

Client:

O'Flynn Construction Unlimited Company



Project:

Proposed Residential Development at
Spa Glen, Mallow, Co. Cork.

Report:

Traffic and Transport Assessment



Document Control Sheet

Client:	O'Flynn Construction
Project Title:	Proposed Residential Development at Spa Glen, Mallow, Co. Cork
Document Title:	Traffic and Transport Assessment
File Name:	22201-JBB-XX-XX-RP-CR-00011_Traffic_and_Transport_Assessment

Table of Contents <i>(incl. Y/N)</i>	List of Tables <i>(incl. Y/N)</i>	List of Figures <i>(incl. Y/N)</i>	Pages of Text <i>(No.)</i>	Appendices <i>(No.)</i>
Y	N	N	59	3

Document Revision				Document Verification			
Issue Date <i>(DD/MM/YY)</i>	Revision Code	Suitability Code	Author <i>(Initials)</i>	Checker <i>(Initials)</i>	Reviewer <i>As Per PMP (Initials)</i>	Approver <i>As Per PMP (Initials)</i>	Peer Review <i>(Initials or N/A)</i>
Add hyperlink to Verification Email on PIM Register for each issue							
26.08.22	P01	S03	TD / KCL	KCL / TD	TF	TF	N/A
29.08.22	P02	S03	TD / KCL	KCL / TD	TF	TF	N/A
06.10.22	P03	S03	TD / KCL	KCL / TD	TF	TF	N/A
25.04.23	P04	S03	TD / KCL	KCL / TD	TF	TF	N/A
18.10.23	P05	S03	TD / KCL	KCL / TD	TF	TF	N/A
25.10.23	P06	S03	TD / KCL	KCL / TD	TF	TF	N/A
27.10.23	P07	S03	TD / KCL	KCL / TD	TF	TF	N/A
01.02.24	P08	S03	TD / KCL	KCL / TD	TF	TF	N/A
06.02.24	C01	A1	TD / KCL	KCL / TD	TF	TF	N/A

Table of Contents

SECTION 1:	INTRODUCTION	1
	1.1 Background	1
	1.2 Objectives	2
	1.3 Methodology	2
SECTION 2:	RECEIVING ENVIRONMENT	4
	2.1 Site Location	4
	2.2 Local Road Network	4
	2.3 Public Transport	7
	2.4 Future Transport Infrastructure Projects	7
SECTION 3:	BASE YEAR 2024 – TRAFFIC VOLUMES	10
	3.1 Traffic Survey Data	10
	3.2 Base Year 2024 – Junction Capacity	13
SECTION 4:	PROPOSED DEVELOPMENT	18
	4.1 Proposed Schedule of Accommodation	18
	4.2 Proposed Access Arrangement	18
	4.3 Proposed N72 / L5331 Signalised Junction	19
	4.4 Proposed Site Layout	20
	4.5 Proposed Parking Provision	20
SECTION 5:	TRIP GENERATION, ASSIGNMENT AND DISTRIBUTION	22
	5.1 Trip Generation – Operational Stage	22
	5.2 Traffic Forecasting	23
	5.3 Future M20 and N72/N73 to N20 Mallow Relief Road Traffic Impact	24
	5.4 Modal Split	24
	5.5 Trip Assignment	26
	5.6 Trip Distribution	26
	5.7 Trip Generation – Construction Stage	29
SECTION 6:	ASSESSMENT	31
	6.1 Road Network Impact – Junction Capacity	31
	6.2 Operational Phase 2026 Opening Year – Junction Capacity	31
	6.3 Operational Phase 2041 Design Year – Junction Capacity	37
	6.4 Possible Future Toucan Crossing Impact	45
	6.5 Site Access and Layout Assessment	51
	6.6 Parking Assessment	51
	6.7 Public Transport Assessment	52
	6.8 Access for People with Disabilities	53
	6.9 Servicing Arrangements	54
	6.10 Construction Stage Assessment	54
SECTION 7:	MITIGATION MEASURES	55
	7.1 Proposed Public Road Improvement Works at N72/L5331 Junction	55
	7.2 Construction Traffic Management Plan	55
	7.3 Public Road Improvement Projects	55
	7.4 Connections to Active Travel Routes and Public Transport Infrastructure ..	56
SECTION 8:	SUMMARY & CONCLUSION	57
APPENDIX A: TRAFFIC SURVEY DATA USED IN THE ASSESSMENT		
APPENDIX B: TRICS OUTPUT FILES		
APPENDIX C: SAMPLE OF JUNCTION CAPACITY OUTPUT FILES		

SECTION 1: INTRODUCTION

1.1 Background

J.B. Barry and Partners Limited are commissioned by O'Flynn Construction to undertake a Traffic and Transport Assessment in support of a Large-Scale Residential Development (LRD) planning submission for a residential development at Spa Glen, Mallow, Co. Cork.

The proposed development will consist of the construction of 186 new residential units and a creche. Vehicular access will be provided from the L5331 immediately to the north of the site. A new footpath and cycle route will be provided along the southern side of the L5331. It is proposed to include cycle routes through the development with public road crossings located to suit Cork County Council's planned Active Travel/Greenway routes in the area. It is also proposed to improve the adjacent uncontrolled N72/L5331 junction to a signalised junction.

The proposed development site is bounded by the N72 to the south, by the L5331 to the north and to the west. The site is surrounded by housing estates to the north and east (some under construction) and by agricultural land to the south. Refer to **Figure 1.1**.

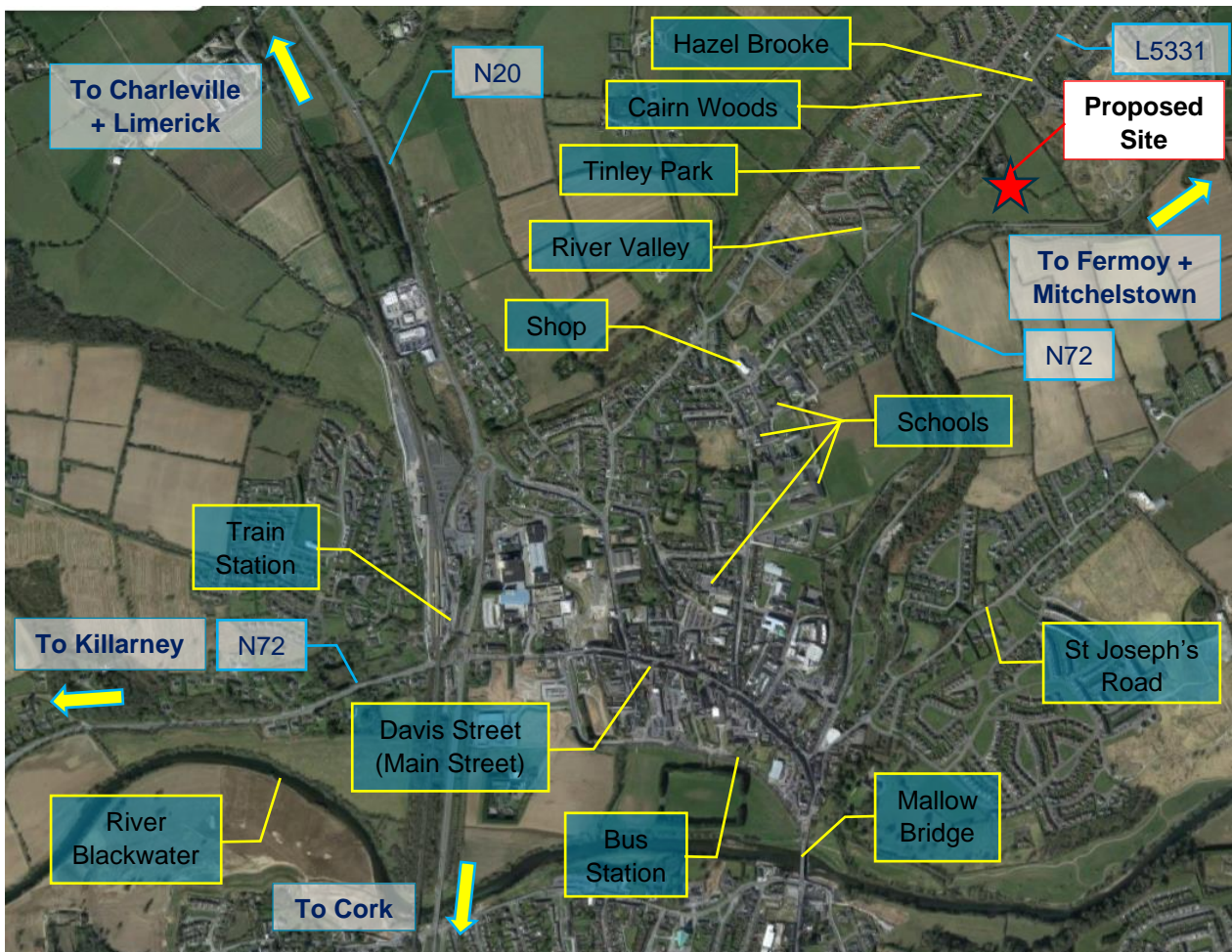


Figure 1.1: Location of Proposed Development (Source: Google Maps, annotation by J.B. Barry & Partners)

Following feedback from Cork County Council in their formal Opinion related to a pre-planning submission, this TTA takes account of:

- Moving a proposed uncontrolled shared crossing of the L5331 further north of the proposed signalisation of the existing N72 / L5331 junction to reduce its impact and also to address a desire line for pedestrians

to/from Mallow and the proposed development using the existing public footpath network. Refer to N-72 / L-5331 Proposed Signalised Junction Layout And Visibility Improvements Drg. No. 22201-JBB-XX-XX-DR-CR-00058.

- Assessing what the future impact this crossing would have on the proposed N72 / L5331 signalised junction if this proposed uncontrolled crossing was upgraded to a Toucan crossing in the future to coincide with the construction of planned future active travel/greenway routes in close proximity to the site.
- Encouraging a modal shift away from vehicular trips by way of more “hard measures” to influence vehicle demand.

In support of this planning application and in accordance with the TII's 'Design Phase Procedure for Road Safety Improvement Schemes, Urban Renewal Schemes and Local Improvement Schemes' (DN-GEO-03030), a Design Report was also submitted to the TII in respect to the proposed improvements of the N72 Signalised Junction. This Design Report is currently being considered by the TII.

The design of the N72 / L5331 signalised junction is in accordance with the 'The Geometric Layout of Signal-Controlled Junctions and Signalised Roundabouts' standard (TII: DN-GEO-03044 Jan 2005) and has been discussed and agreed in principle with Cork County Council and the Cork National Roads Design Office. Refer to Section 4.3 of this TTA for further design details.

1.2 Objectives

This report provides an assessment of the potential traffic impacts associated with the proposed development. In this regard the assessment aims to:

- Identify the existing environment in terms of traffic and transportation;
- Quantify the likely vehicle traffic flows to and from the proposed development;
- Identify and quantify the likely traffic impacts on the surrounding road network; and
- Identify suitable measures to mitigate against any traffic and transportation impacts.

The assessment is based on the findings of site visits, traffic observations, traffic count data, architectural plans, and discussions with Cork County Council, the Cork National Roads Office and the Applicant's design team.

1.3 Methodology

Prior to undertaking this TTA, a Scoping Document outlining the scope and extent of this TTA was agreed with Cork County Council.

The methodology adopted for this report is summarised as follows:

- Reference is made to site layout issued by the project architect and the proposed plans for the site;
- An inspection of the local road network was undertaken;
- Proposed access arrangements for the development are considered;
- Previous historical and recently commissioned traffic survey data was collected in order to estimate current traffic volumes on the surrounding road network at proposed site access points and at nearby junctions;
- The TRICS database and count data at existing residential developments in the immediate area are assessed to estimate the trip generation for the proposed development;
- Traffic volumes on the surrounding road network are analysed; and
- Impacts arising during the construction stage are assessed and mitigations proposed.

In preparing this assessment, reference has been made to the following documents:

- TII Traffic and Transport Assessment Guidelines (PE-PDV-02045, May 2014);
- TII Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections (PE-PAG-02017 October 2021);
- Cork County Development Plan 2022-2028;
- Design Manual for Urban Roads and Streets (DMURS); and
- Cycle Design Manual (September 2023).

SECTION 2: RECEIVING ENVIRONMENT

2.1 Site Location

The proposed development site is located off the L-5331 in the townland of Spa Glen, Mallow, Co. Cork as shown in **Figure 2.1** below.

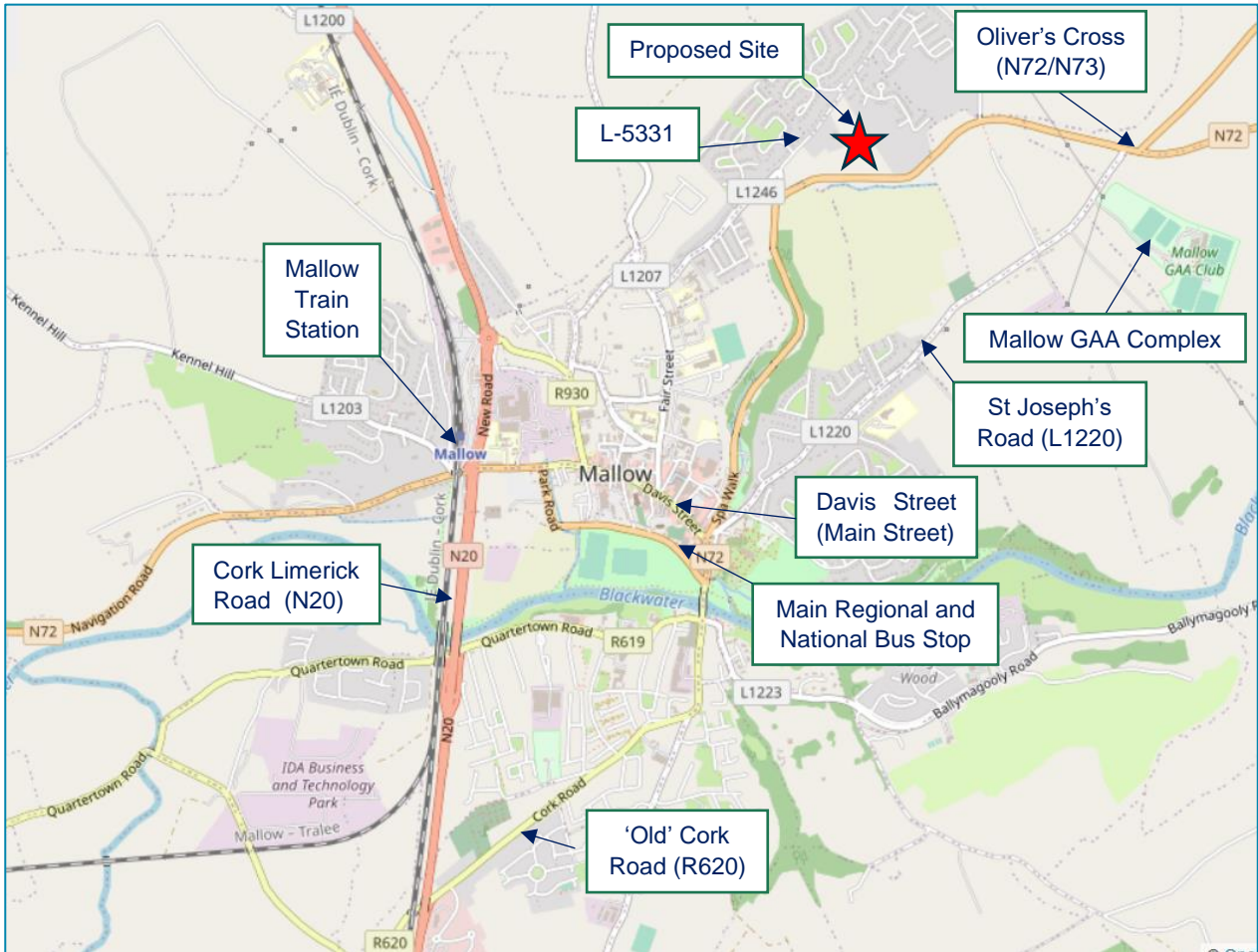


Figure 2.1 – Development Location (source: openstreetmap.org, annotation by JB Barry & Partners)

The site is bounded to the northwest by the L-5331, to the west by a section of the Ballylough Road (also the L-5331), to the south by the 'Fermoy Road' (N72) and to the east by Hazel Brooke housing estate. The site is a green field site currently used for agricultural purposes and has gated access from the L-5331. The site is zoned for residential development. Refer to planning documentation and architect's plans for a more detailed description of the proposed development.

2.2 Local Road Network

The local road network in the vicinity of the subject site is illustrated in **Figure 2.1**. From its junction with the N72 the L5331 is within an 50kph speed limit zone until the entrance to the Clonmore development where the speed zone changes to 60kph for eastbound traffic. The N72 south into Mallow Town and east to Oliver's Cross is in an 80 kph speed limit zone.

The existing and proposed accesses are from the L-5331. Over the past 20 years or so, the L-5331 has been improved in conjunction with the planning and construction of several local housing estates. It has a 6.0m wide carriageway with public lighting and a 2.0m wide footpath along its northern side (**Figure 2.2**). It

has no footpath along its southern side in front of the site but it does have a footpath along its southern side in front of recent developments further to the northeast at Clonmore and Hazelbrook.



Figure 2.2 – ‘Spa Glen Road’ (L-5331 (site on the left))

The L-5531 links the site to Ballyvinitter to the northeast and to the Ballylough Road (L-1246) and N72 to the southwest. A short section of the L-5531 extends from its junction with The Ballylough Road (L-1246) to its junction with the N72. This section of road also has a 6.0m wide carriageway with public lighting and a 2.0m wide footpath along its western side. Refer to **Figure 2.3**.



Figure 2.3 – L5331 (site on the right))

Ballylough Road (L-1246) has a carriageway width of approximately 6.0m with public lighting and a 2.0 wide footpath along its southern side. Refer to **Figure 2.4**. Ballylough Road (L-1246) links the site from its junction with Spa Glen to the north of Mallow Town and onto the Cork - Limerick Road (N20). It also provides access to many of the schools located in Mallow Town namely:

- Patrician Academy Boys Secondary School;
- St Mary’s Girls Secondary School;
- Scoil Íosagáin National School; and
- Mallow Convent Girls National School.

Ballylough Road provides access to the nearest small supermarket and filling station (i.e. Dano’s Centra).



Figure 2.4 – Ballylough Road (L-1246, looking towards its junction with Spa Glen)

The Fermoy Road (N72) to the south of the proposed development has a carriageway width of approximately 6.0m with a 0.3m wide hard strip on both sides of the road. Refer to **Figure 2.5**. The N72 is a national road between Killarney and Dungarvan via Mallow and Fermoy. It also provides the main access route to Mallow Town from the east and forms a junction with the Mitchelstown Road (N72) at Oliver's Cross. The N72 is a busy national road and is the main source of traffic flow associated within Mallow Town at the Clock Tower junction with Mallow main street (Davis Street) and at its junction with Mallow Bridge. The N72 provides direct access to the east and south of Mallow Town and to the main Cork – Limerick Road (N20). The N72 provides access via Mallow Bridge (R620) to schools such as St Gobnait's National School and Davis College. It provides access to Tesco, Lidl, Aldi and Dano's Centra supermarkets and several local shops, businesses and filling stations.



Figure 2.5 – Fermoy Road (N72 with site on the right)

2.3 Public Transport

The subject site is not currently serviced directly by public transport. Refer to **Figure 2.6**.

The nearest bus stop is located on Park Road (Stop No. 631060) which is circa 1.8km (21-minute walk) from the site. This is the main bus stop for Mallow Town and is served by the following routes:

- Route 51: Parnell Place, Cork City to Mallow to Eyre Square, Galway
- Route 243: Parnell Place, Cork City to Mallow to Newmarket, Co. Cork
- Route 522: Mallow to Charleville, Co. Cork
- Route 523: Mallow to Mitchelstown, Co. Cork via the N72 (passing the site)

Mallow Train Station is located adjacent to the N20 / N72 Roundabout which can be accessed via a pedestrian bridge over the N20. It is 2.3km (27-minute walk) from the site. A frequent commuter train service is available to Cork City (including Cobh and Midleton) combined with other regular national services to Dublin, Tralee, Limerick (Galway and Waterford).

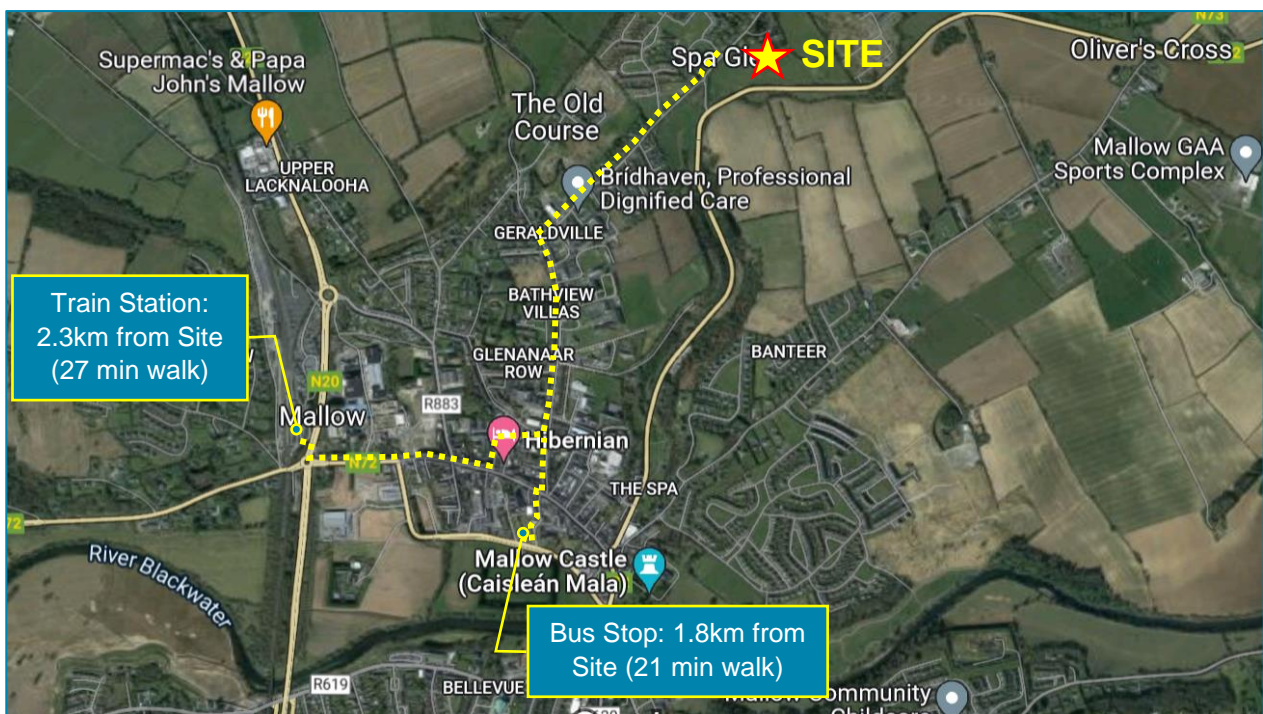


Figure 2.6 –Nearby Public Transport in Mallow Town

2.4 Future Transport Infrastructure Projects

The main future transport infrastructure projects which are relevant to this site are:

- N/M20 Cork to Limerick Road Improvement Scheme; and
- N72/N73 to N20 Mallow Relief Road including online and offline active travel routes.

2.4.1 N/M20 Cork to Limerick Road Improvement Scheme

The N/M20 Cork to Limerick Road Improvement Scheme is a key element in Project Ireland 2040. A consultation process was held in 2020 / 2021 that received significant public feedback on a number of road-based and rail-based options proposed and the suggested active travel strategy. Following consideration of the public feedback and detailed appraisal, a preferred transport solution has been identified that includes active travel infrastructure for walking and cycling, improvements to public transport, new and improved safe

road infrastructure and environmental integration for communities along the N20 transport corridor between Cork and Limerick. The Emerging Preferred Route Corridor at Mallow Town is shown on **Figure 2.7**.

Even though no timeline has been confirmed to deliver the N/M 20 Cork to Limerick project, it was identified as a priority investment in the Government's National Development Plan 2021-2030.

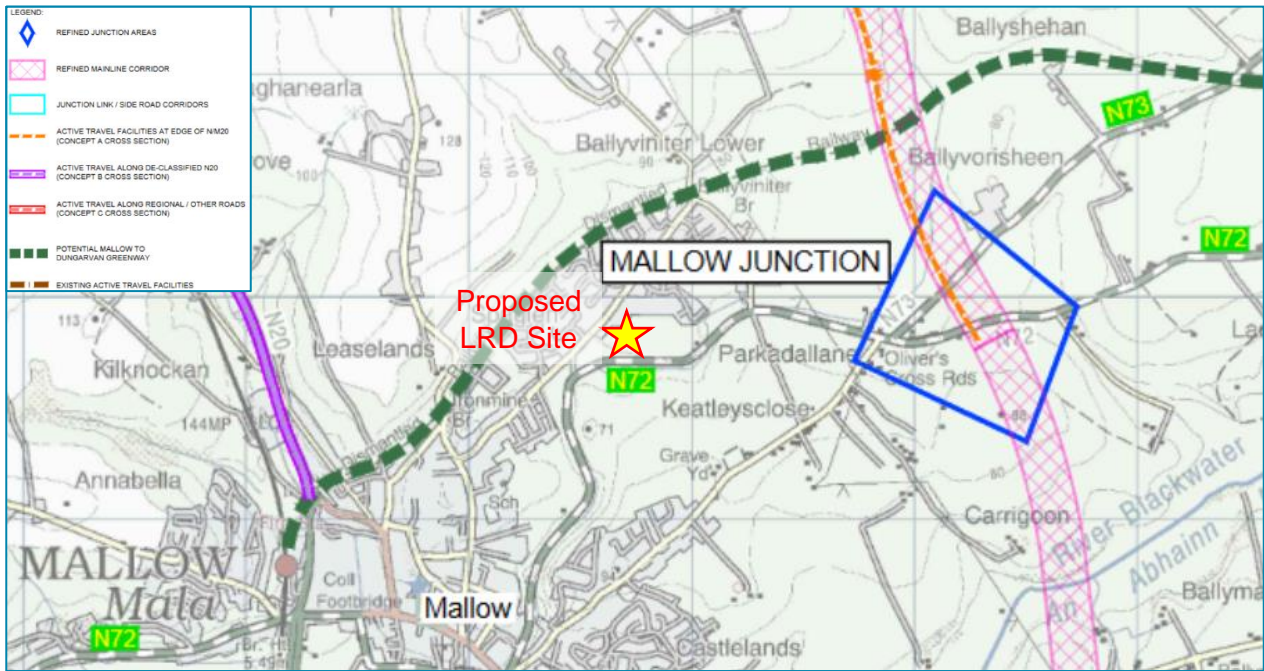


Figure 2.7 – N/M20 Emerging Preferred Route Corridor at Mallow Town

2.4.2 N72/N73 to N20 Mallow Relief Road

A preferred route has emerged for a northern bypass of Mallow Town, and the project will include a cycleway connection to Mallow Train Station. The Preferred Route Option C will extend from a new junction close to Mallow General Hospital east to Ballyvinter Lower, and extend further southeast to Oliver's Cross, where it will connect with the N72 and N73 (Mallow-Fermoy and Mallow-Mitchelstown roads). There will be no other junctions on the route and bridges will be constructed over local roads. Refer to **Figure 2.8**.

A walkway/cycleway will be provided alongside the bypass linking to existing local walkways and would terminate at the hospital. A further link south to the railway station is also to be considered (Refer to **Figure 2.8**). A Greenway will also be created along a section of the old railway line from the eastern side of the Mallow Town to Beecher Street and will link to Mallow Train Station via a new bridge over the N20.

The scheme is currently at Design Stage and a timeline for construction and opening has not been confirmed but it is expected that construction of the route should commence within the next 5 years depending on funding being made available.

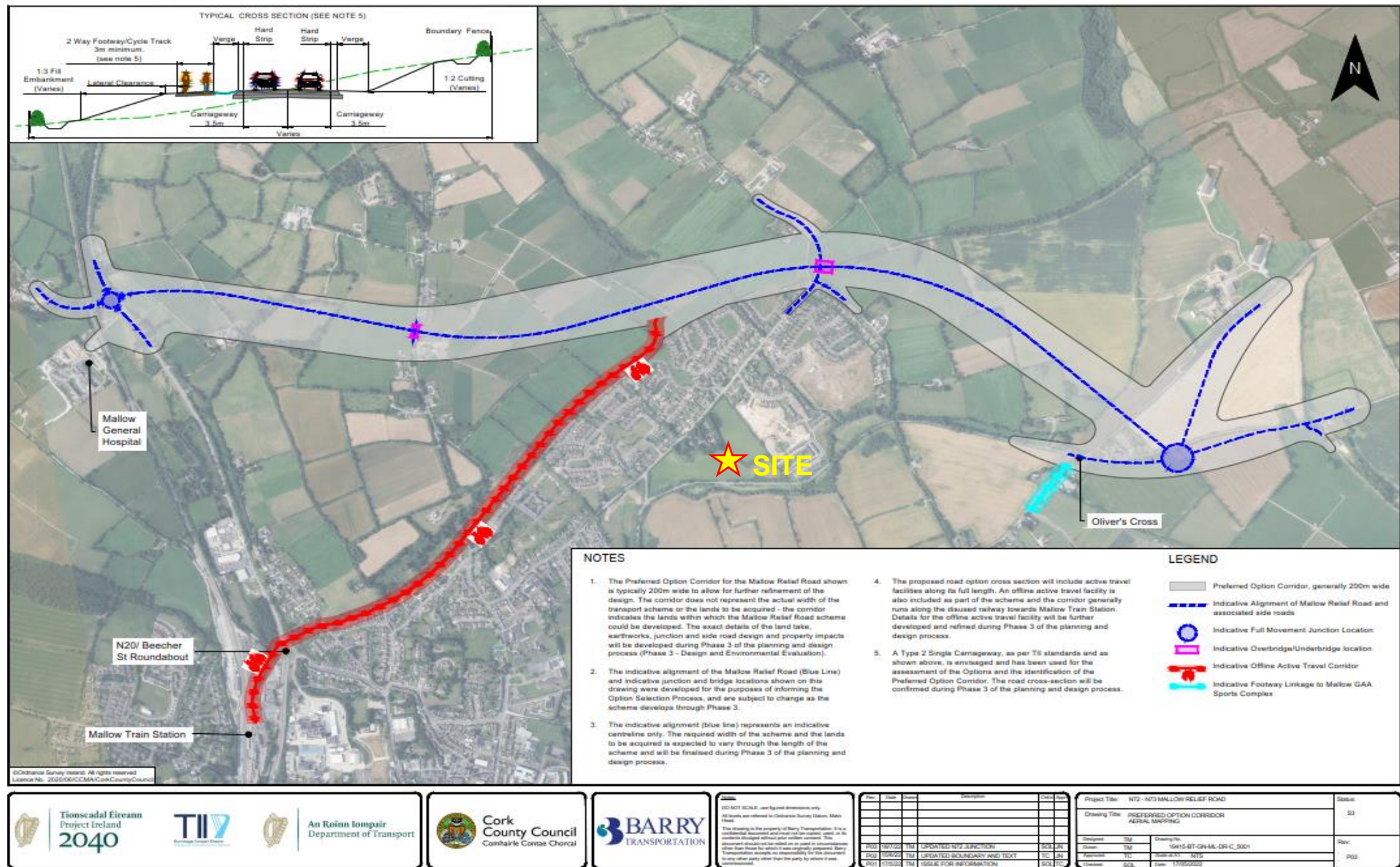


Figure 2.8: N72/N73 to N20 Mallow Relief Road (Preferred Option Corridor)

SECTION 3: BASE YEAR 2024 – TRAFFIC VOLUMES

3.1 Traffic Survey Data

During pre-planning consultations, it was agreed with Cork County Council that a total of 10 public road junctions would be assessed. A traffic survey was commissioned and carried out on Wednesday 10th August 2022.

Also, this commissioned traffic survey was compared with historical traffic surveys carried out for neighbouring housing developments which were conducted before the Covid-19 pandemic travel restrictions.

Twelve-hour classified traffic count data was gathered in August 2022 at the following locations:

- J1: Hazel Brooke estate access with L-5331;
- J2: L-1246 / L-5331;
- J3: L-5331 / N-72 (Spa Walk);
- J4: R-883 (Davis Street) / N-72 (Spa Walk);
- J5: R-620 (Bridge Street + Mallow Bridge) / N-72 (Park Road);
- J6: R-620 (Mallow Bridge + Ballydaheen) / R-619 (Mill Street) / L-1223 (Bear Forest Lwr);
- J7: L-5320 / L-5331;
- J8: L-5320 / N-72;
- J9: L-1207 (Ironmine Bridge Road) / L-9048 (Clifden) / L-1237 (Batchelor's Walk); and
- J10: L-1237 (Upper Lacknalooha) / L-1238 (Shortcastle Rise).

The locations of these surveys are illustrated in **Figures 3.1, 3.2** and **3.3**.



Figure 3.1: Traffic Count Locations (Part 1 of 3)

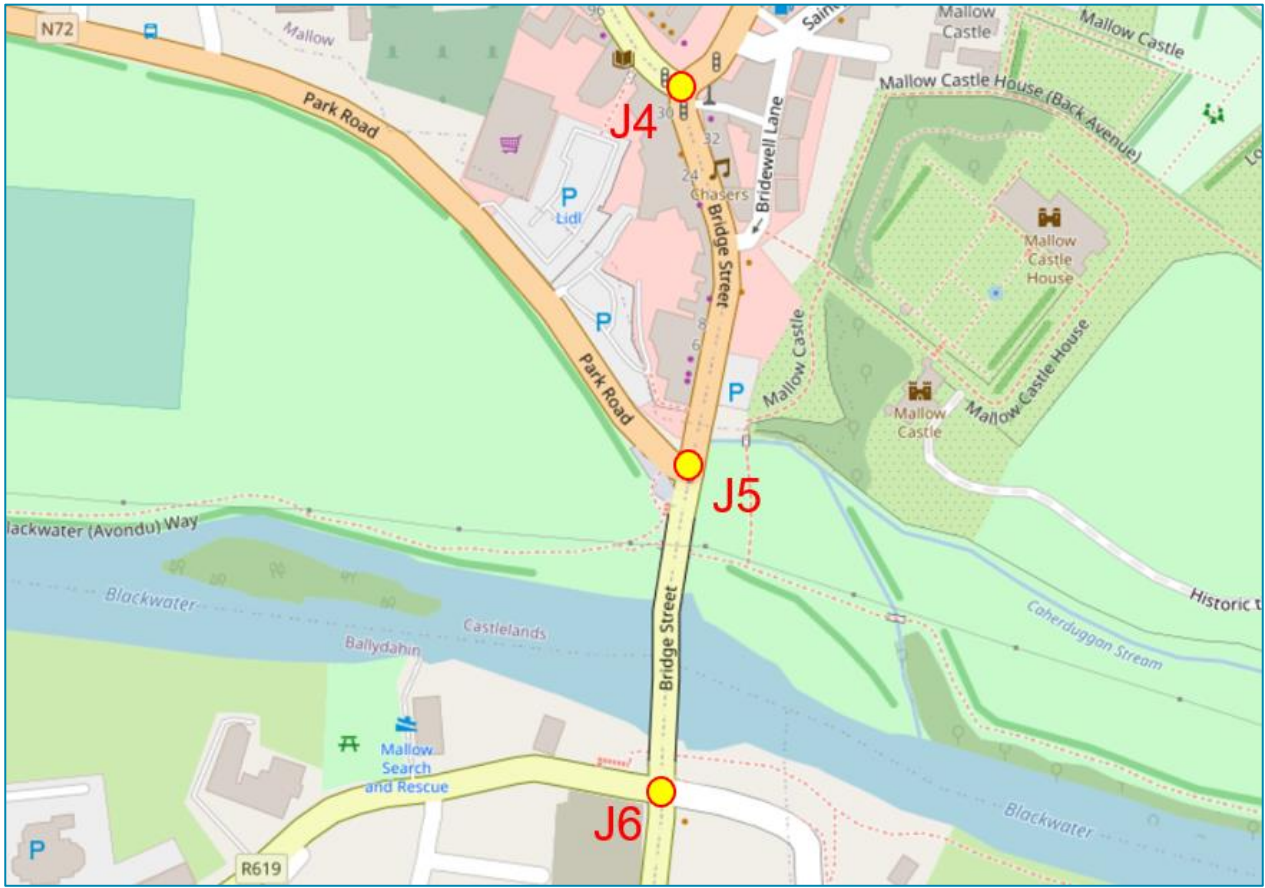


Figure 3.2: Traffic Count Locations (Part 2 of 3)

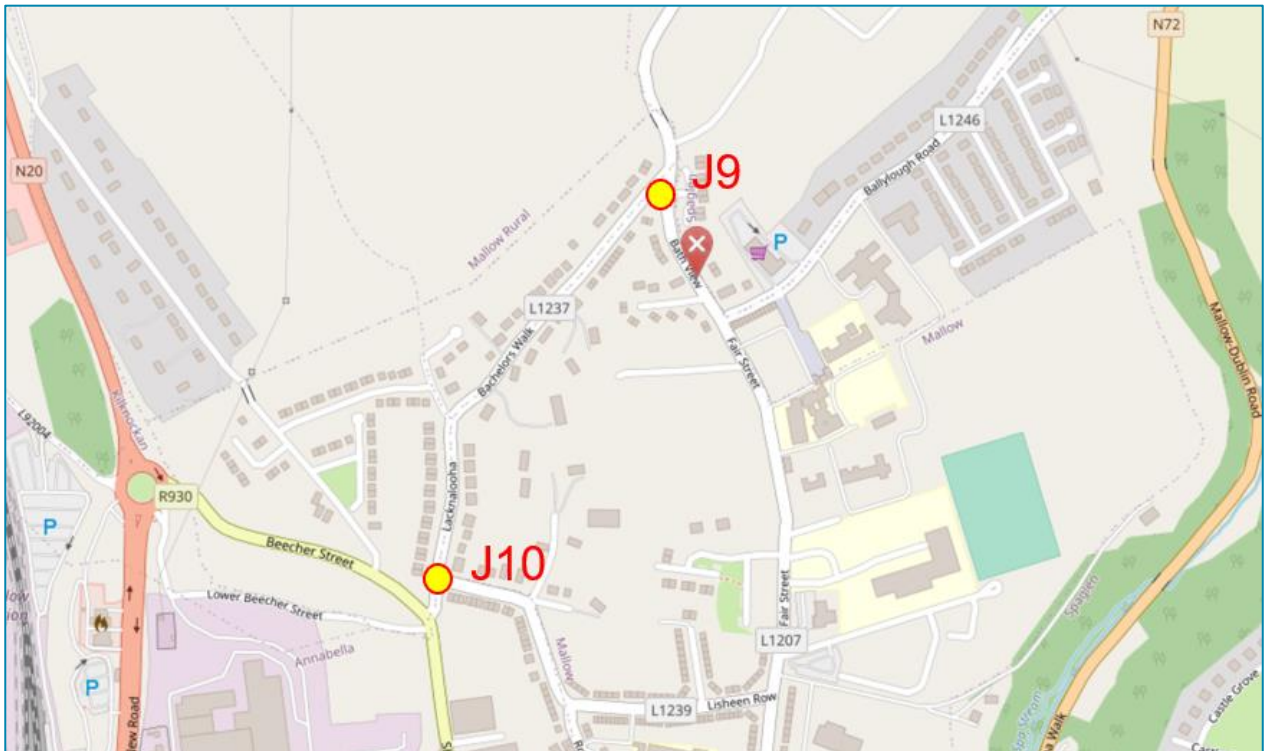


Figure 3.3: Traffic Count Locations (Part 3 of 3)

The traffic surveys were carried out over the 12-hour period from 07:00 hours to 19:00 hours. The counts were designed to identify the critical peak-hour periods of traffic flow through each junction. Data was collected in 15-minute intervals and the following count classifications were employed:

- Cars;
- Light Goods Vehicles (LGV);
- Oversize Goods Vehicles 1 (OGV 1);
- Oversize Goods Vehicles 2 (OGV 2); and
- Public Service Vehicles (PSV).

When the data from the commissioned August 2022 traffic survey was compared with historical traffic surveys carried out in 2017, significant differences for Junctions 4, 5 and 6 were observed. Following an investigation of the reasons for this, it was discovered that there was a road closure in place on the R620 (Old Cork Road) to the south of Junction 6, in August 2022, due to drainage works. This closure would have distorted the normal flow patterns for Junctions 4, 5 and 6 and also, to a lesser extent, Junctions 9 and 10 as these junctions would be on a detour route to avoid the road works. Therefore, to estimate the traffic flows in the current baseline year for Junctions 1 to 6, the historical 2017 traffic surveys were factored up by 0.9%, which is the average growth measured between 2017 and 2022 traffic flows for the following ATC stations from the TII Traffic Count Data:-

- N73 between Kildorrery and Mallow (TMU N73 010.0E);
- N20 between Buttevant and Charleville (TMU N20 050.0N); and
- N20 between Blarney and Mallow (TMU N20 020.0S).

This approach was considered the most accurate way to take account of the effect of the drainage works in place in August 22 and eliminates any effects of the Covid-19 pandemic which reduced traffic volumes considerably in 2020 and 2021.

For Junctions 7 to 10, there were no historical traffic surveys available, but based on local knowledge gathered in the Mallow area, we are aware of the nominal maximum queue lengths and maximum delay times experienced at these junctions.

Also, the commissioned August 2022 traffic survey figures for Junctions 7 to 10 were factored up by 16.0%, with reference to the TII Traffic Count Data for an ATC on N72 (TMU N72 120.0E) and N73 (TMU N73 010.0E), to take account of the fact that the surveys were carried out in the school holiday period, so that the traffic flows in 2022 for Junctions 7 to 10 in “normal” peak hours could be estimated.

The AM peak hour was identified to be the period between 08:00 and 09:00 hours and the PM peak was between 17:00 and 18:00 hours. The 2017 traffic surveys data used in this assessment are contained in **Appendix A** herein. The above-mentioned theoretical 2022 traffic flows were factored up in accordance with the TII's 'Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections' (PE-PAG-02017 Oct 2021) by using 'central' annual growth factors to derive the traffic flows for the 2024 baseline year. A summary of the 2024 baseline year traffic flows for the morning and evening peak hour periods is shown in **Figure 3.4** and **Figure 3.5**.

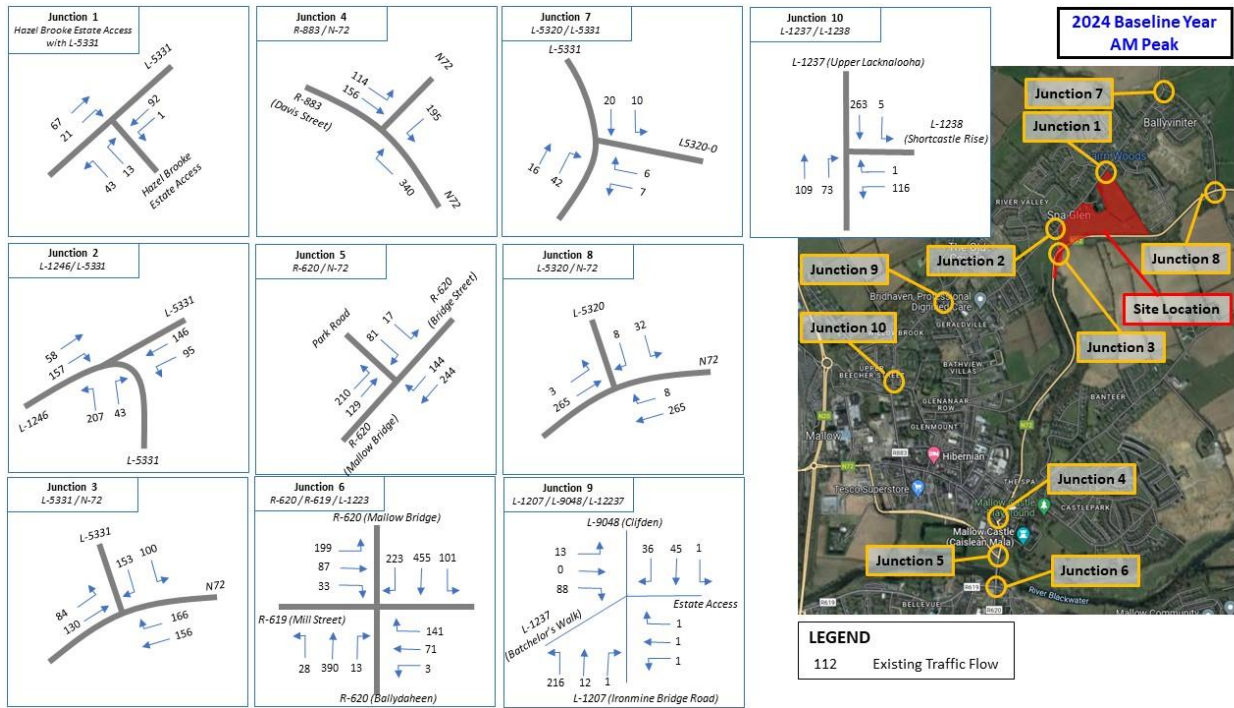


Figure 3.4: Morning Peak Hour 2024 Baseline Year

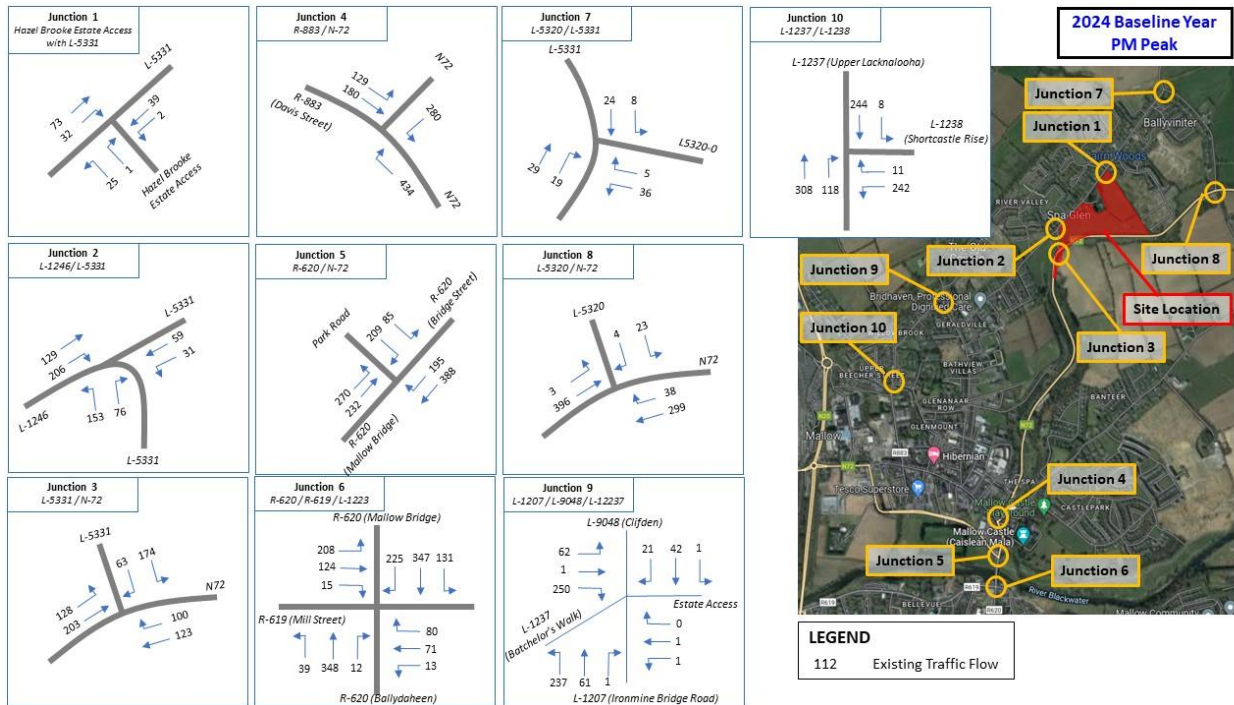


Figure 3.5: Evening Peak Hour 2024 Baseline Year

3.2 Base Year 2024 – Junction Capacity

A traffic capacity assessment of the 10 junctions in the vicinity of the subject site was undertaken utilising the flows illustrated in **Figure 3.4** and **Figure 3.5** above and the Transport Research Laboratory's (TRL) Priority Intersection Capacity and Delay (PICADY) and Optimised Signal Capacity and Delay (OSCADY) traffic modelling software for priority junctions and signalized junctions.

J1: Hazel Brooke estate access with L-5331

A summary of the results of the analysis of Junction 1: Hazel Brooke estate access with L-5331 for the morning and evening peak hours is shown in **Table 3.1**.

Table 3.1: 2024 Baseline Year Junction Capacity Analysis for Junction 1

Approach Arm	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
	AM	PM	AM	PM	AM	PM
L-5331 North	0	0	0	0	0	0
Hazel Brooke Estate Access	0.10	0.04	0	0	7	6
L-5331 South	0.03	0.05	0	0	6	5

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. The results shown in **Table 3.1** demonstrate that Junction 1 is operating within the normal design threshold in both the morning and evening peak hours in 2024 baseline scenario.

J2: L-1246 / L-5331

A summary of the results of the analysis of Junction 2: L-1246 / L-5331 for the morning and evening peak hours is shown in **Table 3.2**.

Table 3.2: 2024 Baseline Year Junction Capacity Analysis for Junction 2

Approach Arm	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
	AM	PM	AM	PM	AM	PM
L-1246	0	0	0	0	0	0
L-5331 North	0.32	0.13	1	0	11	8
L-5331 South	0.07	0.14	0	0	7	7

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. The results shown in **Table 3.2** demonstrate that Junction 2 is operating within the normal design threshold in both the morning and evening peak hours in 2024 baseline scenario.

J3: L-5331 / N-72 (Spa Walk)

A summary of the results of the analysis of Junction 3: L-5331 / N-72 (Spa Walk) for the morning and evening peak hours is shown in **Table 3.3**.

Table 3.3: 2024 Baseline Year Junction Capacity Analysis for Junction 3

Approach Arm	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
	AM	PM	AM	PM	AM	PM
N72 (Spa Walk) West	0	0	0	0	0	0
L-5331	0.44	0.33	1	1	17	16
N72 (Spa Walk) East	0.37	0.23	1	0	9	8

Note: 1) The junction improvement works for Junction 3 will be completed in opening year.

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. The results shown in **Table 3.3** demonstrate that Junction 3 is operating within the normal design threshold in both the morning and evening peak hours in 2024 baseline scenario.

J4: R-883 (Davis Street) / N-72 (Spa Walk)

A summary of the results of the analysis of Junction 4: R-883 (Davis Street) / N-72 (Spa Walk) for the morning and evening peak hours is shown in **Table 3.4**.

Table 3.4: 2024 Baseline Year Junction Capacity Analysis for Junction 4

Approach Arm	Max. DOS		Max. Queue (PCU)	
	AM	PM	AM	PM
R-883 (Davis Street)	0.67	0.80	7	9
N72 (Spa Walk) North	0.34	0.47	4	5
N72 (Spa Walk) South	0.61	0.76	7	9

The normal design threshold for the degree of saturation (DOS) is 0.9 for a signalized junction. The results shown in **Table 3.4** demonstrate that Junction 4 is operating within the normal design threshold in both the morning and evening peak hours in 2024 baseline scenario.

J5: R-620 (Bridge Street + Mallow Bridge) / N-72 (Park Road)

A summary of the results of the analysis of Junction 5: R-620 (Bridge Street + Mallow Bridge) / N-72 (Park Road) for the morning and evening peak hours is shown in **Table 3.5**.

Table 3.5: 2024 Baseline Year Junction Capacity Analysis for Junction 5

Approach Arm	Max. DOS		Max. Queue (PCU)	
	AM	PM	AM	PM
R-620 (Mallow Bridge)	0.38	0.48	5	9
N72 (Park Road)	0.35	0.52	2	6
R-620 (Bridge Street)	0.38	0.54	5	8

The normal design threshold for the degree of saturation (DOS) is 0.9 for a signalized junction. The results shown in **Table 3.5** demonstrate that Junction 5 is operating within the normal design threshold in both the morning and evening peak hours in 2024 baseline scenario.

J6: R-620 (Mallow Bridge + Ballydaheen) / R-619 (Mill Street) / L-1223 (Bear Forest Lwr)

A summary of the results of the analysis of Junction 6: R-620 (Mallow Bridge + Ballydaheen) / R-619 (Mill Street) / L-1223 (Bear Forest Lwr) for the morning and evening peak hours is shown in **Table 3.6**.

Table 3.6: 2024 Baseline Year Junction Capacity Analysis for Junction 6

Approach Arm	Max. DOS		Max. Queue (PCU)	
	AM	PM	AM	PM
R-620 (Mallow Bridge)	1.06	0.95	32	23
L-1223 (Bear Forest Lwr)	1.09	0.92	20	9
R-620 (Ballydaheen)	1.10	0.94	37	16
R-619 (Mill Street)	0.38	0.49	8	9

The normal design threshold for the degree of saturation (DOS) is 0.9 for a signalized junction. The results shown in **Table 3.6** demonstrate that Junction 6 is operating above the normal design threshold in both the morning and evening peak hours in 2024 baseline scenario, resulting in queues and delays for motorists. It should be also noted that the R-620 (Mallow Bridge) arm, L-1223 (Bear Forest Lwr) arm and R-620

(Ballydaheen) arm are operating slightly over the normal design threshold (but still less than its theoretical capacity of 1.0) in the evening peak hour in 2024 baseline scenario. Once a junction is nearing or at capacity, any slight increase in traffic flows, whether it is background traffic growth or other causes, will give rise to a noticeable increase in queues/ delays.

J7: L-5320 / L-5331

A summary of the results of the analysis of Junction 7: L-5320 / L-5331 for the morning and evening peak hours is shown in **Table 3.7**.

Table 3.7: 2024 Baseline Year Junction Capacity Analysis for Junction 7

Approach Arm	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
	AM	PM	AM	PM	AM	PM
L-5331 North	0	0	0	0	0	0
L-5320	0.03	0.08	0	0	7	7
L-5331 South	0.08	0.04	0	0	7	6

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. The results shown in **Table 3.7** demonstrate that Junction 7 is operating within the normal design threshold in both the morning and evening peak hours in 2024 baseline scenario.

J8: L-5320 / N-72

A summary of the results of the analysis of Junction 8: L-5320 / N-72 for the morning and evening peak hours is shown in **Table 3.8**.

Table 3.8: 2024 Baseline Year Junction Capacity Analysis for Junction 8

Approach Arm	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
	AM	PM	AM	PM	AM	PM
N72 West	0	0	0	0	0	0
L-5320	0.09	0.06	0	0	9	8
N72 East	0.02	0.10	0	0	6	5

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. The results shown in **Table 3.8** demonstrate that Junction 8 is operating within the normal design threshold in both the morning and evening peak hours in 2024 baseline scenario.

J9: L-1207 (Ironmine Bridge Road) / L-9048 (Clifden) / L-1237 (Batchelor's Walk)

A summary of the results of the analysis of Junction 9: L-1207 (Ironmine Bridge Road) / L-9048 (Clifden) / L-1237 (Batchelor's Walk) for the morning and evening peak hours is shown in **Table 3.9**.

Table 3.9: 2024 Baseline Year Junction Capacity Analysis for Junction 9

Approach Arm	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
	AM	PM	AM	PM	AM	PM
L-1207 (Ironmine Bridge Road)	0	0	0	0	6	5
L-1237 (Batchelor's Walk)	0.19	0.56	0	1	10	17
L-9048 (Clifden)	0.07	0.04	0	0	7	6
Estate Access	0	0	0	0	0	0

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. The results shown in **Table 3.9** demonstrate that Junction 9 is operating within the normal design threshold in both the morning and evening peak hours in 2024 baseline scenario.

J10: L-1237 (Upper Lacknaloocha) / L-1238 (Shortcastle Rise)

A summary of the results of the analysis of Junction 10: L-1237 (Upper Lacknaloocha) / L-1238 (Shortcastle Rise) for the morning and evening peak hours is shown in **Table 3.10**.

Table 3.10: 2024 Baseline Year Junction Capacity Analysis for Junction 10

Approach Arm	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
	AM	PM	AM	PM	AM	PM
L-1237 (Upper Lacknaloocha) North	0	0	0	0	0	0
L-1238 (Shortcastle Rise)	0.22	0.49	0	1	9	13
L-1237 (Upper Lacknaloocha) South	0.15	0.28	0	1	7	6

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. The results shown in **Table 3.10** demonstrate that Junction 10 is operating within the normal design threshold in both the morning and evening peak hours in 2024 baseline scenario.

A sample of traffic modelling output files are included in this report in **Appendix C**.

SECTION 4: Proposed Development

4.1 Proposed Schedule of Accommodation

The proposed development comprises of 186 residential units and a creche as follows:

- 16 No. 4-bed semi-detached houses
- 56 No. 3-bed semi-detached houses
- 96 No. 3-bed terrace houses
- 18 No. 1-bed duplex units; and
- 50-pupil creche (422m² GFA).

Refer to drawings by Doyle McDonogh Nash (DMN) Architects for the proposed Site Layout Plan and for a full break-down of the Schedule of Accommodation.

4.2 Proposed Access Arrangement

At present, there is one existing field access, located on L-5331 to the development site. It is proposed to construct two vehicular entrances to serve the development. Refer to **Figures 4.1** and **4.2**.

The proposed site accesses are located within a 50km/h speed limit zone. Sight distances of 59.0m can be achieved at both public road accesses from a 2.4m set-back point in accordance with DMURS. Corner radii have been reduced to 6.0m in order to reduce speed of turning vehicles and reduce pedestrian crossing lengths. A 2.0m public footpath is provided along the site frontage with the L-5331.

There will be full connectivity for both pedestrians and cyclists through the development. Pedestrians and cyclists will be able to access the development by using either of the two main vehicular accesses or by using any of the separate shared pedestrian/cyclist accesses located along the L-5331. A total of 4 No. shared 4.0m wide pedestrian / cyclist shared uncontrolled crossings will be provided across the L-5331, including one close to each access point. These locations have been agreed with Cork County Council to serve planned future active travel/greenway routes in close proximity to the site.

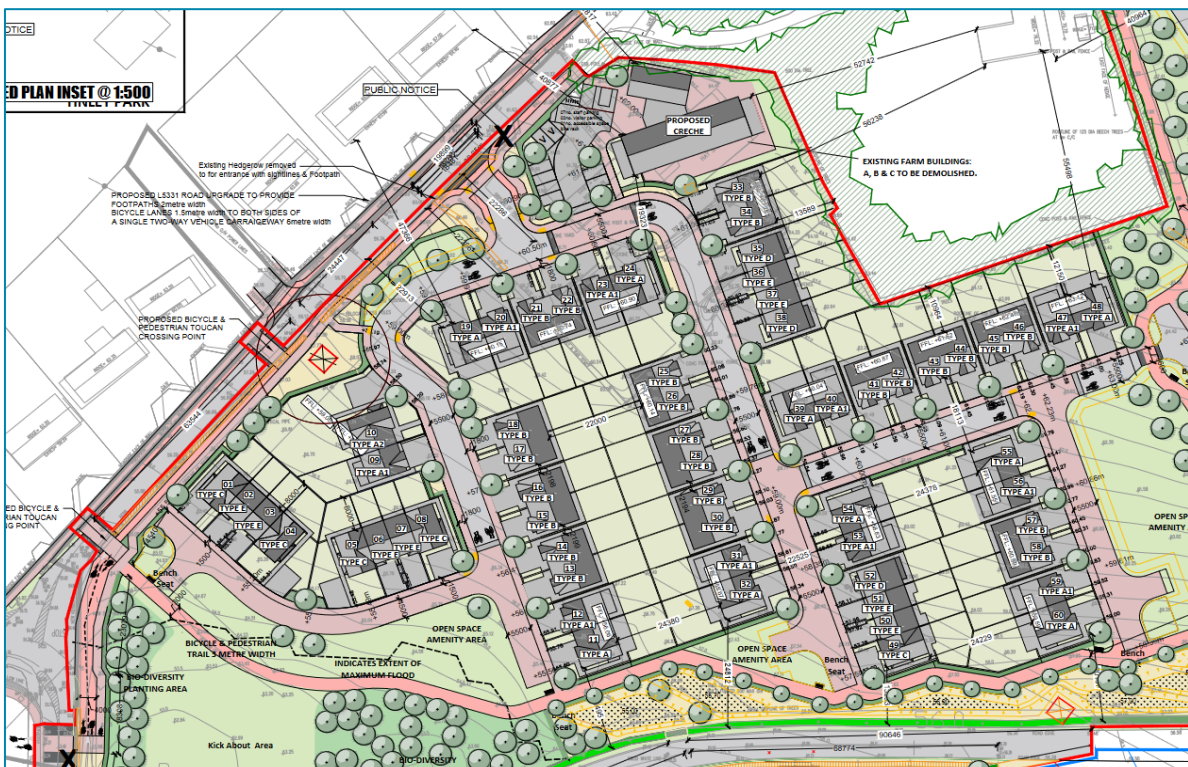


Figure 4.1 – Proposed Access Arrangement [Western portion of site]



Figure 4.2 – Proposed Access Arrangement [Eastern portion of site]

4.3 Proposed N72 / L5331 Signalised Junction

It is proposed to upgrade the existing N72 / L5331 priority junction to improve safety at this junction. The proposed improvements include signalling this junction and providing improved forward visibility and sightlines at the junction. The design is in accordance with the 'The Geometric Layout of Signal-Controlled Junctions and Signalised Roundabouts' standard (TII: DN-GEO-03044 Jan 2005) and has been discussed and agreed in principle with Cork County Council and the Cork National Roads Design Office. The N72 roadside hedgerow will be set-back and adjacent ground level reduced to provide 160.0m Stopping Sight distances based on a Design Speed of 85kph (80 kph Speed Limit) in accordance with 'Rural Road Link Design (TII DN-GEO-03031). We refer to the JBB drawing 'N-72 / L5331 Proposed Signalised Junction Layout and Visibility Improvements' (Drg No. 22201-JBB-XX-XX-DR-CR-00058 _P04' included as part of this LRD planning submission.

Other design features include:

- 50.0m of High Friction buff colour road surfacing in advance of both Stop Lines on the N72
- Existing Public Lighting extended further east on the N72 to circa 80m in advance of the Stop Line.
- Stop Lines setback to accommodate HGV turning following a Vehicle Swept Path Assessment (AutoTrack™)
- Corner radius improved with additional crash barrier on the northeastern corner to accommodate HGV turning following a Vehicle Swept Path Assessment (AutoTrack™)

- Advance Signal Ahead warning signs included on all arms of the junction
- Road Arrow and Slow road markings included on the N72 approaches
- Vehicle Detection Loops and Radar incorporated to optimise Signal Stages and control queue lengths.

4.4 Proposed Site Layout

Internal site roads vary in width from 5.5m wide on main access routes to 4.5m wide in the narrower “home zone” areas. Footpaths widths range from 1.5m to 2.0m and are proposed on one or both sides of the road depending on the layout and the configuration of the houses and desire lines. Shared pedestrian / cyclist pathways are 3.0m wide. This shared pathway meanders around the perimeter of the site and links all 3 shared pedestrian / cyclist access points internally with Hazel Brooke housing estate. Cyclists are required to share the site access roads to access the dwellings. A 4.0m wide uncontrolled shared crossing is proposed at each of the shared access points on the L5331.

All cul-de-sac access roads are designed as shared home zones with raised surfaces formed in distinctive surface materials to indicate strong pedestrian use in these areas. A raised uncontrolled pedestrian crossing or a raised table-top junction will be located across all access roads to slow traffic and to facilitate vulnerable road users crossing the roads.

Dedicated turning areas are provided at the end of long cul-de-sac roads which are large enough to accommodate a refuse vehicle. Vehicles are expected to turn at the junction of short cul-de-sac roads. A vehicular sweep assessment swept (using AutoTrack™ software) was used to confirm that the site layout can accommodate all vehicle types up to a large refuse lorry. Refer to Drawing No. 22201-JBB-XX-XX-DR-CR-00048 Vehicle Sweep Assessment prepared by JB Barry and Partners and contained within the planning drawing pack.

4.5 Proposed Parking Provision

It is proposed to provide 2 private driveway parking spaces per semi-detached or terraced house. Therefore, there will be a total of 336 driveway spaces for 168 of these units. It is proposed to provide 18 shared road-side parking spaces for the 18 duplex houses at the southeast part of the site plus an additional 2 accessible spaces. It is proposed to provide 7 staff spaces plus 2 visitor spaces plus 1 accessible carpark space for the creche, making a total of 10 spaces.

Therefore, a total of 366 parking spaces will be provided within the development for a total of 186 residential units and a creche of which 130 parking spaces can be accessed principally via the western access and the remaining 236 parking spaces can be accessed principally via the eastern access. A summary of the proposed parking provision for this development is included in **Table 4.1**.

Table 4.1: Proposed Parking Provision

Unit Type	No. of Units	Parking Rate	Parking Provision			
			Resident/Staff	Visitor	Accessible	Total
4-bed Semi	16	2	32			32
3-bed Semi	56	2	112			112
3-bed Terrace	96	2	192			192
1-bed Duplex	18	1	18		2	20
Creche	50-pupil (422m2 GFA)	1 per staff + 1 per 25 pupils	7	2	1	10
Total	186 units + Creche		361	2	3	366

It is also proposed to provide 117 shared bike parking spaces as outlined in **Table 4.2**. It is assumed that those in the semi-detached and end-terrace houses will store their bicycles in their back garden.

Table 4.2: Proposed Bicycle Parking Provision

Building	Regular Bike	Cargo Bike
Mid Terrace Housing (48 units)	72 spaces	12 spaces
Creche	6 spaces	1 space
Duplex Apartments (18 Units)	22 spaces	4 spaces
TOTAL	100 spaces	17 spaces

SECTION 5: Trip Generation, Assignment and Distribution

5.1 Trip Generation – Operational Stage

Two sources were used to estimate the vehicle trips generated by the proposed residential component of the development as follows:

- Local traffic survey at Hazel Brooke housing estate; and
- The TRICS Database.

The most conservative (i.e. highest) of the above flows was then used for this assessment. The TRICS Database was used to estimate the trips generated by the proposed creche.

The historical 2017 traffic survey results at the access to Hazel Brooke housing estate adjacent to the site were used in order to calculate the AM and PM flows. These flows were measured pre-Covid and are therefore considered to be conservative figures as in the post-Covid era there are likely to be less trips from residential developments as there is a higher level of work-from-home by adults. The AM and PM trip rates for the Hazel Brooke development were then calculated by dividing the total number of trips by the number of houses completed at the time of the 2017 survey. This data was also used to estimate the directional split between north-bound and south-bound trips for the proposed development. Refer to **Table 5.1**.

The predicted trips to/from the completed residential development were also estimated by using the TRICS Database. TRICS (Trip Rate Information Computer System) is a database of trip rates for developments used in the United Kingdom and Ireland for transport planning purposes, specifically to quantify the trip generation of new developments.

It is an online system of trip generation analysis, which uses a large database of inbound and outbound transport surveys covering a wide variety of development types. TRICS allows users to search for surveys similar to the subject site based on development type, scale, location, public transport provision, local car ownership statistic and other population statistics used to validate assumptions about the transport impacts of new developments.

For this development, our search for appropriate surveys was confined to the Republic of Ireland, excluding the Greater Dublin area, and for surveys comprising of privately owned houses and apartments. A separate search was carried out for creche developments. The resulting trip rates were tabulated and the total trips estimated to be generated by the combined development are included in **Table 5.1**.

Table 5.1: Residential Trip Generation Comparison

	Hazel Brooke Traffic Survey *			TRICS Database (Houses)			TRICS Database (Creche) ^		
	IN	OUT	Two-way	IN	OUT	Two-way	IN	OUT	Two-way
AM	0.241	0.608	0.848	0.144	0.388	0.532	3.455	2.813	6.268
PM	0.367	0.287	0.654	0.353	0.179	0.532	2.540	3.183	5.723

Note: * Hazel Brooke Traffic Survey Rates for residential development used in this assessment.

^ TRICS trip rates were also conservatively applied to the creche as a standalone development.

When comparing the two methods of estimating trip rates, the updated Hazel Brooke traffic survey trip rates produced the highest rates and these are used for this assessment, to ensure a robust and conservative approach.

The TRICS database was used to estimate the trip rates for the creche as no local traffic survey data was available for this use. The same search criteria were applied for the creche trip rates as previously described for the residential component above. Because the survey data used in TRICS Database is for standalone creche sites, the resultant trip rates may be conservatively high for this site, as children from the proposed development are likely to be the principal users of the creche.

The individual and combined trip generation flows are summarised in **Table 5.2**.

Table 5.2: Trip Generation Flows for the Proposed Development

Hour Ending	186 Houses*				422m ² GFA Creche ^				Combined Development		
	Arrivals		Departures		Arrivals		Departures		Arrivals	Departures	Two-Way Trips
	Trip Rate (/unit)	Trips In	Trip Rate (/unit)	Trips Out	Trip Rate (/GFA)	Trips In	Trip Rate (/GFA)	Trips Out	Trips In	Trips Out	
09:00	0.241	45	0.608	113	3.455	15	2.813	12	60	125	185
18:00	0.367	68	0.287	53	2.540	11	3.183	13	79	66	145

Note: * Hazel Brooke Traffic Survey Rates for residential development used in this assessment.

^ TRICS trip rates were also conservatively applied to the creche as a standalone development.

5.2 Traffic Forecasting

Assuming planning permission is granted in the second quarter of 2024, with construction starting in the latter half of 2024, and allowing for a circa two-year construction period, we estimate that the proposed development will be fully operational in 2026. Following the TII's Traffic and Transport Assessment Guidelines, we estimated the traffic flows on adjacent links and at key junctions within the affected catchment for the following design years:

- 2026 (opening year)
- 2041 (opening year +15 years)

Based on national traffic growth forecasts, the TII's 'Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections' (PE-PAG-02017 Oct 2021), the following 'central' annual growth factors for the South-West Region which includes County Cork were used:

- 2016 to 2030: 1.0189 for Cars and 1.0377 for HGVs
- 2030 to 2040: 1.0087 for Cars and 1.0160 for HGVs
- 2040 to 2050: 1.0078 for Cars and 1.0200 for HGVs

The 'central' annual growth was considered appropriate for this site to take account of likely future developments of nearby lands with development potential and for development growth in the Mallow area generally. Also, it should be noted that the trips estimated for the neighbouring sites, the Hazel Brooke and Clonmore residential developments which are close to completion, were also included as part of the trip generation analysis for this TTA. The Hazel Brooke and Clonmore residential developments are now substantially complete but not yet fully occupied and were not picked up in the 2022 traffic survey. Therefore the future trips generated by these developments being fully occupied development was also estimated. The individual and combined trip generation flows for Hazel Brooke and Clonmore residential developments are summarised in **Table 5.3** and **Table 5.4**.

Table 5.3: Trip Generation Flows for the Hazel Brooke Development

Hour Ending	149 Houses*				150m ² GFA Creche ^				Combined Development		
	Arrivals		Departures		Arrivals		Departures		Arrivals	Departures	Two-Way Trips
	Trip Rate (/unit)	Trips In	Trip Rate (/unit)	Trips Out	Trip Rate (/GFA)	Trips In	Trip Rate (/GFA)	Trips Out	Trips In	Trips Out	
09:00	0.241	36	0.608	91	3.455	5	2.813	4	41	95	136
18:00	0.367	55	0.287	43	2.540	4	3.183	5	59	48	107

Note: * Hazel Brooke Traffic Survey Rates for residential development used in this assessment.

^ TRICS trip rates were also conservatively applied to the creche as a standalone development.

Table 5.4: Trip Generation Flows for the Clonmore Development

Hour Ending	108 Houses*				Two-Way Trips
	Arrivals		Departures		
	Trip Rate (/unit)	Trips In	Trip Rate (/unit)	Trips Out	
09:00	0.241	26	0.608	66	92
18:00	0.367	40	0.287	31	71

Note: * Hazel Brooke Traffic Survey Trip Rates for residential development used in this assessment.

5.3 Future M20 and N72/N73 to N20 Mallow Relief Road Traffic Impact

There are two large public works projects at preliminary design stage which will impact positively on the traffic regime in the Mallow area generally and which will have particular positive impacts on traffic volumes in the vicinity of the proposed development, notably the N72 in the Spa Glen / Ballyvinitier area. Section 6 of this TTA will assess and compare the critical junctions within the study area for the 'With' and 'Without' scenarios of these projects for the Design Year 2041.

The N/M20 project and the N72/N73 to N20 Mallow Relief Road project will assist with reducing volumes of traffic through Mallow town and its environs and will thereby facilitate an improved traffic environment in the vicinity of the proposed development. Based on current modelling for the N72/N73 to N20 Mallow Relief Road it is estimated that traffic flows on the N72 in the vicinity of the development will be reduced by approximately 27.6% and 25.0% in the Opening Year 2026 and Design Year 2041 on completion of these projects, and it is planned that no HGV traffic will be permitted within the 50kph speed limit zone west of Oliver's Cross apart from a restricted period for deliveries.

5.4 Modal Split

Without Modal Shift Approach

Because of the proposed development's setting, it is conservatively estimated that the majority of the trips generated will be car trips. 'Theme 11-Commuting' of Census 2016 was interrogated for 'Statistical Small Areas' to gain an understanding of the existing travel patterns in similar nearby residential development areas. The data around the immediate area of the site was used to calculate the existing percentage of people who walk/cycle or use public transport to commute. **Table 5.5** outlines that the majority of those who commute from this small local area, at the time of the census, used a vehicle (driver or passenger) as their main mode of transport to work or education.

It is worth noting that in 2016, 0% of residents travelled to work, school or college by bicycle. However, given the site's close proximity to the planned future greenways and active travel routes to connect the site to Mallow Train Station, it is expected that there will not be a full dependency on a car mode of transport in the medium term. A percentage of the total trips generated by the proposed development will, in the medium term, therefore involve walking, cycling and public transport with respect to commuter trips, school trips and social trips.

However, in order to produce a conservative and robust analysis, this TTA will include an assessment that does not include for any reductions for a modal shift away from car trips, as detailed in **Tables 5.2 to 5.4**.

Table 5.5: Existing Travel Patterns for Statistical Small Area around the site (Census 2016)

Means of Travel	Work	School or College	Total	%
On foot	6	9	15	10%
Bicycle	0	0	0	0%
Bus, minibus or coach	0	2	2	1%
Train, DART or LUAS	1	1	2	1%
Motorcycle or scooter	0	0	0	0%
Car driver	83	3	86	59%
Car passenger	5	25	30	21%
Van	5	0	5	3%
Other (incl. lorry)	0	0	0	0%
Work from home	2	1	3	2%
Not stated	0	2	2	1%
Total	102	43	145	100%

With Modal Shift Approach for Relevant Junctions

For the junctions exceeding the normal design threshold, a traffic analysis has also been carried out assuming a modal shift will be achieved.

According to the Cork County Development Plan 2022-2028, a modal share target for car travel from 77.47% in 2016 to 60% in 2040 is planned, as shown in **Table 5.6** below:

Table 5.6: Mode Share between 2016 – 2040
(Source: Table 12.3 and Table 12.5 of Cork County Development Plan 2022-2028)

Commuting to or within	Year	% travelling to work by driving a private car	% travelling to work by walking	% travelling to work by Cycling	% travelling to work by public transport
Mallow	2016	77.47%	9.57%	0.71%	0.78%
	2040	60%	14%	4%	11%

The outcome of modal share for car travel in 2026 and 2041 can be obtained by interpolating the modal share for car travel in 2016 and 2040. **Table 5.7** below presents the modal share for car travel in 2016, 2024, 2026 and 2041.

Table 5.7: Modal Share of Car

Year	Modal Share of Car	% Change (Based on 2024 Baseline Year)
2016	77.47%	-
2024 Baseline Year	71.87%	-
2026 Opening Year	70.47%	- 1.40%
2041 Design Year	60.00%	- 11.87%

Table 5.7 demonstrates that 1.40% and 11.87% of traffic reduction, either for background traffic or new trips, can be applied to relevant junctions in 2026 Opening Year and 2041 Design Year respectively under a With Modal Shift approach.

5.5 Trip Assignment

The trips generated by the proposed residential development can generally be classed into work, school, shopping or social trips. Factors which influence the distribution of the trip generation flows are the site's close proximity to:

- the most direct route to Mallow Town and Cork City (N72, L-1246 and N20);
- the most direct route to Fermoy (N72) and Mitchelstown (N73);
- zones of employment such as Mallow, Cork City, Charleville, Fermoy, Mitchelstown and Limerick;
- local schools, shops and amenities such as Mallow GAA, Rugby, Soccer, Town Park; and
- public transport such as Mallow Train Station, Town Park Bus Stop.

5.6 Trip Distribution

It was assumed for the purposes of this study that the future development traffic will mirror existing travel flows when entering/exiting the development. The future development traffic distribution at the relevant junctions is likely to mirror existing traffic patterns i.e. development-generated flows will be split through the junctions proportionally to existing flows.

The projected 2026 year of opening and 2041 Design Year flows have been calculated by factoring up the 2024 baseline year traffic flows in accordance with the TII Publications Project Appraisal Guidelines for National Roads document 'Unit 5.3 Travel Demand Projections, Table 6.2: Link-Based Growth Rates: Link-Based Growth Rates: County Annual Growth Rates (excluding Metropolitan Area)¹. As the Hazel Brooke and Clonmore residential developments will be completed and occupied before the opening year (i.e.2026) of the proposed development, the additional traffic flows due to above-mentioned developments will be also included for both the 2026 "without" development and 2041 "without" development scenarios. Additional traffic flows due to the proposed development have been then applied to these future year flows to develop the "with" development scenarios. **Table 5.8** presents the developments included for each scenario.

Table 5.8: Summary of Development included for Each Scenario

Item	Scenario	Development Included		
		Full Hazel Brooke Development	Full Clonmore Development	Proposed Development
1	2024 Baseline Year	Existing Hazelbrook houses incl.	Existing Clonmore houses incl.	X
2	2026 Opening Year (without development)	✓	✓	X
3	2026 Opening Year (with development)	✓	✓	✓
4	2041 Design Year (without development)	✓	✓	X
5	2041 Design Year (with development)	✓	✓	✓

¹ Utilising Central Growth Rate

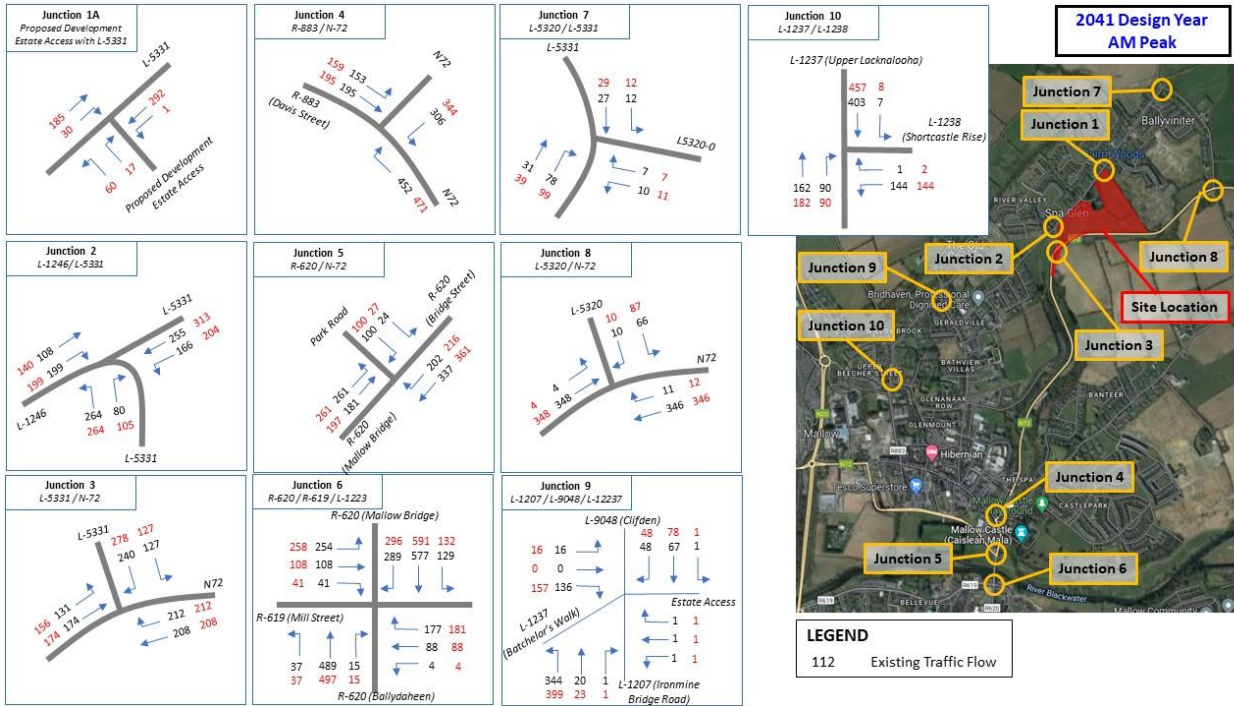


Figure 5.3: 2041 Morning Peak Hour Design Year

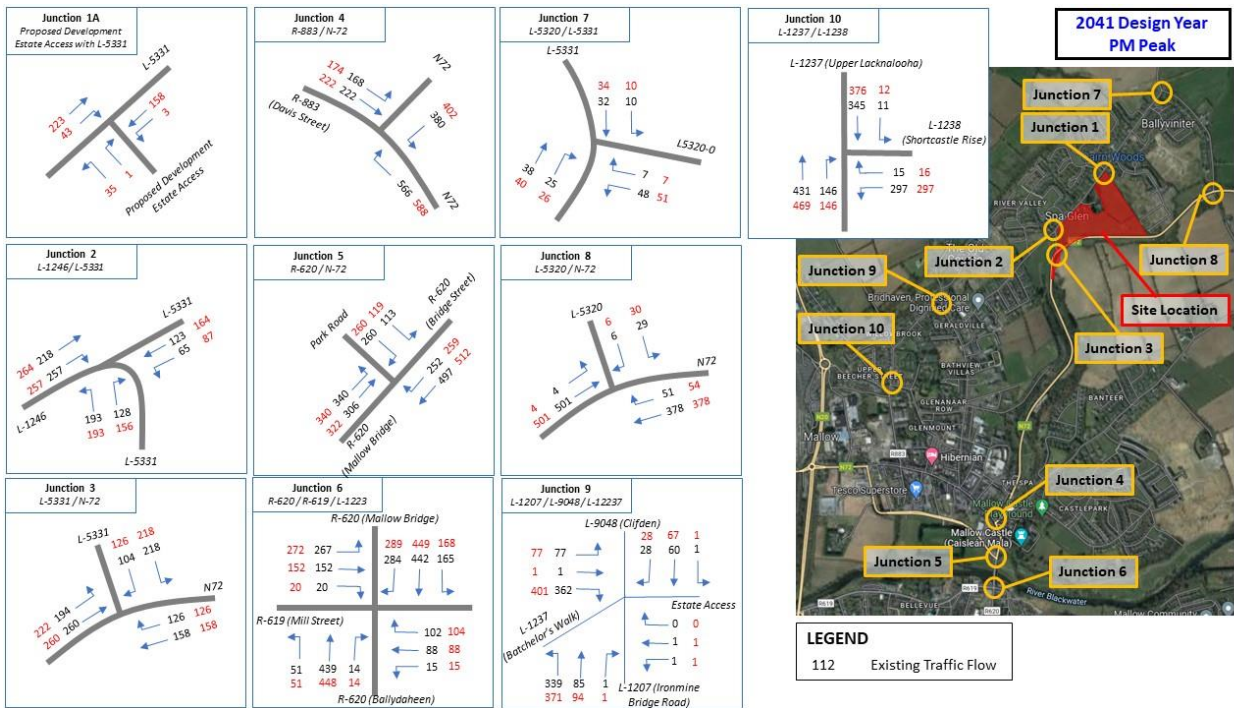


Figure 5.4: 2041 Evening Peak Hour Design Year

5.7 Trip Generation – Construction Stage

The construction phase of the development is expected to generate much lower vehicle movements than the operational phase. However, a greater number of Heavy Goods Vehicles (HGVs) are expected during the construction phase.

The proposed residential development will initially involve significant earthworks in order to level and grade the site to accommodate the construction of sewers, services, foundations and new roads throughout the site. All parking associated with site works will be provided within the curtilage of the site.

To construct the development, the following works will be required to be carried out:

- Provision of a temporary construction access at the same location as the proposed access, safe and secure site compound and the erection of temporary boundary fencing.
- Trenching for underground services including foul sewer, surface water drains, water mains, gas, telecommunications, electricity and lighting.
- Connection of underground services to existing underground services where available.
- Construction of the houses, apartment and the creche on the site.
- Construction of entrance, access roads, footpaths and paving.
- Erection of permanent boundary fencing, landscaping, signage and lighting.
- Construction of the proposed improvements to the N72/L5331 junction and the proposed shared crossings on the L5331.

Each of the activities outlined above will generate a level of vehicle movements to and from the site as well as internally within the subject site. The construction movements will take place initially against a background of no other activities on the subject site during the early stages of the development. However, as the development progresses in phases there will be a period when construction-generated traffic will be operating alongside the traffic generated by the completed phases.

Because the developer will concentrate on discrete sections of the site at a time, the earth moving, and excavation may be spread-out throughout the construction period and will not just be concentrated at the beginning of the development.

It is intended to balance the cut and fill in as far as is possible which will minimise haulage and disposal off site. If rock is encountered, it will be either ripped out or rock breakers may be used, but this is only envisaged for the excavation of the sewers and will not be an everyday occurrence. Topsoil will be temporarily stockpiled on site and re-used when landscaping new open areas, gardens etc.

The typical plant used on site will be as follows:

- 2 no. excavators (with a rock breaker if required);
- 2 no. JCB;
- 4 no. (40T) dumper trucks;
- 2 no. (<6T) dumper trucks;
- 1 no. 20T roller;
- 1 no. small roller or/and heavy compaction plate;
- 1 no. Road Sprayer/Scraper/Sweeper;
- 1 no. Cement Mixer; and
- 1 no. Water Pump.

The estimated construction traffic expected during a typical working day is shown in **Table 5.9**. The starting and finishing times are based on the winter period as this is more concentrated than during the summer period. The trip rates are based on similar sites located in and around Cork County.

Normal working hours will be between 8.00a.m. and 6.00p.m., five days per week, with some working on Saturday mornings, subject to any conditions set down by the Local Authority. The construction workers

are expected to arrive to the site mainly by private vehicle. Depending on the domiciles of the construction staff, some additional trips may be generated by lunchtime traffic.

Table 5.9: Trip Generation based for Construction Stage

Hour Ending	ARRIVALS					DEPARTURES				
	Car	LGV	HGV	Total	% HGV	Car	LGV	HGV	Total	% HGV
07:00	1	0	0	1	0%	0	0	0	0	0%
08:00	15	3	0	18	0%	2	1	0	3	0%
09:00	10	4	0	12	0%	2	1	0	3	0%
10:00	2	2	2	4	50%	2	2	2	4	50%
11:00	2	2	2	4	50%	2	2	2	4	50%
12:00	2	2	2	4	50%	2	2	2	4	50%
13:00	2	2	2	4	50%	2	2	2	4	50%
14:00	4	2	0	2	0%	4	2	0	2	0%
15:00	2	2	2	4	50%	2	2	2	4	50%
16:00	2	2	2	4	50%	2	2	2	4	50%
17:00	2	2	2	4	50%	15	4	2	18	11%
18:00	2	0	2	3	67%	10	3	2	13	15%
19:00	1	0	0	1	0%	2	0	0	2	0%
Daily Trips:	47	23	16	65	25%	47	23	16	65	25%

SECTION 6: Assessment

6.1 Road Network Impact – Junction Capacity

In order to assess the future operational capacity of the proposed access and the surrounding road network the adjacent public road junctions onto the L-5331 plus additional critical junctions, as agreed with Cork County Council, were modelled using the appropriate capacity software packages as follows:

- PICADY – for all Priority type junctions;
- OSCADY – for all Signalised junctions (except Junction 3); and
- Traffic Network Study Tool (TRANSYT) - for Junction 3.

The junctions were modelled for the 2026 year of opening and 2041 (Opening Year + 15 Year) Design Year for morning and evening peak hour periods using the flow diagrams shown in **Figure 5.1** to **Figure 5.4** in the previous sections above.

To demonstrate the direct traffic impact associated with the proposed development, the traffic modelling exercise was carried out for the “without” development and “with” development scenarios.

After completion of the proposed development, two vehicular entrances will serve the proposed development. As the trip generation for eastern-most access will be greater than western-most access, therefore, the eastern-most access, namely Junction 1A: Proposed Development Estate Access with L-5331, was selected for assessment in 2026 year of opening and 2041 Design Year (Opening year plus 15 years).

6.2 Operational Phase 2026 Opening Year – Junction Capacity

A summary of the results of the analysis for the 2026 year of opening, “without” and “with” the development, for the morning and evening peak hours is shown in **Table 6.1** to **Table 6.7** below.

J1A: Proposed Development Estate Access with L-5331

Table 6.1: 2026 Opening Year Junction Capacity Analysis for Junction 1A

Approach Arm	Scenario	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
		AM	PM	AM	PM	AM	PM
L-5331 North	Without Development*	-	-	-	-	-	-
	With Development	0	0	0	0	0	0
Proposed Development Estate Access	Without Development*	-	-	-	-	-	-
	With Development	0.16	0.07	0	0	8	6
L-5331 South	Without Development*	-	-	-	-	-	-
	With Development	0.06	0.08	0	0	5	5

Note: * Hazel Brooke development and Clonmore development are included under without development scenario.

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. The results shown in **Table 6.1** demonstrate that Junction 1A will operate within the normal design threshold in both the morning and evening peak hours in 2026 for both the “without” development and “with” development scenarios.

J2: L-1246 / L-5331**Table 6.2: 2026 Opening Year Junction Capacity Analysis for Junction 2**

Approach Arm	Scenario	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
		AM	PM	AM	PM	AM	PM
L-1246	Without Development*	0	0	0	0	0	0
	With Development	0	0	0	0	0	0
L-5331 North	Without Development*	0.52	0.27	1	0	15	11
	With Development	0.68	0.38	2	1	25	13
L-5331 South	Without Development*	0.13	0.21	0	0	7	8
	With Development	0.17	0.27	0	0	7	9

Note: * Hazel Brooke development and Clonmore development are included under without development scenario.

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. The results shown in **Table 6.2** demonstrate that Junction 2 will operate within the normal design threshold in both the morning and evening peak hours in 2026 for both the “without” development and “with” development scenarios. The analysis indicates that traffic from the proposed development will not have significant impact on this junction.

J3: L-5331 / N-72 (Spa Walk)**Table 6.3: 2026 Opening Year Junction Capacity Analysis for Junction 3**

Approach Arm	Scenario	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
		AM	PM	AM	PM	AM	PM
Without Proposed Improvement Scheme as mentioned in Section 4.3							
N72 (Spa Walk) West	Without Development*	0	0	0	0	0	0
	With Development	0	0	0	0	0	0
L-5331	Without Development*	0.62	0.36	2	1	28	16
	With Development	0.74	0.39	3	1	37	18
N72 (Spa Walk) East	Without Development*	0.40	0.25	1	0	10	8
	With Development	0.40	0.25	1	0	9	8
With Proposed Improvement Scheme as mentioned in Section 4.3 (i.e. Conversion from priority junction to signalised junction)							
N72 (Spa Walk) West	With Development**	0.53	0.50	4	5	-	-
L-5331	With Development**	0.72	0.64	6	5	-	-
N72 (Spa Walk) East	With Development**	0.52	0.45	5	3	-	-

Note: * Hazel Brooke development and Clonmore development are included under without development scenario.

** Under the proposed improvement scheme, this junction will be converted from priority junction to signalised junction.

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. The results shown in **Table 6.3** demonstrate that based on the existing junction layout, Junction 3 will operate within the normal design threshold in both the morning and evening peak hours in 2026 for both the “without”

development and “with” development scenarios. The analysis indicates that traffic from the proposed development will not have significant impact on this junction.

The normal design threshold for the degree of saturation (DOS) is 0.9 for a signalized junction. Based on the proposed improvement scheme (i.e. conversion from priority junction to signalised junction) as mentioned in **Section 4.3**, the results shown in **Table 6.3** demonstrate that Junction 3 will also operate within the normal design threshold in both the morning and evening peak hours in 2026 for the “with” development scenario.

J4: R-883 (Davis Street) / N-72 (Spa Walk)

Table 6.4: 2026 Opening Year Junction Capacity Analysis for Junction 4

Approach Arm	Scenario	Max. DOS		Max. Queue (PCU)	
		AM	PM	AM	PM
R-883 (Davis Street)	Without Development*	0.72	0.85	8	10
	With Development	0.74	0.87	8	11
N72 (Spa Walk) North	Without Development*	0.44	0.54	5	6
	With Development	0.51	0.58	6	7
N72 (Spa Walk) South	Without Development*	0.68	0.84	8	11
	With Development	0.71	0.88	8	13

Note: * Hazel Brooke development and Clonmore development are included under without development scenario.

The normal design threshold for the degree of saturation (DOS) is 0.9 for a signalized junction. The results shown in **Table 6.4** demonstrate that Junction 4 will operate within the normal design threshold in both the morning and evening peak hours in 2026 for both the “without” development and “with” development scenarios. However, the R-883 (Davis Street) arm and N72 (Spa Walk) South arm on this junction in the evening peak hour in 2026 for both the “without” development and “with” development scenarios will begin to approach the design threshold with minor queues and delays for motorists. Once a junction is nearing or at capacity, any slight increase, whether it is background traffic growth or other causes, will give rise to a noticeable increase in queues/ delays. The analysis indicates that traffic from the proposed development will not have significant impact on this junction.

J5: R-620 (Bridge Street + Mallow Bridge) / N-72 (Park Road)

Table 6.5: 2026 Opening Year Junction Capacity Analysis for Junction 5

Approach Arm	Scenario	Max. DOS		Max. Queue (PCU)	
		AM	PM	AM	PM
R-620 (Mallow Bridge)	Without Development*	0.40	0.50	6	9
	With Development	0.40	0.50	6	10
N72 (Park Road)	Without Development*	0.37	0.54	3	7
	With Development	0.37	0.54	3	7
R-620 (Bridge Street)	Without Development*	0.44	0.59	6	9
	With Development	0.48	0.61	6	9

Note: * Hazel Brooke development and Clonmore development are included under without development scenario.

The normal design threshold for the degree of saturation (DOS) is 0.9 for a signalized junction. The results shown in **Table 6.5** demonstrate that Junction 5 will operate within the normal design threshold in both the morning and evening peak hours in 2026 for both the “without” development and “with” development scenarios. The analysis indicates that traffic from the proposed development will not have significant impact on this junction.

J6: R-620 (Mallow Bridge + Ballydaheen) / R-619 (Mill Street) / L-1223 (Bear Forest Lwr)**Table 6.6: 2026 Opening Year Junction Capacity Analysis for Junction 6**

Approach Arm	Scenario	Max. DOS		Max. Queue (PCU)	
		AM	PM	AM	PM
Without Modal Shift Approach as mentioned in Section 5.3					
R-620 (Mallow Bridge)	Without Development*	1.14	1.01	40	28
	With Development	1.18	1.03	48	30
L-1223 (Bear Forest Lwr)	Without Development*	1.23	1.01	32	13
	With Development	1.29	1.03	36	14
R-620 (Ballydaheen)	Without Development*	1.17	1.00	54	23
	With Development	1.20	1.02	59	26
R-619 (Mill Street)	Without Development*	0.39	0.51	9	10
	With Development	0.39	0.51	9	10
With Modal Shift Approach as mentioned in Section 5.3					
R-620 (Mallow Bridge)	Without Development*	1.13	0.99	41	26
	With Development	1.16	1.02	46	28
L-1223 (Bear Forest Lwr)	Without Development*	1.20	0.98	29	11
	With Development	1.25	1.01	33	12
R-620 (Ballydaheen)	Without Development*	1.15	0.99	49	21
	With Development	1.18	1.01	55	24
R-619 (Mill Street)	Without Development*	0.39	0.50	8	10
	With Development	0.39	0.50	8	10

Note: * Hazel Brooke development and Clonmore development are included under without development scenario.

The normal design threshold for the degree of saturation (DOS) is 0.9 for a signalized junction. The results shown in **Table 6.6** demonstrate that in a without modal shift approach as mentioned in **Section 5.3**, the R-620 (Mallow Bridge) arm, L-1223 (Bear Forest Lwr) arm and R-620 (Ballydaheen) arm on Junction 6 will exceed the normal design threshold in both the morning and evening peak hours in 2026 for both the “without” development and “with” development scenarios, resulting in queues and delays for motorists evident.

In a with modal shift approach as mentioned in **Section 5.3**, the R-620 (Mallow Bridge) arm, L-1223 (Bear Forest Lwr) arm and R-620 (Ballydaheen) arm on Junction 6 will also exceed the normal design threshold in both the morning and evening peak hours in 2026 for both the “without” development and “with” development scenarios, resulting in queues and delays for motorists evident.

Once a junction is nearing or at capacity, any slight increase, whether it is background traffic growth or other causes, will lead to a noticeable increase in queues/ delays. However, the above results present a “worst-case” situation because the assessment has included an “all red” stage, which is called on demand and may appear occasionally, for pedestrian movement. Without calling an “all red” stage for pedestrian movement, the junction performance will be improved. Moreover, it is clear that the impact on this junction will be mainly due to regular background traffic growth and not by the proposed development by itself so traffic from the proposed development will not cause a significant impact on this junction..

J7: L-5320 / L-5331**Table 6.7: 2026 Opening Year Junction Capacity Analysis for Junction 7**

Approach Arm	Scenario	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
		AM	PM	AM	PM	AM	PM
L-5331 North	Without Development*	0	0	0	0	0	0
	With Development	0	0	0	0	0	0
L-5320	Without Development*	0.03	0.09	0	0	7	7
	With Development	0.03	0.09	0	0	7	7
L-5331 South	Without Development*	0.13	0.04	0	0	7	6
	With Development	0.17	0.04	0	0	7	6

Note: * Hazel Brooke development and Clonmore development are included under without development scenario.

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. The results shown in **Table 6.7** demonstrate that Junction 7 will operate within the normal design threshold in both the morning and evening peak hours in 2026 for both the “without” development and “with” development scenarios. The analysis indicates that traffic from the proposed development will not have significant impact on this junction.

J8: L-5320 / N-72**Table 6.8: 2026 Opening Year Junction Capacity Analysis for Junction 8**

Approach Arm	Scenario	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
		AM	PM	AM	PM	AM	PM
N72 West	Without Development*	0	0	0	0	0	0
	With Development	0	0	0	0	0	0
L-5320	Without Development*	0.14	0.07	0	0	8	8
	With Development	0.19	0.07	0	0	9	8
N72 East	Without Development*	0.02	0.12	0	0	5	5
	With Development	0.03	0.13	0	0	5	6

Note: * Hazel Brooke development and Clonmore development are included under without development scenario.

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. The results shown in **Table 6.8** demonstrate that Junction 8 will operate within the normal design threshold in both the morning and evening peak hours in 2026 for both the “without” development and “with” development scenarios. The analysis indicates that traffic from the proposed development will not have significant impact on this junction.

J9: L-1207 (Ironmine Bridge Road) / L-9048 (Clifden) / L-1237 (Batchelor's Walk)**Table 6.9: 2026 Opening Year Junction Capacity Analysis for Junction 9**

Approach Arm	Scenario	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
		AM	PM	AM	PM	AM	PM
L-1207 (Ironmine Bridge Road)	Without Development*	0	0	0	0	5	5
	With Development	0	0	0	0	5	5
L-1237 (Batchelor's Walk)	Without Development*	0.26	0.71	0	2	10	26
	With Development	0.31	0.81	0	4	11	39
L-9048 (Clifden)	Without Development*	0.08	0.05	0	0	7	7
	With Development	0.08	0.05	0	0	7	7
Estate Access	Without Development*	0	0	0	0	0	0
	With Development	0	0	0	0	0	0

Note: * Hazel Brooke development and Clonmore development are included under without development scenario.

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. The results shown in **Table 6.9** demonstrate that Junction 9 will operate within the normal design threshold in both the morning and evening peak hours in 2026 for both the “without” development and “with” development scenarios. It should be also noted that the L-1237 (Batchelor's Walk) arm on this junction in the evening peak hour in 2026 for the “with” development scenario will begin to approach the design threshold, resulting in minor queues and delays for motorists. Once a junction is nearing or at capacity, any slight increase, whether it is background traffic growth or other causes, will lead to a noticeable increase in queues/ delays. The analysis indicates that traffic from the proposed development will not have significant impact on this junction.

J10: L-1237 (Upper Lacknalooha) / L-1238 (Shortcastle Rise)**Table 6.10: 2026 Opening Year Junction Capacity Analysis for Junction 10**

Approach Arm	Scenario	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
		AM	PM	AM	PM	AM	PM
L-1237 (Upper Lacknalooha) North	Without Development*	0	0	0	0	0	0
	With Development	0	0	0	0	0	0
L-1238 (Shortcastle Rise)	Without Development*	0.24	0.53	0	1	9	14
	With Development	0.26	0.55	0	1	9	15
L-1237 (Upper Lacknalooha) South	Without Development*	0.17	0.32	0	1	7	6
	With Development	0.18	0.33	0	1	7	6

Note: * Hazel Brooke development and Clonmore development are included under without development scenario.

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. The results shown in **Table 6.10** demonstrate that Junction 10 will operate within the normal design threshold in both the morning and evening peak hours in 2026 for both the “without” development and “with” development scenarios. The analysis indicates that traffic from the proposed development will not have significant impact on this junction.

A sample of the traffic modelling output files is included in this report in **Appendix C**.

6.3 Operational Phase 2041 Design Year – Junction Capacity

A summary of the results of the analysis for the 2041 Design Year, “without” and “with” the development, in the morning and evening peak hours is shown in **Table 6.11** to **Table 6.20** below.

J1A: Proposed Development Estate Access with L-5331

Table 6.11: 2041 Design Year Junction Capacity Analysis for Junction 1A

Approach Arm	Scenario	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
		AM	PM	AM	PM	AM	PM
L-5331 North	Without Development*	-	-	-	-	-	-
	With Development	0	0	0	0	0	0
Proposed Development Estate Access	Without Development*	-	-	-	-	-	-
	With Development	0.16	0.07	0	0	8	6
L-5331 South	Without Development*	-	-	-	-	-	-
	With Development	0.06	0.08	0	0	5	5

Note: * Hazel Brooke development and Clonmore development are included under without development scenario.

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. The results shown in **Table 6.11** demonstrate that Junction 1A will operate within the normal design threshold in both the morning and evening peak hours in 2041 for both the “without” development and “with” development scenarios. The analysis indicates that traffic from the proposed development will not have significant impact on this junction.

J2: L-1246 / L-5331

Table 6.12: 2041 Design Year Junction Capacity Analysis for Junction 2

Approach Arm	Scenario	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
		AM	PM	AM	PM	AM	PM
L-1246	Without Development*	0	0	0	0	0	0
	With Development	0	0	0	0	0	0
L-5331 North	Without Development*	0.62	0.32	2	1	21	12
	With Development	0.82	0.44	4	1	44	16
L-5331 South	Without Development*	0.14	0.25	0	0	7	8
	With Development	0.19	0.31	0	1	7	9

Note: * Hazel Brooke development and Clonmore development are included under without development scenario.

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. The results shown in **Table 6.12** demonstrate that Junction 2 will operate within the normal design threshold in both the morning and evening peak hours in 2041 for both the “without” development and “with” development scenarios. It should be also noted that the L-5331 North arm on this junction in the morning peak hour in 2041 for the “with” development scenario will begin to approach the design threshold, resulting in minor queues and delays for motorists.

J3: L-5331 / N-72 (Spa Walk)

Table 6.13: 2041 Design Year Junction Capacity Analysis for Junction 3

Approach Arm	Scenario	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
		AM	PM	AM	PM	AM	PM
Without Proposed Improvement Scheme as mentioned in Section 4.3							
N72 (Spa Walk) West	Without Development*	0	0	0	0	0	0
	With Development	0	0	0	0	0	0
L-5331	Without Development*	0.80	0.49	4	1	50	22
	With Development	0.99	0.52	11	1	174	26
N72 (Spa Walk) East	Without Development*	0.51	0.32	1	1	11	9
	With Development	0.52	0.32	1	1	11	9
With Proposed Improvement Scheme as mentioned in Section 4.3 (i.e. Conversion from priority junction to signalised junction)							
N72 (Spa Walk) West	With Development**	0.64	0.59	5	7	-	-
L-5331	With Development**	0.83	0.75	8	6	-	-
N72 (Spa Walk) East	With Development**	0.69	0.63	7	5	-	-

Note: * Hazel Brooke development and Clonmore development are included under without development scenario.

** Under the proposed improvement scheme, this junction will be converted from priority junction to signalised junction.

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. The results shown in **Table 6.13** demonstrate that based on the existing junction layout, Junction 3 will operate within the normal design threshold in the morning peak hour in 2041 for the “without” development scenario, and in the evening peak hour in 2041 for both the “without” development and “with” development scenarios. However, the L-5331 arm on this junction in the morning peak hour in 2041 for the “with” development scenario will slightly exceed the normal design threshold (but still less than its theoretical capacity of 1.0), resulting in queues and delays for motorists evident. Once a junction is nearing or at capacity, any slight increase, whether it is background traffic growth or other causes, will lead to a noticeable increase in queues/delays.

The normal design threshold for the degree of saturation (DOS) is 0.9 for a signalized junction. To enhance the operating capacity and improve safety at the junction, it is proposed to convert Junction 3 from priority junction to signalised junction as mentioned in **Section 4.3**. Based on the proposed improvement scheme, the results shown in **Table 6.13** demonstrate that Junction 3 will operate within the normal design threshold in the morning and evening peak hours in 2041 for the “with” development scenario.

The likely development of the N72/73 to N20 Mallow Relief Road as shown in **Figure 2.8** is expected to be in place in advance of the 2041 Design Year. After completion of the N/M20 and/or the N72/N73 to N20 Mallow Relief Road, the performance of this junction will be improved due to reduction of traffic flows on the N72 in this area. By comparing the N72/N73 to N20 Mallow Relief Road ‘do minimum’ and ‘Preferred Route Option’ development scenarios, we are informed that traffic volumes between Oliver’s Cross (N72/N73 junction) and Mallow Town (at 50/80 speed limit sign at Spa House) are estimated to be reduced by 27.6% and 25.0% in the Opening Year 2026 and Design Year 2041 respectively with no HGV traffic permitted within the 50kph speed limit zone west of Oliver’s Cross apart from restricted periods for deliveries.

In a with modal shift approach as mentioned in **Section 5.3** or N20 Mallow Relief Road as mentioned in **Section 2.4**, it is anticipated that performance of Junction 3 will be further improved.

J4: R-883 (Davis Street) / N-72 (Spa Walk)**Table 6.14: 2041 Design Year Junction Capacity Analysis for Junction 4**

Approach Arm	Scenario	Max. DOS		Max. Queue (PCU)	
		AM	PM	AM	PM
Without Modal Shift Approach as mentioned in Section 5.3 and without N20 Mallow Relief Road as mentioned in Section 2.4					
R-883 (Davis Street)	Without Development*	0.87	1.01	11	21
	With Development	0.88	1.03	12	24
N72 (Spa Walk) North	Without Development*	0.53	0.64	6	7
	With Development	0.60	0.68	7	8
N72 (Spa Walk) South	Without Development*	0.81	1.00	10	23
	With Development	0.85	1.03	11	31
With Modal Shift Approach as mentioned in Section 5.3 but without N20 Mallow Relief Road as mentioned in Section 2.4					
R-883 (Davis Street)	Without Development*	0.76	0.89	9	12
	With Development	0.78	0.90	9	12
N72 (Spa Walk) North	Without Development*	0.47	0.57	5	6
	With Development	0.53	0.60	6	7
N72 (Spa Walk) South	Without Development*	0.72	0.88	8	13
	With Development	0.75	0.91	9	14
Without Modal Shift Approach as mentioned in Section 5.3 but with N20 Mallow Relief Road as mentioned in Section 2.4					
R-883 (Davis Street)	Without Development*	0.65	0.75	7	8
	With Development	0.66	0.77	7	8
N72 (Spa Walk) North	Without Development*	0.40	0.48	4	5
	With Development	0.45	0.51	5	6
N72 (Spa Walk) South	Without Development*	0.61	0.75	7	9
	With Development	0.64	0.78	7	10

Note: * Hazel Brooke development and Clonmore development are included under without development scenario.

The normal design threshold for the degree of saturation (DOS) is 0.9 for a signalized junction. The results shown in **Table 6.14** demonstrate that in the without modal shift approach as mentioned in **Section 5.3** and N20 Mallow Relief Road as mentioned in **Section 2.4**, Junction 4 will operate within the normal design threshold in the morning peak hour in 2041 for both the “without” development and “with” development scenarios. However, the R-883 (Davis Street) arm and N72 (Spa Walk) South arm on this junction will exceed the normal design threshold in the evening peak hour in 2041 for both the “without” development and “with” development (without modal shift approach and N20 Mallow Relief Road) scenarios, resulting in queues and delays for motorists evident. Once a junction is nearing or at capacity, any slight increase, whether it is background traffic growth or other causes, will give rise to a noticeable increase in queues/delays.

With modal shift approach as mentioned in **Section 5.3** (but without N20 Mallow Relief Road as mentioned in **Section 2.4**), the results shown in **Table 6.14** demonstrate that Junction 4 will operate within the normal design threshold in the morning peak hour in 2041 for both the “without” development and “with” development scenarios, and in the evening peak hour in 2041 for the “without” development scenario. However, the N72 (Spa Walk) South arm on this junction will slightly exceed the normal design threshold (but still less than its theoretical capacity of 1.0) in the evening peak hour in 2041 for the “with” development (with modal shift approach but without N20 Mallow Relief Road) scenario, resulting in queues and delays for motorists.

The likely development of the N72/73 to N20 Mallow Relief Road as shown in **Figure 2.8** is expected to be in place in advance of the 2041 Design Year. After completion of the N/M20 and/or the N72/N73 to N20 Mallow Relief Road, the performance of this junction will be improved due to reduction of traffic flows entering / exiting this junction. By comparing the N72/N73 to N20 Malow Relief Road ‘do minimum’ and ‘Preferred Route Option’ development scenarios, we are informed that traffic volumes between Oliver’s Cross (N72/N73 junction) and Mallow Town (at 50/80 speed limit sign at Spa House) are estimated to be reduced by 27.6% and 25.0% in the Opening Year 2026 and Design Year 2041 respectively with no HGV traffic permitted within the 50kph speed limit zone west of Oliver’s Cross apart from restricted periods for deliveries.

In the with N20 Mallow Relief Road as mentioned in **Section 2.4** (but without modal shift approach as mentioned in **Section 5.3**), the results shown in **Table 6.14** demonstrate that Junction 4 will operate within the normal design threshold in both the morning and evening peak hours in 2041 for both the “without” development and “with” development scenarios.

The above results present a “worst-case” situation because the assessment has included an “all red stage”, which is called on demand and may appear occasionally, for pedestrian movement. Without calling an “all red” stage for pedestrian movement, the junction performance will be improved. Moreover, it is clear that the impact on this junction will be mainly due to regular background traffic growth and not by the proposed development by itself so traffic from the proposed development will not cause a significant impact on this junction.

J5: R-620 (Bridge Street + Mallow Bridge) / N-72 (Park Road)

Table 6.15: 2041 Design Year Junction Capacity Analysis for Junction 5

Approach Arm	Scenario	Max. DOS		Max. Queue (PCU)	
		AM	PM	AM	PM
R-620 (Mallow Bridge)	Without Development*	0.47	0.60	7	12
	With Development	0.47	0.60	7	12
N72 (Park Road)	Without Development*	0.44	0.65	3	9
	With Development	0.44	0.65	3	9
R-620 (Bridge Street)	Without Development*	0.53	0.70	7	11
	With Development	0.57	0.72	7	12

Note: * Hazel Brooke development and Clonmore development are included under without development scenario.

The normal design threshold for the degree of saturation (DOS) is 0.9 for a signalized junction. The results shown in **Table 6.15** demonstrate that Junction 5 will operate within the normal design threshold in both the morning and evening peak hours in 2041 for both the “without” development and “with” development scenarios. The analysis indicates that traffic from the proposed development will not have significant impact on this junction.

J6: R-620 (Mallow Bridge + Ballydaheen) / R-619 (Mill Street) / L-1223 (Bear Forest Lwr)**Table 6.16: 2041 Design Year Junction Capacity Analysis for Junction 6**

Approach Arm	Scenario	Max. DOS		Max. Queue (PCU)	
		AM	PM	AM	PM
Without Modal Shift Approach as mentioned in Section 5.3 and without N20 Mallow Relief Road as mentioned in Section 2.4					
R-620 (Mallow Bridge)	Without Development*	1.37	1.20	83	53
	With Development	1.41	1.22	91	57
L-1223 (Bear Forest Lwr)	Without Development*	1.81	1.46	92	44
	With Development	1.89	1.49	100	46
R-620 (Ballydaheen)	Without Development*	1.45	1.23	134	69
	With Development	1.47	1.25	143	76
R-619 (Mill Street)	Without Development*	0.49	0.63	10	12
	With Development	0.49	0.63	10	12
With Modal Shift Approach as mentioned in Section 5.3 but without N20 Mallow Relief Road as mentioned in Section 2.4					
R-620 (Mallow Bridge)	Without Development*	1.21	1.06	53	33
	With Development	1.24	1.08	57	35
L-1223 (Bear Forest Lwr)	Without Development*	1.37	1.12	44	19
	With Development	1.43	1.13	49	20
R-620 (Ballydaheen)	Without Development*	1.24	1.05	68	31
	With Development	1.26	1.07	74	34
R-619 (Mill Street)	Without Development*	0.42	0.54	9	10
	With Development	0.42	0.54	9	10
Without Modal Shift Approach as mentioned in Section 5.3 but with N20 Mallow Relief Road as mentioned in Section 2.4					
R-620 (Mallow Bridge)	Without Development*	1.03	0.90	29	20
	With Development	1.05	0.92	32	21
L-1223 (Bear Forest Lwr)	Without Development*	0.99	0.81	13	6
	With Development	1.02	0.83	15	7
R-620 (Ballydaheen)	Without Development*	1.02	0.88	25	13
	With Development	1.04	0.90	27	14
R-619 (Mill Street)	Without Development*	0.35	0.45	8	9
	With Development	0.35	0.45	8	9

Note: * Hazel Brooke development and Clonmore development are included under without development scenario.

The normal design threshold for the degree of saturation (DOS) is 0.9 for a signalized junction. The results shown in **Table 6.16** demonstrate that without or with modal shift approach as mentioned in **Section 5.3** (but without N20 Mallow Relief Road as mentioned in **Section 2.4**), the R-620 (Mallow Bridge) arm, L-1223 (Bear Forest Lwr) arm and R-620 (Ballydaheen) arm on Junction 6 will exceed the normal design threshold in both the morning and evening peak hours in 2041 for both the “without” development and “with”

development scenarios, resulting in queues and delays for motorists evident. Once a junction is nearing or at capacity, any slight increase, whether it is background traffic growth or other causes, will give rise to a noticeable increase in queues/ delays.

The likely development of the N72/73 to N20 Mallow Relief Road as shown in **Figure 2.8** is expected to be in place in advance of the 2041 Design Year. After completion of the N/M20 and/or the N72/N73 to N20 Mallow Relief Road, the performance of this junction will be improved due to reduction of traffic flows entering / exiting this junction. By comparing the N72/N73 to N20 Malow Relief Road 'do minimum' and 'Preferred Route Option' development scenarios, we are informed that traffic volumes between Oliver's Cross (N72/N73 junction) and Mallow Town (at 50/80 speed limit sign at Spa House) are estimated to be reduced by 27.6% and 25.0% in the Opening Year 2026 and Design Year 2041 respectively with no HGV traffic permitted within the 50kph speed limit zone west of Oliver's Cross apart from a restricted period for deliveries.

In the with N20 Mallow Relief Road as mentioned in **Section 2.4** (but without modal shift approach as mentioned in **Section 5.3**), the results shown in **Table 6.16** demonstrate that the R-620 (Mallow Bridge) arm, L-1223 (Bear Forest Lwr) arm and R-620 (Ballydaheen) arm on Junction 6 will exceed the normal design threshold in the morning peak hour in 2041 for both the "without" development and "with" development scenarios. In the evening peak hour, Junction 6 will reach the normal design threshold in 2041 for the "without" development (with N20 Mallow Relief Road but without modal shift approach) scenario. However, the R-620 (Mallow Bridge) arm on this junction will slightly exceed the normal design threshold (but still less than its theoretical capacity of 1.0) in the evening peak hour in 2041 for the "with" development scenario, resulting in queue and delays for motorists evident.

The above results present a "worst-case" situation because the assessment has included an "all red" stage, which is called on demand and may appear occasionally, for pedestrian movement. Without calling an "all red" stage for pedestrian movement, the junction performance will be improved. Moreover, it is clear that the impact on this junction will be mainly due to regular background traffic growth and not by the proposed development by itself so traffic from the proposed development will not cause a significant impact on this junction.

J7: L-5320 / L-5331

Table 6.17: 2041 Design Year Junction Capacity Analysis for Junction 7

Approach Arm	Scenario	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
		AM	PM	AM	PM	AM	PM
L-5331 North	Without Development*	0	0	0	0	0	0
	With Development	0	0	0	0	0	0
L-5320	Without Development*	0.03	0.10	0	0	7	7
	With Development	0.04	0.11	0	0	7	7
L-5331 South	Without Development*	0.14	0.05	0	0	7	6
	With Development	0.19	0.05	0	0	7	6

Note: * Hazel Brooke development and Clonmore development are included under without development scenario.

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. The results shown in **Table 6.17** demonstrate that Junction 7 will operate within the normal design threshold in both the morning and evening peak hours in 2041 for both the "without" development and "with" development scenarios. The analysis indicates that traffic from the proposed development will not have significant impact on this junction.

J8: L-5320 / N-72

Table 6.18: 2041 Design Year Junction Capacity Analysis for Junction 8

Approach Arm	Scenario	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
		AM	PM	AM	PM	AM	PM
N72 West	Without Development*	0	0	0	0	0	0
	With Development	0	0	0	0	0	0
L-5320	Without Development*	0.17	0.09	0	0	9	9
	With Development	0.22	0.09	0	0	9	9
N72 East	Without Development*	0.03	0.15	0	0	5	5
	With Development	0.03	0.16	0	0	5	5

Note: * Hazel Brooke development and Clonmore development are included under without development scenario.

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. The results shown in **Table 6.18** demonstrate that Junction 8 will operate within the normal design threshold in both the morning and evening peak hours in 2041 for both the “without” development and “with” development scenarios. The analysis indicates that traffic from the proposed development will not have significant impact on this junction.

J9: L-1207 (Ironmine Bridge Road) / L-9048 (Clifden) / L-1237 (Batchelor’s Walk)

Table 6.19: 2041 Design Year Junction Capacity Analysis for Junction 9

Approach Arm	Scenario	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
		AM	PM	AM	PM	AM	PM
Without Modal Shift Approach as mentioned in Section 5.3 and without N20 Mallow Relief Road as mentioned in Section 2.4							
L-1207 (Ironmine Bridge Road)	Without Development*	0	0	0	0	5	4
	With Development	0	0	0	0	5	4
L-1237 (Batchelor's Walk)	Without Development*	0.31	0.86	0	5	11	49
	With Development	0.37	0.97	1	11	12	185
L-9048 (Clifden)	Without Development*	0.10	0.06	0	0	7	7
	With Development	0.11	0.06	0	0	7	7
Estate Access	Without Development*	0	0	0	0	0	0
	With Development	0	0	0	0	0	0
With Modal Shift Approach as mentioned in Section 5.3 but without N20 Mallow Relief Road as mentioned in Section 2.4							
L-1207 (Ironmine Bridge Road)	Without Development*	0	0	0	0	5	5
	With Development	0	0	0	0	5	5
L-1237 (Batchelor's Walk)	Without Development*	0.27	0.74	0	3	10	28
	With Development	0.31	0.83	1	4	11	42
	Without Development*	0.09	0.05	0	0	7	7

Approach Arm	Scenario	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
		AM	PM	AM	PM	AM	PM
L-9048 (Clifden)	With Development	0.09	0.05	0	0	7	7
Estate Access	Without Development*	0	0	0	0	0	0
	With Development	0	0	0	0	0	0
Without Modal Shift Approach as mentioned in Section 5.3 but with N20 Mallow Relief Road as mentioned in Section 2.4							
L-1207 (Ironmine Bridge Road)	Without Development*	0	0	0	0	0	0
	With Development	0	0	0	0	0	0
L-1237 (Batchelor's Walk)	Without Development*	0.22	0.61	0	2	9	19
	With Development	0.26	0.68	0	2	10	23
L-9048 (Clifden)	Without Development*	0.07	0.04	0	0	7	6
	With Development	0.08	0.04	0	0	7	7
Estate Access	Without Development*	0	0	0	0	0	0
	With Development	0	0	0	0	0	0

Note: * Hazel Brooke development and Clonmore development are included under without development scenario.

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. The results shown in **Table 6.19** demonstrate that in the without modal shift approach as mentioned in **Section 5.3** and N20 Mallow Relief Road as mentioned in **Section 2.4**, Junction 9 will operate within the normal design threshold in the morning peak hour in 2041 for both the “without” development and “with” development scenarios. However, the L-1237 (Batchelor’s Walk) arm on this junction will slightly exceed the normal design threshold (but still less than its theoretical capacity of 1.0) in the evening peak hour in 2041 for both the “without” development and “with” development (without modal shift approach and N20 Mallow Relief Road) scenarios, resulting in queues and delays for motorists evident. Once a junction is nearing or at capacity, any slight increase, whether it is background traffic growth or other causes, will give rise to a noticeable increase in queues/ delays.

In the with modal shift approach as mentioned in **Section 5.3** (but without N20 Mallow Relief Road as mentioned in **Section 2.4**), the results shown in **Table 6.19** demonstrate that Junction 9 will operate within the normal design threshold in both the morning and evening peak hours in 2041 for both the “without” development and “with” development scenarios. It should be also noted that the L-1237 (Batchelor’s Walk) arm on this junction will begin to approach the design threshold, resulting in minor queues and delays for motorists.

The likely development of the N72/73 to N20 Mallow Relief Road as shown in **Figure 2.8** is expected to be in place in advance of the 2041 Design Year. After completion of the N/M20 and/or the N72/N73 to N20 Mallow Relief Road, the performance of this junction will be improved due to reduction of traffic flows entering / exiting this junction. By comparing the N72/N73 to N20 Mallow Relief Road ‘do minimum’ and ‘Preferred Route Option’ development scenarios, we are informed that traffic volumes between Oliver’s Cross (N72/N73 junction) and Mallow Town (at 50/80 speed limit sign at Spa House) are estimated to be reduced by 27.6% and 25.0% in the Opening Year 2026 and Design Year 2041 respectively with no HGV traffic permitted except for restricted periods for deliveries.

In the with N20 Mallow Relief Road as mentioned in **Section 2.4** (but without modal shift approach as mentioned in **Section 5.3**), the results shown in **Table 6.19** demonstrate that Junction 9 will operate within the normal design threshold in both the morning and evening peak hours in 2041 for both the “without” development and “with” development scenarios.

J10: L-1237 (Upper Lacknaloocha) / L-1238 (Shortcastle Rise)**Table 6.20: 2041 Design Year Junction Capacity Analysis for Junction 10**

Approach Arm	Scenario	Max. RFC		Max. Queue (PCU)		Average Delay (Seconds)	
		AM	PM	AM	PM	AM	PM
L-1237 (Upper Lacknaloocha) North	Without Development*	0	0	0	0	0	0
	With Development	0	0	0	0	0	0
L-1238 (Shortcastle Rise)	Without Development*	0.30	0.65	0	2	10	20
	With Development	0.31	0.67	1	2	10	21
L-1237 (Upper Lacknaloocha) South	Without Development*	0.21	0.41	0	1	7	7
	With Development	0.22	0.43	0	1	7	7

Note: * Hazel Brooke development and Clonmore development are included under without development scenario.

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a priority junction. The results shown in **Table 6.20** demonstrate that Junction 10 will operate within the normal design threshold in both the morning and evening peak hours in 2041 for both the “without” development and “with” development scenarios. The analysis indicates that traffic from the proposed development will not have significant impact on this junction.

A sample of traffic modelling output files is included in this report in **Appendix C**.

6.4 Possible Future Toucan Crossing Impact

It is proposed to provide an uncontrolled shared crossing to be used by pedestrians and cyclists to cross the L-5331 to the south-west of the development. Following the Opinion from Cork County Council following the pre-planning LRD planning submission, this crossing was moved further north from the proposed N72 signalised junction to reduce its impact on this junction and closer to the L-5331 / L-1246 in order to better address a desire line between the development site and mallow Town along the footpath on the L-1246.

This section contains an assessment of what impact this crossing would have on the Signalised junction if it was upgraded to a Toucan crossing to coincide with the construction of an active travel/greenway linking Mallow Town with the future N72/N73 to N20 Mallow Relief Road including online and offline active travel routes.

For this assessment, it is assumed that any future Toucan crossing across the L-5331 would be linked to the proposed N72 signalised junction and therefore TRANSYT (Traffic Network Study Tool) from the Transport Research Laboratory's (TRL) was used for this assessment.

6.4.1 Objectives of this Assessment

It should be noted that the distance between the Stop line of Junction 3 and the Stop line of the new signalised crossing is approximately 40 metres as shown in **Figure 6.1**. The objective of this assessment is to assess the junction capacity of Junction 3 and new signalised crossing in 2026 Opening Year and 2041 Design Year (Opening Year plus 15 years) for the “with” development scenario. Additionally, queue lengths at the above-mentioned junctions have been assessed to check whether the anticipated queue lengths will extend to the upstream junction.

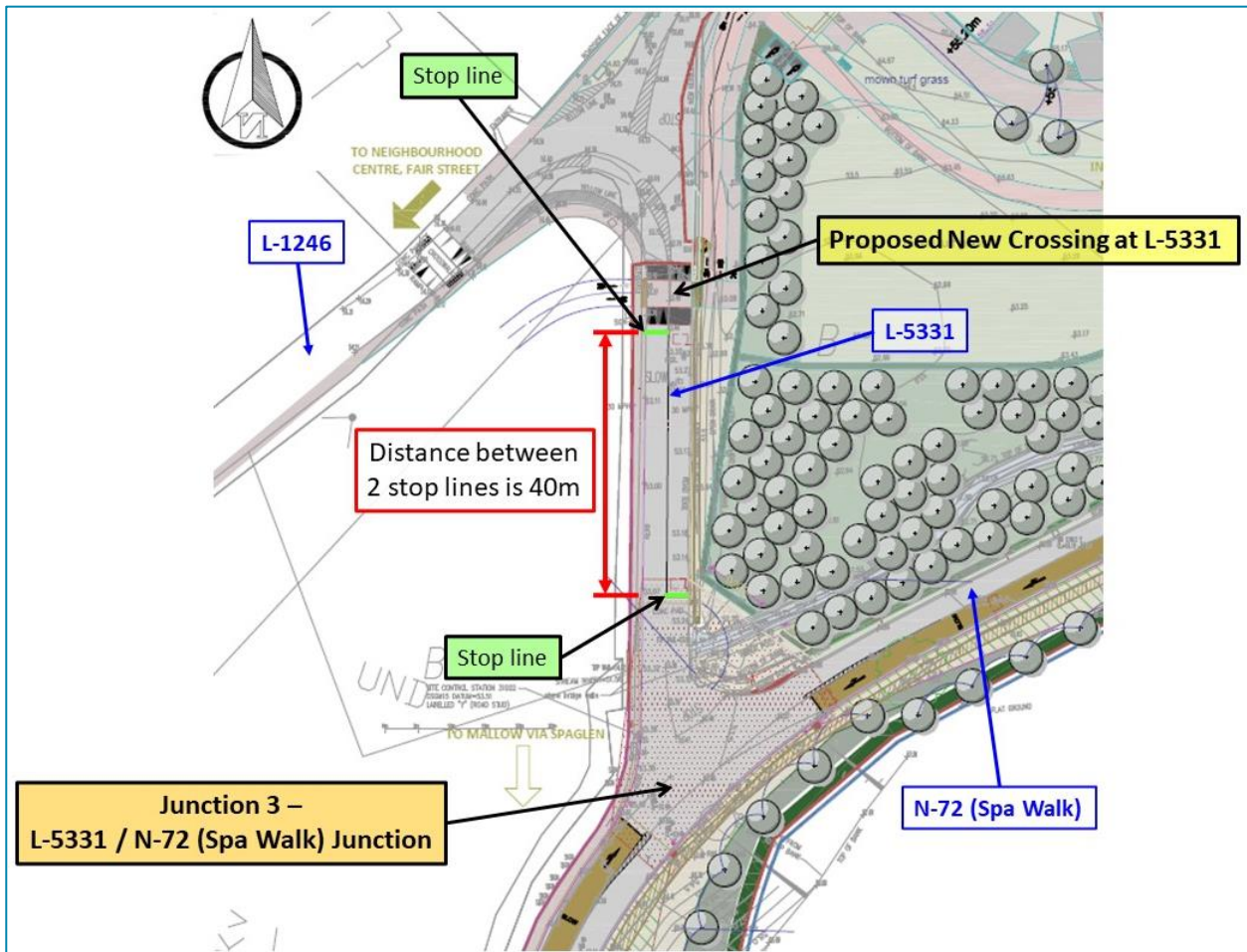


Figure 6.1: Proposed Scheme at Junction 3 and New Signalised Crossing at L-5331

6.4.2 Proposed Phasing / Staging of Junction 3 and New Signalised Crossing at L-5331

As Junction 3 is close to the possible future Toucan signalised crossing at L-5331, these two junctions have been considered as linked junctions for assessment. **Figure 6.2** shows the proposed phasing/staging arrangements of this linked junction. If there are any vehicles turning from the N-72 to L-5331 (i.e. Phase A and Phase C at both Stage 1 and Stage 2) at Junction 3, a green light for vehicles (i.e. Phase D and Phase E at both Stage 1 and Stage 2) at the new signalised crossing at L-5331 will appear simultaneously in order to prevent queue lengths from blocking the N-72. It should be also noted that the pedestrian phase (i.e. Phase P1 at Stage 3b) at the new signalised crossing at L-5331 as shown in **Figure 6.2** is an on-demand phase. Without calling such a pedestrian phase, Stage 3a will appear after the end of Stage 2. On the other hand, when the pedestrian phase is called, Stage 3b will appear instead of Stage 3a after the end of Stage 2. To provide a worst-case scenario, Stage 3b instead of Stage 3a will be adopted for assessment.

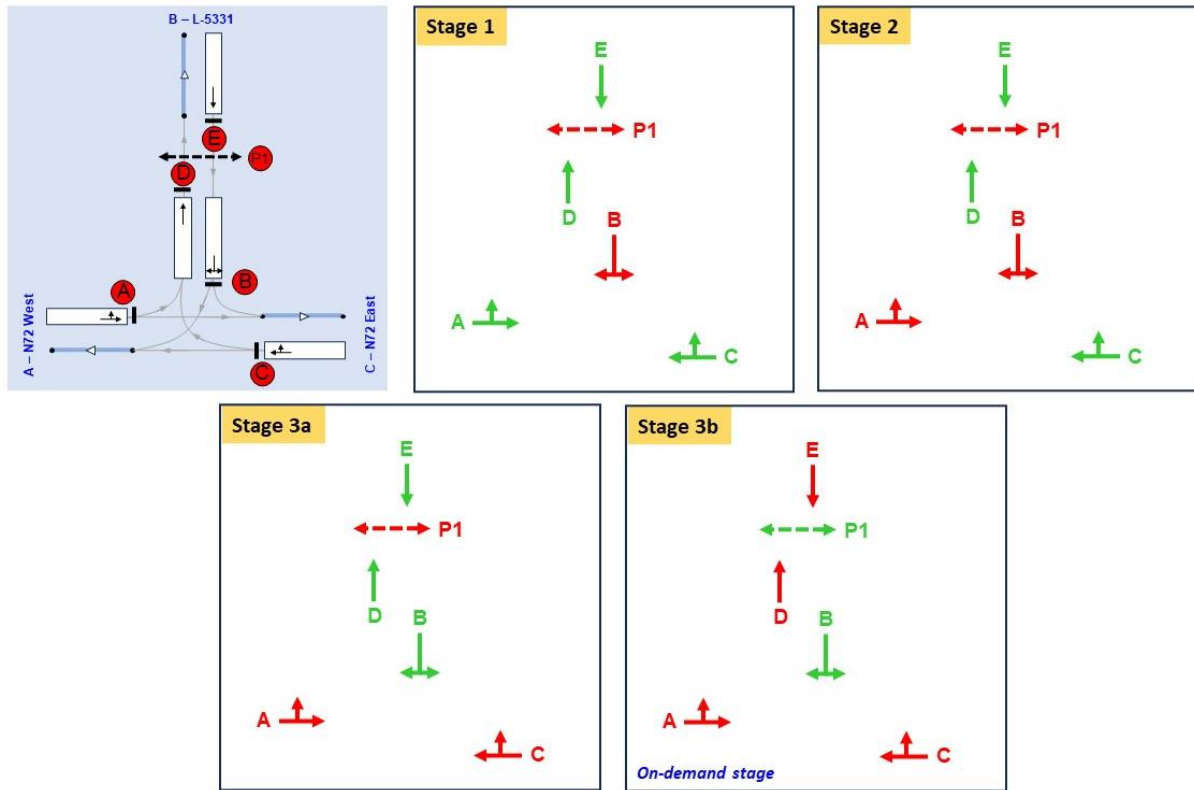


Figure 6.2: Proposed Phasing / Staging Arrangements of Junction 3 and New Signalised Crossing

6.4.3 Junction Capacity and Queue Length Assessment

A traffic capacity assessment of the Junction 3 and possible future signalised crossing at L-5331 was undertaken utilising the estimated traffic flows in 2026 Opening Year and 2041 Design Year, and the proposed phasing / staging arrangements as shown in Section 6.4.2, and TRANSYT for signalised junction.

Operational Phase 2026 Opening Year - Junction Capacity and Queue Length Assessment

A summary of the results of the analysis for the 2026 Opening Year, “with” development scenario, in the morning and evening peak hours is shown in Table 6.21 and Table 6.22.

Junction 3 – L-5331 / N-72 (Spa Walk) Junction

Table 6.21: 2026 Opening Year Junction Capacity Analysis for Junction 3

Approach Arm	Scenario	Max. DOS		Max. Queue (PCU)		Max. Queue Length (metres)**	
		AM	PM	AM	PM	AM	PM
With Proposed Housing Development & without Modal Shift Approach and without N20 Mallow Relief Road							
N72 (Spa Walk) West	With Development*	0.53	0.50	4	5	22	28
L-5331	With Development*	0.72	0.64	7	5	39	28
N72 (Spa Walk) East	With Development*	0.53	0.46	4	3	22	17
With Proposed Housing Development and with Modal Shift Approach and without N20 Mallow Relief Road							
N72 (Spa Walk) West	With Development*	0.52	0.50	4	5	22	28
L-5331	With Development*	0.71	0.63	7	5	39	28
N72 (Spa Walk) East	With Development*	0.52	0.45	4	2	22	17

Note: * Junction 3 is proposed to convert from priority junction to signalised junction with adoption of 60 seconds cycle time in the AM and PM peak hours.

** Assuming 5.5 metres per PCU.

The normal design threshold for the degree of saturation (DOS) is 0.9 for a signalized junction. The results shown in **Table 6.21** demonstrate that Junction 3 will operate within the normal design threshold in both the morning and evening peak hours in 2026 for both the “without” and “with” applying the modal shift approach.

It should be also noted that the maximum queue length at the L-5331 arm on Junction 3 in both the morning and evening peak hours in 2026 for both the “without” or “with” modal shift approaches gives rise to maximum queue length for AM at 39 metres and PM at 28 metres. This is less than 40 metres, which is the distance between the stop line of Junction 3 and the stop line of new signalised crossing at L-5331. Thus, it is anticipated that the queue length at L-5331 arm on Junction 3 in both the morning and evening peak hours in 2026 will not extend to the upstream junction (i.e. possible future signalised crossing at L-5331).

New Signalised Crossing at L-5331

Table 6.22: 2026 Opening Year Junction Capacity Analysis for New Signalised Crossing at L-5331

Approach Arm	Scenario	Max. DOS		Max. Queue (PCU)		Max. Queue Length (metres)**	
		AM	PM	AM	PM	AM	PM
With Proposed Housing Development and without Modal Shift Approach and without N20 Mallow Relief Road							
L-5331 South	With Development*	0.29	0.27	0	0	0	0
L-5331 North	With Development*	0.33	0.27	3	2	17	11
With Proposed Housing Development and with Modal Shift Approach and without N20 Mallow Relief Road							
L-5331 South	With Development*	0.28	0.26	0	0	0	0
L-5331 North	With Development*	0.32	0.26	3	2	17	11

Note: * The new signalised crossing is proposed at L-5331 with adoption of 60 seconds cycle time, inclusive of total 16 seconds for green time and flashing amber time for pedestrians and cyclists, in the AM and PM peak hours.

** Assuming 5.5 metres per PCU.

The normal design threshold for the degree of saturation (DOS) is 0.9 for a signalized junction. The results shown in **Table 6.22** demonstrate that this junction will operate within the normal design threshold in both the morning and evening peak hours in 2026 for both the “without” and “with” modal shift approach.

Additionally, it is anticipated that there is no queue at L-5331 South arm on this junction in both the morning and evening peak hours in 2026 for both the “without” or “with” modal shift approach. This is because when the vehicles turn from the N-72 to L-5331 (i.e. Phase A and Phase C at both Stage 1 and Stage 2 as shown in **Figure 6.2**) at Junction 3, a green light for vehicles (i.e. Phase D and Phase E at both Stage 1 and Stage 2 as shown in **Figure 6.2**) at the new signalised crossing at L-5331 will appear simultaneously so that it can avoid a queue at the L-5331 South arm on the new signalised crossing at L-5331.

Operational Phase 2041 Design Year - Junction Capacity and Queue Length Assessment

A summary of the results of the analysis for the 2041 Design Year (Opening Year plus 15 years), “with” development scenario, in the morning and evening peak hours is shown in **Table 6.23** and **Table 6.24**.

Junction 3 – L-5331 / N-72 (Spa Walk) Junction**Table 6.23: 2041 Design Year Junction Capacity Analysis for Junction 3**

Approach Arm	Scenario	Max. DOS		Max. Queue (PCU)		Max. Queue Length (metres)**	
		AM	PM	AM	PM	AM	PM
With Proposed Housing Development and without Modal Shift Approach and without N20 Mallow Relief Road							
N72 (Spa Walk) West	With Development*	0.64	0.59	5	6	28	33
L-5331	With Development*	0.83	0.75	9	7	50	39
N72 (Spa Walk) East	With Development*	0.70	0.64	6	4	33	22
With Proposed Housing Development and with Modal Shift Approach and without N20 Mallow Relief Road							
N72 (Spa Walk) West	With Development*	0.56	0.52	4	5	22	28
L-5331	With Development*	0.73	0.66	7	6	39	33
N72 (Spa Walk) East	With Development*	0.59	0.51	5	3	28	17

Note: * Junction 3 is proposed to convert from priority junction to signalised junction with adoption of 60 seconds cycle time in the AM and PM peak hours.

** Assuming 5.5 metres per PCU.

The normal design threshold for the degree of saturation (DOS) is 0.9 for a signalized junction. The results shown in **Table 6.23** demonstrate that Junction 3 will operate within the normal design threshold in both the morning and evening peak hours in 2041 for both the “without” and “with” applying the modal shift approach.

It should be noted that in the without modal shift approach, the maximum queue length at L-5331 arm on Junction 3 in the evening peak hour in 2041 is 39 metres, which is less than the distance between the stop line of Junction 3 and the stop line of new signalised crossing at L-5331 (i.e. 40 metres). Thus, it is anticipated that the queue length at L-5331 arm on Junction 3 in the evening peak hour in 2041 will not extend to the upstream junction (i.e. possible future signalised crossing at L-5331). In the morning peak hour, the maximum queue length at L-5331 arm on Junction 3 in 2041 is 50 metres, which is greater than the distance between the stop line of Junction 3 and the stop line of new signalised crossing at L-5331 (i.e. 40 metres).

However, in a with modal shift approach, the maximum queue length at L-5331 arm on Junction 3 in the morning peak hour in 2041 will reduce to 39 metres, which is less than the distance between the stop line of Junction 3 and the stop line of new signalised crossing at L-5331 (i.e. 40 metres). Thus, it is anticipated that the queue length at L-5331 arm on Junction 3 in the morning peak hour in 2041 can be managed with modal shift to not extend to the upstream junction (i.e. the possible future signalised crossing at L-5331).

In addition to the above, vehicle detection loops could be installed in the future close to the N72 signalised junction to ensure that in the event that the queue length extending from the Toucan crossing does not block the N72. Traffic cable ducting will already be in place as part of this proposed development.

New Signalised Crossing at L-5331**Table 6.24: 2041 Design Year Junction Capacity Analysis for New Signalised Crossing at L-5331**

Approach Arm	Scenario	Max. DOS		Max. Queue (PCU)		Max. Queue Length (metres)**	
		AM	PM	AM	PM	AM	PM
With Proposed Housing Development & without Modal Shift Approach and without N20 Mallow Relief Road							
L-5331 South	With Development*	0.34	0.31	0	0	0	0
L-5331 North	With Development*	0.38	0.31	3	3	17	17
With Proposed Housing Development and with Modal Shift Approach and without N20 Mallow Relief Road							
L-5331 South	With Development*	0.30	0.27	0	0	0	0
L-5331 North	With Development*	0.33	0.27	3	2	17	11

Note: * The new signalised crossing is proposed at L-5331 with adoption of 60 seconds cycle time, inclusive of total 16 seconds for green time and flashing amber time for pedestrians and cyclists, in the AM and PM peak hours.
** Assuming 5.5 metres per PCU.

The normal design threshold for the degree of saturation (DOS) is 0.9 for a signalized junction. The results shown in **Table 6.24** demonstrate that this junction will operate within the normal design threshold in both the morning and evening peak hours in 2041 for both the “without” and “with” applying the modal shift approach.

Additionally, it is anticipated that there is no queue at L-5331 South arm on this junction in both the morning and evening peak hours in 2041 for both the “without” or “with” modal shift approach. This is because when the vehicles turn from the N-72 to L-5331 (i.e. Phase A and Phase C at both Stage 1 and Stage 2 as shown in **Figure 6.2**) at Junction 3, a green light for vehicle (i.e. Phase D and Phase E at both Stage 1 and Stage 2 as shown in **Figure 6.2**) at the new signalised crossing at L-5331 will appear simultaneously so that it can avoid a queue at the L-5331 South arm on the new signalised crossing at L-5331.

6.4.4 Assessment Outcomes

This section presents the results of the assessment on junction capacity and queue lengths at Junction 3 – L-5331 / N-72 (Spa Walk) in the event that the proposed shared crossing of the L5331 to the south west of the development is upgraded to a signalised crossing in a 2026 Opening Year and 2041 Design Year (Opening Year plus 15 years) for the “with” development scenario.

2026 Opening Year

Junction 3 and a signalised crossing at L-5331 would operate within the normal design threshold in both the morning and evening peak hours in 2026 for both the “without” and “with” modal shift approach. Additionally, it is anticipated that both queue lengths at the L-5331 arm on Junction 3 and the L-5331 south arm at the signalised shared crossing at L-5331 will not extend to the upstream junctions in both the morning and evening peak hours.

2041 Design Year

Junction 3 and a signalised crossing at L-5331 would operate within the normal design threshold in both the morning and evening peak hours in 2041 for both the “without” and “with” modal shift approach. Additionally, it is anticipated that the queue lengths at the L-5331 South arm on Junction 3 and the L5331 south arm at

the shared surface crossing at L-5331 will not extend to the upstream junctions (i.e. Junction 3) in both the morning and evening peak hours in 2041.

For Junction 3, the queue length at the L-5331 arm on this junction will not extend to the upstream junction (i.e. new signalised crossing at L-5331) in the evening peak hour in 2041 for both the “without” and “with” modal shift approach. Moreover, the queue length of L-5331 arm on Junction 3 will also not extend to the upstream junction (i.e. new signalised crossing at L-5331) in the morning peak hour in 2041 for the “with” modal shift approach.

In addition to the above, vehicle detection loops could be installed in the future close to the N72 signalised junction to ensure that in the event that the queue length extending from the Toucan crossing does not block the N72. Traffic cable ducting will already be in place as part of this proposed development.

In summary, this sub-section concludes that Junction 3 and new signalised crossing at L-5331 will perform satisfactorily in respect of junction capacity and queue lengths.

6.5 Site Access and Layout Assessment

The proposed site layout was described in **Section 4.4** of this report.

A 50/60kmh speed limit sign is located 40m east of the existing entrance to Clonmore. Therefore a 50 KPH speed limit applies at both entrances which equates to a Design Speed of 60 KPH.

In accordance with DMURS, minimum sight distances of 59.0m are therefore required at both public road accesses from a 2.4m set-back point.

A vehicular sweep assessment (using AutoTrack™ software) was used to confirm that the site layout can accommodate all vehicle types including a large refuse lorry. Refer to Drawing No. 22201-JBB-XX-XX-DR-CR-00048 Vehicle Sweep Assessment prepared by JB Barry and Partners and contained within the planning drawing pack.

6.6 Parking Assessment

The proposed car parking provision is described in **Section 4.5** of this report. The Cork County Development Plan 2022 - 2028 has a maximum requirement of:

- 2 spaces per house (168 proposed semi-detached or terraced- houses) = 336 spaces;
- 1.25 spaces per apartment (18 one-bedroom duplex units) = 22.5 spaces; and
- 1 space per 10 pupils (50 pupil capacity) & 1 space per 3 staff (7 staff assumed) for creche = 8 spaces.

Therefore, the Development Plan requirement for this development would be for a maximum of 366.25 parking spaces (i.e. 358 for residential parking and 8 for the creche). Refer to **Table 6.25**.

Table 6.25: Proposed Parking Provision versus CCDP Parking Requirement

Unit Type	No. of Units	Parking Provision				Parking Requirement
		Resident/Staff	Visitor	Accessible	Total	
4-bed Semi	16	32			32	32
3-bed Semi	56	112			112	112
3-bed Terrace	96	192			192	192
1-bed Duplex	18	18		2	20	22
Creche	50-pupil (422m2 GFA)	7	2	1	10	8
Total	186 units + Creche	361	2	3	366	366

It is proposed to provide a total of 366 parking spaces within the development. It is proposed to provide 358 residential parking spaces (which includes 2 road-side accessible parking spaces) in accordance with the above requirement and 10 spaces for the creche (which includes 1 accessible parking space).

It is also proposed to provide 117 shared bike parking spaces as outlined in **Table 6.26**. It is assumed that those in the semi-detached and end-terrace houses will store their bicycles in their back garden.

Table 6.26: Proposed Bike Parking Provision

Building	Regular Bike	Cargo Bike
Mid Terrace Housing (48 units)	72 spaces	12 spaces
Creche	6 spaces	1 space
Duplex Apartments (18 Units)	22 spaces	4 spaces
TOTAL	100 spaces	17 spaces

A Mobility Management Plan (MMP) has also been prepared to support this pre-planning submission and is included with the planning submission.

6.7 Public Transport Assessment

As described in **Section 2.3** of this report, the subject site is not currently serviced directly by public transport. The nearest bus stop is located on Park Road (Stop No. 631060) which is circa 1.8km (21-minute walk) from the site. Mallow Train Station is located adjacent the N20 / N72 Roundabout which can be accessed via a pedestrian bridge over the N20. It is 2.3km (27-minute walk) from the site. Bus Eireann Route 523 from Mallow to Charleville passes the site on the N72 without a dedicated stop.

As described in **Section 2.4** of this report, there are two significant public road/active travel improvement projects which are relevant to this site, namely the N/M20 Cork to Limerick Road Improvement Scheme and the N72/N73 to N20 Mallow Relief Road. Both projects include active travel infrastructure for walking and cycling and improvements to public transport.

As well as advancing a road-based option, the N/M20 will also include public transport-based elements with the following objectives:

- The project will achieve intercity journey time savings of up to 30 minutes for express bus services between Cork and Limerick and improve journey times and journey time reliability for local bus services along the N20 corridor.
- The project examined a range of rail-based options and have recommended the development of a “no change” additional hourly rail service between the two cities, via Limerick Junction, reducing intercity rail journey times by over 20 minutes between Cork and Limerick. The new rail service is being recommended by the project team for consideration within the All-Island Strategic Rail Review.
- The project will facilitate improvements to connectivity by local and express bus services to public transport interchanges (Mobility Hubs) e.g. integration with Mallow and Charleville rail stations and the proposed Park and Ride sites in Blarney and Raheen.

The N72/N73 to N20 Mallow Relief Road will not only include online pedestrian and cyclist facilities along its route with full interconnectivity with the local network but will consider an offline Active Travel Route between the scheme and Mallow Train Station with a corridor which currently passes close to the site (Refer to **Figure 2.8**).

Connecting Ireland is a major public transport initiative developed by the National Transport Authority (NTA) with the aim of increasing connectivity, particularly for people living outside the major cities and towns. The plan aims to improve mobility in rural areas, and it will do this by providing better connections between

villages and towns by linking these areas with an enhanced regional network connecting cities and regional centres. The NTA started implementation of Phase 1 in January 2022. Phase 2 commenced in 2023 with enhanced services being implemented by Bus Éireann, Transport For Ireland Local Link and other operators are expected to emerge over the coming years. A number of enhanced and new services are being planned and implemented within the N/M20 transport corridor including:

- Galway – Limerick – Mallow - Cork (Route 8);
- Mitchelstown – Mallow (523);
- Charleville – Mallow (522); and
- Mallow – Fermoy – Dungarvan (9).

A Local Link service may be more feasible in the future with further residential demand in the immediate area for connection from the area to Mallow Town, the train station, Town Park bus stop, surrounding communities and amenities. It is outside of the Applicant's control to improve local public transport provision or to provide a service to the town centre. However there are "hard measures" proposed including provision of a new shared pedestrian / cyclist route through the site including a link to the neighbouring Hazel Brooke housing estate and safe, shared crossings of the L5331 public road to provide connectivity to the future active travel/greenway networks for the local area.

The Applicant is also providing for a future on-line bus stop along the site's frontage with the L-5331 by local widening of the footpath into the grass verge. This will help to improve the modal split and assist with a shift away from car dependency to walking and cycling.

It may also be possible in the future to accommodate a bus stop closer to the site and the surrounding residential area in association with any future Cork County Council upgrade of the N72/L5331 (such as a future roundabout). Currently Bus Route 523 passes the site on the N72 with no bus stop near the site and surrounding residential estates and the provision of such a bus-stop would assist with attracting additional residents in the area to the use of public transport.

The Applicant is limited in options to encourage a modal shift from vehicular trips to more sustainable modes of transport but the following hard measures proposed under this scheme will assist in this regard:

- Removing all visitor spaces (i.e. the 0.25 spaces per unit) associated with the 18 no. duplex units.
- Providing 72 regular size bike parking spaces and 29 cargo bike spaces.
- Providing greater pedestrian/cyclist connectivity between the proposed development and the neighbouring Hazel Brooke residential development.
- Providing a shared 3.0m amenity path through the scheme to integrate with future active travel network proposed by Cork County Council.
- Providing 4 no. shared uncontrolled crossings on the L5331 which can be upgraded to Toucan crossings in the future to link to the planned active travel network.
- Provision of significant road improvements along the L5331 to include a new footpath / cycle track along its southern side.
- Provision of space for a possible on-line bus stop on the L5331 which may be used by a future Local Link bus service which might be progressed following an increase in demand.
- Paying a financial contribution towards Cork County Council's plans for the upgrade of the L1246-0 which will significantly enhance access from the area to schools and the town centre using active travel considered critical for the development of this area.

6.8 Access for People with Disabilities

In term of pedestrian access, all footpaths will be flush with the road surface or raised crossing provided at dedicated crossing points. All uncontrolled crossing points will contain buff colour tactile paving in accordance with the Traffic Management Guidelines and DMURS. As well as driveway parking, two accessible parking spaces are located within the shared road-side parking area adjacent to the proposed duplex units.

6.9 Servicing Arrangements

A vehicular sweep assessment (using AutoTrack software) was used to confirm that the site layout can accommodate all vehicle types. Refer to Drawing No. 22201-JBB-XX-XX-DR-CR-00048 Vehicle Sweep Assessment prepared by JB Barry and Partners and contained within the planning application drawing pack.

6.10 Construction Stage Assessment

A Construction Management Plan has been prepared by the Applicant and included as part of this planning submission to ensure that proper procedures are put in place to minimise the impact of the construction phase on the existing roads and on the surrounding environment in general. This Construction Management Plan will be updated before construction commences to include real-time consideration of construction phasing and other construction projects taking place in the area.

The overall construction period for the development is expected to be approximately 2.5 years.

Truck movements are expected to be relatively evenly spread throughout the day. As previously discussed, the truck movements associated with earth moving will be generally internal. The majority of light goods vehicles (i.e. cars and van) and all of HGV's (i.e. deliveries such as concrete/mortar, blocks, sand and stone) generated by the site will travel to the site from the N72 and use the shortest path to the site via the section of the L5331 along the western boundary of the site. Also refer to **Section 7** of this report on mitigation measures.

Approximately 16 additional heavy goods two-way movements will be generated onto the surrounding road network each day for the construction period. This would average at approximately 1 HGV per hour in each direction. All HGV drivers and suppliers will be instructed to avoid the morning and evening peak hour periods and only deliver before 8:00am or between 9:00am and 4:30pm. The existing road network has the capacity to cope with these additional movements.

Approximately 114 cars or light goods vehicle two-way movements will be generated on the surrounding road network each day for the construction period. This would average at approximately 16 two-way trips during the peak morning and evening peak hours and 8 two-way trips per hour in each direction from 9.00am to 5.00pm each weekday. The existing road network has the capacity to cope with these short-term movements.

In summary, traffic generated during the construction phase of the proposed development will have minimal impact on existing network flows on these roadways when dispersed throughout the transport system. Construction movements will be for a limited period only and their impacts are considered to be short-term.

SECTION 7: Mitigation Measures

7.1 Proposed Public Road Improvement Works at N72/L5331 Junction

In order to mitigate against the additional trips generated by the development, it is proposed to improve the L-5331 / N72 junction as follows:

- Signalise the junction to improve the safety of the junction while ensuring the operating capacity of this junction.
- Provide the necessary forward, stopping and sight distances at the new junction by reducing the existing embankments to level ground for the required visibility splays.
- 50.0m of high friction buff colour road surfacing in advance of both Stop Lines on the N72
- Existing public lighting extended further east on the N72 to circa 80m in advance of the Stop Line.
- Stop Lines set-back to accommodate HGV turning following a Vehicle Swept Path Assessment (AutoTrack™)
- Corner radius improved at the bridge with additional crash barrier on the northeastern corner to accommodate HGV turning following a Vehicle Swept Path Assessment (AutoTrack™)
- Advance Signal Ahead warning signs included on all arms of the junction
- Road Arrow and Slow road markings included on the N72 approaches
- Vehicle Detection Loops and Radar incorporated to optimise Signal Stage lengths to control queue lengths.

The design of the N72 / L5331 signalised junction is in accordance with the 'The Geometric Layout of Signal-Controlled Junctions and Signalised Roundabouts' standard (TII: DN-GEO-03044 Jan 2005) and has been discussed and agreed in principle with Cork County Council and the Cork National Roads Design Office.

In support of this planning application and in accordance with the TII's 'Design Phase Procedure for Road Safety Improvement Schemes, Urban Renewal Schemes and Local Improvement Schemes' (DN-GEO-03030), a Design Report was also submitted to the TII in respect to the proposed improvements of the N72 Signalised Junction. This Design Report is currently being considered by the TII.

7.2 Construction Traffic Management Plan

A Construction Management Plan has been prepared by the Applicant to ensure that proper procedures are put in place to minimise the impact of the construction phase on the existing roads and on the surrounding environment in general. This plan will outline haul routes that only use the N20, N72, N73 and the shorter section of L-5331. All other local routes will be restricted to LV traffic only. Deliveries are to be restricted to non-peak hour periods.

The above mentioned N72 / L5331 signalised junction improvement works will be carried out in the first phase of the development, to ensure that construction traffic will have sufficient road widths to facilitate safe working.

7.3 Public Road Improvement Projects

There are two large-scale public works projects at preliminary design stage which will impact positively on the traffic regime in the Mallow area generally and which will have particular positive impacts on traffic volumes in the vicinity of the proposed development, notably the N72 in the Spa Glen / Ballyvinitier area.

The N/M20 project and the N72/N73 to N20 Mallow Relief Road project will assist with reducing volumes of traffic through Mallow town and its environs and will thereby facilitate an improved traffic environment in the vicinity of the proposed development. Based on current modelling for the N72/N73 to N20 Mallow Relief Road it is estimated that traffic flows on the N72 in the vicinity of the development will be reduced by approximately 27.6% and 25.0% in the Opening Year 2026 and Design Year 2041 on completion of these

projects with no HGV traffic permitted within the 50kph speed limit zone west of Oliver's Cross apart from restricted periods for deliveries.

The assessments carried out above do not take account of the likely reduced volumes of traffic at the various junctions as a result of these public road improvements and the assessments can therefore be considered to be conservative in this context.

7.4 Connections to Active Travel Routes and Public Transport Infrastructure

It is proposed to provide 4 no. shared uncontrolled crossings on the L5331 as part of the development which can be upgraded to a Toucan crossing in the future to coincide with planned active travel networks in the area.

It is proposed to provide greater pedestrian/cyclist connectivity between the proposed development and the neighbouring Hazel Brooke residential development.

It is proposed to provide a shared 3.0m amenity path through the scheme to integrate with future active travel network proposed by Cork County Council.

It is proposed to provide a new footpath / cycle track along the southern side of the L5331 as part of the development.

It is proposed to provide space for a possible on-line bus stop on the L5331 which may be used by a future Local Link bus service which might be progressed following an increase in demand.

A financial contribution is to be levied on the development towards Cork County Council's plans for the upgrade of the L1246-0 which will significantly enhance access from the area to schools and the town centre using active travel considered critical for the development of this area.

A Technical Note entitled 'Transport and Mobility and Connectivity' has been prepared as a separate document outlining the proposals which facilitate connections to planned and possible future active travel and public transport infrastructure in the vicinity of the proposed development.

SECTION 8: SUMMARY & CONCLUSION

This report has been prepared to assess potential traffic and transport impacts arising from the proposed development. The proposed development consists of 186 new residential units and a creche.

As discussed in **Section 3.1** of this report, a combination of commissioned traffic surveys in August 2022 and historical traffic surveys from 2017 were used in this assessment. Expected trip generation rates for the proposed development were estimated using the surveyed trip rates for the existing, adjacent Hazel Brooke residential development and the TRICS database was used for creche trip rates. It is estimated that there will be a total of 60 trips inbound and 126 trips outbound in the morning peak hour and 80 trips inbound and 67 trips outbound in the evening peak hour on completion of the development.

A traffic modelling exercise was carried out on a number of public road junctions in the vicinity of the proposed development as agreed with Cork County Council. The objective of the modelling exercise was to assess the direct impacts resulting from traffic generated by the proposed development on these key junctions in the operational phase of the development. The anticipated traffic associated with the proposed development was applied to the various junction models.

2024 Baseline Year (Without Development)

In 2024 baseline year, all junctions (except Junction 6) are operating within the normal design threshold in both the morning and evening peak hours. Junction 6 is operating above the normal design threshold in both the morning and evening peak hours in 2024 baseline year. It should be also noted that the R-620 (Mallow Bridge) arm, L-1223 (Bear Forest Lwr) arm and R-620 (Ballydaheen) arm on Junction 6 are operating slightly over the normal design threshold (but still less than its theoretical capacity of 1.0) in the evening peak hour in 2024 baseline year.

2026 Opening Year

In the 2026 Opening Year in a without modal shift approach as mentioned in **Section 5.3**, all junctions (except Junction 6) will operate within the normal design threshold in both the morning and evening peak hours in 2026 for both the “without” development and “with” development scenarios. With a modal shift approach, the performance of Junction 6 will slightly improve but still exceed the normal design threshold in both the morning and evening peak hours in 2026 for both the “without” development and “with” development scenarios.

For Junction 6, the results present a “worst-case” situation because the assessment has included an “all red” stage, which is called on demand and may appear occasionally, for pedestrian movement. Without calling an “all red” stage for pedestrian movement, the junction performance will be improved. Moreover, it is clear that the impact on this junction will be mainly due to regular background traffic growth and not from the proposed development itself so traffic from the proposed development will not cause a significant impact on this junction.

It should be also noted that with the proposed N72/L5331 junction improvement scheme (i.e. conversion from priority junction to signalised junction) at Junction 3 as mentioned in **Section 4.3**, this junction will still operate within the normal design threshold in both the morning and evening peak hours in 2026 for the “with” development and without modal shift scenario.

2041 Design Year (Opening year plus 15 years)

In the Design Year 2041 (opening year plus 15 years) in a without modal shift approach as mentioned in **Section 5.3** and without N20 Mallow Relief Road as mentioned in **Section 2.4**, all junctions (except Junction 3, Junction 4, Junction 6 and Junction 9) will operate within the normal design threshold in both the morning and evening peak hours in 2041 for both the “without” development and “with” development scenarios. However, the following junctions will exceed the normal design threshold with queues and delays for motorists becoming evident:-

- Junction 3 [L-5331 arm] - in the morning peak hour in 2041 for the “with” development scenario (but still less than its theoretical capacity of 1.0);
- Junction 4 [R-883 (Davis Street) arm and N72 (Spa Walk) South arm] - in the evening peak hour in 2041 for both the “without” development and “with” development scenarios;
- Junction 6 [R-620 (Mallow Bridge) arm, L-1223 (Bear Forest Lwr) arm and R-620 (Ballydaheen)] - in both the morning and evening peak hours in 2041 for both the “without” development and “with” development scenarios; and
- Junction 9 [L-1237 (Batchelor’s Walk) arm] - in the evening peak hour in 2041 for both the “without” development and “with” development scenarios (but still less than its theoretical capacity of 1.0 for both scenarios).

To enhance the operating capacity and improve safety at Junction 3, it is proposed to convert this junction from a priority junction to a signalised junction as mentioned **Section 4.3**. Based on this proposed improvement scheme, Junction 3 will operate within the normal design threshold in both the morning and evening peak hours in 2041 for the “with” development and without modal shift scenario.

In a with N20 Mallow Relief Road (but without modal shift approach), Junction 4 will operate within the normal design threshold in both the morning and evening peak hours in 2041 for both the “without” development and “with” development scenarios.

In a with modal shift approach (but without N20 Mallow Relief Road) / with N20 Mallow Relief Road (but without modal shift approach), Junction 6 will also reach / exceed the normal design threshold in the morning and evening peak hours in 2041 for both the “without” development and “with” development scenarios while Junction 9 will operate within the normal design threshold in the morning and evening peak hours in 2041 for both the “without” development and “with” development scenarios.

For Junction 4 and Junction 6, the results present a “worst-case” situation because the assessment has included an “all red” stage, which is called on demand and may appear occasionally, for pedestrian movement. Without calling an “all red” stage for pedestrian movement, the junction performance will be improved. Moreover, it is clear that the impact on Junction 4 and Junction 6 will be mainly due to regular background traffic growth and not the proposed development itself so traffic from the proposed development will not cause a significant impact on these junctions.

The assessments above indicate that all junctions in the immediate vicinity of the proposed development (Junctions 1, 2 and 8, and Junction 3 with proposed improvement scheme) will operate within capacity up to the 2041 Design Year, even without accounting for a modal shift in accordance with that planned under the County Development Plan 2022-2028 and the future reductions in vehicle traffic in the area likely to result from the development of the N/M20 and N72/N73 to N20 Mallow Relief Road.

The assessments also indicate that junctions further from the development site in Mallow Town (Junction 6) are likely to operate above capacity in 2026 and 2041 but that the traffic generated by the proposed development does not have a significant impact on these junction capacity issues which are caused by growth in background traffic generally. The public road improvement works on the N/M20 and the N72/N73 to N20 Mallow Relief Road will improve the situation at these junctions by way of reductions in traffic volumes.

The analyses also indicates that traffic from the proposed development will not have significant impact on these junctions.

N72 / L5331 Signalised Junction

It is proposed to signalise the existing N72 / L5331 priority junction. The design is in accordance with the ‘The Geometric Layout of Signal-Controlled Junctions and Signalised Roundabouts’ standard (TII: DN-GEO-03044 Jan 2005) and has been discussed and agree in principle with Cork County Council and the Cork National Roads Design Office.

In support of this planning application and in accordance with the TII's 'Design Phase Procedure for Road Safety Improvement Schemes, Urban Renewal Schemes and Local Improvement Schemes' (DN-GEO-03030), a Design Report was also submitted to the TII in respect to the proposed improvements of the N72 Signalised Junction. This Design Report is currently being considered by the TII.

Parking Provision

It is proposed to provide a total of 366 car-parking spaces, which includes 356 spaces for proposed houses and duplexes and 10 spaces for the proposed creche, within the development. The Cork County Development Plan 2022-2028 maximum requirement for this development would be 366 parking spaces (i.e. 358 for residential parking and 8 for the creche). It is also proposed to provide 100 regular size bike parking spaces and 17 cargo bike spaces for the mid-terraces houses, duplex apartments and the Creche.

Connections to Active Travel Routes and Public Transport Infrastructure

It is proposed to provide:

- 4 no. shared uncontrolled crossings on the L5331.
- greater pedestrian/cyclist connectivity with the neighbouring Hazel Brooke residential development.
- a shared 3.0m amenity path through the scheme to integrate with the future active travel network.
- a new footpath / cycle track along the southern side of the L5331.
- space for a possible on-line bus stop on the L5331 which may be used by a future Local Link bus service

Also, the Applicant is to be levied a financial contribution towards Cork County Council's plans for the upgrade of the L1246-0 which will significantly enhance connectivity to/from the area.

Construction Management Plan

A Construction Management Plan has been prepared by the Applicant to ensure that proper procedures are put in place to minimise the impact of the construction phase on the existing roads and on the surrounding environment in general.

The proposed N72 / L5331 signalised junction improvement works will be carried out at the early stages of the development to ensure that construction traffic will have sufficient road widths to facilitate safe working.

Appendix A: Survey Data Used in the Assessment

9 TRAFFIC ASSESSMENT

9.1 CURRENT YEAR TRAFFIC PATTERNS

The existing network is modelled with existing traffic flow directions. Base year with entry/exit flow conditions as indicated below.

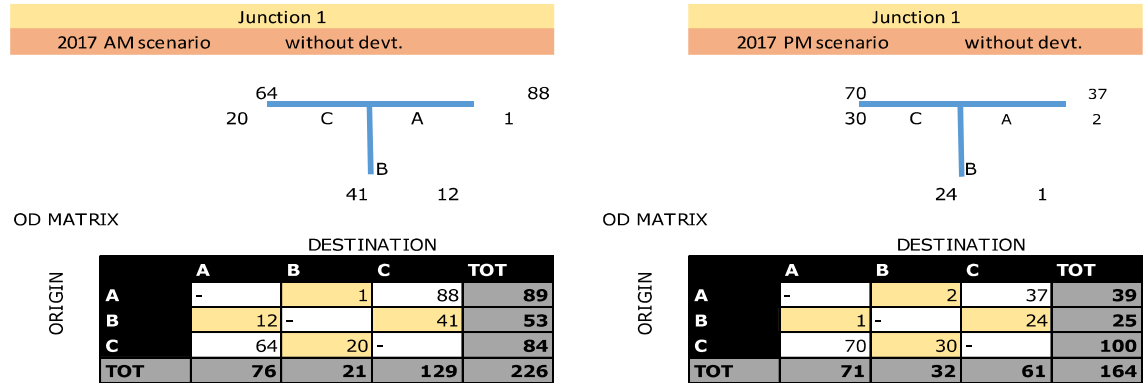


Figure 9.1: Base Year AM & PM Peak Hour Traffic Flows- Junction 1.

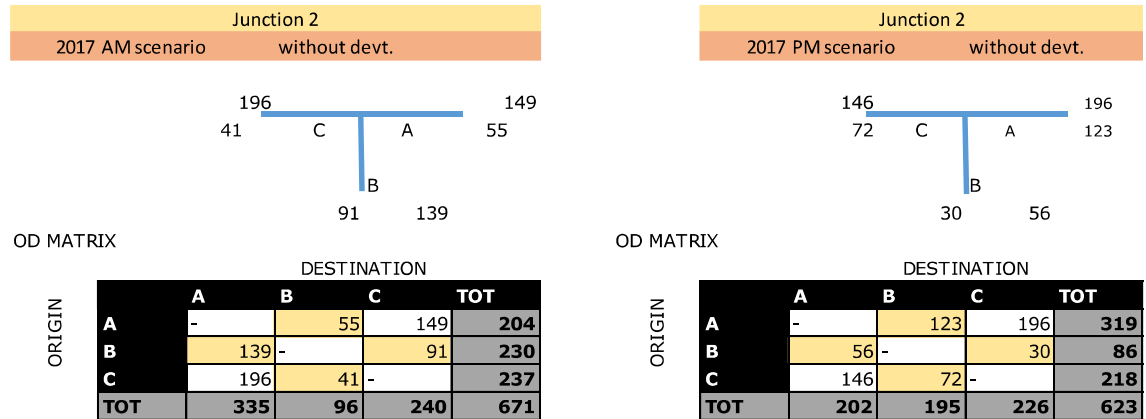


Figure 9.2: Base Year AM & PM Peak Hour Traffic Flows- Junction 2.

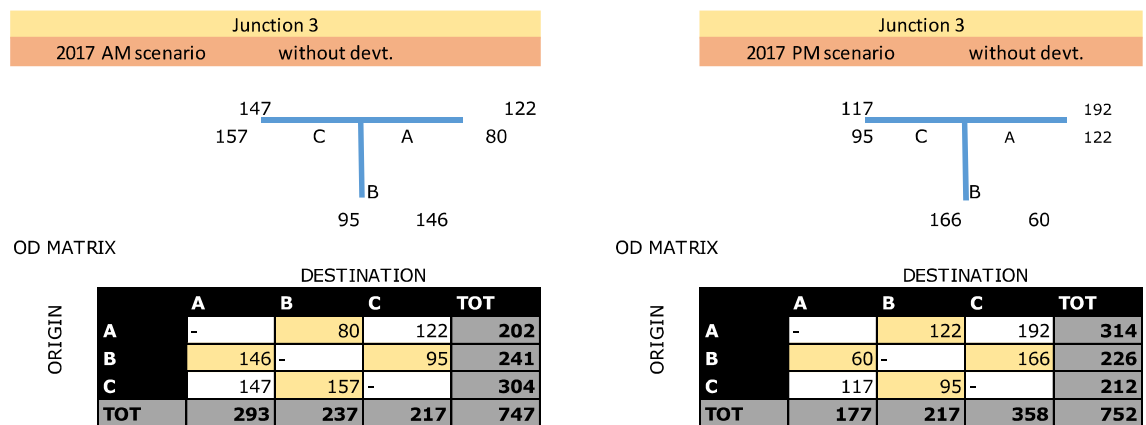


Figure 9.3: Base Year AM & PM Peak Hour Traffic Flows- Junction 3.

The traffic count figures in Figure 9.4 show the existing directional splits in traffic flows on the road network that circulates the redevelopment site.

11.2 TOWN CENTRE JUNCTION J4

AM 07/04/17

O/D		Destination			
		A	B	C	TOTAL
Origin	A	0	108	149	257
	B	0	0	284	284
	C	0	323	0	323
	Total	0	431	433	864



AM Generated flows

O/D		Destination			
		A	B	C	TOTAL
Origin	A	0	0	0	0
	B	0	0	25	25
	C	0	6	0	6
	Total	0	6	25	31

Total Additional
Junction Traffic Gain
4%

Figure 11.2 AM Percentage increase in traffic per arm due to the proposed residential development traffic

PM 07/04/17

O/D		Destination			
		A	B	C	TOTAL
Origin	A	0	123	172	295
	B	0	0	266	266
	C	0	414	0	414
	Total	0	536	438	974



PM Generated flows

O/D		Destination			
		A	B	C	TOTAL
Origin	A	0	0	0	0
	B	0	0	9	9
	C	0	11	0	11
	Total	0	11	9	20

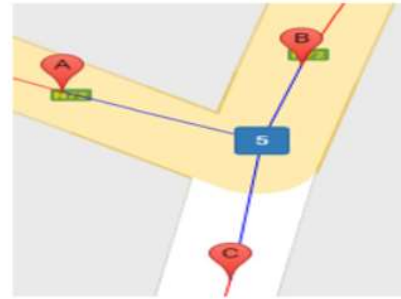
Total Additional
Junction Traffic Gain
2%

Figure 11.3 PM Percentage increase in traffic per arm due to the proposed residential development traffic

11.3 TOWN CENTRE JUNCTION J5

AM 07/04/17

		Destination			TOTAL
		A	B	C	
Origin	A	0	16	77	92
	B	136	0	232	368
	C	200	123	0	323
	Total	336	139	309	783



AM Generated flows

		Destination			TOTAL
		A	B	C	
Origin	A	0	2	0	2
	B	8	0	17	25
	C	0	4	0	4
	Total	8	6	17	31

Total Additional
Junction Traffic Gain
4%

Figure 11.4 AM Percentage increase in traffic per arm due to the proposed residential development traffic

PM 07/04/17

		Destination			TOTAL
		A	B	C	
Origin	A	0	81	199	279
	B	186	0	370	556
	C	257	221	0	478
	Total	443	302	569	1313



PM Generated flows

		Destination			TOTAL
		A	B	C	
Origin	A	0	4	0	4
	B	2	0	7	9
	C	0	7	0	7
	Total	2	11	7	20

Total Additional
Junction Traffic Gain
2%

Figure 11.5 PM Percentage increase in traffic per arm due to the proposed residential development traffic

11.4 TOWN CENTRE JUNCTION J6

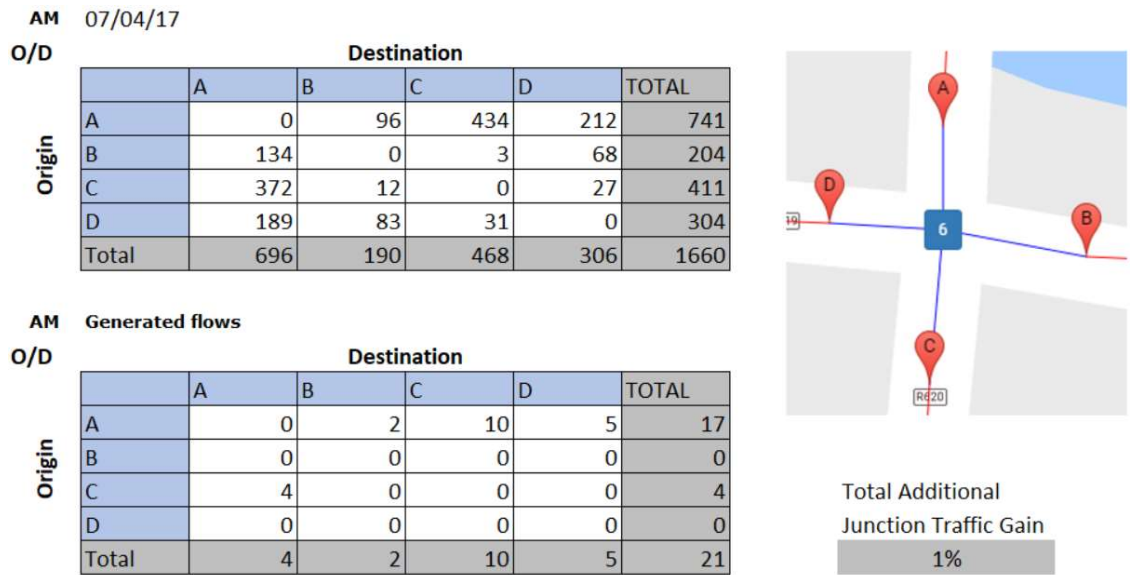


Figure 11.6 AM Percentage increase in traffic per arm due to the proposed residential development traffic

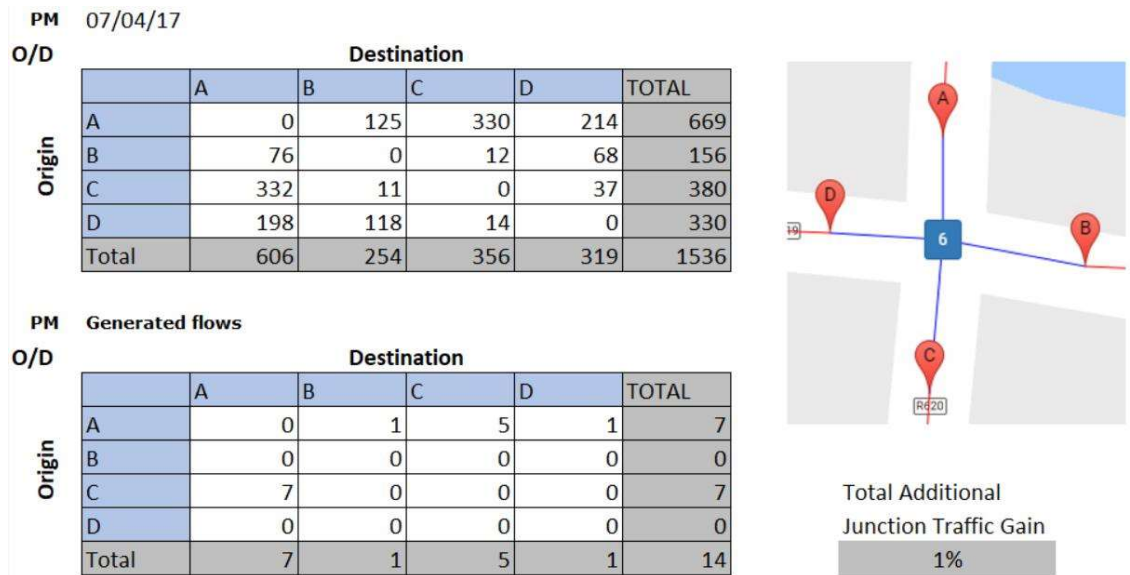


Figure 11.7 PM Percentage increase in traffic per arm due to the proposed residential development traffic

Appendix B: TRICS Output Files

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED

TOTAL VEHICLES

Calculation factor: 1 DWELLS

Estimated TRIP rate value per 188 DWELLS shown in shaded columns

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS				DEPARTURES				TOTALS			
	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated 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	131	100	0.071	13.290	131	100	0.273	51.407	131	100	0.344	64.697
08:00 - 09:00	131	100	0.144	27.112	131	100	0.388	72.930	131	100	0.532	100.042
09:00 - 10:00	131	100	0.146	27.471	131	100	0.179	33.649	131	100	0.325	61.120
10:00 - 11:00	131	100	0.132	24.856	131	100	0.157	29.525	131	100	0.289	54.381
11:00 - 12:00	131	100	0.141	26.580	131	100	0.159	29.856	131	100	0.300	56.436
12:00 - 13:00	131	100	0.165	31.063	131	100	0.162	30.517	131	100	0.327	61.580
13:00 - 14:00	131	100	0.169	31.695	131	100	0.167	31.364	131	100	0.336	63.059
14:00 - 15:00	131	100	0.180	33.807	131	100	0.197	37.054	131	100	0.377	70.861
15:00 - 16:00	131	100	0.263	49.496	131	100	0.182	34.310	131	100	0.445	83.806
16:00 - 17:00	131	100	0.283	53.160	131	100	0.172	32.413	131	100	0.455	85.573
17:00 - 18:00	131	100	0.353	66.321	131	100	0.179	33.649	131	100	0.532	99.970
18:00 - 19:00	131	100	0.280	52.629	131	100	0.170	31.882	131	100	0.450	84.511
19:00 - 20:00	1	97	0.062	11.629	1	97	0.052	9.691	1	97	0.114	21.320
20:00 - 21:00	1	97	0.031	5.814	1	97	0.021	3.876	1	97	0.052	9.690
21:00 - 22:00												
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			2.420	454.923			2.458	462.123			4.878	917.046

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.

The survey data, graphs and all associated supporting information, contained within the TRICS Database are published by TRICS Consortium Limited ("the Company") and the Company claims copyright and database rights in this published work. The Company authorises those who possess a current TRICS licence to access the TRICS Database and copy the data contained within the TRICS Database for the licence holders' use only. Any resulting copy must retain all copyrights and other proprietary notices, and any disclaimer contained thereon.

The Company accepts no responsibility for loss which may arise from reliance on data contained in the TRICS Database. [No warranty of any kind, express or implied, is made as to the data contained in the TRICS Database.]

Parameter summary

Trip rate parameter range selected:	6 - 1882 (units:)
Survey date date range:	01/01/14 - 23/11/21
Number of weekdays (Monday-Friday):	133
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	29
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 shown. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 04 - EDUCATION/D - NURSERY

TOTAL VEHICLES

Calculation factor: 100 sqm

Estimated TRIP rate value per 422 SQM shown in shaded columns

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS				DEPARTURES				TOTALS			
	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated 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	2	455	0.000	0.000	2	455	0.000	0.000	2	455	0.000	0.000
07:00 - 08:00	21	489	1.888	7.968	21	489	0.934	3.943	21	489	2.822	11.911
08:00 - 09:00	21	489	3.455	14.581	21	489	2.813	11.871	21	489	6.268	26.452
09:00 - 10:00	21	489	1.557	6.572	21	489	1.528	6.449	21	489	3.085	13.021
10:00 - 11:00	21	489	0.457	1.931	21	489	0.341	1.438	21	489	0.798	3.369
11:00 - 12:00	21	489	0.652	2.752	21	489	0.438	1.848	21	489	1.090	4.600
12:00 - 13:00	21	489	1.285	5.422	21	489	1.421	5.997	21	489	2.706	11.419
13:00 - 14:00	21	489	0.895	3.779	21	489	1.285	5.422	21	489	2.180	9.201
14:00 - 15:00	21	489	0.701	2.957	21	489	0.623	2.629	21	489	1.324	5.586
15:00 - 16:00	21	489	0.749	3.163	21	489	0.827	3.491	21	489	1.576	6.654
16:00 - 17:00	21	489	1.499	6.325	21	489	1.664	7.024	21	489	3.163	13.349
17:00 - 18:00	21	489	2.540	10.720	21	489	3.183	13.431	21	489	5.723	24.151
18:00 - 19:00	20	506	0.138	0.584	20	506	0.691	2.918	20	506	0.829	3.502
19:00 - 20:00	1	400	0.000	0.000	1	400	0.000	0.000	1	400	0.000	0.000
20:00 - 21:00												
21:00 - 22:00												
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			15.816	66.754			15.748	66.461			31.564	133.215

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.

The survey data, graphs and all associated supporting information, contained within the TRICS Database are published by TRICS Consortium Limited ("the Company") and the Company claims copyright and database rights in this published work. The Company authorises those who possess a current TRICS licence to access the TRICS Database and copy the data contained within the TRICS Database for the licence holders' use only. Any resulting copy must retain all copyrights and other proprietary notices, and any disclaimer contained thereon.

The Company accepts no responsibility for loss which may arise from reliance on data contained in the TRICS Database. [No warranty of any kind, express or implied, is made as to the data contained in the TRICS Database.]

Parameter summary

Trip rate parameter range selected:	150 - 880 (units: sqm)
Survey date range:	01/01/14 - 19/11/21
Number of weekdays (Monday-Friday):	21
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
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 shown. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 04 - EDUCATION/D - NURSERY

TOTAL VEHICLES

Calculation factor: 100 sqm

Estimated TRIP rate value per 150 SQM shown in shaded columns

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS				DEPARTURES				TOTALS			
	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated 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	2	455	0.000	0.000	2	455	0.000	0.000	2	455	0.000	0.000
07:00 - 08:00	21	489	1.888	2.832	21	489	0.934	1.402	21	489	2.822	4.234
08:00 - 09:00	21	489	3.455	5.183	21	489	2.813	4.219	21	489	6.268	9.402
09:00 - 10:00	21	489	1.557	2.336	21	489	1.528	2.292	21	489	3.085	4.628
10:00 - 11:00	21	489	0.457	0.686	21	489	0.341	0.511	21	489	0.798	1.197
11:00 - 12:00	21	489	0.652	0.978	21	489	0.438	0.657	21	489	1.090	1.635
12:00 - 13:00	21	489	1.285	1.927	21	489	1.421	2.132	21	489	2.706	4.059
13:00 - 14:00	21	489	0.895	1.343	21	489	1.285	1.927	21	489	2.180	3.270
14:00 - 15:00	21	489	0.701	1.051	21	489	0.623	0.934	21	489	1.324	1.985
15:00 - 16:00	21	489	0.749	1.124	21	489	0.827	1.241	21	489	1.576	2.365
16:00 - 17:00	21	489	1.499	2.248	21	489	1.664	2.497	21	489	3.163	4.745
17:00 - 18:00	21	489	2.540	3.811	21	489	3.183	4.774	21	489	5.723	8.585
18:00 - 19:00	20	506	0.138	0.207	20	506	0.691	1.037	20	506	0.829	1.244
19:00 - 20:00	1	400	0.000	0.000	1	400	0.000	0.000	1	400	0.000	0.000
20:00 - 21:00												
21:00 - 22:00												
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			15.816	23.726			15.748	23.623			31.564	47.349

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.

The survey data, graphs and all associated supporting information, contained within the TRICS Database are published by TRICS Consortium Limited ("the Company") and the Company claims copyright and database rights in this published work. The Company authorises those who possess a current TRICS licence to access the TRICS Database and copy the data contained within the TRICS Database for the licence holders' use only. Any resulting copy must retain all copyrights and other proprietary notices, and any disclaimer contained thereon.

The Company accepts no responsibility for loss which may arise from reliance on data contained in the TRICS Database. [No warranty of any kind, express or implied, is made as to the data contained in the TRICS Database.]

Parameter summary

Trip rate parameter range selected:	150 - 880 (units: sqm)
Survey date date range:	01/01/14 - 19/11/21
Number of weekdays (Monday-Friday):	21
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
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 shown. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Appendix C: Sample of Junction Capacity Output Files

<h1>Junctions 9</h1>
<h2>PICADY 9 - Priority Intersection Module</h2>
Version: 9.5.0.6896 © Copyright TRL Limited, 2018
For sales and distribution information, program advice and maintenance, contact TRL: +44 (0)1344 379777 software@trl.co.uk www.trlsoftware.co.uk
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: Junction 7.j9

Path: C:\Users\transportpc\Desktop\TRL\Mallow\2. Year update

Report generation date: 30/01/2024 10:21:26

- »Baseline Year 2024 - 2024, AM
- »Baseline Year 2024 - 2024, PM
- »Opening Year 2026 - 2026 DN, AM
- »Opening Year 2026 - 2026 DN, PM
- »Opening Year 2026 - 2026 DS, AM
- »Opening Year 2026 - 2026 DS, PM
- »Design Year 2041 - 2041 DN, AM
- »Design Year 2041 - 2041 DN, PM
- »Design Year 2041 - 2041 DS, AM
- »Design Year 2041 - 2041 DS, PM

Summary of junction performance

	AM								PM							
	Queue (PCU)	95% Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity	Queue (PCU)	95% Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity
Baseline Year 2024 - 2024																
Stream B-AC	0.0	0.5	7.16	0.03	A	3.88	A	792 %	0.1	0.5	6.51	0.08	A	3.18	A	830 %
Stream C-AB	0.1	0.5	6.94	0.08	A			[Stream C-AB]	0.0	0.5	5.95	0.04	A			[Stream B-AC]

	AM								PM							
	Queue (PCU)	95% Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity	Queue (PCU)	95% Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity
Opening Year 2026 - 2026 DN																
Stream B-AC	0.0	0.5	6.56	0.03	A	3.98	A	474 %	0.1	0.5	6.60	0.09	A	3.25	A	713 %
Stream C-AB	0.2	0.5	6.60	0.13	A			[Stream C-AB]	0.0	0.5	5.96	0.04	A			[Stream B-AC]
Opening Year 2026 - 2026 DS																
Stream B-AC	0.0	0.5	6.60	0.03	A	4.30	A	347 %	0.1	0.5	6.64	0.09	A	3.27	A	667 %
Stream C-AB	0.2	0.5	6.86	0.17	A			[Stream C-AB]	0.0	0.5	5.96	0.04	A			[Stream B-AC]

	AM								PM							
	Queue (PCU)	95% Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity	Queue (PCU)	95% Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity
Design Year 2041 - 2041 DN																
Stream B-AC	0.0	0.5	6.64	0.03	A	4.02	A	405 %	0.1	0.5	6.74	0.10	A	3.31	A	593 %
Stream C-AB	0.2	0.5	6.72	0.14	A			[Stream C-AB]	0.1	0.5	5.98	0.05	A			[Stream B-AC]
Design Year 2041 - 2041 DS																
Stream B-AC	0.0	0.5	6.69	0.04	A	4.34	A	304 %	0.1	0.5	6.78	0.11	A	3.33	A	560 %
Stream C-AB	0.2	1.0	6.99	0.19	A			[Stream C-AB]	0.1	0.5	5.99	0.05	A			[Stream B-AC]

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

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages. 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	
Location	
Site number	
Date	05/08/2022
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	JBBARRY\TransportPC
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	AM	ONE HOUR	07:45	09:15	15	✓
D2	2024	PM	ONE HOUR	16:45	18:15	15	✓
D3	2026 DN	AM	ONE HOUR	07:45	09:15	15	✓
D4	2026 DN	PM	ONE HOUR	16:45	18:15	15	✓
D5	2026 DS	AM	ONE HOUR	07:45	09:15	15	✓
D6	2026 DS	PM	ONE HOUR	16:45	18:15	15	✓
D11	2041 DN	AM	ONE HOUR	07:45	09:15	15	✓
D12	2041 DN	PM	ONE HOUR	16:45	18:15	15	✓
D13	2041 DS	AM	ONE HOUR	07:45	09:15	15	✓
D14	2041 DS	PM	ONE HOUR	16:45	18:15	15	✓

Baseline Year 2024 - 2024, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Major arm width	C - L-5331 South - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Analysis Set Details

ID	Name	Include in report	Use specific Demand Set (s)	Specific Demand Set (s)	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	Baseline Year 2024	✓	✓	D1,D2	100.000	100.000

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Junction 7	T-Junction	Two-way		3.88	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	792	Stream C-AB

Arms

Arms

Arm	Name	Description	Arm type
A	L-5331 North		Major
B	L-5320		Minor
C	L-5331 South		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 - L-5331 South	5.80			70.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B - L-5320	One lane	2.50	250	40

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for AB	Slope for AC	Slope for C-A	Slope for C-B
1	B-A	550	0.101	0.255	0.161	0.365
1	B-C	617	0.095	0.241	-	-
1	C-B	615	0.240	0.240	-	-

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	AM	ONE HOUR	07:45	09:15	15	✓

Default vehicle mix	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 - L-5331 North		ONE HOUR	✓	30	100.000
B - L-5320		ONE HOUR	✓	13	100.000
C - L-5331 South		ONE HOUR	✓	58	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A - L-5331 North	B - L-5320	C - L-5331 South
From	A - L-5331 North	0	10	20
	B - L-5320	6	0	7
	C - L-5331 South	16	42	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A - L-5331 North	B - L-5320	C - L-5331 South
From	A - L-5331 North	10	10	10
	B - L-5320	10	10	10
	C - L-5331 South	10	10	10

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.03	7.16	0.0	0.5	A	12	18
C-AB	0.08	6.94	0.1	0.5	A	40	59
C-A						14	21
A-B						9	14
A-C						18	28

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)	Unsignalised level of service
B-AC	10	2	572	0.017	10	0.0	0.0	7.037	A
C-AB	32	8	617	0.052	32	0.0	0.1	6.765	A
C-A	11	3			11				
A-B	8	2			8				
A-C	15	4			15				

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)	Unsignalised level of service
B-AC	12	3	570	0.021	12	0.0	0.0	7.090	A
C-AB	39	10	618	0.063	39	0.1	0.1	6.839	A
C-A	13	3			13				
A-B	9	2			9				
A-C	18	4			18				

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)	Unsignalised level of service
B-AC	14	4	567	0.025	14	0.0	0.0	7.165	A
C-AB	48	12	618	0.077	48	0.1	0.1	6.938	A
C-A	16	4			16				
A-B	11	3			11				
A-C	22	6			22				

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)	Unsignalised level of service
B-AC	14	4	567	0.025	14	0.0	0.0	7.165	A
C-AB	48	12	618	0.077	48	0.1	0.1	6.941	A
C-A	16	4			16				
A-B	11	3			11				
A-C	22	6			22				

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)	Unsignalised level of service
B-AC	12	3	570	0.021	12	0.0	0.0	7.094	A
C-AB	39	10	618	0.063	39	0.1	0.1	6.844	A
C-A	13	3			13				
A-B	9	2			9				
A-C	18	4			18				

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)	Unsignalised level of service
B-AC	10	2	572	0.017	10	0.0	0.0	7.041	A
C-AB	32	8	617	0.052	32	0.1	0.1	6.772	A
C-A	11	3			11				
A-B	8	2			8				
A-C	15	4			15				

Queue Variation Results for each time segment

07:45 - 08:00

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.02	0.00	0.00	0.02	0.02			N/A	N/A
C-AB	0.06	0.00	0.00	0.06	0.06			N/A	N/A

08:00 - 08:15

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.02	0.02	0.28	0.50	0.52			N/A	N/A
C-AB	0.08	0.03	0.28	0.50	0.53			N/A	N/A

08:15 - 08:30

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.03	0.00	0.00	0.03	0.03			N/A	N/A
C-AB	0.09	0.03	0.29	0.51	0.54			N/A	N/A

08:30 - 08:45

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.03	0.00	0.00	0.03	0.03			N/A	N/A
C-AB	0.09	0.00	0.00	0.09	0.09			N/A	N/A

08:45 - 09:00

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.02	0.00	0.00	0.02	0.02			N/A	N/A
C-AB	0.08	0.00	0.00	0.08	0.08			N/A	N/A

09:00 - 09:15

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.02	0.00	0.00	0.02	0.02			N/A	N/A
C-AB	0.06	0.00	0.00	0.06	0.06			N/A	N/A

Baseline Year 2024 - 2024, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Major arm width	C - L-5331 South - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Analysis Set Details

ID	Name	Include in report	Use specific Demand Set (s)	Specific Demand Set (s)	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	Baseline Year 2024	✓	✓	D1,D2	100.000	100.000

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Junction 7	T-Junction	Two-way		3.18	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	830	Stream B-AC

Arms

Arms

Arm	Name	Description	Arm type
A	L-5331 North		Major
B	L-5320		Minor
C	L-5331 South		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 - L-5331 South	5.80			70.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B - L-5320	One lane	2.50	250	40

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	550	0.101	0.255	0.161	0.365
1	B-C	617	0.095	0.241	-	-
1	C-B	615	0.240	0.240	-	-

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
D2	2024	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 - L-5331 North		ONE HOUR	✓	32	100.000
B - L-5320		ONE HOUR	✓	41	100.000
C - L-5331 South		ONE HOUR	✓	48	100.000

Origin-Destination Data

Demand (PCU/hr)

From	To		
	A - L-5331 North	B - L-5320	C - L-5331 South
A - L-5331 North	0	8	24
B - L-5320	5	0	36
C - L-5331 South	29	19	0

Vehicle Mix

Heavy Vehicle Percentages

From	To		
	A - L-5331 North	B - L-5320	C - L-5331 South
A - L-5331 North	0	0	0
B - L-5320	0	0	0
C - L-5331 South	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.08	6.51	0.1	0.5	A	38	56
C-AB	0.04	5.95	0.0	0.5	A	18	27
C-A						26	39
A-B						7	11
A-C						22	33

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)	Unsignalised level of service
B-AC	31	8	601	0.051	31	0.0	0.1	6.307	A
C-AB	15	4	623	0.024	15	0.0	0.0	5.917	A
C-A	21	5			21				
A-B	6	2			6				
A-C	18	5			18				

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)	Unsignalised level of service
B-AC	37	9	600	0.061	37	0.1	0.1	6.390	A
C-AB	18	4	625	0.029	18	0.0	0.0	5.929	A
C-A	25	6			25				
A-B	7	2			7				
A-C	22	5			22				

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)	Unsignalised level of service
B-AC	45	11	598	0.075	45	0.1	0.1	6.505	A
C-AB	22	6	627	0.035	22	0.0	0.0	5.948	A
C-A	31	8			31				
A-B	9	2			9				
A-C	26	7			26				

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)	Unsignalised level of service
B-AC	45	11	598	0.075	45	0.1	0.1	6.505	A
C-AB	22	6	627	0.035	22	0.0	0.0	5.948	A
C-A	31	8			31				
A-B	9	2			9				
A-C	26	7			26				

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)	Unsignalised level of service
B-AC	37	9	600	0.061	37	0.1	0.1	6.391	A
C-AB	18	4	625	0.029	18	0.0	0.0	5.932	A
C-A	25	6			25				
A-B	7	2			7				
A-C	22	5			22				

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)	Unsignalised level of service
B-AC	31	8	601	0.051	31	0.1	0.1	6.313	A
C-AB	15	4	623	0.024	15	0.0	0.0	5.919	A
C-A	21	5			21				
A-B	6	2			6				
A-C	18	5			18				

Queue Variation Results for each time segment

16:45 - 17:00

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.05	0.00	0.00	0.05	0.05			N/A	N/A
C-AB	0.03	0.00	0.00	0.03	0.03			N/A	N/A

17:00 - 17:15

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.06	0.03	0.25	0.45	0.48			N/A	N/A
C-AB	0.03	0.03	0.25	0.45	0.48			N/A	N/A

17:15 - 17:30

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.08	0.03	0.26	0.47	0.49			N/A	N/A
C-AB	0.04	0.03	0.25	0.45	0.48			N/A	N/A

17:30 - 17:45

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.08	0.00	0.00	0.08	0.08			N/A	N/A
C-AB	0.04	0.00	0.00	0.04	0.04			N/A	N/A

17:45 - 18:00

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.07	0.00	0.00	0.07	0.07			N/A	N/A
C-AB	0.03	0.00	0.00	0.03	0.03			N/A	N/A

18:00 - 18:15

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.05	0.00	0.00	0.05	0.05			N/A	N/A
C-AB	0.03	0.00	0.00	0.03	0.03			N/A	N/A

Opening Year 2026 - 2026 DN, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Major arm width	C - L-5331 South - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Analysis Set Details

ID	Name	Include in report	Use specific Demand Set (s)	Specific Demand Set (s)	Network flow scaling factor (%)	Network capacity scaling factor (%)
A2	Opening Year 2026	✓	✓	D3,D4,D5,D6	100.000	100.000

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Junction 7	T-Junction	Two-way		3.98	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	474	Stream C-AB

Arms

Arms

Arm	Name	Description	Arm type
A	L-5331 North		Major
B	L-5320		Minor
C	L-5331 South		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 - L-5331 South	5.80			70.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B - L-5320	One lane	2.50	250	40

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	550	0.101	0.255	0.161	0.365
1	B-C	617	0.095	0.241	-	-
1	C-B	615	0.240	0.240	-	-

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
D3	2026 DN	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 - L-5331 North		ONE HOUR	✓	33	100.000
B - L-5320		ONE HOUR	✓	15	100.000
C - L-5331 South		ONE HOUR	✓	96	100.000

Origin-Destination Data

Demand (PCU/hr)

	To			
		A - L-5331 North	B - L-5320	C - L-5331 South
From	A - L-5331 North	0	10	23
	B - L-5320	6	0	9
	C - L-5331 South	27	69	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		A - L-5331 North	B - L-5320	C - L-5331 South
From	A - L-5331 North	0	0	0
	B - L-5320	0	0	0
	C - L-5331 South	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.03	6.56	0.0	0.5	A	14	21
C-AB	0.13	6.60	0.2	0.5	A	66	99
C-A						22	33
A-B						9	14
A-C						21	32

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)	Unsignalised level of service
B-AC	11	3	573	0.020	11	0.0	0.0	6.411	A
C-AB	54	13	622	0.086	53	0.0	0.1	6.326	A
C-A	19	5			19				
A-B	8	2			8				
A-C	17	4			17				

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)	Unsignalised level of service
B-AC	13	3	570	0.024	13	0.0	0.0	6.473	A
C-AB	65	16	623	0.104	64	0.1	0.1	6.440	A
C-A	22	5			22				
A-B	9	2			9				
A-C	21	5			21				

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)	Unsignalised level of service
B-AC	17	4	565	0.029	16	0.0	0.0	6.559	A
C-AB	80	20	626	0.128	80	0.1	0.2	6.595	A
C-A	26	6			26				
A-B	11	3			11				
A-C	25	6			25				

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)	Unsignalised level of service
B-AC	17	4	565	0.029	17	0.0	0.0	6.559	A
C-AB	80	20	626	0.128	80	0.2	0.2	6.599	A
C-A	26	6			26				
A-B	11	3			11				
A-C	25	6			25				

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)	Unsignalised level of service
B-AC	13	3	570	0.024	14	0.0	0.0	6.476	A
C-AB	65	16	623	0.104	65	0.2	0.1	6.443	A
C-A	22	5			22				
A-B	9	2			9				
A-C	21	5			21				

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)	Unsignalised level of service
B-AC	11	3	573	0.020	11	0.0	0.0	6.415	A
C-AB	54	13	622	0.086	54	0.1	0.1	6.338	A
C-A	19	5			19				
A-B	8	2			8				
A-C	17	4			17				

Queue Variation Results for each time segment

07:45 - 08:00

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.02	0.00	0.00	0.02	0.02			N/A	N/A
C-AB	0.10	0.00	0.00	0.10	0.10			N/A	N/A

08:00 - 08:15

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.02	0.02	0.25	0.45	0.48			N/A	N/A
C-AB	0.12	0.00	0.00	0.12	0.12			N/A	N/A

08:15 - 08:30

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.03	0.00	0.00	0.03	0.03			N/A	N/A
C-AB	0.15	0.03	0.26	0.46	0.49			N/A	N/A

08:30 - 08:45

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.03	0.00	0.00	0.03	0.03			N/A	N/A
C-AB	0.15	0.03	0.25	0.45	0.48			N/A	N/A

08:45 - 09:00

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.02	0.00	0.00	0.02	0.02			N/A	N/A
C-AB	0.12	0.00	0.00	0.12	0.12			N/A	N/A

09:00 - 09:15

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.02	0.00	0.00	0.02	0.02			N/A	N/A
C-AB	0.10	0.00	0.00	0.10	0.10			N/A	N/A

Opening Year 2026 - 2026 DN, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Major arm width	C - L-5331 South - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Analysis Set Details

ID	Name	Include in report	Use specific Demand Set (s)	Specific Demand Set (s)	Network flow scaling factor (%)	Network capacity scaling factor (%)
A2	Opening Year 2026	✓	✓	D3,D4,D5,D6	100.000	100.000

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Junction 7	T-Junction	Two-way		3.25	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	713	Stream B-AC

Arms

Arms

Arm	Name	Description	Arm type
A	L-5331 North		Major
B	L-5320		Minor
C	L-5331 South		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 - L-5331 South	5.80			70.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B - L-5320	One lane	2.50	250	40

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	550	0.101	0.255	0.161	0.365
1	B-C	617	0.095	0.241	-	-
1	C-B	615	0.240	0.240	-	-

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
D4	2026 DN	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 - L-5331 North		ONE HOUR	✓	36	100.000
B - L-5320		ONE HOUR	✓	47	100.000
C - L-5331 South		ONE HOUR	✓	53	100.000

Origin-Destination Data

Demand (PCU/hr)

	To			
	A - L-5331 North	B - L-5320	C - L-5331 South	
From	A - L-5331 North	0	9	27
	B - L-5320	6	0	41
	C - L-5331 South	32	21	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
	A - L-5331 North	B - L-5320	C - L-5331 South	
From	A - L-5331 North	0	0	0
	B - L-5320	0	0	0
	C - L-5331 South	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.09	6.60	0.1	0.5	A	43	65
C-AB	0.04	5.96	0.0	0.5	A	20	30
C-A						28	43
A-B						8	12
A-C						25	37

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)	Unsignalised level of service
B-AC	35	9	600	0.059	35	0.0	0.1	6.368	A
C-AB	16	4	624	0.026	16	0.0	0.0	5.925	A
C-A	23	6			23				
A-B	7	2			7				
A-C	20	5			20				

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)	Unsignalised level of service
B-AC	42	11	599	0.071	42	0.1	0.1	6.468	A
C-AB	20	5	626	0.032	20	0.0	0.0	5.939	A
C-A	28	7			28				
A-B	8	2			8				
A-C	24	6			24				

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)	Unsignalised level of service
B-AC	52	13	597	0.087	52	0.1	0.1	6.604	A
C-AB	25	6	628	0.039	24	0.0	0.0	5.960	A
C-A	34	8			34				
A-B	10	2			10				
A-C	30	7			30				

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)	Unsignalised level of service
B-AC	52	13	597	0.087	52	0.1	0.1	6.604	A
C-AB	25	6	628	0.039	25	0.0	0.0	5.963	A
C-A	34	8			34				
A-B	10	2			10				
A-C	30	7			30				

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)	Unsignalised level of service
B-AC	42	11	599	0.071	42	0.1	0.1	6.472	A
C-AB	20	5	626	0.032	20	0.0	0.0	5.940	A
C-A	28	7			28				
A-B	8	2			8				
A-C	24	6			24				

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)	Unsignalised level of service
B-AC	35	9	600	0.059	35	0.1	0.1	6.377	A
C-AB	16	4	624	0.026	16	0.0	0.0	5.925	A
C-A	23	6			23				
A-B	7	2			7				
A-C	20	5			20				

Queue Variation Results for each time segment

16:45 - 17:00

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.06	0.00	0.00	0.06	0.06			N/A	N/A
C-AB	0.03	0.00	0.00	0.03	0.03			N/A	N/A

17:00 - 17:15

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.08	0.03	0.25	0.45	0.48			N/A	N/A
C-AB	0.04	0.03	0.25	0.45	0.48			N/A	N/A

17:15 - 17:30

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.09	0.03	0.26	0.47	0.49			N/A	N/A
C-AB	0.04	0.03	0.25	0.46	0.48			N/A	N/A

17:30 - 17:45

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.09	0.00	0.00	0.09	0.09			N/A	N/A
C-AB	0.04	0.00	0.00	0.04	0.04			N/A	N/A

17:45 - 18:00

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.08	0.00	0.00	0.08	0.08			N/A	N/A
C-AB	0.04	0.00	0.00	0.04	0.04			N/A	N/A

18:00 - 18:15

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.06	0.00	0.00	0.06	0.06			N/A	N/A
C-AB	0.03	0.00	0.00	0.03	0.03			N/A	N/A

Opening Year 2026 - 2026 DS, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Major arm width	C - L-5331 South - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Analysis Set Details

ID	Name	Include in report	Use specific Demand Set (s)	Specific Demand Set (s)	Network flow scaling factor (%)	Network capacity scaling factor (%)
A2	Opening Year 2026	✓	✓	D3,D4,D5,D6	100.000	100.000

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Junction 7	T-Junction	Two-way		4.30	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	347	Stream C-AB

Arms

Arms

Arm	Name	Description	Arm type
A	L-5331 North		Major
B	L-5320		Minor
C	L-5331 South		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 - L-5331 South	5.80			70.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B - L-5320	One lane	2.50	250	40

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	550	0.101	0.255	0.161	0.365
1	B-C	617	0.095	0.241	-	-
1	C-B	615	0.240	0.240	-	-

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
D5	2026 DS	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 - L-5331 North		ONE HOUR	✓	35	100.000
B - L-5320		ONE HOUR	✓	16	100.000
C - L-5331 South		ONE HOUR	✓	125	100.000

Origin-Destination Data

Demand (PCU/hr)

	To			
		A - L-5331 North	B - L-5320	C - L-5331 South
From	A - L-5331 North	0	10	25
	B - L-5320	6	0	10
	C - L-5331 South	35	90	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		A - L-5331 North	B - L-5320	C - L-5331 South
From	A - L-5331 North	0	0	0
	B - L-5320	0	0	0
	C - L-5331 South	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.03	6.60	0.0	0.5	A	15	22
C-AB	0.17	6.86	0.2	0.5	A	87	131
C-A						28	41
A-B						9	14
A-C						23	34

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)	Unsignalised level of service
B-AC	12	3	572	0.021	12	0.0	0.0	6.433	A
C-AB	71	18	626	0.113	70	0.0	0.1	6.476	A
C-A	23	6			23				
A-B	8	2			8				
A-C	19	5			19				

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)	Unsignalised level of service
B-AC	14	4	568	0.025	14	0.0	0.0	6.504	A
C-AB	85	21	628	0.136	85	0.1	0.2	6.633	A
C-A	27	7			27				
A-B	9	2			9				
A-C	22	6			22				

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)	Unsignalised level of service
B-AC	18	4	563	0.031	18	0.0	0.0	6.604	A
C-AB	106	26	631	0.167	105	0.2	0.2	6.850	A
C-A	32	8			32				
A-B	11	3			11				
A-C	28	7			28				

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)	Unsignalised level of service
B-AC	18	4	563	0.031	18	0.0	0.0	6.604	A
C-AB	106	26	631	0.167	106	0.2	0.2	6.856	A
C-A	32	8			32				
A-B	11	3			11				
A-C	28	7			28				

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)	Unsignalised level of service
B-AC	14	4	568	0.025	14	0.0	0.0	6.508	A
C-AB	85	21	628	0.136	85	0.2	0.2	6.639	A
C-A	27	7			27				
A-B	9	2			9				
A-C	22	6			22				

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)	Unsignalised level of service
B-AC	12	3	571	0.021	12	0.0	0.0	6.435	A
C-AB	71	18	626	0.113	71	0.2	0.1	6.493	A
C-A	23	6			23				
A-B	8	2			8				
A-C	19	5			19				

Queue Variation Results for each time segment

07:45 - 08:00

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.02	0.00	0.00	0.02	0.02			N/A	N/A
C-AB	0.13	0.00	0.00	0.13	0.13			N/A	N/A

08:00 - 08:15

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.03	0.03	0.25	0.45	0.48			N/A	N/A
C-AB	0.16	0.00	0.00	0.16	0.16			N/A	N/A

08:15 - 08:30

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.03	0.00	0.00	0.03	0.03			N/A	N/A
C-AB	0.21	0.03	0.26	0.46	0.49			N/A	N/A

08:30 - 08:45

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.03	0.00	0.00	0.03	0.03			N/A	N/A
C-AB	0.21	0.03	0.26	0.47	0.50			N/A	N/A

08:45 - 09:00

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.03	0.00	0.00	0.03	0.03			N/A	N/A
C-AB	0.17	0.00	0.00	0.17	0.17			N/A	N/A

09:00 - 09:15

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.02	0.00	0.00	0.02	0.02			N/A	N/A
C-AB	0.13	0.00	0.00	0.13	0.13			N/A	N/A

Opening Year 2026 - 2026 DS, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Major arm width	C - L-5331 South - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Analysis Set Details

ID	Name	Include in report	Use specific Demand Set (s)	Specific Demand Set (s)	Network flow scaling factor (%)	Network capacity scaling factor (%)
A2	Opening Year 2026	✓	✓	D3,D4,D5,D6	100.000	100.000

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Junction 7	T-Junction	Two-way		3.27	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	667	Stream B-AC

Arms

Arms

Arm	Name	Description	Arm type
A	L-5331 North		Major
B	L-5320		Minor
C	L-5331 South		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 - L-5331 South	5.80			70.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B - L-5320	One lane	2.50	250	40

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	550	0.101	0.255	0.161	0.365
1	B-C	617	0.095	0.241	-	-
1	C-B	615	0.240	0.240	-	-

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
D6	2026 DS	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 - L-5331 North		ONE HOUR	✓	38	100.000
B - L-5320		ONE HOUR	✓	50	100.000
C - L-5331 South		ONE HOUR	✓	56	100.000

Origin-Destination Data

Demand (PCU/hr)

	To			
	A - L-5331 North	B - L-5320	C - L-5331 South	
From	A - L-5331 North	0	9	29
	B - L-5320	6	0	44
	C - L-5331 South	34	22	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
	A - L-5331 North	B - L-5320	C - L-5331 South	
From	A - L-5331 North	0	0	0
	B - L-5320	0	0	0
	C - L-5331 South	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.09	6.64	0.1	0.5	A	46	69
C-AB	0.04	5.96	0.0	0.5	A	21	32
C-A						30	45
A-B						8	12
A-C						27	40

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)	Unsignalised level of service
B-AC	38	9	600	0.063	37	0.0	0.1	6.392	A
C-AB	17	4	625	0.028	17	0.0	0.0	5.927	A
C-A	25	6			25				
A-B	7	2			7				
A-C	22	5			22				

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)	Unsignalised level of service
B-AC	45	11	599	0.075	45	0.1	0.1	6.498	A
C-AB	21	5	627	0.033	21	0.0	0.0	5.942	A
C-A	30	7			30				
A-B	8	2			8				
A-C	26	7			26				

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)	Unsignalised level of service
B-AC	55	14	597	0.092	55	0.1	0.1	6.644	A
C-AB	26	6	629	0.041	26	0.0	0.0	5.963	A
C-A	36	9			36				
A-B	10	2			10				
A-C	32	8			32				

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)	Unsignalised level of service
B-AC	55	14	597	0.092	55	0.1	0.1	6.644	A
C-AB	26	6	629	0.041	26	0.0	0.0	5.964	A
C-A	36	9			36				
A-B	10	2			10				
A-C	32	8			32				

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)	Unsignalised level of service
B-AC	45	11	599	0.075	45	0.1	0.1	6.500	A
C-AB	21	5	627	0.033	21	0.0	0.0	5.945	A
C-A	30	7			30				
A-B	8	2			8				
A-C	26	7			26				

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)	Unsignalised level of service
B-AC	38	9	600	0.063	38	0.1	0.1	6.398	A
C-AB	17	4	625	0.028	17	0.0	0.0	5.927	A
C-A	25	6			25				
A-B	7	2			7				
A-C	22	5			22				

Queue Variation Results for each time segment

16:45 - 17:00

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.07	0.00	0.00	0.07	0.07			N/A	N/A
C-AB	0.03	0.00	0.00	0.03	0.03			N/A	N/A

17:00 - 17:15

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.08	0.03	0.25	0.46	0.48			N/A	N/A
C-AB	0.04	0.03	0.25	0.45	0.48			N/A	N/A

17:15 - 17:30

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.10	0.03	0.26	0.47	0.49			N/A	N/A
C-AB	0.05	0.03	0.25	0.46	0.48			N/A	N/A

17:30 - 17:45

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.10	0.03	0.25	0.45	0.48			N/A	N/A
C-AB	0.05	0.00	0.00	0.05	0.05			N/A	N/A

17:45 - 18:00

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.08	0.00	0.00	0.08	0.08			N/A	N/A
C-AB	0.04	0.00	0.00	0.04	0.04			N/A	N/A

18:00 - 18:15

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.07	0.00	0.00	0.07	0.07			N/A	N/A
C-AB	0.03	0.00	0.00	0.03	0.03			N/A	N/A

Design Year 2041 - 2041 DN, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Major arm width	C - L-5331 South - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Analysis Set Details

ID	Name	Include in report	Use specific Demand Set (s)	Specific Demand Set (s)	Network flow scaling factor (%)	Network capacity scaling factor (%)
A4	Design Year 2041	✓	✓	D11,D12,D13,D14	100.000	100.000

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Junction 7	T-Junction	Two-way		4.02	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	405	Stream C-AB

Arms

Arms

Arm	Name	Description	Arm type
A	L-5331 North		Major
B	L-5320		Minor
C	L-5331 South		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 - L-5331 South	5.80			70.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B - L-5320	One lane	2.50	250	40

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	550	0.101	0.255	0.161	0.365
1	B-C	617	0.095	0.241	-	-
1	C-B	615	0.240	0.240	-	-

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
D11	2041 DN	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 - L-5331 North		ONE HOUR	✓	39	100.000
B - L-5320		ONE HOUR	✓	17	100.000
C - L-5331 South		ONE HOUR	✓	109	100.000

Origin-Destination Data

Demand (PCU/hr)

From	To		
	A - L-5331 North	B - L-5320	C - L-5331 South
A - L-5331 North	0	12	27
B - L-5320	7	0	10
C - L-5331 South	31	78	0

Vehicle Mix

Heavy Vehicle Percentages

From	To		
	A - L-5331 North	B - L-5320	C - L-5331 South
A - L-5331 North	0	0	0
B - L-5320	0	0	0
C - L-5331 South	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.03	6.64	0.0	0.5	A	16	23
C-AB	0.14	6.72	0.2	0.5	A	75	113
C-A						25	37
A-B						11	17
A-C						25	37

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)	Unsignalised level of service
B-AC	13	3	569	0.022	13	0.0	0.0	6.468	A
C-AB	61	15	623	0.098	61	0.0	0.1	6.398	A
C-A	21	5			21				
A-B	9	2			9				
A-C	20	5			20				

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)	Unsignalised level of service
B-AC	15	4	566	0.027	15	0.0	0.0	6.540	A
C-AB	73	18	625	0.118	73	0.1	0.1	6.530	A
C-A	25	6			25				
A-B	11	3			11				
A-C	24	6			24				

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)	Unsignalised level of service
B-AC	19	5	561	0.033	19	0.0	0.0	6.643	A
C-AB	91	23	627	0.145	91	0.1	0.2	6.712	A
C-A	29	7			29				
A-B	13	3			13				
A-C	30	7			30				

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)	Unsignalised level of service
B-AC	19	5	561	0.033	19	0.0	0.0	6.643	A
C-AB	91	23	627	0.145	91	0.2	0.2	6.716	A
C-A	29	7			29				
A-B	13	3			13				
A-C	30	7			30				

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)	Unsignalised level of service
B-AC	15	4	566	0.027	15	0.0	0.0	6.544	A
C-AB	73	18	625	0.118	74	0.2	0.1	6.537	A
C-A	25	6			25				
A-B	11	3			11				
A-C	24	6			24				

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)	Unsignalised level of service
B-AC	13	3	569	0.022	13	0.0	0.0	6.472	A
C-AB	61	15	623	0.098	61	0.1	0.1	6.408	A
C-A	21	5			21				
A-B	9	2			9				
A-C	20	5			20				

Queue Variation Results for each time segment

07:45 - 08:00

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.02	0.00	0.00	0.02	0.02			N/A	N/A
C-AB	0.11	0.00	0.00	0.11	0.11			N/A	N/A

08:00 - 08:15

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.03	0.03	0.25	0.45	0.48			N/A	N/A
C-AB	0.14	0.00	0.00	0.14	0.14			N/A	N/A

08:15 - 08:30

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.03	0.03	0.25	0.45	0.48			N/A	N/A
C-AB	0.18	0.03	0.26	0.46	0.49			N/A	N/A

08:30 - 08:45

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.03	0.00	0.00	0.03	0.03			N/A	N/A
C-AB	0.18	0.03	0.25	0.45	0.48			N/A	N/A

08:45 - 09:00

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.03	0.00	0.00	0.03	0.03			N/A	N/A
C-AB	0.14	0.00	0.00	0.14	0.14			N/A	N/A

09:00 - 09:15

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.02	0.00	0.00	0.02	0.02			N/A	N/A
C-AB	0.11	0.00	0.00	0.11	0.11			N/A	N/A

Design Year 2041 - 2041 DN, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Major arm width	C - L-5331 South - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Analysis Set Details

ID	Name	Include in report	Use specific Demand Set (s)	Specific Demand Set (s)	Network flow scaling factor (%)	Network capacity scaling factor (%)
A4	Design Year 2041	✓	✓	D11,D12,D13,D14	100.000	100.000

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Junction 7	T-Junction	Two-way		3.31	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	593	Stream B-AC

Arms

Arms

Arm	Name	Description	Arm type
A	L-5331 North		Major
B	L-5320		Minor
C	L-5331 South		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 - L-5331 South	5.80			70.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B - L-5320	One lane	2.50	250	40

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	550	0.101	0.255	0.161	0.365
1	B-C	617	0.095	0.241	-	-
1	C-B	615	0.240	0.240	-	-

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
D12	2041 DN	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 - L-5331 North		ONE HOUR	✓	42	100.000
B - L-5320		ONE HOUR	✓	55	100.000
C - L-5331 South		ONE HOUR	✓	63	100.000

Origin-Destination Data

Demand (PCU/hr)

From	To		
	A - L-5331 North	B - L-5320	C - L-5331 South
A - L-5331 North	0	10	32
B - L-5320	7	0	48
C - L-5331 South	38	25	0

Vehicle Mix

Heavy Vehicle Percentages

From	To		
	A - L-5331 North	B - L-5320	C - L-5331 South
A - L-5331 North	0	0	0
B - L-5320	0	0	0
C - L-5331 South	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.10	6.74	0.1	0.5	A	50	76
C-AB	0.05	5.98	0.1	0.5	A	24	36
C-A						33	50
A-B						9	14
A-C						29	44

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)	Unsignalised level of service
B-AC	41	10	599	0.069	41	0.0	0.1	6.452	A
C-AB	20	5	626	0.032	20	0.0	0.0	5.936	A
C-A	28	7			28				
A-B	8	2			8				
A-C	24	6			24				

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)	Unsignalised level of service
B-AC	49	12	597	0.083	49	0.1	0.1	6.571	A
C-AB	24	6	628	0.038	24	0.0	0.0	5.956	A
C-A	33	8			33				
A-B	9	2			9				
A-C	29	7			29				

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)	Unsignalised level of service
B-AC	61	15	595	0.102	60	0.1	0.1	6.735	A
C-AB	29	7	631	0.047	29	0.0	0.1	5.982	A
C-A	40	10			40				
A-B	11	3			11				
A-C	35	9			35				

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)	Unsignalised level of service
B-AC	61	15	595	0.102	61	0.1	0.1	6.736	A
C-AB	29	7	631	0.047	29	0.1	0.1	5.984	A
C-A	40	10			40				
A-B	11	3			11				
A-C	35	9			35				

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)	Unsignalised level of service
B-AC	49	12	597	0.083	50	0.1	0.1	6.573	A
C-AB	24	6	628	0.038	24	0.1	0.0	5.957	A
C-A	33	8			33				
A-B	9	2			9				
A-C	29	7			29				

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)	Unsignalised level of service
B-AC	41	10	599	0.069	41	0.1	0.1	6.458	A
C-AB	20	5	626	0.032	20	0.0	0.0	5.941	A
C-A	28	7			28				
A-B	8	2			8				
A-C	24	6			24				

Queue Variation Results for each time segment

16:45 - 17:00

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.07	0.00	0.00	0.07	0.07			N/A	N/A
C-AB	0.04	0.00	0.00	0.04	0.04			N/A	N/A

17:00 - 17:15

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.09	0.03	0.26	0.47	0.49			N/A	N/A
C-AB	0.04	0.03	0.25	0.45	0.48			N/A	N/A

17:15 - 17:30

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.11	0.03	0.26	0.47	0.49			N/A	N/A
C-AB	0.05	0.03	0.26	0.46	0.49			N/A	N/A

17:30 - 17:45

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.11	0.03	0.25	0.45	0.48			N/A	N/A
C-AB	0.05	0.00	0.00	0.05	0.05			N/A	N/A

17:45 - 18:00

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.09	0.00	0.00	0.09	0.09			N/A	N/A
C-AB	0.04	0.00	0.00	0.04	0.04			N/A	N/A

18:00 - 18:15

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.07	0.00	0.00	0.07	0.07			N/A	N/A
C-AB	0.04	0.00	0.00	0.04	0.04			N/A	N/A

Design Year 2041 - 2041 DS, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Major arm width	C - L-5331 South - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Analysis Set Details

ID	Name	Include in report	Use specific Demand Set (s)	Specific Demand Set (s)	Network flow scaling factor (%)	Network capacity scaling factor (%)
A4	Design Year 2041	✓	✓	D11,D12,D13,D14	100.000	100.000

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Junction 7	T-Junction	Two-way		4.34	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	304	Stream C-AB

Arms

Arms

Arm	Name	Description	Arm type
A	L-5331 North		Major
B	L-5320		Minor
C	L-5331 South		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 - L-5331 South	5.80			70.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B - L-5320	One lane	2.50	250	40

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	550	0.101	0.255	0.161	0.365
1	B-C	617	0.095	0.241	-	-
1	C-B	615	0.240	0.240	-	-

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
D13	2041 DS	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 - L-5331 North		ONE HOUR	✓	41	100.000
B - L-5320		ONE HOUR	✓	18	100.000
C - L-5331 South		ONE HOUR	✓	138	100.000

Origin-Destination Data

Demand (PCU/hr)

	To			
		A - L-5331 North	B - L-5320	C - L-5331 South
From	A - L-5331 North	0	12	29
	B - L-5320	7	0	11
	C - L-5331 South	39	99	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		A - L-5331 North	B - L-5320	C - L-5331 South
From	A - L-5331 North	0	0	0
	B - L-5320	0	0	0
	C - L-5331 South	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.04	6.69	0.0	0.5	A	17	25
C-AB	0.19	6.99	0.2	1.0	A	97	145
C-A						30	45
A-B						11	17
A-C						27	40

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)	Unsignalised level of service
B-AC	14	3	568	0.024	13	0.0	0.0	6.493	A
C-AB	78	20	627	0.125	78	0.0	0.1	6.551	A
C-A	26	6			26				
A-B	9	2			9				
A-C	22	5			22				

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)	Unsignalised level of service
B-AC	16	4	564	0.029	16	0.0	0.0	6.576	A
C-AB	94	24	629	0.150	94	0.1	0.2	6.730	A
C-A	30	7			30				
A-B	11	3			11				
A-C	26	7			26				

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)	Unsignalised level of service
B-AC	20	5	558	0.036	20	0.0	0.0	6.693	A
C-AB	117	29	632	0.185	117	0.2	0.2	6.983	A
C-A	35	9			35				
A-B	13	3			13				
A-C	32	8			32				

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)	Unsignalised level of service
B-AC	20	5	558	0.036	20	0.0	0.0	6.693	A
C-AB	117	29	632	0.185	117	0.2	0.2	6.987	A
C-A	35	9			35				
A-B	13	3			13				
A-C	32	8			32				

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)	Unsignalised level of service
B-AC	16	4	563	0.029	16	0.0	0.0	6.580	A
C-AB	94	24	629	0.150	95	0.2	0.2	6.741	A
C-A	30	7			30				
A-B	11	3			11				
A-C	26	7			26				

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)	Unsignalised level of service
B-AC	14	3	568	0.024	14	0.0	0.0	6.498	A
C-AB	78	20	627	0.125	78	0.2	0.2	6.571	A
C-A	26	6			26				
A-B	9	2			9				
A-C	22	5			22				

Queue Variation Results for each time segment

07:45 - 08:00

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.02	0.00	0.00	0.02	0.02			N/A	N/A
C-AB	0.15	0.00	0.00	0.15	0.15			N/A	N/A

08:00 - 08:15

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.03	0.03	0.25	0.45	0.48			N/A	N/A
C-AB	0.18	0.00	0.00	0.18	0.18			N/A	N/A

08:15 - 08:30

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.04	0.03	0.25	0.45	0.48			N/A	N/A
C-AB	0.24	0.03	0.26	0.46	0.49			N/A	N/A

08:30 - 08:45

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.04	0.00	0.00	0.04	0.04			N/A	N/A
C-AB	0.24	0.03	0.28	0.58	1.05			N/A	N/A

08:45 - 09:00

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.03	0.00	0.00	0.03	0.03			N/A	N/A
C-AB	0.19	0.00	0.00	0.19	0.19			N/A	N/A

09:00 - 09:15

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.02	0.00	0.00	0.02	0.02			N/A	N/A
C-AB	0.15	0.00	0.00	0.15	0.15			N/A	N/A

Design Year 2041 - 2041 DS, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Major arm width	C - L-5331 South - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Analysis Set Details

ID	Name	Include in report	Use specific Demand Set (s)	Specific Demand Set (s)	Network flow scaling factor (%)	Network capacity scaling factor (%)
A4	Design Year 2041	✓	✓	D11,D12,D13,D14	100.000	100.000

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Junction 7	T-Junction	Two-way		3.33	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	560	Stream B-AC

Arms

Arms

Arm	Name	Description	Arm type
A	L-5331 North		Major
B	L-5320		Minor
C	L-5331 South		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 - L-5331 South	5.80			70.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B - L-5320	One lane	2.50	250	40

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	550	0.101	0.255	0.161	0.365
1	B-C	617	0.095	0.241	-	-
1	C-B	615	0.240	0.240	-	-

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
D14	2041 DS	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 - L-5331 North		ONE HOUR	✓	44	100.000
B - L-5320		ONE HOUR	✓	58	100.000
C - L-5331 South		ONE HOUR	✓	66	100.000

Origin-Destination Data

Demand (PCU/hr)

From	To		
	A - L-5331 North	B - L-5320	C - L-5331 South
A - L-5331 North	0	10	34
B - L-5320	7	0	51
C - L-5331 South	40	26	0

Vehicle Mix

Heavy Vehicle Percentages

From	To		
	A - L-5331 North	B - L-5320	C - L-5331 South
A - L-5331 North	0	0	0
B - L-5320	0	0	0
C - L-5331 South	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.11	6.78	0.1	0.5	A	53	80
C-AB	0.05	5.99	0.1	0.5	A	25	38
C-A						35	53
A-B						9	14
A-C						31	47

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)	Unsignalised level of service
B-AC	44	11	599	0.073	43	0.0	0.1	6.476	A
C-AB	21	5	627	0.033	20	0.0	0.0	5.938	A
C-A	29	7			29				
A-B	8	2			8				
A-C	26	6			26				

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)	Unsignalised level of service
B-AC	52	13	597	0.087	52	0.1	0.1	6.603	A
C-AB	25	6	629	0.039	25	0.0	0.0	5.958	A
C-A	35	9			35				
A-B	9	2			9				
A-C	31	8			31				

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)	Unsignalised level of service
B-AC	64	16	595	0.107	64	0.1	0.1	6.778	A
C-AB	31	8	632	0.049	31	0.0	0.1	5.985	A
C-A	42	10			42				
A-B	11	3			11				
A-C	37	9			37				

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)	Unsignalised level of service
B-AC	64	16	595	0.107	64	0.1	0.1	6.778	A
C-AB	31	8	632	0.049	31	0.1	0.1	5.985	A
C-A	42	10			42				
A-B	11	3			11				
A-C	37	9			37				

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)	Unsignalised level of service
B-AC	52	13	597	0.087	52	0.1	0.1	6.608	A
C-AB	25	6	629	0.039	25	0.1	0.0	5.962	A
C-A	35	9			35				
A-B	9	2			9				
A-C	31	8			31				

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)	Unsignalised level of service
B-AC	44	11	599	0.073	44	0.1	0.1	6.486	A
C-AB	21	5	627	0.033	21	0.0	0.0	5.943	A
C-A	29	7			29				
A-B	8	2			8				
A-C	26	6			26				

Queue Variation Results for each time segment

16:45 - 17:00

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.08	0.00	0.00	0.08	0.08			N/A	N/A
C-AB	0.04	0.00	0.00	0.04	0.04			N/A	N/A

17:00 - 17:15

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.09	0.03	0.25	0.45	0.48			N/A	N/A
C-AB	0.04	0.03	0.25	0.45	0.48			N/A	N/A

17:15 - 17:30

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.12	0.03	0.26	0.46	0.49			N/A	N/A
C-AB	0.06	0.03	0.26	0.46	0.49			N/A	N/A

17:30 - 17:45

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.12	0.03	0.25	0.45	0.48			N/A	N/A
C-AB	0.06	0.00	0.00	0.06	0.06			N/A	N/A

17:45 - 18:00

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.10	0.00	0.00	0.10	0.10			N/A	N/A
C-AB	0.05	0.00	0.00	0.05	0.05			N/A	N/A

18:00 - 18:15

Stream	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.08	0.00	0.00	0.08	0.08			N/A	N/A
C-AB	0.04	0.00	0.00	0.04	0.04			N/A	N/A