

Keepmoat Homes

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**Proposed Residential Development  
Keresforth Road, Dodworth  
Supplementary Transport Assessment**

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April 2022

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# Keepmoat Homes

## Proposed Residential Development Keresforth Road, Dodworth Supplementary Transport Assessment

April 2022

### Client Commission

Client: Keepmoat Homes Date Commissioned: March 2022

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### LTP PROJECT TEAM

As part of our commitment to quality the following team of transport professionals was assembled specifically for the delivery of this project. Relevant qualifications are shown and CVs are available upon request to demonstrate our experience and credentials.

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# PROPOSED RESIDENTIAL DEVELOPMENT KERESFORTH ROAD, DODWORTH SUPPLEMENTARY TRANSPORT ASSESSMENT

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## I. INTRODUCTION

### I.1 Background

- 1.1.1 Local Transport Projects Ltd (LTP) has been commissioned to produce a Supplementary Transport Assessment (STA) in support of an outline planning application (all matters reserved except for access) for a proposed residential development at a site located to the north of Keresforth Road in Dodworth, Barnsley.
- 1.1.2 The local planning and highway authority for the site is Barnsley Metropolitan Borough Council (BMBC). Due to the site's proximity to the M1, which forms part of the Strategic Road Network (SRN), National Highways (NH) are also a key consultee in relation to the proposals.
- 1.1.3 This STA follows on from, and should be read in conjunction with, the Transport Assessment (TA) (LTP, 2021a) and Travel Plan (LTP, 2021b) that have been produced in support of the outline planning application for the development (ref: 2022/0016), which is seeking consent for "*[r]esidential development of up to 215 dwellings and associated works (Outline application with all matters reserved apart from means of access)*". During the determination period for the planning application, NH requested (see Appendix 1) detailed analysis of collisions at the M1 Junction 37 signalised roundabout (Dodworth Roundabout), consideration of the cumulative impact of local committed developments and the proposed development on the operation of Dodworth Roundabout and the Whinby Road/B6449 roundabout, and merge/diverge analysis on the Dodworth Roundabout slip roads. Therefore, this STA has been produced to present the results of the requested assessments from NH. There has been no formal response from BMBC Highways on the planning application at the time of writing this report.
- 1.1.4 This STA report has been prepared in accordance with the following key documents where appropriate:
- National Planning Policy Framework (MHCLG, 2021);
  - Planning Practice Guidance (MHCLG, 2014);
  - The Strategic Road Network and the Delivery of Sustainable Development (DfT, 2013); and
  - Guidance on Transport Assessment (DfT, 2007).

## 2. DETAILED COLLISION ANALYSIS

### 2.1 Introduction

2.1.1 As part of the NH response, it was requested that analysis of the collisions at Dodworth Roundabout was undertaken, with the request extracted below for reference:

*“We suggest that LTP need to present a further analysis of the collision data, causation trends, and cluster analysis that covers Dodworth Roundabout, such that the impact of the development on SRN can be confirmed”.*

2.1.2 Therefore, this section of the report provides detailed analysis of the collisions at Dodworth Roundabout (M1 Junction 37) and the associated slip roads. Personal Injury Collision (PIC) data for Dodworth Roundabout and the associated slip roads for the most recent available six-year study period (01/01/2016 to 31/12/2021) was purchased from the BMBC Traffic team.

### 2.2 Dodworth Roundabout

#### Collision History

2.2.1 A total of six collisions occurred at Dodworth Roundabout, which includes the circulatory carriageway and all junction approaches. The wider study area and the locations of the collisions are shown on the plan attached as Appendix 2. Table 1 below outlines the collision history at Dodworth Roundabout.

**Table 1: Collision History**

Year	2016	2017	2018	2019	2020	2021	Total
Fatal	0	0	0	0	0	0	0
Serious	0	1	0	1	0	0	2
Slight	1	0	2	0	0	1	4
<b>Total</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>6</b>

2.2.2 The collision records show that the number of PICs per year has remained low throughout the study period, with no collisions during 2020 and an average of 1 PIC per annum. There were two Killed or Seriously Injured (KSI) collisions during the study period, resulting in a severity ratio of 33.3%.

### Collision Conditions

2.2.3 Table 2 below summarises the collisions by road surface, weather and lighting conditions:

**Table 2: Collision Conditions**

Road Surface	Collisions	%
Dry	3	50.0%
Wet/Damp	2	33.3%
Snow	1	16.7%
Weather	Collisions	%
Fine	4	66.7%
Rain	1	16.7%
Snow	1	16.7%
Lighting	Collisions	%
Daylight	5	83.3%
Dark	1	16.7%

2.2.4 As illustrated in Table 2, the majority of the collisions occurred without any adverse weather or lighting conditions; half of the collisions occurred with a wet/damp or snow-covered road surface.

### Collision Times

2.2.5 Table 3 below summarises the collisions by the time of year:

**Table 3: Collisions by Time of Year**

Time of Year	Collisions	%
Winter (Dec-Feb)	2	33.3%
Spring (Mar-May)	1	16.7%
Summer (Jun-Aug)	1	16.7%
Autumn (Sep-Nov)	2	33.3%

2.2.6 Table 3 shows that the collisions were spread evenly across the year.

2.2.7 Table 4 below summarises the collisions by day of week and also the time of day:

**Table 4: Collisions by Day and Time**

Day	Morning (06:00- 11:00)	Lunch (11:00- 14:00)	Afternoon (14:00- 19:00)	Evening (19:00- 01:00)	Night (01:00- 06:00)	Total	%
Monday	0	0	0	0	0	0	-
Tuesday	0	0	1	0	0	1	16.7%
Wednesday	0	0	0	0	0	0	-
Thursday	0	1	1	0	0	2	33.3%
Friday	0	0	0	1	0	1	16.7%
Saturday	1	0	1	0	0	2	33.3%
Sunday	0	0	0	0	0	0	-
<b>Total</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>6</b>	
<b>%</b>	<b>16.7%</b>	<b>16.7%</b>	<b>50.0%</b>	<b>16.7%</b>	<b>-</b>		

2.2.8 Table 4 demonstrates that no collisions occurred on a Monday, Wednesday or Sunday. Half of the collisions occurred during the afternoon period with no collisions recorded during the night-time period.

**Casualties**

2.2.9 A total of eight casualties occurred as a result of the six recorded injury collisions during the study period. Table 5 below provides a breakdown of the casualties according to the mode of travel and age group.

**Table 5: Casualty Road User Groups**

Road User Group	Age (years)						Total	%
	0 to 15	16 to 20	21 to 25	26 to 45	46 to 65	66+		
Car Driver	0	0	2	1	1	2	6	75.0%
Pedestrian	0	0	0	1	0	0	1	12.5%
Bus Passenger	0	0	0	0	0	1	1	12.5%
<b>Total</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>8</b>	
<b>%</b>	-	-	<b>25.0%</b>	<b>25.0%</b>	<b>12.5%</b>	<b>37.5%</b>		

2.2.10 Table 5 shows that three quarters of the casualties were car drivers, with over a third of the casualties (37.5%) aged 66 years and over.

**Collision Locations/Factors**

2.2.11 The STATS19 information and police officer descriptions/judgements for the six collisions have been analysed and are summarised below:

- **A628 (Dodworth Road):**
  - One collision was slight in nature and involved three vehicles, although one vehicle drove away from the scene without leaving any details with Police Officers. No contributory/causation factors were recorded for this collision.
  - One collision was slight in nature and involved an elderly passenger falling on a public bus when the vehicle had to brake suddenly because of another vehicle. No contributory/causation factors were recorded for this collision.
- **Dodworth Roundabout (Southern Circulatory):**
  - One collision occurred on the southern circulatory that was serious in nature and involved four vehicles. The contributory/causation factor was recorded as driver error due to the loss of control of the vehicle.
- **M1 Northbound approach to Dodworth Roundabout:**
  - One collision occurred on the M1 northbound off-slip on the approach to Dodworth Roundabout that was serious in nature. The collision involved a pedestrian running out into the carriageway and being hit by a vehicle. The contributory/causation factors were recorded as the pedestrian being careless/reckless and impaired by alcohol.

- **M1 Southbound approach to Dodworth Roundabout:**

- One collision was slight in nature and involved five vehicles. A vehicle lost control and collided with four other vehicles. The contributory/causation factor was recorded as ‘other’.
- One collision was slight in nature and involved one vehicle. The vehicle skidded on ice/snow and collided with a traffic sign. The contributory/causation factor was recorded as driver error due to sudden braking.

2.2.12 The above analysis of the STATS19 data demonstrates that the primary causation factor attributed to the majority of the collisions at Dodworth Roundabout were because of driver error. None of the collisions were consistent in nature or location.

**Summary**

2.2.13 A total of six collisions, resulting in eight casualties, have occurred within the study area during the six-year study period (01/01/2016 to 31/12/2021). Analysis of the study collisions, which considers vehicle types, casualties, weather conditions and road surface, has not revealed any pertinent collision trends that would be expected to be exacerbated by the additional vehicle movements (less than 1%) associated with the proposed development requiring mitigation. The relevant test is that development “*should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe*” (MHCLG, 2021). Therefore, it is considered that there are no existing road safety issues pertinent to the development of the site.

2.2.14 It is considered that the number of collisions that have occurred at Dodworth Roundabout across the six-year study period is low considering the high volume of vehicles that utilise Dodworth Roundabout and the wider SRN.

## 2.3 Dodworth Roundabout Slip Roads

**Collision History**

2.3.1 A total of five collisions occurred on the Dodworth Roundabout slip roads, which includes any attributed to merge/diverge movements to/from the M1. Table 6 below outlines the collision history of the study area.

**Table 6: Collision History**

Year	2016	2017	2018	2019	2020	2021	Total
Fatal	0	0	0	0	0	0	0
Serious	0	0	0	1	0	0	1
Slight	0	3	0	1	0	0	4
<b>Total</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>5</b>

2.3.2 The collision records show that the number of PICs per year has remained low throughout the study period, with collisions only occurring during 2017 and 2019, and therefore no collisions recorded in the most recent two year period. There was a single KSI collision during the study period, resulting in a severity ratio of 20%.

**Collision Conditions**

2.3.3 Table 7 below summarises the collisions by road surface, weather and lighting conditions:

**Table 7: Collision Conditions**

Road Surface	Collisions	%
Dry	2	40%
Wet/Damp	3	60%
Weather	Collisions	%
Fine	3	60%
Rain	1	20%
Snow	1	20%
Lighting	Collisions	%
Daylight	2	40%
Dark	3	60%

2.3.4 As illustrated in Table 7, the majority of the collisions occurred without any adverse weather conditions; over half of the collisions occurred with a wet/damp road surface and in darkness with no streetlighting.

**Collision Times**

2.3.5 Table 8 below summarises the collisions by the time of year:

**Table 8: Collisions by Time of Year**

Time of Year	Collisions	%
Winter (Dec-Feb)	2	40%
Spring (Mar-May)	1	20%
Summer (Jun-Aug)	2	40%
Autumn (Sep-Nov)	0	-

2.3.6 Table 8 shows that no collisions occurred during the autumn months.

2.3.7 Table 9 below summarises the collisions by day of week and also the time of day:

**Table 9: Collisions by Day and Time**

Day	Morning (06:00- 11:00)	Lunch (11:00- 14:00)	Afternoon (14:00- 19:00)	Evening (19:00- 01:00)	Night (01:00- 06:00)	Total	%
Monday	0	0	0	0	0	0	-
Tuesday	0	0	1	0	0	1	20%
Wednesday	0	0	0	0	1	1	20%
Thursday	0	0	1	0	0	1	20%
Friday	0	0	1	1	0	2	40%
Saturday	0	0	0	0	0	0	-
Sunday	0	0	0	0	0	0	-
<b>Total</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>5</b>	
<b>%</b>	<b>-</b>	<b>-</b>	<b>60%</b>	<b>20%</b>	<b>20%</b>		

2.3.8 Table 9 demonstrates that no collisions occurred on a weekend. The majority of the collisions (60%) were recorded during the afternoon period with no collisions occurring during the morning or lunch time periods.

### Casualties

2.3.9 A total of 12 casualties occurred as a result of the 5 recorded injury collisions during the study period. Table 10 below provides a breakdown of the casualties according to the mode of travel and age group.

**Table 10: Casualty Road User Groups**

Road User Group	Age (years)						Total	%
	0 to 15	16 to 20	21 to 25	26 to 45	46 to 65	66+		
Powered Two-Wheeler	0	0	0	0	2	0	2	16.7%
Car Driver	0	2	0	1	2	1	6	50.0%
Car Passenger	0	2	1	0	0	1	4	33.3%
<b>Total</b>	<b>0</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>4</b>	<b>2</b>	<b>12</b>	
<b>%</b>	-	<b>33.3%</b>	<b>8.3%</b>	<b>8.3%</b>	<b>33.3%</b>	<b>16.7%</b>		

2.3.10 Table 10 shows that over three quarters of the casualties were car occupants (83.3%). A third of the casualties were aged between 16 and 20 years, with a third also aged between 46 and 65 years. There were no child casualties.

### Collision Locations/Factors

2.3.11 The STATS19 information and police officer descriptions/judgements for the five collisions has been analysed and is summarised below:

- **Dodworth Roundabout Northbound Off-Slip:**
  - One collision occurred on the Dodworth Roundabout northbound off-slip that was slight in nature and involved four vehicles. The contributory/causation factors were recorded as the driver failing to judge other persons path or speed and swerved.
- **Dodworth Roundabout Southbound Off-Slip:**
  - One collision was slight in nature and involved three vehicles. Two vehicles were stationary in queuing traffic and the remaining vehicle accidentally accelerated into the rear of one of the vehicles which then shunted the third vehicle. The contributory/causation factors were recorded as loss of control of the vehicle, driver travelling too fast for the conditions, and the driver failing to judge other persons path or speed.
  - One collision was serious in nature and involved a single vehicle. The contributory/causation factor was recorded as driver fatigue.
- **Dodworth Roundabout Southbound On-Slip:**
  - One collision was slight in nature and involved two vehicles. The contributory/causation factor was recorded as the driver failed to look properly.
  - One collision was slight in nature and involved three vehicles. The contributory/causation factor was recorded as loss of control by the driver.

- 2.3.12 The above analysis of the STATS19 data demonstrates that the primary causation factor attributed to the majority of the collisions on the Dodworth Roundabout slip roads were because of driver error. None of the collisions were consistent in nature or location.

**Summary**

- 2.3.13 A total of 5 collisions, resulting in 12 casualties, have occurred within the study area during the six-year study period (01/01/2016 to 31/12/2021). Analysis of the study collisions which considers vehicle types, casualties, weather conditions and road surface has not revealed any pertinent collision trends that would be expected to be exacerbated by the additional vehicle movements associated with the proposed development requiring mitigation. The relevant test is that development *“should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe”* (MHCLG, 2021). Therefore, it is considered that there are no existing road safety issues pertinent to the development of the site.
- 2.3.14 It is considered that the number of collisions that have occurred on the Dodworth Roundabout slip roads across the six-year study period is low when compared to the volume of vehicles that utilise Dodworth Roundabout, the slip roads and the wider SRN.

### 3. JUNCTION CAPACITY ASSESSMENTS

#### 3.1 Introduction

3.1.1 NH has requested that capacity assessments of Dodworth Roundabout and the Whinby Road/B6449 roundabout are assessed as part of this planning application, with the full response extracted below:

*“given that the application is seeking to construct a greater number of residential units than originally considered at the allocation stage, it is incumbent on the applicant to reassess the impact of the proposal on the operation of the SRN. In this regard, in the absence of supporting information as to the effective operation of M1 (J37), we would suggest that an operational assessment of the grade separated junction, including merge and diverge assessments, is appropriate in this instance;*

*the assessment should also include the nearby Whinby Road roundabout junction to ensure that queues [d]o not block back and interfere with the operation of the SRN;”*

3.1.2 Therefore, this section of the STA presents the results of the capacity assessments at the two roundabouts, as requested by NH.

#### 3.2 Development Trip Generation

3.2.1 NH consider the trip rates and associated traffic generation presented within the TA (LTP, 2021a) to be acceptable, with the full response extracted below:

*“We would consider LTP’s vehicle trip rates and generation results to be acceptable;”*

3.2.2 The trip generation projections from the TA (LTP, 2021a) have been extracted in Table 11 below for ease of reference.

**Table 11: Projected Vehicle Trip Generation**

Residential Development (03-A)	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arrivals	Departures	Total	Arrivals	Departures	Total
Vehicle Trip Rates (per dwelling)	0.138	0.418	0.556	0.401	0.154	0.555
Proposed Vehicle Trips (220 dwellings)	30	92	122	88	34	122

3.2.3 The trip generation projections indicate that the proposed development could be expected to generate up to 122 two-way vehicle trip movements during each of the respective AM (08:00-09:00) and PM (17:00-18:00) peak hours.

#### 3.3 Baseline Traffic Flows & Peak Hours

3.3.1 The baseline traffic flows utilised within the TA (FC, 2019a) that supported the approved Capitol Park extension (ref: 2019/0286) have been utilised as part of the assessments within this STA. The traffic surveys were undertaken on a neutral weekday during school term time (Thursday 29<sup>th</sup> November 2018) between 07:00 and 10:00, and 16:00 and 19:00. The weekday peak hours on the local highway network were identified as 07:15-08:15 in the morning and 16:45-17:45 in the afternoon.

3.3.2 It should be noted that the peak hours identified for development traffic generation and the baseline traffic flows are slightly offset, and therefore the assessments within this STA represent a robust ‘worst-case’ scenario by applying the worst-case development peak hour traffic (AM 08:00-09:00 and PM 17:00-18:00) against the worst-case network peak hour traffic. The traffic flows across the study area are illustrated in the network diagrams attached as Appendix 3.

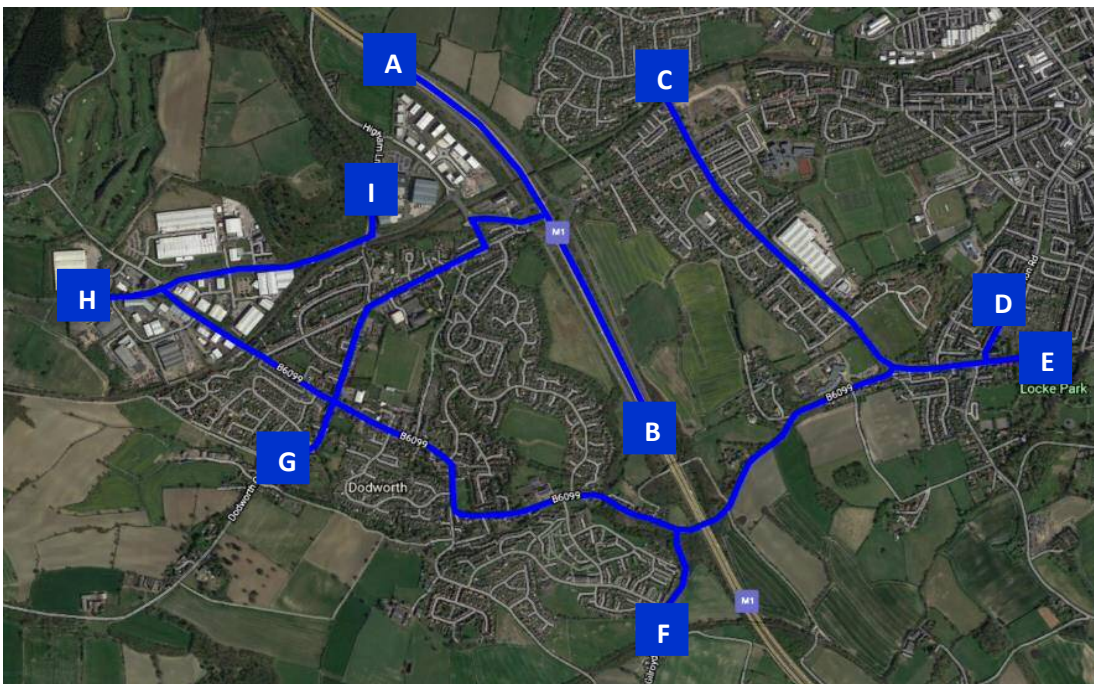
### 3.4 Trip Distribution & Assignment

3.4.1 NH consider the trip distribution and assignment presented within the TA (LTP, 2021a) to be acceptable, with the full response extracted below:

*“We would suggest that, given the similarities between the LTP gravity model approach, and the JSJV (consultants on behalf of NH) GraHAM run, the distribution and assignment derived from the gravity model is appropriate for use in the Transport Assessment;”*

3.4.2 Therefore, in order to understand the development impact at the two study roundabouts, the trip distribution within the TA (LTP, 2021a) has been utilised. The defined zones utilised within the gravity model calculations are reproduced in Figure 1:

**Figure 1: Gravity Model Zones**



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3.4.3 The gravity model results presented in the TA (LTP, 2021a) are summarised in Table 12.

**Table 12: Gravity Model Results**

Zone	Route	Proportion of Development Traffic
A	M1 (North)	15.8%
B	M1 (South)	14.6%
C	Pogmoor Road	9.5%
D	Racecommon Road	12.6%
E	A6133 (East)	25.7%
F	Gilroyd Lane	5.6%
G	Dodworth Green Road	0.6%
H	A628 (West)	12.3%
I	Higham Lane	3.4%

3.4.4 Table 12 indicates that there would be an approximately split of 30.4% of development trips utilising the junctions assessed in this STA to access the M1.

### 3.5 Committed Development

3.5.1 NH has requested that local committed developments are considered alongside the proposed development, with the full response extracted below:

*“We would suggest that LTP engage with BMBC to agree which committed developments should be considered alongside the proposed development and where required, a cumulative assessment of traffic impacts be undertaken. Particularly, we are aware of proposed development at land off Keresforth Close (planning reference: 2021/1631) which includes the construction of a new secondary school.”*

3.5.2 BMBC Highways has identified the committed developments that need to be considered alongside the proposed development, with further details of each committed development outlined below:

- **Capitol Park Extension (approximately 2km to the north of the application site):**
  - A hybrid planning application (ref: 2019/0286) was submitted in March 2019 and subsequently approved in September 2019 for ‘an extension to Capitol Park comprising a) development of 2no warehouses (floorspace of 9,755m<sup>2</sup> and 7,804m<sup>2</sup>) for general industrial and storage and distribution purposes (use classes B2 and B8) with provision of ancillary office accommodation - Outline with all matters reserved apart from means of access; and b) full application for provision of associated earthworks, demolition of existing bungalow and formation of access (Amended Plans)’. The application was supported by a TA (FC, 2019a) and Framework TP (FC, 2019b).
  - In order to ensure a robust worst-case assessment, the traffic flows associated with the development have been explicitly considered as committed development within the traffic projections of this STA, based on the approved projections in the TA supporting the application (FC, 2019a).

- **Residential Development, Former Mount Vernon Hospital [70 dwellings] (approximately 3.7km to the east of the application site):**
  - A full planning application (ref: 2019/0577) was submitted in August 2020 and subsequently approved in April 2021 for the '*Demolition of vacant former hospital buildings and residential development of 70 no dwellings and associated works (Amended Plans)*'. The application was supported by a TA (OIHS, 2017).
  - The traffic assignment projections provided in the TA (OIHS, 2017) only consider the site access junction associated with this development and do not extend as far as the proposed study area, therefore this development has not been explicitly accounted for in the traffic projections but instead has been considered through traffic growthing (which already accounts for development growth in the local area, see Section 3.6 below), which given the small impact on the study junctions (small enough to not require assessment as part of the application) is considered to be appropriate.
  
- **Residential Development, Land off Barugh Green Road [140 dwellings] (approximately 5km to the north of the application site):**
  - A full planning application (ref: 2020/0977) was submitted in August 2020 and is awaiting determination for the '*Residential development of 140 dwellings with associated landscaping, infrastructure and open space*'. The application is supported by a TA (SA, 2020a) and TP (SA, 2020b).
  - As the scheme is not yet consented, it could be argued that the development does not represent a committed development, with reference to Planning Practice Guidance (DCLG, 2014).
  - Furthermore, the traffic assignment projections provided in the TA (SA, 2020a) only consider the site access junction and the A637/A635/Whaley Road roundabout and do not extend as far as the proposed study area, therefore this development has not been explicitly accounted for in the traffic projections but instead has been considered through traffic growthing (which already accounts for development growth in the local area, see Section 3.6 below), which given the small impact on the study junctions (small enough to not require assessment as part of the application) is considered to be appropriate.
  
- **Residential Development, Land off Mount Vernon Road [42 dwellings] (approximately 3.7km to the east of the application site):**
  - A full planning application (ref: 2021/0142) was submitted in January 2021 and subsequently approved in September 2021 for a '*Residential development of 42no. dwellings and associated works including provision of on site open space*'. The application was supported by a Transport Statement (TS) (SCP, 2021).
  - No traffic assignment projections were provided in the TS (SCP, 2021) with the development generating fewer than 30 two-way peak hour vehicle trips, therefore this development has not been explicitly accounted for in the traffic projections but instead has been considered through traffic growthing.

- **Land to the South-East of Higham Common Road, Barnsley [MU1 – Employment] (approximately 2.8km to the north of the application site):**
  - A hybrid planning application (ref: 2021/1089) was submitted in August 2021 and is awaiting determination for *‘employment development comprising:- a) Full planning permission for: earthworks to create development platforms; strategic drainage ponds and associated drainage infrastructure; and location of strategic landscaping and ecological areas. b) Outline planning permission seeking approval over means of access and landscaping for employment use development (use classes E/B2/B8) and associated infrastructure works’*. The application is supported by a TA (FC, 2021a), Framework Residential TP (FC, 2021b) and Framework Workplace TP (FC, 2021c).
  - In order to ensure a robust worst-case assessment, the traffic flows associated with the development have been formally considered as committed development within the traffic projections of this STA, based on the approved projections in the TA supporting the application (FC, 2021a).
- **Land to the South-East of Higham Common Road, Barnsley [MU1 – Residential] (approximately 2.8km to the north of the application site):**
  - A hybrid planning application (ref: 2021/1090) was submitted in August 2021 and is awaiting determination for *‘residential development for 1,760 dwellings comprising: a) Full planning permission for: earthworks to create development platforms; strategic drainage ponds and associated drainage infrastructure; construction of a new link road; location of strategic landscaping and ecological areas; demolition of existing buildings; works to Hermit Lane; and erection of Phase 1 residential development comprising 229 dwellings b) Outline planning permission for: Residential development comprising 1,531 dwellings; new primary school; small shops and community facilities; and associated infrastructure works’*. The application is supported by a TA (FC, 2021a), Framework Residential TP (FC, 2021b) and Framework Workplace TP (FC, 2021c) that have also been submitted as part of the hybrid planning application (ref: 2021/1089).
  - As the scheme is not yet consented, it could be argued that the development does not represent a committed development, with reference to Planning Practice Guidance (DCLG, 2014), which suggests consideration of development *“that is consented or allocated where there is a reasonable degree of certainty will proceed within the next 3 years”*.
  - However, in order to ensure a robust worst-case assessment, the traffic flows associated with the development have been formally considered as committed development within the traffic projections of this STA, based on the approved projections in the TA supporting the application (FC, 2021a).

- **Proposed Secondary School, Land off Keresforth Close, Barnsley (approximately 1.3km to the north-east of the application site):**
  - A full planning application (ref: 2021/1631) was submitted in December 2021 and is awaiting determination for the '*Erection of a new secondary school with associated sports block, sports pitches, hard and soft landscaping, access, parking and drainage*'. A TA (MTP, 2021a) and TP (MTP, 2021b) were submitted in support of the application.
  - As the scheme is not yet consented, it could be argued that the development does not represent a committed development, with reference to Planning Practice Guidance (DCLG, 2014).
  - However, in order to ensure a robust worst-case assessment, the traffic flows associated with the development have been formally considered as committed development within the traffic projections of this STA, with suitable assumptions applied based on existing turning proportions at the study junctions.
- **Land off Smithywood Lane and Calver Close, Gilroyd, Barnsley [198 dwellings] (approximately 1km to the south of the application site):**
  - A full planning application (ref: 2021/1642) was submitted in December 2021 and is awaiting determination for a '*Residential development of 198 dwellings and associated works*'. The application is supported by a TA (OIHS, 2021a) and TP (OIHS, 2021b).
  - As the scheme is not yet consented, it could be argued that the development does not represent a committed development, with reference to Planning Practice Guidance (DCLG, 2014).
  - However, in order to ensure a robust worst-case assessment, the traffic flows associated with the development have been formally considered as committed development within the traffic projections of this STA, with suitable assumptions applied based on existing turning proportions at the study junctions.

### 3.6 Assessment Scenarios

3.6.1 The proposals have been tested against the following weekday AM and PM peak hour traffic flow scenarios:

- **2018 Base** - Traffic flows recorded and observed during the November 2018 traffic surveys undertaken as part of the Capitol Park extension TA (ref: 2019/0286);
- **2032 Do Nothing** - '2018 Base' network traffic flows, growthed to 2032 with the addition of traffic associated with the committed developments (see Section 3.5); and
- **2032 With Development** – '2032 Do Nothing' with the addition of trips associated with the proposed development.

3.6.2 The network traffic flows at 2032 have been predicted using the DfT's 'National Transport Model' (NTM) and Road Traffic Forecasts (RTFs). The growth factor obtained from the NTM has been adjusted to reflect local circumstances for the local authority area (Barnsley) using TEMPro (v7.2b) software (Ref: Yorkshire & Humber Dataset Version 7.2), see Appendix 4. In accordance with the DfT's 'Transport Analysis Guidance' (TAG) (DfT, 2019), the underlying NTEM growth includes for households and jobs have also been adjusted to reflect the traffic associated with the committed developments and residential development that has been explicitly incorporated into the traffic projections of this STA, in order to avoid double counting the associated traffic flows.

### 3.7 Impact at Study Junctions

3.7.1 The predicted increase in traffic across the two study junctions as a result of the development is summarised in Table 13.

**Table 13: Predicted Traffic Impact at Study Junctions**

Junction	2018 Base	2032 Do Nothing	2032 With Development	Development Impact	
<b>AM PEAK</b>					
J1: Whinby Road/B6449 Roundabout	2,316	3,056	3,093	+37	+1.2%
J2: Dodworth Roundabout	4,142	5,321	5,358	+37	+0.7%
<b>PM PEAK</b>					
J1: Whinby Road/B6449 Roundabout	2,572	3,552	3,589	+37	+1.0%
J2: Dodworth Roundabout	4,176	5,406	5,443	+37	+0.7%

3.7.2 The traffic projections summarised in Table 13 indicate that the development of the site is expected to result in a low proportionate increase (1.0/1.2% maximum) at the two study junctions in the '2032 With Development' scenario compared to the '2032 Do Nothing' scenario, with a particularly small relative increase (0.7% at Dodworth Roundabout).

### 3.8 Base Model Validation

3.8.1 The Junctions 9 model for the Whinby Road/B6449 Roundabout is based on the exact geometric inputs associated with the approved model produced as part of the Capitol Park extension development presented in the TA (FC, 2019a). The 2018 baseline traffic survey data used to assess the roundabout was also extracted from the Capitol Park extension development presented in the TA (FC, 2019a). A comparison between the two modelling results has been provided in Table 14 below.

**Table 14: J1 2018 Base Model Comparison**

<b>J1: Whinby Road/B6449 Roundabout (2018 Base)</b>					
Peak	Arm	Application Site		Capitol Park Model	
		Max. RFC*	Max End Q**	Max. RFC	Max End Q
AM	Whinby Road (N)	51.9%	1.1	51.9%	1.1
	Whinby Road (E)	49.4%	1.0	49.4%	1.0
	B6449	75.9%	3.0	75.9%	3.0
	<b>OVERALL</b>	<b>75.9%</b>	<b>3.0</b>	<b>75.9%</b>	<b>3.0</b>
PM	Whinby Road (N)	54.0%	1.2	54.0%	1.2
	Whinby Road (E)	74.8%	2.9	74.8%	2.9
	B6449	39.8%	0.7	39.8%	0.7
	<b>OVERALL</b>	<b>74.8%</b>	<b>2.9</b>	<b>74.8%</b>	<b>2.9</b>

\*Maximum Ratio of Flow to Capacity, \*\*Maximum End Queue

- 3.8.2 The modelling results in Table 15 show that the junction model produced as part of this STA are consistent with the results presented in the Capitol Park extension TA (FC, 2019a). Therefore, the Junctions 9 model is considered appropriate to assess the development’s impact.
- 3.8.3 The LinSig v3 model for Dodworth Roundabout is based on the exact geometric inputs associated with the approved model in the TA (FC, 2019a) produced as part of the Capitol Park extension, also with the same signal controller setup (where available). The 2018 baseline traffic survey data used to assess the signalised roundabout was also extracted from the Capitol Park extension TA (FC, 2019a). A comparison between the two modelling results has been provided in Table 15 below.

**Table 15: J2 2018 Base Model Comparison**

<b>J2: Dodworth Roundabout (2018 Base)</b>				
Arm	Application Site		Capitol Park Model	
	Max. DoS*	MMQ**	Max. DoS	MMQ
<b>AM Peak</b>				
A628 Dodworth Road	62.0%	7.8	62.0%	7.8
M1 J37 Northbound Off-Slip	59.3%	7.1	61.3%	7.5
Whinby Road	64.7%	8.1	62.8%	7.8
M1 J37 Southbound Off-Slip	61.3%	5.5	61.3%	5.5
<b>PRC***</b>	<b>+39.0%</b>		<b>+42.5%</b>	
<b>PM Peak</b>				
A628 Dodworth Road	56.6%	7.3	60.8%	7.6
M1 J37 Northbound Off-Slip	67.9%	9.1	67.9%	9.1
Whinby Road	63.6%	7.1	59.1%	6.7
M1 J37 Southbound Off-Slip	67.1%	6.9	67.1%	6.9
<b>PRC</b>	<b>+31.7%</b>		<b>+29.8%</b>	

\*Degree of Saturation, \*\* Mean Max Queue, \*\*\* Practical Reserve Capacity.

- 3.8.4 The Degree of Saturation (DoS) quoted within Table 18 is a ratio of the demand to capacity on each approach to the junction, with a value of 100% meaning that demand and capacity are equal. The Mean Max Queue (MMQ) is a measurement of the average maximum queue likely to occur across all cycles of the modelled scenario.
- 3.8.5 The modelling results in Table 15 show that the junction model produced as part of this STA is comparable to the approved model presented in the Capitol Park extension TA (FC, 2019a). Therefore, the LinSig v3 model is considered appropriate to assess the development's impact.

### 3.9 J1 Capacity Assessment

- 3.9.1 In order to assess the ability of the existing Whinby Road/B6449 four-arm priority-controlled roundabout to accommodate the traffic associated with the proposed development, a junction capacity assessment has been undertaken using Junctions 9 modelling software (ARCADY module), which is a software package produced by Transport Research Laboratory (TRL) that provides an industry-standard method for assessing roundabout and priority junction capacity, queuing and delay. An aerial image of the roundabout can be seen in Figure 2.

Figure 2: J1 Aerial



Source Imagery: Copyright Google Earth Pro (License Key-JCPMR5M58LXF2GE)

- 3.9.2 The baseline and future peak hour traffic flows have been assessed against the existing junction layout, the results of which are summarised in Table 16 with the complete modelling output in Appendix 5.

**Table 16: J1 Capacity Assessment**

Peak	Arm	2018 Base		2032 Do Nothing		2032 With Development		Development Impact	
		Max. RFC	Max End Q	Max. RFC	Max End Q	Max. RFC	Max End Q	Max. RFC	Max End Q
AM	Whinby Road (N)	51.9%	1.1	74.2%	2.8	74.3%	3.2	+0.1%	+0.4
	Whinby Road (E)	49.4%	1.0	69.0%	2.2	69.5%	2.3	+0.5%	+0.1
	B6449	75.9%	3.0	132.9%	97.3	138.5%	114.0	+5.6%	+16.7
	<b>OVERALL</b>	<b>75.9%</b>	<b>3.0</b>	<b>132.9%</b>	<b>52.0</b>	<b>138.5%</b>	<b>114.0</b>	<b>+5.6%</b>	<b>+16.7</b>
PM	Whinby Road (N)	54.0%	1.2	77.8%	3.4	78.2%	3.5	+0.4%	+0.1
	Whinby Road (E)	74.8%	2.9	104.4%	59.1	105.9%	71.6	+1.5%	+12.5
	B6449	39.8%	0.7	73.6%	2.6	74.5%	2.7	+0.9%	+0.1
	<b>OVERALL</b>	<b>74.8%</b>	<b>2.9</b>	<b>104.4%</b>	<b>59.1</b>	<b>105.9%</b>	<b>71.6</b>	<b>+1.5%</b>	<b>+12.5</b>

3.9.3 The results of the capacity assessment presented in Table 16 indicate that the Whinby Road/B6449 roundabout is expected to operate above capacity in 2032, without the proposed development coming forward. The results indicate that the maximum Ratio to Flow Capacity (RFC) during the peak hours is likely to be 138.5% (weekday AM peak), above the 100% RFC level of full capacity. Queuing in the AM peak is not expected to affect the operation of Dodworth Roundabout, as the level of congestion and queuing on the eastern Whinby Road arm is not significant, although this arm is expected to experience notable queuing during the PM peak hour, which depending on driver behaviour, may block back to Dodworth Roundabout, even in the Do Nothing situation without the proposed development (although there is stacking space for up to 62 cars to queue before blocking back occurs). It should be noted that average daily flows across all slip roads of Dodworth Roundabout are lower than the flows in 2018.

3.9.4 The results predict that the development impact on the operation of the roundabout in the '2032 With Full Development' scenario is expected to result in RFC increases of 5.6% in the AM peak and 1.5% in the PM peak, with Mean Max Queue (MMQ) increases of 16.7 PCUs and 12.5 PCUs respectively. It is worthwhile noting that the results of any Junctions 9 model are unstable when the RFC is expected to be over 100%, with the relative impact of changes exaggerated. The proposed development is only expected to generate up to 37 additional two-way vehicle trips during the AM and PM peak hours at the roundabout, and therefore a sensitivity test has been undertaken which considers the circa 15% traffic growth between 2018 and 2032 but excludes committed development trips. The results of the sensitivity test are presented in Table 17 below.

**Table 17: J1 Sensitivity Test**

Peak	Arm	2032 Do Nothing (without committed development trips)		2032 With Development (without committed development trips)		Development Impact	
		Max. RFC	Max End Q	Max. RFC	Max End Q	Max. RFC	Max End Q
AM	Whinby Road (N)	60.9%	1.5	61.4%	1.6	+0.5%	+0.1
	Whinby Road (E)	56.7%	1.3	57.1%	1.3	+0.5%	-
	B6449	95.6%	11.7	100.1%	18.2	+4.5%	+6.5

Peak	Arm	2032 Do Nothing (without committed development trips)		2032 With Development (without committed development trips)		Development Impact	
		Max. RFC	Max End Q	Max. RFC	Max End Q	Max. RFC	Max End Q
	<b>OVERALL</b>	<b>95.6%</b>	<b>11.7</b>	<b>100.1%</b>	<b>18.2</b>	<b>+4.5%</b>	<b>+6.5</b>
PM	Whinby Road (N)	62.6%	1.7	62.9%	1.7	+0.3%	-
	Whinby Road (E)	86.4%	6.0	87.9%	6.8	+1.5%	+0.8
	B6449	50.4%	1.0	52.1%	1.1	+1.7%	+0.1
	<b>OVERALL</b>	<b>86.4%</b>	<b>6.0</b>	<b>87.9%</b>	<b>6.8</b>	<b>+1.5%</b>	<b>+0.8</b>

3.9.5 The sensitivity test indicates that the maximum RFC during the peak hours is likely to be 100.1% in the weekday AM peak. The modelling results indicate that the development impact on the operation of the roundabout is expected to result in RFC increases of 4.5% in the AM peak and 1.5% in the PM peak, with reduced MMQ increases of 6.5 PCUs and 0.8 PCUs, respectively.

3.9.6 There are two committed developments ‘Capitol Park Extension’ (76 vehicles AM peak/73 vehicles PM peak [approved by NH]) and ‘Land to the South-East of Higham Common Road’ (403 vehicles AM peak/462 vehicles PM peak) that are expected to generate a significantly larger number of additional vehicle trips at the roundabout, although both schemes are not proposing any improvements to the roundabout to mitigate the impacts of the development (the Capitol Park scheme has already been approved without the requirement for improvement).

3.9.7 The relevant test is that development “*should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe*” (MHCLG, 2021). Therefore, it is considered that the proposed development will not have a significant impact on the operation of the Whinby Road/B6449 roundabout and no specific mitigation is required as part of this development.

### 3.10 J2 Capacity Assessment

3.10.1 In order to assess the ability of the existing Dodworth Roundabout junction to accommodate the projected future traffic flows, a junction capacity assessment has been undertaken using LinSig v3 modelling software, a design and assessment tool for traffic signal junctions. An aerial image of the signalised roundabout can be seen in Figure 3.

Figure 3: J2 Aerial



Source Imagery: Copyright Google Earth Pro (License Key-JCPMR5M58LXF2GE)

3.10.2 The baseline and future peak hour traffic flows have been assessed against the existing junction layout, the results of which are summarised in Table 18 and the complete modelling output is provided in Appendix 6.

Table 18: J2 Capacity Assessment

Approach	2018 Base		2032 Do Nothing		2032 With Development		Development Impact	
	Max. DoS	MMQ	Max. DoS	MMQ	Max. DoS	MMQ	Max. DoS	MMQ
<b>AM Peak</b>								
A628 Dodworth Road	62.0%	7.8	77.8%	11.6	80.4%	12.3	+2.6%	+0.7
M1 J37 Northbound Off-Slip	59.3%	7.1	74.4%	10.2	74.4%	10.2	-	-
A628 Whinby Road	64.7%	8.1	79.9%	12.6	81.1%	13.1	+1.2%	+0.5
M1 J37 Southbound Off-Slip	61.3%	5.5	72.1%	7.0	72.1%	7.0	-	-
<b>PRC</b>	<b>+39.0%</b>		<b>+12.7%</b>		<b>+10.9%</b>		<b>-1.8%</b>	
<b>PM Peak</b>								
A628 Dodworth Road	56.6%	7.3	81.1%	12.9	81.1%	12.9	-	-
M1 J37 Northbound Off-Slip	67.9%	9.1	87.5%	16.0	88.8%	16.8	+1.3%	+0.8
A628 Whinby Road	63.6%	7.1	77.4%	10.7	77.9%	10.9	+0.5%	+0.2
M1 J37 Southbound Off-Slip	67.1%	6.9	81.7%	10.2	83.8%	10.8	+2.1%	+0.6
<b>PRC</b>	<b>+31.7%</b>		<b>+2.9%</b>		<b>+1.4%</b>		<b>-1.5%</b>	

3.10.3 The results of the capacity assessments presented in Table 18 indicate that the existing Dodworth Roundabout would be expected to operate within capacity during both peak hours in the future year scenarios, with positive levels of Practical Reserve Capacity (PRC) with the proposed residential development fully constructed and occupied.

3.10.4 The impact of the development is small with a reduction in PRC of 1.8% during the AM peak and 1.5% during the PM peak in comparison to the '2032 Do Nothing' scenario. Therefore, it is concluded that the proposed development would not be expected to have a severe impact on the operation of Dodworth Roundabout.

### 3.11 Dodworth Roundabout Merge/Diverge Analysis

3.11.1 In order to assess the impact of the development on the slip roads to/from the M1 at Dodworth Roundabout, analysis of the baseline and future merge and diverge flows has been undertaken with the results summarised within Table 19.

**Table 19: Dodworth Roundabout Merge/Diverge Impact**

Dodworth Roundabout	AM Peak Hour (07:15-08:15)			PM Peak Hour (16:45-17:45)		
	2018 Base	2032 Do Nothing	2032 With Development	2018 Base	2032 Do Nothing	2032 With Development
M1 Northbound Mainline	3595	4113	4113	3537	4044	4044
Merge Flow (NB On-Slip)	887	1107	1122	511	661	666
<b>Development Impact</b>	<b>+15</b>			<b>+5</b>		
Diverge Flow (NB Off-Slip)	981	1227	1231	1213	1533	1546
<b>Development Impact</b>	<b>+4</b>			<b>+13</b>		
M1 Southbound Mainline	3501	4006	4006	3201	3660	3660
Merge Flow (SB On-Slip)	1244	1572	1585	996	1265	1270
<b>Development Impact</b>	<b>+13</b>			<b>+5</b>		
Diverge Flow (SB Off-Slip)	512	647	652	817	1027	1041
<b>Development Impact</b>	<b>+5</b>			<b>+14</b>		

3.11.2 Based on the analysis presented in Table 19, a maximum of 15 additional vehicle trips are expected to be generated on the Dodworth Roundabout northbound on-slip during the AM peak, which is only an increase of 1.4%. A maximum of 14 two-way vehicle trips would be expected to be generated on the Dodworth Roundabout southbound off-slip during the PM peak.

### 3.12 Traffic Impact Summary

3.12.1 Based on the capacity assessments detailed in this STA, it is considered that the development will not have a severe impact on the operation of the SRN. Therefore, as the traffic impact of the residential development is not expected to be severe, the proposals are considered to be in accordance with the 'National Planning Policy Framework', which states that "development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe" (MHCLG, 2021).

## 4. CONCLUSIONS

- 4.1.1 This Supplementary Transport Assessment (STA) has been produced in support of an outline planning application (all matters reserved except for access) for a proposed residential development at a site located to the north of Keresforth Road in Dodworth, Barnsley.
- 4.1.2 This STA follows on from, and should be read in conjunction with, the Transport Assessment (TA) (LTP, 2021a) and Travel Plan (LTP, 2021b) that have been produced in support of the outline planning application for the development (ref: 2022/0016), which is seeking consent for “[r]esidential development of up to 215 dwellings and associated works (Outline application with all matters reserved apart from means of access)”. During the determination period for the planning application, NH requested (see Appendix 1) detailed analysis of collisions at the M1 Junction 37 signalised roundabout (Dodworth Roundabout), consideration of the cumulative impact of local committed developments and the proposed development on the operation of Dodworth Roundabout and the Whinby Road/B6449 roundabout, and merge/diverge analysis on the Dodworth Roundabout slip roads. Therefore, this STA has been produced to present the results of the requested assessments from NH.
- 4.1.3 As requested by NH, detailed collision analysis has been undertaken at Dodworth Roundabout and associated slip roads. Analysis of the study collisions, which considers vehicle types, casualties, weather conditions and road surface, has not revealed any pertinent collision trends that would be expected to be exacerbated by the additional vehicle movements (less than 1%) associated with the proposed development requiring mitigation. The relevant test is that development “*should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe*” (MHCLG, 2021). Therefore, it is considered that there are no existing road safety issues pertinent to the development of the site.
- 4.1.4 In order to assess the impact of the proposed development on the SRN, junction capacity assessments of the Whinby Road/B6449 roundabout and the M1 Junction 37 (Dodworth Roundabout) have been undertaken as requested by NH as part of this STA. The junction capacity assessments undertaken as part of this STA demonstrate that the development would not have a severe impact on the operation of the SRN.
- 4.1.5 Based on the detailed collision analysis and junction capacity assessments of this STA, it is considered that the proposed development would not be expected to have a severe impact on the operation of the SRN. The relevant test is that development “*should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe*” (MHCLG, 2021). The projections of this STA indicate that the development will not have a severe transport impact, therefore the development is in accordance with the ‘National Planning Policy Framework’ (MHCLG, 2021).

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- 4.1.6 It is concluded from the assessments within this STA that the proposed development would not be expected to have a severe impact in terms of road safety and traffic impact on the operation of the SRN.

## 5. REFERENCES

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## **Appendix I – NH Response**



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

From: Divisional Director  
Network Delivery and Development  
National Highways  
North East Region

To: Elaine Ward, Barnsley MBC

CC: [spatialplanning@highwaysengland.co.uk](mailto:spatialplanning@highwaysengland.co.uk)  
[transportplanning@dft.gov.uk](mailto:transportplanning@dft.gov.uk)

**Council's Reference:** 2022/0016

**Location:** Land north of Keresforth Road, Dodworth, Barnsley

**Proposal:** Residential development of up to 215 dwellings and associated works  
(Outline application with all matters reserved apart from means of access)

Referring to the consultation on the planning application dated 12<sup>th</sup> January 2022 referenced above, notice is hereby given that National Highways' formal recommendation is that we:

- ~~a) offer no objection~~
- ~~b) recommend that conditions should be attached to any planning permission that may be granted (see Annex A – National Highways recommended Planning Conditions & reasons);~~
- c) recommend that planning permission not be granted for a specified period (see reasons at Annex A);
- ~~d) recommend that the application be refused (see reasons at Annex A)~~

Highways Act 1980 Section 175B is not relevant to this application.<sup>1</sup>

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

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<sup>1</sup> Where relevant, further information will be provided within Annex A.

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

<b>Signature: E. Atkinson</b>	<b>Date: 1<sup>st</sup> February 2022</b>
<b>Name: ELISA ATKINSON</b>	<b>Position: Spatial Planning</b>
<b>National Highways</b>	

## **Annex A Further Assessment Required**

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

Keepmoat Homes have submitted a planning application for the proposed residential development of up to 215 dwellings and associated works (Outline application with all matters reserved apart from means of access) located on land north of Keresforth Road in Dodworth, Barnsley. The proposed development is located adjacent to the M1 junction 37. The eastern site boundary of the application site is coincidental with the highway boundary and the northbound off slip road. The southern section of the slip road is set at or around the same elevation as the application site; whilst the northern section of the slip road, on approach to the roundabout, is elevated above the application site.

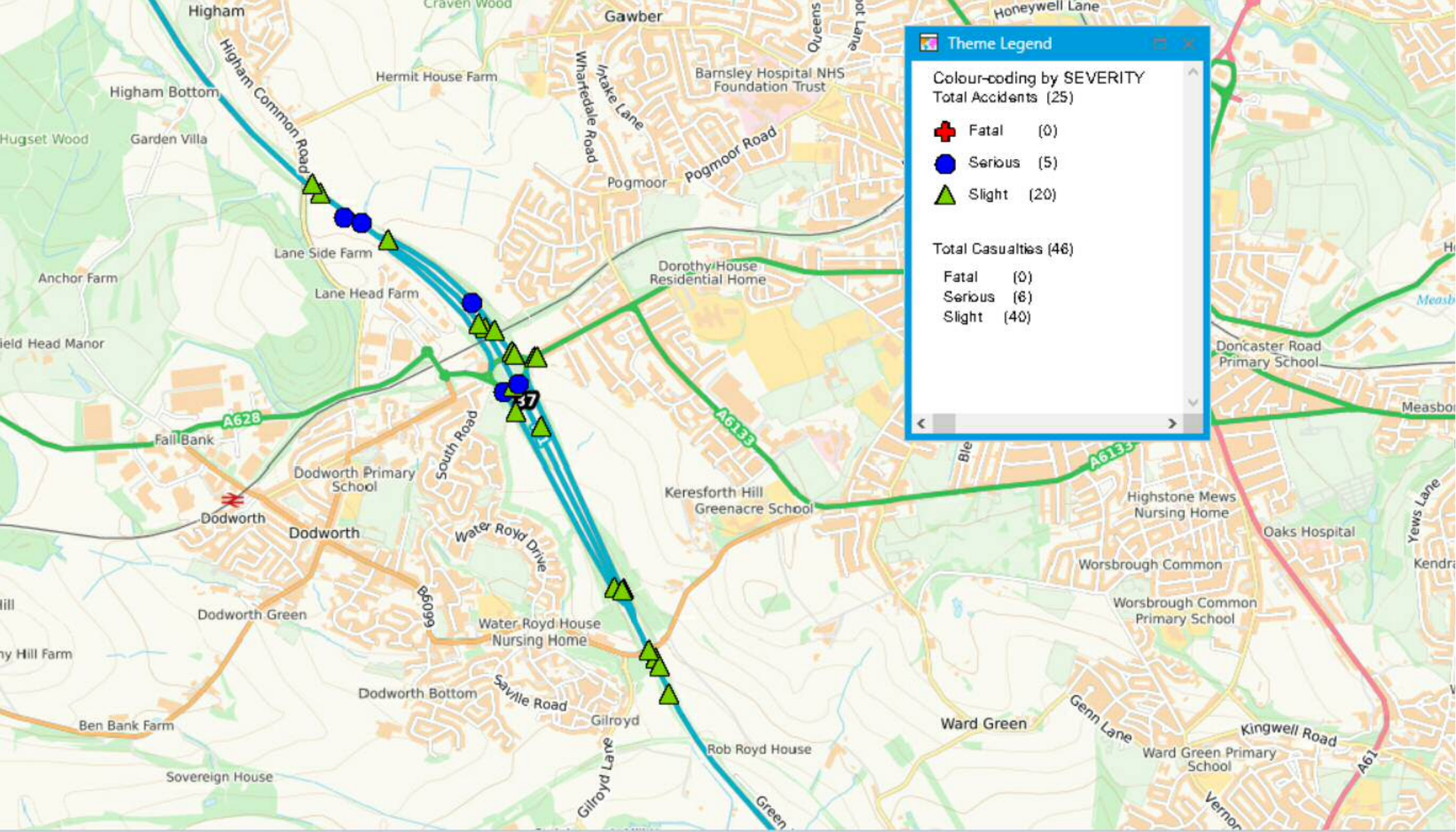
We have reviewed the supporting information and a summary of our comments are detailed below:

- We suggest that LTP need to present a further analysis of the collision data, causation trends, and cluster analysis that covers Dodworth Roundabout, such that the impact of the development on SRN can be confirmed;
- We would suggest that LTP engage with BMBC to agree which committed developments should be considered alongside the proposed development and where required, a cumulative assessment of traffic impacts be undertaken. Particularly, we are aware of proposed development at land off Keresforth Close (planning reference: 2021/1631) which includes the construction of a new secondary school;
- We would consider LTP's vehicle trip rates and generation results to be acceptable;
- We would suggest that, given the similarities between the LTP gravity model approach, and the JSJV (consultants on behalf of NH) GraHAM run, the distribution and assignment derived from the gravity model is appropriate for use in the Transport Assessment;
- We cannot conclude that the traffic generated by the proposed development will not result in a material and detrimental impact on the operation of M1(J37) when considered in isolation or cumulatively with committed development proposals;
- given that the application is seeking to construct a greater number of residential units than originally considered at the allocation stage, it is incumbent on the applicant to reassess the impact of the proposal on the operation of the SRN. In this regard, in the absence of supporting information as to the effective operation of M1 (J37), we would suggest that an operational assessment of the grade separated junction, including merge and diverge assessments, is appropriate in this instance;

- the assessment should also include the nearby Whinby Road roundabout junction to ensure that queues do not block back and interfere with the operation of the SRN; and
- We would request that further information be provided with regards to the proposed boundary treatment between the M1 and the application site.

We therefore recommend that planning permission should not be granted for a period of 6 months from the date of this formal recommendation to understand the SRN impact and any outstanding matters to be resolved.

## **Appendix 2 – Collision Plot**



### Theme Legend

Colour-coding by SEVERITY

Total Accidents (25)

- Fatal (0)
- Serious (5)
- Slight (20)

Total Casualties (46)

- Fatal (0)
- Serious (6)
- Slight (40)

## **Appendix 3 – Network Diagrams**

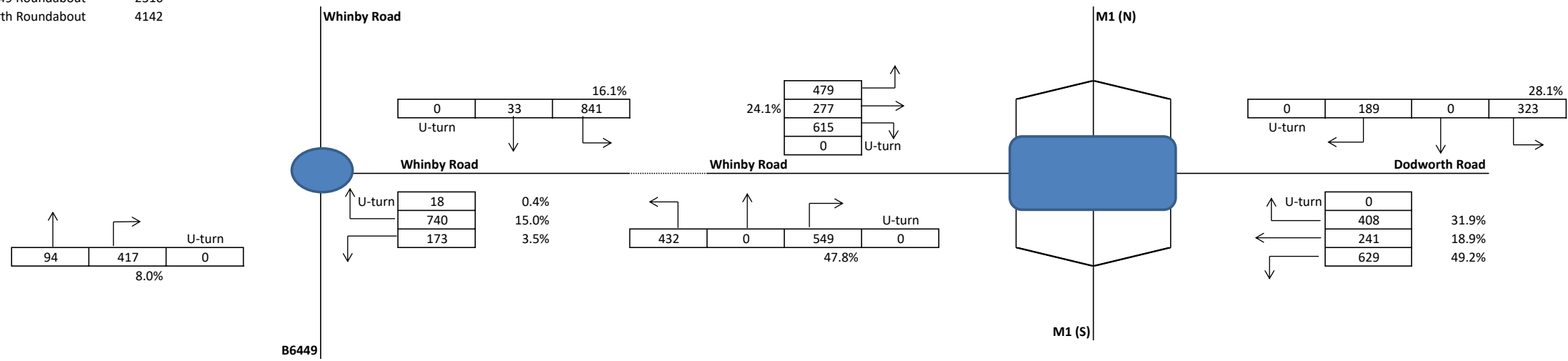
**2018 Base\***

**AM Peak (07:15-08:15)**

2018 peak hour traffic flows obtained from Capitol Park TA (FC, 2019a)

PCUs

Whinby Road/B6449 Roundabout	2316
Dodworth Roundabout	4142



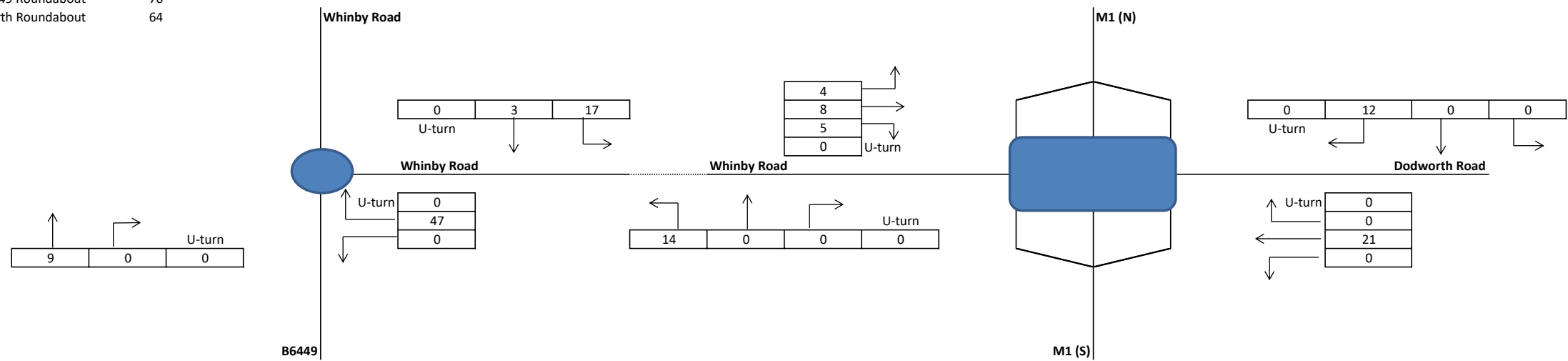
**Committed Development - Capitol Park Extension (Ref: 2019/0286)**

**AM Peak (07:15-08:15)**

Development peak hour traffic flows obtained from Capitol Park TA (FC, 2019a)

PCUs

Whinby Road/B6449 Roundabout	76
Dodworth Roundabout	64



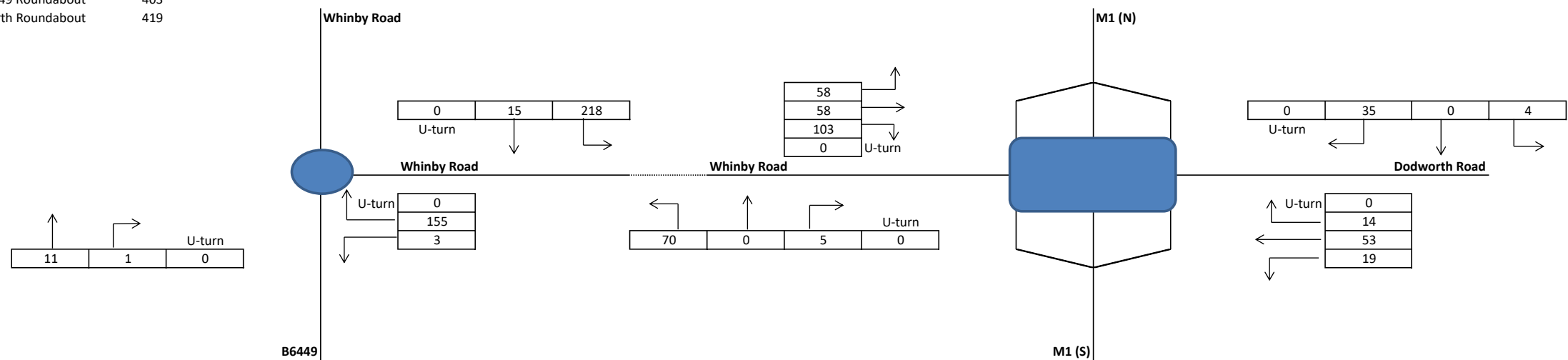
**Committed Development - Land to the South-East of Higham Common Road, Barnsley (MU1 - Residential & Employment) (Ref: 2021/1090 & 2021/1089)**

**AM Peak (07:15-08:15)**

Development peak hour traffic flows obtained from MU1 Residential & Employment TA (FC, 2021a)

PCUs

Whinby Road/B6449 Roundabout	403
Dodworth Roundabout	419



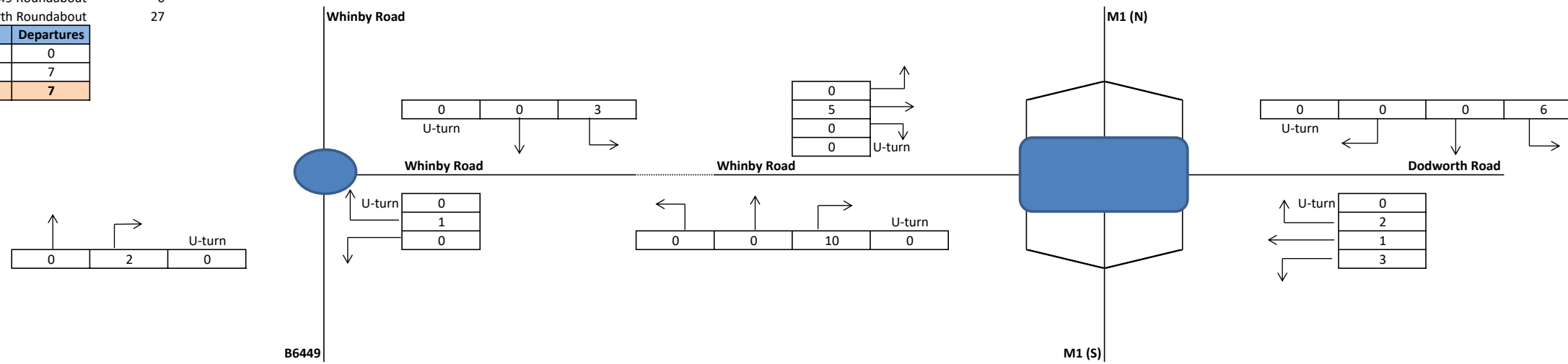
**Committed Development - Proposed Secondary School, Land off Keresforth Close (Ref: 2021/1631)**

**AM Peak (07:15-08:15)**

Development peak hour traffic flows obtained from Trinity Academy, Barnsley TA (MTP, 2021a) - Worst case assumption of all pupil & staff trips applied to peak hours

PCUs

	Whinby Road/B6449 Roundabout	6
	Dodworth Roundabout	27
	<b>Arrivals</b>	<b>Departures</b>
Staff	14	0
Pupils	7	7
<b>Total</b>	<b>21</b>	<b>7</b>



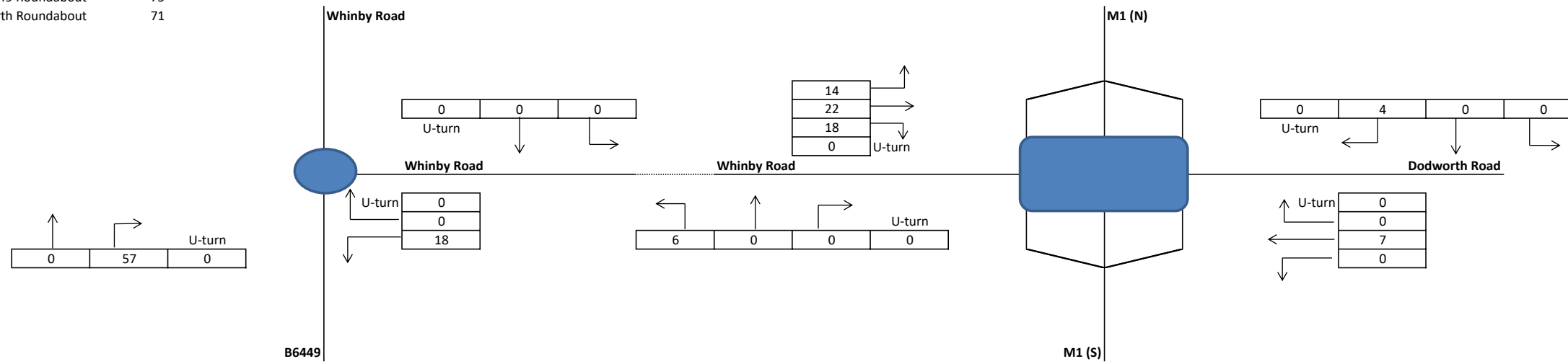
**Committed Development - Land off Smithywood Lane and Calver Close, Gilroyd (Ref: 2021/1642)**

**AM Peak (07:15-08:15)**

Development peak hour traffic flows obtained from the Calver Close Dodworth TA (OIHS, 2021a)

PCUs

	Whinby Road/B6449 Roundabout	75
	Dodworth Roundabout	71

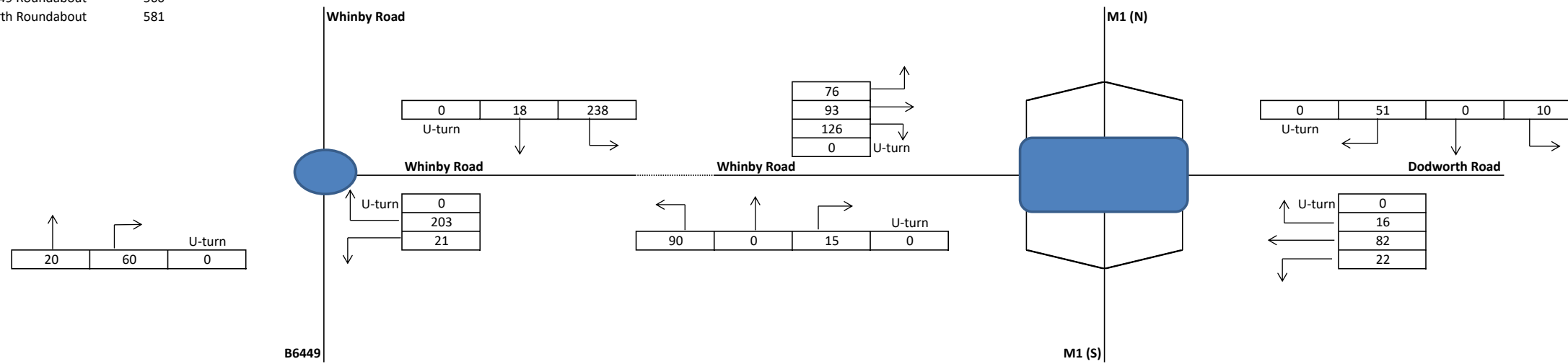


**Total Committed Development**

**AM Peak (07:15-08:15)**

PCUs

	Whinby Road/B6449 Roundabout	560
	Dodworth Roundabout	581



2032 Do Nothing

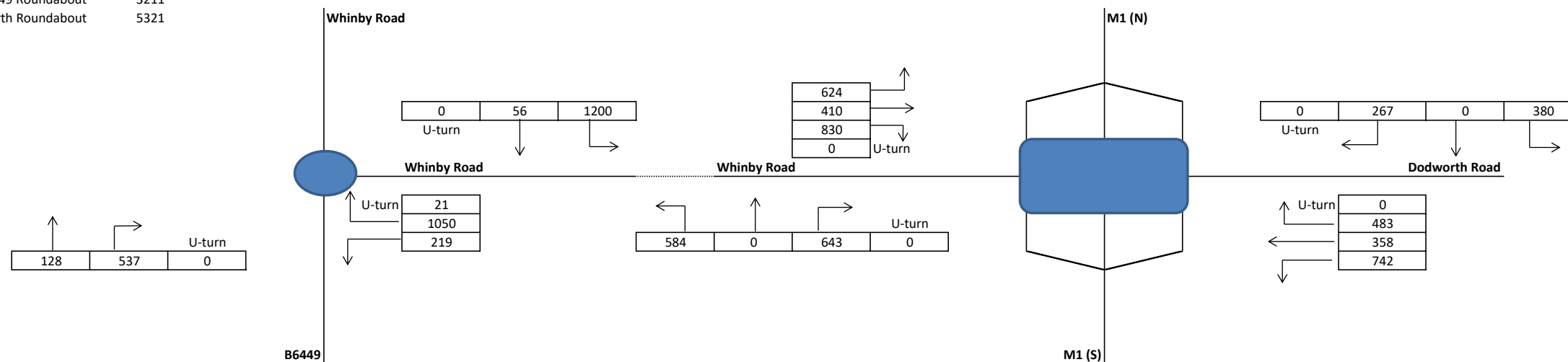
AM Peak (07:15-08:15)

Tempo Traffic Growth 2018 to 2032:

14.4%

PCUs

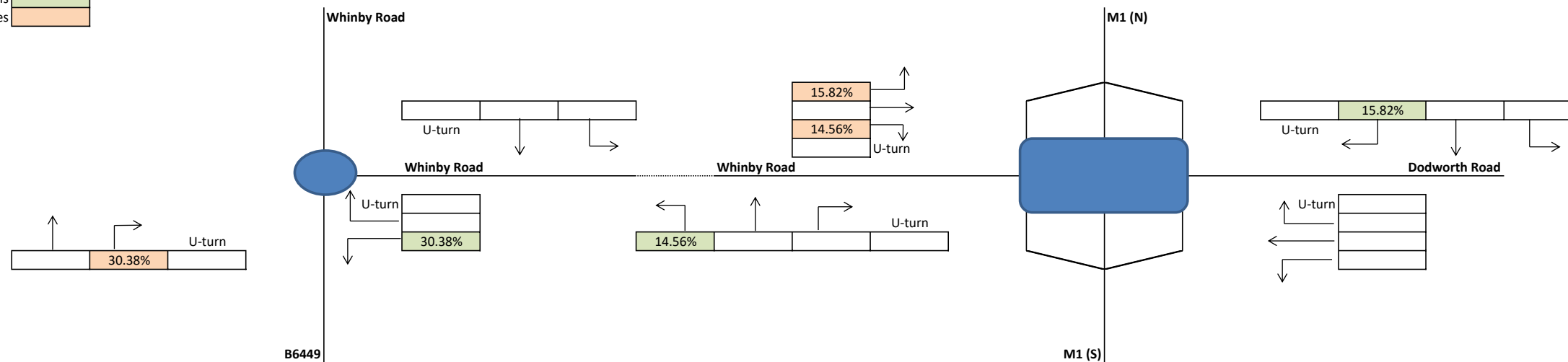
Whinby Road/B6449 Roundabout 3211  
 Dodworth Roundabout 5321



Development Trip Distribution

AM Peak (07:15-08:15)

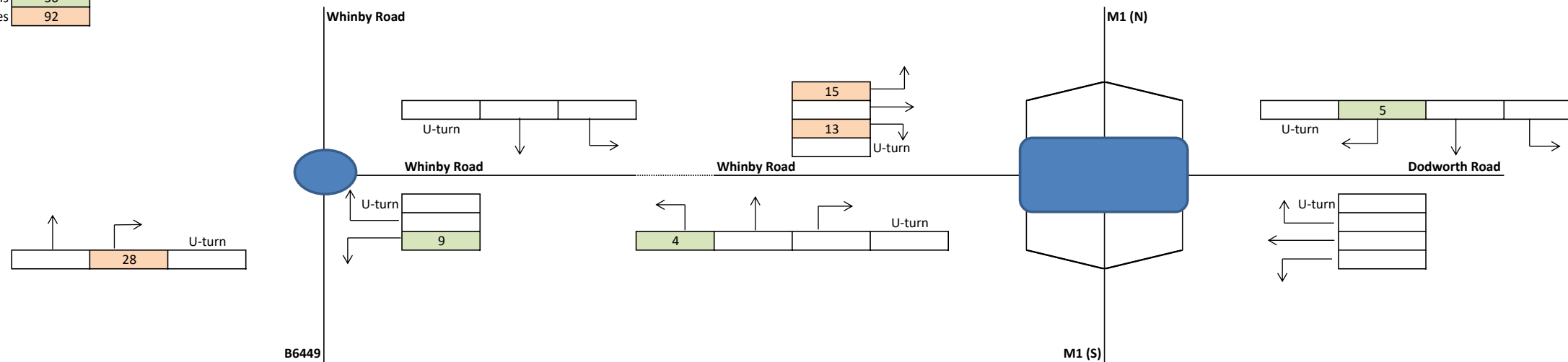
Arrivals  
 Departures



Development Trips

AM Peak (07:15-08:15)

Arrivals 30  
 Departures 92

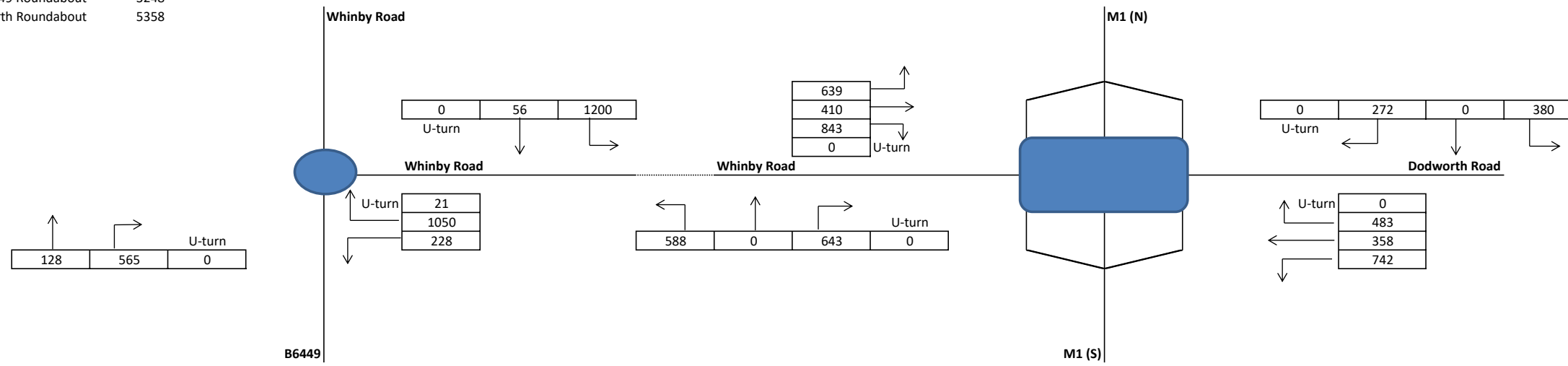


2032 With Development

AM Peak (07:15-08:15)

PCUs

Whinby Road/B6449 Roundabout	3248
Dodworth Roundabout	5358

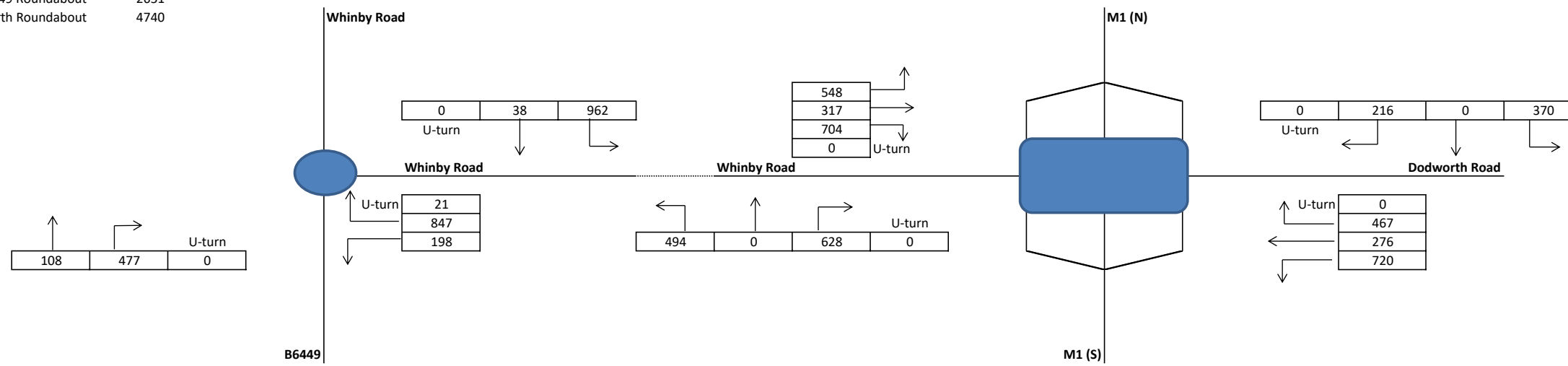


Sensitivity Test (2032 Do Nothing without committed development)

AM Peak (07:15-08:15)

PCUs

Whinby Road/B6449 Roundabout	2651
Dodworth Roundabout	4740

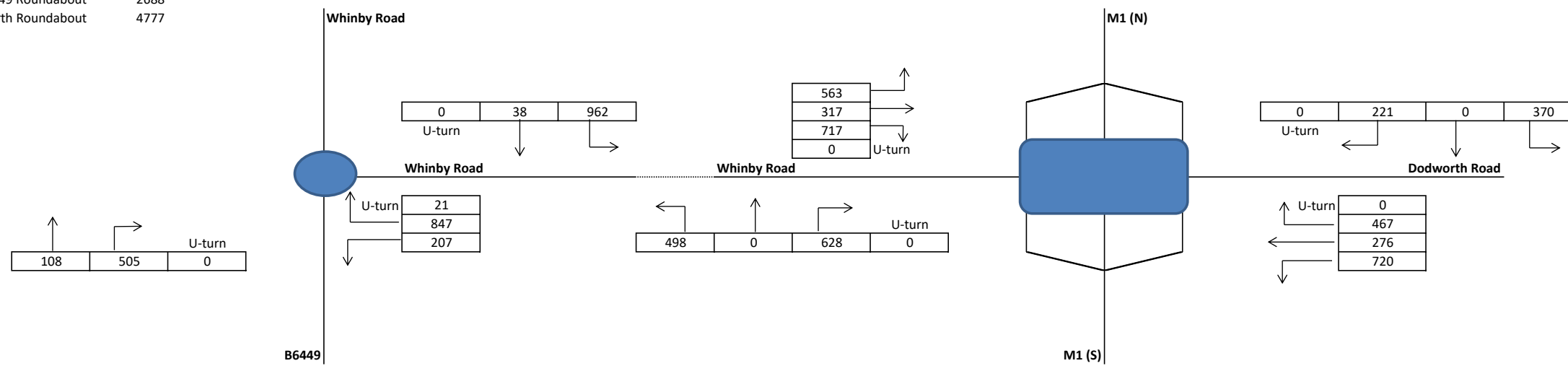


Sensitivity Test (2032 With Development without committed development)

AM Peak (07:15-08:15)

PCUs

Whinby Road/B6449 Roundabout	2688
Dodworth Roundabout	4777



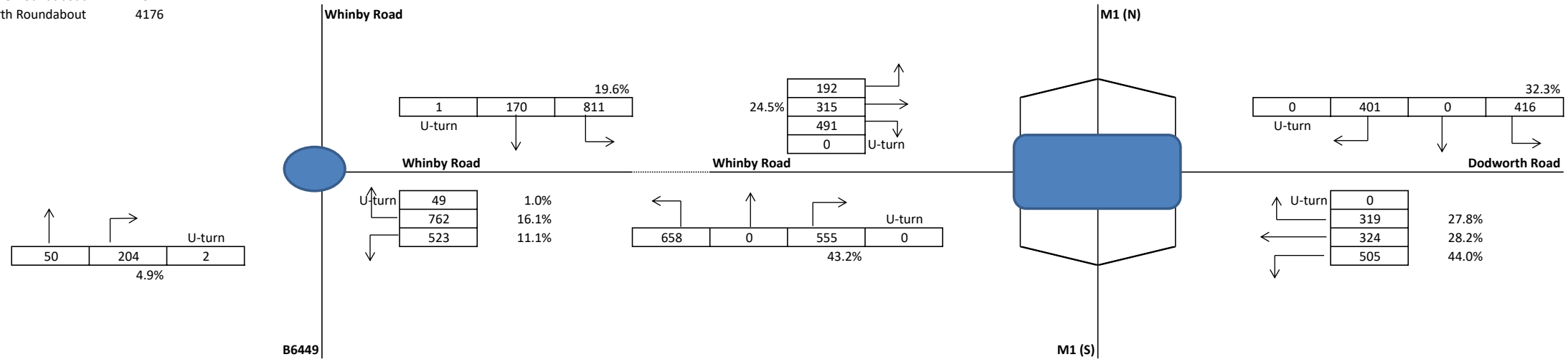
**2018 Base\***

**PM Peak (16:45-17:45)**

2018 peak hour traffic flows obtained from Capitol Park TA (FC, 2019a)

PCUs

Whinby Road/B6449 Roundabout	2572
Dodworth Roundabout	4176



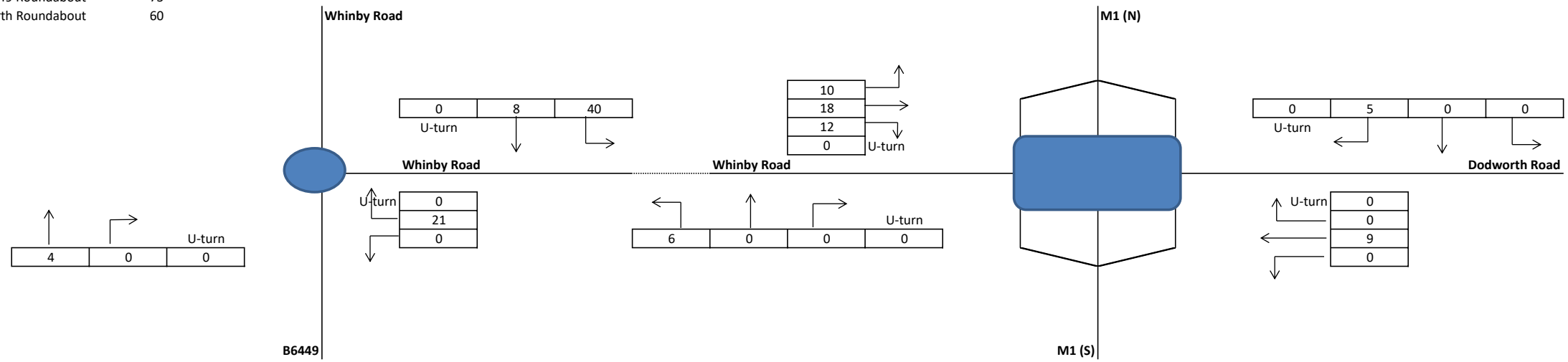
**Committed Development - Capitol Park Extension (Ref: 2019/0286)**

**PM Peak (16:45-17:45)**

Development peak hour traffic flows obtained from Capitol Park TA (FC, 2019a)

PCUs

Whinby Road/B6449 Roundabout	73
Dodworth Roundabout	60



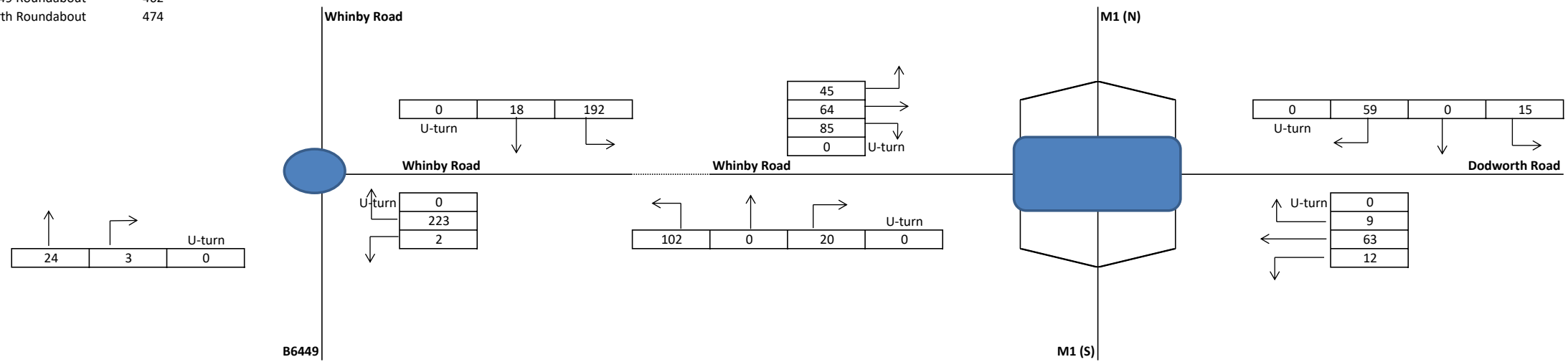
**Committed Development - Land to the South-East of Higham Common Road, Barnsley (MU1 - Residential & Employment) (Ref: 2021/1090 & 2021/1089)**

**PM Peak (16:45-17:45)**

Development peak hour traffic flows obtained from MU1 Residential & Employment TA (FC, 2021a)

PCUs

Whinby Road/B6449 Roundabout	462
Dodworth Roundabout	474



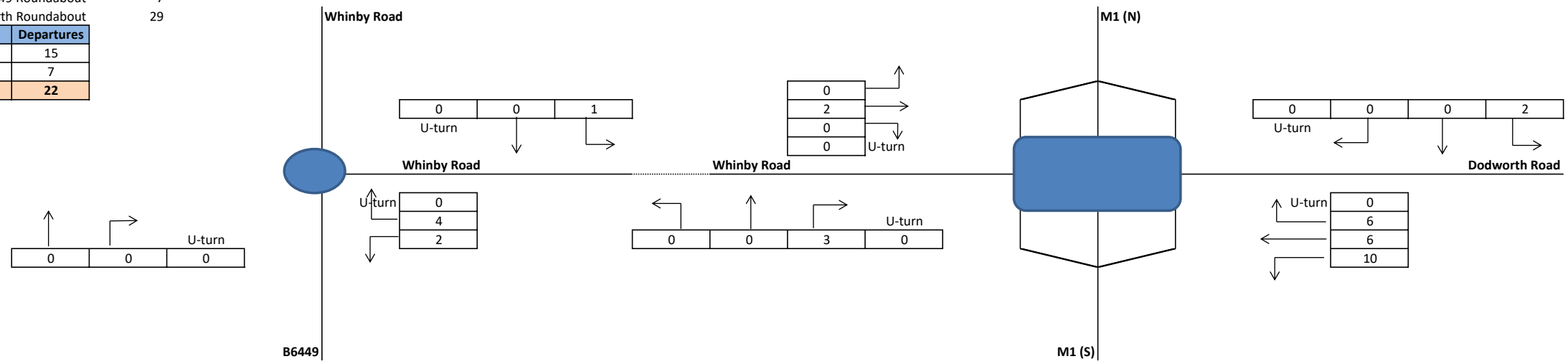
**Committed Development - Proposed Secondary School, Land off Keresforth Close (Ref: 2021/1631)**

**PM Peak (16:45-17:45)**

Development peak hour traffic flows obtained from Trinity Academy, Barnsley TA (MTP, 2021a) - Worst case assumption of all pupil & staff trips applied to peak hours

PCUs

	Whinby Road/B6449 Roundabout		7
	Dodworth Roundabout		29
	<b>Arrivals</b>	<b>Departures</b>	
Staff	0	15	
Pupils	7	7	
<b>Total</b>	<b>7</b>	<b>22</b>	



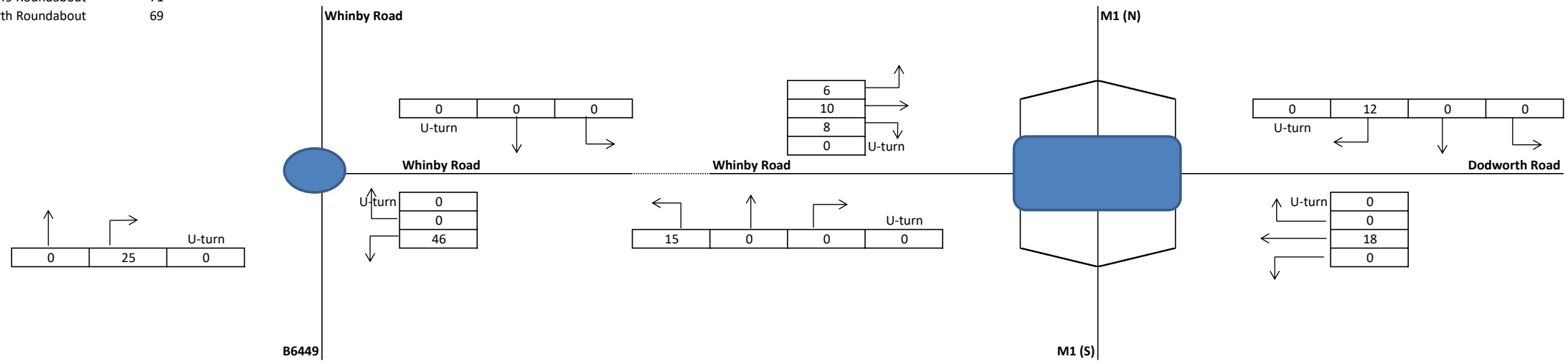
**Committed Development - Land off Smithywood Lane and Calver Close, Gilroyd (Ref: 2021/1642)**

**PM Peak (16:45-17:45)**

Development peak hour traffic flows obtained from the Calver Close Dodworth TA (OIHS, 2021a)

PCUs

	Whinby Road/B6449 Roundabout		71
	Dodworth Roundabout		69



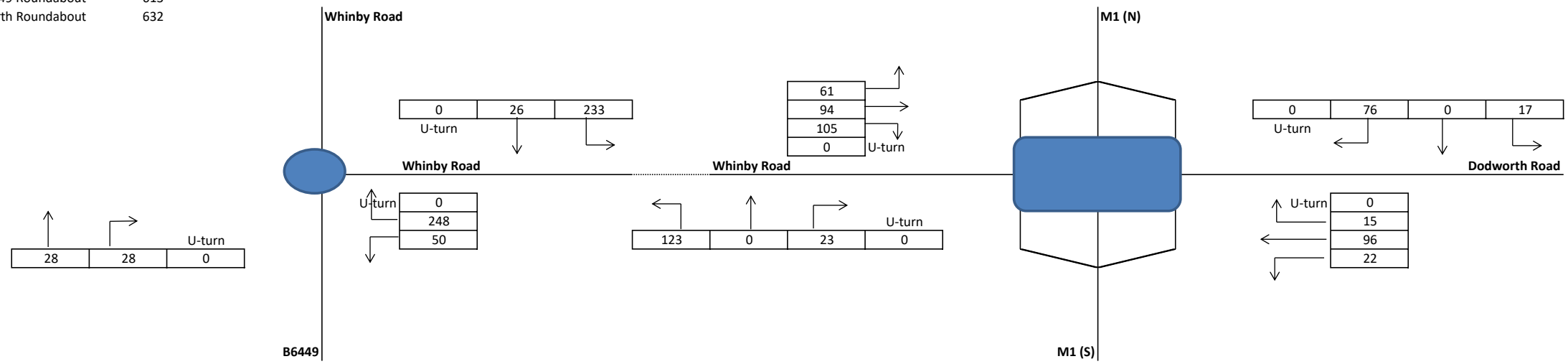
**Total Committed Development**

**PM Peak (16:45-17:45)**

0

PCUs

	Whinby Road/B6449 Roundabout		613
	Dodworth Roundabout		632



**2032 Do Nothing**

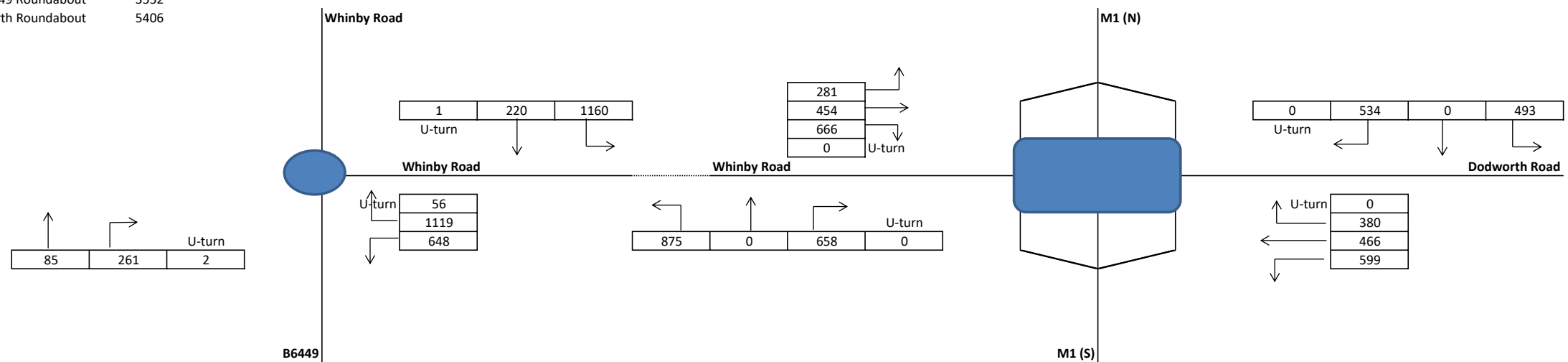
**PM Peak (16:45-17:45)**

Tempo Traffic Growth 2018 to 2032:

14.3%

PCUs

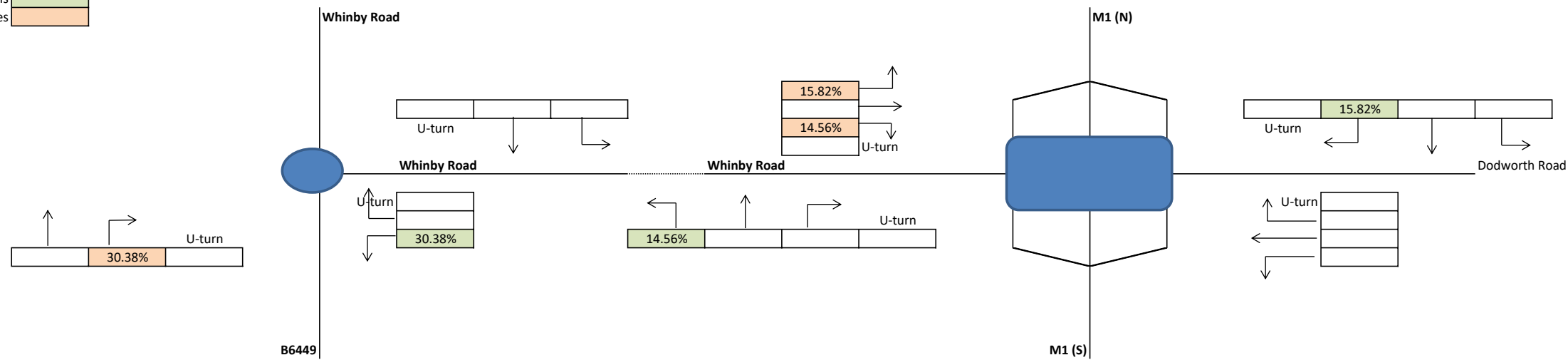
Whinby Road/B6449 Roundabout	3552
Dodworth Roundabout	5406



**Development Trip Distribution**

**PM Peak (16:45-17:45)**

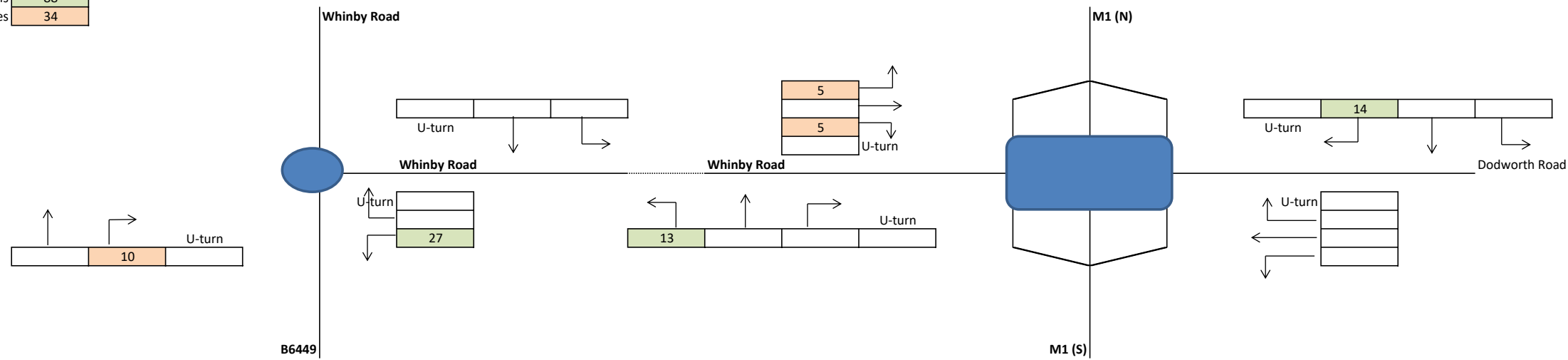
Arrivals	
Departures	



**Development Trips**

**PM Peak (16:45-17:45)**

Arrivals	88
Departures	34

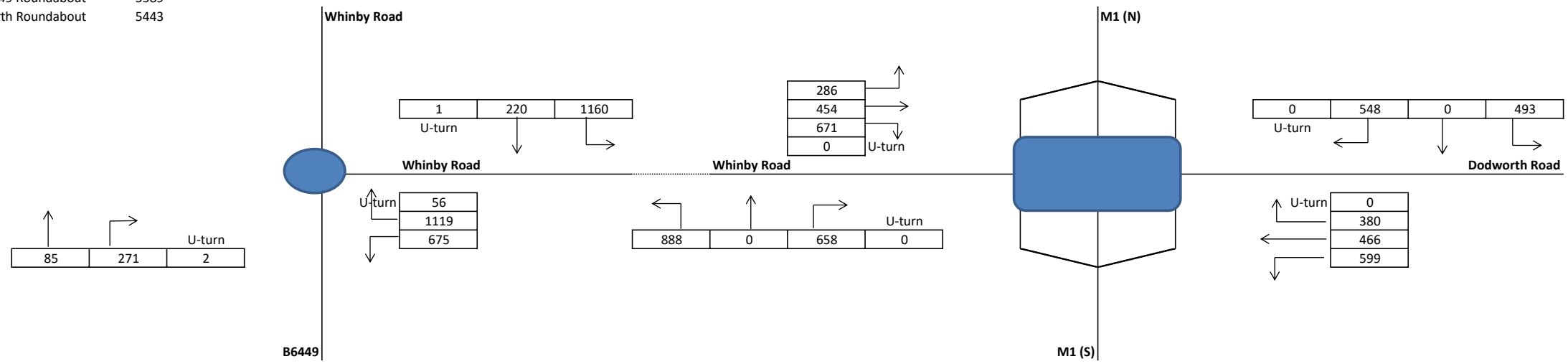


**2032 With Development**

**PM Peak (16:45-17:45)**

PCUs

Whinby Road/B6449 Roundabout	3589
Dodworth Roundabout	5443

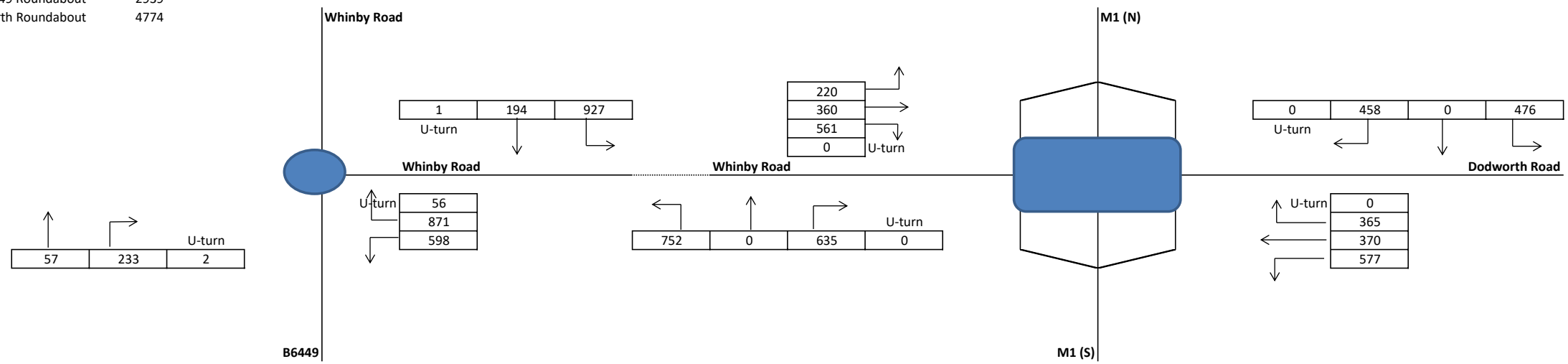


**Sensitivity Test (2032 Do Nothing without committed development)**

**PM Peak (16:45-17:45)**

PCUs

Whinby Road/B6449 Roundabout	2939
Dodworth Roundabout	4774

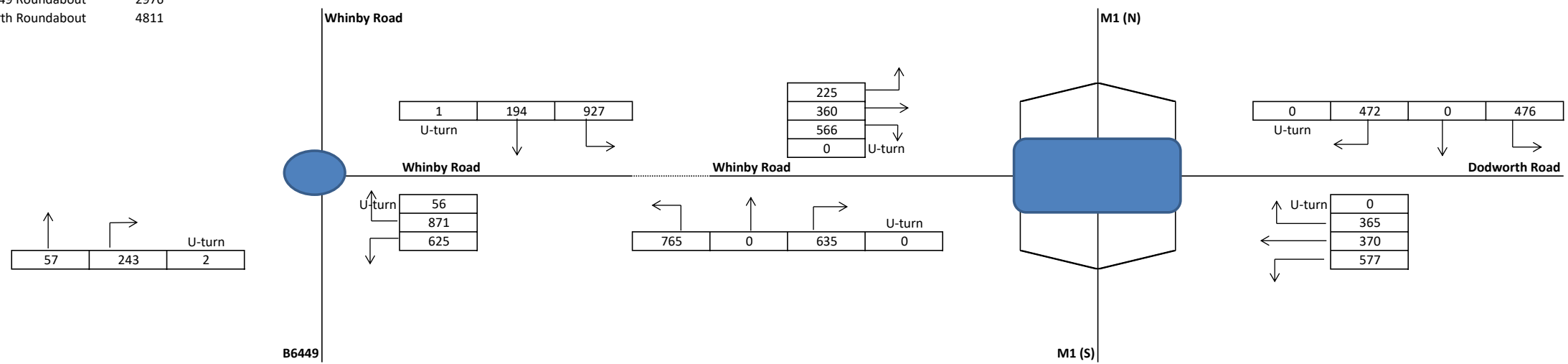


**Sensitivity Test (2032 With Development without committed development)**

**PM Peak (16:45-17:45)**

PCUs

Whinby Road/B6449 Roundabout	2976
Dodworth Roundabout	4811



## **Appendix 4 – TEMPro Traffic Growth**

**Traffic Growth Forecasts**

**Base Year:** 2018  
**Assessment Year:** 2032  
**Period (years):** 14  
**Area Type:** N/A  
**Road Type:** Motorway (worst-case)  
**Area Served:** N/A  
**NTM Dataset:** RTF 2018 Scenario 1 - Reference  
**Region Data Set Version:** Yorkshire & Humber v7.2  
**Software Version:** TEMPPO v7.2b  
**Area:** Barnsley

Factor	Households (HH)	Jobs
Base Year Unadjusted	107366	92478
Forecast Year Unadjusted	118996	96227
Growth Unadjusted	11630	3749
Committed Developments	<b>1958</b>	<b>3143</b>
Do Nothing Adjusted	117038	93084
Proposed Development	<b>220</b>	
Do Something Adjusted	116818	93084

Scenario	Weekday AM Peak	Weekday PM Peak	Average Day
Unadjusted	1.1743	1.1725	1.1794
<b>Unadjusted Growth Factor:</b>	<b>17.4%</b>	<b>17.3%</b>	<b>17.9%</b>

Do Something	Weekday AM Peak	Weekday PM Peak	Average Day
Adjusted	1.1442	1.1433	1.1501
<b>Adjusted Growth Factor:</b>	<b>14.4%</b>	<b>14.3%</b>	<b>15.0%</b>

Land to the South-East of Higham Common Road, Barnsley (MU1 - Residential)	Dwellings	1760
Land off Smithywood Lane and Calver Close, Gilroyd, Barnsley		198
		<b>1958</b>
Proposed Secondary School, Land off Keresforth Close	Jobs	90
Capitol Park Extension		193 based on parking spaces
Land to the South-East of Higham Common Road, Barnsley (MU1 - Employment)		2860 based on land area and job growth aspirations in the local plan
		<b>3143</b>

## **Appendix 5 – JI Modelling Results**

<h1>Junctions 9</h1>
<h2>ARCADY 9 - Roundabout Module</h2>
Version: 9.5.1.7462 © Copyright TRL Limited, 2019
For sales and distribution information, program advice and maintenance, contact TRL: +44 (0)1344 379777 software@trl.co.uk www.trlsoftware.co.uk
<b>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</b>

**Filename:** Whinby Road B6449 Roundabout.j9  
**Path:** Z:\Projects\4283 Bark Meadows Dodworth\Data\Modelling  
**Report generation date:** 08/04/2022 14:52:21

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- »Existing Layout - 2018 Base, AM
- »Existing Layout - 2018 Base, PM
- »Existing Layout - 2032 Do Nothing, AM
- »Existing Layout - 2032 Do Nothing, PM
- »Existing Layout - 2032 With Development, AM
- »Existing Layout - 2032 With Development, PM
- »Existing Layout - Sensitivity Test (2032 Do Nothing without committed development), AM
- »Existing Layout - Sensitivity Test (2032 Do Nothing without committed development), PM
- »Existing Layout - Sensitivity Test (2032 With Development without committed development), AM
- »Existing Layout - Sensitivity Test (2032 With Development without committed development), PM

## Summary of junction performance

	AM					PM				
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS
<b>Existing Layout - 2018 Base</b>										
1 - Whinby Road (N)	D1	1.1	4.03	0.52	A	D2	1.2	3.90	0.54	A
2 - Whinby Road (E)		1.0	3.43	0.49	A		2.9	7.27	0.75	A
3 - B6449		3.0	20.01	0.76	C		0.7	8.44	0.40	A
4 - untitled		0.0	0.00	0.00	A		0.0	0.00	0.00	A
<b>Existing Layout - 2032 Do Nothing</b>										
1 - Whinby Road (N)	D3	2.8	7.48	0.74	A	D4	3.4	8.30	0.78	A
2 - Whinby Road (E)		2.2	5.65	0.69	A		59.1	96.53	1.04	F
3 - B6449		97.3	472.94	1.33	F		2.6	25.67	0.74	D
4 - untitled		0.0	0.00	0.00	A		0.0	0.00	0.00	A
<b>Existing Layout - 2032 With Development</b>										
1 - Whinby Road (N)	D5	2.9	7.54	0.74	A	D6	3.5	8.45	0.78	A
2 - Whinby Road (E)		2.3	5.74	0.70	A		71.6	113.30	1.06	F
3 - B6449		114.0	571.34	1.38	F		2.7	26.11	0.74	D
4 - untitled		0.0	0.00	0.00	A		0.0	0.00	0.00	A
<b>Existing Layout - Sensitivity Test (2032 Do Nothing without committed development)</b>										
1 - Whinby Road (N)	D7	1.5	5.08	0.61	A	D8	1.7	4.87	0.63	A
2 - Whinby Road (E)		1.3	4.01	0.57	A		6.0	13.39	0.86	B
3 - B6449		11.7	68.91	0.96	F		1.0	11.36	0.50	B
4 - untitled		0.0	0.00	0.00	A		0.0	0.00	0.00	A
<b>Existing Layout - Sensitivity Test (2032 With Development without committed development)</b>										
1 - Whinby Road (N)	D9	1.6	5.20	0.61	A	D10	1.7	4.93	0.63	A
2 - Whinby Road (E)		1.3	4.05	0.57	A		6.8	14.97	0.88	B
3 - B6449		18.2	97.85	1.00	F		1.1	11.77	0.52	B
4 - untitled		0.0	0.00	0.00	A		0.0	0.00	0.00	A

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

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

## File summary

### File Description

Title	Whinby Road/B6449 Roundabout
Location	Barnsley, South Yorkshire
Site number	
Date	06/04/2022
Version	
Status	
Identifier	
Client	Keepmoat Homes
Jobnumber	4283
Enumerator	LTPIMR
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

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

### Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2018 Base	AM	ONE HOUR	07:00	08:30	15
D2	2018 Base	PM	ONE HOUR	16:30	18:00	15
D3	2032 Do Nothing	AM	ONE HOUR	07:00	08:30	15
D4	2032 Do Nothing	PM	ONE HOUR	16:30	18:00	15
D5	2032 With Development	AM	ONE HOUR	07:00	08:30	15
D6	2032 With Development	PM	ONE HOUR	16:30	18:00	15
D7	Sensitivity Test (2032 Do Nothing without committed development)	AM	ONE HOUR	07:00	08:30	15
D8	Sensitivity Test (2032 Do Nothing without committed development)	PM	ONE HOUR	16:30	18:00	15
D9	Sensitivity Test (2032 With Development without committed development)	AM	ONE HOUR	07:00	08:30	15
D10	Sensitivity Test (2032 With Development without committed development)	PM	ONE HOUR	16:30	18:00	15

### Analysis Set Details

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

# Existing Layout - 2018 Base, AM

## Data Errors and Warnings

Severity	Area	Item	Description
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.

## Junction Network

### Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Whinby Road/B6449	Standard Roundabout		1, 2, 3, 4	7.31	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Arms

### Arms

Arm	Name	Description
1	Whinby Road (N)	
2	Whinby Road (E)	
3	B6449	
4	untitled	

### Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1 - Whinby Road (N)	7.20	7.20	0.0	48.0	40.0	34.0	
2 - Whinby Road (E)	6.50	7.00	3.0	21.0	40.0	26.0	
3 - B6449	3.70	3.90	2.0	22.0	40.0	23.0	
4 - untitled	3.60	3.60	0.0	13.0	40.0	31.0	

### Slope / Intercept / Capacity

#### Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1 - Whinby Road (N)	0.749	2214
2 - Whinby Road (E)	0.727	2102
3 - B6449	0.551	1201
4 - untitled	0.505	1058

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

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2018 Base	AM	ONE HOUR	07:00	08:30	15

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

### Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Whinby Road (N)		✓	874	100.000
2 - Whinby Road (E)		✓	931	100.000
3 - B6449		✓	511	100.000
4 - untitled		✓	0	100.000

## Origin-Destination Data

### Demand (PCU/hr)

	To			
	1 - Whinby Road (N)	2 - Whinby Road (E)	3 - B6449	4 - untitled
From				
1 - Whinby Road (N)	0	841	33	0
2 - Whinby Road (E)	740	18	173	0
3 - B6449	94	417	0	0
4 - untitled	0	0	0	0

## Vehicle Mix

### Heavy Vehicle Percentages

	To			
	1 - Whinby Road (N)	2 - Whinby Road (E)	3 - B6449	4 - untitled
From				
1 - Whinby Road (N)	0	0	0	0
2 - Whinby Road (E)	0	0	0	0
3 - B6449	0	0	0	0
4 - untitled	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1 - Whinby Road (N)	0.52	4.03	1.1	A
2 - Whinby Road (E)	0.49	3.43	1.0	A
3 - B6449	0.76	20.01	3.0	C
4 - untitled	0.00	0.00	0.0	A

### Main Results for each time segment

#### 07:00 - 07:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	658	325	1970	0.334	656	0.5	2.736	A
2 - Whinby Road (E)	701	25	2084	0.336	699	0.5	2.596	A
3 - B6449	385	569	887	0.434	382	0.8	7.079	A
4 - untitled	0	951	578	0.000	0	0.0	0.000	A

07:15 - 07:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	786	390	1922	0.409	785	0.7	3.165	A
2 - Whinby Road (E)	837	30	2080	0.402	836	0.7	2.892	A
3 - B6449	459	681	825	0.557	457	1.2	9.733	A
4 - untitled	0	1138	484	0.000	0	0.0	0.000	A

07:30 - 07:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	962	473	1859	0.518	961	1.1	4.001	A
2 - Whinby Road (E)	1025	36	2075	0.494	1024	1.0	3.421	A
3 - B6449	563	834	741	0.759	556	2.9	18.768	C
4 - untitled	0	1390	357	0.000	0	0.0	0.000	A

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	962	479	1855	0.519	962	1.1	4.031	A
2 - Whinby Road (E)	1025	36	2075	0.494	1025	1.0	3.426	A
3 - B6449	563	835	741	0.759	562	3.0	20.009	C
4 - untitled	0	1397	353	0.000	0	0.0	0.000	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	786	397	1916	0.410	787	0.7	3.193	A
2 - Whinby Road (E)	837	30	2080	0.402	838	0.7	2.900	A
3 - B6449	459	682	825	0.557	466	1.3	10.233	B
4 - untitled	0	1149	478	0.000	0	0.0	0.000	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	658	329	1967	0.335	659	0.5	2.752	A
2 - Whinby Road (E)	701	25	2084	0.336	702	0.5	2.607	A
3 - B6449	385	571	886	0.434	387	0.8	7.240	A
4 - untitled	0	958	575	0.000	0	0.0	0.000	A

# Existing Layout - 2018 Base, PM

## Data Errors and Warnings

Severity	Area	Item	Description
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.

## Junction Network

### Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Whinby Road/B6449	Standard Roundabout		1, 2, 3, 4	6.10	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2018 Base	PM	ONE HOUR	16:30	18:00	15

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

### Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Whinby Road (N)		✓	982	100.000
2 - Whinby Road (E)		✓	1334	100.000
3 - B6449		✓	256	100.000
4 - untitled		✓	0	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Whinby Road (N)	2 - Whinby Road (E)	3 - B6449	4 - untitled
From	1 - Whinby Road (N)	1	811	170	0
	2 - Whinby Road (E)	762	49	523	0
	3 - B6449	50	204	2	0
	4 - untitled	0	0	0	0

## Vehicle Mix

### Heavy Vehicle Percentages

From	To			
	1 - Whinby Road (N)	2 - Whinby Road (E)	3 - B6449	4 - untitled
1 - Whinby Road (N)	0	0	0	0
2 - Whinby Road (E)	0	0	0	0
3 - B6449	0	0	0	0
4 - untitled	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1 - Whinby Road (N)	0.54	3.90	1.2	A
2 - Whinby Road (E)	0.75	7.27	2.9	A
3 - B6449	0.40	8.44	0.7	A
4 - untitled	0.00	0.00	0.0	A

### Main Results for each time segment

#### 16:30 - 16:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	739	191	2071	0.357	737	0.6	2.695	A
2 - Whinby Road (E)	1004	130	2007	0.500	1000	1.0	3.562	A
3 - B6449	193	609	865	0.223	192	0.3	5.336	A
4 - untitled	0	800	654	0.000	0	0.0	0.000	A

#### 16:45 - 17:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	883	229	2042	0.432	882	0.8	3.101	A
2 - Whinby Road (E)	1199	155	1989	0.603	1197	1.5	4.535	A
3 - B6449	230	729	799	0.288	230	0.4	6.316	A
4 - untitled	0	958	575	0.000	0	0.0	0.000	A

#### 17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1081	280	2004	0.540	1080	1.2	3.887	A
2 - Whinby Road (E)	1469	190	1964	0.748	1463	2.9	7.118	A
3 - B6449	282	891	710	0.397	281	0.6	8.372	A
4 - untitled	0	1172	467	0.000	0	0.0	0.000	A

#### 17:15 - 17:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1081	281	2003	0.540	1081	1.2	3.903	A
2 - Whinby Road (E)	1469	190	1963	0.748	1469	2.9	7.269	A
3 - B6449	282	894	708	0.398	282	0.7	8.444	A
4 - untitled	0	1176	465	0.000	0	0.0	0.000	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	883	230	2041	0.433	884	0.8	3.115	A
2 - Whinby Road (E)	1199	156	1989	0.603	1205	1.5	4.624	A
3 - B6449	230	733	797	0.289	231	0.4	6.379	A
4 - untitled	0	964	571	0.000	0	0.0	0.000	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	739	192	2069	0.357	740	0.6	2.709	A
2 - Whinby Road (E)	1004	130	2007	0.500	1006	1.0	3.604	A
3 - B6449	193	613	863	0.223	193	0.3	5.377	A
4 - untitled	0	806	652	0.000	0	0.0	0.000	A

# Existing Layout - 2032 Do Nothing, AM

## Data Errors and Warnings

Severity	Area	Item	Description
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.

## Junction Network

### Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Whinby Road/B6449	Standard Roundabout		1, 2, 3, 4	103.14	F

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2032 Do Nothing	AM	ONE HOUR	07:00	08:30	15

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

### Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Whinby Road (N)		✓	1256	100.000
2 - Whinby Road (E)		✓	1290	100.000
3 - B6449		✓	665	100.000
4 - untitled		✓	0	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Whinby Road (N)	2 - Whinby Road (E)	3 - B6449	4 - untitled
From	1 - Whinby Road (N)	0	1200	56	0
	2 - Whinby Road (E)	1050	21	219	0
	3 - B6449	128	537	0	0
	4 - untitled	0	0	0	0

## Vehicle Mix

### Heavy Vehicle Percentages

From	To			
	1 - Whinby Road (N)	2 - Whinby Road (E)	3 - B6449	4 - untitled
1 - Whinby Road (N)	0	0	0	0
2 - Whinby Road (E)	0	0	0	0
3 - B6449	0	0	0	0
4 - untitled	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1 - Whinby Road (N)	0.74	7.48	2.8	A
2 - Whinby Road (E)	0.69	5.65	2.2	A
3 - B6449	1.33	472.94	97.3	F
4 - untitled	0.00	0.00	0.0	A

### Main Results for each time segment

#### 07:00 - 07:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	946	414	1904	0.497	942	1.0	3.727	A
2 - Whinby Road (E)	971	42	2071	0.469	968	0.9	3.251	A
3 - B6449	501	803	758	0.661	493	1.9	13.254	B
4 - untitled	0	1297	404	0.000	0	0.0	0.000	A

#### 07:15 - 07:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1129	488	1848	0.611	1127	1.5	4.976	A
2 - Whinby Road (E)	1160	50	2065	0.562	1158	1.3	3.962	A
3 - B6449	598	962	671	0.891	581	6.0	35.120	E
4 - untitled	0	1543	280	0.000	0	0.0	0.000	A

#### 07:30 - 07:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1383	466	1865	0.742	1378	2.8	7.324	A
2 - Whinby Road (E)	1420	61	2057	0.690	1417	2.2	5.588	A
3 - B6449	732	1176	553	1.325	549	51.9	206.131	F
4 - untitled	0	1725	188	0.000	0	0.0	0.000	A

#### 07:45 - 08:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1383	468	1863	0.742	1383	2.8	7.484	A
2 - Whinby Road (E)	1420	62	2057	0.690	1420	2.2	5.651	A
3 - B6449	732	1179	551	1.329	551	97.3	468.773	F
4 - untitled	0	1730	185	0.000	0	0.0	0.000	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1129	553	1799	0.628	1134	1.7	5.443	A
2 - Whinby Road (E)	1160	51	2065	0.562	1163	1.3	4.008	A
3 - B6449	598	966	668	0.894	662	81.3	472.945	F
4 - untitled	0	1628	237	0.000	0	0.0	0.000	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	946	619	1750	0.540	948	1.2	4.498	A
2 - Whinby Road (E)	971	42	2071	0.469	973	0.9	3.284	A
3 - B6449	501	808	756	0.663	746	19.9	249.014	F
4 - untitled	0	1554	274	0.000	0	0.0	0.000	A

# Existing Layout - 2032 Do Nothing, PM

## Data Errors and Warnings

Severity	Area	Item	Description
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.

## Junction Network

### Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Whinby Road/B6449	Standard Roundabout		1, 2, 3, 4	55.28	F

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	2032 Do Nothing	PM	ONE HOUR	16:30	18:00	15

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

### Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Whinby Road (N)		✓	1381	100.000
2 - Whinby Road (E)		✓	1823	100.000
3 - B6449		✓	348	100.000
4 - untitled		✓	0	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Whinby Road (N)	2 - Whinby Road (E)	3 - B6449	4 - untitled
From	1 - Whinby Road (N)	1	1160	220	0
	2 - Whinby Road (E)	1119	56	648	0
	3 - B6449	85	261	2	0
	4 - untitled	0	0	0	0

## Vehicle Mix

### Heavy Vehicle Percentages

From	To			
	1 - Whinby Road (N)	2 - Whinby Road (E)	3 - B6449	4 - untitled
1 - Whinby Road (N)	0	0	0	0
2 - Whinby Road (E)	0	0	0	0
3 - B6449	0	0	0	0
4 - untitled	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1 - Whinby Road (N)	0.78	8.30	3.4	A
2 - Whinby Road (E)	1.04	96.53	59.1	F
3 - B6449	0.74	25.67	2.6	D
4 - untitled	0.00	0.00	0.0	A

### Main Results for each time segment

#### 16:30 - 16:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1040	238	2035	0.511	1036	1.0	3.587	A
2 - Whinby Road (E)	1372	167	1980	0.693	1364	2.2	5.757	A
3 - B6449	262	880	716	0.366	260	0.6	7.852	A
4 - untitled	0	1139	483	0.000	0	0.0	0.000	A

#### 16:45 - 17:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1241	285	2000	0.621	1239	1.6	4.718	A
2 - Whinby Road (E)	1639	200	1956	0.838	1628	4.8	10.648	B
3 - B6449	313	1050	622	0.503	311	1.0	11.524	B
4 - untitled	0	1362	371	0.000	0	0.0	0.000	A

#### 17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1521	343	1957	0.777	1514	3.4	8.003	A
2 - Whinby Road (E)	2007	244	1924	1.043	1884	35.5	47.884	E
3 - B6449	383	1216	531	0.722	378	2.4	22.702	C
4 - untitled	0	1593	254	0.000	0	0.0	0.000	A

#### 17:15 - 17:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1521	348	1953	0.778	1520	3.4	8.298	A
2 - Whinby Road (E)	2007	245	1923	1.044	1913	59.1	96.532	F
3 - B6449	383	1234	521	0.736	382	2.6	25.670	D
4 - untitled	0	1616	242	0.000	0	0.0	0.000	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1241	297	1991	0.623	1249	1.7	4.891	A
2 - Whinby Road (E)	1639	202	1955	0.838	1851	6.1	53.340	F
3 - B6449	313	1194	543	0.576	318	1.4	16.304	C
4 - untitled	0	1511	295	0.000	0	0.0	0.000	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1040	243	2032	0.512	1042	1.1	3.649	A
2 - Whinby Road (E)	1372	168	1979	0.693	1388	2.3	6.233	A
3 - B6449	262	895	707	0.370	265	0.6	8.200	A
4 - untitled	0	1160	473	0.000	0	0.0	0.000	A

# Existing Layout - 2032 With Development, AM

## Data Errors and Warnings

Severity	Area	Item	Description
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.

## Junction Network

### Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Whinby Road/B6449	Standard Roundabout		1, 2, 3, 4	127.11	F

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D5	2032 With Development	AM	ONE HOUR	07:00	08:30	15

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

### Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Whinby Road (N)		✓	1256	100.000
2 - Whinby Road (E)		✓	1299	100.000
3 - B6449		✓	693	100.000
4 - untitled		✓	0	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Whinby Road (N)	2 - Whinby Road (E)	3 - B6449	4 - untitled
From	1 - Whinby Road (N)	0	1200	56	0
	2 - Whinby Road (E)	1050	21	228	0
	3 - B6449	128	565	0	0
	4 - untitled	0	0	0	0

## Vehicle Mix

### Heavy Vehicle Percentages

From	To			
	1 - Whinby Road (N)	2 - Whinby Road (E)	3 - B6449	4 - untitled
1 - Whinby Road (N)	0	0	0	0
2 - Whinby Road (E)	0	0	0	0
3 - B6449	0	0	0	0
4 - untitled	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1 - Whinby Road (N)	0.74	7.54	2.9	A
2 - Whinby Road (E)	0.70	5.74	2.3	A
3 - B6449	1.38	571.34	114.0	F
4 - untitled	0.00	0.00	0.0	A

### Main Results for each time segment

#### 07:00 - 07:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	946	434	1888	0.501	942	1.0	3.787	A
2 - Whinby Road (E)	978	42	2071	0.472	974	0.9	3.271	A
3 - B6449	522	803	758	0.688	513	2.1	14.269	B
4 - untitled	0	1317	394	0.000	0	0.0	0.000	A

#### 07:15 - 07:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1129	509	1833	0.616	1127	1.6	5.082	A
2 - Whinby Road (E)	1168	50	2065	0.565	1166	1.3	3.996	A
3 - B6449	623	961	671	0.929	601	7.7	42.001	E
4 - untitled	0	1562	270	0.000	0	0.0	0.000	A

#### 07:30 - 07:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1383	471	1861	0.743	1378	2.8	7.385	A
2 - Whinby Road (E)	1430	61	2057	0.695	1426	2.2	5.674	A
3 - B6449	763	1176	553	1.381	550	61.0	240.288	F
4 - untitled	0	1726	187	0.000	0	0.0	0.000	A

#### 07:45 - 08:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1383	472	1860	0.743	1383	2.9	7.535	A
2 - Whinby Road (E)	1430	62	2057	0.695	1430	2.3	5.740	A
3 - B6449	763	1179	551	1.385	551	114.0	542.881	F
4 - untitled	0	1730	185	0.000	0	0.0	0.000	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1129	559	1795	0.629	1134	1.7	5.481	A
2 - Whinby Road (E)	1168	51	2065	0.565	1172	1.3	4.047	A
3 - B6449	623	966	668	0.932	663	104.1	571.336	F
4 - untitled	0	1629	236	0.000	0	0.0	0.000	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	946	626	1745	0.542	948	1.2	4.528	A
2 - Whinby Road (E)	978	42	2071	0.472	980	0.9	3.305	A
3 - B6449	522	808	756	0.690	748	47.5	367.421	F
4 - untitled	0	1556	273	0.000	0	0.0	0.000	A

# Existing Layout - 2032 With Development, PM

## Data Errors and Warnings

Severity	Area	Item	Description
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.

## Junction Network

### Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Whinby Road/B6449	Standard Roundabout		1, 2, 3, 4	64.26	F

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D6	2032 With Development	PM	ONE HOUR	16:30	18:00	15

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

### Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Whinby Road (N)		✓	1381	100.000
2 - Whinby Road (E)		✓	1850	100.000
3 - B6449		✓	358	100.000
4 - untitled		✓	0	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Whinby Road (N)	2 - Whinby Road (E)	3 - B6449	4 - untitled
From	1 - Whinby Road (N)	1	1160	220	0
	2 - Whinby Road (E)	1119	56	675	0
	3 - B6449	85	271	2	0
	4 - untitled	0	0	0	0

## Vehicle Mix

### Heavy Vehicle Percentages

From	To			
	1 - Whinby Road (N)	2 - Whinby Road (E)	3 - B6449	4 - untitled
1 - Whinby Road (N)	0	0	0	0
2 - Whinby Road (E)	0	0	0	0
3 - B6449	0	0	0	0
4 - untitled	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1 - Whinby Road (N)	0.78	8.45	3.5	A
2 - Whinby Road (E)	1.06	113.30	71.6	F
3 - B6449	0.74	26.11	2.7	D
4 - untitled	0.00	0.00	0.0	A

### Main Results for each time segment

#### 16:30 - 16:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1040	246	2030	0.512	1036	1.0	3.607	A
2 - Whinby Road (E)	1393	167	1980	0.703	1384	2.3	5.945	A
3 - B6449	270	879	716	0.376	267	0.6	7.978	A
4 - untitled	0	1147	480	0.000	0	0.0	0.000	A

#### 16:45 - 17:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1241	294	1993	0.623	1239	1.6	4.757	A
2 - Whinby Road (E)	1663	200	1956	0.850	1651	5.2	11.386	B
3 - B6449	322	1050	622	0.517	320	1.0	11.842	B
4 - untitled	0	1370	367	0.000	0	0.0	0.000	A

#### 17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1521	353	1949	0.780	1513	3.4	8.133	A
2 - Whinby Road (E)	2037	244	1924	1.059	1892	41.5	53.710	F
3 - B6449	394	1203	538	0.733	388	2.5	23.196	C
4 - untitled	0	1591	255	0.000	0	0.0	0.000	A

#### 17:15 - 17:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1521	358	1946	0.782	1520	3.5	8.446	A
2 - Whinby Road (E)	2037	245	1923	1.059	1916	71.6	113.304	F
3 - B6449	394	1218	529	0.745	393	2.7	26.106	D
4 - untitled	0	1612	245	0.000	0	0.0	0.000	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1241	307	1984	0.626	1249	1.7	4.943	A
2 - Whinby Road (E)	1663	202	1955	0.851	1918	8.0	77.134	F
3 - B6449	322	1219	529	0.608	326	1.6	18.114	C
4 - untitled	0	1545	278	0.000	0	0.0	0.000	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1040	251	2025	0.513	1042	1.1	3.670	A
2 - Whinby Road (E)	1393	168	1979	0.704	1415	2.4	6.617	A
3 - B6449	270	899	705	0.382	274	0.6	8.417	A
4 - untitled	0	1173	466	0.000	0	0.0	0.000	A

# Existing Layout - Sensitivity Test (2032 Do Nothing without committed development), AM

## Data Errors and Warnings

Severity	Area	Item	Description
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.

## Junction Network

### Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Whinby Road/B6449	Standard Roundabout		1, 2, 3, 4	18.74	C

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D7	Sensitivity Test (2032 Do Nothing without committed development)	AM	ONE HOUR	07:00	08:30	15

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

### Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Whinby Road (N)		✓	1000	100.000
2 - Whinby Road (E)		✓	1066	100.000
3 - B6449		✓	585	100.000
4 - untitled		✓	0	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Whinby Road (N)	2 - Whinby Road (E)	3 - B6449	4 - untitled
From	1 - Whinby Road (N)	0	962	38	0
	2 - Whinby Road (E)	847	21	198	0
	3 - B6449	108	477	0	0
	4 - untitled	0	0	0	0

## Vehicle Mix

### Heavy Vehicle Percentages

From	To			
	1 - Whinby Road (N)	2 - Whinby Road (E)	3 - B6449	4 - untitled
1 - Whinby Road (N)	0	0	0	0
2 - Whinby Road (E)	0	0	0	0
3 - B6449	0	0	0	0
4 - untitled	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1 - Whinby Road (N)	0.61	5.08	1.5	A
2 - Whinby Road (E)	0.57	4.01	1.3	A
3 - B6449	0.96	68.91	11.7	F
4 - untitled	0.00	0.00	0.0	A

### Main Results for each time segment

#### 07:00 - 07:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	753	371	1935	0.389	750	0.6	3.031	A
2 - Whinby Road (E)	803	29	2081	0.386	800	0.6	2.806	A
3 - B6449	440	651	842	0.523	436	1.1	8.787	A
4 - untitled	0	1088	509	0.000	0	0.0	0.000	A

#### 07:15 - 07:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	899	445	1881	0.478	898	0.9	3.660	A
2 - Whinby Road (E)	958	34	2077	0.461	957	0.9	3.212	A
3 - B6449	526	780	771	0.682	522	2.0	14.231	B
4 - untitled	0	1302	401	0.000	0	0.0	0.000	A

#### 07:30 - 07:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1101	525	1820	0.605	1099	1.5	4.970	A
2 - Whinby Road (E)	1174	42	2071	0.567	1172	1.3	3.993	A
3 - B6449	644	954	675	0.954	615	9.2	46.906	E
4 - untitled	0	1570	266	0.000	0	0.0	0.000	A

#### 07:45 - 08:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1101	540	1809	0.609	1101	1.5	5.082	A
2 - Whinby Road (E)	1174	42	2071	0.567	1174	1.3	4.009	A
3 - B6449	644	956	674	0.956	634	11.7	68.908	F
4 - untitled	0	1590	256	0.000	0	0.0	0.000	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	899	478	1855	0.485	901	0.9	3.785	A
2 - Whinby Road (E)	958	34	2077	0.461	960	0.9	3.227	A
3 - B6449	526	782	770	0.683	564	2.3	20.315	C
4 - untitled	0	1345	379	0.000	0	0.0	0.000	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	753	379	1930	0.390	754	0.6	3.066	A
2 - Whinby Road (E)	803	29	2081	0.386	803	0.6	2.819	A
3 - B6449	440	654	840	0.524	445	1.1	9.215	A
4 - untitled	0	1099	503	0.000	0	0.0	0.000	A

# Existing Layout - Sensitivity Test (2032 Do Nothing without committed development), PM

## Data Errors and Warnings

Severity	Area	Item	Description
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.

## Junction Network

### Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Whinby Road/B6449	Standard Roundabout		1, 2, 3, 4	9.94	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D8	Sensitivity Test (2032 Do Nothing without committed development)	PM	ONE HOUR	16:30	18:00	15

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

### Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Whinby Road (N)		✓	1122	100.000
2 - Whinby Road (E)		✓	1525	100.000
3 - B6449		✓	292	100.000
4 - untitled		✓	0	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Whinby Road (N)	2 - Whinby Road (E)	3 - B6449	4 - untitled
From	1 - Whinby Road (N)	1	927	194	0
	2 - Whinby Road (E)	871	56	598	0
	3 - B6449	57	233	2	0
	4 - untitled	0	0	0	0

## Vehicle Mix

### Heavy Vehicle Percentages

From	To			
	1 - Whinby Road (N)	2 - Whinby Road (E)	3 - B6449	4 - untitled
1 - Whinby Road (N)	0	0	0	0
2 - Whinby Road (E)	0	0	0	0
3 - B6449	0	0	0	0
4 - untitled	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1 - Whinby Road (N)	0.63	4.87	1.7	A
2 - Whinby Road (E)	0.86	13.39	6.0	B
3 - B6449	0.50	11.36	1.0	B
4 - untitled	0.00	0.00	0.0	A

### Main Results for each time segment

#### 16:30 - 16:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	845	218	2051	0.412	842	0.7	2.973	A
2 - Whinby Road (E)	1148	148	1994	0.576	1143	1.3	4.202	A
3 - B6449	220	695	817	0.269	218	0.4	5.994	A
4 - untitled	0	914	597	0.000	0	0.0	0.000	A

#### 16:45 - 17:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1009	261	2018	0.500	1007	1.0	3.556	A
2 - Whinby Road (E)	1371	177	1973	0.695	1367	2.2	5.906	A
3 - B6449	263	832	742	0.354	262	0.5	7.483	A
4 - untitled	0	1094	506	0.000	0	0.0	0.000	A

#### 17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1235	318	1975	0.625	1233	1.6	4.832	A
2 - Whinby Road (E)	1679	216	1944	0.864	1665	5.8	12.299	B
3 - B6449	321	1013	642	0.500	320	1.0	11.097	B
4 - untitled	0	1333	385	0.000	0	0.0	0.000	A

#### 17:15 - 17:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1235	320	1974	0.626	1235	1.7	4.875	A
2 - Whinby Road (E)	1679	217	1944	0.864	1678	6.0	13.388	B
3 - B6449	321	1021	638	0.504	321	1.0	11.363	B
4 - untitled	0	1343	381	0.000	0	0.0	0.000	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1009	264	2016	0.500	1011	1.0	3.593	A
2 - Whinby Road (E)	1371	178	1973	0.695	1386	2.3	6.282	A
3 - B6449	263	843	736	0.357	264	0.6	7.660	A
4 - untitled	0	1107	499	0.000	0	0.0	0.000	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	845	220	2049	0.412	846	0.7	2.997	A
2 - Whinby Road (E)	1148	149	1994	0.576	1152	1.4	4.294	A
3 - B6449	220	701	814	0.270	221	0.4	6.069	A
4 - untitled	0	922	593	0.000	0	0.0	0.000	A

# Existing Layout - Sensitivity Test (2032 With Development without committed development), AM

## Data Errors and Warnings

Severity	Area	Item	Description
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.

## Junction Network

### Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Whinby Road/B6449	Standard Roundabout		1, 2, 3, 4	25.87	D

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D9	Sensitivity Test (2032 With Development without committed development)	AM	ONE HOUR	07:00	08:30	15

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

### Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Whinby Road (N)		✓	1000	100.000
2 - Whinby Road (E)		✓	1075	100.000
3 - B6449		✓	613	100.000
4 - untitled		✓	0	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Whinby Road (N)	2 - Whinby Road (E)	3 - B6449	4 - untitled
From	1 - Whinby Road (N)	0	962	38	0
	2 - Whinby Road (E)	847	21	207	0
	3 - B6449	108	505	0	0
	4 - untitled	0	0	0	0

## Vehicle Mix

### Heavy Vehicle Percentages

From	To			
	1 - Whinby Road (N)	2 - Whinby Road (E)	3 - B6449	4 - untitled
1 - Whinby Road (N)	0	0	0	0
2 - Whinby Road (E)	0	0	0	0
3 - B6449	0	0	0	0
4 - untitled	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1 - Whinby Road (N)	0.61	5.20	1.6	A
2 - Whinby Road (E)	0.57	4.05	1.3	A
3 - B6449	1.00	97.85	18.2	F
4 - untitled	0.00	0.00	0.0	A

### Main Results for each time segment

#### 07:00 - 07:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	753	392	1920	0.392	750	0.6	3.071	A
2 - Whinby Road (E)	809	29	2081	0.389	807	0.6	2.819	A
3 - B6449	461	651	842	0.548	457	1.2	9.243	A
4 - untitled	0	1108	499	0.000	0	0.0	0.000	A

#### 07:15 - 07:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	899	469	1862	0.483	898	0.9	3.727	A
2 - Whinby Road (E)	966	34	2077	0.465	965	0.9	3.235	A
3 - B6449	551	780	771	0.715	546	2.4	15.692	C
4 - untitled	0	1326	389	0.000	0	0.0	0.000	A

#### 07:30 - 07:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1101	545	1806	0.610	1099	1.5	5.074	A
2 - Whinby Road (E)	1184	42	2071	0.571	1182	1.3	4.038	A
3 - B6449	675	954	675	1.000	633	12.8	58.804	F
4 - untitled	0	1587	257	0.000	0	0.0	0.000	A

#### 07:45 - 08:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1101	561	1793	0.614	1101	1.6	5.198	A
2 - Whinby Road (E)	1184	42	2071	0.571	1184	1.3	4.054	A
3 - B6449	675	956	674	1.001	653	18.2	97.850	F
4 - untitled	0	1609	246	0.000	0	0.0	0.000	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	899	524	1821	0.494	901	1.0	3.925	A
2 - Whinby Road (E)	966	34	2077	0.465	968	0.9	3.251	A
3 - B6449	551	782	770	0.716	613	2.7	30.660	D
4 - untitled	0	1395	354	0.000	0	0.0	0.000	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	753	401	1913	0.393	754	0.7	3.108	A
2 - Whinby Road (E)	809	29	2081	0.389	810	0.6	2.836	A
3 - B6449	461	654	840	0.549	467	1.2	9.805	A
4 - untitled	0	1122	492	0.000	0	0.0	0.000	A

# Existing Layout - Sensitivity Test (2032 With Development without committed development), PM

## Data Errors and Warnings

Severity	Area	Item	Description
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.

## Junction Network

### Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Whinby Road/B6449	Standard Roundabout		1, 2, 3, 4	10.86	B

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D10	Sensitivity Test (2032 With Development without committed development)	PM	ONE HOUR	16:30	18:00	15

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

### Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Whinby Road (N)		✓	1122	100.000
2 - Whinby Road (E)		✓	1552	100.000
3 - B6449		✓	302	100.000
4 - untitled		✓	0	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Whinby Road (N)	2 - Whinby Road (E)	3 - B6449	4 - untitled
From	1 - Whinby Road (N)	1	927	194	0
	2 - Whinby Road (E)	871	56	625	0
	3 - B6449	57	243	2	0
	4 - untitled	0	0	0	0

## Vehicle Mix

### Heavy Vehicle Percentages

From	To			
	1 - Whinby Road (N)	2 - Whinby Road (E)	3 - B6449	4 - untitled
1 - Whinby Road (N)	0	0	0	0
2 - Whinby Road (E)	0	0	0	0
3 - B6449	0	0	0	0
4 - untitled	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1 - Whinby Road (N)	0.63	4.93	1.7	A
2 - Whinby Road (E)	0.88	14.97	6.8	B
3 - B6449	0.52	11.77	1.1	B
4 - untitled	0.00	0.00	0.0	A

### Main Results for each time segment

#### 16:30 - 16:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	845	225	2045	0.413	842	0.7	2.987	A
2 - Whinby Road (E)	1168	148	1994	0.586	1163	1.4	4.302	A
3 - B6449	227	695	818	0.278	226	0.4	6.068	A
4 - untitled	0	921	593	0.000	0	0.0	0.000	A

#### 16:45 - 17:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1009	270	2011	0.501	1007	1.0	3.580	A
2 - Whinby Road (E)	1395	177	1973	0.707	1391	2.4	6.147	A
3 - B6449	271	832	742	0.366	271	0.6	7.622	A
4 - untitled	0	1103	502	0.000	0	0.0	0.000	A

#### 17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1235	329	1967	0.628	1233	1.7	4.885	A
2 - Whinby Road (E)	1709	216	1944	0.879	1692	6.5	13.480	B
3 - B6449	333	1012	643	0.517	331	1.0	11.449	B
4 - untitled	0	1343	381	0.000	0	0.0	0.000	A

#### 17:15 - 17:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1235	331	1965	0.629	1235	1.7	4.930	A
2 - Whinby Road (E)	1709	217	1944	0.879	1707	6.8	14.975	B
3 - B6449	333	1021	638	0.521	332	1.1	11.766	B
4 - untitled	0	1353	375	0.000	0	0.0	0.000	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	1009	273	2009	0.502	1011	1.0	3.615	A
2 - Whinby Road (E)	1395	178	1973	0.707	1413	2.5	6.619	A
3 - B6449	271	845	735	0.369	273	0.6	7.825	A
4 - untitled	0	1118	494	0.000	0	0.0	0.000	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Whinby Road (N)	845	227	2043	0.413	846	0.7	3.011	A
2 - Whinby Road (E)	1168	149	1994	0.586	1173	1.4	4.405	A
3 - B6449	227	701	814	0.279	228	0.4	6.152	A
4 - untitled	0	929	589	0.000	0	0.0	0.000	A

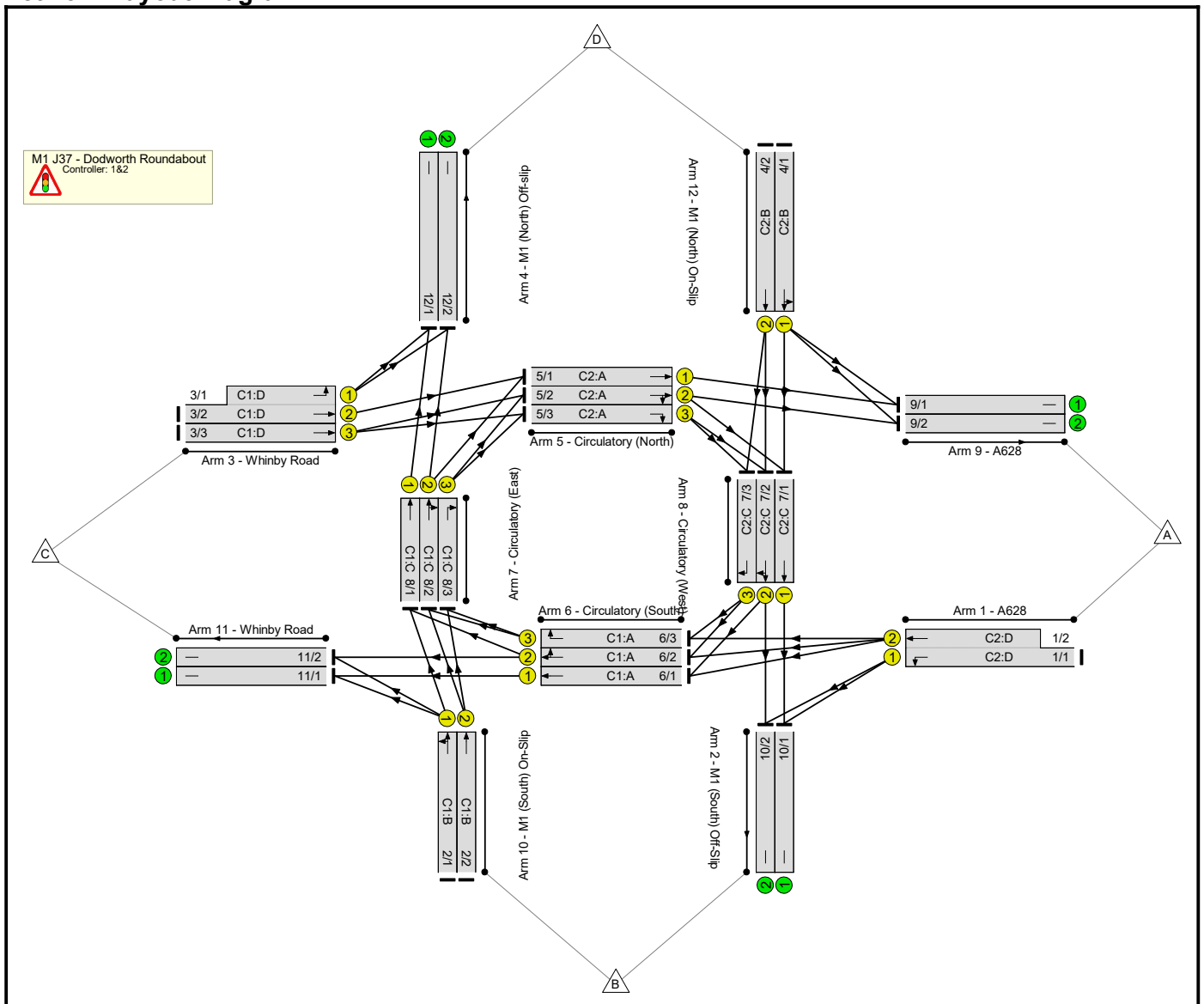
## **Appendix 6 – J2 Modelling Results**

# LTP LinSig Output

## User and Project Details

<b>Project:</b>	<b>M1 J37 Dodworth Roundabout</b>
<b>Title:</b>	
<b>Location:</b>	Barnsley, South Yorkshire
<b>Client:</b>	Keepmoat Homes
<b>Additional detail:</b>	
<b>File name:</b>	M1 Junction 37 (Dodworth Roundabout).lsg3x
<b>Author:</b>	MR
<b>Company:</b>	LTP
<b>Address:</b>	

## Network Layout Diagram



### C1 - Northbound Gyratory

#### Phase Input Data

Phase Name	Phase Type	Stage Stream	Assoc. Phase	Street Min	Cont Min
A	Traffic	1		7	7
B	Traffic	1		7	7
C	Traffic	2		7	7
D	Traffic	2		7	7

#### Phase Intergreens Matrix

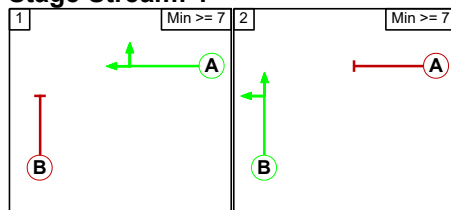
		Starting Phase				
		A	B	C	D	
Terminating Phase	A	5	-	-		
	B	7		-	-	
	C	-	-	5		
	D	-	-	5		

#### Phases in Stage

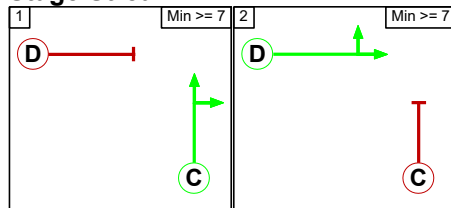
Stream	Stage No.	Phases in Stage
1	1	A
1	2	B
2	1	C
2	2	D

#### Stage Diagram

##### Stage Stream: 1



##### Stage Stream: 2



#### Phase Delays

##### Stage Stream: 1

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

##### Stage Stream: 2

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

### Prohibited Stage Change

#### Stage Stream: 1

	To Stage	
	1	2
From Stage	1	5
	2	7

#### Stage Stream: 2

	To Stage	
	1	2
From Stage	1	5
	2	5

### C2 - Southbound Gyratory

#### Phase Input Data

Phase Name	Phase Type	Stage Stream	Assoc. Phase	Street Min	Cont Min
A	Traffic	2		7	7
B	Traffic	2		7	7
C	Traffic	1		7	7
D	Traffic	1		7	7

#### Phase Intergreens Matrix

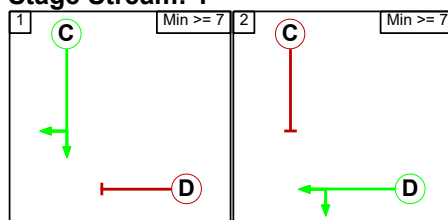
	Starting Phase				
		A	B	C	D
Terminating Phase	A	5	-	-	
	B	8	-	-	
	C	-	-	5	
	D	-	-	5	

#### Phases in Stage

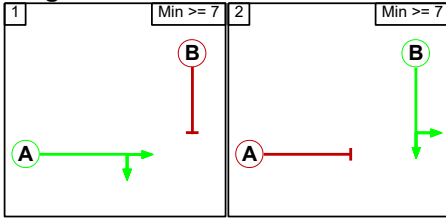
Stream	Stage No.	Phases in Stage
1	1	C
1	2	D
2	1	A
2	2	B

#### Stage Diagram

##### Stage Stream: 1



### Stage Stream: 2



### Phase Delays

#### Stage Stream: 1

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

#### Stage Stream: 2

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

### Prohibited Stage Change

#### Stage Stream: 1

		To Stage	
		1	2
From Stage	1		5
	2	5	

#### Stage Stream: 2

		To Stage	
		1	2
From Stage	1		5
	2	8	

## Give-Way Lane Input Data

Junction: M1 J37 - Dodworth Roundabout

There are no Opposed Lanes in this Junction

## Lane Input Data

Junction: M1 J37 - Dodworth Roundabout												
Lane	Lane Type	Phases	Start Disp.	End Disp.	Physical Length (PCU)	Sat Flow Type	Def User Saturation Flow (PCU/Hr)	Lane Width (m)	Gradient	Nearside Lane	Turns	Turning Radius (m)
1/1 (A628)	U	D	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 10 Left	40.00
1/2 (A628)	U	D	2	3	24.3	User	3830	-	-	-	-	-
2/1 (M1 (South) Off-Slip)	U	B	2	3	130.4	Geom	-	3.30	0.00	Y	Arm 8 Ahead	60.00
											Arm 11 Left	40.00
2/2 (M1 (South) Off-Slip)	U	B	2	3	130.4	Geom	-	3.00	0.00	Y	Arm 8 Ahead	45.00
3/1 (Whinby Road)	U	D	2	3	8.7	Geom	-	3.00	0.00	Y	Arm 12 Left	15.00
3/2 (Whinby Road)	U	D	2	3	25.2	Geom	-	3.00	0.00	Y	Arm 5 Ahead	18.00
3/3 (Whinby Road)	U	D	2	3	25.2	Geom	-	3.00	0.00	Y	Arm 5 Ahead	20.00
4/1 (M1 (North) Off-slip)	U	B	2	3	95.7	Geom	-	3.00	0.00	Y	Arm 7 Ahead	60.00
											Arm 9 Left	50.00
4/2 (M1 (North) Off-slip)	U	B	2	3	95.7	Geom	-	3.00	0.00	Y	Arm 7 Ahead	60.00
5/1 (Circulatory (North))	U	A	2	3	22.6	Geom	-	3.30	0.00	Y	Arm 9 Ahead	Inf
5/2 (Circulatory (North))	U	A	2	3	22.6	Geom	-	3.30	0.00	Y	Arm 7 Right	Inf
											Arm 9 Ahead	Inf
5/3 (Circulatory (North))	U	A	2	3	22.6	Geom	-	3.30	0.00	Y	Arm 7 Right	Inf
6/1 (Circulatory (South))	U	A	2	3	25.2	Geom	-	3.30	0.00	Y	Arm 11 Ahead	Inf
6/2 (Circulatory (South))	U	A	2	3	25.2	Geom	-	3.30	0.00	Y	Arm 8 Right	Inf
											Arm 11 Ahead	Inf
6/3 (Circulatory (South))	U	A	2	3	25.2	Geom	-	3.30	0.00	Y	Arm 8 Right	Inf
7/1 (Circulatory (East))	U	C	2	3	12.2	Geom	-	3.00	0.00	Y	Arm 10 Ahead	Inf



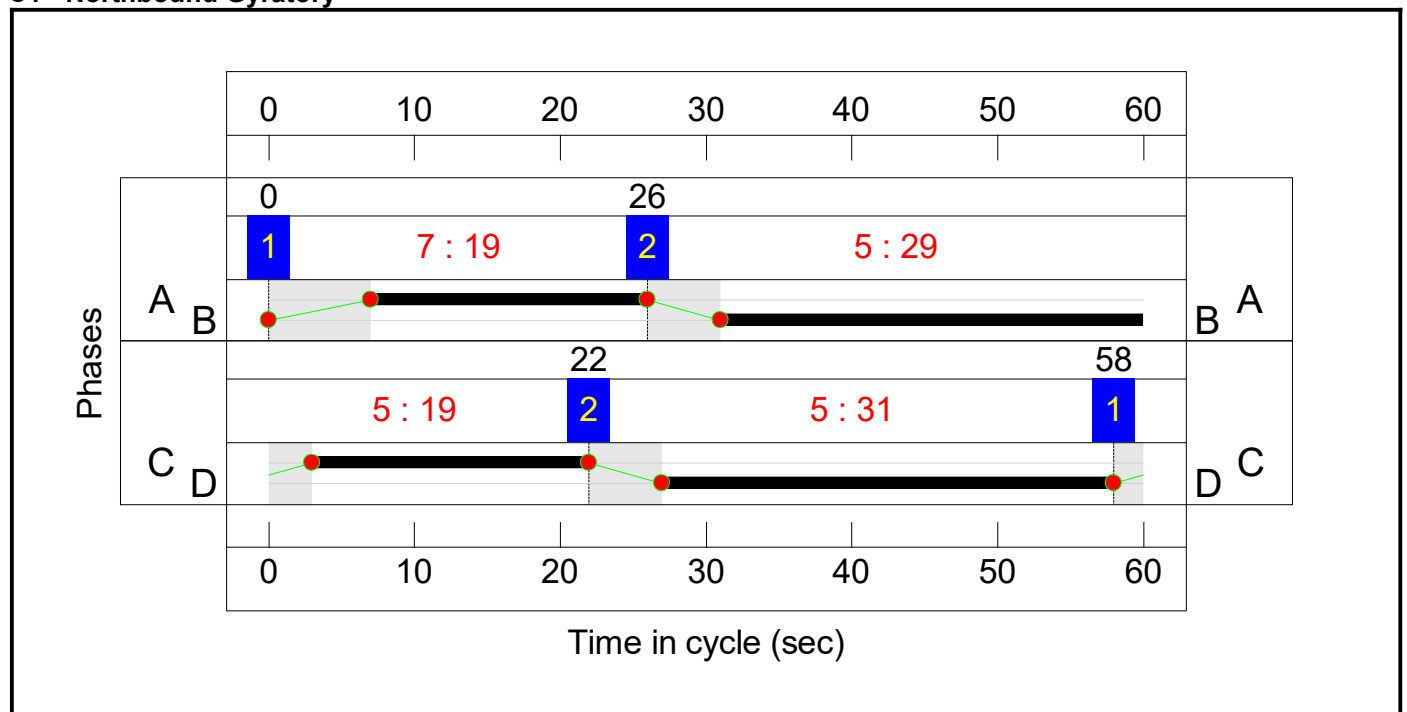
### Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2018 Base AM'	07:15	08:15	01:00	
2: '2018 Base PM'	16:45	17:45	01:00	
3: '2032 Do Nothing AM'	07:15	08:15	01:00	
4: '2032 Do Nothing PM'	16:45	17:45	01:00	
5: '2032 With Development AM'	07:15	08:15	01:00	
6: '2032 With Development PM'	16:45	17:45	01:00	

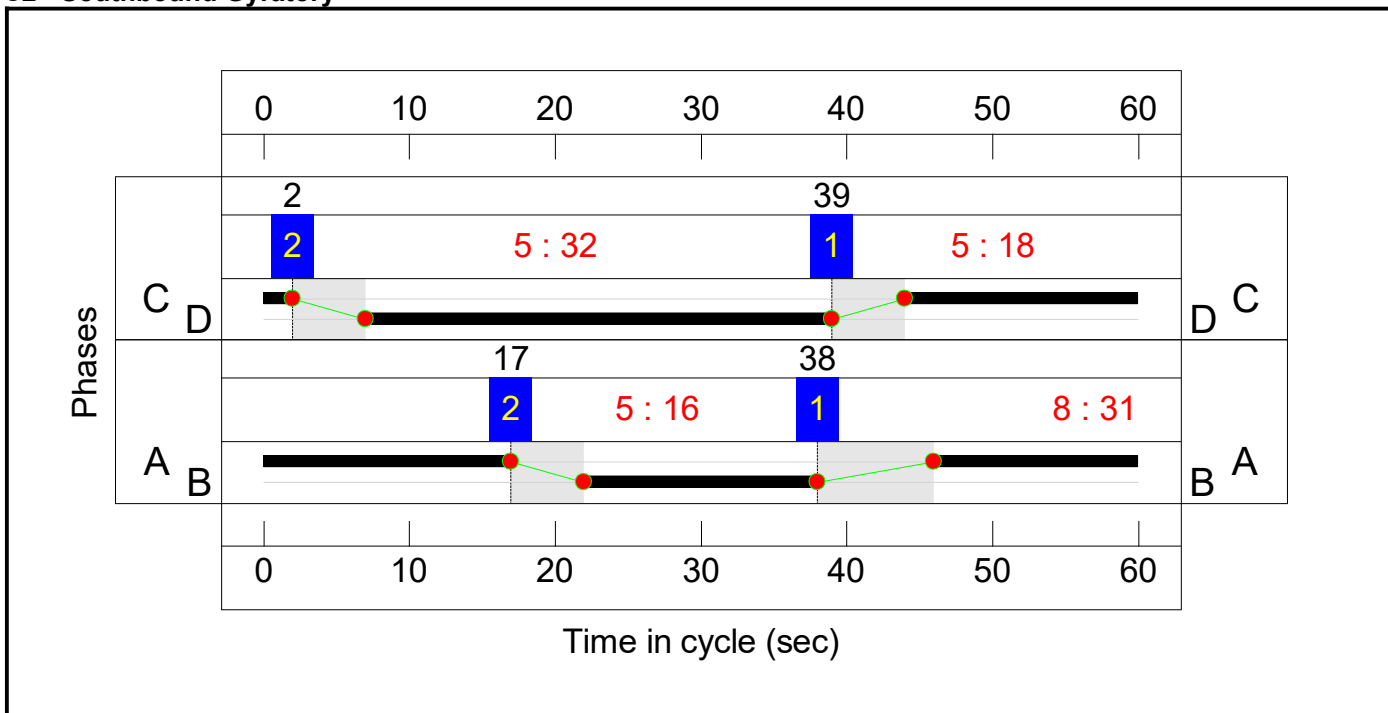
### Signal Timings Diagram

Scenario 1: '2018 Base AM' (FG1: '2018 Base AM', Plan 1: 'Network Control Plan 1')

#### C1 - Northbound Gyratory



**C2 - Southbound Gyratory**



**Traffic Flows, Desired**  
**Desired Flow :**

		Destination				Tot.
		A	B	C	D	
Origin	A	0	629	241	408	1278
	B	549	0	432	0	981
	C	277	615	0	479	1371
	D	323	0	189	0	512
	Tot.	1149	1244	862	887	4142

## Lane Saturation Flows

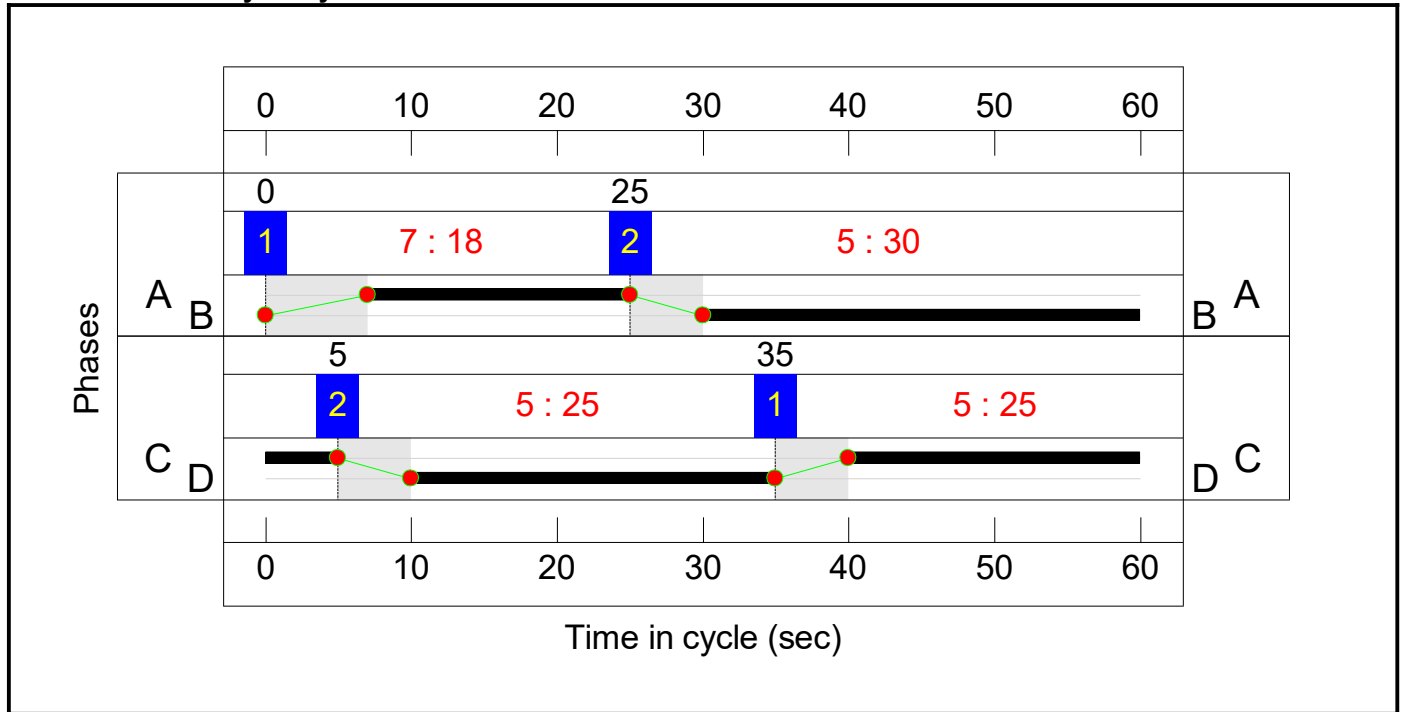
Junction: M1 J37 - Dodworth Roundabout								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (A628)	3.00	0.00	Y	Arm 10 Left	40.00	100.0 %	1846	1846
1/2 (A628 Lane 2)	This lane uses a directly entered Saturation Flow						3830	3830
2/1 (M1 (South) Off-Slip)	3.30	0.00	Y	Arm 8 Ahead	60.00	0.0 %	1875	1875
				Arm 11 Left	40.00	100.0 %		
2/2 (M1 (South) Off-Slip)	3.00	0.00	Y	Arm 8 Ahead	45.00	100.0 %	1853	1853
3/1 (Whinby Road)	3.00	0.00	Y	Arm 12 Left	15.00	100.0 %	1741	1741
3/2 (Whinby Road)	3.00	0.00	Y	Arm 5 Ahead	18.00	100.0 %	1768	1768
3/3 (Whinby Road)	3.00	0.00	Y	Arm 5 Ahead	20.00	100.0 %	1781	1781
4/1 (M1 (North) Off-slip)	3.00	0.00	Y	Arm 7 Ahead	60.00	0.0 %	1859	1859
				Arm 9 Left	50.00	100.0 %		
4/2 (M1 (North) Off-slip)	3.00	0.00	Y	Arm 7 Ahead	60.00	100.0 %	1868	1868
5/1 (Circulatory (North))	3.30	0.00	Y	Arm 9 Ahead	Inf	100.0 %	1945	1945
5/2 (Circulatory (North))	3.30	0.00	Y	Arm 7 Right	Inf	46.4 %	1945	1945
				Arm 9 Ahead	Inf	53.6 %		
5/3 (Circulatory (North))	3.30	0.00	Y	Arm 7 Right	Inf	100.0 %	1945	1945
6/1 (Circulatory (South))	3.30	0.00	Y	Arm 11 Ahead	Inf	100.0 %	1945	1945
6/2 (Circulatory (South))	3.30	0.00	Y	Arm 8 Right	Inf	57.6 %	1945	1945
				Arm 11 Ahead	Inf	42.4 %		
6/3 (Circulatory (South))	3.30	0.00	Y	Arm 8 Right	Inf	100.0 %	1945	1945
7/1 (Circulatory (East))	3.00	0.00	Y	Arm 10 Ahead	Inf	100.0 %	1915	1915
7/2 (Circulatory (East))	3.00	0.00	Y	Arm 6 Right	Inf	8.8 %	1915	1915
				Arm 10 Ahead	Inf	91.2 %		
7/3 (Circulatory (East))	3.00	0.00	Y	Arm 6 Right	Inf	100.0 %	1915	1915
8/1 (Circulatory (West))	3.30	0.00	Y	Arm 12 Ahead	Inf	100.0 %	1945	1945
8/2 (Circulatory (West))	3.30	0.00	Y	Arm 5 Right	Inf	53.2 %	1945	1945
				Arm 12 Ahead	Inf	46.8 %		
8/3 (Circulatory (West))	3.30	0.00	Y	Arm 5 Right	Inf	100.0 %	1945	1945
9/1 (A628 Lane 1)	Infinite Saturation Flow						Inf	Inf

9/2 (A628 Lane 2)	Infinite Saturation Flow	Inf	Inf
10/1 (M1 (South) On-Slip Lane 1)	Infinite Saturation Flow	Inf	Inf
10/2 (M1 (South) On-Slip Lane 2)	Infinite Saturation Flow	Inf	Inf
11/1 (Whinby Road Lane 1)	Infinite Saturation Flow	Inf	Inf
11/2 (Whinby Road Lane 2)	Infinite Saturation Flow	Inf	Inf
12/1 (M1 (North) On-Slip Lane 1)	Infinite Saturation Flow	Inf	Inf
12/2 (M1 (North) On-Slip Lane 2)	Infinite Saturation Flow	Inf	Inf

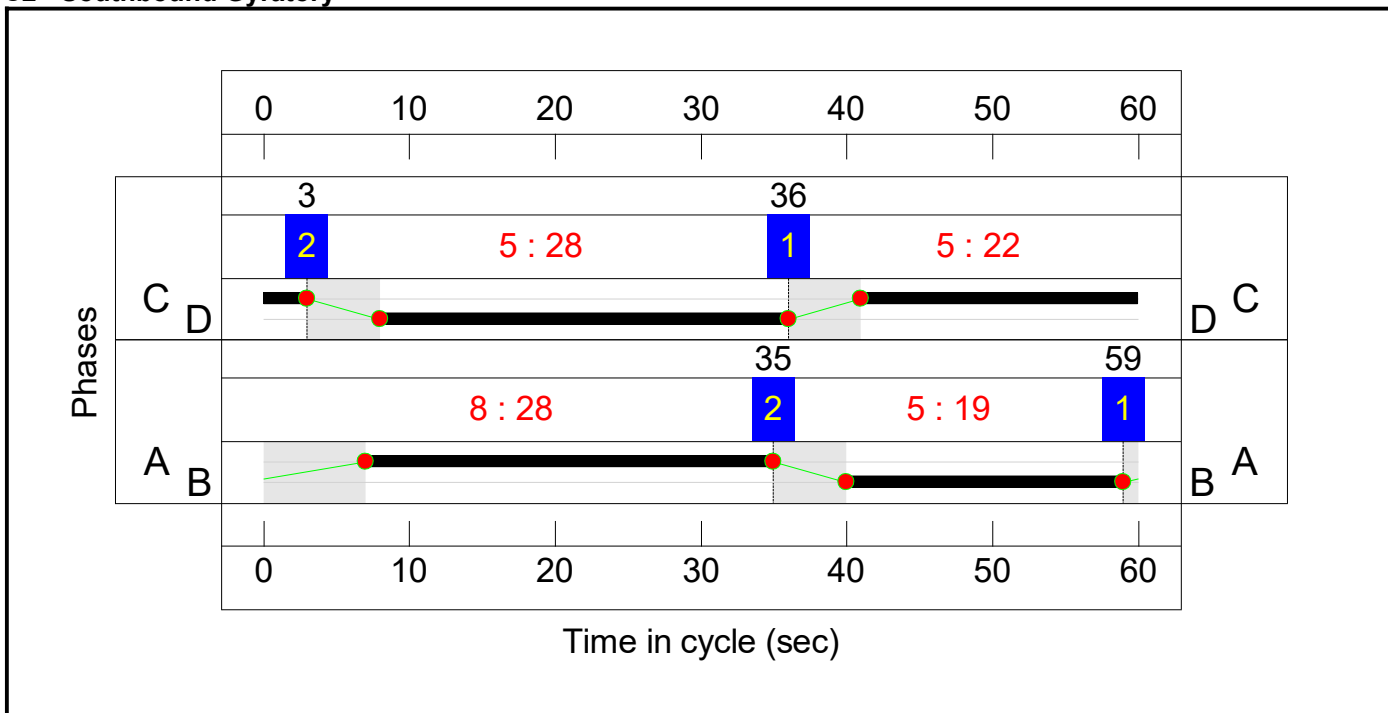
**Signal Timings Diagram**

**Scenario 2: '2018 Base PM'** (FG2: '2018 Base PM', Plan 1: 'Network Control Plan 1')

**C1 - Northbound Gyratory**



**C2 - Southbound Gyratory**



**Traffic Flows, Desired**  
**Desired Flow :**

	Destination					Tot.
	A	B	C	D		
Origin	A	0	505	324	319	1148
	B	555	0	658	0	1213
	C	315	491	0	192	998
	D	416	0	401	0	817
	Tot.	1286	996	1383	511	4176

## Lane Saturation Flows

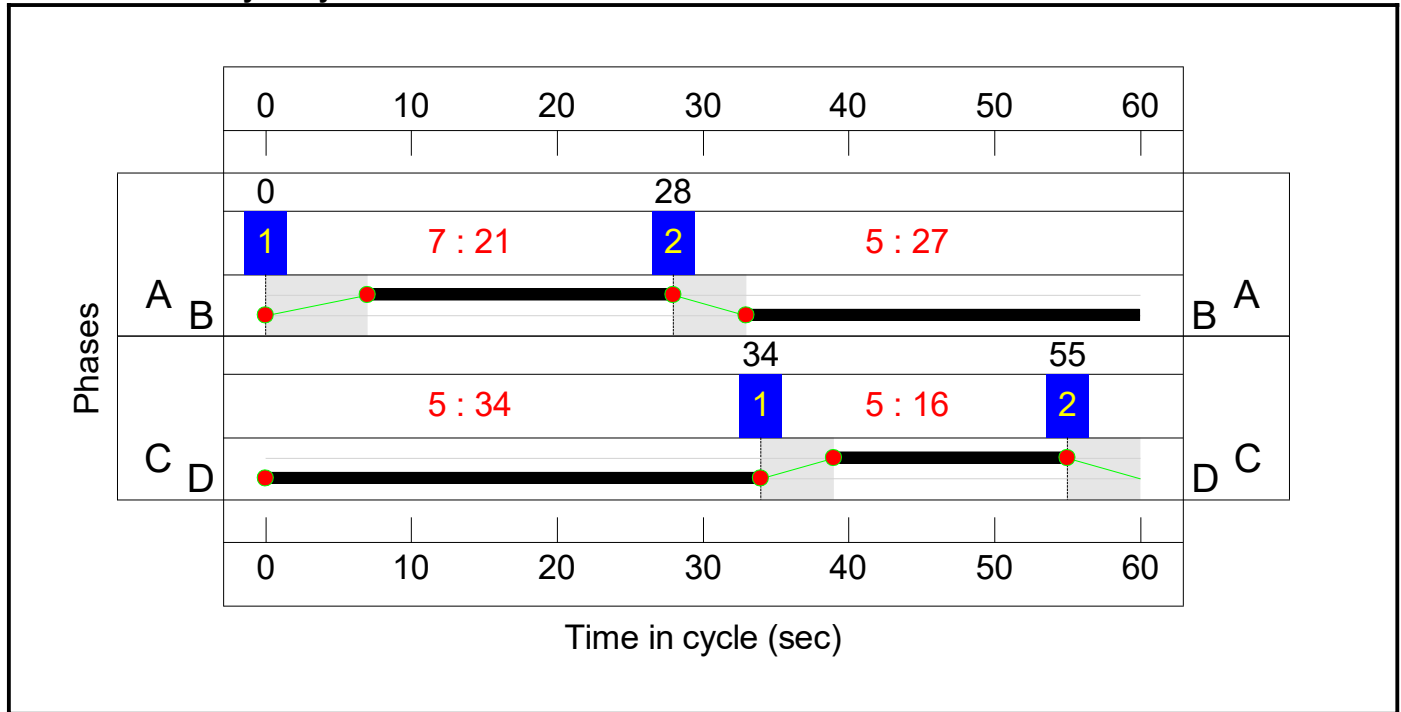
Junction: M1 J37 - Dodworth Roundabout								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (A628)	3.00	0.00	Y	Arm 10 Left	40.00	100.0 %	1846	1846
1/2 (A628 Lane 2)	This lane uses a directly entered Saturation Flow						3830	3830
2/1 (M1 (South) Off-Slip)	3.30	0.00	Y	Arm 8 Ahead	60.00	0.0 %	1875	1875
				Arm 11 Left	40.00	100.0 %		
2/2 (M1 (South) Off-Slip)	3.00	0.00	Y	Arm 8 Ahead	45.00	100.0 %	1853	1853
3/1 (Whinby Road)	3.00	0.00	Y	Arm 12 Left	15.00	100.0 %	1741	1741
3/2 (Whinby Road)	3.00	0.00	Y	Arm 5 Ahead	18.00	100.0 %	1768	1768
3/3 (Whinby Road)	3.00	0.00	Y	Arm 5 Ahead	20.00	100.0 %	1781	1781
4/1 (M1 (North) Off-slip)	3.00	0.00	Y	Arm 7 Ahead	60.00	0.0 %	1859	1859
				Arm 9 Left	50.00	100.0 %		
4/2 (M1 (North) Off-slip)	3.00	0.00	Y	Arm 7 Ahead	60.00	100.0 %	1868	1868
5/1 (Circulatory (North))	3.30	0.00	Y	Arm 9 Ahead	Inf	100.0 %	1945	1945
5/2 (Circulatory (North))	3.30	0.00	Y	Arm 7 Right	Inf	41.3 %	1945	1945
				Arm 9 Ahead	Inf	58.7 %		
5/3 (Circulatory (North))	3.30	0.00	Y	Arm 7 Right	Inf	100.0 %	1945	1945
6/1 (Circulatory (South))	3.30	0.00	Y	Arm 11 Ahead	Inf	100.0 %	1945	1945
6/2 (Circulatory (South))	3.30	0.00	Y	Arm 8 Right	Inf	25.1 %	1945	1945
				Arm 11 Ahead	Inf	74.9 %		
6/3 (Circulatory (South))	3.30	0.00	Y	Arm 8 Right	Inf	100.0 %	1945	1945
7/1 (Circulatory (East))	3.00	0.00	Y	Arm 10 Ahead	Inf	100.0 %	1915	1915
7/2 (Circulatory (East))	3.00	0.00	Y	Arm 6 Right	Inf	27.1 %	1915	1915
				Arm 10 Ahead	Inf	72.9 %		
7/3 (Circulatory (East))	3.00	0.00	Y	Arm 6 Right	Inf	100.0 %	1915	1915
8/1 (Circulatory (West))	3.30	0.00	Y	Arm 12 Ahead	Inf	100.0 %	1945	1945
8/2 (Circulatory (West))	3.30	0.00	Y	Arm 5 Right	Inf	51.8 %	1945	1945
				Arm 12 Ahead	Inf	48.2 %		
8/3 (Circulatory (West))	3.30	0.00	Y	Arm 5 Right	Inf	100.0 %	1945	1945
9/1 (A628 Lane 1)	Infinite Saturation Flow						Inf	Inf

9/2 (A628 Lane 2)	Infinite Saturation Flow	Inf	Inf
10/1 (M1 (South) On-Slip Lane 1)	Infinite Saturation Flow	Inf	Inf
10/2 (M1 (South) On-Slip Lane 2)	Infinite Saturation Flow	Inf	Inf
11/1 (Whinby Road Lane 1)	Infinite Saturation Flow	Inf	Inf
11/2 (Whinby Road Lane 2)	Infinite Saturation Flow	Inf	Inf
12/1 (M1 (North) On-Slip Lane 1)	Infinite Saturation Flow	Inf	Inf
12/2 (M1 (North) On-Slip Lane 2)	Infinite Saturation Flow	Inf	Inf

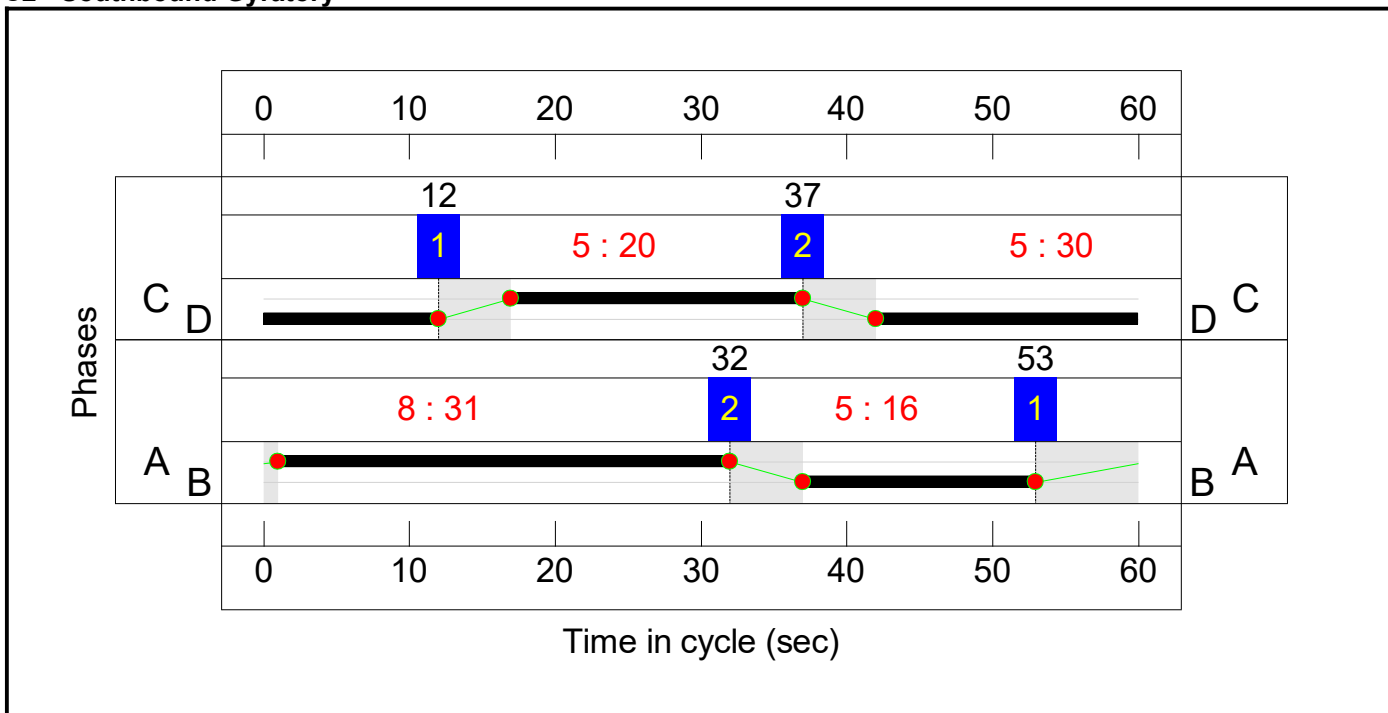
**Signal Timings Diagram**

**Scenario 3: '2032 Do Nothing AM'** (FG3: '2032 Do Nothing AM', Plan 1: 'Network Control Plan 1')

**C1 - Northbound Gyratory**



**C2 - Southbound Gyratory**



**Traffic Flows, Desired**

Desired Flow :

	Destination					Tot.
	A	B	C	D		
Origin	A	0	742	358	483	1583
	B	643	0	584	0	1227
	C	410	830	0	624	1864
	D	380	0	267	0	647
	Tot.	1433	1572	1209	1107	5321

## Lane Saturation Flows

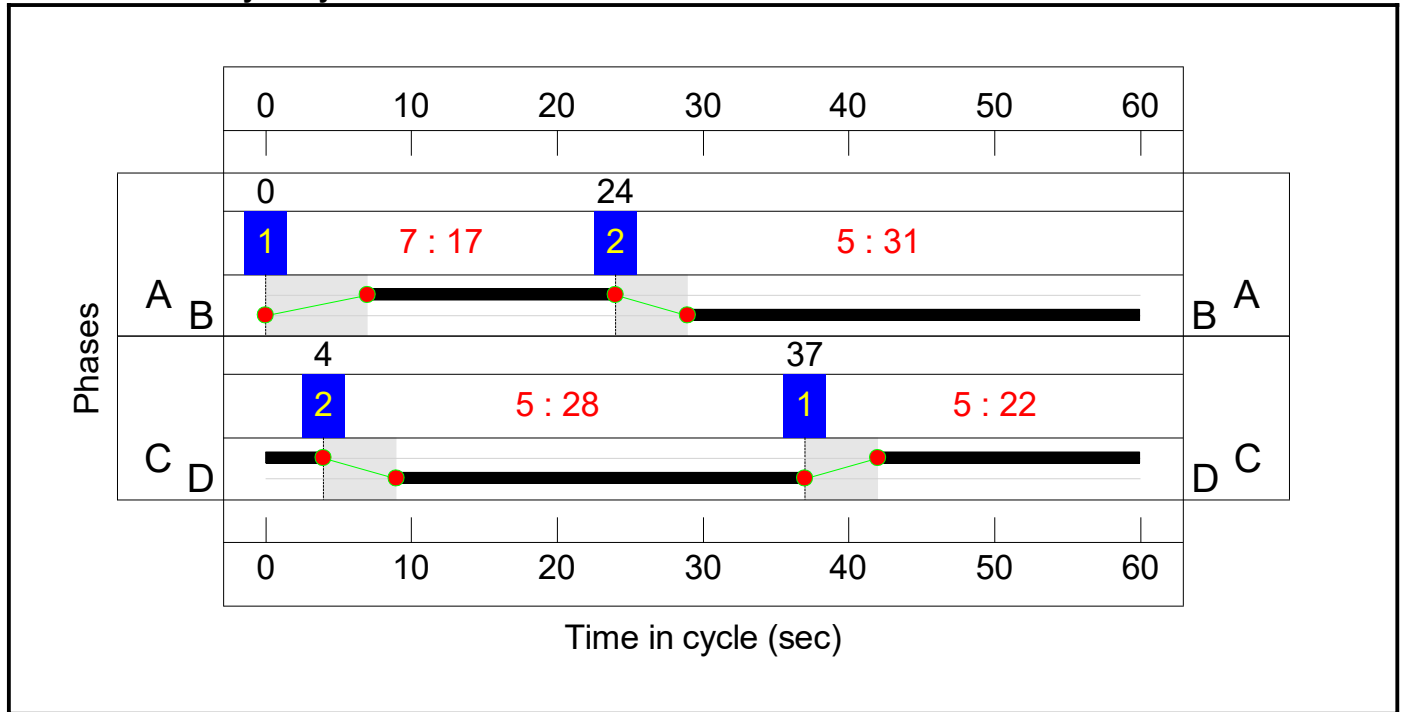
Junction: M1 J37 - Dodworth Roundabout								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (A628)	3.00	0.00	Y	Arm 10 Left	40.00	100.0 %	1846	1846
1/2 (A628 Lane 2)	This lane uses a directly entered Saturation Flow						3830	3830
2/1 (M1 (South) Off-Slip)	3.30	0.00	Y	Arm 8 Ahead	60.00	0.0 %	1875	1875
				Arm 11 Left	40.00	100.0 %		
2/2 (M1 (South) Off-Slip)	3.00	0.00	Y	Arm 8 Ahead	45.00	100.0 %	1853	1853
3/1 (Whinby Road)	3.00	0.00	Y	Arm 12 Left	15.00	100.0 %	1741	1741
3/2 (Whinby Road)	3.00	0.00	Y	Arm 5 Ahead	18.00	100.0 %	1768	1768
3/3 (Whinby Road)	3.00	0.00	Y	Arm 5 Ahead	20.00	100.0 %	1781	1781
4/1 (M1 (North) Off-slip)	3.00	0.00	Y	Arm 7 Ahead	60.00	0.0 %	1859	1859
				Arm 9 Left	50.00	100.0 %		
4/2 (M1 (North) Off-slip)	3.00	0.00	Y	Arm 7 Ahead	60.00	100.0 %	1868	1868
5/1 (Circulatory (North))	3.30	0.00	Y	Arm 9 Ahead	Inf	100.0 %	1945	1945
5/2 (Circulatory (North))	3.30	0.00	Y	Arm 7 Right	Inf	52.0 %	1945	1945
				Arm 9 Ahead	Inf	48.0 %		
5/3 (Circulatory (North))	3.30	0.00	Y	Arm 7 Right	Inf	100.0 %	1945	1945
6/1 (Circulatory (South))	3.30	0.00	Y	Arm 11 Ahead	Inf	100.0 %	1945	1945
6/2 (Circulatory (South))	3.30	0.00	Y	Arm 8 Right	Inf	62.0 %	1945	1945
				Arm 11 Ahead	Inf	38.0 %		
6/3 (Circulatory (South))	3.30	0.00	Y	Arm 8 Right	Inf	100.0 %	1945	1945
7/1 (Circulatory (East))	3.00	0.00	Y	Arm 10 Ahead	Inf	100.0 %	1915	1915
7/2 (Circulatory (East))	3.00	0.00	Y	Arm 6 Right	Inf	15.4 %	1915	1915
				Arm 10 Ahead	Inf	84.6 %		
7/3 (Circulatory (East))	3.00	0.00	Y	Arm 6 Right	Inf	100.0 %	1915	1915
8/1 (Circulatory (West))	3.30	0.00	Y	Arm 12 Ahead	Inf	100.0 %	1945	1945
8/2 (Circulatory (West))	3.30	0.00	Y	Arm 5 Right	Inf	60.5 %	1945	1945
				Arm 12 Ahead	Inf	39.5 %		
8/3 (Circulatory (West))	3.30	0.00	Y	Arm 5 Right	Inf	100.0 %	1945	1945
9/1 (A628 Lane 1)	Infinite Saturation Flow						Inf	Inf

9/2 (A628 Lane 2)	Infinite Saturation Flow	Inf	Inf
10/1 (M1 (South) On-Slip Lane 1)	Infinite Saturation Flow	Inf	Inf
10/2 (M1 (South) On-Slip Lane 2)	Infinite Saturation Flow	Inf	Inf
11/1 (Whinby Road Lane 1)	Infinite Saturation Flow	Inf	Inf
11/2 (Whinby Road Lane 2)	Infinite Saturation Flow	Inf	Inf
12/1 (M1 (North) On-Slip Lane 1)	Infinite Saturation Flow	Inf	Inf
12/2 (M1 (North) On-Slip Lane 2)	Infinite Saturation Flow	Inf	Inf

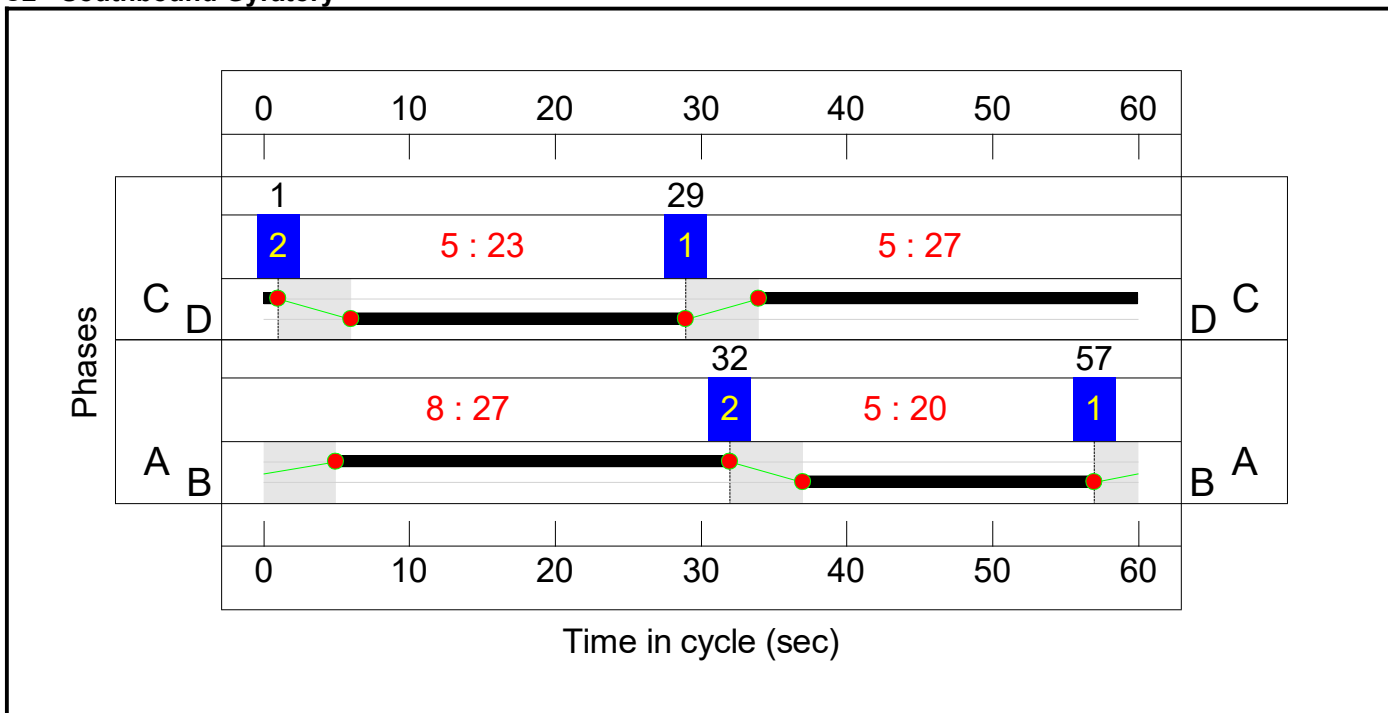
**Signal Timings Diagram**

Scenario 4: '2032 Do Nothing PM' (FG4: '2032 Do Nothing PM', Plan 1: 'Network Control Plan 1')

**C1 - Northbound Gyratory**



**C2 - Southbound Gyratory**



**Traffic Flows, Desired**

**Desired Flow :**

	Destination					Tot.
	A	B	C	D		
Origin	A	0	599	466	380	1445
	B	658	0	875	0	1533
	C	454	666	0	281	1401
	D	493	0	534	0	1027
	Tot.	1605	1265	1875	661	5406

## Lane Saturation Flows

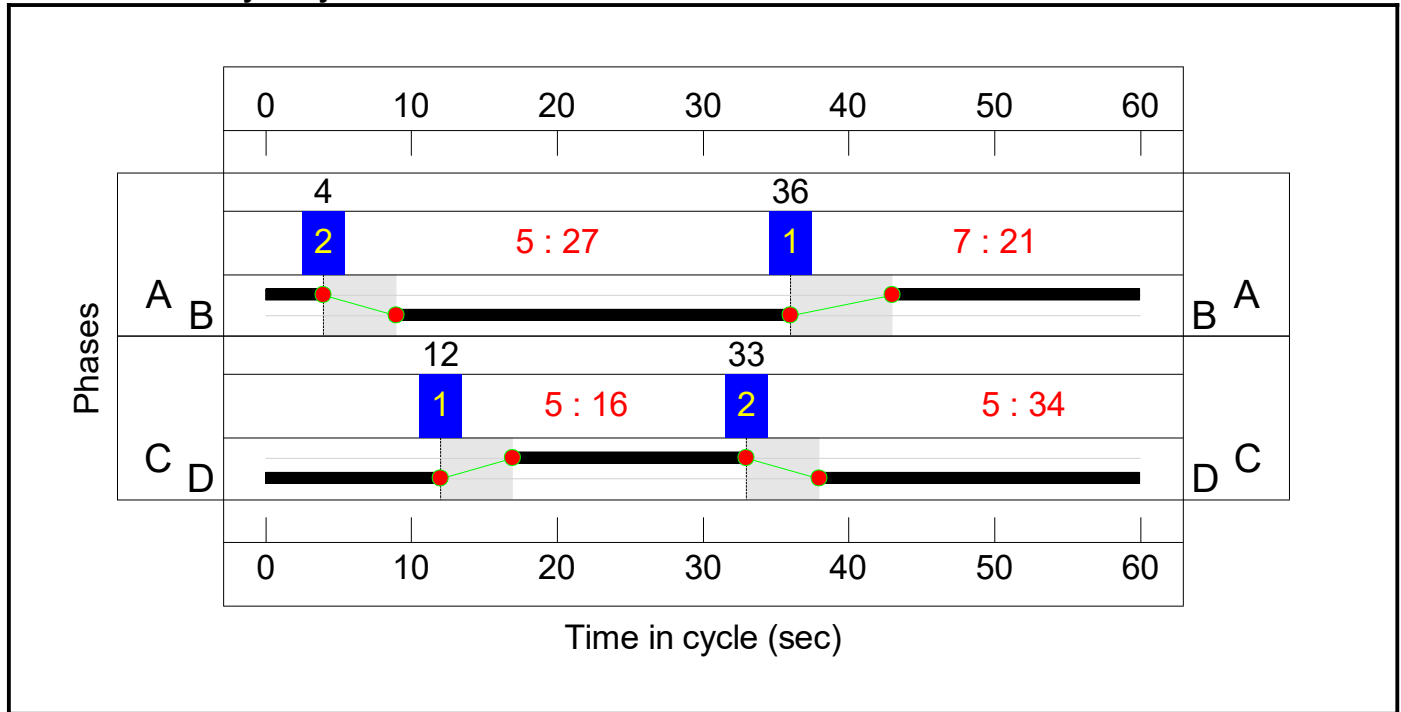
Junction: M1 J37 - Dodworth Roundabout								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (A628)	3.00	0.00	Y	Arm 10 Left	40.00	100.0 %	1846	1846
1/2 (A628 Lane 2)	This lane uses a directly entered Saturation Flow						3830	3830
2/1 (M1 (South) Off-Slip)	3.30	0.00	Y	Arm 8 Ahead	60.00	0.0 %	1875	1875
				Arm 11 Left	40.00	100.0 %		
2/2 (M1 (South) Off-Slip)	3.00	0.00	Y	Arm 8 Ahead	45.00	100.0 %	1853	1853
3/1 (Whinby Road)	3.00	0.00	Y	Arm 12 Left	15.00	100.0 %	1741	1741
3/2 (Whinby Road)	3.00	0.00	Y	Arm 5 Ahead	18.00	100.0 %	1768	1768
3/3 (Whinby Road)	3.00	0.00	Y	Arm 5 Ahead	20.00	100.0 %	1781	1781
4/1 (M1 (North) Off-slip)	3.00	0.00	Y	Arm 7 Ahead	60.00	0.0 %	1859	1859
				Arm 9 Left	50.00	100.0 %		
4/2 (M1 (North) Off-slip)	3.00	0.00	Y	Arm 7 Ahead	60.00	100.0 %	1868	1868
5/1 (Circulatory (North))	3.30	0.00	Y	Arm 9 Ahead	Inf	100.0 %	1945	1945
5/2 (Circulatory (North))	3.30	0.00	Y	Arm 7 Right	Inf	37.8 %	1945	1945
				Arm 9 Ahead	Inf	62.2 %		
5/3 (Circulatory (North))	3.30	0.00	Y	Arm 7 Right	Inf	100.0 %	1945	1945
6/1 (Circulatory (South))	3.30	0.00	Y	Arm 11 Ahead	Inf	100.0 %	1945	1945
6/2 (Circulatory (South))	3.30	0.00	Y	Arm 8 Right	Inf	2.8 %	1945	1945
				Arm 11 Ahead	Inf	97.2 %		
6/3 (Circulatory (South))	3.30	0.00	Y	Arm 8 Right	Inf	100.0 %	1945	1945
7/1 (Circulatory (East))	3.00	0.00	Y	Arm 10 Ahead	Inf	100.0 %	1915	1915
7/2 (Circulatory (East))	3.00	0.00	Y	Arm 6 Right	Inf	35.4 %	1915	1915
				Arm 10 Ahead	Inf	64.6 %		
7/3 (Circulatory (East))	3.00	0.00	Y	Arm 6 Right	Inf	100.0 %	1915	1915
8/1 (Circulatory (West))	3.30	0.00	Y	Arm 12 Ahead	Inf	100.0 %	1945	1945
8/2 (Circulatory (West))	3.30	0.00	Y	Arm 5 Right	Inf	36.8 %	1945	1945
				Arm 12 Ahead	Inf	63.2 %		
8/3 (Circulatory (West))	3.30	0.00	Y	Arm 5 Right	Inf	100.0 %	1945	1945
9/1 (A628 Lane 1)	Infinite Saturation Flow						Inf	Inf

9/2 (A628 Lane 2)	Infinite Saturation Flow	Inf	Inf
10/1 (M1 (South) On-Slip Lane 1)	Infinite Saturation Flow	Inf	Inf
10/2 (M1 (South) On-Slip Lane 2)	Infinite Saturation Flow	Inf	Inf
11/1 (Whinby Road Lane 1)	Infinite Saturation Flow	Inf	Inf
11/2 (Whinby Road Lane 2)	Infinite Saturation Flow	Inf	Inf
12/1 (M1 (North) On-Slip Lane 1)	Infinite Saturation Flow	Inf	Inf
12/2 (M1 (North) On-Slip Lane 2)	Infinite Saturation Flow	Inf	Inf

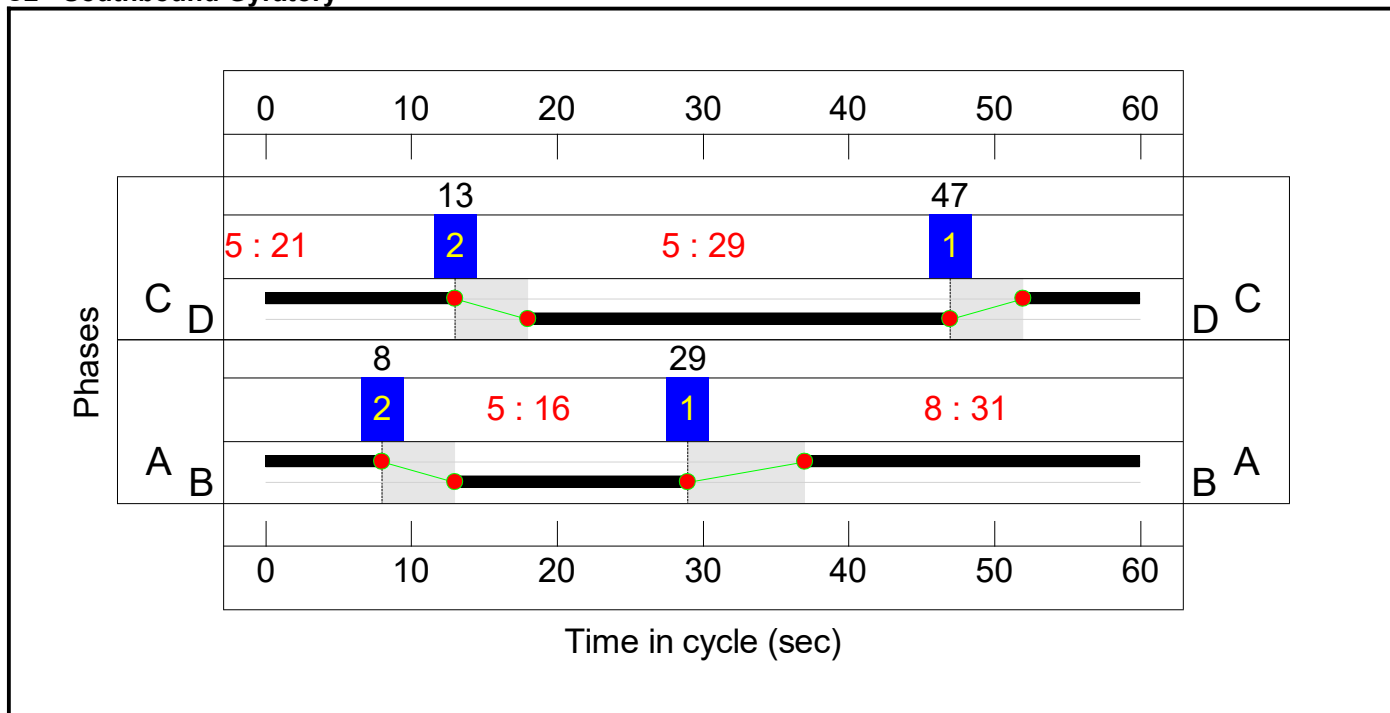
**Signal Timings Diagram**

**Scenario 5: '2032 With Development AM'** (FG5: '2032 With Development AM', Plan 1: 'Network Control Plan 1')

**C1 - Northbound Gyratory**



**C2 - Southbound Gyratory**



**Traffic Flows, Desired**

Desired Flow :

	Destination					Tot.
	A	B	C	D		
Origin	A	0	742	358	483	1583
	B	643	0	588	0	1231
	C	410	843	0	639	1892
	D	380	0	272	0	652
	Tot.	1433	1585	1218	1122	5358

## Lane Saturation Flows

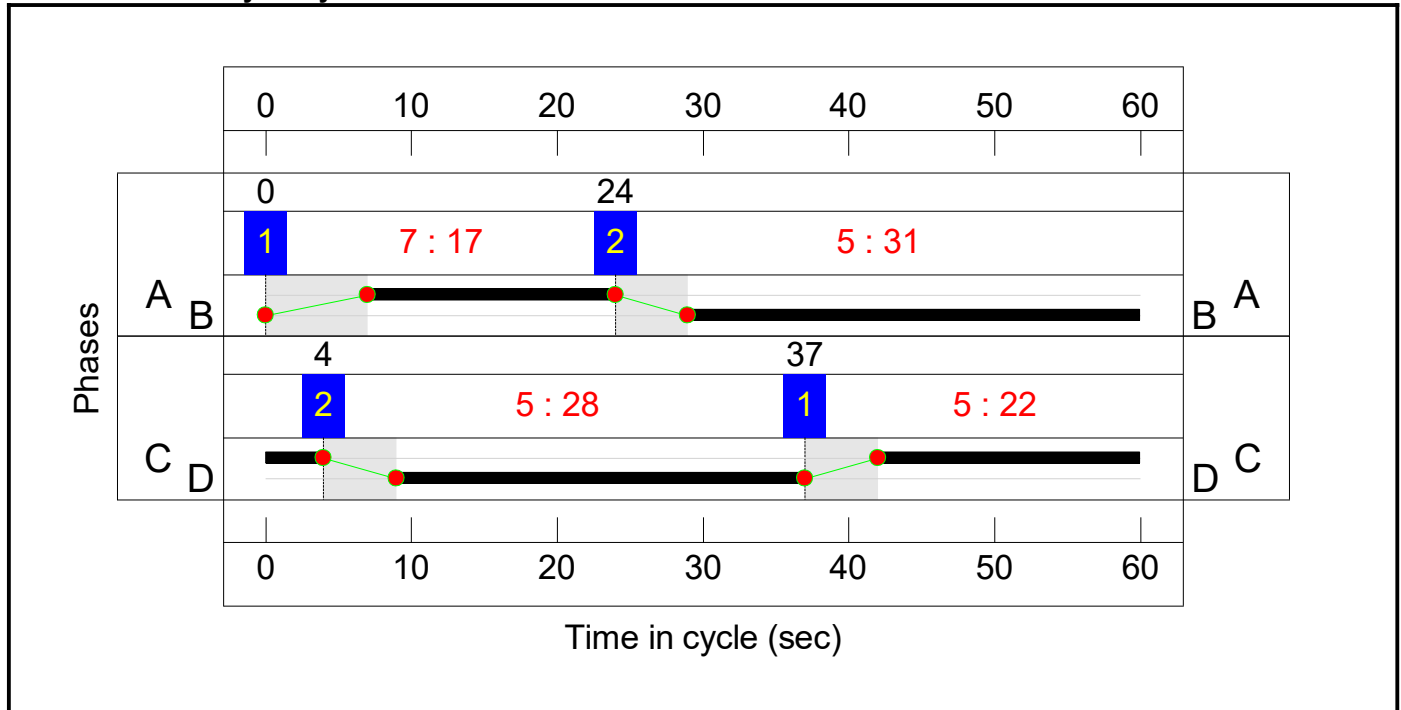
Junction: M1 J37 - Dodworth Roundabout								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (A628)	3.00	0.00	Y	Arm 10 Left	40.00	100.0 %	1846	1846
1/2 (A628 Lane 2)	This lane uses a directly entered Saturation Flow						3830	3830
2/1 (M1 (South) Off-Slip)	3.30	0.00	Y	Arm 8 Ahead	60.00	0.0 %	1875	1875
				Arm 11 Left	40.00	100.0 %		
2/2 (M1 (South) Off-Slip)	3.00	0.00	Y	Arm 8 Ahead	45.00	100.0 %	1853	1853
3/1 (Whinby Road)	3.00	0.00	Y	Arm 12 Left	15.00	100.0 %	1741	1741
3/2 (Whinby Road)	3.00	0.00	Y	Arm 5 Ahead	18.00	100.0 %	1768	1768
3/3 (Whinby Road)	3.00	0.00	Y	Arm 5 Ahead	20.00	100.0 %	1781	1781
4/1 (M1 (North) Off-slip)	3.00	0.00	Y	Arm 7 Ahead	60.00	0.0 %	1859	1859
				Arm 9 Left	50.00	100.0 %		
4/2 (M1 (North) Off-slip)	3.00	0.00	Y	Arm 7 Ahead	60.00	100.0 %	1868	1868
5/1 (Circulatory (North))	3.30	0.00	Y	Arm 9 Ahead	Inf	100.0 %	1945	1945
5/2 (Circulatory (North))	3.30	0.00	Y	Arm 7 Right	Inf	51.7 %	1945	1945
				Arm 9 Ahead	Inf	48.3 %		
5/3 (Circulatory (North))	3.30	0.00	Y	Arm 7 Right	Inf	100.0 %	1945	1945
6/1 (Circulatory (South))	3.30	0.00	Y	Arm 11 Ahead	Inf	100.0 %	1945	1945
6/2 (Circulatory (South))	3.30	0.00	Y	Arm 8 Right	Inf	61.4 %	1945	1945
				Arm 11 Ahead	Inf	38.6 %		
6/3 (Circulatory (South))	3.30	0.00	Y	Arm 8 Right	Inf	100.0 %	1945	1945
7/1 (Circulatory (East))	3.00	0.00	Y	Arm 10 Ahead	Inf	100.0 %	1915	1915
7/2 (Circulatory (East))	3.00	0.00	Y	Arm 6 Right	Inf	14.3 %	1915	1915
				Arm 10 Ahead	Inf	85.7 %		
7/3 (Circulatory (East))	3.00	0.00	Y	Arm 6 Right	Inf	100.0 %	1915	1915
8/1 (Circulatory (West))	3.30	0.00	Y	Arm 12 Ahead	Inf	100.0 %	1945	1945
8/2 (Circulatory (West))	3.30	0.00	Y	Arm 5 Right	Inf	61.2 %	1945	1945
				Arm 12 Ahead	Inf	38.8 %		
8/3 (Circulatory (West))	3.30	0.00	Y	Arm 5 Right	Inf	100.0 %	1945	1945
9/1 (A628 Lane 1)	Infinite Saturation Flow						Inf	Inf

9/2 (A628 Lane 2)	Infinite Saturation Flow	Inf	Inf
10/1 (M1 (South) On-Slip Lane 1)	Infinite Saturation Flow	Inf	Inf
10/2 (M1 (South) On-Slip Lane 2)	Infinite Saturation Flow	Inf	Inf
11/1 (Whinby Road Lane 1)	Infinite Saturation Flow	Inf	Inf
11/2 (Whinby Road Lane 2)	Infinite Saturation Flow	Inf	Inf
12/1 (M1 (North) On-Slip Lane 1)	Infinite Saturation Flow	Inf	Inf
12/2 (M1 (North) On-Slip Lane 2)	Infinite Saturation Flow	Inf	Inf

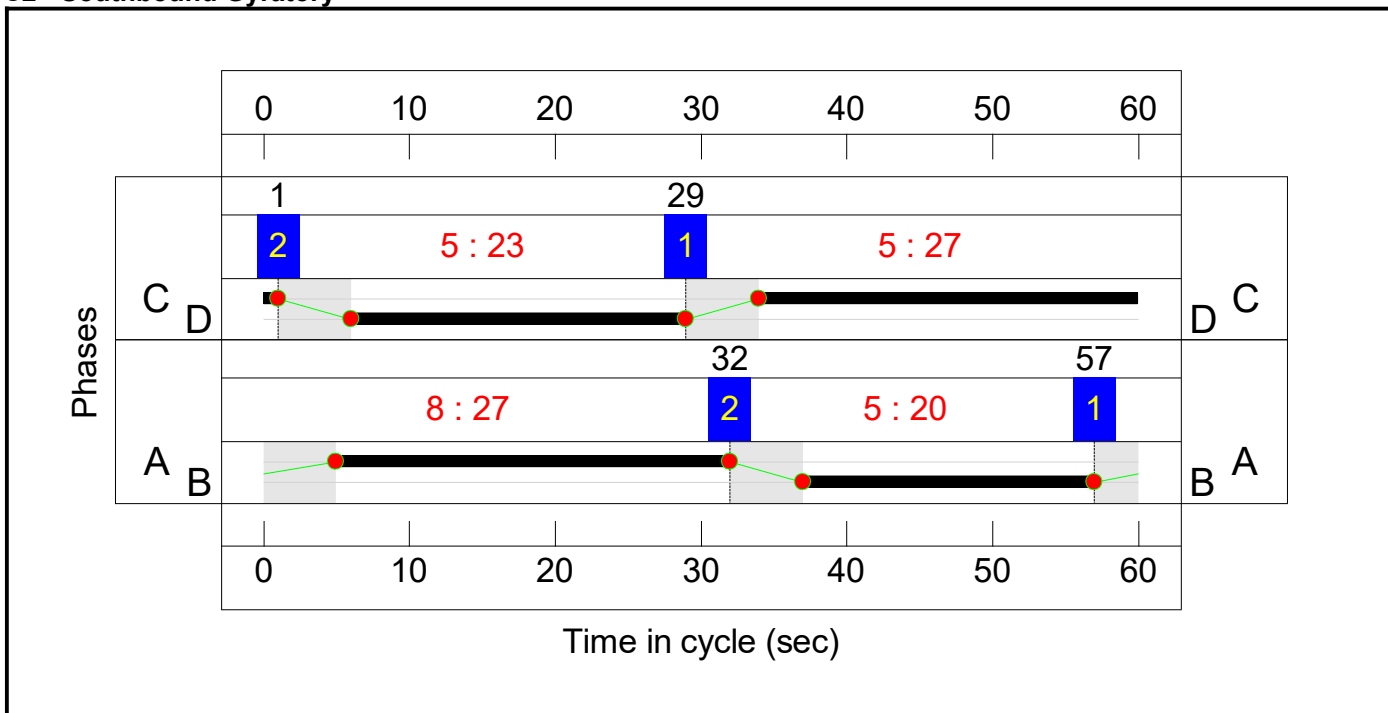
**Signal Timings Diagram**

**Scenario 6: '2032 With Development PM'** (FG6: '2032 With Development PM', Plan 1: 'Network Control Plan 1')

**C1 - Northbound Gyratory**



**C2 - Southbound Gyratory**



**Traffic Flows, Desired**

Desired Flow :

		Destination				Tot.
		A	B	C	D	
Origin	A	0	599	466	380	1445
	B	658	0	888	0	1546
	C	454	671	0	286	1411
	D	493	0	548	0	1041
	Tot.	1605	1270	1902	666	5443

## Lane Saturation Flows

Junction: M1 J37 - Dodworth Roundabout								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (A628)	3.00	0.00	Y	Arm 10 Left	40.00	100.0 %	1846	1846
1/2 (A628 Lane 2)	This lane uses a directly entered Saturation Flow						3830	3830
2/1 (M1 (South) Off-Slip)	3.30	0.00	Y	Arm 8 Ahead	60.00	0.0 %	1875	1875
				Arm 11 Left	40.00	100.0 %		
2/2 (M1 (South) Off-Slip)	3.00	0.00	Y	Arm 8 Ahead	45.00	100.0 %	1853	1853
3/1 (Whinby Road)	3.00	0.00	Y	Arm 12 Left	15.00	100.0 %	1741	1741
3/2 (Whinby Road)	3.00	0.00	Y	Arm 5 Ahead	18.00	100.0 %	1768	1768
3/3 (Whinby Road)	3.00	0.00	Y	Arm 5 Ahead	20.00	100.0 %	1781	1781
4/1 (M1 (North) Off-slip)	3.00	0.00	Y	Arm 7 Ahead	60.00	0.0 %	1859	1859
				Arm 9 Left	50.00	100.0 %		
4/2 (M1 (North) Off-slip)	3.00	0.00	Y	Arm 7 Ahead	60.00	100.0 %	1868	1868
5/1 (Circulatory (North))	3.30	0.00	Y	Arm 9 Ahead	Inf	100.0 %	1945	1945
5/2 (Circulatory (North))	3.30	0.00	Y	Arm 7 Right	Inf	37.8 %	1945	1945
				Arm 9 Ahead	Inf	62.2 %		
5/3 (Circulatory (North))	3.30	0.00	Y	Arm 7 Right	Inf	100.0 %	1945	1945
6/1 (Circulatory (South))	3.30	0.00	Y	Arm 11 Ahead	Inf	100.0 %	1945	1945
6/2 (Circulatory (South))	3.30	0.00	Y	Arm 8 Right	Inf	1.8 %	1945	1945
				Arm 11 Ahead	Inf	98.2 %		
6/3 (Circulatory (South))	3.30	0.00	Y	Arm 8 Right	Inf	100.0 %	1945	1945
7/1 (Circulatory (East))	3.00	0.00	Y	Arm 10 Ahead	Inf	100.0 %	1915	1915
7/2 (Circulatory (East))	3.00	0.00	Y	Arm 6 Right	Inf	34.5 %	1915	1915
				Arm 10 Ahead	Inf	65.5 %		
7/3 (Circulatory (East))	3.00	0.00	Y	Arm 6 Right	Inf	100.0 %	1915	1915
8/1 (Circulatory (West))	3.30	0.00	Y	Arm 12 Ahead	Inf	100.0 %	1945	1945
8/2 (Circulatory (West))	3.30	0.00	Y	Arm 5 Right	Inf	36.3 %	1945	1945
				Arm 12 Ahead	Inf	63.7 %		
8/3 (Circulatory (West))	3.30	0.00	Y	Arm 5 Right	Inf	100.0 %	1945	1945
9/1 (A628 Lane 1)	Infinite Saturation Flow						Inf	Inf

9/2 (A628 Lane 2)	Infinite Saturation Flow	Inf	Inf
10/1 (M1 (South) On-Slip Lane 1)	Infinite Saturation Flow	Inf	Inf
10/2 (M1 (South) On-Slip Lane 2)	Infinite Saturation Flow	Inf	Inf
11/1 (Whinby Road Lane 1)	Infinite Saturation Flow	Inf	Inf
11/2 (Whinby Road Lane 2)	Infinite Saturation Flow	Inf	Inf
12/1 (M1 (North) On-Slip Lane 1)	Infinite Saturation Flow	Inf	Inf
12/2 (M1 (North) On-Slip Lane 2)	Infinite Saturation Flow	Inf	Inf

## Network Results

Scenario 1: '2018 Base AM' (FG1: '2018 Base AM', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
<b>Network</b>	-	-	-		-	-	-	-	-	-	64.7%	-	-	0	0	0	33.1	-	-
<b>M1 J37 - Dodworth Roundabout</b>	-	-	-		-	-	-	-	-	-	64.7%	-	-	0	0	0	33.1	-	-
1/1+1/2	A628 Ahead Left	U	C2:D		1	32	-	1278	1846:3830	1015+1048	62.0 : 62.0%	1278	1278	-	-	-	3.7	10.5	7.8
2/1	M1 (South) Off-Slip Ahead Left	U	C1:B		1	29	-	432	1875	937	46.1%	432	432	-	-	-	1.6	13.3	5.0
2/2	M1 (South) Off-Slip Ahead	U	C1:B		1	29	-	549	1853	926	59.3%	549	549	-	-	-	2.4	15.4	7.1
3/2+3/1	Whinby Road Ahead Left	U	C1:D		1	31	-	756	1768:1741	456+788	60.8 : 60.8%	756	756	-	-	-	2.6	12.2	5.8
3/3	Whinby Road Ahead	U	C1:D		1	31	-	615	1781	950	64.7%	615	615	-	-	-	2.6	15.3	8.1
4/1	M1 (North) Off-slip Ahead Left	U	C2:B		1	16	-	323	1859	527	61.3%	323	323	-	-	-	2.5	27.4	5.5
4/2	M1 (North) Off-slip Ahead	U	C2:B		1	16	-	189	1868	529	35.7%	189	189	-	-	-	1.2	22.4	2.7
5/1	Circulatory (North) Ahead	U	C2:A		1	31	-	499	1945	1037	48.1%	499	499	-	-	-	1.3	9.1	4.4
5/2	Circulatory (North) Right Ahead	U	C2:A		1	31	-	610	1945	1037	58.8%	610	610	-	-	-	1.5	9.0	5.1
5/3	Circulatory (North) Right	U	C2:A		1	31	-	332	1945	1037	32.0%	332	332	-	-	-	0.9	10.0	4.8
6/1	Circulatory (South) Ahead	U	C1:A		1	19	-	273	1945	648	42.1%	273	273	-	-	-	1.2	15.6	2.1

6/2	Circulatory (South) Right Ahead	U	C1:A		1	19	-	370	1945	648	57.1%	370	370	-	-	-	2.1	20.6	5.7
6/3	Circulatory (South) Right	U	C1:A		1	19	-	195	1945	648	30.1%	195	195	-	-	-	0.7	13.7	1.2
7/1	Circulatory (East) Ahead	U	C2:C		1	18	-	283	1915	606	46.7%	283	283	-	-	-	0.8	10.2	1.0
7/2	Circulatory (East) Right Ahead	U	C2:C		1	18	-	364	1915	606	60.0%	364	364	-	-	-	1.3	12.9	2.0
7/3	Circulatory (East) Right	U	C2:C		1	18	-	157	1915	606	25.9%	157	157	-	-	-	0.8	18.9	2.8
8/1	Circulatory (West) Ahead	U	C1:C		1	19	-	213	1945	648	32.9%	213	213	-	-	-	0.8	13.5	1.1
8/2	Circulatory (West) Right Ahead	U	C1:C		1	19	-	417	1945	648	64.3%	417	417	-	-	-	2.7	22.9	5.4
8/3	Circulatory (West) Right	U	C1:C		1	19	-	327	1945	648	50.4%	327	327	-	-	-	2.4	26.6	6.0
C1 - Northbound Gyratory		Stream: 1 PRC for Signalled Lanes (%)		51.9		Total Delay for Signalled Lanes (pcuHr):		7.99		Cycle Time (s):		60							
C1 - Northbound Gyratory		Stream: 2 PRC for Signalled Lanes (%)		39.0		Total Delay for Signalled Lanes (pcuHr):		11.06		Cycle Time (s):		60							
C2 - Southbound Gyratory		Stream: 1 PRC for Signalled Lanes (%)		45.3		Total Delay for Signalled Lanes (pcuHr):		6.68		Cycle Time (s):		60							
C2 - Southbound Gyratory		Stream: 2 PRC for Signalled Lanes (%)		46.8		Total Delay for Signalled Lanes (pcuHr):		7.34		Cycle Time (s):		60							
		PRC Over All Lanes (%)		39.0		Total Delay Over All Lanes(pcuHr):		33.06											

Scenario 2: '2018 Base PM' (FG2: '2018 Base PM', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
<b>Network</b>	-	-	-		-	-	-	-	-	-	<b>68.4%</b>	-	-	<b>0</b>	<b>0</b>	<b>0</b>	<b>37.3</b>	-	-
<b>M1 J37 - Dodworth Roundabout</b>	-	-	-		-	-	-	-	-	-	<b>68.4%</b>	-	-	<b>0</b>	<b>0</b>	<b>0</b>	<b>37.3</b>	-	-
1/1+1/2	A628 Ahead Left	U	C2:D		1	28	-	1148	1846:3830	892+1136	56.6 : 56.6%	1148	1148	-	-	-	3.9	12.3	7.3
2/1	M1 (South) Off-Slip Ahead Left	U	C1:B		1	30	-	658	1875	969	67.9%	658	658	-	-	-	3.0	16.6	9.1
2/2	M1 (South) Off-Slip Ahead	U	C1:B		1	30	-	555	1853	957	58.0%	555	555	-	-	-	2.2	14.5	7.0
3/2+3/1	Whinby Road Ahead Left	U	C1:D		1	25	-	507	1768:1741	693+423	45.4 : 45.4%	507	507	-	-	-	2.0	14.3	4.0
3/3	Whinby Road Ahead	U	C1:D		1	25	-	491	1781	772	63.6%	491	491	-	-	-	2.7	19.7	7.1
4/1	M1 (North) Off-slip Ahead Left	U	C2:B		1	19	-	416	1859	620	67.1%	416	416	-	-	-	3.0	25.9	6.9
4/2	M1 (North) Off-slip Ahead	U	C2:B		1	19	-	401	1868	623	64.4%	401	401	-	-	-	2.8	25.0	6.5
5/1	Circulatory (North) Ahead	U	C2:A		1	28	-	548	1945	940	58.3%	548	548	-	-	-	1.9	12.3	5.6
5/2	Circulatory (North) Right Ahead	U	C2:A		1	28	-	549	1945	940	58.4%	549	549	-	-	-	2.6	17.3	7.3
5/3	Circulatory (North) Right	U	C2:A		1	28	-	264	1945	940	28.1%	264	264	-	-	-	0.4	5.2	0.6
6/1	Circulatory (South) Ahead	U	C1:A		1	18	-	421	1945	616	68.4%	421	421	-	-	-	2.3	19.4	4.4

6/2	Circulatory (South) Right Ahead	U	C1:A		1	18	-	406	1945	616	65.9%	406	406	-	-	-	2.5	22.6	7.3
6/3	Circulatory (South) Right	U	C1:A		1	18	-	217	1945	616	35.2%	217	217	-	-	-	0.8	13.8	1.3
7/1	Circulatory (East) Ahead	U	C2:C		1	22	-	227	1915	734	30.9%	227	227	-	-	-	1.3	20.5	4.0
7/2	Circulatory (East) Right Ahead	U	C2:C		1	22	-	362	1915	734	49.3%	362	362	-	-	-	1.9	18.4	5.5
7/3	Circulatory (East) Right	U	C2:C		1	22	-	303	1915	734	41.3%	303	303	-	-	-	0.4	5.0	0.5
8/1	Circulatory (West) Ahead	U	C1:C		1	25	-	102	1945	843	12.1%	102	102	-	-	-	0.6	22.8	1.8
8/2	Circulatory (West) Right Ahead	U	C1:C		1	25	-	450	1945	843	53.4%	450	450	-	-	-	2.4	18.8	7.2
8/3	Circulatory (West) Right	U	C1:C		1	25	-	322	1945	843	38.2%	322	322	-	-	-	0.5	5.4	3.2
C1 - Northbound Gyratory		Stream: 1 PRC for Signalled Lanes (%)		31.7		Total Delay for Signalled Lanes (pcuHr):		10.90		Cycle Time (s):		60							
C1 - Northbound Gyratory		Stream: 2 PRC for Signalled Lanes (%)		41.5		Total Delay for Signalled Lanes (pcuHr):		8.18		Cycle Time (s):		60							
C2 - Southbound Gyratory		Stream: 1 PRC for Signalled Lanes (%)		59.0		Total Delay for Signalled Lanes (pcuHr):		7.49		Cycle Time (s):		60							
C2 - Southbound Gyratory		Stream: 2 PRC for Signalled Lanes (%)		34.1		Total Delay for Signalled Lanes (pcuHr):		10.68		Cycle Time (s):		60							
		PRC Over All Lanes (%)		31.7		Total Delay Over All Lanes(pcuHr):		37.26											

Scenario 3: '2032 Do Nothing AM' (FG3: '2032 Do Nothing AM', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
<b>Network</b>	-	-	-		-	-	-	-	-	-	<b>79.9%</b>	-	-	<b>0</b>	<b>0</b>	<b>0</b>	<b>53.4</b>	-	-
<b>M1 J37 - Dodworth Roundabout</b>	-	-	-		-	-	-	-	-	-	<b>79.9%</b>	-	-	<b>0</b>	<b>0</b>	<b>0</b>	<b>53.4</b>	-	-
1/1+1/2	A628 Ahead Left	U	C2:D		1	30	-	1583	1846:3830	954+1090	77.8 : 77.1%	1583	1583	-	-	-	6.2	14.1	11.6
2/1	M1 (South) Off-Slip Ahead Left	U	C1:B		1	27	-	584	1875	875	66.7%	584	584	-	-	-	3.0	18.5	8.5
2/2	M1 (South) Off-Slip Ahead	U	C1:B		1	27	-	643	1853	865	74.4%	643	643	-	-	-	3.8	21.1	10.2
3/2+3/1	Whinby Road Ahead Left	U	C1:D		1	34	-	1034	1768:1741	545+829	75.3 : 75.3%	1034	1034	-	-	-	3.7	12.8	8.1
3/3	Whinby Road Ahead	U	C1:D		1	34	-	830	1781	1039	79.9%	830	830	-	-	-	4.2	18.2	12.6
4/1	M1 (North) Off-slip Ahead Left	U	C2:B		1	16	-	380	1859	527	72.1%	380	380	-	-	-	3.3	31.4	7.0
4/2	M1 (North) Off-slip Ahead	U	C2:B		1	16	-	267	1868	529	50.4%	267	267	-	-	-	1.8	24.8	4.2
5/1	Circulatory (North) Ahead	U	C2:A		1	31	-	672	1945	1037	64.8%	672	672	-	-	-	2.6	13.8	10.4
5/2	Circulatory (North) Right Ahead	U	C2:A		1	31	-	794	1945	1037	76.5%	794	794	-	-	-	4.1	18.5	12.7
5/3	Circulatory (North) Right	U	C2:A		1	31	-	417	1945	1037	40.2%	417	417	-	-	-	0.7	6.0	1.2
6/1	Circulatory (South) Ahead	U	C1:A		1	21	-	434	1945	713	60.9%	434	434	-	-	-	2.3	19.1	6.6

6/2	Circulatory (South) Right Ahead	U	C1:A		1	21	-	503	1945	713	70.5%	503	503	-	-	-	2.6	18.8	6.4
6/3	Circulatory (South) Right	U	C1:A		1	21	-	171	1945	713	24.0%	171	171	-	-	-	0.8	16.0	2.7
7/1	Circulatory (East) Ahead	U	C2:C		1	20	-	413	1915	670	61.6%	413	413	-	-	-	1.0	8.9	1.9
7/2	Circulatory (East) Right Ahead	U	C2:C		1	20	-	493	1915	670	73.6%	493	493	-	-	-	2.7	19.8	8.4
7/3	Circulatory (East) Right	U	C2:C		1	20	-	191	1915	670	28.5%	191	191	-	-	-	1.9	36.4	3.4
8/1	Circulatory (West) Ahead	U	C1:C		1	16	-	312	1945	551	56.6%	312	312	-	-	-	2.9	33.6	5.8
8/2	Circulatory (West) Right Ahead	U	C1:C		1	16	-	433	1945	551	78.6%	433	433	-	-	-	3.8	31.5	7.9
8/3	Circulatory (West) Right	U	C1:C		1	16	-	381	1945	551	69.1%	381	381	-	-	-	1.9	18.3	4.0
C1 - Northbound Gyratory		Stream: 1 PRC for Signalled Lanes (%)		21.0		Total Delay for Signalled Lanes (pcuHr):		12.46		Cycle Time (s):		60							
C1 - Northbound Gyratory		Stream: 2 PRC for Signalled Lanes (%)		12.7		Total Delay for Signalled Lanes (pcuHr):		16.53		Cycle Time (s):		60							
C2 - Southbound Gyratory		Stream: 1 PRC for Signalled Lanes (%)		15.7		Total Delay for Signalled Lanes (pcuHr):		11.87		Cycle Time (s):		60							
C2 - Southbound Gyratory		Stream: 2 PRC for Signalled Lanes (%)		17.6		Total Delay for Signalled Lanes (pcuHr):		12.50		Cycle Time (s):		60							
		PRC Over All Lanes (%)		12.7		Total Delay Over All Lanes(pcuHr):		53.37											

Scenario 4: '2032 Do Nothing PM' (FG4: '2032 Do Nothing PM', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
<b>Network</b>	-	-	-		-	-	-	-	-	-	87.5%	-	-	0	0	0	62.9	-	-
<b>M1 J37 - Dodworth Roundabout</b>	-	-	-		-	-	-	-	-	-	87.5%	-	-	0	0	0	62.9	-	-
1/1+1/2	A628 Ahead Left	U	C2:D		1	23	-	1445	1846:3830	738+1043	81.1 : 81.1%	1445	1445	-	-	-	8.0	20.0	12.9
2/1	M1 (South) Off-Slip Ahead Left	U	C1:B		1	31	-	875	1875	1000	87.5%	875	875	-	-	-	6.3	25.9	16.0
2/2	M1 (South) Off-Slip Ahead	U	C1:B		1	31	-	658	1853	988	66.6%	658	658	-	-	-	2.8	15.6	8.8
3/2+3/1	Whinby Road Ahead Left	U	C1:D		1	28	-	735	1768:1741	747+462	60.8 : 60.8%	735	735	-	-	-	2.9	14.1	5.9
3/3	Whinby Road Ahead	U	C1:D		1	28	-	666	1781	861	77.4%	666	666	-	-	-	4.0	21.9	10.7
4/1	M1 (North) Off-slip Ahead Left	U	C2:B		1	20	-	493	1859	651	75.8%	493	493	-	-	-	3.9	28.5	8.8
4/2	M1 (North) Off-slip Ahead	U	C2:B		1	20	-	534	1868	654	81.7%	534	534	-	-	-	4.8	32.3	10.2
5/1	Circulatory (North) Ahead	U	C2:A		1	27	-	667	1945	908	73.5%	667	667	-	-	-	2.5	13.5	6.4
5/2	Circulatory (North) Right Ahead	U	C2:A		1	27	-	716	1945	908	78.9%	716	716	-	-	-	4.6	23.1	11.8
5/3	Circulatory (North) Right	U	C2:A		1	27	-	395	1945	908	43.5%	395	395	-	-	-	1.0	8.9	1.6
6/1	Circulatory (South) Ahead	U	C1:A		1	17	-	505	1945	583	86.5%	505	505	-	-	-	4.6	32.7	10.9

6/2	Circulatory (South) Right Ahead	U	C1:A		1	17	-	509	1945	583	87.2%	509	509	-	-	-	5.2	36.6	11.4
6/3	Circulatory (South) Right	U	C1:A		1	17	-	366	1945	583	62.7%	366	366	-	-	-	1.5	15.0	1.9
7/1	Circulatory (East) Ahead	U	C2:C		1	27	-	271	1915	894	30.3%	271	271	-	-	-	1.1	14.4	4.7
7/2	Circulatory (East) Right Ahead	U	C2:C		1	27	-	611	1915	894	68.4%	611	611	-	-	-	2.8	16.5	9.1
7/3	Circulatory (East) Right	U	C2:C		1	27	-	318	1915	894	35.6%	318	318	-	-	-	0.3	3.9	0.4
8/1	Circulatory (West) Ahead	U	C1:C		1	22	-	14	1945	746	1.9%	14	14	-	-	-	0.1	21.5	0.2
8/2	Circulatory (West) Right Ahead	U	C1:C		1	22	-	579	1945	746	77.7%	579	579	-	-	-	5.1	31.9	11.0
8/3	Circulatory (West) Right	U	C1:C		1	22	-	445	1945	746	59.7%	445	445	-	-	-	1.3	10.6	6.5
C1 - Northbound Gyratory		Stream: 1 PRC for Signalled Lanes (%)		2.9		Total Delay for Signalled Lanes (pcuHr):		20.43		Cycle Time (s):		60							
C1 - Northbound Gyratory		Stream: 2 PRC for Signalled Lanes (%)		15.9		Total Delay for Signalled Lanes (pcuHr):		13.46		Cycle Time (s):		60							
C2 - Southbound Gyratory		Stream: 1 PRC for Signalled Lanes (%)		10.9		Total Delay for Signalled Lanes (pcuHr):		12.28		Cycle Time (s):		60							
C2 - Southbound Gyratory		Stream: 2 PRC for Signalled Lanes (%)		10.2		Total Delay for Signalled Lanes (pcuHr):		16.75		Cycle Time (s):		60							
		PRC Over All Lanes (%)		2.9		Total Delay Over All Lanes(pcuHr):		62.93											

Scenario 5: '2032 With Development AM' (FG5: '2032 With Development AM', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
<b>Network</b>	-	-	-		-	-	-	-	-	-	81.1%	-	-	0	0	0	54.2	-	-
<b>M1 J37 - Dodworth Roundabout</b>	-	-	-		-	-	-	-	-	-	81.1%	-	-	0	0	0	54.2	-	-
1/1+1/2	A628 Ahead Left	U	C2:D		1	29	-	1583	1846:3830	923+1046	80.4 : 80.4%	1583	1583	-	-	-	6.9	15.6	12.3
2/1	M1 (South) Off-Slip Ahead Left	U	C1:B		1	27	-	588	1875	875	67.2%	588	588	-	-	-	3.0	18.7	8.5
2/2	M1 (South) Off-Slip Ahead	U	C1:B		1	27	-	643	1853	865	74.4%	643	643	-	-	-	3.8	21.1	10.2
3/2+3/1	Whinby Road Ahead Left	U	C1:D		1	34	-	1049	1768:1741	534+832	76.8 : 76.8%	1049	1049	-	-	-	3.9	13.3	8.6
3/3	Whinby Road Ahead	U	C1:D		1	34	-	843	1781	1039	81.1%	843	843	-	-	-	4.4	18.9	13.1
4/1	M1 (North) Off-slip Ahead Left	U	C2:B		1	16	-	380	1859	527	72.1%	380	380	-	-	-	3.3	31.4	7.0
4/2	M1 (North) Off-slip Ahead	U	C2:B		1	16	-	272	1868	529	51.4%	272	272	-	-	-	1.9	25.0	4.3
5/1	Circulatory (North) Ahead	U	C2:A		1	31	-	673	1945	1037	64.9%	673	673	-	-	-	2.4	13.1	10.4
5/2	Circulatory (North) Right Ahead	U	C2:A		1	31	-	786	1945	1037	75.8%	786	786	-	-	-	3.8	17.6	12.0
5/3	Circulatory (North) Right	U	C2:A		1	31	-	437	1945	1037	42.1%	437	437	-	-	-	0.8	6.9	1.5
6/1	Circulatory (South) Ahead	U	C1:A		1	21	-	431	1945	713	60.4%	431	431	-	-	-	2.3	19.3	6.7

6/2	Circulatory (South) Right Ahead	U	C1:A		1	21	-	515	1945	713	72.2%	515	515	-	-	-	2.7	19.0	6.6
6/3	Circulatory (South) Right	U	C1:A		1	21	-	167	1945	713	23.4%	167	167	-	-	-	0.7	16.2	2.6
7/1	Circulatory (East) Ahead	U	C2:C		1	21	-	406	1915	702	57.8%	406	406	-	-	-	0.9	8.3	1.9
7/2	Circulatory (East) Right Ahead	U	C2:C		1	21	-	510	1915	702	72.6%	510	510	-	-	-	2.5	17.6	7.7
7/3	Circulatory (East) Right	U	C2:C		1	21	-	199	1915	702	28.3%	199	199	-	-	-	1.9	35.3	3.5
8/1	Circulatory (West) Ahead	U	C1:C		1	16	-	316	1945	551	57.3%	316	316	-	-	-	3.2	35.9	5.9
8/2	Circulatory (West) Right Ahead	U	C1:C		1	16	-	430	1945	551	78.0%	430	430	-	-	-	3.7	31.4	8.2
8/3	Circulatory (West) Right	U	C1:C		1	16	-	380	1945	551	69.0%	380	380	-	-	-	1.8	17.2	4.9
C1 - Northbound Gyratory		Stream: 1 PRC for Signalled Lanes (%)		21.0		Total Delay for Signalled Lanes (pcuHr):		12.60		Cycle Time (s):		60							
C1 - Northbound Gyratory		Stream: 2 PRC for Signalled Lanes (%)		10.9		Total Delay for Signalled Lanes (pcuHr):		17.01		Cycle Time (s):		60							
C2 - Southbound Gyratory		Stream: 1 PRC for Signalled Lanes (%)		12.0		Total Delay for Signalled Lanes (pcuHr):		12.24		Cycle Time (s):		60							
C2 - Southbound Gyratory		Stream: 2 PRC for Signalled Lanes (%)		18.8		Total Delay for Signalled Lanes (pcuHr):		12.33		Cycle Time (s):		60							
		PRC Over All Lanes (%)		10.9		Total Delay Over All Lanes(pcuHr):		54.18											

Scenario 6: '2032 With Development PM' (FG6: '2032 With Development PM', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
<b>Network</b>	-	-	-		-	-	-	-	-	-	88.8%	-	-	0	0	0	64.6	-	-
<b>M1 J37 - Dodworth Roundabout</b>	-	-	-		-	-	-	-	-	-	88.8%	-	-	0	0	0	64.6	-	-
1/1+1/2	A628 Ahead Left	U	C2:D		1	23	-	1445	1846:3830	738+1043	81.1 : 81.1%	1445	1445	-	-	-	8.0	20.0	12.9
2/1	M1 (South) Off-Slip Ahead Left	U	C1:B		1	31	-	888	1875	1000	88.8%	888	888	-	-	-	6.8	27.5	16.8
2/2	M1 (South) Off-Slip Ahead	U	C1:B		1	31	-	658	1853	988	66.6%	658	658	-	-	-	2.8	15.6	8.8
3/2+3/1	Whinby Road Ahead Left	U	C1:D		1	28	-	740	1768:1741	745+469	60.9 : 60.9%	740	740	-	-	-	2.9	14.1	5.9
3/3	Whinby Road Ahead	U	C1:D		1	28	-	671	1781	861	77.9%	671	671	-	-	-	4.1	22.2	10.9
4/1	M1 (North) Off-slip Ahead Left	U	C2:B		1	20	-	493	1859	651	75.8%	493	493	-	-	-	3.9	28.5	8.8
4/2	M1 (North) Off-slip Ahead	U	C2:B		1	20	-	548	1868	654	83.8%	548	548	-	-	-	5.2	34.2	10.8
5/1	Circulatory (North) Ahead	U	C2:A		1	27	-	665	1945	908	73.3%	665	665	-	-	-	2.5	13.4	6.4
5/2	Circulatory (North) Right Ahead	U	C2:A		1	27	-	719	1945	908	79.2%	719	719	-	-	-	4.6	23.3	11.9
5/3	Circulatory (North) Right	U	C2:A		1	27	-	399	1945	908	44.0%	399	399	-	-	-	1.0	9.0	1.7
6/1	Circulatory (South) Ahead	U	C1:A		1	17	-	509	1945	583	87.2%	509	509	-	-	-	4.7	33.5	11.3

6/2	Circulatory (South) Right Ahead	U	C1:A		1	17	-	514	1945	583	88.1%	514	514	-	-	-	5.5	38.3	11.7
6/3	Circulatory (South) Right	U	C1:A		1	17	-	371	1945	583	63.6%	371	371	-	-	-	1.6	15.2	2.0
7/1	Circulatory (East) Ahead	U	C2:C		1	27	-	272	1915	894	30.4%	272	272	-	-	-	1.1	14.4	4.7
7/2	Circulatory (East) Right Ahead	U	C2:C		1	27	-	609	1915	894	68.1%	609	609	-	-	-	2.8	16.7	9.1
7/3	Circulatory (East) Right	U	C2:C		1	27	-	338	1915	894	37.8%	338	338	-	-	-	0.4	4.1	0.5
8/1	Circulatory (West) Ahead	U	C1:C		1	22	-	9	1945	746	1.2%	9	9	-	-	-	0.1	21.2	0.2
8/2	Circulatory (West) Right Ahead	U	C1:C		1	22	-	582	1945	746	78.1%	582	582	-	-	-	5.2	32.3	11.1
8/3	Circulatory (West) Right	U	C1:C		1	22	-	447	1945	746	60.0%	447	447	-	-	-	1.3	10.7	6.5
C1 - Northbound Gyratory		Stream: 1 PRC for Signalled Lanes (%)		1.4		Total Delay for Signalled Lanes (pcuHr):		21.40		Cycle Time (s):		60							
C1 - Northbound Gyratory		Stream: 2 PRC for Signalled Lanes (%)		15.3		Total Delay for Signalled Lanes (pcuHr):		13.63		Cycle Time (s):		60							
C2 - Southbound Gyratory		Stream: 1 PRC for Signalled Lanes (%)		10.9		Total Delay for Signalled Lanes (pcuHr):		12.33		Cycle Time (s):		60							
C2 - Southbound Gyratory		Stream: 2 PRC for Signalled Lanes (%)		7.4		Total Delay for Signalled Lanes (pcuHr):		17.22		Cycle Time (s):		60							
		PRC Over All Lanes (%)		1.4		Total Delay Over All Lanes(pcuHr):		64.58											