TECHNICAL NOTE

Former Nestle Factory, Hayes

Response to LBH Transport Comments

Project No. 16018-01 14th August 2017

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Approved: A Markides

1 Introduction

1.1 This Technical Note provides further responses to the Transport and Modelling responses regarding the application to redevelop the Former Nestle Factory for a mix of residential and employment uses. The note has been informed by a meeting held with LBH Officers and their Consultants (Project Centre) on 14th July 2017.

1.2 For the sake of clarity, this note follows the same headings as the 'Highway Authority Comments on Submitted Planning Proposals' as provided by LBH.

2 Cumulative Impact and Other Committed Developments

2.1 A number of comments / queries have been raised regarding the committed development assumptions within the TA. Looking firstly at sites that have consent, the list included in the TA (and replicated in the response) was agreed with Syed Shad of LBH by e-mail (as included in Appendix A of the Transport Assessment). Syed Shah's letter dated 31st August required that committed development trips should be taken directly from the TA's associated with the applications. Appendix AD of the Transport Assessment included flow spreadsheets for each of the committed developments listed (these are also included as Appendix A of this note for ease of access). Also included are the various TA extracts that were used to obtain these flows.

2.2 For developments that were supported by a Transport Assessment, the flows have been taken directly from the TA where available. Where the flows provided in the TA only cover limited junctions, they have been extended through the network covered in the Former Nestle Factory TA by applying observed turning proportions from 2016 peak period surveys.

2.3 Where Transport Statements only provided comparative trip generation data (on some of the smaller residential schemes such as Trident House) the trip generation applied within the relevant TS has been used and distribution has been based on the same assumptions as the residential trip distribution assumptions for the Former Nestle Factory development (set out in the TA at Table 7.16).

2.4 Moving on to the cumulative development assumptions for the remainder of the land north of Nestles Avenue (other than the Former Nestle Factory). Discussions were held with the Transport Consultant representing the developers of Site A – the Precis and Beccleuch sites – to identify the level of development that was being proposed. For the Precis site we were informed that a total of 164 residential units were proposed along with 1500sqm of office floorspace and that the existing self-storage facility on site would be retained. Application No 1699/APP/2017/2201 covers the Precis site and is for 164 residential units, 7081sqm B8 use and 115 sqm café. With the TA we allowed for 164 residential units and 1500 sqm of office use. The existing self-storage facility (B8 use) was in operation at the time of the surveys and any trips associates with this use would have been picked up in the surveys. The trip generation estimates are therefore robust for the Precis site.

2.5 The Beccleuch site is less straightforward and has been slower in moving towards a planning application. It is understood that this site was supposed to come forward with the Network Rail land to the rear of it, but that this is not now going to be available for development. The scale of development assessed was discussed with the Transport Consultants for Beccleuch and their ES consultants, 410 residential units was identified as being deliverable on the site. No reduction to observed traffic flows from the surveys was made to reflect the existing uses on site. The draft site allocation policy indicates that replacement employment uses would be anticipated on the site and, as no detail was available at the time, it was felt appropriate to assume that they would be the same as existing.

2.6 Site B in emerging policy SA5 is the Squirrels Trading Estate. An assumption of 400 residential units was made for this site as no-one was promoting the site for development at the time and no detail was available. It is understood that this assumption was agreed with the ES officer at LBH. As with the Beccleuch site, no reduction was made for the existing uses on the site to reflect the fact that it is expected that there would be replacement employment use on site to accompany the residential development.

2.7 The Highways Response indicated that some different assumptions have been made for these sites:

- For the Precis site it is suggested that 7000 sqm of B1/B2 space is estimated by LBH. This does not reflect application 1699/APP/2017/2201 that has now been submitted for the site.
- For the Beccleuch site it is suggested that 539 residential units would be delivered. This is substantially more than identified in Policy SA5 and more than previously identified by the developers consultants.
- For Site B (The Squirrels Trading Estate) two figures are provided within the response – 200 units and 427 units. Both are substantially more than identifies in emerging policy SA5 and do to reflect the pre-application discussions that were held regarding the ES.

2.8 Further discussion around the prediction of traffic flows took place at the meeting held on 14th July 2017. It was explained that reference should be made to the extensive pre-application exchange of information that took place, included at Appendix A of the Transport Assessment. The approach to estimating future year traffic flows on the LBH road network involved the application of traffic growth to observed flows and the addition of traffic associated with committed developments taken from Transport Assessments. As identified within Appendix A of the TA, this approach was followed specifically at the request of LBH Officers. Attempts were made to agree to the use of TfL's WeLHAM model for all assessments, which would have been our preferred method, but Syed Shah of LBH rejected this approach.

2.9 Further clarification is required from LBH and / or their Consultants regarding whether any adjustments are required to the committed development assumptions or approach to predicting future traffic flows.

3 Existing Traffic Flows

3.1 Response on traffic flow comments in the 'Audit or Nestle Site Traffic Models' Technical Note is included in Appendix B.

4 Accident Analysis

4.1 It is identified within the response that the four arm mini-roundabout 130m north of Hayes and Harlington Station has a high level of vulnerable road user (VRU) collisions. It is suggested that pedestrian crossing and road safety improvements at this junction should be addressed as part of the S106 / S278 planning conditions.

4.2 However, as part of the planning application for the Hayes and Harlington Station improvements associated with Crossrail measures to improve the public realm around the station were included that cover this junction. The Design and Access statement that accompanied the application for the Station improvements included proposals that involved changing the junction to a simple priority layout and improving crossings facilities:

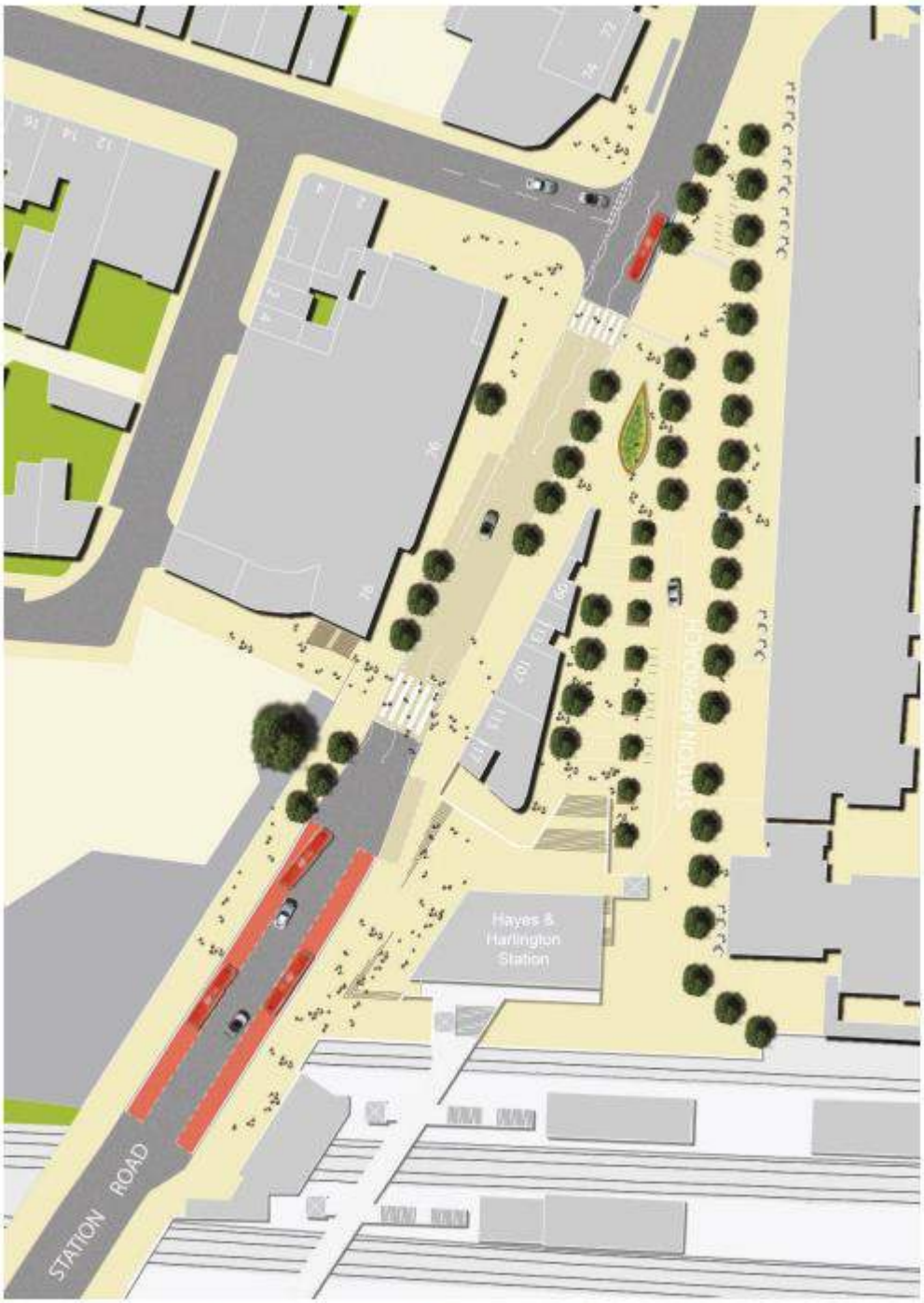


Figure 43. Emerging urban realm plan for Hayes and Harlington Station.

4.3 It is understood that the improvements associated with the Station are likely to be completed within the next 2 years, which is in advance of the occupation of most of the proposed development.

4.4 Whilst Barratt London do not object to the principle of making S106 contributions towards transport infrastructure improvements that are reasonable and related to the proposals, it would not be appropriate to make contributions towards schemes that would already have been implemented prior to the development being operational or where funding is already available from elsewhere. More information on any funding shortfall for this scheme would be required prior to a contribution being agreed.

5 Public Transport Accessibility Levels (PTAL)

5.1 The response states that the site has a PTAL score ranging from 1b to 4 and indicates surprise that the opening of the Elizabeth Line does not result in significant improvements to the PTAL score of the site.

5.2 It should be noted that the higher density development is located in the areas with the higher PTAL scores. PTAL is restricted as it is based on the number / frequency of services available and the distance to stops / stations. It does not take account of the range of destinations served or the journey times achievable. The Elizabeth Line will result in a journey time of 20 minutes between Hayes and Harlington Station and Bond Street Station, making journeys to the very centre of London much more attractive.

6 Public Transport Provision

6.1 The response acknowledges that details of bus routes and frequencies are provided in the TA, but points out that no information is given regarding 24 hour services in the area. Of the services identified within the TA, only the 140 operates on a 24 hour basis. Between 01:00 and 05:00 this route operates on a half hourly basis.

6.2 The distance and walking duration from the furthest accessible point of the site to bus stops has also been requested. The further point would be the access to the employment unit U3 entrance. This is approximately 1km (12 minutes walk) from the bus stops on Station Road and between 450m and 500m (6 minutes walk) from stops on North Hyde Road.

7 Rail Access

7.1 The response requests distance and walking duration from the furthest accessible point of the site to the station. This would effectively be the access to the employment unit U3 entrance. This is approximately 1km (12 minutes walk) from the station.

8 Trip Generation

8.1 Detailed responses on trip generation are provided in the initial pre-meeting response attached at Appendix C. The main comments made relate to:

- Adjustment of residential trip rates to reflect the levels of car parking provision on the site;
- Assumption of the re-occupation of the existing building in the future year baseline scenarios;
- Selection of TRICS trip rates for the various uses; and
- Assumptions on internal use of the Nursery facility.

8.2 Looking firstly at the adjustment of residential trip rates to reflect the level of residential car parking, it was suggested at one point during the scoping discussions that the car mode share for residential units without a car parking space should be set to zero to reflect the fact 50% of the residential units on the site would not have access to a private car. This was rejected by LBH in Syed Shah's letter dated 31st August 2016 and no adjustments were made to residential car mode share within the assessment included in the TA.

8.3 We remain of the view that some adjustment should be made to the car mode share applied to the residential person trip rates to reflect the fact that car availability will be different for this development when compared to that recorded locally by the 2011 Census. The LBH response on transport appears to agree with this in Section 4, where it is suggested that car ownership levels may reduce in the area with the advent of Crossrail and the different form of residential development that is likely to be coming forward in Hayes. We are happy to agree an appropriate car mode share reduction for the site with LBH and their consultants.

8.4 Moving on to the re-occupation of the existing building in the future year baseline scenarios, the LBH transport response suggests that there should be a sensitivity test of the full trip generation from the development proposals on the current traffic conditions. It emerged at the meeting that it had been assumed by LBH's Consultants that traffic that would be generated by the re-occupation of the site had been 'netted-off' and that the future year with development tests did not include a full reflection of the total traffic that would be generated by the proposed development. This is not the case. The future year baseline and with development flows are derived as follows:

Future year baseline = (2016 observed flows x TEMPRO growth rate) + flows associated with committed development (including the Hayes High Street Scheme) + flows associated with the re-occupation of the existing buildings on site

Future year with development = (2016 observed flows x TEMPRO growth rate) + flows associated with committed development (including the Hayes High Street Scheme) + flows associated with the proposed development

8.5 The future year assessments therefore fully reflect the traffic flows based on the existing situation with the addition of growth and committed development and the full level of traffic associated with the proposals. They therefore reflect the maximum flows on the network with the development in place.

8.6 It is only the future year baseline scenarios that include trips from the re-occupation of the existing uses on site. The level of re-occupation assumed has been informed by reports on the structural integrity of the existing buildings and a market report that identifies the local demand for B2 uses. It would be unrealistic to expect that the owner of the site would leave the buildings empty and unlet in the future if, for some reason, redevelopment did not go ahead. Transport for London have confirmed that they are accepting of the assumption of partial re-occupation of the building in the baseline scenario as demonstrated by the e-mails included in Appendix A of the Transport Assessment.

8.7 Moving on to the selection of trip rates for the various uses, for the residential and office uses, LBH's Consultants have suggested alternative assumptions for some of the TRICS sites selected. In making these comments, reference is made to the vehicle trips rates from the

TRICS output included in the TA Appendix AA in comparison with the alternatives derived by the Consultants. It should be noted that the TA does not rely on the vehicle trip rates from TRICS for residential and office uses. It uses the total person trip rate and then applies local mode share data from the 2011 Census. The response indicates in Section 4 that using person trip rates and local mode share data is the appropriate approach. The comments on TRICS residential and office vehicle trip rates and TRICS site selection are therefore not valid.

8.8 For the Industrial Estate use it is suggested that using sites out of Greater London may result in lower trip rates in the TA. This is justified by suggesting that the Bradfield Road Industrial Estate, Ruislip and Hanworth Trade Park, Hounslow would be more appropriate. However, both of the London sites quoted include substantial amounts of retail uses (builders merchants, car sales and repairs, etc) which are not proposed for the Nestle Site. These retail uses would be expected to generate significantly more trips than the B1c/B2/B8 uses proposed on the Nestle site and do not appropriately reflect the proposals for the site.

8.9 For the gym use, the TA assumes the vehicle trip rates direct from the site selected. The response requests an assessment using sites outside of Greater London. This has been done and, as shown in Appendix C, would result in no significant change in trip generation in the AM peak and up to 10 additional vehicle movements in the PM peak.

8.10 Finally, turning to the proposed Nursery use, the response questions the assumption that 50% of the nursery places would be taken up by children living on site. The TA is based on a GFA of 582 sqm for the nursery. It is suggested in the response that this could accommodate approximately 200 children. The following table sets out the various Nursery sites in England that are included in the TRICS database, their GFA and number of children attending:

TRICS Ref	Location	GFA	Children
BG-04-D-01	Bridgend	210	58
CH-04-D-01	Macclesfield	500	70
DH-04-D-02	Durham	382	40
GM-04-D-01	Manchester	200	37
HC-04-D-01	Basingstoke	725	121
KC-04-D-01	Tonbridge	210	124
KI-04-D-01	Surbiton	149	55
LB-04-D-01	Lambeth	109	40
LE-04-D-01	Leicester	375	80
NF-04-D-01	Norwich	700	200
NR-04-D-01	Northampton	350	35
NR-04-D-02	Kettering	182	21
RB-04-D-01	Ilford	129	39
SF-04-D-02	Lowestoft	750	110
SH-04-D-01	Shrewsbury	326	56
TW-04-D-02	Sunderland	500	110
WM-04-D-01	Birmingham	850	63

8.11 It can be seen from these that the of all the sites available, only one has 200 children attending, with the maximum attendance otherwise being in the region of 110-120.

8.12 In terms of the numbers of nursery aged children likely to be living on the development, the Design and Access Statement includes child yield calculations at Page 308. These indicate 115 children of 5 years old and less resident on the site. The assumption that 50% of the Nursery spaces would be taken up by residents of the development is therefore reasonable.

9 Modal Split

9.1 The LBH response states that the 2011 census shows that 36.2% of those living in Hayes and Harlington travel to work by car. The TA relies on the 2011 Census data for Middle Super Output Area Hillingdon 030 (details included in Appendix AB of the TA). This showed 51.2% of journeys to work by residents in the MSOA being as car drivers, rather than the 36.2% quoted within the response. This 51.2% car mode share is what has been applied to the residential person trip rates to calculate the residential vehicle trip rate.

9.2 It is suggested that car ownership in the area may reduce in the future within the response. We agree and have always been of the view that the car mode share would be lower for this

development than the average for the surrounding area. We would be happy to agree a revised assumption with LBH and their Consultants (as identified in paragraphs 8.2 and 8.3 above).

9.3 Within the response is a request to look at supporting data for future modal split assumptions and suggests the use of TRICS or TEMPRO. We have therefore looked at TEMPRO to obtain origin and destination trips for the Hillingdon 030 MSOA by mode for 2016 and 2029. These total trips for each mode can then be used to identify the percentage trips undertaken by each mode of transport for trips with this MSOA as either its origin or destination. The Table below provides a summary of this information:

Mode	2016				2029			
	origin		dest		origin		dest	
walk	3215	16.90%	2919	15.51%	3336	16.48%	3024	15.09%
cycle	249	1.31%	245	1.30%	257	1.27%	252	1.26%
car d	8271	43.47%	8365	44.44%	9085	44.89%	9192	45.87%
car p	3427	18.01%	3400	18.06%	3683	18.20%	3658	18.25%
bus/coach	1972	10.36%	1996	10.60%	1941	9.59%	1969	9.83%
rail/underground	1893	9.95%	1900	10.09%	1936	9.57%	1945	9.71%

9.4 It can be seen that TEMPRO is indicating that car mode share in the areas would be closer to 45% than 51.2%.

10 Access Strategy Review

10.1 The section on service vehicle access identifies the requirement for drag distances to bins to be no more than 9 metres for wheelie bins and identifies that the bin stores shown in some locations are further than 9m from the access roads. It should be noted that a waste report has been produced and is included within the Design and Access Statement. This gives details of the waste strategy for the site. In summary, it is intended that there is a managed system, with bins moved from the stores to centralised collection areas by the on-site management team on the morning of collection and returned after they have been emptied.

10.2 Comments have also been made regarding the absence of vehicle swept path information. This has now been provided to LBH's Consultants electronically for their review. It includes tracking for emergency vehicles.

10.3 With regard to walking and cycling access, clarification is required regarding the gates shown on the vehicle access point and how pedestrians and cyclists will be able to use them. These reflect the existing gates that are in place that are to be retained as a design feature. They are not intended to be closed and all access points onto Nestles Avenue are to be open to pedestrians and cyclists.

10.4 Resurfacing of Nestles Avenue footways has been suggested within the response. Barratt London are open to discussions on appropriate S106 contributions to facilitate improvements of this kind.

10.5 Additional cycle parking at the station and pedestrian improvements at the Clayton Road / Station Road junction are also identified as requiring improvement. As mentioned in paras 4.2 to 4.4, this is anticipated to be in place as part of the Hayes and Harlington Station improvements which will be completed by December 2019. If there are other improvements that are not already being funded elsewhere that are reasonable and related to the development are identified, Barratt London are open to discussions regarding contributions.

10.6 It is suggested within the response that it would be beneficial to extend a bus route along Nestles Avenue. Previous discussions with TfL have indicated that there may be potential for diversion of the route 194 bus along Nestles Avenue. However, this would be dependent on the introduction of on-street parking controls to ensure that sufficient carriageway width is available for two-way bus flows. It has already been proposed that S106 funding is provided for on-street parking control in the area around the development, which would facilitate bus access.

10.7 It was suggested at the meeting that provision of a bus lay-by on the Nestles Avenue site frontage may be required. The proposed development is well set back from the road and there is therefore space to accommodate a bus layby without impact on the proposed buildings. However, it is intended as part of the scheme to retain the locally listed railing that runs along part of the site frontage. The plan enclosed at Appendix D identifies where the

existing railings are to be retained and the remaining frontage that offers the potential for the provision of a layby.

10.8 The provision of a more direct link between the site and rail station is identified as being recommended. The development cannot deliver this as it would require land outside of the control of Barratt London. However, the master plan has been designed to safeguard these future connections that could be provided as development of the rest of the land north of Nestles Avenue comes forward.

10.9 Similarly, the scheme also safeguards land for a new pedestrian bridge across the canal.

11 Parking Provision Review

11.1 The LBH response on car parking confirms that the proposed level of residential parking for the site complies with the London Plan and appears to be appropriate for the predicted level of demand.

11.2 Confirmation of the number of active and passive electric charging points is requested for the residential uses. It is confirmed that these will be provided in line with London Plan standards (20% active and 20% passive provision for the residential use).

11.3 We can confirm that Barratt London are prepared to contribute towards the provision of a Controlled Parking Zone on the streets adjacent to the site.

11.4 Further details are requested on the type and location of cycle parking for the proposals. It is intended that residential cycle parking provision is a mix of stacked stands (Josta type or similar) and larger stands of Sheffield type. Drawing No MP 721 submitted with the application identifies cycle parking locations and routes to access them. More detail of the cycle parking layouts for specific blocks can be seen in the following Drawings:

- Block B – Drawing Nos MA 101 and MA 642
- Block C – Drawing Nos HB200 and HB603
- Block D – Drawing No HB100
- Block E – Drawing No HB110
- Blocks F1, G, H and I – Drawing No DM-1-00
- Blocks F2, F3 and F4 – Drawing No DM-1-01

11.5 Clarification on the number of wheelchair accessible spaces for the residential development is requested within LBH's response. There are a total of 1381 residential units within the

scheme. Of these, 1242 are M4(2) accessible and adaptable units and 139 are M4(3) wheelchair user apartments. The initial provision on site is intended to be:

- 18 M4(3) bays within the podiums for Blocks B and C.
- 26 Blue badge spaces located within the external parking areas close to building cores
- 668 standard parking spaces

11.6 However, in order to allow the provision of M4(3) bays to increase if demand indicates that they are needed, the external landscaping includes areas adjacent to the access roads that can be converted into parking spaces if required.

11.7 All leases for external car parking spaces will be sold with the provision that the space purchased can be relocated by Barratt London if necessary. This will enable the conversion of standard spaces close to the core where the wheelchair unit is located to be converted to an M4(3) space and the standard space to be relocated elsewhere on site within the landscape areas that are available for conversion.

11.8 This approach allows for the amount of landscaping on site to be maximised, whilst still retaining the ability to provide M4(3) spaces if demand requires them to be provided.

11.9 With regard to the management of podium parking, access to the podium areas will be controlled with key fobs / codes provided to those with spaces (car and cycle) within the relevant Blocks.

11.10 With regard to the car club provision, for a phased scheme of the sort proposed it would be a waste of resources to provide three car club vehicles from the occupation of the first unit on site as they would sit unused until more of the development is occupied. The provision of a single vehicle on first occupation and then phased increases in provision as the site is built out and occupied is a better use of resources and will accommodate the demand from the site.

11.11 It is requested that the free credit per unit is increased from £25 to £50. This can be secured via a S106 contribution if felt necessary.

11.12 With regard to the location of the car club spaces, if it is preferred that they are located within the site then five of the spaces at the local centre will be allocated for their use. This central location will make them more visible / accessible to residents outside of the development, as

well as those on the site. Alternatively, many Local Authorities prefer to allocate on-street public parking spaces for car club vehicles to maximise their accessibility to the widest possible membership. If this is preferable then spaces could be incorporated into the designs of the parking controls in the area around the site.

11.13 LBH have requested more info on Zipcar utilisation in Hillingdon. The only Zipcar vehicles in the Borough are located at Heathrow Airport. They do not have any vehicles within residential areas in the Borough.

12 Traffic Impact

12.1 This section of the response makes reference to the 'Audit of Nestle Site Traffic Models' technical note. A response to this is attached at Appendix B. There are a number of comments that relate specifically to the methodology used in the modelling, particularly for the VISSIM model. It is recommended that the pre-application notes and e-mails included in Appendix A of the TA is read by the reviewer so that they have the relevant context to set the comments against. Many of the issues raised are the result of specific requests by LBH at pre-application stage regarding the modelling methodology to be applied.

12.2 The response states that further analysis of the cumulative effects of the Nestle site proposal plus other committed development is required as several junctions appear to be operating at or significantly beyond capacity in the future traffic flow scenario, although the TA concludes that several of these junctions do not require capacity improvements.

12.3 As a starting point, reference should be made to Paragraph 32 of the NPPF. This states that development should only be refused on transport grounds if there is a severe residual cumulative impact. The TA identifies that under future year baseline flows, derived using an approach specified by LBH, several of the junctions would have capacity issues. The proposed development traffic is not shown to have a severe impact on the junctions. There is no justification for the development to resolve capacity problems that are not caused by the development, it simply has to mitigate its own impact to an extent that it is not severe.

12.4 The future baseline capacity problems are shown by the modelling primarily because the approach used to identify future year flows (using TEMPRO and TA data from other developments rather than the WeLHAM model) gives traffic flows that are substantially higher

than are likely to occur in reality. There appeared to be some surprise at the meeting that use had not been made of the WeLHAM model to predict future year traffic flows. Our preferred approach was to make use of the WeLHAM model, which we and TfL believe to be more realistic in predicting future traffic flows in London's congested road network. However, this approach was rejected by LBH officers at the pre-application stage despite repeated attempts on our part to agree the use of a consistent approach for both the LBH and TfL network.

12.5 It is identified that the content of both Travel Plans is thorough and comprehensive. Comments and suggestions for alterations are made. As the Travel Plans will need to be finalised prior to occupation, we suggest that these comments can be picked up as part of the discharge of planning conditions.

12.6 Comment is made regarding their being no reference to the ES regarding impact on air quality or to the Construction Management plan. No specific references are made as these issues are covered in other documents supporting the planning application. Chapter 7 of the Environmental Statement covers Air Quality and a separate Construction Management Plans document was also submitted with the application.

13 Review of Mitigation Measures

13.1 This section of the response begins by stating that concerns with the modelling approach need to be addressed before the mitigation can be agreed. We have responded to the comments on the modelling issues in Appendix B. Many of the issues identified relate to specific requests made with regard to the modelling approach by LBH. Before any additional assessment work is undertaken we request that a review of the pre-application discussions is undertaken and if it is felt that alterations to the previously agreed approach are require that these are discussed in detail and agreed up front to avoid any further abortive work and / or costs.

13.2 It is suggested that consideration be given to the full signalisation of the North Hyde Road / Harold Avenue / Crane Gardens junction. Until agreement is reached on the derivation of future year traffic flows and modelling approach, it is not worth investigating a signal scheme for this junction in detail. However, initial testing using LINSIG indicates that a signal junction that incorporates Crane Gardens and provides a pedestrian crossing over North Hyde Road east of the junction would have Degrees of Saturation in excess of 140% on most arms under

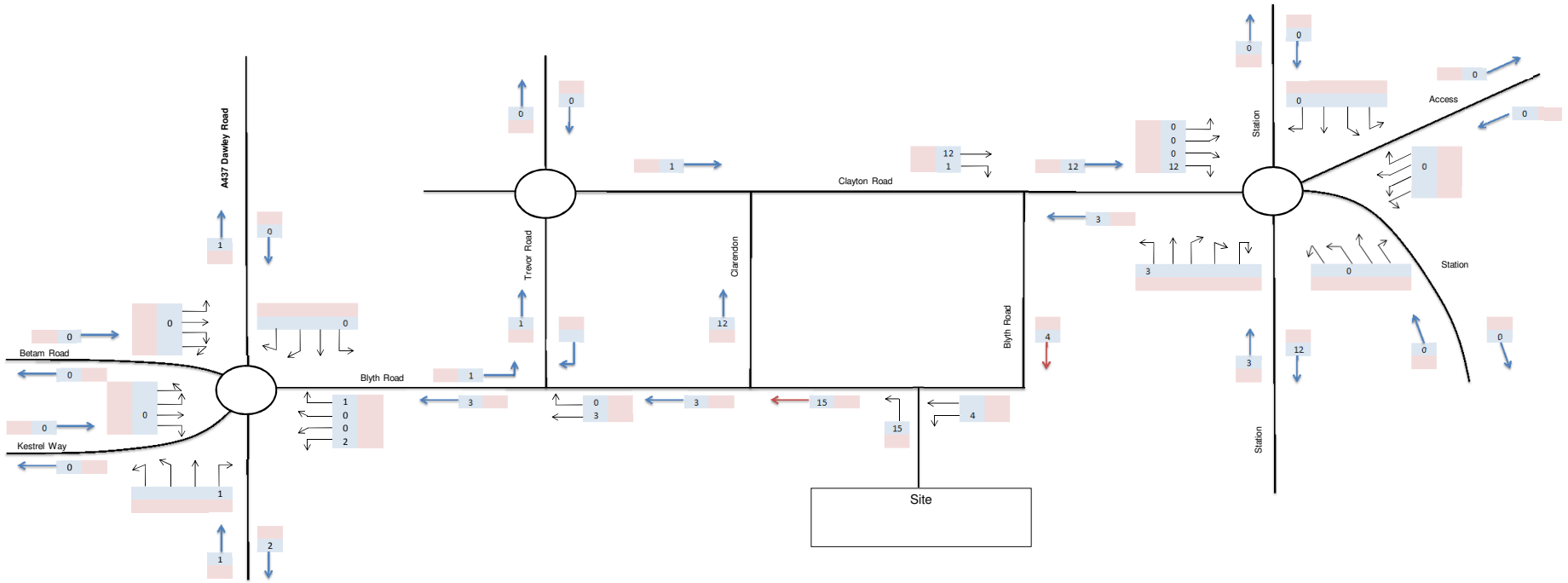
2024 and 2029 baseline flows. This is a result of the excessively high flows that are generated by using the LBH preferred method for future year flow prediction.

13.3 The possibility of further capacity improvements at the North Hyde Road / Station Road signals is raised within LBH's response. The available highway land around the junction restricts what can be achieved in the location. However, there is scope for further physical improvements if the green space on the north-eastern corner of the junction is available. Once agreement on the future year traffic flows and modelling approach is reached this can be investigated further.

13.4 This section of the response concludes that the modelling deficiencies should be addressed and sensitivity tests including the full development traffic should be undertaken. To re-iterate what has been said earlier in this response:

- Many of the concerns raised with regard to the modelling relate to following the requirements made by LB Hillingdon at the pre-application stage. If it is now considered that some of these requirements were inappropriate, then we would request that the approach to deal with this is discussed and agreed as soon as possible to avoid any further abortive work; and
- The with development scenarios already include the full development traffic. It is only in the baseline scenarios that the traffic associated with the re-occupation of existing buildings is taken into account.

APPENDIX A



KEY

100 Total Traffic Flow
10 HGV Flow

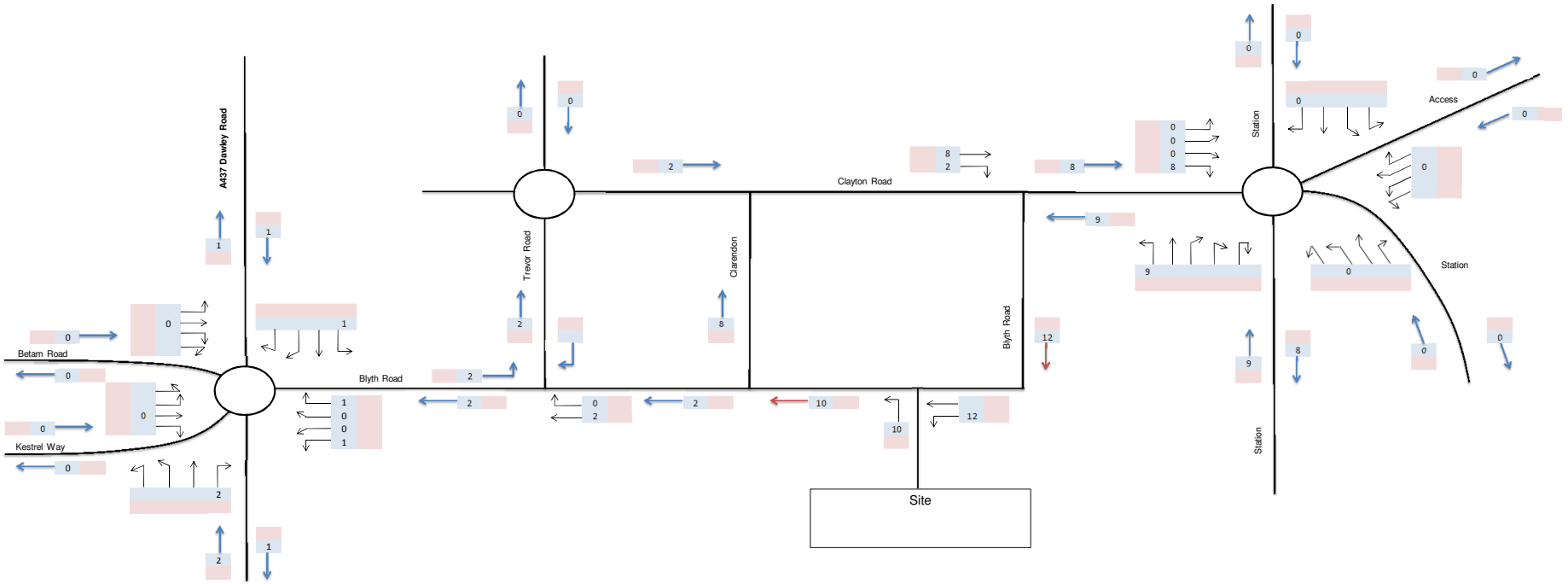
WSP

TITLE

PROPOSED DEVELOPMENT FLOWS
AM PEAK (08:00-09:00)

FIGURE No:

FIGURE 16



KEY

100 Total Traffic Flow
10 HGV Flow

WSP

TITLE

PROPOSED DEVELOPMENT FLOWS
PM PEAK (17:00-18:00)

FIGURE No:

FIGURE 17

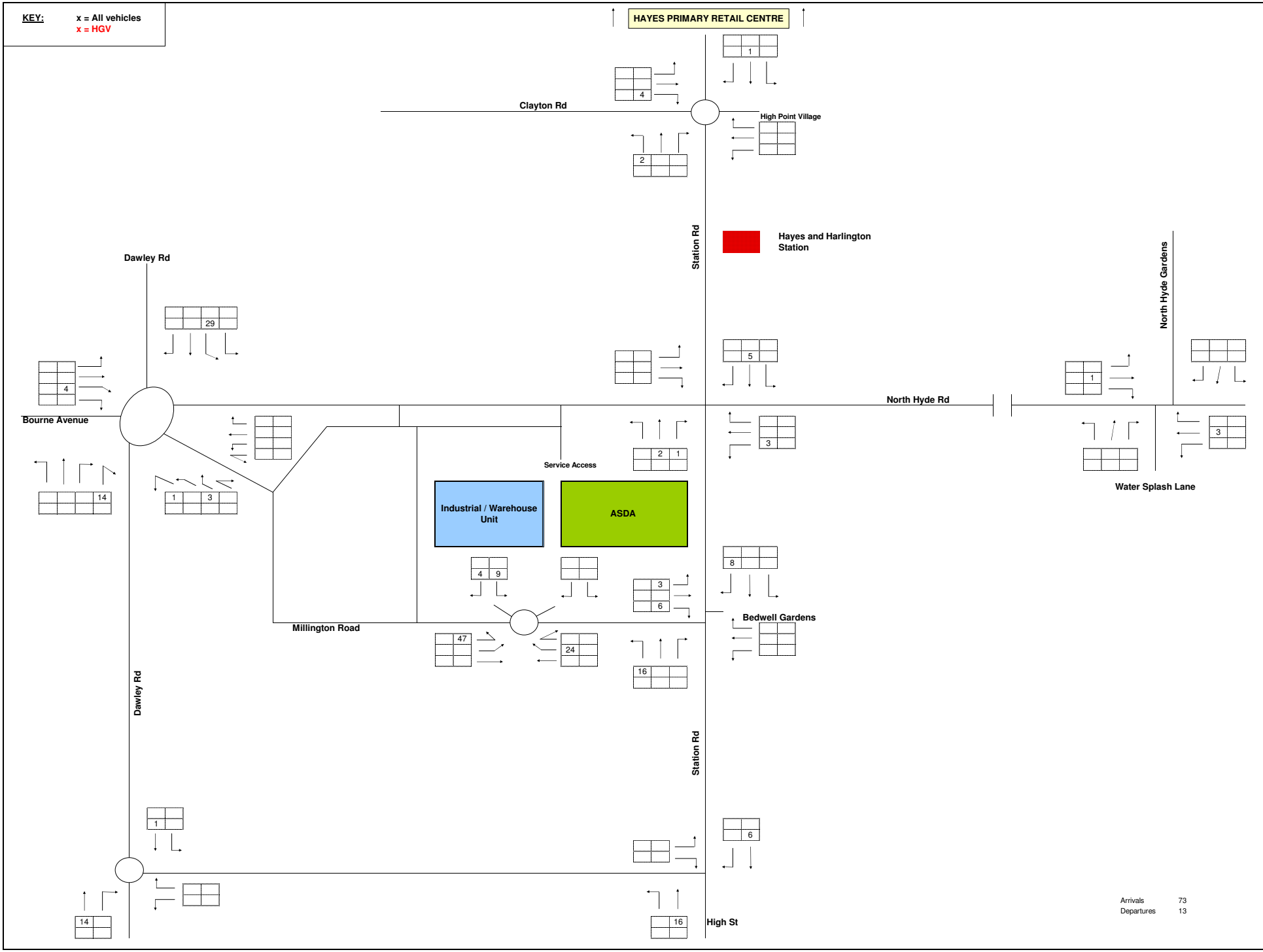


FIGURE DIAGRAM

NO. F29

Industrial Unit - Weekday AM Peak

Proposed ASDA Development at the Westland's Estate, Hayes

Job No. 9V5694

Date: January 2011

ROYAL HASKONING

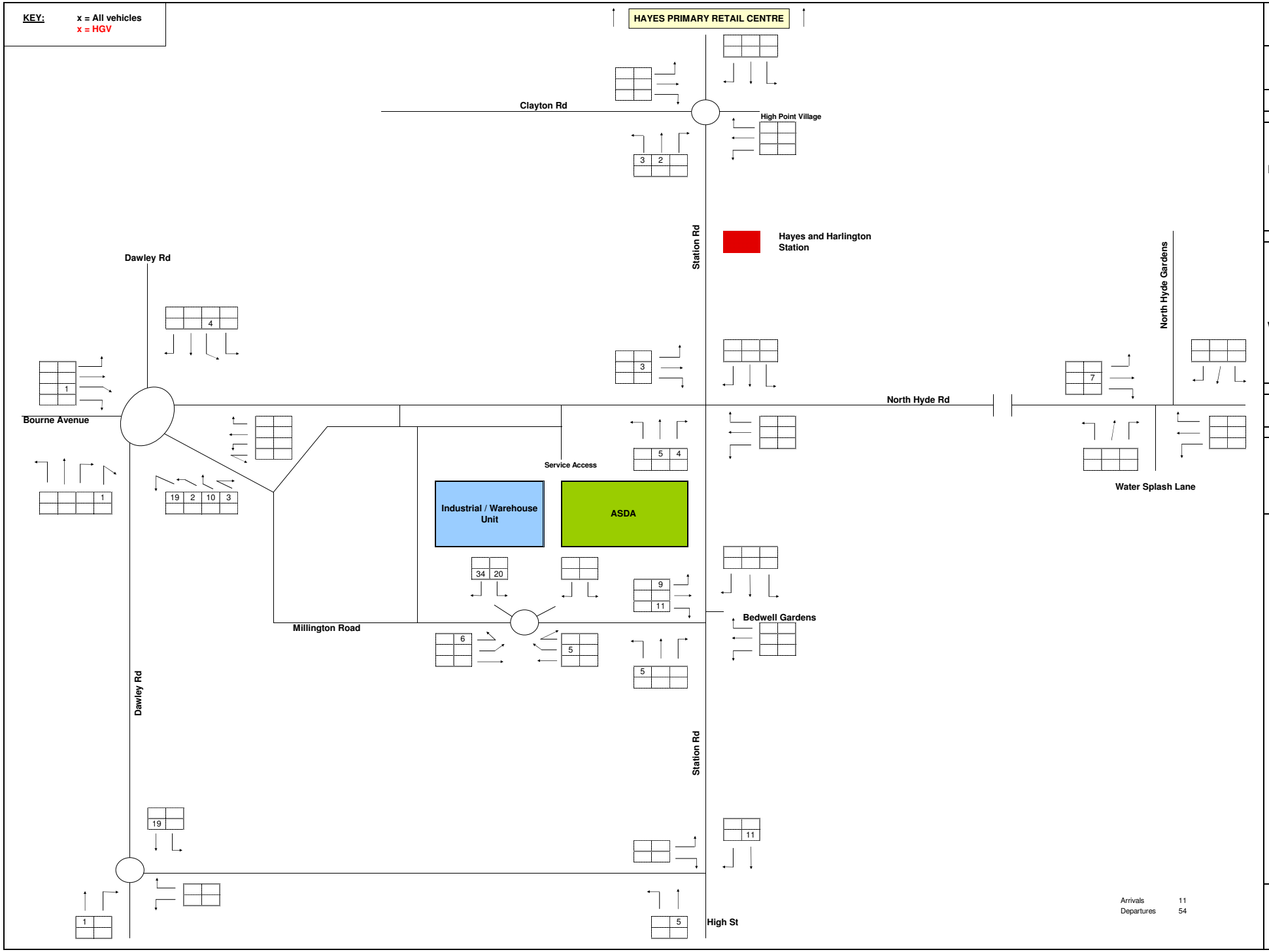


FIGURE DIAGRAM

NO. F30

Industrial Unit - Weekday AM Peak

Proposed ASDA Development at the Westland's Estate, Hayes

Job No. 9V5694

Date: January 2011

ROYAL HASKONING

APPENDIX N

Figure Junc 1 - 1

Survey Date: Thursday February 12th 2015

HAYES - Junction 1 - EMI site Dawley Rd roundabout

07:45 to 08:45 Hrs.

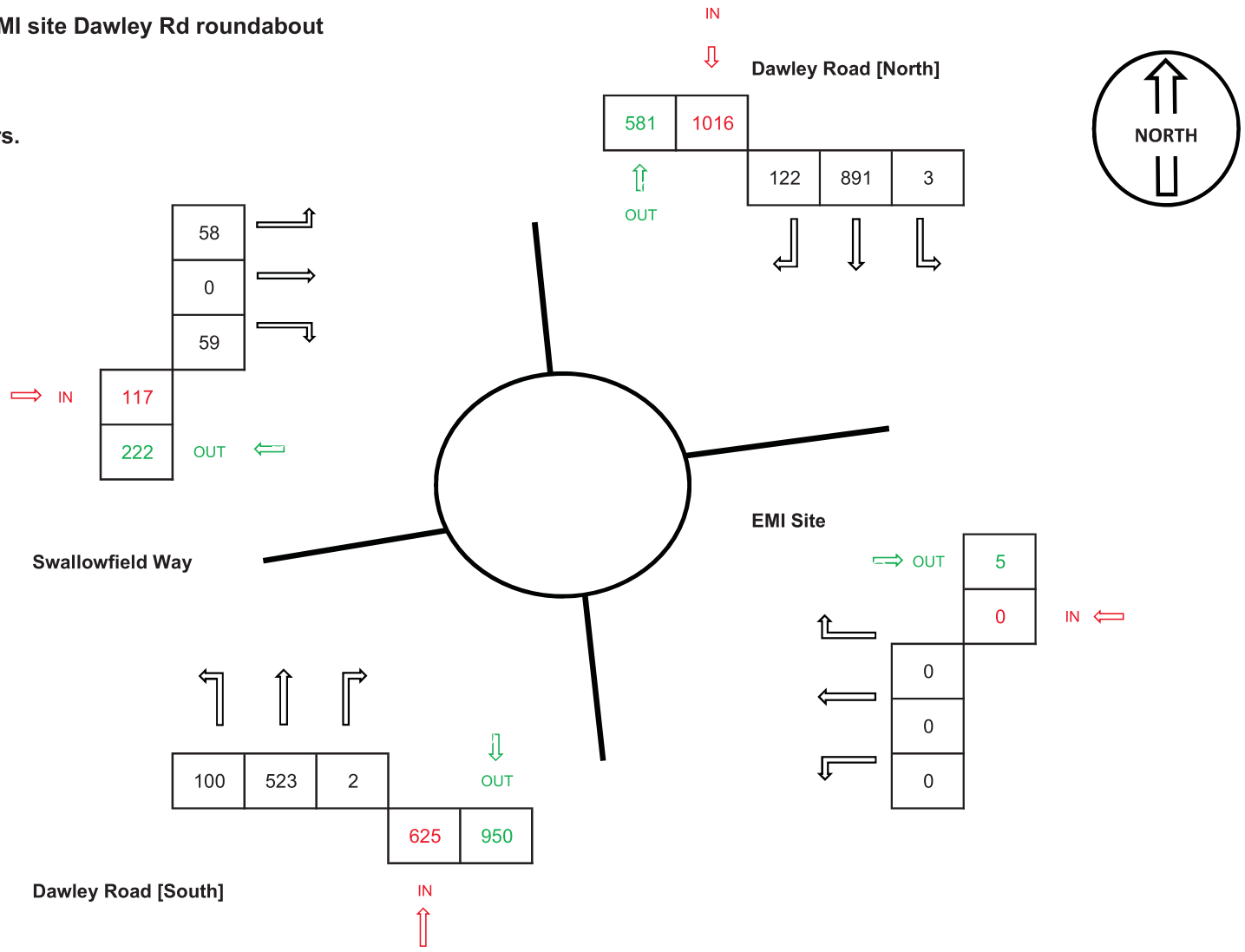


Figure Junc 1 - 2 **Base Flows for Design Year 2021**

HAYES - Junction 1 - EMI site Dawley Rd roundabout

07:45 to 08:45 Hrs.

Growth Factor 1.096

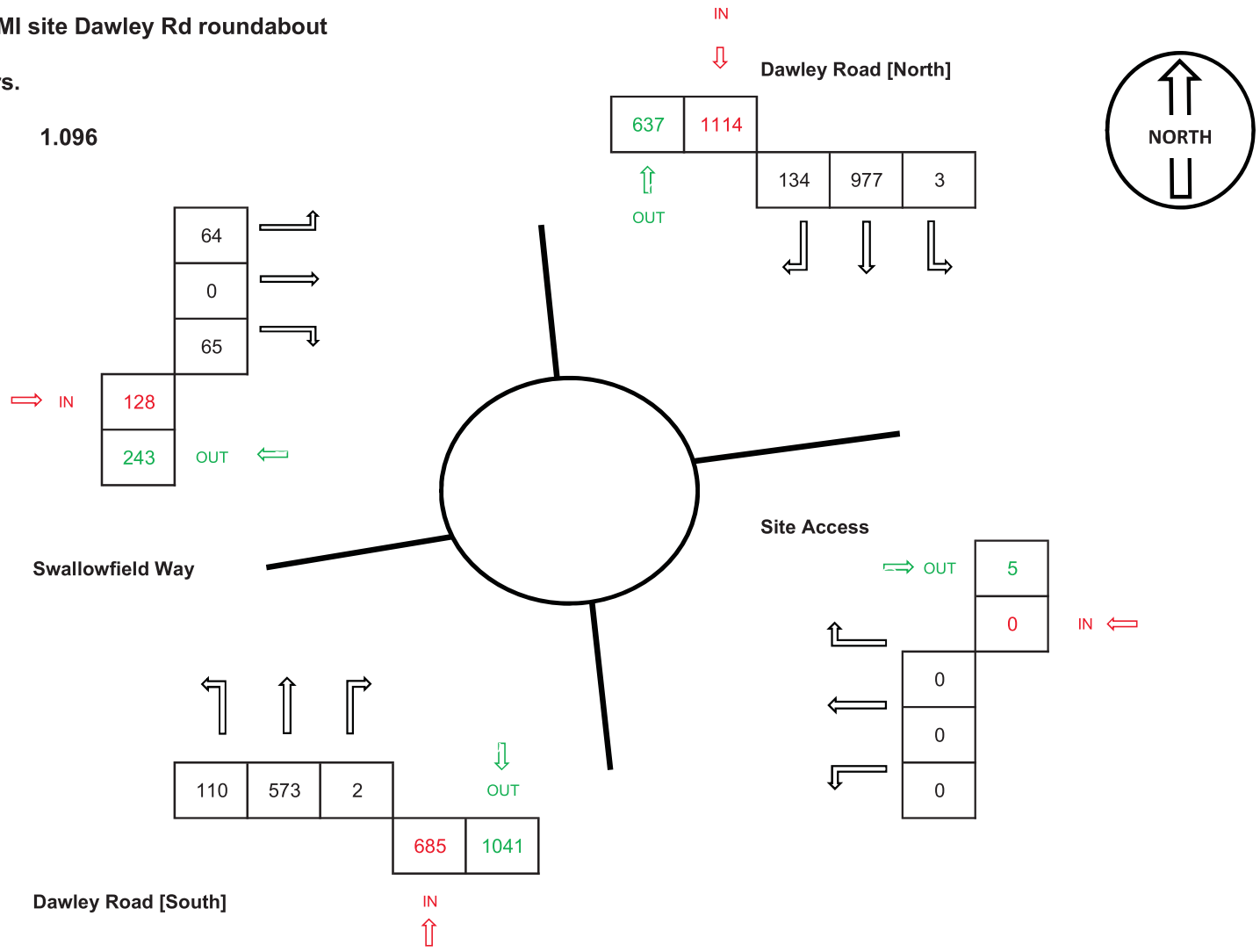


Figure Junc 1 - 3

Committed Developments

HAYES - Junction 1 - EMI site Dawley Rd roundabout

08:00 to 09:00 hrs

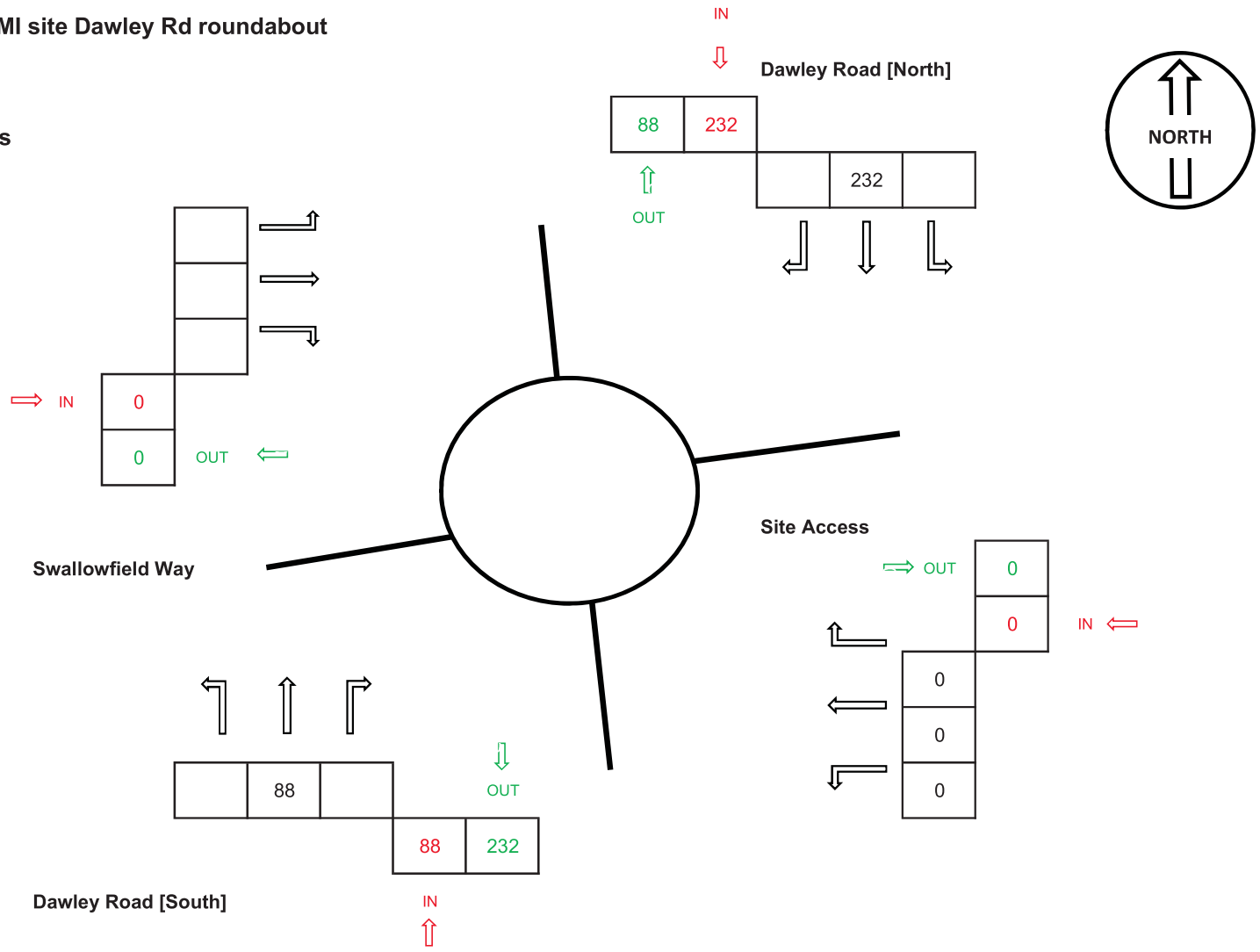


Figure Junc 1 - 4 **Base Flows + Committed Developments** **2021**

HAYES - Junction 1 - EMI site Dawley Rd roundabout

08:00 to 09:00 hrs

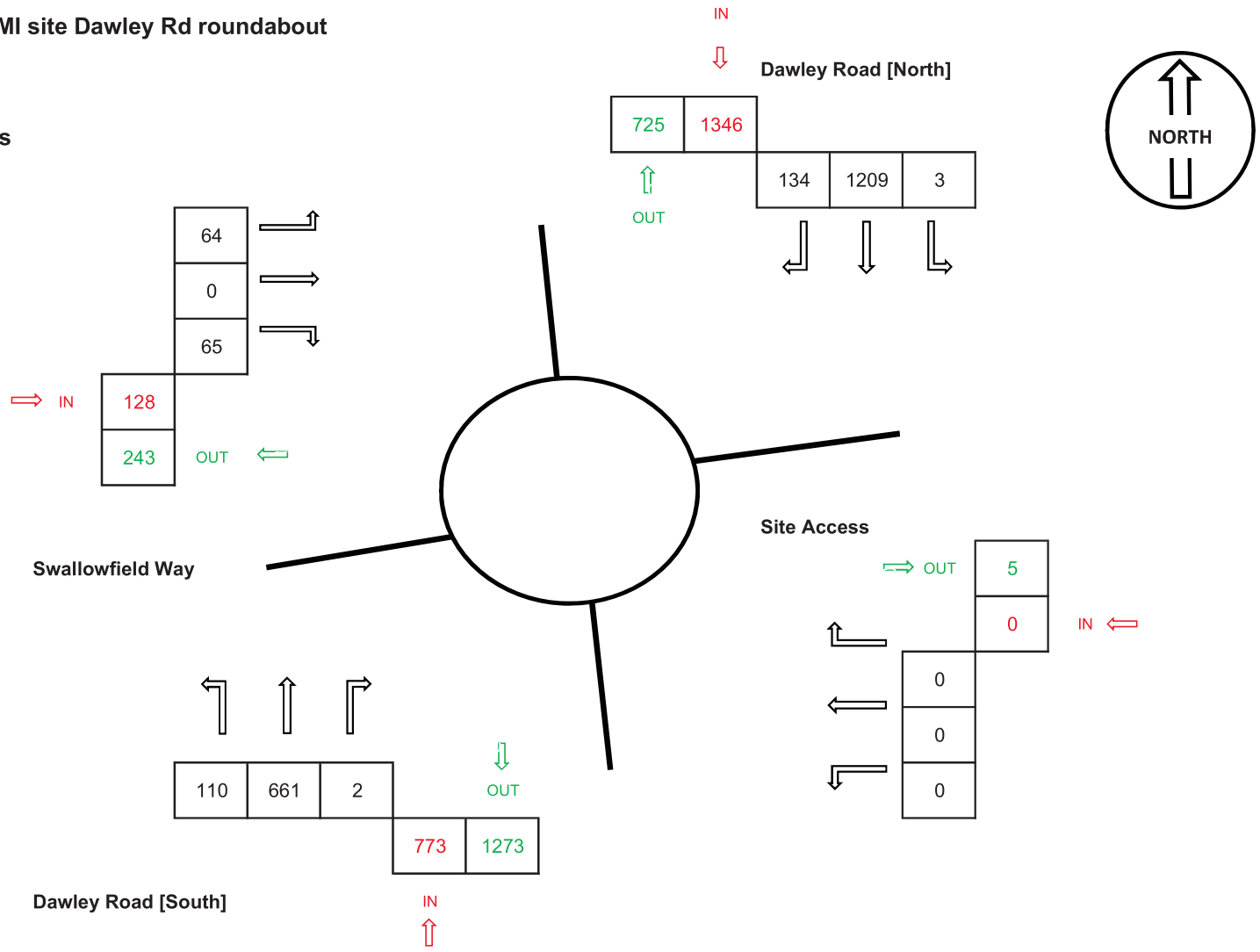


Figure Junc 1 - 5

Development Generated Traffic

HAYES - Junction 1 - EMI site Dawley Rd roundabout

08:00 to 09:00 hrs

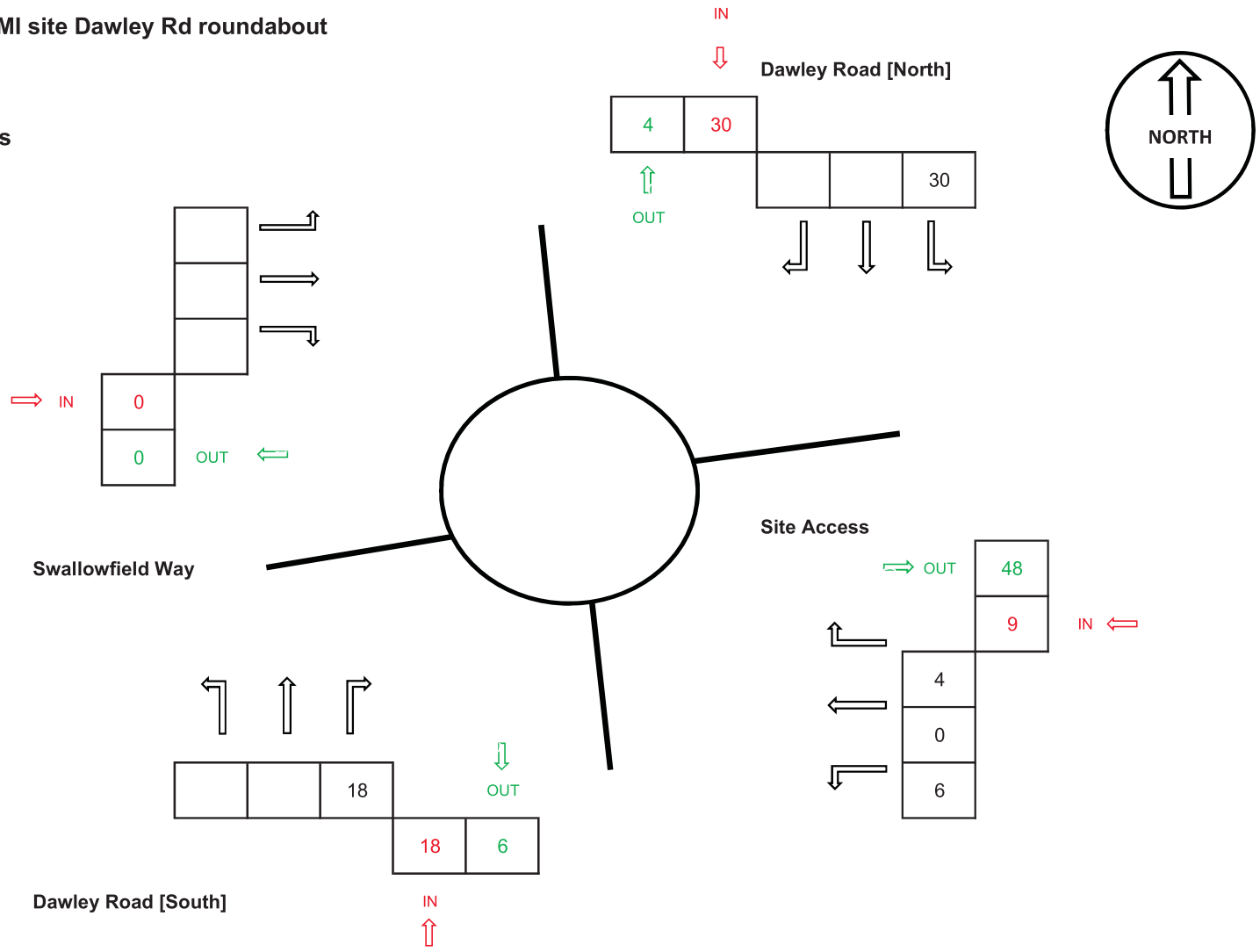


Figure Junc 1 - 6

Base Design Year + Development Generated Traffic 2021

HAYES - Junction 1 - EMI site Dawley Rd roundabout

08:00 to 09:00 hrs

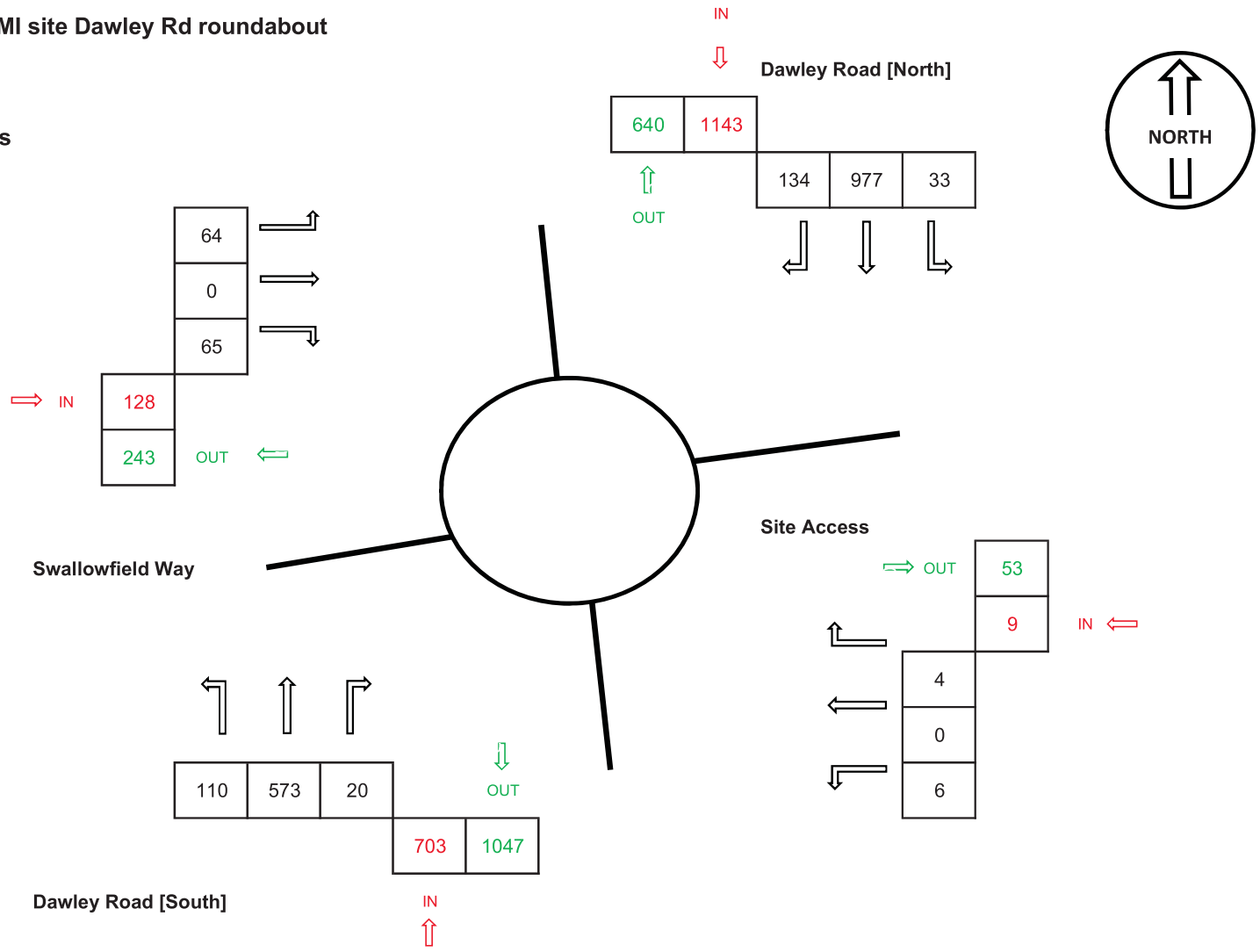


Figure Junc 1 - 7

Base Flows + Committed Developments + Generated Traffic **2021**

HAYES - Junction 1 - EMI site Dawley Rd roundabout

08:00 to 09:00 hrs

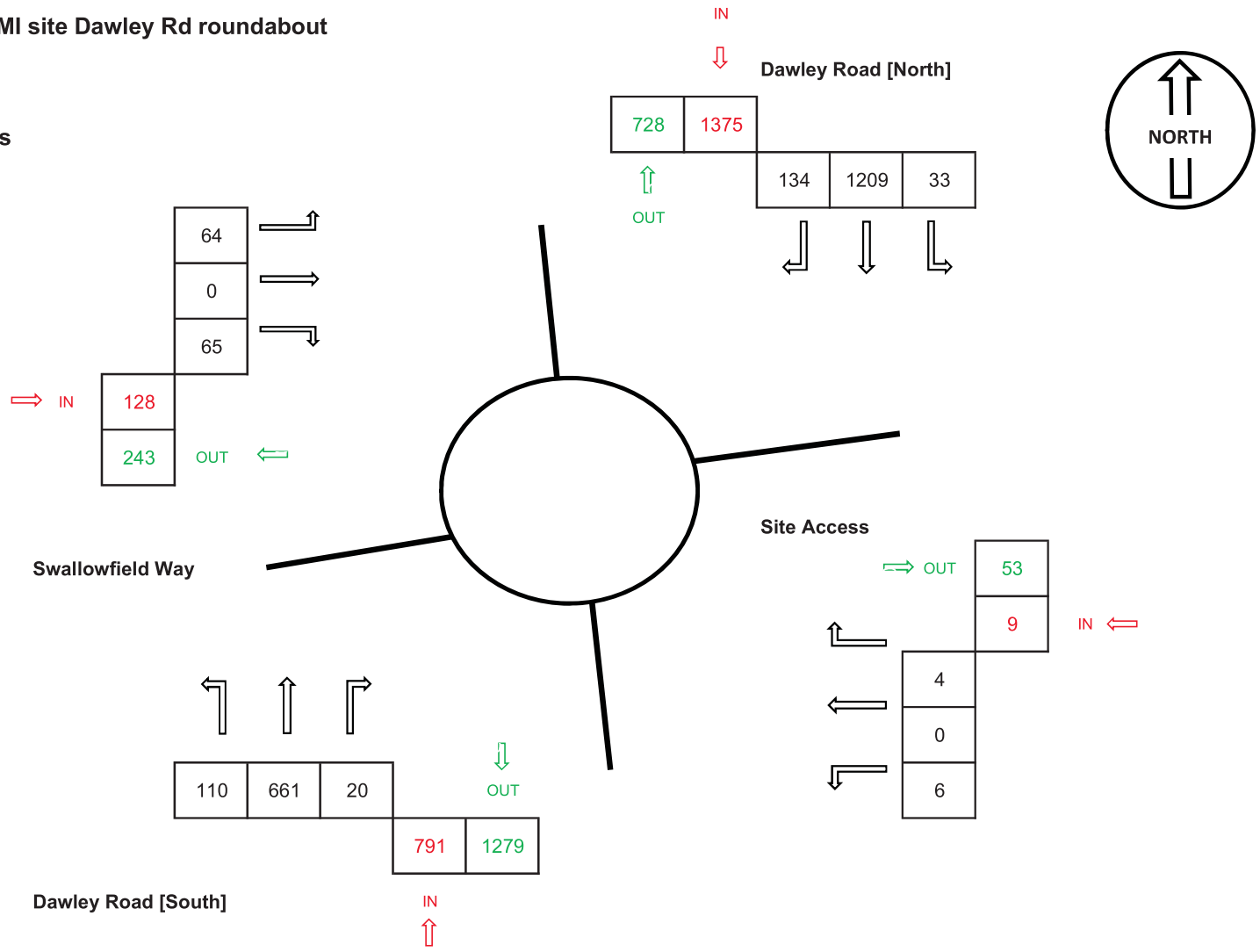


Figure Junc 1 - 8

Survey Date: Thursday February 12th 2015

HAYES - Junction 1 - EMI site Dawley Rd roundabout

17:00 to 18:00 Hrs.

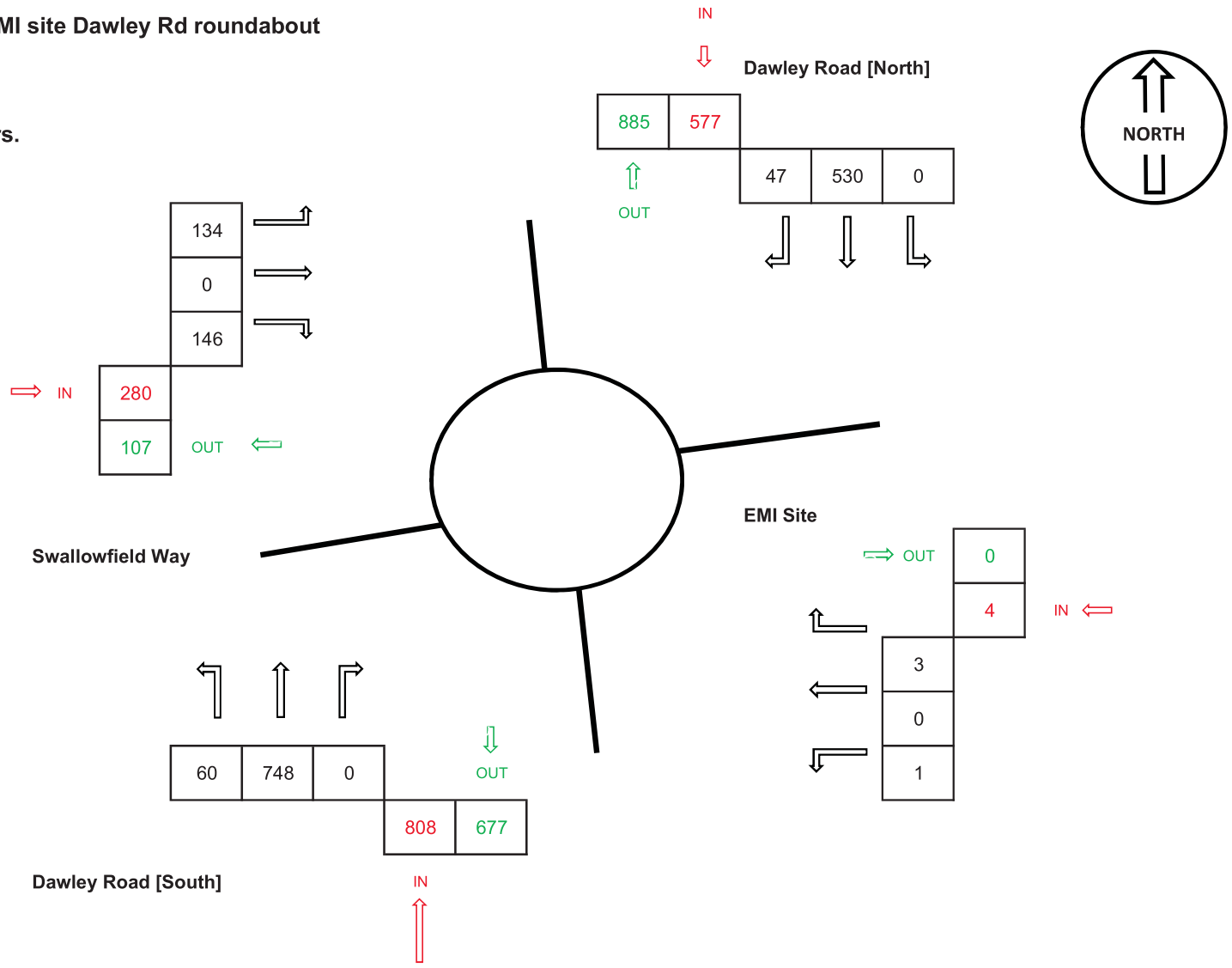


Figure Junc 1 - 9 **Base Flows for Design Year 2021**

HAYES - Junction 1 - EMI site Dawley Rd roundabout

17:00 to 18:00 Hrs.

Growth Factor 1.107

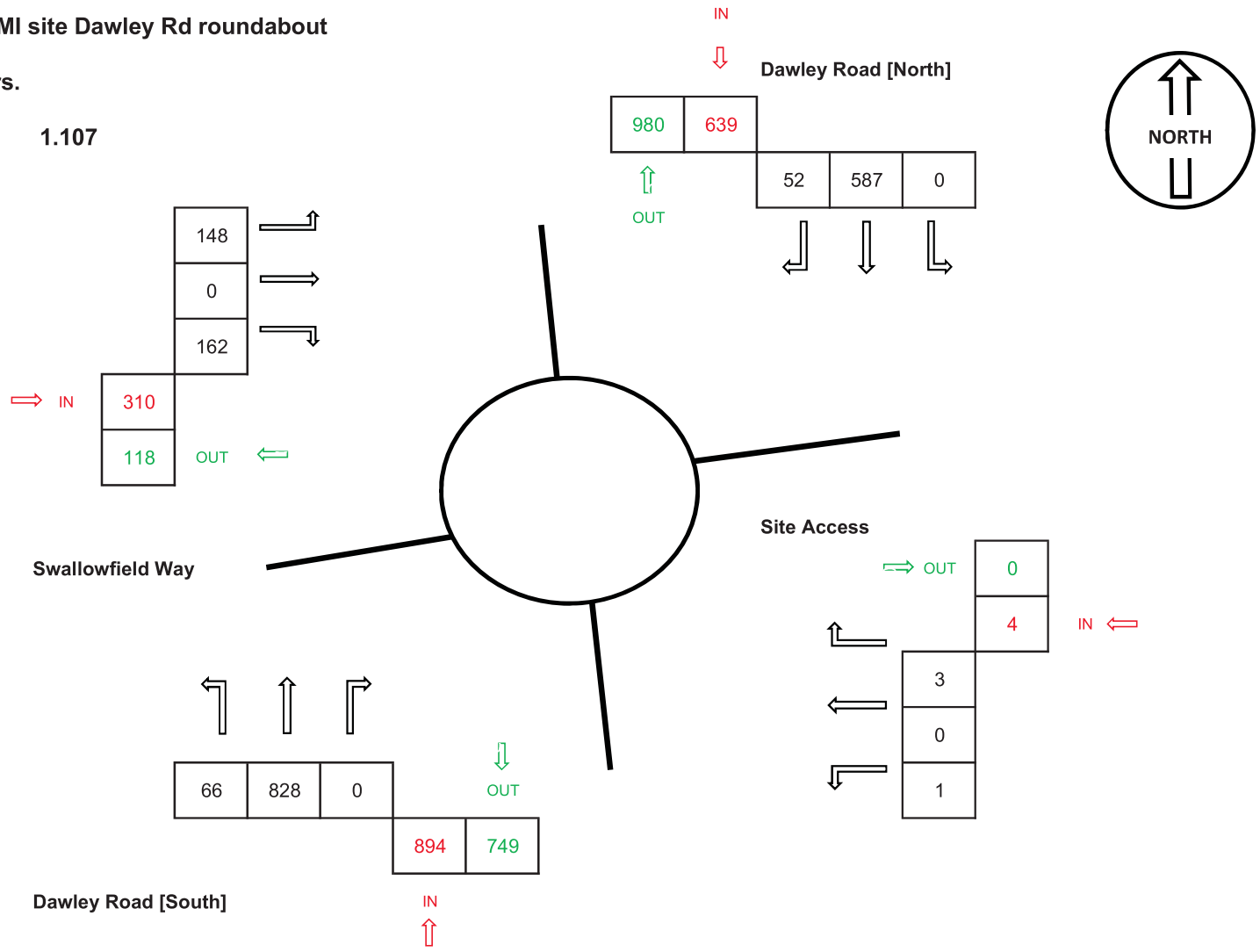


Figure Junc 1 - 10

Committed Developments

HAYES - Junction 1 - EMI site Dawley Rd roundabout

17:00 to 18:00 Hrs.

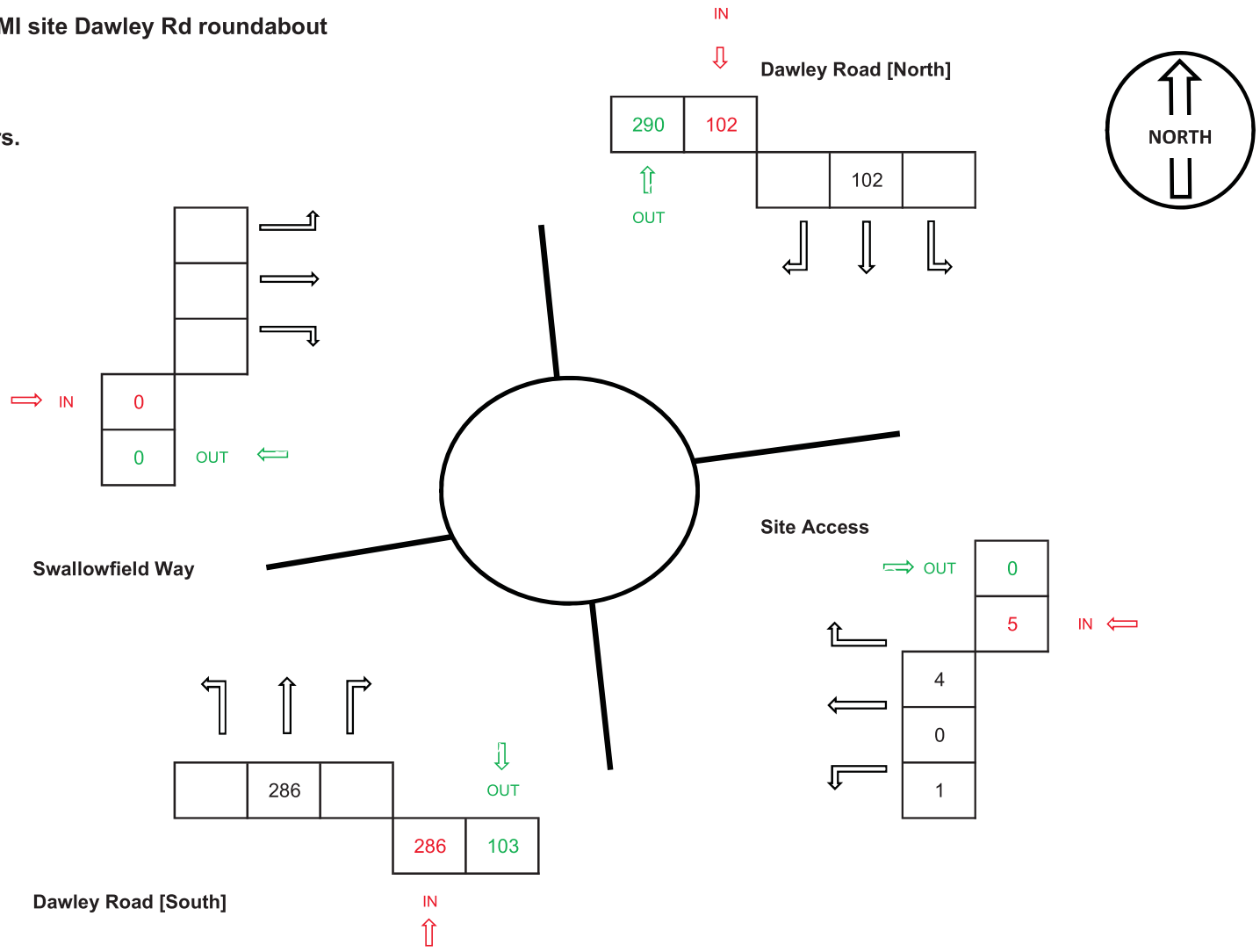


Figure Junc 1 - 11 **Base Flows + Committed Developments** **2021**

HAYES - Junction 1 - EMI site Dawley Rd roundabout

17:00 to 18:00 Hrs.

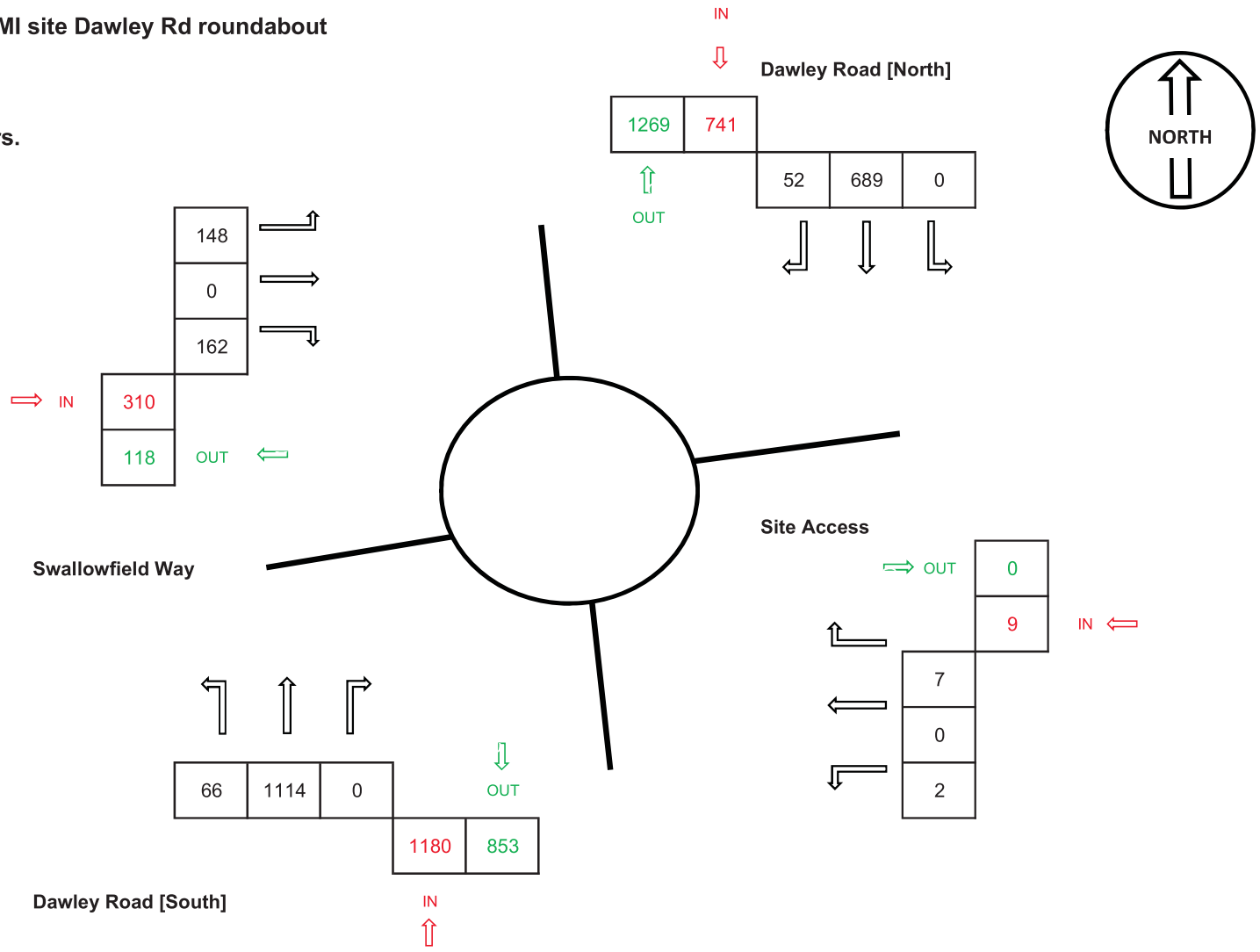


Figure Junc 1 - 12

Development Generated Traffic

HAYES - Junction 1 - EMI site Dawley Rd roundabout

17:00 to 18:00 Hrs.

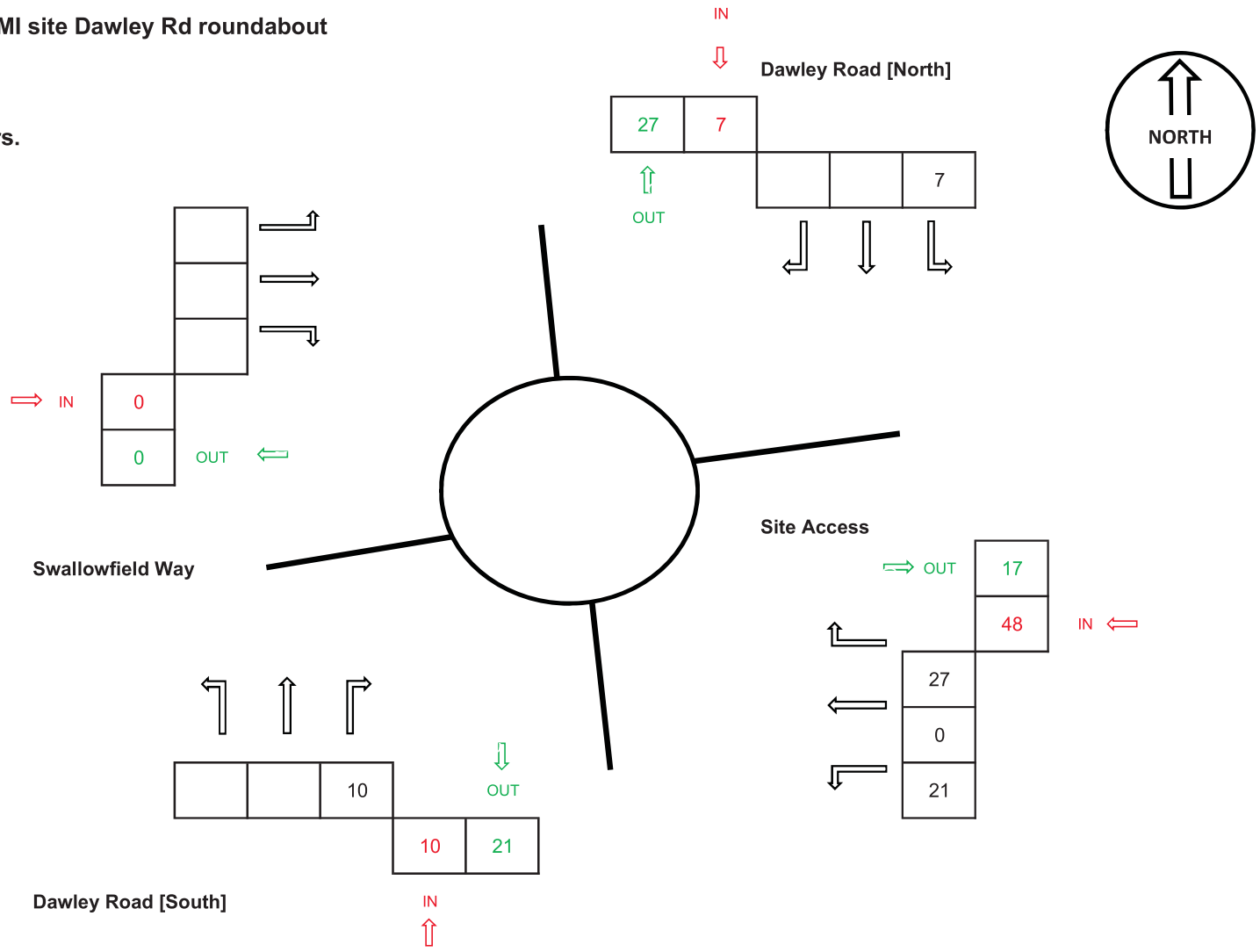


Figure Junc 1 - 13

Base Design Year + Development Generated Traffic 2021

HAYES - Junction 1 - EMI site Dawley Rd roundabout

17:00 to 18:00 Hrs.

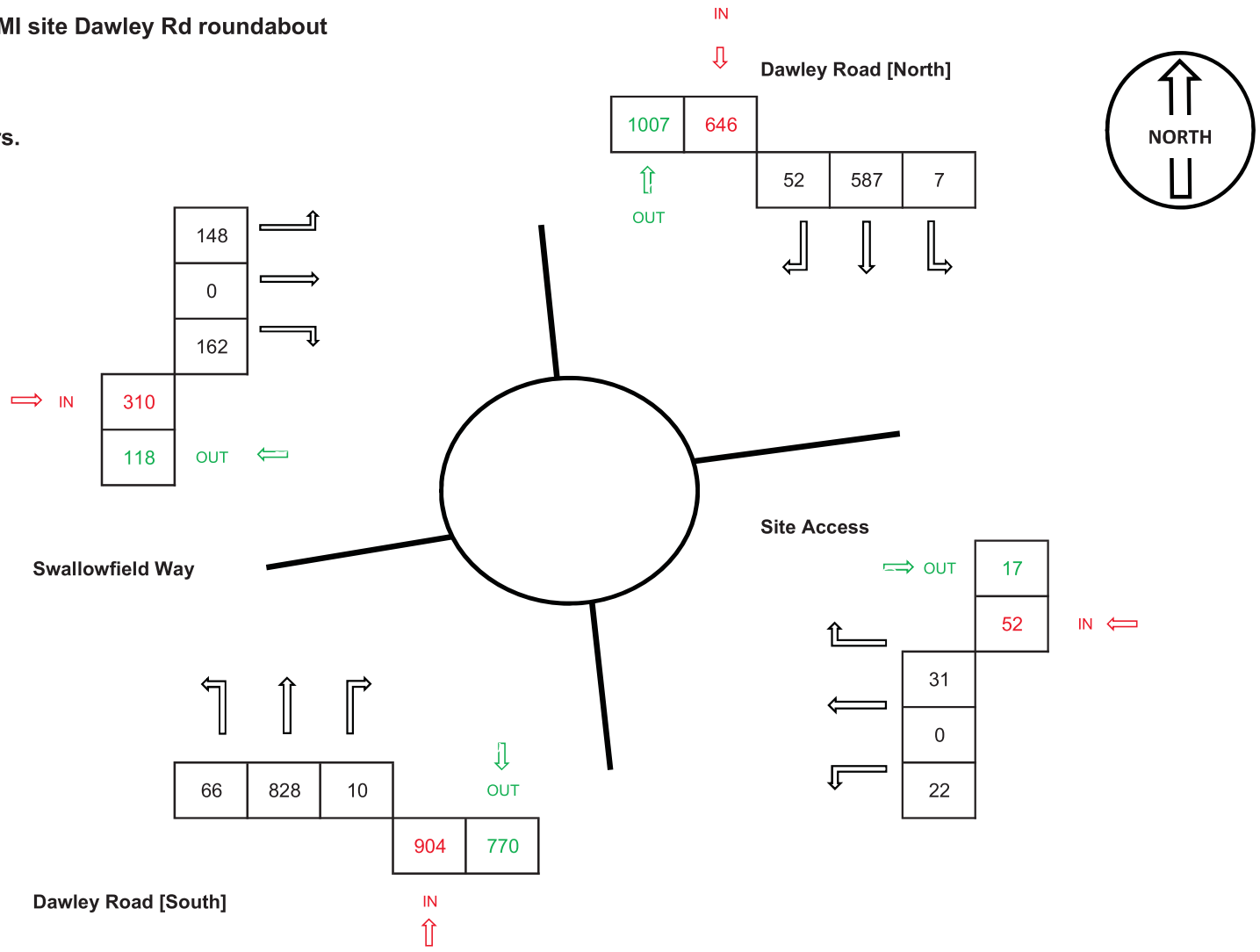
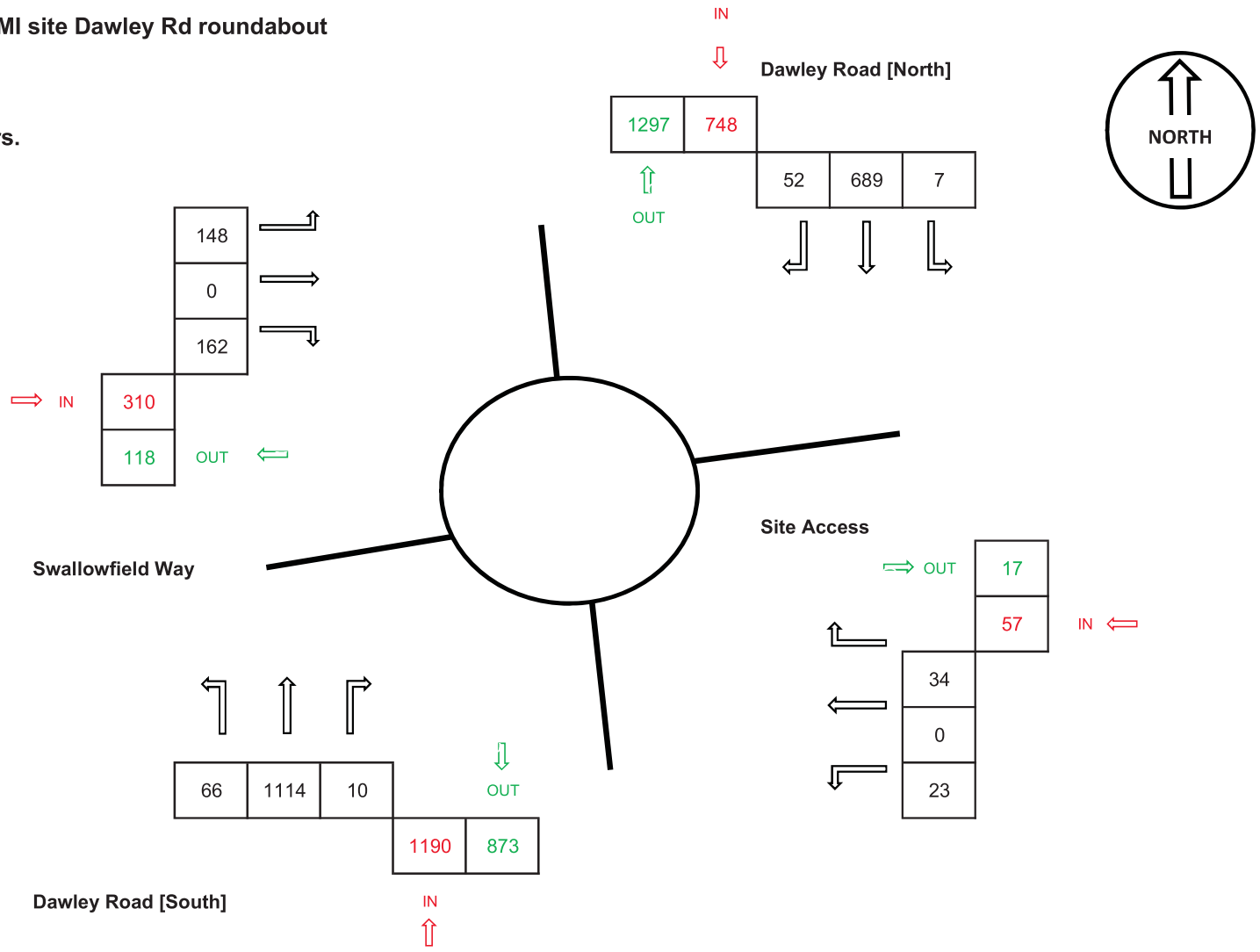


Figure Junc 1 - 14 **Base Flows + Committed Developments + Generated Traffic 2021**

HAYES - Junction 1 - EMI site Dawley Rd roundabout

17:00 to 18:00 Hrs.



use would generate significantly more demand for movement than the proposed development.

Table 6.1 – Trip Generation

	Car Driver Trips		Trips by All Modes	
	AM Peak	PM Peak	AM Peak	PM Peak
Existing (total floorspace)	157	162	322	323
Existing (excluding space that is unsafe for use)	80	83	165	165
Proposed	69	69	159	150

6.7 Even if we exclude areas of the building that are currently unsafe to use from the calculation, the proposed development still would generate slightly less trips than the existing available space for employment use.

6.8 Given the proposal is considered to generate less demand for travel that that which the currently permitted use of the site would generate, it is not predicted that any impact will occur on the local highway network or public transport network as a result of the development proposals.

6.9 The proposal will also support the introduction of electric vehicle charging points on the site and a car club, which should encourage more sustainable patterns of car ownership. A Travel Plan also accompanies this document and will monitor travel to and from the site and encourage sustainable travel habits.

Servicing

6.10 The site is typically currently serviced from the access roads to the east and west of the building and it is proposed that this continues as per the existing situation, which is considered to be reasonable and appropriate.

6.11 The replacement of employment floorspace on the 2nd to 5th floors with residential units will tend to reduce the demand for service vehicles and so no additional service vehicle movements are expected to result from the proposals.

6.12 It is expected that the majority of deliveries would be undertaken by small to medium sized vehicles e.g. transit vans, with the occasional requirement to accommodate larger vehicles.

6.0
Servicing Strategy

6.1 Refuse and Recycling

A single on-street loading bay (approximately 10m in length), located on Blyth Road is proposed to allow access for service vehicles carrying out functions related to refuse, recycling, post and deliveries. The bay will sit within the on-street parking provision and will have minimal impact on traffic flows.

Located adjacent to the north side of the proposed development, the loading bay will allow for easy access to the central lower courtyard, off which the developments main entrance lobby (which will house the post boxes) for each of the flanks, waste storage and utilities can be accessed. This location also allows easy access via the northern shared surface area to the nearby cafe and work units that front Blyth Road.

6.2 Emergency Access

Emergency vehicles will be able to access the eastern facade of the building at grade using the car park access road. At grade emergency vehicle access will to a certain extent be possible along the northern facade of the building.

Fig 6.1 - Ground Floor Plan with loading bay for service vehicles.

Hayes Town Centre Network Model

VISSIM Base Model Validation Technical Note

Report

May 2014

Prepared for:
Transport for London
Click here to enter text.

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CONTENTS

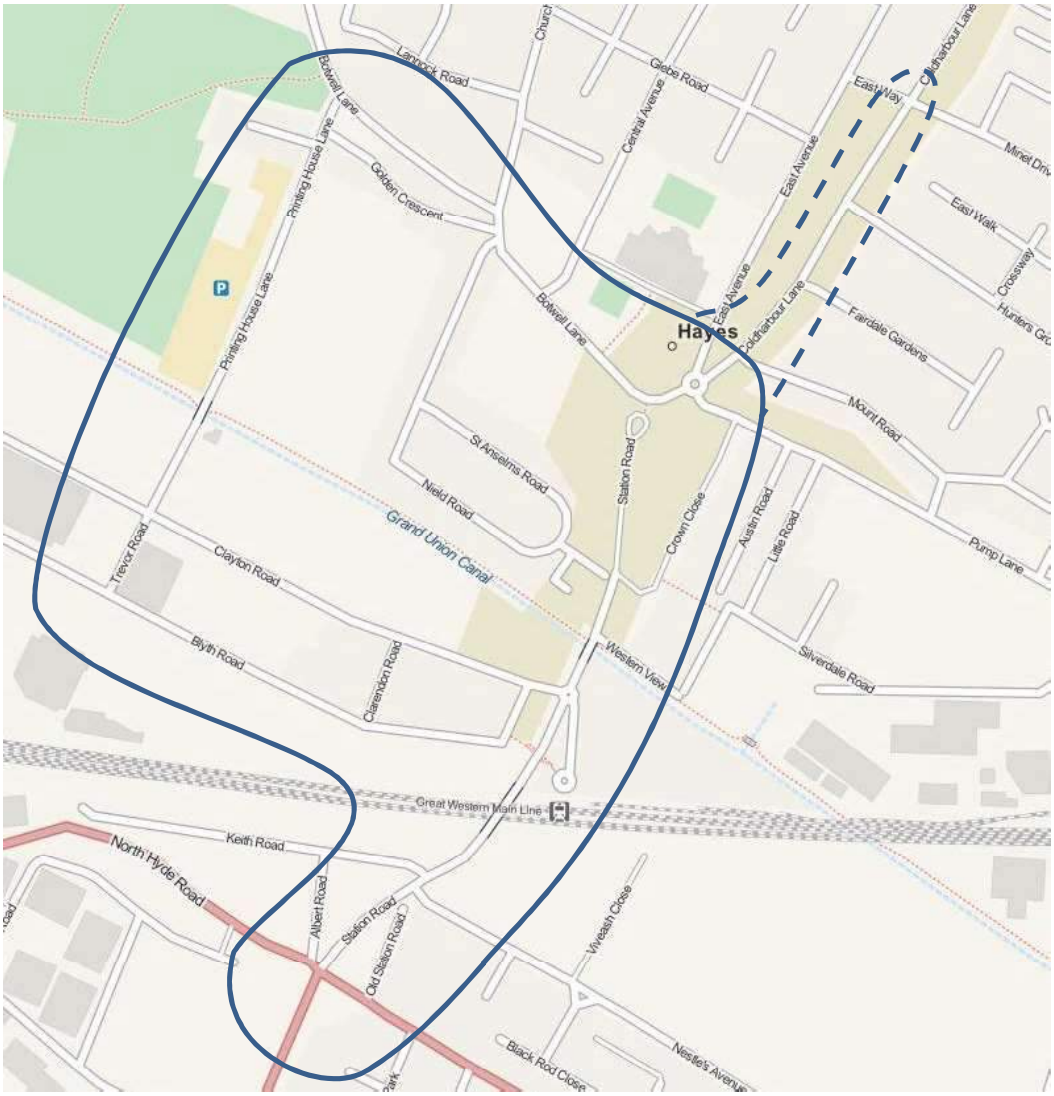
FIGURES

TABLES

1 Introduction

1.1 Steer Davies Gleave has been commissioned to assess proposed changes along the Hayes Town Centre in the London Borough of Hillingdon. A study area has been agreed with TfL, for modelling to assess the impact of the proposals. This can be seen in Figure 1.1.

FIGURE 1.1 MODEL AREA



Purpose

1.2 The purpose of this modelling is to provide a sound base for option testing related to the Hayes Town Centre project. This project seeks to regenerate the town centre through opening up the northern end of Station Road to through-traffic and re-instating a junction at Station Road/Botwell Lane. The scheme aims to improve provision for pedestrians and cyclists along Station Road and Coldharbour Lane, and improve the urban realm in the high street. The scheme will also include

minor rerouting of the bus services through Hayes to provide better located bus stops. It is also proposed to remove the shuttle working signal operation on Printinghouse Lane.

Model Development

1.3 The modelling is being carried out in accordance with the TfL Model Auditing Process for VISSIM (VMAP). The base model process consists of the following three stages:

Stage 1 – Meeting with TfL 29.10.2013, Stage 1 signed off;

Stage 2 – Stage 2 signed off 02.04.2014; and

Stage 3 – This document forms submission for Stage 3.

1.4 The data pack provided with this document has the following structure (this builds on the data pack provided with the Stage 2 submission, and can be included in that directory):

"**Base VISSIM Data Pack**\" – the root directory for the data pack

Files:

"HayesTownCentreNetworkModel_VISSIMTechnicalNote_Part2_v1.0.doc" – this document.

Folders:

"**1 - Check Sheets**\" –SDG-completed check sheets for stage 3.

"**2 - Model Inputs**\" – final (processed, if applicable) data used as model input.

Folders:

"**2-3 - Counts**\" – Updated Traffic count calculations and flow diagrams, Pedestrian counts including adjustment

"**2-5 - Journey Time**\" – Journey Time measurements

"**3 - Models**\" – completed VISSIM models

Files:

"HayesTC_VISSIM5.40_AM_v3.1.inp" – AM Base Model

"HayesTC_VISSIM5.40_PM_3.1.inp" – PM Base Model

"HayesTC_VISSIM5.40_SAT_v3.2.inp" – Saturday Base Model

"**4 - Workings**\" – files used to process model inputs

1.5 All traffic models have been developed in VISSIM version 5.40, in line with the model auditing process stage 1 agreements ("\0 - Check Sheets\Stg 1\") and the most recent TfL Traffic Modelling Guidelines (version 3.0, September 2010).

1.6 For convenience, this report is structured according to the VMAP Stage 3 Check Sheets.

2 Model Input Data (VMAP Stage 3)

V301Technical Note

2.1 This report is the technical note for the Base VISSIM model calibration.

2.2 The study area includes the following junctions, signalled pedestrian crossings and other signalised operation, anti-clockwise south to north:

- Station Road / North Hyde Road signalised junction;
- Station Road / Nestles Avenue give-way junction;
- Station Road / Station Approach / Clayton Road roundabout;
- Station Road / Crown Close give-way junction;
- Pump Lane / Crown Close give-way junction;
- Pump Lane Puffin;
- East Avenue / Coldharbour Lane / Pump Lane / Botwell Road roundabout;
- Coldharbour Lane Puffin;
- Botwell Lane Puffin;
- Botwell Lane Pelican;
- Botwell Lane / Central Avenue give-way junction;
- Botwell Lane / Nield Road give-way junction;
- Botwell Lane / Church Road roundabout;
- Botwell Lane / Printinghouse Lane give-way junction;
- Printinghouse Lane single lane signalised operation;
- Printinghouse Lane / Clayton Road roundabout;
- Clayton Road/ Clarendon Road give-way junction;
- Clayton Road / Blyth Road give-way junction;
- Blyth Road/ Clarendon Road give-way junction; and
- Trevor Road / Blyth Road give-way junction;

2.3 The model includes one signalled junction, four roundabouts and ten give-way junctions, in addition to four signalled pedestrian crossings and the signalled one-lane operation on Printerhouse Lane. The junctions included and their type can be seen in Figure 2.1 overleaf. There are also two zebra crossings in the model, near the station.

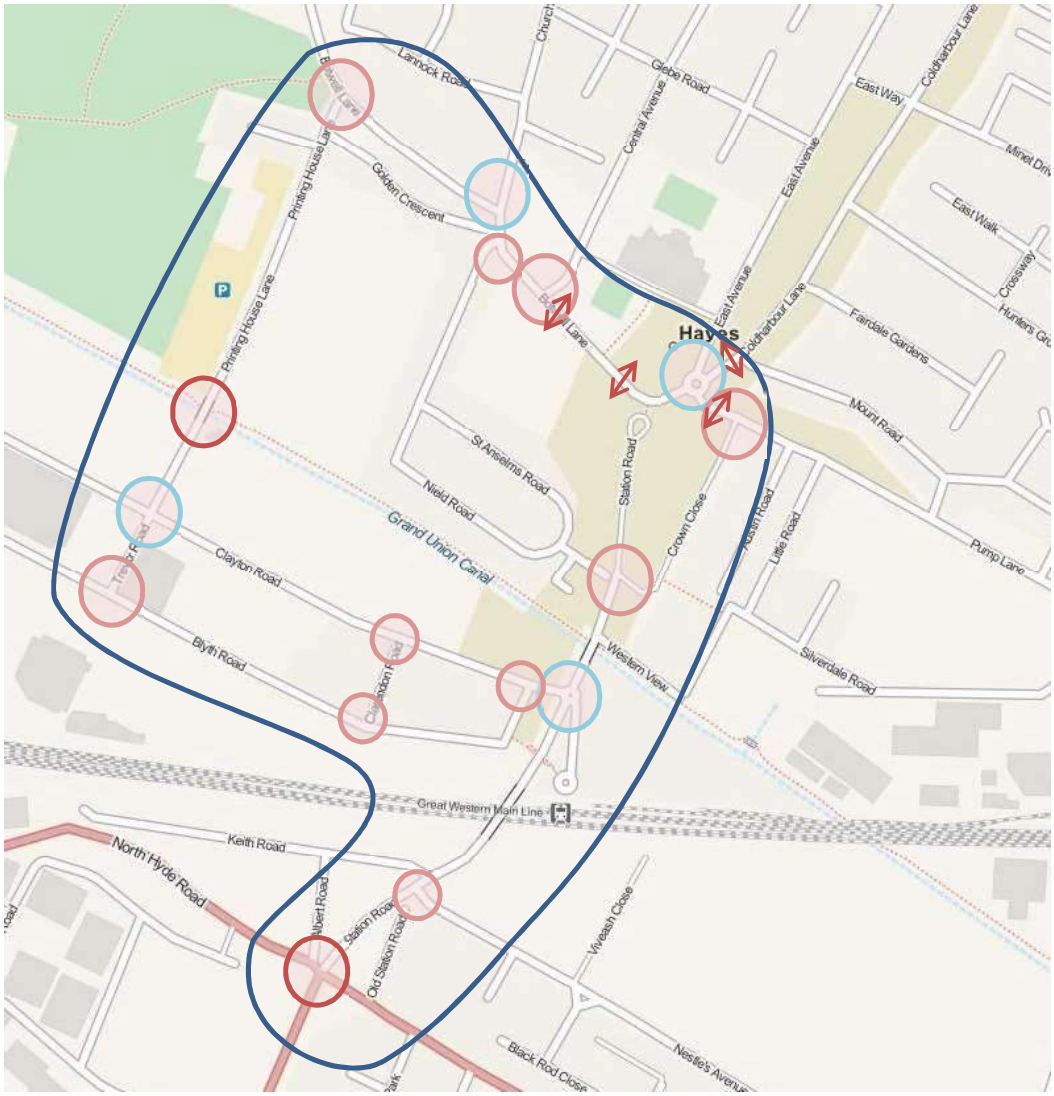
2.4 The proposals are to be implemented on Station Road and Coldharbour Lane, between the junctions with Station Approach and East Way, with the main section being between the Botwell Lane roundabout and the Station Road / Crown Close junction. It is also proposed to remove the one lane shuttle working signal operation of on Printinghouse Lane.

Time Periods

2.5 Three time periods are being modelled;

- Weekday AM Peak (07:30 – 09:30);
- Weekday PM Peak (16:30 – 18:30); and
- Saturday Midday (12.15-14.15).

FIGURE 2.1 VISSIM MODELLED JUNCTIONS



Note: Red - signalised, light red - give-way, blue - roundabouts, large - key junctions, arrows - pedestrian crossings

Model Validation Introduction

2.6 The models have been validated using three main parameters: saturation flows, traffic flows and journey times. In addition, modelled and observed queues at the three junctions have been compared. The validation is done according to TfL's latest traffic modelling and MAP guidance, with the requirements stated under each of the following parameters.

2.7 To gain a suitable average and ensure the VISSIM modelled data is representative, all validation data (except for saturation flow) is based on an average of five model runs using different random seeds, which has been compared against observed conditions.

V302 Adjustments from Stage 2 Models

Network Changes

2.8 To better reflect the actual speeds observed on site, both through journey time measurements and observed on video footage, the speeds has been amended on several locations:

- Higher speeds (30 mph) on all approached to the North Hyde Road / Station Road junction, also removal of all Speed Reduction Areas;
- Lower speeds (15 mph) on northern end of Station Road to reflect the pedestrian environment, as well as parking and loading activities;
- Reduced Speed Areas (15 mph) on Coldharbour Lane, Pump Lane and Botwell Lane near town centre to reflect high levels of kerb side activity, e.g. loading and dropping-off and this being a pedestrian environment;
- Reduced Speed Areas (15 mph) on Botwell Lane outside school and towards Printinghouse Lane in the AM to reflect high levels of kerb side activity, e.g. school traffic and pedestrian activity, and also traffic exiting from private yards;
- Reduced Speed Areas (15 mph) on Printinghouse Lane southbound in the AM and PM to reflect high levels of kerb side and side road activity to/from the local industry sites; and
- Reduced Speed Areas (2.5 mph) on Botwell Lane in the SAT midday to reflect high levels of informal pedestrian crossing between the roundabout and pedestrian crossing.

2.9 The operation of the North Hyde Road / Station Road junction has been amended to better reflect the flare usage and also to avoid turning and ahead traffic blocking each other in the models when in real life vehicles would negotiate around such temporary impediments. This includes extension of flares to better reflect usage (and partly provision), minor changes to routing and increased lane widths on exists.

2.10 The nearside lane on the northbound approach to the Botwell Lane / Pump Lane roundabout has been closed to traffic, as video footage indicates this is commonly blocked for use by loading vehicles.

Flow Changes

2.11 As U-turning traffic was not included in in the calibrated VISUM matrix, this has been included for the Station Road roundabout near the station which has relatively large u-turning movements

- AM: 21 vehicles (as observed) have been added from North Hyde Road east to North Hyde Road west via Station Road roundabout;
- PM: 11 vehicles (as observed) have been added from North Hyde Road west to North Hyde Road east via Station Road roundabout;
- SAT: 9 vehicles (as observed) have been added from North Hyde Road east to North Hyde Road east via Station Road roundabout.

Flow Calibration Update

2.12 For the PM and SAT models the flows have been recalibrated to take into account of minor errors in the input data. These were not visible in the VISUM-VISSIM

comparison, but became evident during the VISSIM validation process. The updated calibration tables can be found in Appendix A. Updated Flow Input Data and Flow Diagram spread sheets (both version 3) are provided with this note.

Occurrence of Demand Dependant Stages

As stated in the calibration report, an adjustment in pedestrian numbers has been made. This takes account of not all pedestrians crossing on green man and/or not activating the push-button, as well as groups of pedestrians approaching the signals together, as observed and identified in surveys. This lead to a reduction in pedestrian input volumes of 10 – 60 percent, depending on the observed use of push buttons and occurrence of demand dependant stages.

2.13 Based on this, the observed and modelled occurrence of demand dependant stages compares better. As can be seen in the tables overleaf, for the North Hyde Road junction there is a 1% to 6% difference in frequency of the demand dependant stage for all time periods. The four pedestrian crossings see a difference in occurrence of demand dependant stages at around 5 - 10 times per hour between modelled and observed.

2.14 While the signalised junction meets the validation criteria of 10% difference, there are no clear conclusions to be drawn for the signalised pedestrian crossings due to reasons highlighted below. Overall, the differences between observed and measured number of occurrences are low, both in actual times per hour and percentage difference.

2.15 The transcribed survey data of occurrence of the pedestrian stage in the Pump Lane Puffin in the SAT midday scenario, did not appear to be entirely accurate. This has therefore been redone based on a video of the site during the appropriate time period. This updated survey data indicates the pedestrian stage is being called 86 times during the SAT midday peak hour.

2.16 There are two reasons why the frequency of demand dependant stages validation criteria is not met for the signalled pedestrian crossings in these models:

- As the signals are pedestrian/vehicle activated, the length and occurrence of stages varies based on the traffic and number of pedestrians present; and
- The above and there being only two observable stages on this pedestrian crossings, makes the measurement of frequency of demand dependant stages difficult. Hence, the survey data does not provide frequency of demand dependant stages, rather how many times the demand dependant stage is called during the one hour peak period.

Green Time Comparison

2.17 As a further control, green time lengths for the signalised junctions, the North Hyde Road / Station Road junction and the Printinghouse Lane signals, have been compared. These comparisons can be found in Appendix B. Generally, the surveyed and modelled green times compare well, potentially with the pedestrian stage in North Hyde Road junction being called a bit too frequently (however, the reduction in pedestrian numbers validate demand dependant stages has been considered sufficient).

TABLE 2.1 DEMAND DEPENDANT STAGES, AM

			Number of times called		Difference	
No	Name	Stage	Model	Survey	Actual	%
26010	Station Road / North Hyde Road	4	80%	78%		3%
26134	Botwell Lane by Central Avenue	2	81	74	7	9%
26107	Botwell Lane by Station Road	2	87	76	11	13%
26108	Coldharbour Lane by Pump Lane	2	47	44	3	6%
26098	Pump Lane by Station Road	2	83	73	10	12%

TABLE 2.2 DEMAND DEPENDANT STAGES, PM

			Number of times called		Difference	
No	Name	Stage	Model	Survey	Actual	%
26010	Station Road / North Hyde Road	4	76%	70%		6%
26134	Botwell Lane by Central Avenue	2	68	61	7	10%
26107	Botwell Lane by Station Road	2	90	94	-4	-4%
26108	Coldharbour Lane by Pump Lane	2	94	78	16	17%
26098	Pump Lane by Station Road	2	88	80	8	9%

TABLE 2.3 DEMAND DEPENDANT STAGES, SAT

			Number of times called		Difference	
No	Name	Stage	Model	Survey	Actual	%
26010	Station Road / North Hyde Road	4	41%	43%		-1%
26134	Botwell Lane by Central Avenue	2	52	41	11	21%
26107	Botwell Lane by Station Road	2	93	98	-5	-5%
26108	Coldharbour Lane by Pump Lane	2	99	91	8	8%
26098	Pump Lane by Station Road	2	93	86	7	8%

V303 Saturation Flows

2.18 Saturation flow has been validated for all approaches at the North Hyde Road junction and the Printinghouse Lane signals.

2.19 Special evaluation output files from VISSIM have been compared to average site observations for the AM, PM and SAT midday period, e.g. combined for all time periods. Some of the approaches proved difficult to observe in certain time periods, as there were only a few saturation flow observations. This was also replicated in the models.

2.20 The following parameters have been used to measure saturation flows from the VISSIM special evaluation output files:

- Ignore first two vehicles across the stopline;
- End of saturated period assumed when headway is greater than 4s; and
- Adjustment for vehicle to PCU factor (based on model outputs).

2.21 Tables 2.4 – 2.6 shows the comparison between the observed and the modelled values of saturation flow. As can be seen, the percentage change between observed and modelled saturation flows is within the 10% validation criteria for all approaches.

2.22 Saturation flows on both approaches in Printinghouse Lane proved difficult to replicate in the AM and Saturday peak periods, likely due somewhat higher observed speeds on this road. Also, the Station Road northbound approach proved difficult to validate as there were few occasions in the model that met the criteria stated above. However, this seems to reflect actual operation as very few observations were included in the site observations during those two time periods. However, in most cases the difference is negative with the modelled saturation flow lower than observed, which indicates conservative models.

2.23 Generally for the right turning movements there is not enough traffic (on site or in the model) to undertake satisfactory saturation flow measurements. Hence only "main lanes" have been included in the comparison.

TABLE 2.4 SATURATION FLOW COMPARISON, AM

Junction 11 - Printinghouse Lane

Approach	Observed	Modelled	% Change
Printinghouse Lane NB	1858	1726	-7%
Printinghouse Lane SB	1856	1686	-9%

Junction 8 - Station Rd / North Hyde Rd

Approach	Observed	Modelled	% Change
Station Road SB, LT & Ahead lane	1969	2012	1%
North Hyde Road WB, LT & Ahead lane	1903	1927	-2%
Station Road NB, LT & Ahead lane	2097	1942	-7%
North Hyde Road EB, LT & Ahead lane	1928	1888	-6%

TABLE 2.5 SATURATION FLOW COMPARISON, PM

Junction 11 - Printinghouse Lane

Approach	Observed	Modelled	% Change
Printinghouse Lane NB	1858	1793	-3%
Printinghouse Lane SB	1856	1812	-2%

Junction 8 - Station Rd / North Hyde Rd

Approach	Observed	Modelled	% Change
Station Road SB, LT & Ahead lane	1969	2063	4%
North Hyde Road WB, LT & Ahead lane	1903	2021	2%
Station Road NB, LT & Ahead lane	2097	1939	-7%
North Hyde Road EB, LT & Ahead lane	1928	1962	-2%

TABLE 2.6 SATURATION FLOW COMPARISON, SAT

Junction 11 - Printinghouse Lane

Approach	Observed	Modelled	% Change
Printinghouse Lane NB	1858	1685	-9%
Printinghouse Lane SB	1856	1686	-9%

Junction 8 - Station Rd / North Hyde Rd

Approach	Observed	Modelled	% Change
Station Road SB, LT & Ahead lane	1969	1851	-7%
North Hyde Road WB, LT & Ahead lane	1903	1984	1%
Station Road NB, LT & Ahead lane	2097	1958	-6%
North Hyde Road EB, LT & Ahead lane	1928	1925	-4%

V304 Traffic Flow Comparison

2.24 For all time periods the modelled flows correspond well with the counted turning movements, with the GEH statistic for all movements being 5 or lower. This is within the GEH requirement of less than 5 in the TfL guidelines and indicates a good fit between the modelled and the observed flows. A breakdown of the observed and modelled flows for each movement and vehicle type, along with GEH values and percentage comparison, are shown in Table 2.7-2.9.

2.25 A can be seen, there are a few flow volumes with 3-5 GEH, generally these flows are similar to the flows in the calibration and compare well to VISUM flows input into the models. The only turning count with GEH of 5, is for a small flow of vehicles in the PM model (and is actually 4.6, but rounded up). The overall differences in flows are 3%, 4% and 3%, for the AM, PM and SAT respectively.

2.26 Entry link percentage difference from counts is also compared (as indicated in "entry lane" column and highlighted bold). These are generally within the criteria of 5% for entry lanes. Where this is not the case, this is generally due to low flow numbers so that a relatively small change gives a high percentage difference. Also, the input flows are taken directly from the calibrated flow matrix estimation and not direct turning counts, so individual movements might be higher/lower than the observed counts.

TABLE 2.7 FLOW COMPARISON, AM

Approach	Entry Lane	Bus	Observed Number of Vehicles					Modelled Number of Vehicles					GEH	% Change
			All	Car	HGV/MGV	PT	MC/bike	All	Car	HGV/MGV	PT	MC/bike		
Botwell Lane EB RT	x		**143**	141	1		1	**133**	129	1	0	2	1	**-7.3%**
Botwell Lane EB Ahead	x	x	**276**	261	2	11	2	**261**	242	3	13	3	1	**-5.5%**
Printinghouse Lane NB RT			**207**	204	3			**224**	214	6	0	3	1	8.0%
Printinghouse Lane NB LT			**91**	88	2		1	**95**	90	3	0	2	0	4.0%
Botwell Lane WB Ahead		x	**196**	173	4	16	3	**173**	154	4	13	2	2	-11.6%
Botwell Lane WB LT			**614**	605	8		1	**564**	551	8	0	6	2	-8.1%
Botwell Lane EB IN		x	**483**	464	5	11	3	**484**	456	9	13	7	0	0.2%
Botwell Lane WB OUT		x	**787**	758	12	15	2	**738**	707	11	13	8	2	-6.2%
Church Road IN	x	x	**380**	363	3	11	3	**354**	338	2	12	2	1	**-6.8%**
Church Road OUT		x	**161**	144	1	16		**146**	129	4	12	2	1	-9.1%
Botwell Lane WB IN		x	**626**	584	10	31	1	**587**	543	12	25	7	2	-6.2%
Botwell Lane EB OUT		x	**539**	507	5	22	5	**541**	502	8	25	7	0	0.4%
Botwell Lane EB LT			**58**	58				**45**	44	1	0	1	2	-22.1%
Central Avenue RT	x		**110**	110				**106**	105	0	0	2	0	**-3.5%**
Central Avenue LT	x		**74**	74				**58**	57	0	0	1	2	**-22.2%**
Botwell Lane WB RT			**14**	14				**14**	13	0	0	0	0	0.0%
Botwell Lane IN		x	**552**	511	6	22	13	**540**	501	7	25	7	0	-2.1%
Botwell Lane OUT		x	**422**	383	6	27	6	**407**	374	6	25	2	1	-3.5%
East Avenue OUT			**112**	109	1		2	**116**	112	3	0	1	0	3.4%
Coldharbour Lane IN	x	x	**491**	462	6	17	6	**493**	464	6	20	3	0	**0.4%**
Coldharbour Lane OUT		x	**238**	207	3	21	7	**203**	176	3	20	3	2	-14.9%
Pump Lane IN		x	**286**	232	4	48	2	**267**	216	4	45	2	1	-6.6%
Pump Lane OUT		x	**557**	506	6	39	6	**574**	518	5	45	6	1	3.1%
Pump Lane EB RT		x	**72**	30		39	3	**78**	31	1	45	1	1	8.3%
Pump Lane WB LT	x		**7**	7				**6**	6	0	0	0	0	**-8.6%**
Crown Close RT			**4**	4				**4**	3	0	0	1	0	-10.0%
Crown Close LT		x	**59**	12		47		**56**	11	0	45	0	0	-4.7%
Station Road SB IN		x	**130**	72	17	41		**135**	80	0	45	10	0	3.8%
Station Road NB OUT		x	**154**	94		45	15	**194**	143	3	45	3	3	25.8%
Station Approach IN	x		**194**	187	2		5	**230**	223	2	0	5	2	**18.6%**
Station Approach OUT			**171**	167	3		1	**226**	215	3	0	7	4	32.0%
Station Road NB IN		x	**403**	327	8	51	17	**440**	353	9	50	28	2	9.1%
Station Road SB OUT		x	**614**	545	4	48	17	**583**	511	8	50	14	1	-5.1%
Clayton Road IN		x	**484**	472	3	7	2	**459**	440	10	5	4	1	-5.2%
Clayton Road OUT		x	**274**	252	8	6	8	**261**	227	6	5	23	1	-4.8%
Station Road SB RT		x	**65**	55		8	2	**47**	37	0	5	5	2	-27.4%
Station Road SB Ahead		x	**381**	338	1	32	10	**386**	328	6	39	13	0	1.3%
Station Road SB LT		x	**93**	82	3	7	1	**76**	68	2	5	2	2	-17.8%
North Hyde Road WB RT	x	x	**117**	102	5	8	2	**148**	134	6	5	3	3	**26.7%**
North Hyde Road WB Ahead	x		**282**	256	10		16	**247**	231	11	0	5	2	**-12.3%**
North Hyde Road WB LT	x		**206**	199	5		2	**198**	184	10	0	4	1	**-3.9%**
Station Road NB RT	x		**150**	144	3		3	**155**	150	3	0	2	0	**3.5%**
Station Road NB Ahead	x	x	**242**	195	6	36	5	**259**	213	2	40	3	1	**6.9%**
Station Road NB LT	x		**87**	84	1		2	**88**	84	2	0	1	0	**0.7%**
North Hyde Road EB RT	x		**46**	44	1		1	**46**	43	2	0	1	0	**0.4%**
North Hyde Road EB Ahead	x		**232**	223	8		1	**218**	203	13	0	2	1	**-5.9%**
North Hyde Road EB LT	x	x	**41**	32		8	1	**36**	29	2	5	0	1	**-12.2%**
Blyth Road WB RT			**190**	184	4		2	**200**	187	5	0	9	1	5.5%
Blyth Road WB Ahead			**99**	90	4		5	**97**	93	2	0	1	0	-2.4%
Blyth Road EB LT	x		**380**	366	12		2	**343**	327	10	0	5	2	**-9.8%**
Trevor Road NB IN			**571**	551	16		4	**544**	514	16	0	14	1	-4.8%
Trevor Road SB OUT			**332**	318	13		1	**288**	277	7	0	3	3	-13.3%
Clayton Road EB IN	x		**18**	14	4			**12**	10	2	0	0	1	**-32.2%**
Clayton Road WB OUT			**32**	29	3			**29**	28	0	0	0	1	-10.0%
Trevor Road SB IN			**736**	718	16		2	**694**	677	9	0	8	2	-5.7%
Trevor Road NB OUT			**356**	343	12		1	**321**	307	9	0	5	2	-9.7%
Clayton Road EB OUT			**603**	593	8		2	**612**	589	10	0	13	0	1.4%

TABLE 2.8 FLOW COMPARISON, PM

Approach	Entry Lane	Bus	Observed Number of Vehicles					Modelled Number of Vehicles					GEH	% Change
			All	Car	HGV/MGV	PT	MC/bike	All	Car	HGV/MGV	PT	MC/bike		
Botwell Lane EB RT	x		**97**	95			2	**96**	93	0	0	2	**0**	**-1.4%**
Botwell Lane EB Ahead	x	x	**258**	239	1	12	6	**236**	217	1	13	5	**1**	**-8.6%**
Printinghouse Lane NB RT			**356**	350	1		5	**359**	350	4	0	6	**0**	1.0%
Printinghouse Lane NB LT			**101**	101				**108**	105	1	0	3	**1**	7.3%
Botwell Lane WB Ahead		x	**233**	214	3	12	4	**211**	192	1	13	5	**1**	-9.5%
Botwell Lane WB LT			**514**	507	2		5	**486**	474	1	0	11	**1**	-5.5%
Botwell Lane EB IN		x	**613**	586	2	12	13	**595**	566	5	13	11	**1**	-3.0%
Botwell Lane WB OUT		x	**761**	731	5	12	13	**697**	667	2	13	16	**2**	-8.4%
Church Road IN	x	x	**254**	236		11	7	**232**	215	0	12	5	**1**	**-8.7%**
Church Road OUT		x	**277**	259		12	6	**259**	240	1	12	6	**1**	-6.6%
Botwell Lane WB IN		x	**724**	683	5	24	12	**671**	627	2	25	18	**2**	-7.3%
Botwell Lane EB OUT		x	**555**	515	2	23	15	**543**	503	4	25	11	**1**	-2.2%
Botwell Lane EB LT			**97**	97				**98**	95	1	0	2	**0**	1.0%
Central Avenue RT	x		**121**	121				**117**	115	0	0	2	**0**	**-3.6%**
Central Avenue LT	x		**81**	81				**82**	81	0	0	1	**0**	**1.2%**
Botwell Lane WB RT			**19**	19				**18**	17	0	0	0	**0**	-6.3%
Botwell Lane IN		x	**603**	561	3	23	16	**588**	548	4	25	12	**1**	-2.4%
Botwell Lane OUT		x	**528**	492	5	24	7	**502**	463	2	25	12	**1**	-5.0%
East Avenue OUT			**188**	181	1		6	**181**	176	1	0	5	**0**	-3.5%
Coldharbour Lane IN	x	x	**407**	376	4	22	5	**395**	367	3	20	6	**1**	**-2.9%**
Coldharbour Lane OUT		x	**425**	393	2	16	14	**397**	363	3	20	11	**1**	-6.5%
Pump Lane IN		x	**569**	515	2	40	12	**553**	487	1	45	20	**1**	-2.8%
Pump Lane OUT		x	**438**	386	1	45	6	**455**	398	2	45	10	**1**	3.8%
Pump Lane EB RT		x	**84**	36		45	3	**75**	30	0	45	1	**1**	-10.5%
Pump Lane WB LT	x		**16**	15			1	**16**	15	0	0	1	**0**	**-2.5%**
Crown Close RT			**14**	13			1	**14**	13	0	0	1	**0**	-1.4%
Crown Close LT		x	**110**	68		40	2	**110**	64	0	45	2	**0**	0.4%
Station Road SB IN		x	**198**	128		48	22	**216**	134	0	45	37	**1**	9.0%
Station Road NB OUT		x	**182**	117		41	24	**154**	105	1	45	3	**2**	-15.5%
Station Approach IN	x		**113**	110			3	**107**	105	0	0	2	**1**	**-5.7%**
Station Approach OUT			**150**	135	6		9	**182**	166	0	0	15	**2**	21.2%
Station Road NB IN		x	**434**	363	2	47	22	**433**	367	6	50	10	**0**	-0.2%
Station Road SB OUT		x	**518**	437	3	55	23	**497**	420	3	49	25	**1**	-4.1%
Clayton Road IN		x	**441**	417	4	7	13	**435**	414	3	5	14	**0**	-1.3%
Clayton Road OUT		x	**339**	329		6	4	**359**	329	5	5	20	**1**	5.8%
Station Road SB RT		x	**83**	78	1	4		**88**	81	1	5	2	**1**	6.0%
Station Road SB Ahead		x	**299**	242	3	43	11	**335**	279	0	40	15	**2**	12.1%
Station Road SB LT		x	**128**	120	1	5	2	**149**	139	1	5	4	**2**	16.3%
North Hyde Road WB RT	x	x	**132**	120	2	6	4	**114**	104	4	5	1	**2**	**-13.9%**
North Hyde Road WB Ahead	x		**278**	266	6		6	**260**	248	9	0	2	**1**	**-6.6%**
North Hyde Road WB LT	x		**197**	193	1		3	**196**	189	6	0	2	**0**	**-0.4%**
Station Road NB RT	x		**212**	203	3		6	**204**	195	2	0	6	**1**	**-4.0%**
Station Road NB Ahead	x	x	**254**	208	1	35	10	**226**	179	2	40	4	**2**	**-11.2%**
Station Road NB LT	x		**75**	74	1			**69**	66	1	0	2	**1**	**-7.7%**
North Hyde Road EB RT	x		**47**	43	0		4	**41**	37	2	0	1	**1**	**-13.6%**
North Hyde Road EB Ahead	x		**297**	264	15		18	**262**	243	10	0	9	**2**	**-11.7%**
North Hyde Road EB LT	x	x	**34**	28		6		**13**	8	0	5	0	**4**	**-61.8%**
Blyth Road WB RT			**304**	301	1		2	**314**	307	1	0	6	**1**	3.4%
Blyth Road WB Ahead			**147**	144	1		2	**139**	127	0	0	11	**1**	-5.7%
Blyth Road EB LT	x		**382**	367	6		9	**339**	326	6	0	7	**2**	**-11.2%**
Trevor Road NB IN			**698**	680	7		11	**653**	633	7	0	13	**2**	-6.5%
Trevor Road SB OUT			**324**	313	6		5	**288**	281	1	0	6	**2**	-11.0%
Clayton Road EB IN	x		**31**	29	2			**21**	20	1	0	0	**2**	**-32.9%**
Clayton Road WB OUT			**11**	10	1			**33**	30	0	0	2	**5**	196.4%
Trevor Road SB IN			**611**	599	4		8	**580**	565	1	0	14	**1**	-5.0%
Trevor Road NB OUT			**530**	523	3		4	**469**	456	4	0	9	**3**	-11.4%
Clayton Road EB OUT			**475**	462	3		10	**463**	450	3	0	10	**1**	-2.5%

TABLE 2.9 FLOW COMPARISON, SAT

Approach	Entry Lane	Bus	Observed Number of Vehicles					Modelled Number of Vehicles					GEH	% Change
			All	Car	HGV/MGV	PT	MC/bike	All	Car	HGV/MGV	PT	MC/bike		
Botwell Lane EB RT	x		**78**	78				**69**	67	0	0	2	1	**-11.0%**
Botwell Lane EB Ahead	x	x	**233**	214	1	13	5	**211**	194	0	13	4	1	**-9.4%**
Printinghouse Lane NB RT			**268**	267			1	**272**	263	3	0	6	0	1.6%
Printinghouse Lane NB LT			**81**	81				**81**	76	2	0	3	0	-0.5%
Botwell Lane WB Ahead		x	**225**	208		11	6	**213**	193	1	13	6	1	-5.4%
Botwell Lane WB LT			**426**	423			3	**374**	365	1	0	8	3	-12.3%
Botwell Lane EB IN		x	**493**	472	1	14	6	**485**	458	3	13	10	0	-1.6%
Botwell Lane WB OUT		x	**646**	627		11	8	**588**	559	2	13	14	2	-9.0%
Church Road IN	x	x	**241**	227		12	2	**218**	201	0	13	5	1	**-9.4%**
Church Road OUT		x	**214**	199		13	2	**199**	180	1	13	5	1	-7.0%
Botwell Lane WB IN		x	**616**	584		24	8	**568**	525	2	26	15	2	-7.7%
Botwell Lane EB OUT		x	**490**	457	1	26	6	**485**	446	3	26	11	0	-0.9%
Botwell Lane EB LT			**66**	66				**71**	67	1	0	3	1	7.3%
Central Avenue RT	x		**101**	100			1	**90**	89	0	0	1	1	**-11.1%**
Central Avenue LT	x		**83**	82			1	**79**	78	0	0	1	0	**-4.6%**
Botwell Lane WB RT			**28**	28				**27**	25	0	0	2	0	-2.1%
Botwell Lane IN		x	**551**	516	1	24	10	**588**	551	2	22	13	2	6.8%
Botwell Lane OUT		x	**493**	460		23	10	**488**	447	2	25	13	0	-1.1%
East Avenue OUT			**160**	155			5	**172**	168	1	0	3	1	7.3%
Coldharbour Lane IN	x	x	**457**	429	1	19	8	**441**	412	3	20	7	1	**-3.5%**
Coldharbour Lane OUT		x	**406**	378	1	20	7	**395**	361	2	20	12	1	-2.8%
Pump Lane IN		x	**546**	496		43	7	**538**	473	2	45	19	0	-1.4%
Pump Lane OUT		x	**495**	448	1	43	3	**512**	459	2	42	9	1	3.5%
Pump Lane EB RT		x	**100**	57		43		**93**	50	0	42	1	1	-7.2%
Pump Lane WB LT	x		**26**	26				**23**	21	0	0	1	1	**-13.1%**
Crown Close RT			**25**	24			1	**25**	24	0	0	1	0	0.8%
Crown Close LT		x	**142**	97		44	1	**139**	90	1	46	3	0	-1.8%
Station Road SB IN		x	**187**	127		45	15	**160**	92	0	41	27	2	-14.5%
Station Road NB OUT		x	**181**	125		46	10	**164**	114	2	46	2	1	-9.6%
Station Approach IN	x		**88**	87			1	**85**	84	0	0	1	0	**-3.9%**
Station Approach OUT			**81**	77			4	**72**	68	0	0	4	1	-10.9%
Station Road NB IN		x	**346**	286		50	10	**337**	277	5	49	6	0	-2.5%
Station Road SB OUT		x	**401**	340		50	11	**395**	326	1	44	24	0	-1.6%
Clayton Road IN		x	**296**	291		5		**298**	284	2	3	9	0	0.7%
Clayton Road OUT		x	**254**	249		4	1	**249**	229	4	3	13	0	-1.9%
Station Road SB RT		x	**49**	42		7		**45**	40	0	3	1	1	-9.0%
Station Road SB Ahead		x	**197**	153		38	6	**189**	137	0	37	14	1	-4.0%
Station Road SB LT		x	**122**	115		6	1	**121**	110	0	5	6	0	-0.5%
North Hyde Road WB RT	x	x	**111**	105		6		**111**	101	4	5	1	0	**-0.2%**
North Hyde Road WB Ahead	x		**290**	284	4		2	**284**	273	9	0	2	0	**-2.1%**
North Hyde Road WB LT	x		**198**	196	2			**196**	188	5	0	2	0	**-1.1%**
Station Road NB RT	x		**202**	199	1		2	**212**	203	3	0	7	1	**5.1%**
Station Road NB Ahead	x	x	**190**	147		39	4	**169**	124	2	41	2	2	**-10.8%**
Station Road NB LT	x		**45**	45				**40**	39	0	0	1	1	**-10.2%**
North Hyde Road EB RT	x		**34**	34				**39**	37	1	0	1	1	**13.5%**
North Hyde Road EB Ahead	x		**261**	249	7		5	**254**	235	9	0	9	0	**-2.8%**
North Hyde Road EB LT	x	x	**47**	41		6		**38**	33	1	3	1	1	**-18.7%**
Blyth Road WB RT			**221**	221				**224**	216	2	0	6	0	1.3%
Blyth Road WB Ahead			**94**	93			1	**90**	83	0	0	6	0	-4.7%
Blyth Road EB LT	x		**263**	261			2	**242**	232	5	0	5	1	**-8.1%**
Trevor Road NB IN			**485**	484			1	**467**	449	7	0	11	1	-3.8%
Trevor Road SB OUT			**225**	220			5	**208**	203	1	0	5	1	-7.5%
Clayton Road EB IN	x		**6**	6				**4**	4	0	0	0	1	**-33.3%**
Clayton Road WB OUT			**7**	7				**8**	8	0	0	0	1	20.0%
Trevor Road SB IN			**456**	450			6	**441**	430	1	0	10	1	-3.3%
Trevor Road NB OUT			**385**	384			1	**354**	339	5	0	9	2	-8.2%
Clayton Road EB OUT			**333**	332			1	**342**	332	2	0	7	0	2.6%

V305 Queue Lengths

2.27 Queues are not a validation criterion, but can provide some additional comparison. As can be seen below in Figure 2.2 - 2.4, the majority of the modelled mean maximum queues correspond well with the observed queues. Some model specific comments:

- AM – longer observed queues on Coldharbour Lane is likely caused by kerbside activity, this has been taken into account with reduced widths and speeds in the model as deemed appropriate. North Hyde Road westbound sees longer queues in the model than observed, despite introduction of adjustments to the network as discussed above and comparable green time splits.
- PM - the observed queue on the Botwell Lane approach to the roundabout is just under 40 metre, which is the distance to the downstream signalised pedestrian crossing. This indicates queuing through this crossing; but that the queue measurements on site are stopped at upstream signals, while in the model they are not. Hence, whilst they appear to not compare, this cannot really be ascertained from the below, however, it's clear both observed and modelled queues are relatively long and goes past the upstream signals.
- SAT - longer observed queues on Coldharbour Lane is likely caused by kerbside activity, this has been taken into account with reduced widths and speeds in the model as deemed appropriate. Both Pump Lane and Botwell Lane have significantly longer modelled queues than the survey indicates, however, this corresponds to video footage showing general queuing on these approaches and occasionally very long queues on these arms during the Saturday midday peak period. Particularly for Botwell Lane, which often sees queues extending back to Central Avenue. The difference is caused by the same difference in measurement approach on site and in the model as for the PM.

FIGURE 2.2 QUEUE COMPARISON, AM

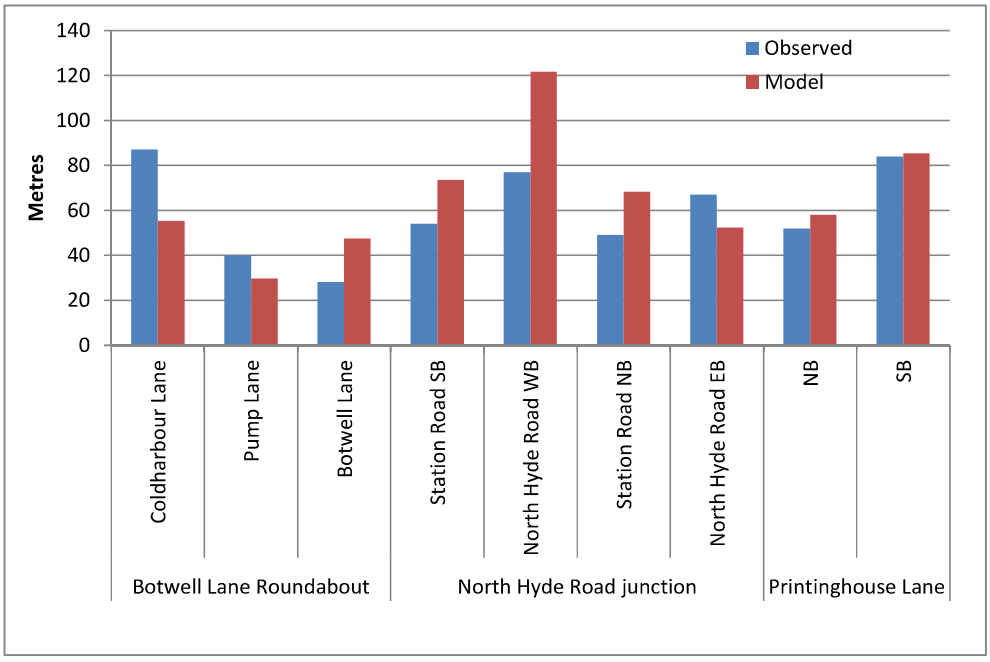


FIGURE 2.3 QUEUE COMPARISON, PM

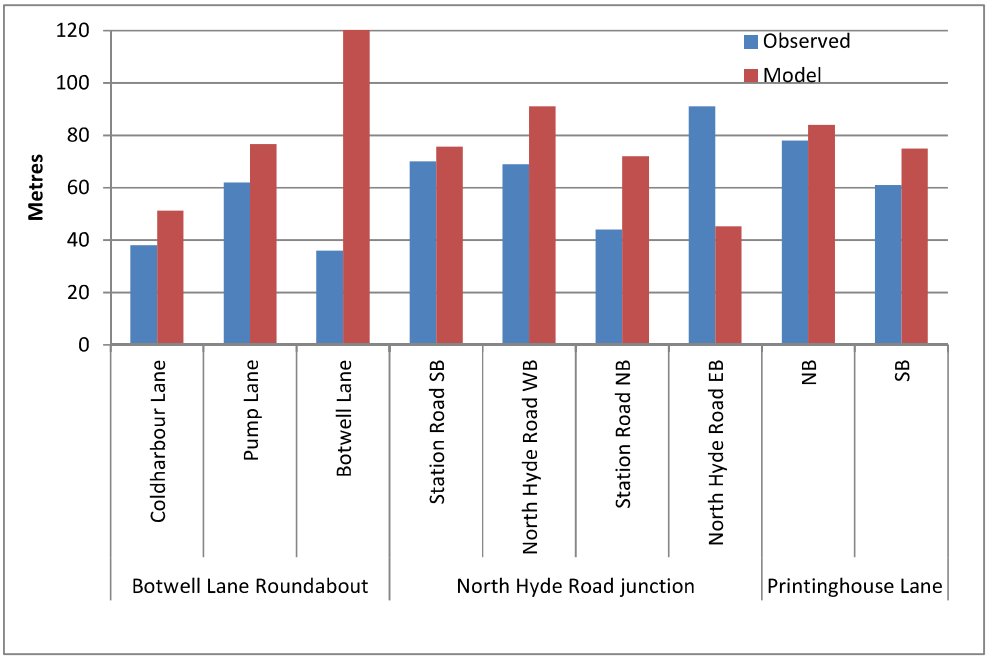
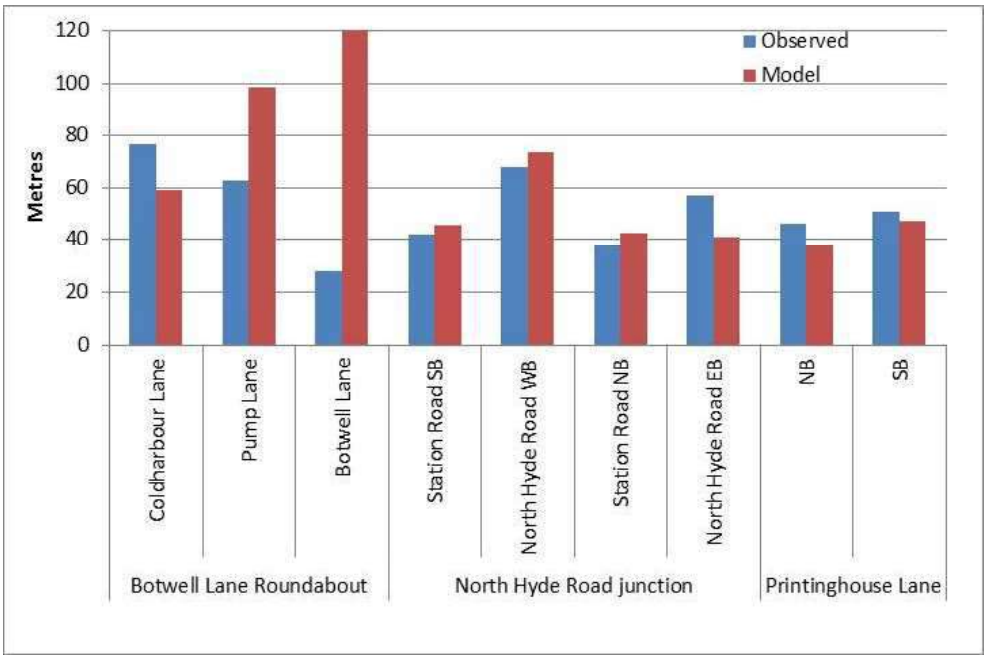


FIGURE 2.4 QUEUE COMPARISON, SAT



Note: Botwell Lane modelled queues are 175 metres (chart has been capped at 120 metres to better present the other queues)

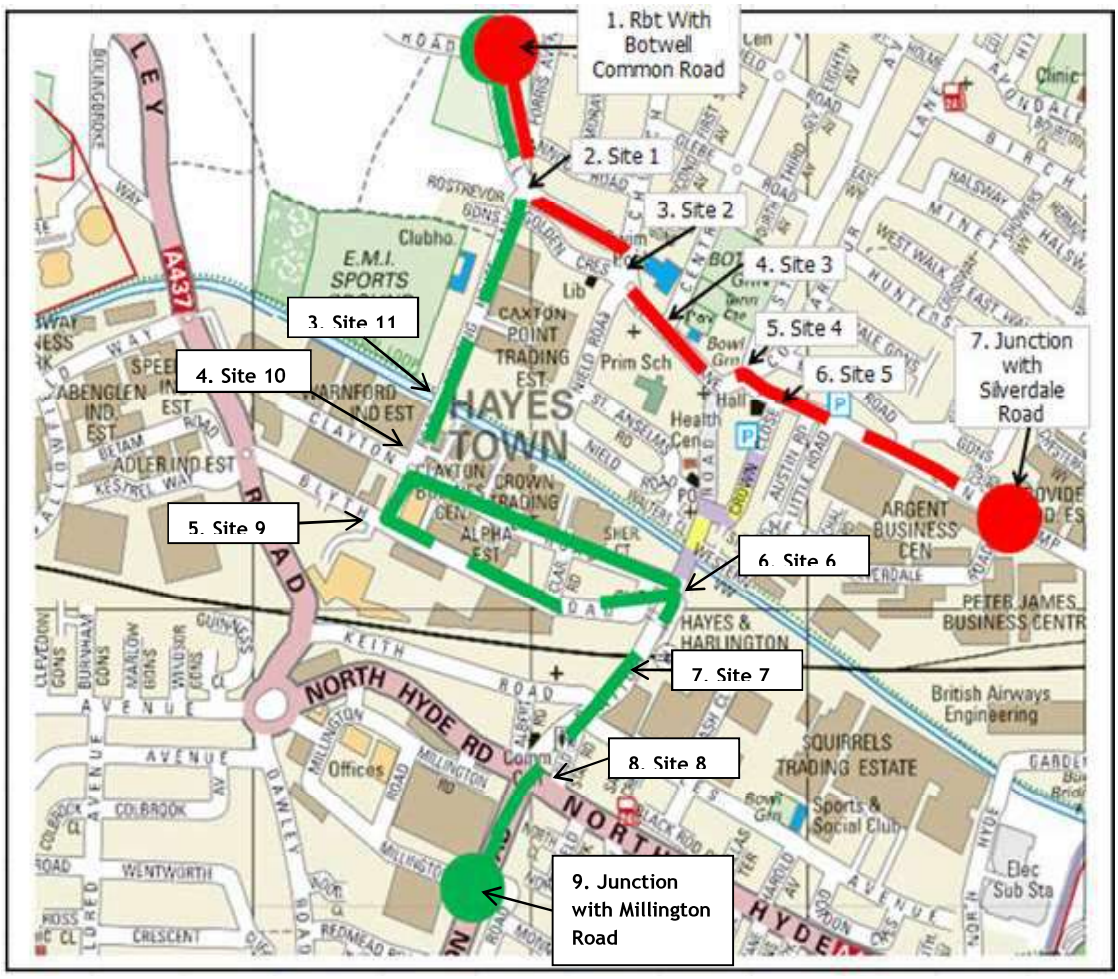
V306 Journey Time Comparison

2.28 Modelled and observed journey times have been compared for two journey time routes:

- East-West (red route) – along Botwell Lane and Pump Lane, in both directions; and
- North-South (green route) – along Printinghouse Lane, through Clayton Business Area and along Station Road, in both directions.

2.29 These are also presented in the Figure 2.5 below. The journey time observations were undertaken on Thursday 24th October and Saturday 26th October 2013 by Intelligent Data on behalf of SDG. They have been reviewed and extreme cases of the ten runs per route and directions excluded from the average.

FIGURE 2.5 JOURNEY TIME MAP - ROUTES AND JOURNEY TIME SECTIONS



2.30 Comparisons between observed and modelled journey times for both directions of the two routes are presented below in Table 2.10-2.12. As can be seen, they are generally within the 15% validation criteria.

2.31 PM red route eastbound (EB) are just outside the 15% validation criteria, with a difference between observed and modelled of 16%. This difference is likely caused by high levels of kerbside activity related to the school, as well as traffic from

private accesses, in the AM, which is only partially mirrored in the model. Also, the low numbers involved, means the same absolute difference gives a larger percentage difference. Still, the model provides a good reflection of actual behaviour within its limits.

TABLE 2.10 JOURNEY TIME COMPARISON, AM

Totals	Model	Observed	Difference
Red EB	130	154	-16%
Red WB	217	226	-4%
Green SB	282	308	-8%
Green NB	334	311	7%

TABLE 2.11 JOURNEY TIME COMPARISON, PM

Totals	Model	Observed	Difference
Red EB	144	154	-6%
Red WB	222	256	-13%
Green SB	289	319	-9%
Green NB	341	365	-7%

TABLE 2.12 JOURNEY TIME COMPARISON, SAT

Totals	Model	Observed	Difference
Red EB	173	177	-2%
Red WB	200	202	-1%
Green SB	255	245	4%
Green NB	286	279	2%

2.32 In addition, journey time sections have been compares, and are presented in Figure 2.7 -2.9 overleaf. They generally compare very well.

2.33 Eastbound journey times show missing/excluded site observations at either end for all time periods. This exclusion is due to the measurement starting west of roundabout on the west side of the entry to Botwell Lane. As this roundabout is not included in the model, the data cannot be compared. This, however, impacts on the overall route assessment, as it leads to a shortening of the route length and hence a higher impact of individual section differences. Westbound journey times are missing section 6 site observation for the Saturday.

2.34 Further comments on the AM model:

- EB 2 - Botwell Lane eastbound towards Church Road roundabout, modelled JT is faster than observed, likely due to access traffic from private court houses and dropping off traffic related to the school nearby. This has partially been taken account of with reduced speed areas.
- EB 4 - Botwell Lane eastbound towards Pump Lane roundabout, modelled JT is faster than observed, likely due to kerb side loading activity. This has partially been taken account of with reduced speed areas and closure of one lane on the approach to the roundabout.

- SB 1 – Printinghouse Lane southbound towards the bridge, modelled JT is lower than the observed value, from the nearby industrial sites, as well as kerbside parking/stopping. This has partially been taken account of with reduced speed areas.
- SB 3 – modelled JT is longer than observed, due to more pedestrian traffic on the zebra crossing near Station Road (more likely to arrive in groups linked to train arrivals in reality than in model, so overall create less delay for traffic)

V307 Error Logs

2.35 Error files have been produced at the end of each simulation runs. These error files do not contain any critical messages.

2.36 The minimum green time violation errors for the pedestrian crossings are caused by the way the VAP signal files are programmed and are not actual errors in the models. The reason these messages occur is that the extendable all-red period at each puffin crossing signal is set to extend as long as pedestrians are being detected on the crossing, up to a maximum possible value. In the coding, this maximum value is set as the minimum "green" phase length for the extendable dummy phase in the signal controller box. Thus, whenever the all-red phase ends before the maximum period, the model produces an error message as the minimum "green" has not been reached. However, the model does actually represent the operation of this all-red extension period accurately.

V308 Other Modelling Issues

There are no other modelling issues to report

FIGURE 2.6 JOURNEY TIME SECTIONS, AM

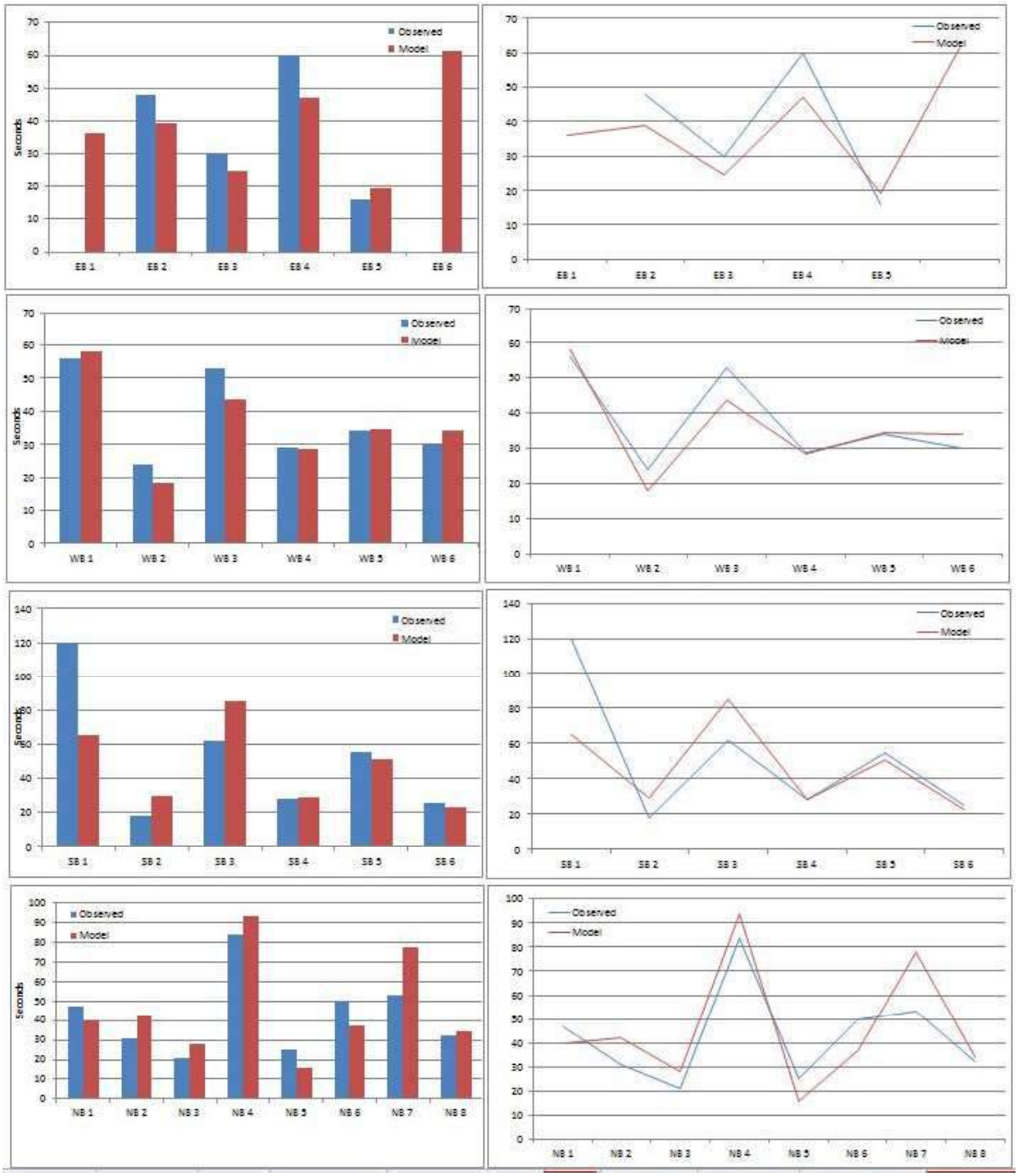


FIGURE 2.7 JOURNEY TIME SECTIONS, PM

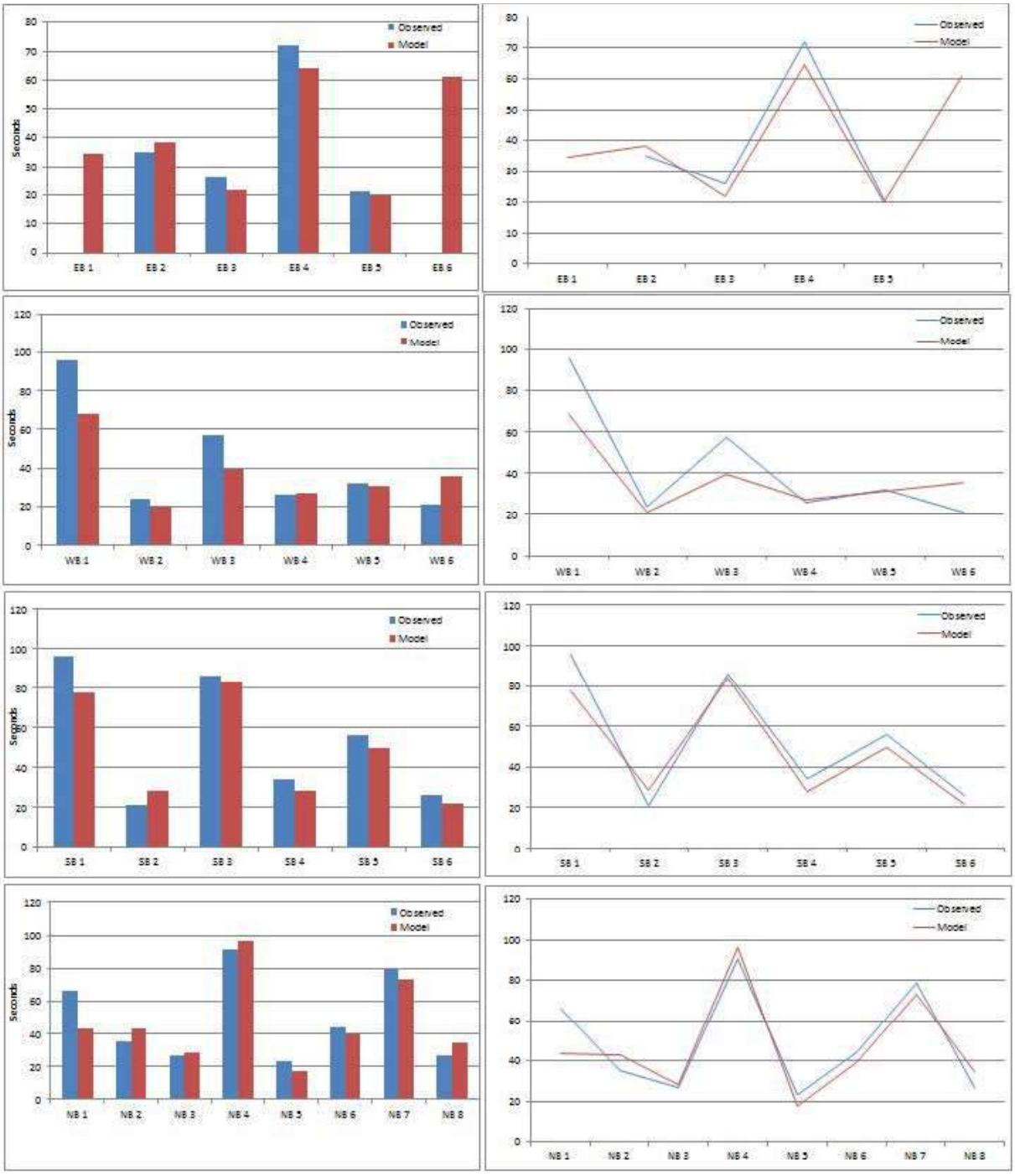
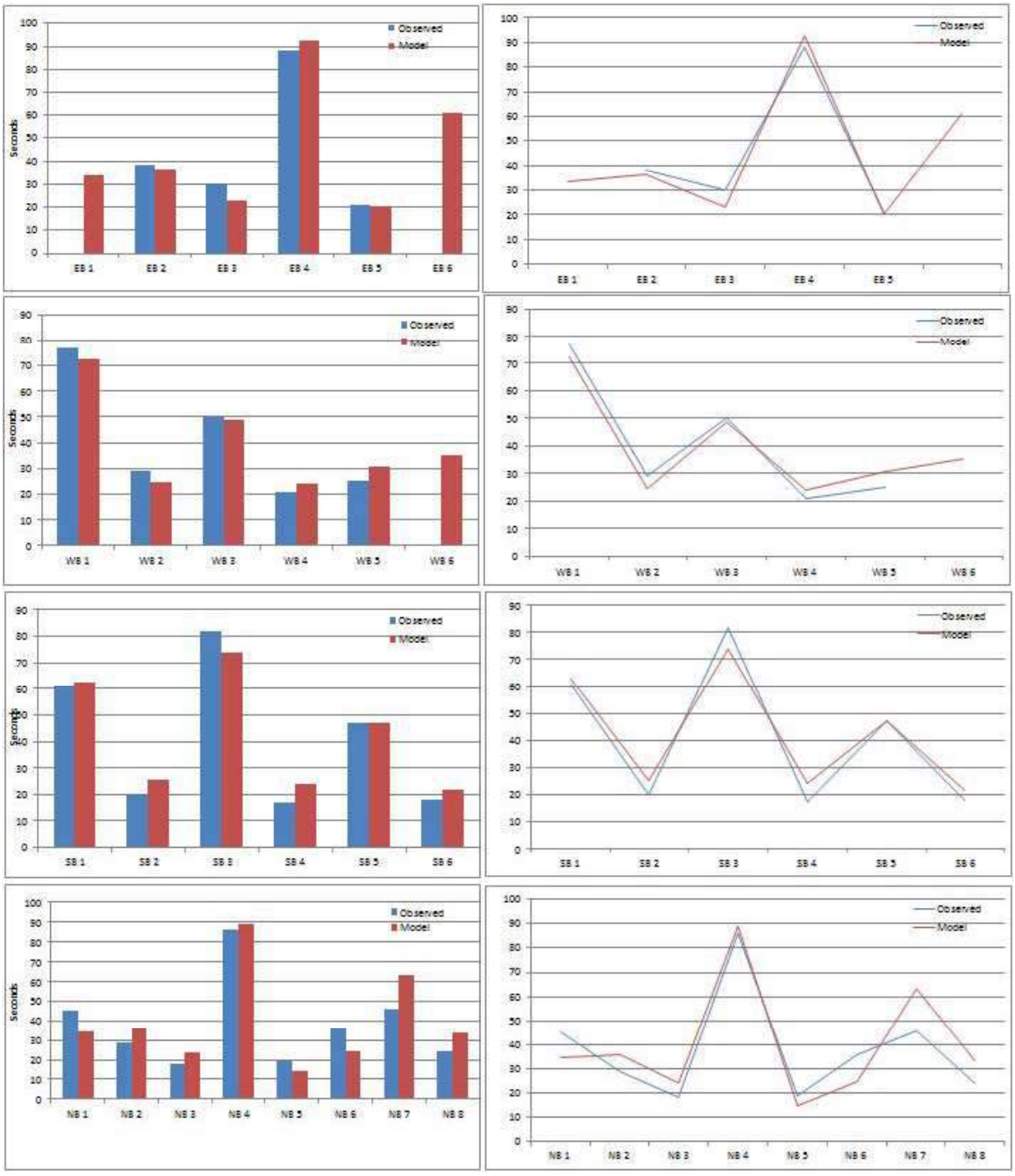


FIGURE 2.8 JOURNEY TIME SECTIONS, SAT



Conclusions

2.37 The VISSIM models have been validated against turning counts, measured saturation flows and journey times and show good fit between observed conditions and model results. The comparison against queue lengths and green time splits are also generally good.

2.38 We conclude that the base scenario modelling presented in this report provides an accurate representation of the road network and traffic operation and is fit-for-purpose.

3 Accompanying Documents

This technical note is accompanied by a data pack. The structure of data pack is as follows:

"**Base VISSIM Data Pack**\" – the root directory for the data pack

Files:

"HayesTownCentreNetworkModel_VISSIMTechnicalNote_Part2_v1.0.doc" – this document.

Folders:

"**1 – Check Sheets**\" –SDG-completed check sheets for stage 3.

"**2 – Model Inputs**\" – final (processed, if applicable) data used as model input.

Folders:

"**2-3 – Counts**\" – Updated Traffic count calculations and flow diagrams, Pedestrian counts including adjustment

"**2-5 – Journey Time**\" – Journey Time measurements

"**3 – Models**\" – completed VISSIM models

Files:

"HayesTC_VISSIM5.40_AM_v3.1.inp" – AM Base Model

"HayesTC_VISSIM5.40_PM_3.1.inp" – PM Base Model

"HayesTC_VISSIM5.40_SAT_v3.3.inp" – Saturday Base Model

"**4 – Workings**\" – files used to process model inputs

4 Appendices

Appendix A: Flow Calibration Update

4.1 Below the updated calibration tables can be seen. **Error! Reference source not found.** Table 4.1 shows that, with regards to the new turning movement data, the modelled flows are within an acceptable range according to DMRB criteria. These results are identical to previous reported results.

TABLE 4.1 VISUM CALIBRATION RESULTS

No. Links	AM	PM	SAT
Total	91	94	89
Vol>0	84	83	83
GEH>5	4	4	0
%age GEH>5	4%	4%	0%

4.2 Updated detailed calibration results, including a comparison to the VISSIM modelled flows, can be found overleaf for the PM peak and Saturday midday periods. Cells highlighted yellow show a GEH over 5. The orange cells indicate movements excluded from the VISUM calibration. This is normal practice, as VISUM cannot handle non-matching flows on a link, e.g. need the number of vehicles entering and leaving the link to be the same, hence it is necessary to exclude a few movements. For completeness, they are still listed here. As can be seen, VISUM and VISSIM correlate very well, and generally correspond to observed turning counts.

TABLE 4.2 VISUM PM CALIBRATION RESULTS

PM Calibration							VISSIM	GEH	
Junction	From Node	To Node	AM Counts	Turn Volume	%Diff	GEH	Turn Volume	Counts	VISUM
101	8	9	193	196	1.7%	0.2	182	0.8	1.4
101	8	10	266	265	-0.6%	0.1	253	0.8	1.0
101	8	102	120	108	-10.0%	1.1	114	0.6	0.8
101	9	8	203	204	0.3%	0.0	184	1.4	1.9
101	9	10	74	74	-0.4%	0.0	63	1.3	1.8
101	9	102	208	187	-10.0%	1.5	188	1.4	0.1
101	10	8	264	258	-2.4%	0.4	250	0.9	0.7
101	10	9	43	45	5.7%	0.4	37	0.9	1.8
101	10	102	28	0	-100.0%	7.5	0	7.5	0.0
101	102	8	120	132	10.0%	1.1	142	1.9	1.2
101	102	9	242	301	24.3%	3.6	298	3.4	0.2
101	102	10	78	83	7.0%	0.6	84	0.7	0.1
102	7	101	176	163	-7.4%	1.0	163	1.0	0.0
102	7	113	107	99	-7.4%	0.8	98	0.9	0.2
102	101	7	100	17	-83.4%	10.9	8	12.5	2.3
102	101	113	256	279	8.8%	1.4	296	2.4	1.5
102	113	7	100	63	-36.9%	4.1	70	3.3	1.2
102	113	101	337	353	4.8%	0.9	361	1.3	0.6
103	1	105	95	98	2.9%	0.3	101	0.6	0.5
103	1	106	239	221	-7.4%	1.2	217	1.5	0.4
103	105	1	101	106	5.2%	0.5	112	1.1	0.8
103	105	106	350	373	6.5%	1.2	359	0.5	1.0
103	106	1	214	208	-3.0%	0.4	211	0.2	0.3
103	106	105	507	515	1.6%	0.4	479	1.3	2.3
104	11	105	367	342	-6.9%	1.3	333	1.8	0.7
104	105	11	321	312	-2.7%	0.5	273	2.8	3.1
104	2006	11	144	140	-3.0%	0.4	120	2.1	2.3
104	2006	105	301	316	4.9%	0.8	305	0.2	0.9
105	12	103	8	1	-81.7%	3.0	3	2.1	1.1
105	12	104	11	11	4.4%	0.1	11	0.0	0.2
105	12	2008	10	10	-3.6%	0.1	7	1.0	1.1
105	103	12	8	7	-7.2%	0.2	8	0.0	0.3
105	103	104	302	301	-0.4%	0.1	262	2.4	3.2
105	103	2008	296	305	2.9%	0.5	310	0.8	0.4
105	104	12	9	23	155.5%	3.5	25	3.9	0.5
105	104	103	515	478	-7.3%	1.7	466	2.2	0.7
105	104	2008	146	157	7.5%	0.9	149	0.2	0.9
106	2	2	1	0	-100.0%	1.4	0	1.4	0.0
106	2	103	155	148	-4.7%	0.6	152	0.2	0.5
106	2	107	80	75	-6.1%	0.6	67	1.5	1.3
106	103	2	154	147	-4.4%	0.6	142	1.0	0.6
106	103	103	4	0	-100.0%	2.8	0	2.8	0.0
106	103	107	428	447	4.4%	0.9	436	0.4	0.7
106	107	2	104	103	-1.4%	0.1	101	0.3	0.2
106	107	103	482	575	8115.1%	4.0	532	2.2	2.5
106	107	107	1	0	-100.0%	1.4	0	1.4	0.0

107	106	108	498	511	2.7%	0.6	491	0.3	1.3
107	106	1302	10	11	6.2%	0.2	12	0.6	0.6
107	108	106	593	586	-1.1%	0.3	544	2.1	2.5
107	108	1302	20	19	-4.3%	0.2	18	0.5	0.4
107	1301	106	83	91	9.9%	0.9	91	0.9	0.0
107	1301	108	79	73	-8.0%	0.7	71	0.9	0.3
108	3	107	121	125	3.0%	0.3	125	0.4	0.0
108	3	109	81	76	-6.7%	0.6	74	0.8	0.3
108	107	3	97	95	-2.0%	0.2	87	1.0	1.2
108	107	109	480	489	1.9%	0.4	473	0.3	1.0
108	109	3	19	18	-2.8%	0.1	16	0.7	0.8
108	109	107	492	481	-2.2%	0.5	440	2.4	2.6
109	5	4	40	40	0.0%	0.0	44	0.6	0.9
109	5	5	10	0	-100.0%	4.5	0	4.5	0.0
109	5	108	187	196	4.9%	0.7	168	1.4	2.8
109	5	110	139	143	3.2%	0.4	163	2.0	2.3
109	108	4	78	80	2.9%	0.3	73	0.6	1.1
109	108	5	236	223	-5.3%	0.8	230	0.4	0.6
109	108	108	3	0	-100.0%	2.4	0	2.4	0.0
109	108	110	244	261	7.0%	1.1	241	0.2	1.7
109	110	4	63	59	-6.0%	0.5	73	1.2	2.5
109	110	5	147	151	2.7%	0.3	130	1.4	2.4
109	110	108	302	303	0.4%	0.1	290	0.7	1.1
109	110	110	3	0	-100.0%	2.4	0	2.4	0.0
110	6	109	444	444	0.0%	0.0	431	0.6	0.9
110	6	111	15	15	-1.0%	0.0	14	0.3	0.3
110	109	6	395	371	-6.0%	1.2	380	0.8	0.6
110	109	111	36	33	-7.6%	0.5	25	2.0	2.0
110	111	6	13	13	3.4%	0.1	10	0.9	1.3
110	111	109	68	70	2.4%	0.2	66	0.2	0.6
112	113	1402	114	113	-1.3%	0.1	116	0.2	0.5
112	1401	113	128	173	35.2%	3.7	141	1.1	3.4
113	102	102	11	0	-100.0%	4.7	0	4.7	0.0
113	102	112	64	69	8.5%	0.7	80	1.9	1.8
113	102	1602	66	67	1.2%	0.1	69	0.4	0.4
113	102	2003	222	241	8.8%	1.3	240	1.2	0.1
113	112	102	70	70	0.0%	0.0	55	1.9	2.5
113	112	112	3	0	-100.0%	2.4	0	2.4	0.0
113	112	1602	1	44	4297.5%	9.1	40	8.6	0.8
113	112	2003	54	59	9.4%	0.7	45	1.3	2.6
113	1601	102	50	55	10.0%	0.7	54	0.6	0.2
113	1601	112	7	1	-91.5%	3.3	0	3.7	0.4
113	1601	1602	2	0	-100.0%	2.0	0	2.0	0.0
113	1601	2003	51	52	1.2%	0.1	51	0.0	0.1
113	2003	102	306	311	1.7%	0.3	318	0.7	0.5
113	2003	112	43	43	-1.1%	0.1	36	1.1	1.4
113	2003	1602	66	67	0.9%	0.1	67	0.1	0.1
113	2003	2003	2	0	-100.0%	2.0	0	2.0	0.0

TABLE 4.3 VISUM SAT CALIBRATION RESULTS

SAT Calibration							VISSIM	GEH	
Junction	From Node	To Node	SAT Counts	Turn Volume	%Diff	GEH	Turn Volume	Counts	VISUM
101	8	9	196	197	0.3%	0.0	185	0.8	1.2
101	8	10	284	284	-0.1%	0.0	280	0.2	0.3
101	8	102	105	96	-8.6%	0.9	88	1.7	1.1
101	9	8	199	200	0.5%	0.1	205	0.4	0.5
101	9	10	45	46	1.2%	0.1	44	0.1	0.3
101	9	102	147	139	-5.5%	0.7	126	1.8	1.5
101	10	8	249	250	0.5%	0.1	244	0.3	0.5
101	10	9	34	35	2.8%	0.2	37	0.5	0.5
101	10	102	41	40	-2.8%	0.2	37	0.6	0.6
101	102	8	115	108	-5.8%	0.6	128	1.2	2.6
101	102	9	153	150	-2.2%	0.3	158	0.4	1.0
101	102	10	42	41	-1.7%	0.1	32	1.6	2.0
102	7	101	70	65	-7.3%	0.6	67	0.4	0.4
102	7	113	106	101	-4.8%	0.5	97	0.9	0.6
102	101	7	100	93	-6.8%	0.7	79	2.2	2.1
102	101	113	180	182	0.8%	0.1	168	0.9	1.4
102	113	7	100	98	-1.8%	0.2	93	0.7	0.7
102	113	101	240	234	-2.3%	0.4	253	0.8	1.7
103	1	105	78	73	-6.8%	0.6	72	0.7	0.1
103	1	106	214	197	-8.2%	1.2	200	1.0	0.3
103	105	1	81	86	5.6%	0.5	72	1.0	2.1
103	105	106	267	277	3.8%	0.6	271	0.2	0.5
103	106	1	208	207	-0.5%	0.1	211	0.2	0.4
103	106	105	423	404	-4.4%	0.9	387	1.8	1.2
104	11	105	261	243	-6.8%	1.1	242	1.2	0.1
104	105	11	218	224	2.8%	0.4	219	0.1	0.5
104	2006	11	93	92	-1.1%	0.1	98	0.5	0.9
104	2006	105	221	227	2.9%	0.4	222	0.1	0.5
105	12	104	2	2	-11.3%	0.2	2	0.0	0.2
105	12	2008	3	3	-7.2%	0.1	2	0.6	0.6
105	103	12	3	4	28.9%	0.5	1	1.4	1.8
105	103	104	216	222	2.9%	0.4	217	0.1	0.5
105	103	2008	231	251	8.7%	1.3	236	0.3	1.3
105	104	12	4	5	14.8%	0.3	4	0.0	0.4
105	104	103	380	362	-4.7%	0.9	350	1.6	0.9
105	104	2008	98	104	6.0%	0.6	111	1.3	1.0
106	2	103	141	131	-6.8%	0.8	120	1.8	1.4
106	2	107	85	78	-8.4%	0.8	89	0.4	1.8
106	103	2	100	97	-2.5%	0.3	91	0.9	0.9
106	103	103	2	0	-100.0%	2.0	0	2.0	0.0
106	103	107	368	376	2.2%	0.4	378	0.5	0.1
106	107	2	98	93	-4.8%	0.5	93	0.5	0.0
106	107	103	482	480	-0.4%	0.1	474	0.4	0.4
106	107	107	4	0	-100.0%	2.8	0	2.8	0.0
107	106	108	443	443	0.0%	0.0	458	0.7	1.0
107	106	1302	10	11	9.1%	0.3	10	0.0	0.4

107	108	106	540	531	-1.8%	0.4	533	0.3	0.2
107	108	1302	20	19	-6.6%	0.3	18	0.5	0.2
107	1301	106	40	43	6.8%	0.4	35	0.8	1.7
107	1301	108	123	112	-8.6%	1.0	116	0.6	0.5
108	3	107	100	101	1.4%	0.1	98	0.2	0.5
108	3	109	82	74	-9.4%	0.9	75	0.8	0.1
108	107	3	66	69	5.2%	0.4	75	1.1	0.9
108	107	109	500	486	-2.8%	0.6	499	0.0	0.8
108	109	3	28	26	-6.4%	0.3	29	0.2	0.8
108	109	107	460	448	-2.6%	0.6	455	0.2	0.5
109	5	4	42	42	0.0%	0.0	42	0.0	0.0
109	5	5	10	0	-100.0%	4.5	0	4.5	0.0
109	5	108	196	203	3.5%	0.5	218	1.5	1.5
109	5	110	181	178	-1.6%	0.2	170	0.8	0.8
109	108	4	64	71	10.2%	0.8	74	1.2	0.6
109	108	5	184	202	9.9%	1.3	202	1.3	0.0
109	108	110	267	288	7.8%	1.3	299	1.9	0.9
109	110	4	49	47	-3.1%	0.2	56	1.0	1.7
109	110	5	184	181	-1.8%	0.2	165	1.4	1.6
109	110	108	263	271	3.1%	0.5	265	0.1	0.5
110	6	109	399	404	1.3%	0.3	398	0.1	0.4
110	6	111	26	26	0.7%	0.0	30	0.8	1.0
110	109	6	406	410	1.0%	0.2	407	0.0	0.2
110	109	111	57	56	-1.9%	0.1	61	0.5	1.0
110	111	6	24	25	2.7%	0.1	24	0.0	0.2
110	111	109	97	95	-1.9%	0.2	94	0.3	0.2
112	113	1402	123	120	-2.6%	0.3	120	0.3	0.0
112	1401	113	123	120	-2.2%	0.2	114	0.8	0.8
113	102	102	9	0	-100.0%	4.2	0	4.2	0.0
113	102	112	76	74	-2.1%	0.2	78	0.2	0.6
113	102	1602	38	37	-2.1%	0.1	33	0.8	1.0
113	102	2003	163	171	4.8%	0.6	156	0.6	1.6
113	112	102	63	61	-2.6%	0.2	60	0.4	0.2
113	112	112	2	0	-100.0%	2.0	0	2.0	0.0
113	112	1602	9	8	-8.9%	0.3	3	2.4	2.3
113	112	2003	53	51	-4.3%	0.3	49	0.6	0.3
113	1601	102	52	50	-4.2%	0.3	36	2.4	2.7
113	1601	112	5	5	-7.6%	0.2	6	0.4	0.9
113	1601	2003	30	31	2.3%	0.1	42	2.0	2.8
113	2003	102	216	221	2.5%	0.4	243	1.8	2.0
113	2003	112	42	41	-2.9%	0.2	36	1.0	1.0
113	2003	1602	30	31	2.0%	0.1	24	1.2	1.7
113	2003	2003	3	0	-100.0%	2.4	0	2.4	0.0

Appendix B: Signal Green Time Comparison

4.3 Green time comparison has been undertaken to ascertain that the signalised junctions operate as programmed. This was done prior to the inclusion of speed reduction areas, so to be able to conclude that the variations in journey time were not due to faulty signals. This test has not been undertaken for all junctions for all time periods. Please note that the observed traffic extension phase has been calculated based on the difference in time for phase A and B, so includes intergreen time. As can be seen, the extension occurred more in PM than AM.

TABLE 4.4 GREEN TIME COMPARISON, AM

Printinghouse Lane

Phase/Movement	Observed	Modelled	% Change	Difference
NB	13	14	4%	-1
SB	25	30	22%	-5
Red Ext	-	5		

Station Road / North Hyde Road

Phase/Movement	Observed	Modelled	% Change	Difference
A - EB traffic	18	22	22%	-4
B - WB traffic	22	25	10%	-2
C - SB traffic	29	34	17%	-5
D - NB traffic	29	34	17%	-5
E - traffic ext (WB RT)	4	4	-6%	0
F - ped	27	38	40%	-11
G - ped	9	9	-6%	1
H - ped	34	46	37%	-12
I - ped	5	5	3%	0
J - ped	27	38	40%	-11
K - ped	5	5	3%	0
L - ped	38	49	28%	-11
M - ped	5	5	3%	0

TABLE 4.5 GREEN TIME COMPARISON, PM

Station Road / North Hyde Road

Phase/Movement	Observed	Modelled	% Change	Difference
A - EB traffic	*16*	21	31%	-5
B - WB traffic	23	23	-1%	0
C - SB traffic	32	32	1%	0
D - NB traffic	32	32	1%	0
E - traffic ext (WB RT)	*7*	4	-42%	3
F - ped	27	35	30%	-8
G - ped	*12*	8	-35%	4
H - ped	37	44	19%	-7
I - ped	5	5	3%	0
J - ped	27	35	30%	-8
K - ped	5	5	3%	0
L - ped	43	46	6%	-3
M - ped	5	5	3%	0

CONTROL SHEET

Project/Proposal Name	Hayes Town Centre Network Model
Document Title	VISSIM Base Model Validation Technical Note
Client Contract/Project No.	-
SDG Project No.	22594802

ISSUE HISTORY

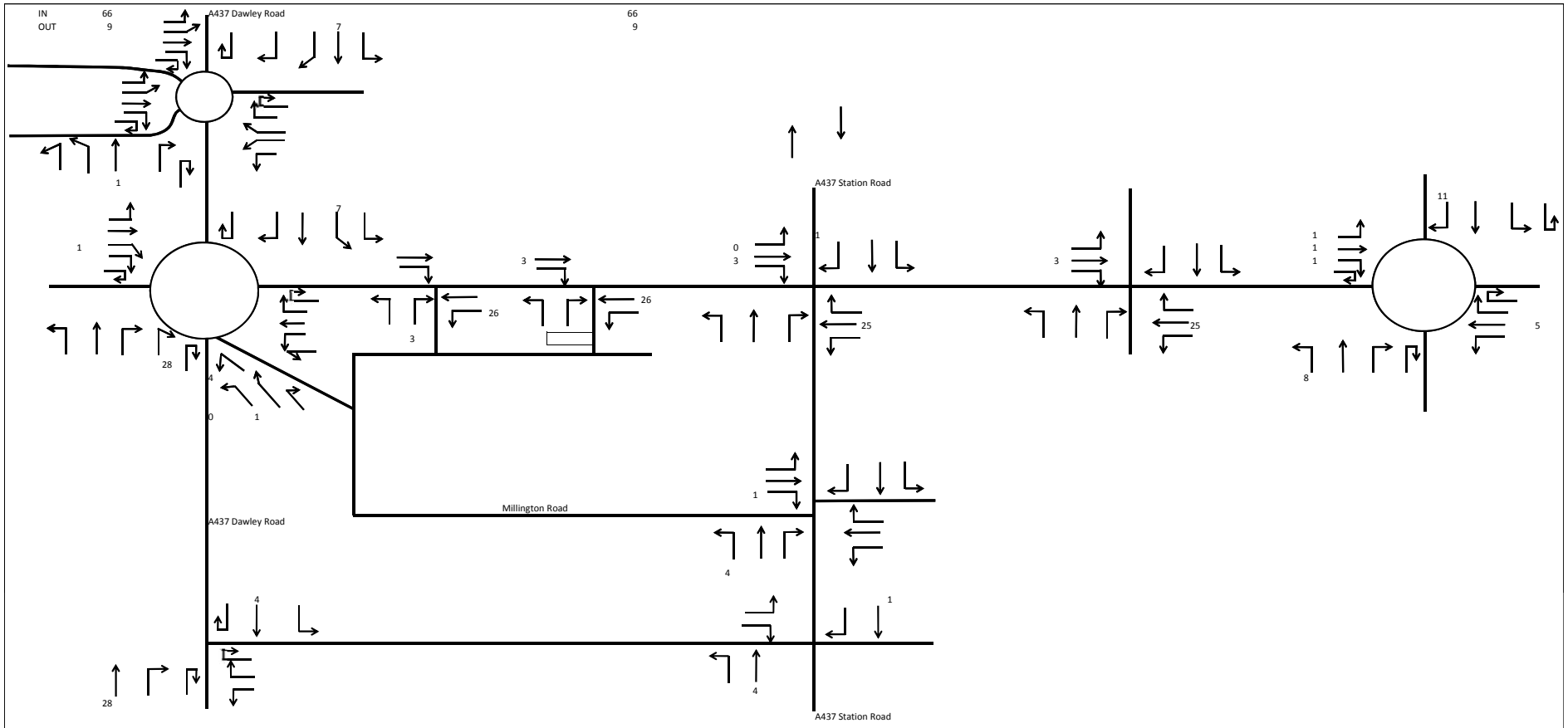
Issue No. 1	Date 20/04/14	Draft
Issue No. 2	Date 9/05/14	Submission

REVIEW

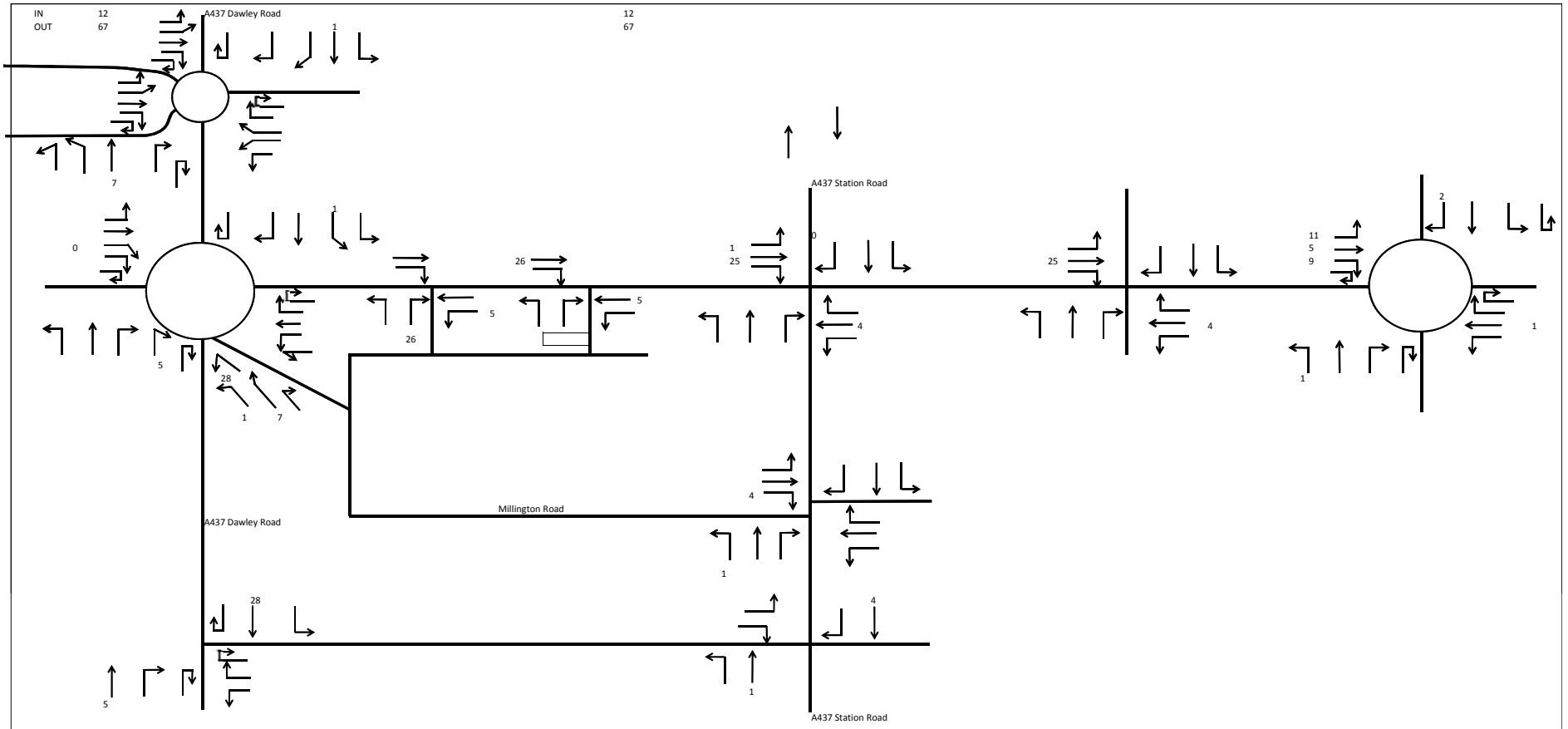
Originator	Linn Verde Thon	
Other Contributors	Ambarene Saddique	
Review by:	Print	Matt Gatenby
	Sign	

DISTRIBUTION

External:	Transport for London

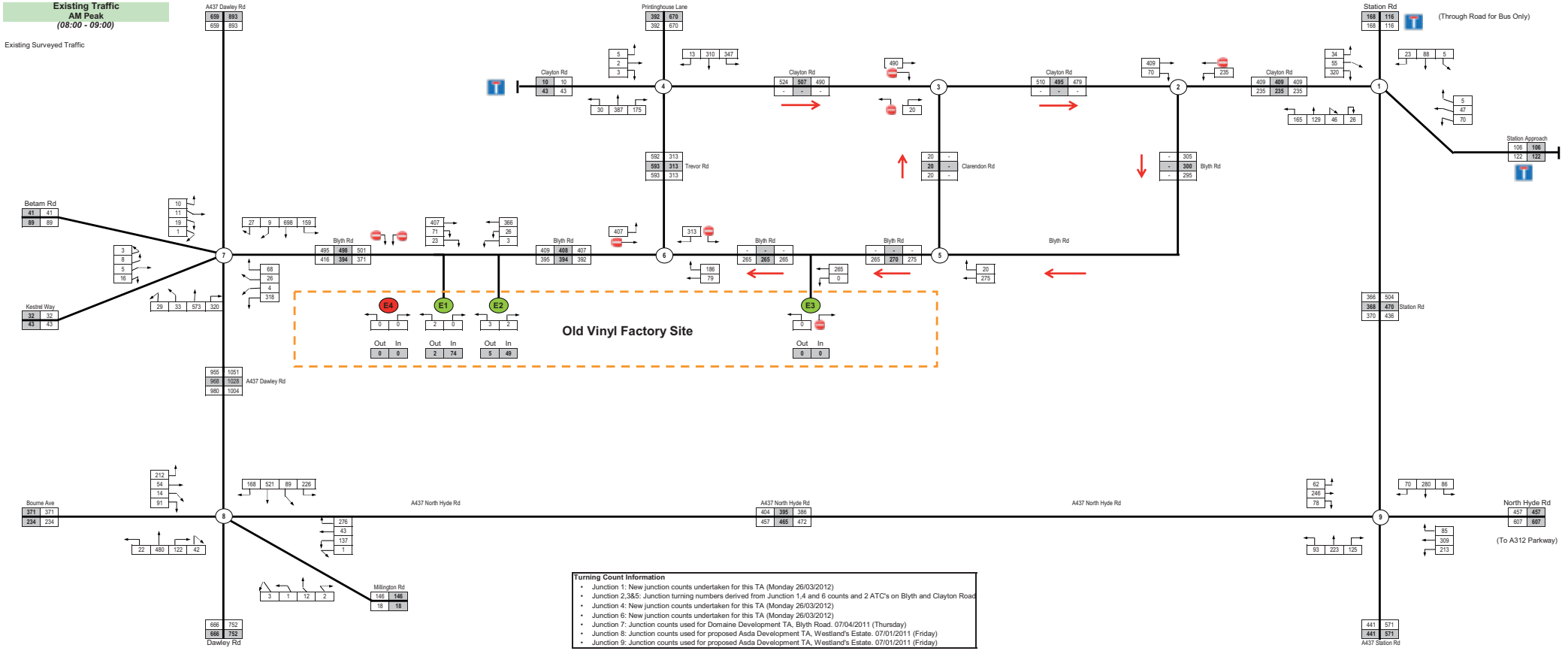


Drawing title: HPH 4 AM	Client: Hyde Park Hayes Ltd Job Title: Hyde Park Hayes	SKM COLIN BUCHANAN	Scale: NTS Designed by: LL Drawn by: LL Ckd/Appd: JSB 1st Issued: APR
			Full extension: Drg no: Figure 5.1



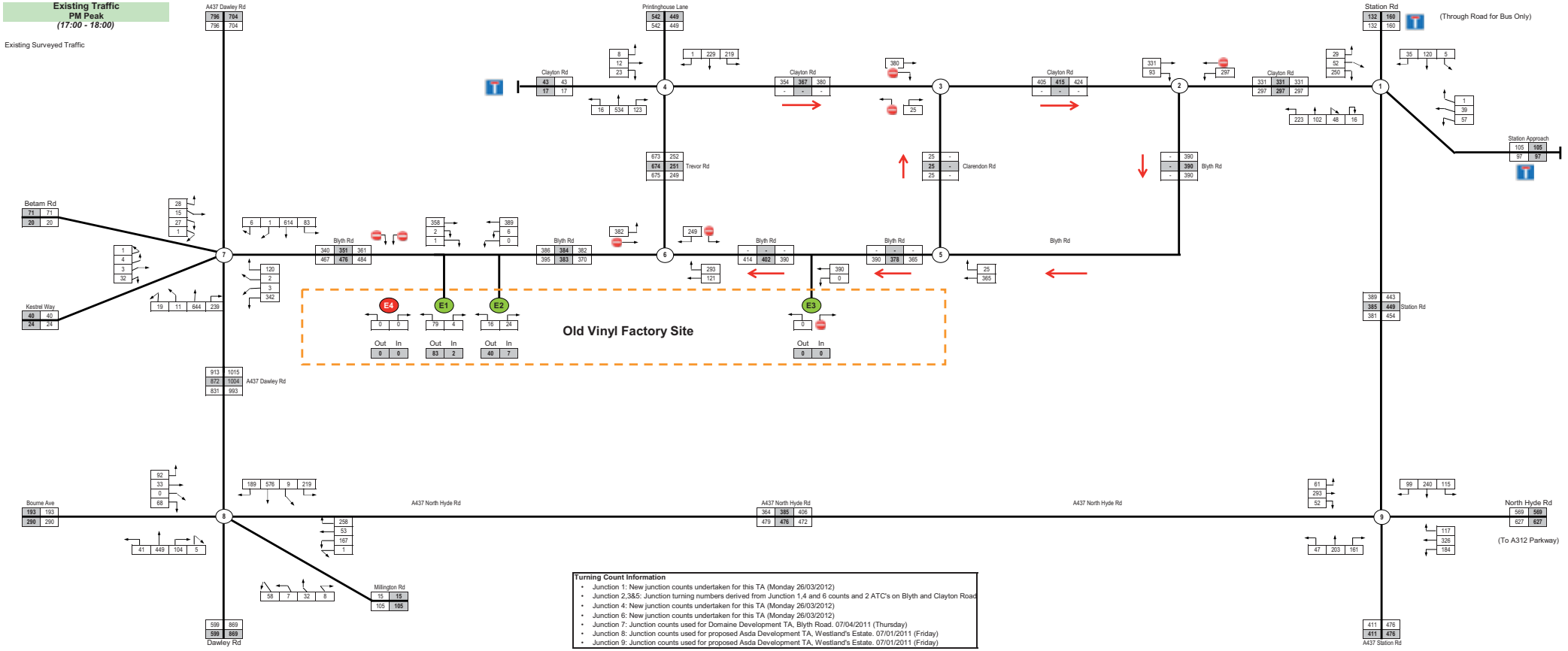
Drawing title: HPH 4 PM	Client: Hyde Park Hayes Ltd	SKM COLIN BUCHANAN	Scale: NTS
	Job Title: Hyde Park Hayes		Designed by: LL
			Drawn by: LL
			Ckd/Appd: JSB
			1st Issued: APR
			Full extension:
			Drg no: Figure 5.2

Appendix J – Traffic Flow Diagrams



Turning Count Information

- Junction 1: New junction counts undertaken for this TA (Monday 26/03/2012)
- Junction 2,3&5: Junction turning numbers derived from Junction 1,4 and 6 counts and 2 ATC's on Blyth and Clayton Road
- Junction 4: New junction counts undertaken for this TA (Monday 26/03/2012)
- Junction 6: New junction counts undertaken for this TA (Monday 26/03/2012)
- Junction 7: Junction counts used for Domaine Development TA, Blyth Road. 07/04/2011 (Thursday)
- Junction 8: Junction counts used for proposed Asda Development TA, Westland's Estate. 07/01/2011 (Friday)
- Junction 9: Junction counts used for proposed Asda Development TA, Westland's Estate. 07/01/2011 (Friday)



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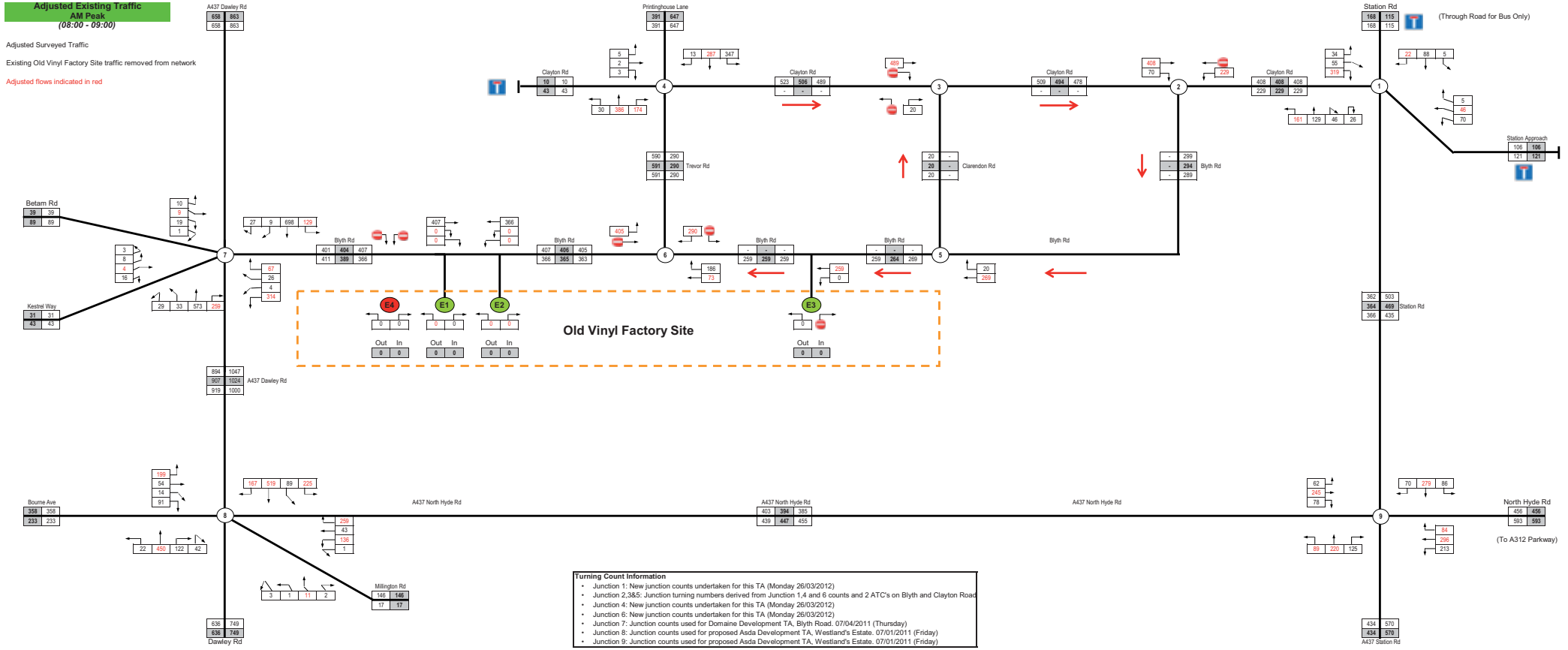
- Junction 8: Junction counts used for proposed Asda Development TA, Westland's Estate. 07/01/2011 (Friday)
- Junction 9: Junction counts used for proposed Asda Development TA, Westland's Estate. 07/01/2011 (Friday)



Turning Count Information

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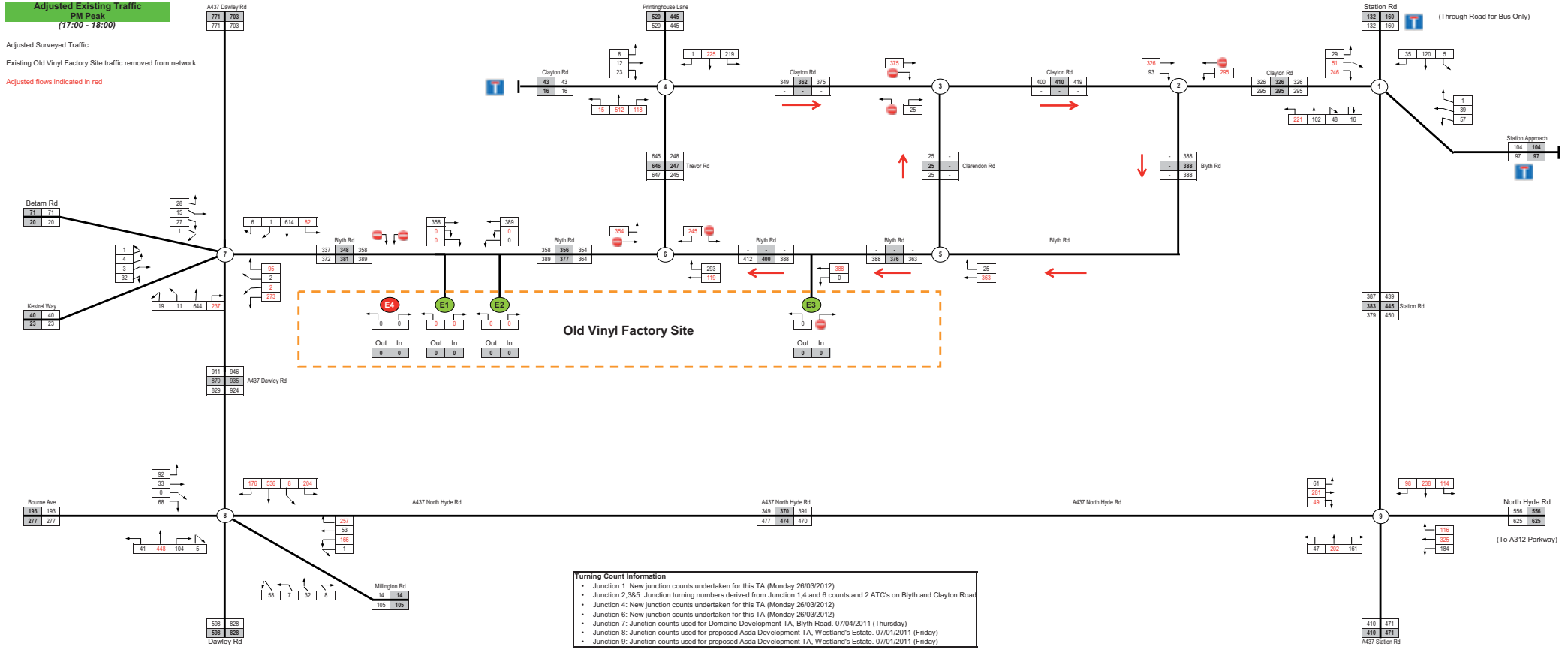
- Junction 9: Junction counts used for proposed Asda Development TA, Westland's Estate. 07/01/2011 (Friday)


Adjusted Existing Traffic
PM Peak
(17:00 - 18:00)
Adjusted Surveyed Traffic
Existing Old Vinyl Factory Site traffic removed from network
Adjusted flows indicated in red
A437 Dawley Rd
Printinghouse Lane
Station Rd
(Through Road for Bus Only)
Clayton Rd
Trevor Rd
Clarendon Rd
Blyth Rd
Station Approach
Betam Rd
Kestrel Way
Station Rd
Old Vinyl Factory Site
E1
E2
E3
E4
Out
In
Bourne Ave
A437 North Hyde Rd
North Hyde Rd
(To A312 Parkway)
Millington Rd
Dawley Rd
A437 Station Rd
Turning Count Information
Junction 1: New junction counts undertaken for this TA (Monday 26/03/2012)
Junction 2,3&5: Junction turning numbers derived from Junction 1,4 and 6 counts and 2 ATC's on Blyth and Clayton Road
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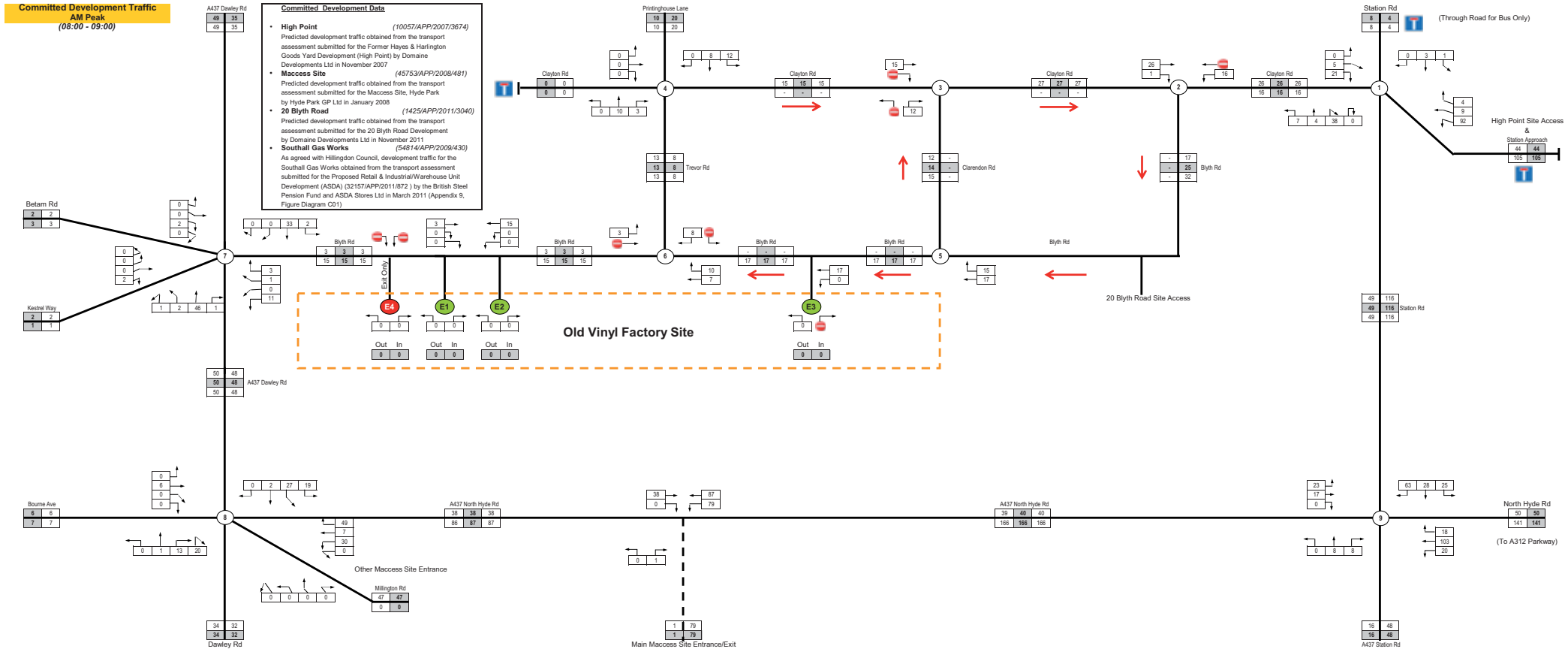
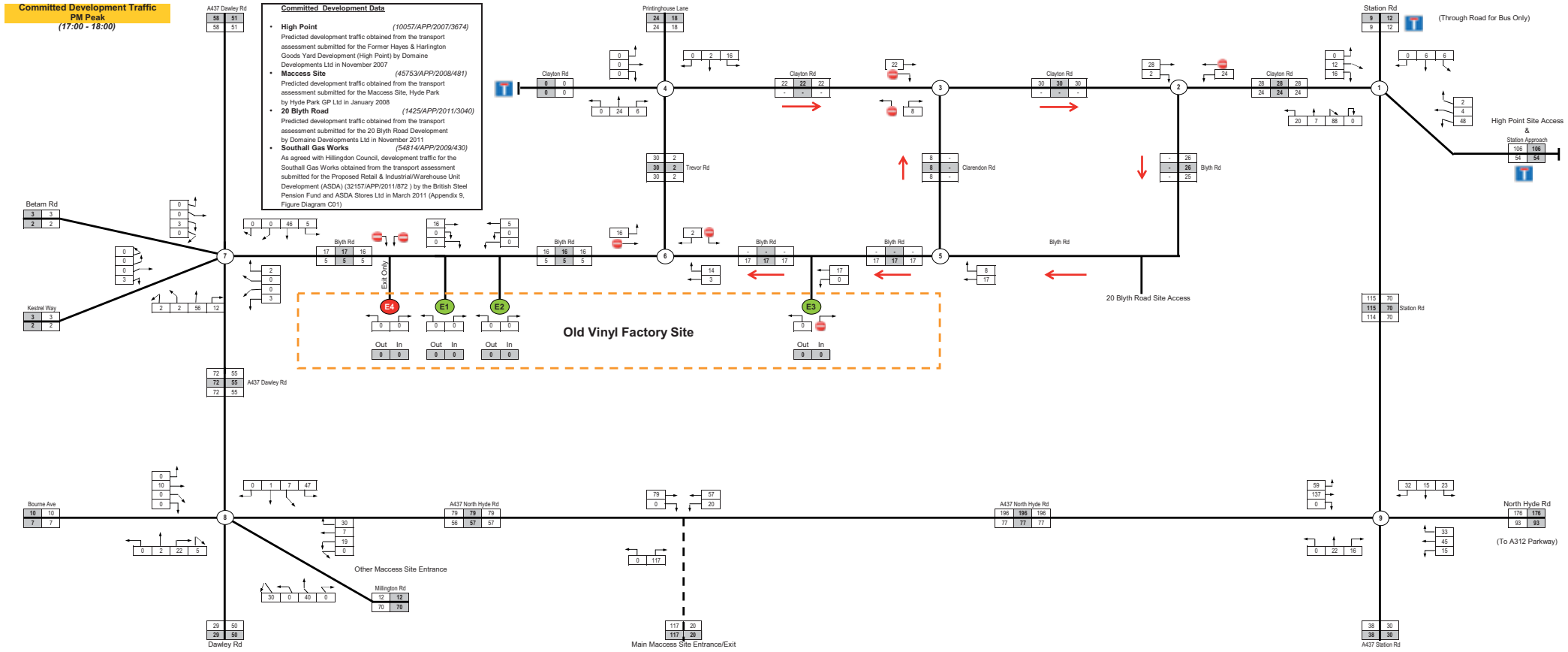
Junction 9: Junction counts used for proposed Asda Development TA, Westland's Estate. 07/01/2011 (Friday)


Committed Development Traffic
AM Peak
(08:00 - 09:00)
Committed Development Data
High Point (10057/APP/2007/3674)
Predicted development traffic obtained from the transport assessment submitted for the Former Hayes & Harlington Goods Yard Development (High Point) by Domaine Developments Ltd in November 2007
Maccess Site (45753/APP/2008/481)
Predicted development traffic obtained from the transport assessment submitted for the Maccess Site, Hyde Park by Hyde Park GP Ltd in January 2008
20 Blyth Road (1425/APP/2011/3040)
Predicted development traffic obtained from the transport assessment submitted for the 20 Blyth Road Development by Domaine Developments Ltd in November 2011
Southall Gas Works (54814/APP/2009/430)
As agreed with Hillingdon Council, development traffic for the Southall Gas Works obtained from the transport assessment submitted for the Proposed Retail & Industrial/Warehouse Unit Development (ASDA) (32157/APP/2011/872) by the British Steel Pension Fund and ASDA Stores Ltd in March 2011 (Appendix 9, Figure Diagram C01)
A437 Dawley Rd
Printinghouse Lane
Station Rd
(Through Road for Bus Only)
Clayton Rd
Trevor Rd
Clarendon Rd
Blyth Rd
High Point Site Access
&
Station Approach
Betam Rd
Kestrel Way
Exit Only
E4
E1
E2
E3
Out
In
Old Vinyl Factory Site
20 Blyth Road Site Access
Station Rd
Bourne Ave
A437 North Hyde Rd
North Hyde Rd
(To A312 Parkway)
Other Maccess Site Entrance
Millington Rd
Dawley Rd
Main Maccess Site Entrance/Exit
A437 Station Rd


Committed Development Traffic
PM Peak
(17:00 - 18:00)
Committed Development Data
High Point (10057/APP/2007/3674)
Predicted development traffic obtained from the transport assessment submitted for the Former Hayes & Harlington Goods Yard Development (High Point) by Domaine Developments Ltd in November 2007
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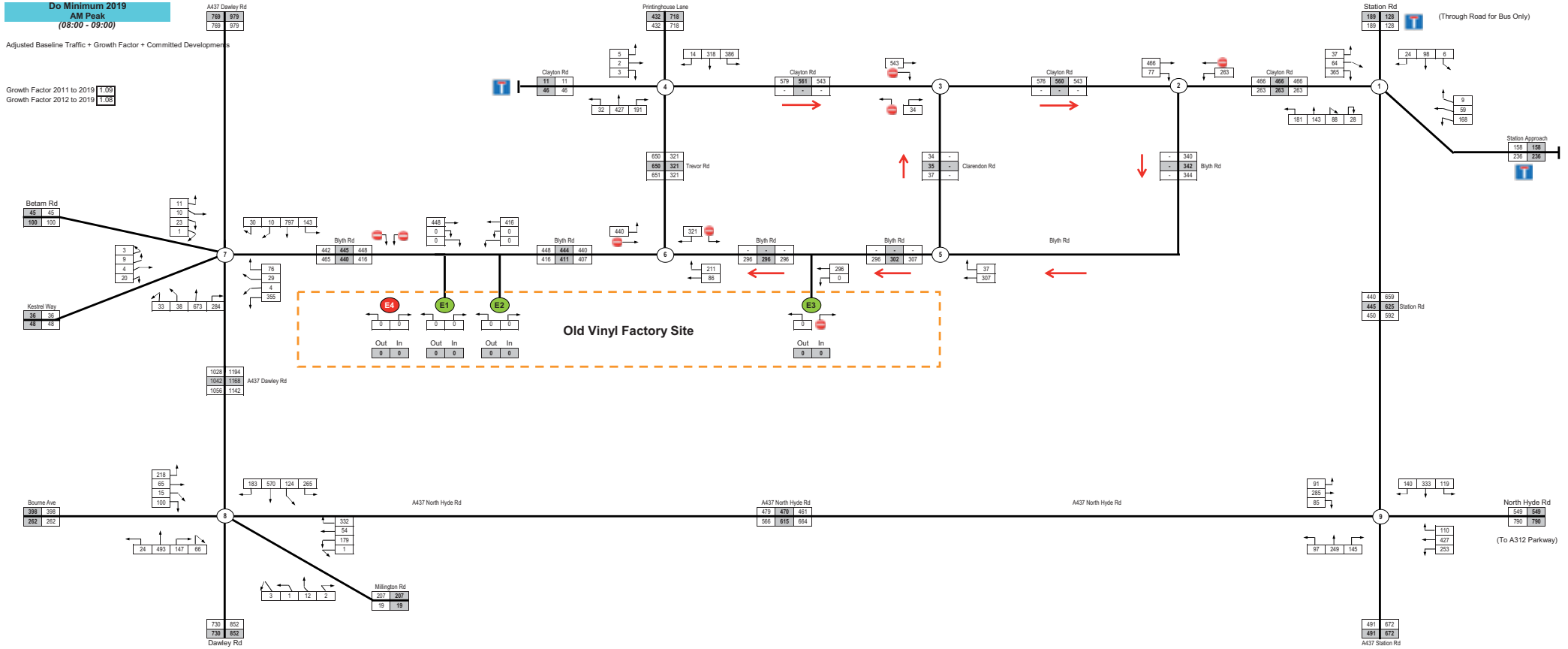
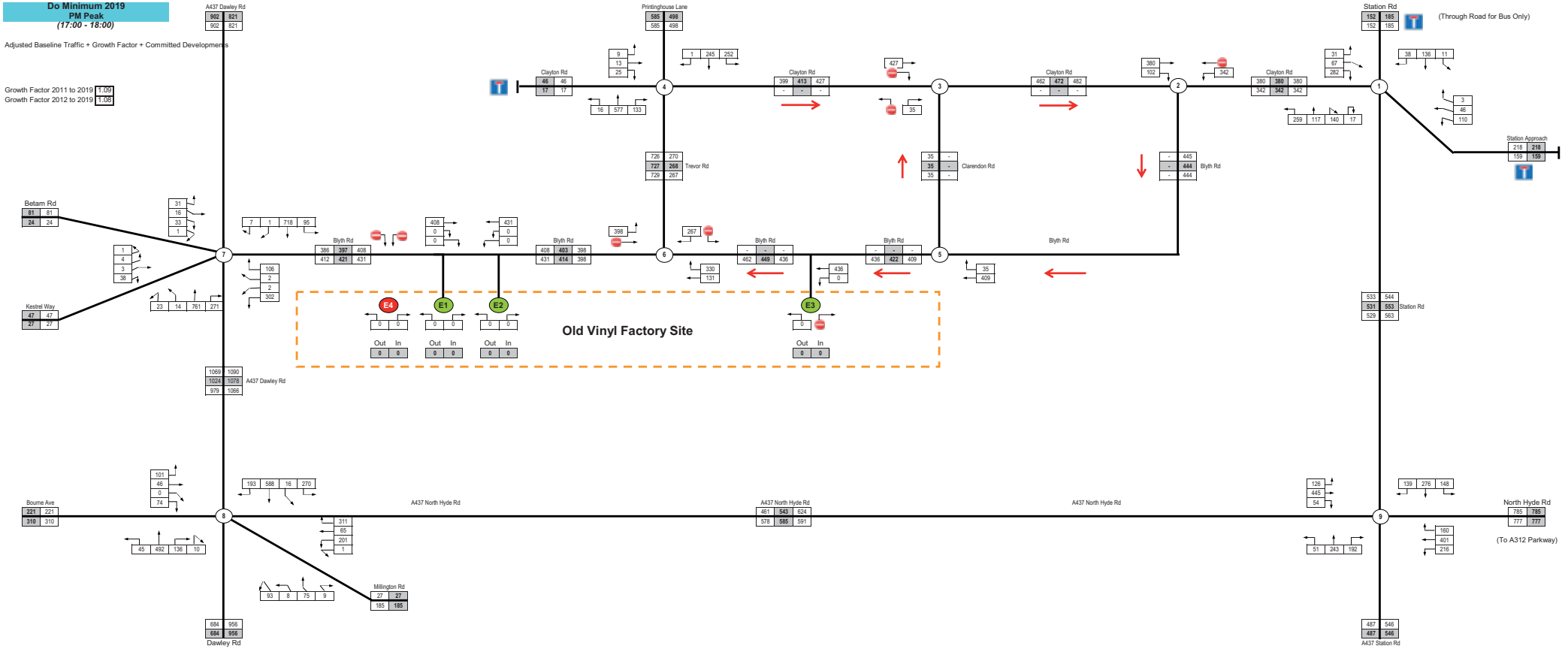
A437 Dawley Rd
Printinghouse Lane
Station Rd
(Through Road for Bus Only)
Clayton Rd
Trevor Rd
Clarendon Rd
Blyth Rd
20 Blyth Road Site Access
High Point Site Access
&
Station Approach
Betam Rd
Kestrel Way
Exit Only
E4
E1
E2
E3
Out
In
Old Vinyl Factory Site
Station Rd
Bourne Ave
A437 North Hyde Rd
Other Maccess Site Entrance
Millington Rd
Dawley Rd
Main Maccess Site Entrance/Exit
North Hyde Rd
(To A312 Parkway)

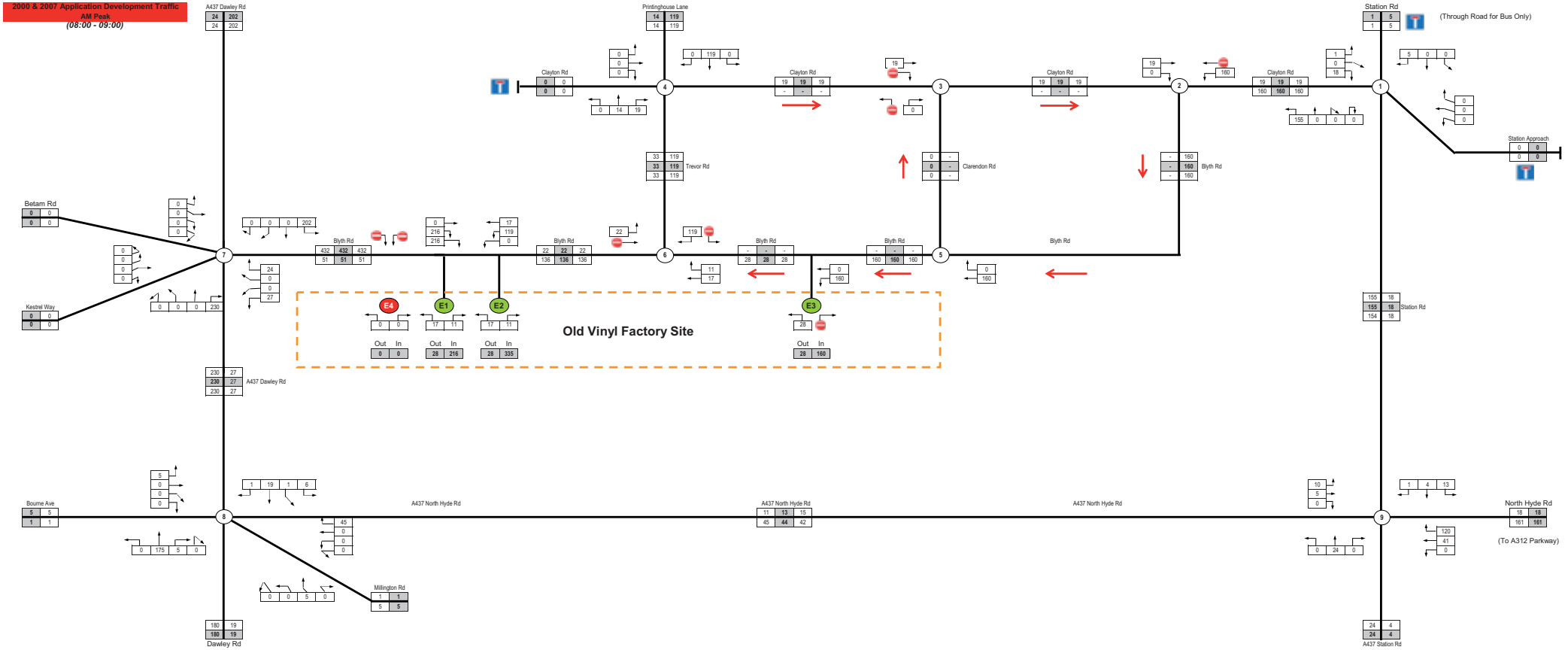

Do Minimum 2019
AM Peak
(08:00 - 09:00)
Adjusted Baseline Traffic + Growth Factor + Committed Developments
Growth Factor 2011 to 2019 1.09
Growth Factor 2012 to 2019 1.08
A437 Dawley Rd
Printinghouse Lane
Station Rd
(Through Road for Bus Only)
Clayton Rd
Trevor Rd
Clarendon Rd
Blyth Rd
Station Approach
Betam Rd
Kestrel Way
Station Rd
A437 Dawley Rd
Old Vinyl Factory Site
E1
E2
E3
E4
Out
In
Bourne Ave
A437 North Hyde Rd
North Hyde Rd
(To A312 Parkway)
Millington Rd
Dawley Rd
A437 Station Rd

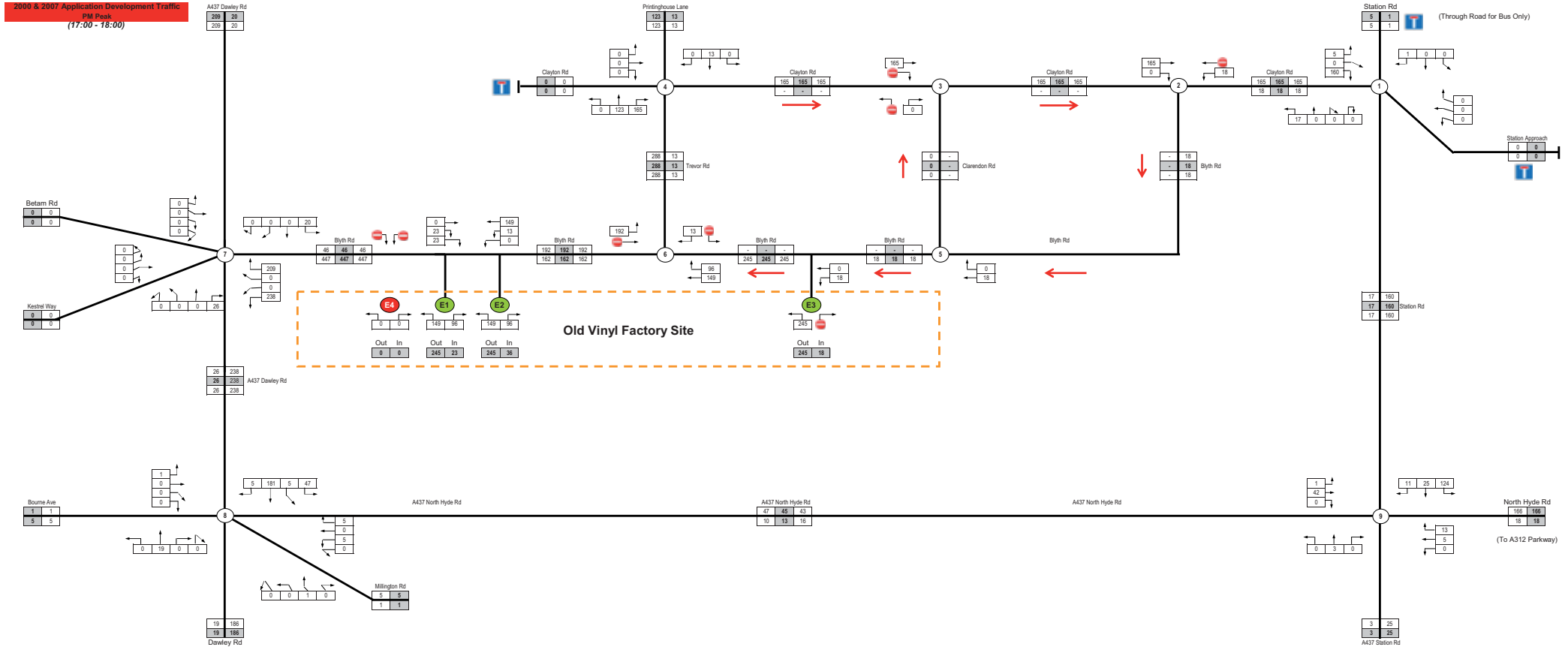
Do Minimum 2019
PM Peak
(17:00 - 18:00)

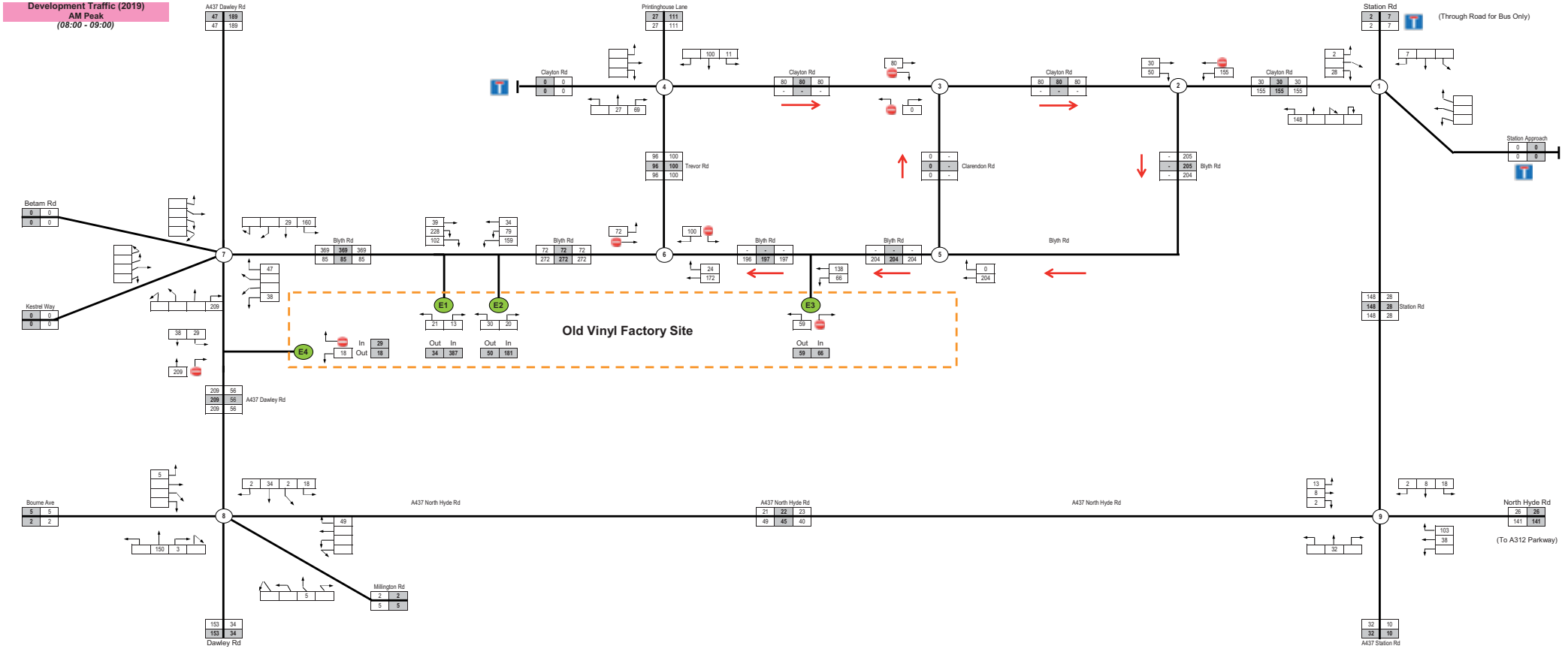
Adjusted Baseline Traffic + Growth Factor + Committed Developments

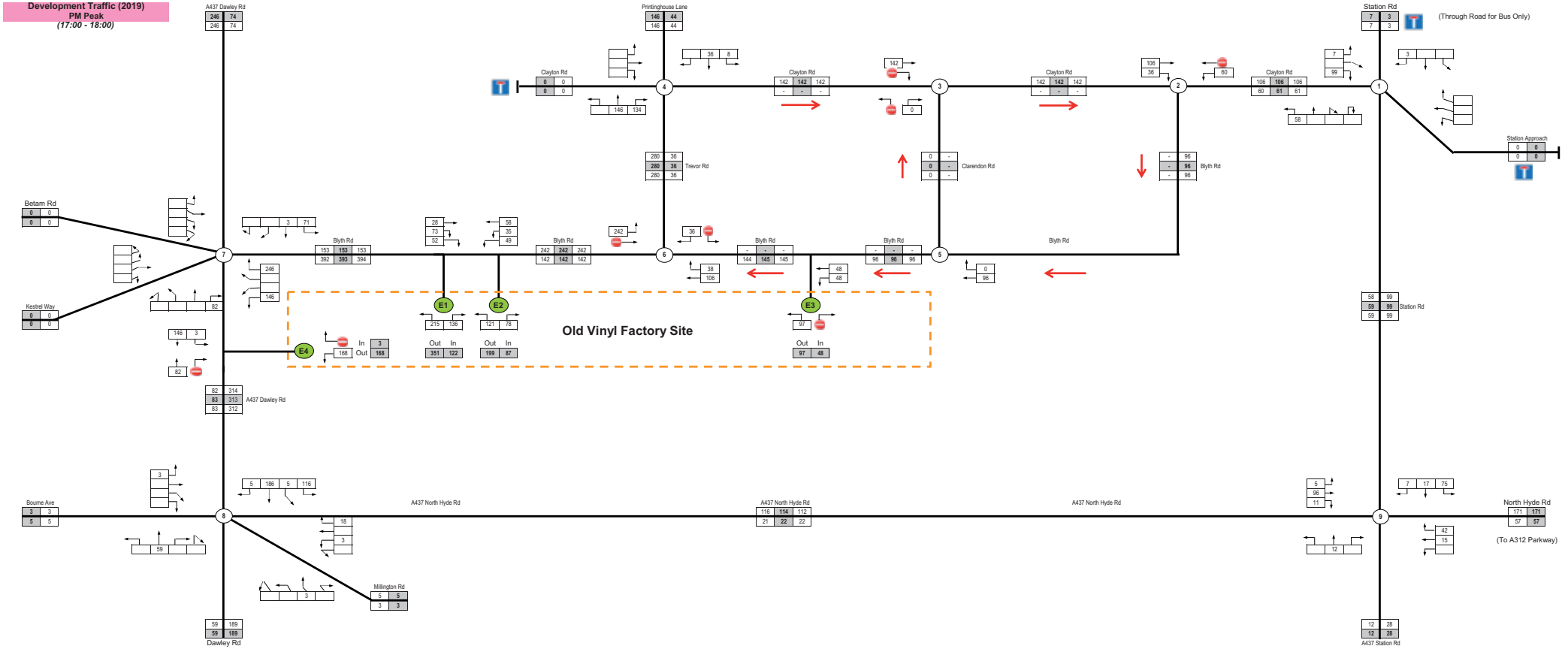
Growth Factor 2011 to 2019 1.09
Growth Factor 2012 to 2019 1.08

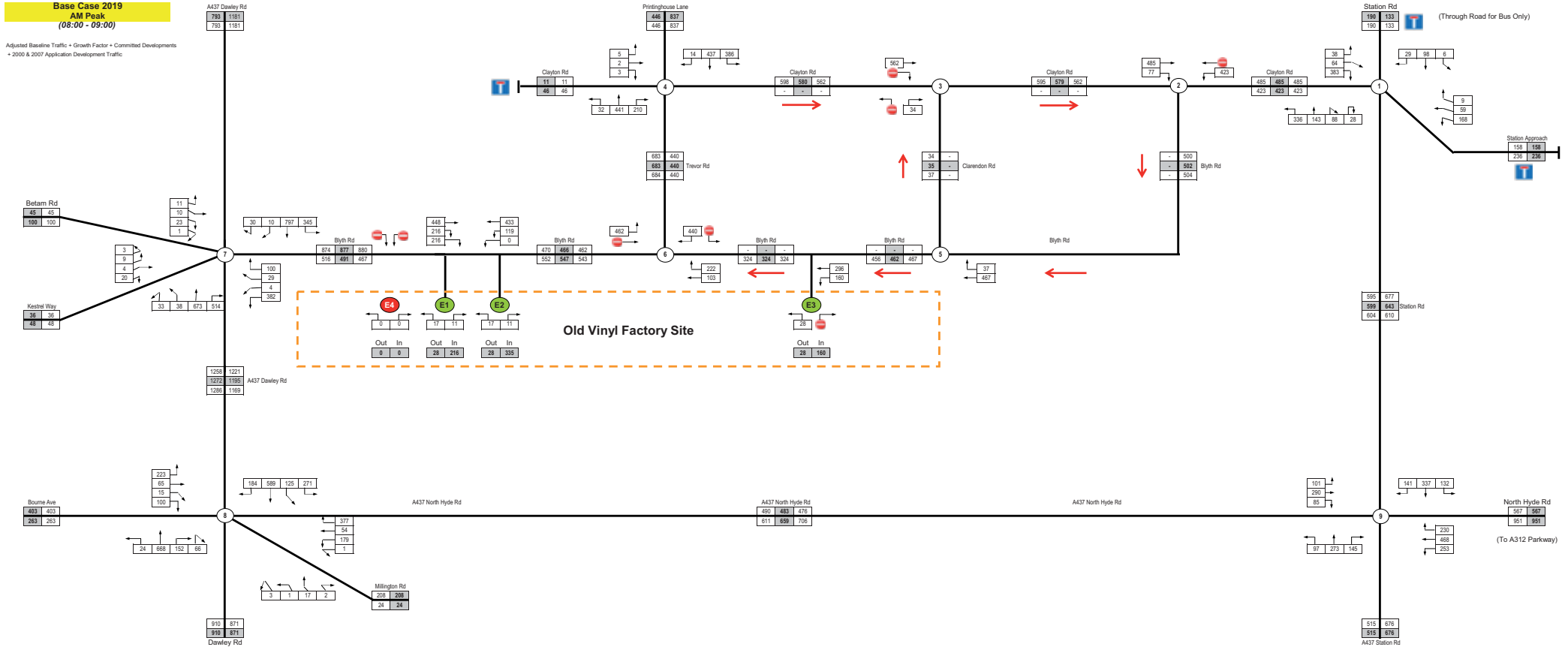


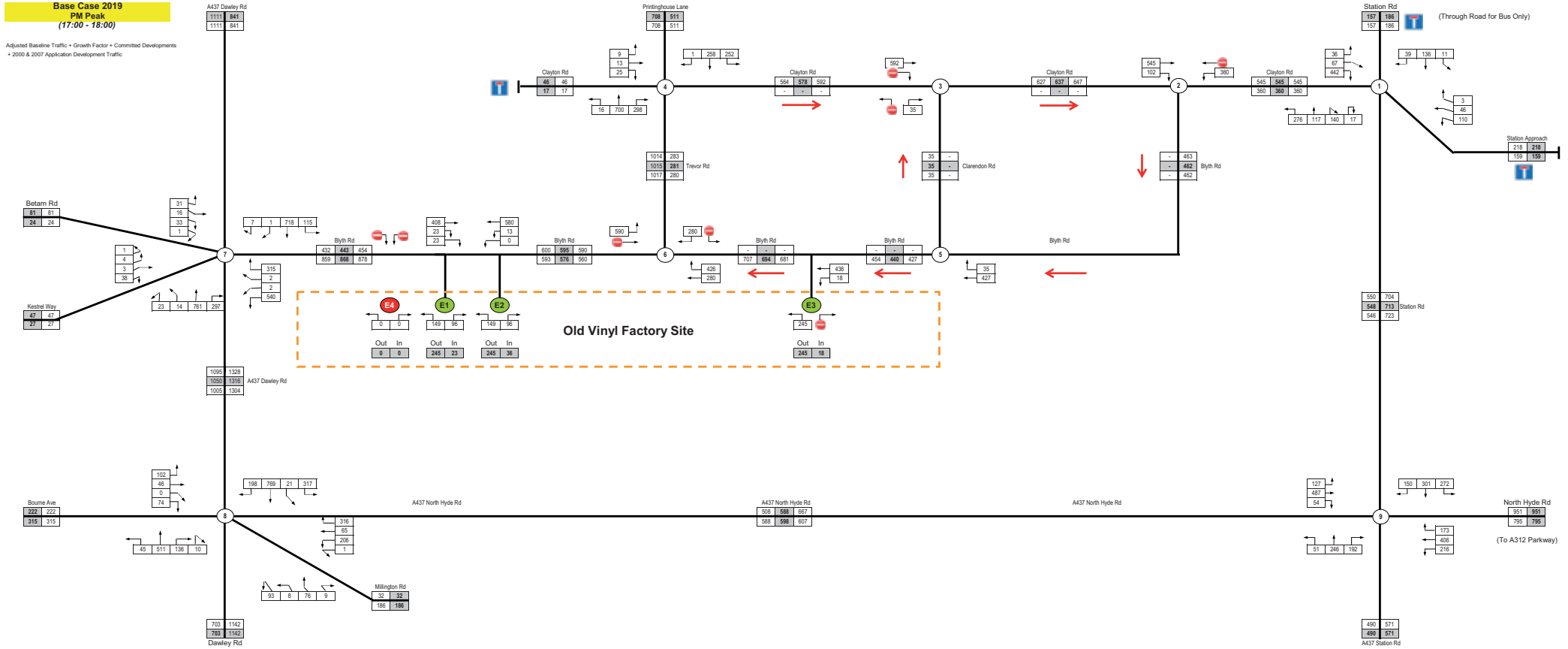

2000 & 2007 Application Development Traffic
AM Peak
(08:00 - 09:00)
A437 Dawley Rd
Printinghouse Lane
Station Rd
(Through Road for Bus Only)
Clayton Rd
Trevor Rd
Clarendon Rd
Blyth Rd
Station Approach
Betam Rd
Kestrel Way
Old Vinyl Factory Site
E1
E2
E3
E4
Out
In
Station Rd
A437 Dawley Rd
Bourne Ave
A437 North Hyde Rd
Millington Rd
Dawley Rd
North Hyde Rd
(To A312 Parkway)
A437 Station Rd

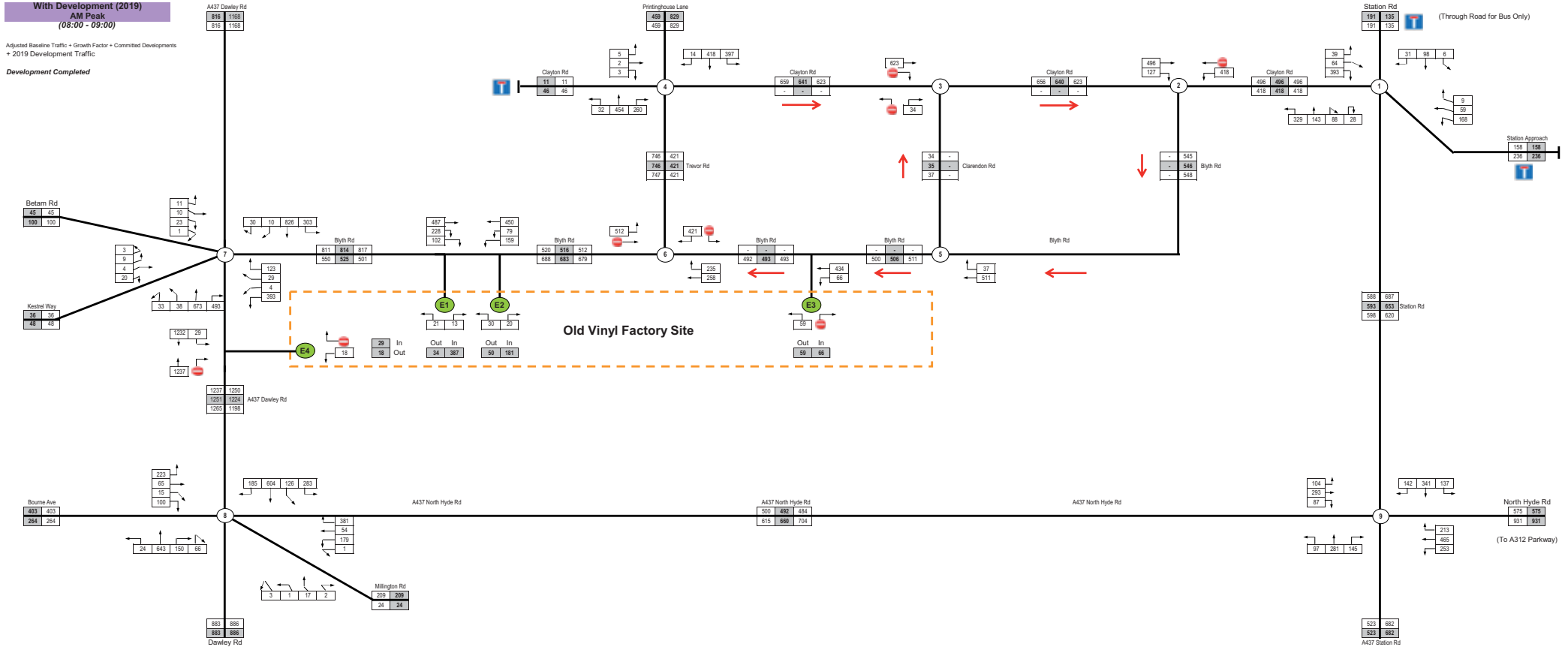

2000 & 2007 Application Development Traffic
PM Peak
(17:00 - 18:00)
A437 Dawley Rd
Printinghouse Lane
Station Rd
(Through Road for Bus Only)
Clayton Rd
Trevor Rd
Clarendon Rd
Blyth Rd
Station Approach
Betam Rd
Kestrel Way
Old Vinyl Factory Site
E1
E2
E3
E4
Out
In
Station Rd
Bourne Ave
A437 North Hyde Rd
North Hyde Rd
(To A312 Parkway)
Millington Rd
Dawley Rd
A437 Station Rd

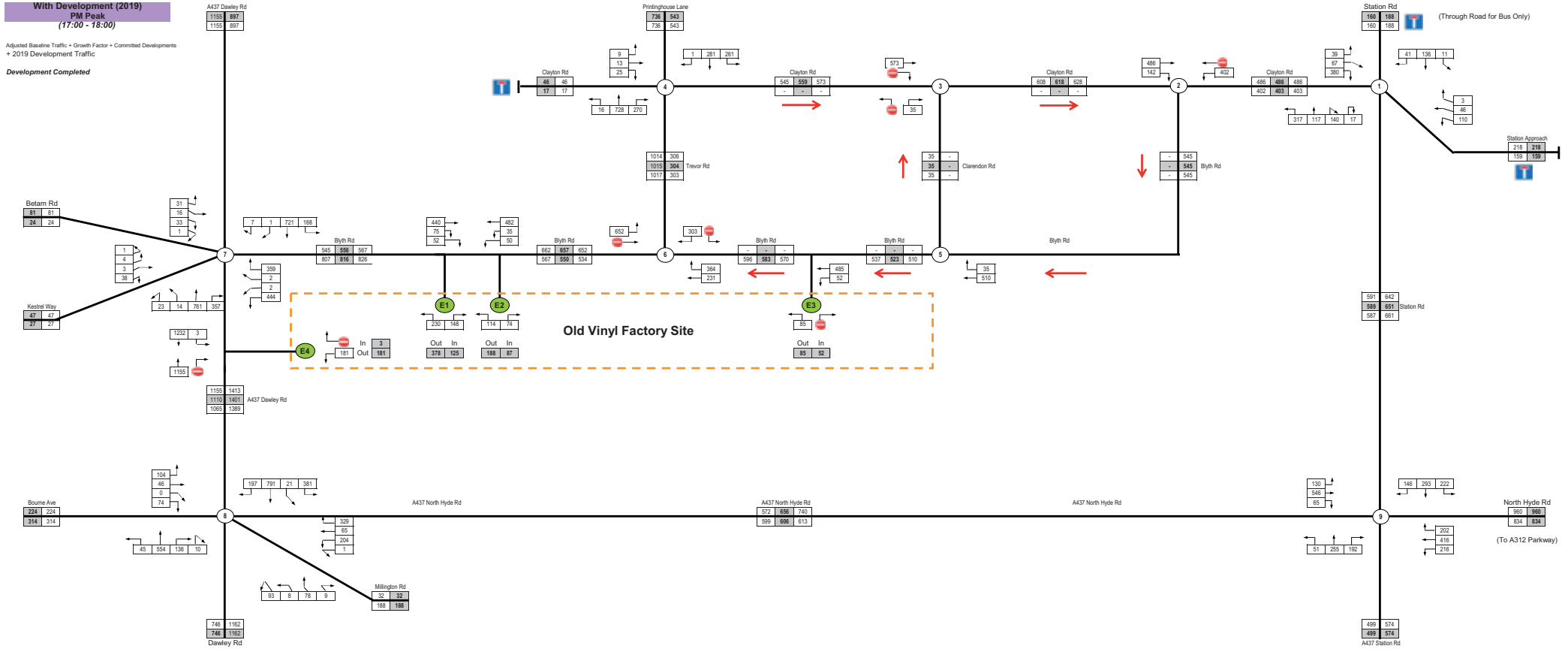

Development Traffic (2019)
AM Peak
(08:00 - 09:00)
A437 Dawley Rd
Printinghouse Lane
Station Rd
(Through Road for Bus Only)
Clayton Rd
Trevor Rd
Clarendon Rd
Blyth Rd
Station Approach
Betam Rd
Kestrel Way
Old Vinyl Factory Site
E1
E2
E3
E4
Station Rd
A437 North Hyde Rd
Bourne Ave
North Hyde Rd
(To A312 Parkway)
Millington Rd
Dawley Rd
A437 Station Rd


Development Traffic (2019)
PM Peak
(17:00 - 18:00)
A437 Dawley Rd
Printinghouse Lane
Station Rd
(Through Road for Bus Only)
Clayton Rd
Trevor Rd
Clarendon Rd
Blyth Rd
Station Approach
Betam Rd
Kestrel Way
Old Vinyl Factory Site
E1
E2
E3
E4
Out
In
Station Rd
Bourne Ave
A437 North Hyde Rd
North Hyde Rd
(To A312 Parkway)
Millington Rd
Dawley Rd
A437 Station Rd

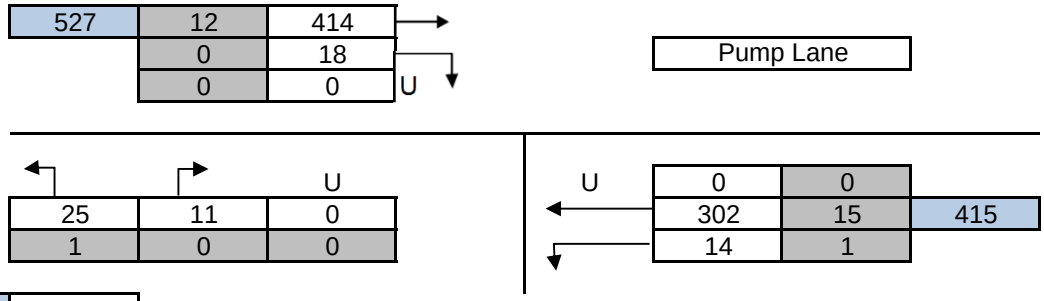

Base Case 2019
AM Peak
(08:00 - 09:00)
Adjusted Baseline Traffic + Growth Factor + Committed Developments
+ 2000 & 2007 Application Development Traffic
A437 Dawley Rd
Printinghouse Lane
Station Rd
(Through Road for Bus Only)
Clayton Rd
Trevor Rd
Clarendon Rd
Blyth Rd
Station Approach
Betam Rd
Kestrel Way
Old Vinyl Factory Site
E4
E1
E2
E3
Out In
Station Rd
A437 North Hyde Rd
Bourne Ave
Millington Rd
Dawley Rd
A437 Station Rd
North Hyde Rd
(To A312 Parkway)


Base Case 2019
PM Peak
(17:00 - 18:00)
Adjusted Baseline Traffic + Growth Factor + Committed Developments
+ 2000 & 2007 Application Development Traffic
A437 Dawley Rd
Printinghouse Lane
Station Rd
(Through Road for Bus Only)
Clayton Rd
Trevor Rd
Clarendon Rd
Blyth Rd
Station Approach
Betam Rd
Kestrel Way
Old Vinyl Factory Site
E4
E1
E2
E3
Out In
Station Rd
Bourne Ave
A437 North Hyde Rd
North Hyde Rd
(To A312 Parkway)
Millington Rd
Dawley Rd
A437 Station Rd


With Development (2019)
AM Peak
(08:00 - 09:00)
Adjusted Baseline Traffic + Growth Factor + Committed Developments
+ 2019 Development Traffic
Development Completed
A437 Dawley Rd
Printinghouse Lane
Station Rd
(Through Road for Bus Only)
Clayton Rd
Trevor Rd
Clarendon Rd
Blyth Rd
Station Approach
Betam Rd
Kestrel Way
E1
E2
E3
E4
Old Vinyl Factory Site
In
Out
Station Rd
Bourne Ave
A437 North Hyde Rd
North Hyde Rd
(To A312 Parkway)
Millington Rd
Dawley Rd
A437 Station Rd

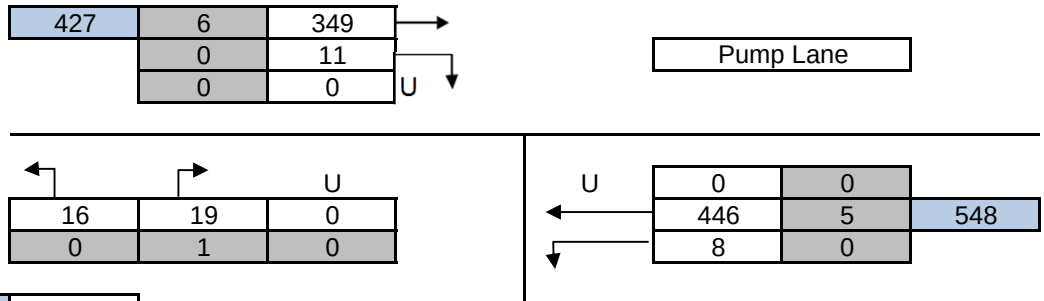

With Development (2019)
PM Peak
(17:00 - 18:00)
Adjusted Baseline Traffic + Growth Factor + Committed Developments
+ 2019 Development Traffic
Development Completed
A437 Dawley Rd
Printinghouse Lane
Station Rd
(Through Road for Bus Only)
Clayton Rd
Trevor Rd
Clarendon Rd
Blyth Rd
Station Approach
Betam Rd
Kestrel Way
Old Vinyl Factory Site
E1
E2
E3
E4
In
Out
Station Rd
A437 North Hyde Rd
Bourne Ave
Millington Rd
Dawley Rd
North Hyde Rd
(To A312 Parkway)
A437 Station Rd

AM Peak 08:00-09:00



	ATC
	Total Veh
	HGV

PM Peak 17:00-18:00



	ATC
	Total Veh
	HGV

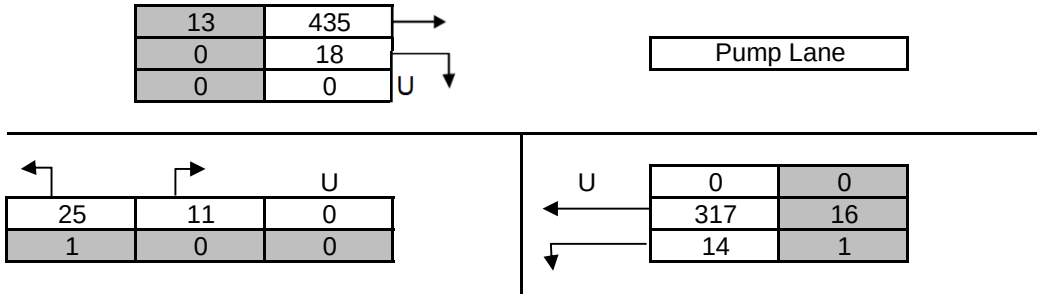
RPS

JNY8812 - Silverdale Road

2016 Observed Flows

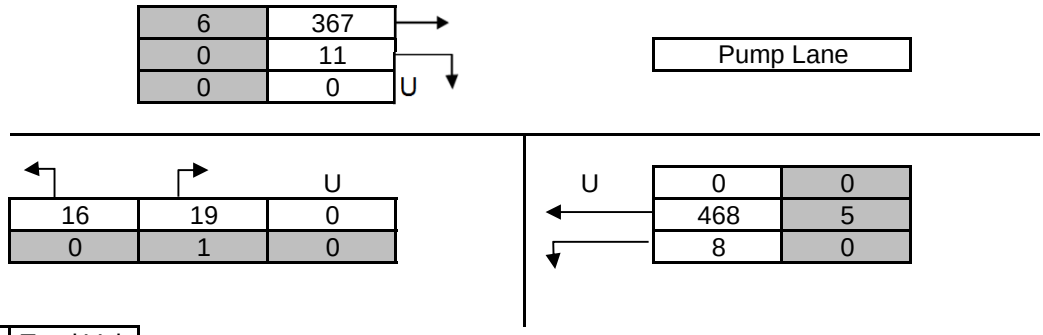
Appendix 11

AM Peak 08:00-09:00



	Total Veh
	HGV

PM Peak 17:00-18:00



	Total Veh
	HGV

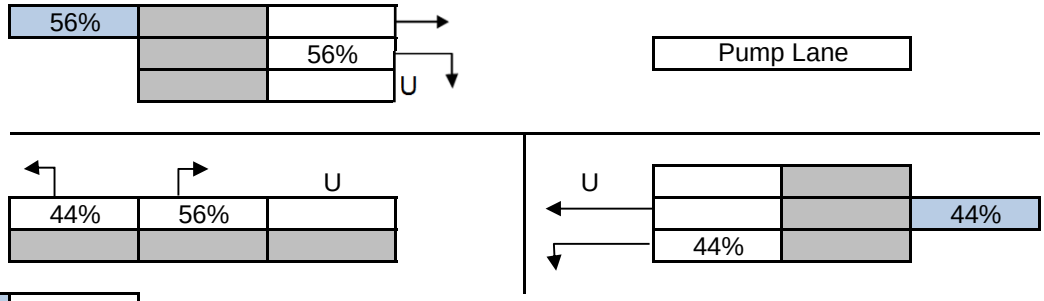
RPS

JNY8812 - Silverdale Road

2021 Future Year Flows

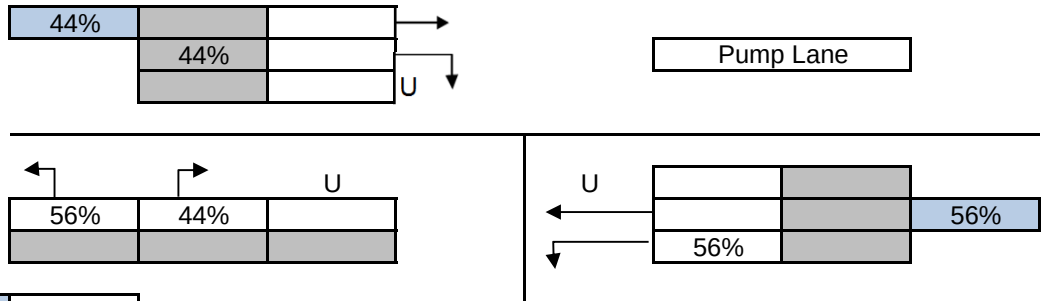
Appendix 11

AM Peak 08:00-09:00



	ATC
	Total Veh
	HGV

PM Peak 17:00-18:00



	ATC
	Total Veh
	HGV

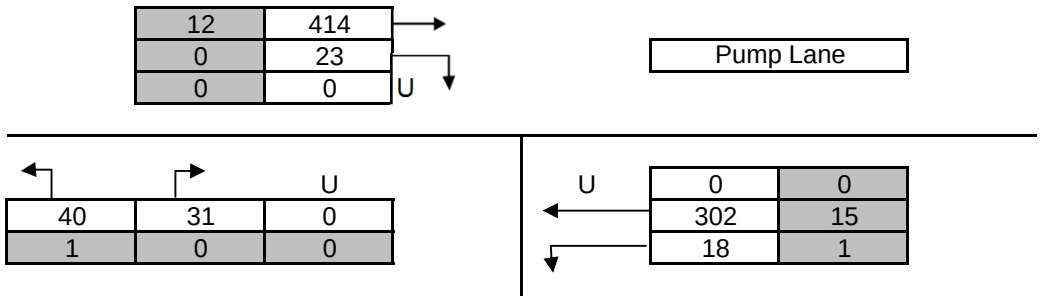
RPS

JNY8812 - Silverdale Road

2016 Observed Flows

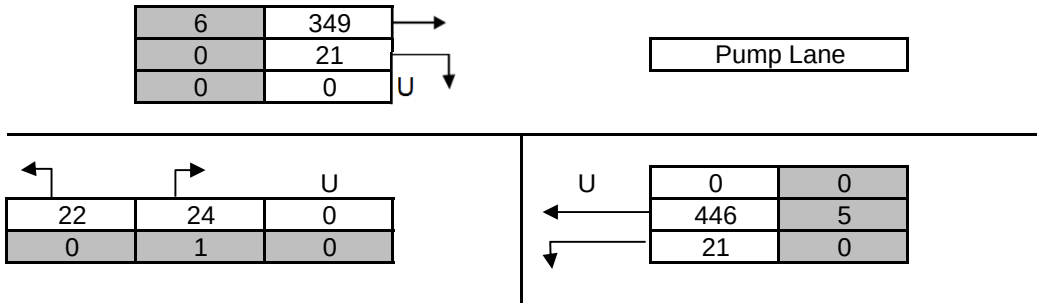
Appendix 11

AM Peak 08:00-09:00



	Total Veh
	HGV

PM Peak 17:00-18:00



	Total Veh
	HGV

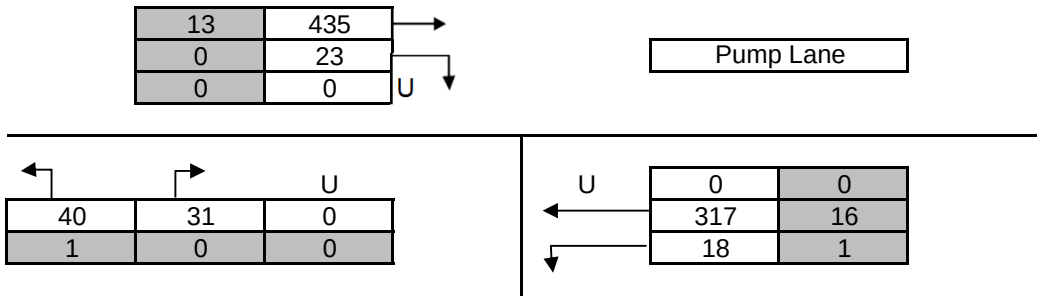
RPS

JNY8812 - Silverdale Road

2016 + Development Flows

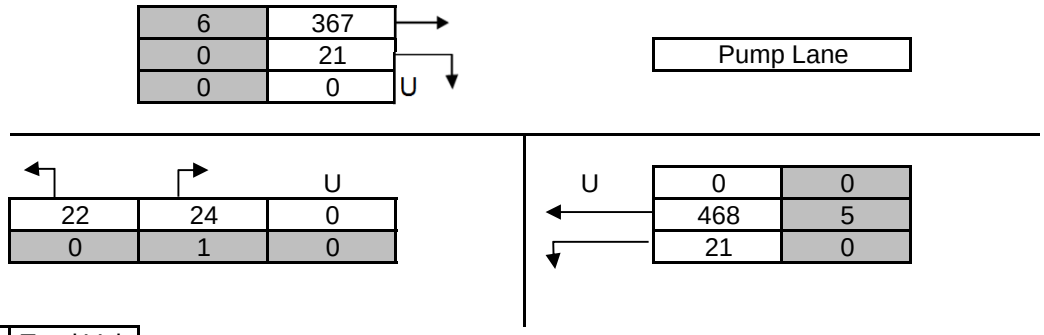
Appendix 11

AM Peak 08:00-09:00



	Total Veh
	HGV

PM Peak 17:00-18:00



	Total Veh
	HGV

RPS

JNY8812 - Silverdale Road

2021 + Development Flows

Appendix 11

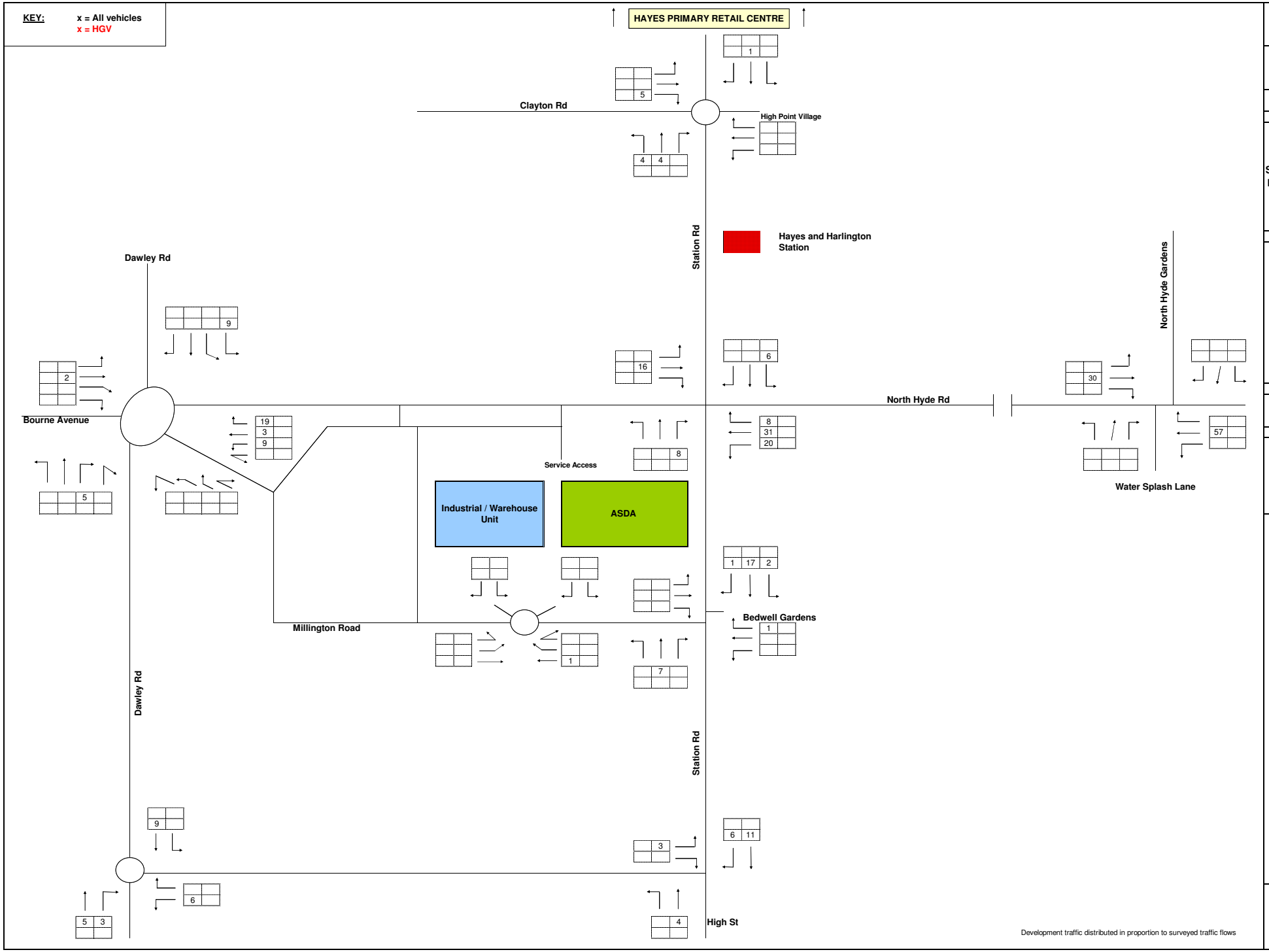


FIGURE DIAGRAM

NO. C01

Southall Gas Works Site - AM Peak Hour Traffic Movement

Proposed ASDA Development at the Westland's Estate, Hayes

Job No. 9V5694

Date: January 2011

ROYAL HASKONING

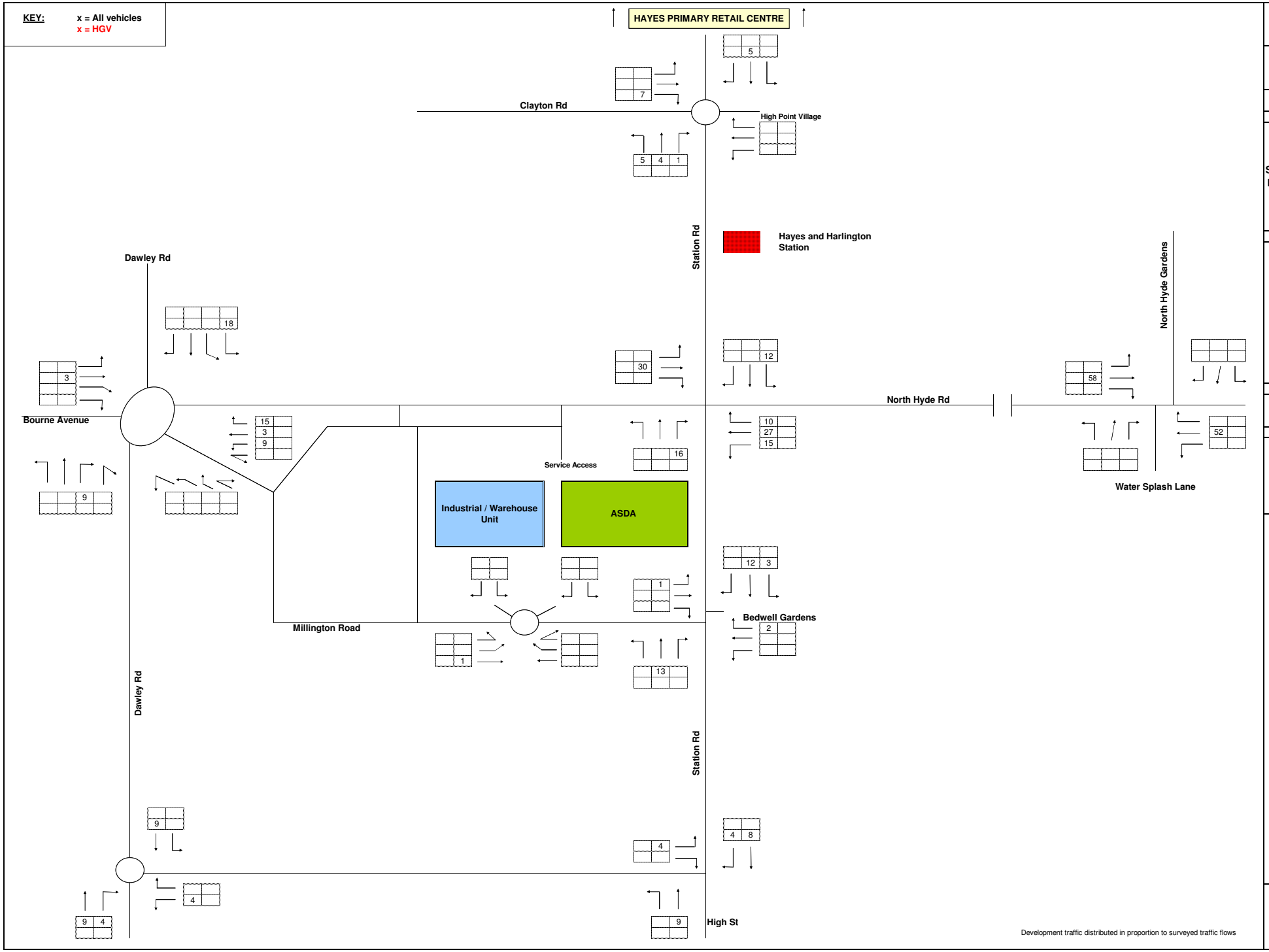


FIGURE DIAGRAM

NO. C02

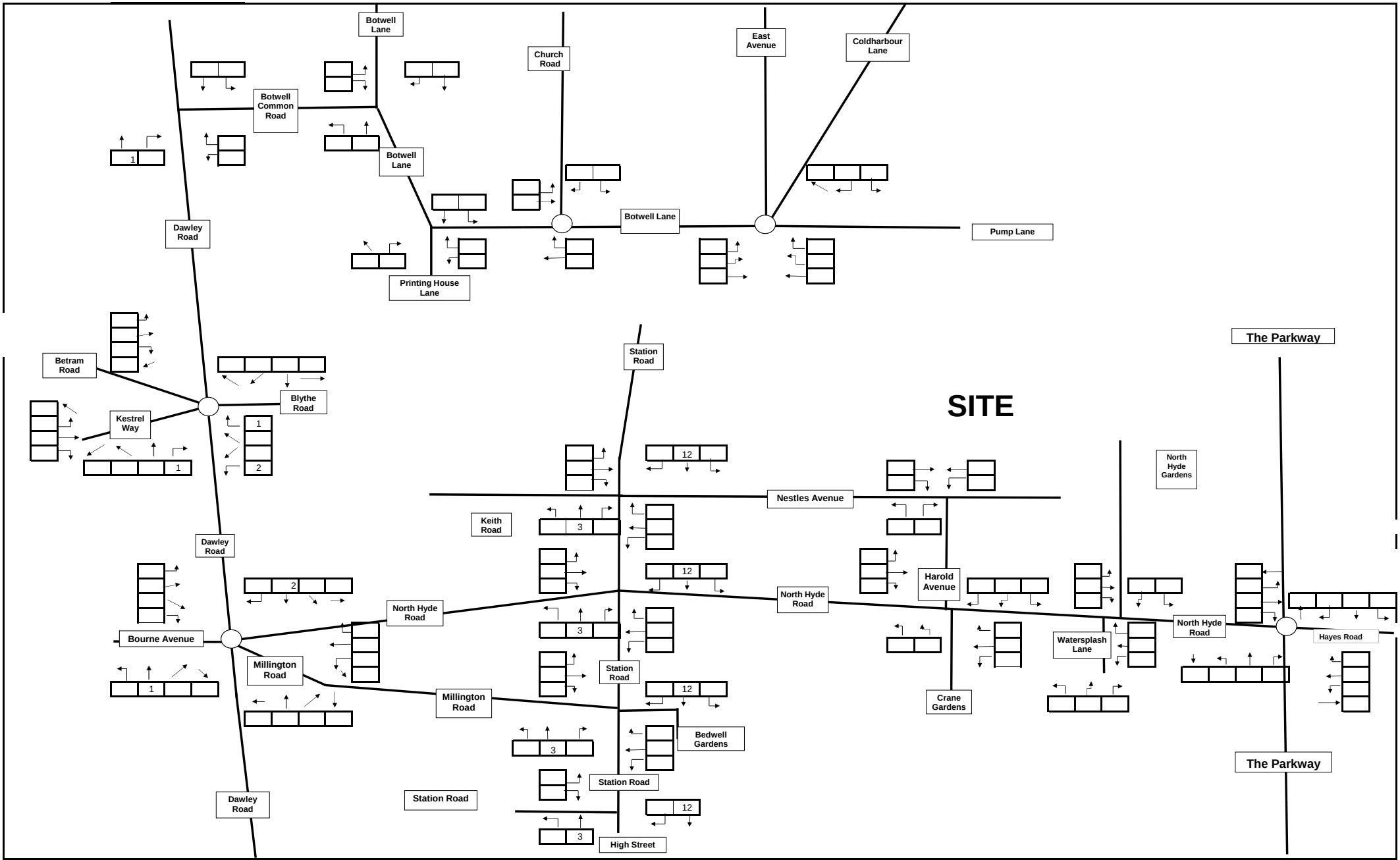
Southall Gas Works Site - PM Peak Hour Traffic Movement

Proposed ASDA Development at the Westland's Estate, Hayes

Job No. 9V5694

Date: January 2011

ROYAL HASKONING



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Notes:

Job Title: **Former Nestles Factory Hayes**	Scale: **NTS**
Drawing Title: **20 Blyth Road AM**	Job No: **16018-01**
Figure No:	Date: **01/10/2016**

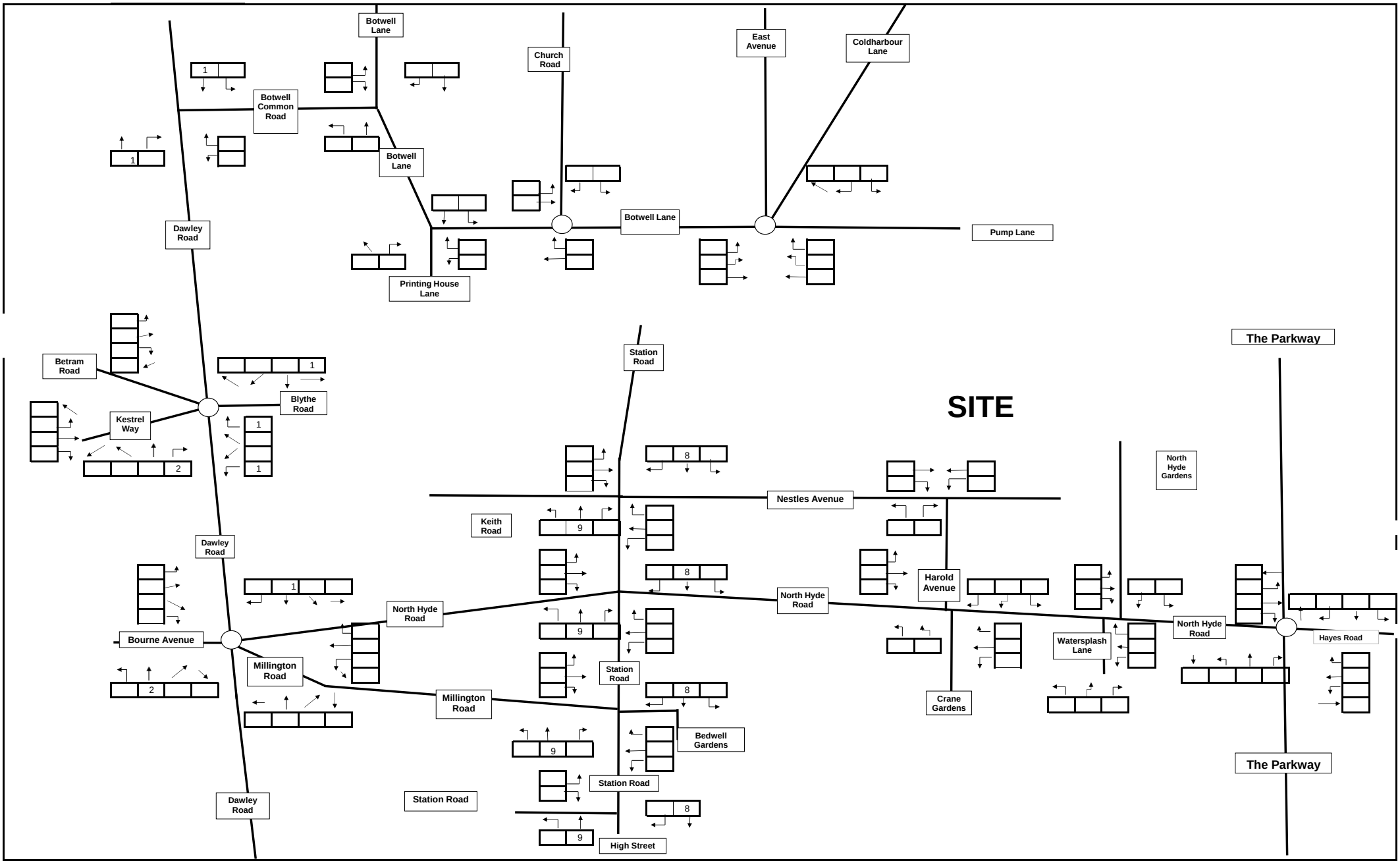

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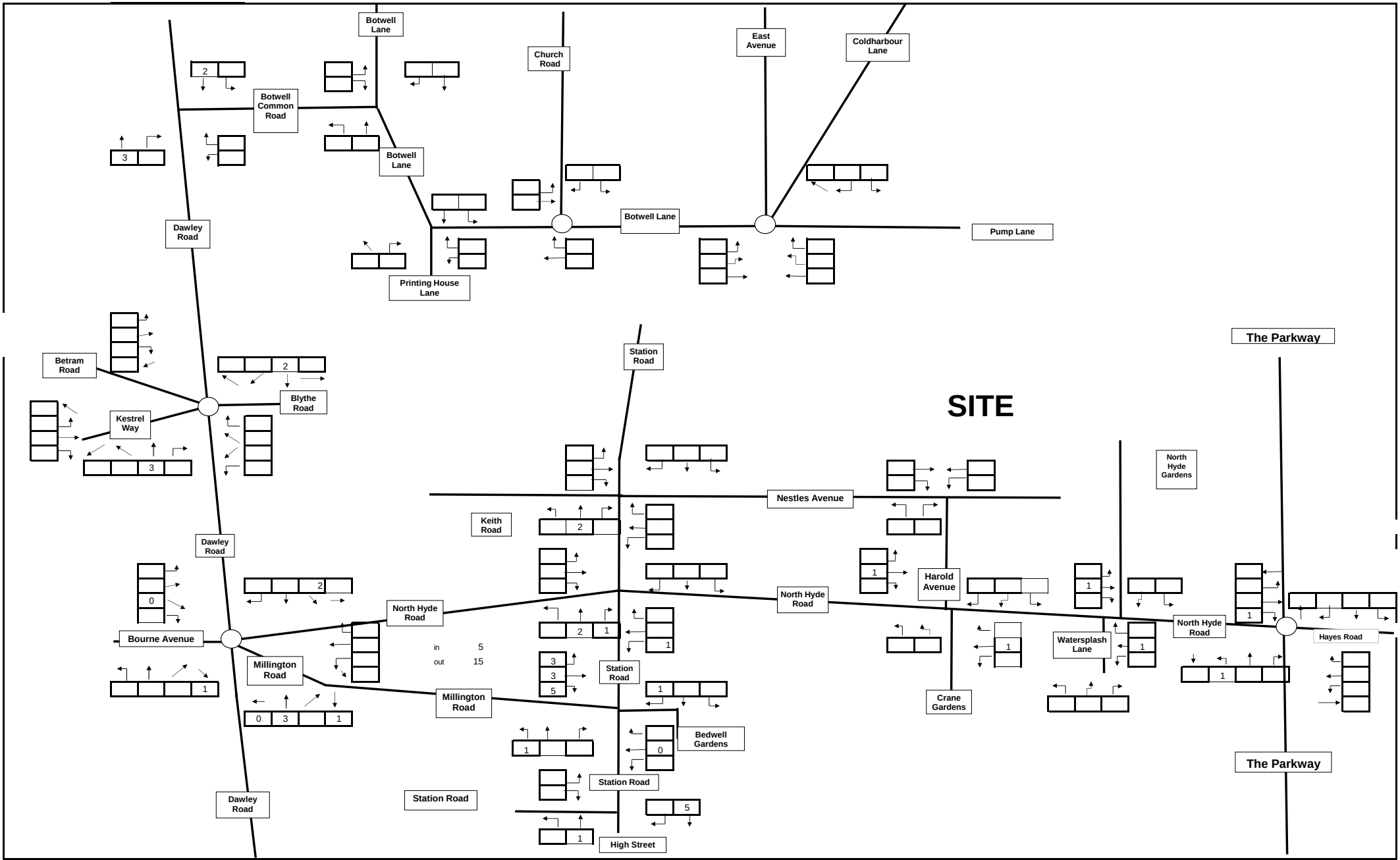
Figure No:	Date: **01/10/2016**



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Notes:

Job Title: **Former Nestles Factory Hayes**

Scale: **NTS**

Drawing Title: **Application 226322APP20162368 AM**

Job No: **16018-01**

Figure No:

Date: **01/10/2016**

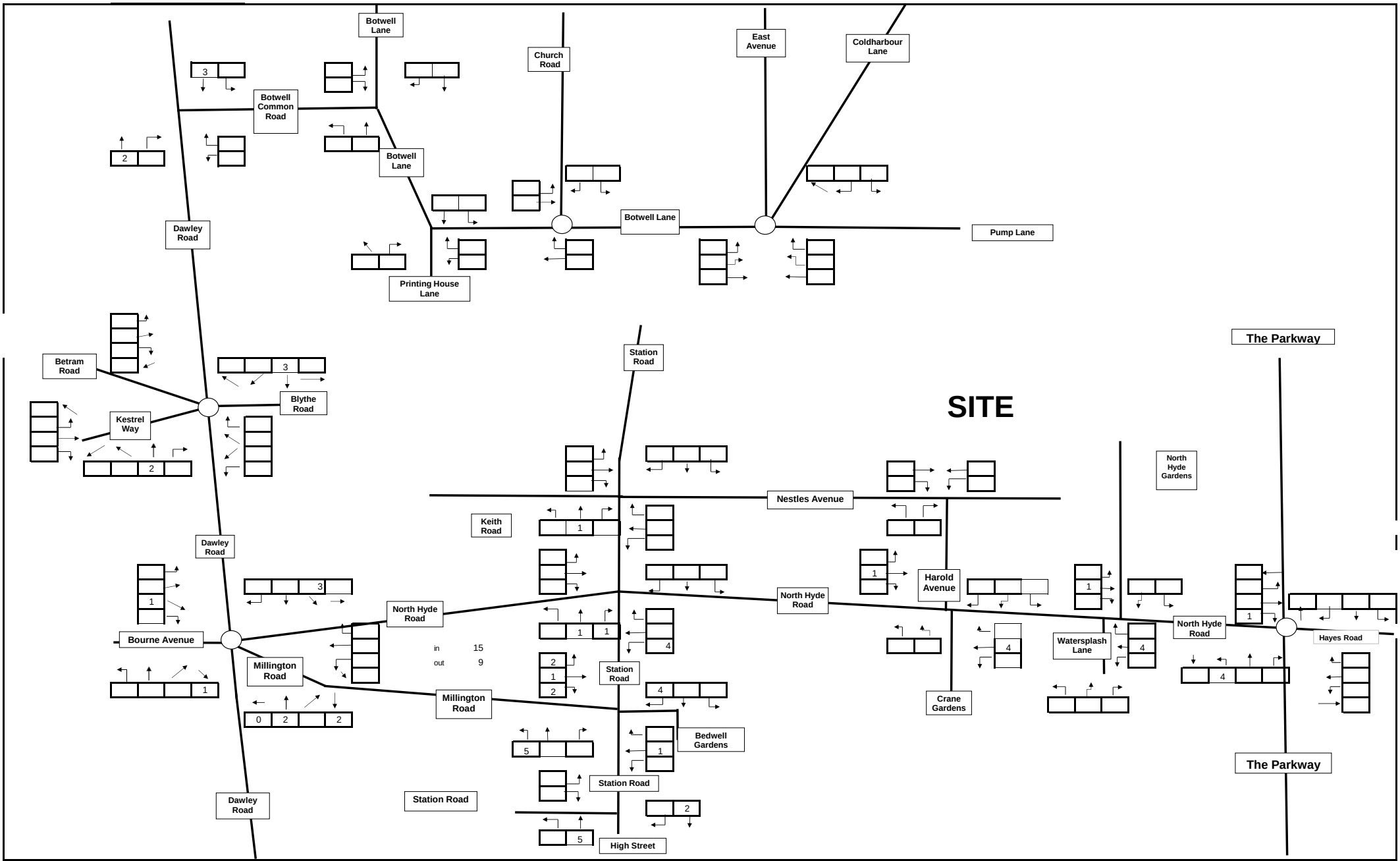

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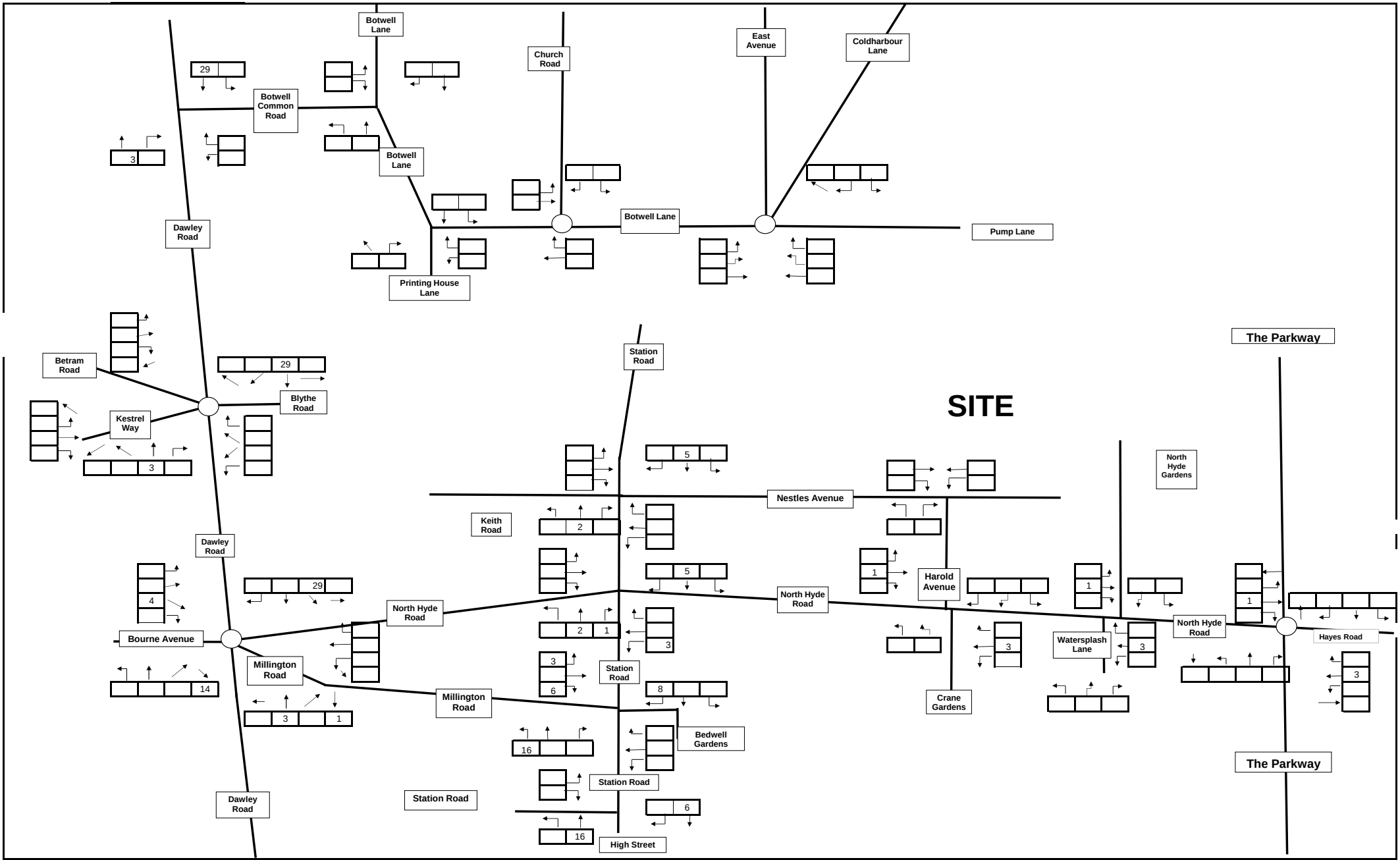
		Figure No:	Date: **01/10/2016**



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Notes:

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Drawing Title: **ASDA Industrial AM**	Job No: **16018-01**
Figure No:	Date: **01/10/2016**

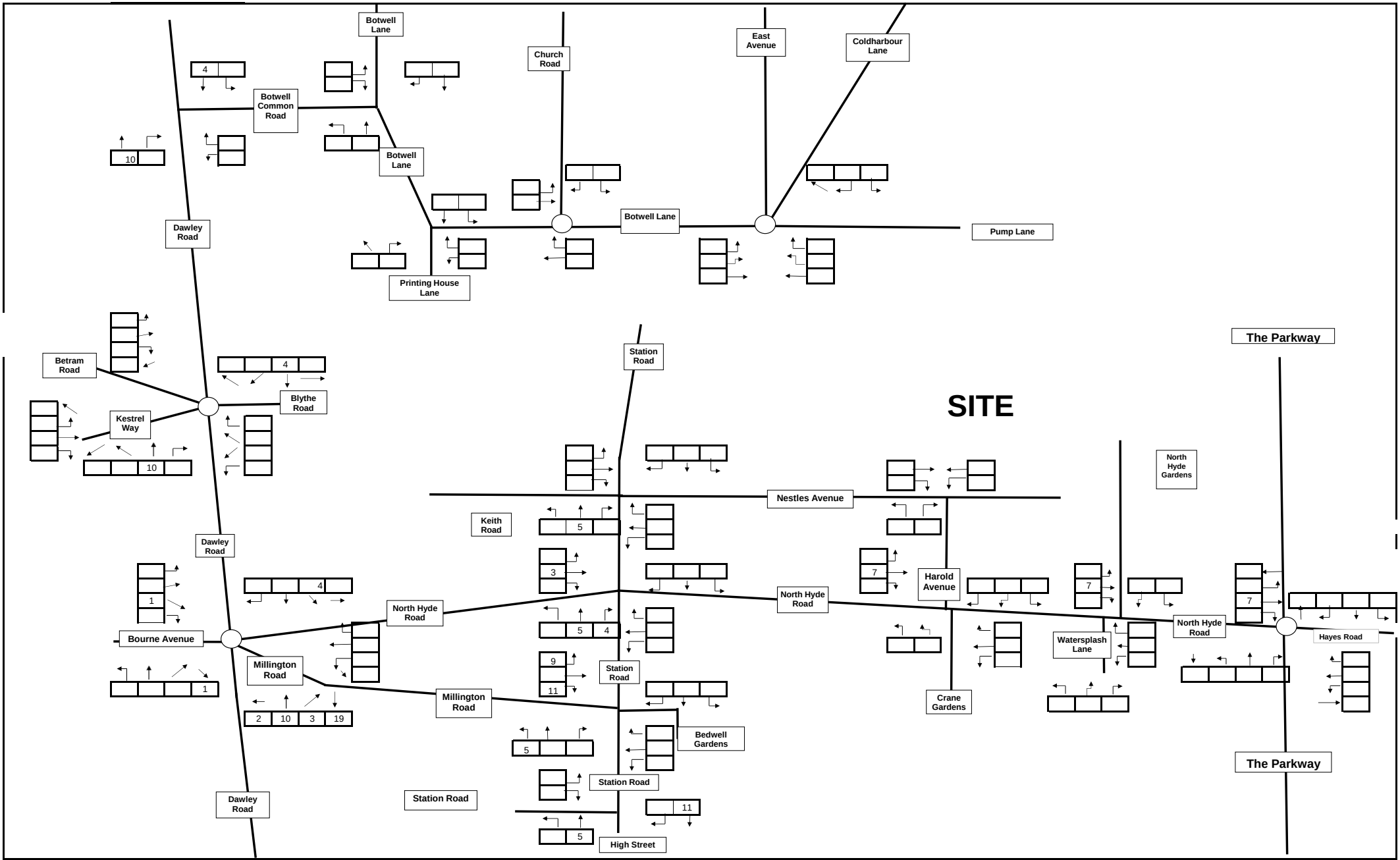

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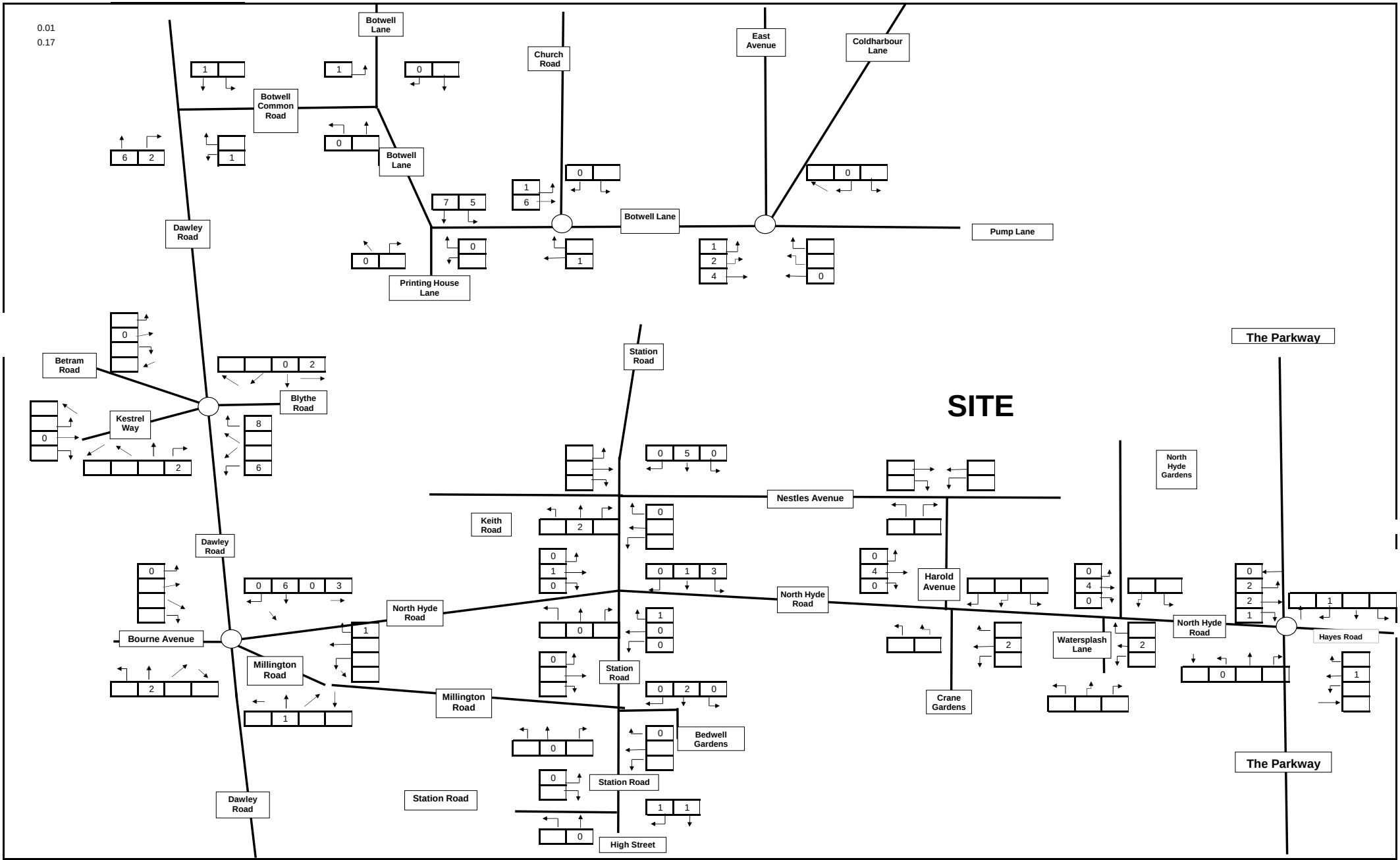
Figure No:	Date: **01/10/2016**



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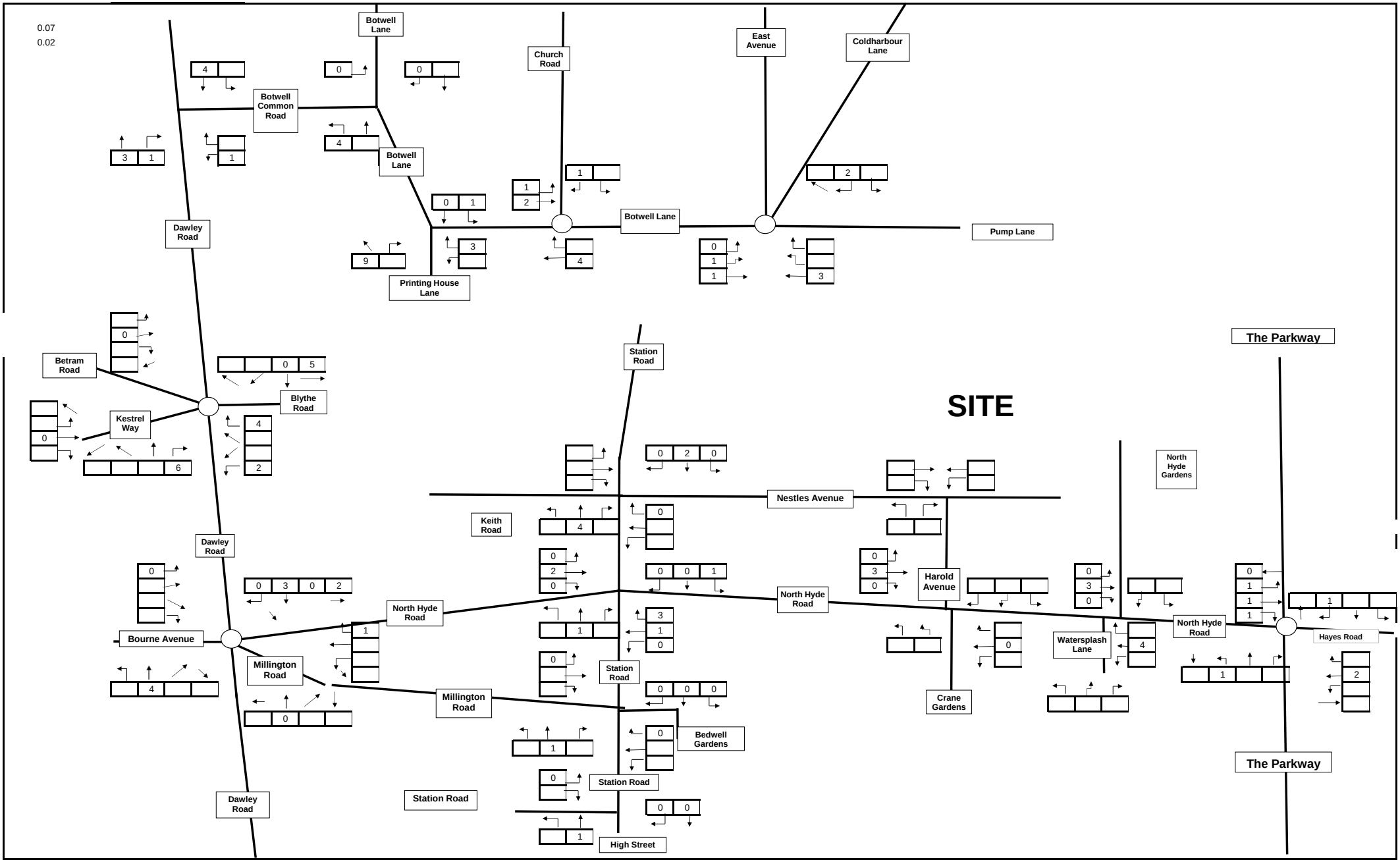
Notes:

Job Title: **Former Nestles Factory Hayes**	Scale: **NTS**
Drawing Title: **Gatefold Building AM**	Job No: **16018-01**
Figure No:	Date: **01/10/2016**



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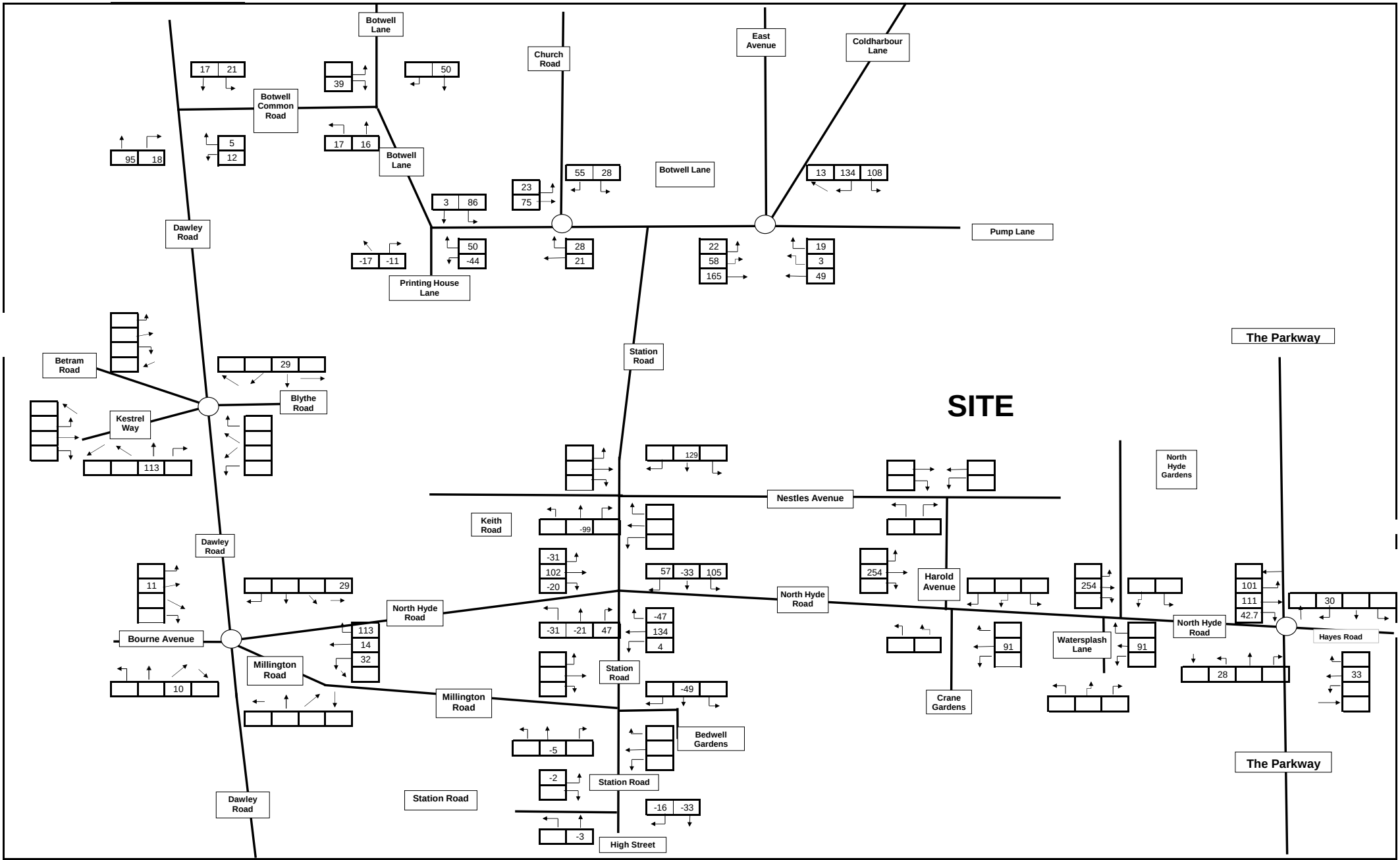
Notes:

Job Title: **Former Nestles Factory Hayes**	Scale: **NTS**
Drawing Title: **Gatefold Building PM**	Job No: **16018-01**
Figure No:	Date: **01/10/2016**



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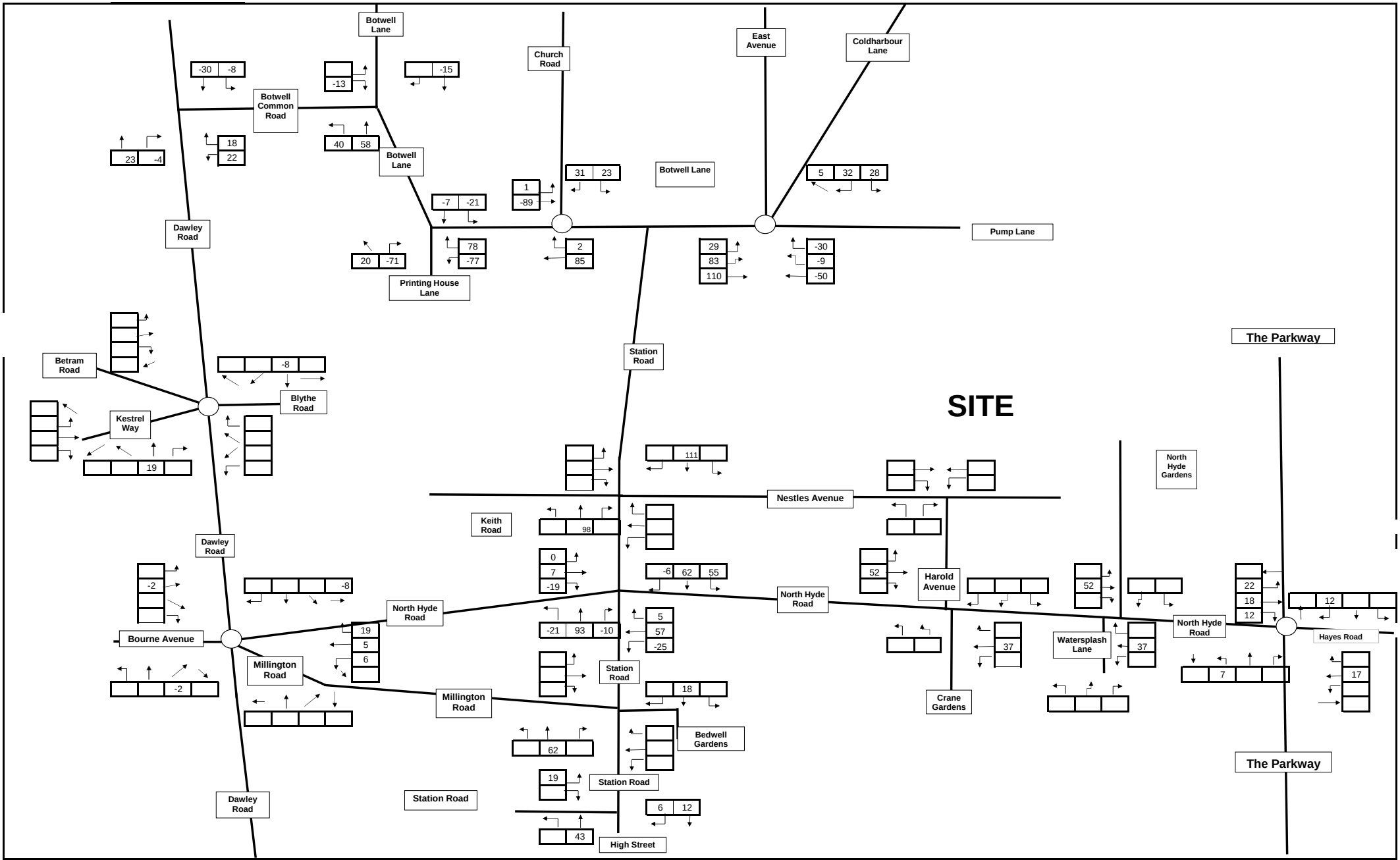
		Drawing Title: **High Street Scheme AM**	Job No: **16018-01**
		Figure No:	Date: **01/10/2016**



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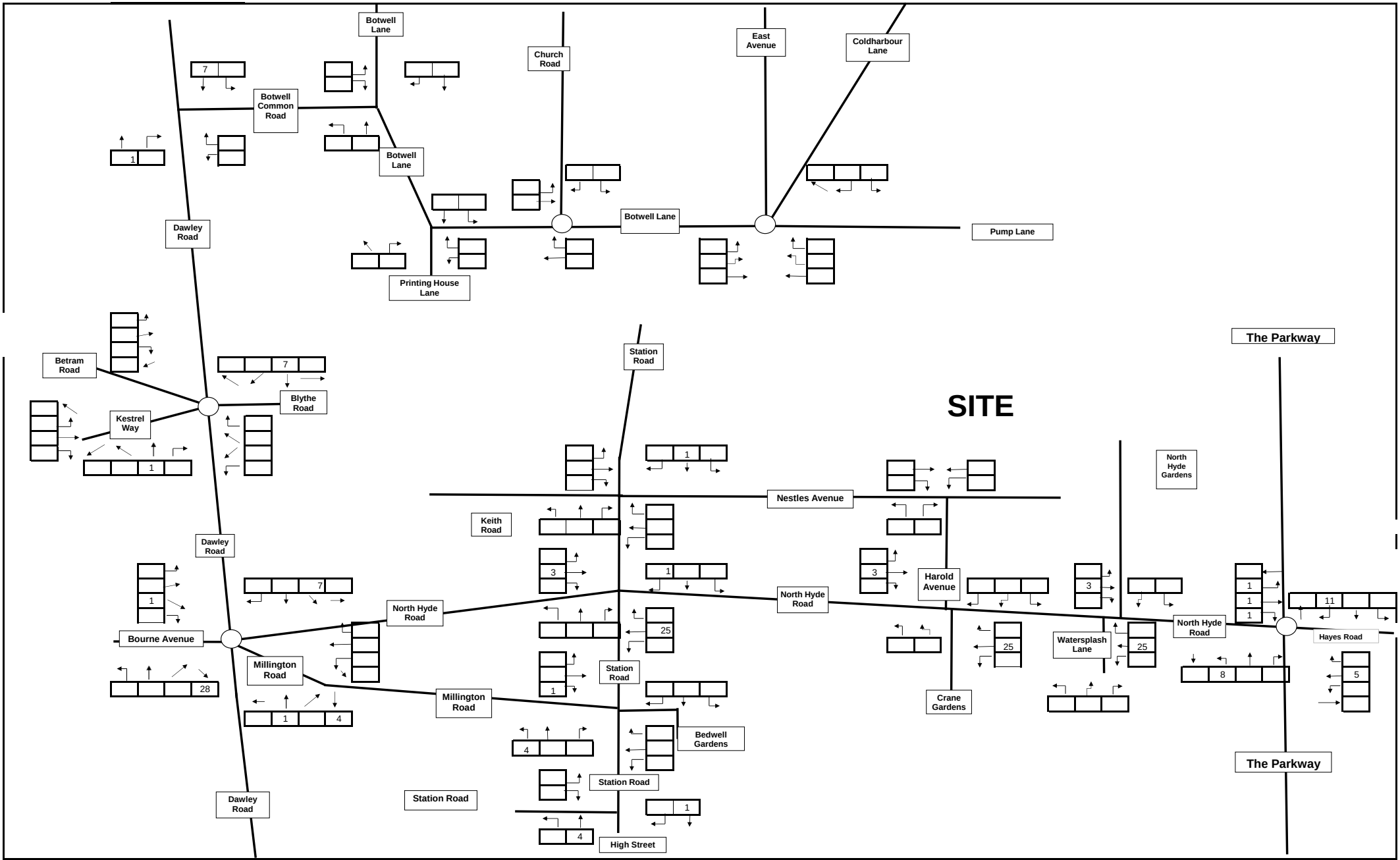
Notes:

Job Title: Former Nestles Factory Hayes	Scale: NTS
Drawing Title: High Street Scheme PM	Job No: 16018-01
Figure No: Figure XX	Date: 01/10/2016



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Notes:

Job Title: **Former Nestles Factory Hayes**	Scale: **NTS**
Drawing Title: **Hyde Park Hayes AM**	Job No: **16018-01**
Figure No:	Date: **01/10/2016**

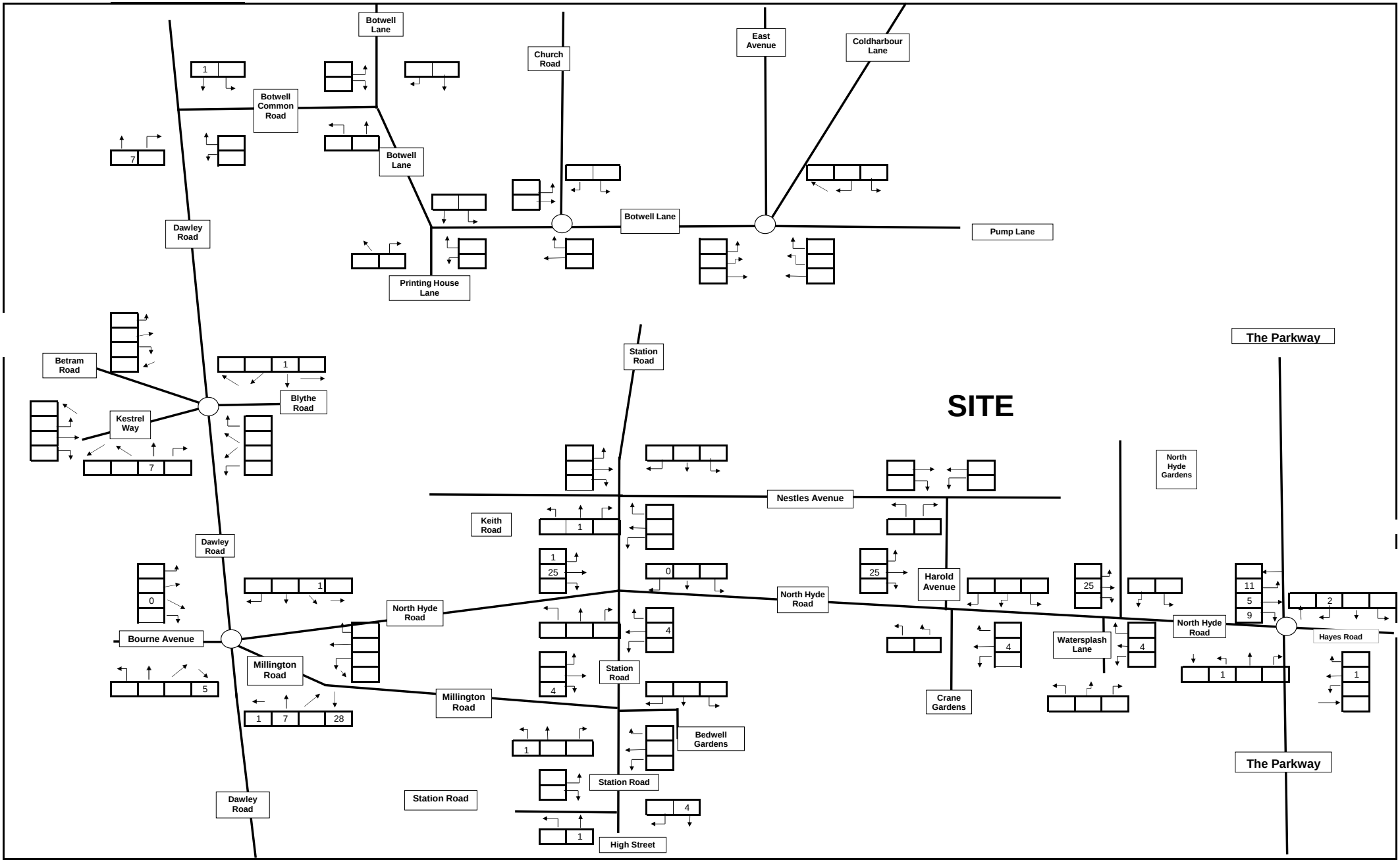

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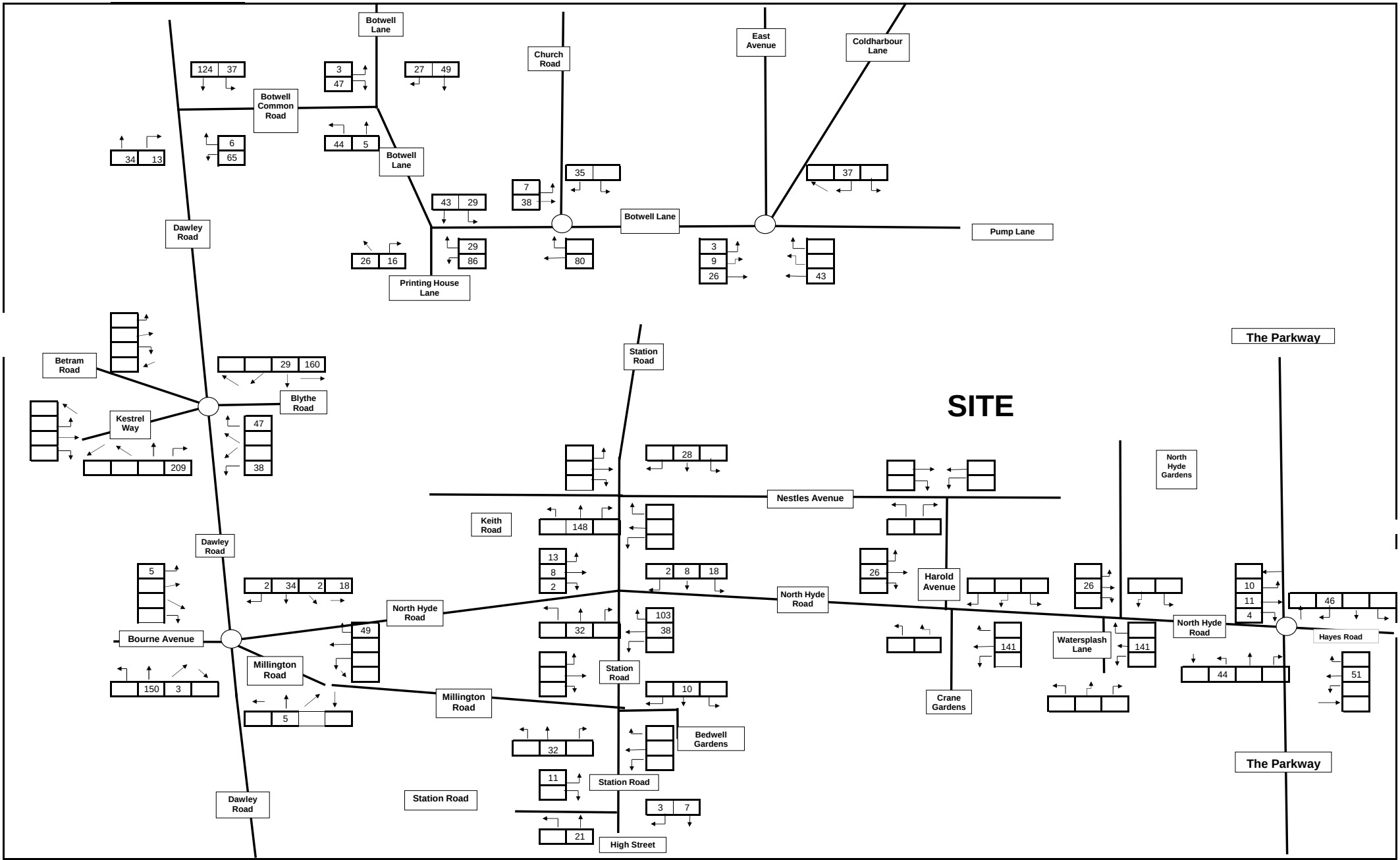
Figure No:	Date: **01/10/2016**



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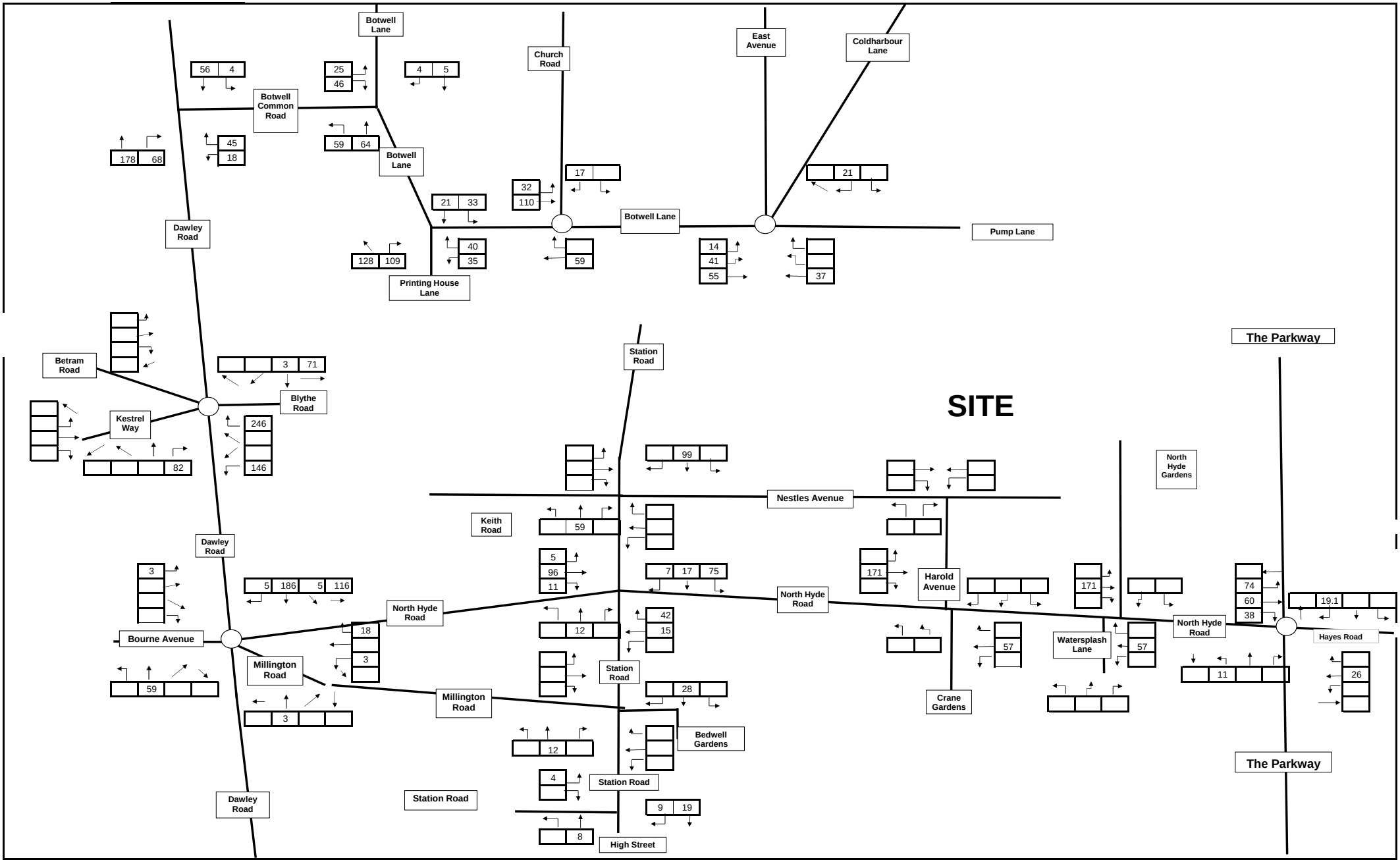
Notes:

Job Title: **Former Nestles Factory Hayes**	Scale: **NTS**
Drawing Title: **Old Vinyl Factory AM**	Job No: **16018-01**
Figure No:	Date: **01/10/2016**



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Notes:

Job Title: **Former Nestles Factory Hayes**	Scale: **NTS**
Drawing Title: **Old Vinyl Factory PM**	Job No: **16018-01**
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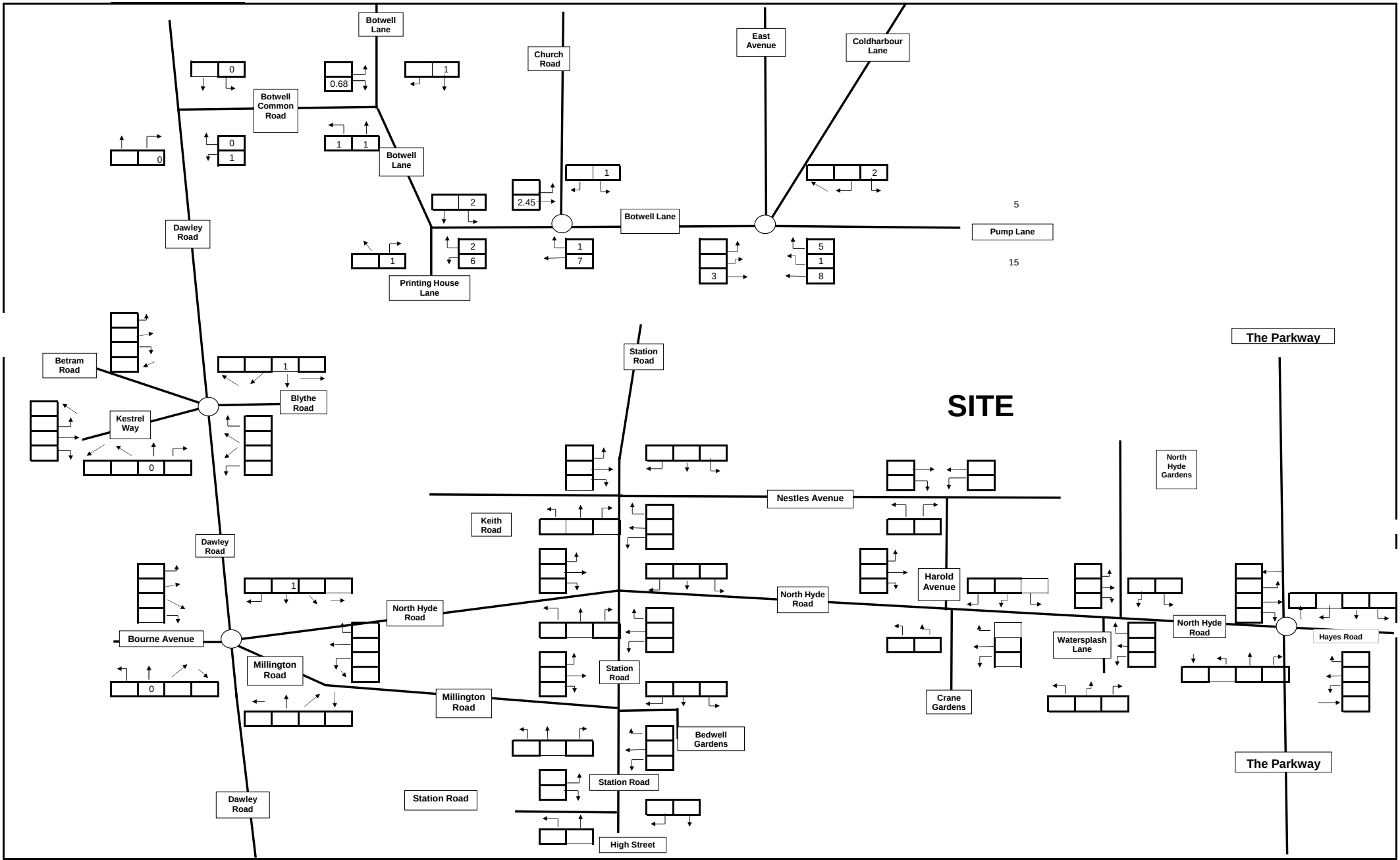

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Notes:

Job Title: Former Nestles Factory Hayes	Scale: NTS
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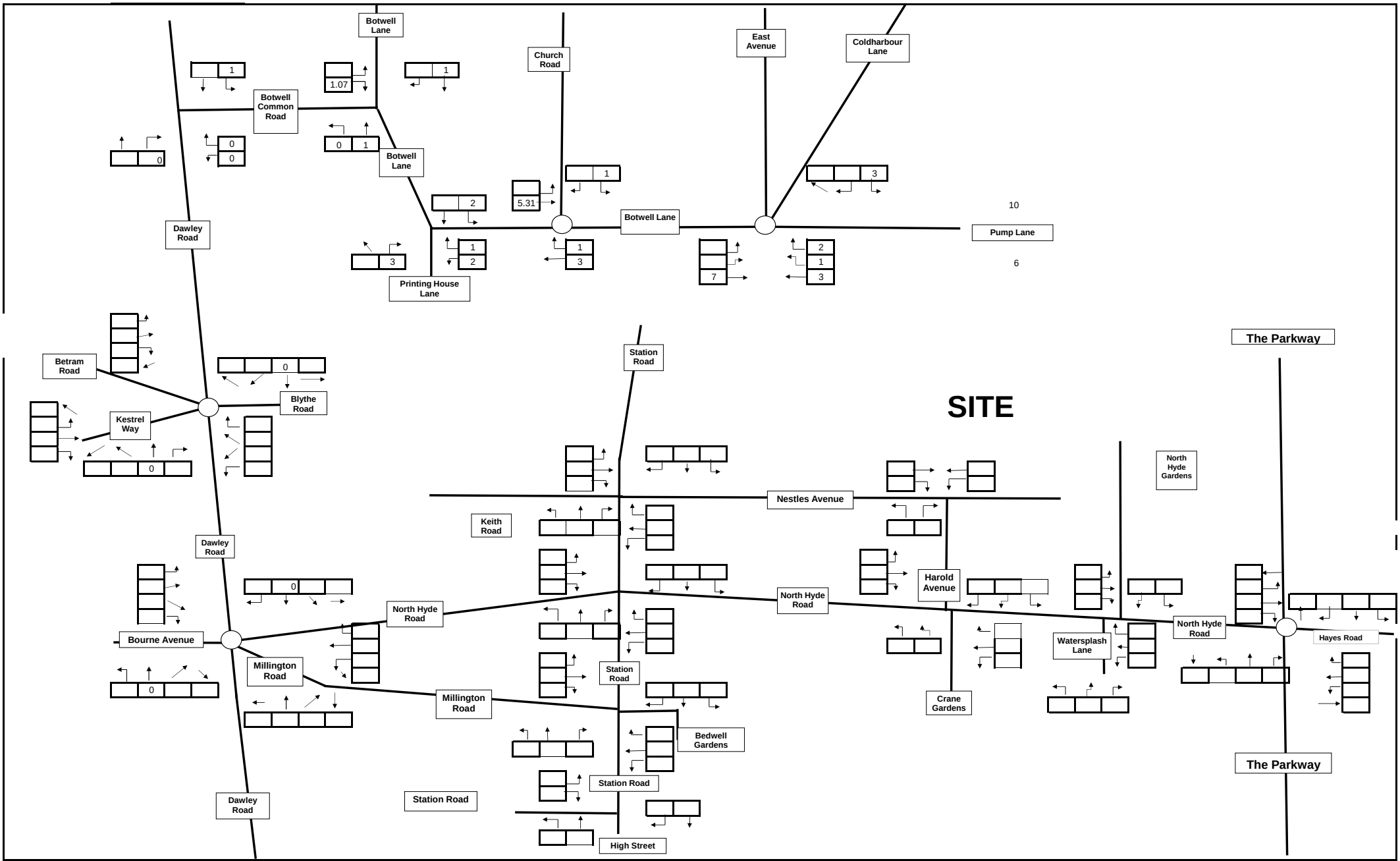
Figure No:	Date: 01/10/2016



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Drawing Title: **Silverdale Road PM**	Job No: **16018-01**
Figure No:	Date: **01/10/2016**

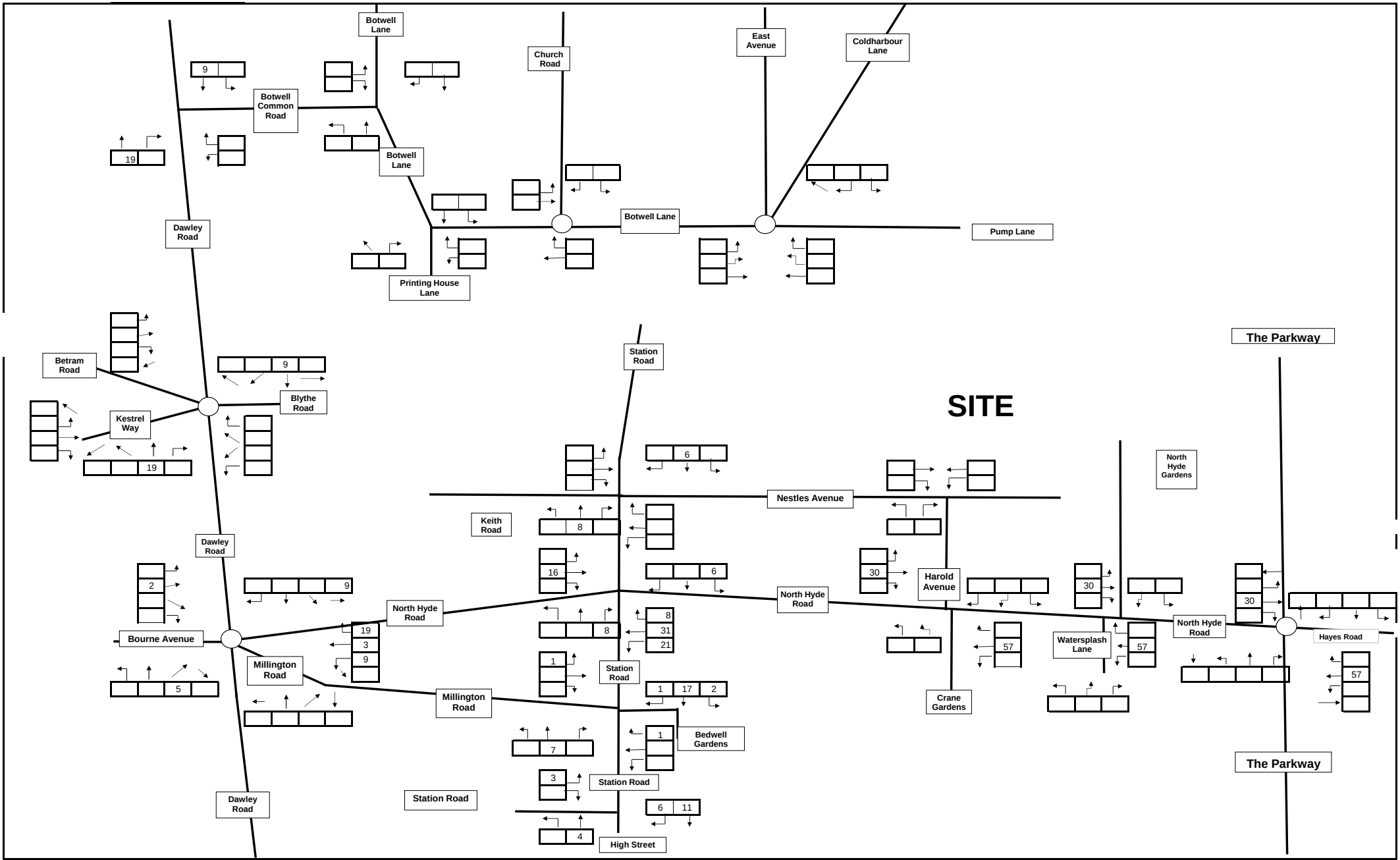

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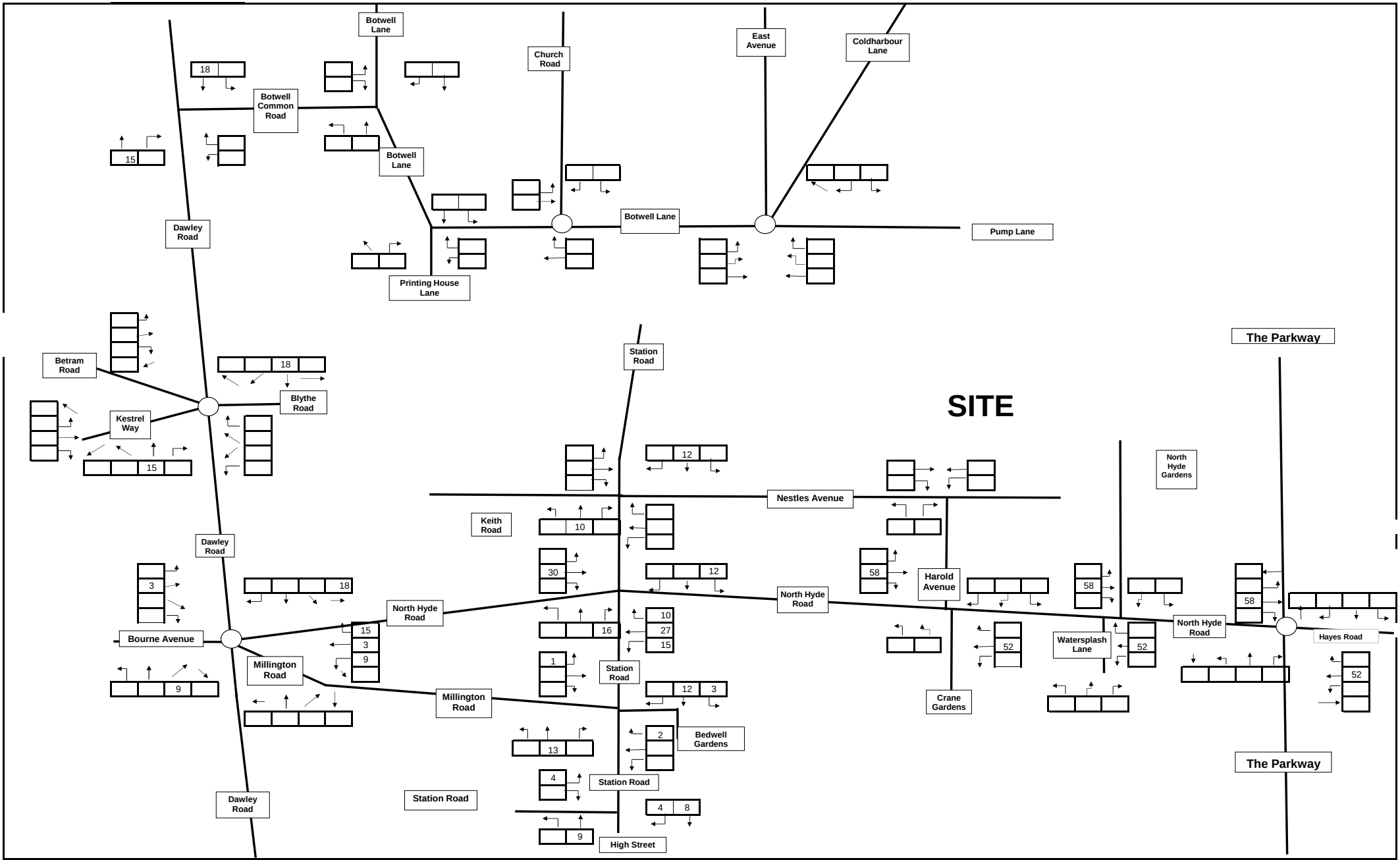
		Figure No:	Date: **01/10/2016**



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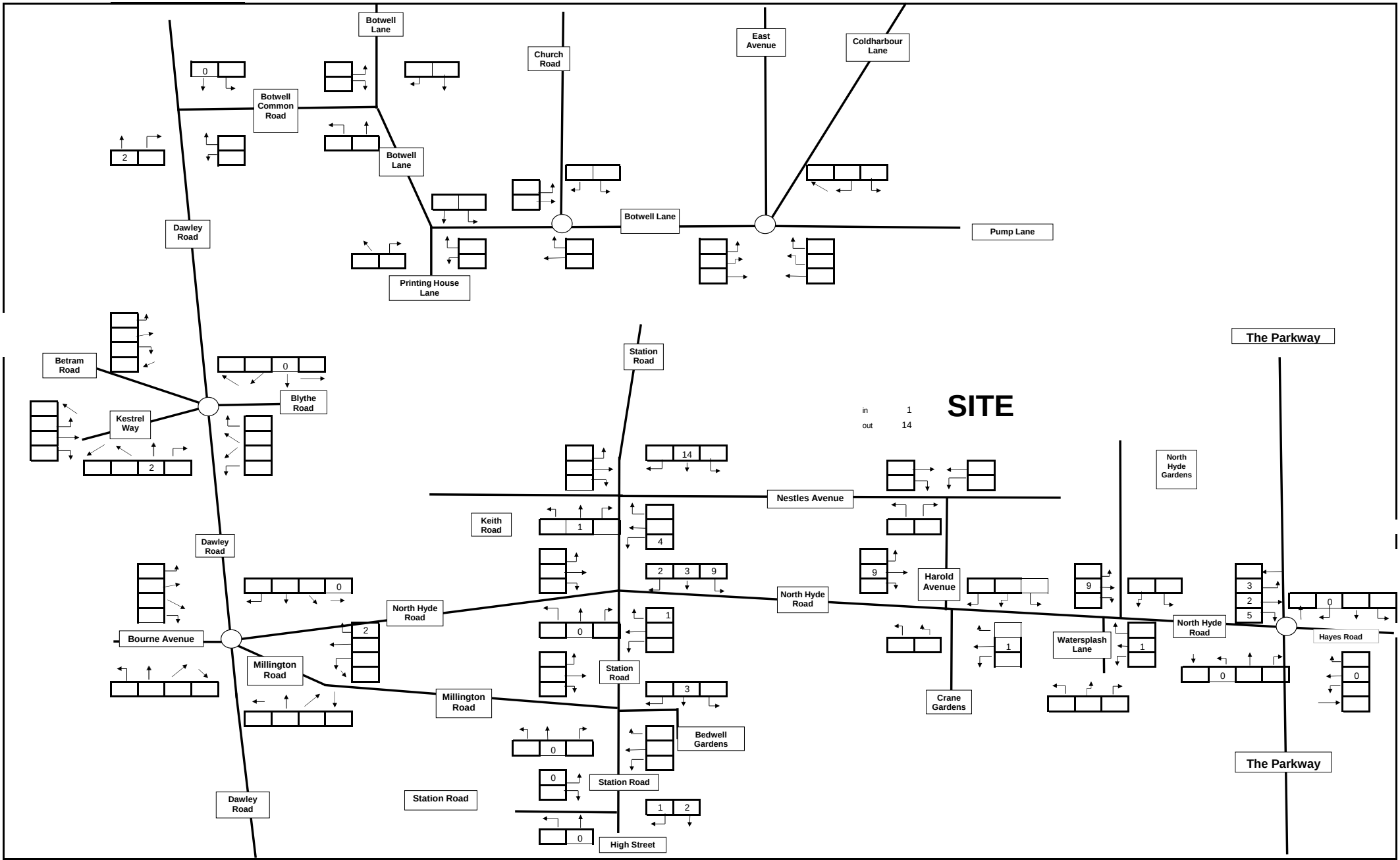

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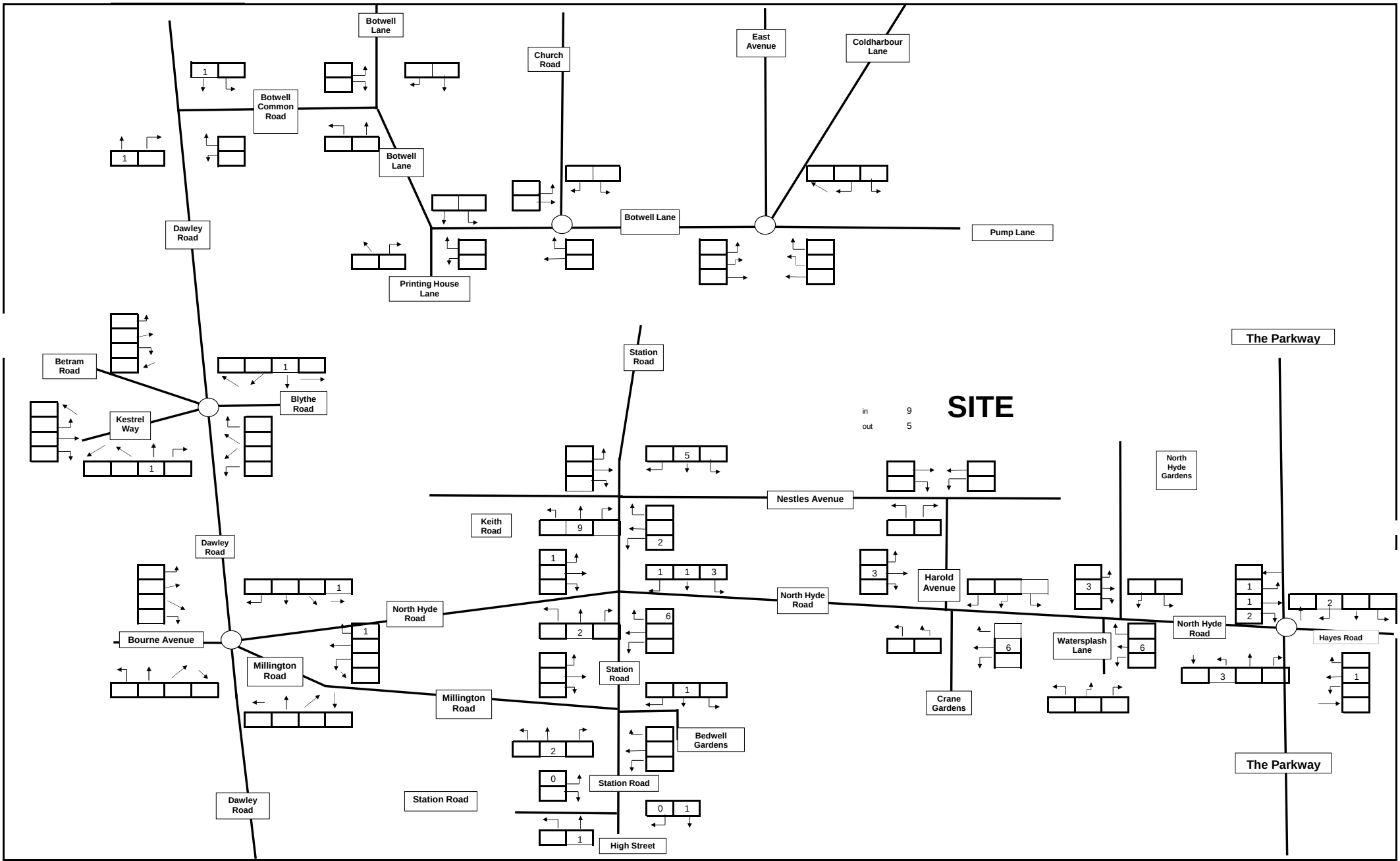

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Notes:

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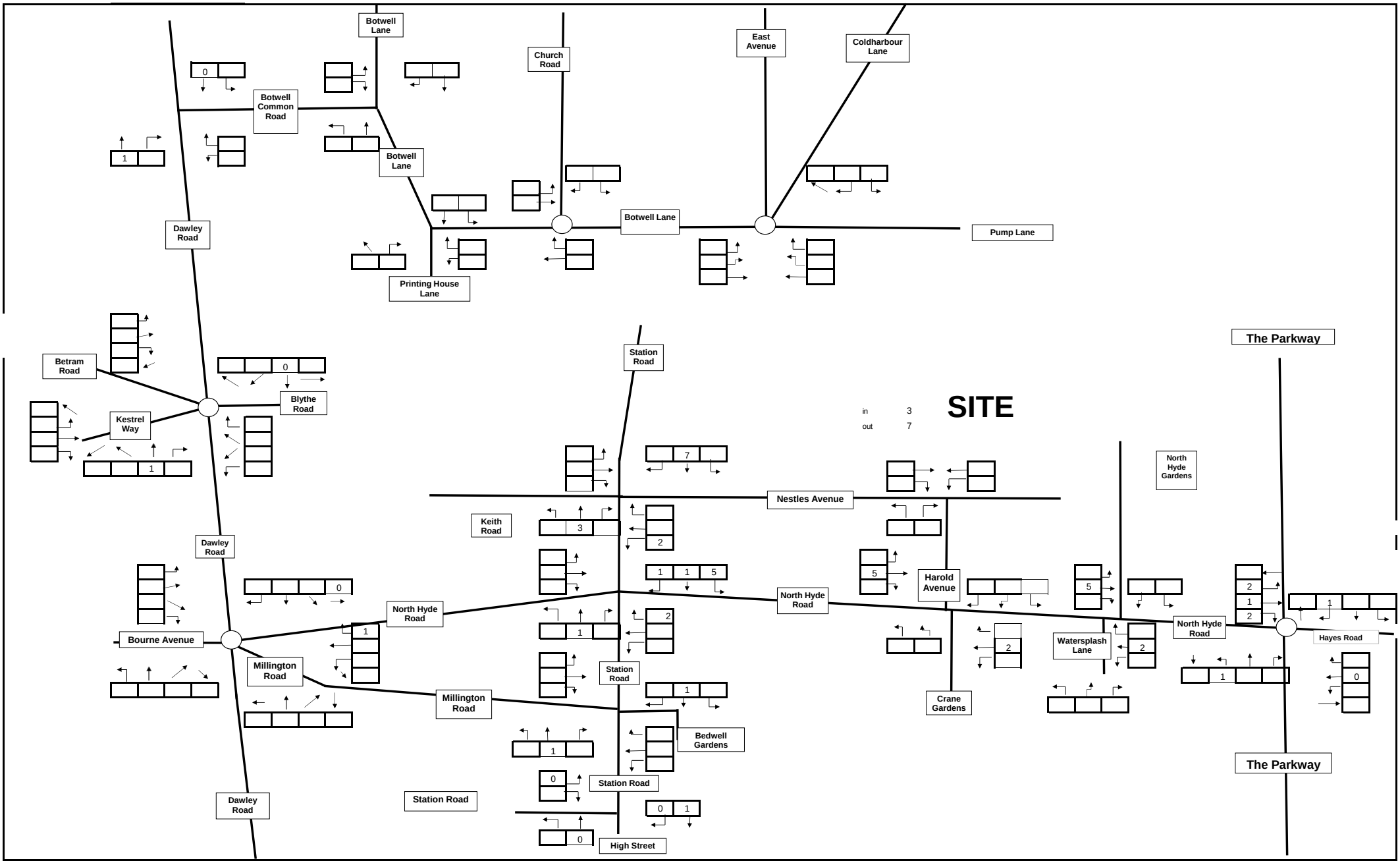

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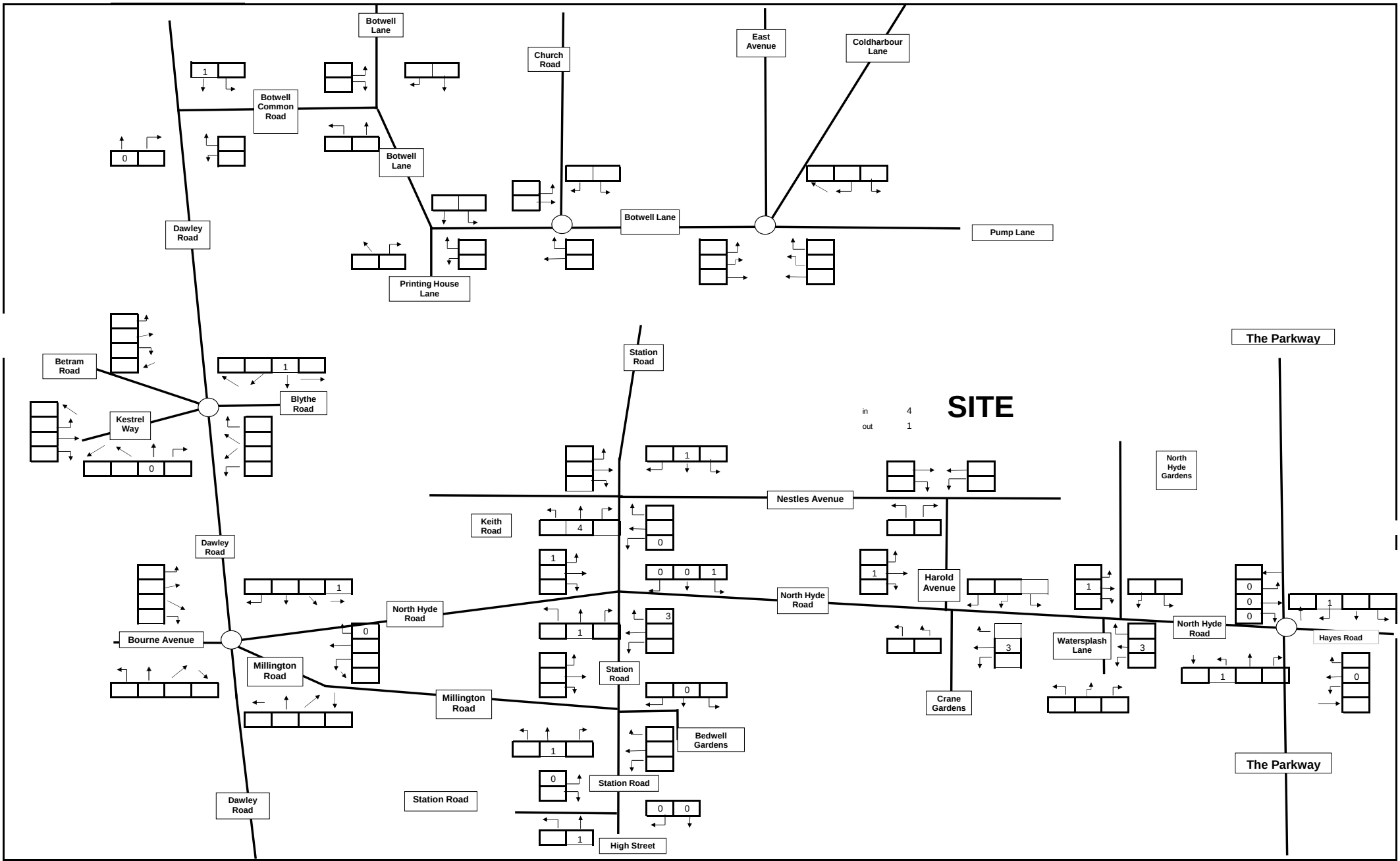
Notes:

Job Title: **Former Nestles Factory Hayes**	Scale: **NTS**
Drawing Title: **Union House AM**	Job No: **16018-01**
Figure No:	Date: **01/10/2016**



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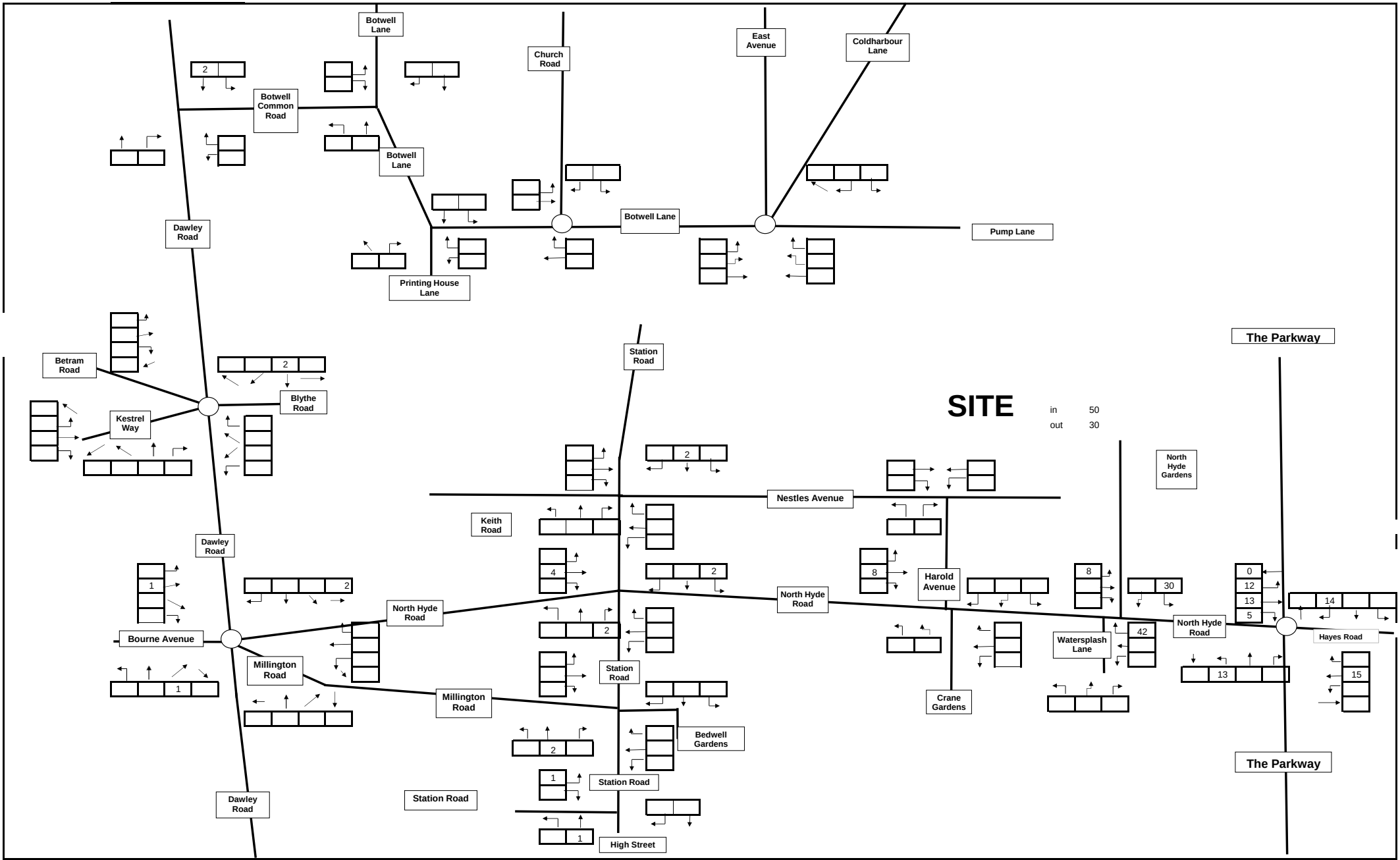

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		Drawing Title: **Unit A Bulls Bridge AM**	Job No: **16018-01**
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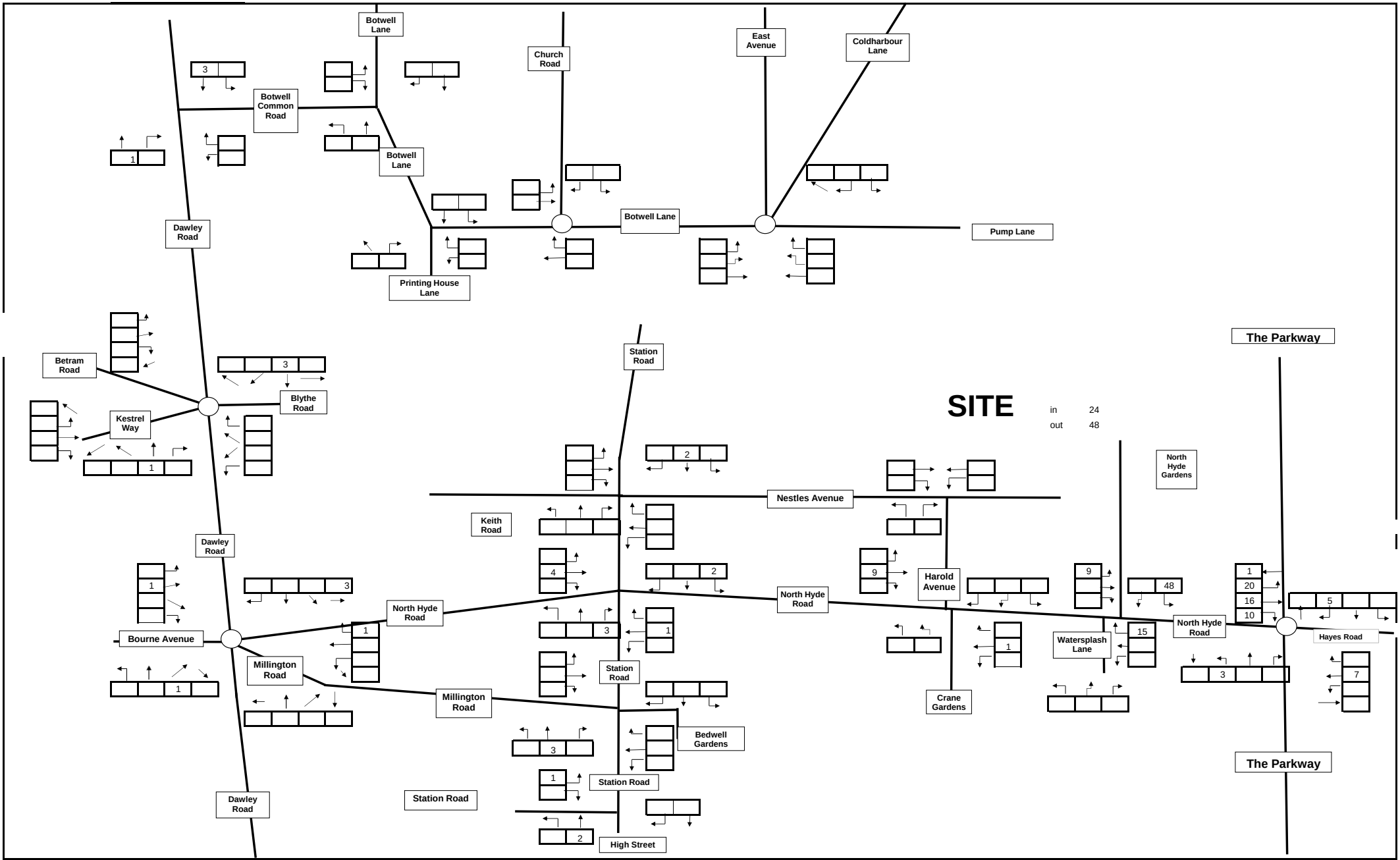

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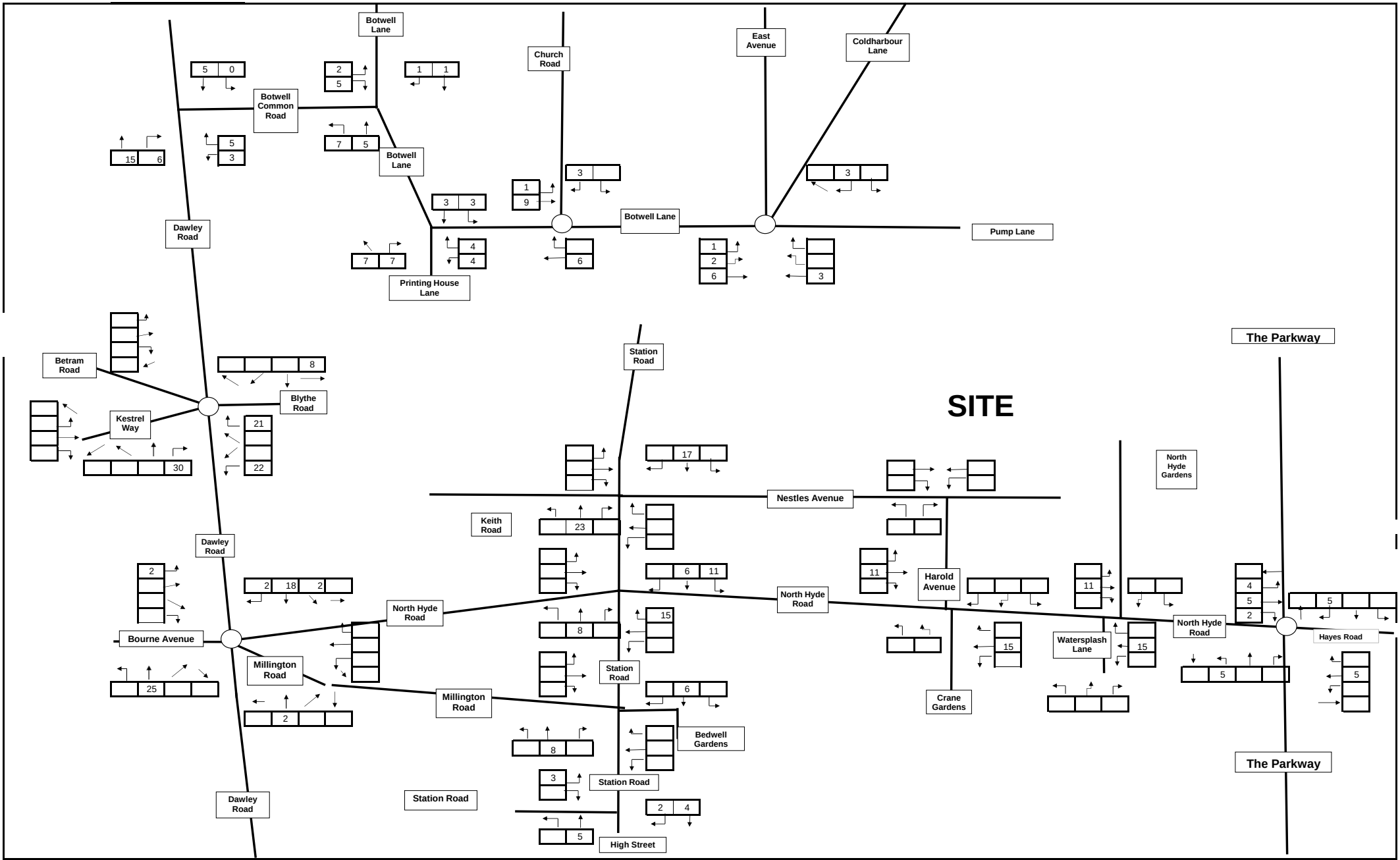
Figure No:	Date: **01/10/2016**



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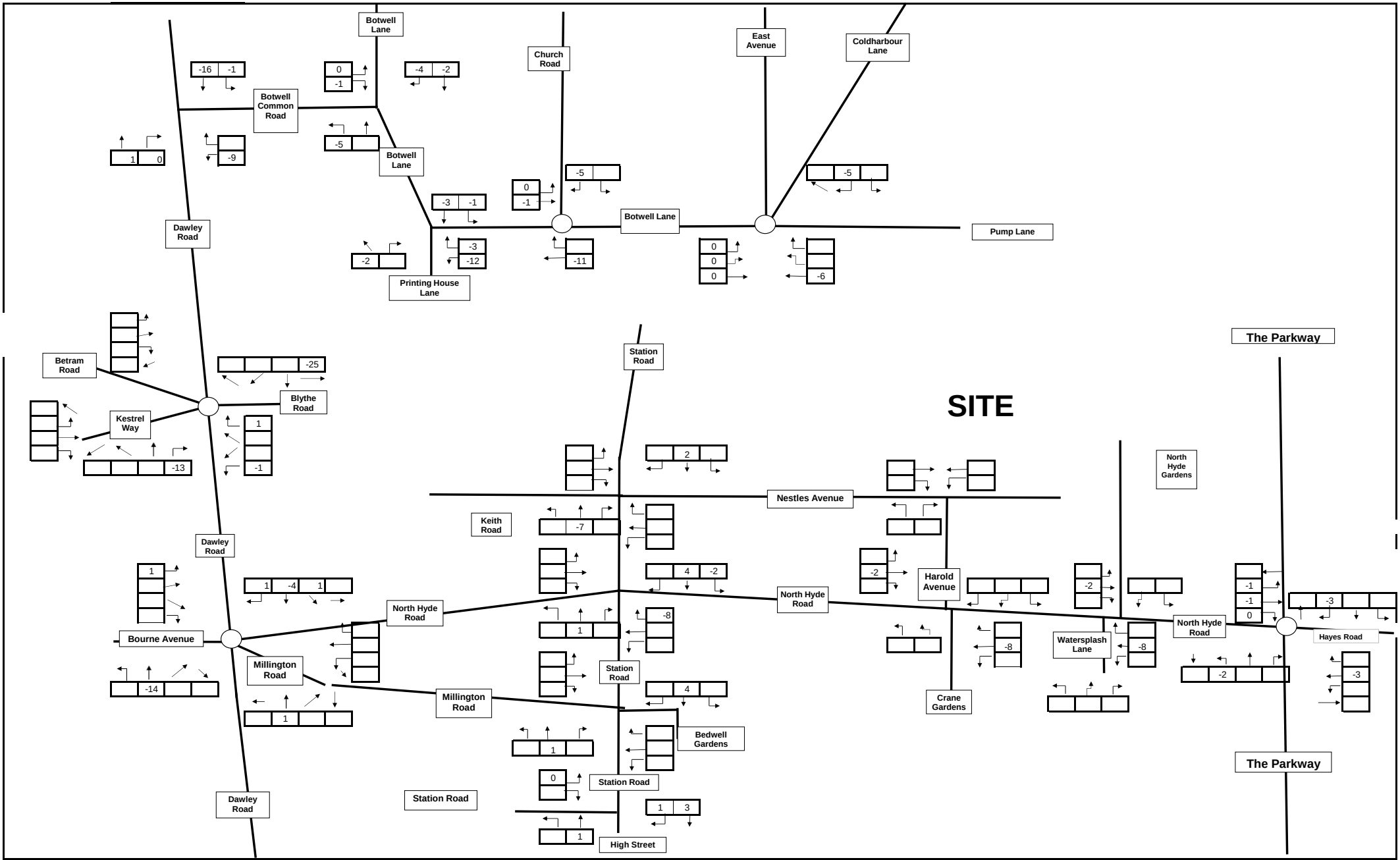
		Drawing Title: **UTC College AM**	Job No: **16018-01**
		Figure No:	Date: **01/10/2016**



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		Drawing Title: **UTC College PM**	Job No: **16018-01**
		Figure No:	Date: **01/10/2016**

although the number of units and parking provision are considered to be broadly comparable.

6.8 Below we provide details of the derived average peak hour and daily vehicular and person trip rates within Tables 6.5 and 6.7 respectively whilst the resulting trip generation is displayed within Tables 6.6 and 6.8 respectively.

Table 6.5: Person Trip Generation Rates for Residential (per unit)

	Arrivals	Departures	Total
AM Peak (08:00-09:00)	0.021	0.432	0.453
PM Peak (17:00-18:00)	0.319	0.141	0.461
12 Hour (07:00-19:00)	2.10	2.159	4.269

Table 6.6: Person Trip Generation - 60 Residential Units

	Arrivals	Departures	Total
AM Peak (08:00-09:00)	1	26	27
PM Peak (17:00-18:00)	19	8	27
12 Hour (07:00-19:00)	126	130	256

Table 6.7: Vehicle (Car Driver) Trip Rates for Residential (per unit)

	Arrivals	Departures	Total
AM Peak (08:00-09:00)	0.010	0.145	0.156
PM Peak (17:00-18:00)	0.088	0.053	0.141
12 Hour (07:00-19:00)	0.563	0.609	1.173

Table 6.8: Vehicle Trip Generation - 60 Residential Units

	Arrivals	Departures	Total
AM Peak (08:00-09:00)	1	9	10
PM Peak (17:00-18:00)	5	3	8
12 Hour (07:00-19:00)	34	37	71

5.2 Residential Development (Class C3)

5.2.1 The sample set of TRICS sites was obtained by selecting the following;

- Land use category = 03 Residential – C Flats Privately Owned
- All sites were included within the UK excluding all Ulster, Scotland, Connaught, Munster, Leinster and Greater Dublin;
- Range between 1 and 100 residential units;
- All weekend sites were deselected;
- Average trip rates have been obtained (based on per no of dwellings)

Table 4.2 Predicted Traffic Generation Figures (proposed residential development)

Peak Time Period	Arrivals 85th percentile trip rates (per single apartment)	Departures 85th percentile trip rates (per single apartment)	Total 2 way Trips
08:00 – 09:00	0.065 (3)	0.205 (10)	13 trips
17:00 – 18:00	0.168 (8)	0.080 (4)	12 trips
	11	**14**	**25 trips**

[Source: TRICS Database Version 7.1.1]

5.2.2 The sites have been selected to provide a variation in trip rates to demonstrate reliability in the estimated average trip rates, as requested by LBHC and includes similar residential sites in Bristol, Cheshire, Denbighshire, Dorset, Flintshire, Haringey, Islington and Oxfordshire amongst others.

5.2.3 The trip rates obtained from TRICS are shown in table 4.2 above for the predicted traffic generation levels for the proposed residential apartments. It is clear from the above calculations that a significant decrease in traffic levels will be generated during the peak operating periods on the network for the proposed residential development in comparison to the existing offices. The proposed residential development will generate approximately 25 No. 2 way trips during the AM and PM peak periods. The previous office development will have generated approximately 58 No. 2 way trips during the AM and PM Peak hours that is considerably more than the proposed residential development.

5.2.4 Table 4.3 below shows the residual traffic flow figures that have been calculated, demonstrating that the potential impact of the proposed residential apartment will have no detrimental impact to the local highway network.

AM PEAK (EXISTING)

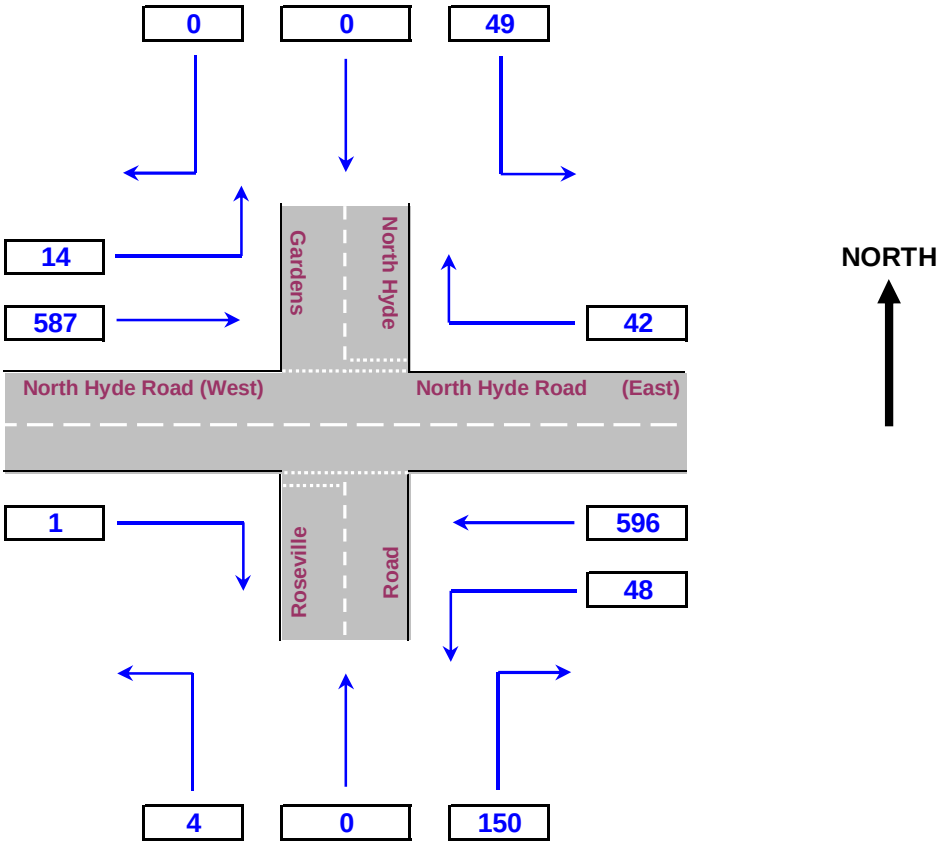
Junction: (1) North Hyde Gardens / North Hyde Road / Roseville Road

Vehicle Class: ALL CLASSES

Start Time: 1) 0800

End Time: 1) 0900

☐ **Peak Hour**



Note: The above diagram represents the Junction surveyed, although may not be the exact layout of the actual location.

Important Note: This spreadsheet & Interactive Vehicle Flow Diagram was produced based on specific parameters. Consequently, alteration to the spreadsheet format or it's properties may result in malfunction.

AM PEAK (PLUS DEVELOPMENT)

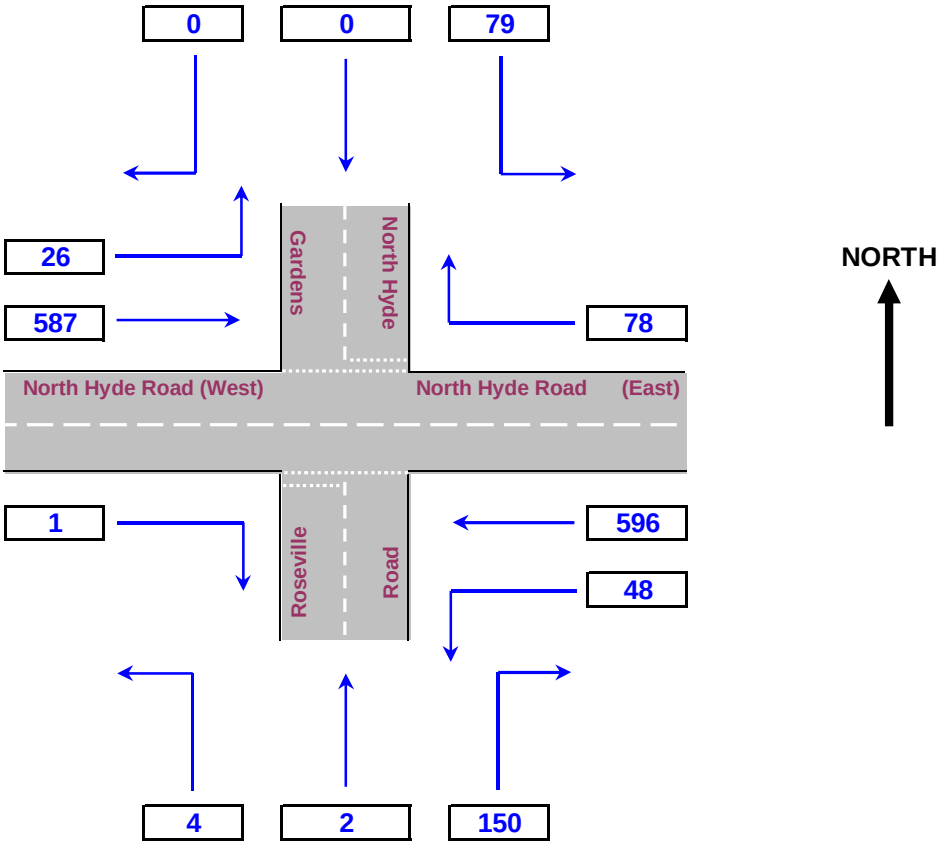
Junction: (1) North Hyde Gardens / North Hyde Road / Roseville Road

Vehicle Class: ALL CLASSES

Start Time: 1) 0800

End Time: 1) 0900

☐ **Peak Hour**



Note: The above diagram represents the Junction surveyed, although may not be the exact layout of the actual location.

Important Note: This spreadsheet & Interactive Vehicle Flow Diagram was produced based on specific parameters. Consequently, alteration to the spreadsheet format or it's properties may result in malfunction.

PM PEAK (EXISTING)

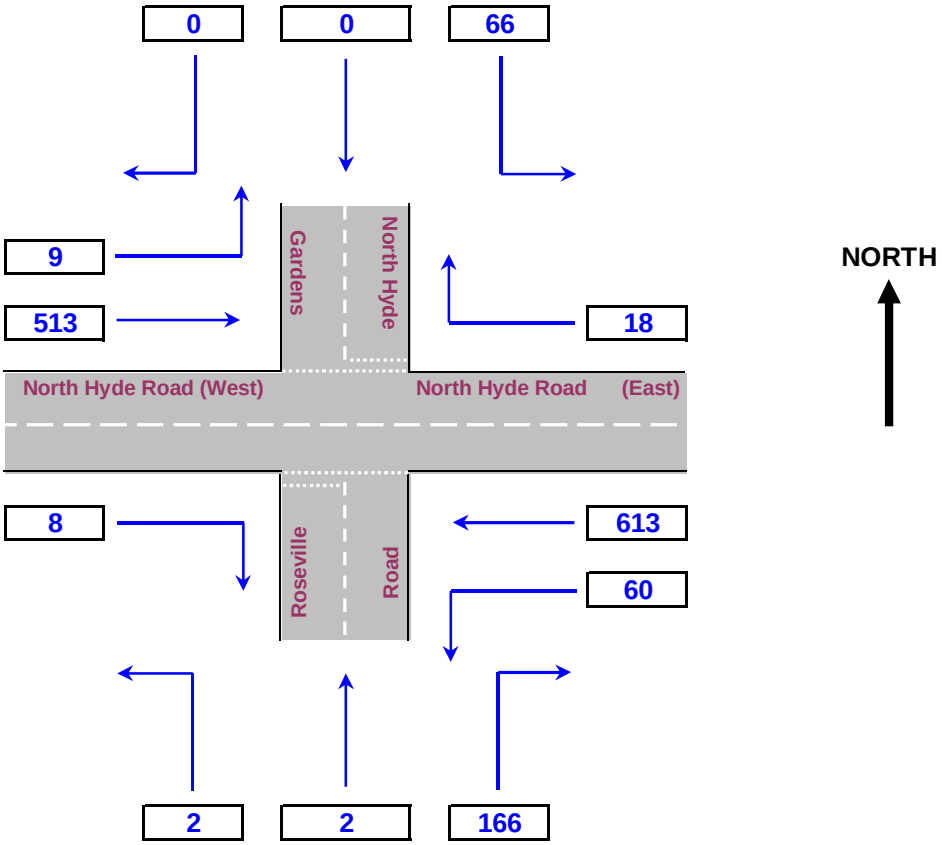
Junction: (1) North Hyde Gardens / North Hyde Road / Roseville Road

Vehicle Class: ALL CLASSES

Start Time: 2) 1700

End Time: 2) 1800

☐ **Peak Hour**



Note: The above diagram represents the Junction surveyed, although may not be the exact layout of the actual location.

Important Note: This spreadsheet & Interactive Vehicle Flow Diagram was produced based on specific parameters. Consequently, alteration to the spreadsheet format or it's properties may result in malfunction.

PM PEAK (PLUS DEVELOPMENT)

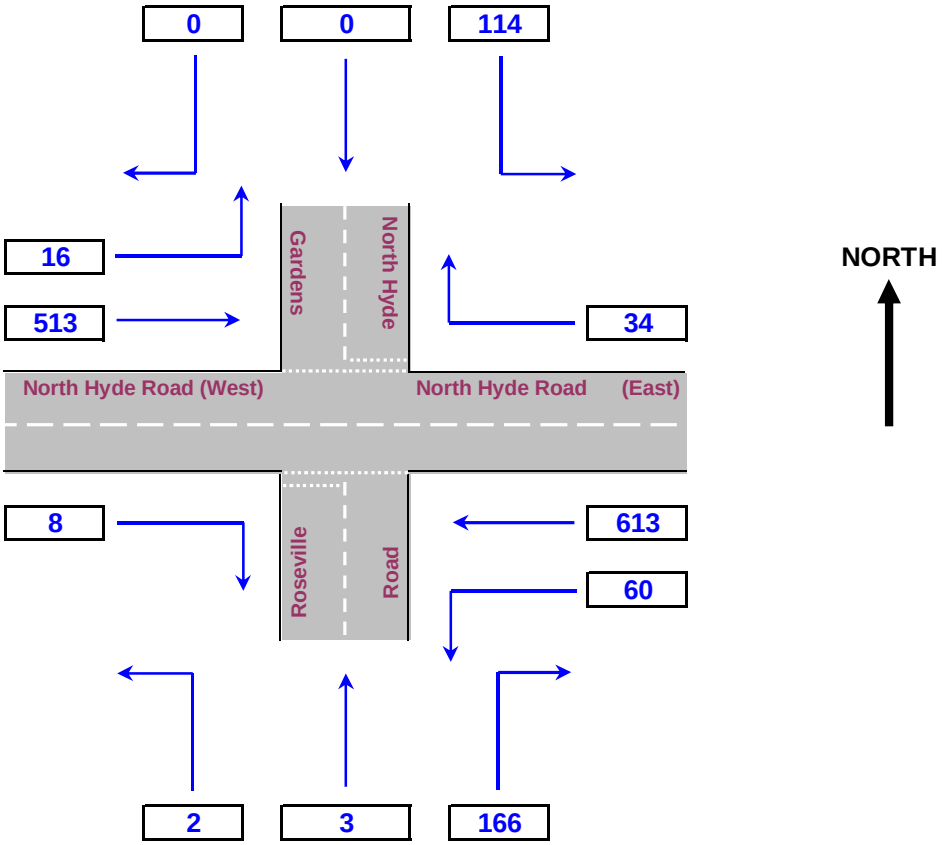
Junction: (1) North Hyde Gardens / North Hyde Road / Roseville Road

Vehicle Class: ALL CLASSES

Start Time: 2) 1700

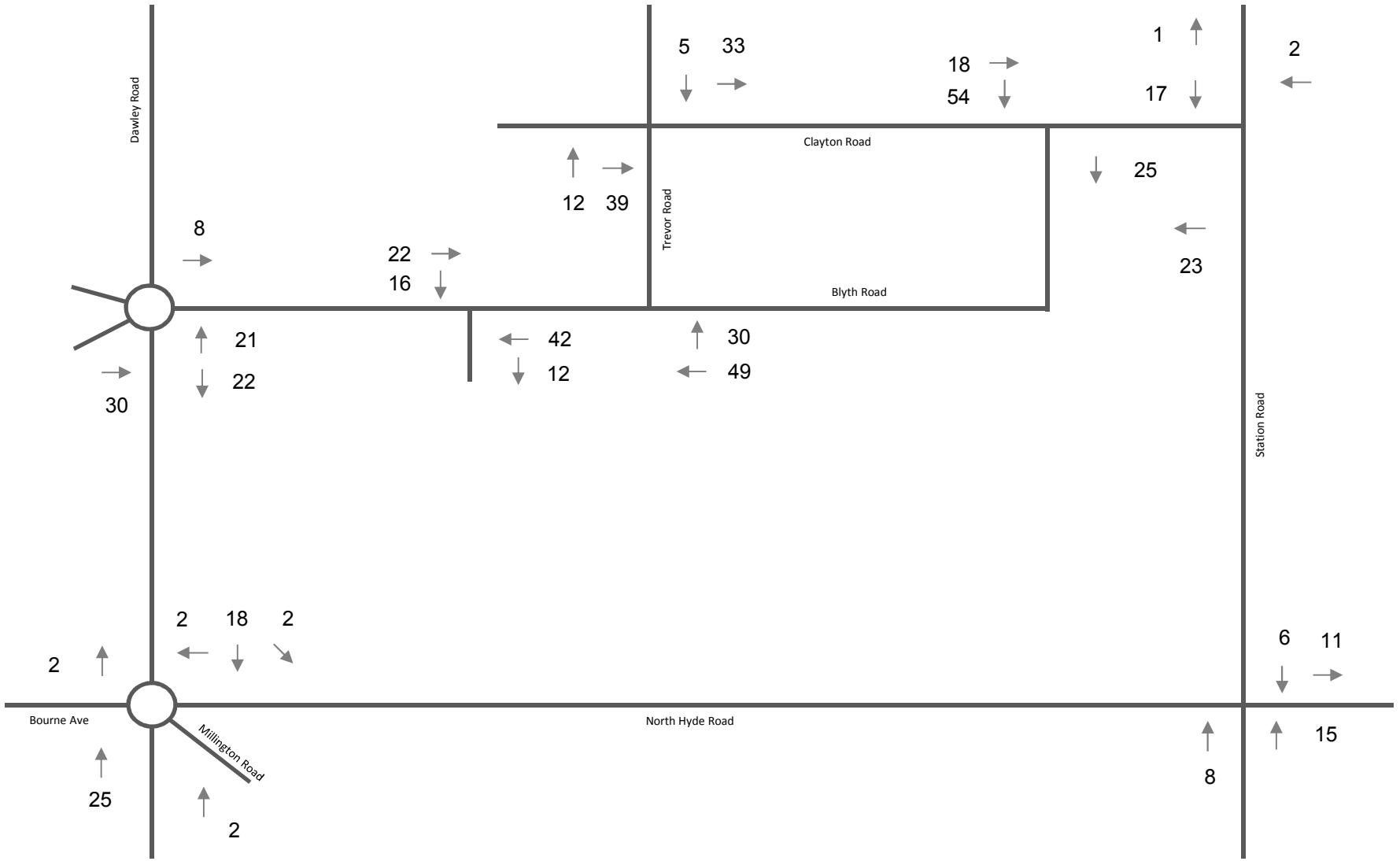
End Time: 2) 1800

☐ **Peak Hour**



Note: The above diagram represents the Junction surveyed, although may not be the exact layout of the actual location.

Important Note: This spreadsheet & Interactive Vehicle Flow Diagram was produced based on specific parameters. Consequently, alteration to the spreadsheet format or it's properties may result in malfunction.



TURNING MOVEMENTS

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Figure T1: AM peak development trips (08:00-09:00)

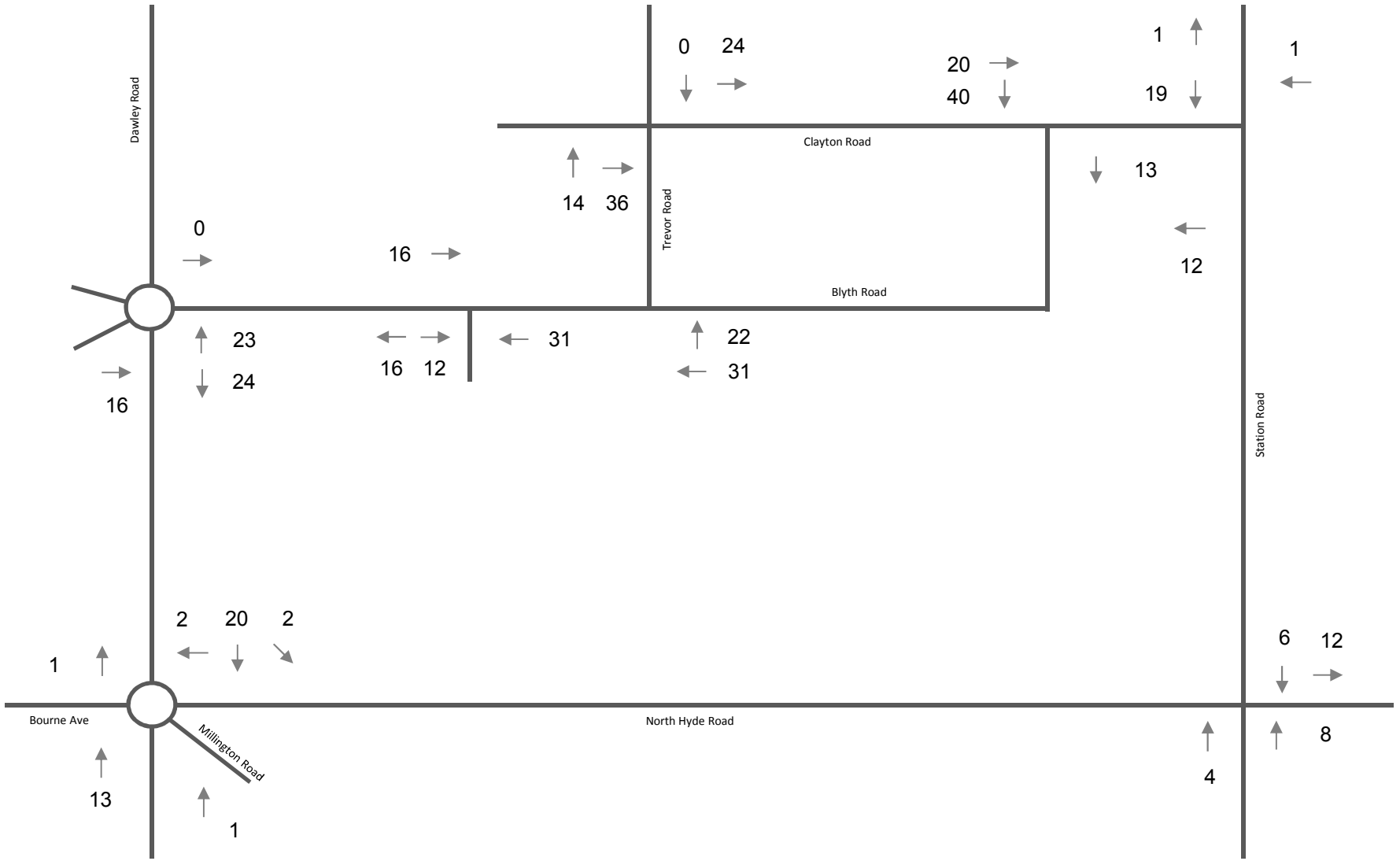

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Figure T2: PM peak development trips (17:00-18:00)

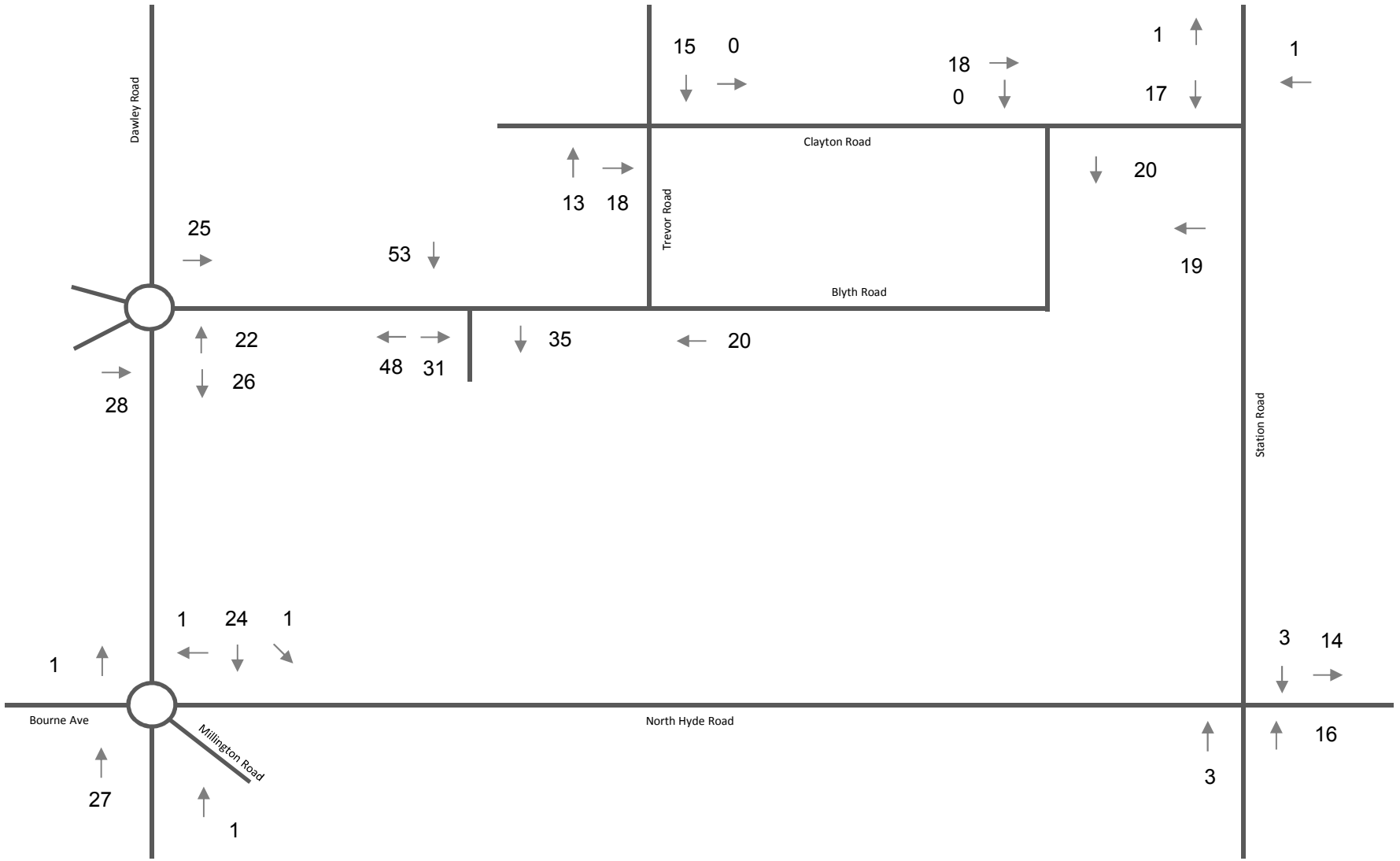

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Figure T3: PM peak cinema trips (17:00-18:00)

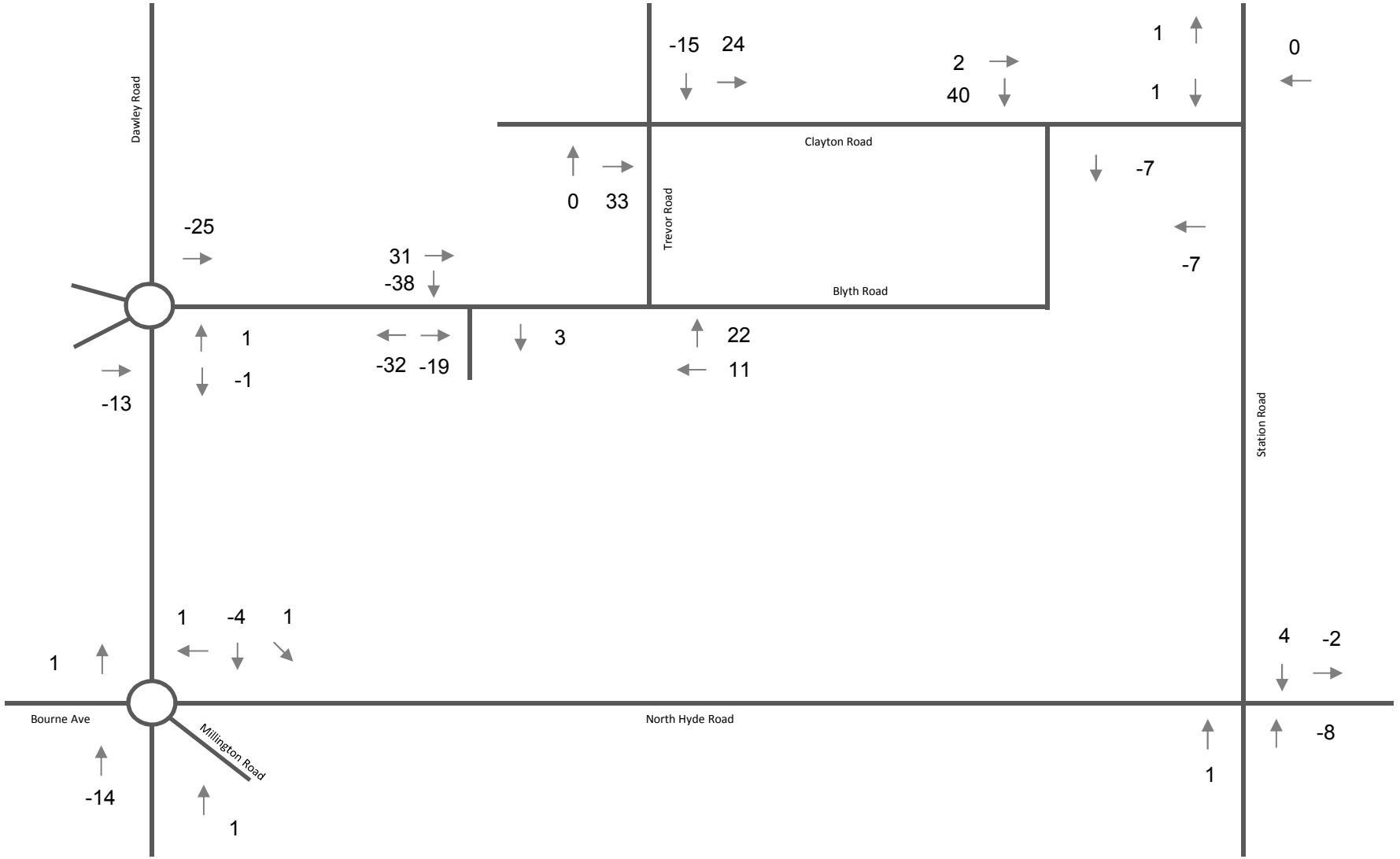

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Figure T4: Difference in PM peak trips (17:00-18:00)

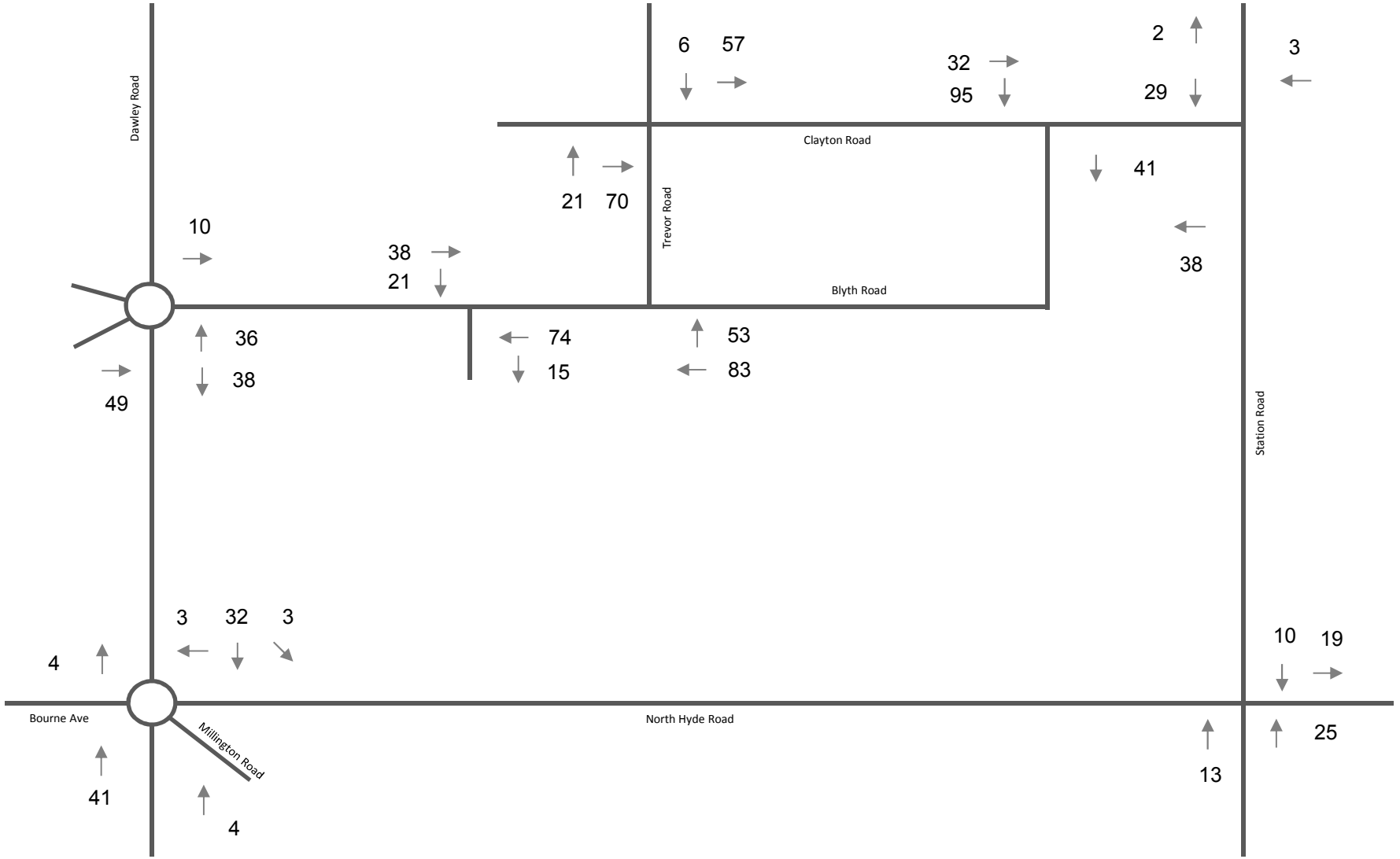

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Figure T5: AM peak sensitivity test (08:00-09:00)

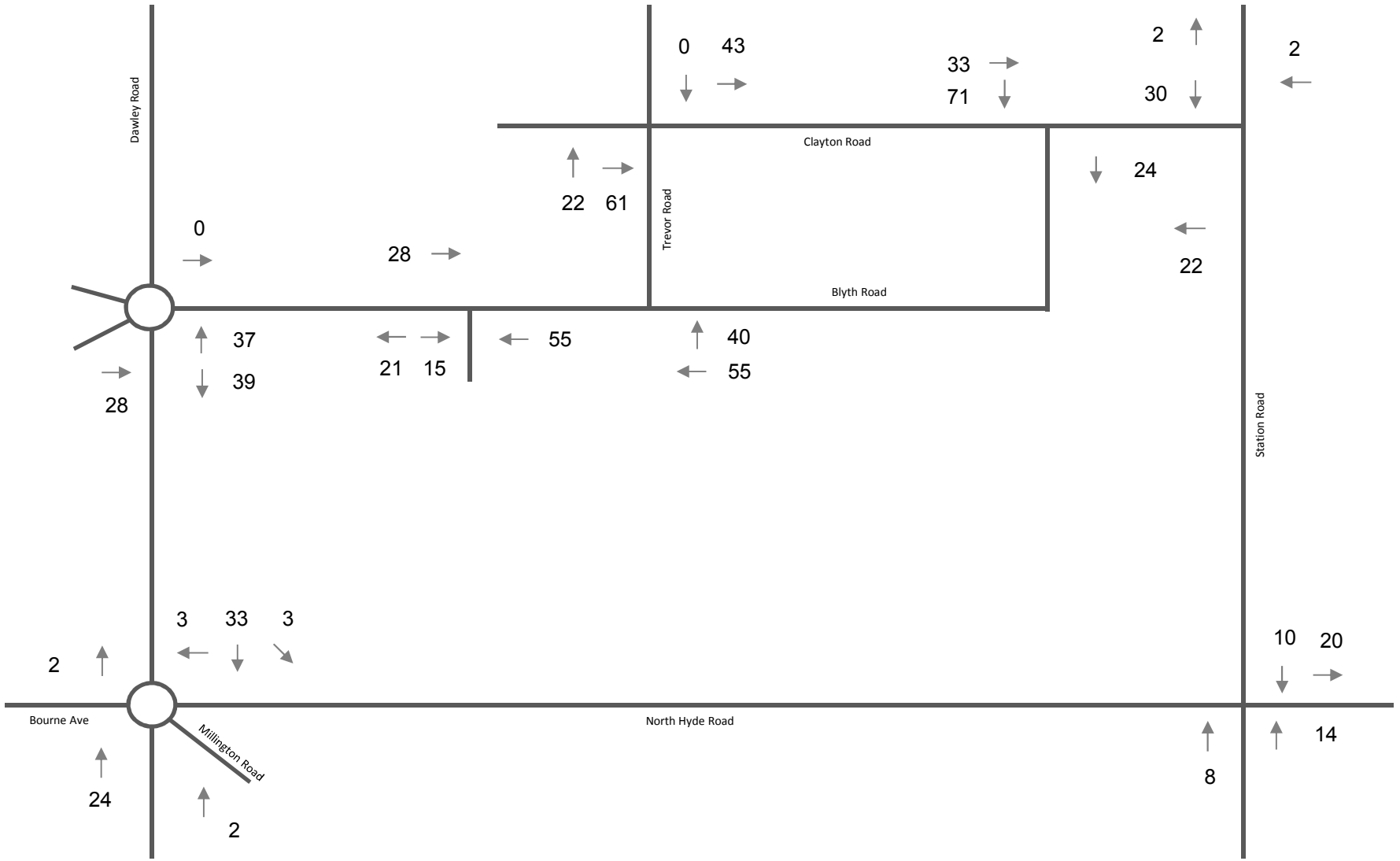

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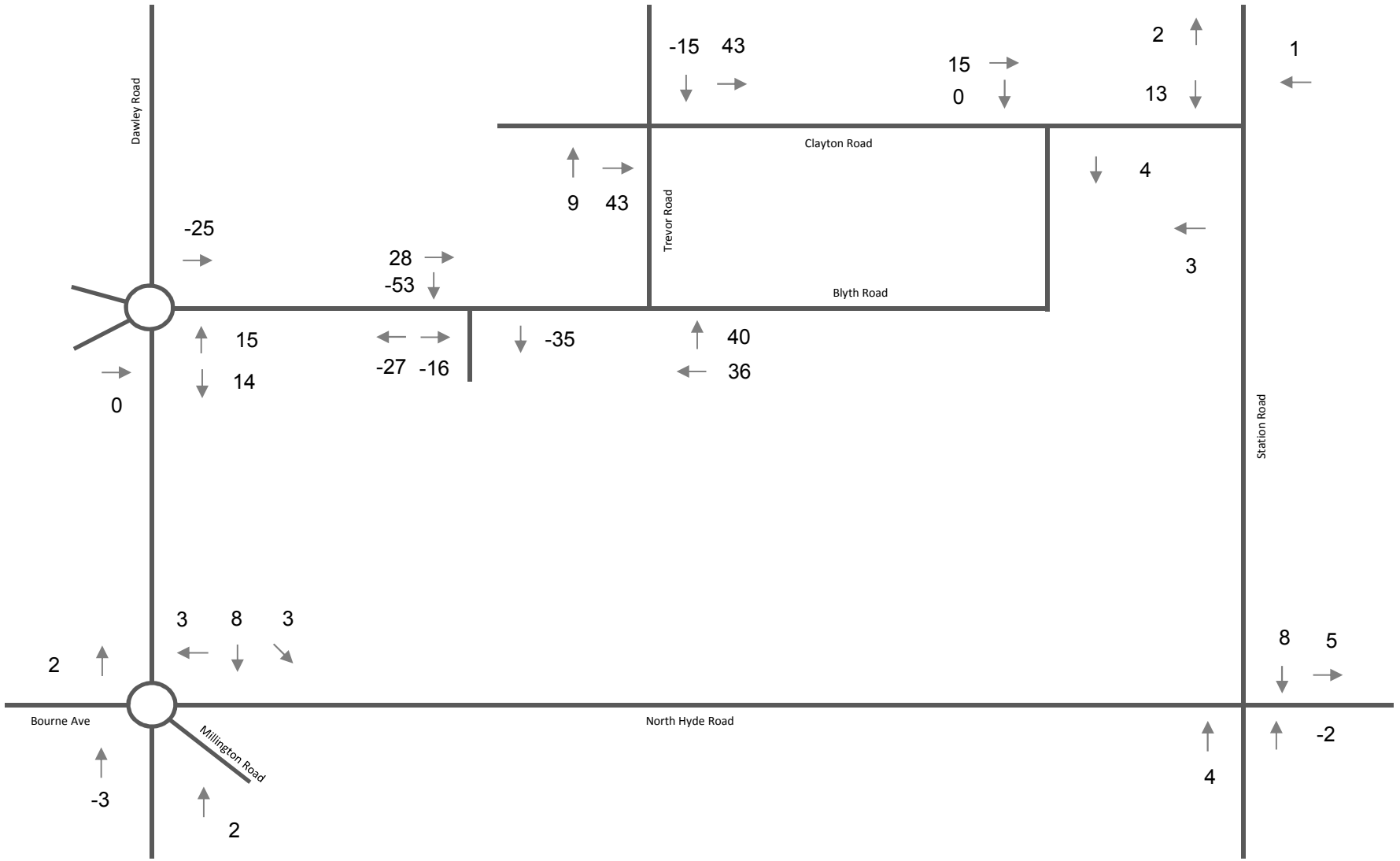
Figure T6: PM peak sensitivity test (17:00-18:00)



TURNING MOVEMENTS

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Figure T7: Difference in PM sensitivity trips (17:00-18:00)

APPENDIX B

Technical Note

Project:	**Former Nestle Factory, Hayes**	Job No:	**1000003934**
Subject:	**Audit of Nestle Site Traffic Models - 2017**		
Prepared by:	**Samuel Asare**	Date:	**27th June 2017**
Approved by:	**Ebenezer Harris**	Date:	**27th June 2017**

This brief technical note provides a summary of the audit of traffic models in support of the Transport Assessment for Nestle Site, Hayes. The technical note comments on general issues relating to the modelling and individual models for the peak hours and options considered. The comments are based on the sections of the Transport Assessment which discuss traffic modelling. It should be noted that the technical note of the Base VISSIM models prepared by Norman Rourke Pryme's has been reviewed for this exercise.

Comments on Base Modelling:

VISSIM LMVR

- Paragraph 3.9.1 states that dynamic assignment has been used in the Base VISSIM modelling whilst TfL modelling guidelines recommends static modelling. This contradicts the NRP report statement that the models have been developed in line with TfL guidelines. Clarification will be needed as to why static assignment was not used.
  Dynamic assignment was used specifically at the request of Syed Shah of LBH. The need for this approach was identified on page three of his letter dated 31 August 2016. The use of dynamic assignment was questioned by us on the in an e-mail dated 12th September 2016 saying that it was not the recommended approach for models of this size. Syed's response restated his requirements for a dynamic assignment approach to be used and, in order to satisfy his requirement, this is the modelling approach that was applied.
- Paragraph 4.1 suggest that traffic surveys covering turning counts and others were undertaken on 19th April 2016 whilst travel time data used for validation was carried out on 30th June 2016. As journey time is dependent on traffic conditions at that time, the observed journey times on 30th June 2016 will be different from the journey times on 19th June 2016, the day the traffic counts were undertaken. This could impact or brings into question the robustness of the base VISSIM models. Clarification is needed as to why corresponding journey times on 19th April 2016 were not used for the validation.
  The junction turning counts were undertaken in advance of the full extent of junctions to be assessed were agreed and before the need for a new VISSIM model for the was identified. The use of later journey time surveys was discussed with Syed Shah and agreed at the time (see e-mail trail regarding VISSIM modelling 20th June 2016). We remain of the view that the requirement to construct a VISSIM model at all was excessive and that the assessment would have been robust using stand-alone junction models.
- Paragraph 4.1.4 – more information is required on the special coded traffic signals to replicate the queuing conditions on the A312 approach to the M4.
  Observations were made that showed a queue extended back from the junction with the M4 to near the southbound exit of the Bulls Bridge roundabout. A number of methods were assessed to model

this accurately and consistently. The method chosen was to have a signal at the southern extent of the A312 that would be red until the queue extended back to the Bulls Bridge roundabout. On link 195 of the VISSM model there were detectors that, when activated, turned the signal on the A312 to green. This meant that the queue would build until it extended back to the detectors, at which point green time would be given to reduce the queue. It would then build back to the detectors and so on.

- Paragraph 4.3.4 – Bus dwell times should be derived from traffic surveys and not from iBus data that does not reflect conditions on the ground at the time of the surveys. Bus dwell times are dependent on passengers alighting and boarding at each stop and this varies throughout the day and time. The report mentions that where dwell times could not be derived from the iBus Data, VISSIM default dwell time mean value of 20 seconds and standard deviation of 2 were used. This assumption could be far from reality if there are more or less passengers using the stops. Were site visits or observations undertaken to support this assumption?
  The use of iBus data for bus dwell times has been accepted on previous modelling submissions to TfL. Given the number of routes and stops within the study area, use of iBus data collected on the day of the original survey (19th April 2016) is considered appropriate. The default dwell time has not been used in the model. The text in the LMVR should have been amended to reflect that.
- Table 3 shows that there are some stoplines where there is significant difference in the VISSIM saturation flow and the LinSig values. Saturation Flow is based on having adequate discharge across the stopline and nothing, such as exit blocking or give-way, impeding the flow across the stopline. More so, saturation flow calibration should be based mainly on cars (as LinSig is based on PCU) and there should be separate calibration VISSIM files to support that. Clarification is needed whether saturation flow calibration was done using additional vehicle types, such as HGV in the models. More so, it should be clarified whether actual counts during the surveys were used for the calibration and therefore leading to insufficient or low flows across some stoplines. More information is required as to why LinSig saturation flows are used for the comparison and not actual observed values. Is the LinSig values based on RR67 that is, calculated from lane geometries?
  The saturation flows used within the LINSIG models are taken direct from observations that were undertaken at the same time that the turning counts and have been used in the LINSIG models. The automated saturation flow measurement includes all vehicles but did not include sequences where gaps between vehicles was greater than 2.5s. This means that it is queues of cars (and other light vehicles) where the most data is collected. This methodology has been used for numerous scheme submissions to TfL and has been accepted. Overall, the saturation flows validate well, with the vast majority within 10% and all but two within 15%. The two locations where the difference in sat flows is over 20% both have high observed sat flows (>2,300). The VISSIM model already uses RSAs that generate a higher saturation flow and it was considered inappropriate to use increase speeds even further.
- Paragraph 5.4 relates to model convergence as dynamic assignment was adopted for the modelling. As highlighted earlier, TfL modelling guidelines recommends static assignment and requires reasons to be provided if that cannot be done. NRP should provide evidence or explanation as to why the dynamic was used and not the static assignment.
  See response to the first point. Dynamic assignment was undertaken specifically at the request of LBH.
- Paragraph 5.6.4 suggest that turning movements for each junction were undertaken during the traffic surveys. This information could easily be used to statically assign the vehicles in the VISSIM. It will therefore be helpful if NRP can clarify why this approach has not been taken but then used the turning counts at each junction to develop origin-destination matrix and then dynamically assigned into the VISSIM models.

See response to the first point. Dynamic assignment was undertaken specifically at the request of LBH.

- Paragraph 5.7.2 indicates that traffic flow validation has been done based on turning counts. This then brings into question, the purpose or benefits of using the dynamic assignment or derived origin – destination flow matrix for the modelling.
- See response to the first point. Dynamic assignment was undertaken specifically at the request of LBH.
- Paragraph 5.9.1 states that journey time surveys were undertaken on the same days as the other surveys. However, paragraph 4.1 suggests different days for the original dataset and the travel time data. NRP to clarify.

  Agreed. Journey time surveys were undertaken on a different day to the original flow surveys. See response to second point.

  Paragraph 5.9.15 suggests that not all bus journey times validate. This is of concern considering that buses carry more passengers, and to assess the impact of the scheme on buses, the base models must accurately simulate bus journey times. More so, NRP must include the comparison of the bus journey time in the main report (as done for general traffic) and not in the Appendix considering that bus journey time impact is critical for schemes.

  It is agreed that bus journey times are important. However, because the journey times for cars were actually collected on site these are deemed to be more accurate than the iBus data (although it is reasonable to use this).Therefore, the model validates well for car journey times, which suggests that the bus journey times are also likely to have an appropriate level of accuracy. The graphs in the Appendix E show the routes mostly validate well. Given the overall accuracy of the model in terms of validation, the bus journey times are considered fit for purpose for this models

PICADY / ARCADY / LinSig

- The results of the base PICADY and LinSig models are provided in section 4.0 of the TA. Ratios of Flow to Capacity (RFC) and Degrees of Saturation (DoS) for some junction approaches are more than 1.00 or 100%. It should be clarified why operating capacities for existing situations can be greater than 1.00 or 100% if flows going through the junctions have been used.

  Looking firstly at the LINSIG models, the only signal junction models built specifically for this TA are those covering the signals on Station Road between North Hyde Road and High Street. These all have Do's less than 100%. The LINSIG models of the Bulls Bridge Roundabout and M4 J3 are models of the existing junction that have been supplied direct by TfL and the baseline performance shown in taken directly from their baseline models.

  Turning to the PICADY models, it is notoriously difficult to validate models of give way junctions undertaken using PICADY and ARCADY. No specific guidance on validations methods is provided in the TfL modelling guidance and the PICADY Manual itself identifies that queue length observations can be so variable that they do not provide a reliable method of validation. The only two PICADY models showing RFC's in excess of 1 in the baseline are Dawley Road / Bothwell Common Road in the AM peak and Bothwell Lane / Printing house Lane in the PM peak. On site observations have indicated that there is queuing at these junctions at those times. If further validation is required at these junctions we are happy to discuss and agree a method for doing so.

- The results, in particular for the signalised junctions, do not show any re-validation or comparison of the base model results to observed values relating to the traffic conditions during the survey periods

(2016). Therefore, it is unknown whether the base model results reflect site conditions. An explanation of how the models have been calibrated and validated will be required as explanation of this situation.

As mentioned above, the only signal junction models built specifically for this TA were the junctions along Station Road. Paragraph 4.25 of the TA states 'provided in Appendix N is a comparison between observed and modelled Degrees of Saturation that demonstrated that the model is reflecting the conditions on the ground.' The signal models have therefore been validated against on site observations. The models of the Bulls Bridge Roundabout and M4 J3 are approved TfL models that they are utilising themselves in the development of improvement schemes for those junctions.

Comments on Proposed Modelling:

VISSIM

- Paragraph 8.2 of the Nestle Site, Hayes TA states that the TfL WelHAM reassignment model has been used to derive future traffic flows. However, the future traffic flows have not been provided as part of the Transport Assessment. It is requested that the future traffic flows should be provided as part of the Transport Assessment.
  See Appendix B of the TN02 tech note attached.
- Although Section 8.0 of the Transport Assessment provides the future model results in journey times, it is difficult to ascertain the traffic impact of the scheme without seeing the models. As a minimum the queue lengths of the base and future models should be provided in addition to the journey time results, to give a good a good understanding of the traffic impact.
  The VISSIM model files are attached to this response. **See Appendix C of TN02 attached.**

PICADY / ARCADY / LinSig

- As discussed under the comments on the Base modelling, some of the junction arms are shown to operate over capacity. This casts doubt on the robustness of the base models and for that matter proposed models. A review of the base models will be necessary to address the capacity issues discussed. In the case of the LinSig models it will have to be reviewed if the appropriate signal timing (stage durations, bonus green times from demand dependent stages and phase delays) for the modelled peak hours during the survey day are accurately applied.
  The LINSIG models files are attached for review, along with the survey data on signal timings.

- Notwithstanding the above comment, the proposed standalone junction modelling shows significantly high RFC values and queues. The predicted queues (for example 189 vehicles equating to about more than 1 km) are likely to extend to surrounding junctions and affect operations by means of causing exit blocking. This likely scenario will not be accounted for in the modelling and therefore the results for the stand-alone junctions should not be used to ascertain or conclude on the impact of the development on the highway network. The results shown in the TA are likely to be optimistic.

  As discussed at our recent meeting, the approach for predicting future year traffic flows (both with and without the development) that was required of us by LBH has resulted in much higher future year traffic flows that we believe to be realistic. TfL have specifically required the use of WeLHAM to assess the junctions on their network (Bulls Bridge Roundabout and M4 J3), whereas the LBH methodology required the use of TEMPRO growth and trip generation information from Transport

Assessments of committed developments. This results in substantially higher traffic flows than would arise from the WeLHAM model and it remains our view that the flows used in the Assessment are a significant over-estimate of the likely situation in the future. On that basis, the results shown in the TA are pessimistic, not optimistic.

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traffic and transportation

Former Nestle Factory, Hayes

Scenario Tests

Produced for Barratt Homes

February 2017

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1 INTRODUCTION

1.1 BACKGROUND

1.1.1 Norman Rourke Pryme (NRP) has been commissioned by Barratt Homes (in conjunction with Markides Associates) to undertake traffic modelling to assess the impact of the proposed development at the Former Nestle Factory, Hayes.

1.1.2 The purpose of this study is to produce a number of scenario based VISSIM models of the Hayes Town Centre to include Station Road to the south, Botwell Common to the North, the A312 The Parkway to the east, and Shepiston Lane to the west.

1.1.3 The scenarios tested and discussed within this document include:

- Baseline 2024
- Baseline 2024 + Development
- Baseline 2024 + Development + Sensitivity
- 5 Years After Opening
- 5 Years After Opening + Development
- 5 Years After Opening + Development + Sensitivity

1.1.4 VISSIM version 5.40-08 was used in the development of these models.

1.1.5 The model filenames submitted with this note are constructed using the following references – note the **XXX** will be replaced by the initials shown in bold below.

- Main title: HayesTC_5408_**XXX**_AM.inp / HayesTC_5408_**XXX**_PM.inp
- Baseline 2024 – **BL**
- Baseline 2024 + Development - **BLD**
- Baseline 2024 + Development + Sensitivity - **BLDS**
- Baseline 2029 - 5 Years After Opening – **5BL**
- Baseline 2029 - 5 Years After Opening + Development – **5BLD**
- Baseline 2029 - 5 Years After Opening + Development + Sensitivity – **5BDS**

1.1.6 All maps / plots within this document contain *OS data © Crown copyright and database right (2016)* and *© OpenStreetMap contributors.*

2 PURPOSE AND SCOPE OF THE VISSIM MODEL

2.1 PURPOSE

2.1.1 The purpose of this study is to produce a number of scenario tests that accurately represent future traffic conditions to compare to the initial base model so that a reliable comparison of the impact can be made to the proposed scheme.

2.2 SCOPE

2.2.1 The scope of the model is shown in Figure 2.1 on the following page.

Figure 2.1: Study area

2.2.2 The area bounded by the dashed line, indicates a 'buffer zone' where the validation criteria required is turning counts only in the base model, however for consistency, this area is included in the scenario models.

2.2.3 The signalised junction and pedestrian crossings included within the scenario models are listed below:

VA Junction

- J26/010 - STATION / NORTH HYDE ROAD – CLF Control / V/A.
- J26/261 - MILLINGTON ROAD / STATION ROAD – CLF Control
- J26/075 - HIGH STREET / STATION ROAD – Local Control VA

UTC SCOOT

- J25/126 - HAYES ROAD - A312 THE PARKWAY - A437 NORTH HYDE ROAD - BULLS BRIDGE ROUNDABOUT

- J25/127 - HAYES ROAD - A312 THE PARKWAY - A437 NORTH HYDE ROAD - BULLS BRIDGE ROUNDABOUT
- J25/128 - HAYES ROAD - A312 THE PARKWAY - A437 NORTH HYDE ROAD - BULLS BRIDGE ROUNDABOUT
- J25/129 - HAYES ROAD - A312 THE PARKWAY - A437 NORTH HYDE ROAD - BULLS BRIDGE ROUNDABOUT
- J26/130 - HAYES ROAD - A312 THE PARKWAY - A437 NORTH HYDE ROAD - BULLS BRIDGE ROUNDABOUT
- J25/131 - HAYES ROAD - A312 THE PARKWAY - A437 NORTH HYDE ROAD - BULLS BRIDGE ROUNDABOUT
- J25/132 - HAYES ROAD - A312 THE PARKWAY - A437 NORTH HYDE ROAD - BULLS BRIDGE ROUNDABOUT
- J26/146 - NORTH HYDE ROAD - NORTH HYDE GARDENS - WATERSPLASH LANE

Pelican

- J26/134 - BOTWELL LANE @ CENTRAL [PEL]J00/263 - B518 AGINCOURT ROAD BY CRESSY ROAD

Puffin

- J26/024 - NORTH HYDE ROAD BY ROSEVILLE ROAD [PUFFIN]
- J26/031 - STATION ROAD BY REDMEAD ROAD [PUFFIN]
- J26/056 - DAWLEY ROAD BYBLYTH ROAD [PUFFIN]
- J26/059 - NORTH HYDE ROAD BY CRANFORD PARK [PUFFIN]

PED X CROSSING – **NEW**

- J26/098 - PUMP LANE @ STATION [PED X CROSSING]
- J26/107 - BOTWELL @ STATION [PED X CROSSING]
- J26/108 - COLDHARBOUR LANE @ PUMP LANE [PED X CROSSING]
- J26/109 – STATION ROAD [PED X CROSSING]

2.2.4 The Puffin crossings **J26/098**, **J26/107** and **J26/108** have been recoded as **Ped X Crossings**. The stoplines for **J26/107** have been moved to the west to accommodate the new link connecting Station Road to the Botwell Lane roundabout.

2.2.5 These changes are part of the Hayes Town Centre redevelopment scheme and have been coded using the provided VISSIM proposed model from SDG. The SDG associated VISSIM Proposed Model Validation Technical report is dated October 2014. The timings coded have been based on the timing data shown below (also found in the SDG report).

Figure 2.2 - Pedestrian Crossing Timings

Timings

Pedestrians	Traffic		7 / 20
Red Man	Green (UTC/Local)	A	
Red Man	Amber	A to B I/G	3
Red Man	Red		2
Green Man	Red	B	6
Blackout	Red	B to A I/G	5
Red Man	Red		3
Red Man	Starting Amber		2

PRE-Timed Max Road Width 9.2 m

26/98 Pump Lane

Timings

Pedestrians	Traffic		7 / 20
Red Man	Green (UTC/Local)	A	
Red Man	Amber	A to B I/G	3
Red Man	Red		2
Green Man	Red	B	6
Blackout	Red	B to A I/G	8
Red Man	Red		3
Red Man	Starting Amber		2

PRE-Timed Max Road Width 12 m

26/109 Station Road

Timings

Pedestrians	Traffic		7 / 20
Red Man	Green (UTC/Local)	A	
Red Man	Amber	A to B I/G	3
Red Man	Red		2
Green Man	Red	B	6
Blackout	Red	B to A I/G	4
Red Man	Red		3
Red Man	Starting Amber		2

PRE-Timed Max Road Width m

26/107 Botwell Lane

Timings

Pedestrians	Traffic		7 / 20
Red Man	Green (UTC/Local)	A	
Red Man	Amber	A to B I/G	3
Red Man	Red		2
Green Man	Red	B	6
Blackout	Red	B to A I/G	7
Red Man	Red		3
Red Man	Starting Amber		2

PRE-Timed Max Road Width 11.2 m

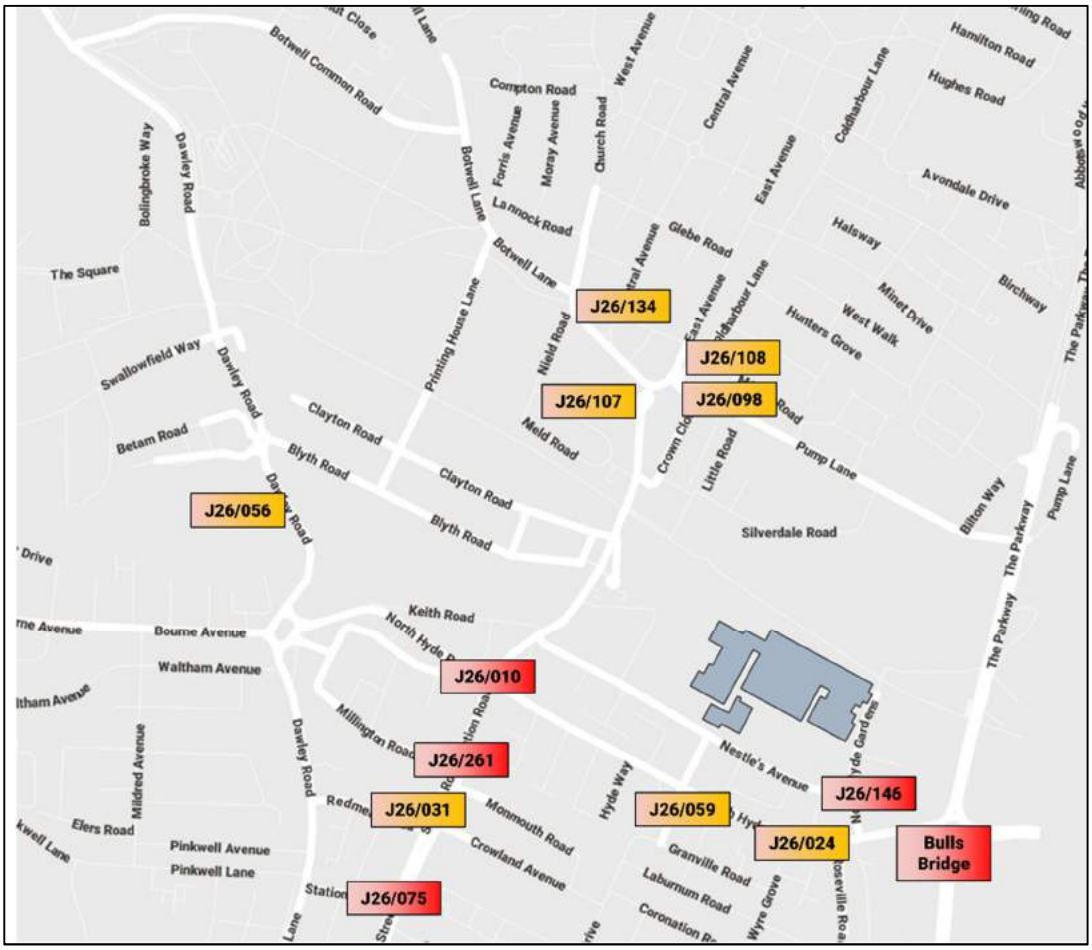
26/108 Coldharbour Lane

Model Calibration Signal Operation (replicated from the base model)

- J25/115 Parkway SB OffSlip & Circulatory – replicates Southbound congestion seen A312 towards the M4.
- J25/114 M4 OffSlip & Circulatory – replicates M4 Offslip platooning traffic
- HGV Unstick - Pump Lane – replicates width restriction operation on Pump Lane
- J25/135 - HAYES LANE / TESCO ACCESS [FT] – replicates Hayes Lane / Tesco Access platooning traffic

2.2.6 The operation of the three VA junctions have been coded using a combination of CLF plan data and site observations. It should be noted that none of the traffic signals are part of the TfL UTC network.

Figure 2.3: Signalised junction locations



2.2.7 The Zebra crossings at the following locations are also included in the model:

- Botwelll Common Road o/s no 112 Botwell Common Road.
- Station Road at the Station Road / Shepiston Lane / Dawley Road mini-roundabout
- Dawley Road at the Station Road / Shepiston Lane / Dawley Road mini-roundabout
- Dawley Road north of Redmead Road junction
- Botwell Common Road at the Botwell Common Road / Botwell Lane mini-roundabout
- Botwell Lane at the Botwell Common Road / Botwell Lane mini-roundabout
- Crown Lane at the Crown Lane / Pump Lane junction
- Clayton Road at the Station Approach / Clayton Road / Station Road mini-roundabout
- Station Road o/s Hayes & Harlington Railway Station

2.2.8 The Scenario models have been developed in accordance with TfL VMAP under '*Stage 5 – Proposed*' for the AM and PM peak periods.

3 MAP STAGE 5 – SCENARIO TESTS

3.1 NETWORK CHANGES (V503)

3.1.1 As part of committed development in and around Hayes Town Centre, the following figures show the coding changes between the Base and the Scenario models. All the network changes are consistent with the changes provided as part of the SDG proposed model.

NOTE – the SDG model contained off-road cycle lanes. These have not been coded into the scenario models as cyclist have not explicitly been modelled. As such, there would be no comparison available between the base and the scenario models.

3.1.2 The **Hayes town centre improvements** introduce a new link between Station Road and Botwell Lane. An additional roundabout is located here with one additional pedestrian crossing.

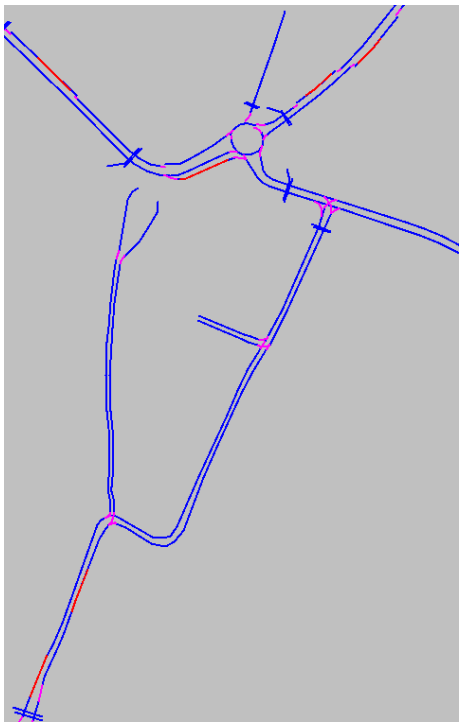
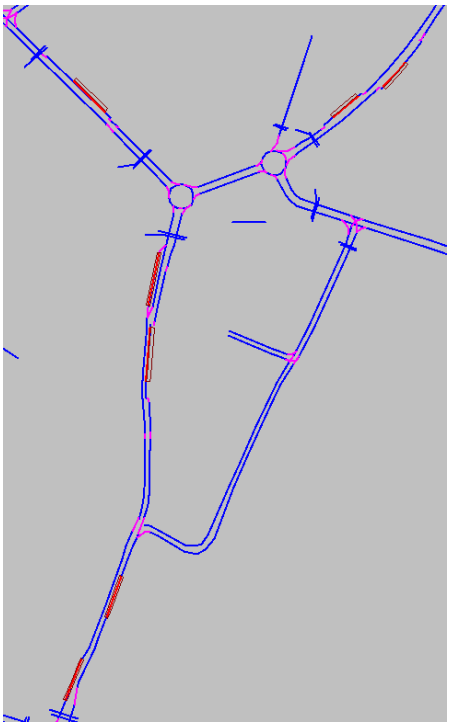
3.1.3 Two bus stops are introduced in both directions.

3.1.4 Traffic can no longer travel northbound via Crown Lane whereas all traffic can now travel southbound rather than only public transport through the Crown Lane bus gate.

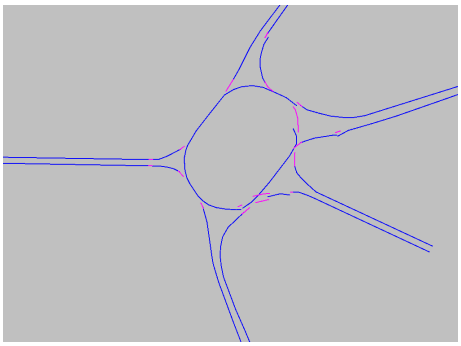
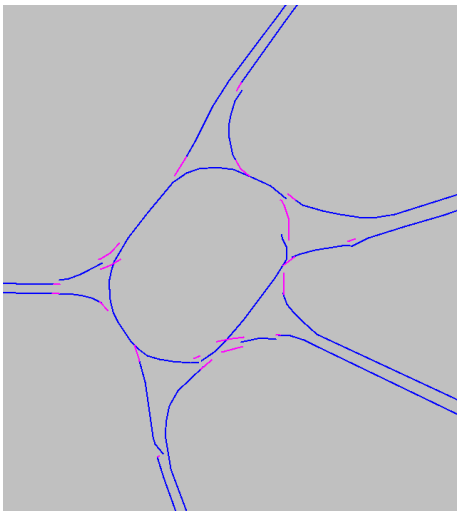
3.1.5 Figure 3.1.1 below, shows the Hayes Town Centre improvement scheme as prepared by the London Borough of Hillingdon in December 2014. The provided VISSIM model from SDG contains coding for this improvement scheme and has been replicated as part of this work. The coding at the two roundabouts is fairly rudimentary in the way traffic operates. In order to replicate previous work – the coding has been retained with a few refinements such as priority rule tweaks.

Figure 3.1: Hayes Town Centre Improvement Scheme

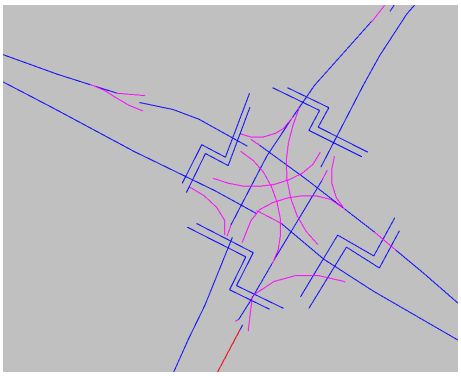
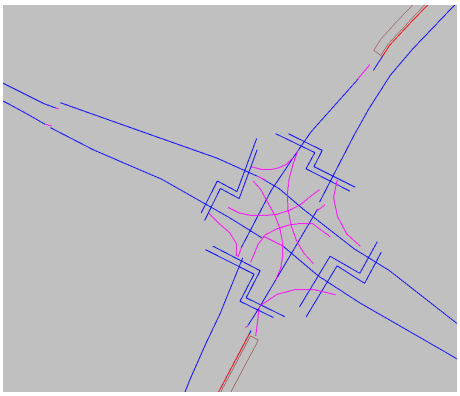
3.1.6 The following images show the network changes coded between the base and the scenario models. These include the Hayes town centre improvement works but also a number of minor amendments to the modelled road network as part of committed development mitigation measures within the study area such as those for the Old Vinyl Factory redevelopment on Blyth Road.

	
Base Model	Scenario Models

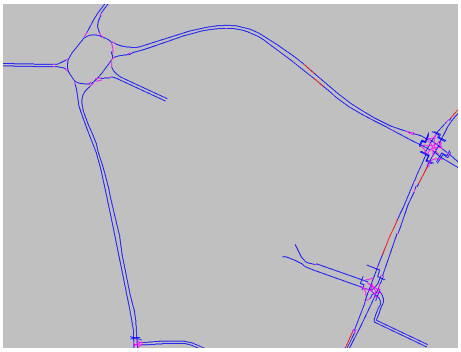
3.1.7 As part of the Old Vinyl Factory redevelopment, the Bourne Avenue / North Hyde Road roundabout will have some minor amendments made to it. From Bourne Avenue, an additional lane entering the roundabout will be introduced. Priority rules have been amended as appropriate. As does the northbound Shepiston Lane approach.

	
Base Model	Scenario Models

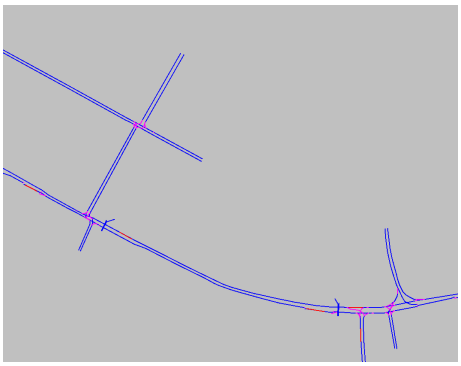
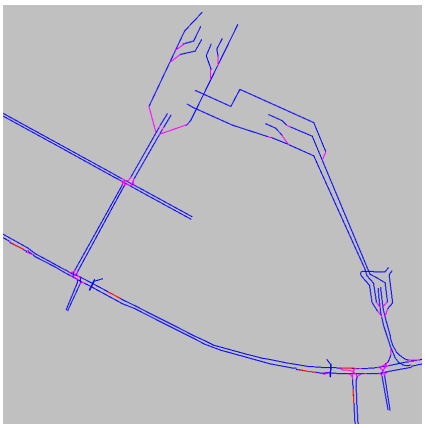
3.1.8 The Station Road / North Hyde Road junction has also been amended. The eastbound North Hyde Road approach has an extended left-turn flare lane.

	
Base Model	Scenario Models

3.1.9 The provided TfL Future Base WeLHAM model introduces an additional link between the Millington Road junction with Station Road and the Millington Road junction and Shepiston Lane. In the base models Millington Road was separated, whereas now access to the Millington Road zone can be accessed via Shepiston Lane or Station Road. The network has been coded as appropriate. Note that traffic cannot use Millington Road as a through route.

	
Base Model	Scenario Models

3.1.10 In addition to the Millington Road changes found in the Future Base WeLHAM Model, an additional connector was added for traffic entering the industrial estate via North Hyde Gardens, which did not exist in the base model. The VISSIM models now contain the additional link representing this traffic movement.

	
Base Model	Scenario Models

3.1.11 No other network changes have been made to the modelled network. Bulls Bridge Roundabout retains its existing layout. Timings have been coded based upon the standalone WelHAM scenario tests – under separate submission.

3.2 FLOW CONSISTENCY CHECK (V504)

3.2.1 Two peak periods have been modelled. The AM peak (**0800-0900**), and the PM peak (**1700-1800**).

3.2.2 The simulation start time is **900** seconds before the start of the peak hour for each peak hour periods.

3.2.3 The simulation period is **3600** seconds for each peak hour period. There is a **900** second warmup period and a **900** second cool down period.

3.2.4 The following traffic compositions have been used with separate peak compositions calculated as per the survey proportions.

- Peak Lights (vehicle type – Car); Note this includes the PCU equivalent of motorcycles;
- Peak Taxis (vehicle type – Taxi); and
- Peak Heavies (vehicle type – MGV, HGV).

3.2.5 Pedestrians have also been used when necessary for demand dependent signal stages at all pedestrian crossings including Puffins. The traffic flow for motorcyclists have been converted into PCUs and added to the Lights traffic flow. This methodology has been adopted in previous models and approved by TfL.

3.2.6 The number of pedestrians remain identical to those found in base model. With the exception of the new pedestrian crossing on the approach to Botwell Lane via the new Station Road link.

3.3 PUBLIC TRANSPORT (V223)

3.3.1 Bus routes and frequencies have been obtained from online TfL timetables. The bus start times have been offset from each other using a randomising algorithm so that buses do not all enter the modelled network at the same time.

3.3.2 The frequency of bus services remains identical to those coded within the base model. To recap, they have been derived from the first bus stop that the bus stops at.

3.3.3 Due to the changes of the network at Station Road and the new link with Botwell Lane, buses are coded to operate via Station Road in both directions rather via the bus gate located on Crown Close. Two bus stops have been created with one northbound, and one southbound within the new link section. All routes that previously ran via Crown Close now stop and use these two bus stops. The two bus stops located to the south of Crown Road (M Clayton Road and D Clayton Road), have been removed as per the improvement works – as shown in the diagram below.

3.3.4 Dwell time information has been provided by TfL. The dwell times have been calculated from iBUS data for each bus route and each bus stop is provided with a dwell time per bus route. Where dwell time information was not provided, the VISSIM default dwell time (Mean Value: 20.0 and Standard Deviation 2.0) has been used. The dwell times used for the two new bus stops are identical to those already located on Station Road. Northbound buses use the same dwell times as those of the removed bus stop M Clayton Road. Southbound buses use the same dwell times as the removed bus stop D Clayton Road.

3.4 SIGNAL DATA (V224)

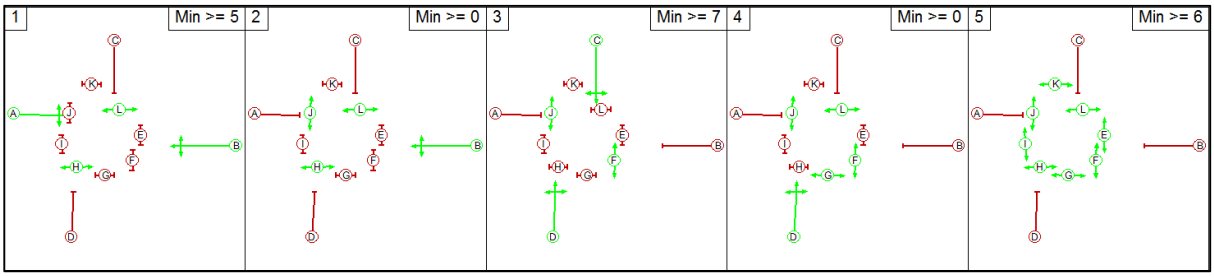
3.4.1 The Bulls Bridge Roundabout has been coded using updated timings based on the separate TfL LinSigs coded using the WeLHAM Saturn scenario flows. Under separate submission.

3.4.2 The **J26/010** Station Road / High Street junction has been coded to operate using the method of control suggested by Alan Baxter as part of the Old Vinyl Factory Committed Development.

3.4.3 The Stages coded are shown in Figure 3.2. The east/westbound traffic now operate concurrently with an early cut-off of the eastbound movement, allowing additional time for the westbound traffic to make an unopposed right-turn towards Hayes Town Centre. Similarly, the north/southbound traffic operate concurrently, as before, but the southbound operates with an early cut-off allowing additional time for the northbound traffic making an unopposed right-turn towards Bulls Bridge and the A312. The timings here have been prepared using individual LinSigs with the calculated proposed flows.

3.4.4 As in the base, the junction operates under VA control and each stage is provided with a maximum and a minimum stage length called using 'Demand Detectors' on the approach to the junction.

Figure 3.2 - Old Vinyl Factory Signal Stages

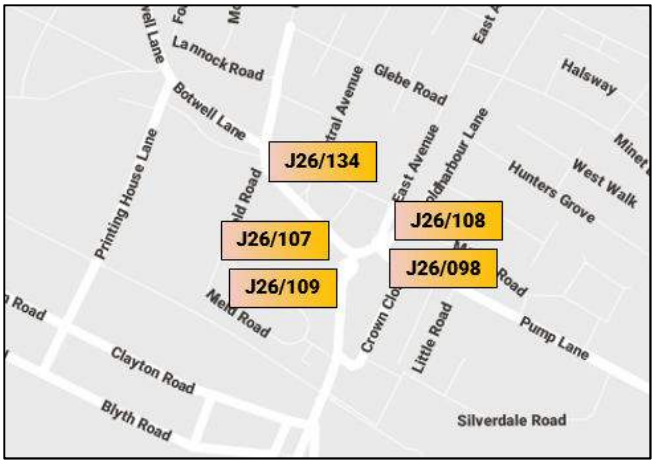


3.4.5 Puffin crossings extend the green time for pedestrians if they are detected on the crossing. As such, there is no fixed cycle time for these crossings. Pedestrians have been coded into the models to arrive and demand the crossing at the same time as those observed on site. This ensures that the signals are demanded correctly. No change has been made to the pedestrian demand from the base model.

3.4.6 The stage intergreens and phase delays remain identical to the base model (with exception of the updated Station Road junction.)

3.4.7 The signals have been coded using VAP control. All relevant PUA files and VAP files are attached with this submission.

3.4.8 The Hayes town centre redevelopment scheme introduces an additional roundabout between Pump Lane and Printinghouse Lane with a new link joining Station Road with Botwell Lane. The roundabout, has been coded as per the SDG model and has introduced an additional pedestrian crossing – J26/109, and converted the remaining crossings in the vicinity to Ped X Crossings.



3.4.9 The VAP and PUA files have been taken directly from the SDG model (and amended as necessary). The pedestrian demand remains the same as the base model for all of the pedestrian facilities with the exception of **J26/109**. The demand for this crossing has been calculated to be based on the average demand for all of the other pedestrian crossings. This methodology replicates those of the SDG reporting.

3.5 PRIORITY RULES / CONFLICT AREAS (V225)

3.5.1 As mentioned in TN01, Priority rules have been used throughout the model to replicate give-way junctions, yellow boxes and other important observed behavioural characteristics. These have been carefully calibrated so that the behaviour in the model matches those observed on site.

3.5.2 Priority rules at the Pump Lane / Coldharbour Lane / Botwell Lane / Station Road roundabouts have been coded as per the SDG model however they have been amended slightly to better represent driver behaviour.

3.6 REDUCED SPEED AREAS (V226)

3.6.1 Reduced speeds areas (RSAs) have been used to reduce vehicle speeds at bends and to calibrate saturation flows.

3.6.2 Additional reduced speed areas have been coded along Station Road, as per the SDG model.

3.6.3 As with the priority rules, the reduced speed areas coded in the SDG model have been replicated here at the Botweel Lane / Station Road roundabouts. They are set to reduce the speed of buses significantly when entering these roundabouts. They may be deemed too severe however for consistency - they have been retained.

3.7 LINK-CONNECTOR STRUCTURE / NETWORK OPERATION (V227)

3.7.1 The network structure has been coded so that it matches the network layout (and the base model) and has been calibrated to match on-site behaviour.

3.7.2 Any changes have been due to proposed network changes previously listed.

4 SCENARIO DATA ANALYSIS

4.1 DEMAND DEPENDENCY

4.1.1 Detailed observations have been carried out at each of the junctions and pedestrian crossing locations. Demand data has been analysed and the models coded to replicate the crossing detection accurately. A comparison between modelled and observed demand dependency is shown in Tables 1-3.

Table 1: Demand dependency comparison – AM peak

Junction	TfL ref	AM peak						
		Base	Baseline	Baseline + DEV	Baseline + DEV + SEN	5 Yr Baseline	5 Yr Baseline + DEV	5 Yr Baseline + DEV + SEN
NORTH HYDE ROAD - NORTH HYDE GARDENS - WATERSPLASH LANE	26/146	0%	0%	0%	0%	0%	0%	0%
BOTWELL LANE @ CENTRAL [PEL]	26/134	72%	68%	68%	69%	68%	69%	69%
NORTH HYDE ROAD BY ROSEVILLE ROAD [PUFFIN]	26/024	20%	20%	20%	20%	19%	20%	20%
STATION ROAD BY REDMEAD ROAD [PUFFIN]	26/031	33%	33%	33%	33%	33%	33%	33%
DAWLEY ROAD BY BLYTH ROAD [PUFFIN]	26/056	18%	18%	18%	18%	18%	18%	18%
NORTH HYDE ROAD BY CRANFORD PARK [PUFFIN]	26/059	19%	19%	19%	19%	19%	19%	19%
PUMP LANE @ STATION [PUFFIN]	26/098	97%	72%	72%	72%	72%	72%	72%
BOTWELL @ STATION [PUFFIN]	26/107	87%	68%	68%	68%	68%	68%	68%
COLDHARBOUR LANE @ PUMP LANE [PUFFIN]	26/108	67%	50%	50%	50%	50%	50%	50%
STATION / NORTH HYDE ROAD – Local Control VA	26/010	52%	46%	52%	52%	49%	49%	52%

MILLINGTON ROAD / STATION ROAD – CLF Control	26/261	52%	52%	52%	52%	52%	52%	52%
HIGH STREET / STATION ROAD – Local Control VA	26/075	100%	100%	100%	100%	100%	100%	100%

Table 2: Demand dependency comparison – PM peak

Junction	TfL ref	PM peak						
		Base	Baseline	Baseline + DEV	Baseline + DEV + SEN	5 Yr Baseline	5 Yr Baseline + DEV	5 Yr Baseline + DEV + SEN
NORTH HYDE ROAD - NORTH HYDE GARDENS - WATERSPLASH LANE	26/146	16%	0%	0%	0%	0%	0%	0%
BOTWELL LANE @ CENTRAL [PEL]	26/134	58%	57%	57%	57%	57%	57%	57%
NORTH HYDE ROAD BY ROSEVILLE ROAD [PUFFIN]	26/024	25%	26%	26%	25%	26%	26%	26%
STATION ROAD BY REDMEAD ROAD [PUFFIN]	26/031	12%	12%	12%	12%	12%	12%	12%
DAWLEY ROAD BY BLYTH ROAD [PUFFIN]	26/056	9%	9%	9%	9%	9%	9%	9%
NORTH HYDE ROAD BY CRANFORD PARK [PUFFIN]	26/059	17%	17%	17%	17%	17%	17%	17%
PUMP LANE @ STATION [PUFFIN]	26/098	100%	81%	81%	81%	81%	81%	81%
BOTWELL @ STATION [PUFFIN]	26/107	99%	80%	80%	80%	80%	80%	80%
COLDHARBOUR LANE @ PUMP LANE [PUFFIN]	26/108	95%	72%	72%	72%	72%	72%	72%

STATION / NORTH HYDE ROAD – Local Control VA	26/010	49%	52%	49%	49%	52%	35%	49%
MILLINGTON ROAD / STATION ROAD – CLF Control	26/261	49%	49%	49%	49%	49%	49%	49%
HIGH STREET / STATION ROAD – Local Control VA	26/075	100%	100%	100%	100%	100%	100%	100%

4.1.2 The Puffin crossings do not have cycle times and so the number of times called for modelled and observed has been presented with a percentage difference.

4.1.3 Where the pedestrian demand is calling stages, specifically at the Pelicans and Puffins, the time when the signal was called has been noted for each peak. Using Public Transport routes, pedestrians have been coded to arrive and demand the crossing at these times within the modelled hour. The pedestrians have been coded using vehicle class **501** [Demand Dependant PED] with the associated signal detectors configured only to activate when these vehicles arrive.

4.2 SIGNAL GREEN TIMES

4.2.1 Junction 26/075 HIGH STREET / STATION ROAD – operates under Local Control Vehicle Actuation and as such phases are called when there is vehicle demand rather than following a dedicated stage order. The average modelled green times are shown in the following tables.

	AM PEAK							PM PEAK						
Approach	**Base**	**BL**	**BLD**	**BLDS**	**5BL**	**5BLD**	**5BLDS**	**Base**	**BL**	**BLD**	**BLDS**	**5BL**	**5BLD**	**5BLDS**
Station Road SB SA	33	35	35	33	34	34	36	32	34	35	33	37	33	36
High Street NB SA LT	13	14	14	13	13	14	14	16	19	17	17	18	17	19
Station Road EB	17	17	21	19	17	19	19	19	19	19	19	19	19	19

4.2.2 Junction 26/010 HIGH STREET / NORTH HYDE ROAD – operates under Local Control Vehicle Actuation and as such phases are called when there is vehicle demand rather than following a dedicated stage order. The average modelled green times are shown in the following tables.

	AM PEAK							PM PEAK						
Approach	**Base**	**BL**	**BLD**	**BLDS**	**5BL**	**5BLD**	**5BLDS**	**Base**	**BL**	**BLD**	**BLDS**	**5BL**	**5BLD**	**5BLDS**
North Hyde Road EB SA/RT/LT	19	25	25	24	22	27	24	19	27	29	29	27	26	29
North Hyde Road WB SA/RT/LT	22	29	29	27	26	31	27	22	42	44	20	42	42	20
Station Road SB	28	39	40	36	39	40	36	28	40	36	29	39	38	29
Station Road NB	28	46	43	36	46	47	36	28	44	39	29	43	46	29

4.3 SATURATION FLOWS (V303)

4.3.1 A comparison of the VISSIM and LinSig (observed) saturation flows is provided in Table 4. The saturation flows are an average of AM and PM peak hour periods with 10 seeds run for each peak.

Table 3: Saturation flow validation (PCUs/hr)

Junction	Approach	Base	Baseline	Baseline + DEV	Baseline + DEV + SEN	5 Yr Baseline	5 Yr Baseline + DEV	5 Yr Baseline + DEV + SEN
26/075	Station Road SB SA	1917	1908	1905	1903	1914	1911	1906
26/075	Station Road SB SA RT	1861	1873	1861	1872	1874	1867	1875
26/075	High Street NB SA LT	1897	1898	1912	1900	1910	1917	1906
26/075	High Street NB SA	2015	2024	2021	2014	2032	2019	2022
26/075	Station Road EB	1951	1925	1967	1947	1938	1962	1949
26/261	Station Road SB SA	1925	1911	1925	1915	1920	1913	1899
26/261	Station Road SB RT	1926	1909	1904	1896	1923	1911	1906
26/261	Bedwell Gardens	1824	1824	1827	1813	1825	1817	1822
26/261	Station Road NB SA RT	1879	1866	1865	1849	1847	1873	1854
26/261	Station Road NB SA LT	1926	1909	1904	1896	1923	1911	1906

26/261	Station Road NB SA LT	1859	1827	1839	1839	1812	1827	1800
26/261	Millington Road EB LT	1851	1851	1844	1843	1830	1830	1838
26/010	Millington Road EB RT	2013	2028	2008	2037	2061	1991	2027
26/010	Station Road SB SA LT	Too Few Vehs	1809	-	1812	1808	-	1808
26/010	Station Road SB RT	1880	1909	1892	1898	1886	1898	1891
26/010	North Hyde Road WB SA LT	1869	1835	1846	1875	1826	1856	1884
26/010	North Hyde Road WB RT	1990	1991	1992	2003	1967	1998	2025
26/010	Station Road NB SA LT	1806	1809	1813	1814	1818	1802	1800
26/010	Station Road NB SA RT	1916	1854	1842	1856	1847	1847	1853
26/010	North Hyde Road EB SA LT	1892	1848	1850	1860	1839	1832	1856
26/146	North Hyde Road EB RT	1844	1843	1836	1879	1844	1826	1875
26/146	North Hyde Road EB	-	1823	1813	1818	Too Few Vehs	1800	1811
26/146	North Hyde Gardens	2012	1965	1878	1923	1857	1873	1926
26/146	North Hyde Road WB	-	-	-	-	-	-	-
25/126	Watersplash Road NB	1934	1902	1884	1875	1897	1887	1890
25/126	North Hyde Road EB Appr	1866	1855	1823	1847	1838	1830	1840
25/126	North Hyde Road EB Appr	1825	-	-	-	-	-	Too Few Vehs
25/127	North Hyde Road EB Appr FLARE	2006	2022	1968	1985	2029	2018	1977
25/127	Parkway [N] SB Lane 1 FLARE	1947	1967	1978	2001	1957	1946	1989
25/127	Parkway [N] SB Lane 2	2013	1997	2106	2124	1988	1981	2124
25/129	Parkway [N] SB Lane 3 Offside	1877	1951	1926	1967	1937	1935	1956

25/129	Hayes Road WB Lane 1 Kerbside	1886	1892	1943	1941	1885	1876	1928
25/129	Hayes Road WB Lane 2	1831	1815	1823	1816	1813	1822	1820
25/129	Hayes Road WB Lane 3	1867	1847	1869	1869	1858	1848	1856
25/131	Hayes Road WB Lane 4 Offside	2033	1894	1985	1970	1882	1899	1982
25/131	Parkway [S] NB Lane 1 FLARE OFFSIDE	1975	1860	1941	1934	1868	1886	1942
25/131	Parkway [S] NB Lane 2	1985	1871	1948	1933	1863	1888	1940
25/131	Parkway [S] NB Lane 3	1845	1878	1852	1844	1897	1881	1855
25/127	Parkway [S] NB Lane 4 FLARE KERBSIDE	1969	1843	1945	1892	1840	1845	1862
25/127	Northern Circulatory LANE 1 KERBSIDE	1881	1820	1907	1847	1820	1808	1834
25/127	Northern Circulatory LANE 2	1854	1866	1843	1834	1852	1846	1848
25/127	Northern Circulatory LANE 3	-	-	-	-	-	-	-
25/129	Northern Circulatory LANE 4 OFFSIDE	1947	1895	1905	1991	1832	1836	1954
25/129	Western Circulatory LANE 1 KERBSIDE	1948	1917	1923	2026	1837	1831	2003
25/129	Western Circulatory LANE 2	1905	1991	2002	2119	1855	1850	2179
25/129	Western Circulatory LANE 3	1940	1883	1873	1897	1864	1851	1916
25/131	Western Circulatory LANE 4 OFFSIDE	1881	1890	1871	1887	1883	1884	1883
25/131	Southern Circulatory LANE 1 KERBSIDE	2120	1813	2120	1927	1818	1805	1983

25/131	Southern Circulatory LANE 2	2060	1865	2023	1935	1930	1921	1977
25/126	Southern Circulatory LANE 3 OFFSIDE	1938	1948	2109	1946	2086	2136	1953
25/126	Eastern Circulatory LANE 1 KERBSIDE	1874	1922	2086	1896	2109	2126	1905
25/126	Eastern Circulatory LANE 2	1891	1906	2032	1872	2095	2080	1881
25/126	Eastern Circulatory LANE 3	2076	1836	2085	1862	1911	1961	1846
26/031	Eastern Circulatory LANE 4 OFFSIDE	1910	1875	1869	1872	1877	1882	1866
26/031	Station Road NB	1975	1913	1951	1924	1929	1935	1905
26/024	Station Road SB	1872	1887	1880	1925	1900	1884	1925
26/024	North Hyde Road EB	1975	1950	1973	1928	1984	1940	1933
26/059	North Hyde Road WB	1946	1894	1886	1887	1902	1855	1891
26/059	North Hyde Road EB	1979	1940	1970	1898	1974	2017	1894
26/098	North Hyde Road WB	1835	1822	1828	1843	1885	1825	1854
26/098	Pump Lane WB	1835	1822	1828	1843	1885	1825	1854
26/108	Pump Lane EB	1814	1800	1802	1804	1805	1801	1802
26/108	Coldharbour Lane NB	1802	1803	1804	1801	1802	1803	1804
26/107	Coldharbour Lane SB	1825	1802	1803	1804	1802	1805	1803
26/107	Botwell Lane WB	1841	1817	1822	1820	1823	1818	1820
26/134	Botwell Lane EB	1862	1842	1860	1841	1857	1857	1855
26/134	Botwell Lane WB	1810	1804	1805	1805	1811	1804	1805
26/109	Station Road Link NB	-	1817	1819	1814	1827	1844	1808
26/109	Station Road Link SB	-	1809	1809	1800	1809	1800	1800

4.3.2 The table found above can also be seen in **Appendix A**.

4.4 Model Convergence

4.4.1 When a VISSIM model is coded to operate under Dynamic Assignment, a series of iterated model runs are used to determine the routes vehicles travel through the network from each OD pair, based on total travel cost. There is a need to assess the convergence of the model to test whether the travel times and volumes do not change significantly from one iteration to the next. This ensures that the model is stable enough for results to be used with confidence.

4.4.2 The Design Manual for Road and Bridges (DMRB) emphasises the importance of convergence within traffic models primarily for strategic models, however it is deemed good practice to ensure the microsimulation model converges also. There are two convergence criteria available for assessment with a VISSIM model.

4.4.3 These are :

- The percentage of links with a flow change (P) of less than 5% should be greater than 90% for four consecutive iterations; and
- The percentage change in user costs or time spent within the network (V) of less than 1% for four consecutive iterations.

4.4.4 A *.CVA file output from VISSIM can be used to assess the P statistic and the *.NPE file output can be used to assess the V statistic.

4.4.5 The data provided in Table 4 and Table 5 indicate that both the AM and PM models are fully converged and provide a suitable platform for further validation.

4.4.6 Under heavily congested networks, there may iterations that do not converge or fully satisfy the convergence criteria. When this is the case, a judgment is made on the stability of the model and wither the convergence will be achieved by further model iterations. If it is deemed that the convergence will not get any better, then the model must be caveated as such.

Table 4: Model Convergence – AM – Baseline

AM	Run (Random seed 42)									
	1	2	3	4	5	6	7	8	9	10
Total Travel Time:	1381.99	1412.12	1382.71	1392.64	1366.66	1514.91	1363.32	1385.52	1388.76	1372.13
% Change in Travel Time:	0%	2%	-2%	1%	-2%	11%	-10%	2%	0%	-1%
% Edges with flow change of less than 5%:	88%	80%	80%	86%	88%	76%	74%	86%	82%	83%

Table 5: Model Convergence – PM – Baseline

PM	Run (Random seed 42)									
	1	2	3	4	5	6	7	8	9	10
Total Travel Time:	1677.67	1645.50	1620.09	1693.31	1672.52	1867.43	1745.30	1708.30	1772.99	1851.32
% Change in Travel Time:	-3%	-2%	-2%	5%	-1%	12%	-7%	-2%	4%	4%

% Edges with flow change of less than 5%:	85%	80%	81%	84%	85%	79%	73%	85%	82%	80%

Table 6: Model Convergence – AM – Baseline + DEV

AM	Run (Random seed 42)									
	1	2	3	4	5	6	7	8	9	10
Total Travel Time:	1413.74	1346.23	1397.57	1410.89	1412.37	1408.05	1414.17	1352.99	1379.88	1371.92
% Change in Travel Time:	1%	-5%	4%	1%	0%	0%	0%	-4%	2%	-1%
% Edges with flow change of less than 5%:	87%	86%	85%	86%	86%	90%	89%	90%	91%	93%

Table 7: Model Convergence – PM – Baseline + DEV

PM	Run (Random seed 42)									
	1	2	3	4	5	6	7	8	9	10
Total Travel Time:	1452.60	1475.46	1460.83	1448.35	1412.99	1444.21	1433.52	1431.23	1449.06	1446.17
% Change in Travel Time:	1%	2%	-1%	-1%	-2%	2%	-1%	0%	1%	0%
% Edges with flow change of less than 5%:	90%	88%	91%	92%	90%	91%	88%	90%	90%	89%

Table 8: Model Convergence – AM – Baseline + DEV + SEN

AM	Run (Random seed 42)									
	1	2	3	4	5	6	7	8	9	10
Total Travel Time:	1546.59	1566.23	1578.82	1562.42	1605.29	1615.88	1561.45	1554.06	1587.30	1562.40
% Change in Travel Time:	-5%	1%	1%	-1%	3%	1%	-3%	0%	2%	-2%
% Edges with flow change of less than 5%:	72%	82%	83%	80%	79%	82%	82%	83%	80%	78%

Table 9: Model Convergence – PM – Baseline + DEV + SEN

PM	Run (Random seed 42)									
	1	2	3	4	5	6	7	8	9	10
Total Travel Time:	1463.32	1453.07	1447.16	1447.67	1454.37	1441.46	1451.72	1416.55	1448.86	1458.91
% Change in Travel Time:	-1%	-1%	0%	0%	0%	-1%	1%	-2%	2%	1%
% Edges with flow change of less than 5%:	83%	87%	85%	85%	86%	87%	88%	86%	87%	86%

4.4.7 IT can seen that the Baseline, and the Baseline + DEV scenario convergence is fairly stable and converges nicely. The Baseline + DEV + SEN scenario, especially in the AM peak, shows the that the converge fluctuates over the course of a number of iterations.

4.4.8 The convergence assessment has only be conducted on the Baseline, Baseline + DEV, and the Baseline + DEV+ SEN models. There is no +5 Yr WelHAM model, as such, the WelHAM assignment for the +5Yr scenarios utilised the baseline dataset.

4.5 Traffic Assignment Methodology

4.5.1 The following text outlines the steps taken to code the VISSIM model with traffic inputs and routing information. It does not detail every calculation but it provides a summary of the methodology.

4.5.2 The base model traffic inputs have been factored using provided TEMPRO values to represent future year baseline traffic growth. It does not take into account any possible traffic reassignment away from the study area due to traffic growth or other unknown factors. The possible reassignment cannot fully be understood using TEMPRO uplifts whereas the use of a strategic model – such as WelHAM, to provide the baseline growth factor would reflect this assignment. It may be the case that certain model inputs would be reduced when using a strategic model because of reassignment of trips to other routes, whereas the TEMPRO factor can only uplift this traffic.

4.5.3 Therefore, the TEMPRO factor can be seen as the worst case and may increase baseline traffic growth to a greater value than would be seen in reality.

4.5.4 The Baseline 2024 TEMPRO factors used are:

- AM Peak: 1.0843
- PM Peak: 1.0853

4.5.5 The 2029 (+5Yr) TEMPRO factors used are:

- AM Peak: 1.1103
- PM Peak: 1.113

4.5.6 In addition, within the Baseline scenario, traffic has been introduced from/to the Nestle Site in the form of B2 land use traffic to represent re-occupation of the existing buildings on site, of which the following table indicates trip generation numbers. These values are in PCU's.

Table 10 - Baseline B2 Trip Generation

B2 Use	AM Peak			PM Peak		
Trip Generation	**IN**	**OUT**	**Total**	**IN**	**OUT**	**Total**
Car trip rate	223	36	**259**	27	201	**228**
Goods Vehicle trip rate	17	15	**32**	6	7	**13**
Total	**241**	**51**	**292**	**33**	**208**	**241**

4.5.7 Within the Development Scenario, the following trips have been assigned to the Nestle Site.

Table 11 - +DEV Development Trip Generation

Proposed Development	AM Peak			PM Peak		
Trip Generation	**IN**	**OUT**	**Total**	**IN**	**OUT**	**Total**
Nursery	20	21	**41**	16	27	**43**
Residential	54	215	**269**	224	130	**354**
Gym / Office	13	6	**19**	9	12	**21**
New Employment	58 (2)	27 (8)	**55**	13 (6)	61 (6)	**86**
Total	**147**	**227**	**384**	**268**	**236**	**504**

4.5.8 Note that the numbers in brackets are HGV traffic.

4.5.9 The following table shows the trips assigned to the remainder of the Nestle site by way of Sensitivity Traffic.

Table 12 - +SEN Sensitivity Trip Generation

Sensitivity Traffic	AM Peak			PM Peak		
Development	**IN**	**OUT**	**Total**	**IN**	**OUT**	**Total**
Beccluech Site	16	63	**79**	66	38	**104**
Squirrel TW	15	61	**76**	64	37	**101**
Precis Resi	6	25	**31**	26	15	**41**
Precis Office	25	3	**28**	5	27	**32**
Total	**62**	**152**	**214**	**161**	**117**	**278**

4.5.10 When developing the traffic matrices for each of the scenarios, the following steps have been undertaken:

1 - OBTAIN WELHAM SCENARIO MATRIX

2 - OBTAIN WELHAM ROUTING FILE (SATPIG)

3 – CREATE WELHAM DIFFERENCE MATRIX BETWEEN BASE AND SCENARIO MATRIX

4 – UPLIFT TRAFFIC FLOW INPUTS BASED UPON TEMPRO AND COMMITTED DEVELOPMENTS PLUS PROPOSED / SENSITIVITY TRAFFIC

5 – USE WELHAM ASSIGNMENT PROPORTIONS PER SCENARIO

6 - PREPARE SCENARIO TRAFFIC MATRICES

7 – DYNAMICALLY ASSIGN MATRICES WITHIN VISSIM

4.5.11 The routing assignment from the WELHAM model and the Dynamic Assignment run in VISSIM can often be different. The VISSIM assignment is compared with the WelHAM assignment and matched where possible.

4.5.12 The Origin and Destination Zones used within the Future Base Scenario is shown in Figure 4.1. Note the additional zones – 31 to 34. 31 is used to represent proposed Nursery traffic, 32 is used to represent the proposed Residential traffic, 33 is used to represent the Office/Gym proposed traffic and zone 34 is used to represent the proposed new employment traffic. Zone 34 access the site via North Hyde Gardens, whereas the 31, 32, and 33 all access the site via Nestle Avenue.

4.5.13 Note that Zone 6 represents the Former Nestle Site. In the Base model, this zone has 0 trips assigned to it. Within the Baseline Scenario, the site is to be assess with B2 Existing Employment trips. In the with Development scenarios, this is to be replaced with the New Employment traffic.

Figure 4.1: O-D Zone Locations – Baseline Scenario, Baseline + DEV, and Baseline + DEV + SEN

4.5.14 For each of the committed developments in and around Hayes Town Centre, a new zone has been created in order for this traffic to be assigned correctly within the model. If the flows associated with the committed developments were assigned using the WELHAM OD proportions for trips entering and leaving the model extent, these trips, although travelling through the model, would not be accurately routed to the correct zones. As such, each committed development has a specific trip value per Origin and Destination within the model.

Figure 4.2: O-D Zone Locations – Committed Developments

The committed developments include the following:

- **101** - Silverdale Road
- **102** - Rackspace City, Millington Road
- **103** - Union House, Clayton Road
- **104** - Trident House, Blyth Road
- **105** - Unit A, Bulls Bridge Centre, North Hyde Gardens
- **106** - Hyde Park Hayes, Millington Road
- **107** - 20 Blyth Road
- **108** - Southwall Gas Works, via Hayes Lane
- **109** – Old Vinyl Factory, Blyth Road
- **110** – Gatefold Building, Blyth Road
- **111** – UTC College (Combined with 109)
- **112** – Asda Industrial, Millington Road

Table 13 - Committed Development Flows - Both Peaks

		AM Peak		PM Peak	
Development	**Road Access**	**IN**	**OUT**	**IN**	**OUT**
Silverdale Road	Pump Lane	5	15	10	6
22632 App	Millington Rd	5	15	15	9
Union House	Clayton Rd	3	7	4	1
Trident House	Clayton Rd	1	14	9	5
Unit A Bulls Bridge	North Hyde Gardens	50	30	24	48
HPH	Millington	65	9	11	66

20 Blyth Road	Blyth Road	4	15	12	10
Gas Works	Blyth Road	30	59	58	52
Old Vinyl Factory (incl UTC College)	Blyth Road	717	221	192	794
Gatefold Building	Blyth Road	8	37	14	13
Asda	Asda	71	13	11	54
Silverdale Road	PUMP LANE	5	15	10	6

4.6 TRAFFIC FLOW VALIDATION (V304)

4.6.1 The traffic flows measured from VISSIM are the average of **10** seed runs. The modelled flows are extracted from VISSIM using Data Collection points and are separated by vehicle type. The vehicle flow numbers are converted into PCU values and compared for each with the surveyed PCU flows.

4.6.2 As with the base model, U-Turning traffic is not explicitly modelled, with the exception of traffic leaving North Hyde Gardens with a destination to the west. These vehicles must turn left onto North Hyde Road and make a U-Turn via Bulls Bridge Roundabout to enter North Hyde Road in a westbound direction.

4.6.3 With Station Road linking directly with Botwell Lane the model cannot reflect vehicles in the base previously parking at Station Road. These trips have been removed. As mentioned in the LMVR document, (and shown below), public transport routes were used to reflect this traffic.

Similarly, the SATURN WeLHAM model does not route traffic into the available parking at Station Road. Traffic has been assigned, using Public Transport routes to enter into this section of the network.

4.6.4 Warmup traffic introduced and retained as part of the scenario tests.

- Bourne Avenue – AM: 140 vehs, PM: 250 vehs.
- A312 Parkway SB – AM: 500 vehs, PM: 150 vehs.
- Hayes Road WB – AM: 150 vehs, PM: 85 vehs.

4.6.5 These additional vehicles do not affect the traffic flow validation as they create congestion and queueing conditions that occur at the beginning of the peak period. The warmup traffic is only loaded into the network during the warmup period.

4.6.6 The comparison of the VISSIM traffic flows is provided at **Appendix B**.

4.7 QUEUE LENGTH ANALYSIS (V305)

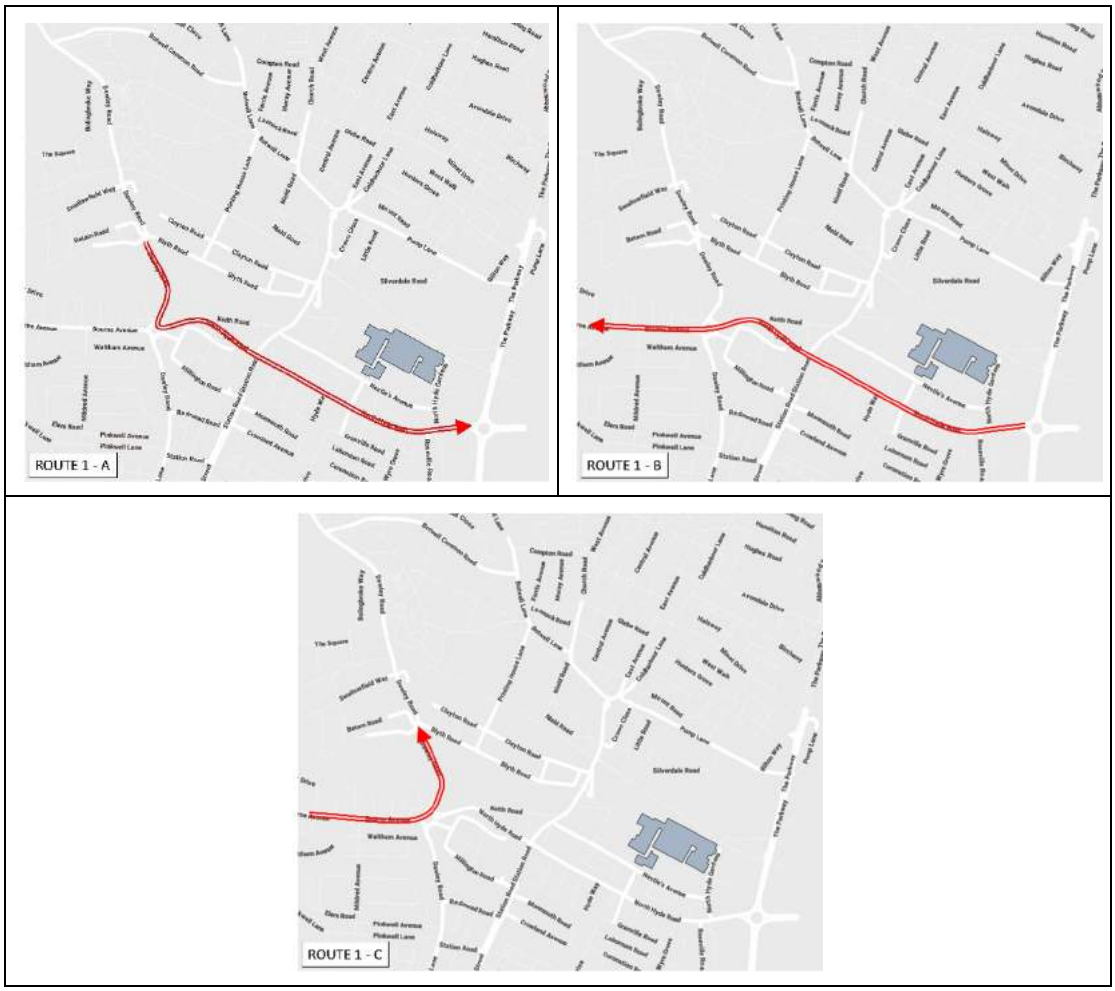
4.7.1 Queue lengths in the scenario models have been analysed and compared between the modelled scenarios.

4.7.2 The comparison between VISSIM modelled queue lengths and those observed on site can be found in **Appendix C**.

4.8 JOURNEY TIME COMPARISON (V306)

4.8.1 The journey time routes are shown in Figure 4.3, Figure 4.4 and Figure 4.5 remain active in the scenario tests, and comparison between these and the base model has been provided.

Figure 4.3: Route 1 Sections A, B & C



4.8.2 Route **1** Section **A** runs between:

- Blyth Road to the A312 via Dawley Road & North Hyde Road EASTBOUND.

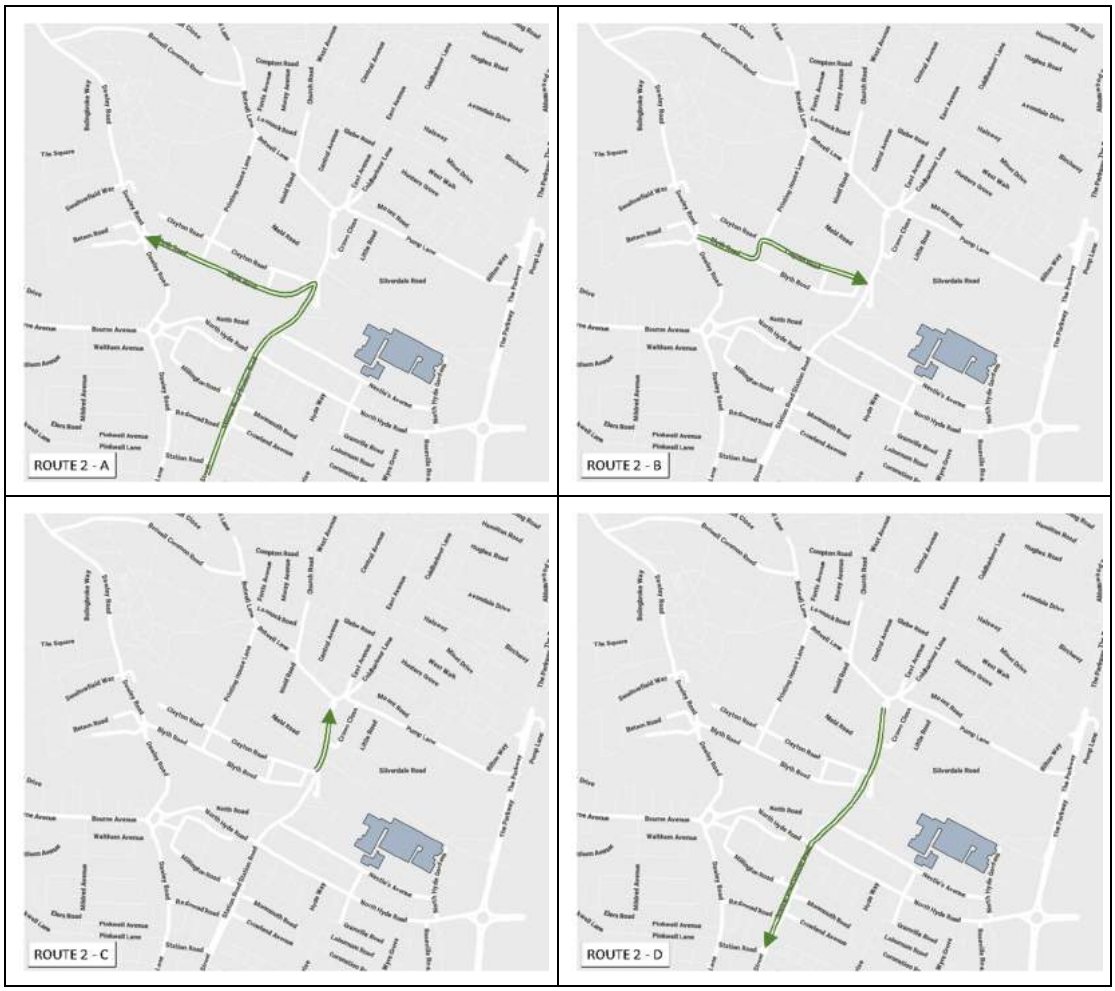
4.8.3 Route **1** Section **B** runs between:

- A312 Bulls Bridge Roundabout to Bourne Avenue via North Hyde Road WESTBOUND.

4.8.4 Route **1** Section **C** runs between:

- Bourne Avenue to Betham Road via Dawley Road NORTHBOUND.

Figure 4.4: Route 2 Sections, A, B, C & D



4.8.5 Route **2** Section **A** runs between:

- High Street / Station Road to Blyth Road / Dawley Road via High Street & Blyth Road NORTHBOUND.

4.8.6 Route **2** Section **B** runs between:

- Blyth Road / Dawley Avenue to Station Approach via Clayton Road EASTBOUND.

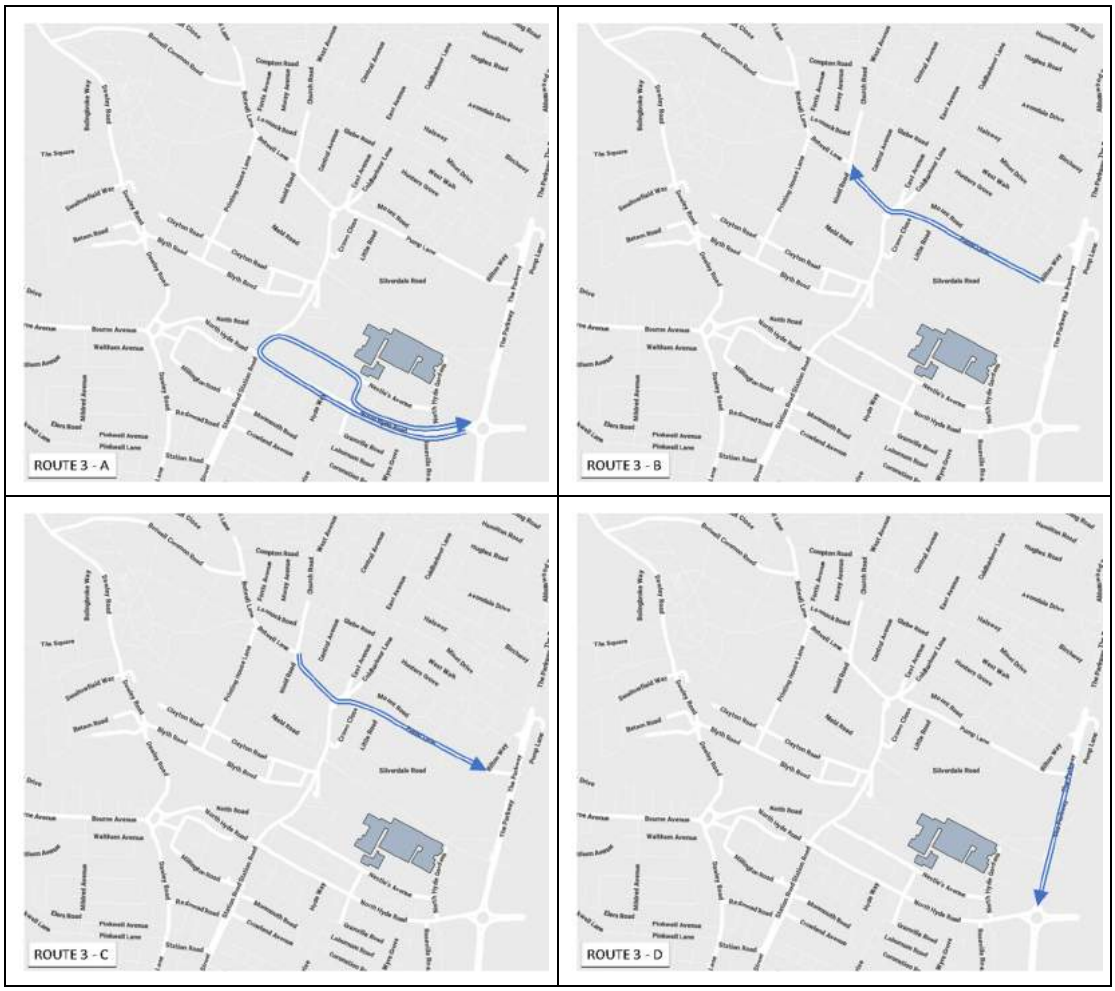
4.8.7 Route **2** Section **C** runs between:

- Station Road Parking NORTHBOUND / SOUTHBOUND.

4.8.8 Route **2** Section **D** runs between:

- Station Road to High Street / Station Road SOUTHBOUND.

Figure 4.5: Route 3 Sections A, B, C & D



4.8.9 Route **3** Section **A** runs between:

- The Parkway / Hayes Road A312 westbound via North Hyde Road via Station Road, Nestle Avenue (eastbound), Harold Avenue and returns eastbound via North Hyde Road to the A312.

4.8.10 Route **3** Section **B** runs between:

- Pump Lane towards Church Road / Botwell Road WESTBOUND

4.8.11 Route **3** Section **C** runs between:

- Church Road / Botwell Road towards Pump Lane EASTBOUND

4.8.12 Route **3** Section **D** runs between:

- Pump Lane and the A312 Bulls Bridge junction along the A312 SOUTHBOUND.

4.8.13 A comparison of the VISSIM and observed journey times is provided in Figure 4.6. The journey time results are the average of 10 seed runs.

Figure 4.6: Modelled Journey Times

AM

Route 1 - Combined	Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
A Route 1 - Blyth Road to A312 EB	436	451	481	856	**15 | 3%**	**30 | 7%**	405 | 90%	478	522	824	**28 | 6%**	**44 | 9%**	346 | 79%
B Route 1 - A312 to Bourne Avenue WB	254	463	309	602	209 | 82%	-154 | -33%	139 | 30%	269	283	573	-193 | -42%	**14 | 5%**	304 | 119%
C Route 1 - Bourne Avenue to Betam Road NB	340	391	347	575	**51 | 15%**	**-44 | -11%**	183 | 47%	486	371	634	95 | 24%	-116 | -24%	148 | 44%

Route 2 - Combined	Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
A Route 2 - High Street to Blyth Road / Dawley Road NB	316	313	542	982	**-4 | -1%**	230 | 74%	669 | 214%	322	890	735	**9 | 3%**	568 | 177%	413 | 131%
B Route 2 - Blyth Road / Dawley Road to Station Approach RAB EB	133	130	137	184	**-3 | -2%**	**7 | 5%**	53 | 41%	134	138	164	**3 | 2%**	**4 | 3%**	31 | 23%
C Route 2 - Station Road Parking	62	50	142	135	-12 | -20%	92 | 186%	86 | 172%	50	157	130	**0 | 1%**	107 | 214%	80 | 129%
D Route 2 - Station Road to High Street SB	221	253	200	454	**31 | 14%**	-52 | -21%	201 | 80%	279	206	386	**27 | 10%**	-73 | -26%	107 | 48%

Route 3 - Individual	Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
A A312 The Pkwy / North Hyde Road RAB to North Hyde Road / North Hyde Green Jct	15	18	20	28	3 | 17%	**2 | 12%**	10 | 55%	22	21	24	4 | 24%	**-1 | -7%**	**2 | 12%**
A North Hyde Road / North Hyde Green Jct to North Hyde Road / Roseville Ped X	18	20	21	34	**2 | 11%**	**1 | 5%**	14 | 71%	20	21	31	**0 | -2%**	**2 | 9%**	11 | 62%
A North Hyde Road / Roseville Ped X to North Hyde Road / Harold Road Ped X	34	67	35	135	33 | 97%	-32 | -47%	68 | 102%	38	36	122	-30 | -44%	**-2 | -4%**	85 | 249%
A North Hyde Road / Harold Road Ped X to A437 Station Road / A437 North Hyde Road Jct	119	287	149	314	168 | 141%	-137 | -48%	**27 | 9%**	121	127	306	-166 | -58%	**6 | 5%**	185 | 156%
A A437 Station Road / A437 North Hyde Road Jct to Nestles Avenue / Station Road Jct	25	53	65	24	29 | 117%	11 | 21%	-29 | -55%	49	70	24	**-5 | -9%**	21 | 44%	-25 | -100%
A Nestles Avenue / Station Road Jct to Nestles Avenue / Harold Avenue Jct	60	61	59	59	**0 | 0%**	**-2 | -2%**	**-2 | -3%**	60	58	61	**-1 | -1%**	**-2 | -3%**	**1 | 1%**
A Nestles Avenue / Harold Avenue Jct to Harold Avenue / North Hyde Road Jct	18	21	25	40	3 | 16%	4 | 18%	19 | 86%	21	24	45	**-1 | -3%**	4 | 17%	24 | 132%
A Harold Avenue / North Hyde Road Jct to North Hyde Road / Harold Road Ped X	6	8	10	7	2 | 32%	2 | 26%	-2 | -20%	12	10	6	3 | 42%	**-1 | -10%**	-5 | -87%
A North Hyde Road / Harold Road Ped X to North Hyde Road / Roseville Ped X	49	64	99	49	15 | 30%	35 | 55%	-15 | -23%	90	108	53	26 | 41%	18 | 20%	-37 | -76%
A North Hyde Road / Roseville Road Ped X to North Hyde Road / Watersplash Lane / North Hyde Gardens Jct	20	19	25	17	**0 | -1%**	6 | 29%	**-3 | -13%**	22	26	18	**3 | 15%**	4 | 18%	-4 | -23%
A North Hyde Road / Watersplash Lane / North Hyde Gardens Jct to A312 The Pkwy / North Hyde Road RAB	70	45	59	42	-25 | -35%	14 | 31%	**-3 | -6%**	60	62	44	15 | 34%	**1 | 2%**	-16 | -24%

Route 3 - Combined	Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
A Route 3 - A312 Parkway Loop	434	664	568	748	230 | 53%	**-95 | -14%**	**85 | 13%**	514	564	734	-149 | -23%	**50 | 10%**	220 | 51%
B Route 3 - Pump Lane to Church Road RAB WB	69	83	95	100	14 | 20%	**12 | 15%**	17 | 21%	87	96	90	**5 | 6%**	**8 | 9%**	**2 | 3%**
C Route 3 - Pump Lane to Church Road RAB EB	47	74	86	73	27 | 58%	12 | 16%	**-1 | -2%**	77	86	76	**2 | 3%**	**9 | 12%**	**-1 | -2%**
D Route 3 - SB A312 Approach to Bulls Bridge RAB	244	248	147	254	**5 | 2%**	-101 | -41%	**5 | 2%**	158	167	250	-90 | -36%	**9 | 5%**	91 | 37%

Bulls Bridge to Harold Avenue	Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
Harold Road to Bulls Bridge Roundabout - Eastbound	138	128	183	108	**-10 | -7%**	55 | 43%	**-20 | -16%**	173	196	115	45 | 35%	**23 | 13%**	-58 | -42%
Bulls Bridge Roundabout to Harold Road - Westbound	67	105	77	197	38 | 56%	-28 | -27%	92 | 88%	79	78	177	-26 | -24%	**-1 | -2%**	98 | 145%

Botwell Common	Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
Botwell Common Road - Eastbound	247	272	319	455	**25 | 10%**	47 | 17%	183 | 67%	468	385	378	195 | 72%	-83 | -18%	-89 | -36%
Botwell Common Road - Westbound	230	246	254	446	**17 | 7%**	**8 | 3%**	200 | 81%	249	260	568	**3 | 1%**	**11 | 4%**	319 | 139%

PM

Route 1 - Combined	Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
A Route 1 - Blyth Road to A312 EB	639	1187	629	642	549 | 86%	-559 | -47%	-545 | -46%	1023	1096	641	**-165 | -14%**	**73 | 7%**	-381 | -37%
B Route 1 - A312 to Bourne Avenue WB	256	268	235	423	**11 | 4%**	**-33 | -12%**	156 | 58%	231	242	404	**-37 | -14%**	**11 | 5%**	173 | 75%
C Route 1 - Bourne Avenue to Betam Road NB	324	357	331	388	**33 | 10%**	**-27 | -7%**	**31 | 9%**	365	340	366	**8 | 2%**	**-25 | -7%**	**1 | 0%**

Route 2 - Combined	Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
A Route 2 - High Street to Blyth Road / Dawley Road NB	378	609	406	525	231 | 61%	-203 | -33%	**-84 | -14%**	577	554	608	**-32 | -5%**	**-23 | -4%**	**31 | 5%**
B Route 2 - Blyth Road / Dawley Road to Station Approach RAB EB	129	404	141	277	275 | 213%	-263 | -65%	-127 | -32%	319	291	364	-86 | -21%	**-28 | -9%**	**45 | 14%**
C Route 2 - Station Road Parking	79	70	162	145	**-9 | -11%**	93 | 133%	75 | 108%	78	129	126	**8 | 12%**	51 | 66%	48 | 61%
D Route 2 - Station Road to High Street SB	264	419	208	453	155 | 59%	-211 | -50%	**34 | 8%**	408	414	485	**-12 | -3%**	**6 | 2%**	78 | 19%

Route 3 - Individual	Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
A A312 The Pkwy / North Hyde Road RAB to North Hyde Road / North Hyde Green Jct	28	24	23	24	**-3 | -12%**	**-2 | -7%**	**0 | -2%**	23	26	21	**-2 | -7%**	**3 | 15%**	**-2 | -7%**
A North Hyde Road / North Hyde Green Jct to North Hyde Road / Roseville Ped X	30	28	22	24	**-2 | -7%**	-6 | -21%	**-3 | -12%**	26	27	22	**-2 | -7%**	**1 | 3%**	**-4 | -15%**
A North Hyde Road / Roseville Ped X to North Hyde Road / Harold Road Ped X	36	35	38	51	**0 | -1%**	**3 | 8%**	15 | 44%	36	36	43	**1 | 2%**	**0 | -1%**	7 | 20%
A North Hyde Road / Harold Road Ped X to A437 Station Road / A437 North Hyde Road Jct	96	116	90	257	20 | 20%	-26 | -23%	141 | 122%	89	91	252	-27 | -23%	**2 | 2%**	163 | 184%
A A437 Station Road / A437 North Hyde Road Jct to Nestles Avenue / Station Road Jct	23	92	54	43	69 | 300%	-38 | -42%	-49 | -53%	66	86	45	-27 | -29%	20 | 30%	-21 | -32%
A Nestles Avenue / Station Road Jct to Nestles Avenue / Harold Avenue Jct	61	60	60	57	**-1 | -2%**	**0 | 1%**	**-2 | -4%**	60	60	58	**0 | 0%**	**1 | 1%**	**-2 | -4%**
A Nestles Avenue / Harold Avenue Jct to Harold Avenue / North Hyde Road Jct	19	20	21	28	**1 | 4%**	**2 | 9%**	9 | 45%	19	25	26	**0 | -1%**	6 | 29%	6 | 32%
A Harold Avenue / North Hyde Road Jct to North Hyde Road / Harold Road Ped X	10	25	9	7	15 | 162%	-16 | -64%	-18 | -73%	22	23	7	**-3 | -14%**	**2 | 9%**	-15 | -68%
A North Hyde Road / Harold Road Ped X to North Hyde Road / Roseville Ped X	122	229	113	70	107 | 88%	-116 | -51%	-159 | -69%	184	202	74	-45 | -20%	**18 | 10%**	-110 | -60%
A North Hyde Road / Roseville Road Ped X to North Hyde Road / Watersplash Lane / North Hyde Gardens Jct	35	44	30	25	9 | 27%	-14 | -31%	-19 | -42%	35	38	26	-8 | -19%	**3 | 8%**	-9 | -27%
A North Hyde Road / Watersplash Lane / North Hyde Gardens Jct to A312 The Pkwy / North Hyde Road RAB	86	85	61	46	**-1 | -1%**	-24 | -28%	-39 | -46%	82	82	46	**-2 | -3%**	**-1 | -1%**	-37 | -44%

Route 3 - Combined	Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
A Route 3 - A312 Parkway Loop	544	758	521	633	214 | 39%	-237 | -31%	-125 | -17%	642	696	619	**-116 | -15%**	**54 | 8%**	**-22 | -3%**
B Route 3 - Pump Lane to Church Road RAB WB	70	107	86	79	37 | 53%	-21 | -19%	-28 | -26%	92	91	77	**-15 | -14%**	**-2 | -2%**	-15 | -17%
C Route 3 - Pump Lane to Church Road RAB EB	53	136	102	95	83 | 157%	-34 | -25%	-41 | -30%	116	108	101	**-20 | -15%**	**-8 | -7%**	**-15 | -13%**
D Route 3 - SB A312 Approach to Bulls Bridge RAB	167	571	236	252	403 | 241%	-334 | -59%	-318 | -56%	568	569	246	**-3 | 0%**	**1 | 0%**	-322 | -57%

Bulls Bridge to Harold Avenue	Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
Harold Road to Bulls Bridge Roundabout - Eastbound	243	358	204	141	220 | 159%	76 | 59%	3 | 2%	302	322	146	**174 | 135%**	**149 | 86%**	-27 | -19%
Bulls Bridge Roundabout to Harold Road - Westbound	93	87	83	99	**20 | 30%**	**-22 | -21%**	**31 | 47%**	84	88	86	**-21 | -20%**	**9 | 11%**	**7 | 10%**

Botwell Common	Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
Botwell Common Road - Eastbound	236	395	277	265	148 | 60%	5 | 2%	18 | 7%	341	309	266	**69 | 25%**	**-159 | -34%**	-201 | -82%
Botwell Common Road - Westbound	222	264	249	239	34 | 15%	**3 | 1%**	**9 | 4%**	263	253	238	**17 | 7%**	**4 | 1%**	**-12 | -5%**

4.8.14 Bus travel time data has been compared between scenarios. Also found in Appendix D.

4.9 Error Logs (V307)

4.9.1 The error logs have been interrogated and there are not significant issues. It should be noted that minimum green time violation errors occur – these can be ignored as the signals operate under VAP control which provides to correct operation of the signals.

APPENDIX A - SATURATION FLOWS

JCT	REF	Approach	v_Ref	AM	PM	LinSig saturation Flow	Base	BASELINE	BASELINE + DEV	BASELINE + DEV + SEN	5YR BASELINE	5YR BASELINE + DEV	5YR BASELINE + DEV + SEN
26/075	A1	Station Road SB SA	750402	1985	2012	1999	1917	1908	1905	1903	1914	1911	1906
26/075	A2	Station Road SB SA RT	750301	1945	2250	2097	1861	1873	1861	1872	1874	1867	1875
26/075	B1	High Street NB SA LT	750102	2056	2026	2041	1897	1898	1912	1900	1910	1917	1906
26/075	B2	High Street NB SA	750101	2109	2081	2095	2015	2024	2021	2014	2032	2019	2022
26/075	C	Station Road WB	750201	1940	1958	1949	1951	1925	1967	1947	1938	1962	1949
26/261	A1	Station Road SB SA	2610202	2064	2026	2045	1925	1911	1925	1915	1920	1913	1899
26/261	A2	Station Road SB RT	2610201	2064	2026	2045	1926	1909	1904	1896	1923	1911	1906
26/261	B	Bedwell Gardens	2610401	1995	1993	1994	1824	1824	1827	1813	1825	1817	1822
26/261	C1	Station Road NB SA RT	2610101	2021	2032	2027	1879	1866	1865	1849	1847	1873	1854
26/261	C2	Station Road NB SA LT	2610201	2156	2023	2089	1926	1909	1904	1896	1923	1911	1906
26/261	D1	Millington Road EB LT	2610302	2386	2386	2386	1859	1827	1839	1839	1812	1827	1800
26/261	D2	Millington Road EB RT	2610301	1982	1925	1953	1851	1851	1844	1843	1830	1830	1838
26/010	A1	Station Road SB SA LT	100302	2149	2062	2106	2013	2028	2008	2037	2061	1991	2027
26/010	A2	Station Road SB RT	100301	2040	2010	2025	Too Few Vehs	1809	-	1812	1808	-	1808
26/010	B1	North Hyde Road WB SA LT	100202	1966	1932	1949	1880	1909	1892	1898	1886	1898	1891
26/010	B2	North Hyde Road WB RT	100201	2094	1988	2041	1869	1835	1846	1875	1826	1856	1884
26/010	C1	Station Road NB SA LT	100402	2287	2113	2200	1990	1991	1992	2003	1967	1998	2025
26/010	C2	Station Road NB SA RT	100401	#DIV/0!	1872	#DIV/0!	1806	1809	1813	1814	1818	1802	1800
26/010	D1	North Hyde Road EB SA LT	100102	1958	2078	2018	1916	1854	1842	1856	1847	1847	1853
26/010	D2	North Hyde Road EB RT	100101	2160	1800	1980	1892	1848	1850	1860	1839	1832	1856
26/146	J4:X	North Hyde Road EB	1460101	1800	1800	1800	1844	1843	1836	1879	1844	1826	1875
26/146	J4:X	North Hyde Gardens	1460301	1800	1800	1800	-	1823	1813	1818	Too Few Vehs	1800	1811
26/146	J4:1/1	North Hyde Road WB	1460202	1780	1780	1780	2012	1965	1878	1923	1857	1873	1926
26/146	J4:X	Watersplash Road NB	1460401	1800	1800	1800	-	-	-	-	-	-	-
25/126	J1:2/1	North Hyde Road EB Appr	1260103	2094	2029	2062	1934	1902	1884	1875	1897	1887	1890
25/126	J1:2/2	North Hyde Road EB Appr	1260102	2123	2025	2074	1866	1855	1823	1847	1838	1830	1840
25/126	0	North Hyde Road EB Appr FLARE	1260101	2520	2268	2394	1825	-	-	-	-	-	Too Few Vehs
25/127	J1:5/1	Parkway [N] SB Lane 1 FLARE	1270503	2117	1963	2040	2006	2022	1968	1985	2029	2018	1977
25/127	J1:5/2	Parkway [N] SB Lane 2	1270502	2059	2034	2046	1947	1967	1978	2001	1957	1946	1989
25/127	J1:5/3	Parkway [N] SB Lane 3 Offside	1270501	2282	2071	2177	2013	1997	2106	2124	1988	1981	2124
25/129	J2:2/1	Hayes Road WB Lane 1 Kerbside	1290104	1951	2030	1991	1877	1951	1926	1967	1937	1935	1956
25/129	J2:2/2	Hayes Road WB Lane 2	1290103	2053	2084	2069	1886	1892	1943	1941	1885	1876	1928
25/129	J2:2/3	Hayes Road WB Lane 3	1290102	2062	2089	2075	1831	1815	1823	1816	1813	1822	1820
25/129	J2:2/4	Hayes Road WB Lane 4 Offside	1290101	1980	1933	1956	1867	1847	1869	1869	1858	1848	1856
25/131	J2:6/4	Parkway [S] NB Lane 1 FLARE OFFSIDE	1310601	2087	2156	2121	2033	1894	1985	1970	1882	1899	1982
25/131	J2:6/3	Parkway [S] NB Lane 2	1310602	2058	2060	2059	1975	1860	1941	1934	1868	1886	1942
25/131	J2:6/2	Parkway [S] NB Lane 3	1310603	2075	2005	2040	1985	1871	1948	1933	1863	1888	1940
25/131	J2:6/1	Parkway [S] NB Lane 4 FLARE KERBSIDE	1310699	2152	2040	2096	1845	1878	1852	1844	1897	1881	1855
25/127	J1:4/1	Northern Circulatory LANE 1 KERBSIDE	1270604	1965	1965	1965	1969	1843	1945	1892	1840	1845	1862
25/127	J1:4/2	Northern Circulatory LANE 2	1270603	1675	1675	1675	1881	1820	1907	1847	1820	1808	1834
25/127	J1:4/3	Northern Circulatory LANE 3	1270602	1975	1975	1975	1854	1866	1843	1834	1852	1846	1848
25/127	J1:4/4	Northern Circulatory LANE 4 OFFSIDE	1270601	1965	1965	1965	-	-	-	-	-	-	-
25/129	J2:1/1	Western Circulatory LANE 1 KERBSIDE	1290204	1995	1995	1995	1947	1895	1905	1991	1832	1836	1954
25/129	J2:1/2	Western Circulatory LANE 2	1290203	1995	1995	1995	1948	1917	1923	2026	1837	1831	2003
25/129	J2:1/3	Western Circulatory LANE 3	1290202	1995	1995	1995	1905	1991	2002	2119	1855	1850	2179
25/129	J2:1/4	Western Circulatory LANE 4 OFFSIDE	1290201	1995	1995	1995	1940	1883	1873	1897	1864	1851	1916
25/131	J2:3/1	Southern Circulatory LANE 1 KERBSIDE	1310703	1995	1995	1995	1881	1890	1871	1887	1883	1884	1883
25/131	J2:3/2	Southern Circulatory LANE 2	1310702	1995	1995	1995	2120	1813	2120	1927	1818	1805	1983
25/131	J2:3/3	Southern Circulatory LANE 3 OFFSIDE	1310701	1975	1975	1975	2060	1865	2023	1935	1930	1921	1977
25/126	J1:1/1	Eastern Circulatory LANE 1 KERBSIDE	1260204	1975	1975	1975	1938	1948	2109	1946	2086	2136	1953
25/126	J1:1/2	Eastern Circulatory LANE 2	1260203	1975	1975	1975	1874	1922	2086	1896	2109	2126	1905
25/126	J1:1/3	Eastern Circulatory LANE 3	1260202	1965	1965	1965	1891	1906	2032	1872	2095	2080	1881
25/126	J1:1/4	Eastern Circulatory LANE 4 OFFSIDE	1260201	1965	1965	1965	2076	1836	2085	1862	1911	1961	1846
26/031	0	Station Road NB	310101	1800	1800	1800	1910	1875	1869	1872	1877	1882	1866
26/031	0	Station Road SB	310401	1800	1800	1800	1975	1913	1951	1924	1929	1935	1905
26/024	0	North Hyde Road EB	240101	1800	1800	1800	1872	1887	1880	1925	1900	1884	1925
26/024	0	North Hyde Road WB	240401	1800	1800	1800	1975	1950	1973	1928	1984	1940	1933
26/059	0	North Hyde Road EB	590101	1800	1800	1800	1946	1894	1886	1887	1902	1855	1891
26/059	0	North Hyde Road WB	590401	1800	1800	1800	1979	1940	1970	1898	1974	2017	1894
26/098	0	Pump Lane WB	980401	1800	1800	1800	1835	1822	1828	1843	1885	1825	1854
26/098	0	Pump Lane EB	980401	1800	1800	1800	1835	1822	1828	1843	1885	1825	1854
26/108	0	Coldharbour Lane NB	1080101	1800	1800	1800	1814	1800	1802	1804	1805	1801	1802
26/108	0	Coldharbour Lane SB	1080401	1800	1800	1800	1802	1803	1804	1801	1802	1803	1804
26/107	0	Botwell Lane WB	1070101	1800	1800	1800	1825	1802	1803	1804	1802	1805	1803
26/107	0	Botwell Lane EB	1070401	1800	1800	1800	1841	1817	1822	1820	1823	1818	1820
26/134	0	Botwell Lane WB	1340401	1800	1800	1800	1862	1842	1860	1841	1857	1857	1855
26/134	0	Botwell Lane EB	1340401	1800	1800	1800	1810	1804	1805	1805	1811	1804	1805
26/109		Station Road NB	1090401	1800	1800	1800	-	1817	1819	1814	1827	1844	1808
26/109		Station Road SB	1090101	1800	1800	1800	-	1809	1809	1800	1809	1800	1800

APPENDIX B -TRAFFIC FLOWS

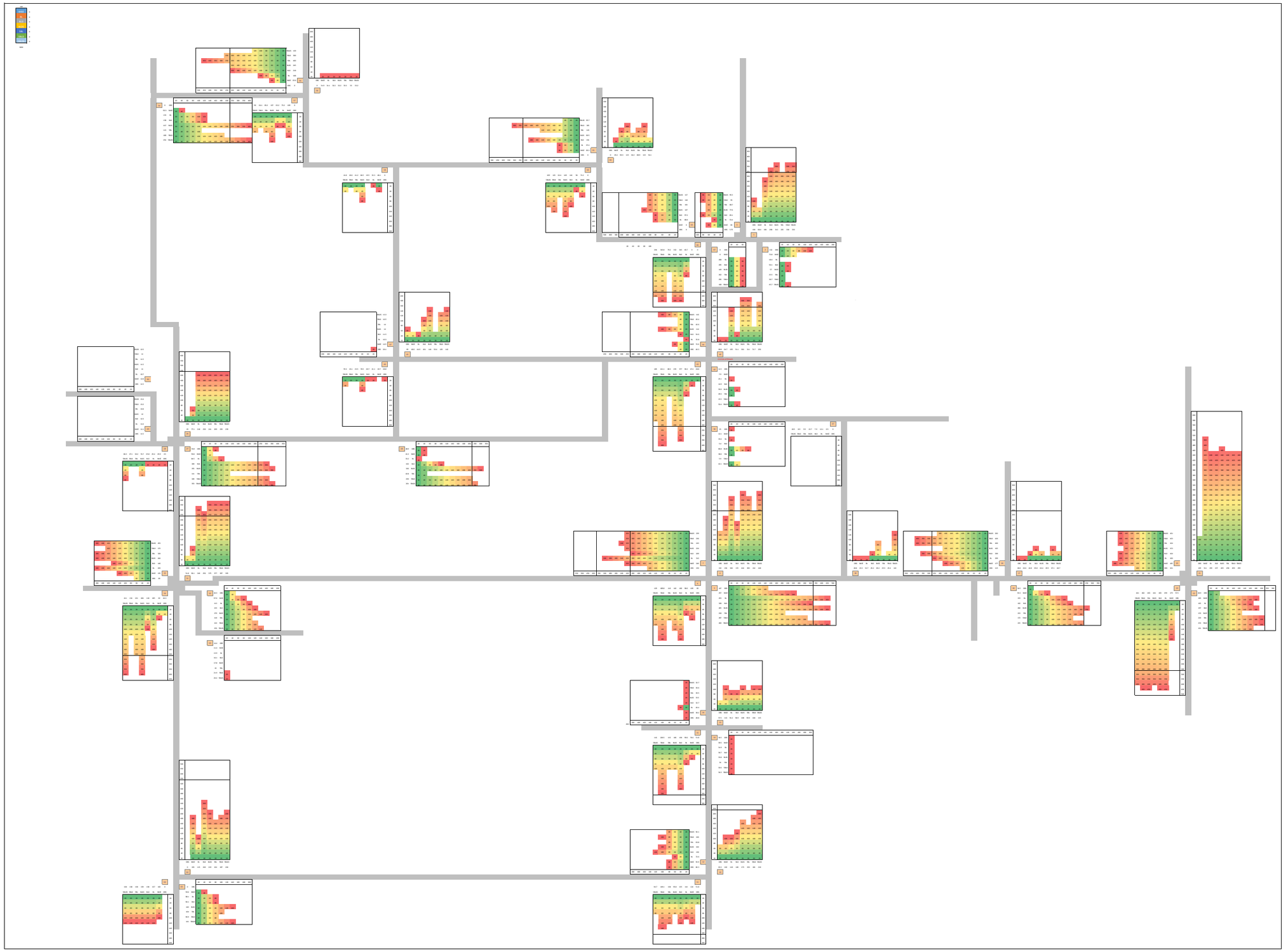
		BASE			BASELINE			BASELINE + DEV			BASELINE + DEV + SENS			5Yr BASELINE			5Yr BASELINE + DEV			5 Yrs BASELINE + DEV + SENS		
AM	MOVEMENT	BASE	Diff	GEH	FB	Diff	GEH	FBS	Diff	GEH				PROP	Diff	GEH				PROPS	Diff	GEH
1_A-B	1_A-B Dawley Road [N] to Blyth Road	128.59		4.7	186	58	4.6	181	-5	4.2	178	-9	4.0	168	-18	3.3	167	-1	3.2	169	2	3.3
1_A-C	1_A-C Dawley Road [N] to Dawley Road [S]	778.96		0.6	824	45	1.6	793	-31	0.5	746	-78	1.2	755	-69	0.9	722	-33	2.1	729	7	1.8
1_A-D	1_A-D Dawley Road [N] to Kestrel Way	32.7		2.6	46	14	2.2	46	0	2.1	35	-11	0.4	41	-5	1.4	41	0	1.4	33	-8	0.0
1_A-E	1_A-E Dawley Road [N] to Betam Road	25.5		0.3	4	-22	5.6	4	0	5.6	3	-1	6.0	3	-1	5.9	3	0	5.8	3	-1	6.1
1_B-A	1_B-A Blyth Road to Dawley Road [N]	83.7		2.6	123	39	3.8	105	-18	2.2	45	-78	4.8	123	0	3.8	82	-41	0.2	47	-34	4.5
1_B-C	1_B-C Blyth Road to Dawley Road [S]	285.89		1.9	292	6	0.3	435	143	7.8	473	181	9.6	353	62	3.8	403	50	6.3	468	64	9.4
1_B-D	1_B-D Blyth Road to Kestrel Way	3.8		0.4	13	9	3.1	5	-8	0.6	6	-7	0.8	19	6	4.5	6	-13	0.9	7	1	1.3
1_B-E	1_B-E Blyth Road to Betam Road	11		1.2	0	-11	4.7	0	0	4.7	0	0	4.7	1	1	4.3	0	-1	4.7	0	0	4.7
1_C-A	1_C-A Dawley Road [S] to Dawley Road [N]	631.56		0.2	579	-52	2.1	580	1	2.1	615	36	0.7	576	-4	2.3	606	31	1.0	627	21	0.2
1_C-B	1_C-B Dawley Road [S] to Blyth Road	310.96		2.0	477	166	8.4	487	10	8.8	607	129	13.8	532	55	10.8	527	-5	10.6	595	68	13.4
1_C-D	1_C-D Dawley Road [S] to Kestrel Way	70.78		1.6	36	-35	4.8	40	4	4.1	39	3	4.3	31	-4	5.5	40	9	4.1	41	1	4.0
1_C-E	1_C-E Dawley Road [S] to Betam Road	42.2		1.4	0	-42	9.2	0	0	9.2	0	0	9.2	0	0	9.2	0	0	9.2	0	0	9.2
1_D-A	1_D-A Kestrel Way to Dawley Road [N]	4		1.1	5	1	0.4	5	0	0.4	5	0	0.3	6	1	0.9	5	-1	0.4	5	0	0.3
1_D-B	1_D-B Kestrel Way to Blyth Road	5.9		0.4	7	1	0.4	7	0	0.4	6	-1	0.1	7	0	0.4	7	0	0.4	6	-1	0.1
1_D-C	1_D-C Kestrel Way to Dawley Road [S]	23.7		0.6	23	0	0.1	24	1	0.1	24	1	0.0	27	4	0.6	27	0	0.7	28	1	0.8
1_D-E	1_D-E Kestrel Way to Betam Road	0		2.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
1_E-A	1_E-A Betam Road to Dawley Road [N]	10.9		2.0	14	3	0.7	14	0	0.8	14	1	1.0	14	1	0.9	13	-1	0.7	14	1	1.0
1_E-B	1_E-B Betam Road to Blyth Road	14		1.8	18	4	1.1	18	0	1.0	17	-1	0.9	18	-1	1.0	18	1	1.1	17	-2	0.7
1_E-C	1_E-C Betam Road to Dawley Road [S]	20.7		0.9	21	0	0.1	22	1	0.3	22	1	0.2	21	-1	0.0	22	1	0.3	22	0	0.2
1_E-D	1_E-D Betam Road to Kestrel Way	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
1_A-A	1_A-A Dawley Road [N] to Dawley Road [N]	0		3.3	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
1_B-B	1_B-B Blyth Road to Blyth Road	0		1.4	0	0	0.0	0	0	0.0	1	1	1.5	0	0	0.0	0	0	0.0	1	1	1.3
1_C-C	1_C-C Dawley Road [S] to Dawley Road [S]	0		1.4	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
1_D-D	1_D-D Kestrel Way to Kestrel Way	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
1_E-E	1_E-E Betam Road to Betam Road	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
2_A-B	2_A-B Dawley Road [N] to A437	253.77		0.9	290	36	2.2	354	64	5.7	315	25	3.6	285	-5	1.9	322	37	4.0	300	-22	2.8
2_A-C	2_A-C Dawley Road [N] to Millington Road	149.1		1.7	61	-88	8.5	71	10	7.4	58	-4	9.0	67	5	7.9	64	-2	8.2	54	-10	9.4
2_A-D	2_A-D Dawley Road [N] to Dawley Road [S[	599.93		0.4	647	47	1.9	682	35	3.2	661	14	2.4	650	3	2.0	632	-19	1.3	669	37	2.7
2_A-E	2_A-E Dawley Road [N] to Bourne Avenue	108.48		0.3	128	19	1.8	158	30	4.3	116	-12	0.7	128	1	1.8	149	21	3.6	112	-38	0.3
2_B-A	2_B-A A437 to Dawley Road [N]	239.64		3.0	302	63	3.8	300	-3	3.7	328	25	5.2	278	-24	2.4	317	39	4.6	342	25	6.0
2_B-C	2_B-C A437 to Millington Road	13.3		2.6	78	65	9.6	73	-5	9.1	66	-13	8.3	74	-5	9.2	76	2	9.4	67	-9	8.5
2_B-D	2_B-D A437 to Dawley Road [S[	106		2.4	43	-63	7.3	26	-17	9.9	22	-21	10.5	41	-2	7.6	29	-12	9.3	26	-3	9.8
2_B-E	2_B-E A437 to Bourne Avenue	46.3		1.5	56	9	1.3	36	-19	1.6	50	-6	0.5	62	6	2.1	38	-24	1.3	54	16	1.1
2_C-A	2_C-A Millington Road to Dawley Road [N]	52.3		0.8	57	5	0.7	58	1	0.8	66	8	1.7	60	3	1.0	60	0	1.0	64	4	1.6
2_C-B	2_C-B Millington Road to A437	0		1.4	10	10	4.5	20	10	6.2	21	11	6.5	10	0	4.4	21	12	6.5	25	4	7.1
2_C-D	2_C-D Millington Road to Dawley Road [S[	33.09		2.5	26	-7	1.3	55	29	3.3	66	40	4.7	27	1	1.1	59	32	3.8	61	2	4.0
2_C-E	2_C-E Millington Road to Bourne Avenue	6		0.4	15	9	2.8	13	-2	2.2	12	-3	2.0	17	2	3.2	13	-3	2.3	12	-1	2.1
2_D-A	2_D-A Dawley Road [S[to Dawley Road [N]	598.94		2.3	620	21	0.9	605	-16	0.2	736	116	5.3	696	76	3.8	649	-47	2.0	731	82	5.1
2_D-B	2_D-B Dawley Road [S[to A437	71.1		1.6	200	129	11.1	93	-107	2.4	83	-117	1.4	180	-20	9.7	105	-74	3.7	85	-20	1.6
2_D-C	2_D-C Dawley Road [S[to Millington Road	59.15		0.9	156	97	9.4	147	-10	8.6	145	-11	8.5	153	-3	9.1	148	-5	8.7	142	-6	8.3
2_D-E	2_D-E Dawley Road [S[to Bourne Avenue	20.5		2.3	19	-1	0.2	20	0	0.2	24	4	0.6	19	0	0.3	21	2	0.2	26	4	1.1
2_E-A	2_E-A Bourne Avenue to Dawley Road [N]	166.1		0.9	117	-49	4.1	151	34	1.2	115	-2	4.3	112	-6	4.6	154	42	1.0	113	-41	4.5
2_E-B	2_E-B Bourne Avenue to A437	103.5		1.0	165	62	5.3	139	-26	3.2	130	-36	2.4	157	-8	4.7	140	-17	3.3	129	-11	2.4
2_E-C	2_E-C Bourne Avenue to Millington Road	8.8		2.0	20	12	3.0	24	3	3.7	20	0	3.0	21	0	3.1	24	3	3.8	19	-5	2.8
2_E-D	2_E-D Bourne Avenue to Dawley Road [S[	56.9		0.5	56	-1	0.2	58	2	0.1	55	0	0.2	54	-2	0.4	61	7	0.5	52	-9	0.7
2_A-A	2_A-A Dawley Road [N] to Dawley Road [N]	0		5.1	0	0	0.0	0	0	0.0	26	26	7.3	0	0	0.0	0	0	0.4	30	29	7.7
2_B-B	2_B-B A437 to A437	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
2_C-C	2_C-C Millington Road to Millington Road	0		1.4	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
2_D-D	2_D-D Dawley Road [S[to Dawley Road [S[	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
2_E-E	2_E-E Bourne Avenue to Bourne Avenue	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
3_A-A	3_A-A Station Road [N] to Station Road [N]	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
3_A-B	3_A-B Station Road [N] to High Street [S]	516.63		1.5	479	-38	1.7	537	58	0.9	470	-8	2.1	499	21	0.8	560	61	1.9	472	-88	2.0
3_A-C	3_A-C Station Road [N] to Station Road [W]	223.5		2.0	366	142	8.3	315	-50	5.6	411	46	10.5	369	3	8.4	340	-29	6.9	370	30	8.5
3_B-A	3_B-A High Street [S] to Station Road [N]	427.4		0.9	364	-64	3.2	374	10	2.7	347	-17	4.1	374	10	2.7	379	5	2.4	341	-38	4.4
3_B-B	3_B-B High Street [S] to High Street [S]	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
3_B-C	3_B-C High Street [S] to Station Road [W]	224.4		0.9	265	40	2.6	248	-16	1.6	284	20	3.8	267	3	2.7	257	-10	2.1	254	-3	1.9
3_C-A	3_C-A Station Road [W] to Station Road [N]	161.9		3.8	116	-46	3.9	332	216	10.8	232	116	5.0	157	42	0.4	328	171	10.6	200	-128	2.8
3_C-B	3_C-B Station Road [W] to High Street [S]	266.88		0.3	282	15	0.9	258	-24	0.6	269	-13	0.1	277	-5	0.6	237	-40	1.9	247	10	1.3
3_C-C	3_C-C Station Road [W] to Station Road [W]	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
4_A-B	4_A-B Station Road [N] to Bedwell Gardens	61.5		2.6	61	0	0.0	62	1	0.1	50	-12	1.6	61	0	0.0	60	-1	0.1	70	9	1.0
4_A-C	4_A-C Station Road [N] to Station Road [S]	490.23		0.3	404	-87	4.1	431	27	2.8	441	38	2.3	418	14	3.4	444	25	2.2	419	-24	3.3
4_A-D	4_A-D Station Road [N] to Millington Road	85.7		0.2	83	-3	0.3	69	-14	1.9	79	-4	0.7	71	-12	1.7	71	0	1.7	72	1	1.6
4_A-A	4_A-A Station Road [N] to Station Road [N]	0			0	0		0	0		0	0		0	0		0	0		0	0	
4_B-A	4_B-A Bedwell Gardens to Station Road [N]	66.6		2.5	45	-22	2.9	31	-14	5.1	31	-14	5.1	48	3	2.5	32	-15	4.9	51	19	2.0
4_B-C	4_B-C Bedwell Gardens to Station Road [S]	1.9		1.9	38	36	8.1	49	11	9.3	49	11	9.3	40	2	8.3	52	12	9.7	47	-6	9.1
4_B-D	4_B-D Bedwell Gardens to Millington Road	37.6		0.8	4	-34	7.4	4	0	7.4	4	0	7.4	4	0	7.4	4	0	7.4	18	14	3.7
4_B-B	4_B-B Bedwell Gardens to Bedwell Gardens	0			0	0		0	0		0	0		0	0		0	0		0	0	
4_C-A	4_C-A Station Road [S] to Station Road [N]	407.9		0.6	338	-70	3.6	533	194	5.8	401	63	0.3	386	48	1.1	512	126	4.9	415	-98	0.3
4_C-B	4_C-B Station Road [S] to Bedwell Gardens	17		4.9	109	92	11.6	111	2	11.8	123	15	12.7	110	1	11.7	107	-3	11.4	138	31	13.7
4_C-D	4_C-D Station Road [S] to Millington Road	162.5		1.4	133	-30	2.4	137	5	2.1	133	0	2.4	138	5	2.0	140	2	1.9	175	35	0.9
4_C-C	4_C-C Station Road [S] to Station Road [S]	0			0	0		0	0		0	0		0	0		0	0		0	0	
4_D-A	4_D-A Millington Road to Station Road [N]	66.1		2.6	61	-5	0.6	52	-9	1.8	35	-26	4.4	62	1	0.5	50	-12	2.1	35	-15	4.4
4_D-B	4_D-B Millington Road to Bedwell Gardens	51.9		0.1	4	-48	9.1	4	0	9.1	4	0	9.1	4	0	9.1	4	0	9.1	7	3	8.4
4_D-C	4_D-C Millington Road to Station Road [S]	56.9		2.8	98	42	4.7	77	-22	2.4	79	-19	2.7	101	3	5.0	80	-21	2.7	82	3	3.0
4_D-D	4_D-D Millington Road to Millington Road	0			0	0		0	0		0	0		0	0		0	0		0	0	
5_A-B	5_A-B Station Road [N] to North Hyde Road [E]	91.5		1.9	187	96	8.1	180	-7	7.6	165	-23	6.5	195	8	8.6	186	-9	8.0	170	-16	6.8
5_A-C	5_A-C Station Road [N] to Station Road [S]	369.33		0.7	350	-20	1.0	269	-81	5.6	302	-47	3.7	376	26	0.3	287	-89	4.5	350	63	1.0
5_A-D	5_A-D Station Road [N] to North Hyde Road [W]	69.2		0.3	112	43	4.5	22	-90	7.0	91	-22	2.4	125	12	5.6	23	-102	6.8	132	109	6.2
5_A-A	5_A-A Station Road [N] to Station Road [N]	0			0	0		0	0		0	0		0	0		0	0		0	0	
5_B-A	5_B-A North Hyde Road [E] to Station Road [N]	135.46		1.4	125	-10	0.9	101	-24	3.2	97	-28	3.6	113	-12	2.0	85	-28	4.8	114	29	1.9
5_B-C	5_B-C North Hyde Road [E] to Station Road [S]	192.5		1.3	140	-52	4.0	216	76	1.7	212	72	1.4	127	-13	5.1	218	90	1.8	187	-31	0.4
5_B-D	5_B-D North Hyde Road [E] to North Hyde Road [W]	314.31		0.8	293	-21	1.2	387	94	3.9	355	62	2.2	267	-26	2.8	410	143	5.0	340	-71	1.4
5_B-B	5_B-B North Hyde Road [E] to North Hyde Road [E]	0			0	0		0	0		0	0		0	0		0	0		0	0	
5_C-A	5_C-A Station Road [S] to Station Road [N]	343		1.6	263	-80	4.6	429	166	4.4	311	48	1.8	294	31	2.7	404	110	3.2	271	-134	4.1
5_C-B	5_C-B Station Road [S] to North Hyde Road [E]	164.9		2.4	133	-32	2.6	160	27	0.4	128	-5	3.0	151	18	1.1	153	2	0.9	170	16	0.4
5_C-D	5_C-D Station Road [S] to North Hyde Road [W]	25.7		4.2	48	22	3.6	15	-32	2.3	26	-21	0.1	53	5	4.3	17	-36	1.9	56	39	4.8
5_C-C	5_C-C Station Road [S] to Station Road [S]	0			0	0		0	0		0	0		0	0		0	0		0	0	
5_D-A	5_D-A North Hyde Road [W] to Station Road [N]	31.4		1.8	72	41	5.7	68	-5	5.2	81	9	6.6	65	-8	4.8	68	3	5.1	83	15	6.8
5_D-B	5_D-B North Hyde Road [W] to North Hyde Road [E]	315.3		3.2	488	173	8.6	426	-62	5.8	380	-108	3.5	482	-6	8.4	417	-66	5.3	384	-32	3.7
5_D-C	5_D-C North Hyde Road [W] to Station Road [S]	80.2		2.5	60	-20	2.4	80	20	0.0	58	-2	2.7	50	-10	3.7	75	24	0.6	63	-12	2.1
5_D-D	5_D-D North Hyde Road [W] to North Hyde Road [W]	0			0	0		0	0		0	0		0	0		0	0		0	0	
6_A-B	6_A-B North Hyde Gardens to North Hyde Road [E]	55.55		1.5	129	73	7.6	130	2	7.7	132	4	7.9	75	-53	2.4	133	58	8.0	166	33	10.5
6_A-C	6_A-C North Hyde Gardens to Watersplash Road	0			0	0		0	0		0	0		0	0		0	0		0	0	
6_A-D	6_A-D North Hyde Gardens to North Hyde Road [W]	0			0	0		0	0		0	0		0	0		0	0		0	0	
6_A-A	6_A-A North Hyde Gardens to North Hyde Gardens	0			0	0		0	0		0	0		0	0		0	0		0	0	
6_B-A	6_B-A North Hyde Road [E] to North Hyde Gardens	81.1		0.7	222	141	11.5	110	-112	2.9	113	-109	3.2	190	-32	9.4	113	-77	3.2	108	-5	2.8
6_B-C	6_B-C North Hyde Road [E] to Watersplash Road	0		2.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	7	7	3.8
6_B-D	6_B-D North Hyde Road [E] to North Hyde Road [W]	740.77		2.0	894	154	5.4	833	-61	3.3	894	0	5.4	800	-95	2.1	838	38	3.4	833	-4	3.3
6_B-B	6_B-B North Hyde Road [E] to North Hyde Road [E]	0			0	0		0	0		0	0		0	0		0	0		0	0	
6_C-A	6_C-A Watersplash Road to North Hyde Gardens	0		2.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	7	7	3.8
6_C-B	6_C-B Watersplash Road to North Hyde Road [E]	0		1.4	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	8	8	4.0
6_C-D	6_C-D Watersplash Road to North Hyde Road [W]	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	7	7	3.7
6_C-C	6_C-C Watersplash Road to Watersplash Road	0			0	0		0	0		0	0		0	0		0	0		0	0	
6_D-A	6_D-A North Hyde Road [W] to North Hyde Gardens	8.4		2.2	43	34	6.8	13	-30	1.3	12	-31	1.1	42	-1	6.7	12	-29	1.2	10	-2	0.6
6_D-B	6_D-B North Hyde Road [W] to North Hyde Road [E]	870.3		1.5	959	88	2.9	907	-52	1.2	845	-114	0.9	944	-15	2.5	891	-53	0.7	912	21	1.4
6_D-C	6_D-C North Hyde Road [W] to Watersplash Road	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
6_D-D	6_D-D North Hyde Road [W] to North Hyde Road [W]	0			0	0		0	0		0	0		0	0		0	0		0	0	
7_A-A	7_A-A The Parkway (A312) [N] to The Parkway (A312) [N]	0		2.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
7_A-B	7_A-B The Parkway (A312) [N] to Hayes Road	608.96		0.5	339	-270	12.4	383	44	10.2	349	10	11.9	382	43	10.2	392	10	9.7	340	-52	12.3
7_A-C	7_A-C The Parkway (A312) [N] to The Parkway (A312) [S]	1466.22		2.2	1870	403	9.9	2073	203	14.4	1899	30	10.6	2112	242	15.3	2142	30	15.9	1853	-289	9.5
7_A-D	7_A-D The Parkway (A312) [N] to North Hyde Road [W]	240.6		2.7	159	-82	5.8	137	-22	7.5	123	-36	8.7	175	16	4.5	136	-39	7.6	117	-19	9.2
7_B-A	7_B-A Hayes Road to The Parkway (A312) [N]	356.29		0.9	160	-196	12.2	182	22	10.7	175	16	11.1	169	9	11.6	185	16	10.4	183	-1	10.5
7_B-B	7_B-B Hayes Road to Hayes Road	4.1		0.4	0	-4	2.9	0	0	2.9	0	0	2.9	0	0	2.9	0	0	2.9	0	0	2.9
7_B-C	7_B-C Hayes Road to The Parkway (A312) [S]	423.92		0.3	599	175	7.8	616	17	8.4	603	4	7.9	625	26	8.8	637	12	9.2	635	-2	9.2
7_B-D	7_B-D Hayes Road to North Hyde Road [W]	314.78		0.0	495	180	9.0	470	-25	7.9	457	-38	7.3	500	5	9.2	466	-35	7.6	467	2	7.7
7_C-A	7_C-A The Parkway (A312) [S] to The Parkway (A312) [N]	1282.78		0.2	1436	153	4.2	1158	-279	3.6	1484	48	5.4	986	-450	8.8	1158	171	3.6	1501	343	5.8
7_C-B	7_C-B The Parkway (A312) [S] to Hayes Road	430.17		3.1	268	-162	8.7	210	-58	12.3	291	23	7.3	175	-94	14.7	213	38	12.1	291	79	7.3
7_C-C	7_C-C The Parkway (A312) [S] to The Parkway (A312) [S]	0		3.3	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
7_C-D	7_C-D The Parkway (A312) [S] to North Hyde Road [W]	268.74		0.2	499	231	11.8	327	-173	3.4	427	-72	8.5	347	-152	4.5	328	-19	3.4	421	93	8.2
7_D-A	7_D-A North Hyde Road [W] to The Parkway (A312) [N]	310.05		4.0	377	67	3.6	318	-59	0.4	305	-72	0.3	356	-22	2.5	307	-48	0.1	320	13	0.6
7_D-B	7_D-B North Hyde Road [W] to Hayes Road	446.16		1.1	415	-31	1.5	404	-12	2.1	378	-37	3.3	410	-5	1.7	391	-19	2.7	381	-10	3.2
7_D-C	7_D-C North Hyde Road [W] to The Parkway (A312) [S]	166.74		0.3	321	154	9.9	299	-22	8.7	269	-52	7.0	283	-38	7.7	299	16	8.7	310	11	9.3
7_D-D	7_D-D North Hyde Road [W] to North Hyde Road [W]	0		2.8	4	4	2.9	47	43	9.7	48	44	9.8	0	-4	0.0	50	50	10.0	53	2	10.3
8_A-B	8_A-B Keith Road to Station Road [N]	0			0	0		0	0		0	0		0	0		0	0		0	0	
8_A-C	8_A-C Keith Road to Nestles Avenue	0			0	0		0	0		0	0		0	0		0	0		0	0	
8_A-D	8_A-D Keith Road to Station Road [S]	0			0	0		0	0		0	0		0	0		0	0		0	0	
8_A-A	8_A-A Keith Road to Keith Road	0			0	0		0	0		0	0		0	0		0	0		0	0	
8_B-A	8_B-A Station Road [N] to Keith Road	0			0	0		0	0		0	0		0	0		0	0		0	0	
8_B-C	8_B-C Station Road [N] to Nestles Avenue	97.7		1.8	133	35	3.3	46	-87	6.2	14	-119	11.3	109	-24	1.1	45	-64	6.2	89	44	0.9
8_B-D	8_B-D Station Road [N] to Station Road [S]	463.48		1.5	528	65	2.9	455	-73	0.4	467	-61	0.2	579	51	5.1	483	-96	0.9	421	-62	2.0
8_B-B	8_B-B Station Road [N] to Station Road [N]	0			0	0		0	0		0	0		0	0		0	0		0	0	
8_C-A	8_C-A Nestles Avenue to Keith Road	0			0	0		0	0		0	0		0	0		0	0		0	0	
8_C-B	8_C-B Nestles Avenue to Station Road [N]	0		8.3	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	12	12	4.9
8_C-D	8_C-D Nestles Avenue to Station Road [S]	72		1.8	116	44	4.6	12	-104	9.2	98	-18	2.9	113	-4	4.2	12	-101	9.2	106	94	3.6
8_C-C	8_C-C Nestles Avenue to Nestles Avenue	0			0	0		0	0		0	0		0	0		0	0		0	0	
8_D-A	8_D-A Station Road [S] to Keith Road	0			0	0		0	0		0	0		0	0		0	0		0	0	
8_D-B	8_D-B Station Road [S] to Station Road [N]	447.16		2.2	449	2	0.1	588	139	6.2	489	40	1.9	463	14	0.7	550	87	4.6	434	-116	0.6
8_D-C	8_D-C Station Road [S] to Nestles Avenue	61.1		0.4	13	-48	8.0	0	-13	11.1	0	-13	11.1	11	-2	8.4	0	-11	11.1	67	67	0.7
8_D-D	8_D-D Station Road [S] to Station Road [S]	0			0	0		0	0		0	0		0	0		0	0		0	0	
9_A-A	9_A-A Nestles Avenue [W] to Nestles Avenue [W]	0			0	0		0	0		0	0		0	0		0	0		0	0	
9_A-B	9_A-B Nestles Avenue [W] to Nestles Avenue [E]	32		2.3	17	-15	3.0	45	28	2.1	2	-16	7.4	11	-7	4.6	45	34	2.1	23	-22	1.7
9_A-C	9_A-C Nestles Avenue [W] to Harold Avenue	126.1		1.9	126	-1	0.1	1	-125	15.8	12	-114	13.8	107	-18	1.8	0	-107	15.8	74	74	5.2
9_B-A	9_B-A Nestles Avenue [E] to Nestles Avenue [W]	17.9		1.0	3	-15	4.8	12	10	1.5	32	29	2.8	2	0	4.9	12	10	1.5	54	42	6.1
9_B-B	9_B-B Nestles Avenue [E] to Nestles Avenue [E]	0			0	0		0	0		0	0		0	0		0	0		0	0	
9_B-C	9_B-C Nestles Avenue [E] to Harold Avenue	36.2		3.8	33	-4	0.6	259	227	18.4	331	299	21.8	33	0	0.6	260	227	18.4	299	39	20.3
9_C-A	9_C-A Harold Avenue to Nestles Avenue [W]	55		3.4	112	57	6.2	0	-112	10.5	70	-42	1.9	111	-1	6.2	0	-111	10.5	99	99	5.1
9_C-B	9_C-B Harold Avenue to Nestles Avenue [E]	34.8		5.1	194	159	14.9	241	48	17.6	305	111	20.7	179	-15	14.0	240	61	17.5	321	81	21.4
9_C-C	9_C-C Harold Avenue to Harold Avenue	0			0	0		0	0		0	0		0	0		0	0		0	0	
10_A-A	10_A-A Harold Avenue to Harold Avenue	0			0	0		0	0		0	0		0	0		0	0		0	0	
10_A-B	10_A-B Harold Avenue to North Hyde Road [E]	139.8		0.8	149	10	0.8	170	20	2.4	231	82	6.7	131	-18	0.8	170	39	2.4	273	103	9.3
10_A-C	10_A-C Harold Avenue to Crane Gardens	15.9		2.0	0	-16	5.6	0	0	5.6	0	0	5.6	0	0	5.6	0	0	5.6	2	2	4.7
10_A-D	10_A-D Harold Avenue to North Hyde Road [W]	6		1.1	8	2	0.9	92	83	12.3	114	105	13.9	9	0	1.0	92	83	12.3	105	13	13.3
10_B-A	10_B-A North Hyde Road [E] to Harold Avenue	54.3		3.0	217	163	14.0	115	-102	6.6	206	-12	13.3	197	-20	12.7	115	-82	6.6	200	84	12.9
10_B-B	10_B-B North Hyde Road [E] to North Hyde Road [E]	0			0	0		0	0		0	0		0	0		0	0		0	0	
10_B-C	10_B-C North Hyde Road [E] to Crane Gardens	20.2		1.7	0	-20	6.4	0	0	6.4	0	0	6.4	0	0	6.4	0	0	6.4	21	21	0.1
10_B-D	10_B-D North Hyde Road [E] to North Hyde Road [W]	612.42		1.2	569	-43	1.8	617	48	0.2	566	-3	1.9	497	-72	4.9	622	125	0.4	541	-81	3.0
10_C-A	10_C-A Crane Gardens to Harold Avenue	20		1.2	0	-20	6.3	0	0	6.3	0	0	6.3	0	0	6.3	0	0	6.3	0	0	6.3
10_C-B	10_C-B Crane Gardens to North Hyde Road [E]	0			0	0		0	0		0	0		0	0		0	0		0	0	
10_C-C	10_C-C Crane Gardens to Crane Gardens	0			0	0		0	0		0	0		0	0		0	0		0	0	
10_C-D	10_C-D Crane Gardens to North Hyde Road [W]	25		2.0	0	-25	7.1	0	0	7.1	0	0	7.1	0	0	7.1	0	0	7.1	0	0	7.0
10_D-A	10_D-A North Hyde Road [W] to Harold Avenue	15.7		1.9	89	73	10.1	126	37	13.1	170	81	16.0	93	4	10.5	125	31	13.0	143	18	14.3
10_D-B	10_D-B North Hyde Road [W] to North Hyde Road [E]	536.3		3.4	720	184	7.3	639	-81	4.2	513	-208	1.0	729	9	7.7	628	-101	3.8	467	-161	3.1
10_D-C	10_D-C North Hyde Road [W] to Crane Gardens	18.6		3.2	0	-19	6.1	0	0	6.1	0	0	6.1	0	0	6.1	0	0	6.1	3	3	4.6
10_D-D	10_D-D North Hyde Road [W] to North Hyde Road [W]	0			0	0		0	0		0	0		0	0		0	0		0	0	
11_A-A	11_A-A Station Road [N] to Station Road [N]	0		2.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0

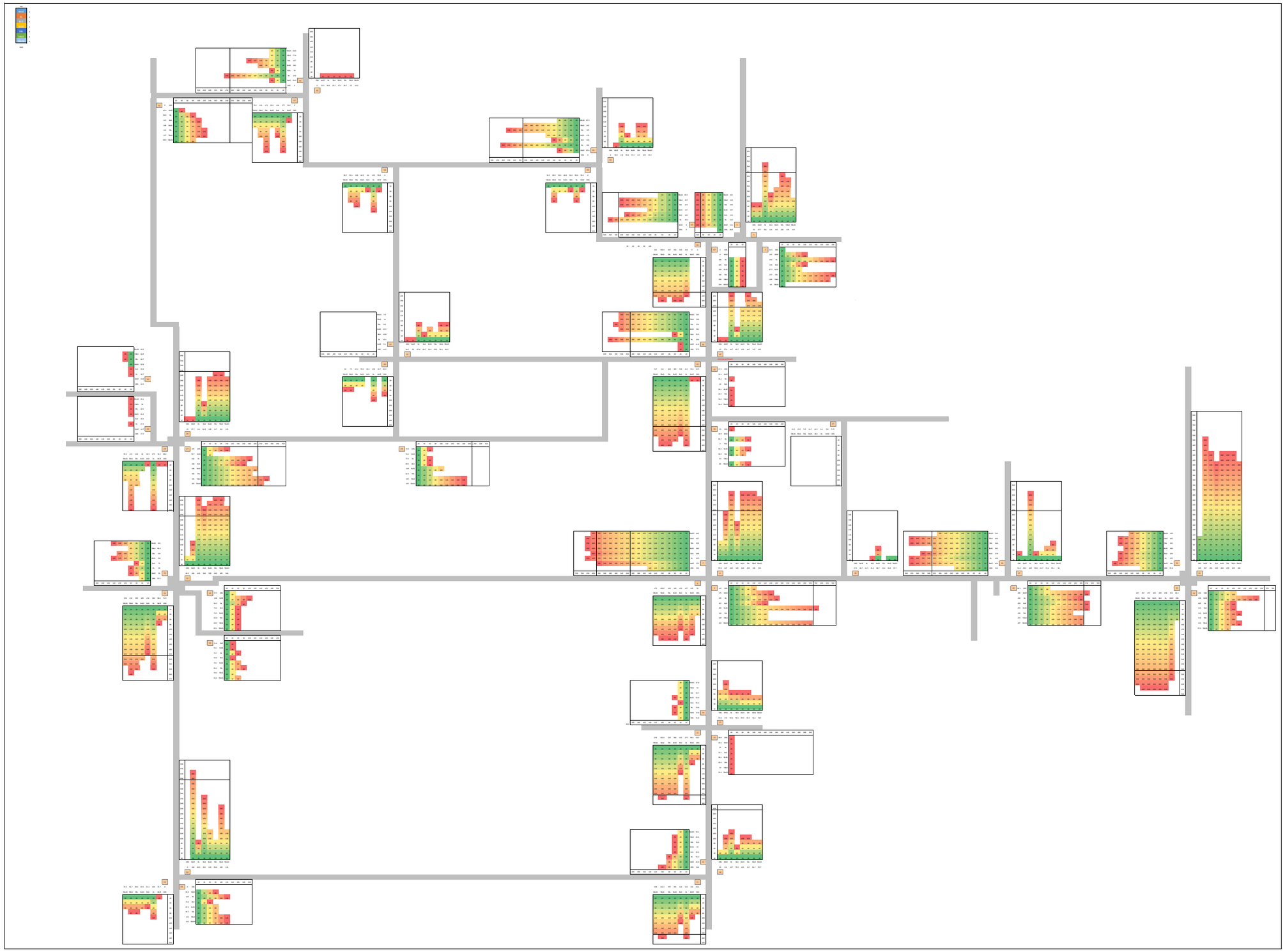
		BASE			BASELINE			BASELINE + DEV			BASELINE + DEV + SENS			5Yr BASELINE			5Yr BASELINE + DEV			5 Yrs BASELINE + DEV + SENS		
AM	MOVEMENT	BASE	Diff	GEH	FB	Diff	GEH	FBS	Diff	GEH				PROP	Diff	GEH				PROPS	Diff	GEH
11_A-B	11_A-B Station Road [N] to Station Approach	0		3.3	4	4	3.0	13	8	5.0	12	7	4.9	7	3	3.8	13	6	5.2	10	-3	4.4
11_A-C	11_A-C Station Road [N] to Station Road [S]	124.8		1.0	641	516	26.4	487	-154	20.7	445	-196	19.0	651	10	26.7	513	-138	21.8	522	9	22.1
11_A-D	11_A-D Station Road [N] to Clayton Road	25.6		0.2	104	78	9.7	43	-61	2.9	29	-74	0.7	106	2	9.9	29	-77	0.6	33	4	1.3
11_B-A	11_B-A Station Approach to Station Road [N]	0		3.2	41	41	9.0	38	-3	8.7	47	6	9.7	42	1	9.2	49	7	9.9	47	-2	9.7
11_B-C	11_B-C Station Approach to Station Road [S]	66.1		1.4	34	-32	4.5	44	10	2.9	55	20	1.5	34	0	4.5	44	10	2.9	56	11	1.4
11_B-D	11_B-D Station Approach to Clayton Road	34.3		0.2	26	-8	1.4	25	-1	1.7	2	-25	7.7	29	3	0.9	13	-17	4.4	2	-11	7.5
11_B-B	11_B-B Station Approach to Station Approach	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
11_C-A	11_C-A Station Road [S] to Station Road [N]	229.6		3.2	375	145	8.3	561	186	16.7	448	74	11.9	405	31	9.9	524	119	15.2	440	-84	11.5
11_C-B	11_C-B Station Road [S] to Station Approach	40		1.9	90	50	6.2	65	-25	3.5	70	-19	4.1	85	-5	5.7	65	-20	3.4	73	8	4.4
11_C-C	11_C-C Station Road [S] to Station Road [S]	0		7.1	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
11_C-D	11_C-D Station Road [S] to Clayton Road	182.41		3.5	117	-65	5.3	71	-46	9.9	65	-52	10.5	112	-5	5.8	56	-56	11.5	64	8	10.6
11_D-A	11_D-A Clayton Road to Station Road [N]	32.9		0.2	28	-5	0.9	89	61	7.2	124	96	10.3	28	0	0.9	101	73	8.3	119	18	9.8
11_D-B	11_D-B Clayton Road to Station Approach	15.99		0.3	76	60	8.9	80	3	9.2	59	-17	7.0	78	2	9.1	75	-3	8.8	57	-18	6.8
11_D-C	11_D-C Clayton Road to Station Road [S]	371.78		0.6	117	-255	16.3	86	-31	18.9	86	-31	18.9	135	18	14.9	85	-50	19.0	102	17	17.5
11_D-D	11_D-D Clayton Road to Clayton Road	0		6.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
12_A-A	12_A-A Trevor Road [N] to Trevor Road [N]	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
12_A-B	12_A-B Trevor Road [N] to Clayton Road [E]	354.83		1.3	169	-185	11.5	137	-33	13.9	170	1	11.4	189	20	10.0	130	-59	14.4	179	48	10.8
12_A-C	12_A-C Trevor Road [N] to Trevor Road [S]	282.61		1.5	233	-50	3.1	442	210	8.4	455	222	9.0	299	67	1.0	432	132	7.9	439	7	8.2
12_A-D	12_A-D Trevor Road [N] to Clayton Road [W]	9.7		0.9	147	137	15.5	148	1	15.5	111	-36	13.0	141	-6	15.1	140	-1	15.0	108	-32	12.8
12_B-A	12_B-A Clayton Road [E] to Trevor Road [N]	0			0	0		0	0		0	0		0	0		0	0		0	0	
12_B-B	12_B-B Clayton Road [E] to Clayton Road [E]	0			0	0		0	0		0	0		0	0		0	0		0	0	
12_B-C	12_B-C Clayton Road [E] to Trevor Road [S]	0			0	0		0	0		0	0		0	0		0	0		0	0	
12_B-D	12_B-D Clayton Road [E] to Clayton Road [W]	0			0	0		0	0		0	0		0	0		0	0		0	0	
12_C-A	12_C-A Trevor Road [S] to Trevor Road [N]	397.63		0.1	201	-196	11.3	123	-78	17.0	327	126	3.7	268	67	7.1	124	-144	16.9	322	197	4.0
12_C-B	12_C-B Trevor Road [S] to Clayton Road [E]	162.83		3.7	242	79	5.6	273	30	7.5	288	46	8.4	234	-8	5.1	279	44	7.8	279	0	7.8
12_C-C	12_C-C Trevor Road [S] to Trevor Road [S]	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
12_C-D	12_C-D Trevor Road [S] to Clayton Road [W]	65.8		4.6	103	37	4.0	118	15	5.4	91	-12	2.8	91	-12	2.8	123	32	5.9	94	-29	3.2
12_D-A	12_D-A Clayton Road [W] to Trevor Road [N]	12.9		0.3	16	3	0.8	18	2	1.3	16	-1	0.7	15	-1	0.6	20	5	1.7	16	-4	0.8
12_D-B	12_D-B Clayton Road [W] to Clayton Road [E]	5		1.2	13	8	2.7	9	-4	1.5	6	-8	0.2	13	0	2.7	9	-4	1.6	7	-3	0.7
12_D-C	12_D-C Clayton Road [W] to Trevor Road [S]	26.13		1.6	30	4	0.7	31	2	1.0	35	5	1.6	32	2	1.1	31	-1	0.9	36	5	1.7
12_D-D	12_D-D Clayton Road [W] to Clayton Road [W]	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
13_A-A	13_A-A Trevor Road [N] to Trevor Road [N]	0			0	0		0	0		0	0		0	0		0	0		0	0	
13_A-B	13_A-B Trevor Road [N] to Blyth Road [E]	0			0	0		0	0		0	0		0	0		0	0		0	0	
13_A-C	13_A-C Trevor Road [N] to Blyth Road [W]	308.24		0.9	261	-47	2.8	473	212	8.3	495	234	9.3	330	69	1.2	456	126	7.6	504	48	9.7
13_B-A	13_B-A Blyth Road [E] to Trevor Road [N]	166.51		2.9	81	-86	7.7	56	-25	10.5	17	-64	15.6	73	-8	8.6	34	-39	13.2	22	-12	14.8
13_B-B	13_B-B Blyth Road [E] to Blyth Road [E]	0			0	0		0	0		0	0		0	0		0	0		0	0	
13_B-C	13_B-C Blyth Road [E] to Blyth Road [W]	76.9		7.1	221	144	11.8	141	-79	6.2	58	-163	2.2	226	5	12.1	85	-140	0.9	73	-13	0.5
13_C-A	13_C-A Blyth Road [W] to Trevor Road [N]	459.05		0.9	465	6	0.3	462	-3	0.1	706	241	10.2	533	68	3.3	491	-41	1.5	639	148	7.7
13_C-B	13_C-B Blyth Road [W] to Blyth Road [E]	0			0	0		0	0		0	0		0	0		0	0		0	0	
13_C-C	13_C-C Blyth Road [W] to Blyth Road [W]	0			0	0		0	0		0	0		0	0		0	0		0	0	
14_A-A	14_A-A Dawley Road [N] to Dawley Road [N]	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
14_A-B	14_A-B Dawley Road [N] to Access	0		2.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
14_A-C	14_A-C Dawley Road [N] to Dawley Road [S]	873.5		1.3	950	77	2.5	914	-36	1.4	876	-74	0.1	856	-94	0.6	826	-30	1.6	840	14	1.1
14_A-D	14_A-D Dawley Road [N] to Swallowfield Way	79.6		0.6	0	-80	12.6	0	0	12.6	0	0	12.6	0	0	12.6	0	0	12.6	0	0	12.6
14_B-A	14_B-A Access to Dawley Road [N]	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
14_B-B	14_B-B Access to Access	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
14_B-C	14_B-C Access to Dawley Road [S]	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
14_B-D	14_B-D Access to Swallowfield Way	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
14_C-A	14_C-A Dawley Road [S] to Dawley Road [N]	638.26		0.8	668	29	1.1	655	-13	0.7	664	-4	1.0	667	-1	1.1	673	6	1.4	675	2	1.4
14_C-B	14_C-B Dawley Road [S] to Access	0		3.9	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
14_C-C	14_C-C Dawley Road [S] to Dawley Road [S]	0		3.2	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
14_C-D	14_C-D Dawley Road [S] to Swallowfield Way	89.6		4.1	50	-40	4.8	45	-5	5.4	16	-34	10.2	50	0	4.8	33	-17	7.2	18	-15	9.7
14_D-A	14_D-A Swallowfield Way to Dawley Road [N]	36.2		0.1	0	-36	8.5	0	0	8.5	18	18	3.6	0	0	8.5	0	0	8.5	17	17	3.8
14_D-B	14_D-B Swallowfield Way to Access	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
14_D-C	14_D-C Swallowfield Way to Dawley Road [S]	93.8		0.2	119	25	2.4	118	-1	2.4	99	-20	0.5	123	4	2.8	123	0	2.8	104	-18	1.1
14_D-D	14_D-D Swallowfield Way to Swallowfield Way	0		2.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
17_A-A	17_A-A East Avenue to East Avenue	0			0	0		0	0		0	0		0	0		0	0		0	0	
17_A-B	17_A-B East Avenue to Coldharbour Lane	0			0	0		0	0		0	0		0	0		0	0		0	0	
17_A-C	17_A-C East Avenue to Pump Lane	0			0	0		0	0		0	0		0	0		0	0		0	0	
17_A-D	17_A-D East Avenue to Botwell Lane	0			0	0		0	0		0	0		0	0		0	0		0	0	
17_B-A	17_B-A Coldharbour Lane to East Avenue	24.2		0.1	0	-24	7.0	0	0	7.0	0	0	7.0	0	0	7.0	0	0	7.0	0	0	7.0
17_B-B	17_B-B Coldharbour Lane to Coldharbour Lane	0		3.3	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
17_B-C	17_B-C Coldharbour Lane to Pump Lane	198.5		0.1	197	-2	0.1	229	32	2.1	197	0	0.1	194	-3	0.3	225	31	1.8	211	-13	0.9
17_B-D	17_B-D Coldharbour Lane to Botwell Lane	212.66		2.3	366	154	9.0	336	-30	7.5	358	-8	8.6	386	20	10.0	356	-30	8.5	371	15	9.3
17_C-A	17_C-A Pump Lane to East Avenue	20.2		0.0	1	-20	6.0	1	0	6.0	1	0	6.0	1	0	6.0	1	0	6.0	1	0	6.0
17_C-B	17_C-B Pump Lane to Coldharbour Lane	101.9		0.9	34	-68	8.2	35	1	8.1	34	0	8.2	34	0	8.2	39	4	7.6	38	0	7.6
17_C-C	17_C-C Pump Lane to Pump Lane	6.48		2.8	0	-6	3.6	0	0	3.6	0	0	3.6	0	0	3.6	0	0	3.6	0	0	3.6
17_C-D	17_C-D Pump Lane to Botwell Lane	302.3		1.1	92	-210	15.0	223	131	4.9	173	81	8.4	95	3	14.7	221	126	5.0	173	-48	8.4
17_D-A	17_D-A Botwell Lane to East Avenue	59.5		1.4	1	-58	10.6	38	37	3.1	1	0	10.6	37	36	3.3	37	1	3.2	1	-36	10.6
17_D-B	17_D-B Botwell Lane to Coldharbour Lane	143.7		1.0	304	160	10.7	336	32	12.4	297	-7	10.3	299	-5	10.4	327	28	11.9	303	-24	10.6
17_D-C	17_D-C Botwell Lane to Pump Lane	349.7		1.3	439	90	4.5	456	17	5.3	431	-9	4.1	410	-29	3.1	443	32	4.7	407	-35	3.0
17_D-D	17_D-D Botwell Lane to Botwell Lane	0		2.6	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
20_A-A	20_A-A Dawley Road [N] to Dawley Road [N]	0			0	0		0	0		0	0		0	0		0	0		0	0	
20_A-B	20_A-B Dawley Road [N] to Botwell Common Road	157.8		1.8	314	156	10.2	366	52	12.9	210	-104	3.8	398	84	14.4	351	-47	12.1	184	-167	2.0
20_A-C	20_A-C Dawley Road [N] to Dawley Road [S]	718.28		2.1	737	19	0.7	697	-41	0.8	629	-109	3.4	689	-48	1.1	658	-31	2.3	555	-103	6.5
20_B-A	20_B-A Botwell Common Road to Dawley Road [N]	117.53		1.9	260	143	10.4	261	1	10.4	191	-69	5.9	245	-15	9.5	257	12	10.2	170	-87	4.4
20_B-B	20_B-B Botwell Common Road to Botwell Common Road	0			0	0		0	0		0	0		0	0		0	0		0	0	
20_B-C	20_B-C Botwell Common Road to Dawley Road [S]	233.89		1.2	211	-23	1.5	194	-17	2.7	278	66	2.7	166	-46	4.8	206	41	1.9	297	91	3.9
20_C-A	20_C-A Dawley Road [S] to Dawley Road [N]	469.06		0.6	451	-18	0.8	453	2	0.7	454	3	0.7	453	2	0.8	453	0	0.8	434	-18	1.6
20_C-B	20_C-B Dawley Road [S] to Botwell Common Road	209.3		2.4	197	-13	0.9	186	-11	1.7	211	15	0.1	199	2	0.7	198	-1	0.8	205	7	0.3
20_C-C	20_C-C Dawley Road [S] to Dawley Road [S]	0			0	0		0	0		0	0		0	0		0	0		0	0	
21_A-A	21_A-A Botwell Lane [N] to Botwell Lane [N]	0		2.8	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
21_A-B	21_A-B Botwell Lane [N] to Botwell Lane [S]	293.8		0.2	378	84	4.6	323	-55	1.7	227	-151	4.1	307	-71	0.8	291	-16	0.2	234	-57	3.7
21_A-C	21_A-C Botwell Lane [N] to Botwell Common Road [W]	113.6		0.5	94	-20	1.9	85	-9	2.9	81	-13	3.3	75	-18	3.9	79	4	3.5	81	2	3.3
21_B-A	21_B-A Botwell Lane [S] to Botwell Lane [N]	243.7		3.3	134	-110	8.0	134	0	8.0	108	-26	10.2	136	2	7.8	134	-2	8.0	108	-26	10.3
21_B-B	21_B-B Botwell Lane [S] to Botwell Lane [S]	0		2.4	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
21_B-C	21_B-C Botwell Lane [S] to Botwell Common Road [W]	229.33		2.6	254	25	1.6	256	2	1.7	224	-30	0.4	253	-1	1.5	261	8	2.0	222	-39	0.5
21_C-A	21_C-A Botwell Common Road [W] to Botwell Lane [N]	79.6		0.5	0	-80	12.6	40	40	5.1	16	16	9.3	38	38	5.5	40	2	5.2	16	-24	9.2
21_C-B	21_C-B Botwell Common Road [W] to Botwell Lane [S]	227.1		0.3	389	161	9.2	483	94	13.6	289	-100	3.9	532	144	15.7	480	-52	13.4	286	-194	3.7
21_C-C	21_C-C Botwell Common Road [W] to Botwell Common Road [W]	0		1.7	0	0	0.0	0	0	0.0	16	16	5.7	0	0	0.0	0	0	0.0	16	16	5.7
22_A-A	22_A-A Botwell Lane [N] to Botwell Lane [N]	0			0	0		0	0		0	0		0	0		0	0		0	0	
22_A-B	22_A-B Botwell Lane [N] to Botwell Lane [S]	316.3		0.1	436	119	6.2	489	53	8.6	189	-246	8.0	437	1	6.2	482	45	8.3	217	-265	6.1
22_A-C	22_A-C Botwell Lane [N] to Printinghouse Lane	201.8		0.3	304	103	6.5	295	-9	5.9	274	-30	4.7	372	67	10.0	264	-108	4.1	328	64	7.8
22_B-A	22_B-A Botwell Lane [S] to Botwell Lane [N]	271.25		1.0	275	3	0.2	301	26	1.7	260	-15	0.7	285	10	0.8	304	19	1.9	262	-42	0.6
22_B-B	22_B-B Botwell Lane [S] to Botwell Lane [S]	0			0	0		0	0		0	0		0	0		0	0		0	0	
22_B-C	22_B-C Botwell Lane [S] to Printinghouse Lane	445.21		0.5	239	-206	11.1	434	195	0.5	499	260	2.5	244	5	10.8	445	200	0.0	449	4	0.2
22_C-A	22_C-A Printinghouse Lane to Botwell Lane [N]	203.3		0.7	85	-119	9.9	67	-18	11.8	60	-25	12.5	81	-3	10.2	67	-15	11.7	61	-6	12.4
22_C-B	22_C-B Printinghouse Lane to Botwell Lane [S]	203.08		1.8	129	-74	5.7	76	-53	10.8	280	151	5.0	200	71	0.2	76	-124	10.7	287	211	5.4
22_C-C	22_C-C Printinghouse Lane to Printinghouse Lane	0			0	0		0	0		0	0		0	0		0	0		0	0	
23_A-A	23_A-A Church Road to Church Road	0		1.4	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
23_A-B	23_A-B Church Road to Botwell Lane [E]	148.2		0.8	250	102	7.2	189	-61	3.2	223	-27	5.5	256	6	7.6	198	-58	3.8	230	32	5.9
23_A-C	23_A-C Church Road to Botwell Lane [W]	290.9		1.2	234	-57	3.5	262	28	1.7	263	29	1.7	241	7	3.1	259	18	2.0	256	-3	2.1
23_B-A	23_B-A Botwell Lane [E] to Church Road	88.2		0.0	140	51	4.8	272	133	13.7	159	19	6.3	172	32	7.3	266	94	13.4	161	-105	6.5
23_B-B	23_B-B Botwell Lane [E] to Botwell Lane [E]	0		2.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
23_B-C	23_B-C Botwell Lane [E] to Botwell Lane [W]	425.41		0.5	306	-119	6.2	502	196	3.6	463	157	1.8	311	5	5.9	514	203	4.1	463	-51	1.8
23_C-A	23_C-A Botwell Lane [W] to Church Road	110.73		4.1	121	10	1.0	62	-59	5.2	165	44	4.6	184	63	6.1	63	-122	5.2	170	107	5.0
23_C-B	23_C-B Botwell Lane [W] to Botwell Lane [E]	405.6		0.7	469	63	3.0	515	46	5.1	279	-190	6.8	464	-5	2.8	505	41	4.7	269	-237	7.5
23_C-C	23_C-C Botwell Lane [W] to Botwell Lane [W]	0		2.4	0	0	0.0	0	0	0.0	49	49	9.9	0	0	0.0	0	0	0.0	48	48	9.8
24_A-A	24_A-A Dawley Road [N] to Dawley Road [N]	0			0	0		0	0		0	0		0	0		0	0		0	0	
24_A-B	24_A-B Dawley Road [N] to Station Road	232.18		0.5	246	14	0.9	223	-23	0.6	249	3	1.1	237	-9	0.3	197	-40	2.4	252	54	1.2
24_A-C	24_A-C Dawley Road [N] to Shepiston Road [S]	475.72		2.8	423	-53	2.5	470	47	0.3	460	37	0.7	432	9	2.0	465	33	0.5	462	-3	0.7
24_B-A	24_B-A Station Road to Dawley Road [N]	253.2		2.1	278	25	1.5	264	-14	0.7	309	32	3.4	282	4	1.8	299	17	2.8	308	9	3.3
24_B-B	24_B-B Station Road to Station Road	0			0	0		0	0		0	0		0	0		0	0		0	0	
24_B-C	24_B-C Station Road to Shepiston Road [S]	194.75		0.8	230	35	2.4	204	-26	0.7	265	35	4.6	234	4	2.7	203	-31	0.6	267	64	4.7
24_C-A	24_C-A Shepiston Road [S] to Dawley Road [N]	510.64		1.2	671	161	6.6	546	-126	1.5	654	-18	5.9	725	54	8.6	574	-151	2.7	656	82	6.0
24_C-B	24_C-B Shepiston Road [S] to Station Road	172.4		0.1	128	-44	3.6	342	214	10.6	215	87	3.0	169	41	0.3	340	171	10.4	218	-122	3.2
24_C-C	24_C-C Shepiston Road [S] to Shepiston Road [S]	0			0	0		0	0		0	0		0	0		0	0		0	0	
55_A-B	55_A-B Roseville Road [S] to North Hyde Road [E]	210.1		1.0	138	-72	5.5	122	-16	6.9	114	-24	7.5	141	3	5.2	115	-26	7.5	112	-3	7.7
55_A-C	55_A-C Roseville Road [S] to North Hyde Road [W]	0		3.5	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	41	41	9.1
55_B-A	55_B-A North Hyde Road [E] to Roseville Road [S]	53.7		1.1	109	55	6.1	99	-10	5.2	92	-16	4.5	103	-5	5.6	99	-4	5.2	90	-9	4.3
55_C-A	55_C-A North Hyde Road [W] to Roseville Road [S]	0		2.8	0	0	0.0	0	0	0.0	1	1	1.7	0	0	0.0	0	0	0.0	4	4	2.7
88_C-A	88_C-A Station Road [S] to Botwell Lane [W]	0		0.0	192	192	19.6	345	153	26.3	224	32	21.2	223	30	21.1	336	113	25.9	230	-106	21.4
88_C-B	88_C-B Station Road [S] to Botwell Lane [E]	0		0.0	251	251	22.4	324	72	25.4	385	134	27.8	256	5	22.6	317	61	25.2	373	56	27.3
88_A-B	88_A-B Botwell Lane [W] to Botwell Lane [E]	0		0.0	494	494	31.4	507	13	31.8	343	-150	26.2	490	-3	31.3	491	1	31.3	338	-153	26.0
88_A-C	88_A-C Botwell Lane [W] to Station Road [S]	0		0.0	211	211	20.5	173	-38	18.6	158	-53	17.8	213	2	20.6	190	-22	19.5	165	-25	18.2
88_B-C	88_B-C Botwell Lane [E] to Station Road [S]	0		0.0	208	208	20.4	132	-76	16.2	131	-77	16.2	222	13	21.1	132	-90	16.2	141	10	16.8
88_B-A	88_B-A Botweel Lane [E] to Botwell Lane [W]	0		0.0	252	252	22.4	429	178	29.3	399	148	28.3	260	8	22.8	447	187	29.9	400	-47	28.3
31_	31_ Exit Zone 31 - Direct	0		0.0	0	0	0.0	16	16	5.7	16	16	5.6	0	0	0.0	16	16	5.7	45	29	9.5
32_	32_ Exit Zone 32 - NHG	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
33_	33_ Exit Zone 33 - NHG	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
34_	34_ Exit Zone 34 - NHG	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
6_	6_ Into Nestle Zone 6 - Direct	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	29	29	7.6
6_	6_ Exit Nestle Zone 6 - Direct	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	30	30	7.8
31_	31_ Into Zone 31 - Direct	0		0.0	0	0	0.0	80	80	12.7	109	109	14.7	0	0	0.0	79	79	12.5	109	30	14.8
32_	32_ Into Zone 32 - NHG	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
33_	33_ Into Zone 33 -NHG	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
34_	34_ Into Zone 34 - NGH	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	24	24	6.9
6_	6_ Into Nestle Zone 6 - NHG	0		0.0	236	236	21.7	0	-236	0.0	0	-236	0.0	206	-30	20.3	0	-206	0.0	0	0	0.0
6_	6_ Exit Nestle Zone 6 - NHG	0		0.0	0	0	0.0	236	236	21.7	329	329	25.6	0	0	0.0	236	236	21.7	297	60	24.4
112_A-B	112_A-B Station Road [S] Northbound	0		0.0	443	443	29.8	678	235	36.8	615	172	35.1	475	32	30.8	664	189	36.5	605	-60	34.8
112_B-A	112_B-A Station Road [N] Southbound	0		0.0	420	420	29.0	305	-115	24.7	272	-148	23.3	436	16	29.5	321	-115	25.3	305	-16	24.7
112_C-B	112_C-B SB Crown Lane left into Station Road [S]	127		15.9	332	205	13.5	237	-95	8.2	227	-105	7.5	333	1	13.6	234	-99	8.0	266	31	9.9
62418_A-B	62418_A-B Pump Lane [W] to Pump Lane [E]	427.48		29.2	543	115	5.2	562	19	6.0	533	-10	4.8	517	-25	4.1	549	32	5.5	513	-36	4.0
62418_A-C	62418_A-C Pump Lane [W] to Crown Road [S]	128.4		16.0	94	-35	3.3	124	31	0.4	94	0	3.2	87	-6	3.9	119	31	0.9	107	-12	2.0
62418_B-A	62418_B-A Pump Lane [E] to Pump Lane [W]	302.7		24.6	126	-176	12.0	258	131	2.7	208	82	5.9	129	3	11.8	260	130	2.6	212	-48	5.7
62418_B-C	62418_B-C Pump Lane [E] to Crown Close [S]	0		0.0	238	238	21.8	113	-125	15.0	158	-79	17.8	247	10	22.2	115	-133	15.1	163	48	18.1
62418_C-A	62418_C-A Crown Close [S] to Pump Lane [W]	128.8		16.0	0	-129	16.0	0	0	16.0	0	0	16.0	0	0	16.0	0	0	16.0	0	0	16.0
62418_C-B	62418_C-B Crown Close [S] to Pump Lane [E]	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
9999916_A-B	9999916_A-B Nestle Site RT Nestle Ave [W]	0		0.0	0	0	0.0	0	0	0.0	26	26	7.2	0	0	0.0	0	0	0.0	27	27	7.3
9999916_A-D	9999916_A-D Nestle Site LT Nestle Ave [E]	0		0.0	0	0	0.0	0	0	0.0	0	0	0.9	0	0	0.0	0	0	0.0	0	0	0.9
9999916_B-A	9999916_B-A Nestle Ave [W] to Nestle Site [N]	0		0.0	0	0	0.0	11	11	4.8	0	0	0.0	0	0	0.0	12	12	4.8	0	-12	0.0
9999916_C-A	9999916_C-A Harold Avenue [S] to Neslte Site [N]	0		0.0	0	0	0.0	69	69	11.7	108	108	14.7	0	0	0.0	67	67	11.5	106	40	14.6
9999916_A-C	9999916_A-C Nestle Site [S] to Harold Avenue	0		0.0	0	0	0.0	236	236	21.7	301	301	24.5	0	0	0.0	236	236	21.7	301	65	24.5

		BASE			BASELINE			BASELINE + DEV			BASELINE + DEV + SENS			5Yr BASELINE			5Yr BASELINE + DEV			5 Yrs BASELINE + DEV + SENS		
PM	MOVEMENT	BASE	Diff	GEH	FB	Diff	GEH	FBS	Diff	GEH				PROP	Diff	GEH				PROPS	Diff	GEH
1_A-B	1_A-B Dawley Road [N] to Blyth Road	83.45		2.9	79	-4	0.4	75	-4	0.9	97	18	1.5	86	6	0.3	59	53	2.9	107	54	2.4
1_A-C	1_A-C Dawley Road [N] to Dawley Road [S]	593.11		0.9	372	-221	10.1	481	109	4.8	478	106	5.0	403	30	8.5	401	370	8.6	453	83	6.1
1_A-D	1_A-D Dawley Road [N] to Kestrel Way	3.8		1.9	3	0	0.2	5	2	0.7	6	2	0.8	4	0	0.1	5	5	0.7	5	0	0.7
1_A-E	1_A-E Dawley Road [N] to Betam Road	11		0.6	0	-11	4.7	0	0	4.7	0	0	4.7	0	0	4.7	0	0	4.7	0	0	4.7
1_B-A	1_B-A Blyth Road to Dawley Road [N]	101.9		3.2	148	46	4.1	182	34	6.7	158	10	4.9	151	3	4.3	134	131	3.0	133	2	2.9
1_B-C	1_B-C Blyth Road to Dawley Road [S]	400		0.4	237	-163	9.1	460	223	2.9	447	210	2.3	256	19	7.9	387	368	0.7	401	34	0.1
1_B-D	1_B-D Blyth Road to Kestrel Way	0		2.0	2	2	2.1	4	2	2.9	3	1	2.5	3	1	2.4	3	2	2.4	3	0	2.2
1_B-E	1_B-E Blyth Road to Betam Road	0		4.4	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
1_C-A	1_C-A Dawley Road [S] to Dawley Road [N]	706.68		1.7	772	66	2.4	689	-83	0.7	765	-7	2.2	791	18	3.1	687	668	0.8	764	96	2.1
1_C-B	1_C-B Dawley Road [S] to Blyth Road	238.9		0.7	270	31	1.9	331	61	5.5	365	96	7.3	273	3	2.1	323	320	5.0	368	48	7.4
1_C-D	1_C-D Dawley Road [S] to Kestrel Way	40.61		1.3	10	-30	6.0	16	6	4.5	16	6	4.6	13	3	5.3	14	12	5.0	15	4	4.8
1_C-E	1_C-E Dawley Road [S] to Betam Road	20.3		0.6	0	-20	6.4	0	0	6.4	0	0	6.4	0	0	6.4	0	0	6.4	0	0	6.4
1_D-A	1_D-A Kestrel Way to Dawley Road [N]	5.1		2.1	16	11	3.4	21	5	4.4	20	4	4.2	16	0	3.3	20	21	4.2	20	-1	4.2
1_D-B	1_D-B Kestrel Way to Blyth Road	12.15		1.6	16	4	1.0	29	14	3.8	15	-1	0.8	17	1	1.2	27	26	3.4	17	-9	1.3
1_D-C	1_D-C Kestrel Way to Dawley Road [S]	58.68		0.6	46	-12	1.7	29	-18	4.5	42	-5	2.4	47	0	1.6	31	31	4.1	43	12	2.2
1_D-E	1_D-E Kestrel Way to Betam Road	0		1.4	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
1_E-A	1_E-A Betam Road to Dawley Road [N]	48.9		2.0	25	-24	3.9	31	6	2.9	30	5	3.0	26	1	3.7	31	30	2.9	30	0	3.1
1_E-B	1_E-B Betam Road to Blyth Road	19.9		0.2	73	53	7.8	43	-31	4.1	29	-44	1.8	74	0	7.9	41	41	3.9	27	-14	1.5
1_E-C	1_E-C Betam Road to Dawley Road [S]	33		3.0	15	-18	3.7	40	25	1.1	53	38	3.0	15	0	3.6	43	43	1.6	57	14	3.6
1_E-D	1_E-D Betam Road to Kestrel Way	0		1.4	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
1_A-A	1_A-A Dawley Road [N] to Dawley Road [N]	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
1_B-B	1_B-B Blyth Road to Blyth Road	0		2.4	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
1_C-C	1_C-C Dawley Road [S] to Dawley Road [S]	0		2.4	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
1_D-D	1_D-D Kestrel Way to Kestrel Way	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
1_E-E	1_E-E Betam Road to Betam Road	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
2_A-B	2_A-B Dawley Road [N] to A437	226.01		0.1	278	52	3.3	355	77	7.6	404	126	10.0	287	9	3.8	308	299	5.0	402	102	9.9
2_A-C	2_A-C Dawley Road [N] to Millington Road	80.8		0.6	74	-7	0.8	96	23	1.6	99	26	2.0	80	7	0.1	84	77	0.3	95	18	1.5
2_A-D	2_A-D Dawley Road [N] to Dawley Road [S[	677.43		1.5	456	-221	9.3	616	160	2.4	528	72	6.1	488	32	7.8	527	495	6.1	485	-10	8.0
2_A-E	2_A-E Dawley Road [N] to Bourne Avenue	95.8		2.9	40	-56	6.8	65	25	3.5	55	15	4.8	46	6	6.0	54	48	4.9	50	2	5.4
2_B-A	2_B-A A437 to Dawley Road [N]	286.2		0.4	193	-94	6.1	200	8	5.5	219	26	4.2	196	4	5.8	195	191	5.9	222	31	4.0
2_B-C	2_B-C A437 to Millington Road	10		0.7	70	60	9.4	73	4	9.8	86	17	11.0	73	3	9.8	64	60	8.8	85	25	10.9
2_B-D	2_B-D A437 to Dawley Road [S[	56.5		3.7	0	-57	10.6	37	37	2.8	30	30	4.1	0	0	10.6	38	38	2.7	32	-6	3.7
2_B-E	2_B-E A437 to Bourne Avenue	74.5		0.3	60	-15	1.8	59	-1	1.9	66	7	1.0	66	6	1.1	54	48	2.6	63	15	1.4
2_C-A	2_C-A Millington Road to Dawley Road [N]	129.7		0.2	204	74	5.7	161	-43	2.6	164	-40	2.8	210	6	6.1	163	157	2.7	167	11	3.1
2_C-B	2_C-B Millington Road to A437	7.9		2.2	103	95	12.7	69	-33	9.9	72	-30	10.2	155	53	16.3	63	10	9.2	75	65	10.4
2_C-D	2_C-D Millington Road to Dawley Road [S[	166.5		1.4	121	-45	3.8	219	97	3.7	204	83	2.7	122	1	3.7	224	223	4.1	208	-16	3.0
2_C-E	2_C-E Millington Road to Bourne Avenue	14.4		0.2	43	29	5.3	30	-13	3.2	29	-14	3.2	44	1	5.5	31	30	3.4	29	0	3.2
2_D-A	2_D-A Dawley Road [S[to Dawley Road [N]	501.79		0.8	512	10	0.4	561	49	2.6	551	39	2.1	523	12	1.0	551	539	2.1	541	2	1.7
2_D-B	2_D-B Dawley Road [S[to A437	29.5		3.4	27	-3	0.5	124	97	10.8	118	91	10.3	28	1	0.3	63	62	5.0	120	58	10.5
2_D-C	2_D-C Dawley Road [S[to Millington Road	25.28		1.4	97	72	9.2	98	0	9.2	99	2	9.4	98	1	9.3	97	97	9.2	94	-3	8.9
2_D-E	2_D-E Dawley Road [S[to Bourne Avenue	58.9		0.3	29	-30	4.5	35	6	3.4	36	7	3.3	31	2	4.2	32	30	3.9	35	5	3.5
2_E-A	2_E-A Bourne Avenue to Dawley Road [N]	91.3		1.9	78	-14	1.5	113	35	2.2	110	32	1.8	78	0	1.5	121	121	2.9	118	-3	2.6
2_E-B	2_E-B Bourne Avenue to A437	95		2.4	125	30	2.8	97	-28	0.2	101	-24	0.6	127	3	3.1	95	93	0.0	102	9	0.7
2_E-C	2_E-C Bourne Avenue to Millington Road	12.7		0.4	16	3	0.8	14	-2	0.2	14	-1	0.4	16	0	0.8	14	13	0.2	15	1	0.5
2_E-D	2_E-D Bourne Avenue to Dawley Road [S[	43.2		0.8	42	-1	0.2	35	-7	1.3	38	-4	0.8	42	0	0.2	36	37	1.1	38	1	0.9
2_A-A	2_A-A Dawley Road [N] to Dawley Road [N]	0		4.5	72	72	12.0	0	-72	0.0	104	32	14.4	75	3	12.3	0	-3	0.0	105	108	14.5
2_B-B	2_B-B A437 to A437	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
2_C-C	2_C-C Millington Road to Millington Road	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
2_D-D	2_D-D Dawley Road [S[to Dawley Road [S[	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
2_E-E	2_E-E Bourne Avenue to Bourne Avenue	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
3_A-A	3_A-A Station Road [N] to Station Road [N]	0		1.4	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
3_A-B	3_A-B Station Road [N] to High Street [S]	540.05		2.6	368	-172	8.1	431	63	5.0	388	20	7.1	404	36	6.3	417	381	5.6	401	20	6.4
3_A-C	3_A-C Station Road [N] to Station Road [W]	238.7		1.2	237	-1	0.1	183	-55	3.9	269	31	1.9	291	54	3.2	158	104	5.7	265	161	1.6
3_B-A	3_B-A High Street [S] to Station Road [N]	444.05		0.8	447	3	0.2	429	-18	0.7	417	-31	1.3	480	32	1.7	454	422	0.5	431	9	0.6
3_B-B	3_B-B High Street [S] to High Street [S]	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
3_B-C	3_B-C High Street [S] to Station Road [W]	323.16		0.2	297	-26	1.5	388	91	3.5	370	73	2.5	326	29	0.2	368	339	2.4	372	33	2.6
3_C-A	3_C-A Station Road [W] to Station Road [N]	183		1.7	169	-14	1.1	167	-2	1.2	178	9	0.4	178	9	0.4	163	154	1.5	184	30	0.0
3_C-B	3_C-B Station Road [W] to High Street [S]	251.83		1.2	153	-99	6.9	190	37	4.2	176	22	5.2	158	5	6.5	176	170	5.2	174	4	5.3
3_C-C	3_C-C Station Road [W] to Station Road [W]	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
4_A-B	4_A-B Station Road [N] to Bedwell Gardens	75.3		0.6	34	-41	5.6	46	12	3.8	38	4	4.9	39	5	4.7	42	37	4.4	38	1	5.0
4_A-C	4_A-C Station Road [N] to Station Road [S]	444.45		2.2	307	-138	7.1	304	-3	7.3	349	42	4.8	340	33	5.3	282	249	8.5	351	101	4.7
4_A-D	4_A-D Station Road [N] to Millington Road	95.21		1.1	68	-27	3.0	86	18	0.9	53	-15	4.9	76	8	2.0	79	70	1.8	53	-18	4.9
4_B-A	4_B-A Bedwell Gardens to Station Road [N]	27.6		0.3	36	9	1.5	41	5	2.2	32	-4	0.8	38	1	1.7	43	42	2.6	33	-9	0.9
4_B-C	4_B-C Bedwell Gardens to Station Road [S]	3		0.6	31	28	6.8	30	-1	6.7	36	5	7.4	32	1	7.0	30	29	6.7	35	7	7.4
4_B-D	4_B-D Bedwell Gardens to Millington Road	30.9		0.5	1	-30	7.7	1	0	7.7	1	0	7.6	1	0	7.7	1	1	7.7	1	0	7.7
4_C-A	4_C-A Station Road [S] to Station Road [N]	446.65		1.6	410	-37	1.8	410	1	1.8	415	6	1.5	453	44	0.3	440	397	0.3	432	35	0.7
4_C-B	4_C-B Station Road [S] to Bedwell Gardens	6.9		2.7	164	157	17.0	179	15	17.9	167	2	17.1	181	17	18.0	180	164	17.9	176	12	17.7
4_C-D	4_C-D Station Road [S] to Millington Road	118.3		0.3	58	-61	6.5	61	3	6.1	53	-4	7.0	65	7	5.5	54	47	6.9	53	6	7.0
4_D-A	4_D-A Millington Road to Station Road [N]	122.4		1.1	63	-59	6.2	71	8	5.3	61	-3	6.5	72	9	5.1	80	71	4.3	66	-5	5.8
4_D-B	4_D-B Millington Road to Bedwell Gardens	74.4		0.4	74	0	0.0	76	2	0.2	73	-1	0.2	4	-70	11.2	75	145	0.1	74	-71	0.0
4_D-C	4_D-C Millington Road to Station Road [S]	137.3		1.6	115	-23	2.0	92	-22	4.2	108	-7	2.7	152	37	1.2	94	56	4.0	112	56	2.3
5_A-B	5_A-B Station Road [N] to North Hyde Road [E]	83.3		2.6	143	60	5.6	128	-15	4.3	176	33	8.1	159	16	6.9	118	101	3.4	196	94	9.5
5_A-C	5_A-C Station Road [N] to Station Road [S]	389.35		3.8	283	-107	5.8	192	-91	11.6	211	-72	10.3	324	41	3.5	174	133	12.8	212	79	10.2
5_A-D	5_A-D Station Road [N] to North Hyde Road [W]	44.9		3.2	77	32	4.1	6	-71	7.6	78	1	4.3	84	7	4.9	6	-1	7.7	79	80	4.4
5_B-A	5_B-A North Hyde Road [E] to Station Road [N]	87.7		1.7	116	29	2.8	136	19	4.5	96	-20	0.9	119	3	3.1	95	92	0.8	103	11	1.5
5_B-C	5_B-C North Hyde Road [E] to Station Road [S]	193.9		3.0	119	-75	6.0	198	80	0.3	145	26	3.8	123	4	5.6	187	183	0.5	143	-40	3.9
5_B-D	5_B-D North Hyde Road [E] to North Hyde Road [W]	309.7		1.7	216	-94	5.8	339	123	1.6	271	56	2.2	220	4	5.5	321	316	0.6	281	-36	1.7
5_C-A	5_C-A Station Road [S] to Station Road [N]	315.5		2.3	382	67	3.6	334	-48	1.0	295	-88	1.2	424	41	5.6	367	326	2.8	318	-8	0.1
5_C-B	5_C-B Station Road [S] to North Hyde Road [E]	199.7		1.2	77	-123	10.5	164	88	2.6	156	80	3.3	92	15	9.0	160	144	3.0	159	15	3.0
5_C-D	5_C-D Station Road [S] to North Hyde Road [W]	72.75		0.7	14	-58	8.8	10	-4	9.8	19	4	8.0	18	3	8.2	9	6	10.0	17	11	8.3
5_D-A	5_D-A North Hyde Road [W] to Station Road [N]	40.1		0.6	84	44	5.5	141	57	10.6	118	34	8.8	86	2	5.7	80	78	5.1	119	41	8.9
5_D-B	5_D-B North Hyde Road [W] to North Hyde Road [E]	295.2		0.2	378	83	4.5	412	35	6.2	392	15	5.2	450	72	8.0	367	295	4.0	420	125	6.6
5_D-C	5_D-C North Hyde Road [W] to Station Road [S]	32.91		2.2	9	-23	5.1	46	37	2.1	84	74	6.7	9	-1	5.3	41	42	1.4	84	42	6.7
6_A-B	6_A-B North Hyde Gardens to North Hyde Road [E]	81.8		0.7	206	125	10.4	178	-28	8.5	178	-29	8.4	104	-102	2.3	152	255	6.5	172	-82	8.0
6_B-A	6_B-A North Hyde Road [E] to North Hyde Gardens	20		0.2	35	15	2.8	56	21	5.8	53	18	5.5	34	0	2.7	44	44	4.2	53	9	5.4
6_B-C	6_B-C North Hyde Road [E] to Watersplash Road	0		3.5	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
6_B-D	6_B-D North Hyde Road [E] to North Hyde Road [W]	877.5		0.1	806	-71	2.4	1085	278	6.6	1010	203	4.3	827	21	1.7	884	864	0.2	1038	175	5.2
6_C-A	6_C-A Watersplash Road to North Hyde Gardens	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
6_C-B	6_C-B Watersplash Road to North Hyde Road [E]	2		0.0	0	-2	2.0	0	0	2.0	0	0	2.0	0	0	2.0	0	0	2.0	0	0	2.0
6_C-D	6_C-D Watersplash Road to North Hyde Road [W]	8		0.0	0	-8	4.0	0	0	4.0	0	0	4.0	0	0	4.0	0	0	4.0	0	0	4.0
6_D-A	6_D-A North Hyde Road [W] to North Hyde Gardens	2.6		3.5	7	4	2.0	5	-1	1.4	5	-2	1.2	7	0	2.0	4	4	0.7	4	0	0.8
6_D-B	6_D-B North Hyde Road [W] to North Hyde Road [E]	718.6		4.5	612	-107	4.1	773	161	2.0	751	139	1.2	709	98	0.3	677	580	1.6	781	202	2.3
6_D-C	6_D-C North Hyde Road [W] to Watersplash Road	0		3.5	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
7_A-A	7_A-A The Parkway (A312) [N] to The Parkway (A312) [N]	0		4.5	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
7_A-B	7_A-B The Parkway (A312) [N] to Hayes Road	578.71		1.6	235	-344	17.0	344	109	10.9	336	100	11.4	235	0	17.0	187	187	20.0	344	157	10.9
7_A-C	7_A-C The Parkway (A312) [N] to The Parkway (A312) [S]	1352.86		1.9	976	-377	11.0	1834	858	12.1	1806	830	11.4	971	-5	11.2	997	1002	10.4	1832	830	12.0
7_A-D	7_A-D The Parkway (A312) [N] to North Hyde Road [W]	313.9		0.8	96	-217	15.2	216	120	6.0	214	118	6.1	96	-1	15.2	114	115	13.6	215	100	6.1
7_B-A	7_B-A Hayes Road to The Parkway (A312) [N]	490.5		1.4	448	-43	2.0	489	42	0.1	503	55	0.5	492	44	0.1	504	460	0.6	466	6	1.1
7_B-B	7_B-B Hayes Road to Hayes Road	2.9		2.2	99	96	13.5	0	-99	2.4	0	-99	2.4	0	-99	2.4	0	99	2.4	0	-99	2.4
7_B-C	7_B-C Hayes Road to The Parkway (A312) [S]	503.62		1.3	526	22	1.0	553	27	2.1	552	26	2.1	581	55	3.3	570	515	2.9	527	12	1.0
7_B-D	7_B-D Hayes Road to North Hyde Road [W]	388.8		1.4	473	84	4.1	496	23	5.1	489	15	4.8	510	37	5.7	506	470	5.5	483	13	4.5
7_C-A	7_C-A The Parkway (A312) [S] to The Parkway (A312) [N]	1758.84		0.9	1212	-547	14.2	1612	400	3.6	1525	313	5.8	1210	-2	14.2	1203	1205	14.4	1533	328	5.6
7_C-B	7_C-B The Parkway (A312) [S] to Hayes Road	284.45		3.4	150	-134	9.1	216	65	4.4	206	56	5.0	149	-2	9.2	154	156	8.8	205	49	5.1
7_C-C	7_C-C The Parkway (A312) [S] to The Parkway (A312) [S]	0		2.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
7_C-D	7_C-D The Parkway (A312) [S] to North Hyde Road [W]	198.3		1.4	297	98	6.3	417	120	12.5	412	116	12.2	296	-1	6.2	313	314	7.2	413	99	12.3
7_D-A	7_D-A North Hyde Road [W] to The Parkway (A312) [N]	311		4.3	236	-75	4.6	258	22	3.2	276	40	2.1	217	-18	5.8	227	246	5.1	272	27	2.3
7_D-B	7_D-B North Hyde Road [W] to Hayes Road	325.2		0.5	404	79	4.1	506	102	8.9	513	109	9.2	478	74	7.6	423	349	5.1	507	157	8.9
7_D-C	7_D-C North Hyde Road [W] to The Parkway (A312) [S]	164.5		2.7	186	22	1.6	182	-4	1.4	166	-20	0.1	146	-40	1.5	158	198	0.5	189	-9	1.8
7_D-D	7_D-D North Hyde Road [W] to North Hyde Road [W]	0		5.5	20	20	6.3	51	31	10.1	52	32	10.2	1	-19	1.1	42	61	9.2	50	-11	10.0
8_B-C	8_B-C Station Road [N] to Nestles Avenue	72.6		3.2	69	-4	0.5	129	60	5.6	9	-60	10.1	87	18	1.6	118	100	4.7	9	-91	10.0
8_B-D	8_B-D Station Road [N] to Station Road [S]	429.8		1.1	400	-30	1.5	320	-80	5.7	385	-15	2.2	462	63	1.5	298	235	6.9	404	169	1.2
8_C-B	8_C-B Nestles Avenue to Station Road [N]	0		7.3	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
8_C-D	8_C-D Nestles Avenue to Station Road [S]	89.5		0.3	109	20	2.0	3	-106	12.6	85	-24	0.4	115	6	2.5	3	-2	12.6	89	91	0.0
8_D-B	8_D-B Station Road [S] to Station Road [N]	378.4		0.5	572	194	8.9	609	37	10.4	505	-67	6.0	623	51	10.9	532	481	7.2	543	61	7.7
8_D-C	8_D-C Station Road [S] to Nestles Avenue	62.8		1.6	1	-62	10.9	0	-1	11.2	0	-1	11.2	1	0	11.0	0	0	11.2	0	0	11.2
9_A-B	9_A-B Nestles Avenue [W] to Nestles Avenue [E]	38.9		3.5	44	5	0.8	129	85	9.8	4	-40	7.7	56	12	2.5	116	104	8.8	3	-101	7.8
9_A-C	9_A-C Nestles Avenue [W] to Harold Avenue	94.9		2.6	25	-69	9.0	1	-24	13.6	5	-20	12.7	30	5	8.2	1	-4	13.5	6	9	12.6
9_B-A	9_B-A Nestles Avenue [E] to Nestles Avenue [W]	5.3		2.5	1	-4	2.3	3	2	1.1	20	19	4.2	1	0	2.1	3	3	1.0	20	17	4.1
9_B-C	9_B-C Nestles Avenue [E] to Harold Avenue	14.8		0.8	25	10	2.3	176	151	16.5	216	191	18.7	25	0	2.2	176	176	16.5	223	47	19.1
9_C-A	9_C-A Harold Avenue to Nestles Avenue [W]	85.2		3.2	116	31	3.1	0	-116	13.0	68	-48	2.0	119	3	3.4	0	-3	13.0	76	79	1.0
9_C-B	9_C-B Harold Avenue to Nestles Avenue [E]	17		2.5	109	92	11.6	303	195	22.6	442	334	28.1	117	8	12.2	236	228	19.4	454	226	28.5
10_A-B	10_A-B Harold Avenue to North Hyde Road [E]	106.1		2.3	47	-59	6.7	114	67	0.8	141	94	3.1	52	5	6.1	114	109	0.8	145	36	3.5
10_A-C	10_A-C Harold Avenue to Crane Gardens	0		2.5	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
10_A-D	10_A-D Harold Avenue to North Hyde Road [W]	2.7		0.2	3	0	0.0	64	61	10.6	79	77	12.0	3	0	0.1	64	64	10.6	86	22	12.5
10_B-A	10_B-A North Hyde Road [E] to Harold Avenue	72.6		2.7	167	94	8.6	206	39	11.3	290	123	16.1	173	6	9.0	153	147	7.6	302	154	16.7
10_B-C	10_B-C North Hyde Road [E] to Crane Gardens	52.4		0.2	0	-52	10.2	0	0	10.2	0	0	10.2	0	0	10.2	0	0	10.2	0	0	10.2
10_B-D	10_B-D North Hyde Road [E] to North Hyde Road [W]	571.6		0.1	452	-120	5.3	602	150	1.2	456	4	5.1	461	9	4.9	541	532	1.3	472	-60	4.4
10_C-A	10_C-A Crane Gardens to Harold Avenue	17.4		3.7	0	-17	5.9	0	0	5.9	0	0	5.9	0	0	5.9	0	0	5.9	0	0	5.9
10_C-D	10_C-D Crane Gardens to North Hyde Road [W]	16.6		2.4	0	-17	5.8	0	0	5.8	0	0	5.8	0	0	5.8	0	0	5.8	0	0	5.8
10_D-A	10_D-A North Hyde Road [W] to Harold Avenue	11.9		1.2	57	45	7.6	97	40	11.5	221	165	19.4	62	6	8.3	82	76	10.2	229	153	19.8
10_D-B	10_D-B North Hyde Road [W] to North Hyde Road [E]	544.1		0.4	516	-28	1.2	601	85	2.4	510	-6	1.5	603	87	2.5	514	427	1.3	547	120	0.1
10_D-C	10_D-C North Hyde Road [W] to Crane Gardens	15.5		1.1	0	-16	5.6	0	0	5.6	0	0	5.6	0	0	5.6	0	0	5.6	0	0	5.6
11_A-A	11_A-A Station Road [N] to Station Road [N]	0		2.0	0	0	0.0	0	0	0.0	28	28	7.5	0	0	0.0	0	0	0.0	23	23	6.8
11_A-B	11_A-B Station Road [N] to Station Approach	0		2.4	24	24	6.9	38	13	8.7	48	23	9.7	30	6	7.8	37	31	8.6	40	9	8.9
11_A-C	11_A-C Station Road [N] to Station Road [S]	166.1		0.4	393	227	13.6	346	-47	11.3	340	-54	10.9	446	53	16.0	340	288	10.9	329	41	10.3
11_A-D	11_A-D Station Road [N] to Clayton Road	44.3		1.3	27	-17	2.9	31	4	2.2	96	69	6.2	27	0	2.9	28	28	2.7	84	55	4.9
11_B-A	11_B-A Station Approach to Station Road [N]	0		2.7	30	30	7.8	25	-5	7.1	33	3	8.1	33	2	8.1	36	33	8.4	32	-1	8.0
11_B-C	11_B-C Station Approach to Station Road [S]	32.9		1.8	8	-25	5.5	14	6	3.9	15	7	3.7	8	0	5.5	15	15	3.7	16	2	3.3
11_B-D	11_B-D Station Approach to Clayton Road	45.2		3.2	20	-26	4.5	20	0	4.5	13	-6	5.9	20	0	4.4	12	12	6.1	13	1	5.9
11_B-B	11_B-B Station Approach to Station Approach	7.1		0.0	0	-7	3.8	0	0	3.8	0	0	3.8	0	0	3.8	0	0	3.8	0	0	3.8
11_C-A	11_C-A Station Road [S] to Station Road [N]	128.8		0.9	487	358	20.4	504	17	21.1	460	-27	19.3	523	36	21.8	458	423	19.2	474	52	19.9
11_C-B	11_C-B Station Road [S] to Station Approach	61.9		0.6	151	89	8.6	171	20	10.1	155	4	8.9	168	17	9.9	152	135	8.7	155	20	8.9
11_C-C	11_C-C Station Road [S] to Station Road [S]	0		6.2	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
11_C-D	11_C-D Station Road [S] to Clayton Road	187.6		1.0	50	-137	12.6	59	9	11.5	58	8	11.7	53	3	12.3	45	42	13.3	59	17	11.6
11_D-A	11_D-A Clayton Road to Station Road [N]	44.5		0.2	29	-16	2.6	68	39	3.1	124	95	8.7	32	3	2.0	61	58	2.3	116	58	8.0
11_D-B	11_D-B Clayton Road to Station Approach	8.7		2.0	37	28	5.9	50	13	7.6	49	12	7.4	44	7	6.8	40	33	6.4	43	10	6.8
11_D-C	11_D-C Clayton Road to Station Road [S]	304.85		1.0	174	-131	8.4	217	43	5.5	201	27	6.5	202	28	6.5	178	150	8.1	198	48	6.7
11_D-D	11_D-D Clayton Road to Clayton Road	0		4.5	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
12_A-A	12_A-A Trevor Road [N] to Trevor Road [N]	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
12_A-B	12_A-B Trevor Road [N] to Clayton Road [E]	242.8		0.9	140	-103	7.5	150	10	6.6	181	41	4.2	159	19	5.9	135	116	7.8	184	68	4.0

		BASE			BASELINE			BASELINE + DEV			BASELINE + DEV + SENS			5Yr BASELINE			5Yr BASELINE + DEV			5 Yrs BASELINE + DEV + SENS		
PM	MOVEMENT	BASE	Diff	GEH	FB	Diff	GEH	FBS	Diff	GEH				PROP	Diff	GEH				PROPS	Diff	GEH
12_A-C	12_A-C Trevor Road [N] to Trevor Road [S]	293.8		0.7	83	-211	15.3	249	166	2.7	216	133	4.9	95	12	14.3	221	209	4.6	205	-4	5.6
12_A-D	12_A-D Trevor Road [N] to Clayton Road [W]	0.8		1.0	5	4	2.5	12	7	4.4	12	7	4.4	7	2	3.1	11	9	4.1	9	0	3.7
12_C-A	12_C-A Trevor Road [S] to Trevor Road [N]	490		0.8	325	-165	8.2	368	42	5.9	357	32	6.5	334	8	7.7	350	342	6.8	361	19	6.3
12_C-B	12_C-B Trevor Road [S] to Clayton Road [E]	47.5		10.3	134	86	9.1	175	41	12.1	221	88	15.0	135	2	9.2	155	153	10.7	225	71	15.2
12_C-C	12_C-C Trevor Road [S] to Trevor Road [S]	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
12_C-D	12_C-D Trevor Road [S] to Clayton Road [W]	8.3		1.7	21	13	3.4	26	5	4.3	18	-3	2.7	24	2	3.8	24	21	3.8	18	-3	2.7
12_D-A	12_D-A Clayton Road [W] to Trevor Road [N]	6.1		1.5	8	2	0.7	8	0	0.6	9	1	1.1	8	0	0.6	9	9	1.0	10	1	1.4
12_D-B	12_D-B Clayton Road [W] to Clayton Road [E]	5.7		1.8	23	18	4.6	11	-13	1.7	9	-14	1.2	23	-1	4.5	11	12	1.9	7	-5	0.6
12_D-C	12_D-C Clayton Road [W] to Trevor Road [S]	16.1		0.2	7	-9	2.5	23	15	1.5	22	15	1.4	8	1	2.3	21	20	1.0	24	4	1.8
12_D-D	12_D-D Clayton Road [W] to Clayton Road [W]	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
13_A-C	13_A-C Trevor Road [N] to Blyth Road [W]	309.6		0.8	94	-216	15.2	268	174	2.4	211	117	6.1	107	13	14.0	236	223	4.4	217	-7	5.7
13_B-A	13_B-A Blyth Road [E] to Trevor Road [N]	192.3		3.9	16	-177	17.3	20	5	16.7	21	6	16.5	17	1	17.2	12	11	17.8	16	5	17.3
13_B-C	13_B-C Blyth Road [E] to Blyth Road [W]	194		4.3	230	36	2.5	227	-4	2.2	271	40	5.0	239	9	3.0	181	173	0.9	220	47	1.8
13_C-A	13_C-A Blyth Road [W] to Trevor Road [N]	353.6		1.1	448	94	4.7	553	105	9.4	539	91	8.8	477	29	6.0	530	501	8.4	569	68	10.0
14_A-A	14_A-A Dawley Road [N] to Dawley Road [N]	0		1.4	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
14_A-B	14_A-B Dawley Road [N] to Access	0		1.4	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
14_A-C	14_A-C Dawley Road [N] to Dawley Road [S]	603.06		1.4	392	-212	9.5	510	118	4.0	538	146	2.7	410	18	8.6	438	420	7.2	535	115	2.9
14_A-D	14_A-D Dawley Road [N] to Swallowfield Way	28.9		0.3	35	6	1.1	39	4	1.7	41	6	2.1	38	3	1.5	35	32	1.1	41	9	2.0
14_B-A	14_B-A Access to Dawley Road [N]	0		2.4	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
14_B-B	14_B-B Access to Access	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
14_B-C	14_B-C Access to Dawley Road [S]	0		3.7	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
14_B-D	14_B-D Access to Swallowfield Way	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
14_C-A	14_C-A Dawley Road [S] to Dawley Road [N]	776.95		3.2	866	89	3.1	829	-38	1.8	888	21	3.8	891	25	3.9	797	773	0.7	880	107	3.6
14_C-B	14_C-B Dawley Road [S] to Access	0		1.4	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
14_C-C	14_C-C Dawley Road [S] to Dawley Road [S]	0		3.2	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
14_C-D	14_C-D Dawley Road [S] to Swallowfield Way	83.9		2.6	88	4	0.4	92	4	0.8	82	-5	0.2	91	3	0.7	73	70	1.2	69	-2	1.7
14_D-A	14_D-A Swallowfield Way to Dawley Road [N]	91.9		0.0	0	-92	13.6	129	129	3.5	134	134	3.9	91	91	0.1	129	38	3.5	133	95	3.8
14_D-B	14_D-B Swallowfield Way to Access	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
14_D-C	14_D-C Swallowfield Way to Dawley Road [S]	90		3.5	92	2	0.3	63	-30	3.1	58	-35	3.7	100	7	1.0	59	52	3.6	60	8	3.5
14_D-D	14_D-D Swallowfield Way to Swallowfield Way	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
17_B-A	17_B-A Coldharbour Lane to East Avenue	30.4		0.1	0	-30	7.8	0	0	7.8	0	0	7.8	0	0	7.8	0	0	7.8	0	0	7.8
17_B-B	17_B-B Coldharbour Lane to Coldharbour Lane	0		4.9	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
17_B-C	17_B-C Coldharbour Lane to Pump Lane	172.8		0.3	260	87	5.9	238	-22	4.6	273	13	6.7	273	13	6.7	251	238	5.4	277	39	7.0
17_B-D	17_B-D Coldharbour Lane to Botwell Lane	207.9		3.0	161	-47	3.4	209	48	0.1	176	15	2.3	167	6	3.0	208	202	0.0	185	-17	1.6
17_C-A	17_C-A Pump Lane to East Avenue	50.6		1.0	1	-50	9.9	1	0	9.9	1	0	9.9	1	0	9.9	1	1	9.9	1	0	9.9
17_C-B	17_C-B Pump Lane to Coldharbour Lane	180.9		1.3	72	-109	9.7	106	34	6.3	103	30	6.6	90	18	7.9	107	89	6.2	84	-5	8.4
17_C-C	17_C-C Pump Lane to Pump Lane	14.23		3.8	111	97	12.2	0	-111	5.3	0	-111	5.3	0	-111	5.3	0	111	5.3	0	-111	5.3
17_C-D	17_C-D Pump Lane to Botwell Lane	387.4		0.4	198	-189	11.0	355	157	1.7	252	53	7.6	255	56	7.4	361	305	1.3	204	-101	10.7
17_D-A	17_D-A Botwell Lane to East Avenue	51.1		4.0	6	-46	8.5	8	2	8.0	8	2	8.1	7	1	8.2	7	6	8.2	8	2	8.0
17_D-B	17_D-B Botwell Lane to Coldharbour Lane	206.5		2.4	333	127	7.7	416	83	11.9	417	84	11.9	370	37	9.6	406	369	11.4	434	65	12.7
17_D-C	17_D-C Botwell Lane to Pump Lane	326.5		0.3	305	-22	1.2	391	86	3.4	409	104	4.3	335	30	0.4	386	356	3.2	396	39	3.6
17_D-D	17_D-D Botwell Lane to Botwell Lane	0		3.2	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
20_A-B	20_A-B Dawley Road [N] to Botwell Common Road	93		2.5	313	220	15.4	260	-53	12.5	248	-65	11.9	310	-3	15.3	258	261	12.5	241	-19	11.5
20_A-C	20_A-C Dawley Road [N] to Dawley Road [S]	506.36		1.1	360	-146	7.0	416	56	4.2	409	48	4.6	367	7	6.6	421	414	4.0	422	8	3.9
20_B-A	20_B-A Botwell Common Road to Dawley Road [N]	85.2		2.2	239	153	12.1	303	64	15.6	221	-17	11.0	287	48	14.8	307	259	15.9	210	-50	10.2
20_B-C	20_B-C Botwell Common Road to Dawley Road [S]	121.9		1.5	100	-22	2.1	122	22	0.0	141	41	1.7	101	2	1.9	125	123	0.3	149	26	2.3
20_C-A	20_C-A Dawley Road [S] to Dawley Road [N]	761.3		2.3	675	-86	3.2	709	35	1.9	729	54	1.2	781	106	0.7	683	577	2.9	744	167	0.6
20_C-B	20_C-B Dawley Road [S] to Botwell Common Road	112.07		3.3	166	53	4.5	216	50	8.1	218	53	8.3	178	12	5.4	232	220	9.2	217	-4	8.2
21_A-A	21_A-A Botwell Lane [N] to Botwell Lane [N]	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
21_A-B	21_A-B Botwell Lane [N] to Botwell Lane [S]	203.7		0.4	218	15	1.0	263	45	3.9	250	32	3.1	239	21	2.4	271	250	4.4	248	-2	2.9
21_A-C	21_A-C Botwell Lane [N] to Botwell Common Road [W]	23		3.4	0	-23	6.8	0	0	6.8	15	15	1.9	0	0	6.8	0	0	6.8	24	24	0.1
21_B-A	21_B-A Botwell Lane [S] to Botwell Lane [N]	210.2		0.2	146	-64	4.8	149	3	4.6	135	-12	5.7	169	23	3.0	144	121	5.0	129	8	6.2
21_B-B	21_B-B Botwell Lane [S] to Botwell Lane [S]	0		1.4	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
21_B-C	21_B-C Botwell Lane [S] to Botwell Common Road [W]	154.7		0.5	324	169	10.9	408	84	15.1	325	1	11.0	364	40	13.0	396	356	14.5	317	-39	10.6
21_C-A	21_C-A Botwell Common Road [W] to Botwell Lane [N]	99.7		0.1	0	-100	14.1	35	35	7.9	45	45	6.5	0	0	14.1	38	38	7.5	45	7	6.4
21_C-B	21_C-B Botwell Common Road [W] to Botwell Lane [S]	169.2		0.2	300	131	8.5	275	-25	7.1	271	-29	6.9	328	28	10.1	277	250	7.2	269	19	6.7
21_C-C	21_C-C Botwell Common Road [W] to Botwell Common Road [W]	0		0.0	0	0	0.0	0	0	0.0	7	7	3.6	0	0	0.0	0	0	0.0	6	6	3.4
22_A-B	22_A-B Botwell Lane [N] to Botwell Lane [S]	272.4		0.4	310	38	2.2	355	45	4.7	292	-18	1.2	347	36	4.2	364	328	5.1	284	-43	0.7
22_A-C	22_A-C Botwell Lane [N] to Printinghouse Lane	101.4		0.0	173	72	6.1	158	-15	5.0	166	-7	5.6	192	19	7.5	148	129	4.2	185	56	7.0
22_B-A	22_B-A Botwell Lane [S] to Botwell Lane [N]	199.2		3.3	255	56	3.7	352	96	9.2	239	-17	2.7	313	58	7.1	336	278	8.3	233	-45	2.3
22_B-C	22_B-C Botwell Lane [S] to Printinghouse Lane	433.5		1.4	74	-360	22.6	253	179	9.8	211	137	12.4	83	10	21.8	235	226	10.8	214	-12	12.2
22_C-A	22_C-A Printinghouse Lane to Botwell Lane [N]	166.5		4.3	182	16	1.2	188	5	1.6	170	-13	0.2	199	17	2.4	174	157	0.6	176	18	0.7
22_C-B	22_C-B Printinghouse Lane to Botwell Lane [S]	325.1		0.8	125	-200	13.4	186	61	8.7	176	51	9.4	137	12	12.4	183	171	8.9	183	11	8.9
23_A-A	23_A-A Church Road to Church Road	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
23_A-B	23_A-B Church Road to Botwell Lane [E]	106.2		0.3	157	51	4.4	163	6	4.9	139	-18	3.0	168	11	5.3	167	156	5.2	146	-10	3.5
23_A-C	23_A-C Church Road to Botwell Lane [W]	182.8		0.7	71	-112	9.9	140	68	3.4	160	89	1.7	79	8	9.0	130	122	4.2	161	39	1.7
23_B-A	23_B-A Botwell Lane [E] to Church Road	146.4		0.0	169	23	1.8	157	-12	0.8	169	0	1.8	193	24	3.6	154	130	0.6	149	19	0.2
23_B-B	23_B-B Botwell Lane [E] to Botwell Lane [E]	0		4.2	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
23_B-C	23_B-C Botwell Lane [E] to Botwell Lane [W]	448.4		3.1	288	-160	8.4	481	193	1.5	343	55	5.3	333	45	5.8	470	425	1.0	320	-105	6.6
23_C-A	23_C-A Botwell Lane [W] to Church Road	114		2.1	66	-48	5.1	113	47	0.1	104	38	0.9	70	4	4.6	108	105	0.5	102	-3	1.2
23_C-B	23_C-B Botwell Lane [W] to Botwell Lane [E]	478.8		0.5	366	-113	5.5	445	79	1.6	410	45	3.2	398	32	3.9	454	421	1.2	405	-17	3.5
23_C-C	23_C-C Botwell Lane [W] to Botwell Lane [W]	0		2.4	0	0	0.0	0	0	0.0	5	5	3.2	0	0	0.0	0	0	0.0	5	5	3.0
24_A-B	24_A-B Dawley Road [N] to Station Road	239.83		2.0	141	-99	7.2	178	37	4.3	182	41	4.0	146	5	6.8	163	158	5.4	172	14	4.7
24_A-C	24_A-C Dawley Road [N] to Shepiston Road [S]	620.5		1.3	357	-264	11.9	518	161	4.3	470	114	6.4	372	16	11.1	481	465	6.0	444	-21	7.7
24_B-A	24_B-A Station Road to Dawley Road [N]	357.51		2.6	199	-158	9.5	337	138	1.1	340	141	0.9	223	24	7.9	284	261	4.1	330	69	1.5
24_B-C	24_B-C Station Road to Shepiston Road [S]	201.1		0.3	157	-44	3.3	122	-36	6.3	173	16	2.0	199	42	0.2	118	77	6.6	165	89	2.7
24_C-A	24_C-A Shepiston Road [S] to Dawley Road [N]	312.46		0.7	416	104	5.4	423	7	5.8	408	-8	5.0	422	6	5.7	418	412	5.5	414	2	5.3
24_C-B	24_C-B Shepiston Road [S] to Station Road	160.6		0.4	133	-28	2.3	134	1	2.2	151	18	0.8	140	7	1.7	132	125	2.4	154	30	0.5
55_A-B	55_A-B Roseville Road [S] to North Hyde Road [E]	110.5		2.4	80	-31	3.1	77	-3	3.5	102	22	0.9	82	2	2.9	77	74	3.5	91	16	2.0
55_A-C	55_A-C Roseville Road [S] to North Hyde Road [W]	6		2.5	0	-6	3.5	0	0	3.5	0	0	3.5	0	0	3.5	0	0	3.5	0	0	3.5
55_B-A	55_B-A North Hyde Road [E] to Roseville Road [S]	195.9		0.7	189	-7	0.5	277	88	5.3	260	71	4.2	196	6	0.0	192	185	0.3	266	81	4.6
55_C-A	55_C-A North Hyde Road [W] to Roseville Road [S]	9.2		0.3	0	-9	4.3	0	0	4.3	0	0	4.3	0	0	4.3	0	0	4.3	0	0	4.3
88_C-A	88_C-A Station Road [S] to Botwell Lane [W]	0		0.0	193	193	19.7	181	-12	19.0	180	-13	19.0	205	12	20.2	160	148	17.9	179	31	18.9
88_C-B	88_C-B Station Road [S] to Botwell Lane [E]	0		0.0	335	335	25.9	397	63	28.2	448	113	29.9	373	38	27.3	380	341	27.6	461	120	30.4
88_A-B	88_A-B Botwell Lane [W] to Botwell Lane [E]	0		0.0	309	309	24.9	418	109	28.9	385	76	27.7	340	31	26.1	419	388	28.9	376	-12	27.4
88_A-C	88_A-C Botwell Lane [W] to Station Road [S]	0		0.0	187	187	19.3	165	-22	18.2	147	-40	17.2	204	17	20.2	173	156	18.6	154	-2	17.5
88_B-C	88_B-C Botwell Lane [E] to Station Road [S]	0		0.0	88	88	13.3	109	21	14.7	94	6	13.7	93	5	13.6	105	100	14.5	98	-3	14.0
88_B-A	88_B-A Botweel Lane [E] to Botwell Lane [W]	0		0.0	270	270	23.2	455	185	30.2	333	63	25.8	327	57	25.6	463	407	30.4	291	-116	24.1
31_	31_ Exit Zone 31 - Direct	0		0.0	0	0	0.0	20	20	6.3	20	20	6.3	0	0	0.0	20	20	6.3	19	-1	6.2
32_	32_ Exit Zone 32 - NHG	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
33_	33_ Exit Zone 33 - NHG	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
34_	34_ Exit Zone 34 - NHG	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
6_	6_ Into Nestle Zone 6 - Direct	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
6_	6_ Exit Nestle Zone 6 - Direct	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
31_	31_ Into Zone 31 - Direct	0		0.0	0	0	0.0	233	233	21.6	283	283	23.8	0	0	0.0	175	175	18.7	289	113	24.0
32_	32_ Into Zone 32 - NHG	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
33_	33_ Into Zone 33 -NHG	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
34_	34_ Into Zone 34 - NGH	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
6_	6_ Into Nestle Zone 6 - NHG	0		0.0	30	30	7.8	0	-30	0.0	0	-30	0.0	30	0	7.8	0	0	0.0	0	0	0.0
6_	6_ Exit Nestle Zone 6 - NHG	0		0.0	0	0	0.0	156	156	17.7	217	217	20.8	0	0	0.0	156	156	17.7	220	64	21.0
112_A-B	112_A-B Station Road [S] Northbound	0		0.0	541	541	32.9	591	50	34.4	639	99	35.8	585	44	34.2	551	507	33.2	645	138	35.9
112_B-A	112_B-A Station Road [N] Southbound	0		0.0	259	259	22.8	273	14	23.4	239	-20	21.9	280	21	23.7	271	250	23.3	242	-8	22.0
112_C-B	112_C-B SB Crown Lane left into Station Road [S]	127.2		15.9	196	69	5.4	143	-54	1.3	282	86	10.8	234	38	7.9	145	108	1.6	242	134	8.4
62418_A-B	62418_A-B Pump Lane [W] to Pump Lane [E]	384.23		27.7	589	205	9.3	584	-5	9.1	606	16	10.0	514	-75	6.1	587	662	9.2	597	-65	9.6
62418_A-C	62418_A-C Pump Lane [W] to Crown Road [S]	128.2		16.0	85	-43	4.2	44	-41	9.0	77	-8	5.1	91	6	3.6	51	45	8.2	77	32	5.1
62418_B-A	62418_B-A Pump Lane [E] to Pump Lane [W]	504.88		31.8	384	-120	5.7	462	78	1.9	355	-30	7.2	348	-37	7.6	471	507	1.6	289	-219	10.8
62418_B-C	62418_B-C Pump Lane [E] to Crown Close [S]	0		0.0	139	139	16.7	98	-41	14.0	206	67	20.3	172	33	18.5	97	65	13.9	172	107	18.5
62418_C-A	62418_C-A Crown Close [S] to Pump Lane [W]	127.6		16.0	0	-128	16.0	0	0	16.0	0	0	16.0	0	0	16.0	0	0	16.0	0	0	16.0
62418_C-B	62418_C-B Crown Close [S] to Pump Lane [E]	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
9999916_A-B	9999916_A-B Nestle Site RT Nestle Ave [W]	0		0.0	0	0	0.0	0	0	0.0	17	17	5.8	0	0	0.0	0	0	0.0	18	18	6.0
9999916_A-D	9999916_A-D Nestle Site LT Nestle Ave [E]	0		0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
9999916_B-A	9999916_B-A Nestle Ave [W] to Nestle Site [N]	20.3		6.4	0	-20	6.4	8	8	3.2	0	0	6.4	0	0	6.4	8	8	3.3	0	-8	6.4
9999916_C-A	9999916_C-A Harold Avenue [S] to Neslte Site [N]	0		0.0	0	0	0.0	224	224	21.2	303	303	24.6	0	0	0.0	168	168	18.3	297	129	24.4
9999916_A-C	9999916_A-C Nestle Site [S] to Harold Avenue	0		0.0	0	0	0.0	156	156	17.6	208	208	20.4	0	0	0.0	156	156	17.6	207	52	20.4

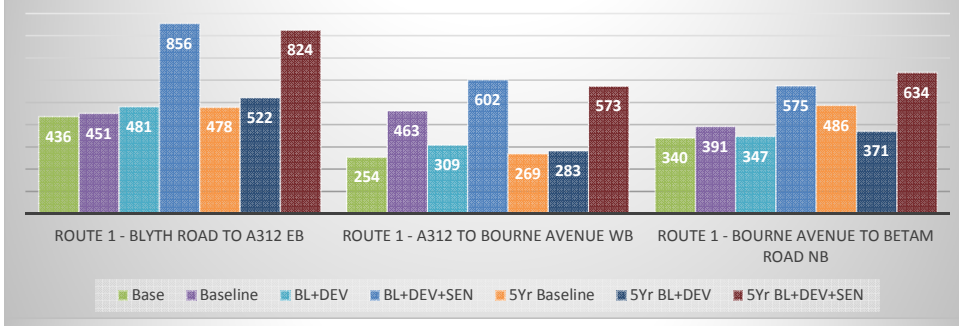
APPENDIX C - QUEUE LENGTH



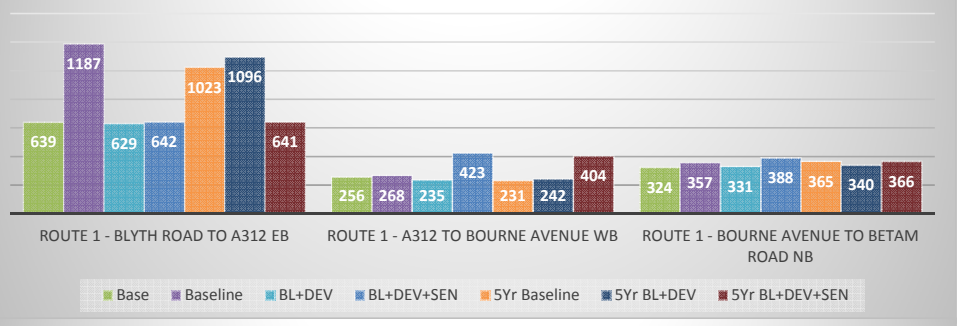


APPENDIX D - TRAVEL TIMES – GENERAL TRAFFIC

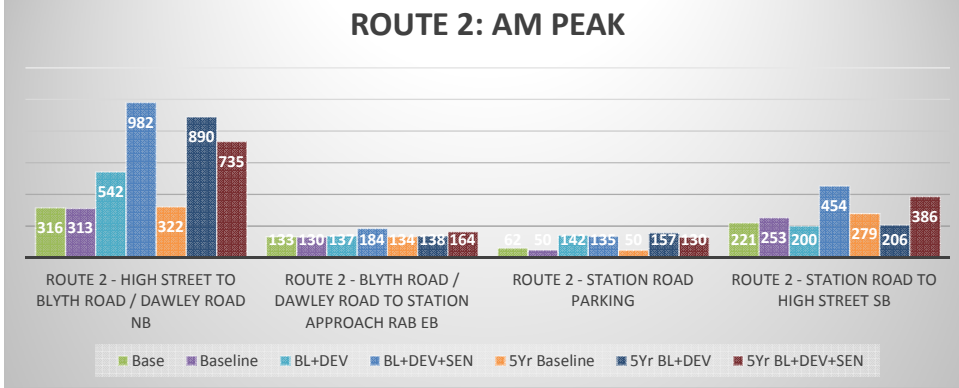
ROUTE 1: AM PEAK



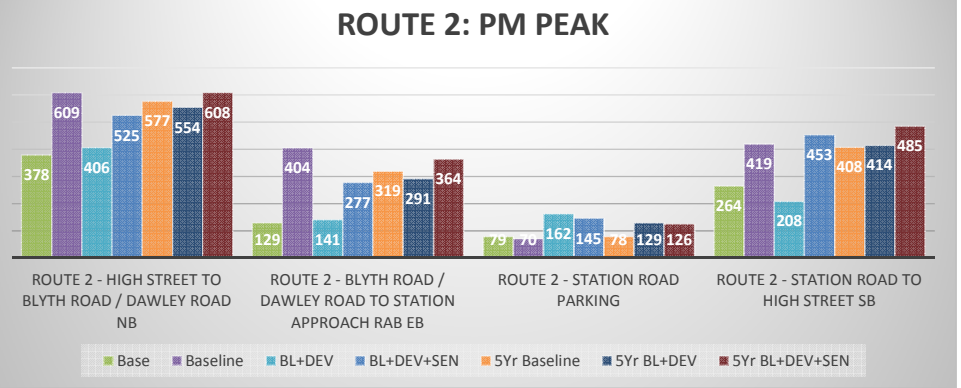
ROUTE 1: PM PEAK



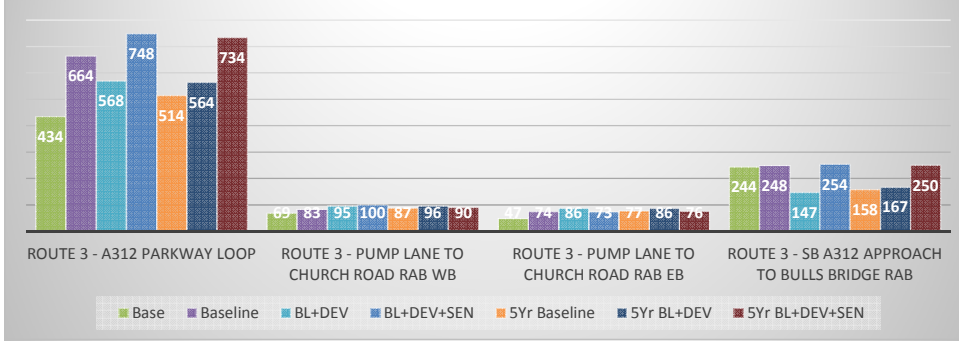
ROUTE 2: AM PEAK



ROUTE 2: PM PEAK



ROUTE 3: AM PEAK



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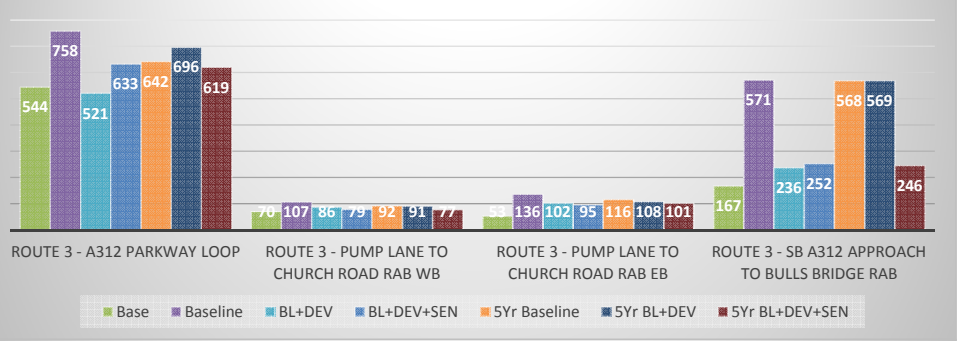

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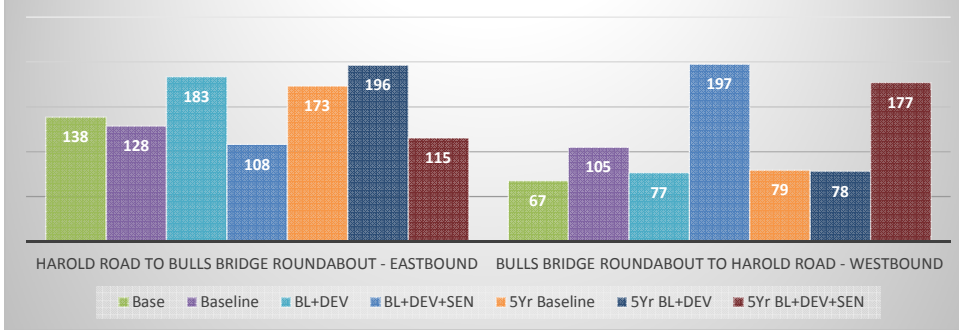
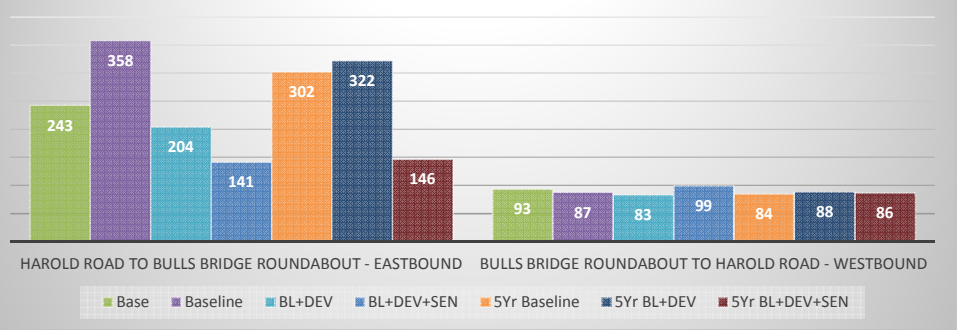
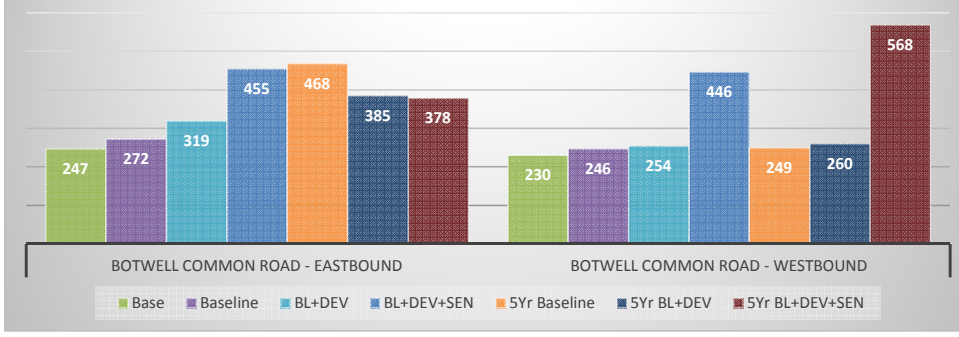


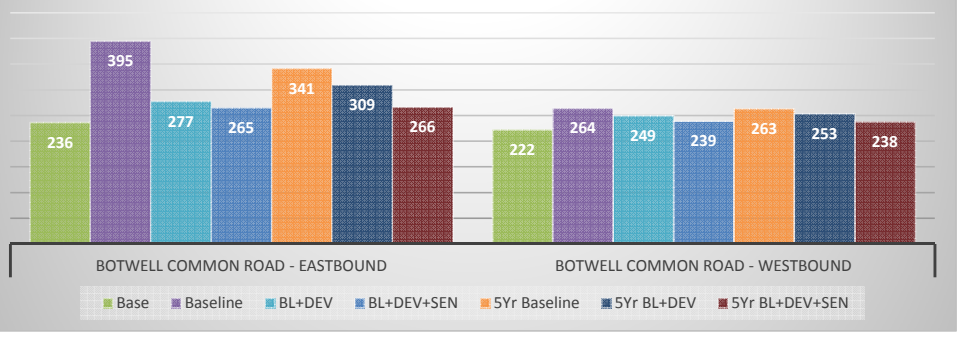
ROUTE 2: PM PEAK



Botwell Common: AM PEAK



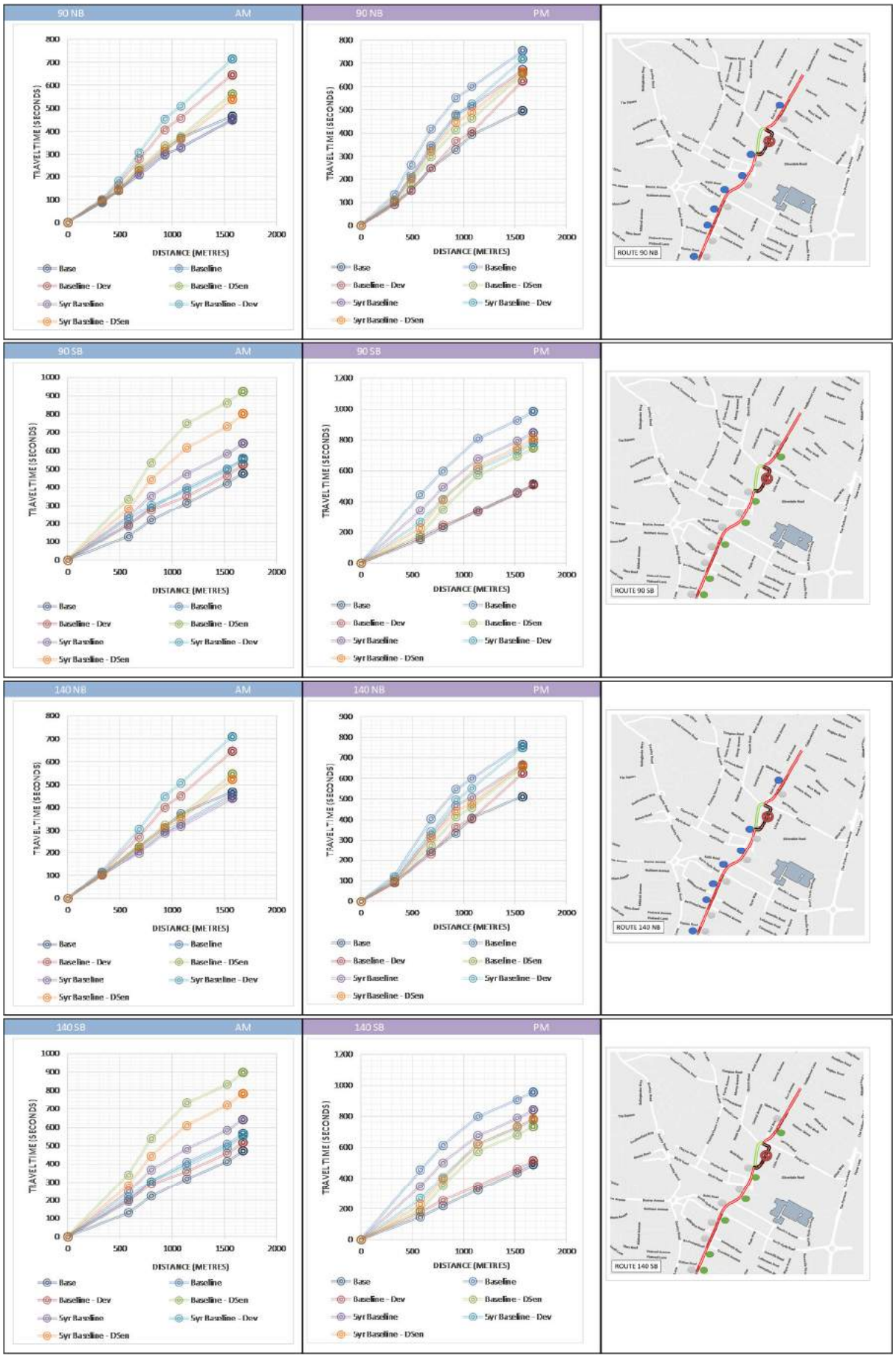
Botwell Common: PM PEAK

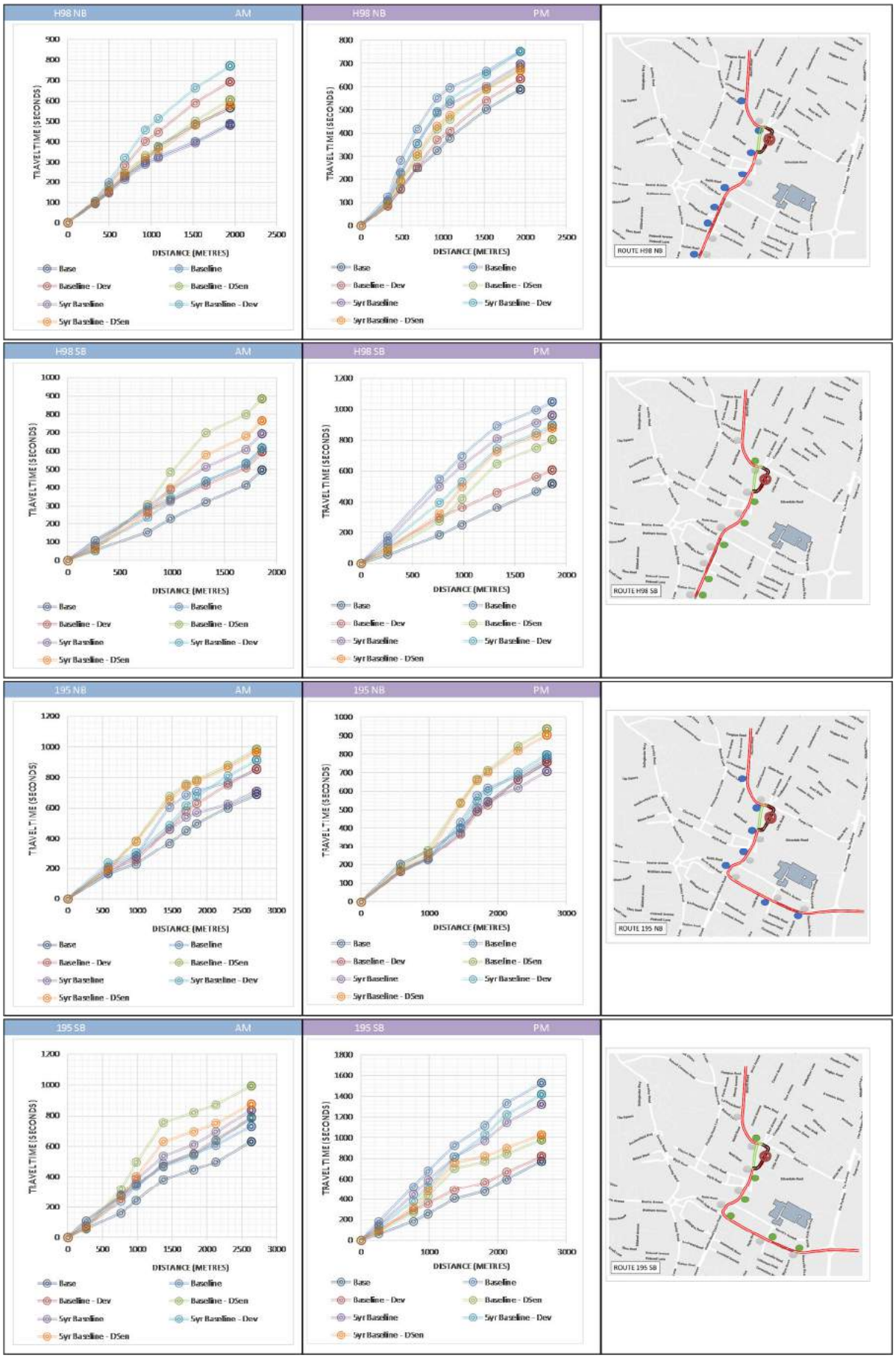


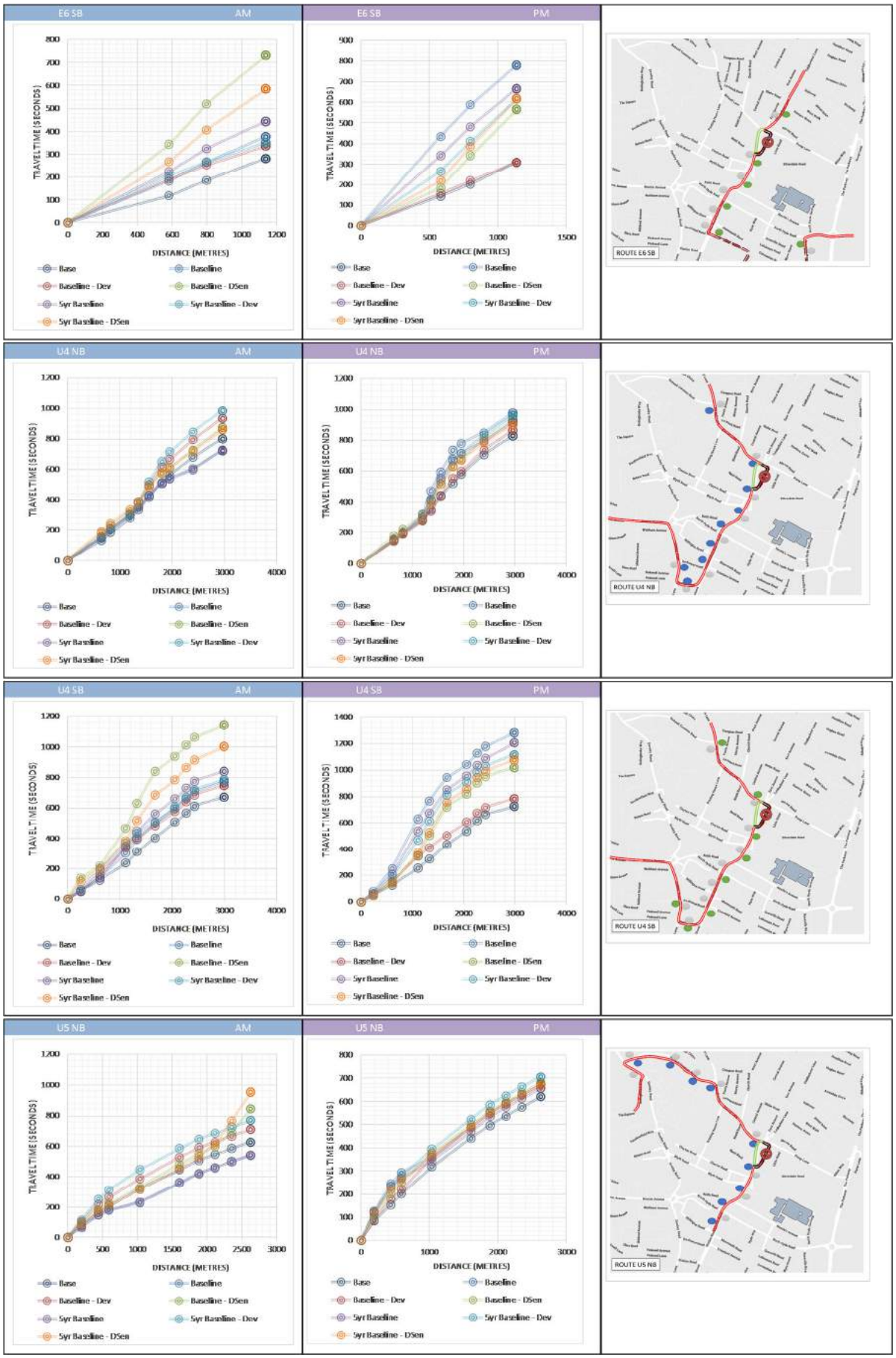
		AM												
	Route 1 - Combined	Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
A	Route 1 - Blyth Road to A312 EB	436	451	481	856	**15 | 3%**	**30 | 7%**	405 | 90%	478	522	824	**28 | 6%**	**44 | 9%**	346 | 79%
B	Route 1 - A312 to Bourne Avenue WB	254	463	309	602	209 | 82%	-154 | -33%	139 | 30%	269	283	573	-193 | -42%	**14 | 5%**	304 | 119%
C	Route 1 - Bourne Avenue to Betam Road NB	340	391	347	575	**51 | 15%**	**-44 | -11%**	183 | 47%	486	371	634	95 | 24%	-116 | -24%	148 | 44%
	Route 2 - Combined	Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
A	Route 2 - High Street to Blyth Road / Dawley Road NB	316	313	542	982	**-4 | -1%**	230 | 74%	669 | 214%	322	890	735	**9 | 3%**	568 | 177%	413 | 131%
B	Route 2 - Blyth Road / Dawley Road to Station Approach RAB EB	133	130	137	184	**-3 | -2%**	**7 | 5%**	53 | 41%	134	138	164	**3 | 2%**	**4 | 3%**	31 | 23%
C	Route 2 - Station Road Parking	62	50	142	135	-12 | -20%	92 | 186%	86 | 172%	50	157	130	**0 | 1%**	107 | 214%	80 | 129%
D	Route 2 - Station Road to High Street SB	221	253	200	454	**31 | 14%**	-52 | -21%	201 | 80%	279	206	386	**27 | 10%**	-73 | -26%	107 | 48%
	Route 3 - Individual	Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
A	A312 The Pkwy / North Hyde Road RAB to North Hyde Road / North Hyde Green Jct	15	18	20	28	3 | 17%	**2 | 12%**	10 | 55%	22	21	24	4 | 24%	**-1 | -7%**	**2 | 12%**
A	North Hyde Road / North Hyde Green Jct to North Hyde Road / Roseville Ped X	18	20	21	34	**2 | 11%**	**1 | 5%**	14 | 71%	20	21	31	**0 | -2%**	**2 | 9%**	11 | 62%
A	North Hyde Road / Roseville Ped X to North Hyde Road / Harold Road Ped X	34	67	35	135	33 | 97%	-32 | -47%	68 | 102%	38	36	122	-30 | -44%	**-2 | -4%**	85 | 249%
A	North Hyde Road / Harold Road Ped X to A437 Station Road / A437 North Hyde Road Jct	119	287	149	314	168 | 141%	-137 | -48%	**27 | 9%**	121	127	306	-166 | -58%	**6 | 5%**	185 | 156%
A	A437 Station Road / A437 North Hyde Road Jct to Nestles Avenue / Station Road Jct	25	53	65	24	29 | 117%	11 | 21%	-29 | -55%	49	70	24	**-5 | -9%**	21 | 44%	-25 | -100%
A	Nestles Avenue / Station Road Jct to Nestles Avenue / Harold Avenue Jct	60	61	59	59	**0 | 0%**	**-2 | -2%**	**-2 | -3%**	60	58	61	**-1 | -1%**	**-2 | -3%**	**1 | 1%**
A	Nestles Avenue / Harold Avenue Jct to Harold Avenue / North Hyde Road Jct	18	21	25	40	3 | 16%	4 | 18%	19 | 86%	21	24	45	**-1 | -3%**	4 | 17%	24 | 132%
A	Harold Avenue / North Hyde Road Jct to North Hyde Road / Harold Road Ped X	6	8	10	7	2 | 32%	2 | 26%	-2 | -20%	12	10	6	3 | 42%	**-1 | -10%**	-5 | -87%
A	North Hyde Road / Harold Road Ped X to North Hyde Road / Roseville Ped X	49	64	99	49	15 | 30%	35 | 55%	-15 | -23%	90	108	53	26 | 41%	18 | 20%	-37 | -76%
A	North Hyde Road / Roseville Road Ped X to North Hyde Road / Watersplash Lane / North Hyde Gardens Jct	20	19	25	17	**0 | -1%**	6 | 29%	**-3 | -13%**	22	26	18	**3 | 15%**	4 | 18%	-4 | -23%
A	North Hyde Road / Watersplash Lane / North Hyde Gardens Jct to A312 The Pkwy / North Hyde Road RAB	70	45	59	42	-25 | -35%	14 | 31%	**-3 | -6%**	60	62	44	15 | 34%	**1 | 2%**	-16 | -24%
	Route 3 - Combined	Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
A	Route 3 - A312 Parkway Loop	434	664	568	748	230 | 53%	**-95 | -14%**	**85 | 13%**	514	564	734	-149 | -23%	**50 | 10%**	220 | 51%
B	Route 3 - Pump Lane to Church Road RAB WB	69	83	95	100	14 | 20%	**12 | 15%**	17 | 21%	87	96	90	**5 | 6%**	**8 | 9%**	**2 | 3%**
C	Route 3 - Pump Lane to Church Road RAB EB	47	74	86	73	27 | 58%	12 | 16%	**-1 | -2%**	77	86	76	**2 | 3%**	**9 | 12%**	**-1 | -2%**
D	Route 3 - SB A312 Approach to Bulls Bridge RAB	244	248	147	254	**5 | 2%**	-101 | -41%	**5 | 2%**	158	167	250	-90 | -36%	**9 | 5%**	91 | 37%
	Bulls Bridge to Harold Avenue	Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
	Harold Road to Bulls Bridge Roundabout - Eastbound	138	128	183	108	**-10 | -7%**	55 | 43%	**-20 | -16%**	173	196	115	45 | 35%	**23 | 13%**	-58 | -42%
	Bulls Bridge Roundabout to Harold Road - Westbound	67	105	77	197	38 | 56%	-28 | -27%	92 | 88%	79	78	177	-26 | -24%	**-1 | -2%**	98 | 145%
	Botwell Common	Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
	Botwell Common Road - Eastbound	247	272	319	455	**25 | 10%**	47 | 17%	183 | 67%	468	385	378	195 | 72%	-83 | -18%	-89 | -36%
	Botwell Common Road - Westbound	230	246	254	446	**17 | 7%**	**8 | 3%**	200 | 81%	249	260	568	**3 | 1%**	**11 | 4%**	319 | 139%

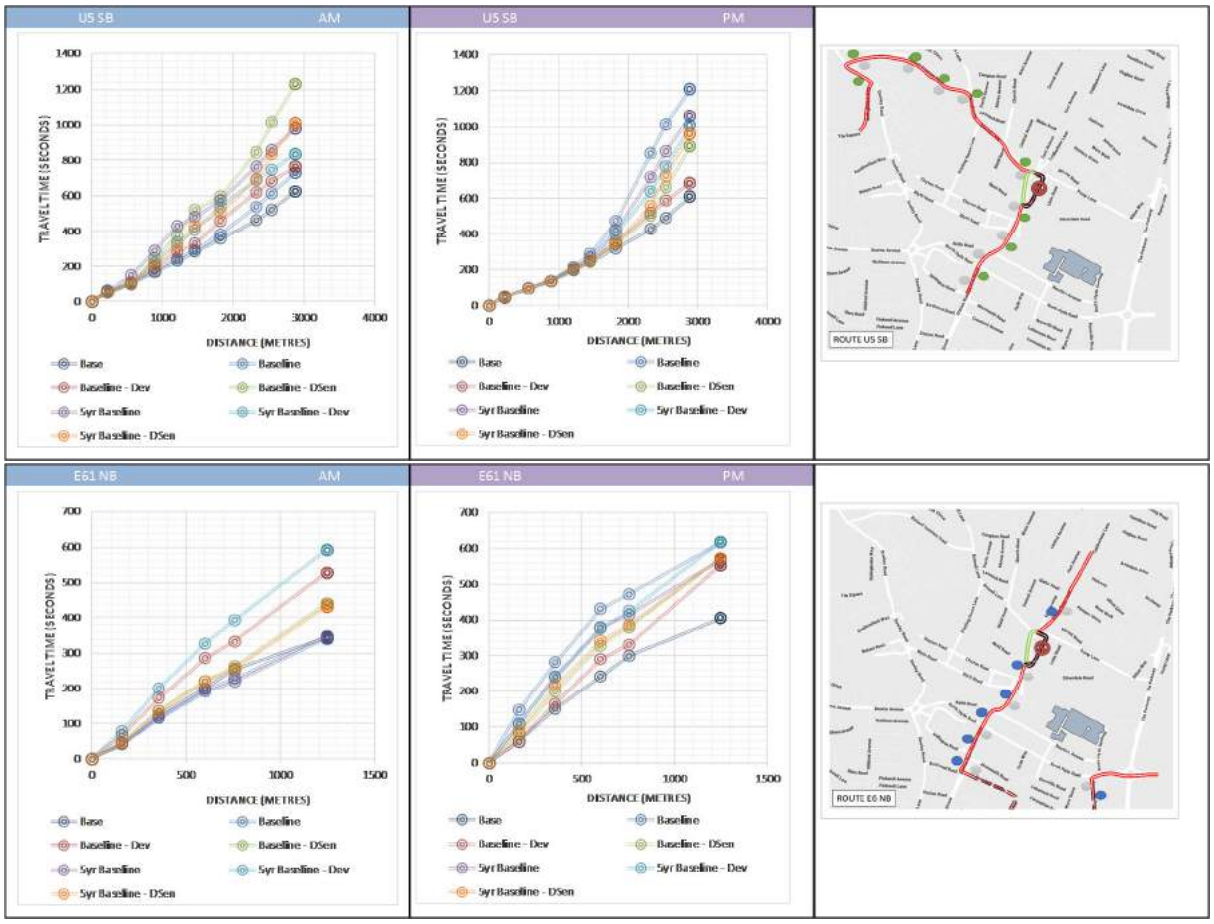
		PM											
Route 1 - Combined		Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
A	Route 1 - Blyth Road to A312 EB	639	1187	629	642	549 | 86%	-559 | -47%	-545 | -46%	1023	1096	641	**-165 | -14%**	**73 | 7%**	-381 | -37%
B	Route 1 - A312 to Bourne Avenue WB	256	268	235	423	**11 | 4%**	**-33 | -12%**	156 | 58%	231	242	404	**-37 | -14%**	**11 | 5%**	173 | 75%
C	Route 1 - Bourne Avenue to Betam Road NB	324	357	331	388	**33 | 10%**	**-27 | -7%**	**31 | 9%**	365	340	366	**8 | 2%**	**-25 | -7%**	**1 | 0%**
Route 2 - Combined		Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
A	Route 2 - High Street to Blyth Road / Dawley Road NB	378	609	406	525	231 | 61%	-203 | -33%	**-84 | -14%**	577	554	608	**-32 | -5%**	**-23 | -4%**	**31 | 5%**
B	Route 2 - Blyth Road / Dawley Road to Station Approach RAB EB	129	404	141	277	275 | 213%	-263 | -65%	-127 | -32%	319	291	364	-86 | -21%	**-28 | -9%**	**45 | 14%**
C	Route 2 - Station Road Parking	79	70	162	145	**-9 | -11%**	93 | 133%	75 | 108%	78	129	126	**8 | 12%**	51 | 66%	48 | 61%
D	Route 2 - Station Road to High Street SB	264	419	208	453	155 | 59%	-211 | -50%	**34 | 8%**	408	414	485	**-12 | -3%**	**6 | 2%**	78 | 19%
Route 3 - Individual		Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
A	A312 The Pkwy / North Hyde Road RAB to North Hyde Road / North Hyde Green Jct	28	24	23	24	**-3 | -12%**	**-2 | -7%**	**0 | -2%**	23	26	21	**-2 | -7%**	**3 | 15%**	**-2 | -7%**
A	North Hyde Road / North Hyde Green Jct to North Hyde Road / Roseville Ped X	30	28	22	24	**-2 | -7%**	-6 | -21%	**-3 | -12%**	26	27	22	**-2 | -7%**	**1 | 3%**	**-4 | -15%**
A	North Hyde Road / Roseville Ped X to North Hyde Road / Harold Road Ped X	36	35	38	51	**0 | -1%**	**3 | 8%**	15 | 44%	36	36	43	**1 | 2%**	**0 | -1%**	7 | 20%
A	North Hyde Road / Harold Road Ped X to A437 Station Road / A437 North Hyde Road Jct	96	116	90	257	20 | 20%	-26 | -23%	141 | 122%	89	91	252	-27 | -23%	**2 | 2%**	163 | 184%
A	A437 Station Road / A437 North Hyde Road Jct to Nestles Avenue / Station Road Jct	23	92	54	43	69 | 300%	-38 | -42%	-49 | -53%	66	86	45	-27 | -29%	20 | 30%	-21 | -32%
A	Nestles Avenue / Station Road Jct to Nestles Avenue / Harold Avenue Jct	61	60	60	57	**-1 | -2%**	**0 | 1%**	**-2 | -4%**	60	60	58	**0 | 0%**	**1 | 1%**	**-2 | -4%**
A	Nestles Avenue / Harold Avenue Jct to Harold Avenue / North Hyde Road Jct	19	20	21	28	**1 | 4%**	**2 | 9%**	9 | 45%	19	25	26	**0 | -1%**	6 | 29%	6 | 32%
A	Harold Avenue / North Hyde Road Jct to North Hyde Road / Harold Road Ped X	10	25	9	7	15 | 162%	-16 | -64%	-18 | -73%	22	23	7	**-3 | -14%**	**2 | 9%**	-15 | -68%
A	North Hyde Road / Harold Road Ped X to North Hyde Road / Roseville Ped X	122	229	113	70	107 | 88%	-116 | -51%	-159 | -69%	184	202	74	-45 | -20%	**18 | 10%**	-110 | -60%
A	North Hyde Road / Roseville Road Ped X to North Hyde Road / Watersplash Lane / North Hyde Gardens Jct	35	44	30	25	9 | 27%	-14 | -31%	-19 | -42%	35	38	26	-8 | -19%	**3 | 8%**	-9 | -27%
A	North Hyde Road / Watersplash Lane / North Hyde Gardens Jct to A312 The Pkwy / North Hyde Road RAB	86	85	61	46	**-1 | -1%**	-24 | -28%	-39 | -46%	82	82	46	**-2 | -3%**	**-1 | -1%**	-37 | -44%
Route 3 - Combined		Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
A	Route 3 - A312 Parkway Loop	544	758	521	633	214 | 39%	-237 | -31%	-125 | -17%	642	696	619	**-116 | -15%**	**54 | 8%**	**-22 | -3%**
B	Route 3 - Pump Lane to Church Road RAB WB	70	107	86	79	37 | 53%	-21 | -19%	-28 | -26%	92	91	77	**-15 | -14%**	**-2 | -2%**	-15 | -17%
C	Route 3 - Pump Lane to Church Road RAB EB	53	136	102	95	83 | 157%	-34 | -25%	-41 | -30%	116	108	101	**-20 | -15%**	**-8 | -7%**	**-15 | -13%**
D	Route 3 - SB A312 Approach to Bulls Bridge RAB	167	571	236	252	403 | 241%	-334 | -59%	-318 | -56%	568	569	246	**-3 | 0%**	**1 | 0%**	-322 | -57%
Bulls Bridge to Harold Avenue		Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
	Harold Road to Bulls Bridge Roundabout - Eastbound	243	358	204	141	220 | 159%	76 | 59%	3 | 2%	302	322	146	**174 | 135%**	**149 | 86%**	-27 | -19%
	Bulls Bridge Roundabout to Harold Road - Westbound	93	87	83	99	**20 | 30%**	**-22 | -21%**	**31 | 47%**	84	88	86	**-21 | -20%**	**9 | 11%**	**7 | 10%**
Botwell Common		Base	Baseline	BL+DEV	BL+DEV+SEN	Baseline vs Base	BLD vs BL	BLDS vs BL	5Yr Baseline	5Yr BL+DEV	5Yr BL+DEV+SEN	5YrBL vs BL	5YrBLD vs 5YrBL	5YrBLDS vs 5YrBL
	Botwell Common Road - Eastbound	236	395	277	265	148 | 60%	5 | 2%	18 | 7%	341	309	266	**69 | 25%**	**-159 | -34%**	-201 | -82%
	Botwell Common Road - Westbound	222	264	249	239	34 | 15%	**3 | 1%**	**9 | 4%**	263	253	238	**17 | 7%**	**4 | 1%**	**-12 | -5%**

APPENDIX D - TRAVEL TIMES – BUSES


90 NB AM
90 NB PM
90 SB AM
90 SB PM
140 NB AM
140 NB PM
140 SB AM
140 SB PM
TRAVEL TIME (SECONDS)
DISTANCE (METRES)
Base
Baseline
Baseline - Dev
Baseline - DSen
5yr Baseline
5yr Baseline - Dev
5yr Baseline - DSen
ROUTE 90 NB
ROUTE 90 SB
ROUTE 140 NB
ROUTE 140 SB


H98 NB AM
TRAVEL TIME (SECONDS)
DISTANCE (METRES)
Base
Baseline
Baseline - Dev
Baseline - DSen
5yr Baseline
5yr Baseline - Dev
5yr Baseline - DSen
H98 NB PM
ROUTE H98 NB
H98 SB AM
H98 SB PM
ROUTE H98 SB
195 NB AM
195 NB PM
ROUTE 195 NB
195 SB AM
195 SB PM
ROUTE 195 SB


E6 SB AM
E6 SB PM
TRAVEL TIME (SECONDS)
DISTANCE (METRES)
Base
Baseline
Baseline - Dev
Baseline - DSen
5yr Baseline
5yr Baseline - Dev
5yr Baseline - DSen
ROUTE E6 SB
U4 NB AM
U4 NB PM
ROUTE U4 NB
U4 SB AM
U4 SB PM
ROUTE U4 SB
U5 NB AM
U5 NB PM
ROUTE U5 NB


U5 SB
AM
TRAVEL TIME (SECONDS)
DISTANCE (METRES)
Base
Baseline
Baseline - Dev
Baseline - DSen
5yr Baseline
5yr Baseline - Dev
5yr Baseline - DSen
U5 SB
PM
TRAVEL TIME (SECONDS)
DISTANCE (METRES)
ROUTE U5 SB
E61 NB
AM
TRAVEL TIME (SECONDS)
DISTANCE (METRES)
E61 NB
PM
TRAVEL TIME (SECONDS)
DISTANCE (METRES)
ROUTE E6 NB

APPENDIX C

1000003934 Former Nestle Factory, Hayes – Highway Authority Comments on Submitted Planning Proposals

Key points arising from initial TA Review:

- Committed development and cumulative assumptions incorporated into modelling scenarios require further analysis.
- The site has a PTAL range of between 1b (very poor accessibility) and 4 (good accessibility).
- Trip generation – Several recommendations identified regarding further TRICS analysis
- Access Strategy - Improvements identified to improve sustainable travel and service vehicle access to the site.
- Electric vehicle charging – further details required.
- Parking - further details required for disabled spaces, cycle parking infrastructure, EV and car club provision.
- CPZ proposal for roads to the south of the development.
- Traffic impact - Further analysis of the cumulative effects of the Nestle site proposal plus other committed developments on the local highways network is required.
- Network modelling. The accompanying 'Audit of Nestle site traffic models' technical note identifies a number of deficiencies and discrepancies in regard to the data and options chosen for modelling the highway network.
- Proposed mitigation measures will need to be revisited after the network modelling deficiencies are addressed and a sensitivity test of the full development traffic are undertaken.

1. Introduction

This note provides the London Borough of Hillingdon's (LBH) initial comments on transport aspects of the Former Nestle Factory, Hayes, planning application (1331/APP/2017/1883). The comments are intended to provide initial guidance to the Applicant and their representatives on what LBH seeks from the perspective of its responsibility as Highway Authority. The comments are intended to be constructive but do not prejudice any future decision by the relevant Planning Committee.

The following comments are based on the Transport Assessment (TA) produced by Markides Associates and submitted in May 2017. This states that the planning application seeks outline permission for:

- 1,381 residential units;
- 22,663 sqm (GEA) of commercial floor space;
- Commercial floor space will be utilised for office, retail, community and leisure uses;
- Approximately 712 car parking spaces (0.50 per dwelling, plus more for the retail, commercial and community components of the site)

Where possible, the comments also seek to acknowledge feedback already provided by Transport for London (TfL) (and the Applicant's subsequent responses); however, the views of TfL do not necessarily reflect those of LBH.

2. Cumulative Impacts and Other Committed Developments

The TA considers the traffic movement, junction capacity performance and implications of the proposed development in relation to the wider cumulative impact of specific committed development sites, predominately to the north of the proposed development site.

The TA references the following assumptions on cumulative development for all the committed land north of Nestles Avenue as follows:

• Precis Site (No. 1 Nestles Ave - part of overall Nestle Site - Site C) – 164 residential units and 1500sqm (LBH estimate 7000sqm of B1/B2) office floorspace.

The assumptions for this site were discussed with the Transport Consultants acting for the developer in advance of the production of the TA, as suggested by LBH. The figures uses closely match those in application no 1699/APP/2017/2201 for 7081 sqm B8 use, 115 sqm café and 164 residential units. Para 7.42 explains that as the B8 use already exists on the site and would be in the surveys no further allowance for that use is required.

• Beccleuch Site (Nestle Site C - other 'half' of No. 1 Nestle avenue site) – TA estimates 410 residential units (LBH estimate 539 units).

Again, a discussion was held with the Transport Consultants acting for Beccleuch and an estimate of 410 units was provided by them at the time the TA was produced. No application has been made for this site, but it should be noted that emerging Policy SA5 : Land to the South of the Railway identifies the entire Site C as accommodating 110 residential units. . It should also be noted that no reduction in trips for the existing occupied employment uses on site has been made.

• Squirrels Trading Estate (Hayes Town Centre Estate) – 400 residential units (LBH estimate 427).

This is Site B in emerging Policy SA5. The Policy identifies it as being able to accommodate 97 residential units. It should also be noted that no reduction in trips for the existing occupied employment uses on site has been made.

In terms of committed developments, the TA's modelling assumptions have taken the following into account:

• Southall Gas Works (LBH confirm circa 3500 units)

• Old Vinyl Factory include the change from cinema to UTC College (LBH confirm circa 510 units)

• EMI Prologis Site

• 20 Blyth Road

• Asda Development – industrial component only

• Hyde Park Hayes Unit 4

• Hayes High Street improvement scheme

• Enterprise Hose, Blyth Road

• Trident House, Station Road

• Union House, Clayton Road

• Plot 6 Rackspace City North Hyde Road

• Unit 3 Millington Road Hayes

• Gatefold Building, Blyth Road

• Silverdale Road development (LBH confirm 122 units)

LBH's identification of Nestle Site B development site with an estimated 200 residential units does not appear to be referenced in the TA's network modelling inclusions for committed and cumulative development locations.

The Squirrels Trading Estate is Site B and has already been accounted for within the TA as identified above. It also appears that two different estimates for what this site can accommodate are being suggested within the response (200 here and 427 in the bullet points above).

Further analysis is required for the committed development and cumulative estimates inputted into the modelling scenarios to ensure the vehicle trip estimates provided in the TA modelling outputs are accurate and concur with LBH's figures for the number of parking spaces and trip generations predicted for all committed residential units and employment sites.

The information for the committed schemes in the bullet points above have been taken from the Transport Assessments and Statements that supported the various applications. The list was agreed with Syed Shah at LB Hillingdon (see attached e-mail) and the use of TA's to obtain trip generation is identified on Page 4 of S Shah's letter dates 31st August 2016 (also attached).

2.1 Existing Traffic Flows

The TA details the results of a range of traffic surveys, junction capacity assessments and journey time modelling for existing traffic flows (section 4.5-4.40). These were undertaken during 2016 at locations agreed with LBH.

In summary, several of these junctions are experiencing RFC's above 85% and DoS over 90%, indicating the junctions are currently operating close to or over capacity during peak travel periods, leading to queuing traffic and congestion.

Information on traffic flows can be found in more detail within the 'Audit of Nestle Site Traffic Models' technical note.

Can we have a copy of this?

2.2 Accident Analysis

The Station Road, Station Approach and Clayton Road four arm mini -roundabout is located approximately 130m north of Hayes and Harlington Station and is on the main pedestrian route into the town centre from the site. The roundabout has a low level of PIAs with 9 in total, however VRU are high with 7 incidents, 3 of which are classified as serious. These high VRU collisions, particularly for pedestrians, could be due to the lack of pedestrian crossings on the Station Approach and southern Station Road arms of the roundabout. Pedestrian cross and road safety improvements at this location and along the route from the development to the station and town centre should be addressed as part of the S.106/278 planning conditions.

It is understood that as part of the Hayes and Harlington Station improvements associated with Crossrail measures to improve the public realm around the station, including the Station Road / Station Approach / Clayton Road junction are proposed. An extract from the Design and Access Statement that supported the Station application is shown below, identifying the emerging plan at the time of the submission. Presumably the design of this has moved on and implementation is imminent?

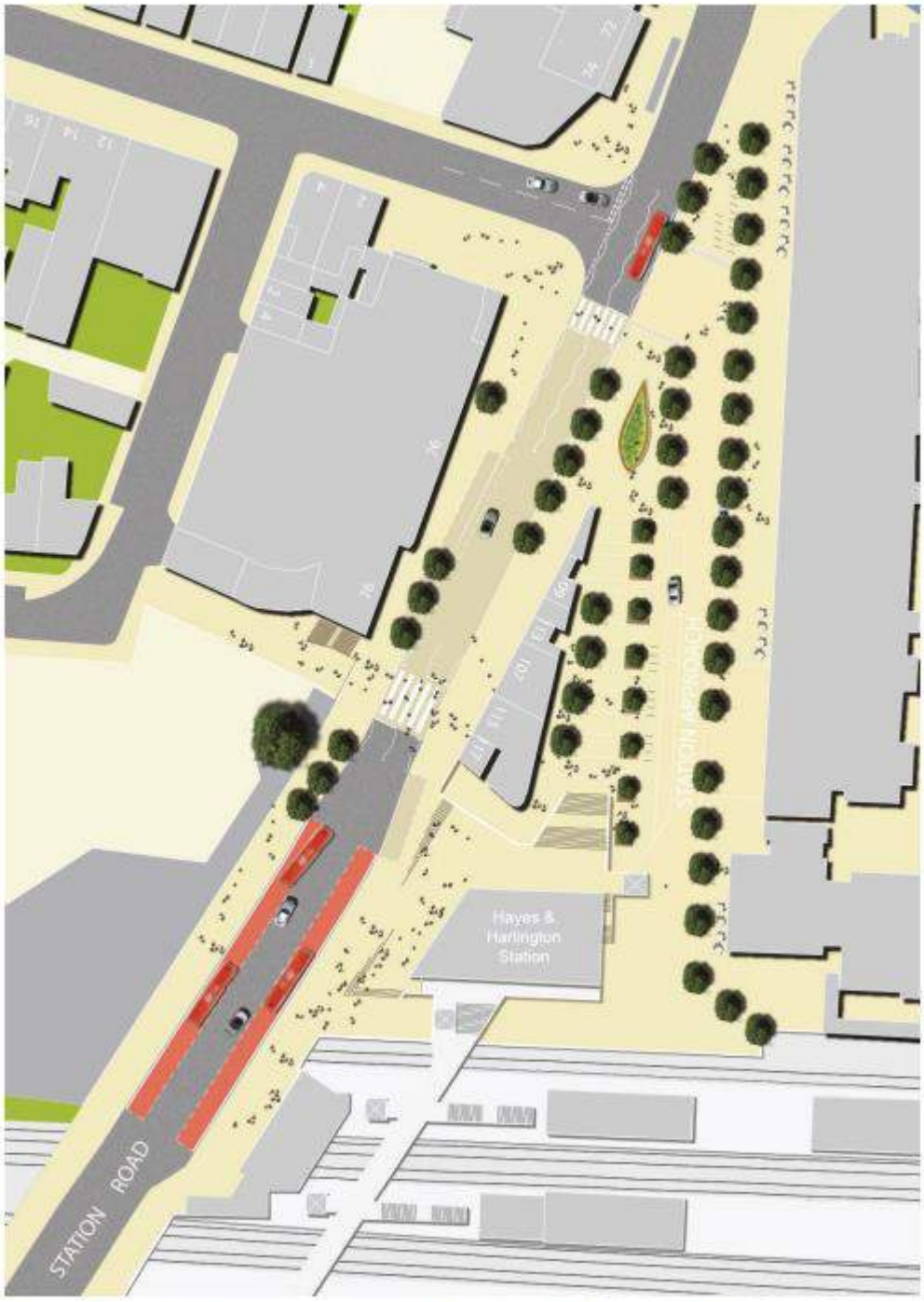


Figure 43. Emerging urban realm plan for Hayes and Harlington Station.

As improvements are already proposed in this area it is not necessary for the Nestle site to fund these.

2.3 Public Transport Accessibility Levels (PTALs)

For 2021 forecast year, the TfL WebCAT assessment indicates the site will have a PTAL range of between 1b (very poor accessibility) and 4 (good accessibility) from east to west. The range in PTAL rating is due to the increased walking distances across the site from the nearest bus stops on North Hyde Road and Hayes and Harlington Railway Station. It is surprising that the opening of the Elizabeth Line, serving Hayes and Harlington

station, from May 2018, does not appear to significantly improve the sites PTAL levels. This indicates a significant part of the development site has a PTAL rating lower than 4.

The higher density elements of the development are located in the areas with the higher PTAL ratings.

PTAL calculations have the limitation of only taking into account proximity and frequency of public transport services within the calculations. The PTAL rating therefore does not reflect the increased range of destinations that will be reached by Crossrail and the rapid journey times into the centre of London that will be achievable from the site.

2.4 Public Transport Provision

The TA provides details of all bus routes and service frequencies within the local area however no reference is made to 24 hour bus services.

Details are provided of the closest bus stops within reasonable walking distance to the proposed development site. Bus stop distances are provided to the closest point of the development. Distance and walking duration from the furthest accessible points of the development should also be included in this assessment.

A supplementary Technical Note setting out the information identified above will be provided.

2.5 Rail Access

In terms of rail infrastructure, the site benefits from being located within an acceptable walking distance of Hayes and Harlington Station, with an approximate walk distance of 420m from the western boundary of the site on Nestles Avenue to the main station entrance. The distance and walking duration from the furthest accessible points of the development should also be included in this assessment.

This can be included in the Technical Note identified above.

3. Trip Generation

With reference to paragraph 7.5 of the TA, LBH remain convinced that the trip rates need to be applied to all units, not just those with allocated parking. Units without car parking spaces will still generate vehicle trips, and need to be considered. The skill is choosing the correct sites from TRICS and/or using a first principles approach.

The approach suggested within the TA, relating trip generation to car parking provision, has been used on significant scale residential schemes elsewhere in London, with the agreement of both the Highway Authority and TfL. The recently consented Hale Wharf proposal in Tottenham Hale is an example of this, where car mode share was only applied to the units that would have access to parking.

A discussion on permitted use needs to be opened up with LBH. PCL considers that, given operations in the Nestle Factory ceased in 2014, discounting the permitted use on site is reasonable to a point but there still needs to be a sensitivity test of the full trip generation from the development proposals on the current traffic conditions. This approach is stated in TfL's own guidance, which declares:

Where a site is vacant or partially vacant, the quantification of trips (and modal distribution) should be based upon the permitted uses. However, TfL will normally request sensitivity testing to gauge the impact of the development against the measured number of trips that the existing site is generating at the time of the application - in order to ensure that the transport impact of the development can be quantified relative to existing conditions

LBH therefore requires a sensitivity test for the full trip generation to be modelled.

It should be noted that TfL have accepted the assumption that a significant proportion of the existing buildings on site could be re-occupied and that they should be considered within the baseline (see attached e-mail).

3.1 Residential Use

The inclusion of several site selections in the TA was questionable in terms of the residential component of the proposed development. A range of 9 to 530 units was originally used for the site search parameters. A more appropriate range of 690 to 2070 (+/- 50%) unfortunately yielded no results on TRICS, so the maximum range of 530 dwellings is a necessity. However, selecting a minimum range of 9 could arguably lead to anomalous data. Sites with considerably fewer dwellings than the proposed site were selected; in fact 3 out of 5 sites selected exhibit less than 100 dwellings. Setting the minimum number of dwellings to 130 will yield more appropriate sites. The survey dates of some sites are, arguably, straying into the realms of redundancy, including one site that was last surveyed over 7 years ago.

It should be acknowledged that the selected sites exhibit a relevant PTAL rating, and the exclusion of any inner city developments was the correct choice. The inclusion of older surveys and smaller developments could be justified by selecting sites with relevant PTAL ratings, location, and dwelling to car parking space ratio. Upon conducting a TRICS exercise with a revised site selection (more recent and increased number of dwellings compared to the TA, with similarly relevant PTAL rating and car space ratio), the result was a slight difference in figures. Though the results are similar, PCL analysis does show an extra 161 vehicles per day, which is not a negligible amount.

It would be helpful to see the PCL analysis to identify what the differences in trip rates are. It is not clear if the PCL analysis has applied the vehicle trip rates from TRICS directly to the number of units to achieve the differences. The Transport Assessment only uses person trip rates from TRICS, rather than vehicle trip rates, and applies local modal share data from the census to derive local vehicle trip rates. PCL indicate support of the use of local mode share data (see Section 4 below) and rather than differences in vehicle trip rate from the TRICS analysis, it would be more helpful if comments on the appropriateness of person trip rates had been provided.

It should also be noted that in Table 7.7 of the Transport Assessment a comparison has been made between the residential vehicle trip rates adopted for this application and those used in TA's supporting other consented schemes in the area. This shows that the trip rates adopted are comparable to what has been found acceptable for other residential schemes nearby – even though parking provision on those site is higher and vehicle use is therefore likely to be lower for this proposal.

3.2 Amenities

Within the residential component of the development, space is being set aside for amenities. What is known is that this space will be utilised with office space, a nursery, a gym and a small cafe. What isn't known is how these amenities will be apportioned. For the purpose of the TA, it was assumed that the nursery would take up 582 sqm GFA, the gym 955 sqm GFA, and 545 sqm for the office. The cafe was considered to be small enough to not warrant TRICS investigation, as it's predicted it won't generate trips in its own right. These estimates seem reasonable, but until the exact sizes of each amenity are known, the data is (through no fault of the TA authors) unreliable. If the facilities are much smaller than estimated, it can be assumed they would just be used by residents and not generate extra trips, if much larger, they could pull in a significant amount of traffic from all around and even beyond LBH. We would also request justification in regards to the suggested 20 car parking spaces in relation to these uses.

The mix of uses assessed is in line with the provision of the different uses on site that Barratt London anticipate will come forward. If necessary a condition limiting floorspaces to maximum sizes could be applied

to the application. Any changes to this would then require an amendment to the application and a revised assessment.

The level of parking provision for these uses has been set in line with LBH parking standards and the likely parking demand associated with the assumed uses. Depending upon the parking control strategy for the streets around the site, the car club vehicles may also be accommodated within these 20 spaces.

3.2.1 Office Use

The TRICS exercise in the TA has a large range of 408 to 4750 sqm, which is presumably intentional given the uncertainty over the exact size of the office space. It is worth mentioning, however, that one of the sites was surveyed 16 years ago and is no longer valid. The other site is over eight times larger than the predicted 545 sqm of office space. A revised site selection brings about an average office size of 1330 sqm GFA as opposed to the 2579 sqm GFA of the TA TRICS data, much closer to the expected GFA. Conversely, this actually leads to a significantly lower total trip rate of 3.095, as opposed to the TA's figure of 12.348. It would be advisable for the TRICS exercise for office space to be revised, as the current figures may be bloated. One suggestion would be to use the first principal approach using employment densities.

Reference is made to the vehicle trip rates from the TRICS output for offices in the TA appendix. These have not been used in estimating vehicle trip rates. As explained in paragraphs 7.1 and 7.2 of the TA, the person trip rates have been used and the local census data has been applied to obtain trip rates by mode. Comparing the vehicle trip rates from the TA with another analysis of vehicle trip rates carried out by PCL does not reflect the vehicle trip rates used in the TA. The statement that they may be 'bloated' is therefore not valid. A comparison of person trip rates from the alternative analysis would be a more valid approach.

3.2.2 Nursery Use

There is severely little data within TRICS for this amenity, and as such, getting an accurate trip estimate would mean having to look outside the Greater London area. The main concern is that of the two TRICS sites available and studied within the TA, both are approximately 120 sqm, with 40 pupils. Extrapolating this, a 582 sqm nursery would have approximately 200 pupils, meaning considerably more trips. However, data may be skewed by the fact that the nursery may be mainly for the use of residents, meaning very few additional trips. In fact, the TA assumes that 50% of the nursery spaces will be occupied by residents of the estate. Whilst this assumption may be acceptable, there is no justification for arriving at this figure. LBH require a justification and this should tally with the number of family units proposed on site, and the number of parking spaces provided.

A quick investigation of the data available on the ONS indicates that in 2011 LBH had 100,214 households and in 2012 17500 of those had at least 1 child between the ages of 0 and 4. Typically, 1 in 5.7 household would therefore be expected to have at least one child of 4 years old or less. Applying this ratio to 1381 dwellings indicates that more than 240 of the households would have at least one child aged 0 to 4 years old. The assumption that 50% of the nursery places would be taken up by local residents is therefore not unreasonable.

3.2.3 Gym Use

As with the nursery, there isn't a wealth of data available for gyms within our parameters. Though all three selected sites have an appropriate GFA (+/- 50%), none have a suitable PTAL rating. The higher PTALs of the sites selected will underestimate the amount of traffic related to the proposed use, as patrons of the gym will be less inclined to use public transport. However, as per previous notes, if the gym is going to be mainly used by residents, extra trips should not be generated. We would request some justification on using sites with higher PTALS, and potentially a TRICS exercise using sites from outside Greater London, again with justification for the sites selected.

We have used TRICS to select similar scale gyms throughout England. The output is attached. The following table shows the vehicle trip rates used in the TA and those from the relevant sites.

	AM Peak		PM Peak	
	In	Out	In	Out
TA	0.418	0.523	0.767	0.244
Wider TRICS analysis	0.439	0.439	1.419	0.7
Difference	0.021	-0.084	0.652	0.456

In the AM peak the trip rates are very similar. In the PM the wider geographic analysis results in higher trip rates. However, applying these to the proposed floorspace would result in 6 additional vehicles arrivals and 4 additional vehicle departures. This is not a significant difference in trip generation.

3.3 Industrial Use

22,663 sqm of the proposed site is allocated for industrial use. For the TRICS exercise, Markides Associates has investigated the trip generation for two different categories; Industrial Estate, and Industrial Unit, and it can be agreed that this is good practice. OGV's will account for the vast majority of trips to an industrial estate, though there will still be other vehicles (belonging to employees, visitors, etc) travelling to and from the site. With this in mind, the TA authors have emphasized the OGV data, which can also be seen as good practice.

3.3.1 Industrial Estate

The chosen range for site selection in the TA is 10,000 to 50,000 sqm. Using the -/+50% rule, a range of approximately 11,330 to 33,994 sqm would be more appropriate, but the 2 chosen sites for the TA were appropriate size wise, both being approximately 23,000 sqm. For this exercise, there is very little data for relevant Industrial Estates in the Greater London region. There are just 2 site results within Greater London, but both are too small at 11000 to 13,850 sqm. However, despite being smaller sites, the trips generated are exponentially higher, with an average trip rate of 18.317, as opposed to the TA data (which looked at sites outside London), which led to an average trip rate of 6.248. It could well be the case that an industrial estate within the Greater London area will be busier than one in the North or the West Midlands (the regions of the 2 sites selected by the TA authors). If this is the case, the estimated trips for the proposed site have been severely underestimated, and it may be advisable for these figures to be looked at again. An additional suggestion would be to undertake a bespoke survey to provide robust analysis.

Reviewing the two London based sites that are available in TRICS, these are the Bradfield Road Industrial Estate, Ruislip and Hanworth Trade Park, Hanworth, Hounslow.

Looking firstly at the Ruislip site, the 13850sqm is split into 20 different units. Of these a number are retail uses (Topps Tiles, Tool Station, Howdens Joinery and Selco Builders Merchants) and car sales / repairs (Spires, Skoda and Greenford Cars). This is not reflective of the proposals for the site, which are for 5 large units that are not intended for retail use.

Similarly, the Hanworth site is also occupied by Selco Builders Merchants. It also has an HSS tool hire company and companies selling plumbing and electricians supplies. Again, not reflective of the proposals for this site.

3.3.2 Industrial Unit

As with the 'Industrial estate' category, the TA authors have looked outside the Greater London area with a large range of 10,000 to 50,000 sqm, as the site results within London are quite small. However, it could be argued that for this category the size of each site does not have to approximate the full 22,663 sqm GFA, as it's

not known whether the floor space will be utilised by just one company, or be divided out for several companies. The site selection results for just the Greater London region exhibit a GFA of 1080 to 6100 sqm, and are interesting because 2 of the results are already within Hayes, Hillingdon, presumably leading to accurate data. In any case, the results of both TRICS exercises are very similar, with the TA site selection leading to an average trip rate of 6.421, and the revised site section leading to an average trip rate of 7.216. With this in mind, this data could be considered reasonable.

4. Modal Split

As opposed to generating multi modal trip rates data via TRICS, Markides Associates have chosen to apply data from the 2011 Census for Journeys to Work from the daytime population of Hillingdon's Middle Super Output Area (MSOA). This method is commonly used in the industry because, as noted in the TA, it takes into account specific characteristics of an area. This method of modal split generation is appropriate and can be supported.

It could be argued that the data received from the census is misleading. The population of Hillingdon, or more specifically Hayes, Botwell ward, may well look radically different in the coming years when compared to those surveyed in the 2011 census. With the advent of Crossrail improving travel links to the City of London and other business hubs, and the consequent appearance of developments such as this, the development of Hayes should see an influx of young professionals that will have different travel habits to those surveyed 6 years ago. At the time of the last census, 36.2% of those living in Hayes and Harlington (which includes the Botwell ward) travelled to work by car, and only 27.1% of households had no car or van. This contrasts sharply with the average figures of London as a whole; where only 18.3% of people drive to work, whilst 41.5% of households have no access to a car or van. However, the new influx of people should see these figures level out with car ownership decreasing, so therefore this approach is acceptable.

Obviously the TA authors have no control over the fact that an updated census will not be available until the year 2021, but to substantiate the modal split values generated, some supporting data could be produced. For example, it could be advisable to carry out a TRICS modal split exercise using data sites that currently contain a similar demographic to what Hillingdon is expecting to have, and seeing if there is a noticeable difference in the results. Another suggestion would be to use TEMPro for analysis.

As indicated in the previous paragraph, the change in public transport availability and type of residential development on offer in Hayes and Harlington is only likely to reduce car ownership and usage compared to the 2011 Census. The trip rates used in the TA are therefore very robust (particularly as no adjustment for lower car parking provision on the site was made). We are more than happy to consider a sensitivity test with reduced car usage. As indicated in the TA, we are of the view that adjust should be made to reflect the fact that many residents will not have access to a car.

5. Access Strategy Review

5.1 Service Vehicle Access

There are several questions raised with regards to access across the whole site. Firstly, LBH planning and building controls state that large bins (for example 1100 litre Eurobins) must be easily and safely accessible, and the drag distance must be no further than 23 metres from the collection point, 9 metres for wheelie bins. Please note that PCL would like clarification from LBH to confirm that this is correct, and on what they define as 'wheelie bins'. Looking at one example (refuse store 8 in Block G), it would appear that bins would have to be dragged past 2 dwellings and a cycle store for collection, questions over distance and safety should be addressed.

There would also have to be clarification over refuse vehicle turning circles (particularly given the number of dead ends within the development), and whether they can safely navigate around and drive under the proposed car park podiums. In fact some bin stores appear to be under the car park podium (such as Podium C). It should be taken into account that some refuse vehicles increase in height whilst they're operating.

It would also be prudent to question how service vehicles (particularly emergency vehicles) will access properties on the northern edge of the proposed site. Clarification on this is needed to substantiate the claim within the TA that a fire tender can get within 18m of all cores and dry risers.

Please note that Appendix W (which contains the vehicle sweeps, shedding more light on refuse vehicle turning circles and tracking) is not uploaded to the documents section of the online application, and we would kindly ask LBH to send it to us.

In order to comply with the requirements of the Building Regulations in relation to distances between the front doors of residential units and waste storage locations and the drag distance requirements between refuse vehicles and waste storage locations, it is proposed that there is a managed system on site. Waste containers will be moved by the on-site management company to external holding areas on the morning of collection and returned to the stores afterwards.

The vehicle swept paths included in the Transport Assessment demonstrate that these holding areas can all be reached and that a large refuse vehicle can turn within the site. Similarly, access by fire tenders to dry riser locations is also shown to be achieved.

5.2 Walking and Cycling Access

There are several points of improvement that could, in line with the NPPF, further enable the most sustainable forms of transport; walking and cycling. Firstly, clarification on access for cyclists using the Canal Street entrance would be helpful. There would appear to be 2 separate gated access points, one for vehicles, and one for pedestrians. It would be best for cyclists to enter and leave the site via the vehicle access, will they be given a fob to open the gates, or is it sensor activated? There are also questions over the placing of cycle stores, for example the Block G cycle store, which would appear to force users to navigate their bikes through 2 narrow doors then through the foyer, or through 2 narrow doors then through the Block F1 cycle store.

The gates shown on Canal Street are the existing factory gates. These are locally listed and have been retained because of this. It is not intended that they are used to stop vehicles or cyclists entering the site.

In the commercial portion of the site, there will obviously be a lot of OGV movement, and creating a roadway that's as safe as possible for those wishing to engage in human powered transport is imperative. Considering the amount of blind spots large vehicles have, mitigating solutions should be sought after, such as a segregated cycle lane. It would also be wise to ensure high kerbs along the pavement to protect pedestrians, whilst also having sufficiently smooth and tactile dropped kerbs for the ambulant and visually impaired. Currently the highway layout is not suitable for cyclists, as the vehicle sweeps found in Appendix X display an encroachment on to opposing lanes when OGVs leave the industrial units. It's pleasing to see car free access points into the site from the canal side walkway on the northern edge of the boundary. Something that could be incorporated to further facilitate travel by bike and foot is access from the southern side of the North Hyde Gardens bridge directly into the canal side walkway. This should dramatically reduce travel times for those walking or cycling to the site from the north. It should be noted that currently there are sections of bollards in the centre of the pavement leading down North Hyde Gardens towards the junction with Nestles Avenue and the commercial entrance to the site. It would be hard to navigate round them if in a wheelchair.

For both the commercial and residential development, it should be seen that, whilst the numerous tree lines are aesthetically pleasing, they don't detract from pedestrian and road user safety ruining what has been a

mostly positive PERS and CERS Audit. Large trunks and shadows cast by trees at pedestrian crossings and junctions could affect driver visibility if strategic tree placing is not considered. It may be appropriate to place speed calming measures such as speed bumps along sections of the development, to prevent speeding that may occur on the long, straight roads.

The journey from the proposed site to Hayes and Harlington Train Station (along Nestles Avenue and Station Road) look industrial and uninviting. To enable more walking and cycling to and from the station it could be sensible to improve street lighting. This would decrease the perception and occurrence of crime. Although there is general agreement with the PERS Audit that most surrounding roads are in an acceptable condition, given that Nestles Avenue will have exponentially greater footfall should the development be built, resurfacing the pavement would be advisable. As acknowledged in section 3.22 of the TA, it's quite damaged and uneven in some areas, impeding access for many pedestrians, whether it be the impaired, pushchair users or wheeled luggage users.

We are amenable to discussions on either providing appropriate contributions to allow for surfacing improvements.

There is agreement that the current 18 cycle spaces at Hayes and Harlington Train Station are not enough. The planned increase in cycle spaces will come with the Crossrail project, due for total completion in Hayes and Harlington in December 2019, it should be ensured that the plan comes to fruition, ideally in conjunction with the completion of the development. The developer should be required to contribute to new cycle parking. There is also agreement with the acknowledgement in the TA that the Station Road/Clayton Road zebra crossing is of significant importance and should be improved, as is the case with junctions and pathways on North Hyde Road, change should be ensured to support greater footfall.

If increased cycle parking at the station and improvements to the public realm are being provided as part of the Crossrail Scheme, why is there the need for funding for these measures from this development proposal?

5.3 Public Transport and Amenities Access

From the western residential portion of the site to the eastern commercial wing, the PTAL rating ranges from 4 to 1b, and efforts should be made to improve the rating. The TA recognizes that LBH have completed phase one improvements on Hayes Town Centre, which is just 800m away from the proposed site. The viability of extending bus services to a closer proximity of the proposed site should be investigated for phase two of town centre improvements, hopefully improving the PTAL rating. This would be a mutually beneficial act for the developers and LBH, as not only would it increase access for the development (thus, desirability), but also it would draw in more revenue for the town centre.

Discussion have been held with TfL regarding the diversion of the route 194 along Nestles Avenue. The Applicant is supportive of this. However, it will only be feasible if on-street parking controls are put in place on Nestles Avenue, which would require LBH support. We understand that the Council has a study relating to the introduction of parking controls, but we are not aware of the outcome of this report.

The suggestion in the TA that a direct link from the site to the train station could be established (from the canal and railway line frontage to the train station car park) is wholly recommended, as this will decrease journey time to the station for many residents, and ease footfall pressures on the narrow Nestles Avenue pavement.

The delivery of this is outside of the Applicants control as it involves land on other ownerships. However, the scheme enables this to be provided when further development in the area takes place.

A recommendation would be to investigate the viability of a foot/cycle bridge (suggested in the TA) connecting the site to the northern bank of the canal. A contribution from the developer should be sought to fund this. Not only would this potentially increase the PTAL rating by decreasing distance to alternative travel links, but it would also directly connect the site to the Grand Union Canal Towpath, a pleasant green space that forms part of the London Loop. It would also improve access to close by Minet Country Park, another green space amenity.

The delivery of this is outside of the Applicants control as it involves land on other ownerships. However, the scheme safeguards land for a canal bridge landing.

6. Parking Provision

6.1 Justification of Parking Standards

Chapter 6 of the TA provides a comprehensive overview of current London Plan and LBH policies in regard to the provision of appropriate parking standards for the type of development proposed. Taking into account existing parking demand for flats in the Hayes area and other similar developments in outer London with similar PTAL levels. The TA concludes that the type of flatted development proposed at the development will result in lower car ownership levels than is typical for existing developments in the Hayes area. The parking demand comparisons with the local development at High Point Village are slightly misleading in regard to PTAL levels, as the High Point development PTAL level 5 is considerably higher than the PTAL levels covering most of the proposed site.

However, a number of other residential developments with lower PTAL ratings and parking demand lower than 0.5 space per unit have also been identified.

The TA confirms the provision of 692 residential parking space on the site, equivalent to a ratio of approximately 0.5 parking spaces per residential unit.

The level of parking provision stated complies with the London Plan requirements for substantially less than 1 space per unit in locations with good public transport accessibility (PTAL 4), and would appear to be the appropriate level of provision to accommodate predicted parking demand.

No details are provided in regard to the number of active and passive electric charging points to be provided and where these will be located within the residential parking areas.

It is intended that these are provided in line with London Plan requirements.

The proposed level of car parking for the employment uses are below the maximum standards identified by LBH and within the range prescribed by the London Plan for Outer London locations.

The developer is expected to contribute towards the implementation of CPZs to prevent the loss of on street parking for residents of existing properties located around the proposed site.

Adequate provision of electric charging facilities and capacity for passive provision are detailed for the employment parking provision.

The cycle parking space provision for the residential, visitor, and employment elements is in line with London Plan maximum cycle parking standards. However the applicant needs to provide more detail regarding the location, accessibility, security and type of cycle parking infrastructure to be provided for both the long and short stay facilities. Will there also be capacity to increase the number of secure cycling parking facilities if demand exceeded the planned cycling parking provision?

This can be provided in a supplementary technical note.

6.2 Disabled Parking

Clarification is required for the initial number of wheelchair accessible parking spaces to be provided. Section 6.29 of the TA refers to initial provision of 18 spaces for residents in wheelchair accessible units; then section 6.30 refers to the initial provision of 14 spaces for wheelchair units within the affordable component of the development. Does that imply only 4 additional wheelchair accessible parking spaces will be initially provided?

More detail is required to understand how the proposed flexible approach to disabled parking provision will work in practical terms; especially in the years following initial occupation.

The provision of wheelchair accessible spaces to cater for the affordable units is understood but there are some concerns with this strategy which need to be understood:

- The overspill spaces are all external to the podiums, is this a realistic strategy and desirable from a sales point of view?
- How do the convertible spaces relate to the units and are they within acceptable walk distance?

It seems the number of spaces will increase, what will the provision be? The provision of disabled parking spaces needs to relate conveniently to cores / building access points. Information is needed to illustrate these are suitable.

This is probably best explained over a plan at the meeting.

6.3 Podium Parking

It is not clear how access to the podium parking (vehicle and cycle) will be managed. This needs careful consideration in order to ensure safety and security for all users. LBH request further details to explain this.

6.4 Cycle Parking

The provision of wider / accessible spaces is welcomed though there is uneven distribution around the site. These spaces should be available throughout the site both for long and short term users.

The dimensions of the cycle stores are not specified nor are the type of rack. For example there appear to be differing styles of rack within the central parking at podium B. These should be to London Cycle design Guide standards. LBH require further information to ensure the racks are suitable and enough space is provided to access them.

A mix of Sheffield Stands and parking racks (Josta type) are intended.

6.5 Electric Vehicle Charging Points

Details are required for the number, type (fast/slow charge) and location of all active and passive electric vehicle charging locations for all parking areas, including the residential, visitor, commercial and employment parking provision. The electric vehicle charging spaces should be clustered in easily accessible locations, clearly signed and enforced. Passive charging provision should also be provided for the 5 car club parking spaces required within the development's parking layout. Details of how to access the charging points should be provided within each new residents travel plan welcome pack.

Can be provided as a supplementary Technical Note.

6.6 Car Club Provision

The TA confirms that Zipcar have expressed interest in operating from the development site and have recommended a total of 5 car club vehicles would be appropriate when the whole development is completed. With one car club vehicle provided at first occupation and then additional vehicles added as demand increases. When the first vehicle achieves an utilisation 15% above the fleet average for a period of 8 weeks, a second vehicle will be added and further vehicles added on this basis. Developer funding will be provided for the

placement of these vehicles which will include 3 years' free membership for occupiers (require confirmation if this free membership will be per dwelling or per resident) plus £25 free credits per unit.

For a development of this size, the developer should be required to fund the provision of 3 car club vehicles from first occupation with the 3 years' free membership for occupiers provided with £50 free credit per unit. This will provide new residents with sufficient access to an alternative to private car use and the free driving credits will incentivise their behaviour change. It is recommended that the car club vehicles are provided designated spaces within the heart of the development's residential car parking provision, either in Milk Street or Canal Street. This will ensure these vehicles have a visual presence to promote their utilisation as well as being easily accessible.

The three years free membership forms part of the Zipcar offer, along with £25.00 usage. If necessary a financial contribution can be made to increase this to £50.

As the development will be phased, it is not appropriate to provide three vehicles from first occupation as they will not be utilised. The approach identified by Zipcar is more cost effective (in line with recommendations in the NPPF) as it enables more vehicles to be provided as demand increases.

The location of all five designated car club parking bays, with sufficient signage and lining, should be identified on the TA's parking plan, in accessible locations. These car club parking bays should also be provided with passive electric vehicle charging point provision.

Many Local Authorities prefer car club vehicles to be located on-street rather than within developments, to widen their availability. LB Islington and Camden in particular follow this approach. No specific location was therefore identified within the site as it was felt that it might be more appropriate to accommodate the spaces on-street as part of changes in parking control. However, if they are provided on site, they will be allocated space within the 20 spaces identified for the commercial uses. This will make them more accessible to existing residents in the area than if they are tucked away within the residential parking areas.

LBH would like more details on Zipcar's average fleet utilisation in Hillingdon, to ensure that achieving an utilisation 15% above the fleet average for an 8 week period is realistic.

The only Zipcars in Hillingdon are based at Heathrow Airport. Bearing in mind the requirements that Zipcar have identified within their quotation regarding parking ratios of 0.7 spaces per residential unit and good availability of public transport for their vehicles to operate successfully, it is not surprising that they have limited vehicles within LBH.

It is also noted from Zipcar's proposal for the development, (Appendix AM of the TA), they will provide 1 year's free business account for any commercial entity operating from or in conjunction with the site.

6.7 Wider Area Controls to Support Low Provision

The TA makes reference to the limited on street parking controls that currently exist in the roads surrounding the development site and the surveyed on-street parking stress currently experienced during the daytime on weekdays, associated with commuters parking to use Hayes and Harlington Station. On street parking demand is likely to increase once Hayes and Harlington Station is served by the Elizabeth Line.

The Applicants proposal to provide funding for the implementation of a controlled parking zone to the south of the development, with residents in the new development prevented from obtaining CPZ parking permits, is a welcome inclusion. This measure will mitigate the impact the development may have on the availability of on-street parking for existing residents in the area as well as discouraging private car use associated with the new development. As parts of the development site only register a PTAL of 1B, and PTAL 4 in the most accessible parts, there would be a risk of significant parking overspill on to surrounding roads if a CPZ for existing residents is not introduced.

The CPZ should cover all roads surrounding the site (the CPZ operational area will be agreed by LBH and subject to consultation) where there is no or limited on street parking restricts currently in place.

We will be guided by the LBH parking study on the requirements for this. When will it be publicly available?

7. Traffic Impact

An in depth analysis of traffic impact can be found within the 'Audit of Nestle Site Traffic Models' technical note.

In regard to junctions on the LBH highway network, in summary, section 8 of the TA identified the following junctions should be examined in more detail to identify the potential for capacity improvements:

• Dawley Road / Botwell Common Road

• Dawley Road / Kestrel Way / Betam Way / Blyth Road

• Harold Avenue / North Hyde Road

• Station Road / North Hyde Road

Further analysis of the cumulative effects of the Nestle site proposal plus other committed developments on the local highways network is required, as several junctions, not listed above, appear to be operating at capacity or significantly beyond capacity in the future traffic flow scenario, although the TA concludes that several of these junctions do not require capacity improvements.

Paragraph 32 of the NPPF states that developments should only be refused on transport grounds if there is a severe residual cumulative impact. Whilst there are other junctions in the area that have capacity issues, it is not the role of development to rectify existing problems. The only requirement is to ensure that the impact of the proposals is not severe. This is the case at all other junctions than those identified.

7.1 Travel Plans

Two draft Travel Plan documents have been prepared in relation to the two parts of the development, the residential travel plan and an employment (industrial framework) travel plan.

It is intended for the Travel Plan to be supported by the S.106 agreement.

The content of both travel plans is thorough and comprehensive. Initial comments regarding the content of the residential travel plan are as follows:

The travel plan document requires the inclusion of an action plan for implementing the measures identified. The plan needs to provide details of the measure to be implemented, the timeframe, funding requirement and responsibility.

The offer of personalised travel planning advice, tailor to the individual's journey requirements, should be considered for all new occupants of the development. This will empower the individual to make informed sustainable travel choices.

Within the residential travel plan welcome packs, information regarding the location and use of electric vehicle charging points on site should be included.

The employment (Industrial Framework) travel plan's content is thorough and contains an action plan for implementing measures identified. Individual employer travel plans will be tailored to reflect the activities of the different business occupants on the site. Through these, specific measures in regard to each businesses activity, such as fleet miles and deliveries can be covered.

7.2 Access to Public Transport

The TA should review opportunities to improve accessibility to the local bus network, such as diverting or extending an existing local bus service, such as route 195 or E6 to service Nestles Avenue. Developer funding contributions could be sought through legal agreement secured as a planning condition. We would also suggest that a capacity assessment for bus and rail travel is addressed.

This is discussed above. The Applicant is supportive of the diversion of buses along Nestles Avenue.

7.3 Traffic Speed Accessing Development

The employment development will be accessed from North Hyde Gardens, utilising the same access as the existing Nestle Factory, whilst the residential element of the development will be accessed from Nestles Avenue. Consideration of appropriate vehicle speed restrictions and traffic calming will be required for vehicular access into and through both the residential complex via Nestles Avenue and the employment development via North Hyde Gardens.

Comments regarding proposals to control parking through the implementation of a CPZ in the roads surrounding the development site, and the provision of 5 car club vehicles for residents use are provided in earlier sections of this review.

There is no reference or link to the Environment Statement in regard to the impact on local air quality as a direct result of the vehicle movements created from the construction phase and full occupation of both the residential employment sections of the development.

There is also no reference to the Construction Management plan in regard to vehicle movements during the different construction phases of the development.

8. Review of the Mitigation Measures

The review highlights concerns with the modelling approach and therefore the proposed mitigation will need to be revisited when these are addressed. However, an initial review of the proposed mitigation has been carried out as the analysis suggests localised widening is considered sufficient to mitigate impact of the development at:

- Dawley Road / Botwell Common Road Priority Junction, and
- Dawley Road / Kestrel Way / Betam Road / Blyth Road Roundabout.

For the Harold Avenue / North Hyde Road junction, the introduction of a right turn refuge in the centre of North Hyde is identified.

For the Station Road / North Hyde Road junction, signals changes to the signal staging is identified as the solution to improve the junction performance.

Generally the proposed mitigation is led by the modelling and proposes simple widening which whilst it may bring about theoretical capacity improvements, in practice may be unlikely to improve capacity.

Increasing flare lengths and entry widths is recognised to improve capacity at roundabouts and introducing flared approaches achieves the same at priority junctions. These are exactly the same sort of measures that have been required of the Old Vinyl Factory site to mitigate its impact.

The proposed right turn lane at North Hyde Road / Harold Avenue intersects a pedestrian crossing and is a potentially dangerous layout with stationary / queuing right turn vehicles in proximity to the crossing. The layout could be better served by signalising the entire junction with integrated pedestrian crossing facilities.

We are prepared to consider a signal controlled scheme in this location. However, the cost of provision of this should not be borne alone by the Nestle site development and should be spread proportionally across the sites identified in Policy SA5.

The TA concludes that further junction improvements 'may' be required to those listed above for the Harold Avenue/North Hyde Road and Station Road/North Hyde Road junctions to mitigate the cumulative effects of all of the sites north of Nestles Avenue. These additional mitigation measures should be identified and incorporated into the final TA for the Former Nestle Factory development proposal.

There is the potential for further improvement at the signals, but it is likely to require land outside the highway boundary to achieve this.

To reiterate, this should be carried out once the modelling deficiencies are addressed and a sensitivity test of the full development traffic are undertaken.

The with development scenario is based on the full proposed development traffic, it is only the baseline that has been adjusted to reflect the re-use of the site. We are happy to review and respond to queries on the modelling when they are provided to us.

APPENDIX D

PARKING BY STREET - DAY ONE

Type	Count
CANAL STREET	
2400x4800mm	59
3600x4800mm - Blu Badge	12
	71
MILK STREET	
2400x4800mm	42
3600x4800mm - Blu Badge	10
	52
MILK YARD	
2400x4800mm	28
	28

Type	Count
PODIUM B	
2400x4800mm	330
4800x4800mm - Wheelchair	9
	339
PODIUM C	
2400x4800mm	120
4800x4800mm - Wheelchair	9
	131
SANDOW WALK	
2400x4800mm	12
3600x4800mm - Blu Badge	4
	16

Type	Count
SANDOW YARD	
2400x4800mm	49
	49
VIVEASH YARD	
2400x4800mm	28
	28

SUMMARY BY TYPE - DAY ONE

Type	Count
2400x4800mm	668
3600x4800mm - Blu Badge	26
4800x4800mm - Wheelchair	18
	712

GRAND UNION CANAL

TOW PATH

+29.94 +29.88 +29.93

Canal Top Water Level +29.6 TBC

+31.16 +31.20 STEPS DOWN +30.07 +30.54

CANAL SQUARE +31.15 +31.30

F4 FFL +31.90

F3 FFL +31.30

F2 FFL +31.30 (EXG)

FI FFL +31.30 (EXG)

SANDOW YARD

U4 FFL +31.250

SEGRO PARKING

U3 FFL +31.00

U2 FFL +31.00

U1 FFL +30.20

N HYDE GARDENS

COFFEE PARK

TOP OF BANK

+31.90 +31.75

B8 FFL +31.90

B9 FFL +31.90

B7 FFL +31.90

B1 FFL +31.90

B6 FFL +31.90

B2 FFL +31.90

B5 FFL +31.90

B4 FFL +31.90

B3 FFL +31.90

MECHANICAL ROOM

VOID TO BELOW

BULKY WASTE

COMMUNAL AREA No.15

GATED ACCESS

WATER TANK

SWITCH ROOM

ENERGY CENTRE STATION

MILK STREET GARDEN

+32.05

VIVEASH SQUARE

ALLOTMENTS

POTENTIAL CONNECTION TO STATION CARPARK

PLANT

LETTABLE STORAGE

E1 FFL +32.20

+32.20 +32.07 +32.05

E2 FFL +32.00

E3 FFL +32.00

+31.30 +31.91 +31.9 +31.85

VIVEASH YARD

MILK STREET

PODIUM B

CANAL STREET

SANDOW YARD

+31.3 +31.30

SANDOW SQUARE

TRIM TRAIL

+31.60

C2 FFL +31.60

C3 FFL +31.60

C4 FFL +31.60

C1 FFL +31.60

C5 FFL +31.60

C6 FFL +31.60

PODIUM C

BRAM TEMPORARY CAR PARKING

REFUSE COLLECTION AREA No.27

BOLLARDS

+31.45 +31.60

D4 FFL +31.60

ENERGY CENTRE

D1 FFL +31.60

D2 FFL +31.60

D3 FFL +31.40

+31.10 +31.44 +31.40

MILK YARD

SQUIRRELS ESTATE

VIVEASH CL

+31.20 +31.35

H FFL +31.35

CAFE

I FFL +31.35 (EXG)

GYM

CHILDREN'S NURSERY / COMMUNITY FACILITY

WALLIS GARDENS

WALLIS WALK

+31.08 +30.96

+30.95

G FFL +31.30

+31.30

FOYER

UNIT OF ACCOMMODATION

EXISTING FENCE RETAINED

NESTLES AVENUE

HAROLD AVE

GORDON CRES

BARRATT LONDON

SEGRO

RESIDENTIALS

STUDIO | 1 BED FLAT | 2 BEDS FLAT | 3 BEDS FLAT | HOUSE | ACCESSIBLE

NON RESIDENTIALS

BRAM | FOUND OBJECT COLLECTION | WAREHOUSE | MAKER SPACE | NURSERY & GYMNASIUM | CANOE STORE | ENERGY SUBSTATION & GAS GOVERNOR | SCALLY USTED HAUSES AND GATES ALONG NESTLES AVENUE

LANDSCAPE

TRIM TRAIL | PLAY AREAS | EXPANSION PARKING AREAS FOR FUTURE PROVISION | EXISTING TREES RETAINED | NEW TREES

DATE	REV	DESCRIPTION	CHK
181004	10	DM24 - Masterplan Freeze Pack - Draft	AA
170210	15	D4 - Design Freeze Update	AA
170217	16	D5 - Design Freeze Update	SJ
170227	17	D6 - Design Freeze Update	SJ
170310	18	D7 - Design Freeze Update	SJ
170516	19	P1 - Planning Application	SJ
170606	20	P2 - Planning Application	SJ

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FORMER NESTLE FACTORY, HAYES

MASTERPLAN - Ground Floor Plan

MP 100

SCALE 1:500 @ A0 0 5 10 25

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