local transport projects

traffic engineering and transport planning

North Lincolnshire Council

Barton upon Humber
Highways Masterplan
A1077 Corridor & Potential Relief Road

April 2018

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Client Commission			
Client:	North Lincolnshire Council	Date Commissioned:	February 2018

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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.

Team Member	LTP Designation	Qualifications
Tony Kirby	*Director (Project Manager)*	*IEng MSc MCIHT FIHE*
Nigel Wilson	*Technical Director*	*CEng FICE FIHE CMIHT*
Mike Raynor	*Senior Transport Planner*	*BA(Hons) MIHE*
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BARTON UPON HUMBER
HIGHWAYS MASTERPLAN
A1077 CORRIDOR & POTENTIAL RELIEF ROAD

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1. INTRODUCTION

1.1 Background

1.1.1 Local Transport Projects Ltd (LTP) has been commissioned by North Lincolnshire Council (NLC) to develop a highways masterplan for Barton upon Humber to identify and assess options for improvements on both the A1077 corridor and potential Barton Relief Road alignments in order to facilitate planned future development growth within Barton.

1.2 Scope of Study

1.2.1 The scope of the study has been provided by NLC and is replicated below:

"A highways masterplan is needed to identify the existing constraints in the highway network and where improvements are required to facilitate further development in Barton. The highway network for the study area is primarily the A1077 between the A15 in west and the A1077/Falkland Way junction in the east."

1.3 Report Structure

1.3.1 Following this introduction, the report is divided into five further sections that provide the following:

- **Section 2:** outlines the data and information used as the basis for the concept design proposals, including details of committed developments, future traffic growthing and junction capacity modelling of the A1077/Holydyke/Hungate mini-roundabout.
- **Section 3:** reviews the most recently available collision data in order to identify any road safety issues and risks that need to be considered as part of option development for the proposed corridor improvements.
- **Section 4:** outlines the potential traffic and highway improvements along the A1077 corridor which support reduction in delays and improvement in capacity, facilities for cycling, walking, mobility impaired, and road safety. This section provides an indication of scheme costings, assessment of the likely benefits by mode/user group, ease of implementation and an indicative phasing plan.
- **Section 5:** considers the options for a potential Barton Relief Road identifying proposed outline alignments, lane widths including cycle/footways etc. This section also provides an estimate of scheme costs for each option, with consideration of the estimated trip transfer and wider network measures to encourage link road usage. A high-level outline economic evaluation and WebTAG based appraisal is also included.
- **Section 6:** provides an overall summary of the potential A1077 corridor improvements and Barton Relief Road options that have been produced as part of this study.

2. BASELINE DATA/INFORMATION

2.1 Data Sources

2.1.1 The following data was provided by NLC to inform the highways masterplan:

- KeyACCIDENT road safety collision and casualty analysis for the period 13/02/2013 to the 12/02/2018 (i.e. 60 months); and
- Ordnance Survey digital mapping.

2.2 Site Reconnaissance & Observations

2.2.1 Site surveys and investigations were undertaken on Wednesday 21st February 2018 during which time digital photographs along the A1077 corridor were obtained together with video footage in both eastbound and westbound directions along the route between the A15/A1077 roundabout and the A1077/Falkland Way priority T-junction.

2.3 Baseline Network Traffic Flows

2.3.1 The Transport Assessment (TA) (SA, 2014a) that was produced for the refused Wren Kitchens mixed-use development application (ref: PA/2014/1360) contains a number of traffic count surveys along the A1077 corridor which will form the baseline network traffic flows for this study, as requested by NLC. The traffic counts were undertaken in July 2014 and include the following junctions:

- A1077/A15 roundabout;
- A1077/Feyzin Drive/Forkedale roundabout; and
- A1077/Holydyke/Hungate mini-roundabout.

2.3.2 Traffic counts undertaken in September 2013 were also captured at the A1077/Falkland Way priority T-junction and included as part of the TA (SA, 2014a). The cumulative network peak hour periods were found to be between 07:30 and 08:30 in the AM peak and 16:45 and 17:45 in the PM peak. Further details of traffic flows at the local junctions can be found in the network diagrams attached as Appendix 1.

2.4 Committed Development

2.4.1 The following committed developments in Barton have been considered within the traffic impact assessments, as requested by NLC. The location of the committed developments are shown in Figure 1.

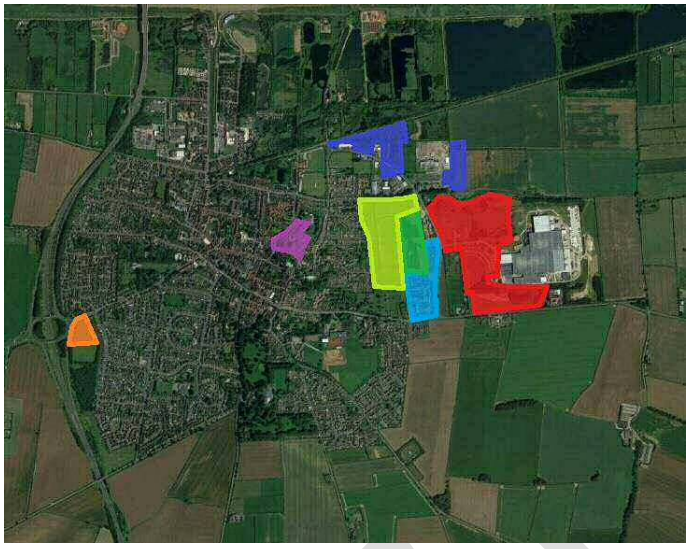
- **Mixed-Use Development, Wren Kitchens -** A TA (SA, 2014a) and Travel Plan (TP) (SA, 2014b) were submitted in December 2014 as part of an outline planning application (ref: PA/2014/1360) to *'Erect 300 dwellings, a small commercial development incorporating a 50 bed hotel, 50 place day nursery and small supermarket, a total of 16 fishing lodges set within 11.42ha of public open space'* however the application was subsequently refused in April 2016. The site extents are highlighted in red in Figure 1.

- **Residential Development, West of Falkland Way (2009) -** A reserved matters application (ref: PA/2009/0257) pursuant to the outline planning application (ref: PA/2003/1121) was submitted in March 2009 for the *'Erection of 135 dwellings, including formation of access, layout of internal access roads and provision of local play area'* and subsequently approved in September 2009. A full planning application (ref: PA/2009/0828) was submitted in July 2009 to *'Erect 38 dwellings, including the provision of access roads and public open space'* and subsequently approved in October 2010 on land immediately to the north of the reserved matters application site. At the time when the 2014 counts were captured as part of the TA (SA, 2014a), 132 dwellings across both sites were still to be constructed and therefore the remaining dwellings have been considered as part of this study. The site extents are highlighted in light blue in Figure 1.
- **Residential Development, West of Falkland Way (2016)** - A TA (BSP, 2016) and TP (BSP, 2016b) were submitted in November 2016 as part of a full planning application (ref: PA/2016/1793) to *'Erect 115 dwellings, construct associated garages, access roads, playground, public open space and pond'* which was subsequently approved in June 2017. The site extents are highlighted in green in Figure 1.Within the TA, an assessment of 345 dwellings associated with the wider site which forms part of the BARH-1 and BARH-2 housing sites discussed further in Section 2.4.2. The extents of the wider site are highlighted in light green in Figure 1.
- **Proposed Mixed-Use Development, Ferriby Road** - A TA (EJSA, 2017a) and TP (EJSA, 2017b) were submitted in September 2017 as part of a full planning application (ref: PA/2017/1449) to '*Erect a foodstore (Use Class A1) and pub/restaurant (Use Class A3/A4), along with associated accesses, car parking, servicing and landscaping'* which was subsequently approved in January 2018. The extents of the site are highlighted in orange in Figure 1.

2.4.2 NLC has also requested that the allocations outlined within the *'Housing and Employment Land Allocations Development Plan Document'* (NLC, 2016) are considered as part of this study. Within the document, there are three housing sites to consider and a single employment site, with further details regarding each site outlined below:

- **BARH-1 & BARH-2 - Land at Pasture Road** - Both sites have already been considered as part of the planning application (ref: PA/2016/1793) and therefore these sites have not been assessed further as part of this study.
- **BARH-3 - St Mary's Cycle Works, Marsh Lane** - The site consists of approximately 1.95ha and is located to the east of Marsh Lane on the former St Mary's Cycle Works. The document indicates that a total of 73 dwellings are expected to be provided on the site. The extents of the site are highlighted in purple in Figure 1.
- **BARE-1 - Humber Bridge Industrial Estate** - This employment allocation forms a number of sites within the Humber Bridge Industrial Estate off Falkland Way with a total area of approximately 7.15ha. The sites would form a mix of B1, B2 and B8 uses. The extents of the site are highlighted in blue in Figure 1.

Figure 1: Committed and Land Allocation Sites Plan



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2.4.3 As highlighted by NLC, there is also expected to be further residential development coming forward over the next 10 to 15 years outside of the committed developments and housing allocations considered above. Therefore, assumptions have been made in regards to the likely location of these sites and the level of dwellings expected to come forward as shown in Figure 2. A total of 2,440 dwellings have been included as part of these assessments, with further details regarding location outlined below:

- **Potential Development Sites - North-East of Barton Town Centre (75%)** - Up to 75% of additional residential development is expected to be located to the north-east of Barton town centre this equates to approximately 1,830 dwellings.
- **Potential Development Sites - South-East of Barton Town Centre (25%)** - Up to 25% of additional residential development is expected to be located to the south-east of Barton town centre this equates to approximately 610 dwellings.

Figure 2: Potential Development Sites Plan

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2.5 Assessment Scenarios

2.5.1 The local junctions along the A1077 corridor have been assessed against the following weekday AM and PM peak hour traffic flow scenarios:

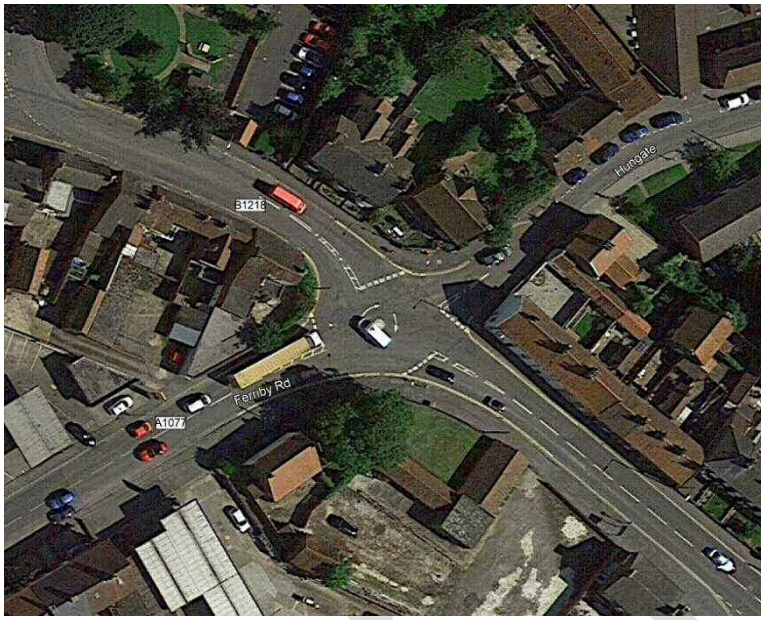
- ***2018 Base:*** 2013 and 2014 traffic flows captured as part of the Wren Kitchens TA (SA, 2014a), growthed to 2018;
- ***2020 Opening Year:*** *'2018 Base'* network traffic flows, growthed to 2020;
- ***2020 Opening Year + Development (Scenario 1):*** *'2020 Opening Year'* network traffic flows, with the addition of traffic associated with committed developments and the housing/employment land allocations;
- ***2020 Opening Year + Development (Scenario 2):*** *'2020 Opening Year'* network traffic flows, with the addition of traffic associated with committed developments, housing/employment land allocations and potential development sites;
- ***2028 Appraisal Year:*** *'2018 Base'* network traffic flows, growthed to 2028;
- ***2028 Appraisal Year + Development (Scenario 1):*** *'2028 Appraisal Year'* flows, with the addition of traffic associated with committed developments and housing/employment land allocations; and
- ***2028 Appraisal Year + Development (Scenario 2):*** *'2028 Appraisal Year'* flows, with the addition of traffic associated with committed developments, housing/employment land allocations and potential development sites.

2.5.2 The network traffic flows at 2018, 2020 and 2028 have been predicted using the DfT's *'National Traffic Model'* (NTM) and *'National Trip End Model'* (NTEM). The growth factors obtained from the NTM has been adjusted to reflect local circumstances from the NTEM, using TEMPro software (Trip End Model Presentation Programme), see Appendix 2. In accordance with the DfT's *'Transport Analysis Guidance'* (TAG) (DfT, 2017b), the underlying NTEM growth includes for households and jobs have also been adjusted to reflect the local development traffic that has been explicitly incorporated into the traffic projections of this report, in order to avoid double-counting the associated traffic flows.

2.6 Existing Junction Modelling

2.6.1 A junction model has been developed for the A1077/Holydyke/Hungate mini-roundabout using Junctions 9 modelling software, which is a software packaged 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 A1077/Holydyke/Hungate mini-roundabout can be seen in Figure 3.

Figure 3: A1077/Holydyke/Hungate Mini-Roundabout



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2.6.2 The input parameters used to create the Junctions 9 model have been measured from relevant scaled Ordnance Survey plans and scaled aerial imagery, verified on-site. The baseline and future peak hour traffic flows have been assessed against the existing junction layout, the results of which are summarised in Table 1 and the complete modelling output in Appendix 3.

Table 1: A1077/Holydyke/Hungate Mini-Roundabout Capacity Assessment

Peak	Arm	2018 Base		2020 Opening Year		2020 Opening Year + Development (Scenario 1)		2020 Opening Year + Development (Scenario 2)		2028 Appraisal Year		2028 Appraisal Year + Development (Scenario 1)		2028 Appraisal Year + Development (Scenario 2)	
		Max. RFC	Max. End Q	Max. RFC	Max. End Q	Max. RFC	Max. End Q	Max. RFC	Max. End Q	Max. RFC	Max. End Q	Max. RFC	Max. End Q	Max. RFC	Max. End Q
AM	B1218 (Holydyke)	30.0%	0.5	30.6%	0.5	38.8%	0.7	64.6%	2.0	33.5%	0.6	42.1%	0.8	68.8%	2.4
	Hungate	29.2%	0.4	30.3%	0.5	53.9%	1.2	139.3%	24.8	35.2%	0.6	63.0%	1.8	191.6%	41.7
	A1077 (Holydyke)	72.8%	2.9	74.6%	3.1	97.4%	16.4	163.0%	408.9	81.3%	4.5	104.8%	34.4	168.4%	486.0
	A1077 (Ferriby Road)	45.5%	0.9	46.4%	0.9	62.3%	1.8	80.3%	4.3	49.9%	1.1	65.7%	2.1	83.8%	5.3
	OVERALL	**72.8%**	**2.9**	**74.6%**	**3.1**	**97.4%**	**16.4**	**163.0%**	**408.9**	**81.3%**	**4.5**	**104.8%**	**34.4**	**191.6%**	**486.0**
PM	B1218 (Holydyke)	47.4%	1.0	48.6%	1.0	61.8%	1.7	73.2%	2.9	53.7%	1.3	65.5%	2.0	76.6%	3.4
	Hungate	42.6%	0.8	45.1%	0.9	93.9%	6.2	187.2%	44.3	55.6%	1.3	110.1%	12.5	230.8%	60.4
	A1077 (Holydyke)	54.1%	1.3	55.3%	1.3	73.9%	3.0	92.3%	10.0	60.0%	1.6	78.6%	3.8	96.7%	15.5
	A1077 (Ferriby Road)	85.3%	5.9	87.0%	6.6	107.4%	49.0	153.6%	376.9	93.7%	11.7	114.4%	81.0	161.0%	455.7
	OVERALL	**85.3%**	**5.9**	**87.0%**	**6.6**	**107.4%**	**49.0**	**153.6%**	**376.9**	**93.7%**	**11.7**	**114.4%**	**81.0**	**230.8%**	**455.7**

2.6.3 The capacity assessment results shown in Table 1 indicate that the A1077/Holydyke/Hungate mini-roundabout would be expected to operate significantly above capacity in the opening and appraisal years with the addition of committed development trips and potential future development sites coming forward. Therefore alternative junction arrangements to improve capacity will be considered as part of this study.

3. ROAD CASUALTY APPRAISAL

3.1 Collision Record

3.1.1 Personal Injury Collision (PIC) data for the highway network local to the site for the most recent available five-year study period (13/02/2013 to 12/02/2018) was obtained from NLC for analysis.

3.1.2 A total of 39 collisions occurred within the study area, which includes the A1077 corridor and a number of local junctions, including the A15/A1077 roundabout. The study area and the location of the collisions are shown on the plan attached as Appendix 4. Table 2 below outlines the collision history of the study area:

Table 2: Collision History

Year	1 (Partial)	2	3	4	5	6 (Partial)	Total
From	13/02/2013	01/01/2014	01/01/2015	01/01/2016	01/01/2017	01/01/2018	
To	31/12/2013	31/12/2014	31/12/2015	31/12/2016	31/12/2017	12/02/2018	
Fatal	0	0	0	0	0	0	**0**
Serious	0	0	2	0	0	1	**3**
Slight	7	8	10	5	5	1	**36**
Total	**7**	**8**	**12**	**5**	**5**	**2**	**39**

3.1.3 The collision records show that the number of PICs per year has remained relatively consistent throughout the study period, apart from a peak of 12 collisions occurring during the third study year. There were 3 Killed or Seriously Injured (KSI) collisions recorded during the study period, resulting in a severity ratio of 7.7%.

3.2 Collision Conditions

3.2.1 Table 3 below summarises the collisions by road surface, weather and lighting conditions:

Table 3: Collision Conditions

Road Surface	Collisions	%
Dry	28	**71.8%**
Wet	11	**28.2%**
Weather	**Collisions**	**%**
Fine	31	**79.5%**
Rain	4	**10.3%**
Snow	2	**5.1%**
High Winds	2	**5.1%**
Lighting	**Collisions**	**%**
Daylight	34	**87.2%**
Dark	5	**12.8%**

3.2.2 As illustrated in Table 3, the majority of collisions did not occur with an adverse road surface, weather or lighting conditions.

3.3 Collision Times

3.3.1 Table 4 summarises the collisions by time of year:

Table 4: Collisions by Time of Year

Time of Year	Collisions	%
Winter (Dec-Feb)	11	**28.2%**
Spring (Mar-May)	11	**28.2%**
Summer (Jun-Aug)	9	**23.1%**
Autumn (Sep-Nov)	8	**20.5%**

3.3.2 Table 4 shows that the highest proportion of collisions occurred during the winter and spring months (28.2% each respectively).

3.3.3 Table 5 below summarises the collisions by day of week and also the time of day:

Table 5: Collisions by Day & Time

	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	4	1	3	1	0	**9**	**23.1%**
Tuesday	0	0	2	0	0	**2**	**5.1%**
Wednesday	3	2	3	0	0	**8**	**20.5%**
Thursday	2	2	2	0	0	**6**	**15.4%**
Friday	6	0	1	1	0	**8**	**20.5%**
Saturday	3	2	0	0	1	**6**	**15.4%**
Sunday	0	0	0	0	0	**0**	-
Total	**18**	**7**	**11**	**2**	**1**	**39**	
%	**46.2%**	**17.9%**	**28.2%**	**5.1%**	**2.6%**		

3.3.4 Table 5 highlights that almost a quarter of collisions occurred on a Monday (23.1%), with no collisions occurring on a Sunday. Just under half of collisions occurred during the morning period (46.2%), with a single collision occurring during the night time period.

3.4 Collision Locations

3.4.1 The locations of the 39 study collisions (shown on the plot attached as Appendix 2) can be summarised as follows:

- 4 PICs occurred on Barrow Road (not at a junction), however 3 PICs were in the vicinity of the pedestrian refuge island to the west of Baysgarth School;
- 4 PICs occurred on the A15 southbound off-slip at the junction with Ferriby Road;
- 3 PICs occurred on the A15 northbound off-slip at the junction with Ferriby Road;
- 3 PICs occurred on Holydyke (not at a junction);
- 3 PICs occurred on Ferriby Road (western arm) eastbound approach to the junction with the A15;
- 2 PICs occurred at the Barrow Road/Falkland Way priority junction;
- 2 PICs occurred at the Market Place/Market Place car park egress junction;

- 2 PICs occurred at the Holydyke/Market Place/Brigg Road ghost island junction;
- 2 PICs occurred at the Ferriby Road/Holydyke/Hungate mini-roundabout;
- 2 PICs occurred at the Holydyke/Bowmandale priority junction;
- 2 PICs occurred at the Ferriby Road/Tofts Road priority junction;
- 2 PICs occurred on the A15 (not at a junction);
- 2 PICs occurred on Market Place within the existing car park area;
- 1 PIC occurred on the Whitecross Street arm of the junction with Barrow Road and Market Lane;
- 1 PIC occurred on Ferriby Road (eastern arm) westbound approach to the junction with the A15;
- 1 PIC occurred at the A15/Ferriby Road roundabout on the circulatory carriageway;
- 1 PIC occurred on Market Lane (not at a junction);
- 1 PIC occurred on George Street in the vicinity of the junction with Market Place; and
- 1 PIC occurred on Ferriby Road (not at a junction).

3.5 Casualties

3.5.1 A total of 60 casualties resulted from the 39 recorded injury collisions during the study period. Table 6 below provides a breakdown of the casualties according to the mode of travel and age group:

Table 6: Casualty Road User Groups

	Age (years)							
Road User Group	**0 to 15**	**16 to 20**	**21 to 25**	**26 to 45**	**46 to 65**	**66+**	**Total**	**%**
Pedestrian	3	0	0	1	3	1	**8**	**13.3%**
Cyclist	0	0	0	0	0	1	**1**	**1.7%**
Powered Two-Wheeler (PTW)	0	3	1	0	0	0	**4**	**6.6%**
Car Driver	0	3	5	18	8	2	**36**	**60.0%**
Car Passenger	0	1	1	4	3	0	**9**	**15.0%**
Goods Vehicle Occupant	0	0	0	1	0	0	**1**	**1.7%**
Taxi Occupant	0	0	0	0	1	0	**1**	**1.7%**
Total	**3**	**7**	**7**	**24**	**15**	**4**	**60**	
%	**5.0%**	**11.7%**	**11.7%**	**40.0%**	**25.0%**	**6.6%**		

3.5.2 Table 6 shows that just under two-thirds of casualties (60.0%) were car drivers, with over a fifth of casualties' (21.6%) vulnerable road users (pedestrian/cyclist/PTW rider). Over a third of casualties (40.0%) were aged between 26 and 45 years old, with a quarter aged between 46 and 65 years old. It is noted that there were 3 child casualties all of whom were pedestrians.

3.6 Contributory Factors

3.6.1 The PIC data provides information on contributory factors and a clear language description of the relevant circumstances. This information was analysed to identify a number of common factors as follows:

- 5/39 collisions involved the contributory factor 108 *'road layout';*
- 23/39 collisions involved the contributory factor 405 *'failed to look properly'*;
- 16/39 collisions involved the contributory factor 406 *'failed to judge other persons path or speed'*.

3.6.2 The results of this road casualty appraisal will inform the development of the A1077 corridor improvement schemes.

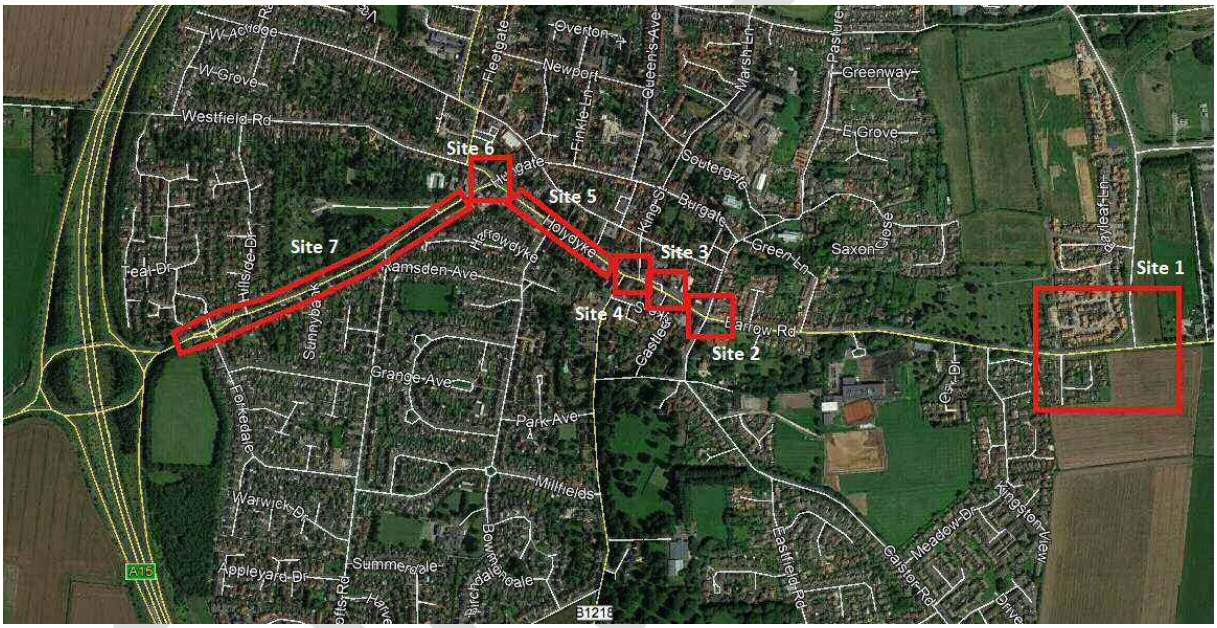
4. A1077 CORRIDOR IMPROVEMENT OPTIONS

4.1 Introduction

4.1.1 This section of the study identifies a number of potential improvement options for the A1077 corridor which intend to support reduction in delays and enhancements in capacity, cycle and pedestrian facilities, and road safety. This section of the report also provides an indication of scheme costings, ease of implementation and a proposed phasing plan.

4.1.2 A plan showing the A1077 corridor and the improvement options broken down into a site by site basis is provided in Figure 4 below.

Figure 4: A1077 Corridor Sites Plan



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4.2 Site 1 - A1077/Falkland Way Priority Junction

4.2.1 An appraisal of the proposed improvement scheme is provided in Table 7, see drawing (ref: LTP/3103/S1/01.01) attached as Appendix 5.

Table 7: Site 1 - A1077/Falkland Way Priority Junction

Issues and Opportunities:	
• Flow of A1077 westbound movements impeded by vehicles waiting to turn right onto Falkland Way. • Lack of connectivity between the residential and employment uses served by Falkland Way and the existing pedestrian/cycle links provided on the southern side of the A1077. • Opportunity to utilise existing public highway extents to improve pedestrian/cyclist facilities at the junction and on the A1077. • Opportunity to improve the flow of westbound movements on the A1077.	
Scheme Description:	
• Provision of a dedicated right turn lane on the A1077 to Falkland Way which includes localised widening. • Widen existing footway from 1.0m to 3.0m west of Falkland Way in order to create a shared-use facility. • Provision of a central refuge island featuring dropped kerbs and tactile paving to connect the shared-use facility present on the A1077 and Falkland Way.	
Key Benefits/Dis-benefits	
Benefits:	**Dis-benefits:**
• Provides stacking space for right turning vehicles to allow the free-flow of westbound vehicles. • No land ownership issues – improvements achieved by widening into the public highway to the south. • Improved facilities for pedestrians/cyclists.	• None
Collision Assessment Summary:	
• There are no identified road safety issues at the existing junction, however the proposals will improve facilities for vulnerable road users at the junction. • Analysis of collision data for the junction for the latest five-year study period does not indicate any significant road safety issues at the junction. Two collisions (1 slight injury and 1 serious injury) were recorded at the junction.	
Ease of Implementation:	
Land requirements: No private land affected, all achievable within extents of the public highway. ***Disruption during construction/Temporary Traffic Management:*** *Proposed changes would have traffic management implications. Works anticipated to take place over a construction period in the region of 6-8 weeks.* ***Legal issues/Traffic Regulation Orders (TRO):*** *N/A*	
Estimated Scheme Implementation Costs:	
£89,280 (including Optimism Bias of 44%)	

4.3 Site 2 - A1077/Whitecross Street Crossroads

4.3.1 An appraisal of the proposed improvement scheme is provided in Table 8, see drawing (ref: LTP/3103/S2/01.01) attached as Appendix 5.

Table 8: Site 2 - A1077/Whitecross Street Crossroads

Issues and Opportunities:	
• Flow of vehicles along the A1077 corridor impeded by vehicles waiting to turn right onto Whitecross Street (North) and Whitecross Street (South) respectively. • Opportunity to improve the free-flow of vehicles and reduce delay on the A1077.	
Scheme Description:	
• Provision of dedicated right turn lanes on the A1077 to Whitecross Street.	
Key Benefits/Dis-benefits	
Benefits:	**Dis-benefits:**
• Provides stacking space for right turning vehicles to allow the free-flow of vehicles on the A1077 in both directions. • No land ownership issues – improvements achieved within the public highway.	• None
Collision Assessment Summary:	
• There are no identified road safety issues at the existing junction. • Analysis of collision data for the junction for the latest five-year study period does not indicate any significant road safety issues at the junction. One slight collision was recorded at the junction.	
Ease of Implementation:	
Land requirements: No private land affected, all achievable within extents of the public highway. ***Disruption during construction/Temporary Traffic Management:*** *Proposed changes would have traffic management implications. Works anticipated to take place over a construction period in the region of 4-8 weeks.* ***Legal issues/Traffic Regulation Orders (TRO):*** *N/A*	
Estimated Scheme Implementation Costs:	
£10,080 (including Optimism Bias of 44%)	

4.4 Site 3 - Market Place

4.4.1 An appraisal of the proposed improvement scheme is provided in Table 9, see drawing (ref: LTP/3103/S3/01.01) attached as Appendix 5.

Table 9: Site 3 - Market Place

<table>
<tr><th colspan="2">Issues and Opportunities:</th></tr>
<tr><td colspan="2">• Zebra crossing results in vehicles stopping on the A1077 to give-way to pedestrians. This is expected to have an impact on the general flow of traffic along the A1077, particularly during peak shopping times.
• Observations indicate the zebra crossing is well utilised due to its location within the centre of Barton and is the only formal crossing on the A1077 within the immediate vicinity of Barton town centre.
• Opportunity to utilise existing public highway extents to enhance pedestrian/cyclist facilities.
• Opportunity to improve the free-flow of vehicles and reduce delay on the A1077.</td></tr>
<tr><th colspan="2">Scheme Description:</th></tr>
<tr><td colspan="2">• Provision of a puffin crossing facility in the location of the existing zebra crossing in order to improve traffic flow along the A1077 corridor.
• Provision of build-out to the west of the crossing to improve turning manoeuvres from the A1077 to Market Place.</td></tr>
<tr><th colspan="2">Key Benefits/Dis-benefits</th></tr>
<tr><th>Benefits:</th><th>Dis-benefits:</th></tr>
<tr><td>• Enhances traffic flow on the A1077 due to the reduction in delay for vehicles giving way to pedestrians at the zebra crossing.
• No land ownership issues – improvements achieved within the public highway.
• Dedicated signalised crossing facility for pedestrians.</td><td>• Increased pedestrian delay waiting to cross the A1077 due to the conversion of the zebra to a puffin crossing.</td></tr>
<tr><th colspan="2">Collision Assessment Summary:</th></tr>
<tr><td colspan="2">• There are no identified road safety issues in the vicinity of the existing zebra crossing.
• Analysis of collision data for the latest five-year study period does not indicate any significant road safety issues in the local area.</td></tr>
<tr><th colspan="2">Ease of Implementation:</th></tr>
<tr><td colspan="2">***Land requirements:*** No private land affected, all achievable within extents of the public highway.
Disruption during construction/Temporary Traffic Management: *Proposed changes would have traffic management implications. Works anticipated to take place over a construction period in the region of 6-8 weeks.*
Legal issues/Traffic Regulation Orders (TRO): *N/A*</td></tr>
<tr><th colspan="2">Estimated Scheme Implementation Costs:</th></tr>
<tr><td colspan="2">**£89,280 (including Optimism Bias of 44%)**</td></tr>
</table>

4.5 Site 4 - George Street/Market Place - Option 1

4.5.1 An appraisal of the proposed improvement scheme is provided in Table 10, see drawing (ref: LTP/3103/S4/01.01) attached as Appendix 5.

Table 10: Site 4 - George Street/Market Place - Option 1

<table>
<tr><th colspan="2">Issues and Opportunities:</th></tr>
<tr><td colspan="2">• Vehicles turning right from the A1077 to George Street impeding vehicles travelling westbound.
• Observations indicate the zebra crossing is well utilised due to its location within the centre of Barton and is the only formal crossing on the A1077 within the immediate vicinity of Barton town centre.
• Providing dedicated signalised facilities would result in improved traffic flows on the A1077.
• Opportunity to utilise existing public highway extents to enhance pedestrian/cyclist facilities.
• Opportunity to improve the flow of vehicles on the A1077.</td></tr>
<tr><th colspan="2">Scheme Description:</th></tr>
<tr><td colspan="2">• Creation of a right turn bay following realignments to the carriageway on the A1077.
• The proposed puffin crossing outlined in Table 9 may require relocation further east in order to accommodate the revised highway alignment.</td></tr>
<tr><th colspan="2">Key Benefits/Dis-benefits</th></tr>
<tr><th>Benefits:</th><th>Dis-benefits:</th></tr>
<tr><td>• Provides stacking space for right turning vehicles to allow the free-flow of vehicles on the A1077 in both directions.
• No land ownership issues – improvements achieved within the public highway.</td><td>• The key pinch point on the A1077 corridor is located immediately west of George Street where the carriageway width reduces to approximately 5.9m due to the existing buildings on both sides of the carriageway. This is expected to limit the effectiveness of any proposed improvement scheme associated with the A1077/George Street junction.</td></tr>
<tr><th colspan="2">Collision Assessment Summary</th></tr>
<tr><td colspan="2">• There are no identified road safety issues in the vicinity of the A1077/George Street junction.
• Analysis of collision data for the junction for the latest five-year study period does not indicate any significant road safety issues at the junction. One slight collision was recorded at the junction.</td></tr>
<tr><th colspan="2">Ease of Implementation:</th></tr>
<tr><td colspan="2">Land requirements: No private land affected, all achievable within extents of the public highway.
Disruption during construction/Temporary Traffic Management: Proposed changes would have traffic management implications. Works anticipated to take place over a construction period in the region of 6-8 weeks.
Legal issues/Traffic Regulation Orders (TRO): N/A</td></tr>
<tr><th colspan="2">Estimated Scheme Implementation Costs:</th></tr>
<tr><td colspan="2">£96,480 (including Optimism Bias of 44%)</td></tr>
</table>

4.6 Site 4 - George Street/Market Place - Option 2

4.6.1 An appraisal of the proposed improvement scheme is provided in Table 11, see drawing (ref: LTP/3103/S4/01.02) attached as Appendix 5.

Table 11: Site 4 - George Street/Market Place - Option 2

Issues and Opportunities:	
• Vehicles turning right from the A1077 to George Street impeding vehicles travelling westbound. • Opportunity to improve the free-flow of vehicles and reduce delay on the A1077. • Opportunity to improve pedestrian/cycle facilities on George Street.	
Scheme Description:	
• Stopping up George Street at its southern end to enhance flow of vehicles along the A1077 due to the removal of the right turn movement from the A1077 to George Street. • Amendments to existing on-street parking spaces required to allow vehicles to suitably navigate parking bays and egress via Chapel Lane/King Street/Priestgate junction.	
Key Benefits/Dis-benefits	
Benefits:	**Dis-benefits:**
• Removes existing right turn movements from the A1077 to George Street to improve the flow of vehicles on the A1077 in both directions. • No land ownership issues – improvements achieved within the public highway.	• Likely opposition from local residents/traders. • Right turn movements would still be permitted in order to access the Market Place car park and therefore right turn movements would not be completely removed.
Collision Assessment Summary:	
• There are no identified road safety issues in the vicinity of the A1077/George Street junction. • Analysis of collision data for the junction for the latest five-year study period does not indicate any significant road safety issues at the junction. One slight collision was recorded at the junction.	
Ease of Implementation:	
Land requirements: No private land affected, all achievable within extents of the public highway. ***Disruption during construction/Temporary Traffic Management:*** *Proposed changes would have traffic management implications. Works anticipated to take place over a construction period in the region of 6-8 weeks.* ***Legal issues/Traffic Regulation Orders (TRO):*** *Amendments to TROs would be required.*	
Estimated Scheme Implementation Costs:	
£14,400 (including Optimism Bias of 44%)	

4.7 Site 5 - Holydyke

4.7.1 An appraisal of the proposed improvement schemes are provided in Table 12, see drawings (ref: LTP/3103/S5/01.01) attached as Appendix 5.

Table 12: Site 5 - Holydyke

Issues and Opportunities:	
• Existing pinch point due to on-street parking on both sides of the carriageway west of Brigg Road. • Lack of dedicated cycle facilities along the route. • The zebra crossing adjacent to the Fire Station is expected to cause an element of delay to vehicles travelling along the A1077 corridor. • Opportunity to improve the free-flow of vehicles and reduce delay on the A1077. • Opportunity to improve pedestrian/cycle facilities on Holydyke (A1077).	
Scheme Description:	
• Removal of existing on-street parking bays on the southern side of the carriageway to be relocated further east in order to remove current pinch point. • Creation of a shared-use facility on the southern side of Holydyke between Brigg Road and the A1077/Hungate/Holydyke mini-roundabout. This includes footway widening and introduction of dropped kerbs and tactile paving at crossing points. • Carriageway marking amendments, including the removal of central hatching and centre line realignment. • Conversion of existing zebra crossing to a toucan crossing. • Creation of an off-road shared-use facility on the northern side of Holydyke between Vestry Lane and the proposed toucan crossing.	
Key Benefits/Dis-benefits	
Benefits:	**Dis-benefits:**
• Enhances traffic flow on the A1077 corridor due to the removal of an existing pinch point and a reduction in delay from vehicles giving way to pedestrians at the zebra crossing. • No land ownership issues – improvements achieved by widening into the public highway. • Improved facilities for pedestrians/cyclists.	• The relocation of the parking bays may cause some local objection.
Collision Assessment Summary:	
• Analysis of collision data for the junction for the latest five-year study period does not indicate any significant road safety issues. Five slight collisions were recorded on Holydyke, with one pedestrian casualty associated with the zebra crossing.	
Ease of Implementation:	
Land requirements: No private land affected, all achievable within extents of the public highway. ***Disruption during construction/Temporary Traffic Management:*** *Proposed changes would have traffic management implications. Works anticipated to take place over a construction period in the region of 6-8 weeks.* ***Legal issues/Traffic Regulation Orders (TRO):*** *Amendments to TROs would be required.*	
Estimated Scheme Implementation Costs:	
£149,245 (including Optimism Bias of 44%)	

4.8 Site 6 - A1077/Holydyke/Hungate Mini-Roundabout - Option 1

4.8.1 An appraisal of the proposed improvement scheme is provided in Table 13, see drawing (ref: LTP/3103/S6/01.01) attached as Appendix 5.

Table 13: Site 6 - A1077/Holydyke/Hungate Mini-Roundabout - Option 1

Issues and Opportunities:	
• The predominant movements at the junction are the left turn from the A1077 (E) and the right turn from the A1077 (S). Therefore a mini-roundabout is not conducive to the movements at the junction. • Significant junction capacity issues in future year scenarios. • Lack of dedicated pedestrian/cycle facilities at the junction. • Opportunity to improve the free-flow of vehicles and reduce delay at the junction. • Opportunity to improve pedestrian/cycle facilities at the junction.	
Scheme Description:	
• Conversion of the existing mini-roundabout to a priority junction with the A1077 forming the major arm and Holydyke and Hungate forming the minor arms. • Hungate would form a one-way egress with a dedicated right turn bay for vehicles on the A1077 (E). • Provision of a central pedestrian refuge island on Ferriby Road (A1077). Dropped kerbs and tactile paving will also be provided at suitable locations. • Creation of an off-road shared-use facility on the north-western side of Ferriby Road.	
Key Benefits/Dis-benefits	
Benefits	**Dis-benefits**
• Enhances traffic flow on the A1077. • No land ownership issues – improvements achieved by widening into the public highway. • Improved facilities for pedestrians/cyclists.	• Increased delay to side road. • The addition of future traffic flows associated with committed development and further developable sites may mean that the junction experiences congestion issues regardless of any improvement scheme in this location. • Increased travel/journey for vehicles accessing Hungate.
Collision Assessment Summary:	
• Analysis of collision data for the junction for the latest five-year study period does not indicate any significant road safety issues. Two slight collisions were recorded at the mini-roundabout.	
Ease of Implementation:	
Land requirements: No private land affected, all achievable within extents of the public highway. ***Disruption during construction/Temporary Traffic Management:*** *Proposed changes would have traffic management implications. Works anticipated to take place over a construction period in the region of 10-12 weeks.* ***Legal issues/Traffic Regulation Orders (TRO):*** *Amendments to TROs would be required.*	
Estimated Scheme Implementation Costs:	
£51,336 (including Optimism Bias of 44%)	

4.9 Site 6 - A1077/Holydyke/Hungate Mini-Roundabout - Option 2

4.9.1 An appraisal of the proposed improvement scheme is provided in Table 14, see drawing (ref: LTP/3103/S6/01.02) attached as Appendix 5.

Table 14: Site 6 - A1077/Holydyke/Hungate Mini-Roundabout - Option 2

Issues and Opportunities:	
• The predominant movements at the junction are the left turn from the A1077 (E) and the right turn from the A1077 (S). Therefore a mini-roundabout is not conducive to the movements at the junction. • Significant junction capacity issues in future year scenarios. • Lack of dedicated pedestrian/cycle facilities at the junction. • Opportunity to improve the free-flow of vehicles and reduce delay at the junction. • Opportunity to improve pedestrian/cycle facilities at the junction.	
Scheme Description:	
• Conversion of the existing mini-roundabout to a signal junction. Creation of two entry lanes on Holydyke (A1077). • Hungate would form a one-way egress. • Creation of an off-road shared-use facility on the north-western side of Ferriby Road.	
Key Benefits/Dis-benefits	
Benefits:	**Dis-benefits:**
• Enhances traffic flow on the A1077 corridor. • No land ownership issues – improvements achieved by widening into the public highway. • Improved facilities for pedestrians/cyclists.	• The addition of future traffic flows associated with committed development and further developable sites may mean that the junction experiences congestion issues regardless of any improvement scheme in this location. • Potential increased traffic delays in inter-peak periods. • Increased travel/journey for vehicles accessing Hungate.
Collision Assessment Summary:	
• Analysis of collision data for the junction for the latest five-year study period does not indicate any significant road safety issues. Two slight collisions were recorded at the mini-roundabout.	
Ease of Implementation:	
Land requirements: No private land affected, all achievable within extents of the public highway. ***Disruption during construction/Temporary Traffic Management:*** *Proposed changes would have traffic management implications. Works anticipated to take place over a construction period in the region of 10-12 weeks.* ***Legal issues/Traffic Regulation Orders (TRO):*** *Amendments to TROs would be required.*	
Estimated Scheme Implementation Costs:	
£280,692 (including Optimism Bias of 44%)	

4.10 Site 7 - Ferriby Road

4.10.1 An appraisal of the proposed improvement scheme is provided in Table 15, see drawings (ref: LTP/3103/S7/01.01, LTP/3103/S7/01.02 and LTP/3103/S7/01.03) attached as Appendix 5.

Table 15: Site 7 - Ferriby Road

<table>
<tr><th colspan="2">Issues and Opportunities:</th></tr>
<tr><td colspan="2">• Unrestricted on-street parking present on Ferriby Road causing larger vehicles to encroach over the centre-line.
• Lack of dedicated cycle facilities on Ferriby Road.
• Opportunity to improve the free-flow of vehicles and reduce delay along the A1077 corridor.
• Opportunity to improve pedestrian/cycle facilities on Ferriby Road.</td></tr>
<tr><th colspan="2">Scheme Description:</th></tr>
<tr><td colspan="2">• Creation of an off-road shared-use facility on the north-western side of Ferriby Road between the A1077/Holydyke/Hungate mini-roundabout and A1077/Feyzin Drive/Forkendale roundabout.
• Creation of sheltered parking bays on the south-eastern side of Ferriby Road.</td></tr>
<tr><th colspan="2">Key Benefits/Dis-benefits</th></tr>
<tr><th>Benefits:</th><th>Dis-benefits:</th></tr>
<tr><td>• Enhances traffic flow on the A1077 corridor due to the A1077 forming the major arm of the new priority junction.
• No land ownership issues – improvements achieved by widening into the public highway.
• Improved facilities for pedestrians/cyclists.</td><td>• None</td></tr>
<tr><th colspan="2">Collision Assessment Summary:</th></tr>
<tr><td colspan="2">• Analysis of collision data for the junction for the latest five-year study period does not indicate any significant road safety issues. Three slight collisions were recorded along the route.</td></tr>
<tr><th colspan="2">Ease of Implementation:</th></tr>
<tr><td colspan="2">Land requirements: No private land affected, all achievable within extents of the public highway.
Disruption during construction/Temporary Traffic Management: Proposed changes would have traffic management implications. Works anticipated to take place over a construction period in the region of 6-8 weeks.
Legal issues/Traffic Regulation Orders (TRO): Amendments to TROs would be required.</td></tr>
<tr><th colspan="2">Estimated Scheme Implementation Costs:</th></tr>
<tr><td colspan="2">£148,626 (including Optimism Bias of 44%)</td></tr>
</table>

4.11 Summary of Costs

4.11.1 Table 16 provides a summary of the costs associated with each identified corridor improvement scheme.

Table 16: Summary of Costs

Site	Approximate Construction Costs
1 - A1077/Falkland Way Priority Junction	£89,280
2 - A1077/Whitecross Street Crossroads	£10,080
3 - Market Place	£89,280
4 - George Street/Market Place - Option 1	£96,480
4 - George Street/Market Place - Option 2	£14,400
5 - Holydyke	£149,245
6 - A1077/Holydyke/Hungate Mini-Roundabout - Option 1	£51,336
6 - A1077/Holydyke/Hungate Mini-Roundabout - Option 2	£280,692
7 - Ferriby Road	£148,626

4.11.2 As can be seen from Table 16, the overall costs for the A1077 corridor improvements range from £552,247 and £863,683, depending on the option implemented at Site 4 and Site 6 respectively.

4.12 Phased Delivery Plan

4.12.1 An indicative phased delivery plan for the preferred A1077 corridor scheme options is provided in Table 17. The design stage is expected to last approximately 2 months, with the construction of the improvement schemes expected to last approximately 9 months.

Table 17: Indicative Phasing Plan

Stage	Approximate Duration of Construction Works	Month											
		1	2	3	4	5	6	7	8	9	10	11	12
Stage 1: Design Stage	8 weeks												
Stage 2: Public Consultation	4 weeks												
Stage 3: Construction	40 weeks												
Site 1 - A1077/Falkland Way Priority Junction	8 weeks												
Site 2 - A1077/Whitecross Street Crossroads	8 weeks												
Site 3 - Market Place	8 weeks												
Site 4 - George Street/Market Place	8 weeks												
Site 5 - Holydyke	8 weeks												
Site 6 - A1077/Holydyke/Hungate Mini-Roundabout	12 weeks												
Site 7 - Ferriby Road	8 weeks												

5. POTENTIAL RELIEF ROAD OPTIONS

5.1 Introduction

5.1.1 This section of the report considers a number of options for a potential Barton Relief Road identifying proposed outline alignments, indicative construction costs, estimated trip transfer and an outline economic appraisal.

5.2 Barton Relief Road - Option 1

5.2.1 A preliminary sketch of the proposed alignment is presented in Figure 5 with the complete drawing (ref: LTP/3103/S8/01.01) attached as Appendix 6.

Figure 5: Barton Relief Road - Option 1

5.2.2 Further details regarding the potential relief road scheme are provided in Table 18.

Table 18: Barton Relief Road - Option 1

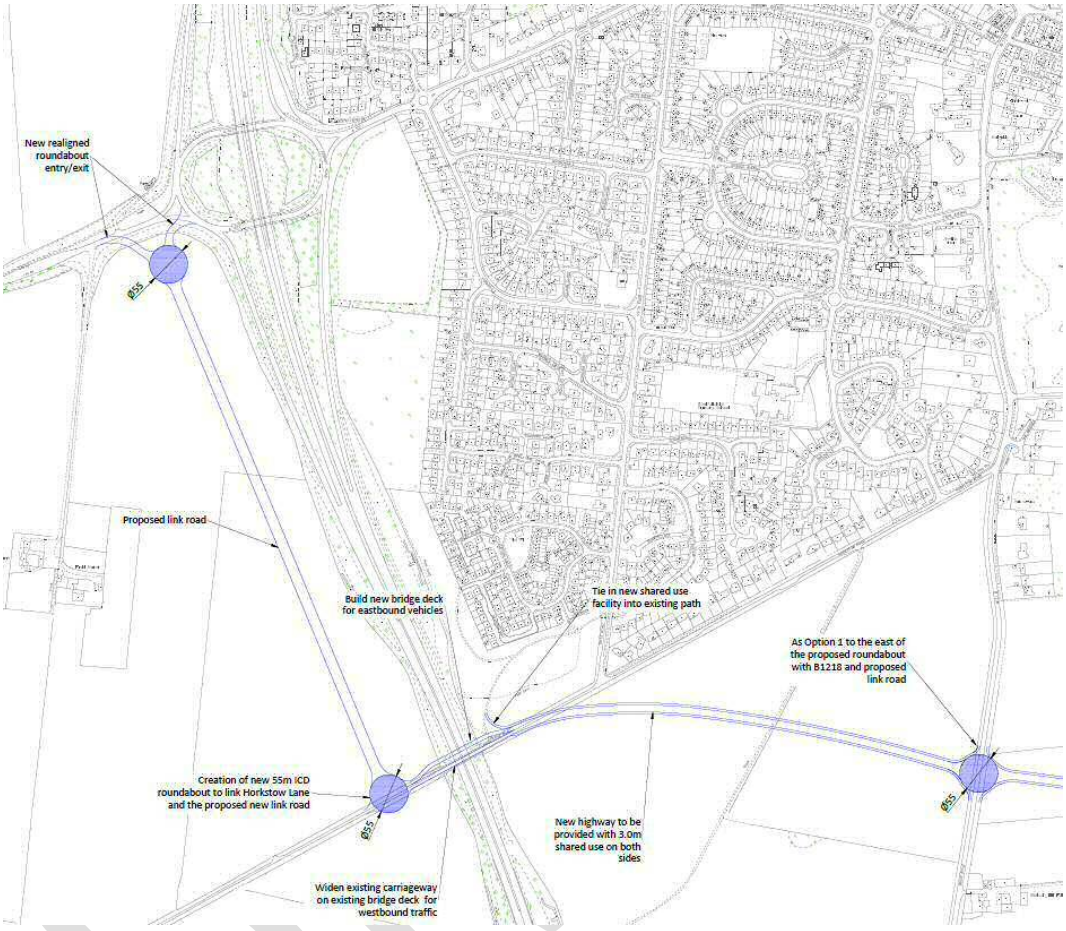
Scheme Purpose & Description:
• This option provides a link for vehicles travelling east of Barton town centre to access the A15 at Bonby Lodge via Brigg Road. • This option would unlock parcels of land for future development. • A series of new priority controlled roundabouts would be created along the proposed relief road alignment.

Key Features:	
• Construction of 4 new priority controlled roundabouts providing connection with Falkland Way, Caistor Road, Eastfield Road and Brigg Road respectively. • Approximately 2.0km worth of new carriageway would be provided. • Provision of a 3.0m wide shared pedestrian/cycle facility on both sides of the carriageway.	
Benefits:	**Dis-benefits:**
• Additional link for vehicles travelling east of Barton town centre to access the A15 at Bonby Lodge, via Brigg Road. • Unlocks land for future development. • Provides enhanced pedestrian/cycle facilities for local residents.	• Convoluted route for vehicles wanting to travel north on the A15 from the east of Barton town centre with these vehicles expected to utilise the A1077 corridor to travel north.
Estimated Scheme Implementation Costs:	
Option 1 Implementation Optimism Bias (44%)	£3,934,150 £1,731,026
TOTAL	**£5,665,176**

5.3 Barton Relief Road - Option 2

5.3.1 A preliminary sketch of the proposed alignment is presented in Figure 6 with the complete drawing (ref: LTP/3103/S8/02.01) attached as Appendix 6.

Figure 6: Barton Relief Road - Option 2



5.3.2 Further details regarding the potential relief road scheme are provided in Table 19.

Table 19: Barton Relief Road - Option 2

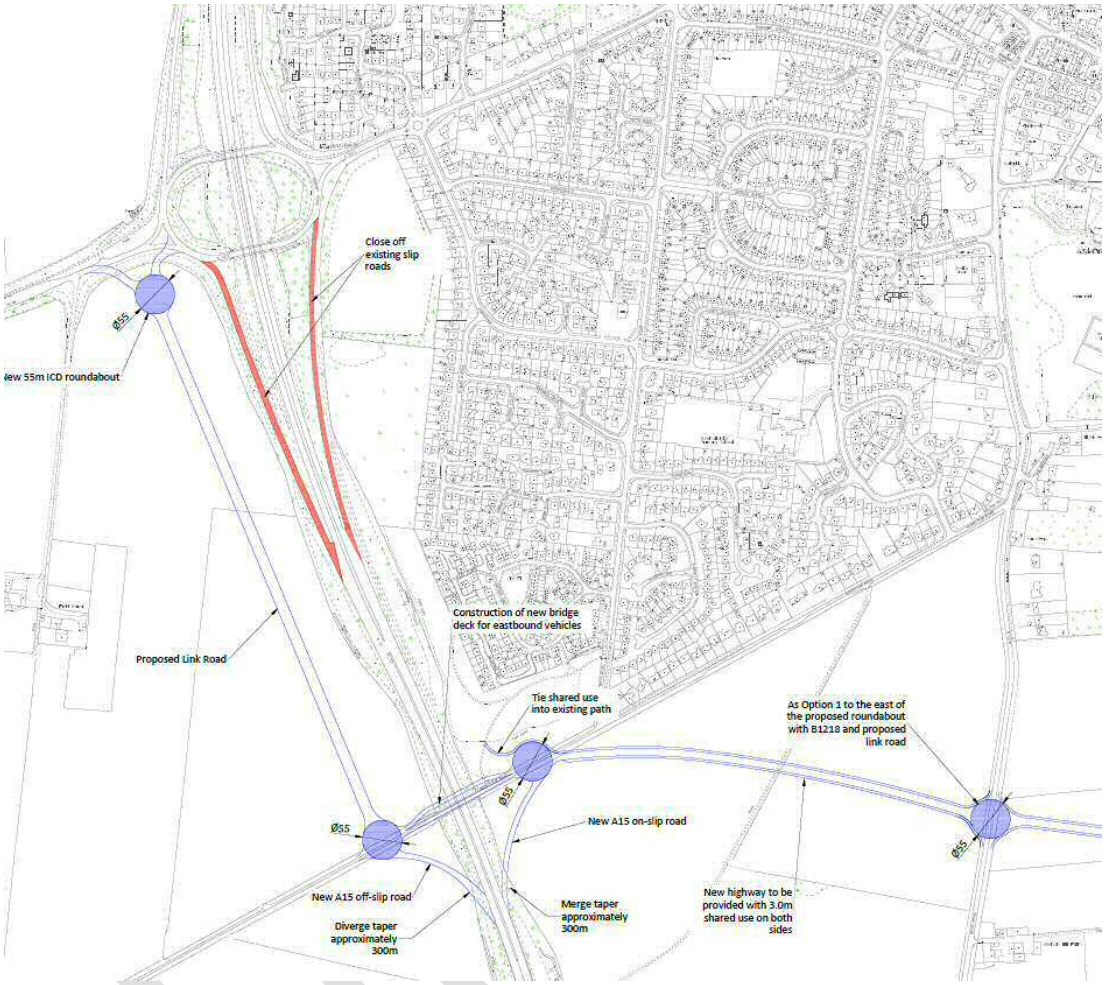
Scheme Purpose & Description:
• This option provides a link for vehicles east of Barton town centre to avoid the A1077 corridor in order to gain access to the A15/A1077 roundabout. • Unlocks parcels of land for future development. • Involves the implementation of Option 1 alongside a series of other packages of infrastructure, including 2 additional priority controlled roundabouts and a new bridge deck across the A15. • To the west of Brigg Road, new carriageway would connect with Horkstow Road. The carriageway will be sufficiently widened with the new bridge deck constructed across the A15 for eastbound traffic and the existing Horkstow Road bridge used for westbound vehicles.

Key Features:	
• Implementation of Option 1. • Construction of 6 new priority controlled roundabouts. • Approximately 3.8km worth of new carriageway would be provided. • New bridge deck across the A15. • New link road on the western side of the A15 to connect with the A15/A1077 junction. • Provision of 3.0m shared use facility on both sides of the carriageway.	
Benefits:	**Dis-benefits:**
• Option to avoid the A1077 corridor to gain access to the A15/A1077 (W). • Unlocks land for future development. • Provides enhanced pedestrian/cycle facilities for local residents.	• Slightly more convoluted route for vehicles wanting to travel north on the A15 from the east of Barton town centre with these vehicles expected to utilise the A1077 corridor to travel north, although vehicles would be travelling at 50mph rather than 30mph and would avoid the congested A1077 corridor.
Estimated Scheme Implementation Costs:	
Option 1 Implementation	£5,665,176
Option 2 Implementation Optimism Bias (44%) Option 2 Sub-Total	£4,200,950 £1,848,418 £6,049,368
TOTAL	**£11,714,544**

5.4 Barton Relief Road - Option 3

5.4.1 A preliminary sketch of the proposed alignment is presented in Figure 7 with the complete drawing (ref: LTP/3103/S8/03.01) attached as Appendix 6.

Figure 7: Barton Relief Road - Option 3



5.4.2 Further details regarding the potential relief road scheme are provided in Table 20.

Table 20: Barton Relief Road - Option 3

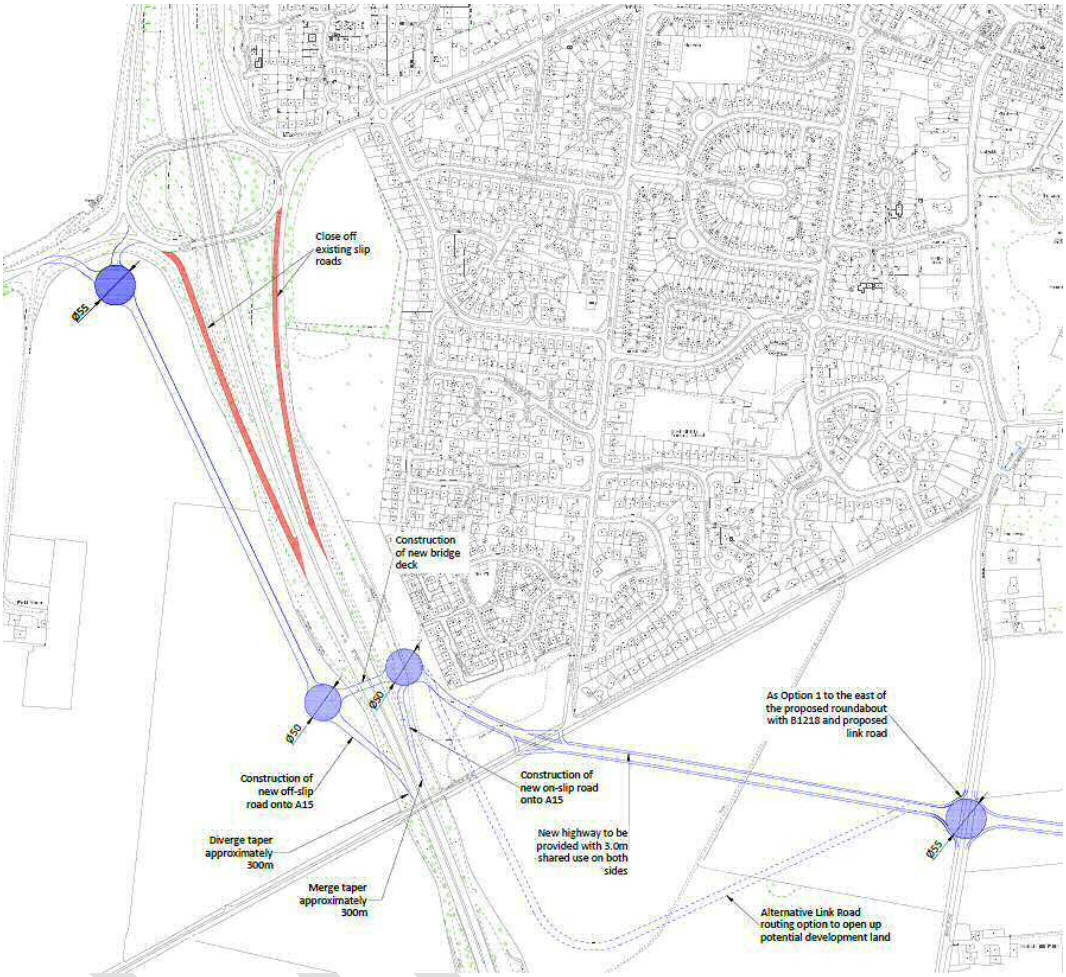
Scheme Purpose & Description:
• This option provides a link for vehicles east of Barton town centre to avoid the A1077 corridor in order to gain better access to the A15 (S) via new southern slip roads. • The closure of the southern slip roads at the A15/A1077 roundabout mean vehicles travelling to/from the A15 (S) avoid the A1077 corridor. • Unlocks parcels of land for future development. • Involves the implementation of Option 1 alongside a series of other packages of infrastructure, including 3 additional priority controlled roundabouts, a new bridge deck across the A15 and the creation of a back to back interchange. • To the west of Brigg Road, new carriageway would connect with Horkstow Road. The carriageway will be sufficiently widened with the new bridge deck constructed across the A15 for eastbound vehicles and the existing Horkstow Road bridge used for westbound vehicles.

Key Features:	
• Implementation of Option 1. • Construction of 7 new priority controlled roundabouts. • Approximately 4.0km worth of new carriageway would be provided. • New bridge deck across the A15. • Southbound on-slip and northbound off-slip created at new A15 junction. • New link road on the western side of the A15 to connect with the A15/A1077 junction. • Closure of A15/A1077 southern slip roads. • Provision of 3.0m shared use facility on both sides of the carriageway.	
Benefits:	**Dis-benefits:**
• Enhanced journey times for vehicles east of Barton town centre wanting to travel to/from the A15 (S). • Unlocks land for future development. • Provides enhanced pedestrian/cycle facilities for local residents.	• Vehicles travelling west of the relief road wanting to travel south on the A15 would need to utilise the new link road adjacent to the A15 rather than existing direct access from the A15/A1077 roundabout.
Estimated Scheme Implementation Costs:	
Option 1 Implementation	£5,665,176
Option 3 Implementation Optimism Bias (44%) Option 3 Sub-Total	£4,819,650 £2,120,646 £6,940,296
TOTAL	**£12,605,472**

5.5 Barton Relief Road - Option 4

5.5.1 A preliminary sketch of the proposed alignment is presented in Figure 8 with the complete drawing (ref: LTP/3103/S8/04.01) attached as Appendix 6.

Figure 8: Barton Relief Road - Option 4



5.5.2 Further details regarding the potential scheme are provided in Table 21.

Table 21: Barton Relief Road - Option 4

Scheme Purpose & Description:
• This option provides a link for vehicles east of Barton town centre to avoid the A1077 corridor in order to gain access to the A15. • The closure of the southern slip roads at the A15/A1077 roundabout mean vehicles travelling to/from the A15 (S) avoid the A1077 corridor. • Unlocks parcels of land for future development. • Involves the implementation of Option 1 alongside a series of other packages of infrastructure, including 3 additional priority controlled roundabouts, a new bridge deck across the A15, new junction with Horkstow Road and the creation of a back to back interchange. • An alternative routing option has also been highlighted on the drawing between the new Brigg Road roundabout and the new A15 junction which would open up additional development land.

Key Features:	
• Implementation of Option 1. • Construction of 7 new priority controlled roundabouts. • Approximately 3.8km worth of new carriageway would be provided. • New bridge deck across the A15. • Construction of a new junction on the A15 featuring southern slip roads and closure of A15/A1077 slip roads. • New link road on the western side of the A15 to connect with the A15/A1077 junction. • Provision of 3.0m shared use facility on both sides of the carriageway.	
Benefits:	**Dis-benefits:**
• Enhanced journey times for vehicles east of Barton town centre wanting to travel to/from the A15 (S). • Unlocks land for future development. • Provides enhanced pedestrian/cycle facilities for local residents.	• Vehicles travelling west of the relief road wanting to travel south on the A15 would need to utilise the new link road adjacent to the A15 rather than existing direct access from the A15/A1077 roundabout.
Estimated Scheme Implementation Costs:	
Option 1 Implementation	£5,665,176
Option 4 Implementation Optimism Bias (44%) Option 4 Sub-Total	£4,786,300 £2,105,972 £6,892,272
TOTAL	**£12,557,448**

5.6 Scheme Assessment Scenarios

5.6.1 In order to establish the level of trips expected to utilise the potential relief road, a number of assessments have been undertaken. The relief road options have been assessed against an opening year of 2022 and an appraisal year (15 years after opening year) of 2037. Further details can be found in Appendix 7.

5.6.2 The potential relief road options have been tested against the following weekday AM and PM peak hour traffic flow scenarios:

- ***2022 Opening Year - Do Minimum:*** *'2018 Base'* network traffic flows, growthed to 2022 with the addition of all future development trips utilising the improved A1077 corridor following the implementation of the preferred corridor improvement schemes;
- ***2022 Opening Year - Do Something:*** *'2018 Base'* network traffic flows, growthed to 2022, with the addition of all future development trips and the proportion of trips expected to utilise each relief road option;
- ***2037 Appraisal Year - Do Minimum:*** *'2018 Base'* network traffic flows, growthed to 2037 with the addition of all future development trips utilising the improved A1077 corridor following the implementation of the preferred corridor improvement schemes; and

- ***2037 Appraisal Year - Do Something:*** *'2018 Base'* network traffic flows, growthed to 2037, with the addition of all future development trips and the proportion of trips expected to utilise each relief road option.

5.7 Select Link Analysis

5.7.1 To analyse the level of re-routing associated with the proposed relief road options, the link traffic flows for the opening year and appraisal year have been extracted as shown in Table 22 and Table 23 respectively.

Table 22: Link Traffic Flows - Opening Year

Link	Direction	Do Minimum	Do Something (Option 1)	Difference	(%)	Do Something (Options 2,3,4)	Difference	(%)
AM Peak								
A15 to Brigg Road	Eastbound	726	663	-63	-8.6%	479	-247	-34.0%
	Westbound	1,477	1,343	-133	-9.0%	955	-521	-35.3%
Brigg Road to Falkland Way	Eastbound	695	632	-63	-9.0%	456	-239	-34.3%
	Westbound	959	826	-133	-13.9%	446	-513	-53.5%
Relief Road	Northbound	0	63	63	N/A	247	247	N/A
	Southbound	0	133	133	N/A	521	521	N/A
PM Peak								
A15 to Brigg Road	Eastbound	1,378	1,269	-109	-7.9%	900	-479	-34.7%
	Westbound	815	764	-52	-6.3%	594	-222	-27.2%
Brigg Road to Falkland Way	Eastbound	973	864	-109	-11.2%	495	-479	-49.2%
	Westbound	793	741	-52	-6.5%	571	-222	-28.0%
Relief Road	Northbound	0	109	109	N/A	479	479	N/A
	Southbound	0	52	52	N/A	222	222	N/A

Table 23: Link Traffic Flows - Appraisal Year

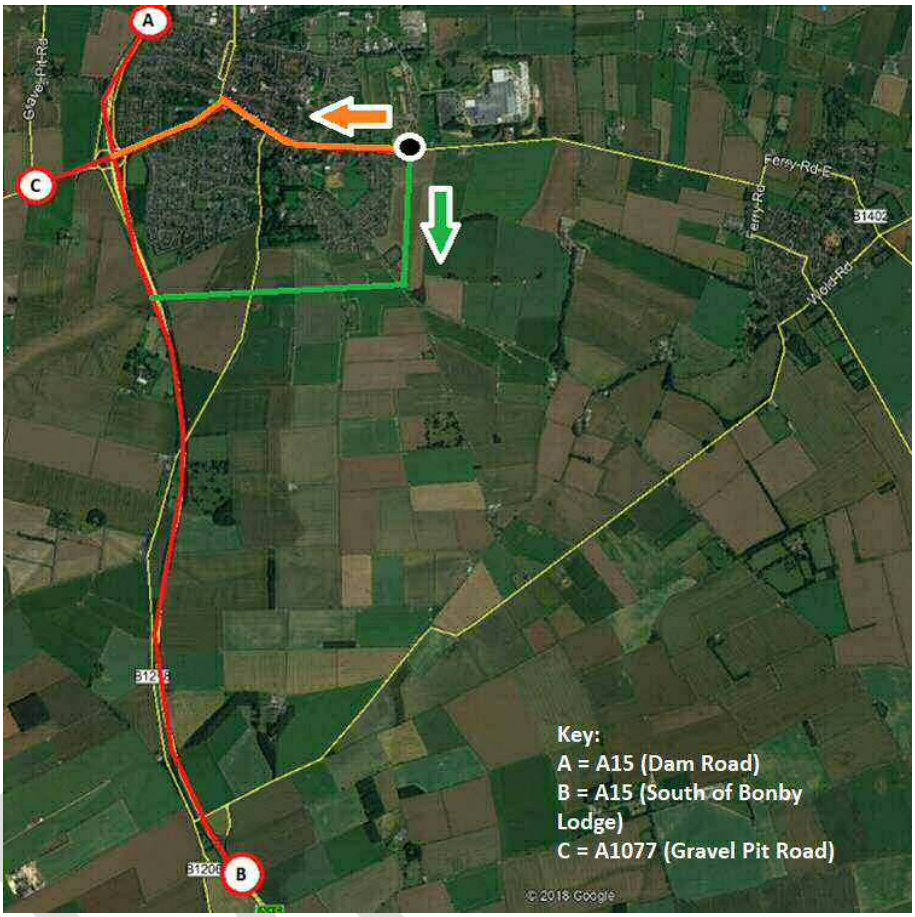
Link	Direction	Do Minimum	Do Something (Option 1)	Difference	(%)	Do Something (Options 2,3,4)	Difference	(%)
AM Peak								
A15 to Brigg Road	Eastbound	772	709	-63	-8.1%	525	-247	-31.9%
	Westbound	1,569	1435	-133	-8.5%	1,047	-521	-33.2%
Brigg Road to Falkland Way	Eastbound	727	665	-63	-8.6%	489	-239	-32.8%
	Westbound	1,002	869	-133	-13.3%	489	-513	-51.2%
Relief Road	Northbound	0	63	63	N/A	247	247	N/A
	Southbound	0	133	133	N/A	521	521	N/A
PM Peak								
A15 to Brigg Road	Eastbound	1,460	1351	-109	-7.5%	981	-479	-32.8%
	Westbound	870	818	-52	-5.9%	648	-222	-25.5%
Brigg Road to Falkland Way	Eastbound	1,014	905	-109	-10.8%	535	-479	-47.2%
	Westbound	837	785	-52	-6.2%	615	-222	-26.5%
Relief Road	Northbound	0	109	109	N/A	479	479	N/A
	Southbound	0	52	52	N/A	222	222	N/A

5.7.2 As can be seen in Table 22 and Table 23, a number of vehicles associated with future development sites within Barton are expected to utilise the potential relief road. It should be noted that these assessments do not account for any re-routing of existing vehicle trips east of Falkland Way although it is likely that an element of vehicle trips would utilise the relief road, in particular Options 2 to 4.

5.8 Journey Time Comparison

5.8.1 The overall journey time between Falkland Way and the A15 utilising the A1077 corridor to/from key reference points have been compared with the expected journey times when utilising the various relief road options. Details regarding the assessment locations are illustrated in Figure 9, with journey time results presented in Table 24.

Figure 9: Journey Time Assessment Locations



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

Table 24: Journey Time Comparison

Location	Route	Via A1077 Corridor	Option 1	Difference	Option 2	Difference	Option 3	Difference	Option 4	Difference
A	Falkland Way to A15 (N)	00:03:54	00:07:39	+00:03:45	00:03:22	-00:00:32	00:03:22	-00:00:32	00:03:19	-00:00:35
	A15 (N) to Falkland Way	00:03:24	00:07:33	+00:04:09	00:03:32	+00:00:08	00:03:32	+00:00:08	00:03:26	+00:00:02
B	Falkland Way to A15 (S)	00:05:33	00:04:38	-00:00:55	00:05:48	+00:00:15	00:04:10	-00:01:23	00:04:32	-00:01:01
	A15 (S) to Falkland Way	00:05:53	00:04:24	-00:01:29	00:05:37	-00:00:16	00:04:30	-00:01:23	00:04:32	-00:01:01
C	Falkland Way to A1077	00:03:18	00:07:18	+00:04:00	00:03:01	-00:00:17	00:03:01	-00:00:17	00:02:54	-00:00:24
	A1077 to Falkland Way	00:03:18	00:07:49	+00:04:31	00:03:01	-00:00:17	00:03:01	-00:00:17	00:02:54	-00:00:24
Average Journey Time Difference			**-00:01:12***		**-00:00:10**		**-00:00:37**		**-00:00:34**	

*Based on the assumption that only vehicles wanting to access the A15 (S) would utilise the relief road.

5.8.2 As can be seen in Table 24, Options 3 and 4 offer the greatest benefits in comparison to the existing A1077 corridor. It should be noted that these journey times are based on the assumption that the A1077 corridor would be free-flowing, however in the future year scenarios there is expected to be a significant amount of delay at local junctions along the corridor due to the additional committed developments and future traffic growthing without any future relief road coming forward. Therefore the future A1077 corridor journey times would be expected to be higher than those analysed as part of this study.

5.9 WebTAG Appraisal

5.9.1 Table 25 provides an initial high level WebTAG assessment undertaken for each of the relief road options.

Table 25: WebTAG Appraisal Table

Category	Impacts	Option 1	Option 2	Option 3	Option 4
Economy	Business users & transport providers	✓	✓	✓✓	✓✓
	Reliability impact on business users	✓	✓	✓✓	✓✓
	Regeneration	✓	✓✓	✓✓	✓✓
	Wider impacts	✓	✓✓	✓✓	✓✓
Environmental	Noise	✓	✓	✓	✓
	Air Quality	✓	✓	✓	✓
	Greenhouse gases	✓	✓	✓	✓
	Landscape	×	×	×	×
	Townscape	O	O	O	O
	Historic Environment	O	O	O	O
	Biodiversity	×	×	×	×
	Water Environment	O	O	O	O
Social	Commuting and Other users	✓	✓	✓✓	✓✓
	Reliability impact on commuting and other users	✓	✓	✓✓	✓✓
	Physical activity	✓	✓	✓	✓
	Journey quality	✓	✓	✓✓	✓✓
	Accidents	✓	✓	✓	✓
	Security	✓	✓	✓	✓
	Access to services	O	O	O	O
	Affordability	O	O	O	O
	Severance	O	O	O	O
	Option and non-use values	O	O	O	O
Public Accounts	Cost to broad transport budget	✓	✓✓	✓✓	✓✓
	Indirect tax revenues	✓	✓	✓	✓

KEY:

✓✓✓ Significant benefit ✓✓ Moderate benefit ✓ Slight benefit

O Neutral impact

× Slight disbenefits ×× Moderate disbenefits ××× Significant disbenefit

5.10 Economic Performance

5.10.1 The relief road options have been subjected to a high level economic appraisal based on the methodologies recommended by the DfT's WebTAG guidance. The key benefits for the scheme are journey time savings, new infrastructure to support future housing and employment aspirations in Barton and the reduction of vehicles travelling through Barton town centre to access the A15. Other WebTAG quantifiable benefits, such as journey reliability and accident savings have not been quantified at this time. Table 26 summarises the net present value of costs and benefits associated with each relief road option in order to calculate a Benefit to Cost Ratio (BCR) for the four potential options. Further details are attached as Appendix 8.

Table 26: Economic Appraisal Table

	Option 1	Option 2	Option 3	Option 4
Net Present Value of Benefits (£m)	12.6	7.2	26.7	24.6
Net Present Value of Costs (£m)	4.3	8.9	9.6	9.5
Benefit to Cost Ratio (BCR)	**2.93**	**0.81**	**2.79**	**2.57**

5.10.2 The initial economic appraisal summarised in Table 26 above indicates that Option 1, 3 and 4 represent the best value for money in relation to travel time benefits. It is considered likely that the benefits of providing a relief road would be greater than those provided above, due to the likely redistribution of existing vehicle trips onto the relief road to access destinations east of Falkland Way which have not been quantified as part of this study. It should be noted that the appraisal year is a 15 year assessment rather than 60 years, therefore it is expected that the benefits would be greater than those presented above if based on a 60 year appraisal even with the consideration of future maintenance and operational costs. Furthermore, in order to facilitate the future development aspirations in Barton, it is recommended that a relief road should be provided as the A1077 corridor improvement schemes as a standalone package outlined as part of this study would not provide sufficient capacity enhancing benefits required to accommodate the level of additional development trips expected to travel along the A1077 corridor in the future, particularly as the A1077/Holydyke/Hungate mini-roundabout currently operates above the target level of 85% during the PM peak.

5.11 Wider Network Measures

5.11.1 A series of wider network measures could also be implemented to encourage the use of the potential relief road, these measures could include and are not limited to:

- Introduction of enforced weight restrictions along the A1077 corridor to ensure large vehicles utilise the relief road and away from Barton town centre;
- Provision of a shared-use scheme on Market Place;
- Provision of a signing strategy on the A15 and wider routes to encourage the use of the relief road; and
- Introduction of traffic calming along the A1077 corridor.

6. CONCLUSIONS

6.1.1 LTP has been commissioned by NLC to develop a highways masterplan for Barton upon Humber to identify and assess options for improvements on both the A1077 corridor and potential Barton Relief Road alignments in order to facilitate planned future growth within Barton.

6.1.2 Detailed analysis of the collision records has identified that over a fifth of casualties' were vulnerable road users. A total of three collisions occurred in the vicinity of the pedestrian refuge island to the west of Baysgarth School. The results of the road casualty appraisal have informed the development of the A1077 corridor improvement schemes.

6.1.3 Baseline traffic surveys have been extracted from the TA (SA, 2014a) which were undertaken in July 2014 to inform this study. Traffic counts undertaken in September 2013 were captured at the A1077/Falkland Way priority junction as part of the TA (SA, 2014a). The cumulative network peak hour periods were found to be between 07:30 and 08:30 in the AM peak and 16:45 and 17:45 in the PM peak.

6.1.4 A number of committed developments and housing and employment land allocations have been factored into the assessments. In addition to the above, there is also expected to be further residential development coming forward over the next 10 to 15 years outside of the committed development. Therefore, suitable assumptions have been made as part of this study in regards to the likely location of these sites and the level of dwellings expected to come forward.

6.1.5 A junction model has been developed for the A1077/Holydyke/Hungate mini-roundabout which indicates that the mini-roundabout would be expected to operate significantly above capacity in the opening and appraisal years with the addition of committed development trips and potential future development sites coming forward. Therefore alternative junction arrangements to improve capacity have been considered as part of this study.

6.1.6 A number of potential improvement options for the A1077 corridor have been proposed which intend to support reduction in delays and improvements in capacity, cycle and pedestrian facilities, and road safety. An indication of scheme costings and a proposed phasing plan have also been provided.

6.1.7 Four options for the potential alignment of the relief road have been identified as part of this report. The proposed outline alignment, indicative construction costs and an outline economic appraisal have been provided for each option. It is considered that Option 1, 3 and 4 would appear to represent the best value for money in relation to travel time benefits. It should also be noted that the benefits of providing a relief road are expected to be greater than those presented in this report due to the likely redistribution of existing vehicle trips onto the relief road, avoiding the A1077 corridor, in order to access destinations east of Falkland Way which have not been quantified as part of this study.

6.1.8 From the analysis presented in this report, it can be concluded that in order to facilitate future development in Barton, a relief road would need to be provided as the A1077 corridor improvement schemes as a standalone package would not provide sufficient capacity enhancing benefits required to accommodate the level of additional development trips expected to travel along the A1077 corridor. A series of wider network measures could also be implemented to encourage the use of any future relief road.

7. REFERENCES

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EJSA, 2017b. Proposed Mixed Use Development. Ferriby Road, Barton upon Humber. Travel Plan.

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TRL, 2004. Knowledge Base Article 131 [online: https://trlsoftware.co.uk/support/knowledgebase/articles/131].

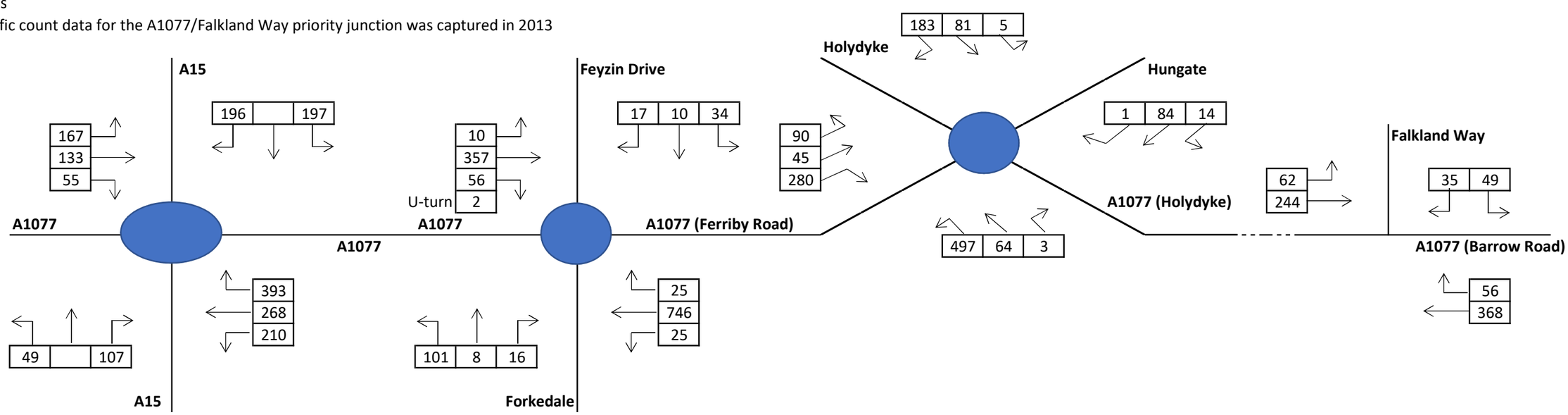
Appendix 1 – Network Diagrams

2014 Base

AM Peak (07:30-08:30)

PCUs

Traffic count data for the A1077/Falkland Way priority junction was captured in 2013

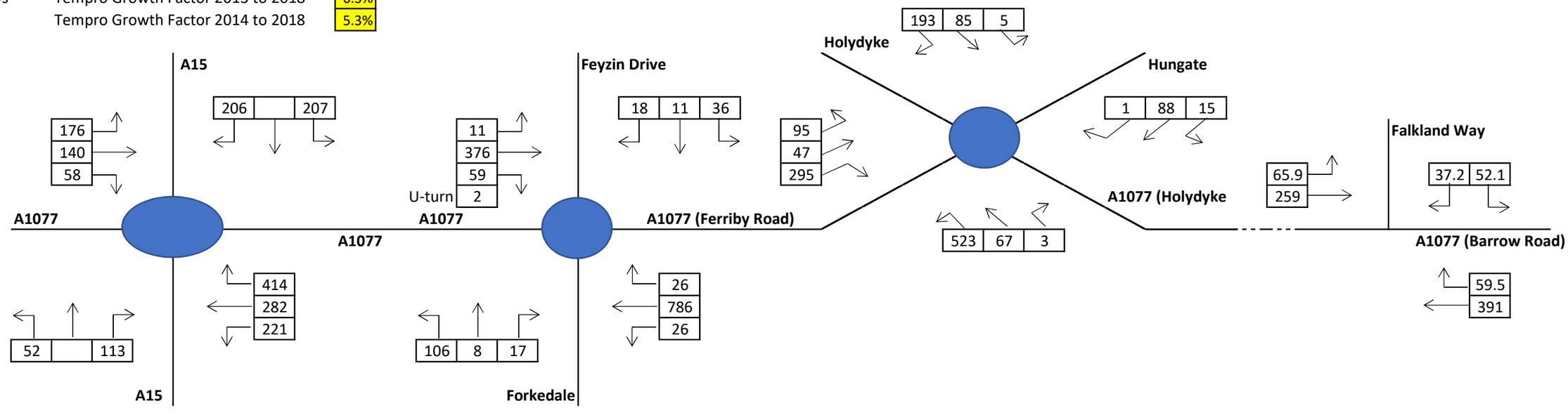


2018 Base

AM Peak (07:30-08:30)

PCUs Tempro Growth Factor 2013 to 2018 6.3%

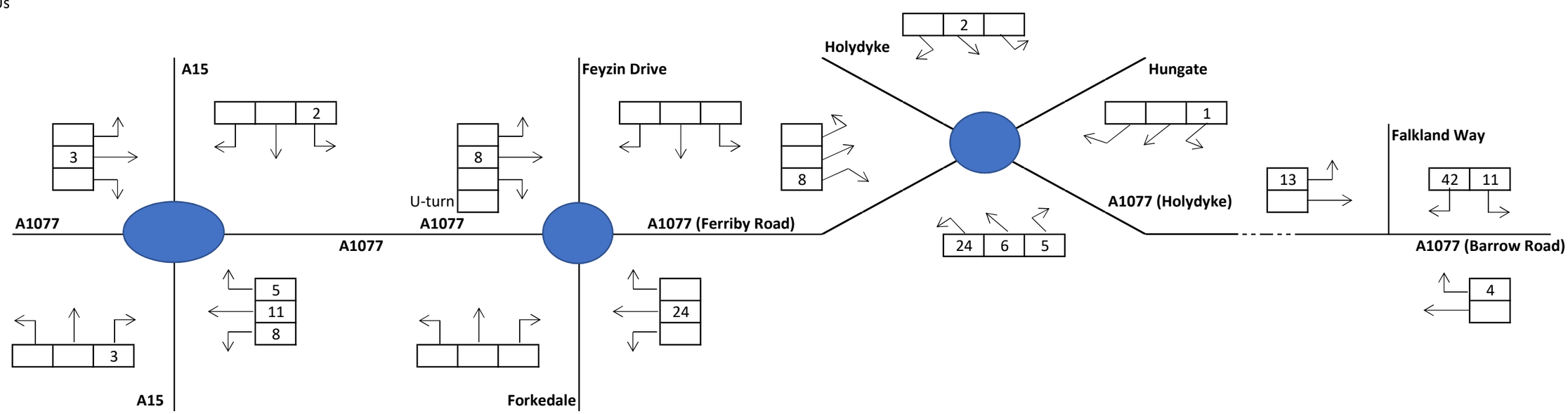
Tempro Growth Factor 2014 to 2018 5.3%



Committed Development - Residential Development West of Falkland Way (ref: PA/2009/0257 and PA/2009/0828)

AM Peak (07:30-08:30)

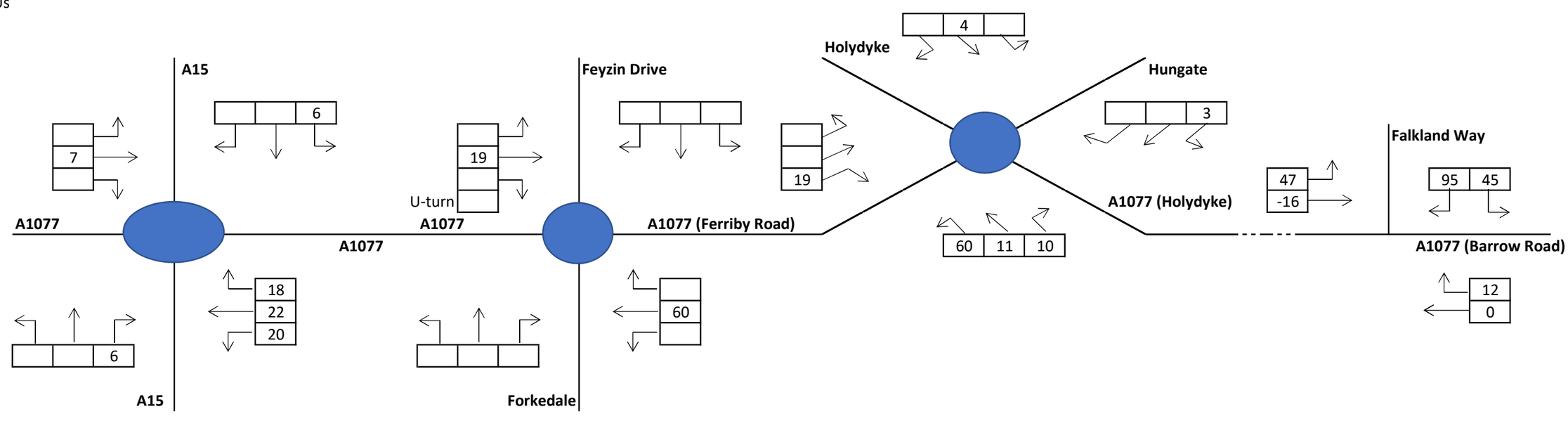
PCUs



Committed Development - Wren Kitchen Development (ref: PA/2014/1360)

AM Peak (07:30-08:30)

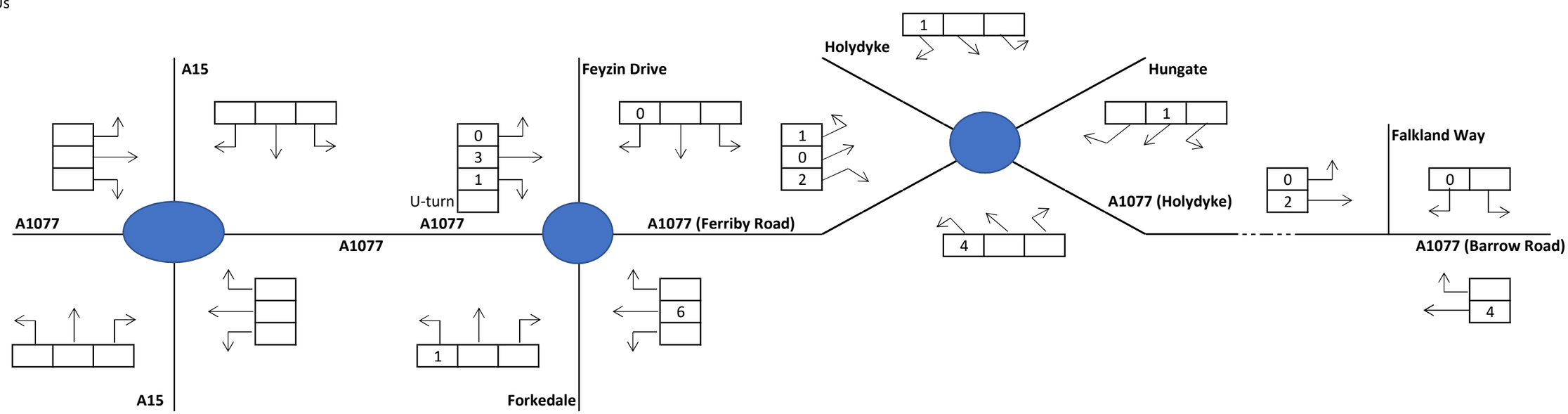
PCUs



Committed Development - Lidl Development (ref: PA/2017/1449)

AM Peak (07:30-08:30)

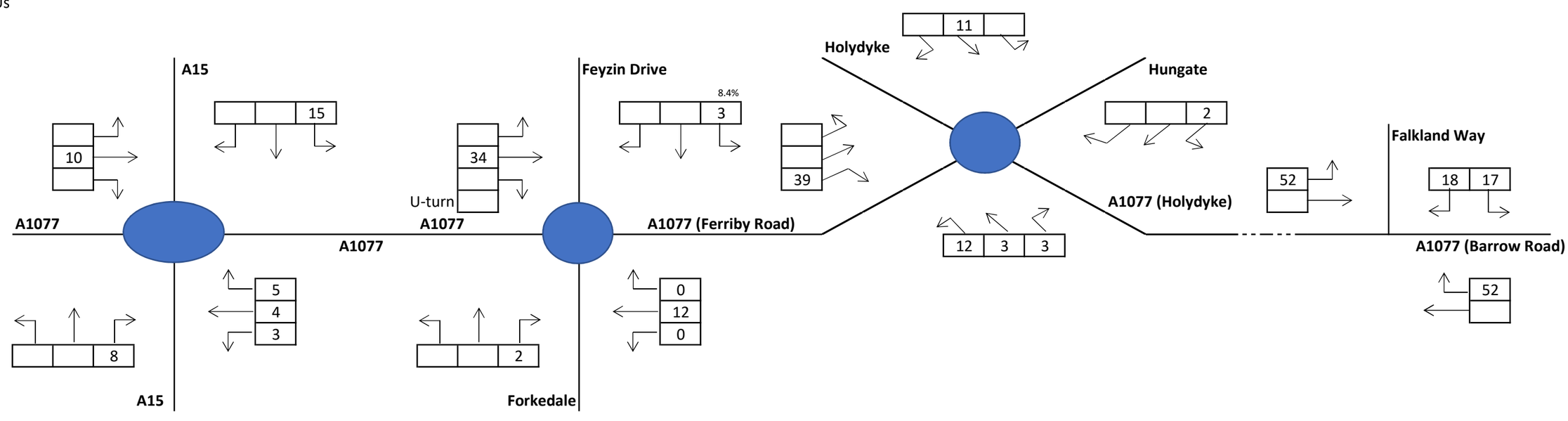
PCUs



Committed Development - Residential Development West of Falkland Way (ref: PA/2016/1793)

AM Peak (07:30-08:30)

PCUs

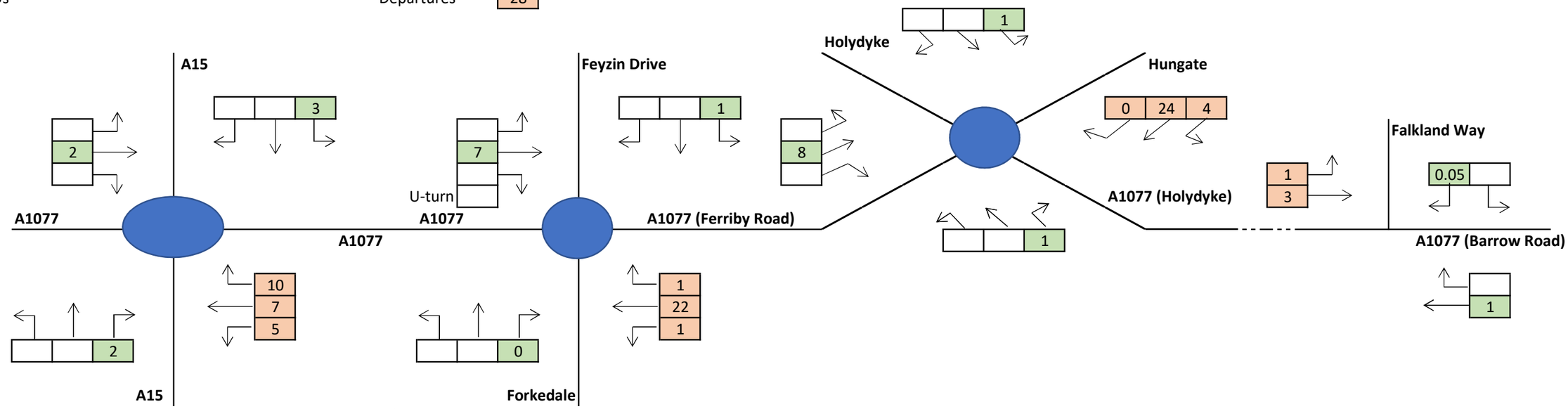


Committed Development - BARH-3 Site (73 Dwellings)

AM Peak (07:30-08:30)

PCUs

Arrivals	10
Departures	28



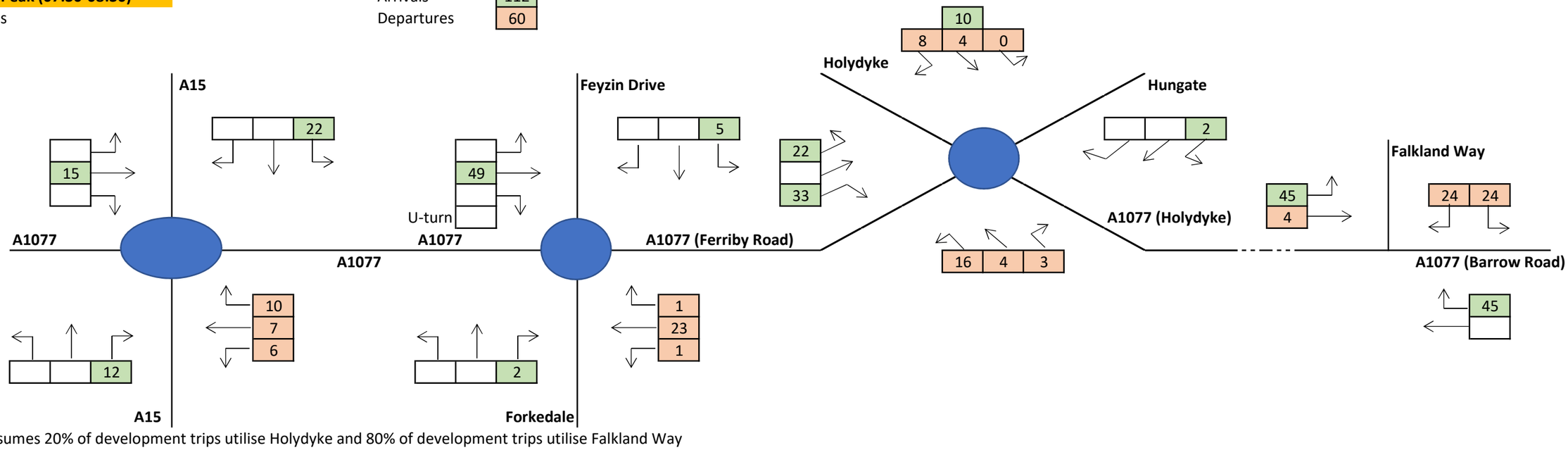
*Assumes all trips utilise Hungate mini-roundabout to access/egress the site

Committed Development - BARE-1 Site (7.15ha)

AM Peak (07:30-08:30)

PCUs

Arrivals	112
Departures	60

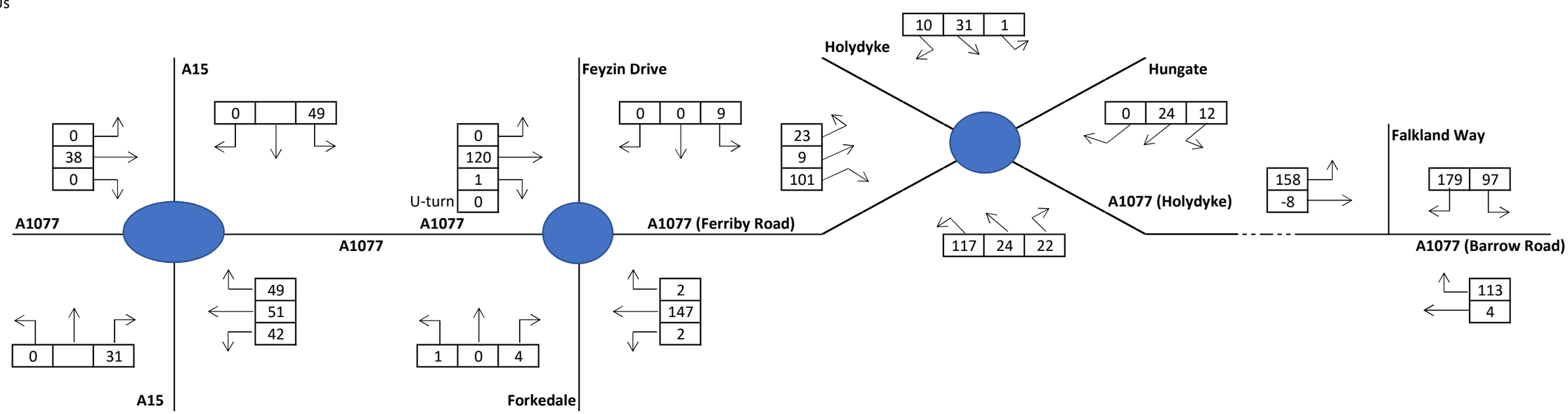


*Assumes 20% of development trips utilise Holydyke and 80% of development trips utilise Falkland Way

Total Committed Development

AM Peak (07:30-08:30)

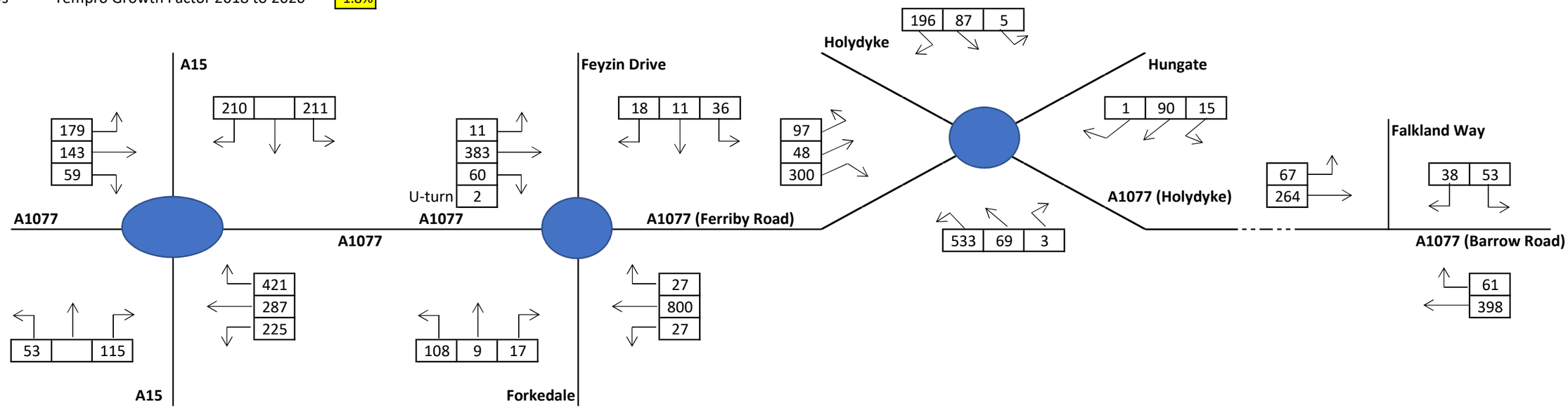
PCUs



2020 Opening Year

AM Peak (07:30-08:30)

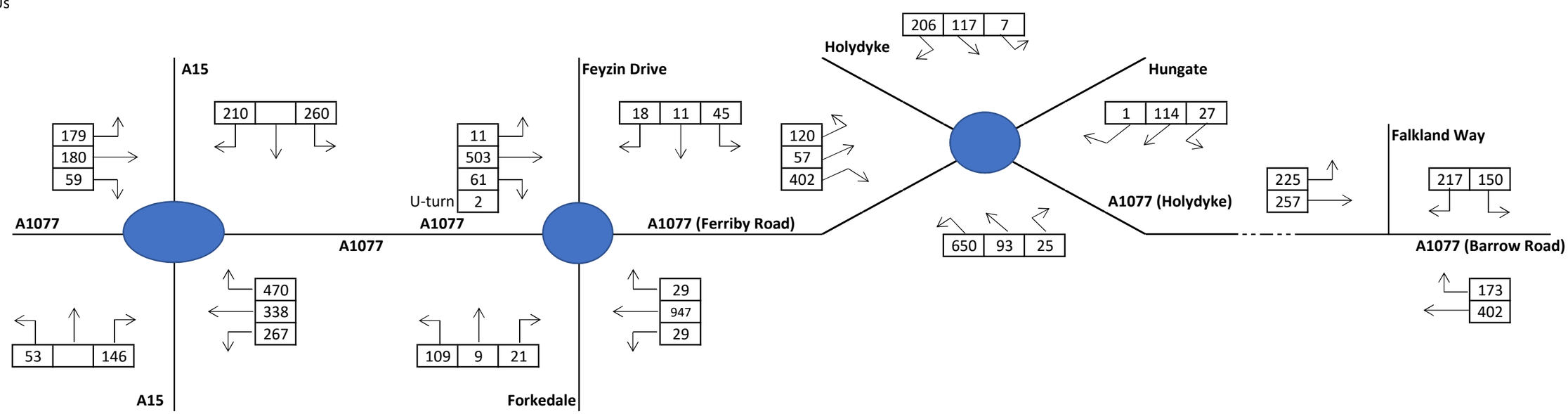
PCUs Tempro Growth Factor 2018 to 2020 1.8%



2020 Opening Year + Development (Scenario 1)

AM Peak (07:30-08:30)

PCUs

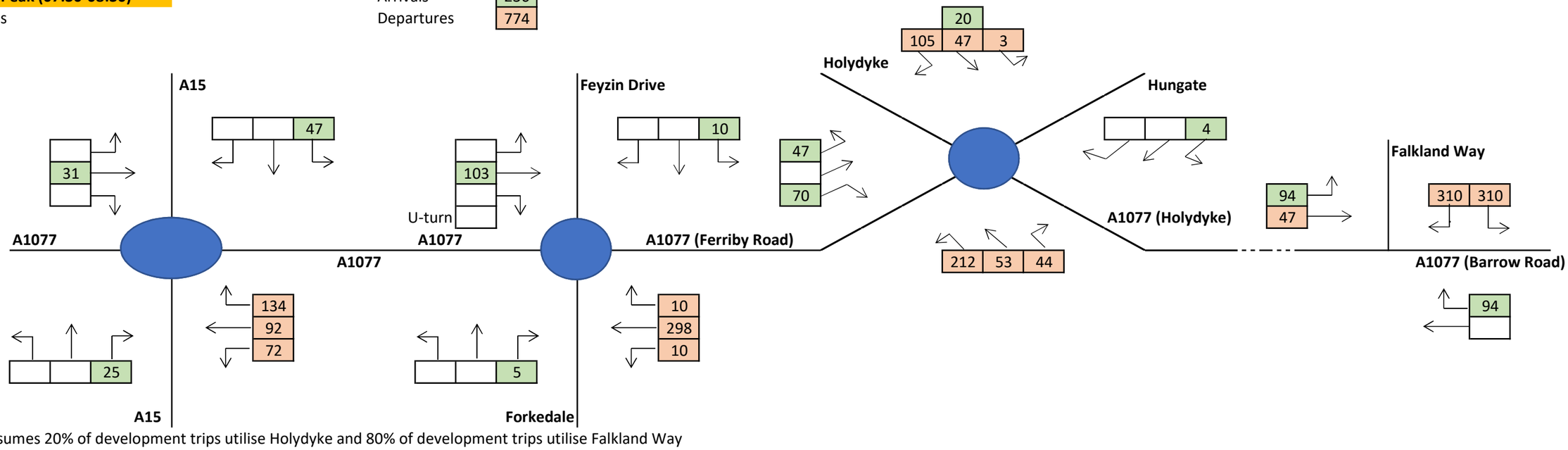


Potential Development Sites (75% North-East of Barton Town Centre)

AM Peak (07:30-08:30)

PCUs

Arrivals	236
Departures	774

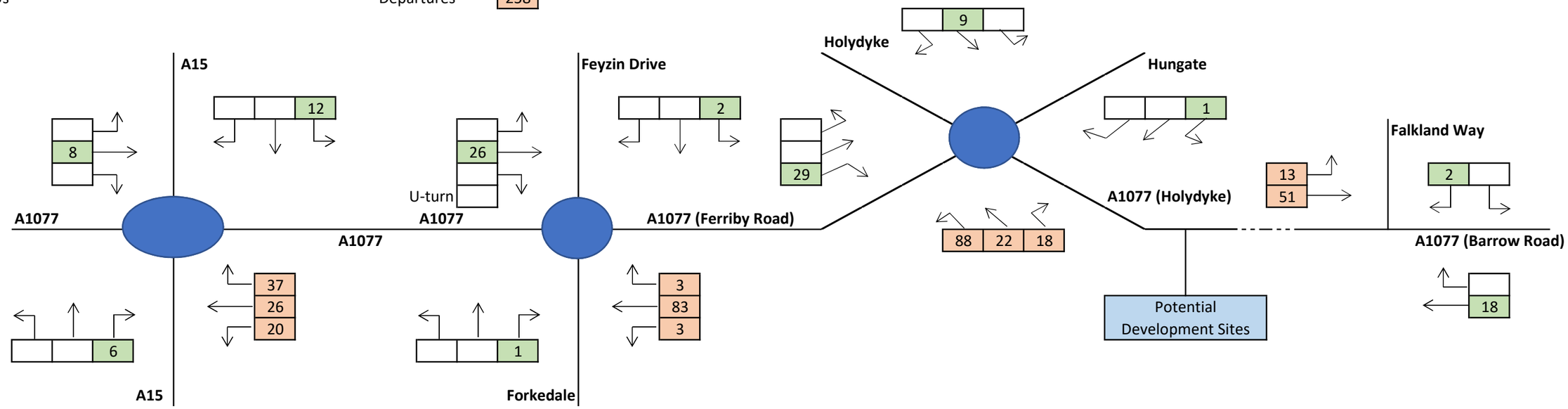


*Assumes 20% of development trips utilise Holydyke and 80% of development trips utilise Falkland Way

Potential Development Sites (25% South-East of Barton Town Centre)

AM Peak (07:30-08:30) Arrivals 79

PCUs Departures 258

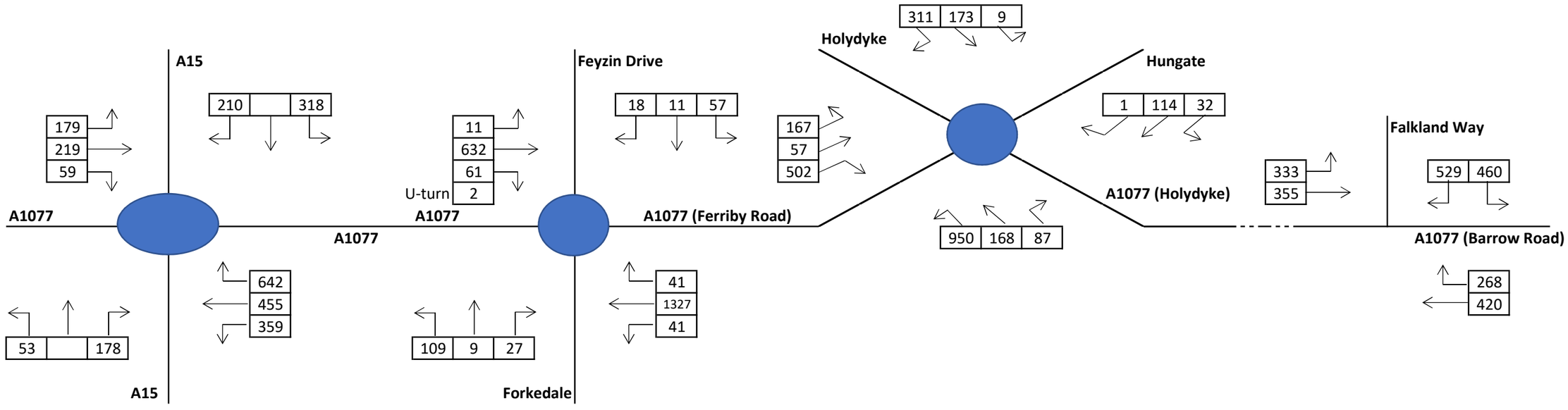


*Assumes 50% of vehicle trips will utilise A1077 (Holydyke), 25% of trips will utilise A1077 (Barrow Road) with the remaining 25% utilising other routes south of Barton town centre

2020 Opening Year + Development (Scenario 2)

AM Peak (07:30-08:30)

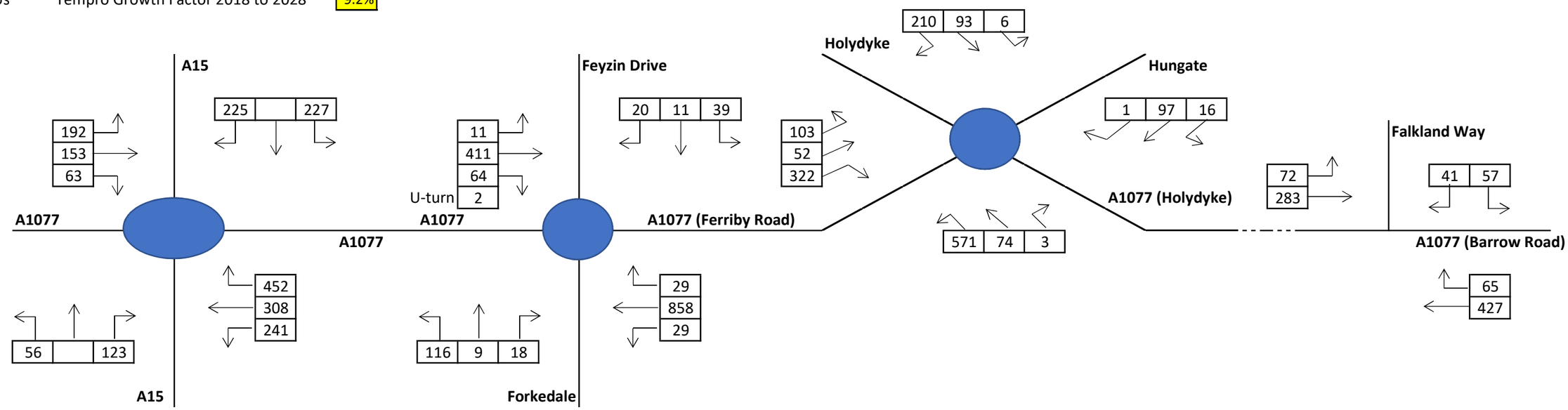
PCUs



2028 Future Year

AM Peak (07:30-08:30)

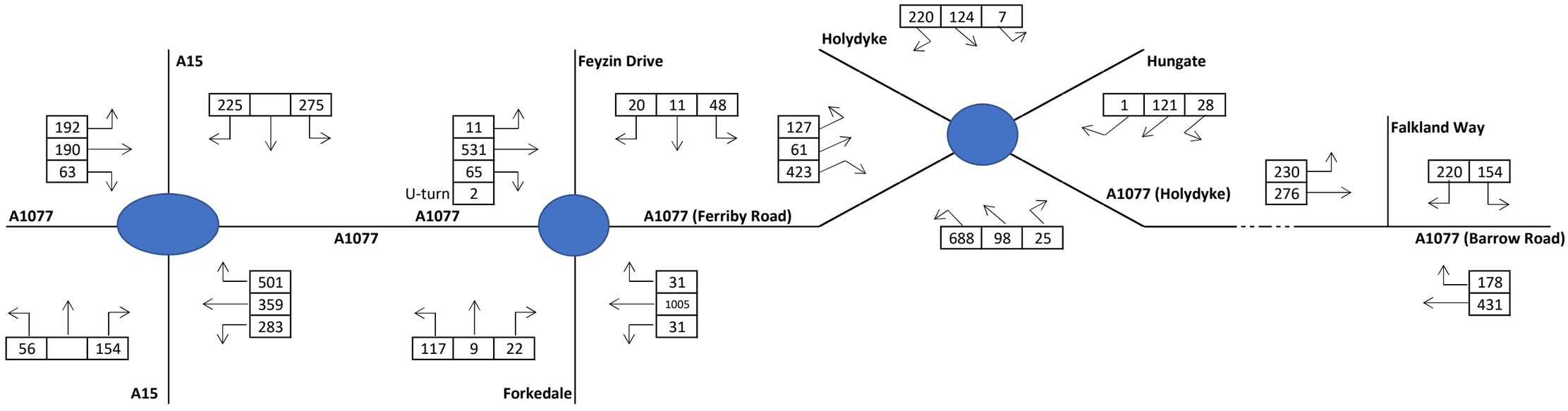
PCUs Tempro Growth Factor 2018 to 2028 9.2%



2028 Future Year + Development (Scenario 1)

AM Peak (07:30-08:30)

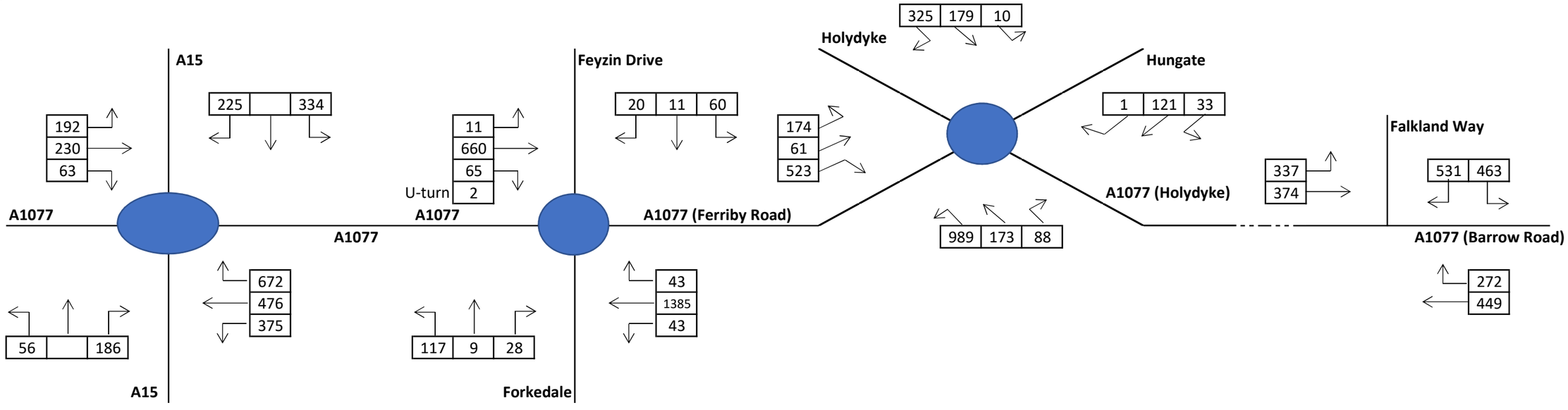
PCUs



2028 Future Year + Development (Scenario 2)

AM Peak (07:30-08:30)

PCUs

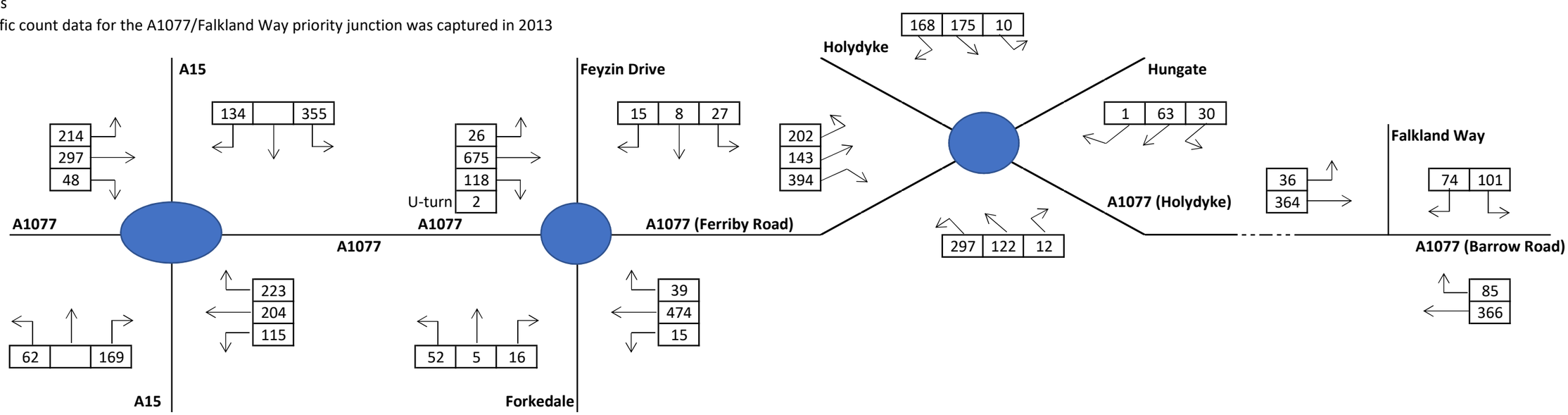


2014 Base

PM Peak (16:45-17:45)

PCUs

Traffic count data for the A1077/Falkland Way priority junction was captured in 2013

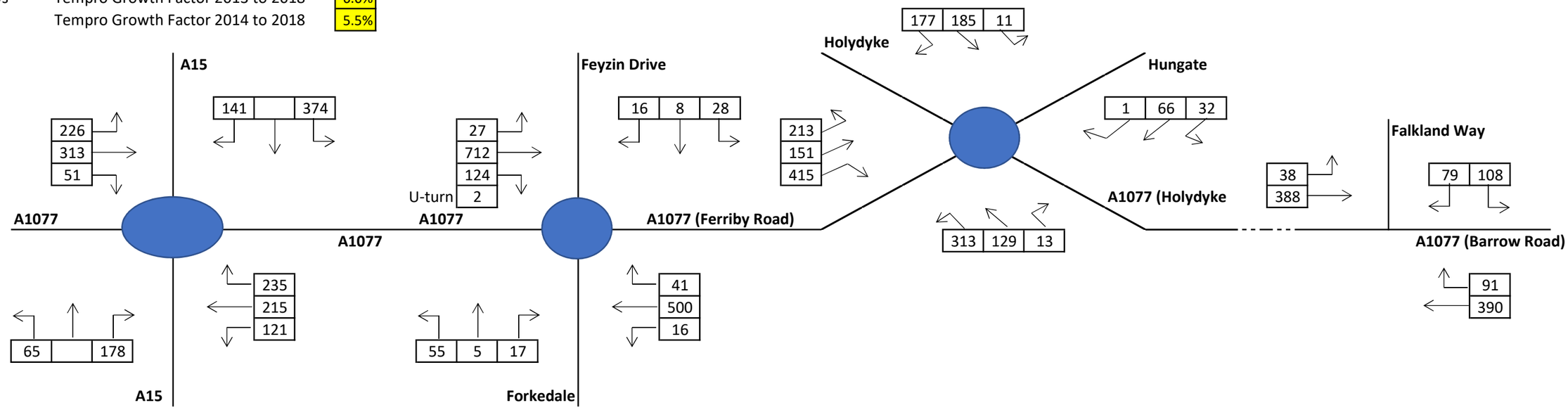


2018 Base

PM Peak (16:45-17:45)

PCUs Tempro Growth Factor 2013 to 2018 6.6%

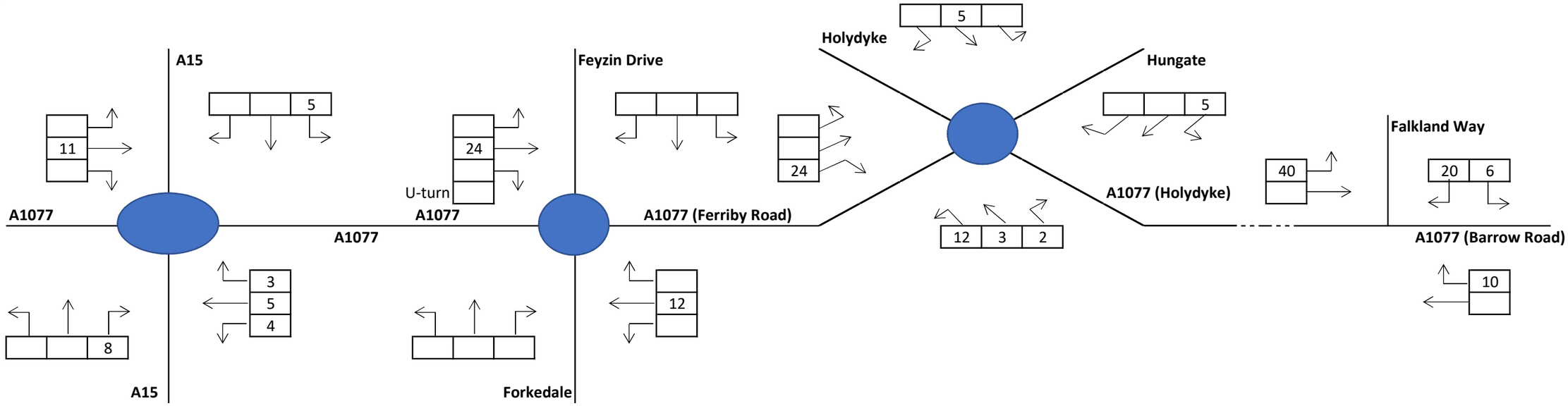
Tempro Growth Factor 2014 to 2018 5.5%



Committed Development - Residential Development West of Falkland Way (ref: PA/2009/0257 and PA/2009/0828)

PM Peak (16:45-17:45)

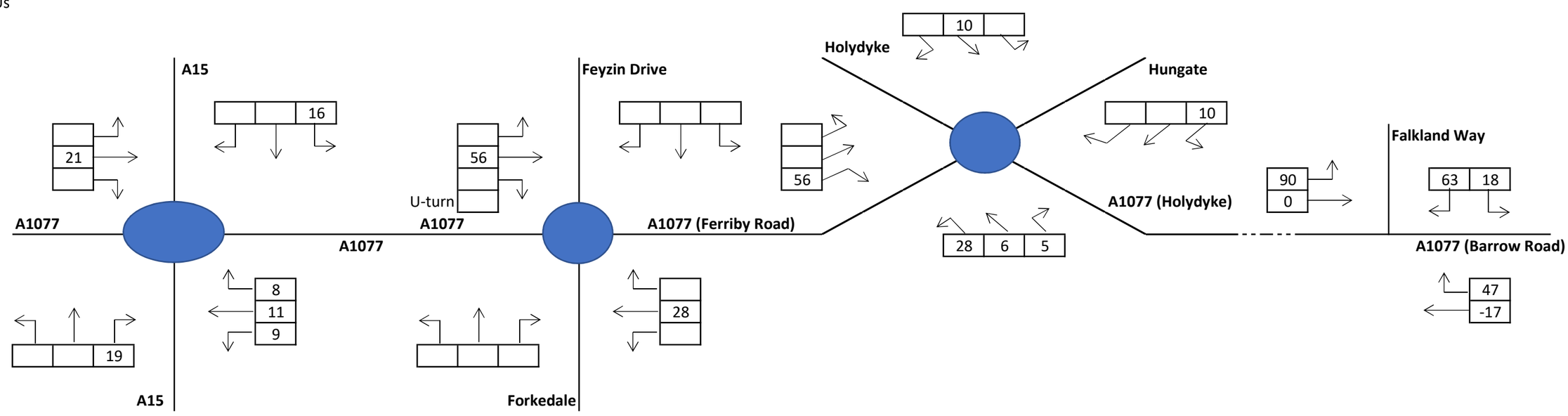
PCUs



Committed Development - Wren Kitchen Development (ref: PA/2014/1360)

PM Peak (16:45-17:45)

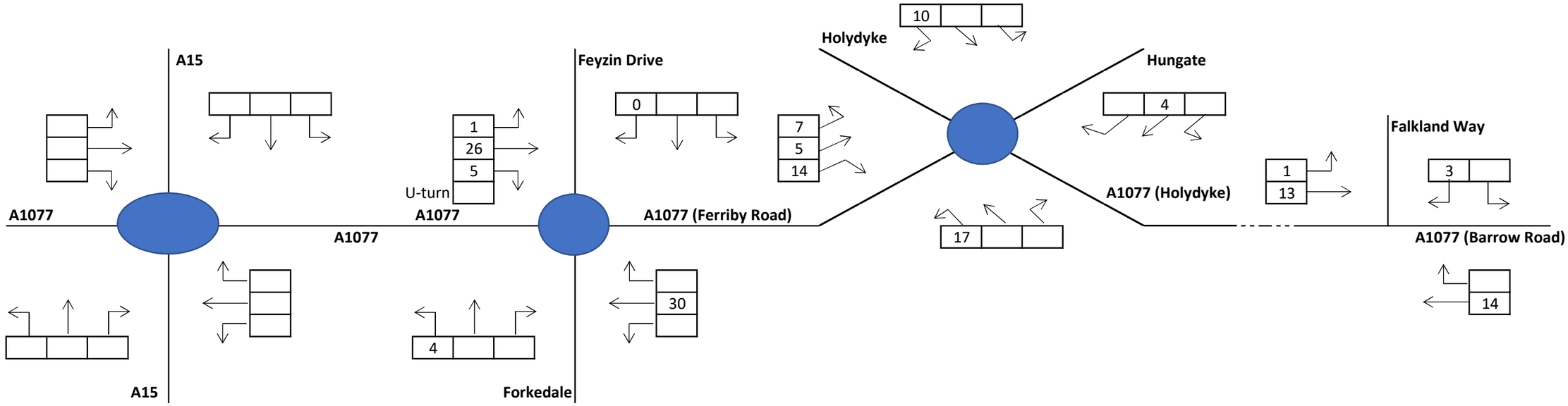
PCUs



Committed Development - Lidl Development (ref: PA/2017/1449)

PM Peak (16:45-17:45)

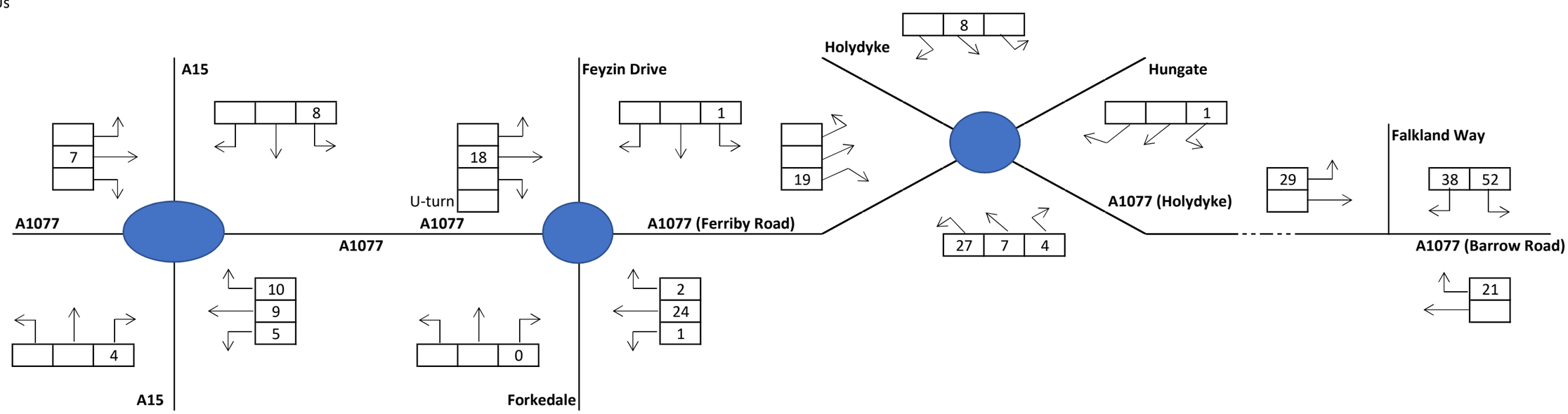
PCUs



Committed Development - Residential Development West of Falkland Way (ref: PA/2016/1793)

PM Peak (16:45-17:45)

PCUs

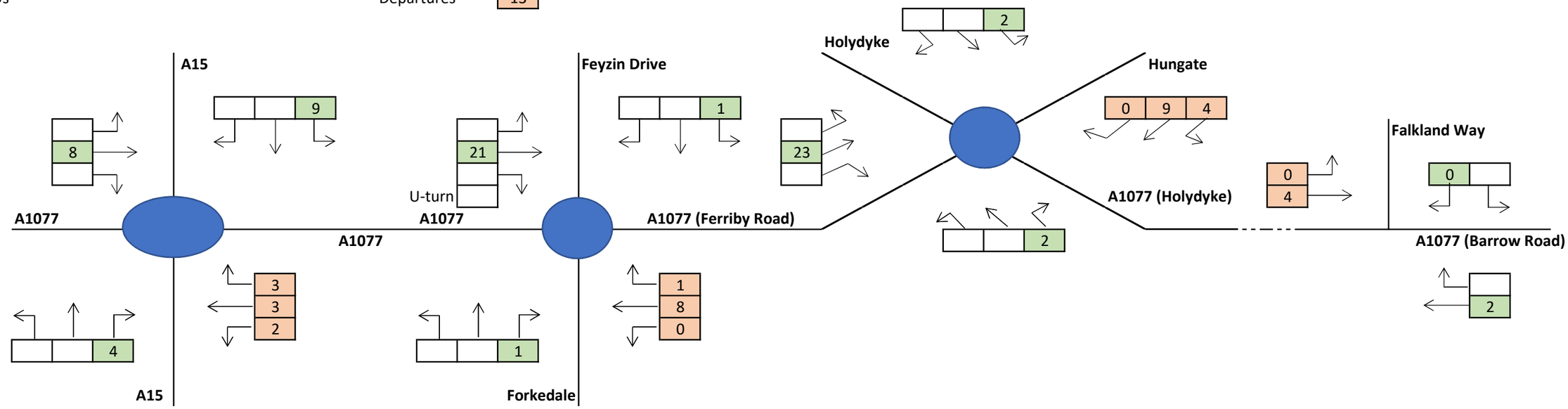


Committed Development - BARH-3 Site (73 Dwellings)

PM Peak (16:45-17:45)

PCUs

Arrivals	26
Departures	13



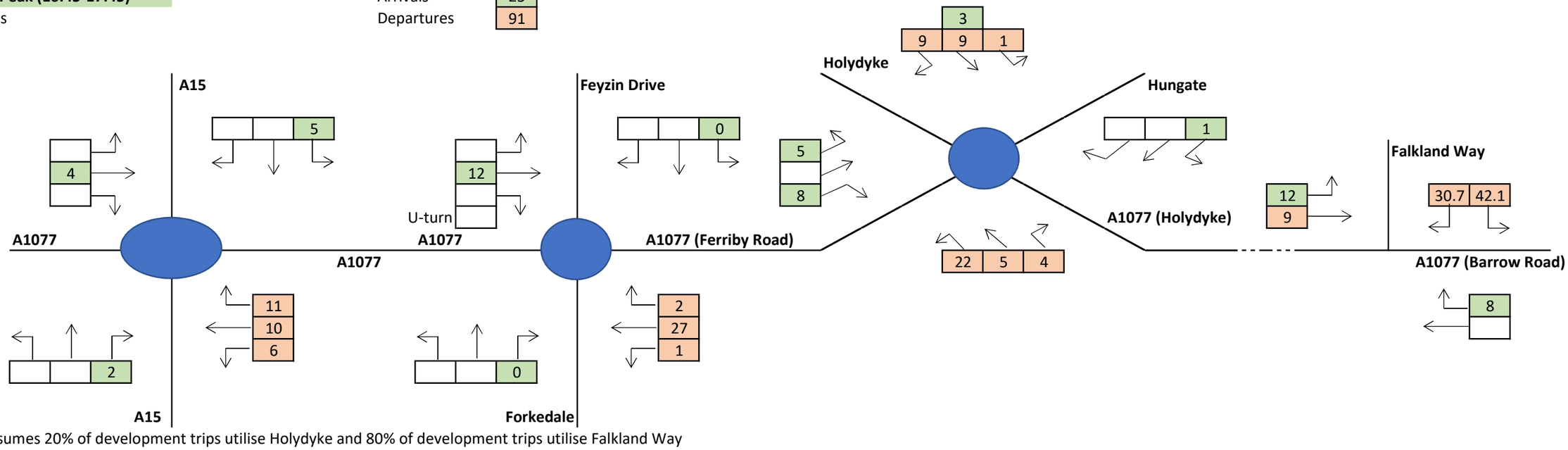
*Assumes all trips utilise Hungate mini-roundabout to access/egress the site

Committed Development - BARE-1 Site (7.15ha)

PM Peak (16:45-17:45)

PCUs

Arrivals	25
Departures	91

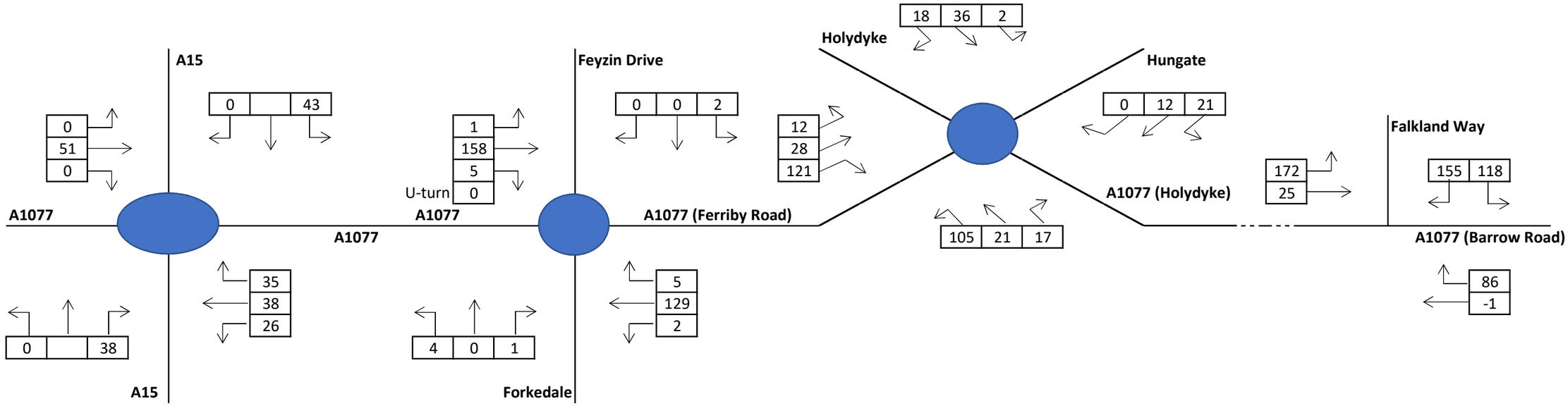


*Assumes 20% of development trips utilise Holydyke and 80% of development trips utilise Falkland Way

Total Committed Development

PM Peak (16:45-17:45)

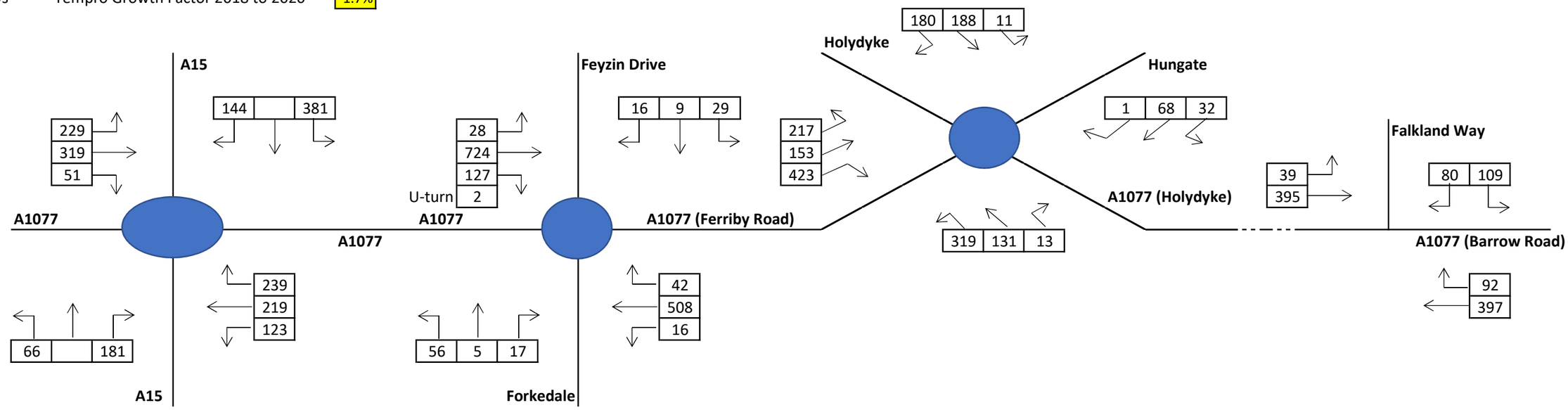
PCUs



2020 Opening Year

PM Peak (16:45-17:45)

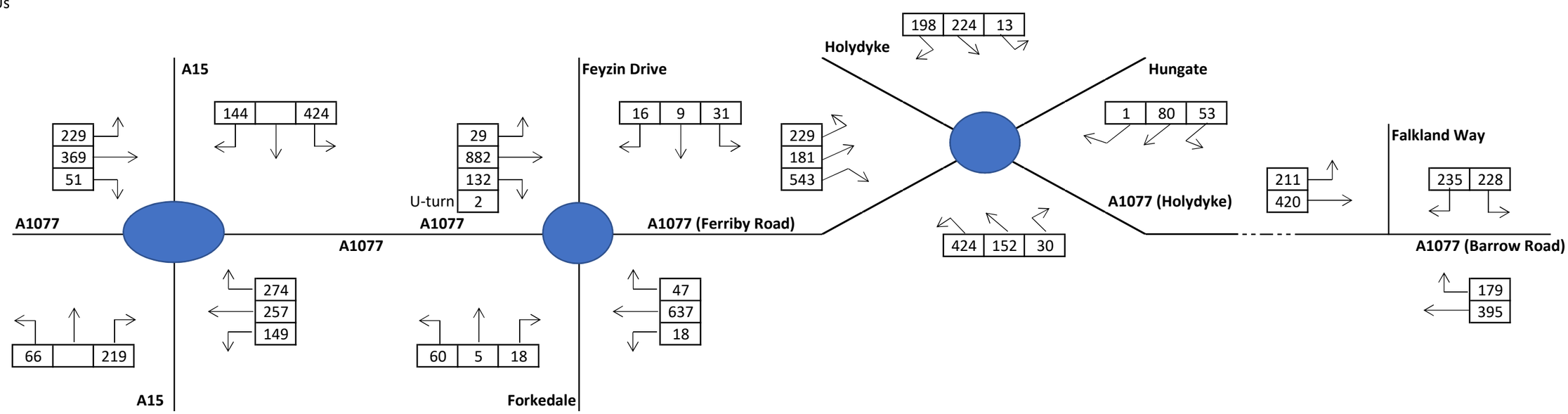
PCUs Tempro Growth Factor 2018 to 2020 1.7%



2020 Opening Year + Development (Scenario 1)

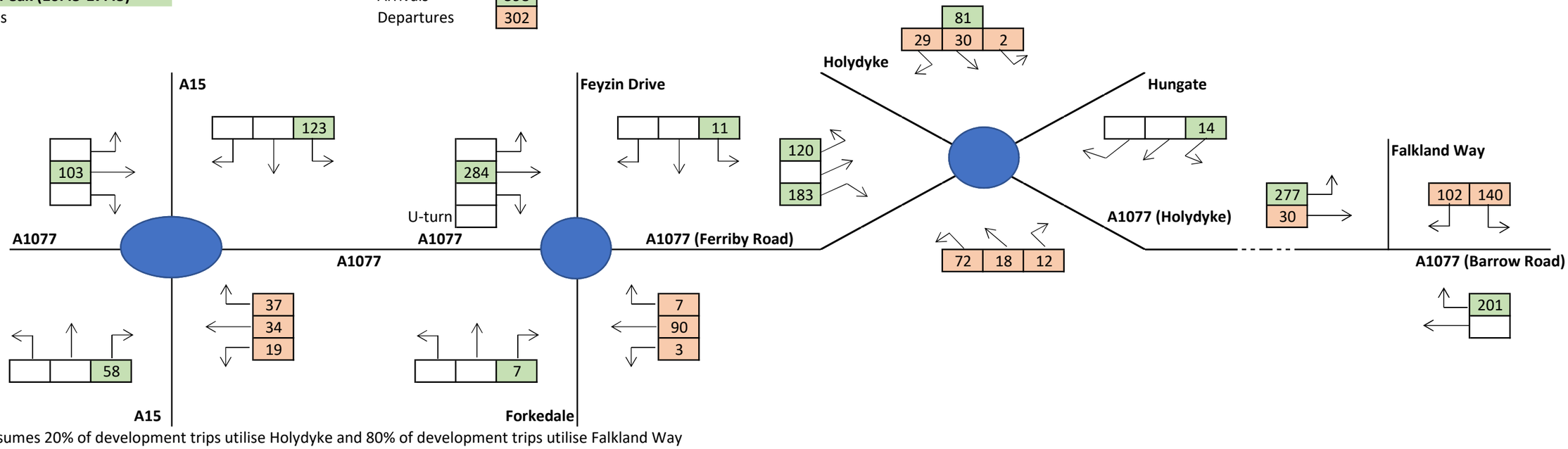
PM Peak (16:45-17:45)

PCUs



Potential Development Sites (75% North-East of Barton Town Centre)

PM Peak (16:45-17:45)	
PCUs	
Arrivals	598
Departures	302



*Assumes 20% of development trips utilise Holydyke and 80% of development trips utilise Falkland Way

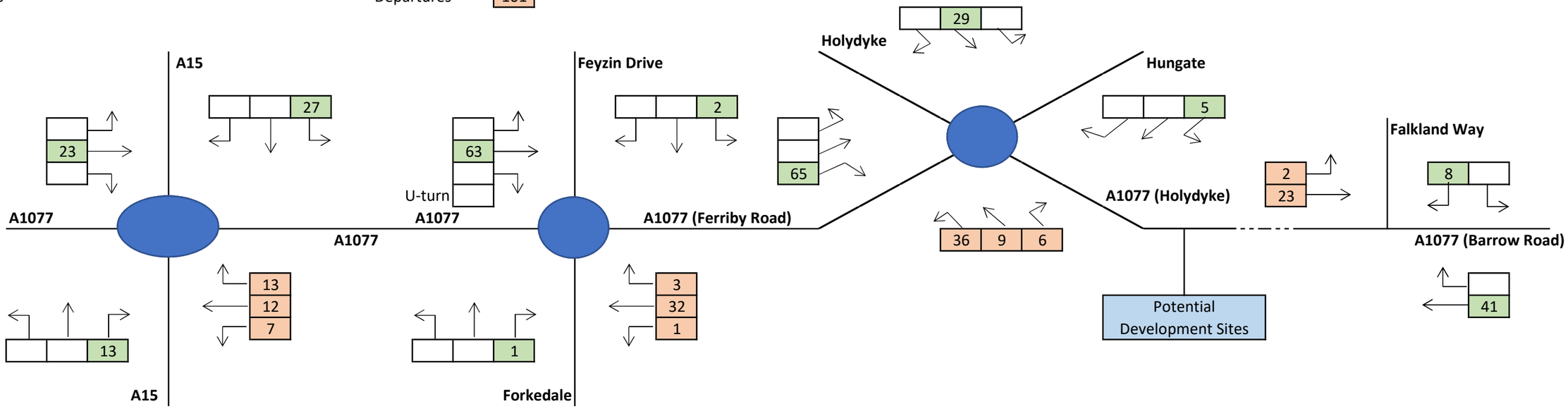
Potential Development Sites (25% South-East of Barton Town Centre)

PM Peak (16:45-17:45)

PCUs

Arrivals 199

Departures 101

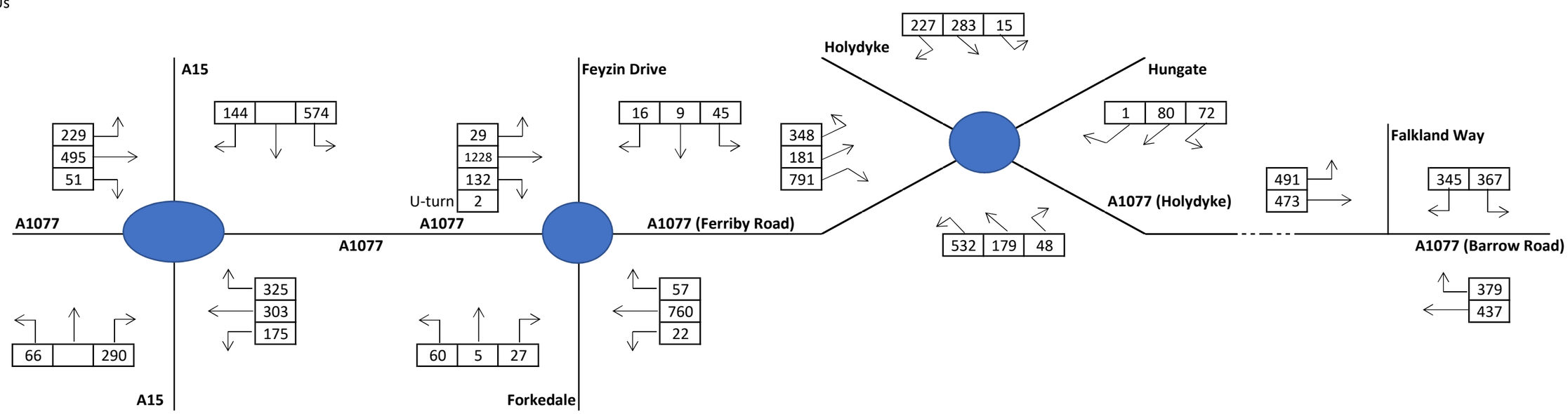


*Assumes 50% of vehicle trips will utilise A1077 (Holydyke), 25% of trips will utilise A1077 (Barrow Road) with the remaining 25% utilising other routes south of Barton town centre

2020 Opening Year + Development (Scenario 2)

PM Peak (16:45-17:45)

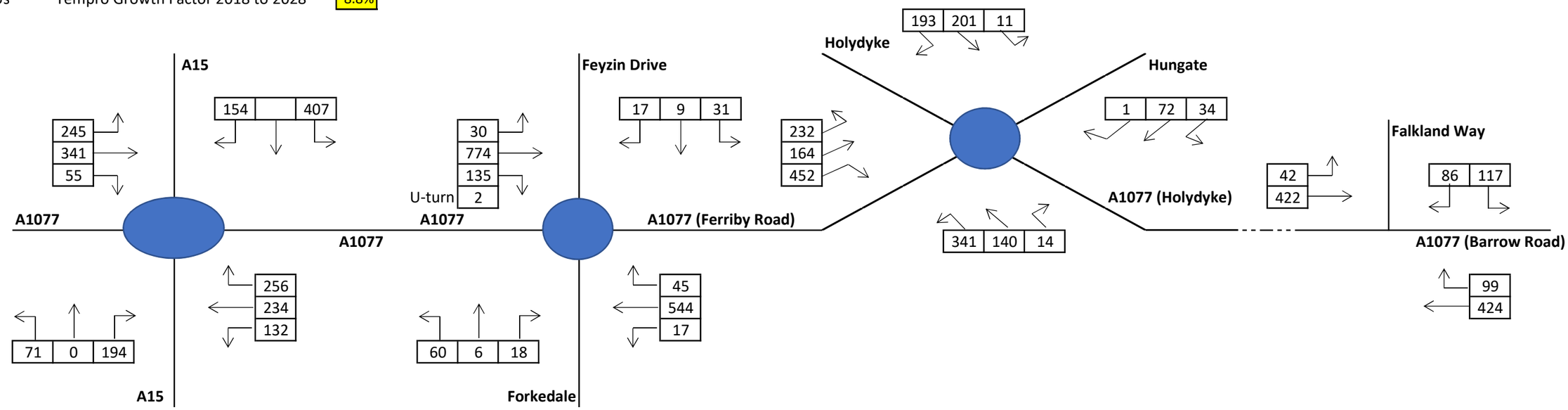
PCUs



2028 Future Year

PM Peak (16:45-17:45)

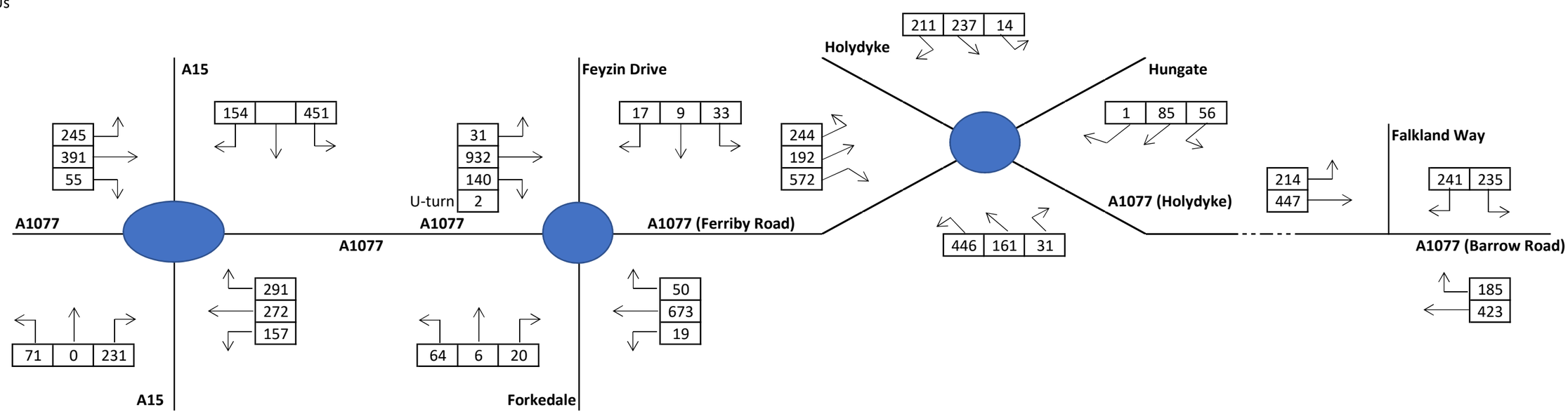
PCUs Tempro Growth Factor 2018 to 2028 8.8%



2028 Future Year + Development (Scenario 1)

PM Peak (16:45-17:45)

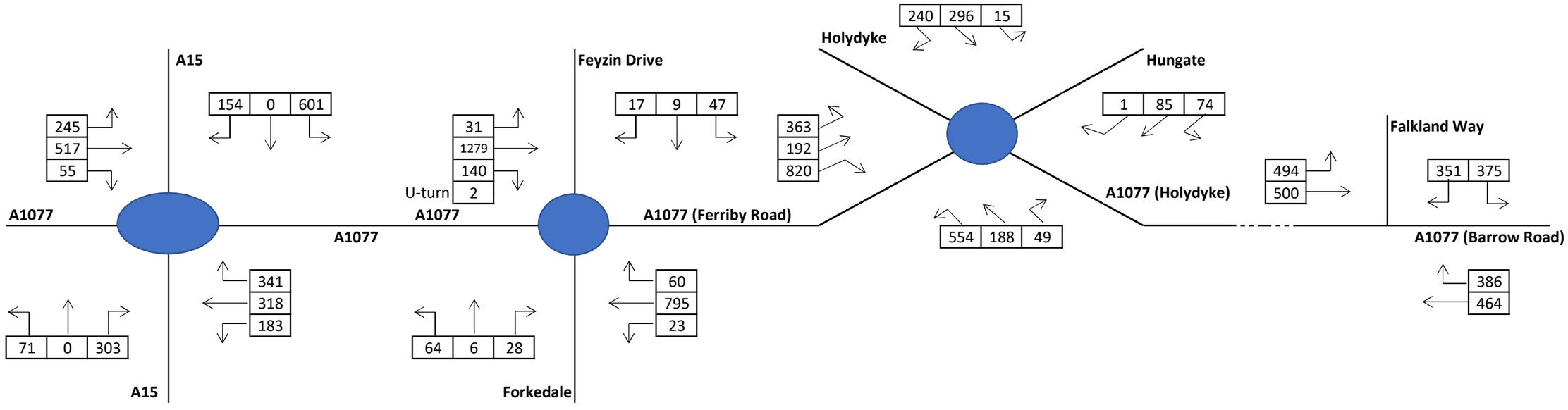
PCUs



2028 Future Year + Development (Scenario 2)

PM Peak (16:45-17:45)

PCUs



Appendix 2 – TEMPro Traffic Growth

Traffic Growth Forecasts

Base Year: 2013
Assessment Year: 2018
Period (years): 5
Area Type: Urban
Road Type: Principal
Area Served: N/A
Region Data Set Version: Yorkshire & Humber YH v7.2
Software Version: TEMPRO v7.2
NTM Version: AF15
NTEM Version: v7.2
Area: North Lincolnshire 001

Factor	Households (HH)	Jobs
Base Year Unadjusted	4898	4246
Forecast Year Unadjusted	5101	4388
Growth Unadjusted	203	142
Committed Developments		
Do Nothing Adjusted	5101	4388
Proposed Development		
Do Something Adjusted	5101	4388

Scenario	Weekday AM Peak Period (07:00-09:59)	Weekday PM Peak Period (16:00-18:59)
Unadjusted	**1.0630**	**1.0658**
Growth Factor:	**6.3%**	**6.6%**

Traffic Growth Forecasts

Base Year: 2014
Assessment Year: 2018
Period (years): 4
Area Type: Urban
Road Type: Principal
Area Served: N/A
Region Data Set Version: Yorkshire & Humber YH v7.2
Software Version: TEMPRO v7.2
NTM Version: AF15
NTEM Version: v7.2
Area: North Lincolnshire 001

Factor	Households (HH)	Jobs
Base Year Unadjusted	4937	4287
Forecast Year Unadjusted	5101	4388
Growth Unadjusted	164	101
Committed Developments		
Do Nothing Adjusted	5101	4388
Proposed Development		
Do Something Adjusted	5101	4388

Scenario	Weekday AM Peak Period (07:00-09:59)	Weekday PM Peak Period (16:00-18:59)
Unadjusted	**1.0530**	**1.0545**
Growth Factor:	**5.3%**	**5.5%**

Traffic Growth Forecasts

Base Year: 2018
Assessment Year: 2020
Period (years): 2
Area Type: Urban
Road Type: Principal
Area Served: N/A
Region Data Set Version: Yorkshire & Humber YH v7.2
Software Version: TEMPRO v7.2
NTM Version: AF15
NTEM Version: v7.2
Area: North Lincolnshire 001

Factor	Households (HH)	Jobs
Base Year Unadjusted	5101	4388
Forecast Year Unadjusted	5188	4407
Growth Unadjusted	87	19
Committed Developments	**800**	**200**
Do Nothing Adjusted	5101	4388
Proposed Development		
Do Something Adjusted	5101	4388

Scenario	Weekday AM Peak Period (07:00-09:59)	Weekday PM Peak Period (16:00-18:59)
Unadjusted	**1.0291**	**1.0282**
Growth Factor:	**2.9%**	**2.8%**

Do Nothing	1.0184	1.0170
Adjusted Growth Factor:	**1.8%**	**1.7%**

Traffic Growth Forecasts

Base Year: 2018
Assessment Year: 2022
Period (years): 4
Area Type: Urban
Road Type: Principal
Area Served: N/A
Region Data Set Version: Yorkshire & Humber YH v7.2
Software Version: TEMPRO v7.2
NTM Version: AF15
NTEM Version: v7.2
Area: North Lincolnshire 001

Factor	Households (HH)	Jobs
Base Year Unadjusted	5101	4388
Forecast Year Unadjusted	5274	4429
Growth Unadjusted	173	41
Committed Developments	**800**	**200**
Do Nothing Adjusted	5101	4388
Proposed Development		
Do Something Adjusted	5101	4388

Scenario	Weekday AM Peak Period (07:00-09:59)	Weekday PM Peak Period (16:00-18:59)
Unadjusted	**1.0635**	**1.0621**
Growth Factor:	**6.3%**	**6.2%**

Do Nothing	1.0415	1.0390
Adjusted Growth Factor:	**4.2%**	**3.9%**

Traffic Growth Forecasts

Base Year: 2018
Assessment Year: 2028
Period (years): 10
Area Type: Urban
Road Type: Principal
Area Served: N/A
Region Data Set Version: Yorkshire & Humber YH v7.2
Software Version: TEMPRO v7.2
NTM Version: AF15
NTEM Version: v7.2
Area: North Lincolnshire 001

Factor	Households (HH)	Jobs
Base Year Unadjusted	5101	4388
Forecast Year Unadjusted	5520	4502
Growth Unadjusted	419	114
Committed Developments	**800**	**200**
Do Nothing Adjusted	5101	4388
Proposed Development		
Do Something Adjusted	5101	4388

Scenario	Weekday AM Peak Period (07:00-09:59)	Weekday PM Peak Period (16:00-18:59)
Unadjusted	**1.1497**	**1.1477**
Growth Factor:	**15.0%**	**14.8%**

Do Nothing	1.0920	1.0877
Adjusted Growth Factor:	**9.2%**	**8.8%**

Traffic Growth Forecasts

Base Year: 2018
Assessment Year: 2037
Period (years): 19
Area Type: Urban
Road Type: Principal
Area Served: N/A
Region Data Set Version: Yorkshire & Humber YH v7.2
Software Version: TEMPRO v7.2
NTM Version: AF15
NTEM Version: v7.2
Area: North Lincolnshire 001

Factor	Households (HH)	Jobs
Base Year Unadjusted	5101	4388
Forecast Year Unadjusted	5815	4615
Growth Unadjusted	714	227
Committed Developments	**800**	**200**
Do Nothing Adjusted	5101	4415
Proposed Development		
Do Something Adjusted	5101	4415

Scenario	Weekday AM Peak Period (07:00-09:59)	Weekday PM Peak Period (16:00-18:59)
Unadjusted	**1.2444**	**1.2402**
Growth Factor:	**24.4%**	**24.0%**

Do Nothing	1.1419	1.1337
Adjusted Growth Factor:	**14.2%**	**13.4%**

Appendix 3 – Baseline Model Results

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.0.1.4646 []

For sales and distribution information, program advice and maintenance, contact TRL:
Tel: +44 (0)1344 770758 email: software@trl.co.uk Web: http://www.trlsoftware.co.uk

Filename: A1077 Holydyke Hungate Mini-Roundabout.j9
Path: Z:\Projects\3103 Barton Highways Masterplan\Data\Junction Model
Report generation date: 14/03/2018 10:05:26

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	Existing Layout - 2018 Base							
1 - B1218 (Holydyke)	0.5	5.44	0.30	A	1.0	8.70	0.47	A
2 - Hungate	0.4	14.28	0.29	B	0.8	26.87	0.43	D
3 - A1077 (Holydyke)	2.9	16.15	0.73	C	1.3	9.33	0.54	A
4 - A1077 (Ferriby Road)	0.9	6.88	0.46	A	5.9	25.89	0.85	D
	Existing Layout - 2020 Opening Year							
1 - B1218 (Holydyke)	0.5	5.52	0.31	A	1.0	8.97	0.49	A
2 - Hungate	0.5	14.76	0.30	B	0.9	29.10	0.45	D
3 - A1077 (Holydyke)	3.1	17.33	0.75	C	1.3	9.61	0.55	A
4 - A1077 (Ferriby Road)	0.9	7.00	0.46	A	6.6	28.77	0.87	D
	Existing Layout - 2020 Opening Year + Development (Scenario 1)							
1 - B1218 (Holydyke)	0.7	6.91	0.39	A	1.7	13.34	0.62	B
2 - Hungate	1.2	29.45	0.54	D	6.2	161.86	0.94	F
3 - A1077 (Holydyke)	16.4	72.69	0.97	F	3.0	16.73	0.74	C
4 - A1077 (Ferriby Road)	1.8	10.24	0.62	B	49.0	156.46	1.07	F
	Existing Layout - 2020 Opening Year + Development (Scenario 2)							
1 - B1218 (Holydyke)	2.0	13.28	0.65	B	2.9	18.63	0.73	C
2 - Hungate	24.8	509.86	1.39	F	44.3	1435.80	1.87	F
3 - A1077 (Holydyke)	408.9	1657.34	1.63	F	10.0	46.15	0.92	E
4 - A1077 (Ferriby Road)	4.3	19.95	0.80	C	376.9	1368.30	1.54	F
	Existing Layout - 2028 Future Year							
1 - B1218 (Holydyke)	0.6	5.86	0.34	A	1.3	10.29	0.54	B
2 - Hungate	0.6	17.10	0.35	C	1.3	41.52	0.56	E
3 - A1077 (Holydyke)	4.5	23.66	0.81	C	1.6	10.86	0.60	B
4 - A1077 (Ferriby Road)	1.1	7.52	0.50	A	11.7	48.11	0.94	E
	Existing Layout - 2028 Future Year + Development (Scenario 1)							
1 - B1218 (Holydyke)	0.8	7.45	0.42	A	2.0	14.73	0.65	B
2 - Hungate	1.8	40.26	0.63	E	12.5	289.44	1.10	F
3 - A1077 (Holydyke)	34.4	132.12	1.05	F	3.8	20.41	0.79	C
4 - A1077 (Ferriby Road)	2.1	11.26	0.66	B	81.0	264.34	1.14	F
	Existing Layout - 2028 Future Year + Development (Scenario 2)							
1 - B1218 (Holydyke)	2.4	15.35	0.69	C	3.4	21.17	0.77	C
2 - Hungate	41.7	1329.13	1.92	F	60.4	2168.04	2.31	F
3 - A1077 (Holydyke)	486.0	2065.13	1.68	F	15.5	67.11	0.97	F
4 - A1077 (Ferriby Road)	5.3	23.85	0.84	C	455.7	1642.37	1.61	F

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

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

File summary

File Description

Title	A1077 Holydyke Hungate Mini-Roundabout
Location	Barton, North Lincolnshire
Site number	
Date	14/03/2018
Version	
Status	(new file)
Identifier	
Client	NLC
Jobnumber	3103
Enumerator	LTP\MR
Description	

Units

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

Analysis Options

Mini-roundabout model	Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
JUNCTIONS 9			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	07:15	08:45	15
D2	2018 Base	PM	ONE HOUR	16:30	18:00	15
D3	2020 Opening Year	AM	ONE HOUR	07:15	08:45	15
D4	2020 Opening Year	PM	ONE HOUR	16:30	18:00	15
D5	2020 Opening Year + Development (Scenario 1)	AM	ONE HOUR	07:15	08:45	15
D6	2020 Opening Year + Development (Scenario 1)	PM	ONE HOUR	16:30	18:00	15
D7	2020 Opening Year + Development (Scenario 2)	AM	ONE HOUR	07:15	08:45	15
D8	2020 Opening Year + Development (Scenario 2)	PM	ONE HOUR	16:30	18:00	15
D9	2028 Future Year	AM	ONE HOUR	07:15	08:45	15
D10	2028 Future Year	PM	ONE HOUR	16:30	18:00	15
D11	2028 Future Year + Development (Scenario 1)	AM	ONE HOUR	07:15	08:45	15
D12	2028 Future Year + Development (Scenario 1)	PM	ONE HOUR	16:30	18:00	15
D13	2028 Future Year + Development (Scenario 2)	AM	ONE HOUR	07:15	08:45	15
D14	2028 Future Year + Development (Scenario 2)	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	Mini-roundabout		Mini-roundabout appears to have unbalanced flows and may behave like a priority junction; treat results with caution. See User Guide for details.[Arms 3 and 4 have 72% of the total flow for the roundabout for one or more time segments]

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	A1077 Holydyke Hungate	Mini-roundabout	11.02	B

Junction Network Options

Driving side	Lighting	Road surface	In London
Left	Normal/unknown	Normal/unknown	

Arms

Arms

Arm	Name	Description
1	B1218 (Holydyke)	
2	Hungate	
3	A1077 (Holydyke)	
4	A1077 (Ferriby Road)	

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
1 - B1218 (Holydyke)	4.30	4.30	6.80	5.0	10.00	9.00	0.0	
2 - Hungate	3.00	3.00	4.50	2.0	7.00	3.00	0.0	
3 - A1077 (Holydyke)	3.90	3.90	4.80	2.0	18.00	16.00	0.0	
4 - A1077 (Ferriby Road)	4.00	4.00	5.30	3.0	11.00	6.00	0.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1 - B1218 (Holydyke)	0.677	1297
2 - Hungate	0.607	775
3 - A1077 (Holydyke)	0.679	1108
4 - A1077 (Ferriby Road)	0.649	1107

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	07:15	08:45	15

Default vehicle mix	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 - B1218 (Holydyke)		✓	283	100.000
2 - Hungate		✓	104	100.000
3 - A1077 (Holydyke)		✓	593	100.000
4 - A1077 (Ferriby Road)		✓	437	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	0	5	85	193
	2 - Hungate	1	0	15	88
	3 - A1077 (Holydyke)	67	3	0	523
	4 - A1077 (Ferriby Road)	95	47	295	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	10	10	10	10
	2 - Hungate	10	10	10	10
	3 - A1077 (Holydyke)	10	10	10	10
	4 - A1077 (Ferriby Road)	10	10	10	10

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - B1218 (Holydyke)	0.30	5.44	0.5	A
2 - Hungate	0.29	14.28	0.4	B
3 - A1077 (Holydyke)	0.73	16.15	2.9	C
4 - A1077 (Ferriby Road)	0.46	6.88	0.9	A

Main Results for each time segment

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)	LOS
1 - B1218 (Holydyke)	213	258	1122	0.190	212	0.3	4.349	A
2 - Hungate	78	429	514	0.152	78	0.2	9.052	A
3 - A1077 (Holydyke)	446	211	964	0.463	443	0.9	7.538	A
4 - A1077 (Ferriby Road)	329	53	1073	0.307	327	0.5	5.294	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)	LOS
1 - B1218 (Holydyke)	254	310	1087	0.234	254	0.3	4.754	A
2 - Hungate	93	514	462	0.202	93	0.3	10.718	B
3 - A1077 (Holydyke)	533	253	936	0.570	531	1.4	9.734	A
4 - A1077 (Ferriby Road)	393	64	1066	0.368	392	0.6	5.871	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)	LOS
1 - B1218 (Holydyke)	312	379	1040	0.300	311	0.5	5.430	A
2 - Hungate	115	630	392	0.292	114	0.4	14.177	B
3 - A1077 (Holydyke)	653	310	897	0.727	648	2.8	15.508	C
4 - A1077 (Ferriby Road)	481	78	1057	0.455	480	0.9	6.850	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)	LOS
1 - B1218 (Holydyke)	312	380	1039	0.300	312	0.5	5.440	A
2 - Hungate	115	631	392	0.292	114	0.4	14.282	B
3 - A1077 (Holydyke)	653	310	897	0.728	653	2.9	16.153	C
4 - A1077 (Ferriby Road)	481	78	1057	0.455	481	0.9	6.878	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)	LOS
1 - B1218 (Holydyke)	254	311	1086	0.234	255	0.3	4.767	A
2 - Hungate	93	516	461	0.203	94	0.3	10.808	B
3 - A1077 (Holydyke)	533	254	935	0.570	539	1.5	10.122	B
4 - A1077 (Ferriby Road)	393	64	1066	0.369	394	0.6	5.906	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - B1218 (Holydyke)	213	260	1120	0.190	213	0.3	4.369	A
2 - Hungate	78	432	512	0.153	79	0.2	9.140	A
3 - A1077 (Holydyke)	446	213	963	0.463	449	1.0	7.725	A
4 - A1077 (Ferriby Road)	329	54	1073	0.307	330	0.5	5.336	A

Existing Layout - 2018 Base, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Mini-roundabout		Mini-roundabout appears to have unbalanced flows and may behave like a priority junction; treat results with caution. See User Guide for details.[Arms 3 and 4 have 72% of the total flow for the roundabout for one or more time segments]

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	A1077 Holydyke Hungate	Mini-roundabout	17.77	C

Junction Network Options

Driving side	Lighting	Road surface	In London
Left	Normal/unknown	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

Default vehicle mix	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 - B1218 (Holydyke)		✓	373	100.000
2 - Hungate		✓	99	100.000
3 - A1077 (Holydyke)		✓	455	100.000
4 - A1077 (Ferriby Road)		✓	779	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	0	11	185	177
	2 - Hungate	1	0	32	66
	3 - A1077 (Holydyke)	129	13	0	313
	4 - A1077 (Ferriby Road)	213	151	415	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	10	10	10	10
	2 - Hungate	10	10	10	10
	3 - A1077 (Holydyke)	10	10	10	10
	4 - A1077 (Ferriby Road)	10	10	10	10

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - B1218 (Holydyke)	0.47	8.70	1.0	A
2 - Hungate	0.43	26.87	0.8	D
3 - A1077 (Holydyke)	0.54	9.33	1.3	A
4 - A1077 (Ferriby Road)	0.85	25.89	5.9	D

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)	LOS
1 - B1218 (Holydyke)	281	432	1004	0.280	279	0.4	5.450	A
2 - Hungate	75	580	422	0.176	74	0.2	11.327	B
3 - A1077 (Holydyke)	343	182	984	0.348	340	0.6	6.129	A
4 - A1077 (Ferriby Road)	586	107	1038	0.565	581	1.4	8.561	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)	LOS
1 - B1218 (Holydyke)	335	518	946	0.355	335	0.6	6.472	A
2 - Hungate	89	696	352	0.253	88	0.4	14.985	B
3 - A1077 (Holydyke)	409	219	959	0.426	408	0.8	7.174	A
4 - A1077 (Ferriby Road)	700	128	1024	0.684	697	2.3	11.959	B

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)	LOS
1 - B1218 (Holydyke)	411	628	871	0.471	409	1.0	8.545	A
2 - Hungate	109	847	260	0.419	107	0.8	25.640	D
3 - A1077 (Holydyke)	501	267	926	0.541	499	1.3	9.226	A
4 - A1077 (Ferriby Road)	858	157	1006	0.853	845	5.5	22.990	C

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)	LOS
1 - B1218 (Holydyke)	411	636	866	0.474	411	1.0	8.700	A
2 - Hungate	109	855	256	0.426	109	0.8	26.871	D
3 - A1077 (Holydyke)	501	269	925	0.541	501	1.3	9.326	A
4 - A1077 (Ferriby Road)	858	157	1005	0.853	856	5.9	25.886	D

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)	LOS
1 - B1218 (Holydyke)	335	530	937	0.358	337	0.6	6.607	A
2 - Hungate	89	707	345	0.258	91	0.4	15.633	C
3 - A1077 (Holydyke)	409	221	958	0.427	411	0.8	7.266	A
4 - A1077 (Ferriby Road)	700	129	1024	0.684	714	2.5	13.291	B

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)	LOS
1 - B1218 (Holydyke)	281	439	999	0.281	282	0.4	5.521	A
2 - Hungate	75	588	418	0.178	75	0.2	11.578	B
3 - A1077 (Holydyke)	343	184	982	0.349	343	0.6	6.208	A
4 - A1077 (Ferriby Road)	586	108	1037	0.565	591	1.5	8.940	A

Existing Layout - 2020 Opening Year, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Mini-roundabout		Mini-roundabout appears to have unbalanced flows and may behave like a priority junction; treat results with caution. See User Guide for details.[Arms 3 and 4 have 72% of the total flow for the roundabout for one or more time segments]

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	A1077 Holydyke Hungate	Mini-roundabout	11.60	B

Junction Network Options

Driving side	Lighting	Road surface	In London
Left	Normal/unknown	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	2020 Opening Year	AM	ONE HOUR	07:15	08:45	15

Default vehicle mix	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 - B1218 (Holydyke)		✓	288	100.000
2 - Hungate		✓	106	100.000
3 - A1077 (Holydyke)		✓	605	100.000
4 - A1077 (Ferriby Road)		✓	445	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	0	5	87	196
	2 - Hungate	1	0	15	90
	3 - A1077 (Holydyke)	69	3	0	533
	4 - A1077 (Ferriby Road)	97	48	300	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	10	10	10	10
	2 - Hungate	10	10	10	10
	3 - A1077 (Holydyke)	10	10	10	10
	4 - A1077 (Ferriby Road)	10	10	10	10

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - B1218 (Holydyke)	0.31	5.52	0.5	A
2 - Hungate	0.30	14.76	0.5	B
3 - A1077 (Holydyke)	0.75	17.33	3.1	C
4 - A1077 (Ferriby Road)	0.46	7.00	0.9	A

Main Results for each time segment

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)	LOS
1 - B1218 (Holydyke)	217	263	1119	0.194	216	0.3	4.381	A
2 - Hungate	80	437	510	0.157	79	0.2	9.180	A
3 - A1077 (Holydyke)	455	215	962	0.473	452	1.0	7.702	A
4 - A1077 (Ferriby Road)	335	54	1072	0.312	333	0.5	5.344	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)	LOS
1 - B1218 (Holydyke)	259	315	1083	0.239	259	0.3	4.798	A
2 - Hungate	95	523	457	0.209	95	0.3	10.930	B
3 - A1077 (Holydyke)	544	258	933	0.583	542	1.5	10.070	B
4 - A1077 (Ferriby Road)	400	65	1065	0.376	399	0.7	5.945	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)	LOS
1 - B1218 (Holydyke)	317	386	1035	0.306	317	0.5	5.508	A
2 - Hungate	117	641	386	0.303	116	0.5	14.638	B
3 - A1077 (Holydyke)	666	315	894	0.745	660	3.0	16.521	C
4 - A1077 (Ferriby Road)	490	80	1056	0.464	489	0.9	6.970	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)	LOS
1 - B1218 (Holydyke)	317	386	1035	0.306	317	0.5	5.516	A
2 - Hungate	117	642	385	0.303	117	0.5	14.755	B
3 - A1077 (Holydyke)	666	316	893	0.746	666	3.1	17.332	C
4 - A1077 (Ferriby Road)	490	80	1055	0.464	490	0.9	7.003	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)	LOS
1 - B1218 (Holydyke)	259	316	1082	0.239	259	0.3	4.817	A
2 - Hungate	95	525	456	0.209	96	0.3	11.030	B
3 - A1077 (Holydyke)	544	259	932	0.584	550	1.6	10.531	B
4 - A1077 (Ferriby Road)	400	66	1064	0.376	401	0.7	5.980	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - B1218 (Holydyke)	217	265	1117	0.194	217	0.3	4.400	A
2 - Hungate	80	440	508	0.157	80	0.2	9.271	A
3 - A1077 (Holydyke)	455	217	961	0.474	458	1.0	7.911	A
4 - A1077 (Ferriby Road)	335	55	1072	0.313	336	0.5	5.387	A

Existing Layout - 2020 Opening Year, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Mini-roundabout		Mini-roundabout appears to have unbalanced flows and may behave like a priority junction; treat results with caution. See User Guide for details.[Arms 3 and 4 have 72% of the total flow for the roundabout for one or more time segments]

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	A1077 Holydyke Hungate	Mini-roundabout	19.36	C

Junction Network Options

Driving side	Lighting	Road surface	In London
Left	Normal/unknown	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	2020 Opening Year	PM	ONE HOUR	16:30	18:00	15

Default vehicle mix	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 - B1218 (Holydyke)		✓	379	100.000
2 - Hungate		✓	101	100.000
3 - A1077 (Holydyke)		✓	463	100.000
4 - A1077 (Ferriby Road)		✓	793	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	0	11	188	180
	2 - Hungate	1	0	32	68
	3 - A1077 (Holydyke)	131	13	0	319
	4 - A1077 (Ferriby Road)	217	153	423	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	10	10	10	10
	2 - Hungate	10	10	10	10
	3 - A1077 (Holydyke)	10	10	10	10
	4 - A1077 (Ferriby Road)	10	10	10	10

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - B1218 (Holydyke)	0.49	8.97	1.0	A
2 - Hungate	0.45	29.10	0.9	D
3 - A1077 (Holydyke)	0.55	9.61	1.3	A
4 - A1077 (Ferriby Road)	0.87	28.77	6.6	D

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)	LOS
1 - B1218 (Holydyke)	285	439	999	0.286	284	0.4	5.520	A
2 - Hungate	76	591	416	0.183	75	0.2	11.582	B
3 - A1077 (Holydyke)	349	186	981	0.355	346	0.6	6.210	A
4 - A1077 (Ferriby Road)	597	108	1037	0.576	591	1.5	8.771	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)	LOS
1 - B1218 (Holydyke)	341	527	940	0.362	340	0.6	6.592	A
2 - Hungate	91	708	345	0.263	90	0.4	15.527	C
3 - A1077 (Holydyke)	416	223	956	0.435	415	0.8	7.306	A
4 - A1077 (Ferriby Road)	713	130	1023	0.697	709	2.4	12.452	B

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)	LOS
1 - B1218 (Holydyke)	417	638	865	0.483	416	1.0	8.791	A
2 - Hungate	111	862	252	0.442	109	0.8	27.508	D
3 - A1077 (Holydyke)	510	272	923	0.552	508	1.3	9.496	A
4 - A1077 (Ferriby Road)	873	159	1004	0.869	859	6.1	24.960	C

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)	LOS
1 - B1218 (Holydyke)	417	647	858	0.486	417	1.0	8.972	A
2 - Hungate	111	870	247	0.451	111	0.9	29.101	D
3 - A1077 (Holydyke)	510	274	922	0.553	510	1.3	9.608	A
4 - A1077 (Ferriby Road)	873	160	1004	0.870	871	6.6	28.773	D

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)	LOS
1 - B1218 (Holydyke)	341	541	930	0.366	342	0.6	6.751	A
2 - Hungate	91	721	337	0.269	93	0.4	16.319	C
3 - A1077 (Holydyke)	416	226	954	0.436	418	0.9	7.413	A
4 - A1077 (Ferriby Road)	713	131	1022	0.697	729	2.6	14.132	B

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)	LOS
1 - B1218 (Holydyke)	285	447	994	0.287	286	0.4	5.601	A
2 - Hungate	76	599	411	0.185	77	0.3	11.858	B
3 - A1077 (Holydyke)	349	188	980	0.356	350	0.6	6.294	A
4 - A1077 (Ferriby Road)	597	109	1036	0.576	601	1.5	9.196	A

Existing Layout - 2020 Opening Year + Development (Scenario 1), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Mini-roundabout		Mini-roundabout appears to have unbalanced flows and may behave like a priority junction; treat results with caution. See User Guide for details.[Arms 3 and 4 have 74% of the total flow for the roundabout for one or more time segments]

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	A1077 Holydyke Hungate	Mini-roundabout	37.50	E

Junction Network Options

Driving side	Lighting	Road surface	In London
Left	Normal/unknown	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	2020 Opening Year + Development (Scenario 1)	AM	ONE HOUR	07:15	08:45	15

Default vehicle mix	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 - B1218 (Holydyke)		✓	330	100.000
2 - Hungate		✓	142	100.000
3 - A1077 (Holydyke)		✓	768	100.000
4 - A1077 (Ferriby Road)		✓	579	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	0	7	117	206
	2 - Hungate	1	0	27	114
	3 - A1077 (Holydyke)	93	25	0	650
	4 - A1077 (Ferriby Road)	120	57	402	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	10	10	10	10
	2 - Hungate	10	10	10	10
	3 - A1077 (Holydyke)	10	10	10	10
	4 - A1077 (Ferriby Road)	10	10	10	10

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - B1218 (Holydyke)	0.39	6.91	0.7	A
2 - Hungate	0.54	29.45	1.2	D
3 - A1077 (Holydyke)	0.97	72.69	16.4	F
4 - A1077 (Ferriby Road)	0.62	10.24	1.8	B

Main Results for each time segment

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)	LOS
1 - B1218 (Holydyke)	248	362	1052	0.236	247	0.3	4.914	A
2 - Hungate	107	542	445	0.240	106	0.3	11.606	B
3 - A1077 (Holydyke)	578	240	945	0.612	571	1.7	10.426	B
4 - A1077 (Ferriby Road)	436	89	1050	0.415	433	0.8	6.384	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)	LOS
1 - B1218 (Holydyke)	297	434	1003	0.296	296	0.5	5.601	A
2 - Hungate	128	650	380	0.336	127	0.5	15.601	C
3 - A1077 (Holydyke)	690	288	912	0.757	684	3.2	16.921	C
4 - A1077 (Ferriby Road)	521	106	1039	0.501	519	1.1	7.606	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)	LOS
1 - B1218 (Holydyke)	363	530	938	0.387	362	0.7	6.869	A
2 - Hungate	156	795	292	0.536	154	1.2	28.172	D
3 - A1077 (Holydyke)	846	351	869	0.973	809	12.4	48.038	E
4 - A1077 (Ferriby Road)	637	125	1026	0.621	635	1.8	10.049	B

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)	LOS
1 - B1218 (Holydyke)	363	532	936	0.388	363	0.7	6.912	A
2 - Hungate	156	798	290	0.539	156	1.2	29.445	D
3 - A1077 (Holydyke)	846	353	868	0.974	830	16.4	72.686	F
4 - A1077 (Ferriby Road)	637	129	1024	0.623	637	1.8	10.235	B

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)	LOS
1 - B1218 (Holydyke)	297	439	999	0.297	298	0.5	5.648	A
2 - Hungate	128	654	377	0.338	130	0.6	16.190	C
3 - A1077 (Holydyke)	690	291	910	0.759	741	3.8	28.773	D
4 - A1077 (Ferriby Road)	521	115	1033	0.504	523	1.1	7.805	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - B1218 (Holydyke)	248	366	1049	0.237	249	0.3	4.952	A
2 - Hungate	107	547	442	0.242	108	0.4	11.866	B
3 - A1077 (Holydyke)	578	243	943	0.613	586	1.8	11.333	B
4 - A1077 (Ferriby Road)	436	91	1049	0.416	437	0.8	6.495	A

Existing Layout - 2020 Opening Year + Development (Scenario 1), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Mini-roundabout		Mini-roundabout appears to have unbalanced flows and may behave like a priority junction; treat results with caution. See User Guide for details.[Arms 3 and 4 have 73% of the total flow for the roundabout for one or more time segments]

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	A1077 Holydyke Hungate	Mini-roundabout	87.75	F

Junction Network Options

Driving side	Lighting	Road surface	In London
Left	Normal/unknown	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	2020 Opening Year + Development (Scenario 1)	PM	ONE HOUR	16:30	18:00	15

Default vehicle mix	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 - B1218 (Holydyke)		✓	435	100.000
2 - Hungate		✓	134	100.000
3 - A1077 (Holydyke)		✓	606	100.000
4 - A1077 (Ferriby Road)		✓	953	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	0	13	224	198
	2 - Hungate	1	0	53	80
	3 - A1077 (Holydyke)	152	30	0	424
	4 - A1077 (Ferriby Road)	229	181	543	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	10	10	10	10
	2 - Hungate	10	10	10	10
	3 - A1077 (Holydyke)	10	10	10	10
	4 - A1077 (Ferriby Road)	10	10	10	10

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - B1218 (Holydyke)	0.62	13.34	1.7	B
2 - Hungate	0.94	161.86	6.2	F
3 - A1077 (Holydyke)	0.74	16.73	3.0	C
4 - A1077 (Ferriby Road)	1.07	156.46	49.0	F

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)	LOS
1 - B1218 (Holydyke)	327	560	917	0.357	325	0.6	6.659	A
2 - Hungate	101	718	339	0.298	99	0.5	16.419	C
3 - A1077 (Holydyke)	456	208	967	0.472	452	1.0	7.645	A
4 - A1077 (Ferriby Road)	717	137	1019	0.704	707	2.5	12.355	B

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)	LOS
1 - B1218 (Holydyke)	391	668	844	0.463	390	0.9	8.691	A
2 - Hungate	120	859	253	0.476	119	0.9	29.012	D
3 - A1077 (Holydyke)	545	249	939	0.580	543	1.5	9.948	A
4 - A1077 (Ferriby Road)	857	164	1001	0.856	844	5.6	23.570	C

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)	LOS
1 - B1218 (Holydyke)	479	758	783	0.611	476	1.7	12.758	B
2 - Hungate	148	1006	164	0.898	134	4.3	103.606	F
3 - A1077 (Holydyke)	667	298	906	0.737	662	2.9	15.864	C
4 - A1077 (Ferriby Road)	1049	200	978	1.073	954	29.3	80.136	F

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)	LOS
1 - B1218 (Holydyke)	479	770	775	0.618	479	1.7	13.343	B
2 - Hungate	148	1017	157	0.939	140	6.2	161.857	F
3 - A1077 (Holydyke)	667	302	902	0.739	667	3.0	16.732	C
4 - A1077 (Ferriby Road)	1049	201	977	1.074	970	49.0	156.463	F

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)	LOS
1 - B1218 (Holydyke)	391	770	775	0.504	393	1.1	10.438	B
2 - Hungate	120	939	205	0.588	138	1.8	69.109	F
3 - A1077 (Holydyke)	545	263	929	0.586	550	1.6	10.599	B
4 - A1077 (Ferriby Road)	857	166	1000	0.857	978	18.8	129.705	F

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)	LOS
1 - B1218 (Holydyke)	327	616	879	0.372	329	0.7	7.229	A
2 - Hungate	101	765	310	0.325	106	0.5	19.782	C
3 - A1077 (Holydyke)	456	214	962	0.474	459	1.0	7.897	A
4 - A1077 (Ferriby Road)	717	139	1018	0.705	781	2.8	20.986	C

Existing Layout - 2020 Opening Year + Development (Scenario 2), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Mini-roundabout		Mini-roundabout appears to have unbalanced flows and may behave like a priority junction; treat results with caution. See User Guide for details.[Arms 3 and 4 have 75% of the total flow for the roundabout for one or more time segments]

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	A1077 Holydyke Hungate	Mini-roundabout	814.11	F

Junction Network Options

Driving side	Lighting	Road surface	In London
Left	Normal/unknown	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	2020 Opening Year + Development (Scenario 2)	AM	ONE HOUR	07:15	08:45	15

Default vehicle mix	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 - B1218 (Holydyke)		✓	493	100.000
2 - Hungate		✓	147	100.000
3 - A1077 (Holydyke)		✓	1205	100.000
4 - A1077 (Ferriby Road)		✓	726	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	0	9	173	311
	2 - Hungate	1	0	32	114
	3 - A1077 (Holydyke)	168	87	0	950
	4 - A1077 (Ferriby Road)	167	57	502	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	10	10	10	10
	2 - Hungate	10	10	10	10
	3 - A1077 (Holydyke)	10	10	10	10
	4 - A1077 (Ferriby Road)	10	10	10	10

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - B1218 (Holydyke)	0.65	13.28	2.0	B
2 - Hungate	1.39	509.86	24.8	F
3 - A1077 (Holydyke)	1.63	1657.34	408.9	F
4 - A1077 (Ferriby Road)	0.80	19.95	4.3	C

Main Results for each time segment

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)	LOS
1 - B1218 (Holydyke)	371	477	973	0.381	368	0.7	6.518	A
2 - Hungate	111	736	328	0.338	108	0.5	17.884	C
3 - A1077 (Holydyke)	907	317	892	1.017	838	17.2	51.224	F
4 - A1077 (Ferriby Road)	547	178	992	0.551	541	1.3	8.692	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)	LOS
1 - B1218 (Holydyke)	443	561	916	0.484	442	1.0	8.321	A
2 - Hungate	132	883	239	0.554	129	1.3	35.323	E
3 - A1077 (Holydyke)	1083	380	850	1.275	847	76.2	213.052	F
4 - A1077 (Ferriby Road)	653	180	991	0.659	650	2.1	11.517	B

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)	LOS
1 - B1218 (Holydyke)	543	668	844	0.643	539	1.9	12.835	B
2 - Hungate	162	1076	121	1.335	114	13.1	277.343	F
3 - A1077 (Holydyke)	1327	430	816	1.626	816	204.0	627.030	F
4 - A1077 (Ferriby Road)	799	173	995	0.803	791	4.1	18.705	C

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)	LOS
1 - B1218 (Holydyke)	543	674	840	0.646	543	2.0	13.276	B
2 - Hungate	162	1085	116	1.393	115	24.8	509.858	F
3 - A1077 (Holydyke)	1327	432	814	1.630	814	332.1	1192.085	F
4 - A1077 (Ferriby Road)	799	173	995	0.803	799	4.3	19.954	C

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)	LOS
1 - B1218 (Holydyke)	443	567	913	0.486	447	1.1	8.561	A
2 - Hungate	132	896	231	0.572	221	2.6	241.745	F
3 - A1077 (Holydyke)	1083	455	799	1.356	799	403.3	1589.051	F
4 - A1077 (Ferriby Road)	653	171	997	0.655	661	2.2	12.074	B

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - B1218 (Holydyke)	371	487	967	0.384	373	0.7	6.680	A
2 - Hungate	111	746	322	0.344	119	0.6	20.205	C
3 - A1077 (Holydyke)	907	328	885	1.025	885	408.9	1657.337	F
4 - A1077 (Ferriby Road)	547	188	985	0.555	550	1.4	9.149	A

Existing Layout - 2020 Opening Year + Development (Scenario 2), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Mini-roundabout		Mini-roundabout appears to have unbalanced flows and may behave like a priority junction; treat results with caution. See User Guide for details.[Arms 3 and 4 have 75% of the total flow for the roundabout for one or more time segments]

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	A1077 Holydyke Hungate	Mini-roundabout	751.05	F

Junction Network Options

Driving side	Lighting	Road surface	In London
Left	Normal/unknown	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	2020 Opening Year + Development (Scenario 2)	PM	ONE HOUR	16:30	18:00	15

Default vehicle mix	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 - B1218 (Holydyke)		✓	525	100.000
2 - Hungate		✓	153	100.000
3 - A1077 (Holydyke)		✓	759	100.000
4 - A1077 (Ferriby Road)		✓	1320	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	0	15	283	227
	2 - Hungate	1	0	72	80
	3 - A1077 (Holydyke)	179	48	0	532
	4 - A1077 (Ferriby Road)	348	181	791	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	10	10	10	10
	2 - Hungate	10	10	10	10
	3 - A1077 (Holydyke)	10	10	10	10
	4 - A1077 (Ferriby Road)	10	10	10	10

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - B1218 (Holydyke)	0.73	18.63	2.9	C
2 - Hungate	1.87	1435.80	44.3	F
3 - A1077 (Holydyke)	0.92	46.15	10.0	E
4 - A1077 (Ferriby Road)	1.54	1368.30	376.9	F

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)	LOS
1 - B1218 (Holydyke)	395	722	808	0.489	391	1.0	9.412	A
2 - Hungate	115	938	205	0.561	110	1.3	39.836	E
3 - A1077 (Holydyke)	571	227	953	0.599	565	1.6	10.043	B
4 - A1077 (Ferriby Road)	994	170	997	0.996	931	15.6	43.511	E

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)	LOS
1 - B1218 (Holydyke)	472	758	783	0.603	470	1.6	12.531	B
2 - Hungate	138	1038	144	0.952	122	5.1	137.847	F
3 - A1077 (Holydyke)	682	268	926	0.737	677	2.9	15.590	C
4 - A1077 (Ferriby Road)	1187	203	976	1.216	971	69.4	170.571	F

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)	LOS
1 - B1218 (Holydyke)	578	750	789	0.733	573	2.8	17.977	C
2 - Hungate	168	1126	92	1.841	90	24.6	654.025	F
3 - A1077 (Holydyke)	836	296	907	0.921	813	8.6	35.645	E
4 - A1077 (Ferriby Road)	1453	244	949	1.531	949	195.5	510.642	F

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)	LOS
1 - B1218 (Holydyke)	578	749	789	0.732	578	2.9	18.627	C
2 - Hungate	168	1128	90	1.872	90	44.3	1435.799	F
3 - A1077 (Holydyke)	836	297	906	0.923	830	10.0	46.149	E
4 - A1077 (Ferriby Road)	1453	249	946	1.536	946	322.3	977.188	F

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)	LOS
1 - B1218 (Holydyke)	472	759	783	0.603	477	1.7	13.123	B
2 - Hungate	138	1044	141	0.975	138	44.3	1103.895	F
3 - A1077 (Holydyke)	682	279	918	0.743	709	3.4	20.868	C
4 - A1077 (Ferriby Road)	1187	213	969	1.224	969	376.7	1293.207	F

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)	LOS
1 - B1218 (Holydyke)	395	768	777	0.509	397	1.2	10.505	B
2 - Hungate	115	981	179	0.643	175	29.4	764.639	F
3 - A1077 (Holydyke)	571	264	928	0.616	578	1.8	11.497	B
4 - A1077 (Ferriby Road)	994	174	995	0.999	993	376.9	1368.299	F

Existing Layout - 2028 Future Year, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Mini-roundabout		Mini-roundabout appears to have unbalanced flows and may behave like a priority junction; treat results with caution. See User Guide for details.[Arms 3 and 4 have 72% of the total flow for the roundabout for one or more time segments]

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	A1077 Holydyke Hungate	Mini-roundabout	14.65	B

Junction Network Options

Driving side	Lighting	Road surface	In London
Left	Normal/unknown	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	2028 Future Year	AM	ONE HOUR	07:15	08:45	15

Default vehicle mix	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 - B1218 (Holydyke)		✓	309	100.000
2 - Hungate		✓	114	100.000
3 - A1077 (Holydyke)		✓	648	100.000
4 - A1077 (Ferriby Road)		✓	477	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	0	6	93	210
	2 - Hungate	1	0	16	97
	3 - A1077 (Holydyke)	74	3	0	571
	4 - A1077 (Ferriby Road)	103	52	322	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	10	10	10	10
	2 - Hungate	10	10	10	10
	3 - A1077 (Holydyke)	10	10	10	10
	4 - A1077 (Ferriby Road)	10	10	10	10

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - B1218 (Holydyke)	0.34	5.86	0.6	A
2 - Hungate	0.35	17.10	0.6	C
3 - A1077 (Holydyke)	0.81	23.66	4.5	C
4 - A1077 (Ferriby Road)	0.50	7.52	1.1	A

Main Results for each time segment

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)	LOS
1 - B1218 (Holydyke)	233	282	1106	0.210	231	0.3	4.525	A
2 - Hungate	86	468	491	0.175	85	0.2	9.741	A
3 - A1077 (Holydyke)	488	230	951	0.513	483	1.1	8.383	A
4 - A1077 (Ferriby Road)	359	58	1070	0.336	357	0.6	5.539	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)	LOS
1 - B1218 (Holydyke)	278	338	1067	0.260	277	0.4	5.010	A
2 - Hungate	102	561	434	0.236	102	0.3	11.911	B
3 - A1077 (Holydyke)	583	276	920	0.633	580	1.8	11.536	B
4 - A1077 (Ferriby Road)	429	70	1062	0.404	428	0.7	6.237	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)	LOS
1 - B1218 (Holydyke)	340	414	1016	0.335	340	0.5	5.845	A
2 - Hungate	126	687	358	0.351	125	0.6	16.901	C
3 - A1077 (Holydyke)	713	338	878	0.812	704	4.2	21.586	C
4 - A1077 (Ferriby Road)	525	85	1052	0.499	524	1.1	7.471	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)	LOS
1 - B1218 (Holydyke)	340	415	1016	0.335	340	0.6	5.863	A
2 - Hungate	126	688	357	0.352	125	0.6	17.100	C
3 - A1077 (Holydyke)	713	339	877	0.813	712	4.5	23.657	C
4 - A1077 (Ferriby Road)	525	86	1052	0.499	525	1.1	7.518	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)	LOS
1 - B1218 (Holydyke)	278	340	1066	0.261	278	0.4	5.031	A
2 - Hungate	102	563	433	0.237	103	0.3	12.065	B
3 - A1077 (Holydyke)	583	278	919	0.634	593	2.0	12.486	B
4 - A1077 (Ferriby Road)	429	71	1061	0.404	430	0.8	6.290	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - B1218 (Holydyke)	233	284	1104	0.211	233	0.3	4.550	A
2 - Hungate	86	471	488	0.176	86	0.2	9.858	A
3 - A1077 (Holydyke)	488	233	950	0.514	491	1.2	8.688	A
4 - A1077 (Ferriby Road)	359	59	1069	0.336	360	0.6	5.591	A

Existing Layout - 2028 Future Year, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Mini-roundabout		Mini-roundabout appears to have unbalanced flows and may behave like a priority junction; treat results with caution. See User Guide for details.[Arms 3 and 4 have 72% of the total flow for the roundabout for one or more time segments]

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	A1077 Holydyke Hungate	Mini-roundabout	29.53	D

Junction Network Options

Driving side	Lighting	Road surface	In London
Left	Normal/unknown	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	2028 Future Year	PM	ONE HOUR	16:30	18:00	15

Default vehicle mix	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 - B1218 (Holydyke)		✓	405	100.000
2 - Hungate		✓	107	100.000
3 - A1077 (Holydyke)		✓	495	100.000
4 - A1077 (Ferriby Road)		✓	848	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	0	11	201	193
	2 - Hungate	1	0	34	72
	3 - A1077 (Holydyke)	140	14	0	341
	4 - A1077 (Ferriby Road)	232	164	452	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	10	10	10	10
	2 - Hungate	10	10	10	10
	3 - A1077 (Holydyke)	10	10	10	10
	4 - A1077 (Ferriby Road)	10	10	10	10

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - B1218 (Holydyke)	0.54	10.29	1.3	B
2 - Hungate	0.56	41.52	1.3	E
3 - A1077 (Holydyke)	0.60	10.86	1.6	B
4 - A1077 (Ferriby Road)	0.94	48.11	11.7	E

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)	LOS
1 - B1218 (Holydyke)	305	469	979	0.311	303	0.5	5.843	A
2 - Hungate	81	631	391	0.206	79	0.3	12.644	B
3 - A1077 (Holydyke)	373	199	973	0.383	370	0.7	6.539	A
4 - A1077 (Ferriby Road)	638	116	1032	0.618	631	1.7	9.722	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)	LOS
1 - B1218 (Holydyke)	364	562	916	0.398	363	0.7	7.155	A
2 - Hungate	96	757	315	0.305	95	0.5	17.948	C
3 - A1077 (Holydyke)	445	238	946	0.470	444	1.0	7.868	A
4 - A1077 (Ferriby Road)	762	139	1017	0.749	757	3.1	14.891	B

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)	LOS
1 - B1218 (Holydyke)	446	674	840	0.531	444	1.2	9.945	A
2 - Hungate	118	915	219	0.538	115	1.2	37.068	E
3 - A1077 (Holydyke)	545	290	911	0.598	542	1.6	10.677	B
4 - A1077 (Ferriby Road)	934	170	997	0.936	907	9.8	36.042	E

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)	LOS
1 - B1218 (Holydyke)	446	688	831	0.537	446	1.3	10.286	B
2 - Hungate	118	927	212	0.556	117	1.3	41.521	E
3 - A1077 (Holydyke)	545	292	909	0.600	545	1.6	10.865	B
4 - A1077 (Ferriby Road)	934	171	997	0.937	926	11.7	48.110	E

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)	LOS
1 - B1218 (Holydyke)	364	590	897	0.406	366	0.8	7.488	A
2 - Hungate	96	780	301	0.319	99	0.5	19.873	C
3 - A1077 (Holydyke)	445	242	943	0.472	447	1.0	8.028	A
4 - A1077 (Ferriby Road)	762	140	1017	0.750	795	3.5	20.070	C

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)	LOS
1 - B1218 (Holydyke)	305	479	972	0.314	306	0.5	5.953	A
2 - Hungate	81	642	385	0.209	81	0.3	13.079	B
3 - A1077 (Holydyke)	373	201	971	0.384	374	0.7	6.647	A
4 - A1077 (Ferriby Road)	638	117	1031	0.619	645	1.8	10.422	B

Existing Layout - 2028 Future Year + Development (Scenario 1), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Mini-roundabout		Mini-roundabout appears to have unbalanced flows and may behave like a priority junction; treat results with caution. See User Guide for details.[Arms 3 and 4 have 73% of the total flow for the roundabout for one or more time segments]

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	A1077 Holydyke Hungate	Mini-roundabout	63.80	F

Junction Network Options

Driving side	Lighting	Road surface	In London
Left	Normal/unknown	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)
D11	2028 Future Year + Development (Scenario 1)	AM	ONE HOUR	07:15	08:45	15

Default vehicle mix	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 - B1218 (Holydyke)		✓	351	100.000
2 - Hungate		✓	150	100.000
3 - A1077 (Holydyke)		✓	811	100.000
4 - A1077 (Ferriby Road)		✓	611	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	0	7	124	220
	2 - Hungate	1	0	28	121
	3 - A1077 (Holydyke)	98	25	0	688
	4 - A1077 (Ferriby Road)	127	61	423	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	10	10	10	10
	2 - Hungate	10	10	10	10
	3 - A1077 (Holydyke)	10	10	10	10
	4 - A1077 (Ferriby Road)	10	10	10	10

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - B1218 (Holydyke)	0.42	7.45	0.8	A
2 - Hungate	0.63	40.26	1.8	E
3 - A1077 (Holydyke)	1.05	132.12	34.4	F
4 - A1077 (Ferriby Road)	0.66	11.26	2.1	B

Main Results for each time segment

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)	LOS
1 - B1218 (Holydyke)	264	380	1039	0.254	263	0.4	5.092	A
2 - Hungate	113	574	426	0.265	111	0.4	12.510	B
3 - A1077 (Holydyke)	611	255	934	0.653	603	2.0	11.672	B
4 - A1077 (Ferriby Road)	460	92	1048	0.439	457	0.8	6.663	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)	LOS
1 - B1218 (Holydyke)	316	456	988	0.319	315	0.5	5.881	A
2 - Hungate	135	688	357	0.378	134	0.6	17.656	C
3 - A1077 (Holydyke)	729	306	900	0.810	720	4.2	21.065	C
4 - A1077 (Ferriby Road)	549	110	1036	0.530	548	1.2	8.086	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)	LOS
1 - B1218 (Holydyke)	386	556	920	0.420	385	0.8	7.388	A
2 - Hungate	165	841	264	0.625	161	1.7	37.119	E
3 - A1077 (Holydyke)	893	373	855	1.045	824	21.5	71.616	F
4 - A1077 (Ferriby Road)	673	126	1026	0.656	669	2.0	11.014	B

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)	LOS
1 - B1218 (Holydyke)	386	559	918	0.421	386	0.8	7.445	A
2 - Hungate	165	844	262	0.630	165	1.8	40.257	E
3 - A1077 (Holydyke)	893	376	852	1.048	842	34.4	132.125	F
4 - A1077 (Ferriby Road)	673	129	1024	0.657	673	2.1	11.257	B

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)	LOS
1 - B1218 (Holydyke)	316	464	983	0.321	317	0.5	5.956	A
2 - Hungate	135	693	354	0.381	139	0.7	18.752	C
3 - A1077 (Holydyke)	729	312	896	0.814	842	6.1	82.663	F
4 - A1077 (Ferriby Road)	549	129	1024	0.536	552	1.3	8.452	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - B1218 (Holydyke)	264	385	1036	0.255	265	0.4	5.139	A
2 - Hungate	113	579	423	0.267	114	0.4	12.865	B
3 - A1077 (Holydyke)	611	259	932	0.655	626	2.2	13.575	B
4 - A1077 (Ferriby Road)	460	96	1045	0.440	462	0.9	6.803	A

Existing Layout - 2028 Future Year + Development (Scenario 1), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Mini-roundabout		Mini-roundabout appears to have unbalanced flows and may behave like a priority junction; treat results with caution. See User Guide for details.[Arms 3 and 4 have 73% of the total flow for the roundabout for one or more time segments]

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	A1077 Holydyke Hungate	Mini-roundabout	145.50	F

Junction Network Options

Driving side	Lighting	Road surface	In London
Left	Normal/unknown	Normal/unknown	

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D12	2028 Future Year + Development (Scenario 1)	PM	ONE HOUR	16:30	18:00	15

Default vehicle mix	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 - B1218 (Holydyke)		✓	462	100.000
2 - Hungate		✓	142	100.000
3 - A1077 (Holydyke)		✓	638	100.000
4 - A1077 (Ferriby Road)		✓	1008	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	0	14	237	211
	2 - Hungate	1	0	56	85
	3 - A1077 (Holydyke)	161	31	0	446
	4 - A1077 (Ferriby Road)	244	192	572	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	10	10	10	10
	2 - Hungate	10	10	10	10
	3 - A1077 (Holydyke)	10	10	10	10
	4 - A1077 (Ferriby Road)	10	10	10	10

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - B1218 (Holydyke)	0.65	14.73	2.0	B
2 - Hungate	1.10	289.44	12.5	F
3 - A1077 (Holydyke)	0.79	20.41	3.8	C
4 - A1077 (Ferriby Road)	1.14	264.34	81.0	F

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)	LOS
1 - B1218 (Holydyke)	348	589	898	0.387	345	0.7	7.130	A
2 - Hungate	107	758	314	0.340	105	0.5	18.703	C
3 - A1077 (Holydyke)	480	221	958	0.502	476	1.1	8.149	A
4 - A1077 (Ferriby Road)	759	144	1014	0.748	747	3.1	14.224	B

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)	LOS
1 - B1218 (Holydyke)	415	699	823	0.505	414	1.1	9.636	A
2 - Hungate	128	904	226	0.565	125	1.3	38.015	E
3 - A1077 (Holydyke)	574	264	928	0.618	571	1.7	11.005	B
4 - A1077 (Ferriby Road)	906	173	995	0.910	886	8.1	31.534	D

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)	LOS
1 - B1218 (Holydyke)	509	761	781	0.651	505	2.0	14.179	B
2 - Hungate	156	1035	147	1.066	131	7.6	163.999	F
3 - A1077 (Holydyke)	702	310	897	0.783	695	3.6	18.892	C
4 - A1077 (Ferriby Road)	1110	210	971	1.143	960	45.5	114.336	F

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)	LOS
1 - B1218 (Holydyke)	509	768	777	0.655	508	2.0	14.726	B
2 - Hungate	156	1042	142	1.101	137	12.5	289.439	F
3 - A1077 (Holydyke)	702	315	894	0.786	702	3.8	20.408	C
4 - A1077 (Ferriby Road)	1110	212	970	1.144	968	81.0	244.388	F

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)	LOS
1 - B1218 (Holydyke)	415	771	775	0.536	418	1.3	11.207	B
2 - Hungate	128	962	191	0.668	166	3.0	163.829	F
3 - A1077 (Holydyke)	574	291	910	0.630	581	1.9	12.308	B
4 - A1077 (Ferriby Road)	906	176	993	0.912	980	62.6	264.342	F

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)	LOS
1 - B1218 (Holydyke)	348	774	773	0.450	349	0.9	9.390	A
2 - Hungate	107	900	228	0.469	115	1.0	36.868	E
3 - A1077 (Holydyke)	480	229	952	0.504	484	1.1	8.504	A
4 - A1077 (Ferriby Road)	759	146	1012	0.750	990	4.8	127.481	F

Existing Layout - 2028 Future Year + Development (Scenario 2), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Mini-roundabout		Mini-roundabout appears to have unbalanced flows and may behave like a priority junction; treat results with caution. See User Guide for details.[Arms 3 and 4 have 75% of the total flow for the roundabout for one or more time segments]

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	A1077 Holydyke Hungate	Mini-roundabout	1050.95	F

Junction Network Options

Driving side	Lighting	Road surface	In London
Left	Normal/unknown	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)
D13	2028 Future Year + Development (Scenario 2)	AM	ONE HOUR	07:15	08:45	15

Default vehicle mix	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 - B1218 (Holydyke)		✓	514	100.000
2 - Hungate		✓	155	100.000
3 - A1077 (Holydyke)		✓	1250	100.000
4 - A1077 (Ferriby Road)		✓	758	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	0	10	179	325
	2 - Hungate	1	0	33	121
	3 - A1077 (Holydyke)	173	88	0	989
	4 - A1077 (Ferriby Road)	174	61	523	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	10	10	10	10
	2 - Hungate	10	10	10	10
	3 - A1077 (Holydyke)	10	10	10	10
	4 - A1077 (Ferriby Road)	10	10	10	10

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - B1218 (Holydyke)	0.69	15.35	2.4	C
2 - Hungate	1.92	1329.13	41.7	F
3 - A1077 (Holydyke)	1.68	2065.13	486.0	F
4 - A1077 (Ferriby Road)	0.84	23.85	5.3	C

Main Results for each time segment

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)	LOS
1 - B1218 (Holydyke)	387	495	962	0.402	384	0.7	6.822	A
2 - Hungate	117	766	309	0.377	114	0.6	20.022	C
3 - A1077 (Holydyke)	941	333	882	1.067	844	24.3	65.842	F
4 - A1077 (Ferriby Road)	571	177	993	0.575	565	1.5	9.138	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)	LOS
1 - B1218 (Holydyke)	462	581	903	0.512	460	1.1	8.916	A
2 - Hungate	139	919	217	0.643	135	1.7	46.252	E
3 - A1077 (Holydyke)	1124	397	838	1.341	836	96.2	272.653	F
4 - A1077 (Ferriby Road)	681	176	994	0.686	678	2.3	12.430	B

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)	LOS
1 - B1218 (Holydyke)	566	692	828	0.684	561	2.3	14.620	B
2 - Hungate	171	1119	95	1.787	93	21.2	514.401	F
3 - A1077 (Holydyke)	1376	428	817	1.685	817	236.0	739.607	F
4 - A1077 (Ferriby Road)	835	171	996	0.838	824	5.0	21.690	C

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)	LOS
1 - B1218 (Holydyke)	566	700	823	0.688	566	2.4	15.347	C
2 - Hungate	171	1130	89	1.916	89	41.7	1329.129	F
3 - A1077 (Holydyke)	1376	428	817	1.684	817	375.8	1353.718	F
4 - A1077 (Ferriby Road)	835	171	996	0.838	833	5.3	23.853	C

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)	LOS
1 - B1218 (Holydyke)	462	590	897	0.515	467	1.2	9.298	A
2 - Hungate	139	936	207	0.674	201	26.1	555.442	F
3 - A1077 (Holydyke)	1124	454	800	1.405	800	456.8	1851.182	F
4 - A1077 (Ferriby Road)	681	168	998	0.683	693	2.5	13.396	B

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - B1218 (Holydyke)	387	501	958	0.404	389	0.8	6.981	A
2 - Hungate	117	778	303	0.386	218	0.7	103.945	F
3 - A1077 (Holydyke)	941	418	824	1.142	824	486.0	2065.128	F
4 - A1077 (Ferriby Road)	571	173	995	0.574	574	1.5	9.504	A

Existing Layout - 2028 Future Year + Development (Scenario 2), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Mini-roundabout		Mini-roundabout appears to have unbalanced flows and may behave like a priority junction; treat results with caution. See User Guide for details.[Arms 3 and 4 have 75% of the total flow for the roundabout for one or more time segments]

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	A1077 Holydyke Hungate	Mini-roundabout	928.01	F

Junction Network Options

Driving side	Lighting	Road surface	In London
Left	Normal/unknown	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)
D14	2028 Future Year + Development (Scenario 2)	PM	ONE HOUR	16:30	18:00	15

Default vehicle mix	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 - B1218 (Holydyke)		✓	551	100.000
2 - Hungate		✓	160	100.000
3 - A1077 (Holydyke)		✓	791	100.000
4 - A1077 (Ferriby Road)		✓	1375	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	0	15	296	240
	2 - Hungate	1	0	74	85
	3 - A1077 (Holydyke)	188	49	0	554
	4 - A1077 (Ferriby Road)	363	192	820	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	10	10	10	10
	2 - Hungate	10	10	10	10
	3 - A1077 (Holydyke)	10	10	10	10
	4 - A1077 (Ferriby Road)	10	10	10	10

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - B1218 (Holydyke)	0.77	21.17	3.4	C
2 - Hungate	2.31	2168.04	60.4	F
3 - A1077 (Holydyke)	0.97	67.11	15.5	F
4 - A1077 (Ferriby Road)	1.61	1642.37	455.7	F

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)	LOS
1 - B1218 (Holydyke)	415	733	800	0.518	410	1.2	10.034	B
2 - Hungate	120	963	190	0.634	114	1.6	48.687	E
3 - A1077 (Holydyke)	596	240	945	0.630	588	1.8	10.897	B
4 - A1077 (Ferriby Road)	1035	177	993	1.043	946	22.3	55.669	F

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)	LOS
1 - B1218 (Holydyke)	495	756	785	0.631	493	1.8	13.439	B
2 - Hungate	144	1056	133	1.078	120	7.6	200.552	F
3 - A1077 (Holydyke)	711	279	918	0.775	704	3.5	17.971	C
4 - A1077 (Ferriby Road)	1236	212	970	1.274	968	89.4	220.085	F

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)	LOS
1 - B1218 (Holydyke)	607	747	791	0.767	601	3.3	20.172	C
2 - Hungate	176	1147	78	2.252	78	32.2	950.556	F
3 - A1077 (Holydyke)	871	303	902	0.966	837	12.0	45.953	E
4 - A1077 (Ferriby Road)	1514	251	944	1.603	944	231.8	620.349	F

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)	LOS
1 - B1218 (Holydyke)	607	745	792	0.766	606	3.4	21.167	C
2 - Hungate	176	1151	76	2.308	76	57.1	2168.036	F
3 - A1077 (Holydyke)	871	305	901	0.967	857	15.5	67.112	F
4 - A1077 (Ferriby Road)	1514	257	940	1.610	940	375.1	1150.059	F

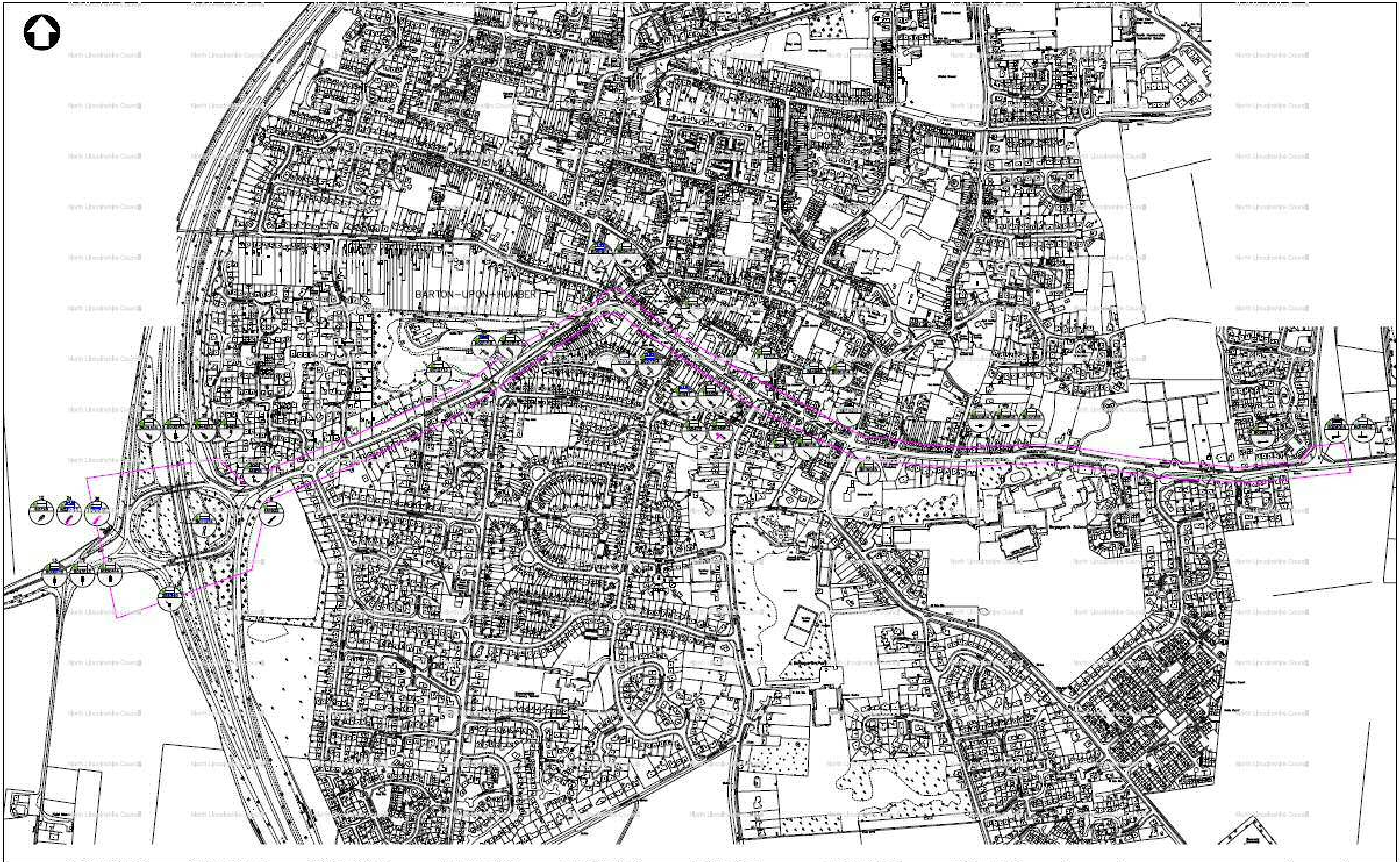
17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - B1218 (Holydyke)	495	753	786	0.630	501	1.9	14.167	B
2 - Hungate	144	1060	131	1.097	131	60.4	1479.198	F
3 - A1077 (Holydyke)	711	289	912	0.780	756	4.3	30.494	D
4 - A1077 (Ferriby Road)	1236	227	960	1.288	960	444.2	1522.558	F

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)	LOS
1 - B1218 (Holydyke)	415	765	778	0.533	417	1.3	11.055	B
2 - Hungate	120	996	170	0.708	167	48.7	1178.924	F
3 - A1077 (Holydyke)	596	272	923	0.645	604	2.1	12.750	B
4 - A1077 (Ferriby Road)	1035	182	989	1.046	989	455.7	1642.373	F

Appendix 4 – PIC Data



Transport, Highways & Environment

Barton Interchange to Falklands Way – 5 Year injury related accident data
(Data range from the 13/02/2013 to the 12/02/2018)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Reference Number	1264 42	1519 17	1533 26	1554 72	1819 22	1949 84	2583 40	2649 65	4177 3	4682 5	5506 8	6272 8	B000 115	B000 914	B006 015	B009 115	B011 214	B012 713	B013 015	B013 113
Date / Day	Sa12	We01	Fr03	Mo13	Fr12	Mo26	Mo08	Th01	We20	Mo15	Sa19	Tu26	We07	Th09	Mo02	Th26	Mo24	Th02	We06	Tu07
Month	Nov	Feb	Feb	Feb	May	Jun	Jan	Feb	Jan	Feb	Mar	Apr	Jan	Jan	Mar	Mar	Mar	May	May	May
Year	2016	2017	2017	2017	2017	2017	2018	2018	2016	2016	2016	2016	2015	2014	2015	2015	2014	2013	2015	2013
Time	1015	1724	0840	1440	0820	0600	1050	1105	1305	0758	1100	1600	0730	1336	1328	1530	0840	1040	1052	1720
Severity	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Se	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Se	Sl
Dark / Lit																				
Weather Conditions																				
Road Surface																				
Special Conditions																				
Carriageway Hazards																				
Vehicle Manoeuvres																				
Vehicle 1 5 e																				
Vehicle 2 6 t																				
Vehicle 3 7 c																				
Vehicle 4 8																				
Casualty /age																				
Failed to Give-Way																				
Signal Ignored																				
Loss of Control																				
Hit Object IN C'way																				
Hit Object OFF C'way																				
Vehicle Left C'way							NN			N				N	N		O		N	
Breath Test																				
Contributory Factors 1/2	V1 * 405	V1 * 405	V1 * 405	V1 * 405 / V1 * 501	V2 * 406 / V4 * 406		V1 ** 502 / V2 ** 502	V1 ** 505 / V1 ** 405	V1 ** 405	V1 ** 103 / V1 ** 307	C1 ** 503 / V1 ** 405		V1 ** 405 / V1 * 405	V1 ** 405 / V1 * 110	V1 ** 405 / V1 ** 406	V1 * 405 / V1 * 405	V1 ** 406 / V1 * 308	V1 ** 602	V1 ** 705	V1 ** 502
3/4								V1 ** 410		V1 ** 410 / V1 ** 605			V1 * 402			V1 * 406	V1 ** 405 / V1 * 408			
* possible, ** very likely 5/6																				
School No./Ref.																				
User fields 1																				
2																				
3																				
4																				

	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Reference Number	B014 415	B019 015	B020 414	B021 413	B021 715	B025 615	B027 713	B029 915	B031 414	B032 715	B037 315	B037 815	B044 213	B046 913	B051 014	B051 914	B051 914	B054 713	B057 314
Date / Day	We20	We10	We18	Th27	Mo01	Sa08	Fr23	Fr28	Sa23	Mo28	Sa31	Fr11	Sa30	Mo09	We19	Th11	Fr14	Fr12	Fr21
Month	May	Jun	Jun	Jun	Jun	Aug	Aug	Aug	Aug	Sep	Oct	Sep	Nov	Dec	Nov	Dec	Nov	Jul	Nov
Year	2015	2015	2014	2013	2015	2015	2013	2015	2014	2015	2015	2015	2013	2013	2014	2014	2014	2013	2014
Time	1149	1442	1647	1730	2027	0445	1030	1810	1321	1815	0800	1025	1315	1853	0940	0800	0720	0955	2245
Severity	Se	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl
Dark / Lit																			
Weather Conditions																			
Road Surface																			
Special Conditions																			
Carriageway Hazards																			
Vehicle Manoeuvres																			
Vehicle 1 5 e																			
Vehicle 2 6 t																			
Vehicle 3 7 c																			
Vehicle 4 8																			
Casualty /age																			
Failed to Give-Way																			
Signal Ignored																			
Loss of Control																			
Hit Object IN C'way																			
Hit Object OFF C'way																			
Vehicle Left C'way						N										O			N
Breath Test																			
Contributory Factors 1/2	V1 ** 405	V1 ** 405 / V1 * 106	V1 * 308 / V1 * 402	V2 ** 405	V1 ** 402 / V1 * 403	V1 ** 501 / V1 ** 602	V1 * 108 / V1 * 407	V3 ** 108 / V2 ** 108	V1 ** 406 / V1 ** 602	V1 ** 405 / V1 ** 406	V1 ** 510 / V1 * 405	V1 ** 405 / V1 ** 406	V1 ** 405 / V1 ** 406	V1 * 405 / V1 * 406	V1 * 405 / C1 * 802	V1 ** 102	V1 ** 406 / V1 * 602	V1 ** 108 / V2 ** 108	V2 ** 506
3/4		C1 * 803	V1 * 403 / V1 * 405		V1 ** 405 / V1 ** 701			V1 ** 405 / V1 ** 406	V1 * 509	V1 ** 706		V1 ** 805					V1 * 605		
* possible, ** very likely 5/6					V1 * 406			V1 * 509											
School No./Ref.																			
User fields 1																			
2																			
3																			
4																			

REV	DETAILS	APPROVED BY	DATE APPROVED

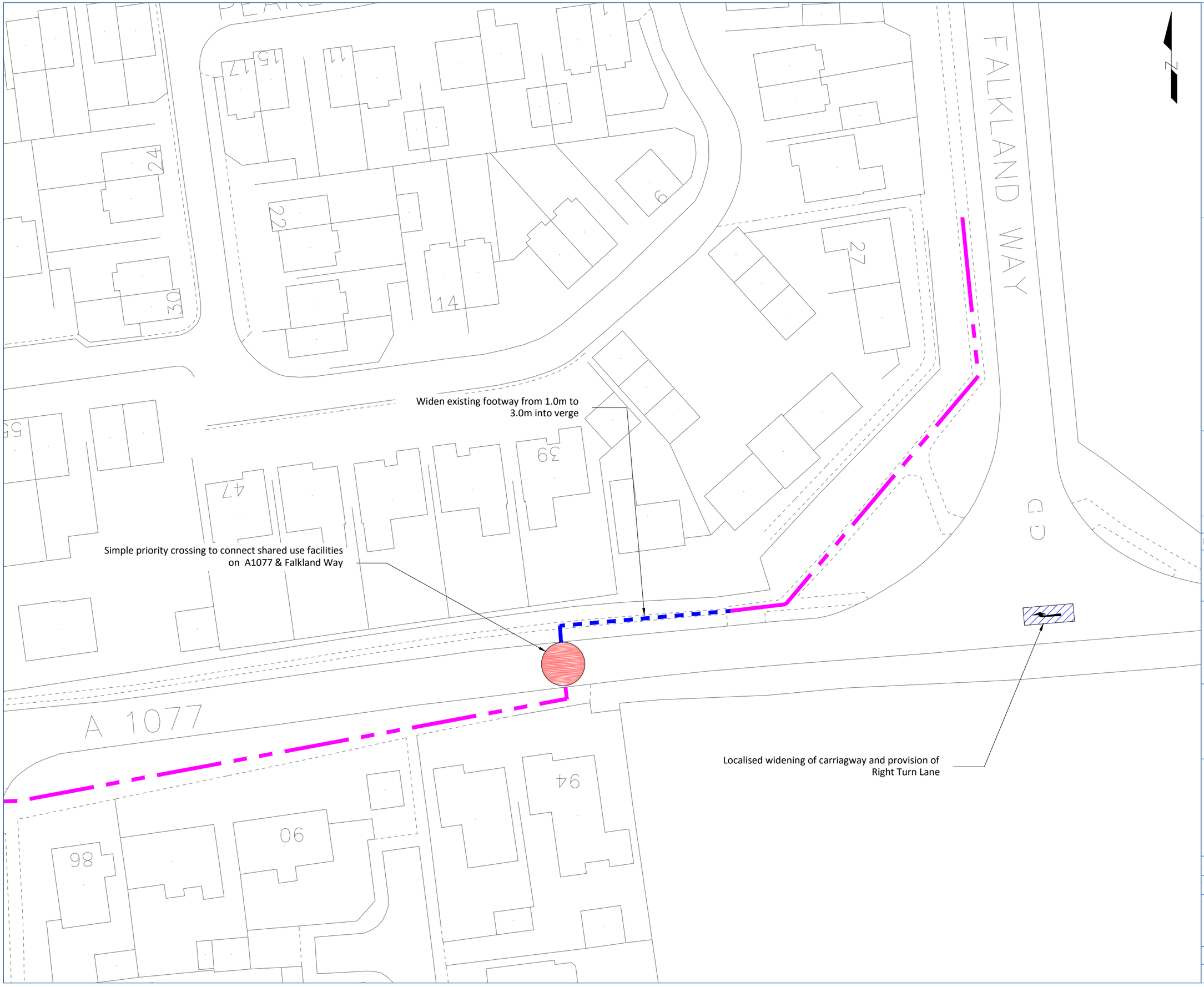
Transport, Highways & Environment

NORTH LINCOLNSHIRE COUNCIL 2018 0100020950

Barton Interchange to Falklands Way – 5 Year injury related accident data sticks (Data range from the 13/02/2013 to the 12/02/2018)

DRAWN BY	SCALE	CHECKED BY	DATE CHECKED	APPROVED BY	DATE APPROVED
PROJECT TITLE			DRAWING NUMBER		REV

Appendix 5 – Preliminary Concept Drawings



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A3

Key:-

- Use existing Shared Use Facilities
- Widen Existing Footway to provide Shared Use Facility
- Proposed Crossing
- Provision of Right Turn Lane

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iv. All work shall be carried out in accordance with local authority, statutory authority and health & safety requirements & regulations

v. Mapping supplied by Client

Rev.	Date	By	Chk	Description
0	-	-	-	-

Client

North Lincolnshire Council

Project

Barton Highways Masterplan

Title

Falkland Way / A1077
Highway Options and Cycle Facilities
Concept Design

local transport projects
traffic engineering and transport planning
Office 2, Armstrong House, The Flemingate Centre, Armstrong Way Beverley, East Riding of Yorkshire. HU17 0NW.
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Registered No. 5295328

Drawn	Date
SL	27/03/2018
Scale	Checked
1 : 500	NW

Status

- [/] INTERNAL DRAFT
- [ ] PRELIMINARY
- [ ] DRAFT
- [ ] CONSTRUCTION
- [ ] APPROVED
- [ ] AS BUILT

Drawing number

Project	Job	Drawing	Sheet	Revision
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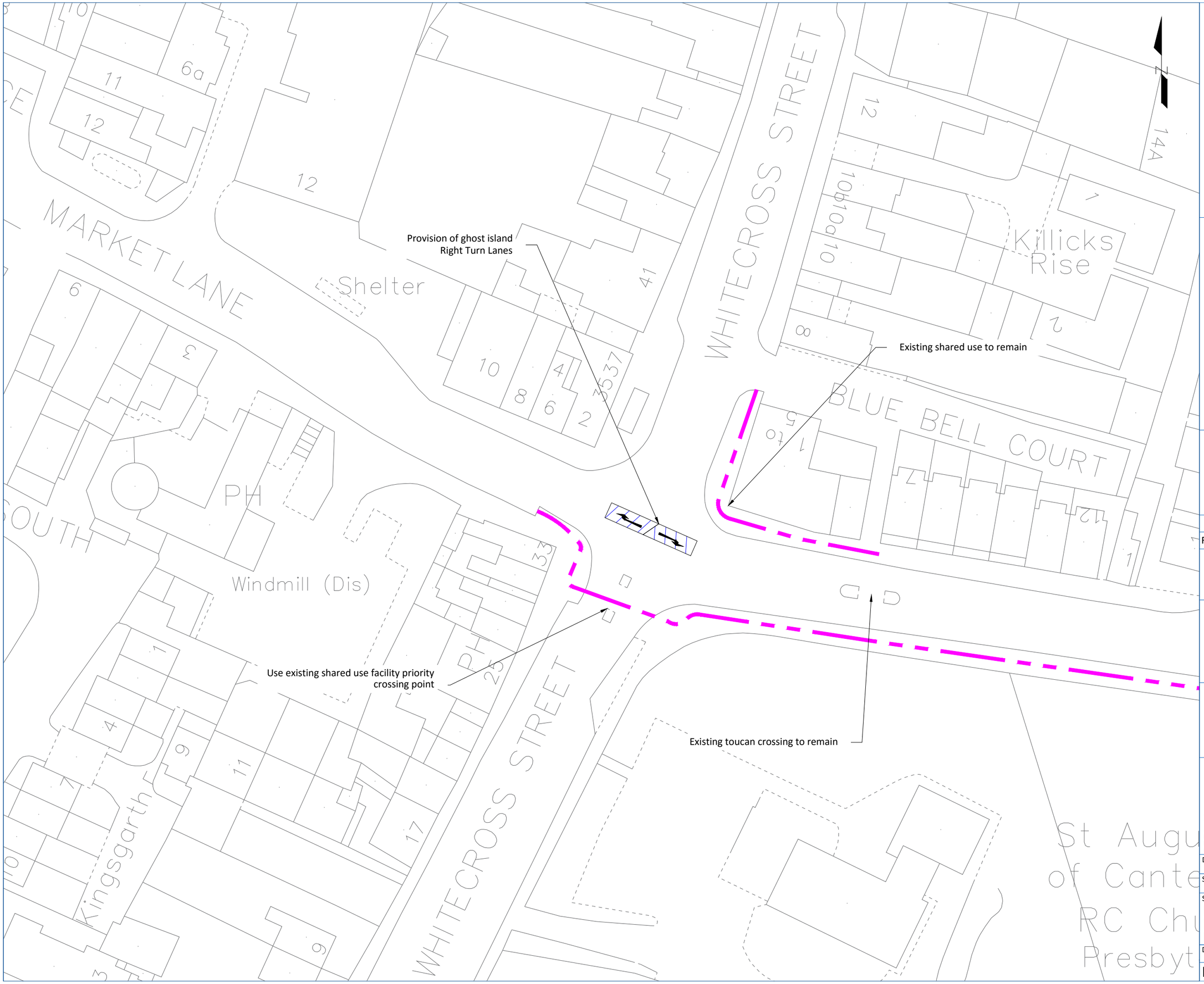

10mm

A3

Key:-

Use existing Shared Use Facilities

Provision of Right Turn Lane

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v. Mapping supplied by Client

Rev.	Date	By	Chk	Description
0	-	-	-	-

Client

North Lincolnshire Council

Project

Barton Highways Masterplan

Title

A1077 / Whitecross Street Highway Options and Cycle Facilities Concept Design

local transport projects
traffic engineering and transport planning
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SL	27/03/2018
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1 : 500	NW

Status

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Drawing number

Project	Job	Drawing	Sheet	Revision
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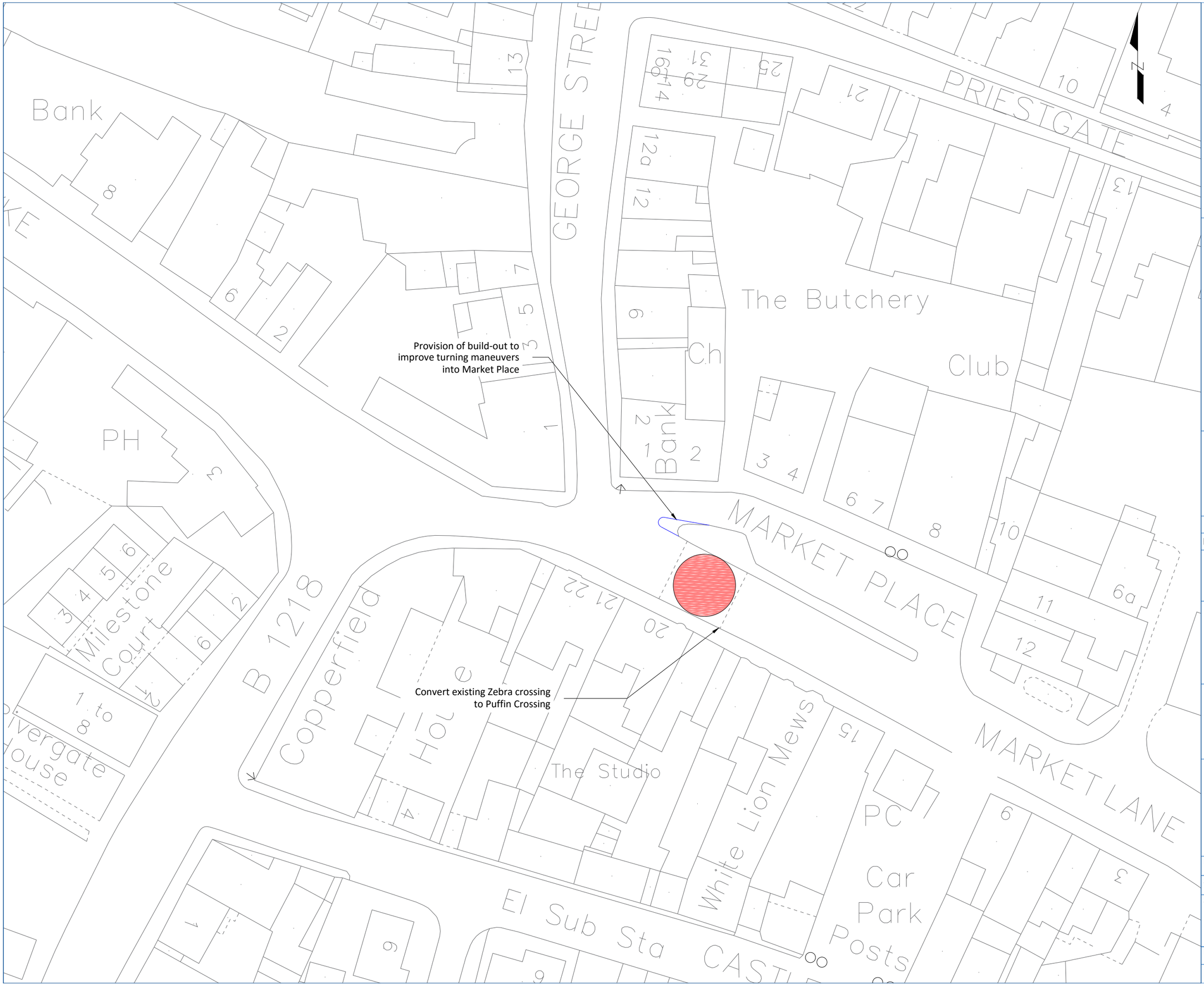

10mm

A3

Key:-

New Kerbline

Proposed Crossing

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v. Mapping supplied by Client

Rev.	Date	By	Chk	Description
0	.	-	-	.

Client

North Lincolnshire Council

Project

Barton Highways Masterplan

Title

Market Place
Highway Options and Cycle Facilities
Concept Design

local transport projects
traffic engineering and transport planning
Office 2, Armstrong House,
The Flemingate Centre,
Armstrong Way
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SL	27/03/2018
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Drawing number

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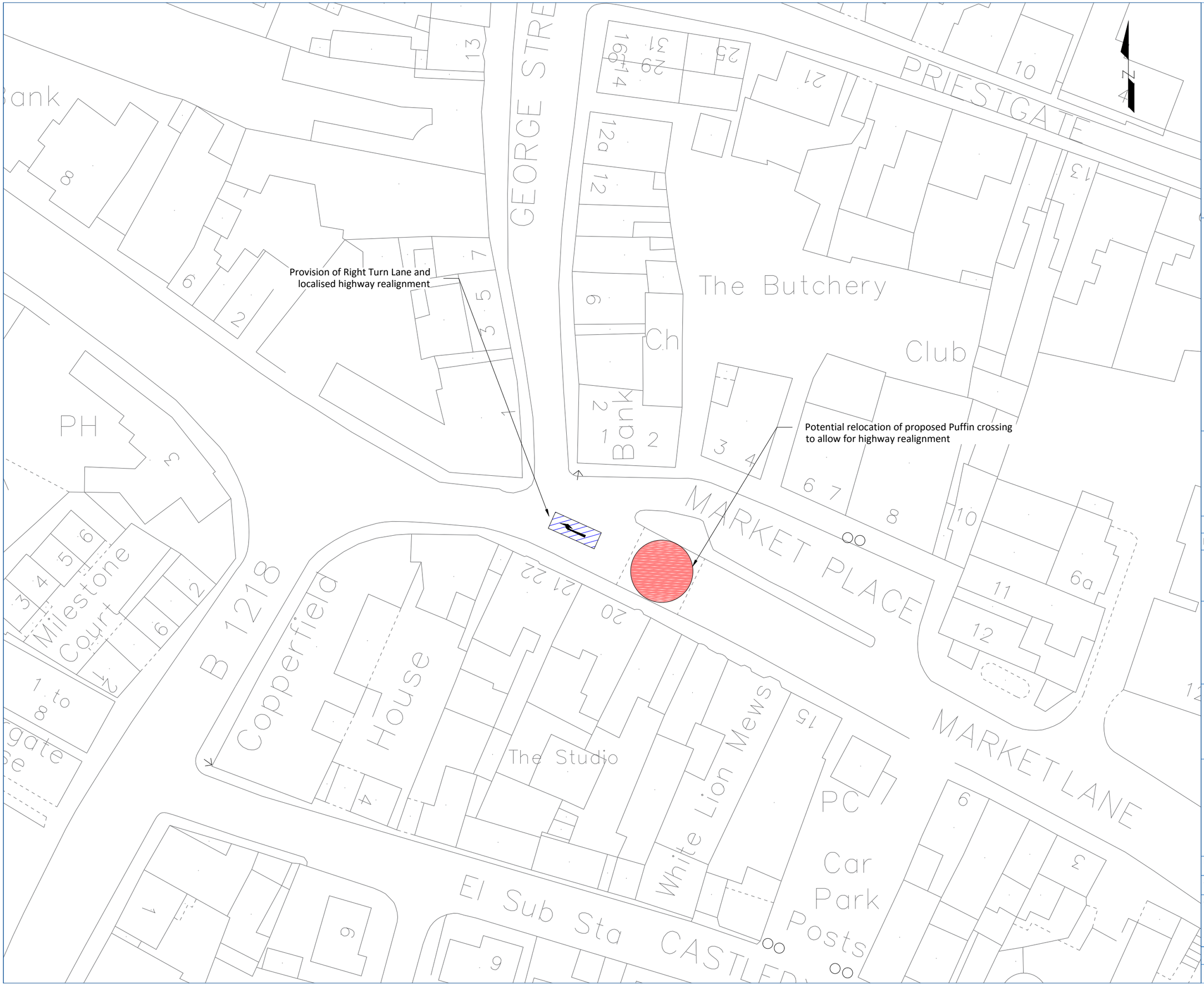

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A3

Key:-

Proposed Crossing

Provision of Right Turn Lane

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Rev.	Date	By	Chk	Description
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Client

North Lincolnshire Council

Project

Barton Highways Masterplan

Title

George Street Option 1
Highway Options and Cycle Facilities
Concept Design

local transport projects
traffic engineering and transport planning
Office 2, Armstrong House,
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info@local-transport-projects.co.uk
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Registered No. 5295328

Drawn	Date
SL	27/03/2018
Scale	Checked
1 : 500	NW

Status

- [/] INTERNAL DRAFT
- [ ] PRELIMINARY
- [ ] DRAFT
- [ ] CONSTRUCTION
- [ ] APPROVED
- [ ] AS BUILT

Drawing number

Project	Job	Drawing	Sheet	Revision
LTP/	3103 /	P1 /	S4 .	01 0

10mm

A3

Key:-

- Stopped up highway
- Existing road markings
- Proposed Bollards

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v. Mapping supplied by Client

Rev.	Date	By	Chk	Description
0	-	-	-	-

Client

North Lincolnshire Council

Project

Barton Highways Masterplan

Title

George Street Option 2
Highway Options and Cycle Facilities
Concept Design

local transport projects
traffic engineering and transport planning
Office 2, Armstrong House,
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www.local-transport-projects.co.uk
Registered No. 5295328

Drawn	Date
SL	27/03/2018
Scale	Checked
1 : 500	NW

Status

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- [ ] APPROVED
- [ ] PRELIMINARY
- [ ] CONSTRUCTION
- [ ] AS BUILT

Drawing number

Project	Job	Drawing	Sheet	Revision
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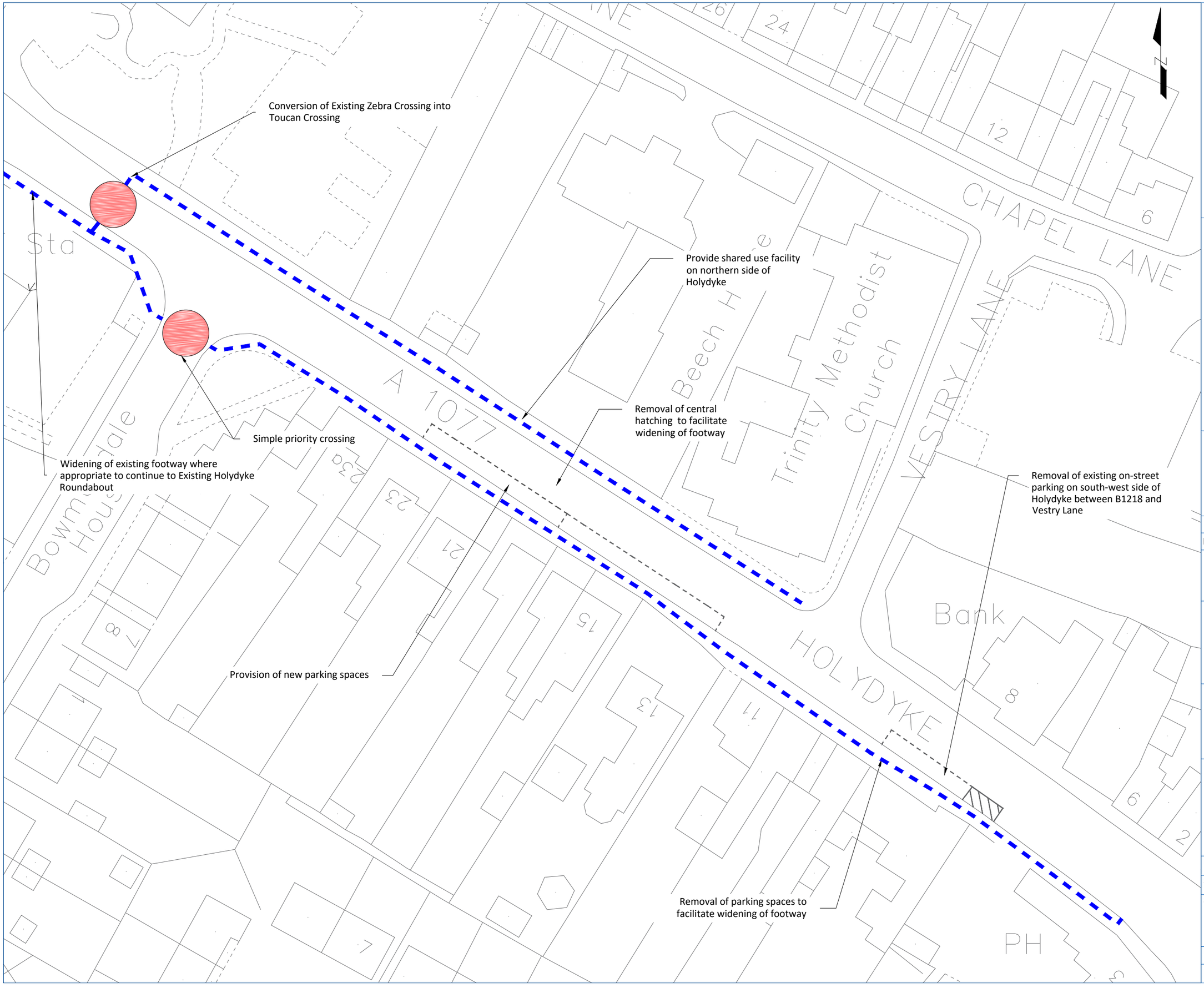

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A3

Key:-

Widen Existing Footway to provide Shared Use Facility

Proposed Crossing

Existing Road Markings

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iii. All dimensions are to be checked by the contractor prior to commencement of work. Any discrepancy shall be reported immediately to Local Transport Projects Ltd

iv. All work shall be carried out in accordance with local authority, statutory authority and health & safety requirements & regulations

v. Mapping supplied by Client

Rev.	Date	By	Chk	Description
0	-	-	-	-

Client

North Lincolnshire Council

Project

Barton Highways Masterplan

Title

Holydyke
Highway Options and Cycle Facilities
Concept Design

local transport projects
traffic engineering and transport planning
Office 2, Armstrong House,
The Flemingate Centre,
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www.local-transport-projects.co.uk
Registered No. 5295328

Drawn	Date
SL	27/03/2018
Scale	Checked
1 : 500	NW

Status

- [/] INTERNAL DRAFT
- [ ] PRELIMINARY
- [ ] DRAFT
- [ ] CONSTRUCTION
- [ ] APPROVED
- [ ] AS BUILT

Drawing number

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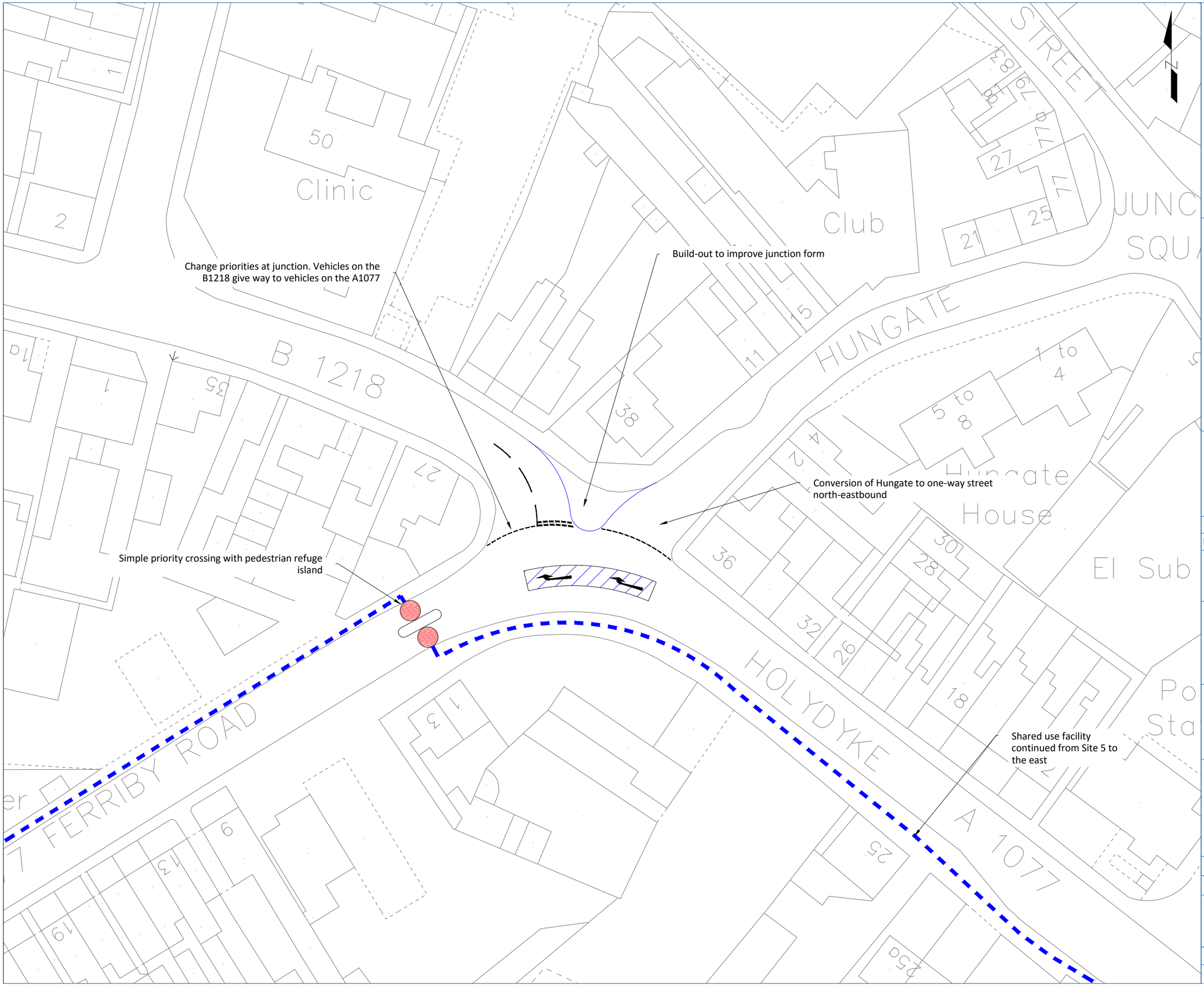

10mm

A3

Key:-

- Proposed new kerbline
- Proposed crossing
- Provision of Right Turn Lane
- Widen existing footway to provide shared use facility

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iii. All dimensions are to be checked by the contractor prior to commencement of work. Any discrepancy shall be reported immediately to Local Transport Projects Ltd

iv. All work shall be carried out in accordance with local authority, statutory authority and health & safety requirements & regulations

v. Mapping supplied by Client

Rev.	Date	By	Chk	Description
0	-	-	-	-

Client: North Lincolnshire Council

Project: Barton Highways Masterplan

Title: A1077 / B1218 Mini-Roundabout Option 1 Change in Priorities Concept Design

local transport projects
traffic engineering and transport planning
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info@local-transport-projects.co.uk
www.local-transport-projects.co.uk
Registered No. 5295328

Drawn	Date
SL	27/03/2018
Scale	Checked
1 : 500	NW

Status: INTERNAL DRAFT; DRAFT; APPROVED; PRELIMINARY; CONSTRUCTION; AS BUILT

Drawing number: LTP / 3103 / S6 / 01 .01 0

Project	Job	Drawing	Sheet	Revision
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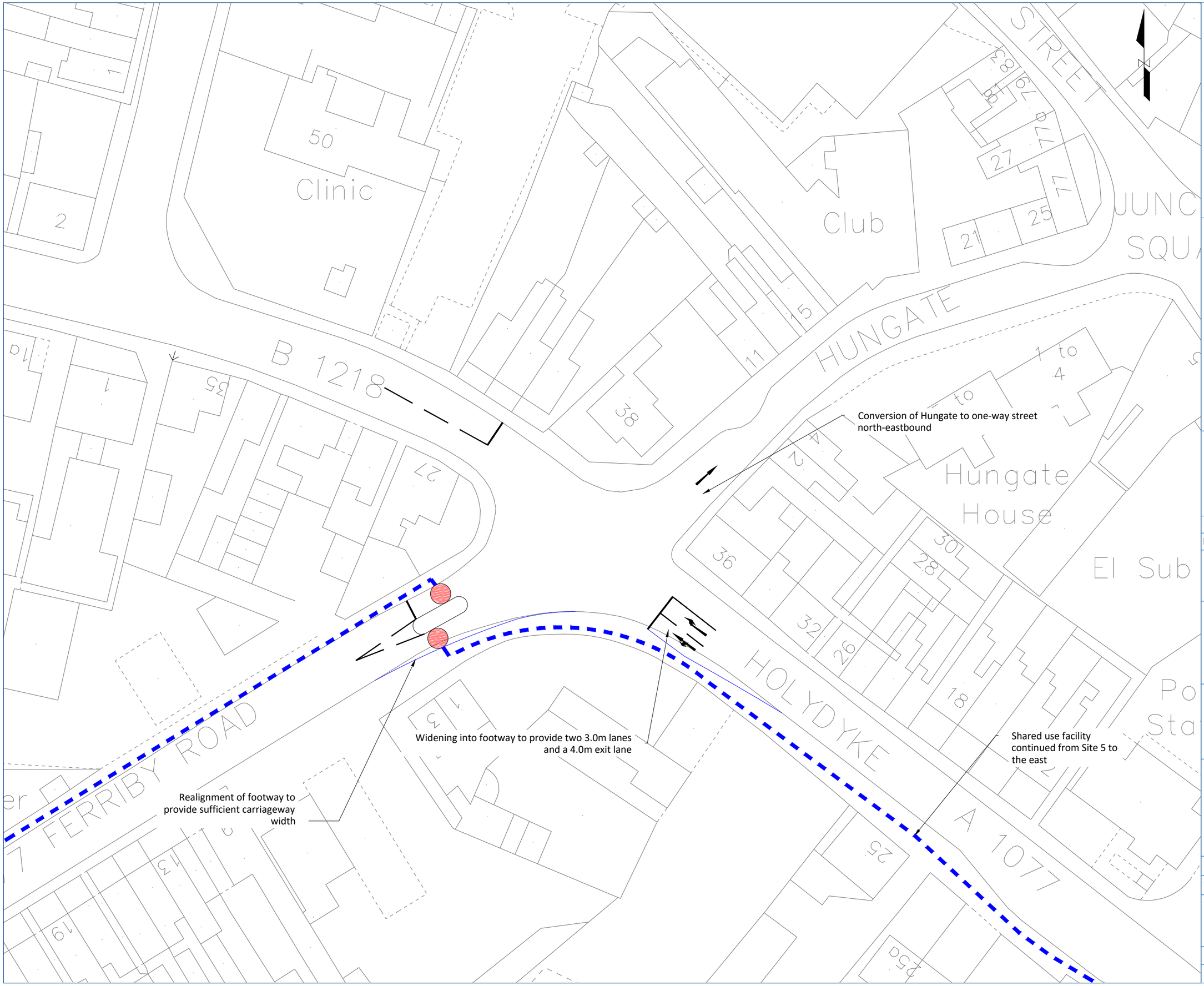

10mm

A3

Key:-

- Proposed new kerbline
- Proposed Crossing
- Proposed Road Markings
- Widen existing footway to provide shared use facility

Disclaimers:-

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iv. All work shall be carried out in accordance with local authority, statutory authority and health & safety requirements & regulations

v. Mapping supplied by Client

Rev.	Date	By	Chk	Description
0	.	-	-	.

Client

North Lincolnshire Council

Project

Barton Highways Masterplan

Title

A1077 / B1218 Mini-Roundabout
Option 2 Signalised Junction
Concept Design

local transport projects
traffic engineering and transport planning

Office 2, Armstrong House,
The Flemingate Centre,
Armstrong Way
Beverley,
East Riding of Yorkshire.
HU17 0NW.

t 01482 679 911
info@local-transport-projects.co.uk
www.local-transport-projects.co.uk
Registered No. 5295328

Drawn	Date
SL	27/03/2018
Scale	Checked
1 : 500	NW

Status

- [/] INTERNAL DRAFT
- [ ] PRELIMINARY
- [ ] DRAFT
- [ ] CONSTRUCTION
- [ ] APPROVED
- [ ] AS BUILT

Drawing number

Project	Job	Drawing	Sheet	Revision
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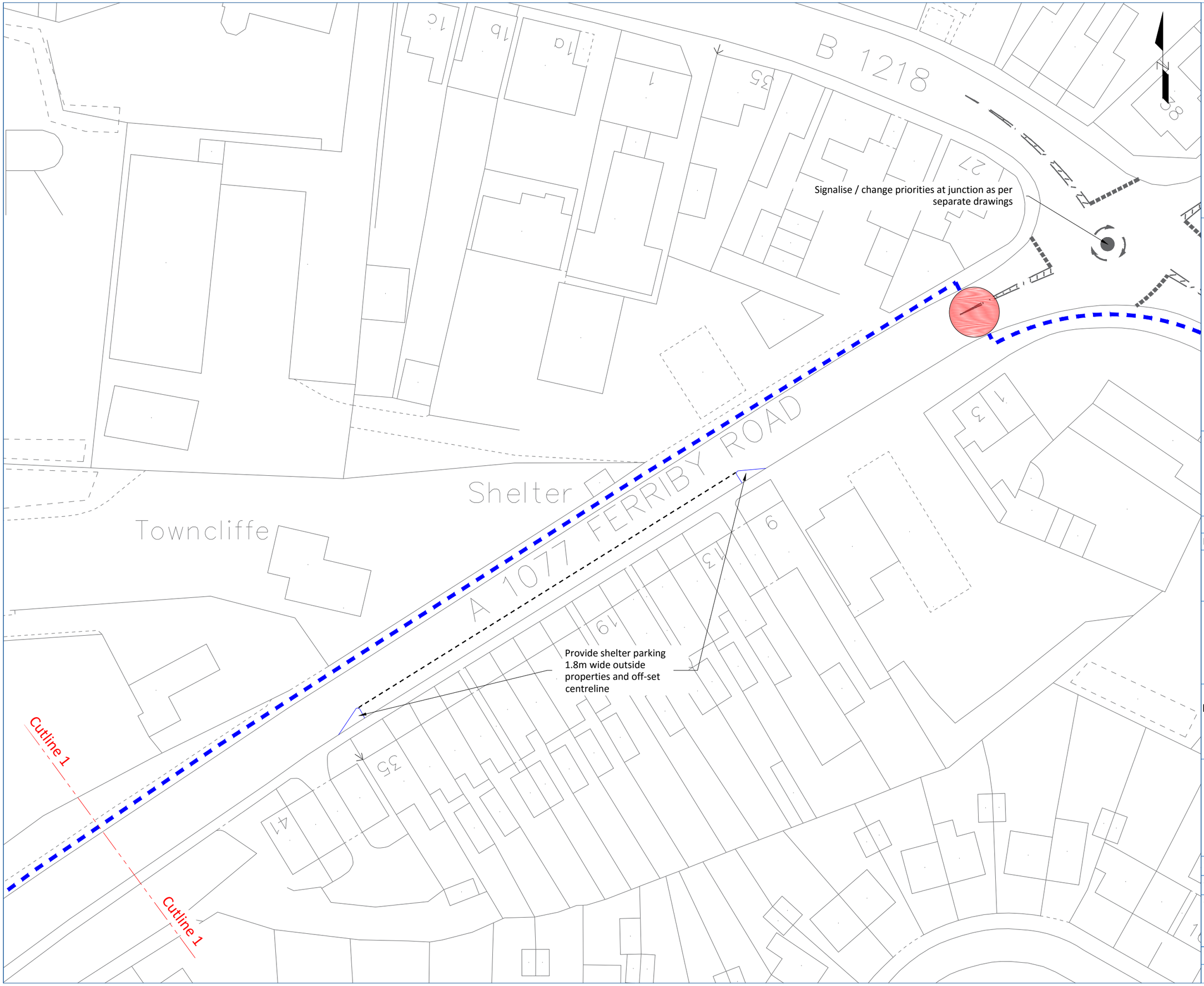

10mm

A3

Key:-

Widen Existing Footway to provide Shared Use Facility

Proposed Crossing

Existing Road Markings

Proposed Road Markings

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v. Mapping supplied by Client

Rev.	Date	By	Chk	Description
0	-	-	-	-

Client

North Lincolnshire Council

Project

Barton Highways Masterplan

Title

Ferriby Road Highway Options and Cycle Facilities
Concept Design
Sheet 1 of 3

local transport projects
traffic engineering and transport planning

Office 2, Armstrong House,
The Flemingate Centre,
Armstrong Way
Beverley,
East Riding of Yorkshire.
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Registered No. 5295328

Drawn	Date
SL	27/03/2018
Scale	Checked
1 : 500	NW

Status

- [x] INTERNAL DRAFT
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- [ ] DRAFT
- [ ] CONSTRUCTION
- [ ] APPROVED
- [ ] AS BUILT

Drawing number

Project	Job	Drawing	Sheet	Revision
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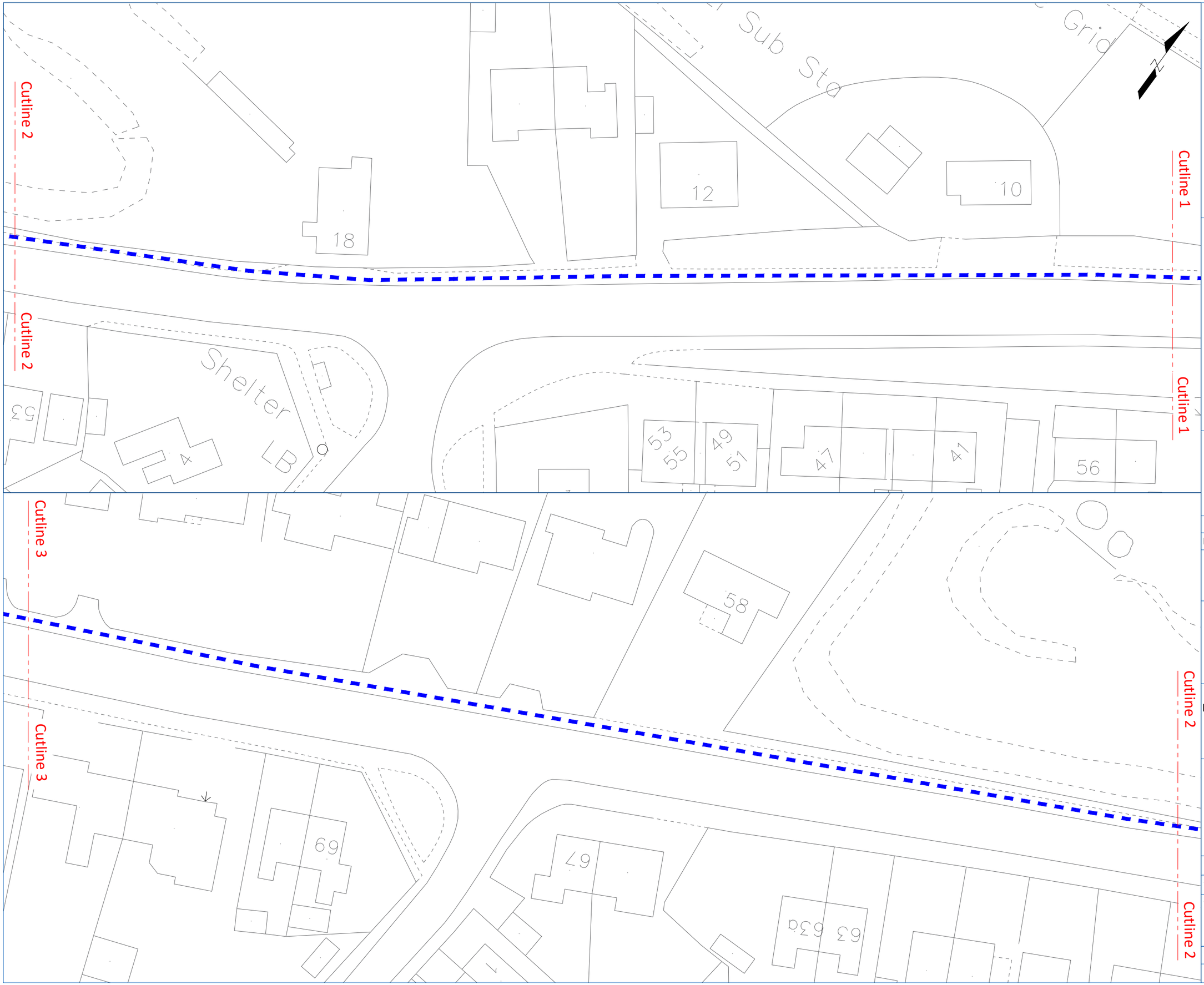

10mm

A3

Key:-

Widen Existing Footway to provide Shared Use Facility

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v. Mapping supplied by Client

Rev.	Date	By	Chk	Description
0	.	-	-	.

Client

North Lincolnshire Council

Project

Barton Highways Masterplan

Title

Ferriby Road Highway Options and Cycle Facilities
Concept Design
Sheet 2 of 3

local transport projects
traffic engineering and transport planning
Office 2, Armstrong House,
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info@local-transport-projects.co.uk
www.local-transport-projects.co.uk
Registered No. 5295328

Drawn	Date
SL	27/03/2018
Scale	**Checked**
1 : 500	NW

Status

- [x] INTERNAL DRAFT
- [ ] PRELIMINARY
- [ ] DRAFT
- [ ] CONSTRUCTION
- [ ] APPROVED
- [ ] AS BUILT

Drawing number

Project	Job	Drawing	Sheet	Revision
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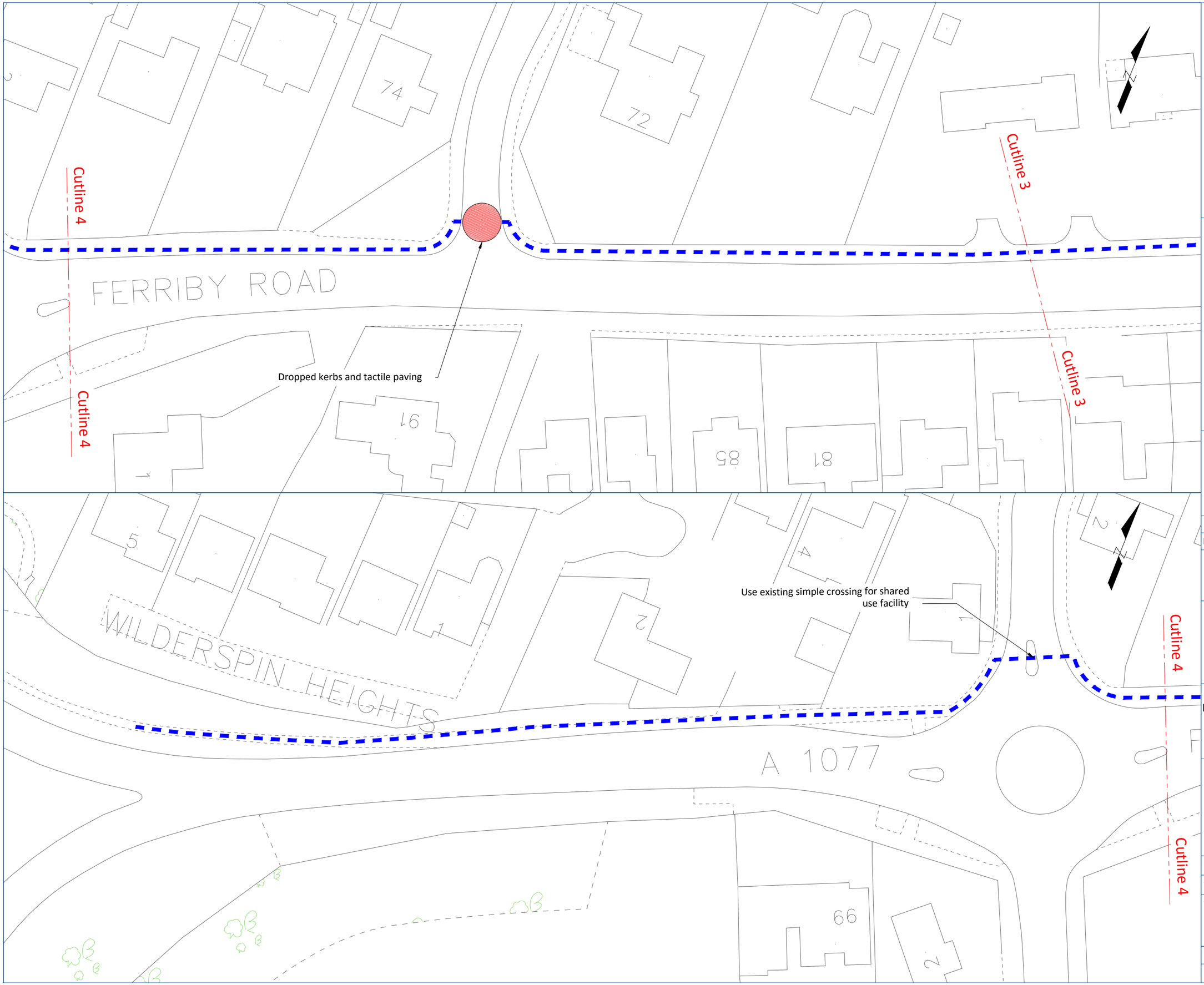

10mm

A3

Key:-

Widen Existing Footway to provide Shared Use Facility

Proposed Crossing

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Rev.	Date	By	Chk	Description
0	-	-	-	-

Client

North Lincolnshire Council

Project

Barton Highways Masterplan

Title

Ferriby Road Highway Options and Cycle Facilities
Concept Design
Sheet 3 of 3

local transport projects
traffic engineering and transport planning
Office 2, Armstrong House,
The Flemingate Centre,
Armstrong Way
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www.local-transport-projects.co.uk
Registered No. 5295328

Drawn	Date
SL	27/03/2018
Scale	Checked
1 : 500	NW

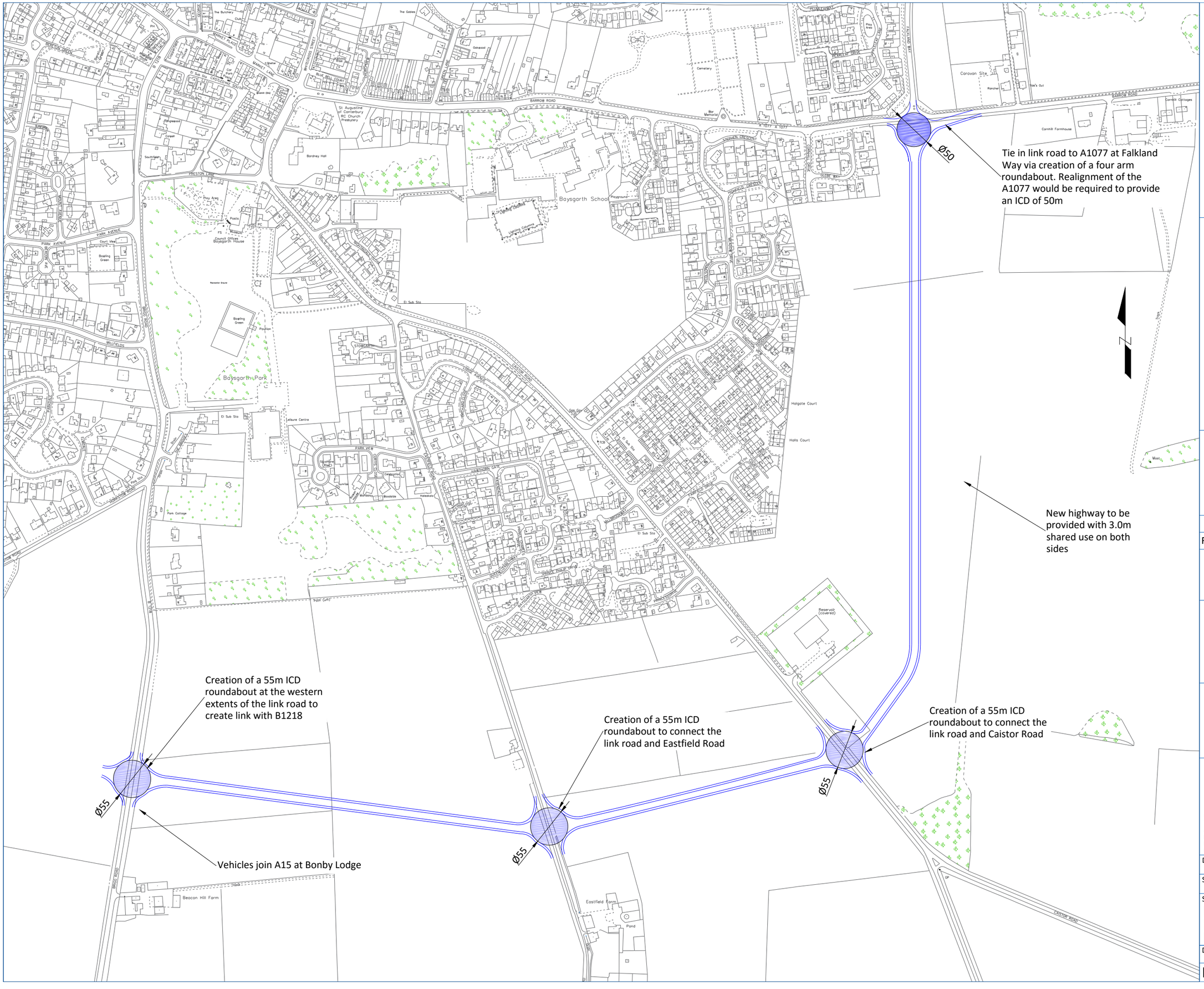
Status

- [x] INTERNAL DRAFT
- [ ] PRELIMINARY
- [ ] DRAFT
- [ ] CONSTRUCTION
- [ ] APPROVED
- [ ] AS BUILT

Drawing number

Project	Job	Drawing	Sheet	Revision
LTP/	3103 /	S7 /	01 .	03	0

Appendix 6 – Relief Road Concept Designs



10mm

A3

Key:-

New Highway

New Roundabout

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Rev.	Date	By	Chk	Description
0	.	-	-	.

Client

North Lincolnshire Council

Project

Barton Highways Masterplan

Title

Proposed Link Road Option 1

local transport projects
traffic engineering and transport planning
Office 2, Armstrong House, The Flemingate Centre, Armstrong Way Beverley, East Riding of Yorkshire. HU17 0NW.
01482 679 911
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Registered No. 5295328

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SL	27/03/18
Scale	Checked
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Status

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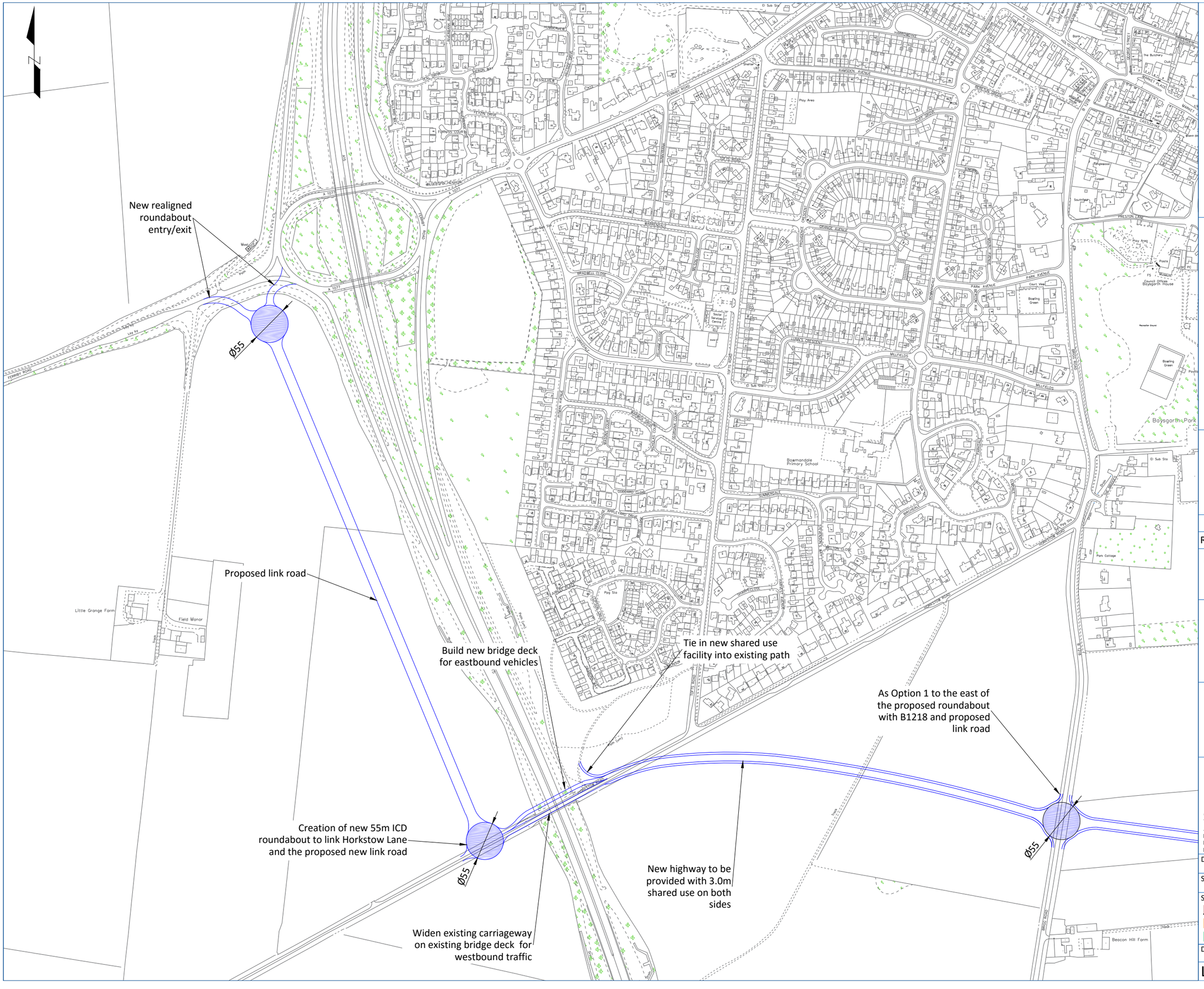
- [ ] PRELIMINARY
- [ ] DRAFT
- [ ] CONSTRUCTION
- [ ] APPROVED
- [ ] AS BUILT

Drawing number

Project	Job	Drawing	Sheet	Revision
LTP/3103/	S8 /	01	.01	0



Key:-

New Highway

New Roundabout

10mm

A3

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v. Mapping provided by Client

Rev.	Date	By	Chk	Description
0	-	-	-	-

Client

North Lincolnshire Council

Project

Barton Highways Masterplan

Title

Proposed Link Road
Option 2

local transport projects
traffic engineering and transport planning
Office 2, Armstrong House,
The Flemingate Centre,
Armstrong Way
Beverley,
East Riding of Yorkshire.
HU17 0NW.
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SL	27/03/18
Scale	Checked
1 : 5000	NW

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- [ ] PRELIMINARY
- [ ] DRAFT
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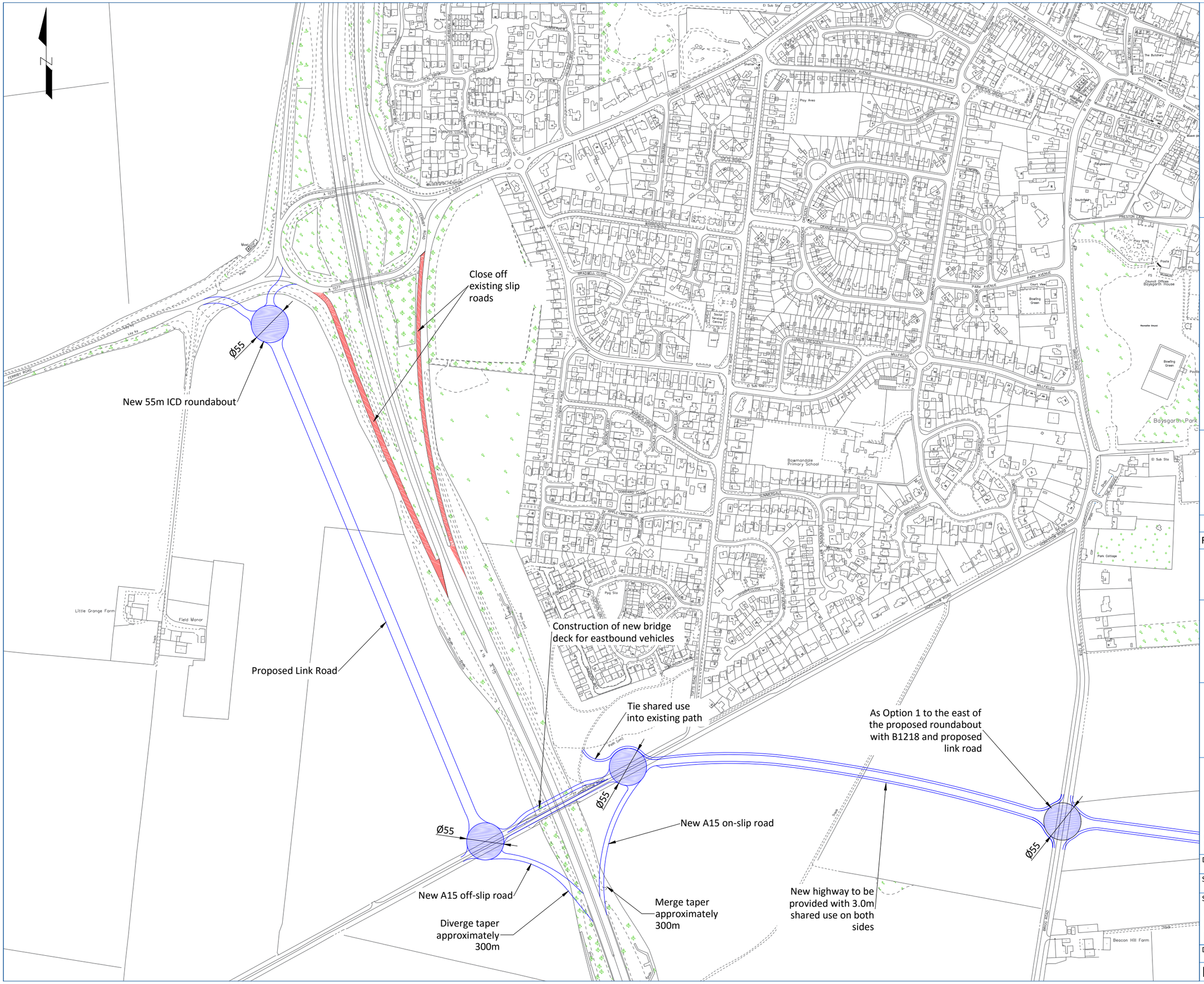
- [ ] APPROVED
- [ ] AS BUILT

Drawing number

Project	Job	Drawing	Sheet	Revision
LTP/ 3103 /	S8 /	02	.01	0



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A3

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Key:-

New Highway

New Roundabout

Closed Off Slip Road

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v. Mapping provided by Client

Rev.	Date	By	Chk	Description
0	-	-	-	-

Client

North Lincolnshire Council

Project

Barton Highways Masterplan

Title

Proposed Link Road
Option 3

local transport projects
traffic engineering and transport planning
Office 2, Armstrong House,
The Flemingate Centre,
Armstrong Way
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Registered No. 5295328

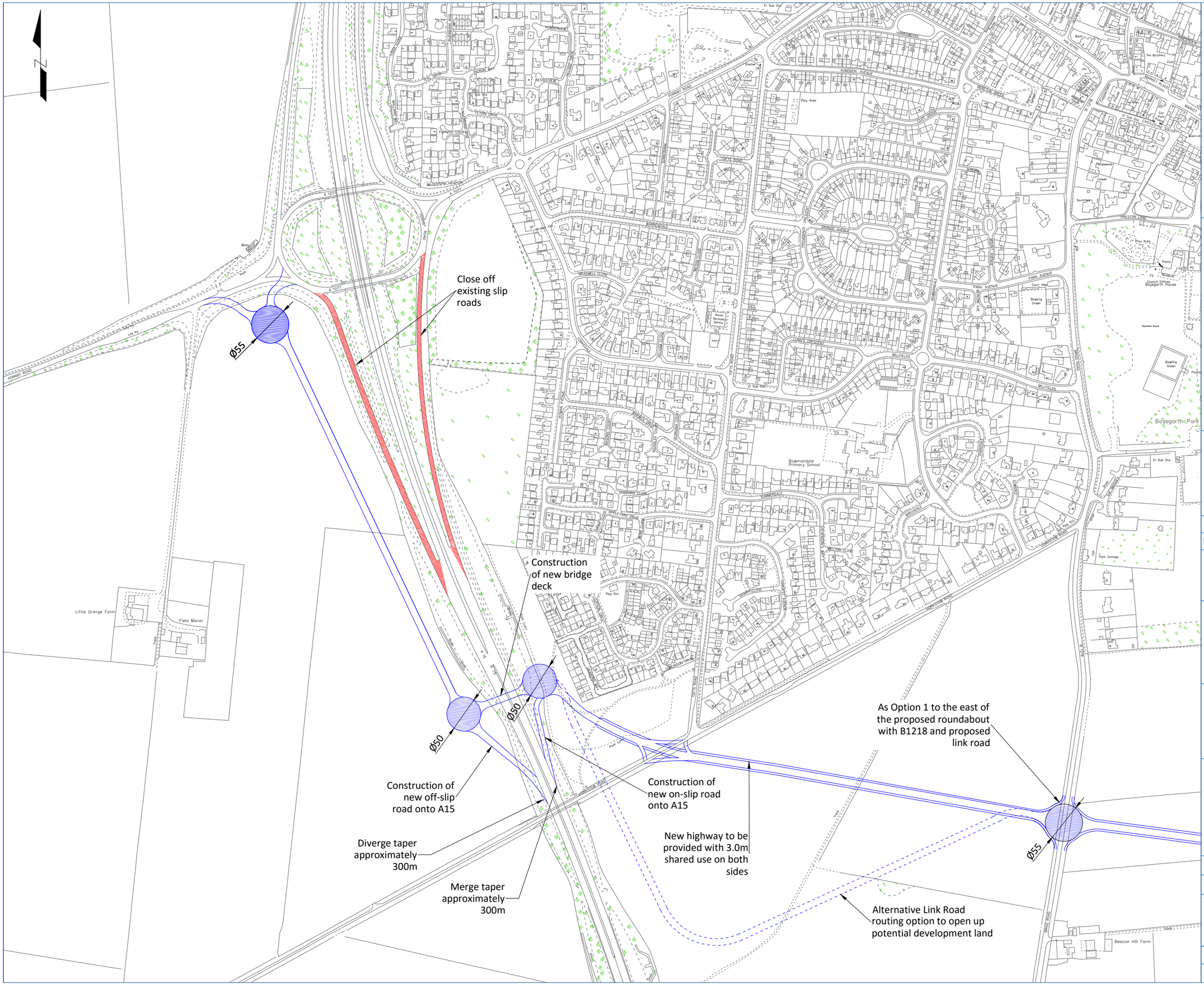
Drawn	Date
SL	27/03/18
Scale	**Checked**
1 : 5000	NW

Status

- [ ] INTERNAL DRAFT
- [ ] PRELIMINARY
- [ ] DRAFT
- [ ] CONSTRUCTION
- [ ] APPROVED
- [ ] AS BUILT

Drawing number

Project	Job	Drawing	Sheet	Revision
LTP/3103/	S8 /	03	.01	0



Key:-

- New Highway
- Alternative Link Road Route
- New Roundabout
- Closed Off Slip Road

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v. Mapping provided by Client

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A3

Rev.	Date	By	Chk	Description
0	-	-	-	-

Client: North Lincolnshire Council

Project: Barton Highways Masterplan

Title: Proposed Link Road Option 4

local transport projects
traffic engineering and transport planning
Office 2, Armstrong House, The Flemingate Centre, Armstrong Way Beverley, East Riding of Yorkshire. HU17 0NW.
01482 679 911
info@local-transport-projects.co.uk
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Registered No. 5295328

Drawn	Date
SL	27/03/18
Scale: 1 : 5000	Checked: NW

Status: INTERNAL DRAFT; DRAFT; APPROVED; PRELIMINARY; CONSTRUCTION; AS BUILT

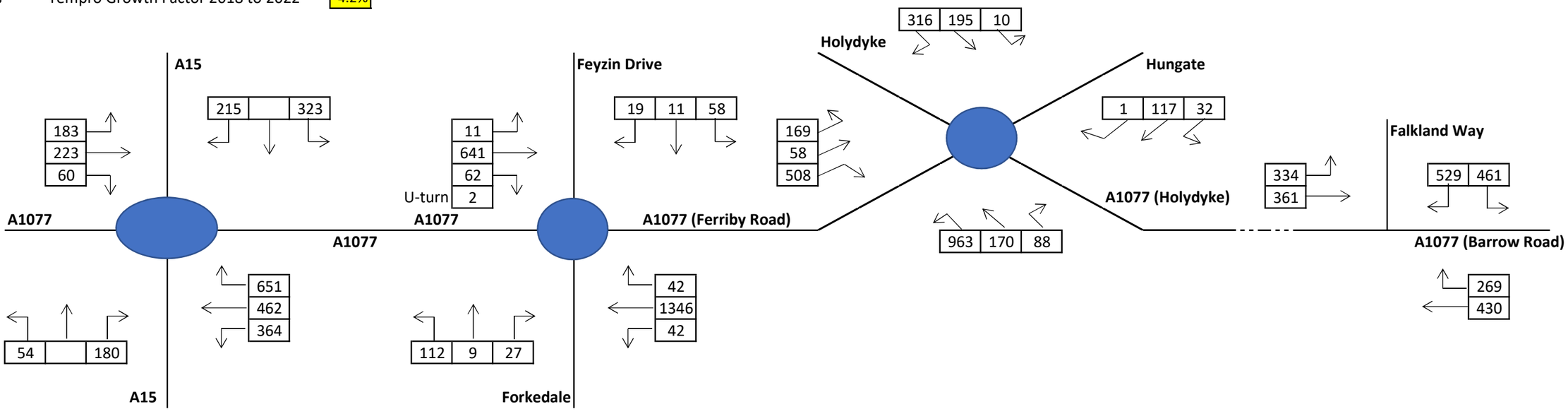
Drawing number: LTP / 3103 / S8 / 04 .01 0 (Project / Job / Drawing / Sheet / Revision)

Appendix 7 – Relief Road Network Diagrams

2022 Opening Year (Do Minimum)

AM Peak (07:30-08:30)

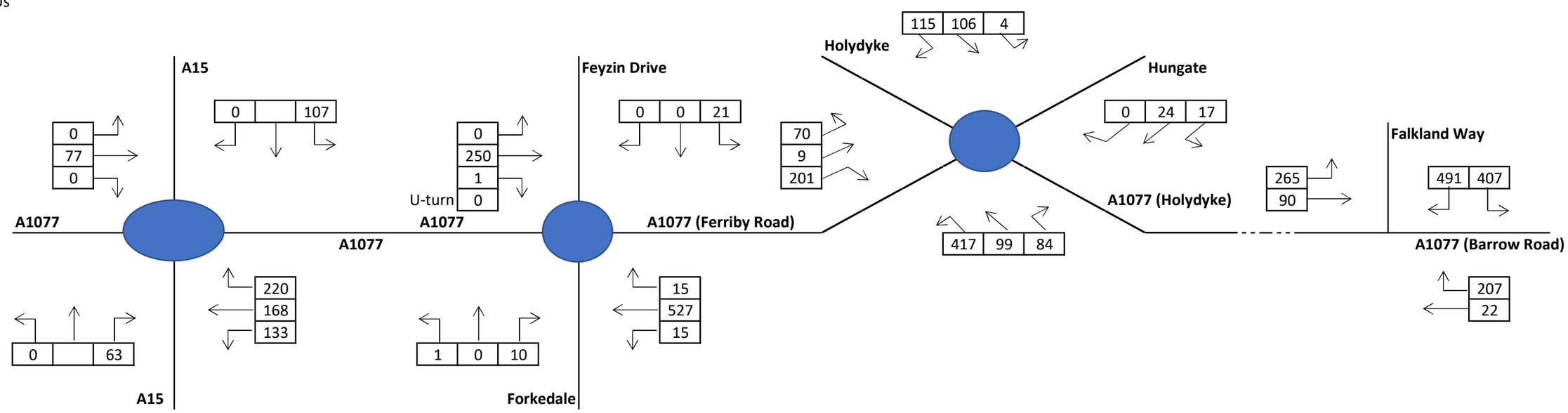
PCUs Tempro Growth Factor 2018 to 2022 4.2%



Total Development Trips (Scenario 2)

AM Peak (07:30-08:30)

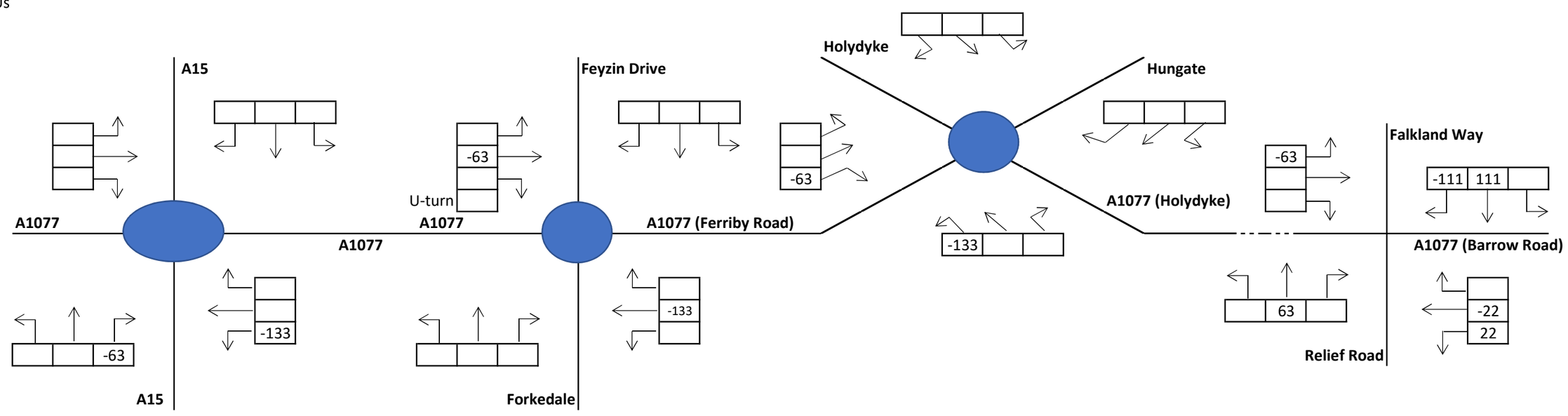
PCUs



Option 1 Relief Road Trips

AM Peak (07:30-08:30)

PCUs

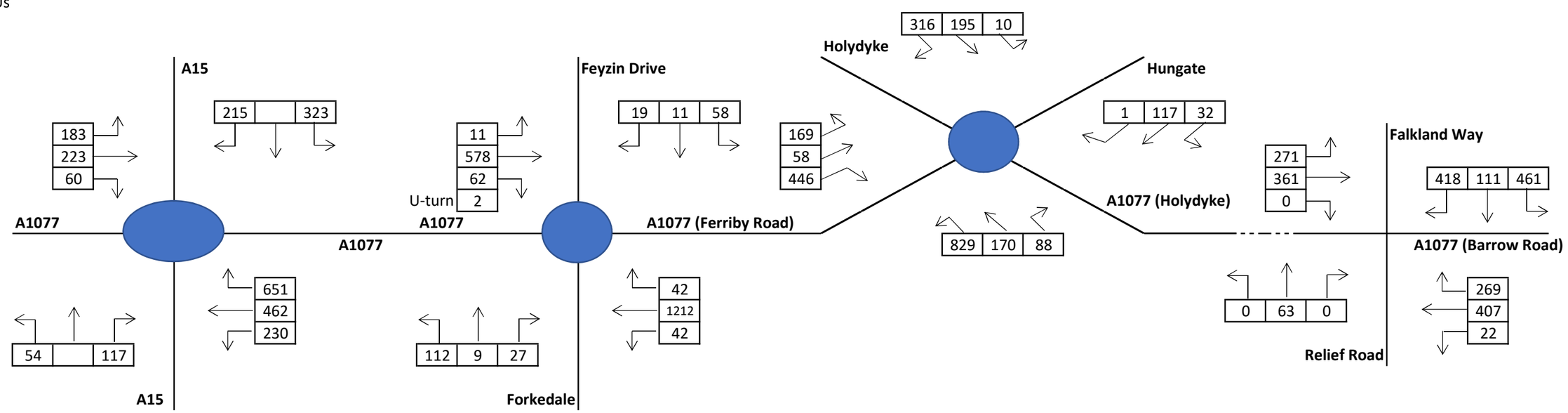


*assuming all northbound trips on A15 and westbound trips on A1077 do not utilise relief road

2022 Opening Year (Do Something) - Option 1

AM Peak (07:30-08:30)

PCUs

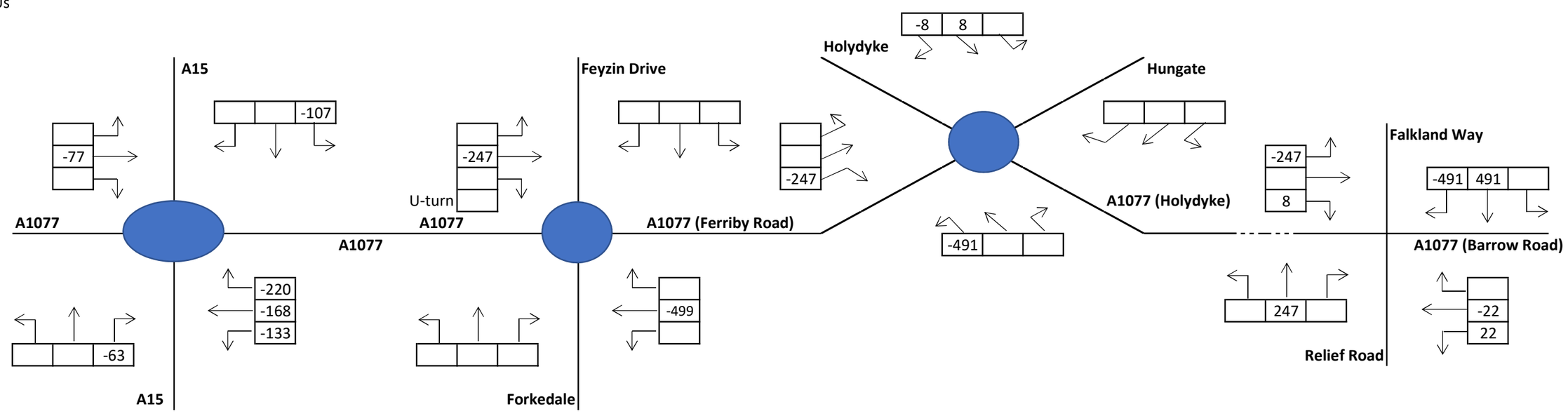


*assuming all northbound trips on A15 and westbound trips on A1077 do not utilise relief road

Option 2, 3 and 4 Relief Road Trips

AM Peak (07:30-08:30)

PCUs

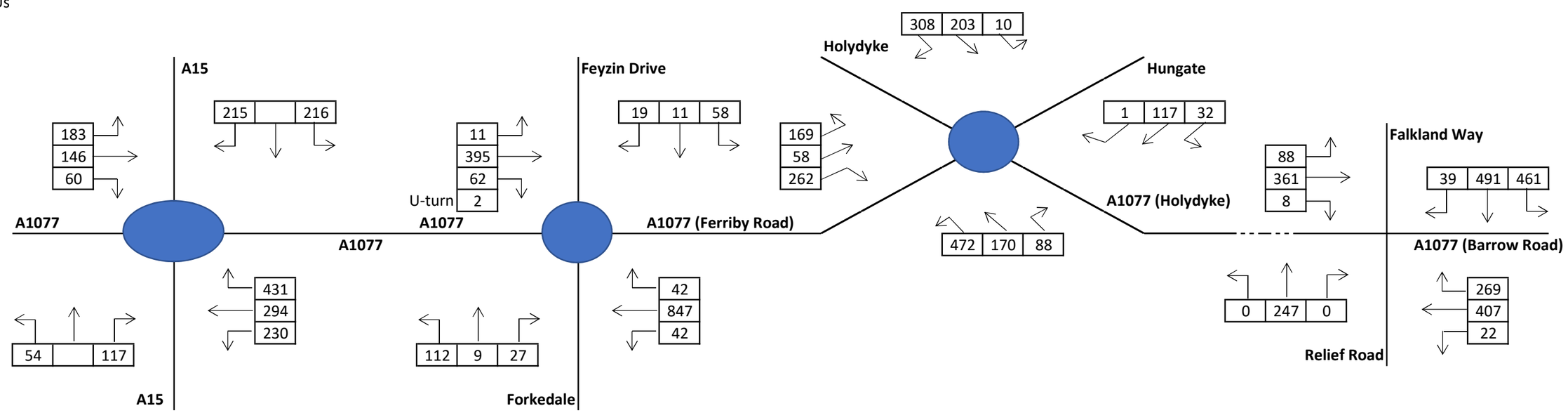


*assuming all development trips utilising A15/A1077 junction will utilise relief road

2022 Opening Year (Do Something) - Option 2,3,4

AM Peak (07:30-08:30)

PCUs

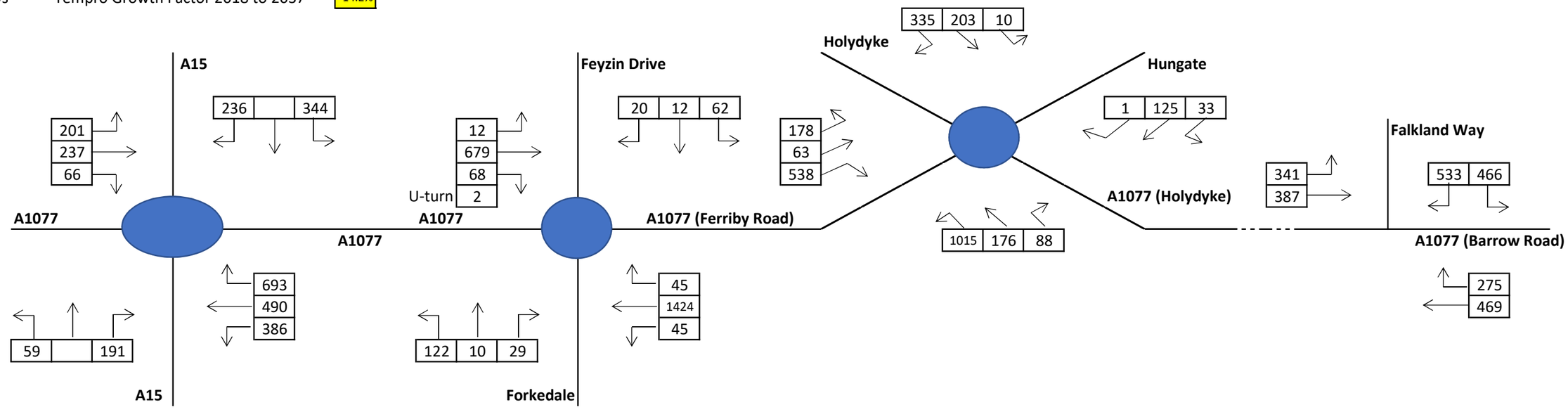


*assuming all northbound trips on A15 and westbound trips on A1077 do not utilise relief road

2037 Appraisal Year (Do Minimum)

AM Peak (07:30-08:30)

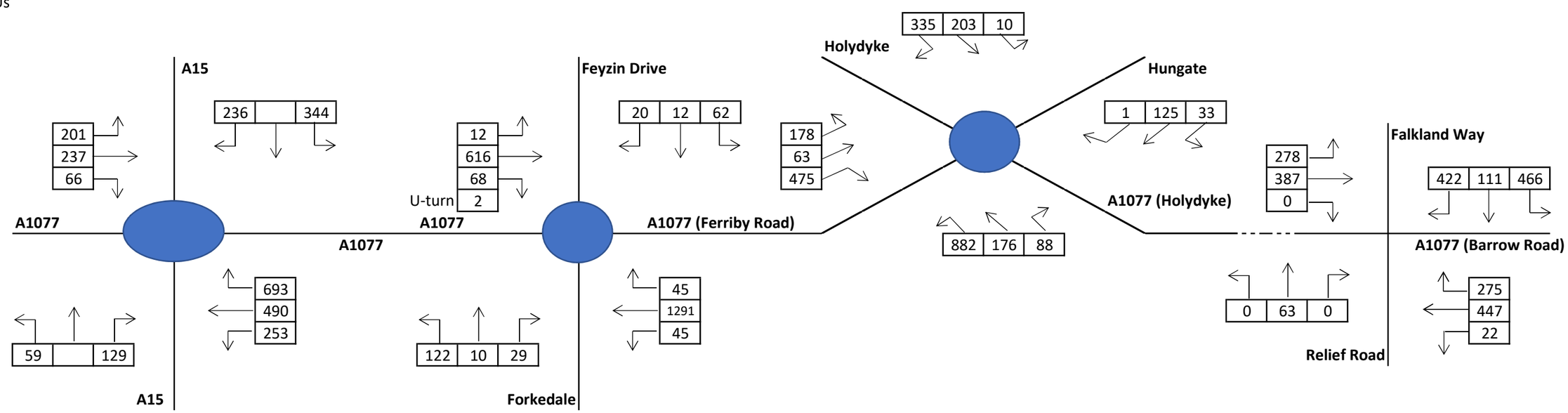
PCUs Tempro Growth Factor 2018 to 2037 14.2%



2037 Appraisal Year (Do Something) - Option 1

AM Peak (07:30-08:30)

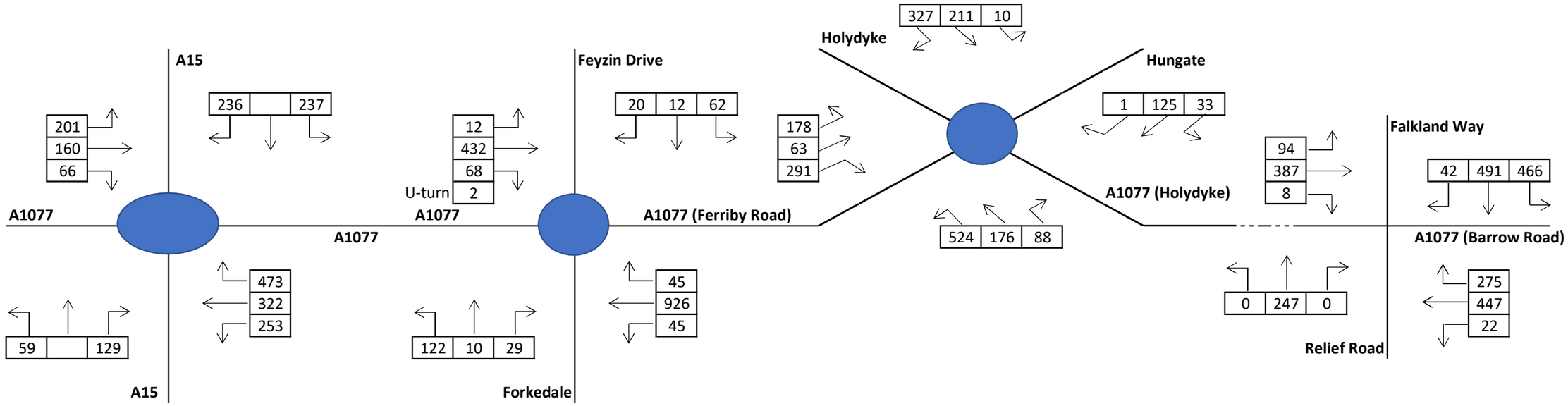
PCUs



2037 Appraisal Year (Do Something) - Option 2,3,4

AM Peak (07:30-08:30)

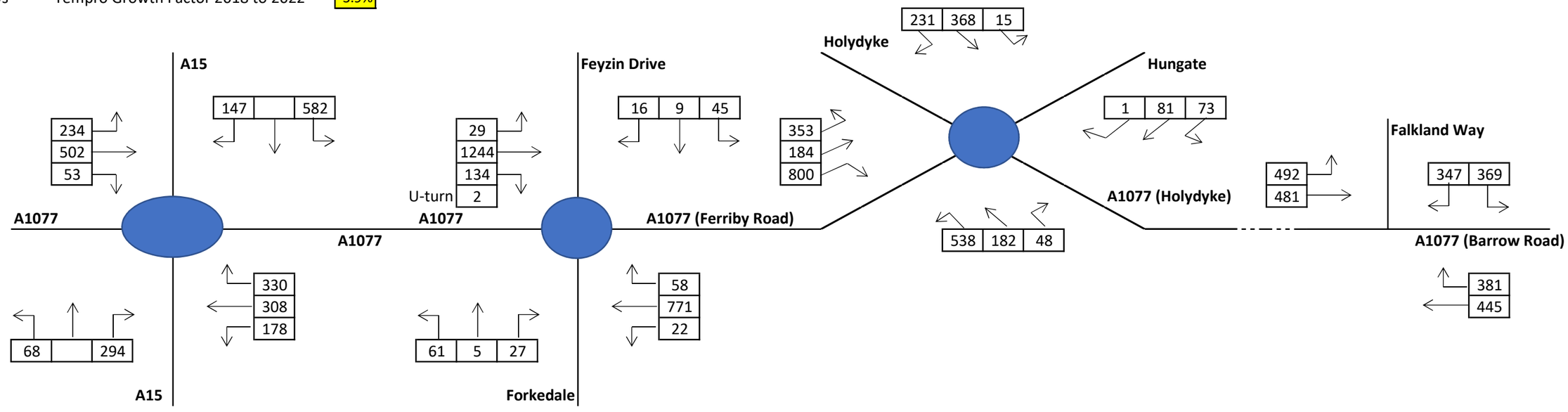
PCUs



2022 Opening Year (Do Minimum)

PM Peak (16:45-17:45)

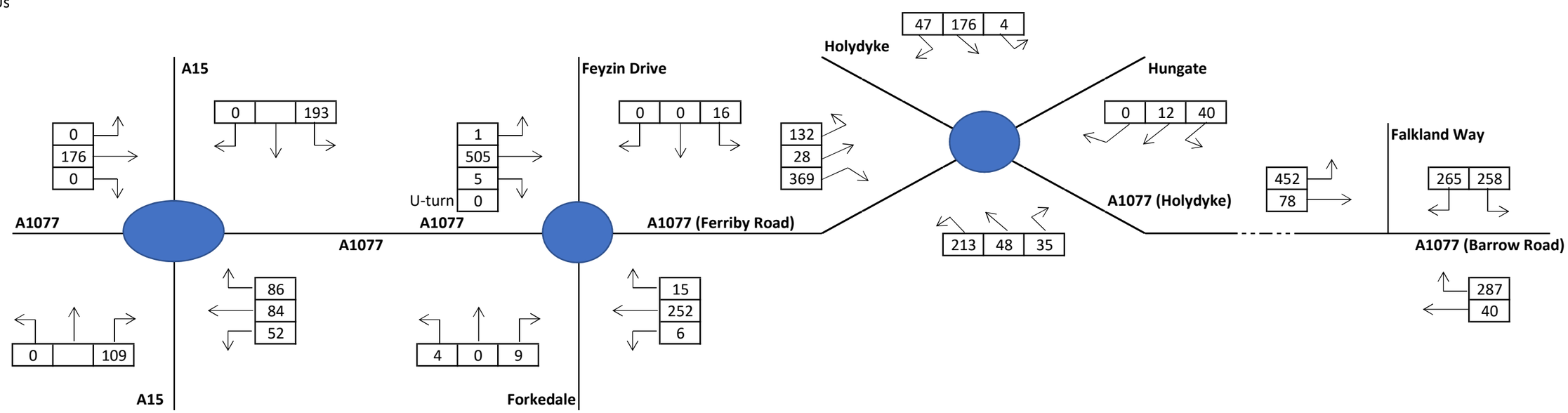
PCUs Tempro Growth Factor 2018 to 2022 3.9%



Total Development Trips (Scenario 2)

PM Peak (16:45-17:45)

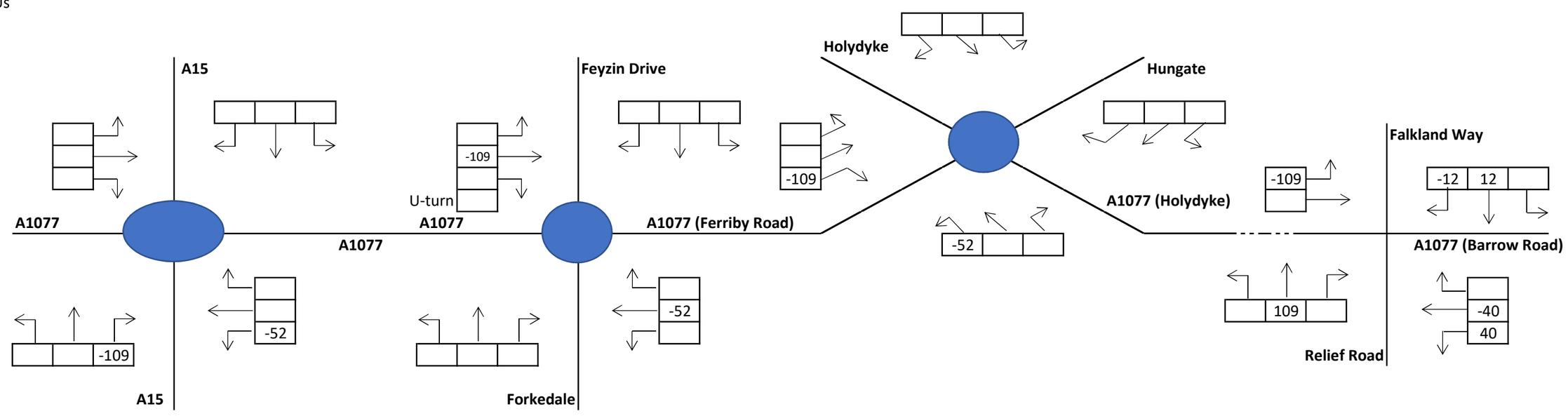
PCUs



Option 1 Relief Road Trips

PM Peak (16:45-17:45)

PCUs

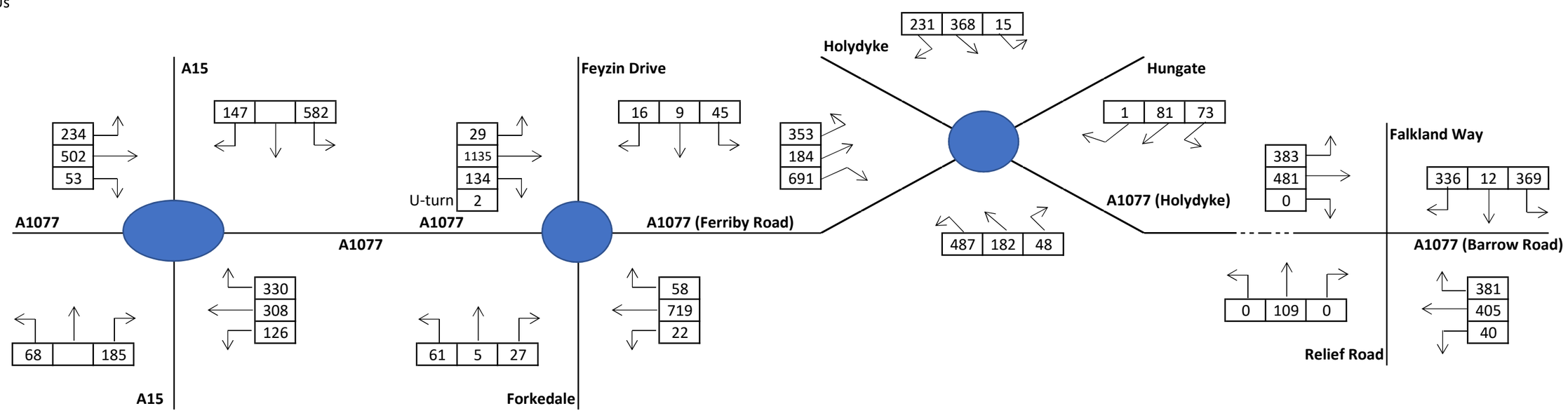


*assuming all northbound trips on A15 and westbound trips on A1077 do not utilise relief road

2022 Opening Year (Do Something) - Option 1

PM Peak (16:45-17:45)

PCUs

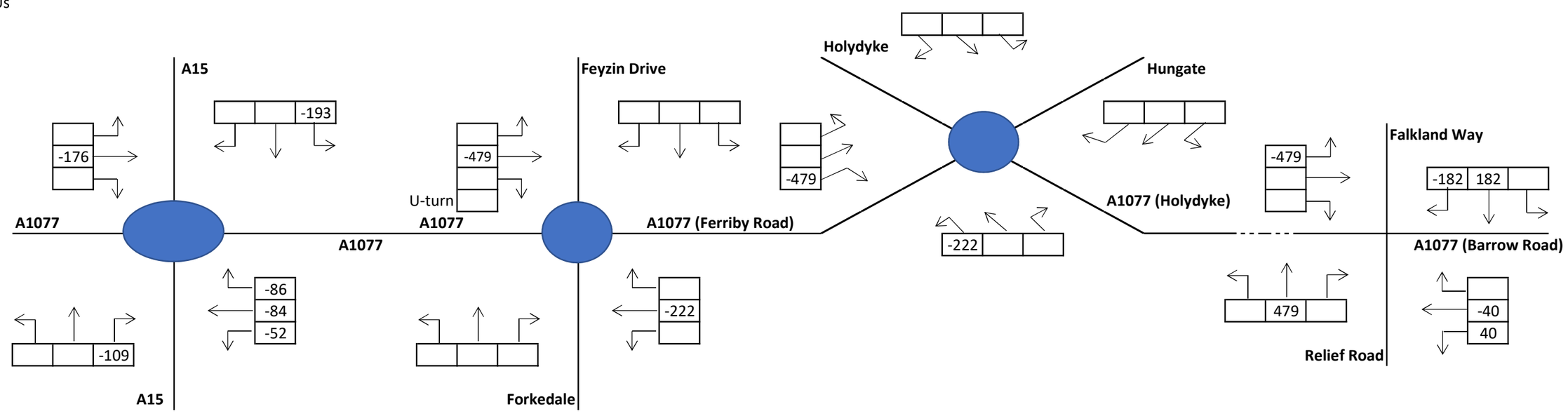


*assuming all northbound trips on A15 and westbound trips on A1077 do not utilise relief road

Option 2, 3 and 4 Relief Road Trips

PM Peak (16:45-17:45)

PCUs

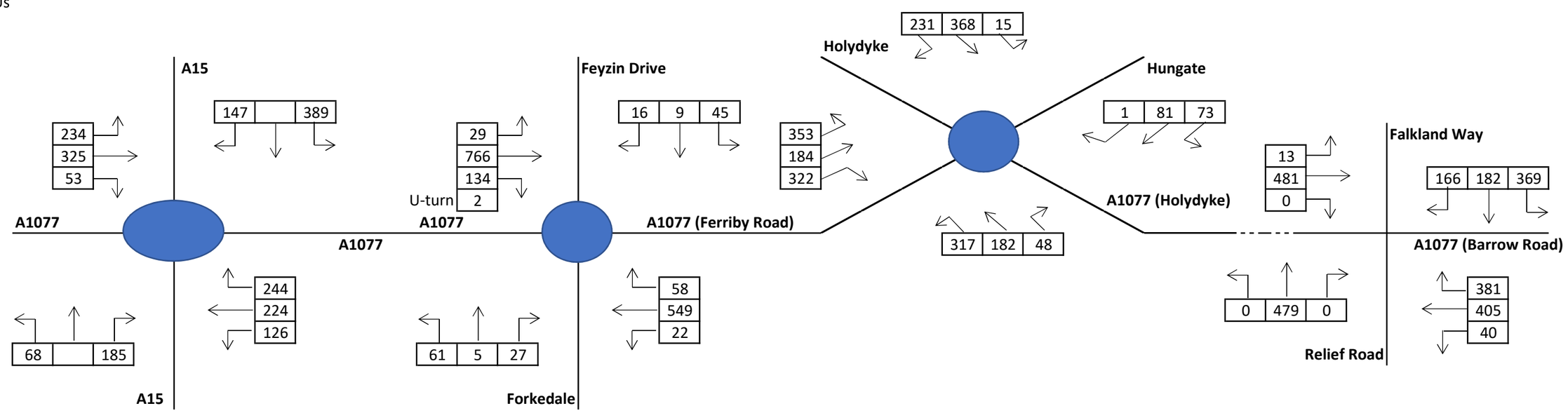


*assuming all development trips utilising A15/A1077 junction will utilise relief road

2022 Opening Year (Do Something) - Option 2,3,4

PM Peak (16:45-17:45)

PCUs

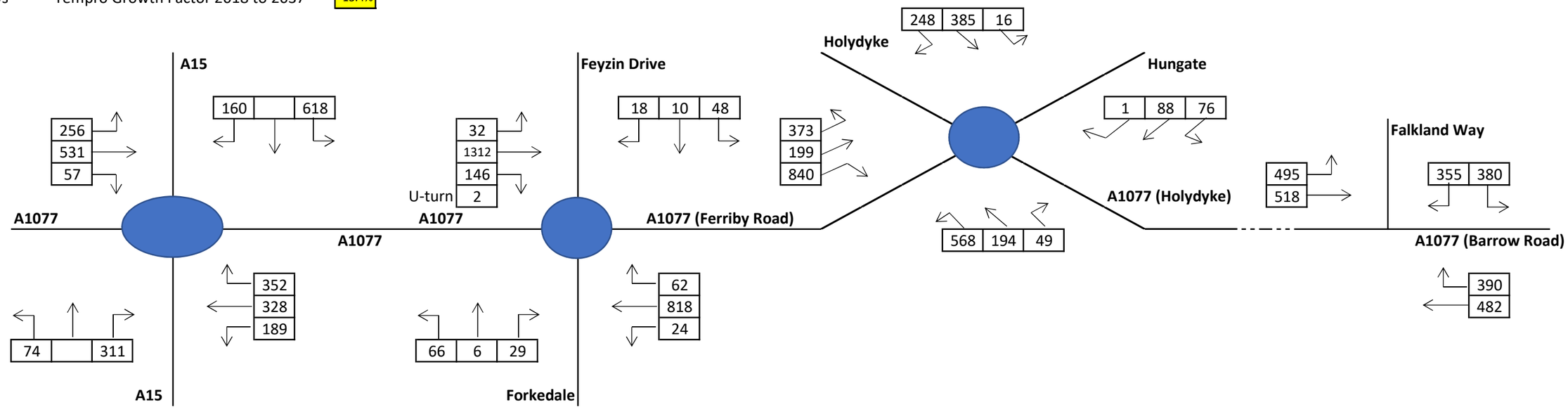


*assuming all northbound trips on A15 and westbound trips on A1077 do not utilise relief road

2037 Appraisal Year (Do Minimum)

PM Peak (16:45-17:45)

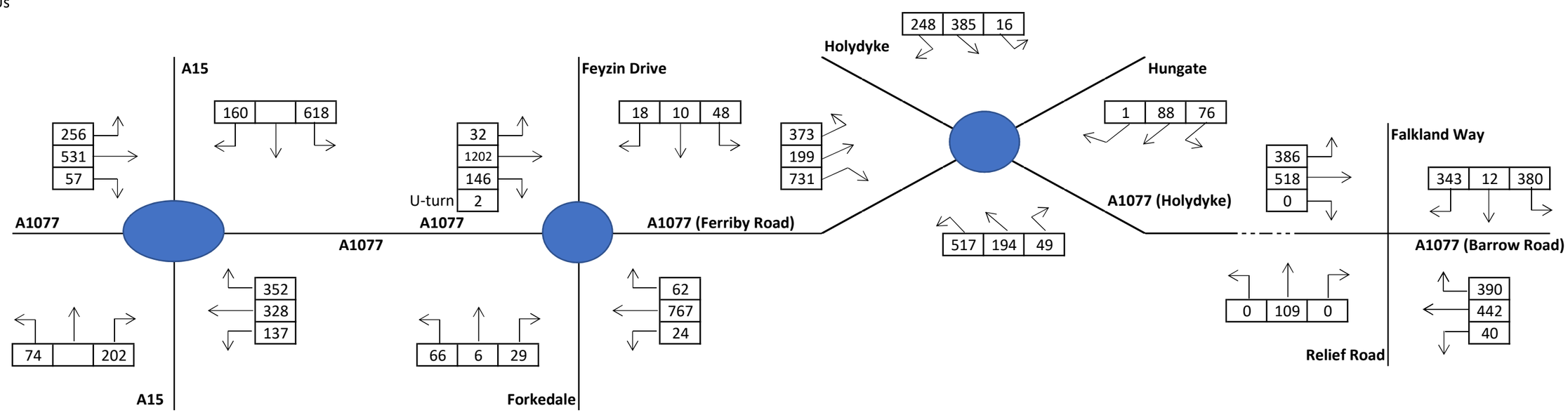
PCUs Tempro Growth Factor 2018 to 2037 13.4%



2037 Appraisal Year (Do Something) - Option 1

PM Peak (16:45-17:45)

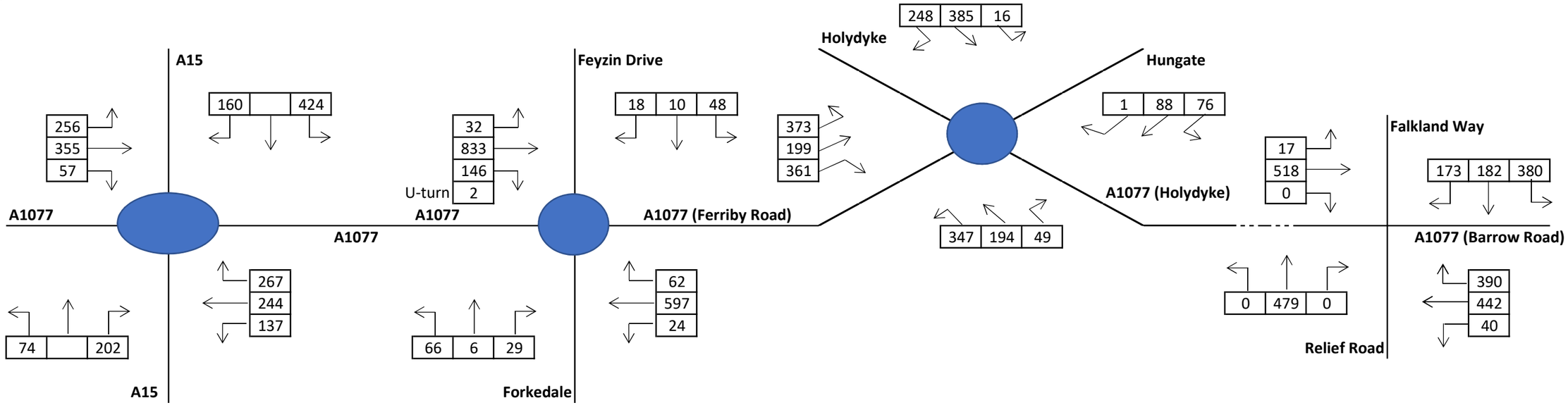
PCUs



2037 Appraisal Year (Do Something) - Option 2,3,4

PM Peak (16:45-17:45)

PCUs



Appendix 8 – Economic Appraisal

Location	Route	Via A1077 Corridor	Option 1	Difference	Option 2	Difference	Option 3	Difference	Option 4	Difference
A	Falkland Way to A15 (N)	00:03:54	00:07:39	+00:03:45	00:03:22	-00:00:32	00:03:22	-00:00:32	00:03:19	-00:00:35
	A15 (N) to Falkland Way	00:03:24	00:07:33	+00:04:09	00:03:32	+00:00:08	00:03:32	+00:00:08	00:03:26	+00:00:02
B	Falkland Way to A15 (S)	00:05:33	00:04:38	-00:00:55	00:05:48	+00:00:15	00:04:10	-00:01:23	00:04:32	-00:01:01
	A15 (S) to Falkland Way	00:05:53	00:04:24	-00:01:29	00:05:37	-00:00:16	00:04:30	-00:01:23	00:04:32	-00:01:01
C	Falkland Way to A1077	00:03:18	00:07:18	+00:04:00	00:03:01	-00:00:17	00:03:01	-00:00:17	00:02:54	-00:00:24
	A1077 to Falkland Way	00:03:18	00:07:49	+00:04:31	00:03:01	-00:00:17	00:03:01	-00:00:17	00:02:54	-00:00:24
Average Journey Time Difference			**00:01:12**		**-00:00:10**		**-00:00:37**		**-00:00:34**	
Average Journey Time Difference (Seconds)			**72**		**10**		**37**		**34**	

Link	Direction	Option 1	Option 2, 3, 4
AM Peak			
A15 to Brigg Road	Eastbound	-63	-247
	Westbound	-133	-521
Brigg Road to Falkland Way	Eastbound	-63	-239
	Westbound	-133	-513
Relief Road	Northbound	63	247
	Southbound	133	521
PM Peak			
A15 to Brigg Road	Eastbound	-109	-479
	Westbound	-52	-222
Brigg Road to Falkland Way	Eastbound	-109	-479
	Westbound	-52	-222
Relief Road	Northbound	109	479
	Southbound	52	222
	AM (Two-Way Movements)	196	768
	PM (Two-Way Movements)	161	701
	Peaks (AM + PM)	357	1469
	AADT	2252	9265

		Option 1	Option 2	Option 3	Option 4
AM	Travel Time Savings (secs)	14112	7680	28416	26112
PM	Travel Time Savings (secs)	11592	7010	25937	23834
Peaks	Travel Time Savings (secs)	25704	14690	54353	49946
Daily	Travel Time Savings (secs)	162114	92649	342801	315007
Daily	Travel Time Savings (mins)	2701.90	1544.15	5713.36	5250.11
Daily	Travel Time Savings (hours)	45.03	25.74	95.22	87.50

Values of Working Time per person (£ per hour)	£27.07	£1,219.01	£696.67	£2,577.68	£2,368.68
Average working days per year	260	£316,941.38	£181,134.02	£670,195.87	£615,855.66
Average occupancy of vehicle	1.5	£475,412.06	£271,701.03	£1,005,293.80	£923,783.49
Scheme Benefits (Opening year - 2022)		£1,901,648.25	£1,086,804.11	£4,021,175.21	£3,695,133.98

Year	Discount Rate	Discount Factor	Option 1		Option 2		Option 3		Option 4	
			Benefits £m (2010 prices)	Net Present Value Benefits	Benefits £m (2010 prices)	Net Present Value Benefits	Benefits £m (2010 prices)	Net Present Value Benefits	Benefits £m (2010 prices)	Net Present Value Benefits
2010	3.5%	1.000		0.00		0.00		0.00		0.00
2011	3.5%	1.035		0.00		0.00		0.00		0.00
2012	3.5%	1.071		0.00		0.00		0.00		0.00
2013	3.5%	1.109		0.00		0.00		0.00		0.00
2014	3.5%	1.148		0.00		0.00		0.00		0.00
2015	3.5%	1.188		0.00		0.00		0.00		0.00
2016	3.5%	1.229		0.00		0.00		0.00		0.00
2017	3.5%	1.272		0.00		0.00		0.00		0.00
2018	3.5%	1.317		0.00		0.00		0.00		0.00
2019	3.5%	1.363		0.00		0.00		0.00		0.00
2020	3.5%	1.411		0.00		0.00		0.00		0.00
2021	3.5%	1.460		0.00		0.00		0.00		0.00
2022	3.5%	1.511	1.90	1.26	1.09	0.72	4.02	2.66	3.70	2.45
2023	3.5%	1.564	1.84	1.17	1.05	0.67	3.89	2.48	3.57	2.28
2024	3.5%	1.619	1.78	1.10	1.01	0.63	3.75	2.32	3.45	2.13
2025	3.5%	1.675	1.72	1.02	0.98	0.59	3.63	2.17	3.33	1.99
2026	3.5%	1.734	1.66	0.96	0.95	0.55	3.50	2.02	3.22	1.86
2027	3.5%	1.795	1.60	0.89	0.92	0.51	3.39	1.89	3.11	1.73
2028	3.5%	1.857	1.55	0.83	0.88	0.48	3.27	1.76	3.01	1.62
2029	3.5%	1.923	1.49	0.78	0.85	0.44	3.16	1.64	2.90	1.51
2030	3.5%	1.990	1.44	0.73	0.83	0.41	3.05	1.53	2.81	1.41
2031	3.5%	2.059	1.40	0.68	0.80	0.39	2.95	1.43	2.71	1.32
2032	3.5%	2.132	1.35	0.63	0.77	0.36	2.85	1.34	2.62	1.23
2033	3.5%	2.206	1.30	0.59	0.74	0.34	2.75	1.25	2.53	1.15
2034	3.5%	2.283	1.26	0.55	0.72	0.32	2.66	1.17	2.45	1.07
2035	3.5%	2.363	1.22	0.51	0.69	0.29	2.57	1.09	2.36	1.00
2036	3.5%	2.446	1.17	0.48	0.67	0.27	2.48	1.02	2.28	0.93
2037	3.5%	2.532	1.14	0.45	0.65	0.26	2.40	0.95	2.21	0.87
			23.80	**12.63**	13.60	**7.22**	50.33	**26.71**	46.25	**24.55**
		Scheme Costs (£m)		4.31		8.89		9.57		9.54
		Benefit to Cost Ratio		2.93		0.81		2.79		2.57

Year	Discount Rate	Discount Factor	Option 1		Option 2		Option 3		Option 4	
			Scheme Costs £m	Net Present Value of Costs	Scheme Costs £m	Net Present Value of Costs	Scheme Costs £m	Net Present Value of Costs	Scheme Costs £m	Net Present Value of Costs
2018	3.5%	1.317	5.67	4.31	11.71	8.89	12.61	9.57	12.56	9.54