1020	--	1120	--	1220	--	1320	--	1420	--	1520	--	1635	--	1730	1828
Garston Bus Garage	--	0636	--	0736	--	0828	--	0927	--	1032	--	1132	--	1232	--	1332	--	1432	--	1532	--	1647	--	1742	1840
Chiswell Green Three Hammers PH	--	0643	--	0743	--	0835	--	0935	--	1040	--	1140	--	1240	--	1340	--	1440	--	1540	--	1655	--	1749	1847
St Albans St Peter's Street	0201	0650	0655	0750	0755	0845	0850	0948	0953	1053	1058	1153	1158	1253	1258	1353	1358	1453	1458	1553	1558	1708	1713	1801	1857
St Albans City Railway Station	0205	--	0700	--	0800	--	0855	--	1000	--	1105	--	1205	--	1305	--	1405	--	1505	--	1605	--	1720	--	--
Hatfield The Galleria	0216	--	0711	--	0811	--	0907	--	1016	--	1121	--	1221	--	1321	--	1421	--	1521	--	1621	--	1736	--	--
Hatfield Town Centre	0219	--	0714	--	0814	--	0910	--	1019	--	1124	--	1224	--	1324	--	1424	--	1524	--	1624	--	1739	--	--
Hatfield Railway Station	0222	--	0717	--	0817	--	0913	--	1022	--	1127	--	1227	--	1327	--	1427	--	1527	--	1627	--	1742	--	--
Welwyn Garden City New QEII Hospital	0228	--	0725	--	0825	--	0921	--	1030	--	1135	--	1235	--	1335	--	1435	--	1535	--	1635	--	1750	--	--
Welwyn Garden City Bus Station	0238	--	0735	--	0835	--	0932	--	1042	--	1147	--	1247	--	1347	--	1447	--	1547	--	1647	--	1802	--	--
Panshanger Windhill	0243	--	0742	--	0842	--	0939	--	1050	--	1155	--	1255	--	1355	--	1455	--	1555	--	1655	--	1810	--	--
Hertford North Railway Station	0251	--	0752	--	0852	--	0949	--	1100	--	1205	--	1305	--	1405	--	1505	--	1605	--	1705	--	1820	--	--
Hertford Bus Station	0258	--	0759	--	0859	--	0957	--	1108	--	1213	--	1313	--	1413	--	1513	--	1613	--	1713	--	1828	--	--
Ware Hertford Regional College	0304	--	0806	--	0906	--	1004	--	1115	--	1220	--	1320	--	1420	--	1520	--	1620	--	1720	--	1835	--	--
Great Amwell Amwell Roundabout	0307	--	0810	--	0910	--	1008	--	1119	--	1224	--	1324	--	1424	--	1524	--	1624	--	1724	--	1839	--	--
Harlow Town Centre Bus Station	0317	--	0820	--	0920	--	1018	--	1130	--	1235	--	1335	--	1435	--	1535	--	1635	--	1735	--	1850	--	--

	724	724	724	724	724	724	724	724	724	724	724	724	724
Heathrow Airport Heathrow Central Bus Station	--	1830	--	1945	--	2040	--	2140	--	2240	0025	--	--
Heathrow Airport Terminal 5 Heathrow Terminal 5	--	--	--	--	--	--	--	--	--	--	0035	--	--
Uxbridge York Road (UB8)	--	1847	--	2001	--	2056	--	2154	--	2254	0054	--	--
Denham Station Parade	--	1855	--	2009	--	2104	--	2202	--	2302	0102	--	--
Maple Cross The Cross	--	1903	--	2018	--	2113	--	2211	--	2311	0110	--	--
Rickmansworth Railway Station	--	1909	--	2024	--	2119	--	2217	--	2317	0117	--	--
Watford Clarendon Road	--	1922	--	2037	--	2132	--	2229	--	2329	0129	--	--
Watford Junction Railway Station	--	1927	--	2042	--	2137	--	2234	--	2334	0134	--	--
Garston Bus Garage	--	1938	--	2051	--	2146	--	2242	--	2342	0142	--	--
Chiswell Green Three Hammers PH	--	1945	--	2057	--	2152	--	2249	--	2349	0149	--	--
St Albans St Peter's Street	1902	1955	2000	2104	2109	2159	2204	2256	2301	2356	0156	1806	0001
St Albans City Railway Station	1907	--	2005	--	2113	--	2208	--	2305	--	--	1811	0005
Hatfield The Galleria	1919	--	2017	--	2126	--	2221	--	2316	--	--	1825	0016
Hatfield Town Centre	1922	--	2020	--	2129	--	2224	--	2319	--	--	1828	0019
Hatfield Railway Station	1925	--	2023	--	2132	--	2227	--	2322	--	--	1831	0022
Welwyn Garden City New QEII Hospital	1932	--	2030	--	2138	--	2233	--	2328	--	--	1838	0028
Welwyn Garden City Bus Station	1943	--	2041	--	2148	--	2243	--	2338	--	--	1849	0038
Panshanger Windhill	1949	--	2047	--	2154	--	2249	--	2343	--	--	1857	0043
Hertford North Railway Station	1958	--	2056	--	2202	--	2257	--	2351	--	--	1906	0051
Hertford Bus Station	2005	--	2103	--	2209	--	2304	--	2358	--	--	1913	0058
Ware Hertford Regional College	2011	--	2109	--	2215	--	2310	--	0004	--	--	1919	0104
Great Amwell Amwell Roundabout	2015	--	2113	--	2218	--	2313	--	0007	--	--	1923	0107
Harlow Town Centre Bus Station	2025	--	2123	--	2228	--	2323	--	0017	--	--	1933	0117

Sunday - Heathrow Airport Heathrow Central Bus Station

	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724
Harlow Town Centre Bus Station	0110	--	0310	--	0510	--	0645	--	0845	--	1045	--	1245	--	1445	--	1725	--	2030	--
Great Amwell Amwell Roundabout	0121	--	0321	--	0521	--	0656	--	0856	--	1056	--	1256	--	1456	--	1736	--	2041	--
Ware Hertford Regional College	0125	--	0325	--	0525	--	0701	--	0901	--	1101	--	1301	--	1501	--	1741	--	2045	--
Hertford Bus Station	0131	--	0331	--	0532	--	0712	--	0912	--	1112	--	1312	--	1512	--	1752	--	2054	--
Hertford North Railway Station	0135	--	0335	--	0536	--	0718	--	0918	--	1118	--	1318	--	1518	--	1758	--	2058	--
Panshanger Windhill	0144	--	0344	--	0544	--	0727	--	0927	--	1127	--	1327	--	1527	--	1807	--	2107	--
Welwyn Garden City Bus Station	0151	--	0351	--	0551	--	0737	--	0937	--	1137	--	1337	--	1537	--	1817	--	2115	--
Welwyn Garden City New QEII Hospital	0158	--	0358	--	0558	--	0746	--	0946	--	1146	--	1346	--	1546	--	1824	--	2122	--
Hatfield Railway Station	0205	--	0405	--	0605	--	0754	--	0954	--	1154	--	1354	--	1554	--	1831	--	2129	--
Hatfield Town Centre	0208	--	0408	--	0608	--	0757	--	0957	--	1157	--	1357	--	1557	--	1833	--	2131	--
Hatfield The Galleria	0211	--	0411	--	0611	--	0800	--	1000	--	1200	--	1400	--	1600	--	1835	--	2133	--
St Albans City Railway Station	0223	--	0423	--	0623	--	0814	--	1014	--	1214	--	1414	--	1614	--	1845	--	2143	--
St Albans St Peter's Street	0226	0231	0426	0431	0626	0632	0820	0825	1020	1025	1220	1225	1420	1425	1620	1625	1850	1855	2146	2154
Chiswell Green Three Hammers PH	--	0238	--	0438	--	0639	--	0832	--	1032	--	1232	--	1432	--	1632	--	1902	--	2201
Garston Bus Garage	--	0245	--	0445	--	0648	--	0844	--	1044	--	1244	--	1444	--	1644	--	1912	--	2210
Watford Junction Railway Station	--	0256	--	0456	--	0702	--	0902	--	1102	--	1302	--	1502	--	1702	--	1925	--	2224
Watford Town Hall	--	0300	--	0500	--	0706	--	0906	--	1106	--	1306	--	1506	--	1706	--	1928	--	2227
Rickmansworth Railway Station	--	0309	--	0509	--	0716	--	0916	--	1116	--	1316	--	1516	--	1716	--	1937	--	2236
Maple Cross The Cross	--	0315	--	0515	--	0725	--	0925	--	1125	--	1325	--	1525	--	1725	--	1945	--	2243
Denham Station Parade	--	0321	--	0521	--	0731	--	0931	--	1131	--	1331	--	1531	--	1731	--	1950	--	2248
Uxbridge York Road (UB8)	--	0329	--	0529	--	0739	--	0939	--	1139	--	1339	--	1539	--	1739	--	1958	--	2255
Heathrow Airport Terminal 5 Heathrow Terminal 5	--	0345	--	0545	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Heathrow Airport Heathrow Central Bus Station	--	0355	--	0555	--	0755	--	0955	--	1155	--	1355	--	1555	--	1755	--	2013	--	2310

Sunday - Harlow Town Centre Bus Station

	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724	724
Heathrow Airport Heathrow Central Bus Station	--	0530	--	0705	--	0915	--	1115	--	1315	0025	--	1515	--	1715	--	1915	--	2125	--	--
Heathrow Airport Terminal 5 Heathrow Terminal 5	--	--	--	0715	--	--	--	--	--	--	0035	--	--	--	--	--	--	--	--	--	--
Uxbridge York Road (UB8)	--	0546	--	0733	--	0933	--	1133	--	1333	0054	--	1533	--	1733	--	1932	--	2142	--	--
Denham Station Parade	--	0554	--	0742	--	0942	--	1142	--	1342	0102	--	1542	--	1742	--	1940	--	2150	--	--
Maple Cross The Cross	--	0602	--	0748	--	0948	--	1148	--	1348	0110	--	1548	--	1748	--	1945	--	2155	--	--
Rickmansworth Railway Station	--	0610	--	0757	--	0957	--	1157	--	1357	0117	--	1557	--	1757	--	1953	--	2203	--	--
Watford Clarendon Road	--	0622	--	0812	--	1012	--	1212	--	1412	0129	--	1612	--	1812	--	2004	--	2214	--	--
Watford Junction Railway Station	--	0627	--	0817	--	1017	--	1217	--	1417	0134	--	1617	--	1817	--	2008	--	2218	--	--
Garston Bus Garage	--	0636	--	0829	--	1029	--	1229	--	1429	0142	--	1629	--	1829	--	2020	--	2228	--	--
Chiswell Green Three Hammers PH	--	0643	--	0837	--	1037	--	1237	--	1437	0149	--	1637	--	1837	--	2027	--	2235	--	--
St Albans St Peter's Street	0201	0650	0655	0852	0857	1052	1057	1252	1257	1452	0156	1457	1652	1657	1852	1857	2038	2043	2246	2251	0001
St Albans City Railway Station	0205	--	0700	--	0903	--	1103	--	1303	--	--	1503	--	1703	--	1902	--	2048	--	2256	0005
Hatfield The Galleria	0216	--	0711	--	0917	--	1117	--	1317	--	--	1517	--	1717	--	1914	--	2100	--	2306	0016
Hatfield Town Centre	0219	--	0714	--	0919	--	1119	--	1319	--	--	1519	--	1719	--	1916	--	2102	--	2310	0019
Hatfield Railway Station	0222	--	0717	--	0922	--	1122	--	1322	--	--	1522	--	1722	--	1918	--	2104	--	2312	0022
Welwyn Garden City New QEII Hospital	0228	--	0725	--	0930	--	1130	--	1330	--	--	1530	--	1730	--	1924	--	2110	--	2318	0028
Welwyn Garden City Bus Station	0238	--	0735	--	0942	--	1142	--	1342	--	--	1542	--	1742	--	1932	--	2118	--	2326	0038
Panshanger Windhill	0243	--	0742	--	0949	--	1149	--	1349	--	--	1549	--	1749	--	1937	--	2123	--	2331	0043
Hertford North Railway Station	0251	--	0752	--	0958	--	1158	--	1358	--	--	1558	--	1758	--	1946	--	2132	--	2340	0051
Hertford Bus Station	0258	--	0759	--	1005	--	1205	--	1405	--	--	1605	--	1805	--	1951	--	2135	--	2343	0058
Ware Hertford Regional College	0304	--	0806	--	1014	--	1214	--	1414	--	--	1614	--	1814	--	1958	--	2142	--	2350	0104
Great Amwell Amwell Roundabout	0307	--	0810	--	1018	--	1218	--	1418	--	--	1618	--	1818	--	2002	--	2145	--	2354	0107
Harlow Town Centre Bus Station	0317	--	0820	--	1029	--	1229	--	1429	--	--	1629	--	1829	--	2012	--	2155	--	0004	0117

New Greens/St Albans - Bricket Wood/Garston **361**

MONDAY-FRIDAY — From 1st April 2019

ROUTE VARIANT:	20	20	20	20	20	20	18	18
New Greens, High Oaks Terminus	0825						1545	
St Albans, Green Lane, New Greens Ave	0828						1548	
St Albans, Harpenden Rd, Ancient Briton	0830						1550	
St Albans, St Peter's Street, Stop 5	0840	0940	1040	1240	1340	1440	1600	1720
St Albans Abbey Railway Station, Stop A	0845	0945	1045	1245	1345	1445	1605	1726
Chiswell Grn, Tippendell Ln, 3 Hammers PH (E)	0851	0951	1051	1251	1351	1451	1611	1732
How Wood, Penn Rd, Shops, Stop 2	0855	0955	1055	1255	1355	1455	1616	1737
Bricket Wood, West Riding, North Riding	0901	1001	1101	1301	1401	1501	1622	1743
Bricket Wood, Victor Smith Court, Stop B	0903	1003	1103	1303	1403	1503	|	|
Bricket Wood, Mt Pleasant Lane, School							1625	1746
Garston, St Albans Rd, Bus Garage							1630	

MONDAY-FRIDAY

ROUTE VARIANT:	19	24	24	24	24	24	15	4
Garston, St Albans Rd, opp Bus Garage	0725							1638
Bricket Wood, Mt Pleasant Lane, opp Sch	0735							1643
Bricket Wood, Victor Smith Court, Stop B	|	0903	1003	1103	1303	1403	1503	|
Bricket Wood, W Riding, opp North Riding	0739	0905	1005	1105	1305	1405	1505	1647
How Wood, Penn Rd, Shops, Stop 1	0746	0911	1011	1111	1311	1411	1511	1653
Chiswell Green, Watford Rd, 3 Hammers PH	0751	0915	1015	1115	1315	1415	1515	1658
St Albans Abbey Railway Station, Stop B	0758	0920	1020	1120	1320	1420	1520	1704
St Albans, St Peter's Street, Stop 14	|	0928	1028	1128	1328	1428	|	1712
St Albans, St Peter's Street, Stop 11	0813						1530	
St Albans, Harpenden Rd, opp Ancient Briton	0817						1534	
St Albans, Green Ln, opp New Greens Ave	0819						1536	
New Greens, High Oaks Terminus	0824						1539	

SATURDAY

ROUTE VARIANT:	20	20	20	20	20	20	20	20	20
St Albans, St Peter's Street, Stop 5	0840	0940	1040	1240	1340	1440	1540	1640	1740
St Albans Abbey Railway Station, Stop A	0845	0945	1045	1245	1345	1445	1545	1645	1745
Chiswell Grn, Tippendell Ln, 3 Hammers PH (E)	0851	0951	1051	1251	1351	1451	1551	1651	1751
How Wood, Penn Rd, Shops, Stop 2	0855	0955	1055	1255	1355	1455	1555	1655	1755
Bricket Wood, West Riding, North Riding	0901	1001	1101	1301	1401	1501	1601	1701	1801
Bricket Wood, Victor Smith Court, Stop B	0903	1003	1103	1303	1403	1503	1603	1703	1803

SATURDAY

ROUTE VARIANT:	24	24	24	24	24	24	24	24
Bricket Wood, Victor Smith Court, Stop B	0903	1003	1103	1303	1403	1503	1603	1703
Bricket Wood, W Riding, opp North Riding	0905	1005	1105	1305	1405	1505	1605	1705
How Wood, Penn Rd, Shops, Stop 1	0911	1011	1111	1311	1411	1511	1611	1711
Chiswell Green, Watford Rd, 3 Hammers PH	0915	1015	1115	1315	1415	1515	1615	1715
St Albans Abbey Railway Station, Stop B	0920	1020	1120	1320	1420	1520	1620	1720
St Albans, St Peter's Street, Stop 14	0928	1028	1128	1328	1428	1528	1628	1728

Write to us: Red Eagle Buses, The Blinking Owl Garage, Oxford Road, Dinton, HP17 8TT

Email: info@redeagle.org.uk

All Enquiries to 01296 747926

Emergency line 07999 223359

Appendix AHJ/15

Local Community Travel Schemes

Transport for people who can't drive or use public transport

If you're permanently disabled or an older person, we'll do our best to make sure you can get to where you need to be.

Dial-a-Ride

A door to door travel service for people over 75 and anyone with a permanent disability.

Apply for Dial a Ride transport ›

Before you apply online...

You'll need either:

- Proof that you are over 75. This could be a photo of your passport or birth certificate.
- Proof of disability. This could be a photo of a letter from Department for Work and Pensions (DWP) which shows you are getting Disability Living Allowance, Personal Independence Payment or something similar.

You'll be asked to upload this photo in your application.

To become a member and book a ride, you can also call us on:

> **01992 556771**
>
> If you live in Broxbourne, call 01992 534269 to make a booking.

We're available **Monday to Friday 9:00am - 4:30pm.** You can use us to get to places like:

- local shops
- visiting friends and relatives
- clubs
- your local GP or dentist surgery.

It costs £2.10 for the first mile, 50p every mile after.

When you travel with us you can bring a friend too, they'll be charged the same amount.

Other community transport options

Community Transport Hertfordshire can help you find other providers in your area to help you get around, including:

- car schemes
- buses
- minibuses
- shopmobility.

Search Community Transport Hertfordshire ›

COMMUNITY TRANSPORT HERTFORDSHIRE

There's also help available if you need to get to an important hospital or GP appointment.

Rate this page

Appendix AHJ/16

Hertfordshire Saver Card Details

Hertfordshire SaverCard

Half-fare bus travel for 11-25 year olds.

SaverCard - 11-19 year olds

SaverCard Plus - 20-25 year olds

SaverCard for 11-19 year olds

To get a SaverCard, you need to:

- **be 11-19 years old**
- **live in Hertfordshire**
- **pay a fee of £20 online (it's £25 if you apply by post).**

The card will arrive within 14 days.

Savercard 11-19 years - apply or renew now

SaverCard Plus for 20-25 year olds

To get a SaverCard Plus, you need to:

- **be 20-25 years old**
- **live in Hertfordshire**
- **pay a fee of £20 online (it's £25 if you apply by post).**

The card will arrive within 14 days.

SaverCard Plus for 20-25 year olds - apply or renew ›

About SaverCards (including SaverCard Plus)

A SaverCard is valid for 12 months.

You can renew every year, as long as you're still eligible. You can renew up to 60 days before your current card expires.

If you're at secondary school and your family is on a **low income** or **receive benefits** you may be able to get a SaverCard for free - apply for help for school travel.

Where you can use your SaverCard

The SaverCard can be used on all local bus services within Hertfordshire (except Transport for London services).

It can also be used on any services from Hertfordshire to:

- Amersham Station
- Aylesbury Bus Station
- Chesham Broadway
- Cockfosters Station
- Dunstable Town Centre
- Harlow Bus Station
- Luton Town Centre
- Mount Vernon Hospital
- Queensbury Station
- Uxbridge Bus Station.

Terms and conditions

1. Hertfordshire SaverCards are only issued by Hertfordshire County Council to people between the age of 11 and 25 and resident in the administrative county of Hertfordshire.
2. A Hertfordshire SaverCard is only valid for use by the person named on the card when the photograph is a true likeness of the holder.
3. A Hertfordshire SaverCard must be renewed annually from the date the application is processed to continue being activated up until the 'Expiry Date' shown.

4. The Hertfordshire SaverCard remains the property of Hertfordshire County Council and must be surrendered on demand.
5. Use of the Hertfordshire SaverCard is subject to the scheme terms and conditions. The conditions of carriage of the bus company on whose services you are travelling also apply.
6. If revealed that any details used to apply for a Hertfordshire SaverCard were inaccurate or fraudulent, Hertfordshire County Council reserves the right to withdraw the Hertfordshire SaverCard.
7. If a Hertfordshire SaverCard is no longer valid or has been altered, defaced, deliberately damaged in any way or cancelled ('hotlisted') then the Hertfordshire SaverCard will be retained by the bus driver or authorised official and returned to the Passenger Transport Unit.
8. Hertfordshire SaverCards are not valid when used in any way which is fraudulent. Hertfordshire SaverCards not used in accordance with the terms of this scheme may be withdrawn by the operator and returned to the Passenger Transport Unit with a report of the circumstances of use.
9. Hertfordshire County Council reserves the right to withdraw a Hertfordshire SaverCard and not issue a replacement where fraudulent activity has been found to occur.
10. Hertfordshire County Council reserves the right to consider progressing prosecution and legal action where a Hertfordshire SaverCard has been found to be obtained or used fraudulently.
11. If a Hertfordshire SaverCard is lost, stolen or damaged you should let us know immediately so we can cancel it. A replacement Hertfordshire SaverCard will cost £20 (online).
12. If there is a change of circumstances, including changes to name, address or contact details, eligibility or a significant change in appearance then they can be updated online. Alternatively you can contact the Hertfordshire SaverCard Team on 0300 123 4050.
13. If you no longer need your Hertfordshire SaverCard, then return it to us at the address shown on the back of Hertfordshire SaverCard.
14. Hertfordshire County Council reserves the right to amend and change the general terms and conditions for Hertfordshire SaverCard usage and/or the scheme from time to time subject to statutory notice periods.
15. A Hertfordshire SaverCard allows the holder to purchase single and return bus tickets at half the adult fare. The discount offered for season, area and multi journey tickets may be less and therefore cost more than half the adult fare.
16. The reduced fare is available at all times on all local bus services (except Transport for London services) within Hertfordshire and the following points outside the county. Amersham (College and Railway Station), Aylesbury Bus Station, New Barnet Railway Station, Chesham Broadway, Dunstable Square, Edgware Bus Station, Enfield Town Centre, Harlow Bus Station, Harrow Bus Station, Luton Town Centre, Mount Vernon Hospital, Southgate Tube Station and Uxbridge Bus Station.
17. A Hertfordshire SaverCard must be touched on the card reader, where fitted, or presented to the bus driver for visual inspection before purchasing a ticket, otherwise the appropriate full (standard) fare will be charged. No refunds will be made for any additional fares paid.
18. To prevent fraudulent use of Hertfordshire SaverCard, passengers may be required to show their Hertfordshire SaverCard and confirm their identity if requested to do so by the bus driver, a bus company representative, a Hertfordshire County Council authorised representative or a Police Officer.
19. Possession of a Hertfordshire SaverCard does not confer any rights upon the holder other than those of a fare paying passenger.
20. Hertfordshire County Council will not accept any liability for the consequences arising from:

- journeys that do not operate in accordance with the published timetables
- the shortage of accommodation in any vehicle
- detentions, delay or non-operation of a journey for whatever reason
- failing to provide a relief vehicle.

About SaverCard

There's no obligation for bus companies to provide half fare travel to children and young people, so we provide a scheme called Hertfordshire SaverCard.

A SaverCard entitles the holder to travel for half the adult fare at all times on most local bus services within Hertfordshire and to certain destinations outside the county (see Terms and conditions).

You must have a valid Hertfordshire SaverCard with you when you travel, otherwise you'll be charged the full adult fare.

Privacy notice – Hertfordshire SaverCard

Why we need your information

The data on this form is being gathered for the purpose of processing Hertfordshire SaverCard applications. Hertfordshire County Council will use this information to ensure all contacts (including calls, emails, online contacts and webchats) are managed effectively to assess eligibility, process applications and give the best customer service possible.

Hertfordshire County Council collect and process this data in order to meet our legal obligation to provide travel concessions under the Transport Act 1985, the provisions of The Travel Concessions Schemes Regulations 1986 and The Local Government Act 2000.

What we will do with your information

The information you give us will be processed by Novacroft under contract to the Passenger Transport Unit team of Hertfordshire County Council and will be used to process Hertfordshire SaverCard applications and help us to manage and improve the scheme. The information provided may be verified against existing data held by the council. It can also be used for statistical analysis and reporting to help plan and improve the passenger transport network.

Novacroft also print and issue the Hertfordshire SaverCards under contract to Hertfordshire County Council.

We will also share information with third parties if we are legally obliged to do so, for example if it necessary to safeguard or protect a vulnerable adult or child.

We may also share information with the police or other agencies if it is necessary for the following purposes:

1. the prevention or detection of crime
2. the apprehension or prosecution of offenders
3. the assessment or collection of any tax or duty or any imposition of a similar nature.

This also includes the internal fraud service and bus companies in relation to potential fraudulent use of Hertfordshire SaverCards.

How long we will keep your information

The information that you supply to us will be kept on file for:

1. Application data - 7 years after creation of the Hertfordshire SaverCard
2. Passenger details - 2 years after the last use or expiry of an 'active' Hertfordshire SaverCard
3. Hertfordshire SaverCard usage - 8 years after the Hertfordshire SaverCard transaction data record was created.

What are your rights?

Hertfordshire County Council will be the Data Controller for this information. In relation to this data:

- you have the right to be informed about what information we hold about you and how we use it
- you have the right to request copies of any information the Council holds about you by making a subject access request

- you have the right to correct information we hold about you if it is factually inaccurate
- you have the right to object to the way we are using your data
- you have the right to request that your data is deleted. However we may be unable to delete your data if there is a need for us to keep it. In this case you will receive an explanation of why we need to keep the data.
- You can also request that we stop using your data while we consider a request to have it corrected or deleted. There may be some circumstances in which we are unable to do this however we will provide an explanation if this is the case.
- In certain circumstances you may also request data we hold about you in a format that allows it to be transferred to another organisation.
- In the event that decisions are taken using automated processes you have the right to request that these decisions are reviewed by a member of staff and to challenge these decisions.

If you would like to request copies of your data, request that your data is deleted or have any other queries in relation to data which the council holds about you please contact:

> Data Protection Team
> Hertfordshire County Council
> County Hall, Pegs Lane, Hertford
> SG13 8DQ
>
> data.protection@hertfordshire.co.uk
> 01992 588099
>
> You can also contact our Data Protection Officer at dataprotection.officer@hertfordshire.gov.uk or in writing to the address above.

If you are unhappy with the way that Hertfordshire County Council has used your data, or with the way we have responded to a request, you also have the right to contact the Information Commissioner's Office at www.ico.org.uk.

Appendix AHJ/17

Paragraph 4.4.1 from Manual for Streets

Communities and Local Government

Department for Transport

Manual for Streets

Figure 4.6 Perimeter blocks enclosing a pleasant communal open space.

Figure 4.7 A highways-dominated layout with buildings that have a poor relationship to the road.

4.4 The walkable neighbourhood

4.4.1 Walkable neighbourhoods are typically characterised by having a range of facilities within 10 minutes' (up to about 800 m) walking distance of residential areas which residents may access comfortably on foot. However, this is not an upper limit and PPS13[4] states that walking offers the greatest potential to replace short car trips, particularly those under 2 km. MfS encourages a reduction in the need to travel by car through the creation of mixed-use neighbourhoods with interconnected street patterns, where daily needs are within walking distance of most residents.

4.4.2 By creating linkages between new housing and local facilities and community infrastructure, the public transport network and established walking and cycling routes are fundamental to achieving more sustainable patterns of movement and to reducing people's reliance on the car. A masterplan (or scheme layout for smaller-scale developments) can help ensure that proposals are well integrated with existing facilities and places.

4.4.3 Density is also an important consideration in reducing people's reliance on the private car. PPS3[5] encourages a flexible approach to density, reflecting the desirability of using land efficiently, linked to the impacts of climate change. It sets a national minimum indicative density of 30 dwellings per hectare. Residential densities should be planned to take advantage of a proximity to activities, or to good public transport linking those activities. *Better Places to Live: By Design*[6] advises that a certain critical mass of development is needed to justify a regular bus service, at frequent intervals, which is sufficient to provide a real alternative to the car.

4.5 Layout considerations

4.5.1 Streets are the focus of movement in a neighbourhood. Pedestrians and cyclists should generally share streets with motor vehicles. There will be situations where it is appropriate to include routes for pedestrians and cyclists segregated from motor traffic, but they should be short, well overlooked and relatively wide to avoid any sense of confinement. It is difficult to design an underpass or alleyway which satisfies the requirement that pedestrians or cyclists will feel safe using them at all times.

4.5.2 The principle of integrated access and movement means that the perimeter block is usually an effective structure for residential neighbourhoods. A block structure works in terms of providing direct, convenient, populated and overlooked routes. In addition, it makes efficient use of land, offers opportunities for enclosed private or communal gardens, and is a tried and tested way of creating quality places (Figs 4.6 and 4.7).

4.5.3 Several disadvantages have become apparent with housing developments built in the last 40 years which departed from traditional arrangements. Many have layouts that make orientation difficult, create left-over or ill-defined spaces, and have too many blank walls or façades. They can also be inconvenient for pedestrians, cyclists and bus users.

4 DETR (2001) *Policy Planning Guidance 13: Transport.* London: TSO.
5 DTLR and CABE (2001) *Better Places to Live: By Design. A Companion Guide to PPG3.* London: Thomas Telford Ltd.
6 Communities and Local Government (2006) *Planning Policy Statement 3: Housing*. London: TSO.

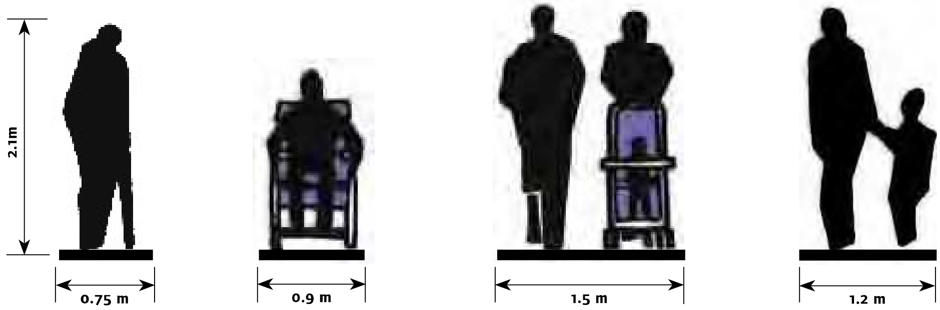
Appendix AHJ/18

Figure 6.8 from Manual for Streets

Communities and Local Government

Department for Transport

Manual for Streets



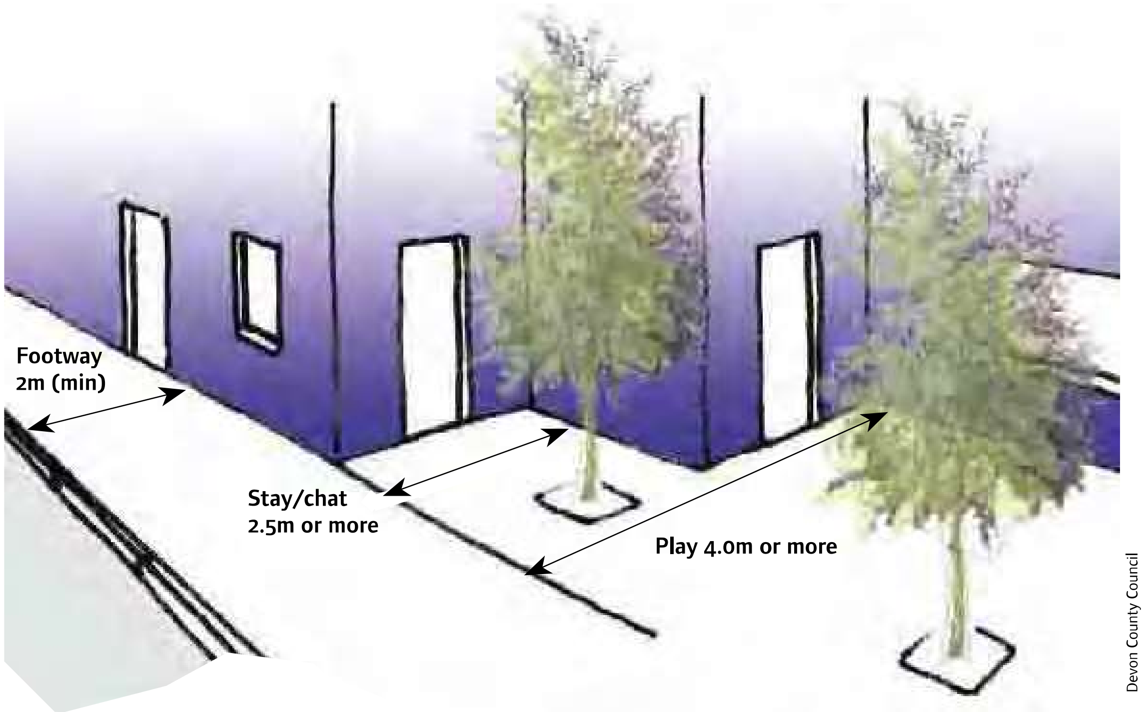


Figure 6.8 The footway and pedestrian areas provide for a range of functions which can include browsing, pausing, socialising and play.

6.3.20 *Inclusive Mobility* gives guidance on design measures for use where there are steep slopes or drops at the rear of footways.

6.3.21 Places for pedestrians may need to serve a variety of purposes, including movement in groups, children's play and other activities (Fig. 6.8).

6.3.22 There is no maximum width for footways. In lightly used streets (such as those with a purely residential function), the minimum unobstructed width for pedestrians should generally be 2 m. Additional width should be considered between the footway and a heavily used carriageway, or adjacent to gathering places, such as schools and shops. Further guidance on minimum footway widths is given in *Inclusive Mobility*.

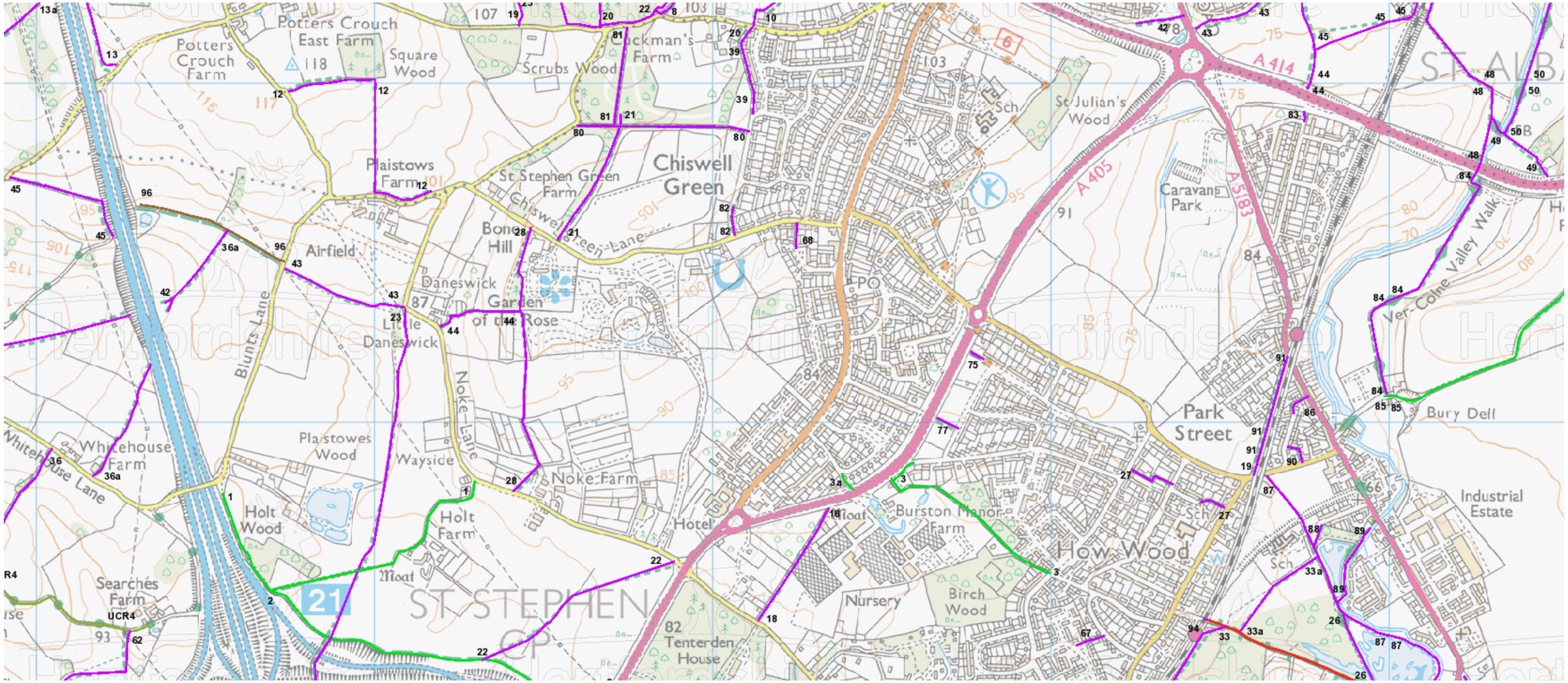
6.3.23 Footway widths can be varied between different streets to take account of pedestrian volumes and composition. Streets where people walk in groups or near schools or shops, for example, need wider footways. In areas of high pedestrian flow, the quality of the walking experience can deteriorate unless sufficient width is provided. The quality of service goes down as pedestrian flow density increases. Pedestrian congestion through insufficient capacity should be avoided. It is inconvenient and may encourage people to step into the carriageway (Fig. 6.9).

6.3.24 Porch roofs, awnings, garage doors, bay windows, balconies or other building elements should not oversail footways at a height of less than 2.6 m.

Appendix AHJ/19

Local Public Rights of Way

<u>Extract from Hertfordshire County Council's Online Public Right of Way Map</u> (taken from https://webmaps.hertfordshire.gov.uk/row/row.htm)



Rights of Way

- Byway Open to All Traffic
- Restricted Byway
- Bridleway
- Footpath
- Temporary Footpath
- Temporarily Closed Footpath
- Unmetalled UCR

Rights of Way PTRO

- PTRO

Appendix AHJ/20

St Albans Cycle Map

St Albans City & District Cycling Map

Welcome to this revised St Albans City & District Cycling Map. This new edition features the **St Albans Green Ring,** a continuous walking and cycling route covering 6.5 miles of open space, parks, nature reserves, and heritage sites.

For more maps and further information on cycling in the district, go to **www.stalbans.gov.uk/cycling**

If you have any suggestions for improving cycling provisions in the district, such as additional cycle parking locations or new cycle routes, please contact us at **contactus@stalbans.gov.uk**

St Albans District Council is grateful for assistance given by members of the St Albans Cycle Campaign with this map revision. **www.stacc.org.uk**

This map shows the **National Cycle Networks (NCN)** within the district.
To see the whole network, visit **www.sustrans.org.uk/ncn/map**

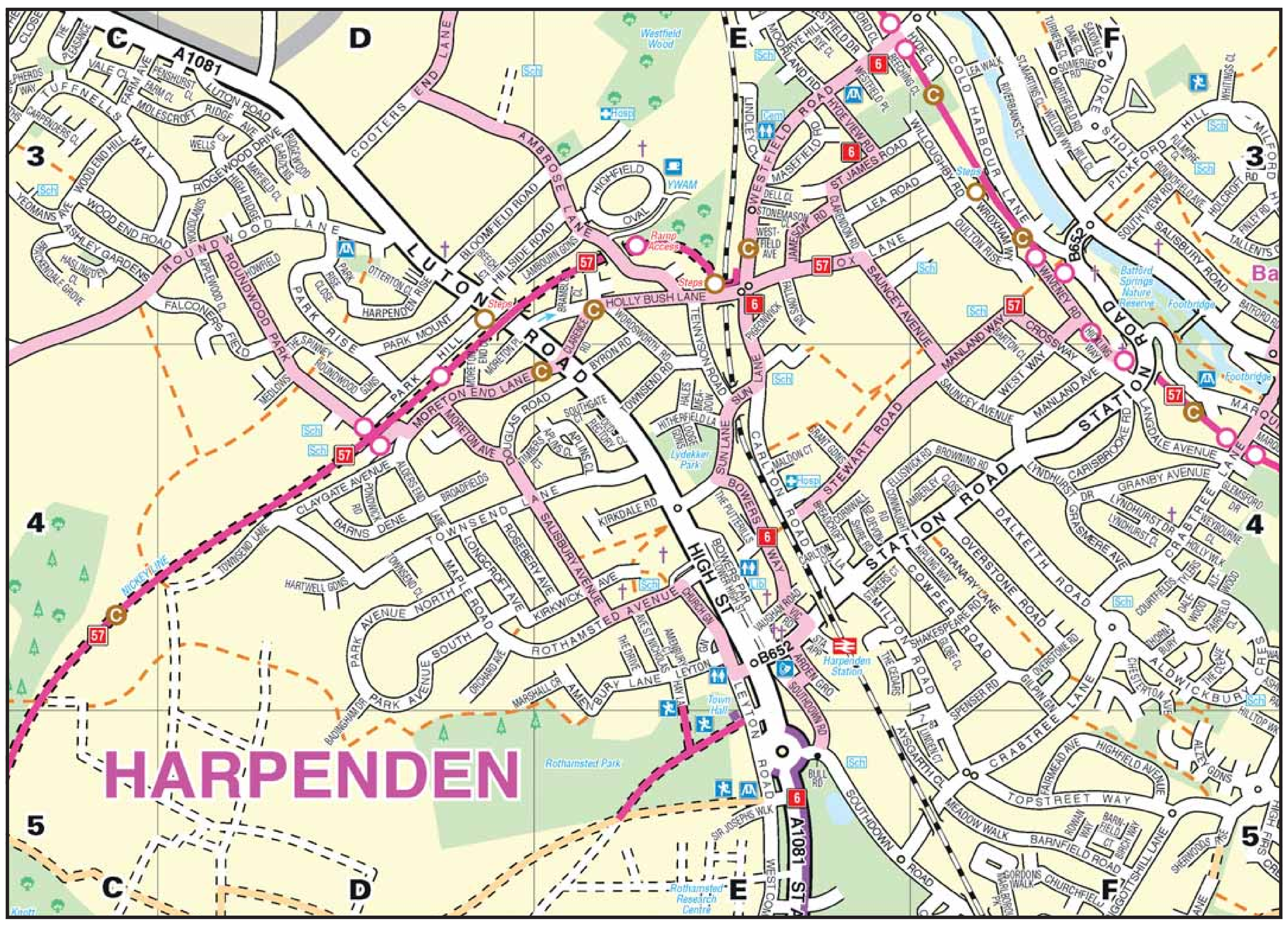
This map also shows part of the **Chiltern Cycleway.** To see the whole of the 170 mile circular route visit **www.chilternsaonb.org/explore-enjoy/chilterns-cycleway**

Signs and symbols - common signs relating to cycling

For all traffic signs and road markings, and rules of the road, refer to the Highway Code- **https://www.gov.uk/highway-code/contents**

St Albans City & District Council

July 2019



St Albans City & District Cycling Map

Your guide to cycle routes in St Albans District

St Albans City & District Council

Appendix AHJ/21

Extract from LTN 1/20

Department for Transport

Cycle Infrastructure Design

Local Transport Note 1/20
July 2020

- In situations where high cycle and high pedestrian flows occur at different times (also see Figure 6.27).

6.5.7 Recommended minimum widths of shared use routes carrying up to 300 pedestrians per hour are given in Table 6-3. Wherever possible, and where pedestrian flows are higher, greater widths should be used to reduce conflict.

Table 6-3: Recommended minimum widths for shared use routes carrying up to 300 pedestrians per hour

Cycle flows	Minimum width
Up to 300 cyclists per hour	3.0m
Over 300 cyclists per hour	4.5m

6.5.8 Designers should be realistic about cyclists wanting to make adequate progress. The preferred approach for shared use routes is therefore to provide sufficient space so that cyclists can comfortably overtake groups of pedestrians and slower cyclists.

6.5.9 Research shows that cyclists alter their behaviour according to the density of pedestrians – as pedestrian flows rise, cyclists tend to ride more slowly and where they become very high cyclists typically dismount.[30] It should therefore rarely be necessary to provide physical calming features to slow cyclists down on shared use routes, but further guidance on this, and reducing conflict more generally, is given in Chapter 8, section 8.2.

6.6 Cycling on bus and tram routes

Bus lanes

6.6.1 Cyclists are usually permitted to use with-flow and contraflow bus lanes. Whilst not specifically a cycle facility, bus lanes can offer some degree of segregation for cyclists as they significantly reduce the amount of interaction with motor traffic. However, they do not provide an environment attractive to a wide range of people and should therefore not be regarded as inclusive. Some bus lanes also allow taxis and motorcycles to use them, which can significantly increase traffic flows, thereby acting as a deterrent to cycling while also increasing risk of conflict.

6.6.2 Where cyclists are using bus lanes, the lane should be at least 4m wide, and preferably 4.5m, to enable buses to pass cyclists with sufficient room. Bus lanes less than 4m in width are not recommended and widths between 3.2m and 3.9m wide should not be used.

6.6.3 Cycle lanes or protected space for cycling may be provided within or adjacent to bus lanes where the overall width available is 4.5m or more – see Figure 6.28. At bus stops a bus stop bypass or bus boarder arrangement may be appropriate (see 6.6.7).

Figure 6.28: Cycle lane within bus lane, Brighton

Bus gates and bus-only roads

6.6.4 Bus gates are used to control routes and access to bus-only roads by preventing access by general traffic. Nearside bus gates and bus-only roads should by default be accessible by cyclists.

6.6.5 Bus gates may be implemented through the use of rising bollards, traffic signals or simply traffic signs. Where bus activated signals are used without a cycle bypass, it will be necessary to provide a means for cyclists to activate the signals. This may be achieved by a suitable means of detection or a pushbutton unit for cyclists to operate. Care should be taken to ensure push-buttons can be reached by cyclists who cannot dismount, including from a recumbent position.

30 Davies DG et al. (2003) Cycling in Vehicle Restricted Areas: TRL583

Appendix AHJ/22

Extract from Appendix A of the St Albans Consultation Draft LCWIP

St Albans District

LCWIP – RURAL CONNECTIVITY

HCC / SADC

APPENDIX (PUBLIC)

PROJECT 70080342

JANUARY 2023

VERSION CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	DRAFT	DRAFT	Consultation document	
Date	December 2022	January 2023	February 2023	
Prepared by	ET	ET	ET	
Signature	ET	ET	ET	
Checked by	NF	SJ, WF	SJ, NF, WF, RT	
Signature	NF	SJ, WF	SJ, NF, WF, RT	
Project number	70080342	70080342	70080342	
Report number	SADC-LCWIP-001	SADC-LCWIP-001	SADC-LCWIP-001	
File reference				

1.1 INTRODUCTION

1.1.1 Due to its emphasis on the areas with the greatest potential demand and potential to encourage new walking and cycling trips, the LCWIP focuses mostly on infrastructure and routes found in dense urban areas. However, we recognise that rural connectivity is also important to the district, and that investment in rural transport will also be essential to creating a greener, cleaner, healthier Hertfordshire.

1.1.2 Rural connectivity is of particular importance in St Albans, where towns are often surrounded by many smaller settlements less than five miles away, meaning distances between facilities and services are often a cyclable distance for many – especially with the rising popularity of e-bikes.

1.1.3 Many rural connectivity routes were not prioritised in this first iteration of the LCWIP and were therefore not audited and so are not shown in the infrastructure improvement plans. However, this Rural Connectivity Appendix seeks to rebalance this approach by capturing aspirations for these rural connections that might not have the greatest potential increase in trips overall but where we nevertheless recognise the need to improve walking and cycling provision and are already undertaking work outside the main LCWIP process. The Appendix therefore details the additional, ongoing work undertaken by HCC and partners to identify improvements to rural connectivity, and supplements the routes set out in the infrastructure improvement plans.

1.2 KEY ROUTES FOR RURAL CONNECTIVITY

A5183 Redbourn-St Albans

1.2.1 A project has been commissioned in response to ongoing community concerns and a number of serious accidents along the A5183 between Redbourn and St Albans. The feasibility study has reviewed options for both road safety improvements and improvements to walking and cycling.

1.2.2 Opportunities for improved walking and cycling provision along this route have been identified and include:

- A shared use facility to provide a segregated cycling path alongside the footway
- Footway resurfacing
- Tightening of side road junctions and active travel priority at junctions
- Improvements to pedestrian crossings linked to bus stop access
- Improvements to roundabouts at either end of the corridor

1.2.3 Currently, no funding mechanism for these improvements has been identified but we will continue to seek opportunities to bring these improvements forward. This could be through existing work programmes, external funding bids and where appropriate developer funding to allow for delivery of the most appropriate measures to take place.

1.2.4 Onward west-bound connections towards settlements such as Markyate and onwards to Luton will be considered as part of the Dacorum LCWIP.

Harpenden-Wheathampstead (NCN 57 / Lea Valley Walk)

1.2.5 Connections between Harpenden and Wheathampstead, bridging a missing section of National Cycle Network (NCN) route 57, are an identified scheme in the South Central Growth and Transport Plan and remain a popular request by the local community. To date, initial route scoping and investigation work has identified several potential options for a route between Leasey Bridge Lane and Wheathampstead.

1.2.6 All of these options are reliant on third party land in multiple ownership. We are currently identifying how to work with landowners to seek access rights over this land.

Redbourn-Harpenden (B487)

1.2.7 The B487 between Redbourn and Harpenden provides an alternative link between the two villages, connecting Redbourn to the southern end of Harpenden. This has been identified as a primary unaudited route in the Network Plan for Cycling, and links to both the A1081 at Harpenden and the Nickey Line as well as several off-road rights of way.

1.2.8 During the stakeholder engagement sessions, concerns were raised with regards to safety due to vehicle speeds and a lack of segregated space for walking and cycling on this route. Cycling provision along the B487 is also dependent on safety at the junction with the A5183, which is already being considered as part of a study on the A5183 and improvements to the Nickey Line.

1.2.9 These suggestions have been noted as part of the LCWIP stakeholder engagement process and will be considered in future programmes of work. The further development of proposals for this route will also be in scope for a future iteration of the LCWIP.

Harpenden-Wheathampstead (Harpenden / Wheathampstead Rd)

1.2.10 An alternative route between the southern part of Wheathampstead and Luton is along Harpenden Rd then Wheathampstead Rd.

1.2.11 There is community support for improvements on this route: the Safe Cycle Routes for Wheathampstead project (a sub-committee of the Wheathampstead Community Group) identified a number of potential infrastructure improvements on this route, including vegetation cutback, white lines, signage, surfacing, and changes to the rights of way.

1.2.12 While these community-led proposals have not yet been assessed for alignment with LTN 1/20 standards or technical deliverability by HCC, these suggestions have been noted as part of the LCWIP stakeholder engagement process and will be considered in future programmes of work.

Wheathampstead-St Albans (B651)

1.2.13 There is potential demand for safe cycle connections between Wheathampstead and St Albans given the relatively close distance involved and the demographics of both settlements. This is identified as a Primary Cycle Route in Wheathampstead's Neighbourhood Plan, and the southern section has also already been identified as part of the St Albans LCWIP Infrastructure Improvement Plan.

1.2.14 Investigation works around particular junctions and locations on the route have been undertaken and led to a number of suggestions that have been logged as part of the wider LCWIP programme, as well as being investigated as potential options using HCC Highways Locality Budget.

1.2.15 The Safe Cycle Routes for Wheathampstead project (a sub-committee of the Wheathampstead Community Group) identified a number of further potential infrastructure improvements on this route, including dropped kerbs, resurfacing, signage, road markings, new path creation, ditch filling, improved drainage, and vegetation cutback.

1.2.16 Suggestions put forward by the Safe Cycle Routes for Wheathampstead project (led by the Wheathampstead Community Group) are shown in **Figure 1**.

1.2.17 It should also be noted that a shared cycleway/footway has now been installed on one section of the route between Sandridge and the Cricket Club.

1.2.18 While these suggestions have not yet been examined in detail for alignment with appropriate standards and/or deliverability by HCC, they have been noted through the LCWIP stakeholder engagement process and we will investigate opportunities to introduce improvements to this route through existing highway programmes.

FIG 1.1 – 'SAFE CYCLE ROUTES FOR WHEATHAMPSTEAD' REPORT EXTRACT

Section	Suggested requirements
A	Dropped kerb near bus stop at top of The Hill
A to B	Resurface and widen tarmac path remove some trees/bushes to create lightwells Change use of RoW to shared cycling/walking Install shared use signs (“Share with care”)
B	Install warning signs (“Cyclists give way”)
B to C	Two alternative options around Silverlands New path through field Install passing spaces Remove some trees/bushes to create additional space
C	Replace and extend metal fence Widen exit from path onto cricket club driveway
C to D	White line & cycle markings for crossing over cricket club entrance Warning signs for cars exiting cricket club Warning signs on B651 for cars entering cricket club
D	Widen and level entrance to Nomansland
D to E	Dig out and lay new MOT type 1/type 2 path parallel to B651 (651m)
E	Fill in ditch to Ferrers Lane
E to F	White line and cycle markings
F	Fill in ditch to Ferrers Lane
F to G	Dig out and lay new MOT Type ½ path parallel to B651 (300m)
G	Ensure adequate drainage Create separation for horses & cyclists on steep slope
H	Entrance to Heartwoood Forest – join existing bridleway
Heartwood	Improve cycle path at Heartwood for access to Sandridgebury Lane

Luton-Harpenden (Lea Valley Walk)

1.2.19 The Lee Valley Line (NCN6) provides an existing off road walking and cycleway between southern Luton and the north eastern part of Harpenden.

1.2.20 Improvements to the Harpenden section of the Lea Valley route (approximately between Riverford Close and Piggottshill Lane) are identified in the Greenspace Action Plan, produced by the Countryside Management Service on behalf of St Albans City & District Council. Active travel aspirations for the Lea Valley Walk include:

- To improve user experience, awareness and understanding of the route through appropriate signage and information
- To provide and maintain clear and safe public access onto and along the multi-user route, through improved links to local destinations and managing the route’s surface as well as through restricting unwanted vehicular access as much as possible

Wheathampstead-Welwyn Garden City (B653)

1.2.21 Links between the two towns are of a suitable cycling distance, and may provide an alternative option for rail connections as well as links to the University of Hertfordshire and Hatfield Business Park.

1.2.22 Off-road links between Wheathampstead and Welwyn Garden City for people walking and cycling are currently limited to the National Cycling Network route along the Ayot Greenway. Although this route has had recent surfacing improvements, it is a rural unlit route and not suitable for utility journeys in all seasons for all people.

1.2.23 The most direct on-road route is along the B653 Marford Road. However, this is a heavily trafficked B-road with unrestricted speed (60mph) so is unsuitable for on road cycling. The Safe Cycle Routes for Wheathampstead project (a sub-committee of the Wheathampstead Community Group) has identified a number of potential infrastructure improvements on this route, including dropped kerbs, vegetation cutback, surfacing, signage, white lines, and changes to Rights of Way.

1.2.24 The route is one of local interest, and suggestions put forward by the Safe Cycle Routes for Wheathampstead project (led by the Wheathampstead Community Group) are shown in **Figure 2**.

1.2.25 Whilst some quick wins have been identified including vegetation cutback and new footpath surfacing, the provision of a safe cycle route which adheres to current LTN1/20 design standards would require full segregation from the road carriageway and significant investment. The suggestions have been noted through the LCWIP stakeholder engagement process but would need to be investigated in further detail and assessed against new design standards.

FIG-2 EXTRACT FROM 'SAFE CYCLE ROUTES FOR WHEATHAMPSTEAD' REPORT

Section	Suggested requirements
A	Dropped kerb at top of Sheepcote Lane
A to B	Clear hedgerow along verge Lay new tarmac path Route tarmac round lay-by
B	Dropped kerb to return to main carriageway White lining to show cycle track entering roundabout Warning signs for cars on Marford Rd and on Cory-Wright Way
B to C	White lining to show cycle track around outside of roundabout
C	Dropped kerb for exit from/entry to roundabout
C to D	Clear hedgerow along verge Lay new tarmac path (500m) Route tarmac round lay-by
D	Dropped kerb Warning signs for cars on Marford Rd and on Waterend Lane
D to E	White line and cycle markings for crossing over Waterend Lane
E	Dropped kerb
E to F	Lay new tarmac following existing footpath (2,500m) Change use of RoW to shared cycling/walking
F	If Bricket lay-by is reopened then need warning signs for cars and cyclists
F to G	Use Bricket lay-by
G	Dropped kerb to join existing tarmac path
G to H	Cut back trees from existing tarmac path Change use of RoW to shared walking/cycling
H to I	White lines and cycle markings for crossing over Brocket Hall GC entrance
I to J	Cut back trees from existing tarmac path
J	Dropped kerb to join carriageway before Green Lanes Dropped kerb to join carriageway before Lemsford Village

1.3 CYCLING CONNECTIVITY PROJECT

1.3.1 A separate HCC project is underway to identify key gaps in the interurban cycle network and link what would otherwise by separate routes into a cohesive network. Two of the first shortlisted routes identified through the project are within the St Albans district area and are already featured within the infrastructure plans.

1.3.2 A summary in this Appendix has been provided to give further context to this ongoing work, as they are important routes for inter-settlement travel.

Watford-St Albans via Chiswell Green

1.3.3 The connection between Watford and St Albans via Chiswell Green and Bricket Wood has been identified as a key cycling connection.

1.3.4 We are investigating options to provide a safe segregated cycleway along this route along with improvements for pedestrians. Initial concept designs are being developed and funding opportunities to take this forward into more detailed design and implementation are being investigated.

Nickey Line (Redbourn-Harpenden)

1.3.5 The Nickey Line is an important route for both walking and cycling between Hemel Hempstead and Harpenden.

1.3.6 Potential opportunities to improve access to the route and provide safer crossings where it interacts with the highway network have been identified as part of the HCC Connectivity Study.

1.3.7 Improvements to the crossings of the A5183 and B487, as well as improved links between the Nickey Line and the High Street, are included in the Redbourn Neighbourhood Plan, therefore further supporting the objectives of the ongoing Connectivity Study.

1.3.8 The HCC Rights of Way team have also developed a Greenspace Action Plan for the Nickey Line (as described in Appendix B) and Sustrans (the national cycling charity) are also looking at potential for improvements to the route. Further discussions will be held with all three parties to identify how the suggested improvements can be delivered

1.4 NEIGHBOURHOOD PLANS

1.4.1 As part of consideration given to rural connectivity across the districts, we have identified key routes of local importance as set out in Neighbourhood Plans.

1.4.2 At the time of writing, three parishes in the district have adopted neighbourhood plans: Harpenden, St Stephen, and Sandridge.

1.4.3 Neighbourhood Plans have also been submitted either for consultation or examination in Wheathampstead and Redbourn.

1.4.4 A plan is also being developed in London Colney and Colney Heath.

1.4.5 Ambitions and policies set out in Neighbourhood Plans have been taken into account during the LCWIP process and will be considered further when developing walking and cycling schemes in these geographical areas, or where funding is made available for such improvements.

Harpenden ('Made')

1.4.6 The Harpenden Neighbourhood Plan contains the following relevant policies and objectives:

- Policy ESD11 specifies that major developments outside the built-up area should create new public rights of way and cycle paths, and supports proposals for new definite rights of way to improve opportunities for sustainable transport.
- The Transport & Movement Objectives set out aims to promote sustainable transport, integration of different modes, to reduce pollution and ensure new development deliver or improve sustainable transport infrastructure.

- Policy T9 specifically supports new and improved walking and cycling routes and associated facilities. It also makes specific reference to need to improve cycling provisions on the route between Harpenden and St Albans via Beesonend Lane past West Common.

St Stephen Neighbourhood Plan ('Made')

1.4.7 While there are no specific walking/cycling routes identified within the St Stephen Neighbourhood Plan, there are some relevant policies and objectives:

- Objective 8 is "to improve transport and movement, in particular through further development of public transport provision and other non-car travel modes, whilst ensuring a safe environment for pedestrians, cyclists and horse-riders as well as motorists."
- Policy S5 requires developments to provide pedestrian and cycle connections to community facilities, local services and transport modes as well as to the countryside.
- Policy S14 requires new developments to incorporate safe and accessible walking and cycling access to existing footways and cycleways and supports the delivery of improvements to rights of way.
- Policy S15 seeks to improve or enable connectivity between villages and the wider countryside along bridleways.
- In Section 11 'Non-Land Use Actions and Spending Priorities', the Plan identifies aspirations for traffic calming and reduced speed limits in Chiswell Green, Park Street, Bricket Wood. The Plan also supports the introduction of new parking restrictions at some locations, as well as the enforcement of existing restrictions.

Sandridge ('Made')

1.4.8 The Sandridge Parish Neighbourhood Plan sets out a number of aspirations and policies that are relevant to the LCWIP:

- Policy T1 (Traffic Congestion and Road Safety) seeks to minimise the impact of traffic congestion on residential roads, and to improve road safety and the roadside environment.
- Policy T3 (Walking, Cycling and Recreational Travel) seeks to ensure safe, attractive and accessible pedestrian and cycle routes to key destinations. The policy requires proposals for new development to take opportunities to increase, extend of upgrade multi-user off-road rights of way in line with the HCC Rights of Way Improvement Plan as well as the 'Database of Suggestions for Sandridge Parish' in figures 4 and 5 of the Plan.

Wheathampstead (Regulation 16)

1.4.9 The regulation 16 draft version of the Wheathampstead Neighbourhood Plan sets out the following relevant policies:

- Policy W12 (Improving walking and cycling in the parish) supports development which would secure sustainable movement within the parish.
  - A series of "Primary Local Access Routes" have been identified that enable access on foot, and where possible bicycle, to these key areas. These are shown in Figures 7.1, 7.2 and 7 of the Regulation 16 draft Neighbourhood Plan.
  - For any development that does come forward, the policy requires safe footpath access to be provided to link in with these primary local access routes.
  - The policy sets out a priority for Primary Local Access Routes to be improved and for access to them from any new housing developments to be provided, in order to encourage more intra-parish, local trips to be taken using non-car, sustainable methods.
  - Section 106 and/or CIL funding will be sought to improve off-road cycle routes linking up with the existing Hertfordshire network.

Redbourn (Regulation 16)

1.4.10 The Regulation 16 draft of the Redbourn Neighbourhood Plan includes several policies and objectives relevant to the LCWIP:

- Objective 5 of the Plan is to "Increase walking and cycling movements through improved footpath and cycle path provision".
- Chapter 8 recognises the interest of community members in shifting to modes of travel other than the private car, and an increased interest in cycling, and Policy 9 set out requirements for new development to deliver or improve walking and cyclin routes.
- Project E identifies a number of key locations or routes, such between Redbourn and St Albans, Harpenden, Hemel Hempstead, and links to the Nickey Line.

London Colney (In development)

1.4.11 Several technical reports (including design code, housing needs, area analysis and policy review reports) have been produced for the London Colney Neighbourhood Plan and an initial document with vision and objectives has been produced.

- The May 2021 'Vision, Objectives, Policy and Project Ideas' document sets out a number of draft policy areas, including a policy to ensure all new developments incorporate adequate active travel infrastructure.
- Parish council stakeholders have also expressed interest in improvements or extensions to a number of rights of way, including safe crossing points and rerouting of some footpaths, which may be included in future full drafts of the Neighbourhood Plan.

1.4.12 An extract from the London Colney travel Active Travel project document, which was sent to the LCWIP project team during the stakeholder engagement phase, is shown in **Figure 3**.

FIG-3 EXTRACT FROM LONDON COLNEY NEIGHBOURHOOD PLAN DRAFT ACTIVE TRAVEL PROJECTS DOCUMENT

Project	Route
1	Bridleway to St Albans City from Napsbury
2	Safe crossing of A414 for footpath 53 HCC
3	London Road at London Colney Roundabout
4	Morriss Playing Fields to Highfield Lane
5	Bell Roundabout to bridleway 43
6	Access to Blind Lane from Colney Fields
7	Circular Route around Sainsbury's field
8	Former Pastoral Centre
9	Shenley Lane to Harperbury Park
9a	Spur to Napsbury Park to create Harperbury Park to Napsbury Park
10	Napsbury to Frogmore
11	Napsbury to Colney Street
12	Cycle to School: London Colney
13	Broad Colney Lakes

Colney Heath (In development)

1.4.13 The process to develop a Neighbourhood Plan in Colney Heath has started. There is no information currently publicly available about potential priorities for walking and cycling routes in the parish that will be included in the Plan.

1.4.14 Priorities for Colney Heath Parish Council (as of January 2022) are:

- Footpath/cycleway links from the Alban Way to Colney Heath longabout across Smallford pits
- Oaklands Lane footpath, with access to Coopers Green Lane
- Colney heath to London Colney (Coursers Road)
- Tollgate Road
- Smallford/Ellenbrook area
- Improvements to existing provisions on the Alban Way and A414

1.5 STAKEHOLDER FEEDBACK

1.5.1 During the three rounds of LCWIP stakeholder engagement, a number of valuable comments were made by a range of parish, district and county Councillors, as well as representatives from walking/cycling groups, with regards to infrastructure improvements in areas not included in the infrastructure plans, including Wheathampstead, Redbourn, Colney Heath and other smaller settlements.

1.5.2 Comments were varied in nature, and included the following themes:

a. Maintenance issues, such as paths that become very wet and muddy
b. Routes where infrastructure does not meet demand, such as walking routes with no footway
c. Routes where it is difficult or unsafe to cross
d. Routes where people feel unsafe due to vehicle behaviour

e. Alternative ‘quiet routes’ with lower traffic volumes or speeds
f. Inaccessible or discriminatory barriers
g. Opportunities to improve existing provision, such as widening footways or improving junctions

1.5.3 These comments will be passed on to the appropriate teams within HCC (e.g. for maintenance issues) to be actioned, or stored for incorporation in the next iteration of the LCWIP.

1.5.4 Stakeholder comments have also been used to support the creation of a list of general principles for walking/cycling improvements on rural routes, as shown in **Table 4**.

Table 4: Potential interventions for St Albans villages

Approach	Example interventions
Reduce vehicle speeds	20mph zones Traffic calming engineering measures (vertical or horizontal) Reduce carriageway widths Centre line removal
Reduce vehicle traffic volumes	Modal filters Review on-street parking
Improve safety for people walking	New or improved footways Junction treatments New crossings
Improve safety for people cycling	New or improved shared use paths Segregated cycleways Junction treatments Consider appropriate surfacing on rights of way Parallel crossings
Make walking and cycling more pleasant	Planting for shade, shelter and aesthetic enjoyment Urban realm improvements Provide benches Heritage wayfinding and signage Maintenance and appropriate surfacing
Improve accessibility	Tactile paving Dropped kerbs Footway resurfacing Steps, ramps and gradient improvements Remove discriminatory access barriers Install benches New crossings
Make walking and cycling easier	Review on-street parking Install cycle parking in key locations Wayfinding and signage Removal of cycle bans or restrictions

Appendix AHJ/23

Technical Appendix 1 of Developer Contribution Guidance

Technical Appendix 1: Transport

1.0 Service Overview

1.1 The Hertfordshire County Council 4th Local Transport Plan (LTP4)[1] has developed strategies and plans for the county and the towns and areas within it which identifies the sustainable transport and accessibility measures for which contributions would be sought. The Hertfordshire Infrastructure Funding Prospectus (HIFP)[2] outlines a detailed list of projects necessary to support growth outlined within Local Plans, and a number of Growth & Transport Plans across the county are now in place to progress the delivery of such schemes.

1.2 LTP4 builds on current national planning guidance, with particular emphasis on paragraphs 108 – 110 of the National Planning Policy Framework 2019 (NPPF). These paragraphs set out how maximising accessibility by sustainable travel modes is one the key considerations in the 'severe' highways test of determining the acceptability of a proposed development. Planning obligations is one way to ensure developments achieve this, and can also be used to secure safe access/egress and minimise development-related impacts such as traffic congestion. The county council will actively seek planning obligations which will improve sustainable transport facilities and services for passenger transport users who are using the development and generally for those users in the surrounding area.

1.3 Measures necessary to mitigate against the impact of new developments should be identified through Transport Assessments (TAs) or via site specific negotiations. The thresholds at which a Transport Statement (TS) or a more comprehensive TA should form part of a planning application are set out in Chapter 7 of Section 1 of the highways design guide 'Roads in Hertfordshire'. For a residential development, more than 80 units usually require a TA, and for a B1 office development the figure is a gross floor area of 2500 square metres.

1.4 Smaller developments do not always require a TS or TA, but the cumulative impacts of such developments can be very significant and may well exceed those of larger developments in total. It is therefore justified to consider seeking a planning contribution, or relevant conditions, for all developments whatever their size, to ensure that accessibility by sustainable modes is maximised in line with the Hertfordshire LTP Policies and objectives, and other supporting material considerations, such as adopted Local Plans.

1.5 The county council intends to update the existing two strand approach to transport contributions. The immediate and specific impacts of larger developments are established via a TA and mitigated via S278 obligation, or

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[1] https://www.hertfordshire.gov.uk/services/recycling-waste-and-environment/planning-in-hertfordshire/transport-planning/local-transport-plan.aspx

[2] https://www.hertfordshire.gov.uk/media-library/documents/environment-and-planning/planning/hertfordshire-infrastructure-and-funding-prospectus-2018-2031.pdf

funded via CIL/S106 agreement in the conventional way. This is the first strand of possible transport contributions.

1.6 The second strand should address the cumulative impacts of all development, large and small, facilitating delivery and enhancement of the necessary active and sustainable transport networks. These local sustainable networks must be provided in their entirety to provide the sustainable connections to the key trip generators, as such contributions will be pooled to fund these networks within the local area (subject to any legislative restrictions), as supported by National Planning Policy Framework (NPPF). This second strand contribution is intended to help implement broader transport measures in the catchments of new development from which contributions are secured. The need for second stand contributions will be balanced against the level of first strand contributions and any other relevant planning matters.

In areas without a Community Infrastructure Levy adopted, this second strand is the principal means of securing contributions towards broader sustainable transport infrastructure. At the time of publication, the second strand contribution generally does not apply in Dacorum, Hertsmere, Stevenage, Three Rivers and Watford as they have fully adopted CIL regimes in place.

1.7 Impacts of cross boundary sites will be considered on a case by case basis. It is anticipated that strategic development sites will require a bespoke package of transport measures and contributions.

2.0 Assessing need and calculating demand

2.1 CIL Regulation 122 (2)(c) makes it clear that any financial contribution sought should be fair and reasonable in proportion to the scale of the proposed development. As per other county council services, it is intended that a connection is made between the number of bedrooms of an individual dwelling and the scale of contribution.

2.2 The residential charge provides a benchmark against which non-residential charges can be set. The appropriate basis for comparison is some measure of transport and traffic impact; the greater that impact, the greater the need for accessibility measures. As with residential development, the likely number of trips for non-residential development will vary according to the proposed use of an individual site as identified in the TA and/or transport modelling.

2.3 Non-residential development will also contribute to traffic growth, attracting new travel activity to new facilities (e.g. leisure) and possibly from neighbouring authorities with less competitive attractions.

2.4 At this stage, it is not possible to analyse the likely quantum and location of future non-residential development to devise a matrix of non-residential based contributions. Non-residential charges should be levied on the basis that they should reflect likely transport impacts as per residential charges. In this case, the likely number of trips is again used as a proxy for transport and traffic impact.

2.5 A significant amount of highway infrastructure needs to be constructed across the county to support the amount of new development coming forward in a cumulative context. In line with the County Council's Local Transport Plan 4, much of this infrastructure will be designed to accommodate and actively encourage sustainable travel, and reduce dependence on the private motorcar. Reference should be made to policy 1 of LTP4 in particular.

2.6 The type, scale and likely cost of the necessary infrastructure will vary across the county depending on geographic location and specific circumstances/needs. The scale and quantum of transport infrastructure is constantly evolving as District & Borough Local Plans continue to be developed and reviewed. Accordingly the County Council's aspirations in this respect are also constantly evolving and listed within various strategies which sits beneath the LTP4. This includes, but is not limited to, Growth and Transport Plans, jointly developed area specific Transport Strategic to support Local Plans, the A414 Strategy, etc. As such, in order to meet the 'directly related' CIL test of any s106 request, it seems reasonable to break down the cost of these wider highway works to a district/borough level.

2.7 Section 6.0 sets out the strand 2 calculations and shows how much an individual dwelling within each District/Borough would need to pay to cumulatively cover the cost of delivering the wider necessary sustainable transport works within their area. However, it should be stressed that these figures are the starting point for S106 discussions, and each application needs to be considered on its own merits.

2.8 The exact and most appropriate amount of S106 contributions should be established through early discussions with the developer, ideally at the pre-application stage, and will be based on the specific circumstances of the development (such as its location, size, type, amount of off-site sustainable-travel works to be delivered by condition, and cost of HCC sustainable transport infrastructure schemes which are in the vicinity of the development). For example, the rationale behind calculating a suitable S106 contribution from a development which lies close to the border of an adjacent district/borough may have to consider the infrastructure needs of two districts/boroughs.

2.9 In some cases the most appropriate amount sought may be less than the headline figures in section 6.0 below; in other cases it might be more. The Highway Authority will provide a clear rationale in each case as to how S106 figures have been calculated and meet the 3 CIL tests (see paragraph 1.3.7 of the Guide).

2.10 Where a development genuinely cannot commit to paying a financial contribution to cover the cost of highway works which would normally be considered necessary due to financial viability issues, the Highway Authority will consider this in determining its consultation response. Generally, the Highway Authority will look to the Local Planning Authority for advice in this respect, as they hold the expertise to examine financial viability assessments of developments. It should be noted however that financial viability issues does not make a fundamentally unsustainable and/or unsafe development acceptable. See also paragraph 3.5 of the Guide.

2.11 All highway contributions are to be Index linked by SPON'S from January 2019, which is the point in time at which the figures were calculated. Contributions should be payable before commencement of the development wherever possible as trigger dates later than this carry additional risks for HCC. Exceptional circumstances should be demonstrated by the developer if alternative trigger points are proposed.

2.12 Some LPA's adopt their own S106 planning obligations approach, and these are usually published as SPDs on their websites. Where variation is evident, the more recent document usually takes precedence. However, each case is considered on its own merit, and where an obvious difference exists, discussion will take place with the LPA as to the most suitable approach.

3.0 Transport projects

3.1 In all cases, financial contributions will be passed directly by the developer to either the Highway Authority or the LPA as appropriate. Generally, payment direct to the Highway Authority is preferable as highway schemes are usually delivered by the Highway Authority, and direct funding avoids unnecessary delay.

3.2 Some highway works and sustainable transport measures are better delivered through planning condition rather than planning obligation. Indeed, paragraph 54 of the NPPF states that "Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition".

3.3 Any requirements for highway works or sustainable infrastructure works as part of a planning condition should be in the form a Grampian condition and delivered through a S278 agreement with the Highway Authority, under the Highways Act 1980.

3.4 This method means that the Developer is responsible for designing and implementing the necessary highway measures following approval from the LPA. It also ensures that the necessary works are completed on time, and directly linked to a trigger point of the development, usually before first occupation or use. In exceptional circumstances, alternative or phased trigger points may be considered. In addition, the s278 route eliminates the risks associated with an s106 Agreement, which include the necessary works not being delivered on time, and possible overspend due to unexcepted costs further down the line.

3.5 The following items are often more suitably delivered through planning condition via a Section 278 agreement, though there may be occasions when a planning obligation is more appropriate:

- works to ensure safe access and egress to a development;

- changes to the highway network to improve capacity or safety;
- smaller infrastructure such as bus stops/shelters/raised kerbing, and real time information displays;
- provision of amended highway networks, including roads/ cycleways/ footways.

3.6 The following items are more likely to be considered as appropriate for developer contributions, though there may be occasions when a planning condition is more appropriate:

- subsidy to forward fund a new or enhanced bus service for a set period;
- purchase or upgrade of vehicles on a bus service;
- payment towards community transport services;
- large infrastructure which requires partnership working with other organisations;
- a highway measure or sustainable transport scheme which has already been identified by HCC, and towards which a pooled contribution can be justified. This is typically a scheme identified in the HCC's Local Transport Plan (LTP) and its supporting documents, Growth and Transport Plans (GTPs). Schemes in addition to these plans will be considered where they are identified in other recognised strategies and a need has been identified as a result of new development;
- small-scale local improvements which would not be covered by the IDP and CIL funded items in CIL authorities;
- The county council's reasonable costs in ensuring that travel plans are fully implemented;
- The provision of new or improvement to existing Rights of Way or active travel routes within green infrastructure;
- The county council's reasonable costs in ensuring that any developer-created Rights of Way meet required specifications.

3.7 Many of the schemes lists in paragraphs 3.5 and 3.6 form a key part in contributing to the Council's broader objectives of active and inclusive travel, future mobility, modal shift, place-making, use of innovative transport technology, etc.

3.8 Whilst this Guide provides a figure to determine what level of second strand contribution is reasonable in proportion to the scale of the proposed development, CIL tests state that any works/measures undertaken (whether they are delivered by planning condition or planning obligation) must be necessary to make the development acceptable in planning and directly related to the development. As such, any figure calculated according to the method above should be treated as a headline figure only, and the actual figure is dependent on the specific measures/works identified as absolutely necessary.

3.9 For second strand contributions, the Highway Authority will consider the cost to the developer of implementing of any measures necessary as part of a condition. In some circumstances, it may be justified to factor this into the overall calculation.

4.0 Pre-Application Charges

4.1 The county council Highways Development Management Team encourages developers to have discussion before submitting a planning application. For up to date information and guidance on pre-application charges, please contact the county council as indicated in Chapter 5 (specifically paragraph 5.2.3) of the Guide.

5.0 Travel Plans

5.1 Travel Plans are a useful tool for enabling sustainable development, in particular for residential, commercial and school developments. Working in synergy with sustainable transport infrastructure provision and supported by local policy that encourages sustainable development, travel plans improve and promote access to, from and around development sites. The county council's requirements of travel plans can be found in the current Travel Plan Guidance, available on our website via this link.

5.2 In the delivery of schools, the county council will seek reference to the Modeshift STARS accreditation Framework, or any such replacement School Travel Plan accreditation framework. Further details are available via www.modeshiftstars.org. A School Travel Plan would contain practical measures to promote active, healthy, safe and sustainable travel to and from and in the vicinity of schools.

5.3 The county council will seek contributions towards its costs in providing Travel Plan Evaluation and Support throughout the travel plan implementation period for all developments requiring a Travel Plan or Travel Plan Statement.

5.4 The value of the contribution sought will be in accordance with the levels set out in the Travel Plan Guidance current at the time of application. The Travel Plan Evaluation and Support contribution will be index-linked from the date of agreement to the date of payment to the RPI and secured by a Section 106 agreement or Unilateral Undertaking.

5.5 The county council may seek additional contributions for large development that would fund and enable delivery of additional measures if the objectives or targets of the Travel Plan are not being met, or to mitigate observed impacts of the development on the transport network. The need for and specifics of these contributions would be determined on a case-by-case basis. The contribution would be included into the agreement along with any other contributions. Developers are encouraged to discuss this at an early stage.

5.6 Securing delivery of the approved travel plan should be written into the agreement. It is not current practice for the county council to seek financial contributions (as planning obligations) towards delivery of Travel Plans. Developers should fund, manage and deliver such measures, monitoring and employ a Travel Plan Co-ordinator themselves, and these commitments should be written into the Travel Plan.

6.0 Strand 2

6.1 A guide to the strand 2 calculation is provided below:

a) HIFP Active Travel Funding Gap: £589,010,000
b) HIFP homes planned from 2017 – 2031: 83,530
c) HIFP jobs planned from 2017 – 2031: 44,650
d) Average bedrooms per dwelling, based on dwelling composition data from the SMART planning database (2002 to 2020): 2.35
e) 2019 National Travel Survey, average daily trip rate: 2.6[3]
f) 2019 National Travel Survey, average daily commuting trip rate: 0.38[4]
g) 2018 Hertfordshire County Travel Survey, proportions of non-car driver trips: 52%
h) Daily non-car driver trip rate: 1.4
i) Daily non-car driver trip employment rate: 0.2

<u>Calculations*</u>

1. Number of forecasted sustainable daily residential trips from 2017 to 2031:
   a. (b * d) * h = 267,244

2. Number of forecasted sustainable daily non-residential trips from 2017 to 2031: c * i = 8,823

3. Proportion of funding gap based on residential and non-residential trips:

   a. Total: 267,244 + 8,823 = 276,067
   b. Residential: 267,244 / 276,067 = 97%
   c. Non-residential: 8,823 / 276,067 = 3%

4. Residential and no residential contribution of the funding gap based on trips:
   a. Residential: 97% of £589,010,000 = £570,185,769
   b. Non-residential: 3% of £589,010,000 = £18,824,230

5. Contribution per dwelling based on forecasted residential development proportion required to meet Active Travel funding gap (cost per dwelling): £570,185,769 / 83,530 = **£6,826**

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[3] 2019 NTS0101: Trips, distance travelled and time taken: England. All Trips per annum: 953 (953/52/7 = 2.6).
[4] 2019 NTS0403: Average number of trips, miles and time spent travelling by trip purpose: England. Commuting in 2019: 140 a year (140/52/7 = 0.38).

*Please note numbers may not sum due to rounding.

6. Contribution per job based on forecasted non-residential development proportion required to meet Active Travel funding gap (cost per job): £18,824,230 / 44,650 = **£422**

7. Cost per non-car driver residential trip: £570,185,769 / 267,244 = **£2,133**

8. Cost per non-car driver non-residential trip: £18,824,230 / 8,823 = **£2,133**

Example 1: 500 residential dwelling

[S106 strand 2 Contribution a 500 residential development: 500 * **£6,826** = **£3,413,059**]
[Daily trips of a 500 residential development: 500 * (d * h) = 1,600]
[Cost per trip of a 500 residential development: **£3,413,059** / 1,600 = **£2,133**]

Example 2: a non-residential development creating 100 jobs

[S106 strand 2 Contribution: 100 * £422 = **£42,159**]
[Daily trips of a 100 non-residential development: 100 * i = 19.76]
[Cost per trip of a 100 non-residential development: **£42,159** / 19.76 = **£2,133**]

Summary

6.2 Based on current evidence, the analysis concludes that each non-car driver trip should contribute **£2,133** to S106 strand 2 contributions, which translates to **£6,826** per each average residential dwelling and **£422** per job.

Appendix AHJ/24

Email from HCC Highways Confirming Acceptance of the Transport Assessment Methodology, dated 14/01/2022

David Kemp

From:	Oliver Sowerby <[redacted]>
Sent:	14 January 2022 13:14
To:	Delafield, James
Cc:	Justin Kenworthy; Boyd, John; Paul McCann; David Burne; andrew.holloway@taylorwimpey.com; Jonathan Locke - TW North Thames; James Dale; John Birch; David Kemp
Subject:	RE: SA/9526/2021 Pre-application - West of Chiswell Green [CJ-WORKSITE.FID712255]
Categories:	Filed by Newforma

CAUTION: This email originated from outside of the organisation. Do not click or open attachments, if you suspect the content may not be safe.

Hi James,

Just one query regarding the meeting note. In our meeting, it was agreed to do some further work around the distribution of trips, for instance if there was a through route between the two sections, as below. We would be interested in taking a look at this prior to any further meeting/application..

"JDa suggested that to justify the approach it may be useful to model the traffic flows if there was vehicular connectivity through the site. This may prove useful in demonstrating to residents living on Forge End and Chiswell Green Lane that they are no worse off as a result of the chosen approach."

I can confirm from the Scoping Note that the trip generation and overall assessment methodology is acceptable.

We can discuss this and the other actions by way of a further pre-app meeting (if desired) in due course.

Thanks,

Oliver

Hertfordshire

Oliver Sowerby
Senior Development Officer| Development Management| Environment & Infrastructure
Hertfordshire County Council
County Hall, Pegs Lane, Hertford, SG13 8DE, Postal Point: CHN213
T: [redacted] **(Internal:** [redacted]
E: [redacted]

Update me

From: Delafield, James <[redacted]>
Sent: 06 January 2022 09:08
To: James Dale [redacted]>; Oliver Sowerby <[redacted]>
Cc: Justin Kenworthy [redacted]>; Boyd, John <[redacted]>; Paul McCann <[redacted]>; David Burne <[redacted]>;
[redacted]; Jonathan Locke - TW North Thames <[redacted]>;

Appendix AHJ/25

Extract from the National Planning Policy Guidance

Guidance

Travel Plans, Transport Assessments and Statements

Provides advice on when Transport Assessments and Transport Statements are required, and what they should contain.

From:
Department for Levelling Up, Housing and Communities (/government/organisations/department-for-levelling-up-housing-and-communities) and **Ministry of Housing, Communities & Local Government (/government/organisations/ministry-of-housing-communities-and-local-government)**

Published
6 March 2014

Contents

Where plans are being prepared under the transitional arrangements set out in Annex 1 to the revised National Planning Policy Framework (https://www.gov.uk/government/publications/national-planning-policy-framework--2), the policies in the previous version of the framework published in 2012 (http://webarchive.nationalarchives.gov.uk/20180608095821/https:/www.gov.uk/government/publications/national-planning-policy-framework--2) will continue to apply, as will any previous guidance which has been superseded since the new framework was published in July 2018. If you'd like an email alert when changes are made to planning guidance please subscribe

- whether there are particular types of impacts around which to focus the Transport Assessment or Statement (eg assessing traffic generated at peak times).

Paragraph: 013 Reference ID: 42-013-20140306

Revision date: 06 03 2014

How should the need for and scope of a Transport Assessment or Statement be established?

The need for, scale, scope and level of detail required of a Transport Assessment or Statement should be established as early in the development management process as possible as this may therefore positively influence the overall nature or the detailed design of the development.

Key issues to consider at the start of preparing a Transport Assessment or Statement may include:

- the planning context of the development proposal;
- appropriate study parameters (ie area, scope and duration of study);
- assessment of public transport capacity, walking/cycling capacity and road network capacity;
- road trip generation and trip distribution methodologies and/ or assumptions about the development proposal;
- measures to promote sustainable travel;
- safety implications of development; and
- mitigation measures (where applicable) – including scope and implementation strategy.

It is important to give appropriate consideration to the cumulative impacts arising from other committed development (ie development that is consented or allocated where there is a reasonable degree of certainty will proceed within the next 3 years). At the decision-taking stage this may require the developer to carry out an assessment of the impact of those adopted Local Plan allocations which have the potential to impact on the same sections of transport network as well as other relevant local sites benefitting from as yet unimplemented planning approval.

Transport Assessments or Statements may identify the need for associated studies or may feed into other studies. However care should be taken to establish the full range of studies that will be required of development at the earliest opportunity as it is unlikely that a Transport Assessment or Statement in itself could fulfil the specific role required of a transport element of an Environmental Impact Assessment (https://www.gov.uk/guidance/environmental-impact-assessment) where this is required. Particular attention should be given to this issue where there are environmentally sensitive areas nearby and where the proposal could have implications for breach of statutory thresholds in relation to noise and air quality either as a result of traffic

Appendix AHJ/26

Email from the Transport Research Laboratory

David Kemp

From:	Graham Burtenshaw (TRL Software Support) <software@trl.co.uk>
Sent:	17 March 2023 13:25
To:	Deni Krevesic
Subject:	[TRL Software] Re: Double Mini Roundabout Warning Messages

##- Please type your reply above this line -##

Your request (16156) has been updated. To add additional comments, reply to this email.

Graham Burtenshaw (TRL Software)

Mar 17, 2023, 13:25 GMT

Hi Deni,

Thanks for your enquiry.

The mini-roundabout model in ARCADY can tend to underestimate capacity if the flows are much heavier on some arms than others, e.g., if there's a dominant route through the system. As the warning says, such mini-roundabouts may behave more like priority junctions, if the flow on the 'major route' becomes very established. Unfortunately there isn't a reliable model for such cases. If you have observations from the site, you could apply these as site-specific corrections. If not, then you may have to use the mini-roundabout model as normal but bear in mind that the results are likely to overestimate queues and delays. If the site is a T-shape then you could even try modelling it as a PICADY T-junction.

If you have linked mini-roundabouts, especially close together, then the above still applies but there's additional complexity about whether there's a dominant route through the entire system. However if there's 25m between the minis then they probably do act as two separate minis and you can probably ignore the warning.

If there's unequal lane usage in general then you could also consider using Lane Simulation mode.

I hope this is of some help to you.

Best regards,
Graham Burtenshaw
TRL Software

Deni Krevesic

Mar 15, 2023, 08:59 GMT

Hi,

I am working on a project where I need to assess the impact of the double mini roundabout. The model is produced as two li
roundabouts is approximately 25 m long, with zebra crossing between the two roundabouts.

The error received regarding the unbalanced flow and the way how should be treated. We have unequal lane usage (domina
roundabouts. I am asking what would be the best way to model this? The warning /error suggests that the model might beha

Please could you suggest the best approach to the model?

Many thanks

Data Errors and Warnings

Severity	Area	Item	
Warning	Mini-roundabout	Junction 3a - Southern Jct	Mini-roundabout appears to have unbalanced flo caution. See User Guide for details.[Arms A and more time segments]
Warning	Mini-roundabout	Junction 3b - Northern Jct	Mini-roundabout appears to have unbalanced flo caution. See User Guide for details.[Arms A and more time segments]
Warning	Linked Roundabout	Junction 3a - Southern Jct - Watford Road (North)	If the distance between linked junctions is small, be modelled as separate junctions, but the real that cannot be modelled
Warning	Linked Roundabout	Junction 3b - Northern Jct - Watford Road (South)	If the distance between linked junctions is small, be modelled as separate junctions, but the real that cannot be modelled

Regards

Deni Krevesic BSc(Hons), MSc, MCIHT
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Appendix AHJ/27

TRICS Outputs

Filtering Summary

Land Use	03/A	RESIDENTIAL/HOUSES PRIVATELY OWNED
Selected Trip Rate Calculation Parameter Range	150-500 DWELLS	
Actual Trip Rate Calculation Parameter Range	159-432 DWELLS	
Date Range	Minimum: 01/01/14	Maximum: 27/09/22
Parking Spaces Range	All Surveys Included	
Parking Spaces Per Dwelling Range:	All Surveys Included	
Bedrooms Per Dwelling Range:	All Surveys Included	
Percentage of dwellings privately owned:	All Surveys Included	
Days of the week selected	Monday	2
	Tuesday	2
	Wednesday	2
	Friday	1
Main Location Types selected	Edge of Town	5
	Neighbourhood Centre (PPS6 Local Centre)	2
Inclusion of Servicing Vehicles Counts	Servicing vehicles Included	9 - Selected
	Servicing vehicles Excluded	36 - Selected
Population within 500m	All Surveys Included	
Population <1 Mile ranges selected	1,001 to 5,000	2
	5,001 to 10,000	1
	10,001 to 15,000	4
Population <5 Mile ranges selected	25,001 to 50,000	1
	50,001 to 75,000	3
	75,001 to 100,000	1
	125,001 to 250,000	2
Car Ownership <5 Mile ranges selected	0.6 to 1.0	2
	1.1 to 1.5	5
PTAL Rating	No PTAL Present	7

Calculation Reference: AUDIT-225601-230316-0304

TRIP RATE CALCULATION SELECTION PARAMETERS:

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

TOTAL VEHICLES

Selected regions and areas:

02	SOUTH EAST		
	ES	EAST SUSSEX	1 days
	KC	KENT	2 days
04	EAST ANGLIA		
	CA	CAMBRIDGESHIRE	1 days
05	EAST MIDLANDS		
	DY	DERBY	1 days
06	WEST MIDLANDS		
	ST	STAFFORDSHIRE	1 days
07	YORKSHIRE & NORTH LINCOLNSHIRE		
	NE	NORTH EAST LINCOLNSHIRE	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: No of Dwellings
Actual Range: 159 to 432 (units:)
Range Selected by User: 150 to 500 (units:)

Parking Spaces Range: All Surveys Included

Parking Spaces per Dwelling Range: All Surveys Included

Bedrooms per Dwelling Range: All Surveys Included

Percentage of dwellings privately owned: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/14 to 27/09/22

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	2 days
Tuesday	2 days
Wednesday	2 days
Friday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	7 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town	5
Neighbourhood Centre (PPS6 Local Centre)	2

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	4
Village	2
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Inclusion of Servicing Vehicles Counts:

Servicing vehicles Included	9 days - Selected
Servicing vehicles Excluded	36 days - Selected

Secondary Filtering selection:

Use Class:

C3	7 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order (England) 2020 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 500m Range:
All Surveys Included

Population within 1 mile:

1,001 to 5,000	2 days
5,001 to 10,000	1 days
10,001 to 15,000	4 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

25,001 to 50,000	1 days
50,001 to 75,000	3 days
75,001 to 100,000	1 days
125,001 to 250,000	2 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	2 days
1.1 to 1.5	5 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	7 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	7 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

Site(1):	CA-03-A-06	Site area:	10.25 hect
Development Name:	MIXED HOUSES	No of Dwellings:	207
Location:	NEAR CAMBRIDGE	Housing density:	29
Postcode:	CB23 8TW	Total Bedrooms:	634
Main Location Type:	Neighbourhood Centre (PPS6 Local Centre)	Survey Date:	22/06/18
Sub-Location Type:	Village	Survey Day:	Friday
PTAL:	n/a	Parking Spaces:	777
Site(2):	DY-03-A-01	Site area:	16.45 hect
Development Name:	MIXED HOUSES	No of Dwellings:	371
Location:	DERBY	Housing density:	36
Postcode:	DE22 4HH	Total Bedrooms:	1402
Main Location Type:	Edge of Town	Survey Date:	10/07/18
Sub-Location Type:	Residential Zone	Survey Day:	Tuesday
PTAL:	n/a	Parking Spaces:	1083
Site(3):	ES-03-A-03	Site area:	9.91 hect
Development Name:	MIXED HOUSES & FLATS	No of Dwellings:	212
Location:	POLEGATE	Housing density:	63
Postcode:	BN26 6HR	Total Bedrooms:	649
Main Location Type:	Edge of Town	Survey Date:	11/07/16
Sub-Location Type:	Residential Zone	Survey Day:	Monday
PTAL:	n/a	Parking Spaces:	357
Site(4):	KC-03-A-07	Site area:	9.46 hect
Development Name:	MIXED HOUSES	No of Dwellings:	288
Location:	HERNE BAY	Housing density:	40
Postcode:	CT6 6HZ	Total Bedrooms:	934
Main Location Type:	Edge of Town	Survey Date:	27/09/17
Sub-Location Type:	Residential Zone	Survey Day:	Wednesday
PTAL:	n/a	Parking Spaces:	891
Site(5):	KC-03-A-08	Site area:	0.86 hect
Development Name:	MIXED HOUSES	No of Dwellings:	159
Location:	CHARING	Housing density:	418
Postcode:	TN27 0GX	Total Bedrooms:	569
Main Location Type:	Neighbourhood Centre (PPS6 Local Centre)	Survey Date:	22/05/18
Sub-Location Type:	Village	Survey Day:	Tuesday
PTAL:	n/a	Parking Spaces:	480
Site(6):	NE-03-A-02	Site area:	12.00 hect
Development Name:	SEMI DETACHED & DETACHED	No of Dwellings:	432
Location:	SCUNTHORPE	Housing density:	133
Postcode:	DN15 8GS	Total Bedrooms:	1174
Main Location Type:	Edge of Town	Survey Date:	12/05/14
Sub-Location Type:	No Sub Category	Survey Day:	Monday
PTAL:	n/a	Parking Spaces:	432
Site(7):	ST-03-A-07	Site area:	9.00 hect
Development Name:	DETACHED & SEMI-DETACHED	No of Dwellings:	248
Location:	STAFFORD	Housing density:	173
Postcode:	ST16 1GZ	Total Bedrooms:	821
Main Location Type:	Edge of Town	Survey Date:	22/11/17
Sub-Location Type:	Residential Zone	Survey Day:	Wednesday
PTAL:	n/a	Parking Spaces:	881

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

TOTAL VEHICLES

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	7	274	0.074	7	274	0.310	7	274	0.384
08:00 - 09:00	7	274	0.129	7	**274**	**0.377**	7	**274**	**0.506**
09:00 - 10:00	7	274	0.127	7	274	0.160	7	274	0.287
10:00 - 11:00	7	274	0.117	7	274	0.140	7	274	0.257
11:00 - 12:00	7	274	0.128	7	274	0.145	7	274	0.273
12:00 - 13:00	7	274	0.147	7	274	0.146	7	274	0.293
13:00 - 14:00	7	274	0.134	7	274	0.133	7	274	0.267
14:00 - 15:00	7	274	0.177	7	274	0.166	7	274	0.343
15:00 - 16:00	7	274	0.247	7	274	0.176	7	274	0.423
16:00 - 17:00	7	274	0.278	7	274	0.170	7	274	0.448
17:00 - 18:00	7	**274**	**0.348**	7	274	0.138	7	274	0.486
18:00 - 19:00	7	274	0.299	7	274	0.168	7	274	0.467
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.205			2.229			4.434

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	159 - 432 (units:)
Survey date date range:	01/01/14 - 27/09/22
Number of weekdays (Monday-Friday):	7
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Filtering Summary

Land Use	03/B	RESIDENTIAL/AFFORDABLE/LOCAL AUTHORITY HOUS
Selected Trip Rate Calculation Parameter Range	50-500 DWELLS	
Actual Trip Rate Calculation Parameter Range	54-228 DWELLS	
Date Range	Minimum: 01/01/12	Maximum: 13/05/22
Parking Spaces Range	All Surveys Included	
Parking Spaces Per Dwelling Range:	All Surveys Included	
Bedrooms Per Dwelling Range:	All Surveys Included	
Percentage of dwellings privately owned:	All Surveys Included	
Days of the week selected	Monday	2
	Tuesday	1
	Thursday	1
	Friday	1
Main Location Types selected	Edge of Town	3
	Neighbourhood Centre (PPS6 Local Centre)	2
Inclusion of Servicing Vehicles Counts	Servicing vehicles Included	X - Selected
	Servicing vehicles Excluded	5 - Selected
Population within 500m	All Surveys Included	
Population <1 Mile ranges selected	1,001 to 5,000	2
	5,001 to 10,000	1
	10,001 to 15,000	1
	15,001 to 20,000	1
Population <5 Mile ranges selected	5,000 or Less	1
	50,001 to 75,000	1
	75,001 to 100,000	1
	125,001 to 250,000	2
Car Ownership <5 Mile ranges selected	0.6 to 1.0	2
	1.1 to 1.5	3
PTAL Rating	No PTAL Present	5

Calculation Reference: AUDIT-225601-230316-0349

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : B - AFFORDABLE/LOCAL AUTHORITY HOUSES
TOTAL VEHICLES

Selected regions and areas:

02	SOUTH EAST		
	EX	ESSEX	1 days
07	YORKSHIRE & NORTH LINCOLNSHIRE		
	WY	WEST YORKSHIRE	1 days
08	NORTH WEST		
	AC	CHESHIRE WEST & CHESTER	1 days
09	NORTH		
	CB	CUMBRIA	1 days
	NB	NORTHUMBERLAND	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: No of Dwellings
Actual Range: 54 to 228 (units:)
Range Selected by User: 50 to 500 (units:)

Parking Spaces Range: All Surveys Included

Parking Spaces per Dwelling Range: All Surveys Included

Bedrooms per Dwelling Range: All Surveys Included

Percentage of dwellings privately owned: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/12 to 13/05/22

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	2 days
Tuesday	1 days
Thursday	1 days
Friday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	5 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town	3
Neighbourhood Centre (PPS6 Local Centre)	2

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	3
Village	2

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

C3	5 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order (England) 2020 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 500m Range:
All Surveys Included

Population within 1 mile:

1,001 to 5,000	2 days
5,001 to 10,000	1 days
10,001 to 15,000	1 days
15,001 to 20,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,000 or Less	1 days
50,001 to 75,000	1 days
75,001 to 100,000	1 days
125,001 to 250,000	2 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	2 days
1.1 to 1.5	3 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	5 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	5 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

Site(1):	AC-03-B-01	Site area:	1.74 hect
Development Name:	HOUSES & FLATS	No of Dwellings:	80
Location:	CHESTER	Housing density:	66
Postcode:	CH1 5UP	Total Bedrooms:	204
Main Location Type:	Edge of Town	Survey Date:	17/11/14
Sub-Location Type:	Residential Zone	Survey Day:	Monday
PTAL:	n/a	Parking Spaces:	189
Site(2):	CB-03-B-02	Site area:	2.40 hect
Development Name:	SEMI DETACHED & TERRACED	No of Dwellings:	66
Location:	ALSTON	Housing density:	33
Postcode:	CA9 3RW	Total Bedrooms:	198
Main Location Type:	Neighbourhood Centre (PPS6 Local Centre)	Survey Date:	13/05/22
Sub-Location Type:	Village	Survey Day:	Friday
PTAL:	n/a	Parking Spaces:	115
Site(3):	EX-03-B-01	Site area:	2.66 hect
Development Name:	MIXED HOUSES & FLATS	No of Dwellings:	228
Location:	NEAR BRAINTREE	Housing density:	233
Postcode:	CM3 1SG	Total Bedrooms:	651
Main Location Type:	Neighbourhood Centre (PPS6 Local Centre)	Survey Date:	10/05/18
Sub-Location Type:	Village	Survey Day:	Thursday
PTAL:	n/a	Parking Spaces:	220
Site(4):	NB-03-B-01	Site area:	3.60 hect
Development Name:	SEMI DET. & TERRACED	No of Dwellings:	97
Location:	BEDLINGTON	Housing density:	36
Postcode:	NE22 6DX	Total Bedrooms:	292
Main Location Type:	Edge of Town	Survey Date:	19/11/12
Sub-Location Type:	Residential Zone	Survey Day:	Monday
PTAL:	n/a	Parking Spaces:	111
Site(5):	WY-03-B-02	Site area:	1.53 hect
Development Name:	MIXED HOUSES	No of Dwellings:	54
Location:	HUDDERSFIELD	Housing density:	39
Postcode:	HD2 1LU	Total Bedrooms:	144
Main Location Type:	Edge of Town	Survey Date:	17/09/13
Sub-Location Type:	Residential Zone	Survey Day:	Tuesday
PTAL:	n/a	Parking Spaces:	60

TRIP RATE for Land Use 03 - RESIDENTIAL/B - AFFORDABLE/LOCAL AUTHORITY HOUSES
TOTAL VEHICLES
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	5	105	0.059	5	105	0.192	5	105	0.251
08:00 - 09:00	5	105	0.101	5	**105**	**0.232**	5	**105**	**0.333**
09:00 - 10:00	5	105	0.112	5	105	0.185	5	105	0.297
10:00 - 11:00	5	105	0.110	5	105	0.130	5	105	0.240
11:00 - 12:00	5	105	0.105	5	105	0.130	5	105	0.235
12:00 - 13:00	5	105	0.152	5	105	0.103	5	105	0.255
13:00 - 14:00	5	105	0.124	5	105	0.107	5	105	0.231
14:00 - 15:00	5	105	0.137	5	105	0.126	5	105	0.263
15:00 - 16:00	5	105	0.133	5	105	0.126	5	105	0.259
16:00 - 17:00	5	**105**	**0.208**	5	105	0.091	5	105	0.299
17:00 - 18:00	5	105	0.194	5	105	0.124	5	105	0.318
18:00 - 19:00	5	105	0.170	5	105	0.109	5	105	0.279
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			1.605			1.655			3.260

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	54 - 228 (units:)
Survey date date range:	01/01/12 - 13/05/22
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Filtering Summary

Land Use	04/A	EDUCATION/PRIMARY
Selected Trip Rate Calculation Parameter Range	200-500 PUPILS	
Actual Trip Rate Calculation Parameter Range	219-407 PUPILS	
Date Range	Minimum: 01/01/14	Maximum: 23/05/22
Parking Spaces Range	All Surveys Included	
Days of the week selected	Monday	2
	Tuesday	1
	Thursday	3
Main Location Types selected	Edge of Town	5
	Neighbourhood Centre (PPS6 Local Centre)	1
Inclusion of Servicing Vehicles Counts	Servicing vehicles Included	2 - Selected
	Servicing vehicles Excluded	10 - Selected
Population within 500m	All Surveys Included	
Population <1 Mile ranges selected	1,001 to 5,000	1
	10,001 to 15,000	1
	15,001 to 20,000	4
Population <5 Mile ranges selected	75,001 to 100,000	1
	125,001 to 250,000	3
	250,001 to 500,000	2
Car Ownership <5 Mile ranges selected	0.6 to 1.0	2
	1.1 to 1.5	4
PTAL Rating	No PTAL Present	6

Calculation Reference: AUDIT-225601-230316-0354

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 04 - EDUCATION
Category : A - PRIMARY
TOTAL VEHICLES

<u>*Selected regions and areas:*</u>

03	SOUTH WEST		
	SM	SOMERSET	1 days
05	EAST MIDLANDS		
	DY	DERBY	1 days
	LE	LEICESTERSHIRE	1 days
06	WEST MIDLANDS		
	WM	WEST MIDLANDS	1 days
08	NORTH WEST		
	AC	CHESHIRE WEST & CHESTER	1 days
09	NORTH		
	TV	TEES VALLEY	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Number of pupils
Actual Range: 219 to 407 (units:)
Range Selected by User: 200 to 500 (units:)

Parking Spaces Range: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/14 to 23/05/22

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	2 days
Tuesday	1 days
Thursday	3 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	6 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town	5
Neighbourhood Centre (PPS6 Local Centre)	1

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	5
Village	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Inclusion of Servicing Vehicles Counts:

Servicing vehicles Included	2 days - Selected
Servicing vehicles Excluded	10 days - Selected

Secondary Filtering selection:

Use Class:	
F1(a)	6 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order (England) 2020 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 500m Range:	
All Surveys Included	
Population within 1 mile:	
1,001 to 5,000	1 days
10,001 to 15,000	1 days
15,001 to 20,000	4 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:	
75,001 to 100,000	1 days
125,001 to 250,000	3 days
250,001 to 500,000	2 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:	
0.6 to 1.0	2 days
1.1 to 1.5	4 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:	
No	6 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:	
No PTAL Present	6 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

Site(1):	AC-04-A-01	Gross floor area:	1350 sqm
Development Name:	PRIMARY SCHOOL	Number of pupils:	219
Location:	CHESTER		
Postcode:	CH2 1QJ	No of Employees:	46
Main Location Type:	Edge of Town	Survey Date:	17/11/14
Sub-Location Type:	Residential Zone	Survey Day:	Monday
PTAL:	n/a	Parking Spaces:	28
Site(2):	DY-04-A-01	Gross floor area:	1600 sqm
Development Name:	PRIMARY SCHOOL	Number of pupils:	387
Location:	DERBY		
Postcode:	DE3 0EY	No of Employees:	53
Main Location Type:	Edge of Town	Survey Date:	25/06/15
Sub-Location Type:	Residential Zone	Survey Day:	Thursday
PTAL:	n/a	Parking Spaces:	34
Site(3):	LE-04-A-02	Gross floor area:	1750 sqm
Development Name:	PRIMARY SCHOOL	Number of pupils:	380
Location:	LEICESTER		
Postcode:	LE2 4TY	No of Employees:	56
Main Location Type:	Edge of Town	Survey Date:	30/10/14
Sub-Location Type:	Residential Zone	Survey Day:	Thursday
PTAL:	n/a	Parking Spaces:	35
Site(4):	SM-04-A-01	Gross floor area:	2525 sqm
Development Name:	PRIMARY SCHOOL	Number of pupils:	407
Location:	NEAR TAUNTON		
Postcode:	TA2 8FT	No of Employees:	72
Main Location Type:	Neighbourhood Centre (PPS6 Local Centre)	Survey Date:	27/09/18
Sub-Location Type:	Village	Survey Day:	Thursday
PTAL:	n/a	Parking Spaces:	44
Site(5):	TV-04-A-02	Gross floor area:	1500 sqm
Development Name:	PRIMARY SCHOOL	Number of pupils:	232
Location:	BILLINGHAM		
Postcode:	TS22 5LU	No of Employees:	28
Main Location Type:	Edge of Town	Survey Date:	23/05/22
Sub-Location Type:	Residential Zone	Survey Day:	Monday
PTAL:	n/a	Parking Spaces:	18
Site(6):	WM-04-A-02	Gross floor area:	1375 sqm
Development Name:	PRIMARY SCHOOL	Number of pupils:	234
Location:	BIRMINGHAM		
Postcode:	B45 9DX	No of Employees:	39
Main Location Type:	Edge of Town	Survey Date:	10/11/15
Sub-Location Type:	Residential Zone	Survey Day:	Tuesday
PTAL:	n/a	Parking Spaces:	18

TRIP RATE for Land Use 04 - EDUCATION/A - PRIMARY
TOTAL VEHICLES
Calculation factor: 1 PUPILS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	6	310	0.053	6	310	0.025	6	310	0.078
08:00 - 09:00	6	**310**	**0.260**	6	310	0.207	6	**310**	**0.467**
09:00 - 10:00	6	310	0.031	6	310	0.031	6	310	0.062
10:00 - 11:00	6	310	0.014	6	310	0.012	6	310	0.026
11:00 - 12:00	6	310	0.019	6	310	0.014	6	310	0.033
12:00 - 13:00	6	310	0.019	6	310	0.026	6	310	0.045
13:00 - 14:00	6	310	0.015	6	310	0.016	6	310	0.031
14:00 - 15:00	6	310	0.057	6	310	0.023	6	310	0.080
15:00 - 16:00	6	310	0.167	6	**310**	**0.222**	6	310	0.389
16:00 - 17:00	6	310	0.067	6	310	0.103	6	310	0.170
17:00 - 18:00	6	310	0.023	6	310	0.041	6	310	0.064
18:00 - 19:00	6	310	0.012	6	310	0.005	6	310	0.017
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.737			0.725			1.462

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

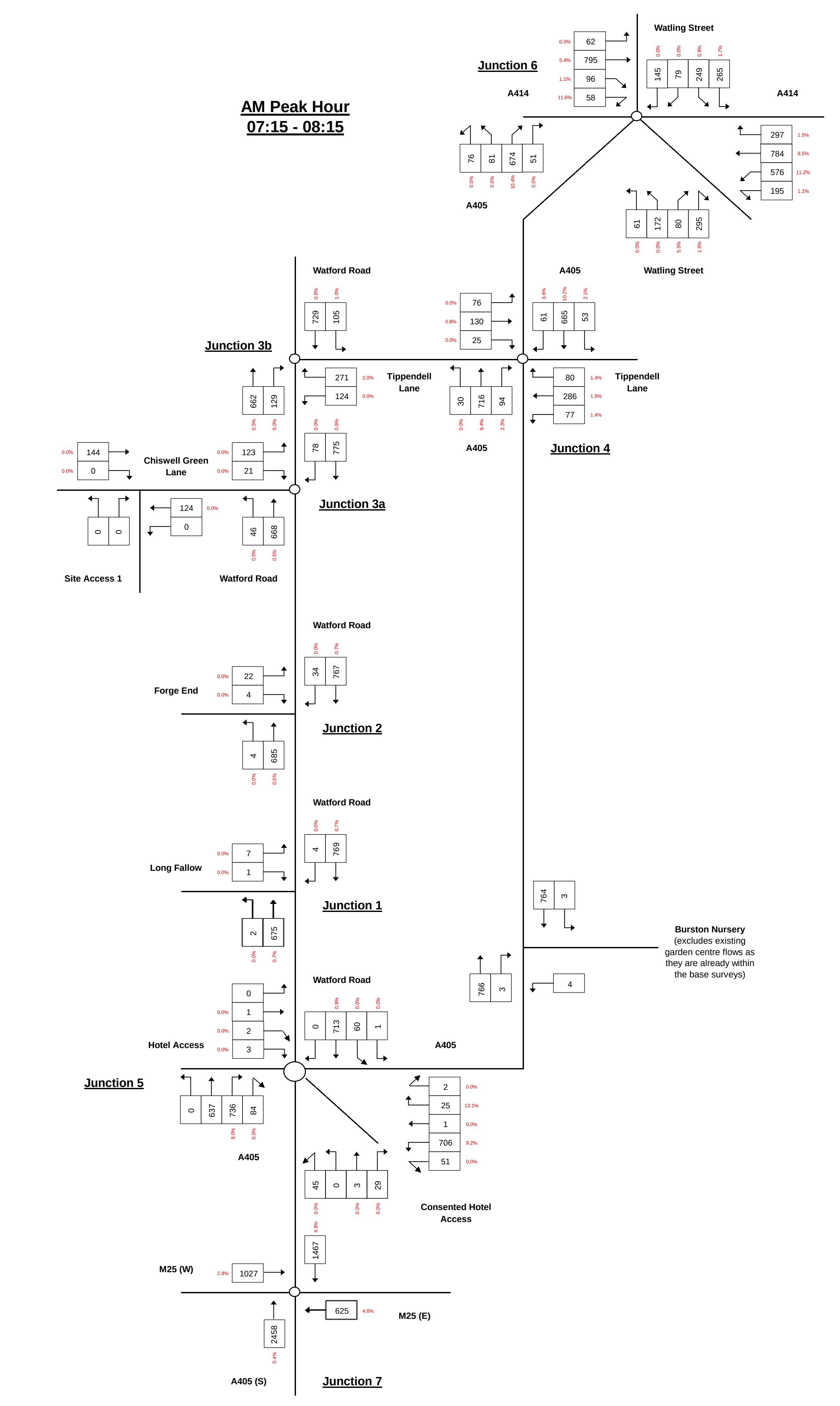
Parameter summary

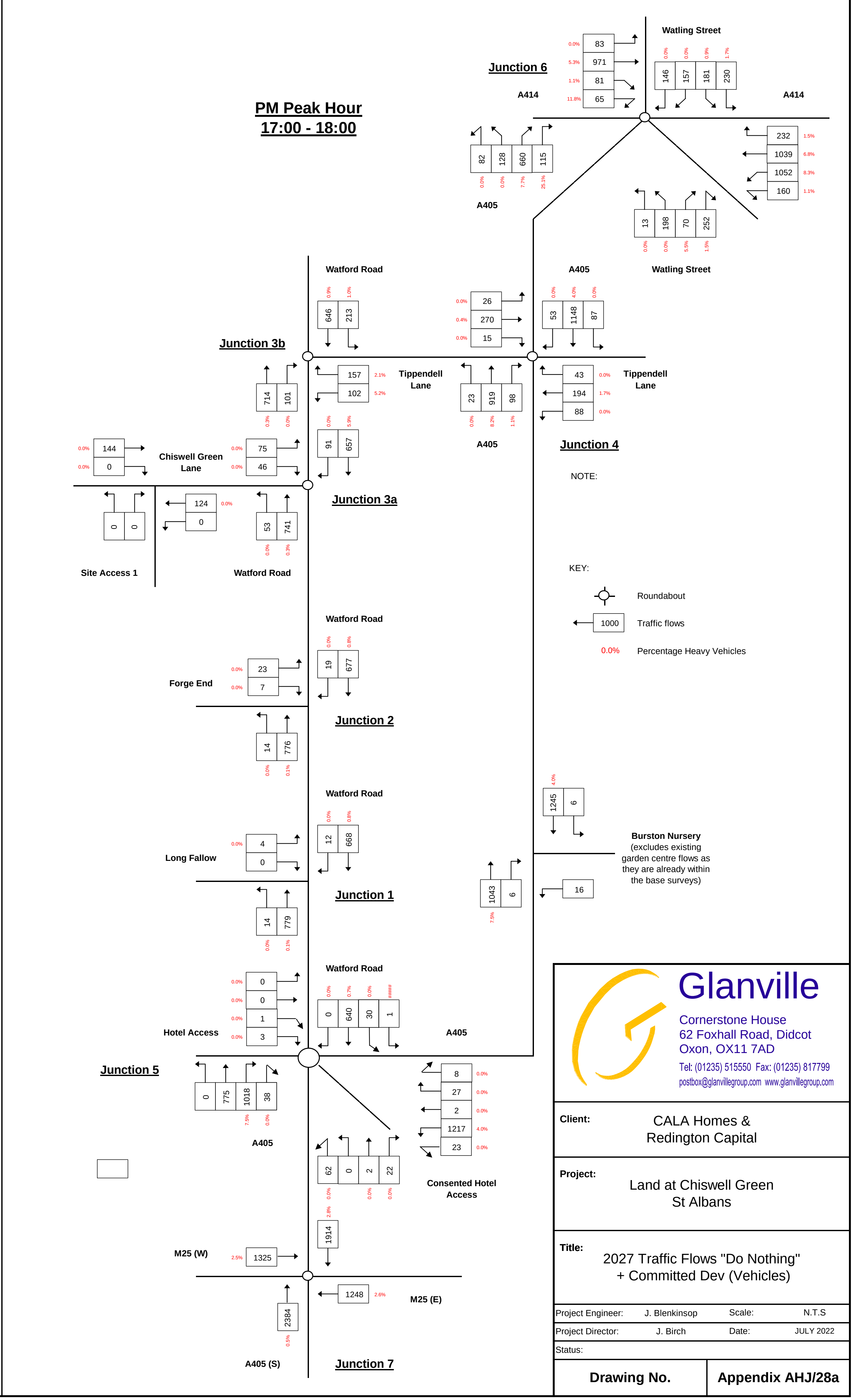
Trip rate parameter range selected:	219 - 407 (units:)
Survey date date range:	01/01/14 - 23/05/22
Number of weekdays (Monday-Friday):	6
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Appendix AHJ/28

Turning Count Diagrams





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Tel: (01235) 515550 Fax: (01235) 817799
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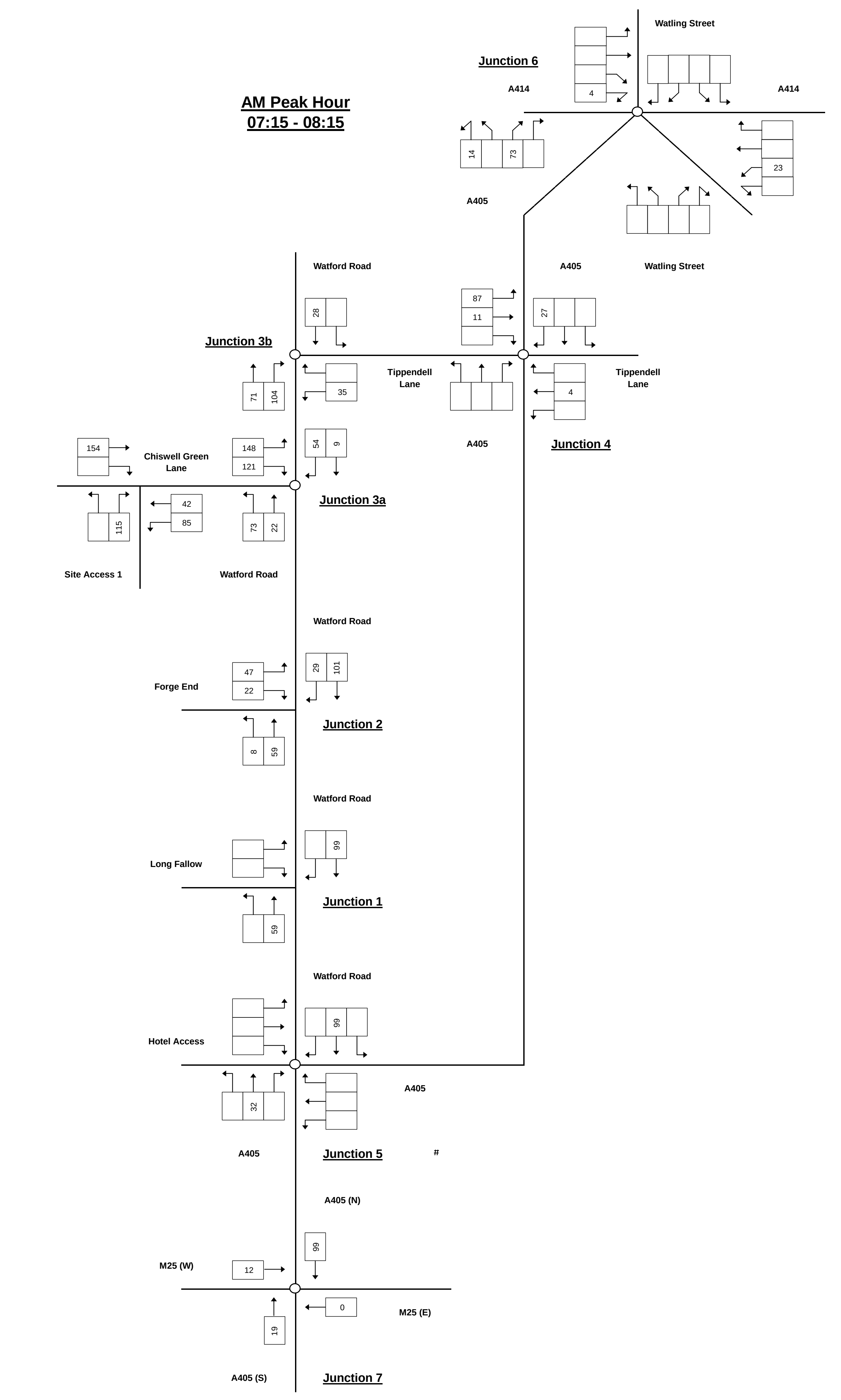
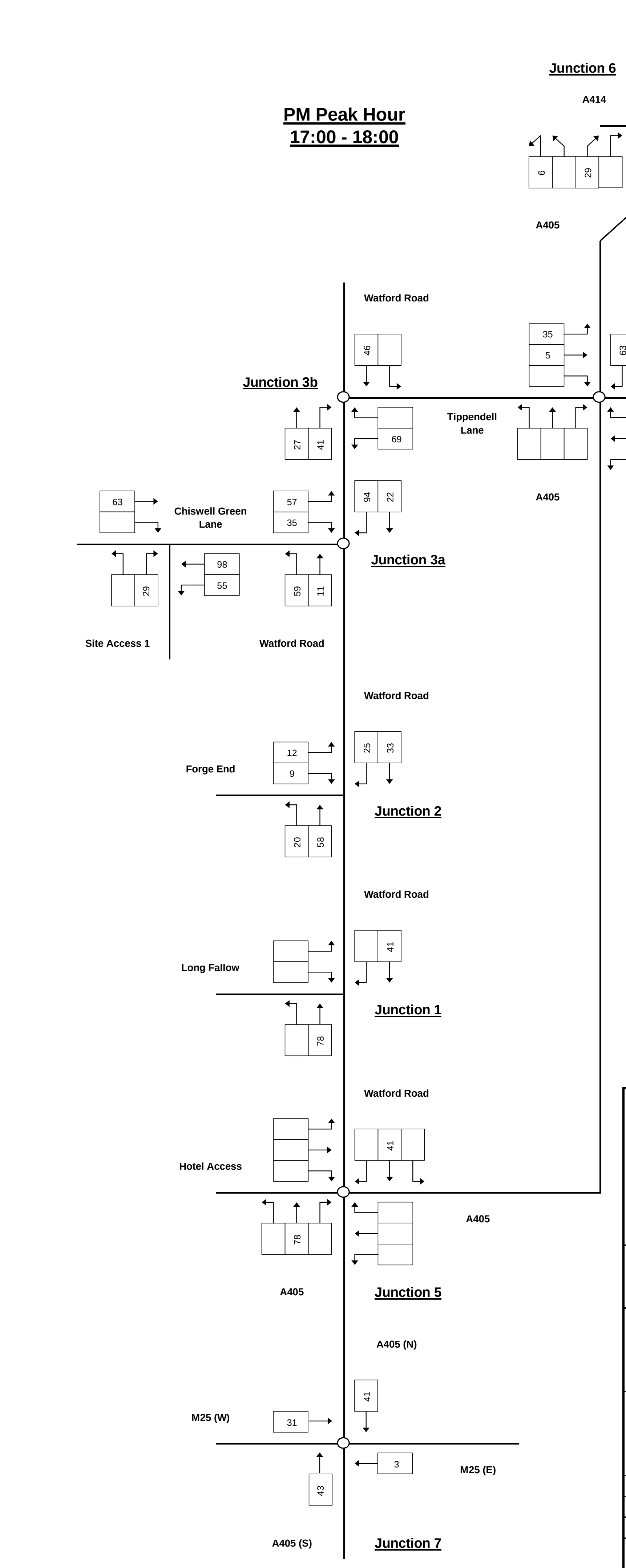
Client:	CALA Homes & Redington Capital
Project:	Land at Chiswell Green St Albans
Title:	2027 Traffic Flows "Do Nothing" + Committed Dev (Vehicles)

Project Engineer:	J. Blenkinsop	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			

Drawing No.	Appendix AHJ/28a





NOTE:

1. The school flows disappear off Watford Road and Tippendell Lane throughout Chiswell Green, hence the reduction in flows at the A405 junctions.

KEY:

⊕	Roundabout
1000	Traffic flows
0.0%	Percentage Heavy Vehicles

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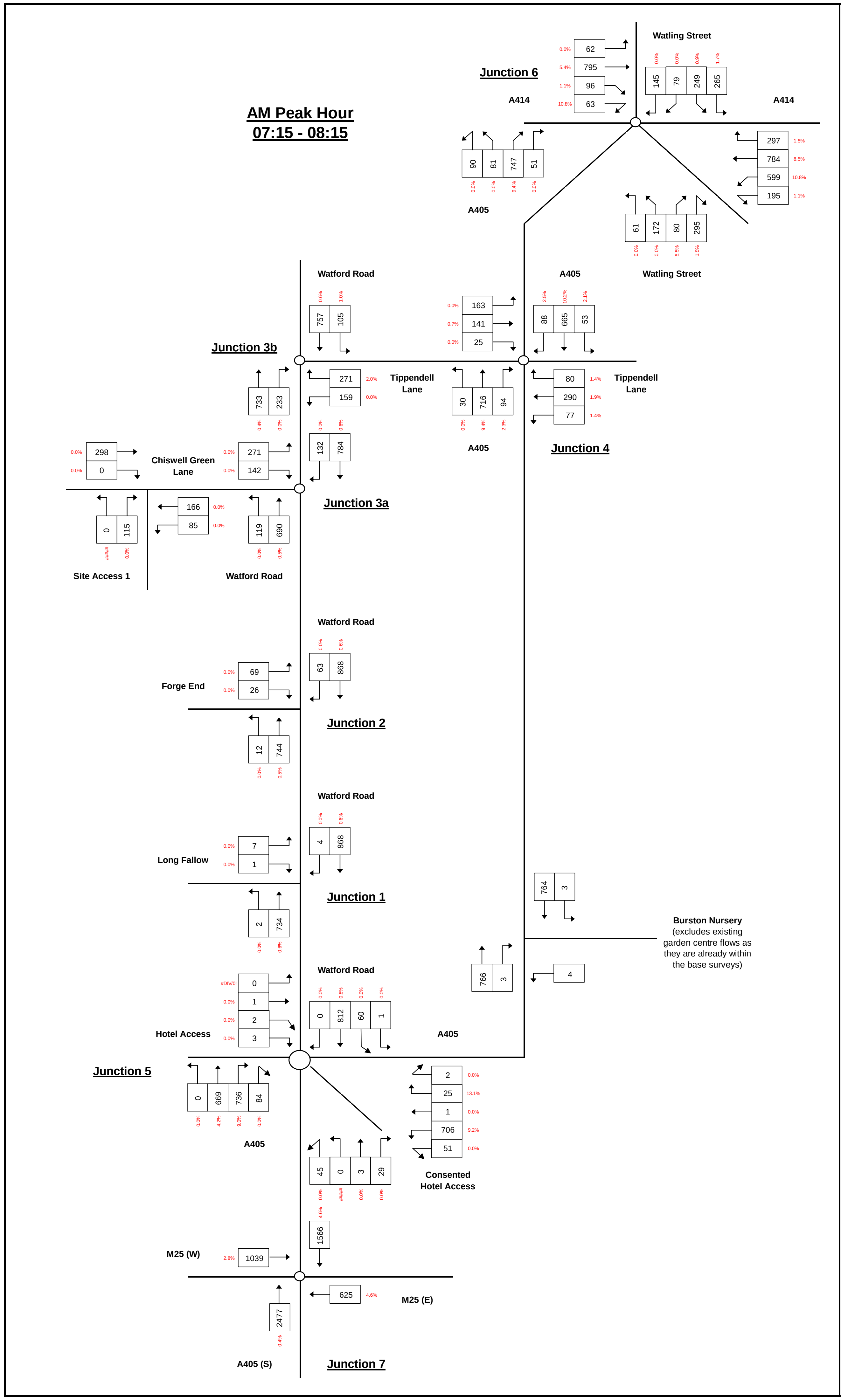
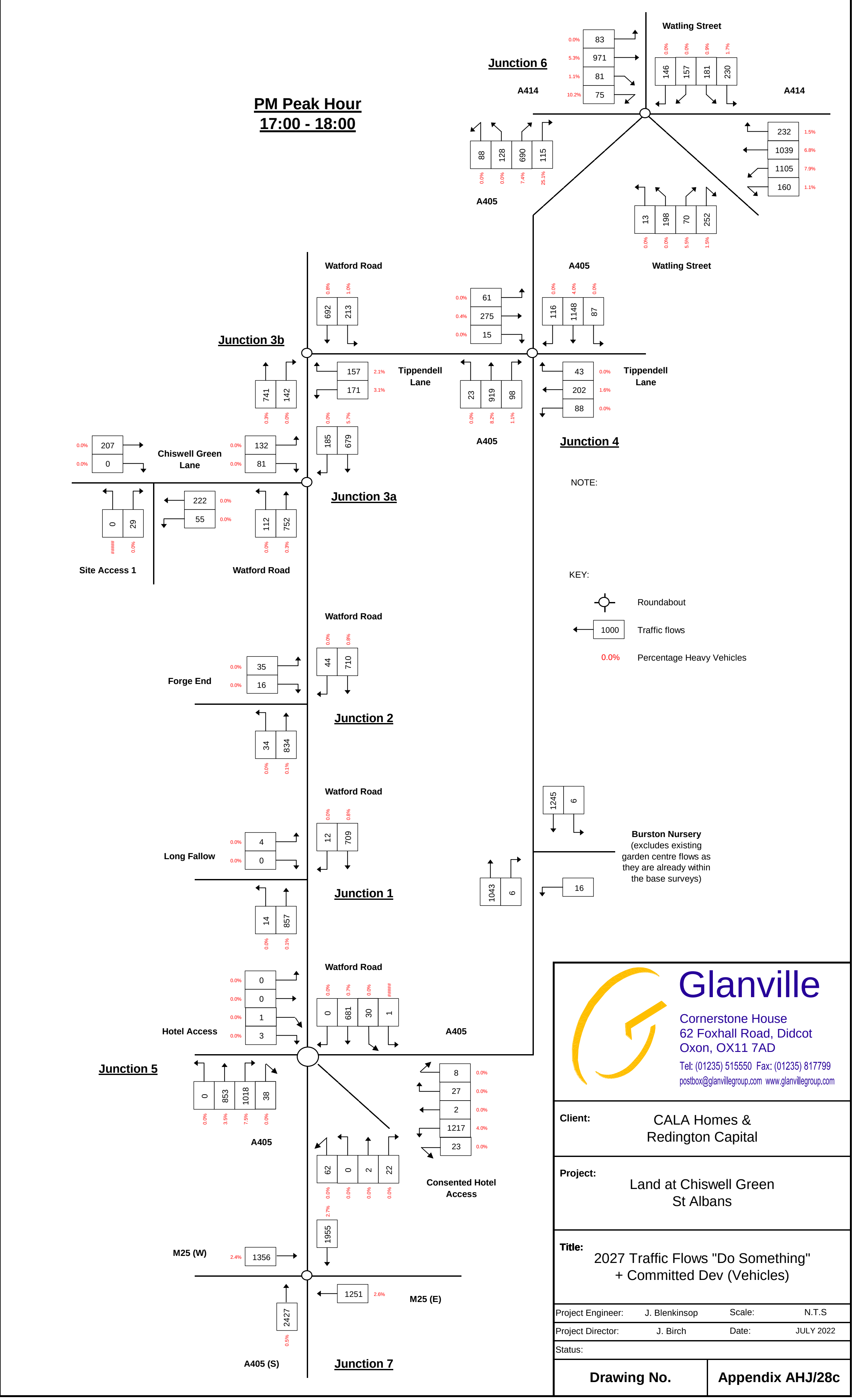
Client:	CALA Homes & Redington Capital
Project:	Land at Chiswell Green St Albans
Title:	Cumulative Development Flows (Vehicles)

Project Engineer:	D. Kemp	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			
Drawing No.		Appendix AHJ/28b	





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Client:	CALA Homes & Redington Capital
Project:	Land at Chiswell Green St Albans
Title:	2027 Traffic Flows "Do Something" + Committed Dev (Vehicles)

Project Engineer:	J. Blenkinsop	Scale:	N.T.S
Project Director:	J. Birch	Date:	JULY 2022
Status:			

Drawing No.	Appendix AHJ/28c

Appendix AHJ/29

Cumulative Assessment – ARCADY Outputs

Junctions 9

ARCADY 9 - Roundabout Module

Filename: J3 - Watford Rd_Chiswell_Tippendell + Ped - AM (391 dwellings) v1.1.j9
Path: \\gc-did-fs01\CAD\2023\8230258\(6)_Transport\(1)_Planning\(1)_Traffic Analysis\Modelling\Models Issued
Report generation date: 20/03/2023 18:20:10

Summary of junction performance

	AM				
	Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)
	Existing Layout - 2027 - Cumulative Assessment				
Junction 3a - Southern Jct - Watford Road (North)	4.5	17.18	0.83	C	44.43
Junction 3a - Southern Jct - Watford Road (South)	5.6	25.04	0.87	D	
Junction 3a - Southern Jct - Chiswell Green Lane	15.8	140.64	1.03	F	
Junction 3b - Northern Jct - Watford Road (South)	2.0	7.31	0.67	A	57.81
Junction 3b - Northern Jct - Watford Road (North)	14.1	49.44	0.98	E	
Junction 3b - Northern Jct - Tippendell Lane	25.1	174.75	1.14	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. Junction LOS and Junction Delay are demand-weighted averages.

File summary

File Description

Title	Watford Rd / Tippendell Ln / Chiswell Green Ln (391 Dwellings)
Location	Chiswell Green
Site number	J3
Date	20/02/2022
Version	
Status	(new file)
Identifier	
Client	CALA Homes & Redlington Capital
Jobnumber	8210856
Enumerator	UK\DKemp
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	mph	Veh	Veh	perTimeSegment	s	-Min	perMin

Analysis Options

Mini-roundabout model	Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
JUNCTIONS 9	5.75				0.85	36.00	20.00

Analysis Set Details

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

Existing Layout - 2027 - Cumulative Assessment, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Linked Roundabout	Junction 3a - Southern Jct - Watford Road (North)	If the distance between linked junctions is small, results should be treated with caution. The linked junctions will be modelled as separate junctions, but the real behaviour may be that of a complex system with interactions that cannot be modelled.
Warning	Linked Roundabout	Junction 3b - Northern Jct - Watford Road (South)	If the distance between linked junctions is small, results should be treated with caution. The linked junctions will be modelled as separate junctions, but the real behaviour may be that of a complex system with interactions that cannot be modelled.

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	Junction 3a - Southern Jct	Mini-roundabout	A, B, C	44.43	E
2	Junction 3b - Northern Jct	Mini-roundabout	A, B, C	57.81	F

Junction Network Options

Driving side	Lighting	Road surface	In London
Left	Normal/unknown	Normal/unknown	

Arms

Arms

Junction	Arm	Name	Description
Junction 3a - Southern Jct	A	Watford Road (North)	
	B	Watford Road (South)	
	C	Chiswell Green Lane	
Junction 3b - Northern Jct	A	Watford Road (South)	
	B	Watford Road (North)	
	C	Tippendell Lane	

Mini Roundabout Geometry

Junction	Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
Junction 3a - Southern Jct	Watford Road (North)	5.20	5.20	5.62	2.4	15.70	17.70	0.0	✓
	Watford Road (South)	4.40	4.40	5.00	3.0	13.89	10.25	0.0	✓
	Chiswell Green Lane	3.50	3.50	4.50	1.9	14.00	8.50	0.0	
Junction 3b - Northern Jct	Watford Road (South)	5.20	5.20	6.50	7.4	18.80	19.90	0.0	✓
	Watford Road (North)	3.80	3.80	4.60	0.4	12.80	8.20	0.0	✓
	Tippendell Lane	3.40	3.40	5.60	2.6	15.20	9.20	0.0	

Zebra Crossings

Junction	Arm	Space between crossing and junction entry (Zebra) (PCU)	Vehicles queueing on exit (Zebra) (PCU)	Central Refuge	Crossing data type	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
Junction 3a - Southern Jct	Watford Road (North)	4.00	4.00	✓	Distance	5.00	3.57	5.00	3.57

Slope / Intercept / Capacity

Arm Intercept Adjustments

Junction	Arm	Type	Reason	Percentage intercept adjustment (%)
Junction 3a - Southern Jct	Watford Road (North)	None		
	Watford Road (South)	None		
	Chiswell Green Lane	None		
Junction 3b - Northern Jct	Watford Road (South)	None		
	Watford Road (North)	Percentage		125.00
	Tippendell Lane	Percentage		117.00

Roundabout Slope and Intercept used in model

Junction	Arm	Final slope	Final intercept (PCU/TS)
Junction 3a - Southern Jct	Watford Road (North)	0.669	321.940
	Watford Road (South)	0.548	259.564
	Chiswell Green Lane	0.624	220.161
Junction 3b - Northern Jct	Watford Road (South)	0.883	437.644
	Watford Road (North)	0.514	275.100
	Tippendell Lane	0.629	245.774

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D11	2027 - Cumulative Assessment	AM	DIRECT	08:00	09:00	60	15	✓

Vehicle mix varies over time	Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
✓	✓	✓	HV Percentages	2.00	✓

Linked Arm Data

Junction	Arm	Feeding Junction	Feeding Arm	Link Type	Flow source	Uniform flow (Veh/TS)	Flow multiplier (%)	Internal storage space (PCU)
Junction 3a - Southern Jct	Watford Road (North)	2	A	Simple (vertical queueing)	Normal	0.00	100.00	
Junction 3b - Northern Jct	Watford Road (South)	1	A	Simple (vertical queueing)	Normal	0.00	100.00	

Demand overview (Traffic)

Junction	Arm	Linked arm	Profile type	Use O-D data	Scaling Factor (%)
Junction 3a - Southern Jct	Watford Road (North)	✓			
	Watford Road (South)		DIRECT	✓	100.000
	Chiswell Green Lane		DIRECT	✓	100.000
Junction 3b - Northern Jct	Watford Road (South)	✓			
	Watford Road (North)		DIRECT	✓	100.000
	Tippendell Lane		DIRECT	✓	100.000

Demand overview (Pedestrians)

Junction	Arm	Profile type
Junction 3a - Southern Jct	Watford Road (North)	[DIRECT]
	Watford Road (South)	
	Chiswell Green Lane	
Junction 3b - Northern Jct	Watford Road (South)	
	Watford Road (North)	
	Tippendell Lane	

Origin-Destination Data

Junction 3a - Southern Jct 08:00 - 08:15

Demand (Veh/TS)

		To		
		Watford Road (North)	Watford Road (South)	Chiswell Green Lane
From	Watford Road (North)	0.00	173.00	31.00
	Watford Road (South)	166.00	0.00	26.00
	Chiswell Green Lane	72.00	35.00	0.00

Junction 3a - Southern Jct 08:15 - 08:30

Demand (Veh/TS)

		To		
		Watford Road (North)	Watford Road (South)	Chiswell Green Lane
From	Watford Road (North)	0.00	205.00	33.00
	Watford Road (South)	188.00	0.00	20.00
	Chiswell Green Lane	67.00	37.00	0.00

Junction 3a - Southern Jct 08:30 - 08:45

Demand (Veh/TS)

		To		
		Watford Road (North)	Watford Road (South)	Chiswell Green Lane
From	Watford Road (North)	0.00	229.00	33.00
	Watford Road (South)	178.00	0.00	27.00
	Chiswell Green Lane	68.00	37.00	0.00

Junction 3a - Southern Jct 08:45 - 09:00

Demand (Veh/TS)

		To		
		Watford Road (North)	Watford Road (South)	Chiswell Green Lane
From	Watford Road (North)	0.00	175.00	34.00
	Watford Road (South)	161.00	0.00	37.00
	Chiswell Green Lane	60.00	39.00	0.00

Junction 3b - Northern Jct 08:00 - 08:15

Demand (Veh/TS)

		To		
		Watford Road (South)	Watford Road (North)	Tippendell Lane
From	Watford Road (South)	0.00	179.00	42.00
	Watford Road (North)	164.00	0.00	19.00
	Tippendell Lane	35.00	60.00	0.00

Junction 3b - Northern Jct 08:15 - 08:30

Demand (Veh/TS)

		To		
		Watford Road (South)	Watford Road (North)	Tippendell Lane
From	Watford Road (South)	0.00	195.00	43.00
	Watford Road (North)	193.00	0.00	26.00
	Tippendell Lane	41.00	75.00	0.00

Junction 3b - Northern Jct 08:30 - 08:45

Demand (Veh/TS)

		To		
		Watford Road (South)	Watford Road (North)	Tippendell Lane
From	Watford Road (South)	0.00	187.00	42.00
	Watford Road (North)	219.00	0.00	26.00
	Tippendell Lane	39.00	85.00	0.00

Junction 3b - Northern Jct 08:45 - 09:00

Demand (Veh/TS)

		To		
		Watford Road (South)	Watford Road (North)	Tippendell Lane
From	Watford Road (South)	0.00	166.00	39.00
	Watford Road (North)	160.00	0.00	34.00
	Tippendell Lane	45.00	87.00	0.00

Vehicle Mix

Junction 3a - Southern Jct 08:00 - 08:15

Heavy Vehicle Percentages

		To		
		Watford Road (North)	Watford Road (South)	Chiswell Green Lane
From	Watford Road (North)	0	0	0
	Watford Road (South)	0	0	0
	Chiswell Green Lane	0	0	0

Junction 3a - Southern Jct 08:15 - 08:30

Heavy Vehicle Percentages

		To		
		Watford Road (North)	Watford Road (South)	Chiswell Green Lane
From	Watford Road (North)	0	1	0
	Watford Road (South)	1	0	0
	Chiswell Green Lane	0	0	0

Junction 3a - Southern Jct 08:30 - 08:45

Heavy Vehicle Percentages

		To		
		Watford Road (North)	Watford Road (South)	Chiswell Green Lane
From	Watford Road (North)	0	1	0
	Watford Road (South)	1	0	0
	Chiswell Green Lane	0	0	0

Junction 3a - Southern Jct 08:45 - 09:00

Heavy Vehicle Percentages

		To		
		Watford Road (North)	Watford Road (South)	Chiswell Green Lane
From	Watford Road (North)	0	1	0
	Watford Road (South)	1	0	0
	Chiswell Green Lane	0	0	0

Junction 3b - Northern Jct 08:00 - 08:15

Heavy Vehicle Percentages

		To		
		Watford Road (South)	Watford Road (North)	Tippendell Lane
From	Watford Road (South)	0	0	0
	Watford Road (North)	0	0	0
	Tippendell Lane	0	0	0

Junction 3b - Northern Jct 08:15 - 08:30

Heavy Vehicle Percentages

		To		
		Watford Road (South)	Watford Road (North)	Tippendell Lane
From	Watford Road (South)	0	1	0
	Watford Road (North)	1	0	4
	Tippendell Lane	0	2	0

Junction 3b - Northern Jct 08:30 - 08:45

Heavy Vehicle Percentages

		To		
		Watford Road (South)	Watford Road (North)	Tippendell Lane
From	Watford Road (South)	0	1	0
	Watford Road (North)	1	0	0
	Tippendell Lane	0	3	0

Junction 3b - Northern Jct 08:45 - 09:00

Heavy Vehicle Percentages

		To		
		Watford Road (South)	Watford Road (North)	Tippendell Lane
From	Watford Road (South)	0	1	0
	Watford Road (North)	1	0	0
	Tippendell Lane	0	3	0

Results

Results Summary for whole modelled period

Junction	Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/TS)	Total Junction Arrivals (Veh)
Junction 3a - Southern Jct	Watford Road (North)	0.83	17.18	4.5	C	221.06	884.25
	Watford Road (South)	0.87	25.04	5.6	D	200.75	803.01
	Chiswell Green Lane	1.03	140.64	15.8	F	103.75	415.00
Junction 3b - Northern Jct	Watford Road (South)	0.67	7.31	2.0	A	237.69	950.75
	Watford Road (North)	0.98	49.44	14.1	E	210.25	841.00
	Tippendell Lane	1.14	174.75	25.1	F	116.79	467.15

Main Results for each time segment

08:00 - 08:15

Junction	Arm	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Circulating flow (Veh/TS)	Pedestrian demand (Ped/TS)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Throughput (exit side) (Veh/TS)	Start queue (Veh)	End queue (Veh)	D (
Junction 3a - Southern Jct	Watford Road (North)	196.08	196.08	32.98	10.00	299.87	0.654	194.24	230.88	0.0	1.8	8.
	Watford Road (South)	192.00	192.00	29.52		243.38	0.789	188.56	197.71	0.0	3.4	15
	Chiswell Green Lane	107.00	107.00	163.03		117.19	0.913	100.84	55.05	0.0	6.2	45
Junction 3b - Northern Jct	Watford Road (South)	230.88	230.88	58.84		385.66	0.599	229.41	196.08	0.0	1.5	5.
	Watford Road (North)	183.00	183.00	43.60		252.68	0.724	180.50	244.65	0.0	2.5	12
	Tippendell Lane	95.00	95.00	161.76		144.01	0.660	93.17	62.34	0.0	1.8	17

08:15 - 08:30

Junction	Arm	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Circulating flow (Veh/TS)	Pedestrian demand (Ped/TS)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Throughput (exit side) (Veh/TS)	Start queue (Veh)	End queue (Veh)	D
Junction 3a - Southern Jct	Watford Road (North)	228.88	228.88	34.30	10.00	296.46	0.772	227.52	248.60	1.8	3.2	1
	Watford Road (South)	208.00	208.00	31.57		240.12	0.866	205.93	230.25	3.4	5.5	2
	Chiswell Green Lane	104.00	104.00	185.99		101.42	1.025	96.90	51.51	6.2	13.3	11
Junction 3b - Northern Jct	Watford Road (South)	248.39	248.39	71.34		370.36	0.671	247.87	228.97	1.5	2.0	7
	Watford Road (North)	219.00	219.00	44.80		248.73	0.881	215.48	274.41	2.5	6.0	2
	Tippendell Lane	116.00	116.00	189.93		123.53	0.939	110.38	70.34	1.8	7.4	5

08:30 - 08:45

Junction	Arm	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Circulating flow (Veh/TS)	Pedestrian demand (Ped/TS)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Throughput (exit side) (Veh/TS)	Start queue (Veh)	End queue (Veh)	D
Junction 3a - Southern Jct	Watford Road (North)	245.66	245.66	36.16	10.00	295.17	0.832	244.33	244.48	3.2	4.5	1
	Watford Road (South)	205.00	205.00	30.82		240.57	0.852	204.95	249.68	5.5	5.6	2
	Chiswell Green Lane	105.00	105.00	178.15		106.38	0.987	102.48	57.61	13.3	15.8	14
Junction 3b - Northern Jct	Watford Road (South)	244.26	244.26	73.10		368.17	0.663	244.27	245.69	2.0	2.0	7
	Watford Road (North)	245.00	245.00	44.80		249.80	0.981	236.95	272.58	6.0	14.1	4
	Tippendell Lane	124.00	124.00	211.73		109.06	1.138	107.07	70.02	7.4	24.4	15

08:45 - 09:00

Junction	Arm	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Circulating flow (Veh/TS)	Pedestrian demand (Ped/TS)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Throughput (exit side) (Veh/TS)	Start queue (Veh)	End queue (Veh)	D
Junction 3a - Southern Jct	Watford Road (North)	213.62	213.62	41.73	10.00	291.58	0.733	215.28	227.43	4.5	2.9	1
	Watford Road (South)	198.00	198.00	34.86		238.51	0.830	198.33	222.15	5.6	5.2	2
	Chiswell Green Lane	99.00	99.00	161.57		117.11	0.845	107.59	71.61	15.8	7.2	9
Junction 3b - Northern Jct	Watford Road (South)	227.21	227.21	87.30		355.34	0.639	227.39	213.71	2.0	1.8	7
	Watford Road (North)	194.00	194.00	43.25		250.78	0.774	204.38	271.44	14.1	3.7	2
	Tippendell Lane	132.00	132.00	169.53		135.35	0.975	131.47	78.09	24.4	24.9	17

Junctions 9

ARCADY 9 - Roundabout Module

Filename: J3 - Watford Rd_Chiswell_Tippendell + Ped - PM (391 dwellings) v1.1.j9
Path: \\gc-did-fs01\CAD\2023\8230258\(6)_Transport\(1)_Planning\(1)_Traffic Analysis\Modelling\Models Issued
Report generation date: 20/03/2023 18:22:20

Summary of junction performance

	PM				
	Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)
	Existing Layout - 2027 - Cumulative Assessment				
Junction 3a - Watford Road (North)	2.2	9.79	0.69	A	30.96
Junction 3a - Watford Road (South)	13.8	54.37	0.97	F	
Junction 3a - Chiswell Green Lane	1.2	19.23	0.56	C	
Junction 3b - Watford Road (South)	1.3	5.00	0.56	A	159.77
Junction 3b - Watford Road (North)	30.1	119.68	1.04	F	
Junction 3b - Tippendell Lane	51.1	669.33	1.26	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. Junction LOS and Junction Delay are demand-weighted averages.

File summary

File Description

Title	Watford Rd / Tippendell Ln / Chiswell Green Ln (391 Dwellings)
Location	Chiswell Green
Site number	J3
Date	21/11/2021
Version	
Status	(new file)
Identifier	
Client	CALA Homes & Redington Capital
Jobnumber	8210856
Enumerator	UK\DKemp
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	mph	Veh	Veh	perTimeSegment	s	-Min	perMin

Analysis Options

Mini-roundabout model	Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
JUNCTIONS 9	5.75				0.85	36.00	20.00

Analysis Set Details

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

Existing Layout - 2027 - Cumulative Assessment, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Mini-roundabout	Junction 3a	Mini-roundabout appears to have unbalanced flows and may behave like a priority junction; treat results with caution. See User Guide for details.[Arms A and B have 89% of the total flow for the roundabout for one or more time segments]
Warning	Mini-roundabout	Junction 3b	Mini-roundabout appears to have unbalanced flows and may behave like a priority junction; treat results with caution. See User Guide for details.[Arms A and B have 82% of the total flow for the roundabout for one or more time segments]
Warning	Linked Roundabout	Junction 3a - Watford Road (North)	If the distance between linked junctions is small, results should be treated with caution. The linked junctions will be modelled as separate junctions, but the real behaviour may be that of a complex system with interactions that cannot be modelled.
Warning	Linked Roundabout	Junction 3b - Watford Road (South)	If the distance between linked junctions is small, results should be treated with caution. The linked junctions will be modelled as separate junctions, but the real behaviour may be that of a complex system with interactions that cannot be modelled.

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	Junction 3a	Mini-roundabout	A, B, C	30.96	D
2	Junction 3b	Mini-roundabout	A, B, C	159.77	F

Junction Network Options

Driving side	Lighting	Road surface	In London
Left	Normal/unknown	Normal/unknown	

Arms

Arms

Junction	Arm	Name	Description
Junction 3a	A	Watford Road (North)	
	B	Watford Road (South)	
	C	Chiswell Green Lane	
Junction 3b	A	Watford Road (South)	
	B	Watford Road (North)	
	C	Tippendell Lane	

Mini Roundabout Geometry

Junction	Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
Junction 3a	Watford Road (North)	5.20	5.20	5.62	2.4	15.70	17.70	0.0	✓
	Watford Road (South)	4.40	4.40	5.00	3.0	13.89	10.25	0.0	✓
	Chiswell Green Lane	3.50	3.50	4.50	1.9	14.00	8.50	0.0	
Junction 3b	Watford Road (South)	5.20	5.20	6.50	7.4	18.80	19.90	0.0	✓
	Watford Road (North)	3.80	3.80	4.60	0.4	12.80	8.20	0.0	✓
	Tippendell Lane	3.40	3.40	5.60	2.6	15.20	9.20	0.0	

Zebra Crossings

Junction	Arm	Space between crossing and junction entry (Zebra) (PCU)	Vehicles queueing on exit (Zebra) (PCU)	Central Refuge	Crossing data type	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
Junction 3a	Watford Road (North)	4.00	4.00	✓	Distance	5.00	3.57	5.00	3.57

Slope / Intercept / Capacity

Arm Intercept Adjustments

Junction	Arm	Type	Reason	Percentage intercept adjustment (%)
Junction 3a	Watford Road (North)	None		
	Watford Road (South)	None		
	Chiswell Green Lane	None		
Junction 3b	Watford Road (South)	None		
	Watford Road (North)	Percentage		114.00
	Tippendell Lane	Percentage		86.00

Roundabout Slope and Intercept used in model

Junction	Arm	Final slope	Final intercept (PCU/TS)
Junction 3a	Watford Road (North)	0.669	321.940
	Watford Road (South)	0.548	259.564
	Chiswell Green Lane	0.624	220.161
Junction 3b	Watford Road (South)	0.883	437.644
	Watford Road (North)	0.514	250.892
	Tippendell Lane	0.629	180.655

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D9	2027 - Cumulative Assessment	PM	DIRECT	17:00	18:00	60	15	✓

Vehicle mix varies over time	Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
✓	✓	✓	HV Percentages	2.00	✓

Linked Arm Data

Junction	Arm	Feeding Junction	Feeding Arm	Link Type	Flow source	Uniform flow (Veh/TS)	Flow multiplier (%)	Internal storage space (PCU)
Junction 3a	Watford Road (North)	2	A	Simple (vertical queueing)	Normal	0.00	100.00	
Junction 3b	Watford Road (South)	1	A	Simple (vertical queueing)	Normal	0.00	100.00	

Demand overview (Traffic)

Junction	Arm	Linked arm	Profile type	Use O-D data	Scaling Factor (%)
Junction 3a	Watford Road (North)	✓			
	Watford Road (South)		DIRECT	✓	100.000
	Chiswell Green Lane		DIRECT	✓	100.000
Junction 3b	Watford Road (South)	✓			
	Watford Road (North)		DIRECT	✓	100.000
	Tippendell Lane		DIRECT	✓	100.000

Demand overview (Pedestrians)

Junction	Arm	Profile type
Junction 3a	Watford Road (North)	[DIRECT]
	Watford Road (South)	
	Chiswell Green Lane	
Junction 3b	Watford Road (South)	
	Watford Road (North)	
	Tippendell Lane	

Origin-Destination Data

Junction 3a 17:00 - 17:15

Demand (Veh/TS)

		To		
		Watford Road (North)	Watford Road (South)	Chiswell Green Lane
From	Watford Road (North)	0.00	171.00	51.00
	Watford Road (South)	194.00	0.00	28.00
	Chiswell Green Lane	32.00	22.00	0.00

Junction 3a 17:15 - 17:30

Demand (Veh/TS)

		To		
		Watford Road (North)	Watford Road (South)	Chiswell Green Lane
From	Watford Road (North)	0.00	173.00	47.00
	Watford Road (South)	174.00	0.00	31.00
	Chiswell Green Lane	33.00	20.00	0.00

Junction 3a 17:30 - 17:45

Demand (Veh/TS)

		To		
		Watford Road (North)	Watford Road (South)	Chiswell Green Lane
From	Watford Road (North)	0.00	179.00	45.00
	Watford Road (South)	205.00	0.00	25.00
	Chiswell Green Lane	29.00	18.00	0.00

Junction 3a 17:45 - 18:00

Demand (Veh/TS)

		To		
		Watford Road (North)	Watford Road (South)	Chiswell Green Lane
From	Watford Road (North)	0.00	155.00	44.00
	Watford Road (South)	178.00	0.00	28.00
	Chiswell Green Lane	37.00	22.00	0.00

Junction 3b 17:00 - 17:15

Demand (Veh/TS)

		To		
		Watford Road (South)	Watford Road (North)	Tippendell Lane
From	Watford Road (South)	0.00	187.00	39.00
	Watford Road (North)	178.00	0.00	58.00
	Tippendell Lane	43.00	43.00	0.00

Junction 3b 17:15 - 17:30

Demand (Veh/TS)

		To		
		Watford Road (South)	Watford Road (North)	Tippendell Lane
From	Watford Road (South)	0.00	175.00	32.00
	Watford Road (North)	176.00	0.00	64.00
	Tippendell Lane	43.00	46.00	0.00

Junction 3b 17:30 - 17:45

Demand (Veh/TS)

		To		
		Watford Road (South)	Watford Road (North)	Tippendell Lane
From	Watford Road (South)	0.00	200.00	34.00
	Watford Road (North)	180.00	0.00	44.00
	Tippendell Lane	43.00	35.00	0.00

Junction 3b 17:45 - 18:00

Demand (Veh/TS)

		To		
		Watford Road (South)	Watford Road (North)	Tippendell Lane
From	Watford Road (South)	0.00	178.00	36.00
	Watford Road (North)	158.00	0.00	47.00
	Tippendell Lane	40.00	33.00	0.00

Vehicle Mix

Junction 3a 17:00 - 17:15

Heavy Vehicle Percentages

		To		
		Watford Road (North)	Watford Road (South)	Chiswell Green Lane
From	Watford Road (North)	0	21	0
	Watford Road (South)	0	0	0
	Chiswell Green Lane	0	0	0

Junction 3a 17:15 - 17:30

Heavy Vehicle Percentages

		To		
		Watford Road (North)	Watford Road (South)	Chiswell Green Lane
From	Watford Road (North)	0	1	0
	Watford Road (South)	1	0	0
	Chiswell Green Lane	0	0	0

Junction 3a 17:30 - 17:45

Heavy Vehicle Percentages

		To		
		Watford Road (North)	Watford Road (South)	Chiswell Green Lane
From	Watford Road (North)	0	1	0
	Watford Road (South)	0	0	0
	Chiswell Green Lane	0	0	0

Junction 3a 17:45 - 18:00

Heavy Vehicle Percentages

		To		
		Watford Road (North)	Watford Road (South)	Chiswell Green Lane
From	Watford Road (North)	0	1	0
	Watford Road (South)	0	0	0
	Chiswell Green Lane	0	0	0

Junction 3b 17:00 - 17:15

Heavy Vehicle Percentages

		To		
		Watford Road (South)	Watford Road (North)	Tippendell Lane
From	Watford Road (South)	0	0	0
	Watford Road (North)	1	0	0
	Tippendell Lane	20	3	0

Junction 3b 17:15 - 17:30

Heavy Vehicle Percentages

		To		
		Watford Road (South)	Watford Road (North)	Tippendell Lane
From	Watford Road (South)	0	1	0
	Watford Road (North)	1	0	2
	Tippendell Lane	0	2	0

Junction 3b 17:30 - 17:45

Heavy Vehicle Percentages

		To		
		Watford Road (South)	Watford Road (North)	Tippendell Lane
From	Watford Road (South)	0	0	0
	Watford Road (North)	1	0	0
	Tippendell Lane	0	0	0

Junction 3b 17:45 - 18:00

Heavy Vehicle Percentages

		To		
		Watford Road (South)	Watford Road (North)	Tippendell Lane
From	Watford Road (South)	0	0	0
	Watford Road (North)	1	0	2
	Tippendell Lane	0	3	0

Results

Results Summary for whole modelled period

Junction	Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/TS)	Total Junction Arrivals (Veh)
Junction 3a	Watford Road (North)	0.69	9.79	2.2	A	201.07	804.30
	Watford Road (South)	0.97	54.37	13.8	F	215.74	862.98
	Chiswell Green Lane	0.56	19.23	1.2	C	53.25	213.00
Junction 3b	Watford Road (South)	0.56	5.00	1.3	A	218.40	873.60
	Watford Road (North)	1.04	119.68	30.1	F	226.27	905.09
	Tippendell Lane	1.26	669.33	51.1	F	81.14	324.54

Main Results for each time segment

17:00 - 17:15

Junction	Arm	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Circulating flow (Veh/TS)	Pedestrian demand (Ped/TS)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Throughput (exit side) (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	LOS
Junction 3a	Watford Road (North)	176.56	176.56	21.57	10.00	264.69	0.667	174.63	217.71	0.0	1.9	9.795	A
	Watford Road (South)	222.00	222.00	40.12		237.56	0.934	213.23	156.08	0.0	8.8	30.396	D
	Chiswell Green Lane	54.00	54.00	186.34		103.03	0.524	52.94	67.01	0.0	1.1	17.624	C
Junction 3b	Watford Road (South)	217.71	217.71	32.61		407.97	0.534	216.58	196.96	0.0	1.1	4.676	A
	Watford Road (North)	236.00	236.00	37.37		229.93	1.026	217.90	211.82	0.0	18.1	50.579	F
	Tippendell Lane	86.00	86.00	164.35		68.37	1.258	65.23	90.93	0.0	20.8	163.803	F

17:15 - 17:30

Junction	Arm	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Circulating flow (Veh/TS)	Pedestrian demand (Ped/TS)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Throughput (exit side) (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	LOS
Junction 3a	Watford Road (North)	204.37	204.37	20.07	10.00	305.59	0.668	204.27	207.86	1.9	2.0	8.878	A
	Watford Road (South)	205.00	205.00	43.68		233.71	0.877	205.73	180.65	8.8	8.0	33.721	D
	Chiswell Green Lane	53.00	53.00	174.84		109.22	0.485	53.09	74.57	1.1	1.0	16.069	C
Junction 3b	Watford Road (South)	207.78	207.78	36.22		401.53	0.517	207.83	202.13	1.1	1.1	4.647	A
	Watford Road (North)	240.00	240.00	32.15		231.52	1.037	228.14	211.90	18.1	30.0	107.058	F
	Tippendell Lane	89.00	89.00	167.67		71.09	1.213	70.67	92.61	20.8	39.0	409.934	F

17:30 - 17:45

Junction	Arm	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Circulating flow (Veh/TS)	Pedestrian demand (Ped/TS)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Throughput (exit side) (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	LOS
Junction 3a	Watford Road (North)	212.29	212.29	17.99	10.00	307.45	0.691	212.10	228.52	2.0	2.2	9.413	A
	Watford Road (South)	230.00	230.00	42.64		236.11	0.974	224.23	187.46	8.0	13.8	54.369	F
	Chiswell Green Lane	47.00	47.00	199.52		94.65	0.497	46.99	67.35	1.0	1.0	18.874	C
Junction 3b	Watford Road (South)	228.59	228.59	32.76		408.35	0.560	228.41	212.21	1.1	1.3	4.996	A
	Watford Road (North)	224.00	224.00	33.20		231.85	0.966	224.05	227.97	30.0	30.0	119.683	F
	Tippendell Lane	78.00	78.00	177.91		67.22	1.154	67.06	79.34	39.0	50.0	605.799	F

17:45 - 18:00

Junction	Arm	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Circulating flow (Veh/TS)	Pedestrian demand (Ped/TS)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Throughput (exit side) (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	LOS
Junction 3a	Watford Road (North)	211.20	211.20	21.92	10.00	304.90	0.693	211.16	219.52	2.2	2.2	9.589	A
	Watford Road (South)	206.00	206.00	46.64		233.98	0.880	210.99	186.43	13.8	8.8	43.186	E
	Chiswell Green Lane	59.00	59.00	182.69		105.26	0.561	58.75	74.95	1.0	1.2	19.226	C
Junction 3b	Watford Road (South)	219.52	219.52	31.69		409.40	0.536	219.61	211.12	1.3	1.2	4.746	A
	Watford Road (North)	205.00	205.00	36.91		229.24	0.895	222.35	214.38	30.0	12.6	92.956	F
	Tippendell Lane	73.00	73.00	172.34		70.87	1.040	70.47	86.92	50.0	52.5	669.334	F

Appendix AHJ/30

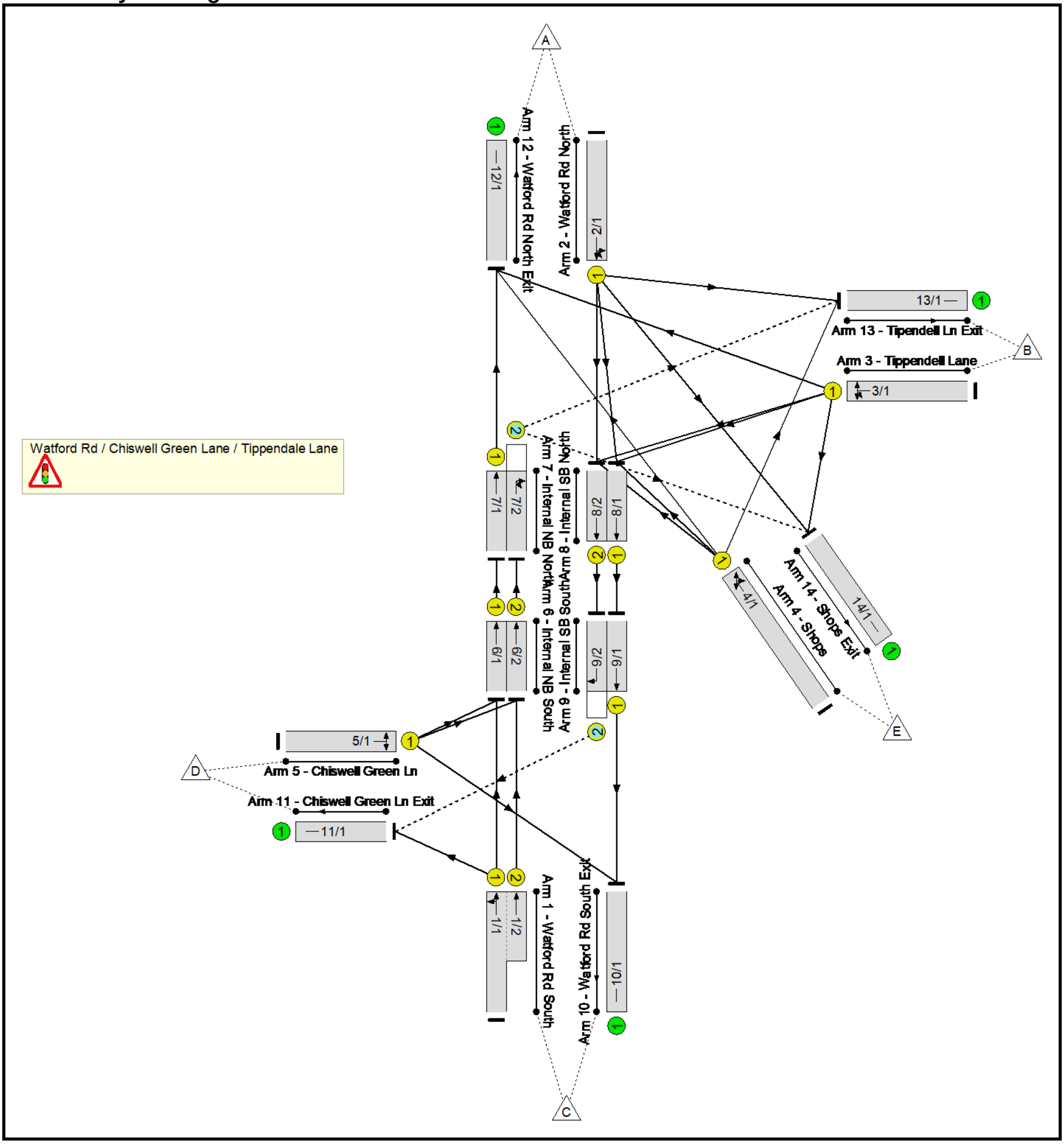
Cumulative Assessment Potential Signalised Junction Linsig Outputs

Glanville Full Report

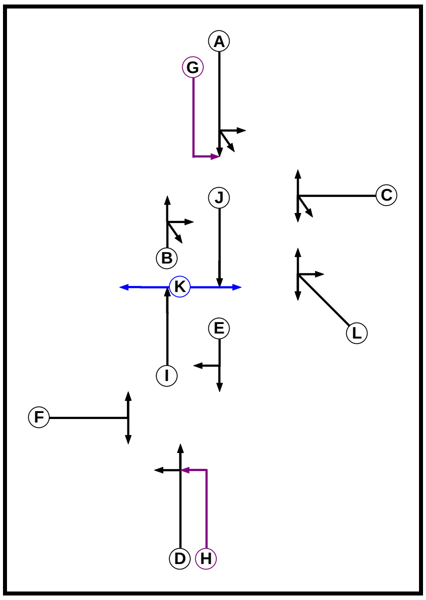
User and Project Details

Project:	**Land West of Chiswell Green**
Title:	**Proposed Watford Road / Tippendell Lane / Chiswell Green Lane**
Location:	
Client:	CALA Homes & Redington Capital
Additional detail:	
File name:	Watford Rd_Chiswell Green + Central Crossing_V1.2.lsg3x
Author:	Dkemp
Company:	Glanville Consultants
Address:	

Network Layout Diagram



Phase Diagram



Phase Input Data

Phase Name	Phase Type	Stage Stream	Assoc. Phase	Street Min	Cont Min
A	Traffic	1		7	7
B	Traffic	1		7	7
C	Traffic	1		7	7
D	Traffic	2		7	7
E	Traffic	2		7	7
F	Traffic	2		7	7
G	Ind. Arrow	1	B	7	7
H	Ind. Arrow	2	E	7	7
I	Traffic	3		7	7
J	Traffic	3		7	7
K	Pedestrian	3		7	7
L	Traffic	1		7	7

Glanville Full Report

Phase Intergreens Matrix

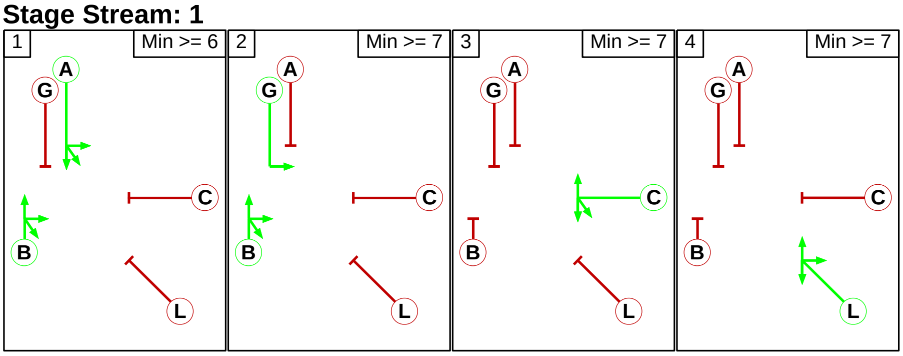
		Starting Phase											
		A	B	C	D	E	F	G	H	I	J	K	L
Terminating Phase	A		-	5	-	-	-	2	-	-	-	-	5
	B	-		5	-	-	-	-	-	-	-	-	5
	C	5	6		-	-	-	2	-	-	-	-	5
	D	-	-	-		-	7	-	3	-	-	-	-
	E	-	-	-	-		5	-	-	-	-	-	-
	F	-	-	-	5	5		-	3	-	-	-	-
	G	3	-	3	-	-	-		-	-	-	-	5
	H	-	-	-	2	-	2	-		-	-	-	-
	I	-	-	-	-	-	-	-	-		-	5	-
	J	-	-	-	-	-	-	-	-	-		5	-
	K	-	-	-	-	-	-	-	-	14	14		-
	L	5	6	5	-	-	-	5	-	-	-	-	

Phases in Stage

Stream	Stage No.	Phases in Stage
1	1	A B
1	2	B G
1	3	C
1	4	L
2	1	D E
2	2	E H
2	3	F
3	1	I J
3	2	K

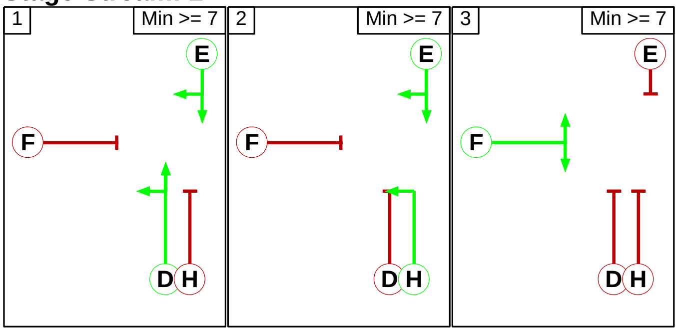
Stage Diagram

Stage Stream: 1

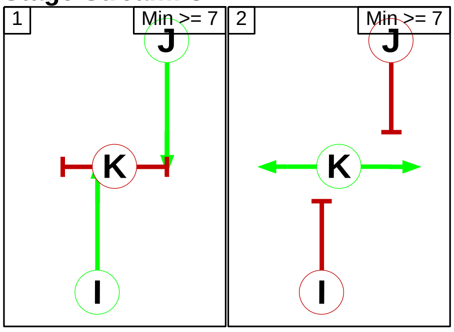


Glanville Full Report

Stage Stream: 2



Stage Stream: 3



Phase Delays

Stage Stream: 1

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Stage Stream: 2

Term. Stage	Start Stage	Phase	Type	Value	Cont value
1	3	E	Losing	2	2

Stage Stream: 3

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Prohibited Stage Change

Stage Stream: 1

		To Stage			
		1	2	3	4
From Stage	1		2	5	5
	2	3		5	5
	3	6	X		5
	4	6	X	5	

Glanville Full Report

Stage Stream: 2

		To Stage		
From Stage		1	2	3
	1		3	7
	2	2		5
	3	5	X	

Stage Stream: 3

		To Stage	
From Stage		1	2
	1		5
	2	14	

Give-Way Lane Input Data

Junction: Watford Rd / Chiswell Green Lane / Tippendale Lane											
Lane	Movement	Max Flow when Giving Way (PCU/Hr)	Min Flow when Giving Way (PCU/Hr)	Opposing Lane	Opp. Lane Coeff.	Opp. Mvmnts.	Right Turn Storage (PCU)	Non-Blocking Storage (PCU)	RTF	Right Turn Move up (s)	Max Turns in Intergreen (PCU)
7/2 (Internal NB North)	13/1 (Right)	1439	0	2/1	1.09	All	2.00	-	0.50	2	2.00
	14/1 (U-Turn)	1439	0	2/1	1.09	All					
9/2 (Internal SB South)	11/1 (Right)	1439	0	1/2	1.09	All	2.00	-	0.50	2	2.00
				1/1	1.09	All					

Lane Input Data

Junction: Watford Rd / Chiswell Green Lane / Tippendale Lane

Lane	Lane Type	Phases	Start Disp.	End Disp.	Physical Length (PCU)	Sat Flow Type	Def User Saturation Flow (PCU/Hr)	Lane Width (m)	Gradient	Nearside Lane	Turns	Turning Radius (m)
1/1 (Watford Rd South)	U	D	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 6 Ahead	Inf
											Arm 11 Left	10.00
1/2 (Watford Rd South)	U	D	2	3	5.2	Geom	-	3.00	0.00	N	Arm 6 Ahead	Inf
2/1 (Watford Rd North)	U	A	2	3	60.0	Geom	-	4.40	0.00	Y	Arm 8 Ahead	Inf
											Arm 13 Left	12.00
											Arm 14 Ahead	Inf
3/1 (Tippendell Lane)	U	C	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 8 Left	Inf
											Arm 12 Right	10.00
											Arm 14 Left	Inf
4/1 (Shops)	U	L	2	3	60.0	Geom	-	2.40	0.00	Y	Arm 8 U-Turn	10.00
											Arm 12 Ahead	10.00
											Arm 13 Right	10.00
5/1 (Chiswell Green Ln)	U	F	2	3	60.0	Geom	-	3.60	0.00	Y	Arm 6 Left	Inf
											Arm 10 Right	10.00
6/1 (Internal NB South)	U	I	2	3	5.2	Geom	-	3.20	0.00	Y	Arm 7 Ahead	Inf
6/2 (Internal NB South)	U	I	2	3	5.2	Geom	-	3.00	0.00	Y	Arm 7 Ahead	Inf
7/1 (Internal NB North)	U	B	2	3	3.5	Geom	-	3.20	0.00	Y	Arm 12 Ahead	Inf
7/2 (Internal NB North)	O	B G	2	3	3.5	Geom	-	3.00	0.00	Y	Arm 13 Right	12.00
											Arm 14 U-Turn	Inf
8/1 (Internal SB North)	U	J	2	3	6.1	Geom	-	3.20	0.00	Y	Arm 9 Ahead	Inf
8/2 (Internal SB North)	U	J	2	3	6.1	Geom	-	3.00	0.00	Y	Arm 9 Ahead	Inf

9/1 (Internal SB South)	U	E	2	3	3.5	Geom	-	3.20	0.00	Y	Arm 10 Ahead	Inf
9/2 (Internal SB South)	O	E H	2	3	3.5	Geom	-	3.00	0.00	Y	Arm 11 Right	12.00
10/1 (Watford Rd South Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
11/1 (Chiswell Green Ln Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
12/1 (Watford Rd North Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
13/1 (Tipendell Ln Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
14/1 (Shops Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2027 Cumulative Sensitivity AM'	08:00	09:00	01:00	
2: '2027 Cumulative Sensitivity PM'	17:00	18:00	01:00	

Scenario 1: '2027 Cumulative AM' (FG1: '2027 Cumulative Sensitivity AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination						
		A	B	C	D	E	Tot.
Origin	A	0	106	670	91	5	872
	B	276	0	117	41	5	439
	C	571	124	0	119	4	818
	D	162	110	142	0	1	415
	E	5	5	0	0	0	10
	Tot.	1014	345	929	251	15	2554

Traffic Lane Flows

Lane	Scenario 1: 2027 Cumulative AM
Junction: Watford Rd / Chiswell Green Lane / Tippendale Lane	
1/1 (with short)	818(In) 690(Out)
1/2 (short)	128
2/1	872
3/1	439
4/1	10
5/1	415
6/1	733
6/2	239
7/1	733
7/2	239
8/1	787
8/2	132
9/1	787
9/2	132
10/1	929
11/1	251
12/1	1014
13/1	345
14/1	15

Lane Saturation Flows

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
Junction: Watford Rd / Chiswell Green Lane / Tippendale Lane								
1/1 (Watford Rd South)	3.00	0.00	Y	Arm 6 Ahead	Inf	82.8 %	1867	1867
				Arm 11 Left	10.00	17.2 %		
1/2 (Watford Rd South)	3.00	0.00	N	Arm 6 Ahead	Inf	100.0 %	2055	2055
2/1 (Watford Rd North)	4.40	0.00	Y	Arm 8 Ahead	Inf	87.3 %	2024	2024
				Arm 13 Left	12.00	12.2 %		
				Arm 14 Ahead	Inf	0.6 %		
3/1 (Tippendell Lane)	3.00	0.00	Y	Arm 8 Left	Inf	36.0 %	1750	1750
				Arm 12 Right	10.00	62.9 %		
				Arm 14 Left	Inf	1.1 %		
4/1 (Shops)	2.40	0.00	Y	Arm 8 U-Turn	10.00	0.0 %	1613	1613
				Arm 12 Ahead	10.00	50.0 %		
				Arm 13 Right	10.00	50.0 %		
5/1 (Chiswell Green Ln)	3.60	0.00	Y	Arm 6 Left	Inf	65.8 %	1879	1879
				Arm 10 Right	10.00	34.2 %		
6/1 (Internal NB South)	3.20	0.00	Y	Arm 7 Ahead	Inf	100.0 %	1935	1935
6/2 (Internal NB South)	3.00	0.00	Y	Arm 7 Ahead	Inf	100.0 %	1915	1915
7/1 (Internal NB North)	3.20	0.00	Y	Arm 12 Ahead	Inf	100.0 %	1935	1935
7/2 (Internal NB North)	3.00	0.00	Y	Arm 13 Right	12.00	97.9 %	1706	1706
				Arm 14 U-Turn	Inf	2.1 %		
8/1 (Internal SB North)	3.20	0.00	Y	Arm 9 Ahead	Inf	100.0 %	1935	1935
8/2 (Internal SB North)	3.00	0.00	Y	Arm 9 Ahead	Inf	100.0 %	1915	1915
9/1 (Internal SB South)	3.20	0.00	Y	Arm 10 Ahead	Inf	100.0 %	1935	1935
9/2 (Internal SB South)	3.00	0.00	Y	Arm 11 Right	12.00	100.0 %	1702	1702
10/1 (Watford Rd South Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
11/1 (Chiswell Green Ln Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
12/1 (Watford Rd North Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
13/1 (Tipendell Ln Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
14/1 (Shops Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 2: '2027 Cumulative PM' (FG2: '2027 Cumulative Sensitivity PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination					
		A	B	C	D	E	Tot.
Origin	A	0	215	570	79	5	869
	B	160	0	95	12	5	272
	C	649	92	0	53	5	799
	D	66	9	53	0	0	128
	E	5	5	0	0	0	10
	Tot.	880	321	718	144	15	2078

Traffic Lane Flows

Lane	**Scenario 2: 2027 Cumulative PM**
Junction: Watford Rd / Chiswell Green Lane / Tippendale Lane	
1/1 (with short)	799(In) 702(Out)
1/2 (short)	97
2/1	869
3/1	272
4/1	10
5/1	128
6/1	715
6/2	106
7/1	715
7/2	106
8/1	665
8/2	91
9/1	665
9/2	91
10/1	718
11/1	144
12/1	880
13/1	321
14/1	15

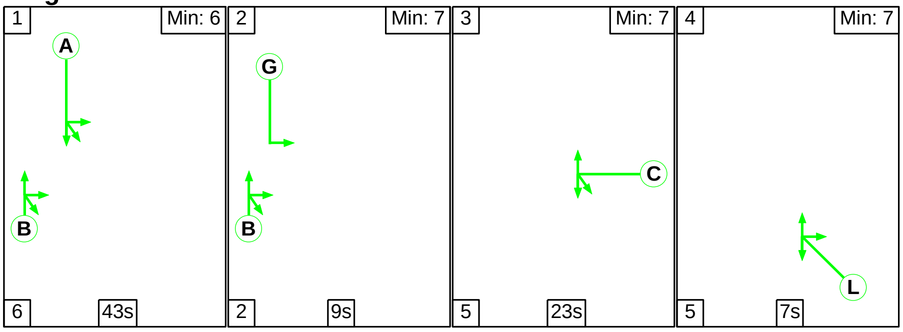
Lane Saturation Flows

Junction: Watford Rd / Chiswell Green Lane / Tippendale Lane								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Watford Rd South)	3.00	0.00	Y	Arm 6 Ahead	Inf	92.5 %	1894	1894
				Arm 11 Left	10.00	7.5 %		
1/2 (Watford Rd South)	3.00	0.00	N	Arm 6 Ahead	Inf	100.0 %	2055	2055
2/1 (Watford Rd North)	4.40	0.00	Y	Arm 8 Ahead	Inf	74.7 %	1993	1993
				Arm 13 Left	12.00	24.7 %		
				Arm 14 Ahead	Inf	0.6 %		
3/1 (Tippendell Lane)	3.00	0.00	Y	Arm 8 Left	Inf	39.3 %	1760	1760
				Arm 12 Right	10.00	58.8 %		
				Arm 14 Left	Inf	1.8 %		
4/1 (Shops)	2.40	0.00	Y	Arm 8 U-Turn	10.00	0.0 %	1613	1613
				Arm 12 Ahead	10.00	50.0 %		
				Arm 13 Right	10.00	50.0 %		
5/1 (Chiswell Green Ln)	3.60	0.00	Y	Arm 6 Left	Inf	58.6 %	1860	1860
				Arm 10 Right	10.00	41.4 %		
6/1 (Internal NB South)	3.20	0.00	Y	Arm 7 Ahead	Inf	100.0 %	1935	1935
6/2 (Internal NB South)	3.00	0.00	Y	Arm 7 Ahead	Inf	100.0 %	1915	1915
7/1 (Internal NB North)	3.20	0.00	Y	Arm 12 Ahead	Inf	100.0 %	1935	1935
7/2 (Internal NB North)	3.00	0.00	Y	Arm 13 Right	12.00	95.3 %	1711	1711
				Arm 14 U-Turn	Inf	4.7 %		
8/1 (Internal SB North)	3.20	0.00	Y	Arm 9 Ahead	Inf	100.0 %	1935	1935
8/2 (Internal SB North)	3.00	0.00	Y	Arm 9 Ahead	Inf	100.0 %	1915	1915
9/1 (Internal SB South)	3.20	0.00	Y	Arm 10 Ahead	Inf	100.0 %	1935	1935
9/2 (Internal SB South)	3.00	0.00	Y	Arm 11 Right	12.00	100.0 %	1702	1702
10/1 (Watford Rd South Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
11/1 (Chiswell Green Ln Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
12/1 (Watford Rd North Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
13/1 (Tipendell Ln Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
14/1 (Shops Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

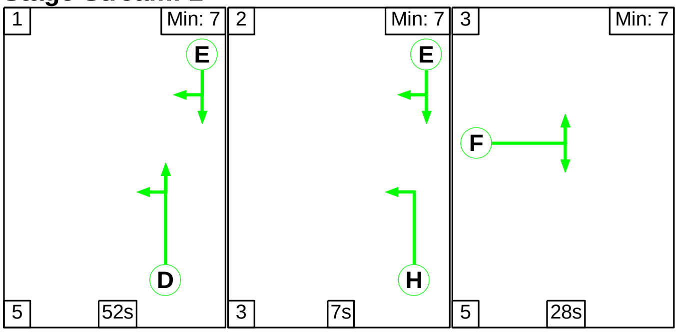
Scenario 1: '2027 Cumulative AM' (FG1: '2027 Cumulative Sensitivity AM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

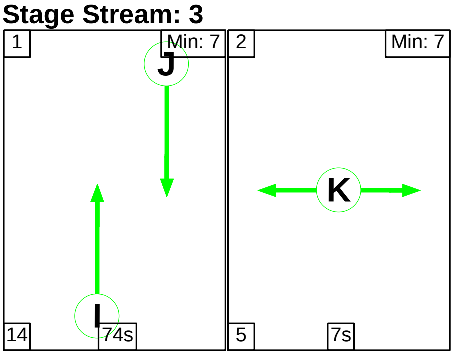
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2	3	4
Duration	43	9	23	7
Change Point	0	49	60	88

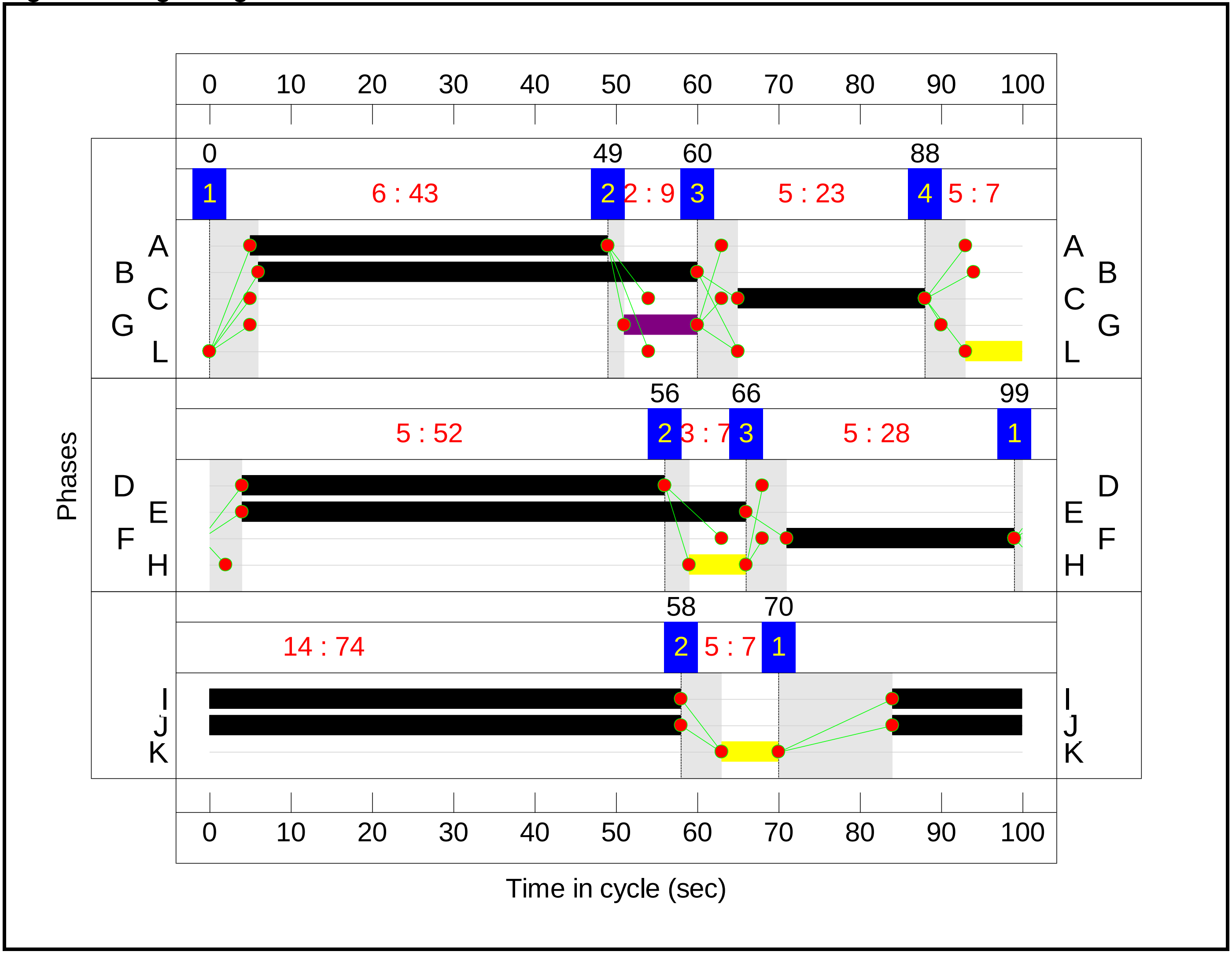
Stage Stream: 2

Stage	1	2	3
Duration	52	7	28
Change Point	99	56	66

Stage Stream: 3

Stage	1	2
Duration	74	7
Change Point	70	58

Signal Timings Diagram



Glanville Full Report

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Proposed Watford Road / Tippendell Lane / Chiswell Green Lane	-	-	**N/A**	-	-		-	-	-	-	-	-	**104.5%**
Watford Rd / Chiswell Green Lane / Tippendale Lane	-	-	**N/A**	-	-		-	-	-	-	-	-	**104.5%**
1/1+1/2	Watford Rd South Ahead Left	U	2	N/A	D		1	52	-	818	1867:2055	871+162	79.2 : 79.2%
2/1	Watford Rd North Ahead Left Ahead2	U	1	N/A	A		1	44	-	872	2024	911	95.7%
3/1	Tippendell Lane Left Right Left2	U	1	N/A	C		1	23	-	439	1750	420	104.5%
4/1	Shops U-Turn Ahead Right	U	1	N/A	L		1	7	-	10	1613	129	7.7%
5/1	Chiswell Green Ln Left Right	U	2	N/A	F		1	28	-	415	1879	545	76.2%
6/1	Internal NB South Ahead	U	3	N/A	I		1	74	-	733	1935	1451	50.5%
6/2	Internal NB South Ahead	U	3	N/A	I		1	74	-	239	1915	1436	16.6%
7/1	Internal NB North Ahead	U	1	N/A	B		1	54	-	733	1935	1064	68.9%
7/2	Internal NB North Right U-Turn	O	1	N/A	B	G	1	54	9	239	1706	240	99.5%
8/1	Internal SB North Ahead	U	3	N/A	J		1	74	-	787	1935	1451	53.9%
8/2	Internal SB North Ahead	U	3	N/A	J		1	74	-	132	1915	1436	9.1%
9/1	Internal SB South Ahead	U	2	N/A	E		1	62	-	787	1935	1219	64.1%
9/2	Internal SB South Right	O	2	N/A	E	H	1	62	7	132	1702	317	41.0%

10/1	Watford Rd South Exit	U	N/A	N/A	-		-	-	-	929	Inf	Inf	0.0%
11/1	Chiswell Green Ln Exit	U	N/A	N/A	-		-	-	-	251	Inf	Inf	0.0%
12/1	Watford Rd North Exit	U	N/A	N/A	-		-	-	-	1014	Inf	Inf	0.0%
13/1	Tipendell Ln Exit	U	N/A	N/A	-		-	-	-	345	Inf	Inf	0.0%
14/1	Shops Exit	U	N/A	N/A	-		-	-	-	15	Inf	Inf	0.0%

Glanville Full Report

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Proposed Watford Road / Tippendell Lane / Chiswell Green Lane	**-**	**-**	**124**	**174**	**71**	**24.2**	**38.7**	**1.8**	**64.7**	**-**	**-**	**-**	**-**
Watford Rd / Chiswell Green Lane / Tippendale Lane	**-**	**-**	**124**	**174**	**71**	**24.2**	**38.7**	**1.8**	**64.7**	**-**	**-**	**-**	**-**
1/1+1/2	818	818	-	-	-	4.1	1.9	-	6.0	26.4	17.2	1.9	19.1
2/1	872	872	-	-	-	6.4	8.0	-	14.4	59.5	23.3	8.0	31.2
3/1	439	420	-	-	-	5.3	16.3	-	21.5	176.5	12.7	16.3	29.0
4/1	10	10	-	-	-	0.1	0.0	-	0.2	57.9	0.3	0.0	0.3
5/1	415	415	-	-	-	3.7	1.6	-	5.3	45.9	10.5	1.6	12.1
6/1	733	733	-	-	-	0.2	0.5	-	0.7	3.5	3.4	0.5	3.9
6/2	239	239	-	-	-	0.1	0.1	-	0.2	3.1	1.9	0.1	2.0
7/1	733	733	-	-	-	1.2	1.1	-	2.3	11.1	12.5	1.1	13.6
7/2	239	239	15	154	71	2.0	7.4	1.0	10.4	157.1	6.6	7.4	14.0
8/1	782	782	-	-	-	0.2	0.6	-	0.8	3.6	2.5	0.6	3.0
8/2	130	130	-	-	-	0.1	0.0	-	0.1	2.9	0.7	0.0	0.8
9/1	782	782	-	-	-	0.5	0.9	-	1.4	6.5	3.3	0.9	4.1
9/2	130	130	109	21	0	0.3	0.3	0.8	1.4	39.3	1.3	0.3	1.6
10/1	924	924	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	249	249	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/1	1002	1002	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/1	345	345	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/1	15	15	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1	Stream: 1	PRC for Signalled Lanes (%):	-16.1	Total Delay for Signalled Lanes (pcuHr):	48.79	Cycle Time (s):	100
C1	Stream: 2	PRC for Signalled Lanes (%):	13.7	Total Delay for Signalled Lanes (pcuHr):	14.13	Cycle Time (s):	100
C1	Stream: 3	PRC for Signalled Lanes (%):	67.0	Total Delay for Signalled Lanes (pcuHr):	1.81	Cycle Time (s):	100
		PRC Over All Lanes (%):	-16.1	Total Delay Over All Lanes(pcuHr):	64.73		

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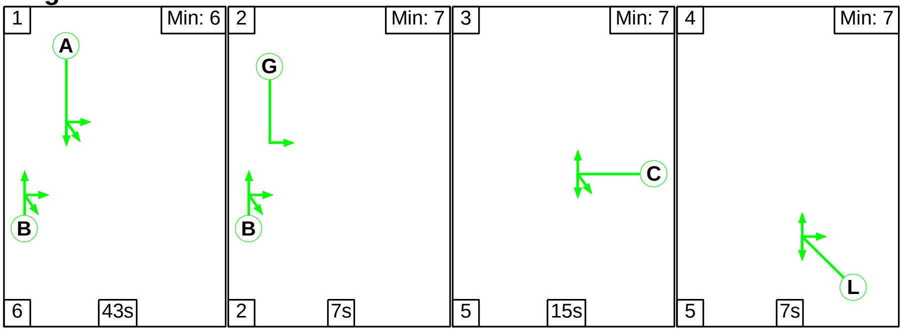
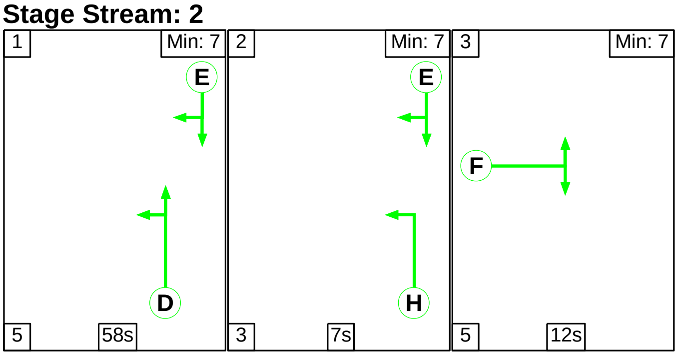
Scenario 2: '2027 Cumulative PM' (FG2: '2027 Cumulative Sensitivity PM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

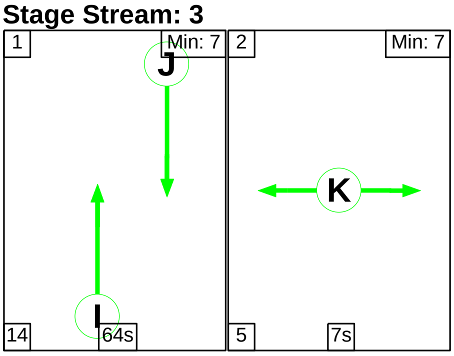
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2	3	4
Duration	43	7	15	7
Change Point	0	49	58	78

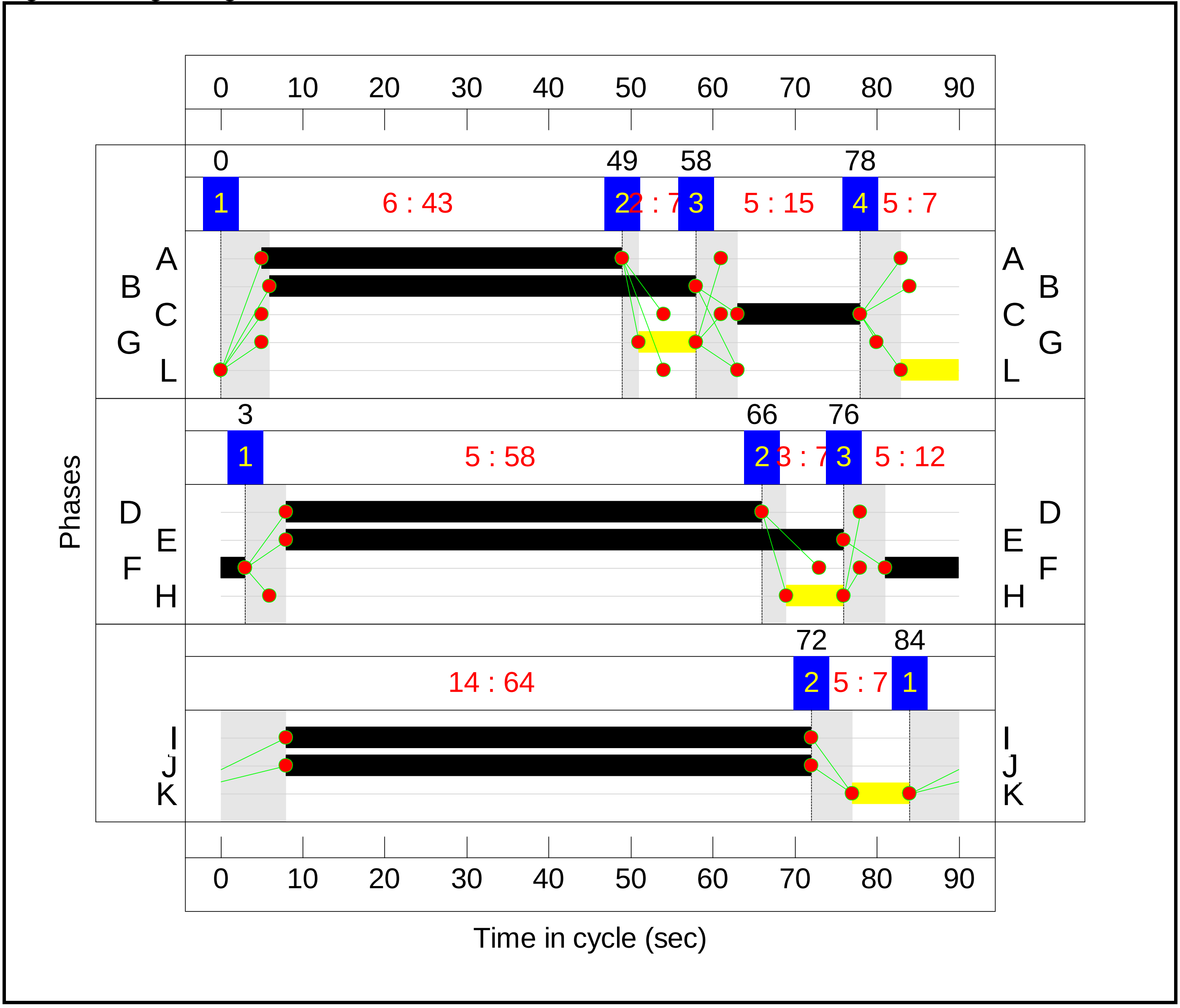
Stage Stream: 2

Stage	1	2	3
Duration	58	7	12
Change Point	3	66	76

Stage Stream: 3

Stage	1	2
Duration	64	7
Change Point	84	72

Signal Timings Diagram



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Proposed Watford Road / Tippendell Lane / Chiswell Green Lane	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**87.2%**
Watford Rd / Chiswell Green Lane / Tippendale Lane	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**87.2%**
1/1+1/2	Watford Rd South Ahead Left	U	2	N/A	D		1	58	-	799	1894:2055	1119+155	62.7 : 62.7%
2/1	Watford Rd North Ahead Left Ahead2	U	1	N/A	A		1	44	-	869	1993	996	87.2%
3/1	Tippendell Lane Left Right Left2	U	1	N/A	C		1	15	-	272	1760	313	86.9%
4/1	Shops U-Turn Ahead Right	U	1	N/A	L		1	7	-	10	1613	143	7.0%
5/1	Chiswell Green Ln Left Right	U	2	N/A	F		1	12	-	128	1860	269	47.6%
6/1	Internal NB South Ahead	U	3	N/A	I		1	64	-	715	1935	1397	51.2%
6/2	Internal NB South Ahead	U	3	N/A	I		1	64	-	106	1915	1383	7.7%
7/1	Internal NB North Ahead	U	1	N/A	B		1	52	-	715	1935	1140	62.7%
7/2	Internal NB North Right U-Turn	O	1	N/A	B	G	1	52	7	106	1711	268	39.6%
8/1	Internal SB North Ahead	U	3	N/A	J		1	64	-	665	1935	1397	47.6%
8/2	Internal SB North Ahead	U	3	N/A	J		1	64	-	91	1915	1383	6.6%
9/1	Internal SB South Ahead	U	2	N/A	E		1	68	-	665	1935	1483	44.8%
9/2	Internal SB South Right	O	2	N/A	E	H	1	68	7	91	1702	471	19.3%

10/1	Watford Rd South Exit	U	N/A	N/A	-		-	-	-	718	Inf	Inf	0.0%
11/1	Chiswell Green Ln Exit	U	N/A	N/A	-		-	-	-	144	Inf	Inf	0.0%
12/1	Watford Rd North Exit	U	N/A	N/A	-		-	-	-	880	Inf	Inf	0.0%
13/1	Tipendell Ln Exit	U	N/A	N/A	-		-	-	-	321	Inf	Inf	0.0%
14/1	Shops Exit	U	N/A	N/A	-		-	-	-	15	Inf	Inf	0.0%

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Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Proposed Watford Road / Tippendell Lane / Chiswell Green Lane	**-**	**-**	**141**	**54**	**3**	**12.5**	**10.2**	**0.9**	**23.6**	**-**	**-**	**-**	**-**
Watford Rd / Chiswell Green Lane / Tippendale Lane	**-**	**-**	**141**	**54**	**3**	**12.5**	**10.2**	**0.9**	**23.6**	**-**	**-**	**-**	**-**
1/1+1/2	799	799	-	-	-	1.9	0.8	-	2.7	12.3	10.6	0.8	11.4
2/1	869	869	-	-	-	4.8	3.2	-	8.1	33.4	19.1	3.2	22.3
3/1	272	272	-	-	-	2.7	2.9	-	5.6	74.5	6.6	2.9	9.5
4/1	10	10	-	-	-	0.1	0.0	-	0.1	51.3	0.2	0.0	0.3
5/1	128	128	-	-	-	1.3	0.5	-	1.7	48.1	2.9	0.5	3.4
6/1	715	715	-	-	-	0.2	0.5	-	0.8	3.8	3.3	0.5	3.8
6/2	106	106	-	-	-	0.0	0.0	-	0.1	2.4	0.2	0.0	0.3
7/1	715	715	-	-	-	0.9	0.8	-	1.7	8.6	2.7	0.8	3.6
7/2	106	106	55	49	2	0.1	0.3	0.7	1.1	38.9	0.4	0.3	0.7
8/1	665	665	-	-	-	0.4	0.5	-	0.8	4.5	4.4	0.5	4.8
8/2	91	91	-	-	-	0.0	0.0	-	0.1	3.0	0.2	0.0	0.2
9/1	665	665	-	-	-	0.0	0.4	-	0.4	2.2	0.0	0.4	0.4
9/2	91	91	86	5	0	0.0	0.1	0.2	0.3	12.5	0.0	0.1	0.1
10/1	718	718	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	144	144	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/1	880	880	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/1	321	321	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/1	15	15	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 Stream: 1 PRC for Signalled Lanes (%): 3.2 Total Delay for Signalled Lanes (pcuHr): 16.69 Cycle Time (s): 90
C1 Stream: 2 PRC for Signalled Lanes (%): 43.5 Total Delay for Signalled Lanes (pcuHr): 5.17 Cycle Time (s): 90
C1 Stream: 3 PRC for Signalled Lanes (%): 75.9 Total Delay for Signalled Lanes (pcuHr): 1.74 Cycle Time (s): 90
PRC Over All Lanes (%): 3.2 Total Delay Over All Lanes(pcuHr): 23.60

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User and Project Details

Project:	**Land West of Chiswell Green**
Title:	**Proposed Watford Road / Tippendell Lane / Chiswell Green Lane**
Location:	
Client:	CALA Homes & Redington Capital
Additional detail:	
File name:	Watford Rd_Chiswell Green + Central Crossing_V1.2 - Alternate Crossings.lsg3x
Author:	Dkemp
Company:	Glanville Consultants
Address:	

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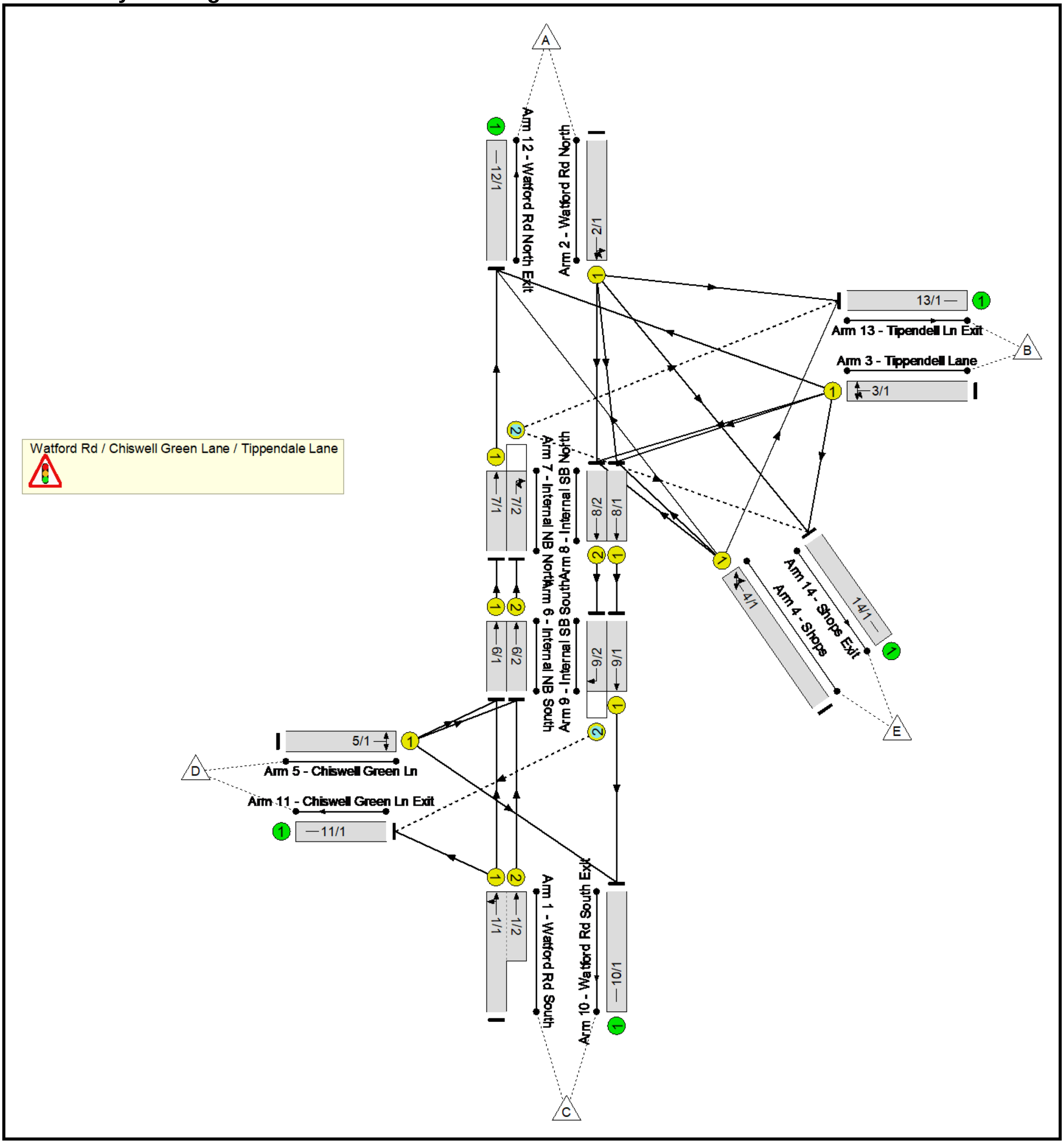
Network Layout Diagram



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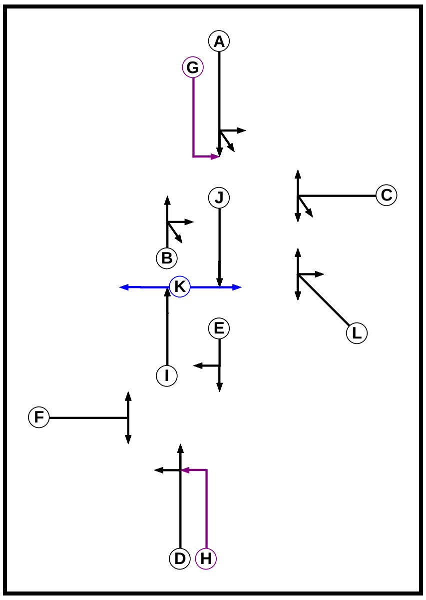
Phase Diagram



Phase Input Data

Phase Name	Phase Type	Stage Stream	Assoc. Phase	Street Min	Cont Min
A	Traffic	1		7	7
B	Traffic	1		7	7
C	Traffic	1		7	7
D	Traffic	2		7	7
E	Traffic	2		7	7
F	Traffic	2		7	7
G	Ind. Arrow	1	B	7	7
H	Ind. Arrow	2	E	7	7
I	Traffic	3		7	7
J	Traffic	3		7	7
K	Pedestrian	3		7	7
L	Traffic	1		7	7

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Phase Intergreens Matrix

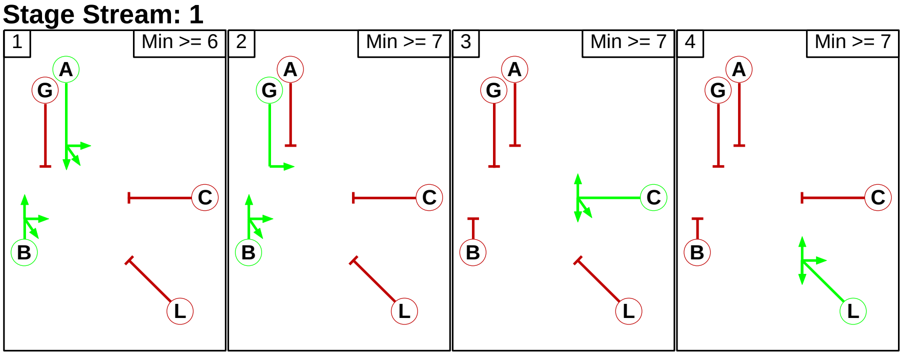
		Starting Phase											
		A	B	C	D	E	F	G	H	I	J	K	L
Terminating Phase	A		-	5	-	-	-	2	-	-	-	-	5
	B	-		5	-	-	-	-	-	-	-	-	5
	C	5	6		-	-	-	2	-	-	-	-	5
	D	-	-	-		-	7	-	3	-	-	-	-
	E	-	-	-	-		5	-	-	-	-	-	-
	F	-	-	-	5	5		-	3	-	-	-	-
	G	3	-	3	-	-	-		-	-	-	-	5
	H	-	-	-	2	-	2	-		-	-	-	-
	I	-	-	-	-	-	-	-	-		-	5	-
	J	-	-	-	-	-	-	-	-	-		5	-
	K	-	-	-	-	-	-	-	-	14	14		-
	L	5	6	5	-	-	-	5	-	-	-	-	

Phases in Stage

Stream	Stage No.	Phases in Stage
1	1	A B
1	2	B G
1	3	C
1	4	L
2	1	D E
2	2	E H
2	3	F
3	1	I J
3	2	K

Stage Diagram

Stage Stream: 1



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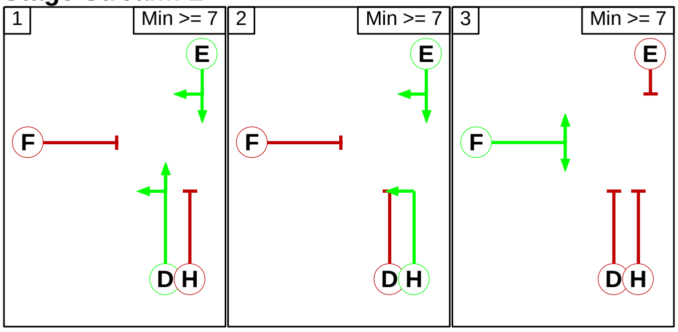
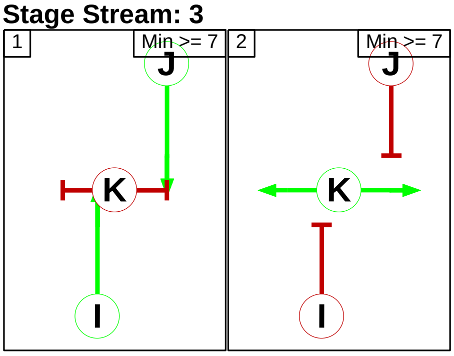
Stage Stream: 2



Stage Stream: 3



Phase Delays

Stage Stream: 1

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Stage Stream: 2

Term. Stage	Start Stage	Phase	Type	Value	Cont value
1	3	E	Losing	2	2

Stage Stream: 3

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Prohibited Stage Change

Stage Stream: 1

	To Stage				
		1	2	3	4
From Stage	1		2	5	5
	2	3		5	5
	3	6	X		5
	4	6	X	5	

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Stage Stream: 2

	To Stage			
From Stage		1	2	3
	1		3	7
	2	2		5
	3	5	X	

Stage Stream: 3

	To Stage		
From Stage		1	2
	1		5
	2	14	

Give-Way Lane Input Data

Junction: Watford Rd / Chiswell Green Lane / Tippendale Lane											
Lane	Movement	Max Flow when Giving Way (PCU/Hr)	Min Flow when Giving Way (PCU/Hr)	Opposing Lane	Opp. Lane Coeff.	Opp. Mvmnts.	Right Turn Storage (PCU)	Non-Blocking Storage (PCU)	RTF	Right Turn Move up (s)	Max Turns in Intergreen (PCU)
7/2 (Internal NB North)	13/1 (Right)	1439	0	2/1	1.09	All	2.00	-	0.50	2	2.00
	14/1 (U-Turn)	1439	0	2/1	1.09	All					
9/2 (Internal SB South)	11/1 (Right)	1439	0	1/2	1.09	All	2.00	-	0.50	2	2.00
				1/1	1.09	All					

Lane Input Data

Junction: Watford Rd / Chiswell Green Lane / Tippendale Lane												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Watford Rd South)	U	D	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 6 Ahead	Inf
											Arm 11 Left	10.00
1/2 (Watford Rd South)	U	D	2	3	5.2	Geom	-	3.00	0.00	N	Arm 6 Ahead	Inf
2/1 (Watford Rd North)	U	A	2	3	60.0	Geom	-	4.40	0.00	Y	Arm 8 Ahead	Inf
											Arm 13 Left	12.00
											Arm 14 Ahead	Inf
3/1 (Tippendell Lane)	U	C	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 8 Left	Inf
											Arm 12 Right	10.00
											Arm 14 Left	Inf
4/1 (Shops)	U	L	2	3	60.0	Geom	-	2.40	0.00	Y	Arm 8 U-Turn	10.00
											Arm 12 Ahead	10.00
											Arm 13 Right	10.00
5/1 (Chiswell Green Ln)	U	F	2	3	60.0	Geom	-	3.60	0.00	Y	Arm 6 Left	Inf
											Arm 10 Right	10.00
6/1 (Internal NB South)	U	I	2	3	5.2	Geom	-	3.20	0.00	Y	Arm 7 Ahead	Inf
6/2 (Internal NB South)	U	I	2	3	5.2	Geom	-	3.00	0.00	Y	Arm 7 Ahead	Inf
7/1 (Internal NB North)	U	B	2	3	3.5	Geom	-	3.20	0.00	Y	Arm 12 Ahead	Inf
7/2 (Internal NB North)	O	B G	2	3	3.5	Geom	-	3.00	0.00	Y	Arm 13 Right	12.00
											Arm 14 U-Turn	Inf
8/1 (Internal SB North)	U	J	2	3	6.1	Geom	-	3.20	0.00	Y	Arm 9 Ahead	Inf
8/2 (Internal SB North)	U	J	2	3	6.1	Geom	-	3.00	0.00	Y	Arm 9 Ahead	Inf

9/1 (Internal SB South)	U	E	2	3	3.5	Geom	-	3.20	0.00	Y	Arm 10 Ahead	Inf
9/2 (Internal SB South)	O	E H	2	3	3.5	Geom	-	3.00	0.00	Y	Arm 11 Right	12.00
10/1 (Watford Rd South Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
11/1 (Chiswell Green Ln Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
12/1 (Watford Rd North Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
13/1 (Tipendell Ln Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
14/1 (Shops Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2027 Cumulative AM'	08:00	09:00	01:00	
2: '2027 Cumulative PM'	17:00	18:00	01:00	

Scenario 1: '2027 Cumulative AM' (FG1: '2027 Cumulative AM', Plan 1: 'Alternate Cycles')

Traffic Flows, Desired

Desired Flow :

	Destination						
		A	B	C	D	E	Tot.
Origin	A	0	106	670	91	5	872
	B	276	0	117	41	5	439
	C	571	124	0	119	4	818
	D	162	110	142	0	1	415
	E	5	5	0	0	0	10
	Tot.	1014	345	929	251	15	2554

Traffic Lane Flows

Lane	Scenario 1: 2027 Cumulative AM
Junction: Watford Rd / Chiswell Green Lane / Tippendale Lane	
1/1 (with short)	818(In) 690(Out)
1/2 (short)	128
2/1	872
3/1	439
4/1	10
5/1	415
6/1	733
6/2	239
7/1	733
7/2	239
8/1	787
8/2	132
9/1	787
9/2	132
10/1	929
11/1	251
12/1	1014
13/1	345
14/1	15

Lane Saturation Flows

Junction: Watford Rd / Chiswell Green Lane / Tippendale Lane								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Watford Rd South)	3.00	0.00	Y	Arm 6 Ahead	Inf	82.8 %	1867	1867
				Arm 11 Left	10.00	17.2 %		
1/2 (Watford Rd South)	3.00	0.00	N	Arm 6 Ahead	Inf	100.0 %	2055	2055
2/1 (Watford Rd North)	4.40	0.00	Y	Arm 8 Ahead	Inf	87.3 %	2024	2024
				Arm 13 Left	12.00	12.2 %		
				Arm 14 Ahead	Inf	0.6 %		
3/1 (Tippendell Lane)	3.00	0.00	Y	Arm 8 Left	Inf	36.0 %	1750	1750
				Arm 12 Right	10.00	62.9 %		
				Arm 14 Left	Inf	1.1 %		
4/1 (Shops)	2.40	0.00	Y	Arm 8 U-Turn	10.00	0.0 %	1613	1613
				Arm 12 Ahead	10.00	50.0 %		
				Arm 13 Right	10.00	50.0 %		
5/1 (Chiswell Green Ln)	3.60	0.00	Y	Arm 6 Left	Inf	65.8 %	1879	1879
				Arm 10 Right	10.00	34.2 %		
6/1 (Internal NB South)	3.20	0.00	Y	Arm 7 Ahead	Inf	100.0 %	1935	1935
6/2 (Internal NB South)	3.00	0.00	Y	Arm 7 Ahead	Inf	100.0 %	1915	1915
7/1 (Internal NB North)	3.20	0.00	Y	Arm 12 Ahead	Inf	100.0 %	1935	1935
7/2 (Internal NB North)	3.00	0.00	Y	Arm 13 Right	12.00	97.9 %	1706	1706
				Arm 14 U-Turn	Inf	2.1 %		
8/1 (Internal SB North)	3.20	0.00	Y	Arm 9 Ahead	Inf	100.0 %	1935	1935
8/2 (Internal SB North)	3.00	0.00	Y	Arm 9 Ahead	Inf	100.0 %	1915	1915
9/1 (Internal SB South)	3.20	0.00	Y	Arm 10 Ahead	Inf	100.0 %	1935	1935
9/2 (Internal SB South)	3.00	0.00	Y	Arm 11 Right	12.00	100.0 %	1702	1702
10/1 (Watford Rd South Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
11/1 (Chiswell Green Ln Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
12/1 (Watford Rd North Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
13/1 (Tipendell Ln Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
14/1 (Shops Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 2: '2027 Cumulative PM' (FG2: '2027 Cumulative PM', Plan 1: 'Alternate Cycles')

Traffic Flows, Desired

Desired Flow :

		Destination					
		A	B	C	D	E	Tot.
Origin	A	0	215	570	79	5	869
	B	160	0	95	12	5	272
	C	649	92	0	53	5	799
	D	66	9	53	0	0	128
	E	5	5	0	0	0	10
	Tot.	880	321	718	144	15	2078

Traffic Lane Flows

Lane	Scenario 2: 2027 Cumulative PM
Junction: Watford Rd / Chiswell Green Lane / Tippendale Lane	
1/1 (with short)	799(In) 702(Out)
1/2 (short)	97
2/1	869
3/1	272
4/1	10
5/1	128
6/1	715
6/2	106
7/1	715
7/2	106
8/1	665
8/2	91
9/1	665
9/2	91
10/1	718
11/1	144
12/1	880
13/1	321
14/1	15

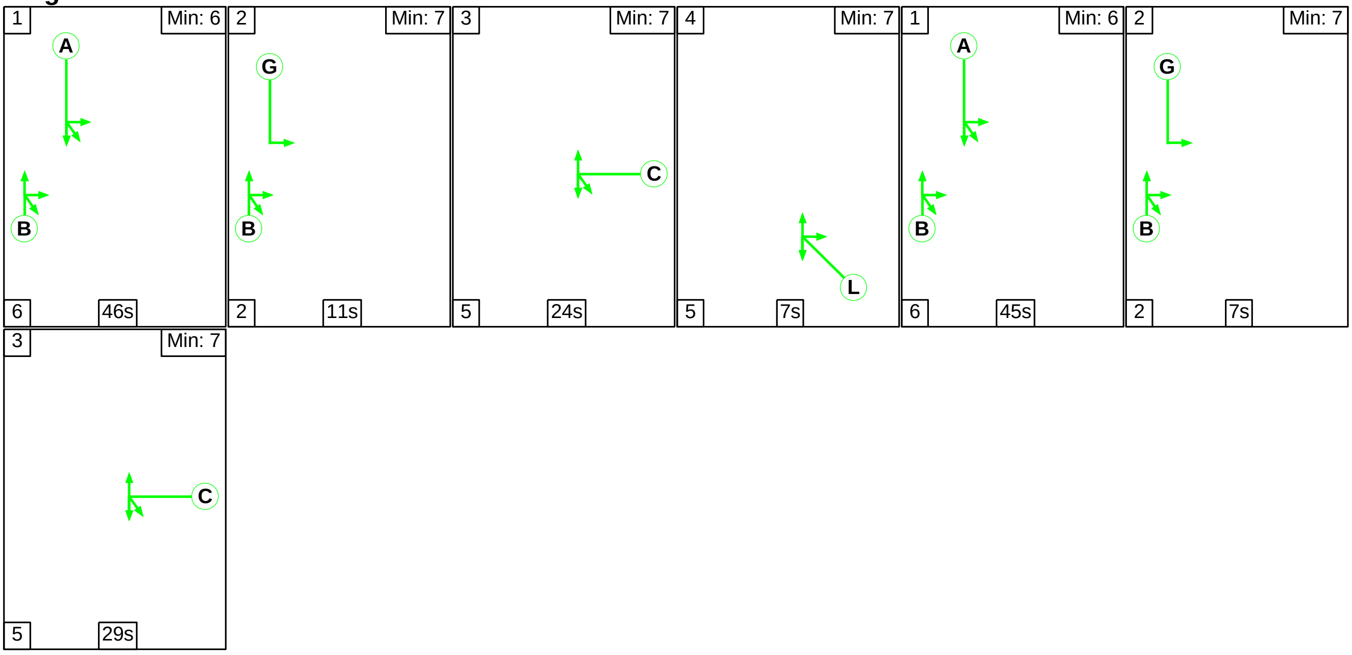
Lane Saturation Flows

Junction: Watford Rd / Chiswell Green Lane / Tippendale Lane								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Watford Rd South)	3.00	0.00	Y	Arm 6 Ahead	Inf	92.5 %	1894	1894
				Arm 11 Left	10.00	7.5 %		
1/2 (Watford Rd South)	3.00	0.00	N	Arm 6 Ahead	Inf	100.0 %	2055	2055
2/1 (Watford Rd North)	4.40	0.00	Y	Arm 8 Ahead	Inf	74.7 %	1993	1993
				Arm 13 Left	12.00	24.7 %		
				Arm 14 Ahead	Inf	0.6 %		
3/1 (Tippendell Lane)	3.00	0.00	Y	Arm 8 Left	Inf	39.3 %	1760	1760
				Arm 12 Right	10.00	58.8 %		
				Arm 14 Left	Inf	1.8 %		
4/1 (Shops)	2.40	0.00	Y	Arm 8 U-Turn	10.00	0.0 %	1613	1613
				Arm 12 Ahead	10.00	50.0 %		
				Arm 13 Right	10.00	50.0 %		
5/1 (Chiswell Green Ln)	3.60	0.00	Y	Arm 6 Left	Inf	58.6 %	1860	1860
				Arm 10 Right	10.00	41.4 %		
6/1 (Internal NB South)	3.20	0.00	Y	Arm 7 Ahead	Inf	100.0 %	1935	1935
6/2 (Internal NB South)	3.00	0.00	Y	Arm 7 Ahead	Inf	100.0 %	1915	1915
7/1 (Internal NB North)	3.20	0.00	Y	Arm 12 Ahead	Inf	100.0 %	1935	1935
7/2 (Internal NB North)	3.00	0.00	Y	Arm 13 Right	12.00	95.3 %	1711	1711
				Arm 14 U-Turn	Inf	4.7 %		
8/1 (Internal SB North)	3.20	0.00	Y	Arm 9 Ahead	Inf	100.0 %	1935	1935
8/2 (Internal SB North)	3.00	0.00	Y	Arm 9 Ahead	Inf	100.0 %	1915	1915
9/1 (Internal SB South)	3.20	0.00	Y	Arm 10 Ahead	Inf	100.0 %	1935	1935
9/2 (Internal SB South)	3.00	0.00	Y	Arm 11 Right	12.00	100.0 %	1702	1702
10/1 (Watford Rd South Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
11/1 (Chiswell Green Ln Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
12/1 (Watford Rd North Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
13/1 (Tipendell Ln Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
14/1 (Shops Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

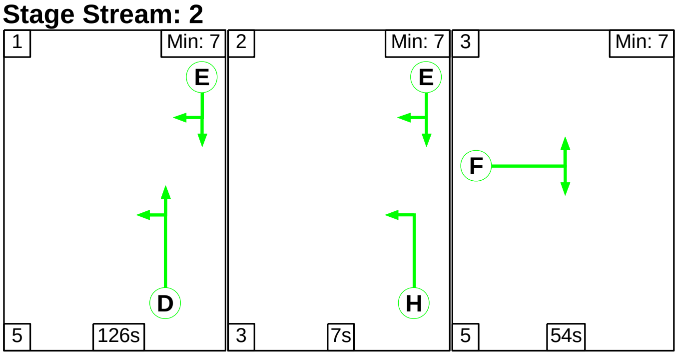
Scenario 1: '2027 Cumulative AM' (FG1: '2027 Cumulative AM', Plan 1: 'Alternate Cycles')

Stage Sequence Diagram

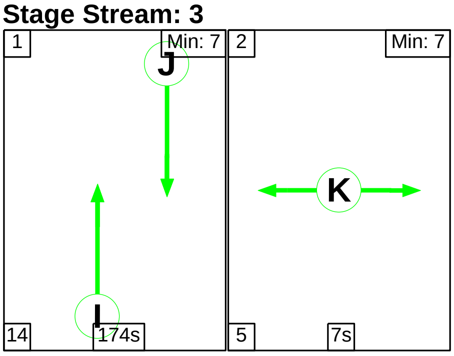
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2	3	4	1	2	3
Duration	46	11	24	7	45	7	29
Change Point	0	52	65	94	106	157	166

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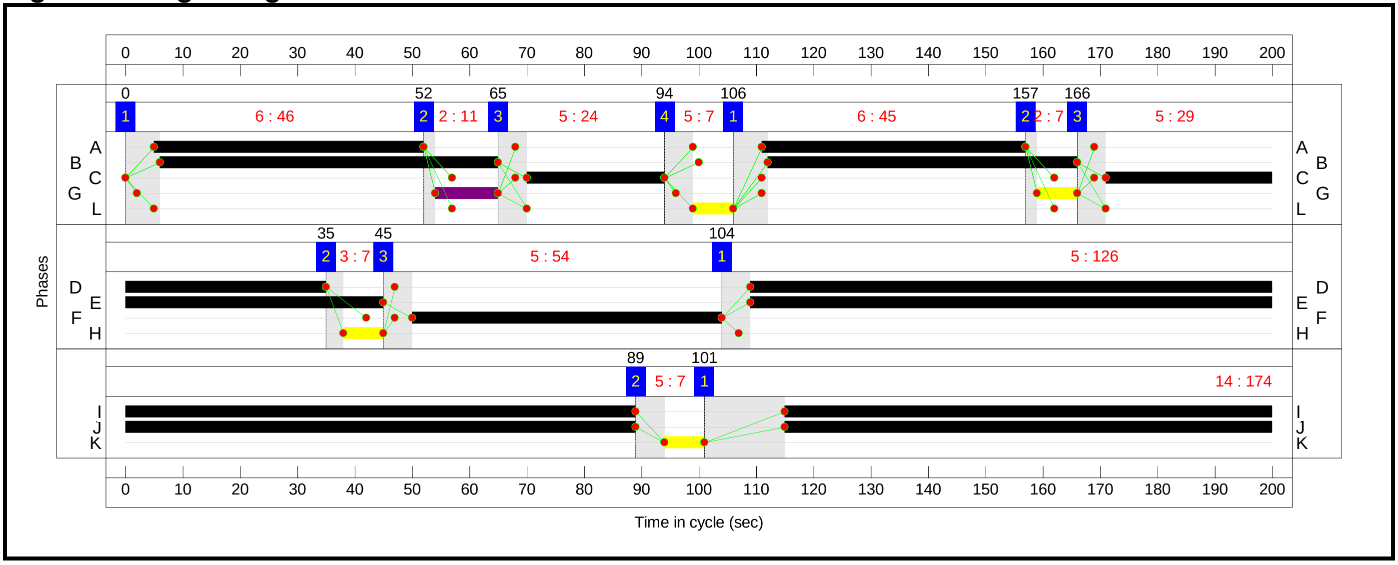
Stage Stream: 2

Stage	1	2	3
Duration	126	7	54
Change Point	104	35	45

Stage Stream: 3

Stage	1	2
Duration	174	7
Change Point	101	89

Signal Timings Diagram



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Proposed Watford Road / Tippendell Lane / Chiswell Green Lane	-	-	**N/A**	-	-		-	-	-	-	-	-	**91.2%**
Watford Rd / Chiswell Green Lane / Tippendale Lane	-	-	**N/A**	-	-		-	-	-	-	-	-	**91.2%**
1/1+1/2	Watford Rd South Ahead Left	U	2	N/A	D		1	126	-	818	1867:2055	1027+190	67.2 : 67.2%
2/1	Watford Rd North Ahead Left Ahead2	U	1	N/A	A		2	93	-	872	2024	961	90.7%
3/1	Tippendell Lane Left Right Left2	U	1	N/A	C		2	53	-	439	1750	481	91.2%
4/1	Shops U-Turn Ahead Right	U	1	N/A	L		1	7	-	10	1613	65	15.5%
5/1	Chiswell Green Ln Left Right	U	2	N/A	F		1	54	-	415	1879	517	80.3%
6/1	Internal NB South Ahead	U	3	N/A	I		1	174	-	733	1935	1693	43.3%
6/2	Internal NB South Ahead	U	3	N/A	I		1	174	-	239	1915	1676	14.3%
7/1	Internal NB North Ahead	U	1	N/A	B		2	113	-	733	1935	1113	65.9%
7/2	Internal NB North Right U-Turn	O	1	N/A	B	G	2	113	18	239	1706	262	91.2%
8/1	Internal SB North Ahead	U	3	N/A	J		1	174	-	787	1935	1693	46.5%
8/2	Internal SB North Ahead	U	3	N/A	J		1	174	-	132	1915	1676	7.9%
9/1	Internal SB South Ahead	U	2	N/A	E		1	136	-	787	1935	1325	59.4%
9/2	Internal SB South Right	O	2	N/A	E	H	1	136	7	132	1702	307	43.1%

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10/1	Watford Rd South Exit	U	N/A	N/A	-		-	-	-	929	Inf	Inf	0.0%
11/1	Chiswell Green Ln Exit	U	N/A	N/A	-		-	-	-	251	Inf	Inf	0.0%
12/1	Watford Rd North Exit	U	N/A	N/A	-		-	-	-	1014	Inf	Inf	0.0%
13/1	Tipendell Ln Exit	U	N/A	N/A	-		-	-	-	345	Inf	Inf	0.0%
14/1	Shops Exit	U	N/A	N/A	-		-	-	-	15	Inf	Inf	0.0%

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Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Proposed Watford Road / Tippendell Lane / Chiswell Green Lane	**-**	**-**	**158**	**162**	**51**	**31.2**	**18.7**	**1.7**	**51.6**	**-**	**-**	**-**	**-**
Watford Rd / Chiswell Green Lane / Tippendale Lane	**-**	**-**	**158**	**162**	**51**	**31.2**	**18.7**	**1.7**	**51.6**	**-**	**-**	**-**	**-**
1/1+1/2	818	818	-	-	-	5.1	1.0	-	6.1	26.9	27.4	1.0	28.5
2/1	872	872	-	-	-	5.9	4.4	-	10.4	42.8	24.5	4.4	28.9
3/1	439	439	-	-	-	4.3	4.3	-	8.6	70.5	12.3	4.3	16.6
4/1	10	10	-	-	-	0.3	0.1	-	0.3	125.7	0.5	0.1	0.6
5/1	415	415	-	-	-	7.8	2.0	-	9.7	84.5	21.4	2.0	23.4
6/1	733	733	-	-	-	0.3	0.4	-	0.7	3.3	9.8	0.4	10.2
6/2	239	239	-	-	-	0.1	0.1	-	0.2	3.1	1.9	0.1	2.0
7/1	733	733	-	-	-	2.2	1.0	-	3.2	15.5	20.5	1.0	21.4
7/2	239	239	37	154	49	3.6	3.9	1.0	8.4	126.9	9.1	3.9	13.0
8/1	787	787	-	-	-	0.2	0.4	-	0.6	2.7	7.6	0.4	8.0
8/2	132	132	-	-	-	0.0	0.0	-	0.1	2.2	0.4	0.0	0.5
9/1	787	787	-	-	-	1.0	0.7	-	1.8	8.1	4.5	0.7	5.2
9/2	132	132	122	8	2	0.5	0.4	0.7	1.5	41.2	2.1	0.4	2.5
10/1	929	929	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	251	251	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/1	1014	1014	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/1	345	345	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/1	15	15	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 Stream: 1 PRC for Signalled Lanes (%): -1.4 Total Delay for Signalled Lanes (pcuHr): 30.90 Cycle Time (s): 200
C1 Stream: 2 PRC for Signalled Lanes (%): 12.1 Total Delay for Signalled Lanes (pcuHr): 19.14 Cycle Time (s): 200
C1 Stream: 3 PRC for Signalled Lanes (%): 93.6 Total Delay for Signalled Lanes (pcuHr): 1.55 Cycle Time (s): 200
PRC Over All Lanes (%): -1.4 Total Delay Over All Lanes(pcuHr): 51.60

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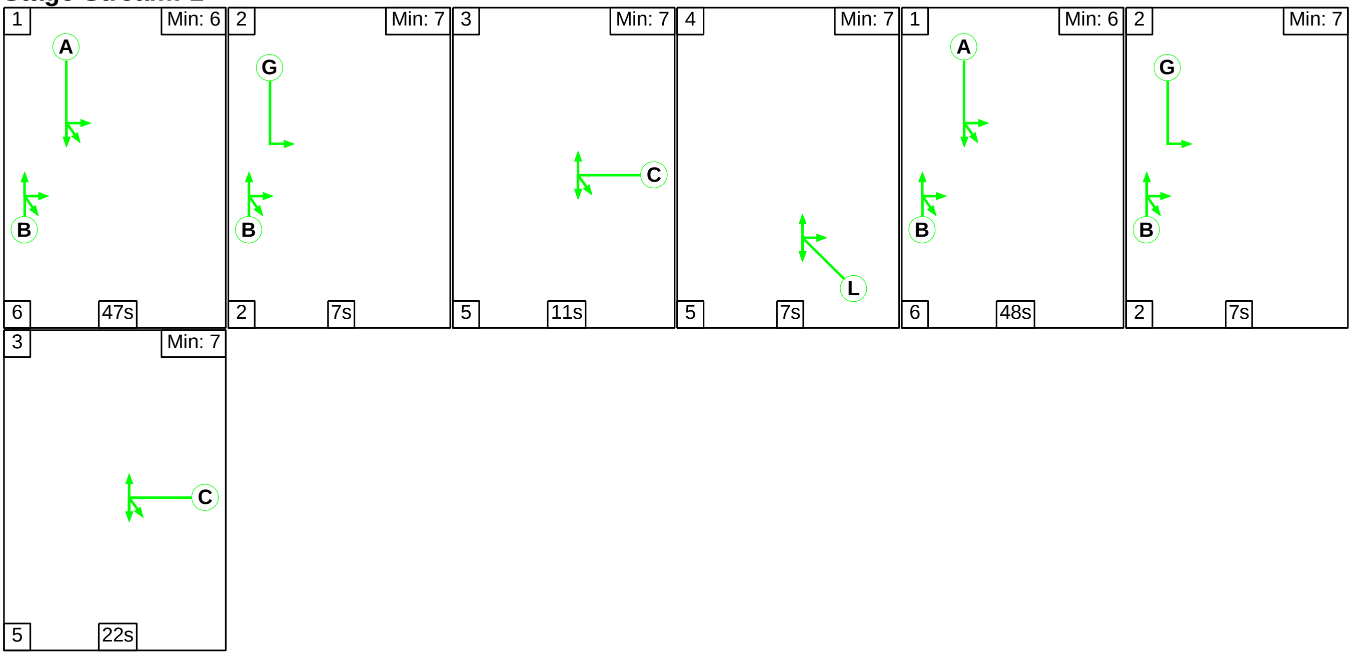
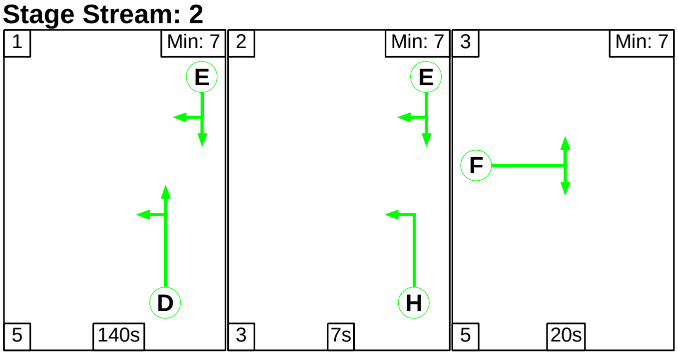
Scenario 2: '2027 Cumulative PM' (FG2: '2027 Cumulative PM', Plan 1: 'Alternate Cycles')

Stage Sequence Diagram

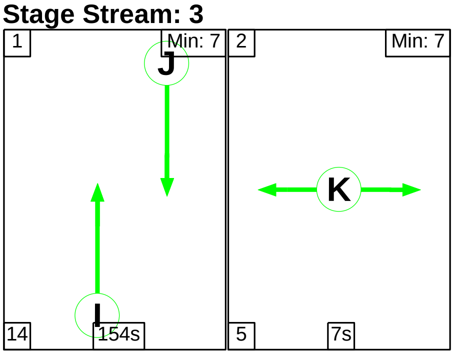
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2	3	4	1	2	3
Duration	47	7	11	7	48	7	22
Change Point	0	53	62	78	90	144	153

Stage Stream: 2

Stage	1	2	3
Duration	140	7	20
Change Point	2	147	157

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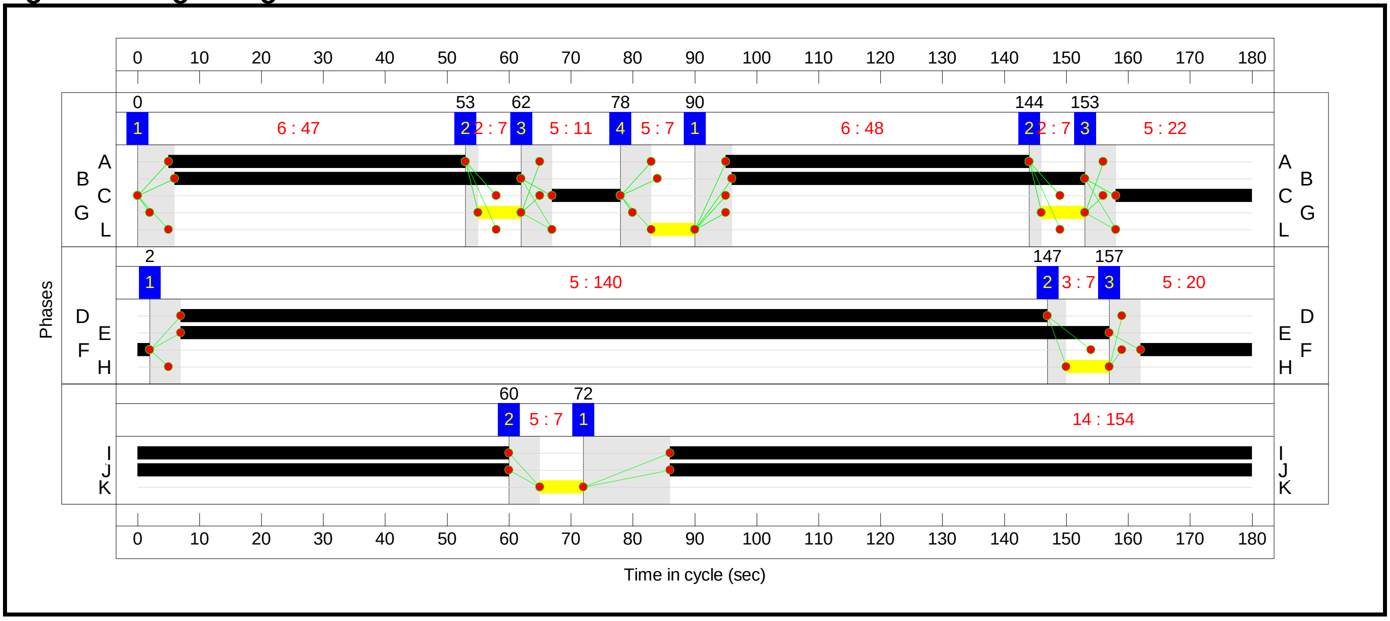
Stage Stream: 3

Stage	1	2
Duration	154	7
Change Point	72	60

Signal Timings Diagram



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Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Proposed Watford Road / Tippendell Lane / Chiswell Green Lane	-	-	**N/A**	-	-		-	-	-	-	-	-	**79.5%**
Watford Rd / Chiswell Green Lane / Tippendale Lane	-	-	**N/A**	-	-		-	-	-	-	-	-	**79.5%**
1/1+1/2	Watford Rd South Ahead Left	U	2	N/A	D		1	140	-	799	1894:2055	1325+183	53.0 : 53.0%
2/1	Watford Rd North Ahead Left Ahead2	U	1	N/A	A		2	97	-	869	1993	1096	79.3%
3/1	Tippendell Lane Left Right Left2	U	1	N/A	C		2	33	-	272	1760	342	79.5%
4/1	Shops U-Turn Ahead Right	U	1	N/A	L		1	7	-	10	1613	72	13.9%
5/1	Chiswell Green Ln Left Right	U	2	N/A	F		1	20	-	128	1860	217	59.0%
6/1	Internal NB South Ahead	U	3	N/A	I		1	154	-	715	1935	1666	42.9%
6/2	Internal NB South Ahead	U	3	N/A	I		1	154	-	106	1915	1649	6.4%
7/1	Internal NB North Ahead	U	1	N/A	B		2	113	-	715	1935	1236	57.8%
7/2	Internal NB North Right U-Turn	O	1	N/A	B	G	2	113	14	106	1711	311	34.0%
8/1	Internal SB North Ahead	U	3	N/A	J		1	154	-	665	1935	1666	39.9%
8/2	Internal SB North Ahead	U	3	N/A	J		1	154	-	91	1915	1649	5.5%
9/1	Internal SB South Ahead	U	2	N/A	E		1	150	-	665	1935	1623	41.0%
9/2	Internal SB South Right	O	2	N/A	E	H	1	150	7	91	1702	477	19.1%

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10/1	Watford Rd South Exit	U	N/A	N/A	-		-	-	-	718	Inf	Inf	0.0%
11/1	Chiswell Green Ln Exit	U	N/A	N/A	-		-	-	-	144	Inf	Inf	0.0%
12/1	Watford Rd North Exit	U	N/A	N/A	-		-	-	-	880	Inf	Inf	0.0%
13/1	Tipendell Ln Exit	U	N/A	N/A	-		-	-	-	321	Inf	Inf	0.0%
14/1	Shops Exit	U	N/A	N/A	-		-	-	-	15	Inf	Inf	0.0%

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Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Proposed Watford Road / Tippendell Lane / Chiswell Green Lane	**-**	**-**	**183**	**12**	**2**	**12.6**	**7.3**	**0.8**	**20.7**	**-**	**-**	**-**	**-**
Watford Rd / Chiswell Green Lane / Tippendale Lane	**-**	**-**	**183**	**12**	**2**	**12.6**	**7.3**	**0.8**	**20.7**	**-**	**-**	**-**	**-**
1/1+1/2	799	799	-	-	-	1.5	0.6	-	2.1	9.4	13.7	0.6	14.3
2/1	869	869	-	-	-	3.9	1.9	-	5.8	24.0	17.4	1.9	19.3
3/1	272	272	-	-	-	2.6	1.8	-	4.5	59.4	7.1	1.8	8.9
4/1	10	10	-	-	-	0.2	0.1	-	0.3	111.8	0.5	0.1	0.6
5/1	128	128	-	-	-	2.7	0.7	-	3.4	95.3	6.0	0.7	6.8
6/1	715	715	-	-	-	0.5	0.4	-	0.8	4.3	6.7	0.4	7.0
6/2	106	106	-	-	-	0.0	0.0	-	0.1	2.9	0.7	0.0	0.7
7/1	715	715	-	-	-	0.6	0.7	-	1.3	6.7	8.8	0.7	9.5
7/2	106	106	93	11	2	0.1	0.3	0.6	0.9	31.9	0.9	0.3	1.2
8/1	665	665	-	-	-	0.1	0.3	-	0.5	2.5	2.0	0.3	2.4
8/2	91	91	-	-	-	0.0	0.0	-	0.0	1.7	0.3	0.0	0.3
9/1	665	665	-	-	-	0.3	0.3	-	0.6	3.3	4.4	0.3	4.7
9/2	91	91	90	1	0	0.0	0.1	0.2	0.3	12.9	0.3	0.1	0.5
10/1	718	718	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	144	144	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/1	880	880	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
13/1	321	321	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
14/1	15	15	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1	Stream: 1	PRC for Signalled Lanes (%):	13.2	Total Delay for Signalled Lanes (pcuHr):	12.85	Cycle Time (s):	180
C1	Stream: 2	PRC for Signalled Lanes (%):	52.6	Total Delay for Signalled Lanes (pcuHr):	6.41	Cycle Time (s):	180
C1	Stream: 3	PRC for Signalled Lanes (%):	109.7	Total Delay for Signalled Lanes (pcuHr):	1.43	Cycle Time (s):	180
		PRC Over All Lanes (%):	13.2	Total Delay Over All Lanes(pcuHr):	20.69		

Appendix AHJ/31

Cumulative Assessment Additional Junctions Modelling Outputs

Junctions 9

PICADY 9 - Priority Intersection Module

Filename: J2 - Watford Rd_Forge End - Cumulative.j9
Path: \\gc-did-fs01\CAD\2023\8230258\(6)_Transport\(1)_Planning\(1)_Traffic Analysis\Modelling\Models Issued
Report generation date: 20/03/2023 20:14:11

»Existing Layout - 2027 - With Cumulative Dev - Sensitivity, AM
»Existing Layout - 2027 - With Cumulative Dev - Sensitivity, PM

Summary of junction performance

	AM					PM				
	Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)	Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)
	Existing Layout - 2027 - With Cumulative Dev - Sensitivity									
Stream B-C	0.2	8.86	0.18	A	1.54	0.1	9.42	0.13	A	1.11
Stream B-A	0.2	21.03	0.14	C		0.2	22.58	0.15	C	
Stream C-AB	1.3	5.43	0.31	A		1.1	5.26	0.30	A	

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages.

File summary

File Description

Title	Watford Road / Forge End (391 Dwellings)
Location	Chiswell Green
Site number	J2
Date	18/03/2023
Version	
Status	(new file)
Identifier	
Client	CALA Homes & Redlington Capital
Jobnumber	8230258
Enumerator	UK\DKemp
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	mph	Veh	Veh	perTimeSegment	s	-Min	perMin

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

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D11	2027 - With Cumulative Dev - Sensitivity	AM	DIRECT	08:00	09:00	60	15	✓
D12	2027 - With Cumulative Dev - Sensitivity	PM	DIRECT	17:00	18:00	60	15	✓

Analysis Set Details

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

Existing Layout - 2027 - With Cumulative Dev - Sensitivity, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	Junction 2	T-Junction	Two-way	1.54	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	Watford Road (South)		Major
B	Forge End		Minor
C	Watford Road (North)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
Watford Road (North)	7.75			109.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate flare length	Flare length (PCU)	Visibility to left (m)	Visibility to right (m)
Forge End	One lane plus flare	10.00	4.60	2.80	2.80	2.80		1.00	38	85

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (Veh/TS)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	136.508	0.092	0.232	0.146	0.332
1	B-C	174.335	0.099	0.250	-	-
1	C-B	159.272	0.228	0.228	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D11	2027 - With Cumulative Dev - Sensitivity	AM	DIRECT	08:00	09:00	60	15	✓

Vehicle mix varies over time	Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
✓	✓	✓	HV Percentages	2.00	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Scaling Factor (%)
Watford Road (South)		DIRECT	✓	100.000
Forge End		DIRECT	✓	100.000
Watford Road (North)		DIRECT	✓	100.000

Origin-Destination Data

Demand (Veh/TS)

08:00 - 08:15

		To		
		Watford Road (South)	Forge End	Watford Road (North)
From	Watford Road (South)	0.00	3.00	182.00
	Forge End	7.00	0.00	14.00
	Watford Road (North)	198.00	11.00	0.00

Demand (Veh/TS)

08:15 - 08:30

		To		
		Watford Road (South)	Forge End	Watford Road (North)
From	Watford Road (South)	0.00	3.00	193.00
	Forge End	6.00	0.00	19.00
	Watford Road (North)	124.00	16.00	0.00

Demand (Veh/TS)

08:30 - 08:45

		To		
		Watford Road (South)	Forge End	Watford Road (North)
From	Watford Road (South)	0.00	2.00	187.00
	Forge End	7.00	0.00	22.00
	Watford Road (North)	247.00	16.00	0.00

Demand (Veh/TS)

08:45 - 09:00

		To		
		Watford Road (South)	Forge End	Watford Road (North)
From	Watford Road (South)	0.00	4.00	180.00
	Forge End	8.00	0.00	15.00
	Watford Road (North)	196.00	19.00	0.00

Vehicle Mix

Heavy Vehicle Percentages

08:00 - 08:15

		To		
		Watford Road (South)	Forge End	Watford Road (North)
From	Watford Road (South)	0	0	0
	Forge End	0	0	0
	Watford Road (North)	1	0	0

08:15 - 08:30

Heavy Vehicle Percentages

		To		
		Watford Road (South)	Forge End	Watford Road (North)
From	Watford Road (South)	0	0	1
	Forge End	0	0	0
	Watford Road (North)	1	0	0

08:30 - 08:45

Heavy Vehicle Percentages

		To		
		Watford Road (South)	Forge End	Watford Road (North)
From	Watford Road (South)	0	0	0
	Forge End	0	0	0
	Watford Road (North)	1	0	0

08:45 - 09:00

Heavy Vehicle Percentages

		To		
		Watford Road (South)	Forge End	Watford Road (North)
From	Watford Road (South)	0	0	1
	Forge End	0	0	0
	Watford Road (North)	1	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/TS)	Total Junction Arrivals (Veh)
B-C	0.18	8.86	0.2	A	17.50	70.00
B-A	0.14	21.03	0.2	C	7.00	28.00
C-AB	0.31	5.43	1.3	A	63.75	255.02
C-A					143.00	571.98
A-B					3.00	12.00
A-C					185.50	742.00

Main Results for each time segment

08:00 - 08:15

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	LOS
B-C	14.00	14.00	124.72	0.112	13.87	0.0	0.1	8.111	A
B-A	7.00	7.00	61.00	0.115	6.87	0.0	0.1	16.591	C
C-AB	44.48	44.48	263.05	0.169	43.98	0.0	0.5	4.110	A
C-A	164.52	164.52			164.52				
A-B	3.00	3.00			3.00				
A-C	182.00	182.00			182.00				

08:15 - 08:30

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	LOS
B-C	19.00	19.00	123.31	0.154	18.95	0.1	0.2	8.619	A
B-A	6.00	6.00	65.66	0.091	6.02	0.1	0.1	15.100	C
C-AB	40.30	40.30	206.64	0.195	40.29	0.5	0.5	5.431	A
C-A	99.70	99.70			99.70				
A-B	3.00	3.00			3.00				
A-C	193.00	193.00			193.00				

08:30 - 08:45

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	LOS
B-C	22.00	22.00	123.47	0.178	21.97	0.2	0.2	8.863	A
B-A	7.00	7.00	49.69	0.141	6.94	0.1	0.2	21.027	C
C-AB	93.44	93.44	299.00	0.313	92.66	0.5	1.3	4.378	A
C-A	169.56	169.56			169.56				
A-B	2.00	2.00			2.00				
A-C	187.00	187.00			187.00				

08:45 - 09:00

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	LOS
B-C	15.00	15.00	123.56	0.121	15.07	0.2	0.1	8.301	A
B-A	8.00	8.00	58.54	0.137	8.00	0.2	0.2	17.809	C
C-AB	76.79	76.79	262.26	0.293	77.01	1.3	1.1	4.903	A
C-A	138.21	138.21			138.21				
A-B	4.00	4.00			4.00				
A-C	180.00	180.00			180.00				

Existing Layout - 2027 - With Cumulative Dev - Sensitivity, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	Junction 2	T-Junction	Two-way	1.11	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D12	2027 - With Cumulative Dev - Sensitivity	PM	DIRECT	17:00	18:00	60	15	✓

Vehicle mix varies over time	Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
✓	✓	✓	HV Percentages	2.00	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Scaling Factor (%)
Watford Road (South)		DIRECT	✓	100.000
Forge End		DIRECT	✓	100.000
Watford Road (North)		DIRECT	✓	100.000

Origin-Destination Data

Demand (Veh/TS)

17:00 - 17:15

		To		
		Watford Road (South)	**Forge End**	**Watford Road (North)**
From	**Watford Road (South)**	0.00	9.00	219.00
	Forge End	5.00	0.00	8.00
	Watford Road (North)	175.00	9.00	0.00

Demand (Veh/TS)

17:15 - 17:30

		To		
		Watford Road (South)	**Forge End**	**Watford Road (North)**
From	**Watford Road (South)**	0.00	9.00	197.00
	Forge End	5.00	0.00	10.00
	Watford Road (North)	184.00	14.00	0.00

17:30 - 17:45

Demand (Veh/TS)

		To		
		Watford Road (South)	Forge End	Watford Road (North)
From	Watford Road (South)	0.00	12.00	234.00
	Forge End	7.00	0.00	14.00
	Watford Road (North)	187.00	18.00	0.00

17:45 - 18:00

Demand (Veh/TS)

		To		
		Watford Road (South)	Forge End	Watford Road (North)
From	Watford Road (South)	0.00	8.00	198.00
	Forge End	4.00	0.00	6.00
	Watford Road (North)	165.00	12.00	0.00

Vehicle Mix

17:00 - 17:15

Heavy Vehicle Percentages

		To		
		Watford Road (South)	Forge End	Watford Road (North)
From	Watford Road (South)	0	0	0
	Forge End	0	0	0
	Watford Road (North)	1	0	0

17:15 - 17:30

Heavy Vehicle Percentages

		To		
		Watford Road (South)	Forge End	Watford Road (North)
From	Watford Road (South)	0	0	0
	Forge End	0	0	0
	Watford Road (North)	1	0	0

17:30 - 17:45

Heavy Vehicle Percentages

		To		
		Watford Road (South)	Forge End	Watford Road (North)
From	Watford Road (South)	0	0	1
	Forge End	0	0	0
	Watford Road (North)	1	0	0

17:45 - 18:00

Heavy Vehicle Percentages

		To		
		Watford Road (South)	Forge End	Watford Road (North)
From	Watford Road (South)	0	0	0
	Forge End	0	0	0
	Watford Road (North)	1	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/TS)	Total Junction Arrivals (Veh)
B-C	0.13	9.42	0.1	A	9.50	38.00
B-A	0.15	22.58	0.2	C	5.25	21.00
C-AB	0.30	5.26	1.1	A	50.63	202.52
C-A					140.37	561.48
A-B					9.50	38.00
A-C					212.00	848.00

Main Results for each time segment

17:00 - 17:15

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	LOS
B-C	8.00	8.00	115.55	0.069	7.93	0.0	0.1	8.358	A
B-A	5.00	5.00	56.63	0.088	4.91	0.0	0.1	17.369	C
C-AB	33.18	33.18	240.14	0.138	32.83	0.0	0.4	4.343	A
C-A	150.82	150.82			150.82				
A-B	9.00	9.00			9.00				
A-C	219.00	219.00			219.00				

17:15 - 17:30

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	LOS
B-C	10.00	10.00	121.43	0.082	9.98	0.1	0.1	8.074	A
B-A	5.00	5.00	58.06	0.086	5.00	0.1	0.1	16.964	C
C-AB	53.38	53.38	250.11	0.213	53.01	0.4	0.7	4.579	A
C-A	144.62	144.62			144.62				
A-B	9.00	9.00			9.00				
A-C	197.00	197.00			197.00				

17:30 - 17:45

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	LOS
B-C	14.00	14.00	109.42	0.128	13.94	0.1	0.1	9.419	A
B-A	7.00	7.00	46.70	0.150	6.92	0.1	0.2	22.580	C
C-AB	75.23	75.23	246.97	0.305	74.81	0.7	1.1	5.258	A
C-A	129.77	129.77			129.77				
A-B	12.00	12.00			12.00				
A-C	234.00	234.00			234.00				

17:45 - 18:00

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	LOS
B-C	6.00	6.00	128.85	0.047	6.10	0.1	0.0	7.339	A
B-A	4.00	4.00	62.21	0.064	4.10	0.2	0.1	15.514	C
C-AB	40.73	40.73	236.35	0.172	41.33	1.1	0.5	4.648	A
C-A	136.27	136.27			136.27				
A-B	8.00	8.00			8.00				
A-C	198.00	198.00			198.00				

Junctions 9
ARCADY 9 - Roundabout Module
Version: 9.0.2.5947 © Copyright TRL Limited, 2017
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Filename: A405_Tippendell Lane - Cumulative.j9
Path: \\gc-did-fs01\CAD\2023\8230258\(6)_Transport\(1)_Planning\(1)_Traffic Analysis\Modelling\Models Issued
Report generation date: 20/03/2023 20:09:42

»Existing Layout - 2027 + committed with Cumulative Dev, AM
»Existing Layout - 2027 + committed with Cumulative Dev, PM

Summary of junction performance

	AM					PM				
	Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)	Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)
	Existing Layout - 2027 + committed with Cumulative Dev									
Arm 1	0.8	3.09	0.43	A	5.15	2.6	6.31	0.72	A	7.51
Arm 2	1.4	10.71	0.59	B		2.1	21.56	0.69	C	
Arm 3	1.0	3.81	0.50	A		1.4	4.35	0.58	A	
Arm 4	0.7	6.68	0.40	A		0.9	8.92	0.49	A	

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages.

File summary

File Description

Title	J4 - A405 / Tippendell Lane + Committed Development
Location	Chiswell Green
Site number	J4
Date	17/03/2023
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	8230258
Enumerator	UK\dkemp
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	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D11	2027 + committed with Cumulative Dev	AM	ONE HOUR	07:00	08:30	15
D12	2027 + committed with Cumulative Dev	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	Existing Layout	100.000

Existing Layout - 2027 + committed with Cumulative Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	5.15	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	A405 (North)	
2	Tippendell Lane (East)	
3	A405 (South)	
4	Tippendell Lane (West)	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1	7.40	8.00	18.6	31.0	44.0	28.0	
2	3.20	5.10	10.3	23.0	44.0	20.0	
3	7.50	8.00	2.3	43.0	44.0	29.0	
4	3.20	6.10	16.0	17.0	44.0	23.5	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.789	2465
2	0.582	1386
3	0.783	2432
4	0.605	1547

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D11	2027 + committed with Cumulative Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	806	100.000
2		✓	447	100.000
3		✓	843	100.000
4		✓	329	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	53	665	88
	2	80	0	77	290
	3	719	94	0	30
	4	163	141	25	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	2	10	4
	2	1	0	1	2
	3	10	2	0	0
	4	0	1	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.43	3.09	0.8	A
2	0.59	10.71	1.4	B
3	0.50	3.81	1.0	A
4	0.40	6.68	0.7	A

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	607	195	2119	0.286	605	0.4	2.377	A
2	337	584	998	0.337	335	0.5	5.409	A
3	635	343	1991	0.319	633	0.5	2.647	A
4	248	670	1105	0.224	247	0.3	4.188	A

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	725	233	2090	0.347	724	0.5	2.635	A
2	402	699	926	0.434	401	0.8	6.838	A
3	758	411	1941	0.390	757	0.6	3.040	A
4	296	802	1019	0.290	295	0.4	4.969	A

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	887	286	2052	0.432	887	0.8	3.085	A
2	492	856	828	0.594	489	1.4	10.536	B
3	928	502	1874	0.495	927	1.0	3.798	A
4	362	981	902	0.401	361	0.7	6.640	A

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	887	286	2052	0.433	887	0.8	3.091	A
2	492	857	828	0.594	492	1.4	10.714	B
3	928	504	1872	0.496	928	1.0	3.813	A
4	362	983	901	0.402	362	0.7	6.678	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	725	234	2090	0.347	725	0.5	2.642	A
2	402	700	925	0.434	405	0.8	6.947	A
3	758	414	1938	0.391	759	0.6	3.057	A
4	296	805	1018	0.291	297	0.4	5.000	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	607	196	2118	0.287	607	0.4	2.383	A
2	337	586	997	0.338	338	0.5	5.469	A
3	635	346	1989	0.319	635	0.5	2.662	A
4	248	673	1103	0.225	248	0.3	4.212	A

Existing Layout - 2027 + committed with Cumulative Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Tippendell Lane	Standard Roundabout	1, 2, 3, 4	7.51	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D12	2027 + committed with Cumulative Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	1351	100.000
2		✓	333	100.000
3		✓	1040	100.000
4		✓	351	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	87	1148	116
	2	43	0	88	202
	3	919	98	0	23
	4	61	275	15	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	0	4	0
	2	0	0	0	2
	3	8	1	0	0
	4	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.72	6.31	2.6	A
2	0.69	21.56	2.1	C
3	0.58	4.35	1.4	A
4	0.49	8.92	0.9	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1017	291	2162	0.470	1014	0.9	3.126	A
2	251	960	800	0.313	249	0.5	6.513	A
3	783	270	2066	0.379	781	0.6	2.795	A
4	264	795	1031	0.256	263	0.3	4.678	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1215	348	2118	0.573	1213	1.3	3.967	A
2	299	1148	687	0.435	298	0.8	9.218	A
3	935	323	2027	0.461	934	0.9	3.290	A
4	316	952	929	0.339	315	0.5	5.851	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1487	426	2059	0.722	1483	2.5	6.195	A
2	367	1404	535	0.685	362	2.0	20.188	C
3	1145	393	1976	0.580	1143	1.4	4.314	A
4	386	1164	792	0.488	385	0.9	8.814	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1487	427	2058	0.723	1487	2.6	6.306	A
2	367	1408	532	0.689	366	2.1	21.563	C
3	1145	397	1973	0.580	1145	1.4	4.349	A
4	386	1167	790	0.489	386	0.9	8.920	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1215	350	2116	0.574	1219	1.4	4.035	A
2	299	1154	684	0.438	305	0.8	9.627	A
3	935	329	2023	0.462	937	0.9	3.322	A
4	316	956	927	0.340	317	0.5	5.921	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	1017	293	2161	0.471	1019	0.9	3.157	A
2	251	965	797	0.315	252	0.5	6.622	A
3	783	273	2064	0.379	784	0.6	2.815	A
4	264	799	1029	0.257	265	0.3	4.720	A

Junctions 9

ARCADY 9 - Roundabout Module

Filename: A405_Watford Road - Cumulative.j9
Path: \\gc-did-fs01\CAD\2023\8230258\(6)_Transport\(1)_Planning\(1)_Traffic Analysis\Modelling\Models Issued
Report generation date: 20/03/2023 20:11:29

»Proposed Layout - 2027 + committed with Cumulative Dev, AM
»Proposed Layout - 2027 + committed with Cumulative Dev, PM

Summary of junction performance

	AM					PM				
	Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)	Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)
	Proposed Layout - 2027 + committed with Cumulative Dev									
Arm 1	2.5	9.52	0.72	A	6.36	1.9	8.96	0.66	A	12.77
Arm 2	1.0	4.47	0.51	A		3.1	8.12	0.76	A	
Arm 3	0.1	3.61	0.08	A		0.1	4.94	0.11	A	
Arm 4	2.5	5.62	0.72	A		9.7	17.51	0.91	C	
Arm 5	0.1	35.21	0.06	E		0.0	0.00	0.00	A	

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages.

File summary

File Description

Title	J5 - A405 / Watford Road + Committed Development
Location	Chiswell Green
Site number	J5
Date	18/03/2023
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	8230258
Enumerator	UK\dkemp
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	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D11	2027 + committed with Cumulative Dev	AM	ONE HOUR	07:00	08:30	15
D12	2027 + committed with Cumulative Dev	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	Proposed Layout	100.000

Proposed Layout - 2027 + committed with Cumulative Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Watford Road	Standard Roundabout	1, 2, 3, 4, 5	6.36	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Watford Road	
2	A405 (North)	
3	New Hotel Access	
4	A405 (South)	
5	Hotel Access	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1	3.85	9.10	13.0	30.0	64.0	21.5	
2	7.40	8.60	14.0	25.0	64.0	43.0	
3	6.60	8.00	8.4	25.0	60.0	38.0	
4	6.75	8.80	28.6	10.0	60.0	24.5	
5	3.00	3.90	1.7	6.5	48.0	50.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.588	1946
2	0.649	2438
3	0.645	2236
4	0.683	2474
5	0.402	838

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D11	2027 + committed with Cumulative Dev	AM	ONE HOUR	07:00	08:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	872	100.000
2		✓	760	100.000
3		✓	77	100.000
4		✓	1489	100.000
5		✓	6	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	59	1	812	0
	2	25	2	26	706	1
	3	3	29	0	45	0
	4	669	736	84	0	0
	5	1	2	0	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	0	0	1	0
	2	13	0	0	9	0
	3	0	0	0	0	0
	4	4	9	0	0	0
	5	0	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.72	9.52	2.5	A
2	0.51	4.47	1.0	A
3	0.08	3.61	0.1	A
4	0.72	5.62	2.5	A
5	0.06	35.21	0.1	E

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	656	642	1526	0.430	653	0.7	4.112	A
2	572	675	1832	0.312	570	0.5	2.849	A
3	58	1162	1450	0.040	58	0.0	2.586	A
4	1121	45	2294	0.489	1117	0.9	3.050	A
5	5	1161	341	0.013	4	0.0	10.699	B

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	784	768	1447	0.542	782	1.2	5.405	A
2	683	807	1753	0.390	682	0.6	3.362	A
3	69	1390	1295	0.053	69	0.1	2.936	A
4	1339	54	2288	0.585	1337	1.4	3.780	A
5	5	1390	243	0.022	5	0.0	15.128	C

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	960	940	1339	0.717	955	2.4	9.250	A
2	837	986	1646	0.509	835	1.0	4.435	A
3	85	1699	1086	0.078	85	0.1	3.595	A
4	1639	66	2279	0.719	1635	2.5	5.548	A
5	7	1700	111	0.060	6	0.1	34.477	D

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	960	942	1338	0.718	960	2.5	9.521	A
2	837	991	1643	0.509	837	1.0	4.467	A
3	85	1705	1082	0.078	85	0.1	3.609	A
4	1639	66	2279	0.719	1639	2.5	5.623	A
5	7	1704	109	0.061	7	0.1	35.207	E

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	784	772	1444	0.543	789	1.2	5.536	A
2	683	814	1749	0.391	685	0.6	3.388	A
3	69	1399	1289	0.054	69	0.1	2.953	A
4	1339	54	2287	0.585	1343	1.4	3.828	A
5	5	1396	241	0.022	6	0.0	15.330	C

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	656	646	1524	0.431	658	0.8	4.166	A
2	572	679	1830	0.313	573	0.5	2.868	A
3	58	1169	1445	0.040	58	0.0	2.595	A
4	1121	45	2293	0.489	1123	1.0	3.079	A
5	5	1167	338	0.013	5	0.0	10.785	B

Proposed Layout - 2027 + committed with Cumulative Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	A405 / Watford Road	Standard Roundabout	1, 2, 3, 4, 5	12.77	B

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D12	2027 + committed with Cumulative Dev	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		✓	712	100.000
2		✓	1277	100.000
3		✓	86	100.000
4		✓	1909	100.000
5		✓	4	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	28	3	681	0
	2	27	8	23	1217	2
	3	2	22	0	62	0
	4	853	1018	38	0	0
	5	0	1	0	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	4	0	1	0
	2	0	0	0	4	0
	3	0	0	0	0	0
	4	4	8	0	0	0
	5	0	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (Veh)	Max LOS
1	0.66	8.96	1.9	A
2	0.76	8.12	3.1	A
3	0.11	4.94	0.1	A
4	0.91	17.51	9.7	C
5	0.00	0.00	0.0	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	536	814	1422	0.377	534	0.6	4.041	A
2	961	541	2008	0.479	958	0.9	3.416	A
3	65	1451	1274	0.051	65	0.1	2.977	A
4	1437	46	2312	0.622	1431	1.6	4.057	A
5	0	1475	212	0.000	0	0.0	0.000	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	640	974	1323	0.484	639	0.9	5.255	A
2	1148	648	1941	0.591	1146	1.4	4.515	A
3	77	1736	1084	0.071	77	0.1	3.573	A
4	1716	55	2306	0.744	1711	2.8	6.008	A
5	0	1764	90	0.000	0	0.0	0.000	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	784	1182	1193	0.657	780	1.9	8.651	A
2	1406	791	1851	0.760	1400	3.1	7.861	A
3	95	2121	830	0.114	94	0.1	4.895	A
4	2102	67	2298	0.915	2077	9.0	14.912	B
5	0	2142	0	0.000	0	0.0	0.000	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	784	1194	1185	0.662	784	1.9	8.960	A
2	1406	795	1849	0.761	1406	3.1	8.117	A
3	95	2130	823	0.115	95	0.1	4.939	A
4	2102	67	2298	0.915	2099	9.7	17.511	C
5	0	2164	0	0.000	0	0.0	0.000	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	640	991	1312	0.488	644	1.0	5.421	A
2	1148	653	1938	0.592	1155	1.5	4.634	A
3	77	1750	1076	0.072	78	0.1	3.606	A
4	1716	55	2305	0.744	1743	3.0	6.692	A
5	0	1796	76	0.000	0	0.0	0.000	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1	536	821	1418	0.378	537	0.6	4.096	A
2	961	545	2006	0.479	964	0.9	3.460	A
3	65	1460	1267	0.051	65	0.1	2.993	A
4	1437	46	2311	0.622	1443	1.7	4.168	A
5	0	1487	207	0.000	0	0.0	0.000	A

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