Transport Assessment

Ref	JTP18_095
Site Name	Land South of Kelvedon Road, Tiptree
Date	January 2019

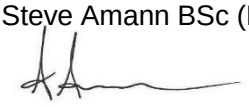
Quality Assurance

Site name: Land South of Kelvedon Road, Tiptree

Client name: Marden Homes

Type of report: Transport Assessment

Prepared by: Steve Amann BSc (Hons) MSc (Eng)

Signed 

Date January 2019

Reviewed by: Fiona Hunter BSc(Hons)

Signed: 

Date: January 2019

Table of Contents

Appendices

1 Introduction

Background

1.1 Journey Transport Planning has been commissioned by Marden Homes to undertake a Transport Assessment in support of proposals for residential development on land to the south of Kelvedon Road Tiptree.

1.2 The proposal site is comprised of an area of land across 5.16 hectares occupied by a range of uses and is illustrated in **Appendix 1.**

1.3 This report provides a detailed assessment of the proposed location for the outlined development in respect to its suitability as a sustainable location in transport terms for the purpose of residential development and in terms of the adequacy of the local highway and transport network infrastructure to support such a proposal.

1.4 Specifically, this report provides a technical appraisal of how appropriate access can be achieved for a sustainable residential development on land to the south of Kelvedon Road Tiptree, Essex and sets out a detailed deliverable access strategy encompassing public transport, cycle, pedestrian and vehicular access. It demonstrates the level of access that will be required and provides an analysis of the likely trip distribution and assignment for the development generated traffic and the potential impact on the routes and junctions in terms of vehicular impact, public transport capacity and available cycle and pedestrian infrastructure.

1.5 This assessment is informed by the requirements of Colchester Borough Council and Essex County Council.

1.6 Fundamentally, the purpose of this assessment is to demonstrate that the development of up to 150 homes is deliverable in the context of both the existing transport infrastructure and moreover any impacts associated with additional traffic generated by the proposal can be accommodated on the transport network and will not have a deleterious impact on the operation of that network.

Brief

1.7 The following matters have been considered in this appraisal:

- Section 2 considers the way in which the proposals accord with and support the objectives of local, regional and national policy with respect to transport and movements.
- Section 3 considers the existing site conditions and reviews the accessibility of the site by road, public transport, on foot and by bicycle, including an assessment of

highway safety, to illustrate that the site is easily accessible by a range of alternative transport modes.

- Section 4 outlines the development aspirations for the site and access proposals.
- Section 5 sets out the methodology for the calculation of traffic generation, trip distribution and assignment from the allocation site.
- Section 6 considers the potential traffic impact of an allocation utilising industry standard capacity assessment methodology and software as appropriate.
- Section 7 sets out a summary and conclusion to the Assessment.

2 Policy Context

2.1 The proposed development is subject to both national and local planning policy guidance with respect to transportation and its impact upon the local environment and surrounding infrastructure. A number of policies are directly pertinent to this site and are set out below.

2.2 Relevant policy guidance relating to new development, transport and land use planning is set out at the national and local level in the following documents:

- The National Planning Policy Framework;
- The Essex 2011 Local Transport Plan;
- Essex County Council's Development Management Policies 2011; and
- Colchester Borough Council Core Strategy (adopted 2008, amended 2014)
- Colchester Borough Council Site Allocations DPD (adopted 2010)
- Colchester Borough Council Development Policies DPD (adopted 2010, amended 2014)

2.3 These documents set the context in which the site's proposals have been assessed.

The National Planning Policy Framework (NPPF)

2.4 The National Planning Policy Framework (NPPF,2018) in this document the government sets out its core principles for the planning system in England.

2.5 The purpose of the planning system is to contribute to the achievement of sustainable development. At a very high level, the objective of sustainable development can be summarised as meeting the needs of the present without compromising the ability of future generations to meet their own needs.

Promoting Sustainable Transport

2.6 The NPPF in promoting sustainable transport considers that for sites to be allocated for development in plans, or specific applications for development, it should be ensured that:

- appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;
- safe and suitable access to the site can be achieved for all users; and
- any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree.

2.7 The framework goes on to re-iterate that Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe.

2.8 The NPPF sets out in the context of applications for development that they should:

a) give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second – so far as possible – to facilitating access to high quality

public transport, with layouts that maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use;

b) address the needs of people with disabilities and reduced mobility in relation to all modes of transport;
c) create places that are safe, secure and attractive – which minimise the scope for conflicts between pedestrians, cyclists and vehicles, avoid unnecessary street clutter, and respond to local character and design standards;
d) allow for the efficient delivery of goods, and access by service and emergency vehicles; and
e) be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations.

2.9 The chapter concludes that … All developments that will generate significant amounts of movement should be required to provide a travel plan, and the application should be supported by a transport statement or transport assessment so that the likely impacts of the proposal can be assessed.

Essex Local Transport Plan 2011

2.10 The 2011 Essex Local Transport Plan sets out the County Council's aims and objectives for transport and infrastructure for the next ten-year period and provides the policy framework to achieve the objectives.

2.11 Policy 2 Integrated Development sets out the County's position in relation to integrated planning and states that:

Transport and land-use planning will be used together to secure new development at the most appropriate and sustainable locations by: working closely with district planning authorities to enable a better balance of new homes, jobs and services; locating new developments in areas which are accessible to key services by sustainable forms of transport; ensuring new developments provide for sustainable transport and effective travel planning; requiring new developments to provide appropriate transport infrastructure in line with the Council's current development management policies; and making the most effective use of all available funding sources by co-ordinating the delivery of ECC and development funded works.

Development Management Policies 2011

2.12 The aims and objectives of LTP policy are supported by the policies set out in the Development Management Policies 2011 which provides specific requirements in terms of transport access and new development in relation to the County Council's functional route hierarchy.

2.13 The site is bordered by East Road to the north which is classified as an *Other Road* in the hierarchy, and to the west by residential development and Seaview Avenue, which is also classed as an *Other Road.*

2.14 The proposals take full regard of and accord with the policies set out as they apply to the road and access options for the site.

Colchester Local Plan

2.15 The Colchester Borough Local Plan is contained with the following documents:

- Colchester Borough Council Core Strategy (adopted 2008, amended 2014)
- Colchester Borough Council Site Allocations DPD (adopted 2010)
- Colchester Borough Council Development Policies DPD (adopted 2010, amended 2014)

2.16 Whilst these documents represent the currently adopted Local Plan for development in the Borough; this plan is currently being replaced to ensure its compliance with National Planning Policy.

2.17 The Colchester Borough Council CBC Local Plan 2017-2033 Publication Draft, remains as the 'emerging' Local plan for Colchester.

2.18 In consideration of the above, the following Local Plan policies have relevance to the site and the proposals.

2.19 Policy SG5: – Centre Hierarchy identifies Tiptree as a District Centre with a good range of supporting facilities and amenities.

2.20 Policy SS14: identifies the proposal site as being suitable to support residential development, open space and community infrastructure.

2.21 Policy DM21: Sustainable Access to Development, sets out the requirement for developments to consider all forms of access placing emphasis on sustainable means and also sets out that: "*Development will only be allowed where there is physical and environmental capacity to accommodate the type and amount of traffic generated in a safe manner. Developments that generate significant amounts of movement will require a Transport Statement or Transport Assessment in line with the thresholds set in the latest Essex County Council development management policies relating to highways."*

2.22 Policy DM 21 also sets out that significant residential developments will be required to provided residential travel packs in accordance with Essex County Council guidance.

2.23 Policy DM22: Parking sets out that the amount of car parking to be provided in association with new residential development will be assessed using the most recent local Parking Guidance.

2.24 This appraisal and the proposals for the site fully take into consideration the policies set out in the adopted and emerging Local Plan for Colchester.

3 Existing Conditions

Site Location

3.1 The proposal site is located in Tiptree, directly to the south of Kelvedon Road B1023 which runs north west to south east past the site. The location of the site in relation to the local area is shown in **Appendix 1**.

Highway Access to Development Area

3.2 The routes in the vicinity of the area of land being considered for development and links to the local area road network have been examined in detail.

3.3 Kelvedon Road runs north west to south east to the north of the site and links Tiptree centre to the east with Kelvedon and the A12 to the west.

3.4 Kelvedon Road is a single carriageway road with an effective running width of 6.0 metres. It is subject to the 30mph speed limit as it passes to the north of the site. The road has the benefit of street lighting and continuous footway provision to both sides as it passes the site.

Public Transport Accessibility: Rail Services

3.5 Kelvedon operates the closest mainline rail station to the development site and is around 3 miles from the site.

3.6 Currently, there is a very frequent service during peak periods from Kelvedon to either Colchester or London Liverpool Street. During the rest of the day the service operates on a reasonably frequent basis with trains to London every 15 minutes or so.

3.7 There is a dedicated car park (around 280 Spaces) at the station. The station also has the benefit of sheltered cycle stands for cycle parking.

Public Transport Accessibility: Bus Services

3.8 The provision of bus based public transport in the area has been assessed in terms of access to routes, frequencies of services and levels of reliability. The quality of the bus infrastructure in the area has also been assessed in respect of the provision and quality of shelters, information and seating.

3.9 Bus accessibility is measured by reference to the number and frequency of services available within easy walking distance of the proposal site. Easy walking distance is considered to be up to 400 metres in the case of accessing bus based public transport. This equates to a five minute walk time assuming a walk speed of 80 metres per minute.

3.10 The whole of the site is within 400m of bus stops on Kelvedon Road near to Oak Road and East Road. From these stops, numbers 91 provides a service between Tollesbury and Witham on a two hourly basis. In addition, stops on Maldon Road B1022 to the east within 500m of the site provide access to the 75 service which operates between Maldon and Colchester on a half hourly basis.

3.11 **Table 3.1** summarises the bus services available from the stops in the vicinity of the site.

Table 3.1 Bus Service Summary

Bus Number	Route	Frequency
91	Witham to Tollesbury	Mon-Sat 2 hourly freq
75	Maldon- Colchester	Mon-Sat Hal hourly Sunday 2 hourly

3.12 With a regular bus services available between Maldon and Colchester with potential connections to destinations further afield, the proposal site is well provided for by public transport.

3.13 The routes and timetables are held in **Appendix 2.**

Walking and Cycling Assessment

3.14 This Assessment has considered the accessibility and integration of the site to local amenities and facilities on foot and by bicycle.

Cycling

3.15 Cycling has the potential to substitute for short car trips, especially those less than 5km. Cycle access to the site has been considered in detail and for the purposes of cycle accessibility, a cycle time of 20 minutes, which equates to 5km at an average speed of 15kph, has been assumed.

3.16 The 5km catchment area within an acceptable cycling distance of the site includes Tiptree and Kelvedon covers the full range of local facilities and amenities including:

- Supermarket;
- Hotel;
- Employment Areas;
- Churches;
- Nursery Primary and Secondary Educational facilities;
- Pubs and Restaurants;
- Banks and Financial Services;
- Post Offices;
- Country Park;
- Doctors / Dental Surgeries;
- Chemists;
- Village Halls; and
- Mainline rail station

3.17 The site is therefore within reasonable cycling distance of a good range of local amenities and employment opportunities and as such, is considered to have very good levels of accessibility

and integration opportunities in line with the aims and objectives of the National Planning Policy Framework.

3.18 There is no specific cycle infrastructure in the vicinity of the site.

Walking

3.19 With respect to pedestrian access, a walk time of ten minutes is generally considered the maximum acceptable to directly access any local facility or amenity and equates to a distance of 800 metres at an average speed of 5kph.

3.20 Whilst there are limited facilities and amenities within the 800 metre pedestrian catchment area from the centre of the site, The National Planning Policy Framework identifies walking as the most important mode of travel at the local level which offers the greatest opportunity to replace short car trips of less than 2km. The site is within acceptable walking distance of:

- Primary Schools
- Local Shops
- Post Office
- Chemist
- General Store
- Doctors

3.21 The provision of pedestrian routes through the proposal site will also enable further direct pedestrian connection between the site and the surrounding built up area, thus integrating the development into the existing community.

3.22 The site is therefore considered to be within reasonable walking distance of a good range of local amenities and as such, is considered to have very good levels of accessibility and integration opportunities in line with policy requirements.

Highway Safety Assessment

3.23 A highway safety assessment has been undertaken for the highway network surrounding the site, based upon Essex County Council Personal Injury Accident (PIA) data obtained for the three year period June 2015 to June 2018.

3.24 A total of personal injury accidents were recorded over the three year period 2 of which were classed as slight and one serious.

3.25 The recorded accidents were dispersed throughout the local network with 1 slight accident to the west of the site on the Kelvedon Road and another slight accident at the junction of Grange Road and Kelvedon Road The serious accident took place on Kelvedon Road to the west of the site between Grange Rod and Maldon

3.26 The accident data reviewed above identifies the absence of any specific accident pattern with no identified clusters in the vicinity of the site.

3.27 It is considered that in view of the foregoing review there are no prevailing highway safety concerns in relation to site and the surrounding area, and moreover residential development

on the site and the resulting increase in traffic would not have a significantly detrimental impact on that safety record.

4 Development Access

Highway Access

4.1 Access to the site has been considered in the context of the aims and objectives of policies set out in the Essex Development Management Policies 2011 which provides specific policy requirements in terms of transport access and new development in relation to the County Council's functional route hierarchy.

4.2 The site is bordered by Kelvedon Road to the north which is classified as a Secondary Distributor in the hierarchy.

4.3 The proposals take full regard of and accord with the policies set out as they apply to the road and access options for the site.

4.4 The access requirements for the site have been also considered in the context of the guidance set out in the latest iteration of the Essex Design Guide 2018. in accordance with the guidance a Type E Minor Access Road would provide a suitable and appropriate level of access to the site to accommodate the development aspirations for the site.

4.5 An Access road with a 5.5m carriageway and two 2.0m footways in accordance with the Type E specification will be provided through the site to accommodate the needs of cyclists, pedestrians and other vehicles and will be designed to achieve a 20mph environment.

4.6 The layout of the development will accord with the Road Type criteria set out in the residential road layout guidance as produced by Essex County Council.

4.7 Access would be taken directly from Kelvedon Road to the north of the site. The access form has been considered in the context of the level of development proposed and the existing traffic levels and also the advice provided in TD 42/95. In the context of that advice, the potential to provide a compact access roundabout to the site has been assessed as it would have the potential to provide sufficient capacity to accommodate through route traffic for the Grange Road site to the south in the future.

4.8 A compact roundabout access arrangement can be provided within land within the site and the control of the highway authority.

4.9 The proposed roundabout access arrangement is held in **Appendix 3** and would be suitable to accommodate both the site development traffic and an additional element associated with the Grange Road site and would also accommodate the private access to the land to the north of Kelvedon Road.

4.10 Two units are proposed to take access directly via Kelvedon Road via a single private drive arrangement, consistent with the arrangements for existing houses on Kelvedon Road.

5 Traffic Generation

Proposed Development

5.1 The proposals for the site comprise a sustainable development of up to 150 dwellings with associated infrastructure, open space, parking and access.

5.2 An illustrative development layout is held in **Appendix 4.**

5.3 In order to forecast the likely travel demand associated with the proposed development allocation for the site, a detailed interrogation of the TRICS Version 7 trip generation database has been undertaken.

5.4 The TRICS database contains a wide range of information relating to travel patterns and behaviours associated with various development types and locations and it provides a robust and accepted basis for assessing the likely impact in terms of travel demand associated with new development.

5.5 For the purposes of this appraisal, information from the TRICS database has been disaggregated by development type, mode and location in order to provide a development trip generation profile that corresponds closely with the characteristics of the proposal site.

5.6 The information supplied from the database provides an estimate of the likely number of vehicular trips to and from the development area. This information in turn informs the infrastructure requirements of the development in terms of highway capacity, public transport capacity, cycle movements and pedestrian movements.

Residential Trip Rates

5.7 Appropriate vehicular residential trip rates have been obtained from the TRICS database and full details of the TRICS Version 7 residential trip rate data are held in **Appendix 5**.

5.8 The trip rates for private housing have been extracted from the database for the AM (08:00-09:00) and PM (17:00-18:00) peak hours and the forecast unrestrained vehicular trip rate generation associated with the proposed residential site is summarised in **Table 5.1.** The TRICS data assumes a standalone residential development without the benefit of travel planning or improvements to public transport and sustainable modes of travel.

Table 5.1 Residential Trip Rates

Land Use	AM 08:00-09:00		PM17:00-18:00	
	Arrival Rates	Departure Rates	Arrival Rates	Departure Rates
Private Housing	0.140	0.384	0.338	0.156

5.9 The residential trip rate data has been applied to the ultimate development capacity of the site to provide a robust estimate of the likely vehicular trips that could be associated with a

residential development on the site. For the purposes of this assessment the impact of a development of up to 150 units has been assessed. **Table 5.2** summarises the vehicular trip generation based on the likely tenure and type of residential units envisaged.

Table 5.2 Vehicular Trip Generation 150 Dwellings

Land Use	AM 08:00-09:00		PM17:00-18:00	
	Arrivals	Departures	Arrivals	Departures
150 Dwellings	21	58	51	23

5.10 **Table 5.2** indicates that a development of 150 residential units as proposed could generate up to 79 vehicular trips in the AM peak and 74 vehicular trips in the PM peak.

Trip Distribution

5.11 The forecast development traffic has been assigned on the network in accordance with local highway network in accordance with the Census Travel to Work Origin and Destination data for the resident population of Tiptree who drive to work. The Census data is held in **Appendix 6.**

5.12 The Google Maps satellite navigation direction finder application was used to verify the distribution of vehicle trips on the local highway network.

5.13 Table 5.3 provides a summery of the Development Traffic Trip Distribution and is applied to the network traffic flow diagrams in **Appendix 8**.

Table 5.3 Vehicular Trip Distribution

Link	AM 08:00-09:00		PM17:00-18:00	
	Arrivals	Departures	Arrivals	Departures
Kelvedon Road North/West	62%	62%	62%	62%
London Road East	62%	62%	62%	62%
Kelvedon Road South/East	38%	38%	38%	38%
B1022 South	38%	38%	38%	38%

6 Traffic Impact

Background Traffic Flows

6.1 Existing traffic data has been obtained via manually classified junction turning count (MCC) undertaken by Advanced Transport Research (ATR) on Tuesday 24th January 2018 at the following junctions:

- Maypole Road/Colchester Road/Oak Road Priority Junction
- Kelvedon Road/Maypole Road/Church Road/Maldon Road Mini Roundabout
- Vine Road/Townsend Road/Kelvedon Road Crossroads
- Kelvedon Road/Oak Road

6.2 The full set of observed traffic data, comprising manually classified turning counts is contained in **Appendix 7.**

6.3 It was identified that on the day of the survey Vine Road was closed by road works which would have resulted in traffic diverting via Maldon Road/Maypole Road. In view of this the traffic surveyed for the Colchester United FC/Grange Road was added to the ins and outs for Vine Road. This will inevitably result in an element of double counting across the network and at the junction and as such provides a robust basis for the assessment.

6.4 For the purposes of this assessment the observed AM and PM network peak hour periods of 08:00 to 09:00 and 17:00 to 18:00 have been used, as determined from the surveys undertaken on site. The observed peak hour network traffic flows are illustrated by the network diagrams contained in **Appendix 8.**

Assessment Year and Background Traffic Growth

6.5 An assessment of the impact of the proposed development upon the local highway network in the vicinity of the site comprising the study area has been undertaken. An assessment year of 2024, reflecting the planning timescale, has been applied to the assessment of the local highway network adjacent to the site. The use NTEM Tempro traffic growth factors used incorporate an element of growth to represent consented development schemes and as such provide a robust forecast for the assessment.

Committed Development

6.6 The traffic associated with the ongoing development site at Grange Road has been included in this assessment with the flow information taken directly from the associated Transport Assessment undertaken by Ardent Consulting Engineers in support of the development. The committed development traffic is shown in the network flow diagrams in **Appendix 8.**

Assessment of Traffic Impact

6.7 The traffic impact of the proposals has been examined in terms of the total additional external vehicle trips forecast from the development based on the distribution methodology set out in Section 5 above.

6.8 Principally, this section considers the immediate highway network, the number of additional trips in the AM and PM peak periods (the critical periods for network assessment), the ability of the existing network to accommodate additional traffic, the potential mitigation that may be required and an assessment of the deliverability of that mitigation.

6.9 Detailed assessments of the capacity of the following junctions has been undertaken for AM and PM peak periods with and without development scenarios utilising the Junctions 9 ARCADY/PICADY software.

- Maypole Road/Colchester Road/Oak Road Priority Junction
- Kelvedon Road/Maypole Road/Church Road/Maldon Road Mini Roundabout
- Vine Road/Townsend Road/Kelvedon Road Crossroads
- Kelvedon Road/Oak Road Priority Junction
- Kelvedon Road Site Access Roundabout

6.10 The Junctions 9 capacity assessments set out the maximum Ratio of Flow to Capacity (RFC) and Maximum Queue (vehicles) for each arm of the junction. Generally, where the RFC of an arm is greater than 1.0 then the arm is said to be operating at over its theoretical capacity and would be expected to suffer levels of queuing and delay. An arm with an RFC of between 0.85 and 1.0 is considered to be approaching its practical capacity and some queuing and delay may be expected to occur.

Maypole Road/Colchester Road/Oak Road Priority Junction

6.11 A detailed assessment of the impact of the potential development upon the priority junction has been undertaken and is considered in **Table 6.1** below.

Table 6.1 Maypole Road/Colchester Road/Oak Road PICADY Junction Summary

		Maypole Road		Oak Road	
		RFC	Q	RFC	Q
AM	2024 Total Flows	0.20	0.3	0.20	0.3
PM	2024 Total Flows	0.04	0.0	0.31	0.5

6.12 The full Junctions 9 PICADY outputs for the junction are contained in **Appendix 9.**

6.13 The PICADY analysis indicates that in the 2024 forecast year with the development, the junction will operate within capacity during all time periods.

Kelvedon Road/Maypole Road/Church Road/Maldon Road Mini Roundabout

6.14 A detailed assessment of the operation of the Kelvedon Road/Maypole Road/Church Road/Maldon Road double Mini Roundabout junction has been undertaken and is considered in **Table 6.2** below.

6.15 The roundabout was modelled as 2 separate 3 arm mini roundabouts in accordance with current guidance and are referred to as the north and south roundabouts respectively.

Table 6.2 North Roundabout Mini Roundabout

		Roundabout Link		Kelvedon Road		Maypole Road	
		RFC	Q	RFC	Q	RFC	Q
AM	2024 Base	0.53	1.2	0.35	0.6	0.90	7.9
PM	2024 Base	0.81	4.3	0.67	2.2	0.57	1.4
AM	2024 Total Flows	0.54	1.3	0.38	0.7	0.91	9.0
PM	2024 Total Flows	0.83	4.9	0.68	2.3	0.57	1.5

Table 6.3 South Roundabout Mini Roundabout

		Roundabout Link		Church Road		Maldon Road	
		RFC	Q	RFC	Q	RFC	Q
AM	2024 Base	0.61	1.7	0.63	1.9	0.78	3.6
PM	2024 Base	0.83	5.0	0.51	1.1	0.78	3.8
AM	2024 Total Flows	0.63	1.9	0.65	2.0	0.79	3.8
PM	2024 Total Flows	0.83	4.9	0.68	2.3	0.57	1.5

6.16 The Junctions 9 North Roundabout PICADY assessment illustrated in **Table 6.2** identifies that the junction will operate in excess of capacity with an RFC of 0.9 and queueing up to 8 vehicles identified on Maypole Road in the AM peak in the 2024 base case without the development, this is identified to increase by just 0.1 with the development with an in crease in queuing of 1 vehicle. It is considered that this increase will not be perceptible when considered against the daily fluctuations at the junction and as such is not considered to be material of significant in the context of highway capacity and traffic impact.

6.17 The Junctions 9 South Roundabout PICADY assessment illustrated in **Table 6.3** identifies that the junction will operate within capacity in the design year with and without the development.

6.18 The full Junctions 9 PICADY outputs for the junction are contained in **Appendix 9**.

Vine Road/Townsend Road/Kelvedon Road Crossroads

6.19 A detailed assessment of the operation of the Vine Road/Townsend Road/Kelvedon Road junction has been undertaken and is considered in **Table 6.4** below.

Table 6.4 Vine Road/Townsend Road/Kelvedon Road Crossroads PICADY Summary

		Kelvedon Road		Vine Road		Kelvedon Road West		Townsend Road	
		RFC	Q	RFC	Q	RFC	Q	RFC	Q
AM	2024 Total Flows	0.11	0.2	0.28	0.4	0.11	0.1	0.18	0.2
PM	2024 Total Flows	0.16	0.2	0.29	0.4	0.08	0.1	0.07	0.1

6.20 The Junctions 9 PICADY assessment illustrated in **Table 6.4** identifies that the junction will operate comfortably within the operational capacity of the junction for the design year 2024 with the site development flows in both the AM and PM peak with no significant queuing or delay predicted.

6.21 The full Junctions 9 PICADY outputs for the junction are contained in **Appendix 9**.

Kelvedon Road/Oak Road Junction Assessment

6.22 A detailed assessment of the impact of the potential development upon the priority junction has been undertaken and is considered in **Table 6.5** below.

Table 6.5 Maypole Road/Colchester Road/Oak Road PICADY Junction Summary

		Kelvedon Road		Oak Road	
		RFC	Q	RFC	Q
AM	2024 Total Flows	0.01	0.0	0.36	0.6
PM	2024 Total Flows	0.01	0.0	0.09	0.1

6.1 The PICADY analysis indicates that in the 2024 forecast year with the development, the junction will operate within capacity during all time periods.

6.2 The full Junctions 9 PICADY outputs for the junction are contained in **Appendix 9.**

Site Access Roundabout Junction Assessment

6.3 A detailed assessment of the operation of the Site Access Roundabout has been undertaken and is considered in **Table 6.6** below.

Table 6.6 Site Access Arcady Summary

		Kelvedon Rd E		Site Access		Kelvedon Rd W	
		RFC	Q	RFC	Q	RFC	Q
AM	2024 Total Flows	0.57	1.5	0.12	0.1	0.29	0.4
PM	2024 Total Flows	0.27	0.4	0.04	0.0	0.68	2.3

6.4 The Junctions 9 Arcady assessment illustrated in **Table 6.6** identifies that the junction will operate within the operational capacity of the junction for the design year 2024 with the site development flows in both the AM and PM peak with no significant queuing or delay predicted.

6.5 The full Junctions 9 ARCADY outputs for the junction are contained in **Appendix 9**.

6.6 In summary, the detailed network capacity analysis identifies that additional vehicular trips that the proposed development would generate would not have a significant or material impact in terms of either highway capacity or safety and moreover can be accommodated within the capacity of the existing network.

Vehicle Parking

6.7 Car parking for the proposal is proposed in accordance with the minimum standards set out in the Essex Planning Officers Association Standards for Parking as appropriate for residential developments. Cycle parking is also be provided in accordance with current standards.

6.8 Car parking is provided in accordance with the following schedule:

• 1 pace per flat	43 Flats	43 spaces
• 2 spaces per non garaged house	83 Houses	166 spaces
• 3 spaces per garaged houses	24 houses	72 spaces
• 0.25 visitor spaces per house	150 Houses	38 spaces
• Total		319 Spaces

Servicing

6.9 The proposed access and internal layout will be designed in accordance with current Essex County Council standards to accommodate the delivery and servicing requirements of a range of vehicles including emergency vehicles and refuse vehicles.

Residential Travel Planning

6.10 The provision of travel plans, travel plan groups and travel plan co-ordination services will be fundamental to ensuring that the development promotes sustainable alternatives to sole occupancy car use not only in its implementation but throughout the life of the proposals.

6.11 This approach will help the development manage its own travel demand at source rather than relying on outside agencies to deal with the travel consequences of the development. Additionally, travel planning will also seek to reduce, over time, through the setting of targets for modal shift, the numbers of vehicle movements associated with the proposals. This will mean that in time there will be reductions in the number of sole occupancy trips associated with the development on the network as the development becomes established.

6.12 Taking the baseline trip generation as a starting point at the occupation of various phases of the development, achievable targets for traffic reduction will be set and monitored throughout the early stages of the development. A variety of schemes and measures to reduce sole occupancy trips will be put into action and the effectiveness of these schemes will be monitored against the set targets. The following list provides examples of the various travel plan measures applicable to residential uses which can be promoted for this development:

- Site pedestrian and cycle permeability;

- Sustainable modal hierarchy;
- Car sharing database;
- Taxi buddy schemes;
- Residents Travel Plan Packs giving information on the alternatives available;
- Discounted public transport travel vouchers;
- Promotion of cycle routes to the development;
- Regular promotion including e-mail, posters and flyers to maintain or increase the level of participation;
- Improvements to the cycle infrastructure; and
- Providing for home-working (Broadband access/home office rooms etc.)

6.13 The travel plan measures set out above have the ability to effect a reduction in vehicular movements associated with the proposals and will over time ensure the sustainability of the development. The measures will be promoted as a part of any proposals coming forward and are an integral part of the planning process and as such, will be deliverable as a part of those proposals. In consideration of the target modal shift potential, discounts on trip rates for the development will be appropriate.

6.14 As a part of the proposals, a Residential Travel Information Pack will be provided for each new dwelling.

7 Summary

Summary

7.1 This report provides an assessment of the likely transport impacts arising from the erection of up to 150 dwellings and with associated parking, public open space, landscaping, sustainable drainage system (SUDs) and vehicular access points from Kelvedon Road.

7.2 The assessment considers impact of the proposed development and its corresponding trip generation on the transport infrastructure.

7.3 The assessment demonstrates that the site is a suitable location for sustainable development and has the benefit of being accessible to a full range of key services and amenities to support the development and also is in accordance with the sustainability framework.

7.4 Residential Travel Packs are proposed as a part of the proposals and will assist in managing the traffic impact of the development.

7.5 A comprehensive trip generation analysis has been undertaken in order to understand the impacts, in terms of transport and traffic that the proposals will engender.

7.6 The assessment identifies that the proposals will not have a significant or material impact on the operation of the local highway network.

7.7 The capacity assessment demonstrates that the proposal site can be delivered without having a detrimental impact on the local transport infrastructure in the vicinity of the site and can be accommodated for the purposes of capacity and safety.

Conclusion

7.8 The assessment clearly demonstrates that the proposed development of 150 dwellings on land to the south of Kelvedon Road, Tiptree will not have a material or significant impact on the operation of the local road network.

7.9 The assessment also demonstrates that the proposed development is suitably located to access key services, facilities and amenities by means other than private vehicles.

7.10 In consideration of the above, there are no substantive transport or access reasons why the proposals as submitted should not receive planning permission.

Appendix 1

Site Location

KELVEDON ROAD

Water Tower

Tower House

Golden Warren

Coronation Cottages

1

2

Tower End

Ponys Farm

El Sub Sta

El Sub Sta

Pond

Pond

The Gables

Track

100

95

103

68

67.9m

Stourton

Baynards Primary School

Colt Farm

B 1023

The Paddock

Revelors Farm

Gwy

N

Patrick Stroud Designs Ltd, 10 Hurstwood Avenue, Brentwood, Essex CM15 9HT T: 01277 260130 M 07955 687623 E: patrickjstroud@btinternet.com	Client : **MARDEN.HOMES** Project : **LAND.AT.KELVEDON.ROAD,** **TIPTREE** Drawing : **LOCATION.PLAN**	Scale : **1:1250@A3** 0 25 50 Status : **PLANNING** Rev : Dwg No : **2017-116-01**

C:\Users\Pat\Documents\New Projects\2017.116 - Tiptree\2017.115 - Site Plans

Appendix 2

Public Transport Data

Hedingham 91 Witham-Tollesbury

Mondays to Fridays (from 27 August 2017)

service no.	91	91	91	91	91	91	91	91	91	91	91
notes											
Witham, Morrisons	-	-	-	0840	0955	1125	1345	1603	1633	1755	-
Witham, Rail Station Stop 2	-	0700	0753	0842	0958	1128	1348	1606	1635	1758	1905
Witham, The George	-	0702	0755	0845	1000	1130	1350	1608	1638	1800	1908
Kelvedon, The Railway Tavern	0646	0711	0804	0852	1009	1139	1359	1617	1645	1809	1916
Feering, Gore Pit Corner	0647	0714	0807	0854	1012	1142	1402	1620	1647	1812	1917
Inworth, The Prince of Wales	0650	0717	0810	0857	1015	1145	1405	1623	1650	1815	1920
Tiptree, Windmill Green	0653	0720	0814	0859	1018	1148	1408	1626	1651	1818	1923
Tiptree, The Centre	0654	0722	|	0900	1020	1150	1410	1628s	|	1820	1924
Tolleshunt Knights, Top Road	0659	0729	|	0904	1027	1157	1417	1635	|	1827	1929
Tolleshunt D'Arcy, The Red Lion	0703	0733	|	0908	1031	1201	1421	1639	|	1831	1933
Tollesbury, The Square	0708	0738	|	0913	1036	1206	1426	1644	|	1836	1938
Tiptree, The New Times	-	-	0817	-	-	-	-	-	1654	-	-
Tiptree, The Centre	-	-	0820	-	-	-	-	-	1656	-	-

Hedingham 91 Witham-Tollesbury

Saturdays (from 27 August 2017)

service no.	91	91	91	91	91	91
notes						
Witham, Morrisons	-	0820	0950	1200	1430	1733
Witham, Rail Station Stop 2	-	0822	0952	1202	1432	1735
Witham, The George	-	0825	0955	1205	1435	1738
Kelvedon, The Railway Tavern	0712	0832	1002	1212	1442	1745
Feering, Gore Pit Corner	0714	0834	1004	1214	1444	1747
Inworth, The Prince of Wales	0717	0837	1007	1217	1447	1750
Tiptree, Windmill Green	0719	0839	1009	1219	1449	1752
Tiptree, The Centre	0720	0840	1010	1220	1450	1753
Tolleshunt Knights, Top Road	0724	0844	1014	1224	1454	1757
Tolleshunt D'Arcy, The Red Lion	0728	0848	1018	1228	1458	1801
Tollesbury, The Square	0733	0853	1023	1233	1503	1806

Hedingham 91 Tollesbury-Witham

Mondays to Fridays (from 27 August 2017)

service no.	91	91	91	91	91	91	91	91	91	91
notes										
Tollesbury, The Square	-	0710	-	0910	1040	1300	1518	1710	1825	1940
Tolleshunt D'Arcy, The Red Lion	-	0715	-	0915	1045	1305	1523	1715	1828	1943
Tolleshunt Knights, Top Road	-	0719	-	0919	1049	1309	1527	1719	1830	1945
Tiptree, The Centre	0634	0726	0821	0926	1056	1316	1534	1726	1835	1950
Tiptree, Windmill Green	0635	0727	0823	0927	1057	1317	1535	1727	1837	1952
Inworth, The Prince of Wales	0640	0732	0824	0932	1102	1322	1540	1732	1839	1954
Feering, Gore Pit Corner	0643	0735	0826	0935	1105	1325	1543	1735	1841	1956
Kelvedon, The Railway Tavern	0646	0738	0827	0938	1108	1328	1546	1738	1843	1958
Witham, The George	0655	0747	0835	0947	1117	1337	1555	1747	1851	-
Witham, Rail Station	0658	0750	0837	0950	1120	1340	1558	1750	1853	-
Witham, Morrisons	-	-	0838	0953	1123	1343	1601	1753	-	-

Hedingham 91 Tollesbury-Witham

Saturdays (from 27 August 2017)

service no.	91	91	91	91	91	91	91
notes							
Tollesbury, The Square	0737	0907	1107	1337	1552	-	1810
Tolleshunt D'Arcy, The Red Lion	0740	0910	1110	1340	1555	-	1813
Tolleshunt Knights, Top Road	0742	0912	1112	1342	1557	-	1815
Tiptree, The Centre	0747	0917	1117	1347	1602	1701	1822
Tiptree, Windmill Green	0749	0919	1119	1349	1604	1703	1824
Inworth, The Prince of Wales	0751	0921	1121	1351	1606	1705	1826
Feering, Gore Pit Corner	0753	0923	1123	1353	1608	1707	1828
Kelvedon, The Railway Tavern	0755	0925	1125	1355	1610	1709	-
Witham, The George	0803	0933	1133	1403	1618	1717	-
Witham, Rail Station	0805	0935	1135	1405	1620	1719	-
Witham, Morrisons	0806	0936	1136	1406	1621	1720	-

Appendix 3

Proposed Access Arrangement

Access to existing properety maintained with potential to tie into wider development in future

2.0m Footways

Kerbed Build Out

28m ICD Roundabout

Proposed 5.5m Carriageway

Pond

Golden Warren

Coronation Cottages

Tower End

Ponys Farm

The Gables

client: Marden Homes	title: Potential Roundabout Access	date: 01/10/2018	scale @ A3 1:500	
project: Kelvedon Road Tiptree	status: Planning (not for construction)	drawn	Revision	
discipline Transport Planning	project no. JTP 07718	chk'd SAA	dwg no. DR2	

Appendix 4

Illustrative Development Layout

Water Tower

Coal Yard

Golden Warren

KELVEDON ROAD

Coronation Cottages

public open space

public open space

swale

public open space

play area

92-106

112-125

126-139

The Gables

Stourton

Colt Farm

103

Legend

- Site Boundary
- Existing Trees to be retained
- Existing Trees to be removed
- Proposed Trees & Shrubs
- Paving - generally 600 x 600 concrete slabs.
- 1.8m high garden walls
- 1.8m high close boarded fence.
- Surface parking spaces (2.95m x 5.5m)
- * Garage parking spaces (3m x 7m) (cycle hook to rear of garage)
- Existing buildings to be removed
- Affordable Units

0 5 10 15 20 25 30 Scale Bar

Scale : 1:500 @ A1

Date : Nov2018

Status : PLANNING

Dwg No : 2018.190.002

Rev

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E: patrickjstroud@btinternet.com

Client : Marden Homes Ltd

Project : Land at Kelvedon Road, Tiptree

Drawing : Site Plan

Appendix 5

TRICS Data

Calculation Reference: AUDIT-757101-181004-1022

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : A - HOUSES PRIVATELY OWNED
VEHICLES

Selected regions and areas:

02	SOUTH EAST		
	ES	EAST SUSSEX	2 days
	HC	HAMPSHIRE	1 days
	KC	KENT	2 days
	SC	SURREY	1 days
	WS	WEST SUSSEX	2 days
03	SOUTH WEST		
	DV	DEVON	2 days
04	EAST ANGLIA		
	NF	NORFOLK	2 days
	SF	SUFFOLK	1 days
05	EAST MIDLANDS		
	LN	LINCOLNSHIRE	1 days
06	WEST MIDLANDS		
	SH	SHROPSHIRE	2 days
	ST	STAFFORDSHIRE	1 days
07	YORKSHIRE & NORTH LINCOLNSHIRE		
	NE	NORTH EAST LINCOLNSHIRE	1 days
	NY	NORTH YORKSHIRE	6 days
08	NORTH WEST		
	CH	CHESHIRE	2 days
09	NORTH		
	DH	DURHAM	1 days
10	WALES		
	PS	POWYS	1 days
11	SCOTLAND		
	AG	ANGUS	1 days
	FA	FALKIRK	1 days
	HI	HIGHLAND	1 days
	PK	PERTH & KINROSS	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary 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 dwellings
Actual Range: 7 to 805 (units:)
Range Selected by User: 5 to 4334 (units:)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/10 to 19/04/18

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	6 days
Tuesday	7 days
Wednesday	8 days
Thursday	7 days
Friday	4 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	32 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:

Suburban Area (PPS6 Out of Centre)	16
Edge of Town	16

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

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	32 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

1,000 or Less	1 days
1,001 to 5,000	5 days
5,001 to 10,000	8 days
10,001 to 15,000	11 days
15,001 to 20,000	7 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,001 to 25,000	7 days
25,001 to 50,000	5 days
50,001 to 75,000	6 days
75,001 to 100,000	12 days
100,001 to 125,000	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	8 days
1.1 to 1.5	24 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:

Yes	4 days
No	28 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	32 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 AG-03-A-01 BUNGALOWS/DET. ANGUS
KEPTIE ROAD
ARBROATH

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 7
Survey date: TUESDAY *22/05/12* *Survey Type: MANUAL*

2 CH-03-A-08 DETACHED CHESHIRE
WHITCHURCH ROAD
CHESTER
BOUGHTON HEATH
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 11
Survey date: TUESDAY *22/05/12* *Survey Type: MANUAL*

3 CH-03-A-09 TERRACED HOUSES CHESHIRE
GREYSTOKE ROAD
MACCLESFIELD
HURDSFIELD
Edge of Town
Residential Zone
Total Number of dwellings: 24
Survey date: MONDAY *24/11/14* *Survey Type: MANUAL*

4 DH-03-A-01 SEMI DETACHED DURHAM
GREENFIELDS ROAD
BISHOP AUCKLAND

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 50
Survey date: TUESDAY *28/03/17* *Survey Type: MANUAL*

5 DV-03-A-02 HOUSES & BUNGALOWS DEVON
MILLHEAD ROAD
HONITON

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 116
Survey date: FRIDAY *25/09/15* *Survey Type: MANUAL*

6 DV-03-A-03 TERRACED & SEMI DETACHED DEVON
LOWER BRAND LANE
HONITON

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 70
Survey date: MONDAY *28/09/15* *Survey Type: MANUAL*

7 ES-03-A-02 PRIVATE HOUSING EAST SUSSEX
SOUTH COAST ROAD
PEACEHAVEN

Edge of Town
Residential Zone
Total Number of dwellings: 37
Survey date: FRIDAY *18/11/11* *Survey Type: MANUAL*

8 ES-03-A-04 MIXED HOUSES & FLATS EAST SUSSEX
NEW LYDD ROAD
CAMBER

Edge of Town
Residential Zone
Total Number of dwellings: 134
Survey date: FRIDAY *15/07/16* *Survey Type: MANUAL*

9 FA-03-A-01 SEMI-DETACHED/TERRACED FALKIRK
MANDELA AVENUE
FALKIRK

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 37
Survey date: THURSDAY *30/05/13* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

10 HC-03-A-19 HOUSES & FLATS HAMPSHIRE
CANADA WAY
LIPHOOK

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 62
Survey date: MONDAY *27/11/17* *Survey Type: MANUAL*

11 HI-03-A-14 SEMI-DETACHED & TERRACED HIGHLAND
KING BRUDE ROAD
INVERNESS
SCORGUIE
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 40
Survey date: WEDNESDAY *23/03/16* *Survey Type: MANUAL*

12 KC-03-A-03 MIXED HOUSES & FLATS KENT
HYTHE ROAD
ASHFORD
WILLESBOROUGH
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 51
Survey date: THURSDAY *14/07/16* *Survey Type: MANUAL*

13 KC-03-A-07 MIXED HOUSES KENT
RECULVER ROAD
HERNE BAY

Edge of Town
Residential Zone
Total Number of dwellings: 288
Survey date: WEDNESDAY *27/09/17* *Survey Type: MANUAL*

14 LN-03-A-03 SEMI DETACHED LINCOLNSHIRE
ROOKERY LANE
LINCOLN
BOULTHAM
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 22
Survey date: TUESDAY *18/09/12* *Survey Type: MANUAL*

15 NE-03-A-02 SEMI DETACHED & DETACHED NORTH EAST LINCOLNSHIRE
HANOVER WALK
SCUNTHORPE

Edge of Town
No Sub Category
Total Number of dwellings: 432
Survey date: MONDAY *12/05/14* *Survey Type: MANUAL*

16 NF-03-A-01 SEMI DET. & BUNGALOWS NORFOLK
YARMOUTH ROAD
CAISTER-ON-SEA

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 27
Survey date: TUESDAY *16/10/12* *Survey Type: MANUAL*

17 NF-03-A-03 DETACHED HOUSES NORFOLK
HALING WAY
THETFORD

Edge of Town
Residential Zone
Total Number of dwellings: 10
Survey date: WEDNESDAY *16/09/15* *Survey Type: MANUAL*

18 NY-03-A-06 BUNGALOWS & SEMI DET. NORTH YORKSHIRE
HORSEFAIR
BOROUGHBRIDGE

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 115
Survey date: FRIDAY *14/10/11* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

19 NY-03-A-07 DETACHED & SEMI DET. NORTH YORKSHIRE
CRAVEN WAY
BOROUGHBRIDGE

Edge of Town
No Sub Category
Total Number of dwellings: 23
Survey date: TUESDAY *18/10/11* *Survey Type: MANUAL*

20 NY-03-A-09 MIXED HOUSING NORTH YORKSHIRE
GRAMMAR SCHOOL LANE
NORTHALLERTON

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 52
Survey date: MONDAY *16/09/13* *Survey Type: MANUAL*

21 NY-03-A-10 HOUSES AND FLATS NORTH YORKSHIRE
BOROUGHBRIDGE ROAD
RIPON

Edge of Town
No Sub Category
Total Number of dwellings: 71
Survey date: TUESDAY *17/09/13* *Survey Type: MANUAL*

22 NY-03-A-11 PRIVATE HOUSING NORTH YORKSHIRE
HORSEFAIR
BOROUGHBRIDGE

Edge of Town
Residential Zone
Total Number of dwellings: 23
Survey date: WEDNESDAY *18/09/13* *Survey Type: MANUAL*

23 NY-03-A-13 TERRACED HOUSES NORTH YORKSHIRE
CATTERICK ROAD
CATTERICK GARRISON
OLD HOSPITAL COMPOUND
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 10
Survey date: WEDNESDAY *10/05/17* *Survey Type: MANUAL*

24 PK-03-A-01 DETAC. & BUNGALOWS PERTH & KINROSS
TULLYLUMB TERRACE
PERTH
GORNHILL
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 36
Survey date: WEDNESDAY *11/05/11* *Survey Type: MANUAL*

25 PS-03-A-02 DETACHED/SEMI-DETACHED POWYS
GUNROG ROAD
WELSHPOOL

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 28
Survey date: MONDAY *11/05/15* *Survey Type: MANUAL*

26 SC-03-A-04 DETACHED & TERRACED SURREY
HIGH ROAD
BYFLEET

Edge of Town
Residential Zone
Total Number of dwellings: 71
Survey date: THURSDAY *23/01/14* *Survey Type: MANUAL*

27 SF-03-A-05 DETACHED HOUSES SUFFOLK
VALE LANE
BURY ST EDMUNDS

Edge of Town
Residential Zone
Total Number of dwellings: 18
Survey date: WEDNESDAY *09/09/15* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

28	SH-03-A-05	SEMI-DETACHED/TERRACED	SHROPSHIRE
	SANDCROFT		
	TELFORD		
	SUTTON HILL		
	Edge of Town		
	Residential Zone		
	Total Number of dwellings:	54	
	Survey date: THURSDAY	*24/10/13*	*Survey Type: MANUAL*
29	SH-03-A-06	BUNGALOWS	SHROPSHIRE
	ELLESMERE ROAD		
	SHREWSBURY		
	Edge of Town		
	Residential Zone		
	Total Number of dwellings:	16	
	Survey date: THURSDAY	*22/05/14*	*Survey Type: MANUAL*
30	ST-03-A-07	DETACHED & SEMI-DETACHED	STAFFORDSHIRE
	BEACONSIDE		
	STAFFORD		
	MARSTON GATE		
	Edge of Town		
	Residential Zone		
	Total Number of dwellings:	248	
	Survey date: WEDNESDAY	*22/11/17*	*Survey Type: MANUAL*
31	WS-03-A-04	MIXED HOUSES	WEST SUSSEX
	HILLS FARM LANE		
	HORSHAM		
	BROADBRIDGE HEATH		
	Edge of Town		
	Residential Zone		
	Total Number of dwellings:	151	
	Survey date: THURSDAY	*11/12/14*	*Survey Type: MANUAL*
32	WS-03-A-06	MIXED HOUSES	WEST SUSSEX
	ELLIS ROAD		
	WEST HORSHAM		
	S BROADBRIDGE HEATH		
	Edge of Town		
	Residential Zone		
	Total Number of dwellings:	805	
	Survey date: THURSDAY	*02/03/17*	*Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
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	32	98	0.083	32	98	0.291	32	98	0.374
08:00 - 09:00	32	98	0.140	32	98	0.384	32	98	0.524
09:00 - 10:00	32	98	0.148	32	98	0.164	32	98	0.312
10:00 - 11:00	32	98	0.130	32	98	0.159	32	98	0.289
11:00 - 12:00	32	98	0.133	32	98	0.153	32	98	0.286
12:00 - 13:00	32	98	0.160	32	98	0.154	32	98	0.314
13:00 - 14:00	32	98	0.160	32	98	0.155	32	98	0.315
14:00 - 15:00	32	98	0.163	32	98	0.187	32	98	0.350
15:00 - 16:00	32	98	0.257	32	98	0.175	32	98	0.432
16:00 - 17:00	32	98	0.275	32	98	0.171	32	98	0.446
17:00 - 18:00	32	98	0.338	32	98	0.156	32	98	0.494
18:00 - 19:00	32	98	0.278	32	98	0.173	32	98	0.451
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.265			2.322			4.587

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:	7 - 805 (units:)
Survey date date range:	01/01/10 - 19/04/18
Number of weekdays (Monday-Friday):	32
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	2
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 6

Census Information

WU03EW - Location of usual residence and place of work by method of travel to work (MSOA level)

population	All usual residents aged 16 and over in employment the week before the census
units	Persons
date	2011
method of travel to work	Driving a car or van

place of work : 2011 census merged local authority district	usual residence E02004525 : Colchester 020
Babergh	25
Basildon	47
Bedford	1
Braintree	332
Breckland	1
Brentwood	23
Broxbourne	1
Cambridge	3
Castle Point	3
Chelmsford	214
Colchester	472
East Hertfordshire	4
Epping Forest	8
Forest Heath	1
Harlow	12
Hertsmere	2
Ipswich	21
Maldon	330
Mid Suffolk	5
Norwich	1
Rochford	5

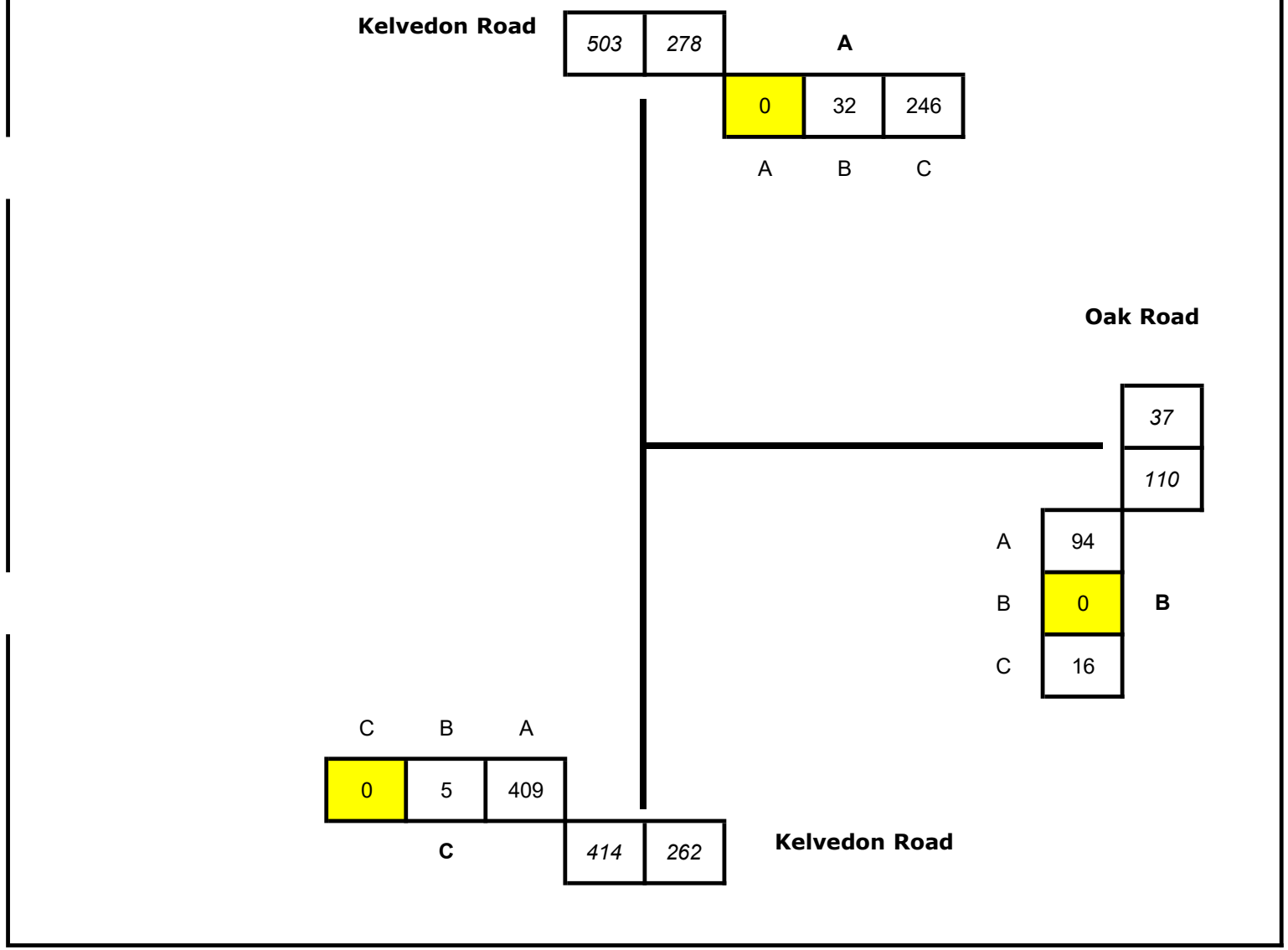
South Cambridgeshire	3
Southend-on-Sea	7
St Albans	2
St Edmundsbury	7
Stevenage	2
Suffolk Coastal	5
Tendring	68
Three Rivers	1
Thurrock	14
Uttlesford	21
Welwyn Hatfield	1
	1,642

Appendix 7

Traffic Data

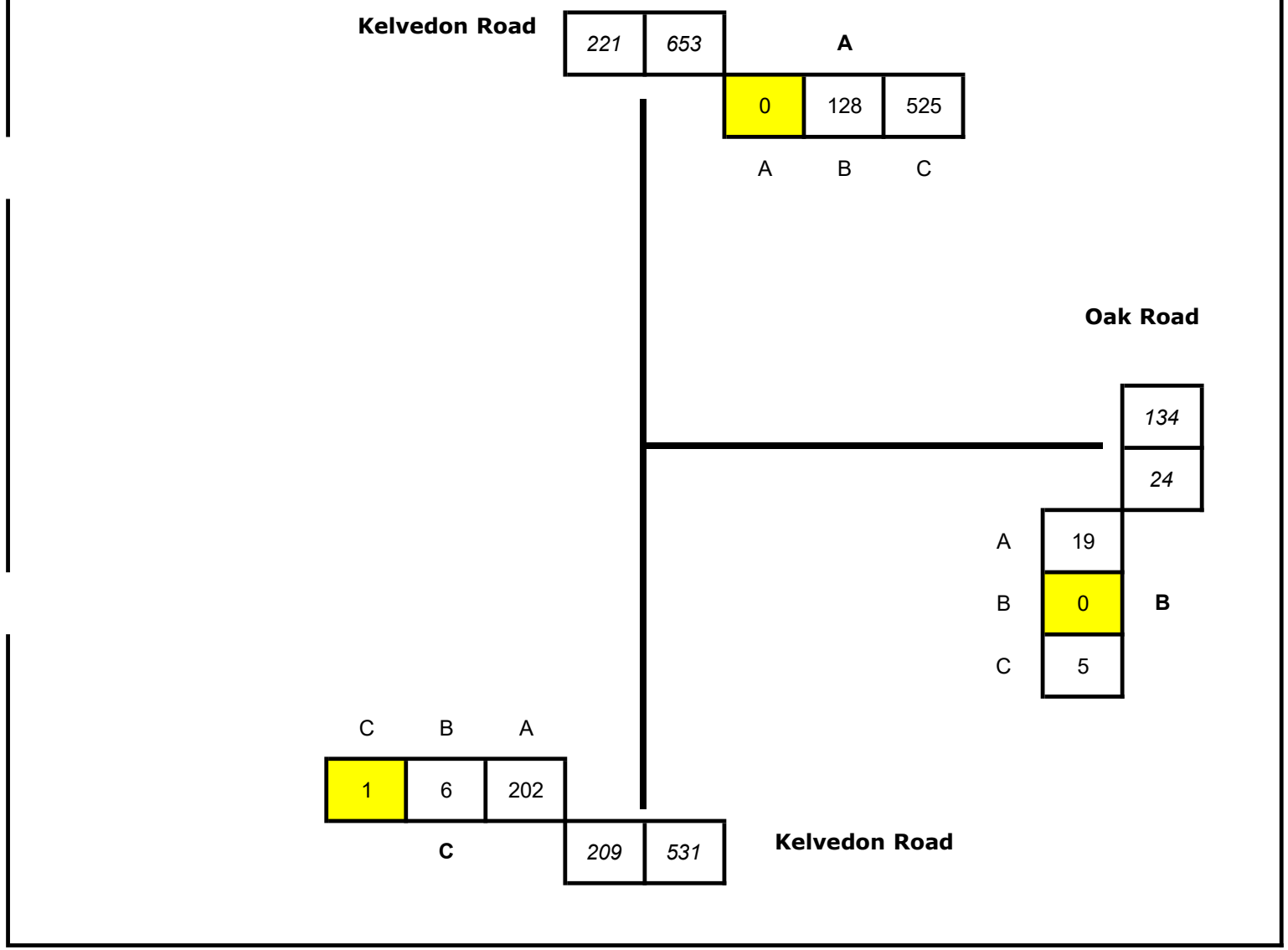
Advanced Transport Research	Job Number & Name:	20319 Tiptree, Essex
Site 1 - Kelvedon Road/ Oak Road	Client:	Journey TP
Flow Diagram	Date:	Thursday 24 Jan 2019

Select Period **0800 Hourly Total**



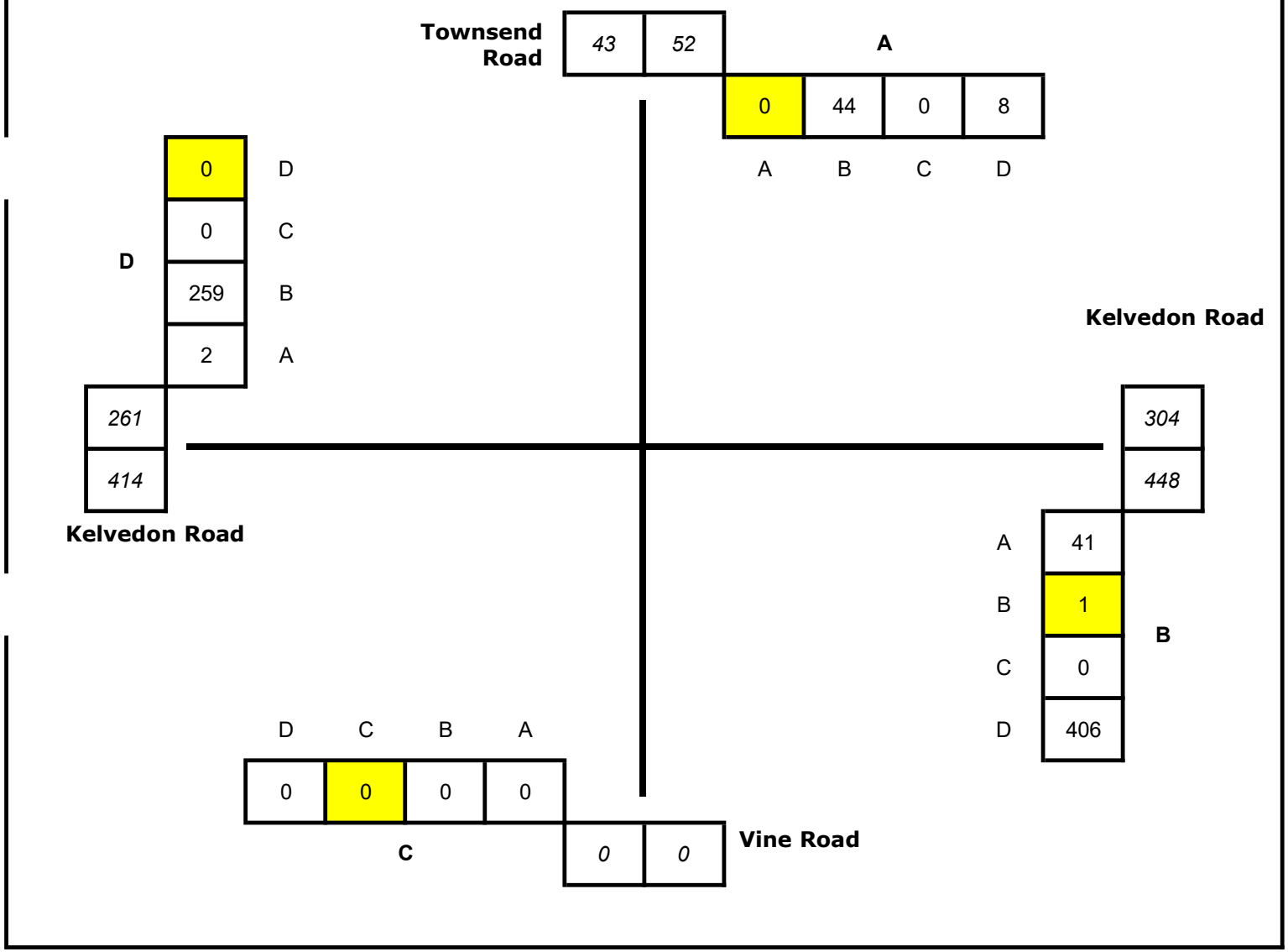
Advanced Transport Research	*Job Number & Name:*	**20319 Tiptree, Essex**
Site 1 - Kelvedon Road/ Oak Road	*Client:*	**Journey TP**
Flow Diagram	*Date:*	**Thursday 24 Jan 2019**

Select Period **1700 Hourly Total**

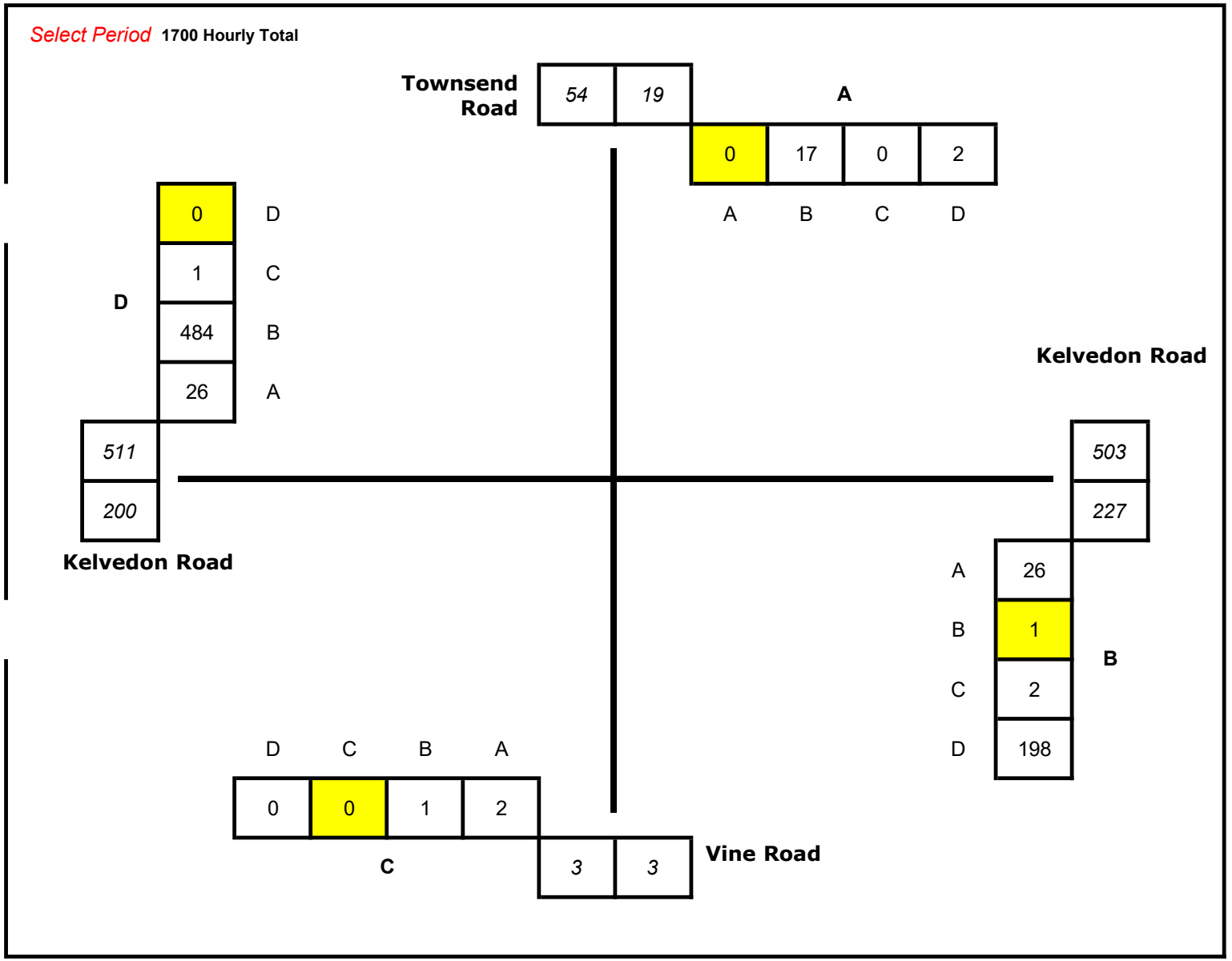


Advanced Transport Research	Job Number & Name:	20319 Tiptree, Essex
Site 2 - Kelvedon Road/ Vine Road/Townsend Road	Client:	Journey TP
Flow Diagram	Date:	Thursday 24 Jan 2019

Select Period **0800 Hourly Total**

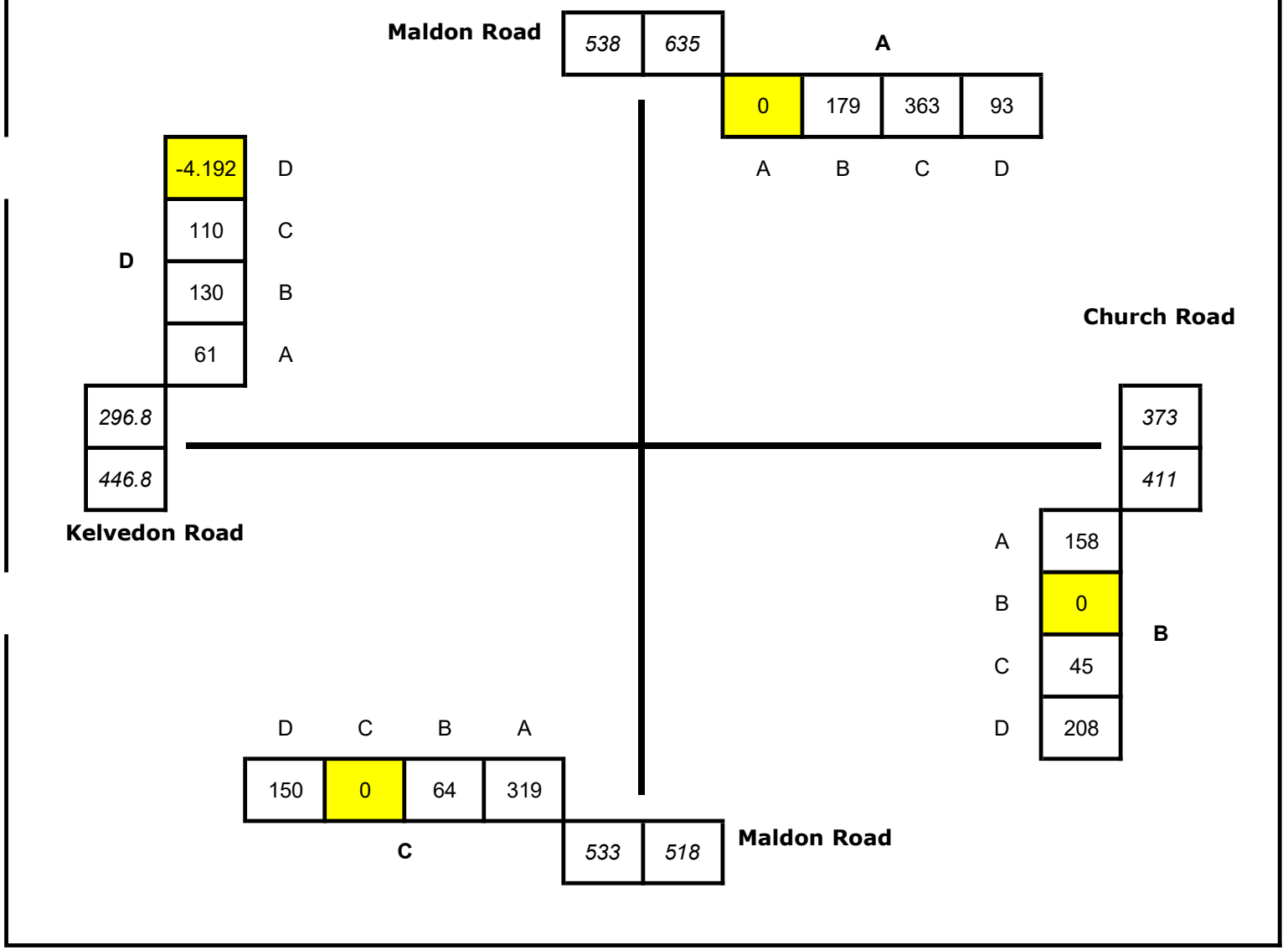


Advanced Transport Research	Job Number & Name:	20319 Tiptree, Essex
Site 2 - Kelvedon Road/ Vine Road/Townsend Road	Client:	Journey TP
Flow Diagram	Date:	Thursday 24 Jan 2019



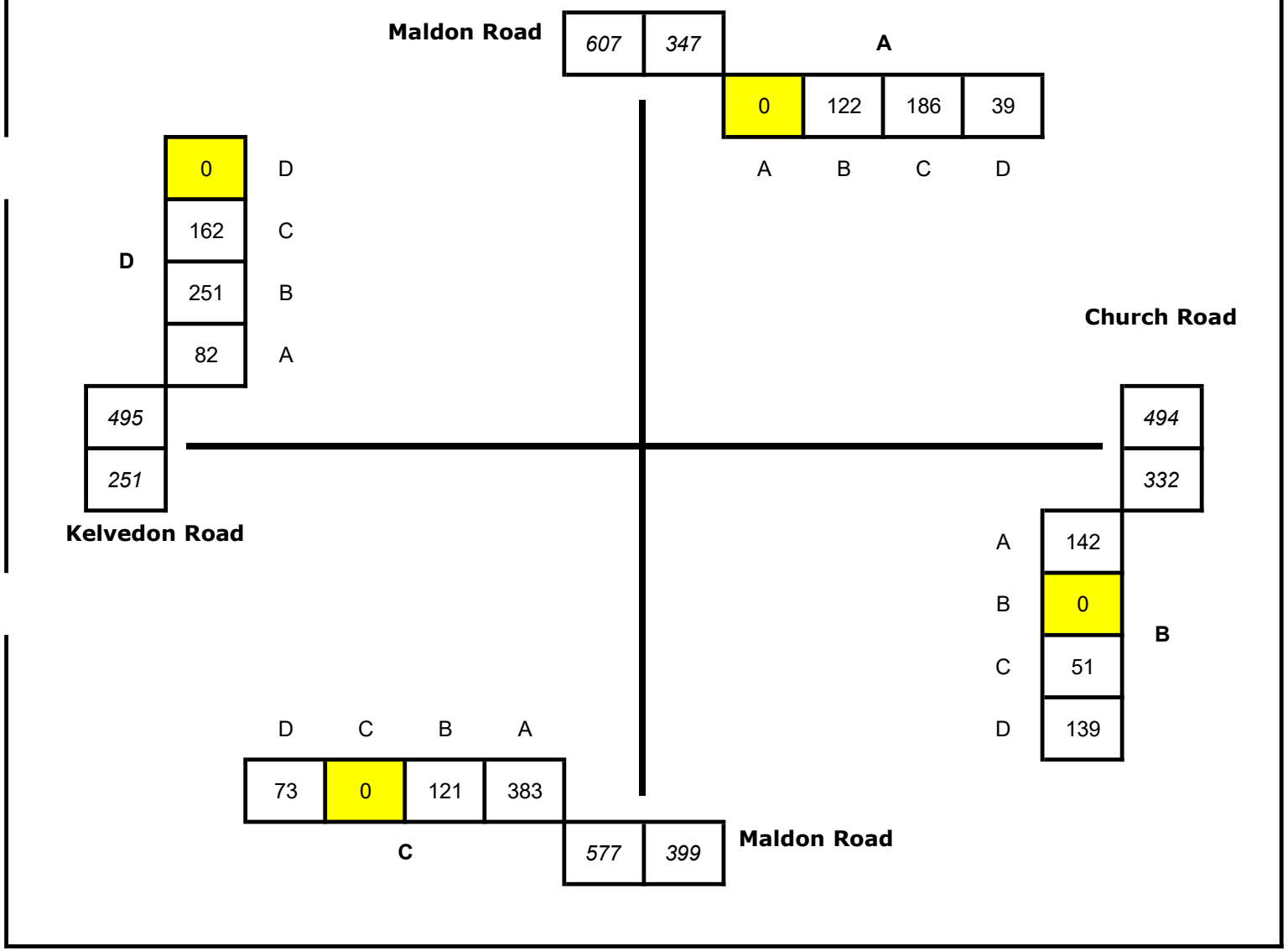
Advanced Transport Research	Job Number & Name:	20319 Tiptree, Essex
Site 3 - Maldon Road/ Kelvedon Road	Client:	Journey TP
Flow Diagram	Date:	Thursday 24 Jan 2019

Select Period **0800 Hourly Total**

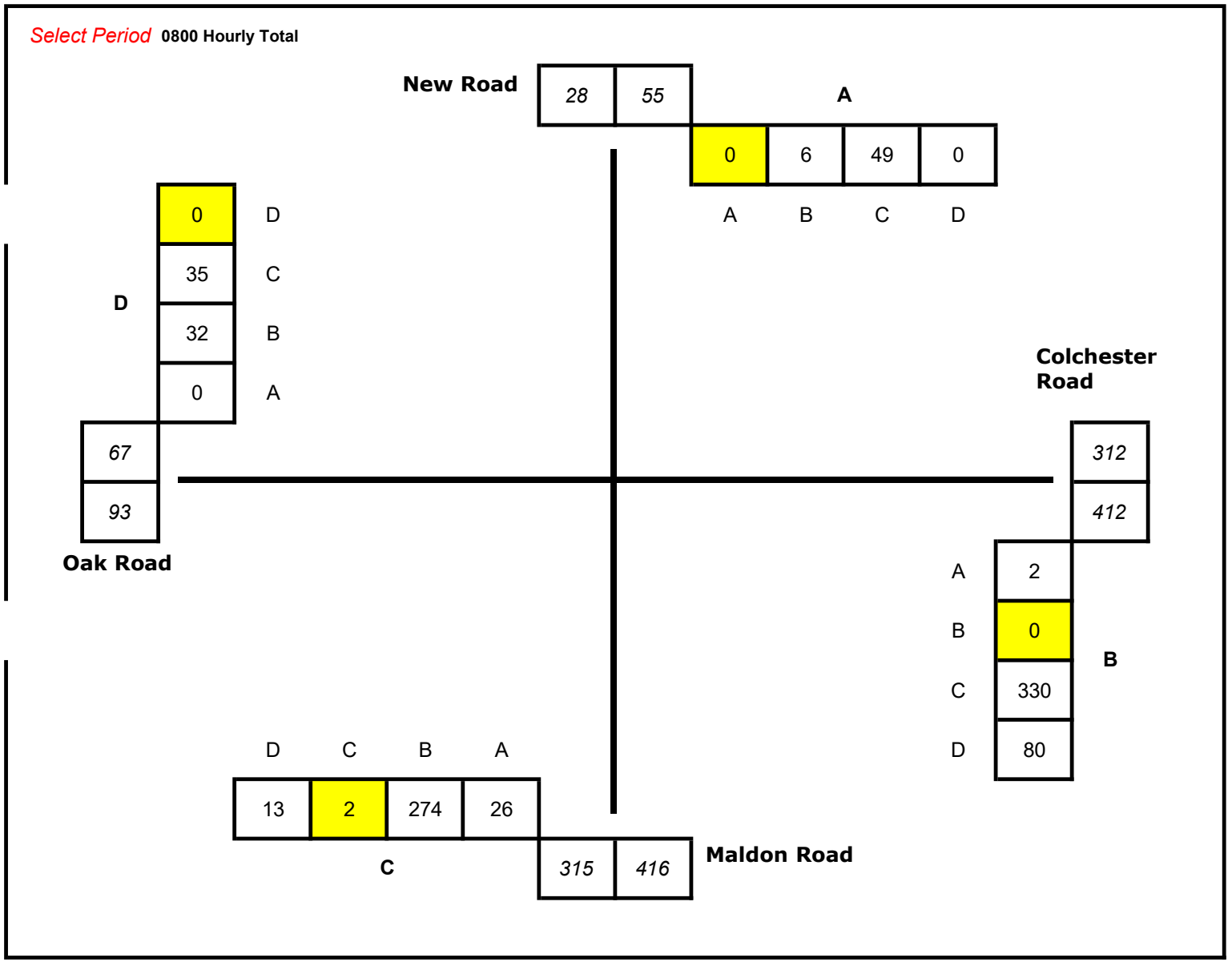


Advanced Transport Research	Job Number & Name:	20319 Tiptree, Essex
Site 3 - Maldon Road/ Kelvedon Road	Client:	Journey TP
Flow Diagram	Date:	Thursday 24 Jan 2019

Select Period **1700 Hourly Total**

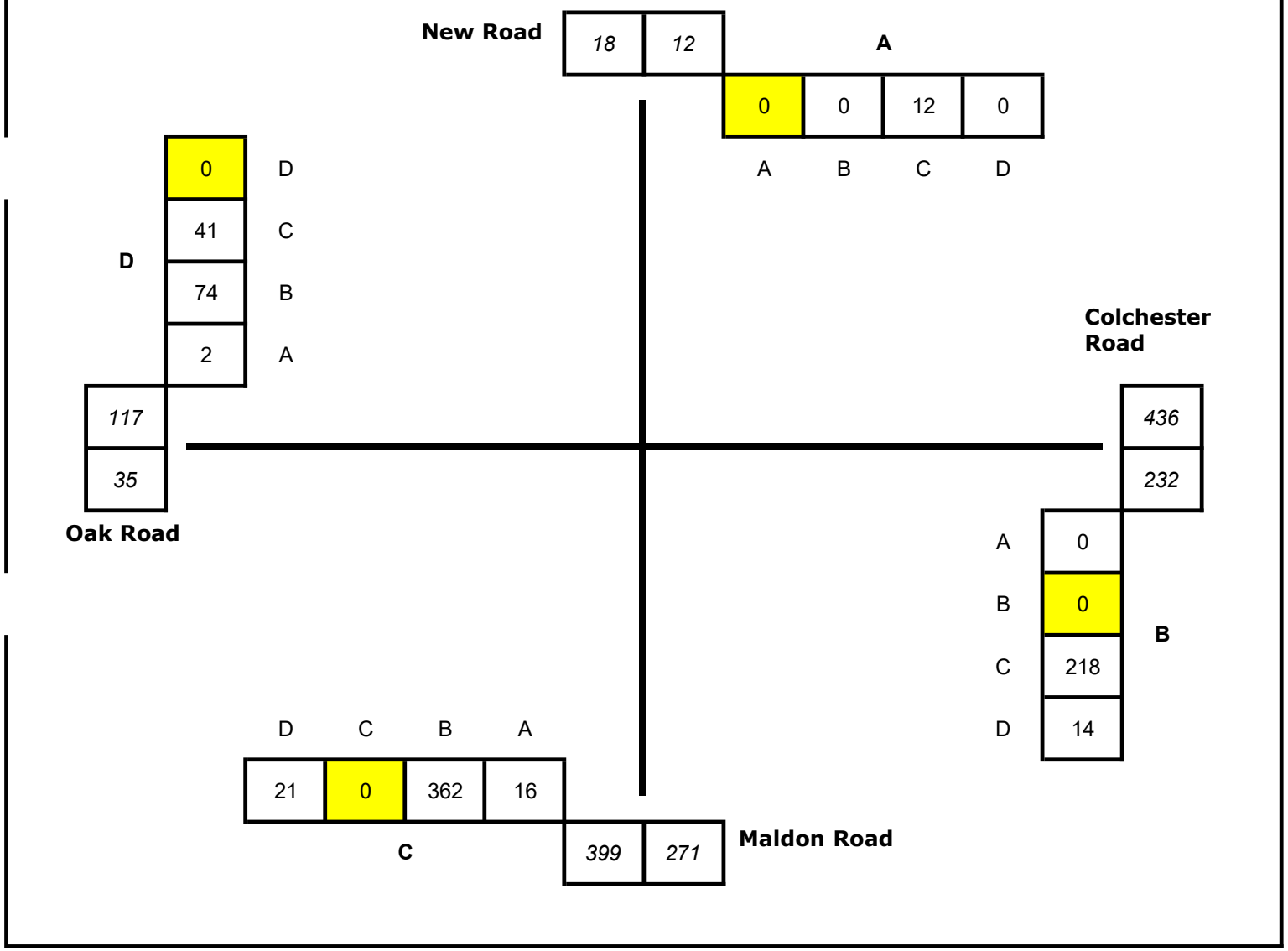


Advanced Transport Research	Job Number & Name:	20319 Tiptree, Essex
Site 4 - Colchester Road/ Oak Road/ Maldon Road	Client:	Journey TP
Flow Diagram	Date:	Thursday 24 Jan 2019



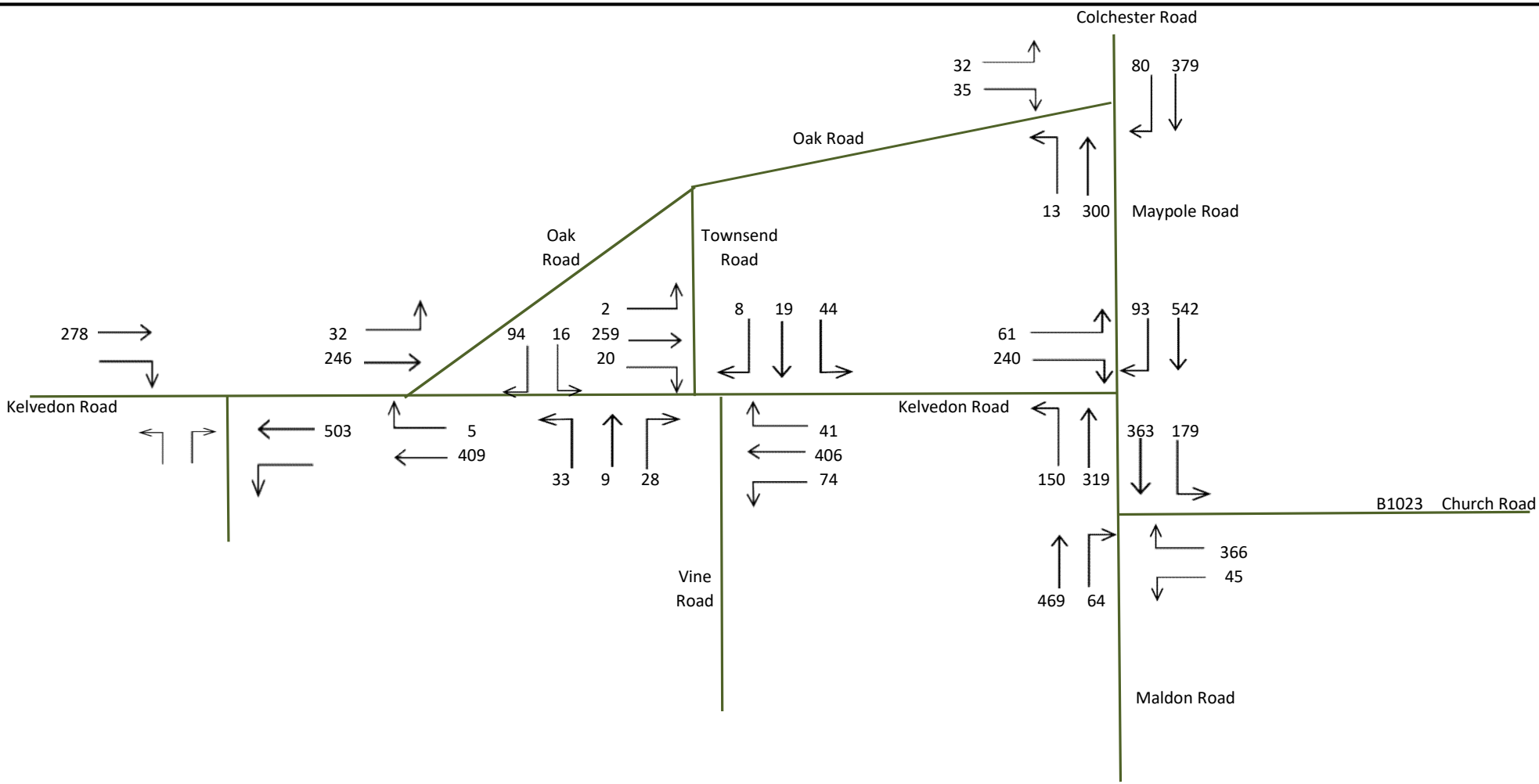
Advanced Transport Research	Job Number & Name:	20319 Tiptree, Essex
Site 4 - Colchester Road/ Oak Road/ Maldon Road	Client:	Journey TP
Flow Diagram	Date:	Thursday 24 Jan 2019

Select Period **1700 Hourly Total**



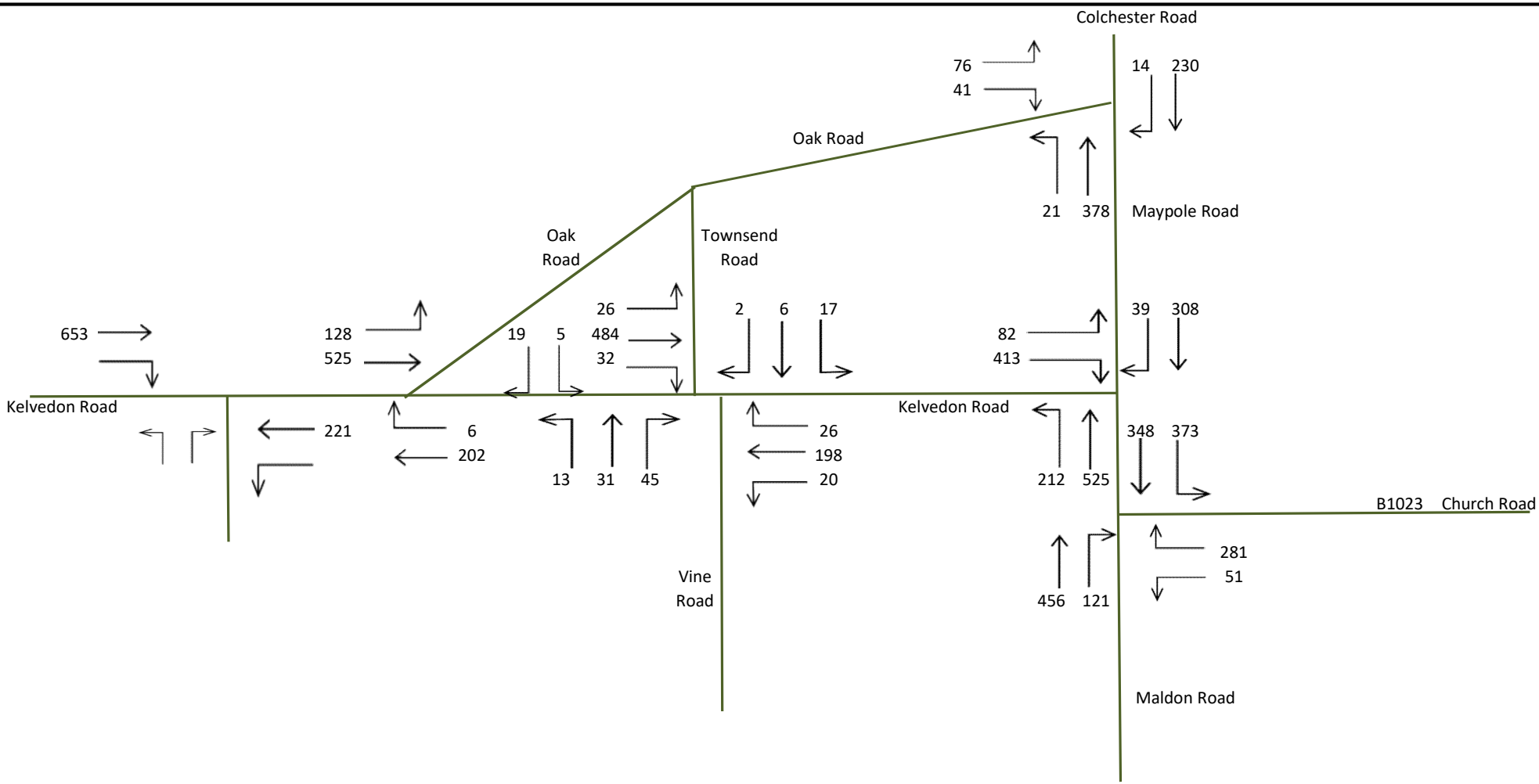
Appendix 8

Network Flows



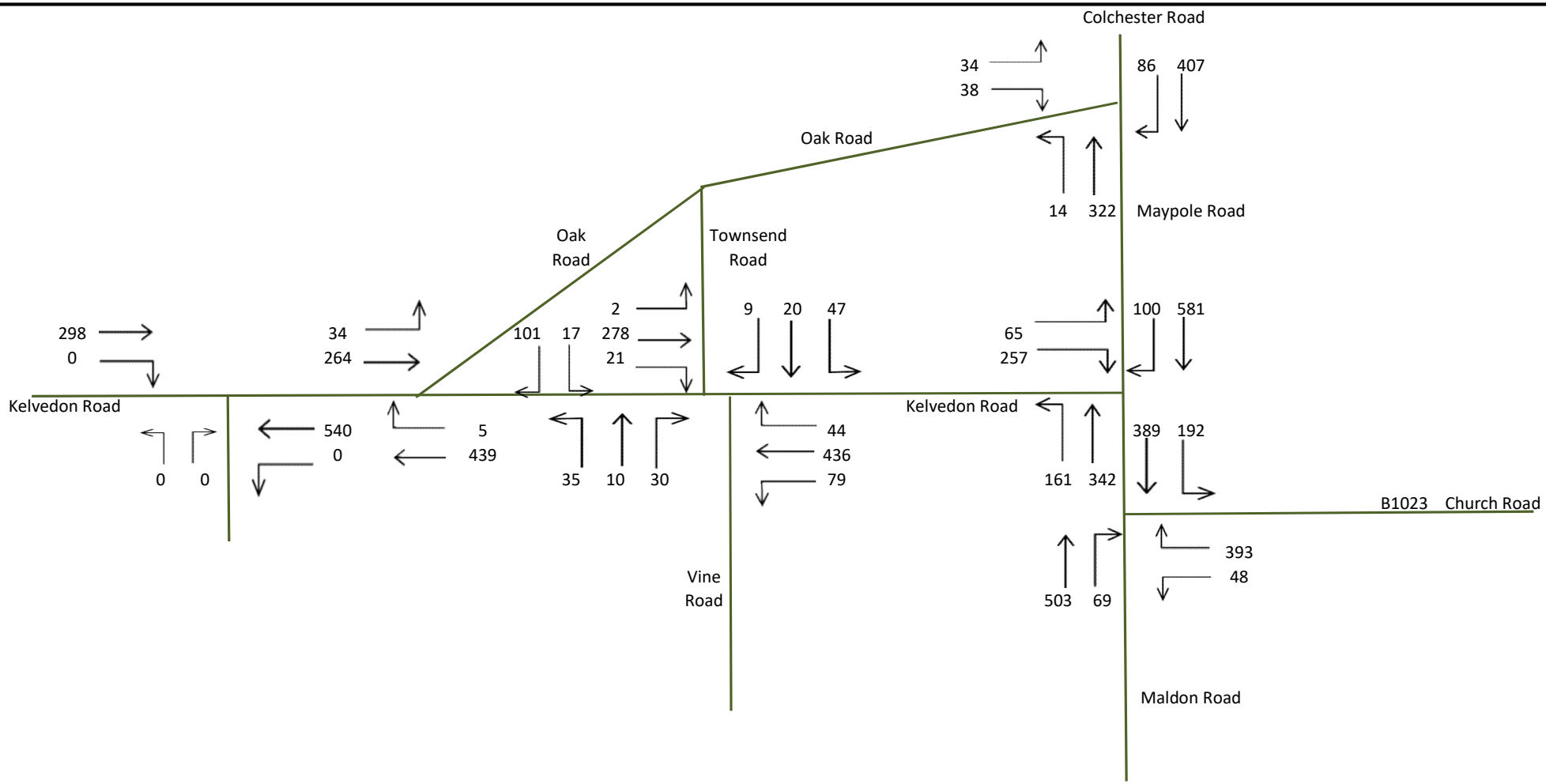
Drawing Title	**AM Peak 08:00-09:00 2019 Surveyed Flows**	Drawn	SAA
		Date	02/01/2019
Project Title	Land to the South of Kelvedon Road, Tiptree	Ref	Figure 1

Journey transport planning



Drawing Title	**PM Peak 17:00-18:00 2019 Surveyed Flows**	Drawn	SAA
		Date	02/01/2019
Project Title	Land to the South of Kelvedon Road, Tiptree	Ref	Figure 2

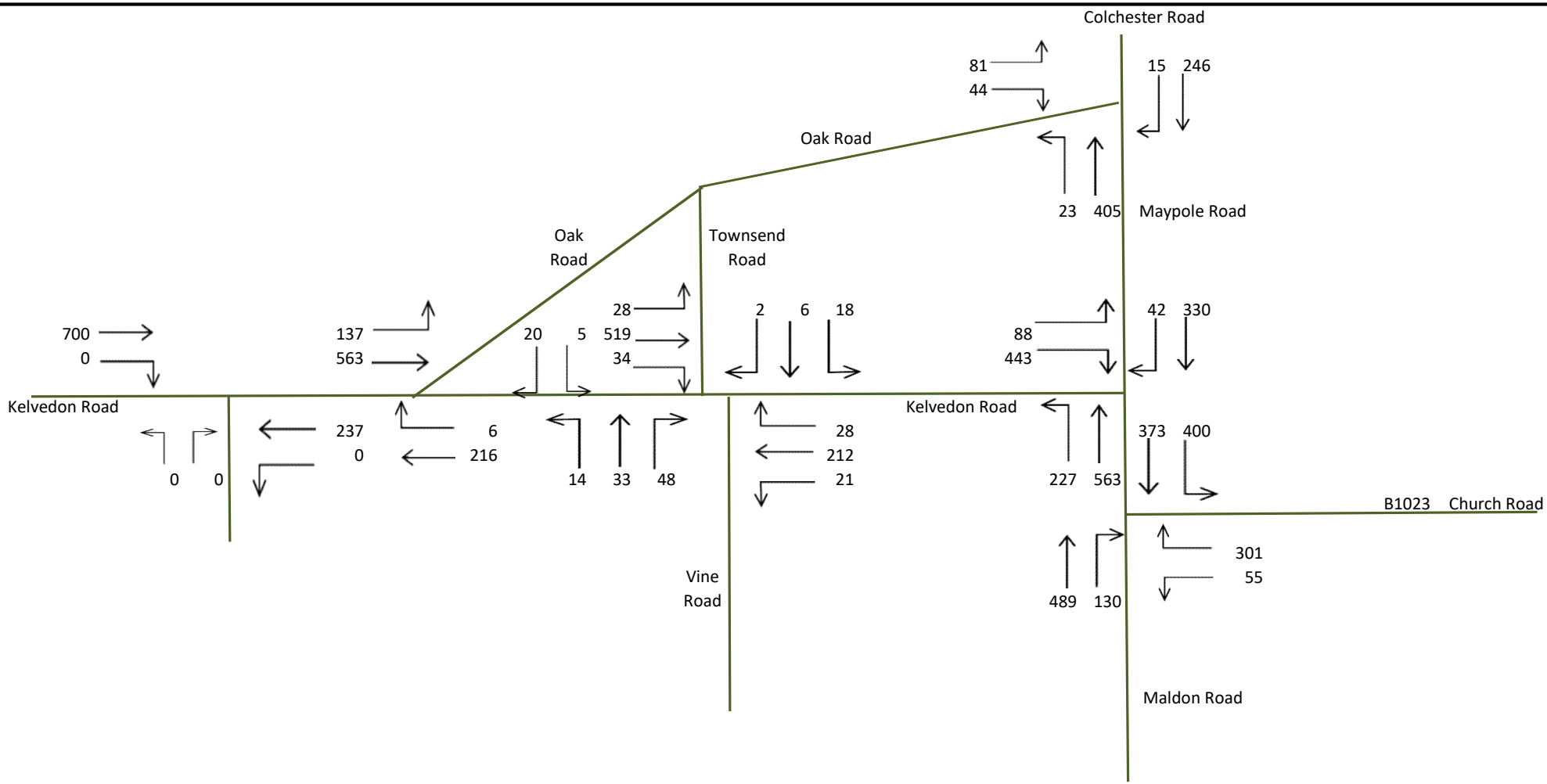
Journey transport planning



Level	Area	Local Growth Figure	
E02004525	Colchester 020	1.073	

Drawing Title	**AM Peak 08:00-09:00 2024 Forecast Flows**	Drawn	SAA
		Date	02/01/2019
Project Title	Land to the South of Kelvedon Road, Tiptree	Ref	Figure 3

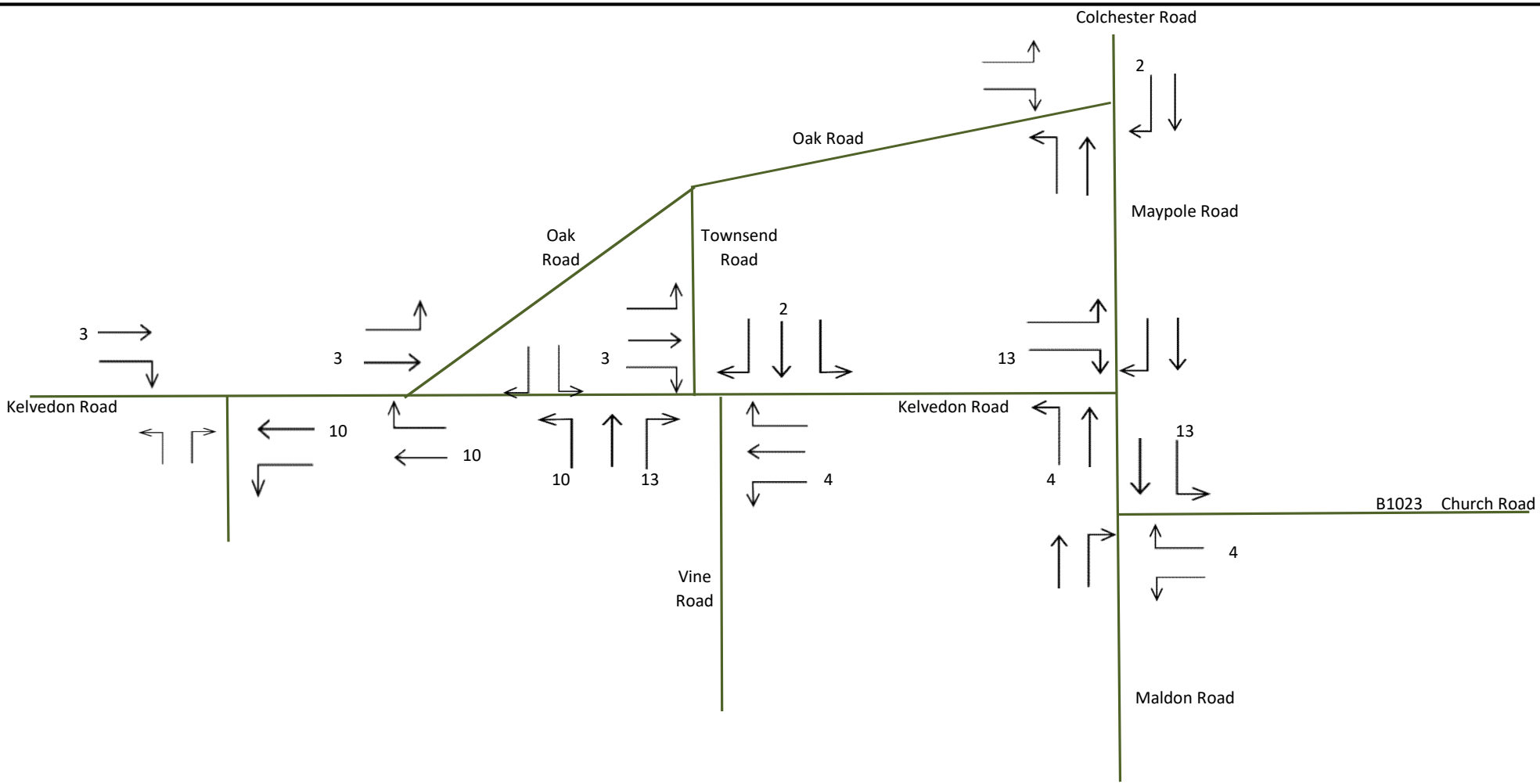
Journey transport planning



Level	Area	Local Growth Figure
E02004525	Colchester 020	1.072

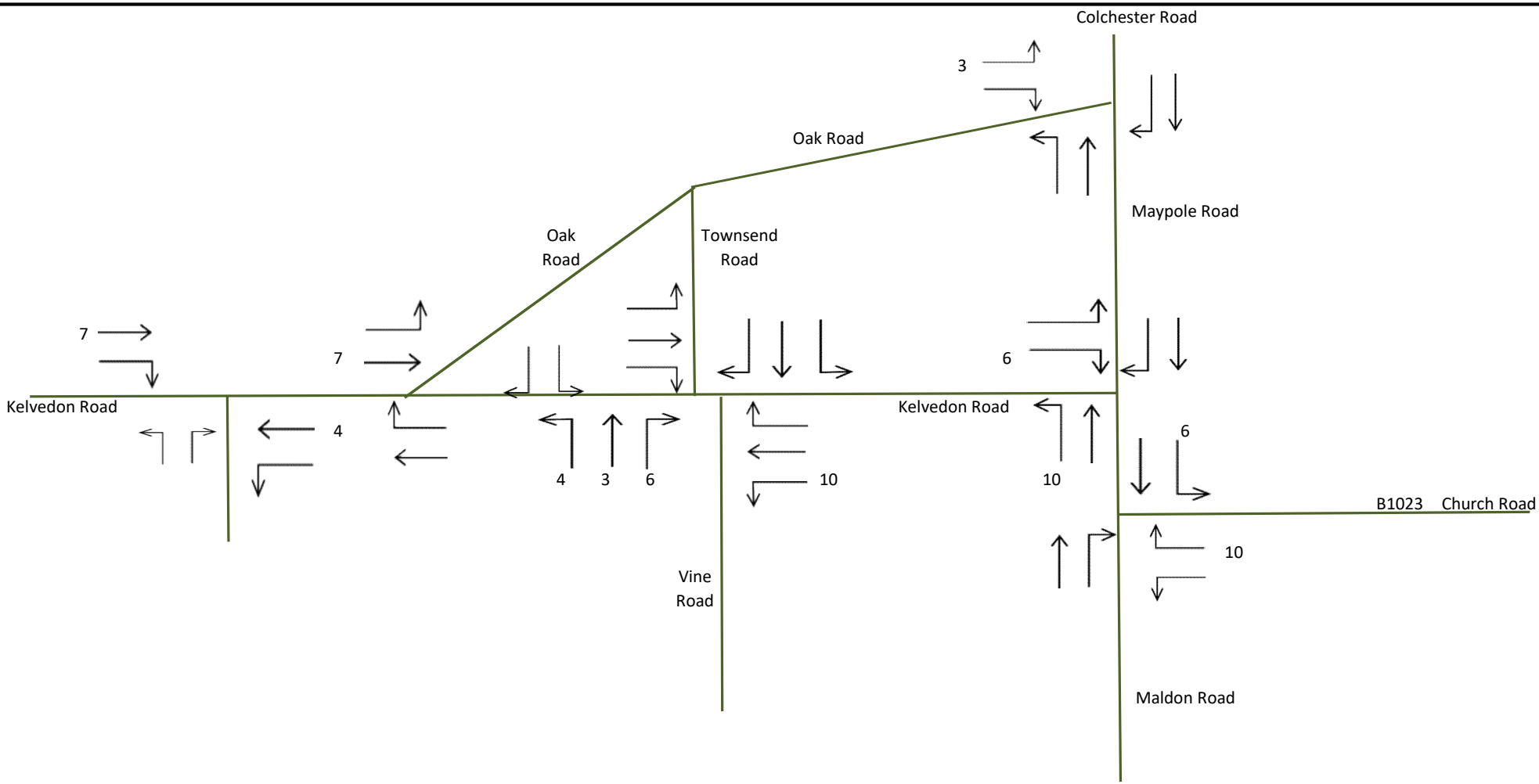
Drawing Title	**PM Peak 17:00-18:00 2024 Forecast Flows**	Drawn	SAA
		Date	02/01/2019
Project Title	Land to the South of Kelvedon Road, Tiptree	Ref	Figure 4

Journey transport planning



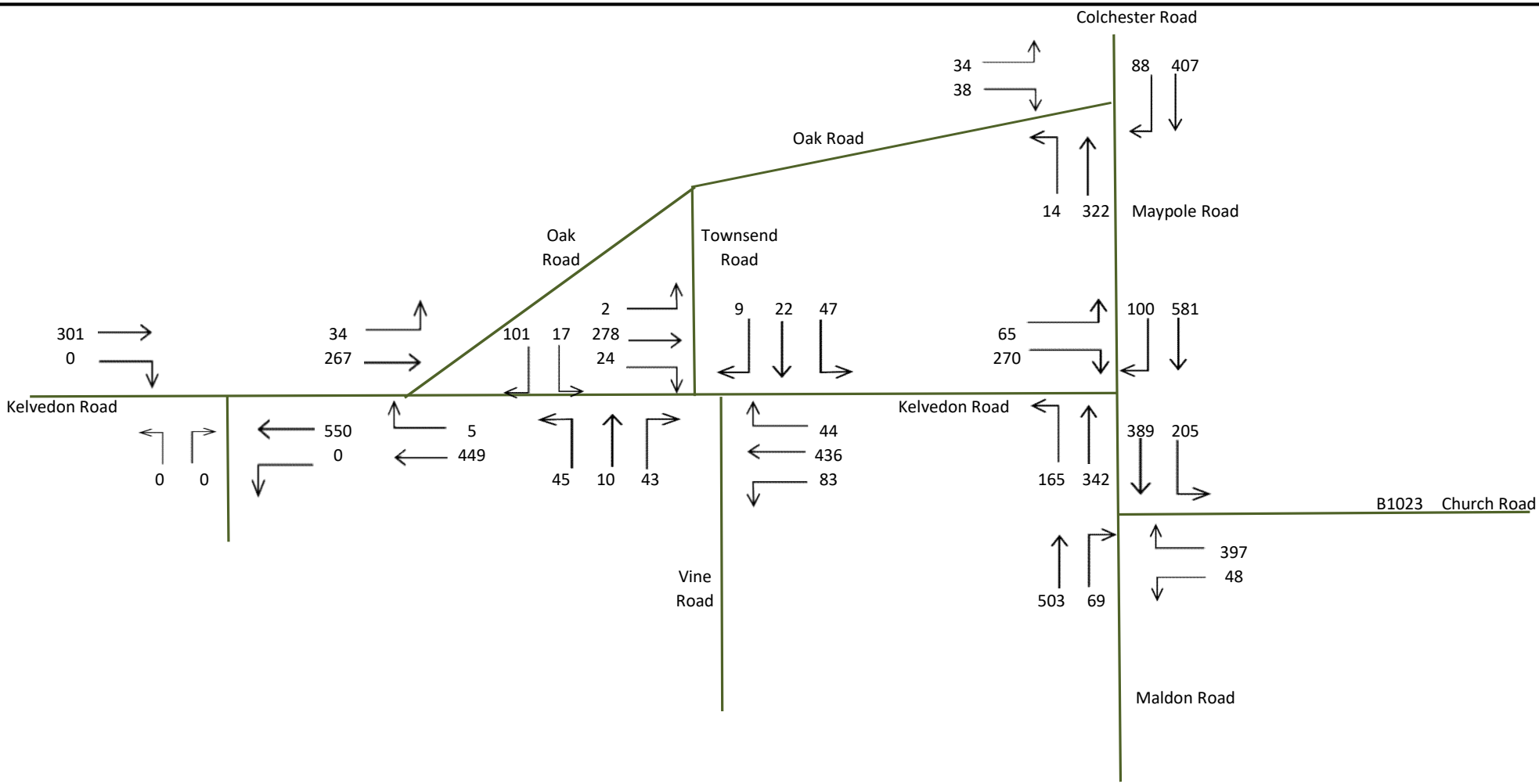
Drawing Title	**AM Peak 08:00-09:00 Committed Development**	Drawn	SAA
		Date	02/01/2019
Project Title	Land to the South of Kelvedon Road, Tiptree	Ref	Figure 5

Journey transport planning



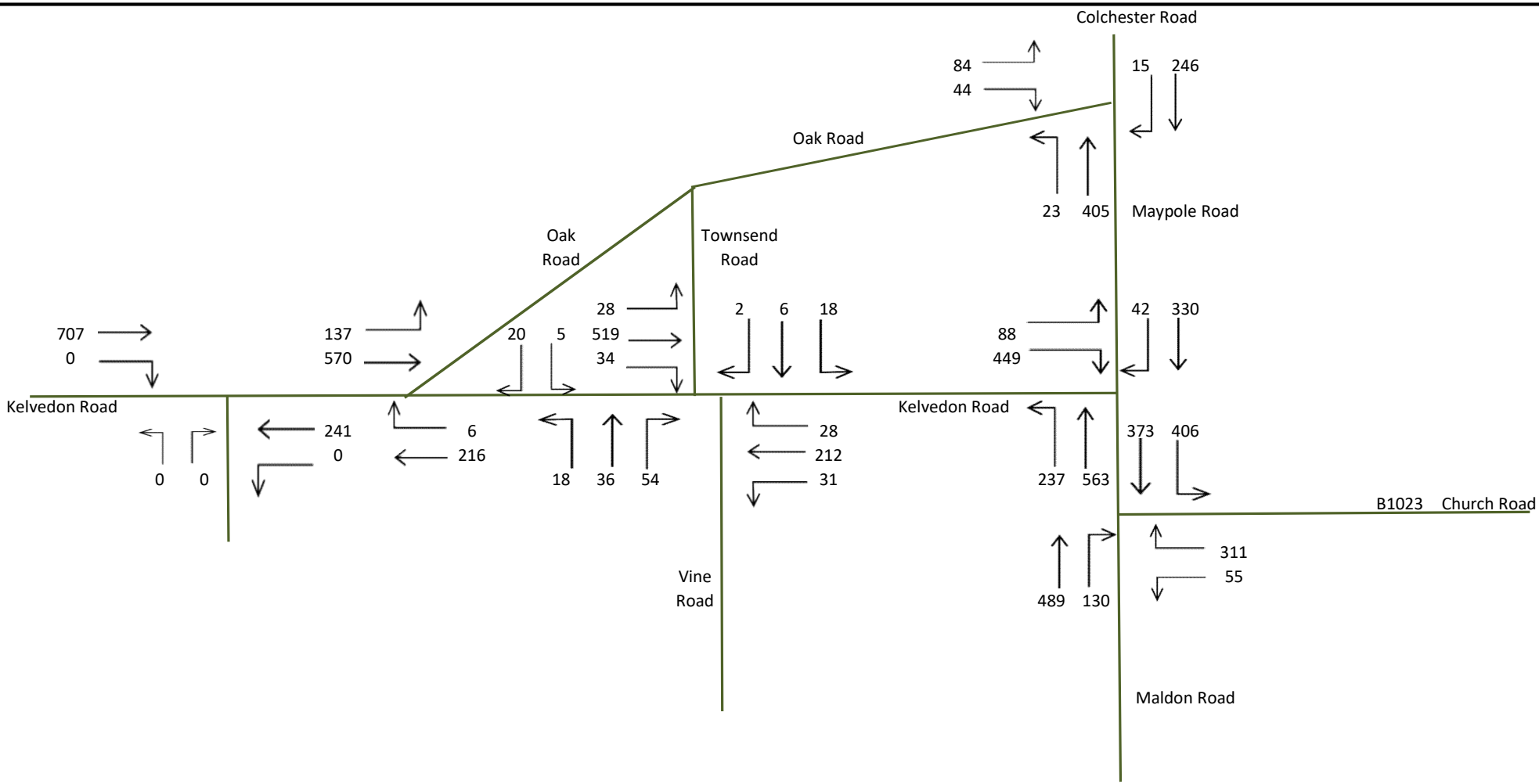
Drawing Title	**PM Peak 17:00-18:00 Committed Development**	Drawn	SAA
		Date	02/01/2019
Project Title	Land to the South of Kelvedon Road, Tiptree	Ref	Figure 6

Journey transport planning



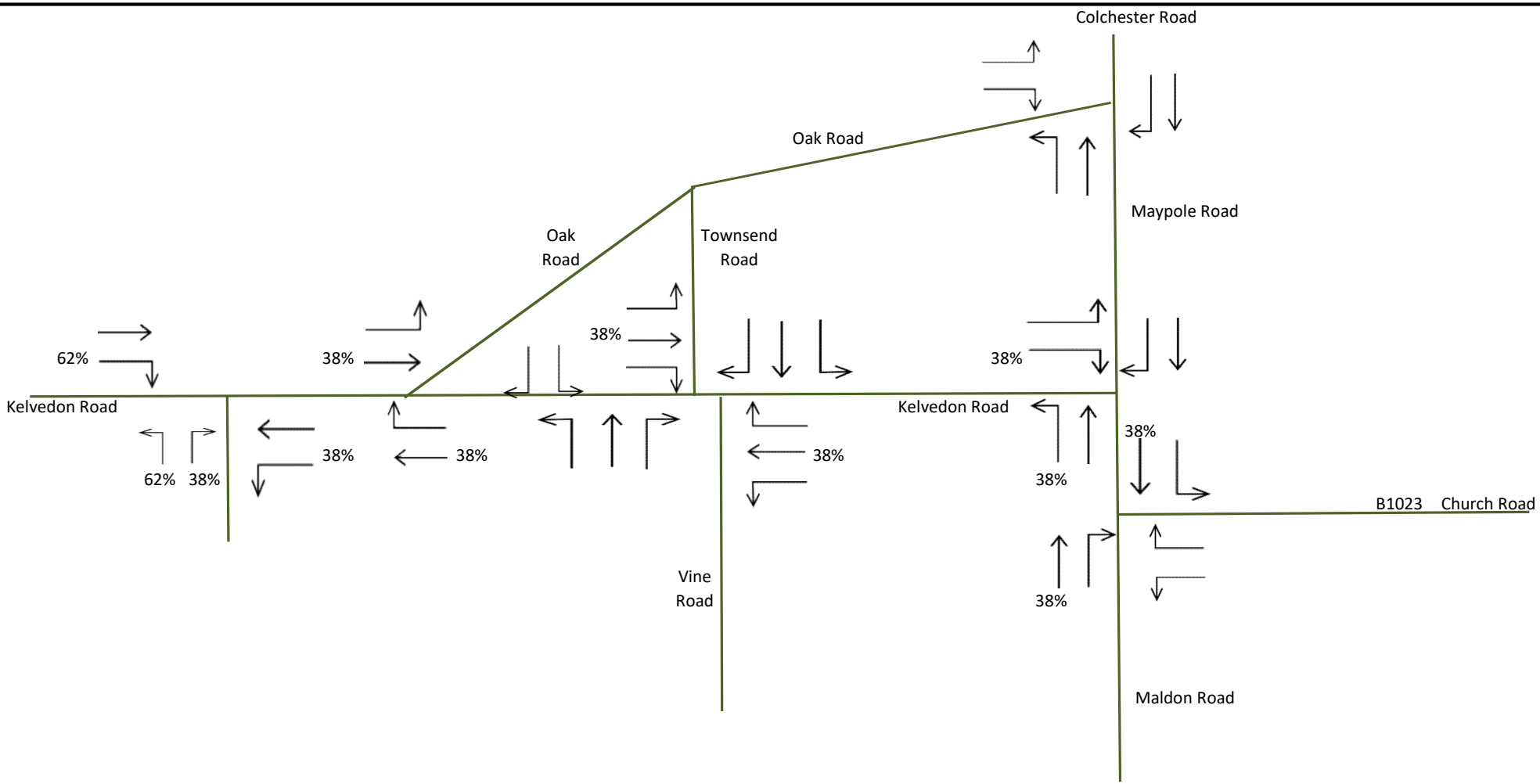
Drawing Title	**AM Peak 08:00-09:00 2024 Base Flows**	Drawn	SAA
		Date	02/01/2019
Project Title	Land to the South of Kelvedon Road, Tiptree	Ref	Figure 7

Journey transport planning



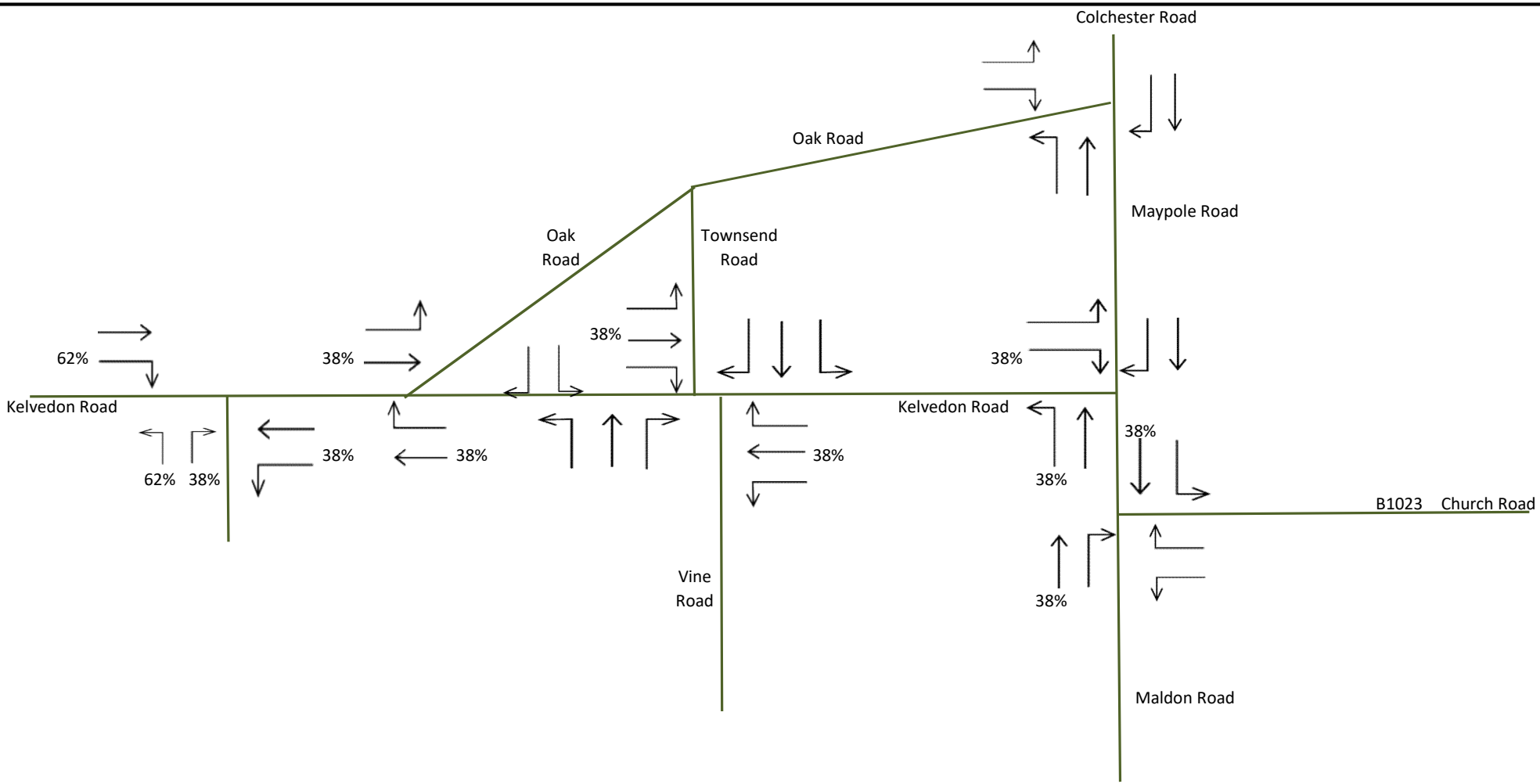
Drawing Title	**PM Peak 17:00-18:00 2024 Base Flows**	Drawn	SAA
		Date	02/01/2019
Project Title	Land to the South of Kelvedon Road, Tiptree	Ref	Figure 8

Journey transport planning



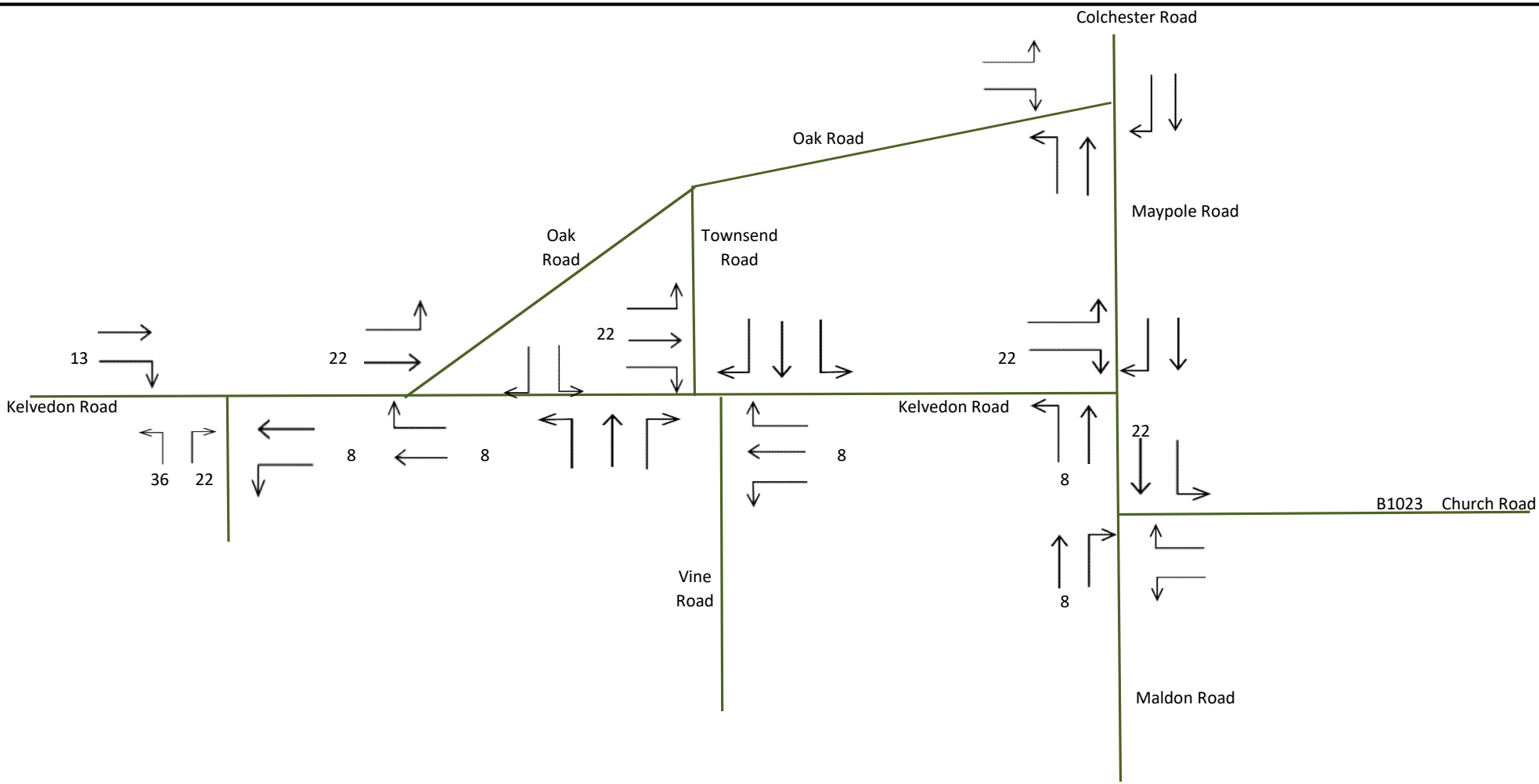
Drawing Title	**AM Peak 08:00-09:00 Residential Trip Distribution**	Drawn	SAA
		Date	02/01/2019
Project Title	Land to the South of Kelvedon Road, Tiptree	Ref	Figure 9

Journey transport planning



Drawing Title	**PM Peak 17:00-18:00 Residential Trip Distribution**	Drawn	SAA
		Date	02/01/2019
Project Title	Land to the South of Kelvedon Road, Tiptree	Ref	Figure 10

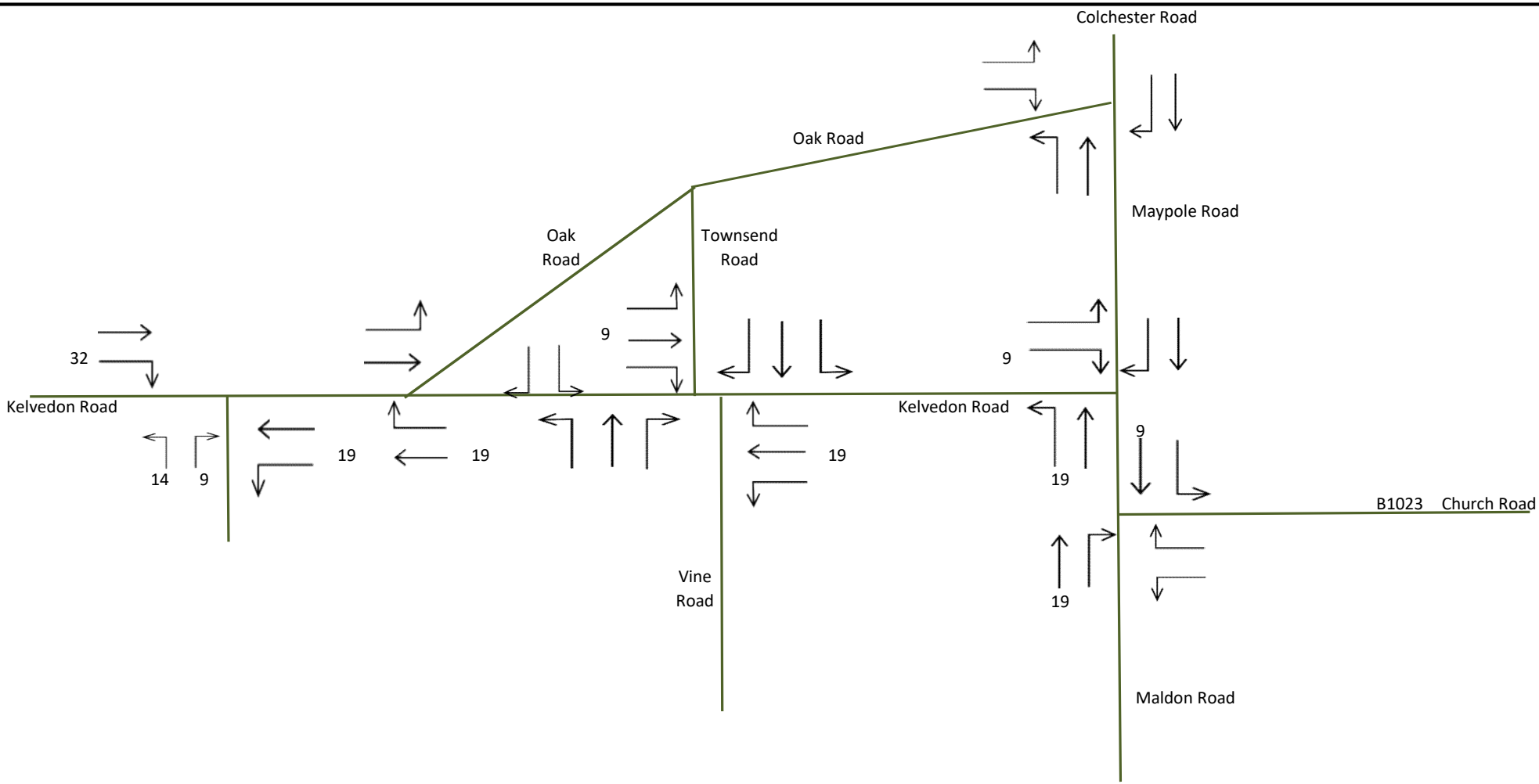
Journey transport planning



Arrivals	21
Departures	58

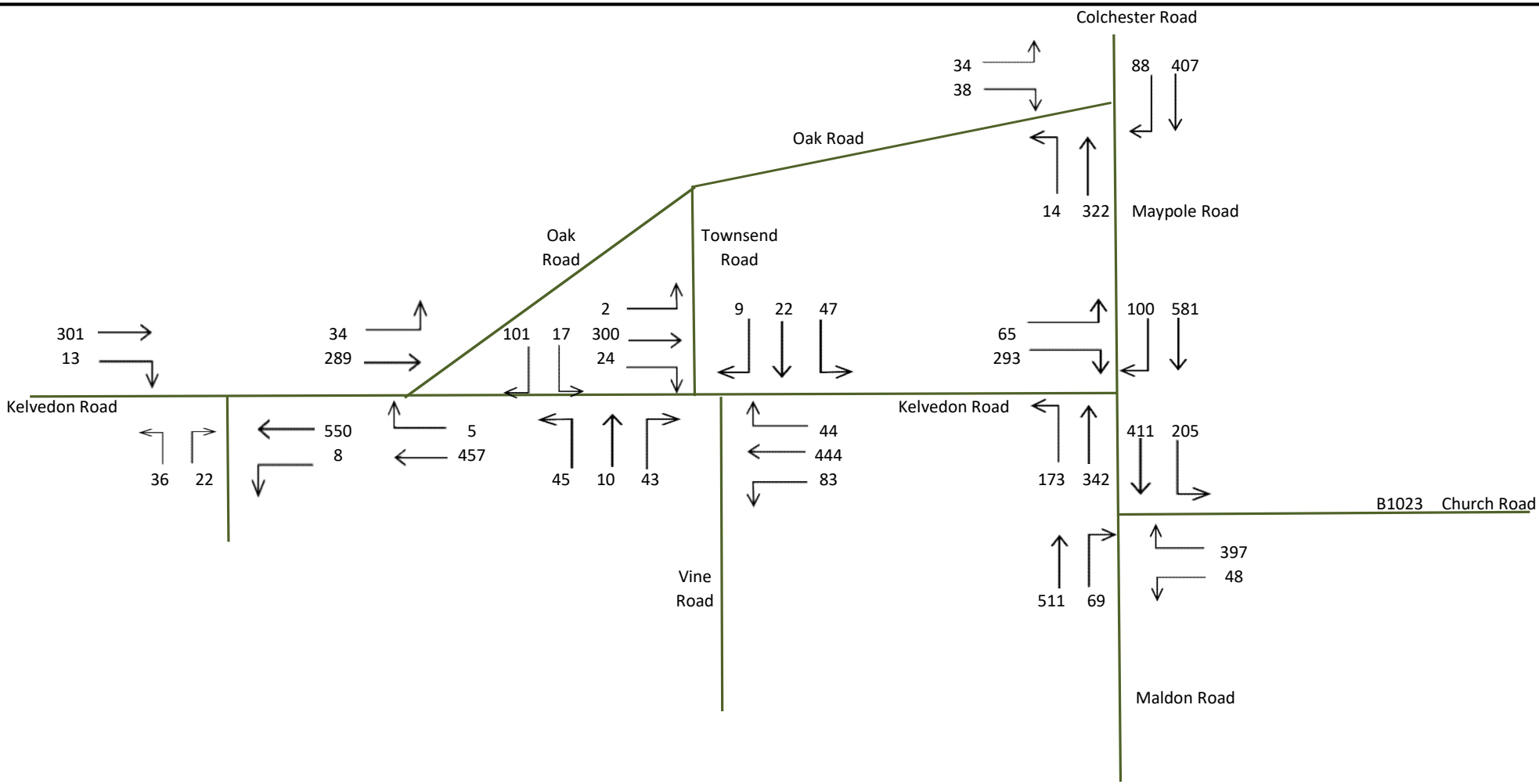
Drawing Title	**AM Peak 08:00-09:00 Residential Trip Generation**	Drawn	SAA
		Date	02/01/2019
Project Title	Land to the South of Kelvedon Road, Tiptree	Ref	Figure 11

Journey transport planning



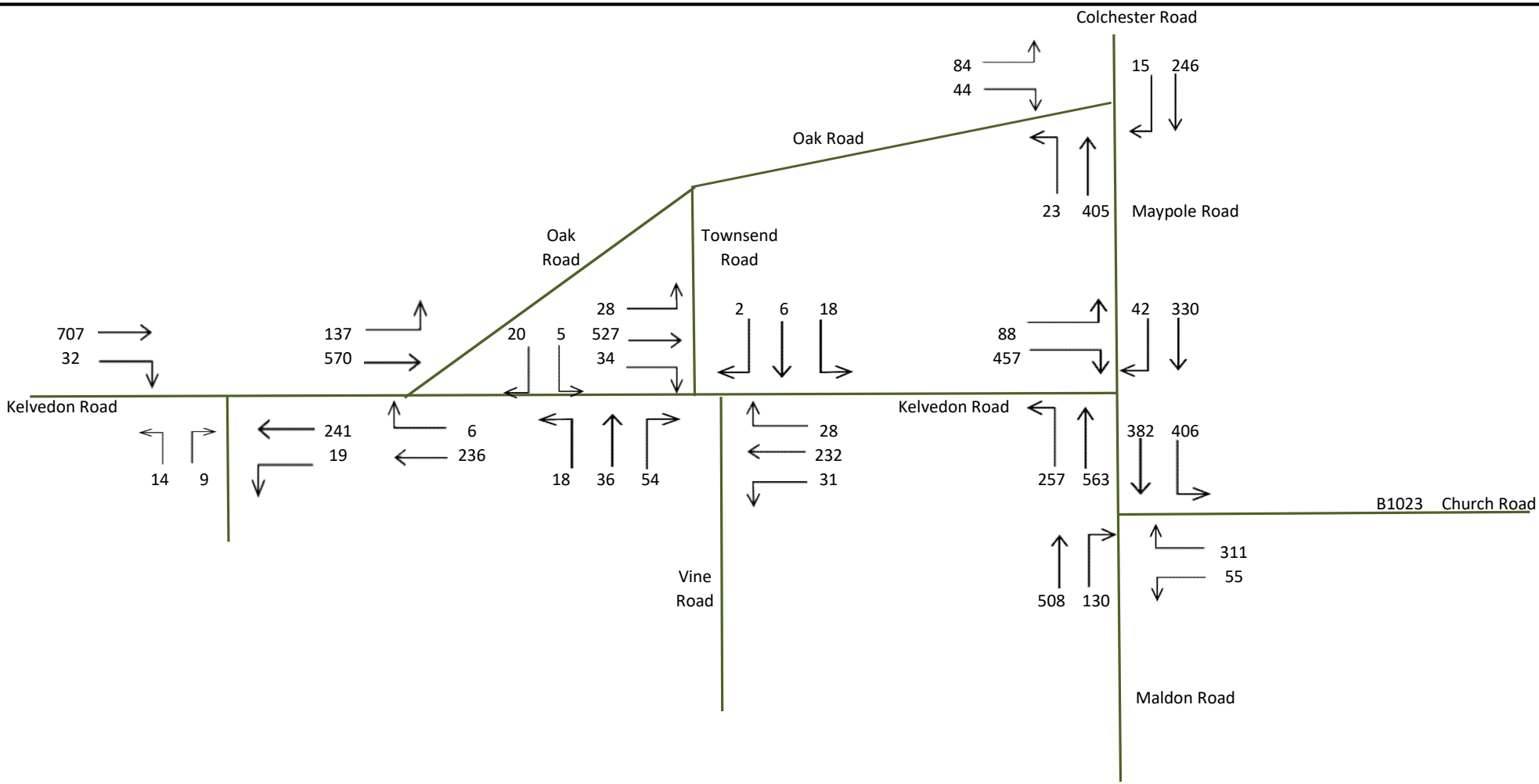
Arrivals	51
Departures	23

Drawing Title	**PM Peak 17:00-18:00 Residential Trip Generation**	Drawn	SAA
		Date	02/01/2019
Project Title	Land to the South of Kelvedon Road, Tiptree	Ref	Figure 12



Drawing Title	**AM Peak 08:00-09:00 2024 Total Trips**	Drawn	SAA
		Date	02/01/2019
Project Title	Land to the South of Kelvedon Road, Tiptree	Ref	Figure 13

Journey transport planning



Drawing Title	**PM Peak 17:00-18:00 2024 Total Trips**	Drawn	SAA
		Date	02/01/2019
Project Title	Land to the South of Kelvedon Road, Tiptree	Ref	Figure 14

Journey transport planning

Appendix 9

Junctions 9 Output

Junctions 9

ARCADY 9 - Roundabout Module

Filename: Double Mini North.j9
Path: C:\Users\Steve\OneDrive\Journey\Projects\002 Project Live\18_099 Kelvedon Road Tiptree Phase 2\05 Calculations
Report generation date: 30/01/2019 17:35:22

Summary of junction performance

	AM					PM				
	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity
	2024 Base									
Arm 1	1.2	7.98	0.53	A	-2 %	4.3	18.40	0.81	C	12 %
Arm 2	0.6	5.88	0.35	A		2.2	13.63	0.67	B	
Arm 3	7.9	40.43	0.90	E	[Arm 3]	1.4	12.75	0.57	B	[Arm 1]
	2024 with development									
Arm 1	1.3	8.12	0.54	A	-4 %	4.9	20.41	0.83	C	10 %
Arm 2	0.7	6.11	0.38	A		2.3	14.04	0.68	B	
Arm 3	9.0	46.20	0.91	E	[Arm 3]	1.5	12.97	0.57	B	[Arm 1]

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	29/01/2019
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	STEVE-PC\Steve
Description	

Units

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

Analysis Options

Mini-roundabout model	Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
JUNCTIONS 9	5.75			✓	Delay	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)	Run automatically
D1	2024 Base	AM	ONE HOUR	07:45	09:15	15	✓
D2	2024 Base	PM	ONE HOUR	16:45	18:15	15	✓
D3	2024 with development	AM	ONE HOUR	07:45	09:15	15	✓
D4	2024 with development	PM	ONE HOUR	16:45	18:15	15	✓

Analysis Set Details

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

2024 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	Maypole Rd N Mini roundabout	Mini-roundabout	1,2,3	22.03	C

Junction Network Options

Driving side	Lighting	Road surface	In London	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	Normal/unknown		-2	Arm 3

Arms

Arms

Arm	Name	Description
1	Link	
2	Kelvedon Road	
3	Maypole Road	

Mini Roundabout Geometry

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
1	3.00	3.00	4.50	6.0	5.00	3.00	0.0	
2	3.00	3.00	6.00	18.0	6.00	3.00	0.0	
3	3.00	3.00	3.30	1.0	8.00	3.00	0.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.622	1122
2	0.664	1292
3	0.596	1014

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)	Run automatically
D1	2024 Base	AM	ONE HOUR	07:45	09:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	507	100.000
2		ONE HOUR	✓	335	100.000
3		ONE HOUR	✓	681	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	165	342
	2	270	0	65
	3	581	100	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		1	2	3
From	1	0	10	10
	2	10	0	10
	3	10	10	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.53	7.98	1.2	A	465	698
2	0.35	5.88	0.6	A	307	461
3	0.90	40.43	7.9	E	625	937

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	382	95	74	1076	0.355	379	635	0.0	0.6	5.665	A
2	252	63	256	1122	0.225	251	198	0.0	0.3	4.537	A
3	513	128	202	894	0.574	507	305	0.0	1.4	10.094	B

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	456	114	89	1067	0.427	455	761	0.6	0.8	6.463	A
2	301	75	307	1089	0.277	301	237	0.3	0.4	5.024	A
3	612	153	242	870	0.704	608	365	1.4	2.5	14.883	B

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	558	140	107	1055	0.529	557	921	0.8	1.2	7.913	A
2	369	92	375	1043	0.354	368	289	0.4	0.6	5.861	A
3	750	187	297	837	0.895	732	447	2.5	7.0	32.916	D

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	558	140	110	1054	0.530	558	934	1.2	1.2	7.981	A
2	369	92	377	1042	0.354	369	291	0.6	0.6	5.879	A
3	750	187	297	837	0.896	746	448	7.0	7.9	40.426	E

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	456	114	93	1064	0.428	457	783	1.2	0.8	6.541	A
2	301	75	309	1087	0.277	302	242	0.6	0.4	5.046	A
3	612	153	243	869	0.704	633	367	7.9	2.8	17.988	C

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	382	95	76	1075	0.355	383	645	0.8	0.6	5.728	A
2	252	63	258	1121	0.225	253	201	0.4	0.3	4.563	A
3	513	128	204	893	0.574	518	307	2.8	1.5	10.686	B

2024 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	Maypole Rd N Mini roundabout	Mini-roundabout	1,2,3	15.67	C

Junction Network Options

Driving side	Lighting	Road surface	In London	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	Normal/unknown		12	Arm 1

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)	Run automatically
D2	2024 Base	PM	ONE HOUR	16:45	18:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	800	100.000
2		ONE HOUR	✓	537	100.000
3		ONE HOUR	✓	372	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	237	563
	2	449	0	88
	3	330	42	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		1	2	3
From	1	0	10	10
	2	10	0	10
	3	10	10	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.81	18.40	4.3	C	734	1101
2	0.67	13.63	2.2	B	493	739
3	0.57	12.75	1.4	B	341	512

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	602	151	31	1103	0.546	597	582	0.0	1.3	7.755	A
2	404	101	420	1013	0.399	401	208	0.0	0.7	6.443	A
3	280	70	336	814	0.344	278	486	0.0	0.6	7.350	A

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	719	180	38	1099	0.655	716	698	1.3	2.0	10.272	B
2	483	121	504	958	0.504	481	250	0.7	1.1	8.288	A
3	334	84	402	775	0.432	333	583	0.6	0.8	8.957	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	881	220	46	1094	0.805	872	852	2.0	4.2	17.238	C
2	591	148	614	885	0.668	587	304	1.1	2.1	13.131	B
3	410	102	491	722	0.567	407	710	0.8	1.4	12.498	B

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	881	220	46	1093	0.806	880	857	4.2	4.3	18.396	C
2	591	148	619	881	0.671	591	307	2.1	2.2	13.628	B
3	410	102	494	720	0.569	409	716	1.4	1.4	12.747	B

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	719	180	38	1099	0.655	728	706	4.3	2.2	10.924	B
2	483	121	512	952	0.507	487	254	2.2	1.2	8.586	A
3	334	84	407	772	0.433	337	592	1.4	0.9	9.151	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	602	151	32	1102	0.546	605	589	2.2	1.3	8.020	A
2	404	101	426	1009	0.401	406	211	1.2	0.7	6.579	A
3	280	70	339	812	0.345	281	493	0.9	0.6	7.473	A

2024 with development, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	Maypole Rd N Mini roundabout	Mini-roundabout	1,2,3	24.35	C

Junction Network Options

Driving side	Lighting	Road surface	In London	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	Normal/unknown		-4	Arm 3

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)	Run automatically
D3	2024 with development	AM	ONE HOUR	07:45	09:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	515	100.000
2		ONE HOUR	✓	358	100.000
3		ONE HOUR	✓	681	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	173	342
	2	293	0	65
	3	581	100	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		1	2	3
From	1	0	10	10
	2	10	0	10
	3	10	10	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.54	8.12	1.3	A	473	709
2	0.38	6.11	0.7	A	329	493
3	0.91	46.20	9.0	E	625	937

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	388	97	74	1076	0.360	385	652	0.0	0.6	5.715	A
2	270	67	256	1122	0.240	268	204	0.0	0.3	4.627	A
3	513	128	219	884	0.580	507	305	0.0	1.5	10.356	B

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	463	116	89	1067	0.434	462	782	0.6	0.8	6.540	A
2	322	80	307	1089	0.296	321	244	0.3	0.5	5.158	A
3	612	153	263	858	0.714	608	365	1.5	2.6	15.567	C

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	567	142	107	1056	0.537	565	944	0.8	1.3	8.048	A
2	394	99	375	1043	0.378	393	297	0.5	0.7	6.088	A
3	750	187	322	822	0.912	729	447	2.6	7.8	36.228	E

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	567	142	109	1054	0.538	567	958	1.3	1.3	8.125	A
2	394	99	377	1042	0.378	394	300	0.7	0.7	6.109	A
3	750	187	323	822	0.912	745	448	7.8	9.0	46.204	E

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	463	116	93	1064	0.435	465	807	1.3	0.9	6.625	A
2	322	80	309	1087	0.296	323	250	0.7	0.5	5.184	A
3	612	153	264	857	0.714	636	367	9.0	2.9	19.645	C

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	388	97	76	1075	0.361	389	663	0.9	0.6	5.777	A
2	270	67	258	1121	0.240	270	207	0.5	0.4	4.657	A
3	513	128	221	883	0.581	518	307	2.9	1.6	11.018	B

2024 with development, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	Maypole Rd N Mini roundabout	Mini-roundabout	1,2,3	16.82	C

Junction Network Options

Driving side	Lighting	Road surface	In London	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	Normal/unknown		10	Arm 1

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)	Run automatically
D4	2024 with development	PM	ONE HOUR	16:45	18:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	820	100.000
2		ONE HOUR	✓	545	100.000
3		ONE HOUR	✓	372	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	257	563
	2	457	0	88
	3	330	42	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		1	2	3
From	1	0	10	10
	2	10	0	10
	3	10	10	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.83	20.41	4.9	C	752	1129
2	0.68	14.04	2.3	B	500	750
3	0.57	12.97	1.5	B	341	512

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	617	154	31	1103	0.560	612	588	0.0	1.4	7.981	A
2	410	103	420	1013	0.405	407	223	0.0	0.7	6.504	A
3	280	70	342	811	0.345	278	486	0.0	0.6	7.399	A

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	737	184	38	1099	0.671	734	705	1.4	2.2	10.757	B
2	490	122	504	958	0.512	488	268	0.7	1.1	8.410	A
3	334	84	410	770	0.434	333	583	0.6	0.8	9.042	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	903	226	46	1094	0.826	893	861	2.2	4.7	18.822	C
2	600	150	613	885	0.678	596	326	1.1	2.2	13.478	B
3	410	102	500	717	0.572	407	709	0.8	1.4	12.699	B

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	903	226	46	1093	0.826	902	866	4.7	4.9	20.405	C
2	600	150	619	881	0.681	600	329	2.2	2.3	14.045	B
3	410	102	503	715	0.573	409	716	1.4	1.5	12.966	B

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	737	184	38	1099	0.671	747	713	4.9	2.3	11.592	B
2	490	122	513	951	0.515	494	272	2.3	1.2	8.743	A
3	334	84	415	767	0.436	337	593	1.5	0.9	9.246	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	617	154	32	1102	0.560	621	595	2.3	1.4	8.283	A
2	410	103	426	1009	0.407	412	226	1.2	0.8	6.651	A
3	280	70	345	808	0.346	281	493	0.9	0.6	7.528	A

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.0.1.4646 []

Filename: Double Mini South.j9
Path: C:\Users\Steve\OneDrive\Journey\Projects\002 Project Live\18_099 Kelvedon Road Tiptree Phase 2\05 Calculations
Report generation date: 30/01/2019 17:46:22

Summary of junction performance

	AM					PM				
	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity
	2024 Base									
Arm 1	1.7	9.40	0.61	A	8 %	5.0	22.06	0.83	C	8 %
Arm 2	1.9	13.91	0.63	B		1.1	10.36	0.51	B	
Arm 3	3.6	21.46	0.78	C	[Arm 3]	3.8	20.80	0.78	C	[Arm 1]
	2024 with development									
Arm 1	1.9	9.97	0.63	A	7 %	5.3	23.27	0.84	C	7 %
Arm 2	2.0	14.65	0.65	B		1.2	10.52	0.52	B	
Arm 3	3.8	22.49	0.79	C	[Arm 3]	4.3	23.25	0.81	C	[Arm 1]

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	29/01/2019
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	STEVE-PC\Steve
Description	

Units

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

Analysis Options

Mini-roundabout model	Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
JUNCTIONS 9	5.75			✓	Delay	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)	Run automatically
D1	2024 Base	AM	ONE HOUR	07:45	09:15	15	✓
D2	2024 Base	PM	ONE HOUR	16:45	18:15	15	✓
D3	2024 with development	AM	ONE HOUR	07:45	09:15	15	✓
D4	2024 with development	PM	ONE HOUR	16:45	18:15	15	✓

Analysis Set Details

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

2024 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	Maypole Rd N Mini roundabout	Mini-roundabout	1,2,3	14.93	B

Junction Network Options

Driving side	Lighting	Road surface	In London	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	Normal/unknown		8	Arm 3

Arms

Arms

Arm	Name	Description
1	Link	
2	Kelvedon Road	
3	Maldon Road	

Mini Roundabout Geometry

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
1	3.00	3.00	4.50	6.0	5.00	3.00	0.0	
2	3.00	3.00	4.00	1.0	6.00	3.00	0.0	
3	3.00	3.00	4.00	3.0	5.00	3.00	0.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.622	1122
2	0.599	1031
3	0.608	1078

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)	Run automatically
D1	2024 Base	AM	ONE HOUR	07:45	09:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	594	100.000
2		ONE HOUR	✓	445	100.000
3		ONE HOUR	✓	572	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	205	389
	2	397	0	48
	3	503	69	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		1	2	3
From	1	0	10	10
	2	10	0	10
	3	10	10	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.61	9.40	1.7	A	545	818
2	0.63	13.91	1.9	B	408	613
3	0.78	21.46	3.6	C	525	787

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	447	112	51	1090	0.410	444	672	0.0	0.8	6.102	A
2	335	84	291	856	0.391	332	205	0.0	0.7	7.517	A
3	431	108	296	897	0.480	427	327	0.0	1.0	8.343	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	534	133	62	1084	0.493	533	806	0.8	1.1	7.170	A
2	400	100	349	822	0.487	399	246	0.7	1.0	9.335	A
3	514	129	356	861	0.597	512	392	1.0	1.6	11.252	B

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	654	164	75	1076	0.608	652	982	1.1	1.7	9.285	A
2	490	122	427	775	0.632	487	300	1.0	1.8	13.588	B
3	630	157	434	814	0.774	622	479	1.6	3.4	19.958	C

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	654	164	76	1075	0.608	654	990	1.7	1.7	9.398	A
2	490	122	428	774	0.633	490	302	1.8	1.9	13.910	B
3	630	157	437	812	0.776	629	481	3.4	3.6	21.464	C

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	534	133	63	1083	0.493	536	819	1.7	1.1	7.277	A
2	400	100	351	820	0.488	403	248	1.9	1.1	9.568	A
3	514	129	360	859	0.599	522	395	3.6	1.7	12.003	B

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	447	112	52	1090	0.410	448	681	1.1	0.8	6.189	A
2	335	84	294	855	0.392	336	207	1.1	0.7	7.663	A
3	431	108	300	895	0.481	433	330	1.7	1.0	8.621	A

2024 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	Maypole Rd N Mini roundabout	Mini-roundabout	1,2,3	19.19	C

Junction Network Options

Driving side	Lighting	Road surface	In London	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	Normal/unknown		8	Arm 1

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)	Run automatically
D2	2024 Base	PM	ONE HOUR	16:45	18:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	779	100.000
2		ONE HOUR	✓	366	100.000
3		ONE HOUR	✓	619	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	406	373
	2	311	0	55
	3	489	130	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		1	2	3
From	1	0	10	10
	2	10	0	10
	3	10	10	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.83	22.06	5.0	C	715	1072
2	0.51	10.36	1.1	B	336	504
3	0.78	20.80	3.8	C	568	852

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	586	147	97	1062	0.552	581	597	0.0	1.3	8.151	A
2	276	69	278	864	0.319	274	400	0.0	0.5	6.685	A
3	466	117	232	936	0.498	462	319	0.0	1.1	8.271	A

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	700	175	116	1050	0.667	697	717	1.3	2.1	11.122	B
2	329	82	334	831	0.396	328	480	0.5	0.7	7.869	A
3	556	139	279	908	0.613	554	383	1.1	1.7	11.102	B

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	858	214	142	1034	0.829	847	873	2.1	4.7	20.109	C
2	403	101	406	788	0.512	401	583	0.7	1.1	10.207	B
3	682	170	341	870	0.783	674	466	1.7	3.6	19.409	C

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	858	214	143	1033	0.830	857	880	4.7	5.0	22.060	C
2	403	101	410	785	0.513	403	589	1.1	1.1	10.361	B
3	682	170	342	870	0.784	681	471	3.6	3.8	20.801	C

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	700	175	119	1049	0.668	711	727	5.0	2.3	12.094	B
2	329	82	341	827	0.398	331	489	1.1	0.7	8.010	A
3	556	139	281	907	0.614	564	390	3.8	1.8	11.817	B

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	586	147	98	1061	0.553	590	605	2.3	1.4	8.474	A
2	276	69	283	861	0.320	276	406	0.7	0.5	6.781	A
3	466	117	235	935	0.498	469	324	1.8	1.1	8.546	A

2024 with development, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	Maypole Rd N Mini roundabout	Mini-roundabout	1,2,3	15.67	C

Junction Network Options

Driving side	Lighting	Road surface	In London	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	Normal/unknown		7	Arm 3

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)	Run automatically
D3	2024 with development	AM	ONE HOUR	07:45	09:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	616	100.000
2		ONE HOUR	✓	445	100.000
3		ONE HOUR	✓	580	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	205	411
	2	397	0	48
	3	511	69	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		1	2	3
From	1	0	10	10
	2	10	0	10
	3	10	10	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.63	9.97	1.9	A	565	848
2	0.65	14.65	2.0	B	408	613
3	0.79	22.49	3.8	C	532	798

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	464	116	51	1090	0.425	461	677	0.0	0.8	6.258	A
2	335	84	307	847	0.396	332	205	0.0	0.7	7.658	A
3	437	109	296	897	0.487	433	343	0.0	1.0	8.446	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	554	138	62	1084	0.511	552	813	0.8	1.1	7.435	A
2	400	100	369	810	0.494	399	246	0.7	1.1	9.600	A
3	521	130	356	861	0.605	519	412	1.0	1.6	11.477	B

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	678	170	75	1076	0.631	675	990	1.1	1.8	9.827	A
2	490	122	451	761	0.644	487	300	1.1	1.9	14.266	B
3	639	160	434	814	0.785	631	503	1.6	3.6	20.759	C

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	678	170	76	1075	0.631	678	999	1.8	1.9	9.969	A
2	490	122	452	760	0.645	490	302	1.9	2.0	14.653	B
3	639	160	437	812	0.786	638	505	3.6	3.8	22.492	C

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	554	138	63	1083	0.511	557	827	1.9	1.2	7.558	A
2	400	100	371	808	0.495	403	248	2.0	1.1	9.864	A
3	521	130	360	859	0.607	530	415	3.8	1.8	12.317	B

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	464	116	52	1090	0.426	465	687	1.2	0.8	6.353	A
2	335	84	310	845	0.397	336	207	1.1	0.7	7.815	A
3	437	109	300	895	0.488	439	347	1.8	1.1	8.740	A

2024 with development, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	Maypole Rd N Mini roundabout	Mini-roundabout	1,2,3	20.66	C

Junction Network Options

Driving side	Lighting	Road surface	In London	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	Normal/unknown		7	Arm 1

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)	Run automatically
D4	2024 with development	PM	ONE HOUR	16:45	18:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	788	100.000
2		ONE HOUR	✓	366	100.000
3		ONE HOUR	✓	638	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	406	382
	2	311	0	55
	3	508	130	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		1	2	3
From	1	0	10	10
	2	10	0	10
	3	10	10	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.84	23.27	5.3	C	723	1085
2	0.52	10.52	1.2	B	336	504
3	0.81	23.25	4.3	C	585	878

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	593	148	97	1062	0.559	588	611	0.0	1.4	8.260	A
2	276	69	285	860	0.320	273	400	0.0	0.5	6.730	A
3	480	120	232	936	0.513	476	326	0.0	1.1	8.515	A

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	708	177	116	1050	0.675	705	733	1.4	2.2	11.368	B
2	329	82	342	826	0.398	328	480	0.5	0.7	7.943	A
3	574	143	279	908	0.632	571	391	1.1	1.8	11.641	B

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	868	217	141	1034	0.839	856	893	2.2	5.0	20.994	C
2	403	101	415	782	0.515	401	582	0.7	1.1	10.355	B
3	702	176	341	870	0.807	693	475	1.8	4.1	21.321	C

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	868	217	143	1033	0.840	866	901	5.0	5.3	23.268	C
2	403	101	420	779	0.517	403	589	1.1	1.2	10.524	B
3	702	176	342	870	0.808	702	481	4.1	4.3	23.253	C

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	708	177	119	1048	0.676	720	745	5.3	2.4	12.473	B
2	329	82	349	821	0.401	331	490	1.2	0.7	8.098	A
3	574	143	281	907	0.632	583	399	4.3	2.0	12.570	B

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	593	148	99	1061	0.559	597	620	2.4	1.4	8.606	A
2	276	69	289	857	0.321	276	406	0.7	0.5	6.827	A
3	480	120	235	935	0.514	483	331	2.0	1.2	8.831	A

Junctions 9

PICADY 9 - Priority Intersection Module

Filename: Oak Road Kelvedon Road.j9
Path: C:\Users\Steve\OneDrive\Journey\Projects\002 Project Live\18_099 Kelvedon Road Tiptree Phase 2\05 Calculations
Report generation date: 30/01/2019 16:51:32

Summary of junction performance

	AM					PM				
	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity
	2024 With Development									
Stream B-AC	0.6	17.31	0.36	C	43 %	0.1	13.70	0.09	B	79 %
Stream C-AB	0.0	7.24	0.01	A	[Stream B-AC]	0.0	8.99	0.01	A	[Stream B-AC]

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	28/01/2019
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	STEVE-PC\Steve
Description	

Units

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

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75			✓	Delay	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)	Run automatically
D1	2024 With Development	AM	ONE HOUR	07:45	09:15	15	✓
D2	2024 With Development	PM	ONE HOUR	16:45	18:15	15	✓

Analysis Set Details

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

2024 With Development, 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	Maypole Road Oak Road	T-Junction	Two-way	2.30	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	43	Stream B-AC

Arms

Arms

Arm	Name	Description	Arm type
A	Kelvedon Road W		Major
B	Oak Road		Minor
C	Kelvedon Road E		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)
C	6.00			100.0	✓	1.00

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	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	3.00	10	10

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	486	0.088	0.224	0.141	0.320
1	B-C	630	0.097	0.244	-	-
1	C-B	632	0.245	0.245	-	-

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 segment length (min)	Run automatically
D1	2024 With Development	AM	ONE HOUR	07:45	09:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	323	100.000
B		ONE HOUR	✓	118	100.000
C		ONE HOUR	✓	462	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	34	289
	B	101	0	17
	C	457	5	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	10	10
	B	10	0	10
	C	10	10	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.36	17.31	0.6	C	108	162
C-AB	0.01	7.24	0.0	A	5	7
C-A					419	629
A-B					31	47
A-C					265	398

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	89	22	405	0.220	88	0.0	0.3	12.450	B
C-AB	4	0.95	576	0.007	4	0.0	0.0	6.920	A
C-A	344	86			344				
A-B	26	6			26				
A-C	218	54			218				

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	106	27	385	0.275	106	0.3	0.4	14.161	B
C-AB	5	1	566	0.008	5	0.0	0.0	7.053	A
C-A	411	103			411				
A-B	31	8			31				
A-C	260	65			260				

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	130	32	359	0.362	129	0.4	0.6	17.196	C
C-AB	6	1	553	0.010	6	0.0	0.0	7.239	A
C-A	503	126			503				
A-B	37	9			37				
A-C	318	80			318				

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	130	32	359	0.362	130	0.6	0.6	17.311	C
C-AB	6	1	553	0.010	6	0.0	0.0	7.242	A
C-A	503	126			503				
A-B	37	9			37				
A-C	318	80			318				

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	106	27	385	0.275	107	0.6	0.4	14.260	B
C-AB	5	1	566	0.008	5	0.0	0.0	7.053	A
C-A	411	103			411				
A-B	31	8			31				
A-C	260	65			260				

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	89	22	404	0.220	89	0.4	0.3	12.580	B
C-AB	4	0.95	576	0.007	4	0.0	0.0	6.923	A
C-A	344	86			344				
A-B	26	6			26				
A-C	218	54			218				

2024 With Development, 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	Maypole Road Oak Road	T-Junction	Two-way	0.41	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	79	Stream B-AC

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)	Run automatically
D2	2024 With Development	PM	ONE HOUR	16:45	18:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	707	100.000
B		ONE HOUR	✓	25	100.000
C		ONE HOUR	✓	242	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	137	570
	B	20	0	5
	C	236	6	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	10	10
	B	10	0	10
	C	10	10	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.09	13.70	0.1	B	23	34
C-AB	0.01	8.99	0.0	A	6	8
C-A					217	325
A-B					126	189
A-C					523	785

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	19	5	378	0.050	19	0.0	0.1	11.013	B
C-AB	5	1	504	0.009	4	0.0	0.0	7.927	A
C-A	178	44			178				
A-B	103	26			103				
A-C	429	107			429				

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	22	6	352	0.064	22	0.1	0.1	12.003	B
C-AB	5	1	480	0.011	5	0.0	0.0	8.346	A
C-A	212	53			212				
A-B	123	31			123				
A-C	512	128			512				

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	28	7	317	0.087	27	0.1	0.1	13.688	B
C-AB	7	2	447	0.015	7	0.0	0.0	8.993	A
C-A	260	65			260				
A-B	151	38			151				
A-C	628	157			628				

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	28	7	317	0.087	28	0.1	0.1	13.699	B
C-AB	7	2	447	0.015	7	0.0	0.0	8.995	A
C-A	260	65			260				
A-B	151	38			151				
A-C	628	157			628				

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	22	6	352	0.064	23	0.1	0.1	12.018	B
C-AB	5	1	480	0.011	5	0.0	0.0	8.348	A
C-A	212	53			212				
A-B	123	31			123				
A-C	512	128			512				

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	19	5	378	0.050	19	0.1	0.1	11.033	B
C-AB	5	1	504	0.009	5	0.0	0.0	7.929	A
C-A	178	44			178				
A-B	103	26			103				
A-C	429	107			429				

Junctions 9

PICADY 9 - Priority Intersection Module

Filename: Oak Road Maypole Road.j9
Path: C:\Users\Steve\OneDrive\Journey\Projects\002 Project Live\18_099 Kelvedon Road Tiptree Phase 2\05 Calculations
Report generation date: 30/01/2019 17:51:50

Summary of junction performance

	AM					PM				
	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity
	2024 With Development									
Stream B-AC	0.3	12.44	0.20	B	79 %	0.5	12.88	0.31	B	70 %
Stream C-AB	0.3	8.31	0.20	A	[Stream B-AC]	0.0	8.51	0.04	A	[Stream B-AC]

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	28/01/2019
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	STEVE-PC\Steve
Description	

Units

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

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75			✓	Delay	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)	Run automatically
D1	2024 With Development	AM	ONE HOUR	07:45	09:15	15	✓
D2	2024 With Development	PM	ONE HOUR	16:45	18:15	15	✓

Analysis Set Details

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

2024 With Development, 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	Maypole Road Oak Road	T-Junction	Two-way	1.92	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	79	Stream B-AC

Arms

Arms

Arm	Name	Description	Arm type
A	Maypole Rd S		Major
B	Oak Road		Minor
C	Colchester Road		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)
C	6.00			0.0	✓	1.00

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	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	3.00	25	25

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	498	0.091	0.229	0.144	0.328
1	B-C	640	0.098	0.248	-	-
1	C-B	574	0.222	0.222	-	-

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 segment length (min)	Run automatically
D1	2024 With Development	AM	ONE HOUR	07:45	09:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	336	100.000
B		ONE HOUR	✓	72	100.000
C		ONE HOUR	✓	495	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	14	322
	B	38	0	34
	C	407	88	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	10	10
	B	10	0	10
	C	10	10	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.20	12.44	0.3	B	66	99
C-AB	0.20	8.31	0.3	A	93	140
C-A					361	542
A-B					13	19
A-C					295	443

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	54	14	450	0.120	54	0.0	0.1	9.971	A
C-AB	72	18	565	0.128	72	0.0	0.2	8.016	A
C-A	300	75			300				
A-B	11	3			11				
A-C	242	61			242				

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	65	16	428	0.151	65	0.1	0.2	10.878	B
C-AB	90	22	574	0.156	89	0.2	0.2	8.165	A
C-A	355	89			355				
A-B	13	3			13				
A-C	289	72			289				

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	79	20	398	0.199	79	0.2	0.3	12.409	B
C-AB	117	29	594	0.197	117	0.2	0.3	8.296	A
C-A	428	107			428				
A-B	15	4			15				
A-C	355	89			355				

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	79	20	398	0.199	79	0.3	0.3	12.437	B
C-AB	117	29	594	0.197	117	0.3	0.3	8.308	A
C-A	428	107			428				
A-B	15	4			15				
A-C	355	89			355				

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	65	16	428	0.151	65	0.3	0.2	10.913	B
C-AB	90	22	574	0.156	90	0.3	0.2	8.186	A
C-A	355	89			355				
A-B	13	3			13				
A-C	289	72			289				

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	54	14	450	0.120	54	0.2	0.2	10.016	B
C-AB	72	18	565	0.128	73	0.2	0.2	8.046	A
C-A	300	75			300				
A-B	11	3			11				
A-C	242	61			242				

2024 With Development, 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	Maypole Road Oak Road	T-Junction	Two-way	2.18	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	70	Stream B-AC

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)	Run automatically
D2	2024 With Development	PM	ONE HOUR	16:45	18:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	428	100.000
B		ONE HOUR	✓	128	100.000
C		ONE HOUR	✓	261	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	23	405
	B	44	0	84
	C	246	15	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	10	10
	B	10	0	10
	C	10	10	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.31	12.88	0.5	B	117	176
C-AB	0.04	8.51	0.0	A	14	21
C-A					225	338
A-B					21	32
A-C					372	557

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	96	24	491	0.196	95	0.0	0.3	9.971	A
C-AB	11	3	508	0.022	11	0.0	0.0	7.967	A
C-A	185	46			185				
A-B	17	4			17				
A-C	305	76			305				

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	115	29	473	0.243	115	0.3	0.3	11.031	B
C-AB	14	3	497	0.028	14	0.0	0.0	8.196	A
C-A	221	55			221				
A-B	21	5			21				
A-C	364	91			364				

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	141	35	448	0.314	140	0.3	0.5	12.842	B
C-AB	17	4	482	0.035	17	0.0	0.0	8.513	A
C-A	270	68			270				
A-B	25	6			25				
A-C	446	111			446				

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	141	35	448	0.314	141	0.5	0.5	12.884	B
C-AB	17	4	482	0.035	17	0.0	0.0	8.513	A
C-A	270	68			270				
A-B	25	6			25				
A-C	446	111			446				

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	115	29	473	0.243	116	0.5	0.4	11.085	B
C-AB	14	3	497	0.028	14	0.0	0.0	8.198	A
C-A	221	55			221				
A-B	21	5			21				
A-C	364	91			364				

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-AC	96	24	491	0.196	97	0.4	0.3	10.040	B
C-AB	11	3	508	0.022	11	0.0	0.0	7.972	A
C-A	185	46			185				
A-B	17	4			17				
A-C	305	76			305				

Junctions 9

ARCADY 9 - Roundabout Module

Filename: Site Access.j9
Path: C:\Users\Steve\OneDrive\Journey\Projects\002 Project Live\18_099 Kelvedon Road Tiptree Phase 2\05 Calculations
Report generation date: 30/01/2019 17:19:34

Summary of junction performance

	AM					PM				
	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity
	2024 Total Development									
Arm 1	1.5	8.67	0.57	A	57 %	0.4	5.12	0.27	A	35 %
Arm 2	0.1	8.26	0.12	A		0.0	5.87	0.04	A	
Arm 3	0.4	4.69	0.29	A	[Arm 1]	2.3	10.30	0.68	B	[Arm 3]

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	29/01/2019
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	STEVE-PC\Steve
Description	

Units

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

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75			✓	Delay	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)	Run automatically
D1	2024 Total Development	AM	ONE HOUR	07:45	09:15	15	✓
D2	2024 Total Development	PM	ONE HOUR	16:45	18:15	15	✓

Analysis Set Details

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

2024 Total Development, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1,2,3	7.30	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	57	Arm 1

Arms

Arms

Arm	Name	Description
1	Kelvedon Road South East	
2	Site Access	
3	Kelvedon Road North 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	3.00	4.00	5.0	14.0	35.0	28.0	
2	2.75	3.00	1.0	12.0	28.0	38.0	
3	3.00	5.40	8.0	12.0	28.0	38.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.521	1078
2	0.461	822
3	0.539	1203

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)	Run automatically
D1	2024 Total Development	AM	ONE HOUR	07:45	09:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	558	100.000
2		ONE HOUR	✓	58	100.000
3		ONE HOUR	✓	314	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	8	550
	2	22	0	36
	3	301	13	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		1	2	3
From	1	0	10	10
	2	10	0	10
	3	10	10	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.57	8.67	1.5	A	512	768
2	0.12	8.26	0.1	A	53	80
3	0.29	4.69	0.4	A	288	432

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	420	105	10	1073	0.391	417	242	0.0	0.7	6.011	A
2	44	11	411	633	0.069	43	16	0.0	0.1	6.714	A
3	236	59	16	1194	0.198	235	438	0.0	0.3	4.127	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	502	125	12	1072	0.468	501	290	0.7	1.0	6.913	A
2	52	13	493	595	0.088	52	19	0.1	0.1	7.292	A
3	282	71	20	1192	0.237	282	526	0.3	0.3	4.350	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	614	154	14	1071	0.574	612	355	1.0	1.4	8.597	A
2	64	16	604	544	0.117	64	23	0.1	0.1	8.237	A
3	346	86	24	1190	0.291	345	643	0.3	0.4	4.687	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	614	154	14	1071	0.574	614	356	1.4	1.5	8.669	A
2	64	16	606	543	0.118	64	23	0.1	0.1	8.257	A
3	346	86	24	1190	0.291	346	645	0.4	0.4	4.691	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	502	125	12	1072	0.468	504	291	1.5	1.0	6.988	A
2	52	13	496	594	0.088	52	19	0.1	0.1	7.315	A
3	282	71	20	1192	0.237	283	529	0.4	0.3	4.358	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	420	105	10	1073	0.391	421	243	1.0	0.7	6.081	A
2	44	11	415	631	0.069	44	16	0.1	0.1	6.744	A
3	236	59	17	1194	0.198	237	442	0.3	0.3	4.139	A

2024 Total Development, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1,2,3	8.88	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	35	Arm 3

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)	Run automatically
D2	2024 Total Development	PM	ONE HOUR	16:45	18:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	260	100.000
2		ONE HOUR	✓	23	100.000
3		ONE HOUR	✓	739	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	19	241
	2	9	0	14
	3	707	32	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		1	2	3
From	1	0	10	10
	2	10	0	10
	3	10	10	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.27	5.12	0.4	A	239	358
2	0.04	5.87	0.0	A	21	32
3	0.68	10.30	2.3	B	678	1017

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	196	49	24	1066	0.184	195	535	0.0	0.2	4.541	A
2	17	4	181	739	0.023	17	38	0.0	0.0	5.484	A
3	556	139	7	1199	0.464	553	191	0.0	0.9	6.090	A

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	234	58	29	1063	0.220	233	642	0.2	0.3	4.770	A
2	21	5	216	723	0.029	21	46	0.0	0.0	5.639	A
3	664	166	8	1198	0.554	663	229	0.9	1.3	7.370	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	286	72	35	1060	0.270	286	785	0.3	0.4	5.112	A
2	25	6	265	700	0.036	25	56	0.0	0.0	5.865	A
3	814	203	10	1197	0.680	810	280	1.3	2.3	10.124	B

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	286	72	35	1060	0.270	286	788	0.4	0.4	5.117	A
2	25	6	265	700	0.036	25	56	0.0	0.0	5.867	A
3	814	203	10	1197	0.680	814	281	2.3	2.3	10.304	B

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	234	58	29	1063	0.220	234	647	0.4	0.3	4.777	A
2	21	5	217	722	0.029	21	46	0.0	0.0	5.642	A
3	664	166	8	1198	0.554	668	230	2.3	1.4	7.517	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1	196	49	24	1066	0.184	196	541	0.3	0.2	4.555	A
2	17	4	182	739	0.023	17	38	0.0	0.0	5.488	A
3	556	139	7	1199	0.464	558	192	1.4	1.0	6.195	A

Junctions 9

PICADY 9 - Priority Intersection Module

Filename: Townsend Stagger.j9
Path: C:\Users\Steve\OneDrive\Journey\Projects\002 Project Live\18_099 Kelvedon Road Tiptree Phase 2\05 Calculations
Report generation date: 30/01/2019 16:30:07

Summary of junction performance

	AM					PM				
	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity
	2024 With Development									
Stream B-ACD	0.4	14.61	0.28	B	53 % [Stream B-ACD]	0.4	13.46	0.29	B	67 % [Stream B-ACD]
Stream AB-CD	0.2	7.47	0.11	A		0.2	9.38	0.16	A	
Stream D-ABC	0.2	10.43	0.18	B		0.1	10.14	0.07	B	
Stream CD-AB	0.1	8.75	0.11	A		0.1	7.23	0.08	A	

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	28/01/2019
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	STEVE-PC\Steve
Description	

Units

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

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75			✓	Delay	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)	Run automatically
D1	2024 With Development	AM	ONE HOUR	07:45	09:15	15	✓
D2	2024 With Development	PM	ONE HOUR	16:45	18:15	15	✓

Analysis Set Details

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

2024 With Development, 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	Kelvedon Rd Townsend Rd Stagger	Left-Right Stagger	Two-way	1.60	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	53	Stream B-ACD

Arms

Arms

Arm	Name	Description	Arm type
A	Kelvedon Road E		Major
B	Grange Road		Minor
C	Kelvedon Road W		Major
D	Townsend Road		Minor

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)
A	6.00			50.0	✓	1.00
C	6.00			55.0	✓	1.00

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	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	3.00	10	10
D	One lane	2.20	10	10

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B
1	AB-D	603	-	-	-	-	-	0.234	0.234	0.234	-	-
1	B-A	486	0.088	0.224	0.224	-	-	0.141	0.320	-	0.141	0.320
1	B-CD	630	0.097	0.244	0.244	-	-	-	-	-	-	-
1	CD-B	606	0.235	0.235	0.235	-	-	-	-	-	-	-
1	D-AB	580	-	-	-	-	-	0.225	0.225	0.089	-	-
1	D-C	447	-	0.129	0.294	0.129	0.294	0.206	0.206	0.081	-	-

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 segment length (min)	Run automatically
D1	2024 With Development	AM	ONE HOUR	07:45	09:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	563	100.000
B		ONE HOUR	✓	98	100.000
C		ONE HOUR	✓	304	100.000
D		ONE HOUR	✓	78	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	83	436	44
	B	43	0	45	10
	C	278	24	0	2
	D	47	22	9	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		A	B	C	D
From	A	0	10	10	10
	B	10	0	10	10
	C	10	10	0	10
	D	10	10	10	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-ACD	0.28	14.61	0.4	B	90	135
A-B					76	114
A-C					400	600
A-D					40	61
AB-CD	0.11	7.47	0.2	A	55	82
AB-C					436	654
D-ABC	0.18	10.43	0.2	B	72	107
C-D					2	3
C-A					255	383
C-B					22	33
CD-AB	0.11	8.75	0.1	A	45	68
CD-A					295	443

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-ACD	74	18	437	0.169	73	0.0	0.2	10.841	B
A-B	62	16			62				
A-C	328	82			328				
A-D	33	8			33				
AB-CD	43	11	583	0.074	43	0.0	0.1	7.320	A
AB-C	359	90			359				
D-ABC	59	15	497	0.118	58	0.0	0.1	9.010	A
C-D	2	0.38			2				
C-A	209	52			209				
C-B	18	5			18				
CD-AB	36	9	528	0.068	36	0.0	0.1	8.044	A
CD-A	243	61			243				

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-ACD	88	22	413	0.213	88	0.2	0.3	12.164	B
A-B	75	19			75				
A-C	392	98			392				
A-D	40	10			40				
AB-CD	53	13	588	0.090	53	0.1	0.1	7.406	A
AB-C	428	107			428				
D-ABC	70	18	484	0.145	70	0.1	0.2	9.562	A
C-D	2	0.45			2				
C-A	250	62			250				
C-B	22	5			22				
CD-AB	44	11	518	0.085	44	0.1	0.1	8.351	A
CD-A	289	72			289				

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-ACD	108	27	379	0.285	107	0.3	0.4	14.549	B
A-B	91	23			91				
A-C	480	120			480				
A-D	48	12			48				
AB-CD	68	17	598	0.113	68	0.1	0.2	7.469	A
AB-C	521	130			521				
D-ABC	86	21	466	0.184	86	0.2	0.2	10.412	B
C-D	2	0.55			2				
C-A	306	77			306				
C-B	26	7			26				
CD-AB	56	14	508	0.110	56	0.1	0.1	8.747	A
CD-A	352	88			352				

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-ACD	108	27	379	0.285	108	0.4	0.4	14.607	B
A-B	91	23			91				
A-C	480	120			480				
A-D	48	12			48				
AB-CD	68	17	598	0.113	68	0.2	0.2	7.473	A
AB-C	521	130			521				
D-ABC	86	21	466	0.184	86	0.2	0.2	10.425	B
C-D	2	0.55			2				
C-A	306	77			306				
C-B	26	7			26				
CD-AB	56	14	508	0.110	56	0.1	0.1	8.752	A
CD-A	353	88			353				

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-ACD	88	22	413	0.213	89	0.4	0.3	12.229	B
A-B	75	19			75				
A-C	392	98			392				
A-D	40	10			40				
AB-CD	53	13	588	0.090	53	0.2	0.1	7.414	A
AB-C	428	107			428				
D-ABC	70	18	484	0.145	70	0.2	0.2	9.577	A
C-D	2	0.45			2				
C-A	250	62			250				
C-B	22	5			22				
CD-AB	44	11	518	0.085	44	0.1	0.1	8.359	A
CD-A	290	72			290				

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-ACD	74	18	437	0.169	74	0.3	0.2	10.918	B
A-B	62	16			62				
A-C	328	82			328				
A-D	33	8			33				
AB-CD	43	11	583	0.074	43	0.1	0.1	7.332	A
AB-C	360	90			360				
D-ABC	59	15	497	0.118	59	0.2	0.1	9.041	A
C-D	2	0.38			2				
C-A	209	52			209				
C-B	18	5			18				
CD-AB	36	9	528	0.068	36	0.1	0.1	8.060	A
CD-A	243	61			243				

2024 With Development, 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	Kelvedon Rd Townsend Rd Stagger	Left-Right Stagger	Two-way	1.44	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	67	Stream B-ACD

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)	Run automatically
D2	2024 With Development	PM	ONE HOUR	16:45	18:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	271	100.000
B		ONE HOUR	✓	108	100.000
C		ONE HOUR	✓	581	100.000
D		ONE HOUR	✓	26	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	31	212	28
	B	54	0	18	36
	C	519	34	0	28
	D	18	6	2	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		A	B	C	D
From	A	0	10	10	10
	B	10	0	10	10
	C	10	10	0	10
	D	10	10	10	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-ACD	0.29	13.46	0.4	B	99	149
A-B					28	43
A-C					195	292
A-D					26	39
AB-CD	0.16	9.38	0.2	A	63	94
AB-C					207	310
D-ABC	0.07	10.14	0.1	B	24	36
C-D					26	39
C-A					476	714
C-B					31	47
CD-AB	0.08	7.23	0.1	A	40	60
CD-A					490	735

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-ACD	81	20	458	0.178	80	0.0	0.2	10.461	B
A-B	23	6			23				
A-C	160	40			160				
A-D	21	5			21				
AB-CD	50	12	521	0.096	49	0.0	0.1	8.385	A
AB-C	171	43			171				
D-ABC	20	5	466	0.042	19	0.0	0.0	8.854	A
C-D	21	5			21				
C-A	391	98			391				
C-B	26	6			26				
CD-AB	32	8	586	0.054	31	0.0	0.1	7.132	A
CD-A	403	101			403				

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-ACD	97	24	439	0.221	97	0.2	0.3	11.547	B
A-B	28	7			28				
A-C	191	48			191				
A-D	25	6			25				
AB-CD	61	15	511	0.119	61	0.1	0.2	8.799	A
AB-C	203	51			203				
D-ABC	23	6	447	0.052	23	0.0	0.1	9.354	A
C-D	25	6			25				
C-A	467	117			467				
C-B	31	8			31				
CD-AB	39	10	589	0.066	39	0.1	0.1	7.191	A
CD-A	480	120			480				

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-ACD	119	30	413	0.288	118	0.3	0.4	13.416	B
A-B	34	9			34				
A-C	233	58			233				
A-D	31	8			31				
AB-CD	77	19	500	0.155	77	0.2	0.2	9.365	A
AB-C	246	61			246				
D-ABC	29	7	419	0.068	29	0.1	0.1	10.139	B
C-D	31	8			31				
C-A	571	143			571				
C-B	37	9			37				
CD-AB	49	12	597	0.082	49	0.1	0.1	7.229	A
CD-A	586	147			586				

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-ACD	119	30	413	0.288	119	0.4	0.4	13.463	B
A-B	34	9			34				
A-C	233	58			233				
A-D	31	8			31				
AB-CD	78	19	500	0.155	78	0.2	0.2	9.377	A
AB-C	246	61			246				
D-ABC	29	7	419	0.068	29	0.1	0.1	10.144	B
C-D	31	8			31				
C-A	571	143			571				
C-B	37	9			37				
CD-AB	49	12	597	0.082	49	0.1	0.1	7.232	A
CD-A	586	147			586				

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-ACD	97	24	439	0.221	98	0.4	0.3	11.605	B
A-B	28	7			28				
A-C	191	48			191				
A-D	25	6			25				
AB-CD	61	15	511	0.120	62	0.2	0.2	8.816	A
AB-C	203	51			203				
D-ABC	23	6	447	0.052	23	0.1	0.1	9.361	A
C-D	25	6			25				
C-A	467	117			467				
C-B	31	8			31				
CD-AB	39	10	589	0.066	39	0.1	0.1	7.195	A
CD-A	480	120			480				

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-ACD	81	20	458	0.178	82	0.3	0.2	10.530	B
A-B	23	6			23				
A-C	160	40			160				
A-D	21	5			21				
AB-CD	50	13	521	0.096	50	0.2	0.1	8.412	A
AB-C	171	43			171				
D-ABC	20	5	466	0.042	20	0.1	0.0	8.866	A
C-D	21	5			21				
C-A	391	98			391				
C-B	26	6			26				
CD-AB	32	8	586	0.054	32	0.1	0.1	7.139	A
CD-A	403	101			403				