Bunn, Nick

From: Patrick Thomas [redacted]
Sent: 26 October 2023 13:01
To: Wakenshaw, Gareth
Cc: Adrian Chadha; Moises Muguerza; alanlaw; Piechocki, Amrit (E,I&S); Spencer, Will (E,I&S); Tony Burrows; Evans, Mark (E,I&S); [redacted]
Subject: RE: Land NE of M42 J10 2023 - Baseline Transyt Validation Report & Consildated Modelling Strategy Note NH review
Attachments: TRANSYT 2023 Baseline Model - Response to NH 2023-10-09.pdf; M42 Jn10 and A5 - Exist With Ref Case Pen Way & Dordon v5.t16; Level 1 Baseline.dwg

Hi Gareth,

We have undertaken a review of the suitability of the applicant's response to previous NH comments on the TRANSYT Baseline model for the site. We thank the applicant for the latest model submission, and have included the following documents as part of our review:

- M42 Jn10 and A5 – Exist With Ref Case Pen Way & Dordon v5.t16 unable to attach model file
- TRANSYT 2023 Baseline Model – Response to NH 2023-10-09.pdf
- Level 1 Baseline.dwg

Context

The applicant has provided sufficient information to close out most comments, with the model being validated to a reasonable level. The following text highlights a need for the applicant to supply further information around how signal timings and demand dependency have been derived, as our calculations based upon the signal specifications provided do not produce the same signal timings and demand dependency parameters as those modelled. Though the model validates reasonably well, our comments request the applicant's workings to arrive at these signal timings as this discrepancy in signal timings could mask other issues if used as a basis for future year modelling.

Can the applicant confirm that the signal specifications supplied by the applicant are the most recently available for the SRN junctions at A5/Birch Coppice & A5/Hall End Lane, where signal specifications are dated May 2011 and November 2016 respectively?

We note the following comments based on a review of the above documents against NH comments raised in the **TRANSYT 2023 Baseline Model – Response to NH 2023-10-09** document:

1. Traffic Flow Consistency between Nodes

Flows updated. Matter closed.

2. Traffic Flow Inputs

Flows updated. Matter closed.

3. Give Way Parameters at the A5 Dordon Roundabout

- A5 Westbound approach to the A5 / Dordon Roundabout – Values updated. Matter closed.
- A5 Eastbound approach to the A5 / Dordon Roundabout – Values updated. Matter closed.
- Northbound overbridge approach to the Pennine Way North Roundabout – Changes are accepted. Matter closed.

- Quarry Hill approach to the Pennine Way South Roundabout – Changes are accepted. Matter closed.

4. Traffic Signal Data

- **M42 Junction 10** – No changes have been made to the signal timings. Based on the model results, this is acceptable.

- **A5 / Birch Coppice** – The signal timings have been updated and provide a good level of validation against the observations.

- **A5 / Core 42** – We are not able to follow your revised summary of how often the stages are called at this junction (further detail below).

The staging used in the model is based on the drawing supplied previously, however this staging differs from that in the controller specification document have supplied by the applicant. Although the Stage 1s match, the modelled Stages 2 and 3 match Stages 4 and 5 in the controller specification. The AM Peak model's new Stage 6 closely replicates Stage 2 in the controller specification, but the model has not called the pedestrian phases F, G and I.

The controller specification has six stages and our analysis of the AM Peak hour signal data supplied suggests that the different stages are called this often:

- Stage 1 – 47 times
- Stage 2 – 33
- Stage 3 – 8
- Stage 4 – 9
- Stage 5 – 6
- Stage 6 – 1

Please note the above stage numbers are those in the controller specification and not those in the TRANSYT model. As only the movement green times have been supplied rather than stage frequency data, we have had to make assumptions over which stages are running when. We have not reviewed the PM Peak data to see how it matches the values used in the model.

Although it is desirable that this demand dependency is replicated in the TRANSYT model, it is more important that the TRANSYT model replicates the amount of green time observed over the modelled hour as well as possible. Although the model results are fairly consistent with the observed data, it is important to understand whether the modelled junction is receiving a similar amount of green time to that observed. As stated previously, incorrect signal timings may mask issues with the other input data such as the saturation flows.

Therefore, we ask the applicant to supply further information detailing how signal timings have been determined and the frequency of the demand dependent stages at the A5 / Core 42 junction. This would allow us to understand how the peak hour green times have been determined from the observed data.

We hope this provides you with sufficient information to progress, please reach out to us should you require clarification on any of the above.

Kind Regards
Patrick

Patrick Thomas, Spatial Planner
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Land North-East of M42 Junction 10
TRANSYT 2023 Baseline Validation Report
Response to NH Comments of 21st September 2023

Client: Hodgetts Estates Limited Date: 9 October 2023

1 INTRODUCTION

1.1 Tetra Tech (TT) were appointed in 2022 by Hodgetts Estates Limited to provide technical transport and highways support for their outline planning application (PAP/2021/0663) for a proposed development of up to 100,000sqm of employment floorspace and a 150-space overnight lorry park (including an associated 400sqm amenity block) on land north-east of M42 Junction 10. The application is also supported by a Transport Assessment (TA) prepared by TT, dated February 2023.

1.2 In August 2023 TT issued the TRANSYT 2023 Baseline Validation Report, copy of the TRANSYT 16 model and survey data, which set out the main parameters of the TRANSYT model and presented the results using the 2023 survey data. This document and TRANSYT model have been reviewed by NH who issued a Technical Model Review, dated 21 September 2023 which highlighted a number of points in the model which required further clarification or correction. The Technical Model Review is attached at Appendix A for ease of reference.

1.3 This Note addresses the comments and issues raised by NH in the order they were presented in the Technical Model Review.

2 NH COMMENTS

1. <u>Traffic Flow Consistency between Nodes</u>

2.1 NH state that flow discrepancies of under 10pcu could be considered insignificant if there are no obvious "sinks" in the network, particularly to the west of Junction 10. Upon review of the 2023 AM peak, the total flow departing from Junction 10 (Local Matrix 1) and heading west on the A5 (to Local Matrix 5) is 1519pcu. The total flow departing from the A5 west at Local Matrix 5 (the A5 mainline/ Pennine Way slip roads) is 1519pcu, which is the same. In the reverse direction the total flow heading east from Local Matrix 5 is 2127pcu. The total A5 west flow arriving at Local Matrix 1 is 2135pcu, thus an 8pcu difference. This slight discrepancy has been corrected so that the total flow leaving Local Matrix 5 on this movement is consistent with that arriving Local Matrix 1, refer to Figure 1v2 attached in Appendix B. The traffic flows in the model have been updated accordingly.

2.2 There was no discrepancy between Local Matrix 1 and Matrix 5 in the 2023 PM peak.

2. Traffic Flow Inputs

2.3 At Local Matrix 2 (A5/ Birch Coppice) the modelled flow has been corrected for the AM and PM peak hours as identified by NH.

2.4 At Local Matrix 4 (Pennine Way Northern Roundabout) the modelled flow has been corrected for the AM peak hours as identified by NH and a revised Figure 1v2 is attached at Appendix B. The TRANSYT model has been updated accordingly.

2.5 At Local Matrix 7 (A5/ Dordon roundabout), as discussed at para 3.5 in the Validation Report, there was a difference between the A5 eastbound exit flow at the A5/ Core 42 junction and the A5 eastbound entry flow at Dordon Roundabout of 109pcu. At that time it was considered appropriate to apply a 100pcu uplift onto the ahead movement as that would result in a higher flow at the roundabout entry. However, noting NH's comments and on the A5 between the A5/ Core 42 junction and Dordon Roundabout there are a number of minor access roads, such as New Street, it is likely that the flow discrepancy results from vehicles leaving the A5 to these accesses. As a result, the A5 eastbound approach flow to Dordon Roundabout has been returned to the survey value of 1112pcu to match the observed turning counts. Traffic flow diagram Figure 3v2 attached in Appendix B refers and the model has been updated accordingly.

3. Give Way Parameters at the A5 Dordon Roundabout

2.6 The intercept value per lane on the A5 westbound approach to Dordon Roundabout has been reviewed in the light of NH's comments. An intercept value of 1864pcu/hr was calculated for the approach overall then split equally between the nearside and offside lanes. A further intercept adjustment of plus 400pcu/hr was applied to the nearside lane to reduce its modelled queue to 6pcu, similar to the observed 5pcu queue. As noted by NH this results in an overall increase in the intercept value for the approach. As suggested by NH, a corresponding adjustment of minus 400pcu/hr has been applied to the offside lane so the intercept value of the approach overall remains as calculated (1864pcu/hr). With the adjustment to the offside lane intercept, its queue remains similar to that observed during the survey. This adjustment has been made to both AM and PM peak hour models.

2.7 The same approach had been adopted on the A5 eastbound approach to Dordon Roundabout in the PM peak. An intercept value of 2332pcu/hr was calculated for the approach overall then split equally between the nearside and offside lanes. A further adjustment of plus 300pcu/hr was applied to the nearside lane to reduce its modelled queue to 5pcu to provide a closer match to the observed queue of 2pcu. A corresponding adjustment of minus 300pcu/hr has been applied to the offside lane so the intercept value of the approach overall remains as calculated (2332pcu/hr). With the adjustment to the offside lane intercept, its queue remains similar to that observed. This adjustment has been made in the PM peak model only.

2.8 The same approach had also been adopted on the two Pennine Way Roundabouts, west of Junction 10. Although these had not been identified as an issue by NH, the intercepts have been reviewed and amended so that a consistent methodology is applied.

2.9 On the Pennine Way North Roundabout an intercept value of 2262pcu/hr was calculated for the northbound approach overall then split equally between the nearside and offside lanes. An adjustment of plus 300pcu/hr was applied to the nearside lane to reduce its modelled queue to 2pcu which was similar to the observed queue of 1pcu. An adjustment of minus 300pcu/hr has been applied to the offside lane so the intercept value of the approach overall remains as calculated. With the adjustment to the offside lane intercept, its queue remains similar to that observed. This adjustment has been made in the PM peak only.

2.10 The intercept values of the nearside lane on the Pennine Way approach to Pennine Way North Roundabout (AM and PM peak hours) and the Quarry Hill approach to Pennine Way South Roundabout (PM peak only) both were subject to negative adjustments so that the modelled queue was similar to that observed. In those cases, the corresponding positive adjustments to the offside lane have not been made as doing so resulted in modelled queues less than those observed.

4. <u>Traffic Signal Data</u>

M42 Junction 1 (Controller Streams 2 and 3)

2.11 As the signal timings vary from cycle to cycle across the hour, it is not always the case that the average green times generate the queues similar to those observed, therefore slight adjustments in the modelled green times (within reason) are considered acceptable if the resulting queues are closer in value to the observed queues. It is confirmed that where the modelled green times slightly differ from the observed average green time this is so that the modelled queue is closer to the observed queue.

A5/ Birch Coppice (Controller 7)

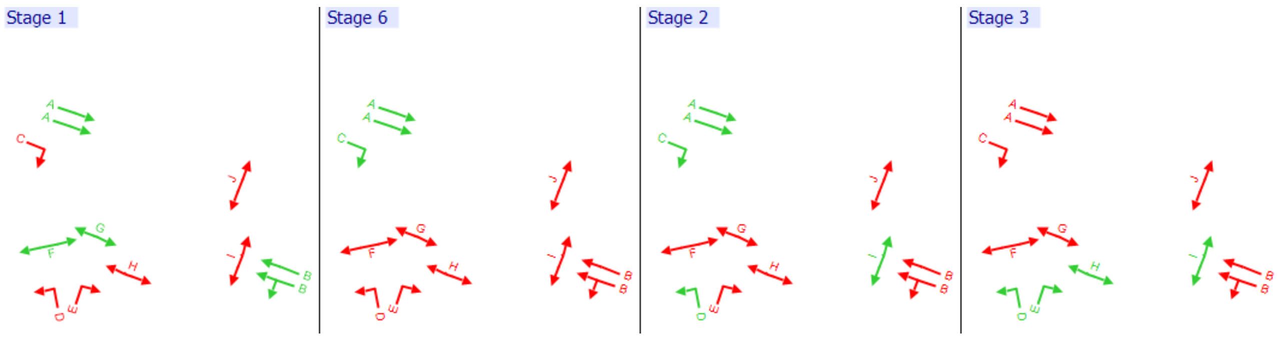
2.12 In the AM peak the signal timings have been revised so that the modelled queues more closely match the observed queues. The modelled green time for Phase A (A5 eastbound ahead) has been amended to 62 secs, that for Phase B (A5 westbound) is 35 secs, Phase C (A5 Right Turn) 15 secs, Phase D (Danny Morson Way Left Turn) 37 secs, and Phase E (Danny Morson Way Right Turn) 33 secs. Following a review of the survey videos, an intergreen period of 11 secs between Phase G and B is appropriate. With the changes made to the signal timings the observed and modelled queues are closely matched, refer to Table 4.1v2 attached in Appendix C and discussed in Chapter 3.

2.13 In the PM peak the signal timings have also been revised. The modelled green time for Phase A (A5 eastbound ahead) has been amended to 50 secs, that for Phase B (A5 westbound) is 28 secs, Phase C (A5 Right Turn) 10 secs, Phase D (Danny Morson Way Left Turn) 36 secs, and Phase E (Danny Morson Way Right Turn) 32 secs. With the changes made to the signal timings the observed and modelled queues are closely matched, refer to Table 4.1v2 attached in Appendix C and discussed in Chapter 3.

A5/ Core 42 (Controller 8)

2.14 The operation of the A5/ Core 42 is demand dependent and responds promptly to vehicles queuing at the stop lines. In the AM peak the number of vehicles turning left and right out of the site is quite low and so these stages are infrequently called. Following a review of the survey videos it is apparent that the on-street staging is slightly different to that in the signal's specification. There is a stage which only runs Phase A and C together (A5 eastbound ahead and right turn), same as Stage 2 except it does not include Phase D (left turn out of Meridian Drive) as there is no vehicle waiting at the stop line triggering the green signal to be activated. This stage has been replicated in the model and called Stage 6, see Image 2.1 below showing the observed stages.

Image 2.1: A5/ Core 42 – Observed Stages



2.15 In the AM peak the observed signal timings show that Phase A runs with long green periods (during Stages 1, 6 and 2) and only receives a red signal during Stage 3, i.e. when Phase E is called (right turn out of Meridian Drive). Phase B (A5 westbound) receives a green signal for 54 secs during a typical cycle and is called 47 times in the hour. Phase C is called 40 times (85% of cycles) in the hour and typically runs for 8 secs each time. Phase D is called 20 times (45% of cycles) in the hour and typically runs for 10 secs. Finally Phase E is only called 5 times (10% of cycles) in the hour and for 7 secs on average.

2.16 The “probability of running %” feature had been used for Stages 2 and 6, with Stage 2 (Phases A, C & D) being set to 40% and Stage 6 (Phases A & C) being set to 50%. As Phase C runs in both stages it will be called 90% of the cycles, similar to that observed on average. Phase D within Stage 2 will be called typically every 2nd cycle, also similar to that observed on average.

2.17 By applying this method to Stage 3 (Phase E), as it is called so infrequently, there are instances (when reviewing the signals log in the model) that the stage is called in back-to-back cycles and then not called for another circa 15 to 20 cycles, thus resulting in very long delays at this stop line which is not representative of the observed conditions. As TRANSYT cannot be configured to model demand dependent stages (triggered when a vehicle arrives at the stop line) it is considered more reasonable to use the “run every N cycles” option for this Phase, thus ensuring it is called 5 times in the hour (every 8th cycle) and resulting in delays which are more representative on this lightly trafficked approach.

2.18 By setting the AM peak cycle time to 90 secs it enables the resultant green periods in the model to be representative of those observed as discussed above. The modelled queues are very similar to those observed, see Table 4.1v2 in Appendix C discussed at Chapter 3 below.

The changes made to the AM peak timings at this junction are therefore considered acceptable.

2.19 In the PM peak the observed signal timings show that Phase A also runs with long green times (during Stages 1, 6 and 2) and only receives a red signal during Stage 3, i.e. when Phase E is called (right turn out of Meridian Drive). Phase E is called more often than thein AM peak hour, being called 12 times (23% of cycles) in the hour and for 8 secs on average. Phase B (A5 westbound) receives a green signal for 39 secs during a typical cycle and is called 54 times in the hour. Phase C is called 35 times (60% of cycles) in the hour and typically runs for 10 secs each time. Phase D is called 43 times (80% of cycles) in the hour and typically runs for 12 secs.

2.20 Similar to the AM Peak, the “probability of running %” feature has been used for Stages 2 and 6, with Stage 2 (Phases A, C & D) being set to 60% and Stage 6 (Phases A & C) being set to 10%. As Phase C runs in both stages it will be called 70% of the cycles, similar to that observed on average. Phase E in Stage 3 has been set up to be called every 4th cycle using the “run every N cycles” option. As Phase D runs in Stages 2 and 3, it will be activated approximately 80% of the cycles, similar to that observed on average.

2.21 By setting the PM peak cycle time to 77 secs it enables the resultant green periods in the model to be similar to those observed as discussed above. The modelled queues are very similar to those observed, see Table 4.1v2 in Appendix C discussed at Chapter 3 below. The changes made to the PM peak timings at this junction are therefore considered acceptable.

3 2023 UPDATED MODEL RESULTS

<u>2023 AM Peak Summary Results</u>

3.1 The 2023 AM peak observed and modelled queues are shown at Table 4.1v2 attached in Appendix C.

3.2 The Pennine Way roundabouts validate well, with most queuing observed on the Pennine Way North arm with an observed average queue of 5pcu and the modelled queue is also 5pcu. The modelled queues are very similar to those observed on all approaches at the two roundabouts.

3.3 The most notable queues and delays are experienced on the A5 eastbound approach to the M42 Junction 10 with the queue extending west beyond the Pennine Way overbridge for about half of the peak hour period. The majority of traffic is in the nearside lane in order to be in the correct lane at the stop line for circulating the roundabout. The modelled queues in the nearside lane are longer to those observed (60pcu vs 47pcu) whilst the offside lane modelled queue is also more than the observed queue (49pcu vs 32cpu). There are queues on the A5 eastbound merge slip road from Pennine Way due to merge interaction and queues on the nearside lane of the A5. The observed average queue on the eastbound merge lane is 4pcu and the initial modelled queue was 18pcu. This modelled queue is considered excessive and so the intercept was increased from 1800pcu/hr to 2200pcu/hr which reduced the queue down to 8pcu, a closer match to the observed. The modelled queues presented at Table 4.1v2 are considered a fair representation of the existing conditions. This adjustment has been made to both AM and PM peak hour models.

3.4 All other approaches and circulatory lanes on Junction 10 validate well have modelled queues which are a reasonable match to the observed. There are instances in the model when the queuing does extend back momentarily from one stop line to the previous, slightly affecting the performance of the upstream link, and this is considered an accurate representation of on-street conditions based upon review of the survey videos. The simulation model runs can be demonstrated on a Teams call if necessary.

3.5 The A5/ Birch Coppice junction validates well with most queueing on the westbound approaches. The modelled queues are considered a good match to the observed queues.

3.6 Likewise the A5/ Core 42 junction validates well and the modelled queues are considered a good match to the observed queues.

3.7 The A5/ Dordon roundabout works validates well with the modelled queues closely matcing the observed.

3.8 The 2023 AM peak model is considered a good base to use and amend for the future 2026/ 2033 Reference Case and 2033 Local Plan scenarios.

2023 PM Peak Summary Results

3.9 The 2023 PM peak observed and modelled queues are shown at Table 4.1v2 attached in Appendix C.

3.10 The Pennine Way roundabouts validate well with the most queuing observed on the Quarry Hill approach with a queue of 6pcu and the modelled queue is 7pcu. The modelled queues are very similar to those observed on all approaches at the two roundabouts.

3.11 The PM peak operates in a similar manner to the AM peak with the most notable queues and delays experienced on the M42 Jn 10 northbound off slip, the two circulating lanes at the south overbridge. The M42 northbound off-slip experiences an average observed queue of 15pcu in the nearside lane and the model reflects this with a queue of 14pcu. The M42 northbound nearside circulating lane has a modelled queue of 25pcu, longer than the observed average queue of 16pcu, whilst the offside circulating lane has a modelled queue of 15pcu and the observed average queue of 14pcu. Although the modelled queue is longer on the nearside lane it is considered reasonable to retain.

3.12 There was also some queueing on the A5 eastbound approach to the M42 Junction 10, although much less than in the AM peak hour. The modelled queues are similar to those observed and it is considered a fair representation of the existing conditions. For consistency the correction made to the eastbound merge from Pennine Way was also applied to the PM peak hour and resulted in a close match between the observed and modelled queue.

3.13 On all the other approaches and circulatory lanes at M42 Jn 10 the lanes validate well and the modelled queues are considered a good match with the observed. There are instances in the model when the queuing does extend back momentarily from one stop line to the previous, slightly affecting the performance of the junction and this is considered accurate upon observation of the survey videos. The simulation model runs can be demonstrated on a Teams call if necessary.

3.14 The A5/ Birch Coppice junction validates well with most queueing on the westbound approaches. The modelled queues are considered a good match to the observed queues. As expected there is slightly more queuing on the Birch Coppice exit approach as a result of the workforce finishing for the day.

3.15 Likewise the A5/ Core 42 junction validates well and the modelled queues are considered a good match to the observed queues.

3.16 The A5/ Dordon roundabout works validates well with the modelled queues closely matching the observed.

3.17 The 2023 PM peak model is considered a good base to use and amend for the future 2026/ 2031 Reference Case and 2031 Local Plan scenarios.

4 CONCLUSIONS

4.1 The comments made by NH in their response of 21st September have been reviewed and the 2023 TRANSYT Baseline model has been revised to address the comments made. The AM and PM modelled queues validate well to those observed.

4.2 The model is considered to be a suitable base to assess the impacts of the proposed development at Land North-East of M42 Jn10 for for the future 2026/ 2031 Reference Case and 2031 Local Plan scenarios.

APPENDIX A

NH RESPONSE of 21st SEPTEMBER 2023

Our ref: **93439**
Your ref: PAP/2021/0663

Nick Bunn
TetraTech

Via email: [redacted]

Patrick Thomas
Spatial Planner
National Highways
Floor 9, The Cube
199 Wharfside Street
Birmingham
B1 1RN

21 September 2023

Dear Nick,

Review of Modelling Relating to the Development at Land to Northeast of M42 Junction 10

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

This formal response letter has been prepared in response to two consultations, as follows:

- The Baseline TRANSYT Validation Report & supporting documents; and
- The Consolidated M42 Jn10 Modelling Strategy 2023-06-07 & supporting documents.

As such, comments in relation to both are provided in turn below.

<u>Baseline TRANSYT Validation Report</u>

In relation to the Baseline TRANSYT Validation Report, National Highways welcomes the opportunity to review and comment on the following models & files associated with the application:

- M42 Jn10 and A5 – Exist With Ref Case Pen Way & Dordon v4 (Model)
- TRANSYT 2023 Baseline Validation Report
- MHC-110-23 Classified Junction Count – All Sites
- MHC-110-23 Signal Cycle Count Survey – Sites 1-3
- MHC-110-23 Queue Length Survey – All Sites (TT Edit)
- A5 Watling Street, Long Street, Gypsy Lane – Dordon Roundabout Drawing

The following text sets out our response based on an audit of the listed model & associated documents by ourselves and our consultants, AECOM. Based on these reviews we provide the following advice and guidance.

1. Traffic Flow Consistency between Nodes

Paragraph 3.4 of the TRANSYT 2023 Baseline Validation Report states that "*it was agreed with AECOM (NH's review consultant) for the assessment of the 2022 TRANSYT on behalf of NH, that minor flow inconsistencies in the order of around 20 PCUs were negligible and could be ignored*". However, the applicant should note that in previous correspondence NH have stated that the flows between zones should be consistent. This guidance was received from TRL in an email received by the applicant on 1st February 2023 and included in Appendix Q of the Tetra Tech Technical Note dated 3rd February 2023. The response from TRL stated "*what matters is that the total across the boundary is consistent, that is, the total flow entering the upstream matrix location(s) matches the total flow exiting the downstream matrix location(s)*".

We note that there are a number of minor road accesses onto the A5 between the M42 Junction 10 and the A5 Dordon Roundabout that have not been included in the TRANSYT model, where it is likely that these junctions are likely to add or remove traffic from A5 mainline. Most of these accesses are located between the A5/Meridian Drive junction and the Dordon Roundabout. The applicant should ensure that turning flows at junctions are representative of the observed traffic counts (see point 2 'Traffic Flow Inputs' below). Therefore, at the junctions to the east of the M42 where there are minor accesses between modelled junctions, minor flow differences between zones can be expected. However, to the west of the M42 there are no such sinks, so flows between the zones should be more consistent.

We would consider any flow differences on a case-by-case basis, but a starting point would be that a flow difference of under 10 PCUs could be considered insignificant where they are no obvious "sinks" in the network.

2. Traffic Flow Inputs

We note the following flow inconsistencies when comparing the flow spreadsheet (MHC-110-23 Classified Junction Count – All Sites.xlsx) and the TRANSYT model supplied:

- At node 2 (A5 / Danny Morson Way), the A5 Westbound left turn into Danny Morson Way has been modelled as 147 PCUs in the AM Peak, but is 179 PCUs in the traffic survey. In the PM Peak on the same movement, 147 PCUs has been modelled, but the spreadsheet shows a flow value of 95 PCUs.

- At node 4 (B5080 Pennine Way Northern Roundabout), the AM Peak flows on the Pennine Way northern arm (Arm 54) do not correspond to the flow spreadsheet. The flow to the overbridge is 422 PCUs in the model and 393 PCUs in the spreadsheet, whilst the flow to the A5 slip road is 417 PCUs in the model and 422 PCUs in the spreadsheet.

- At node 7 (A5 Dordon Roundabout), the A5 Eastbound ahead flow in the PM Peak has been modelled as 1,212 PCUs, but the flow spreadsheet shows a flow of 1,112 PCUs. This could perhaps explain why the applicant has had to increase the intercept value on this approach (Paragraph 4.10 of the report). Please review the flow, as well as the give way parameters to ensure the model accurately represents the observed situation.

We therefore request the applicant to update the flow matrices to match the flow spreadsheet information that has been supplied.

3. Give way parameters at the A5 Dordon Roundabout

In light of the flow issue highlighted above about the PM Peak flows on the A5 Eastbound approach to the Dordon Roundabout, we recommend that the applicant review the adjustment made to the Intercept value on Arm 91, Stream 1.

Please note that the slope and Intercept give way values calculated from ARCADY (JUNCTIONS) are for the approach and where there are multi-lane approaches, these values should be split across the lanes. However, where a single lane flares into two lanes on the roundabout entry, splitting the values equally between the two lanes may not be appropriate. This may be why issues arise in validating the AM Peak queues on the A5 westbound approach. Whilst increasing the Intercept on the nearside lane may be suitable, it may be appropriate to reduce the value on the offside lane accordingly.

Therefore, we suggest the applicant review the Intercept adjustment on the A5 Westbound approach to the Dordon Roundabout. Although the AM Peak changes to the PM Peak have been applied, it may be that this adjustment is not needed in the PM Peak. We consider that it is more important for the give way values to correspond to those calculated by ARCADY, but are then only adjusted on a peak by peak basis to ensure the base models results validate against the queue length observations.

4. Traffic Signal Data

4.1. M42 Junction 10

At Controller Stream 2 (M42 West Side, A5 Eastbound Entry), the AM Peak observed Green Time for the Entry is 35 seconds (Cell AT261 of the spreadsheet), but Phase C in the TRANSYT model has only been given a green time of 29 seconds. At Controller 3 (Green Lane Entry), there are also some differences with the entry green time compared to the observations.
As the applicant has tried to match the green time on each approach with the observed values, we suggest it is confirmed that the green times for these nodes have been inputted as intended in order to match the observations.

In the PM Peak, there are minor differences with the green time on the roundabout entries on Controllers 3 (Green Lane) and 6 (Trinity Road). All the other entries see the TRANSYT green time match the observation, however these two entries are different.

We therefore suggest the applicant confirm whether there a reason why the green time values have been changed.

4.2. A5 / Birch Coppice (Controller 7)

At Controller 7 (A5 / Birch Coppice) in the AM Peak, the Birch Coppice phases (D and E) seem to be getting less green time than was observed. We think this is due to a couple of reasons: the first is that the applicant has given Stage 2 more green time than observed (17 seconds in the TRANSYT as opposed to 15 seconds in the observations) and the second is that the observations indicate that the Interstage between stages 4 and 1 is not as long as the applicant has modelled. The applicant has determined the intergreen between Phases G and B to be 11 seconds based on safety calculations, which is correct. However, the applicant's observations indicate it runs with a shorter intergreen, assumedly due to no pedestrians being present on the crossing at the end of the green time. The applicant's observations indicate that Phases A and B nearly always start at the same time. With the duration of Stage 1 fixed at the observed green time of Phase B (40 seconds), it means that the green time for Phase A (A5 Eastbound Ahead) is greater in the model than observed (69 seconds versus 61 seconds). Although the queue length validation on this arm is reasonable, over-estimating the green time may mean that other capacity parameters, such as Saturation Flows are not accurate. There is a similar issue in the PM Peak. We therefore suggest the applicant review the signal timings at this junction to ensure they are as accurate as possible.

A possible solution to improve the similarities between the observed and modelled signal timings could be to reduce the Stage 2 duration by 2 seconds to match the observations and then looking to reduce the Phase G to B intergreen to better match the observations.

4.3. A5 / Core 42 (Controller 8)

It has been difficult to see how the signal timings for this junction have been determined from the signal data provided. we recommend the applicant set out how the stage lengths have been determined and how the frequency of the demand dependent stage has been determined, both linking back to the signal data provided.

Rather than use the "Run every N cycles" feature, it may be more appropriate to use the "Probability of running (%)" feature instead if the number of occurrences the stage gets called is not a whole number.

Please also review the signal data to confirm what happens to the timings when the intermittent stage is not called. The TRANSYT model is currently set up exclude skipped time (i.e. the cycle time shortens). If the junction is under MOVA control, the cycle time will vary, so it is probably likely that the time will be skipped and the cycle time will be shortened. However, it may be worth confirming that the green time isn't reallocated to adjacent stages. Please refer to section 24.8 of the latest TRANSYT 16 user guide for more information.

The signal data supplied by the applicant suggests that in both peaks Stage 2 is not called every cycle, so should this also be an intermittent stage? Approach 3g (Phase C) in Stage 2 is not called as often as Approach 3a and 3b (Phase B) in Stage 1. Also, some green durations of Phase B are greater than the average cycle time, suggesting that it runs for more than one cycle when the other two stages aren't demanded during a specific cycle. National Highways welcomes the opportunity to review and comment on the following models & files associated with the application:

- M42 Jn10 and A5 – Exist With Ref Case Pen Way & Dordon v4 (Model)
- TRANSYT 2023 Baseline Validation Report
- MHC-110-23 Classified Junction Count – All Sites
- MHC-110-23 Signal Cycle Count Survey – Sites 1-3
- MHC-110-23 Queue Length Survey – All Sites (TT Edit)
- A5 Watling Street, Long Street, Gypsy Lane – Dordon Roundabout Drawing

Conclusions

Overall, the reporting is well presented and the identification of issues is clear and understandable. However, there are still some significant concerns regarding routeing and coding to be addressed. At present the TRANSYT model cannot be accepted National Highways until all outstanding issues have been addressed.

Consolidated M42 Jn10 Modelling Strategy

Paramics

Based on our review of the Consolidated Modelling Strategy note, we note that the modelling approach has previously been agreed with National Highways. As such, we have no further comments to make. We also note that use of the modelling has been transferred from Paramics to TRANSYT as agreed, although this has yet to be signed off. Hence, our comments in relation to the baseline TRANSYT validation report contained within this letter response.

We note the concerns raised by SCC that the base year flows in the Paramics model may influence the routeing of the committed traffic. However, Vectos stated the following points:

1. the model has limited route choice;
2. the A5 is classed as a Major road so is more attractive in Paramics making route choice switching less sensitive;

But most importantly:

3. the Demand flows are taken out of a model run with no congestion (i.e. running the model with 50% of demands and double the answers), which ensures traffic (including Committed Development demands) uses the preferred route despite any congestion that may be seen in a 100% run.

We note that SCC were satisfied with the responses provided and as such National Highways have no further comments to add on this.

Trip Generation

We have reviewed the development generated traffic flow as presented in Figure 21 & 22 of the Consolidated Modelling Strategy Note dated 7th June 2023. Based on our review, we note that the attraction flow to the site in the PM peak (as presented in Figure 22) is significantly lower than that which was agreed in the last version of the Modelling Strategy Note (dated 18 March 2022). Based on this, we advise the applicant to review and confirm the trip generation adopted in the model is presenting the agreed traffic flow generation for the site.

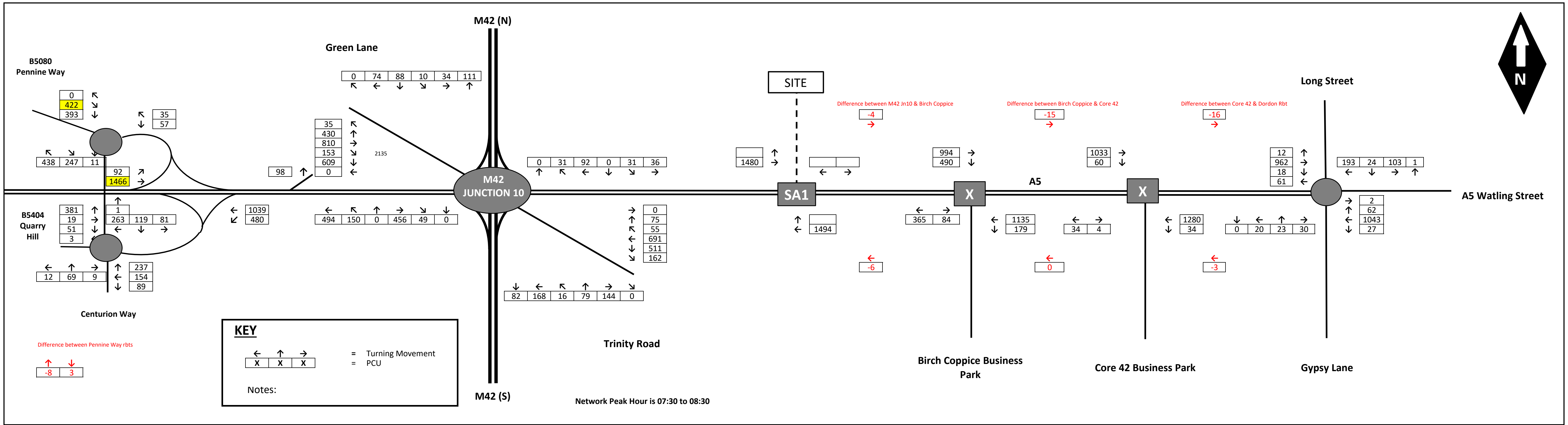
Your sincerely

[redacted]

Patrick Thomas
Spatial Planner
Operations (Midlands)
Email: [redacted]

APPENDIX B

FIGURES



TETRA TECH

FIGURE 1v2

2023 AM PEAK (0730 TO 0830) - DEMAND FLOWS

Land North East of M42 Junction 10

JOB NUMBER: 784-B033920

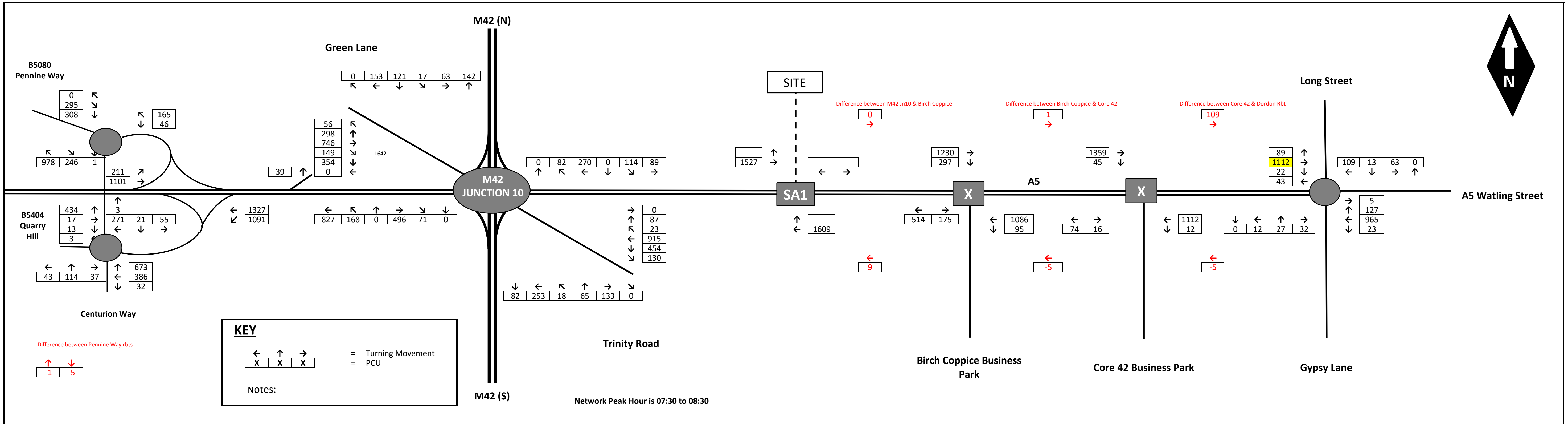


FIGURE 3v2

2023 PM PEAK (1645 TO 1745) - DEMAND FLOWS CORRECTED

Land North East of M42 Junction 10

JOB NUMBER: 784-B033920

APPENDIX C

2023 AM & PM PEAK HOUR MODELLING RESULTS

Table 4.1v2: M42/ Junction 10 + A5/ Birch Coppice + A5/ Core 42, 2023 Surveyed Year

Traffic Stream(s)	Lane	Saturation Flow pcu/hr	Model Output	AM Peak Observed Queue	AM Peak Modelled Queue	PM Peak Observed Queue	PM Peak Modelled Queue
B5080 Pennine Way North/ A5 Eastbound On/ Off Slip Road							
54/1 + 55/1	Pennine Way North Lane 1	N/A	Queue Aver Delay	5	5 33 secs	0	1 13 secs
54/2	Pennine Way North Lane 2	N/A	Queue Aver Delay	2	0 7 secs	1	1 5 secs
60/1	A5 Eastbound Off Slip Lane 1	N/A	Queue Aver Delay	0	0 4 secs	0	0 4 secs
60/2	A5 Eastbound Off Slip Lane 2	N/A	Queue Aver Delay	0	0 4 secs	0	0 4 secs
64/1 + 66/1	Northbound Overbridge Lane 1	N/A	Queue Aver Delay	0	1 5 secs	1	2 8 secs
64/2	Northbound Overbridge Lane 2	N/A	Queue Aver Delay	0	0 4 secs	0	0 7 secs
68/1 + 59/1	A5 Eastbound On-Slip Merge	N/A	Queue Aver Delay	4	9 1m 1s	0	0 1 sec
B5080 Pennine Way South/ A5 Westbound On/ Off Slip Road/ Quarry Hill							
89/1	Southbound Overbridge Lane 1	N/A	Queue Aver Delay	0	0 5 secs	0	0 4 secs
89/2	Southbound Overbridge Lane 2	N/A	Queue Aver Delay	0	0 5 secs	0	0 5 secs
76/1	A5 Westbound Off Slip Lane 1	N/A	Queue Aver Delay	0	0 6 secs	1	1 8 secs
76/2 + 75/1	A5 Westbound Off Slip Lane 2	N/A	Queue Aver Delay	1	0 6 secs	1	3 15 secs
81/1	Centurion Way Lane 1	N/A	Queue Aver Delay	0	0 4 secs	2	0 7 secs
81/2	Centurion Way Lane 2	N/A	Queue Aver Delay	0	0 4 secs	1	0 5 secs
86/1	Quarry Hill Lane 1	N/A	Queue Aver Delay	1	1 6 secs	6	6 42 secs
86/2	Quarry Hill Lane 2	N/A	Queue Aver Delay	0	0 4 secs	0	0 4 secs
M42 Junction 10							
1/1 + 2/1	M42 Northbound Offslip Lane 1	1740	Queue Aver Delay	6	3 16 secs	15	14 1m 14s
1/2	M42 Northbound Offslip Lane 2	1740	Queue Aver Delay	3	2 15 secs	5	4 32 secs
1/3	M42 Northbound Offslip Lane 3	1740	Queue Aver Delay	2	1 13 secs	2	2 21 secs
3/1	M42 Northbound Offslip Lane 4	1849	Queue Aver Delay	7	4 18 secs	9	7 28 secs
3/2	M42 Northbound Offslip Lane 5	1849	Queue Aver Delay	8	4 17 secs	9	6 26 secs
7/1	M42 Northbound Circulating Lane 1	2039	Queue Aver Delay	10	5 17 secs	16	25 22 secs
7/2	M42 Northbound Circulating Lane 2	1840	Queue Aver Delay	7	2 14 secs	14	15 17 secs
8/1 + 9/1 + 11/1	A5 Eastbound Lane 1	1828	Queue Aver Delay	47	60 4m 24s	12	10 50 secs
8/2	A5 Eastbound Lane 2	1900	Queue Aver Delay	10	4 20 secs	9	5 21 secs
8/3 + 9/2 + 11/2	A5 Eastbound Lane 3	1900	Queue Aver Delay	32	49 3 mins	9	9 32 secs
12/1	A5 Eastbound Circulating Lane 1	1846	Queue Aver Delay	5	2 14 secs	3	4 18 secs
12/2	A5 Eastbound Circulating Lane 2	1878	Queue Aver Delay	6	3 15 secs	6	8 19 secs
12/3	A5 Eastbound Circulating Lane 3	1878	Queue Aver Delay	6	3 14 secs	7	7 18 secs
12/4	A5 Eastbound Circulating Lane 4	1878	Queue Aver Delay	2	1 12 secs	2	1 15 secs
14/1	Green Lane Lane 1	1602	Queue Aver Delay	4	3 39 secs	8	4 37 secs
14/2	Green Lane Lane 2	1602	Queue Aver Delay	4	4 53 secs	8	12 1m 42s
15/1	Green Lane Circulating Lane 1	1950	Queue Aver Delay	7	8 4 secs	6	9 9 secs
15/2	Green Lane Circulating Lane 2	1745	Queue Aver Delay	8	6 5 secs	6	8 11 secs
15/3	Green Lane Circulating Lane 3	1745	Queue Aver Delay	2	1 3 secs	1	1 3 secs

18/1	M42 Southbound Offslip Lane 1	1804	Queue Aver Delay	1	1 25 secs	3	1 19 secs
18/2	M42 Southbound Offslip Lane 2	1813	Queue Aver Delay	1	2 28 secs	3	4 32 secs
18/3	M42 Southbound Offslip Lane 3	1813	Queue Aver Delay	2	1 26 secs	4	3 25 secs
17/1	M42 Southbound Circulating Lane 1	1956	Queue Aver Delay	3	5 5 secs	5	2 7 secs
17/2	M42 Southbound Circulating Lane 2	1956	Queue Aver Delay	4	10 6 secs	6	4 10 secs
17/3	M42 Southbound Circulating Lane 3	1800	Queue Aver Delay	5	11 7 secs	5	4 9 secs
17/4	M42 Southbound Circulating Lane 4	1800	Queue Aver Delay	1	1 3 secs	3	3 5 secs
23/1	A5 Westbound Lane 1	1930	Queue Aver Delay	7	9 21 secs	6	4 20 secs
23/2	A5 Westbound Lane 2	1851	Queue Aver Delay	6	5 17 secs	5	3 18 secs
23/3 + 24/1 + 25/1	A5 Westbound Lane 3	1851	Queue Aver Delay	10	10 31 secs	13	10 34 secs
23/4 + 24/1	A5 Westbound Lane 4	1851	Queue Aver Delay	6	6 18 secs	6	4 21 secs
22/1	A5 Westbound Circulating Lane 1	1797	Queue Aver Delay	6	3 14 secs	6	11 19 secs
22/2	A5 Westbound Circulating Lane 2	1797	Queue Aver Delay	8	1 11 secs	5	4 14 secs
22/3	A5 Westbound Circulating Lane 3	1902	Queue Aver Delay	2	2 11 secs	5	2 13 secs
22/4	A5 Westbound Circulating Lane 4	1902	Queue Aver Delay	1	2 11 secs	5	3 13 secs
28/1 + 29/1	Trinity Road Lane 1	1669	Queue Aver Delay	8	4 31 secs	9	7 56 secs
28/2	Trinity Road Lane 2	1669	Queue Aver Delay	7	5 37 secs	7	4 32 secs
27/1	Trinity Road Circulating Lane 1	1846	Queue Aver Delay	3	3 9 secs	3	5 8 secs
27/2	Trinity Road Circulating Lane 2	1846	Queue Aver Delay	8	2 9 secs	6	5 10 secs
27/3	Trinity Road Circulating Lane 3	1878	Queue Aver Delay	3	8 10 secs	8	10 7 secs
27/4	Trinity Road Circulating Lane 4	1878	Queue Aver Delay	2	3 8 secs	4	7 8 secs
A5/ Birch Coppice							
31/1	A5 Eastbound Ahead Lane 1	1814	Queue Aver Delay	5	4 16 secs	9	13 26 secs
31/2	A5 Eastbound Ahead Lane 2	2082	Queue Aver Delay	4	5 13 secs	5	8 14 secs
32/1	A5 Eastbound Right Turn Lane 3	1960	Queue Aver Delay	5	7 57 secs	4	5 53 secs
32/2	A5 Eastbound Right Turn Lane 4	1667	Queue Aver Delay	8	10 1m 31s	4	4 50 secs
37/1	A5 Westbound Ahead Lane 1	1751	Queue Aver Delay	2	3 24 secs	2	2 22 secs
37/2 + 38/1	A5 Westbound Ahead Lane 2	2015	Queue Aver Delay	16	15 40 secs	13	9 43 secs
37/3 + 38/2	A5 Westbound Ahead Lane 3	2015	Queue Aver Delay	14	16 45 secs	13	13 1m 11s
42/1	Birch Coppice Left Turn Lane 1	1695	Queue Aver Delay	5	5 27 secs	6	5 21 secs
42/2	Birch Coppice Left Turn Lane 2	1983	Queue Aver Delay	6	3 25 secs	9	5 21 secs
43/1	Birch Coppice Right Turn Lane 3	1690	Queue Aver Delay	3	2 27 secs	5	3 23 secs
A5/ Core 42							
46/1	A5 Eastbound Ahead Lane 1	1833	Queue Aver Delay	2	3 3 secs	6	2 7 secs
46/2	A5 Eastbound Ahead Lane 2	2082	Queue Aver Delay	1	2 1 sec	3	1 2 secs
47/1	A5 Eastbound Right Turn Lane 3	1667	Queue Aver Delay	2	1 32 secs	1	1 34 secs
49/1	A5 Westbound Ahead & Left Turn Lane 1	1957	Queue Aver Delay	6	6 5 secs	8	5 9 secs
49/2	A5 Westbound Ahead Lane 2	1909	Queue Aver Delay	4	3 4 secs	7	5 9 secs
51/1	Core 42 Left Turn Lane 1	1695	Queue Aver Delay	1	1 1 min	2	1 24 secs

52/1	Core 42 Right Turn Lane 2	1690	Queue Aver Delay	0	1 3m 41s	1	1 1m 34s
A5/ Dordon Roundabout							
91/1	A5 Eastbound Lane 1	N/A	Queue Aver Delay	2	3 16 secs	2	5 18 secs
91/2	A5 Eastbound Lane 2	N/A	Queue Aver Delay	0	0 5 secs	0	0 7 secs
92/1 + 92/2 + 93/1	Long Street	N/A	Queue Aver Delay	3	2 32 secs	2	1 34 secs
97/1 + 98/1	A5 Westbound Lane 1	N/A	Queue Aver Delay	3	6 18 secs	1	3 11 secs
97/2	A5 Westbound Lane 2	N/A	Queue Aver Delay	0	0 12 secs	0	1 12 secs
100/1 + 100/2 + 101/1	Gypsey Lane	N/A	Queue Aver Delay	1	0 22 secs	1	0 19 secs
			Network PI	5723.26		5161.53	


Level 1 baseline.dwg