

## TECHNICAL NOTE

**Job Name:** Land West of Park Farm, Thornbury  
**Job No:** 39209  
**Note No:** 39209/007  
**Date:** 30 April 2020  
**Prepared By:** K. Stock  
**Subject:** **PT18/6450/O Land West of Park Farm, Thornbury – Response to SGC Comments dated 2<sup>nd</sup> April 2020**

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### 1. Introduction

- 1.1. This Technical Note (TN) has been prepared by Stantec on behalf of Barwood Development Securities Ltd & North West Thornbury Landowner Consortium (the Developer). It provides an update in response to comments received from South Gloucestershire Council (SGC) on planning application PT18/6450/O, Land West of Park Farm, Thornbury.
- 1.2. An updated Transport Assessment (TA) (ref 39209-5560-001D, dated December 2019) and Framework Travel Plan (ref 39209-5501-002E, dated December 2019) was submitted to SGC in January 2020 considering the updated development proposals for 595 dwellings and land for a 1 FE primary school, as well as incorporate the further technical work and matters discussed and agreed with the Authorities since submission of the original TA and FTP.
- 1.3. Further comments were received from SGC via email on 2<sup>nd</sup> April on the following matters:
  - Walking and Cycling Distances.
  - Existing Public Transport.
  - Committed Infrastructure.
  - Personal Injury Collision Data.
  - Framework Travel Plan.
  - Sustainable Travel Link.
  - Public Transport Strategy.
  - Vehicle Trip Rates.
  - Local Highway Network Mitigation; and
  - Design and Access Statement.
- 1.4. This TN responds to these comments and concludes that the proposed development can be mitigated and accommodated on the local highway network and therefore that there are no valid highway or transportation reasons that should prevent the development proposals from being awarded planning consent.

### 2. Local Facilities and Amenities: Walking and Cycling

- 2.1. Section 3.5 of the submitted TA sets out walking and cycling distances to local facilities and amenities.

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- 2.2. SGC have identified a number of discrepancies between distances quoted in the text and those in Table 3.1. However, Table 1 and Figures 1 to 3 of Technical Note 39209/5540/TN001 Rev A “Walking Distances to Key Facilities and Quality of Routes”, included as Appendix C of the TA, sets out the routes considered and associated distances. This TN was agreed with SGC prior to submission of the TA and Table 3.1 of the TA is consistent with this.
- 2.3. As set out in the TA, the development proposals includes a retail and community hub which provides the opportunity to deliver a range of facilities and services that may be required on a daily basis, therefore reducing walking and cycling distances not only for new residents but also residents of existing neighbouring areas.
- 2.4. Based on the submitted information, it is not considered necessary to update the TA, with distances already agreed with SGC.

### 3. Site Accessibility by Non-Car Modes

#### Public Transport

- 3.1. SGC have made a number of comments in relation to the existing public transport provision in the area as follows:
- The distance to the 77 service bus stops on Morton Street is between 1,300 and 2,100 from the nearest and furthest parts of the site.
  - The Health Centre bus stop is between 1,500 and 2,200m distance from the site.
  - Service 77 does not enter or stop at Manor Walk.
- 3.2. SGC conclude their comments on public transport by suggesting that, contrary to paragraph 3.6.16 of the TA, the current access to public transport does not accord with SGC Policy PSP11. Whilst paragraph 3.6.16 confirms the bus frequencies in the vicinity of the site are appropriate, it acknowledges that the nearest bus stops are outside of the distances prescribed in PSP11.
- 3.3. The above comments are acknowledged; however, they do not affect the conclusions of the TA associated with the sustainable location of the proposed development, given the committed bus services and stops within the adjacent Park Farm site and the proposed public transport strategy which will extend buses to serve the development site. It is therefore not considered necessary to update the TA.

### 4. Committed Infrastructure

- 4.1. Section 3.7 of the TA sets out the committed infrastructure associated with development in the area.
- 4.2. SGC have provided some clarifications on the development sites delivering each of the infrastructure schemes listed. These are noted; however, they do not affect the assessment undertaken or conclusions of the TA. It is therefore not considered necessary to update the TA.

### 5. Personal Injury Collision Data

- 5.1. SGC have requested that an update of the Personal Injury Collision records is provided to cover the most recently available data, as the TA includes data up to December 2017.
- 5.2. A review of the CrashMap database, which includes data up to July 2019, confirms that only two additional PICs were recorded in the study area, both of which were slight collisions; the first at the Quaker Lane / Gloucester Road mini roundabout junction and the second on the B4509 at the junction with the M5.

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- 5.3. This demonstrates that there remains no pattern of highway safety issues at the junctions assessed within the study area.

### 6. Travel Plan

- 6.1. Comments have been received from SGC on the updated Travel Plan. This document had been updated previously to accommodate comments made by SGC on 2<sup>nd</sup> August 2019.
- 6.2. These further comments are considered to be generally minor. However, SGC have requested that electric vehicle charging points and a car club are considered in the context of the climate emergency declared by the Council in 2019. As legislation and national and local policies relating to EV charging technologies are changing rapidly, this is a matter that should be agreed at the Reserved Matters stage, taking into consideration the relevant Policies and Guidance at that time, and the need to consider this further can be secured by an appropriately worded planning condition. The request for a car club is noted, and this will be discussed further with the planning officer.

### 7. Sustainable Travel Link

- 7.1. The proposed layout and concept design of the Sustainable Travel Link (STL) has been discussed in detail with SGC throughout the course of the planning application. Drawing 39209/5501/SK25-A shows the agreed layout.
- 7.2. In their latest comments, SGC suggest that, in addition to buses, the STL may need to provide for taxis and motorcycles which could be controlled through the making of a Traffic Regulation Order (TRO) and controlled through a number plate recognition camera. This approach is considered acceptable in principle, the details of which can be confirmed through detailed design at the reserved matters stage.

### 8. Public Transport Strategy

#### Bus Stops Within Park Farm and The Development Site

- 8.1. SGC have suggested that the committed bus stops with shelters and RTI within the Park Farm development will not be within 400m of all the proposed dwellings at the development site and that should the Alexandra Way Bus Link option proceed, it will require the relocation of two committed bus stops on the Park Farm bus route.
- 8.2. Previous comments received from SGC dated 24/06/19 confirm that they “*accept that diverted bus route and stop locations demonstrates that stops can be provided within 400m of all dwellings on the proposed development and the existing Park Farm development with the exception of phase 4 for which a bus stop is planned on the bus link to Alexandra Way. The cost of removing / relocating the existing approved stops on the Park Farm spine road would need to be borne by the development.*”
- 8.3. Paragraph 5.5.16 of the TA confirms that new bus stops will be provided so that each part of the development is within 400m of the service and Figure 5.1 identifies potential locations for new bus stops within the site, including a relocated bus stop within the Park Farm site just south of the STL. The locations of the bus stops ensure that all of the existing and proposed development would be within 400m of the proposed route. This is in line with the best practice desirable distance to a bus stop. This approach was agreed on 28<sup>th</sup> August, as per the correspondence included at **Appendix A**.

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### Town Centre Bus Stops

- 8.4. Paragraph 5.5.17 and 5.5.18 of the TA confirm that the Developer is willing to contribute towards better waiting facilities for bus passengers in the centre of Town in line with the locally identified need, as set out within SGC's PSP Plan Appendix 3 'Thornbury'. SGC have confirmed that the cost of providing these improvements is £20,500. This is acceptable in principle and can be secured through the S106 agreement.

### 9. Site Accesses

- 9.1. SGC's comments suggest that the provision of the site accesses and reduction in the speed limit on Oldbury Lane from 60mph to 40mph will need to be accompanied by a street lighting scheme from the western access to the existing street lighting at the junction with Butt Lane.
- 9.2. This is acceptable in principle and can be secured by condition to be addressed at the detailed design / technical approval stage.

### 10. Vehicle Trip Rates

- 10.1. The updated planning submission includes land for a 1FE primary school and reduction of 35 dwellings.
- 10.2. Both the original TA (dated November 2018) and the updated TA set out an approach whereby there is a reduction in trips as a result of the proposed primary school due to the forecast high levels of internalisation. There are at least six existing primary schools within Thornbury and the majority of residential areas are within a 1km walking distance<sup>1</sup> of at least one of the existing or proposed schools, as shown on **Figure 10.1**. Whilst parents can choose which schools to send their children to, it is clear that the schools are located such that they serve a 'local' catchment and pupils can access them by non-car modes.
- 10.3. The proposed school could accommodate 210 pupils and it is estimated that 214 primary school age children could live within the development site itself. It is therefore considered that a high level of internalisation is probable, and / or pupils attending the school from the residential areas immediately adjacent to the development site.
- 10.4. The location of the proposed primary school, opposite the proposed STL, has also been chosen to maximise the accessibility by walking and cycling for residents within the site and immediate adjacent residential areas, to provide a real advantage over the private car for the significant majority of pupils and staff attending. In addition, the proposed bus stop immediately adjacent to the school, offers the opportunity of staff living further afield to travel to the school by means other than the private car from across Thornbury, along the A38 and through the North Fringe to central Bristol.
- 10.5. Whilst SGC did not formally comment on the approach set out in the previous TA, they have advised in their latest comments that "*the proposed vehicle trip rate reduction associated with the new school needs some further consideration*".

### Forecast Trips

- 10.6. It has been agreed with SGC that, in the absence of surveys from primary schools in Thornbury, the TRICS database will be used. The development has been assessed using the 'Primary Education' TRICS survey category with the following criteria:
- Vehicular trip rates.

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<sup>1</sup> Note 1km distance provided as an indicator only and is not considered to be a maximum walk distance to schools

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- Sites with 100-450 pupils.
- Sites in central London and Republic of Ireland excluded.
- Sites in town centre and edge of town centre locations excluded.
- Sites with a population of up to 20,000 within 1 mile and up to 250,000 within 5 miles (therefore excluding the largest towns / cities).

10.7. For the purpose of the assessment, those sites categorised as being in a village location have been removed as this is not considered to be comparable to Thornbury.

10.8. The resultant trip rates and generated trips are presented below in **Table 10.1** and full TRICS outputs can be found in **Appendix B**.

Table 10.1: Vehicular Trip Rates & Trips

	Trip Rates (per pupil)			Trips (210 pupils)		
	IN	OUT	2-WAY	IN	OUT	2-WAY
<b>AM (0800 – 0900)</b>	0.183	0.128	0.311	38	27	65
<b>PM (1700 – 1800)</b>	0.010	0.029	0.039	2	6	8
<b>Daily</b>	0.529	0.545	1.074	111	114	226

10.9. Whilst these trip rates are considered overly robust to the proposed situation (as explained above) **Table 10.1** shows that the school could generate up to 65 and 8 two-way vehicle trips during each of the weekday peak hours. This robust assessment equates to around only one additional vehicle per minute in the AM peak hour.

10.10. In addition to over-estimating the number of vehicle trips associated with the proposed school, it should also be noted that not all trips associated with a new primary school will be new trips on the local road network. Should the new school attract pupils from other residential areas, these trips would either already be on the network (attending other schools) or their impact on the local road network have been assessed and mitigated through their own permissions. This is considered further below.

### Impact at Butt Lane / Gloucester Road / Morton Way Junction

10.11. SGC has suggested that it could be assumed that 20% of vehicle trips are local to the development site and therefore not travelling through the Butt Lane junction as part of a school trip. Whilst Stantec consider that this is an overly robust assumption (see Para's 10.2 and 10.4 of this Note), this has been applied as a robust assessment of vehicular trips that could be associated with the school. The resultant vehicle trips are set out in **Table 10.2**.

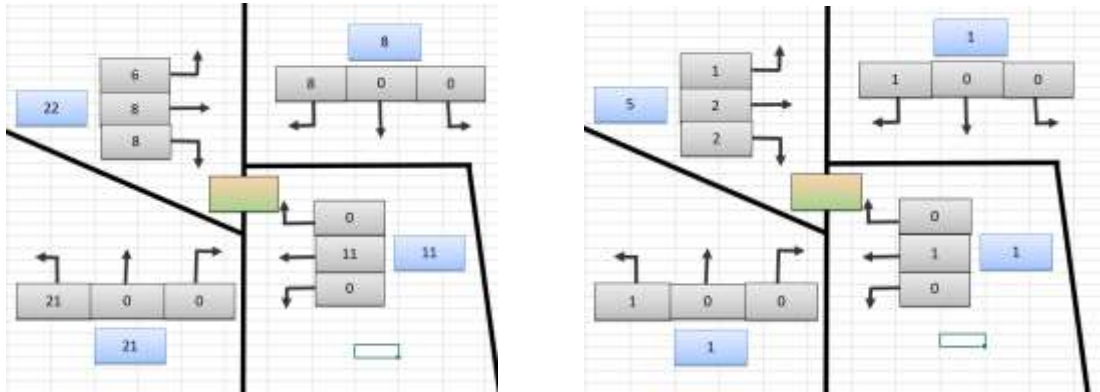
Table 10.2: Vehicular Trip Rates & Trips at Butt Lane Junction

	Trips (210 pupils)		
	IN	OUT	2-WAY
<b>AM (0800 – 0900)</b>	30	22	52
<b>PM (1700 – 1800)</b>	2	5	7
<b>Daily</b>	89	91	181

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- 10.12. In order to consider the distribution of these trips at the Butt Lane junction, the assignment of all development trips included in the TA has been reviewed. This is considered appropriate on the basis that staff trips associated with the school will likely be generated from both within and external to Thornbury. The resultant school trips at the Butt Lane junction are shown below and, as requested, revised 2028 AM and PM “Test Case” flow diagrams are included at [Appendix C](#).

Plate 10.1: Forecast School Trips at Butt Lane - SGC 80% Assumption (AM Peak = left, PM Peak = right)



- 10.13. [Table 10.2](#) and [Plate 10.1](#) demonstrate that the school could be associated with up to 52 two-way vehicle movements in the AM peak hour through the Butt Lane junction, equating to less than one additional vehicle per minute, on average.
- 10.14. However, as stated above, should the proposed school attract pupils from outside the immediate catchment, it must be the case that most of those trips will already be on the local highway network associated with other residential developments within Thornbury and will have been assessed through other planning applications. On this basis, there will already be a number of these trips passing through the Butt Lane junction associated with school trips elsewhere (either through observed surveys, or through our assessment as committed development trips). [Appendix D](#) demonstrates that vehicles routing from existing residential areas to the east of the Butt Lane junction would already be passing through the Butt Lane junction to reach other schools.
- 10.15. Therefore, it is considered that the actual number of new vehicle trips, not already accounted for within the modelling of the junction, will be significantly less, and negligible to the operation of the junction.

### Proposed Mitigation Scheme

- 10.16. Since submission of the TA, discussions have been ongoing with SGC to agree the mitigation scheme at the Butt Lane / Gloucester Road / Moreton Way Junction. The latest mitigation scheme is shown on drawing [39209/5501/SK08-G](#). This junction design has been agreed in principle with SGC, subject to a Road Safety Audit.
- 10.17. SGC have previously confirmed that the prioritisation of pedestrians and cyclists is of higher priority at the junction than that of vehicle delay, and a balanced view on a reviewed signal solution would be taken. At the request of SGC, the latest scheme includes advance cycle stop lines, (straight-across) signalised pedestrian crossings on all arms of the junction and a footway connection on the northern side of Butt Lane.

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- 10.18. A copy of the latest LinSig model outputs and latest correspondence with SGC are included at **Appendix E**. This shows that, in the 2028 Test Case “ped stage every other cycle” scenario, the proposed Butt Lane / Morton Way / Gloucester Road signalised junction is forecast to operate within capacity in the PM peak and slightly over capacity in the AM peak. The maximum Degree of Saturation in the AM peak is on Morton Way at 102.9% and the maximum queue is on Butt Lane at 50 PCUs. As discussed previously, it is considered that in reality the crossings are likely to be called less frequently than every other cycle, which would increase the available capacity at the junction across the peak hours.
- 10.19. The forecast vehicle trips that could be associated with the proposed school, which is likely to be significantly less than one additional vehicle per minute on average in the AM peak hour, is considered immaterial and will not affect the conclusions of the modelling results already presented. It is therefore not considered necessary to remodel the junction at this stage.

### Summary

- 10.20. Following discussions with SGC, the mitigation proposals for the Butt Lane / Morton Way / Gloucester Road junction have been developed to achieve a more balanced solution for the provision of active modes and seek to minimise delay for vehicular traffic. The addition of significantly less than one additional vehicle per minute at the junction in the AM peak as a result of the proposed school is not considered to be significant.
- 10.21. Based on the above, the proposed signalised mitigation scheme is considered acceptable to accommodate baseline and development traffic in this location, whilst enhancing the facilities for pedestrians and cyclists.

## 11. M5 J14 / A38 VISSIM Modelling

- 11.1. Following submission of the planning application, Highways England (HE) confirmed that mitigation is required to address the increase in queuing on the M5 northbound off-slip. Discussions have been ongoing with HE to confirm the mitigation required.
- 11.2. HE has confirmed that, in terms of design, the mitigation scheme proposed as part of the Development is considered to be suitable in principle, subject to a Stage 1 Road Safety Audit (RSA). However, HE identified additional queuing within the model on the A38, which is within the control of SGC, as a result of this proposed mitigation.
- 11.3. Technical Note 006 v.1, included at **Appendix F**, has therefore been prepared and submitted to HE and SGC for agreement. This outlines the proposed mitigation that has been put forward and tested within the model for the M5 and A38.
- 11.4. In terms of the A38, the updated modelling suggests that, without mitigation, queuing on the A38 northbound will increase as a result of the proposed development. Discussions have been undertaken with SGC, who have advised of an aspiration to resolve this existing concern by way of extending the two-lane approach to the junction. It is therefore proposed to lengthen the two-lane approach to the junction with the B4509 to mitigate the impacts of the development and resolve the existing concern. The two-lanes will extend from the existing stop line to the Sundayshill Lane junction. The existing bus layby will be converted to an on-carriageway bus cage. Existing right turn lanes will be unchanged as a result of the proposals. The TN demonstrates that the net impact of the development following mitigation on the A38 NB is immaterial and therefore that there is no severe impact on the operation of the local highway network in this location.
- 11.5. HE has confirmed that the submitted modelling and mitigation proposals are acceptable. Agreement with SGC is sought on the A38 mitigation proposals.

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### 12. Local Highway Network Mitigation

- 12.1. The TA confirms that the Developer is willing in principle to contribute towards the implementation of mitigation schemes at the A38 / Church Road and A38 / B4061 Thornbury Road junctions.
- 12.2. On the basis of a reduction in dwellings from 630 to 595, SGC have confirmed that a reduced contribution of £171,208 would be appropriate. We understand that this has been based on a pro-rata calculation derived from the Land South of Gloucester Road contribution agreed in the S106 for that development, which was subsequently dismissed by the Appeal Inspector for other reasons.
- 12.3. We can confirm that this is acceptable in principle and can be secured through the S106 agreement.

### 13. DAS / Street Hierarchy Plan

- 13.1. SGC have made some comments / suggestions about the plans included within the Design and Access Statement. These comments are noted, however, as the application is in outline with all matters reserved except access, any matters concerning the internal layout will be addressed at the reserved matters stage.

### 14. Summary and Conclusions

- 14.1. This TN has provided an update in response to further comments received from SGC on the submitted TA for planning application PT18/6450/O, Land West of Park Farm Thornbury.
- 14.2. It has been demonstrated that the existing walking and cycling distances, existing public transport network and committed infrastructure has been adequately assessed within the submitted TA and that further updates are not necessary on the basis that the conclusions of the TA would be unaffected.
- 14.3. A review of Personal Injury Collision data has been provided and this demonstrates that there remains no pattern of highway safety issues within the study area.
- 14.4. It is confirmed that requests made by SGC in respect of the Travel Plan are acceptable in principle and this can be secured by condition and S106 agreement in due course.
- 14.5. The Developer agrees in principle to the approach to design and management of the STL and this can be confirmed through detailed design of the STL at the reserved matters stage.
- 14.6. It has been demonstrated that the public transport strategy is appropriate and that SGC have previously accepted the location of committed and new bus stops within the development site and adjacent Park Farm. The suggested financial contribution towards bus stop improvements in the town centre is acceptable in principle and can be secured through the S106 agreement.
- 14.7. SGC's request for a lighting scheme at the site access junctions is acknowledged and this can be secured by condition and addressed at the detailed design / technical approval stage.
- 14.8. Vehicular trips that could be associated with the proposed primary school has been assessed using the methodology requested by SGC using the TRICS database, in the absence of local data. Even allowing for an extremely robust analysis, this shows that there could be up to 52 two-way trips associated with the school in the AM peak hour; in reality being significantly less than one additional vehicle every minute on average.



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- 14.9. The proposed mitigation scheme design and junction modelling for the Butt Lane / Gloucester Road / Morton Way junction has been demonstrated to be appropriate. Noting SGC's requests for the junction to prioritise pedestrians and cyclists, the additional school trips will not materially affect the operation of the junction in the 2028 test case.
- 14.10. We await formal comments from SGC on the submitted A38 VISSIM modelling. However, HE has confirmed that the modelling and proposed mitigation scheme is acceptable in principle.
- 14.11. It is confirmed that the Developer is happy to offer a financial contribution towards mitigation schemes at the A38 / Church Road and A38 / B4061 Thornbury Road junctions and this can be secured through the S106 agreement in due course.
- 14.12. Comments made by SGC on the DAS and internal layout are noted, however as the application is made in outline this will be addressed at the reserved matters stage.
- 14.13. It is finally concluded that the proposed development is sustainable and off-site impacts can be mitigated on the local and strategic highway networks. The development would therefore not result in an unacceptable impact on highway safety or a residual cumulative severe impact on the surrounding transport networks, as set out in Para 109 of NPPF.
- 14.14. It is therefore considered that there are no valid highway or transportation reasons that should prevent the development proposals from being awarded planning consent, subject to securing the proposed package of transport measures through relevant conditions or legal agreement.

### DOCUMENT ISSUE RECORD

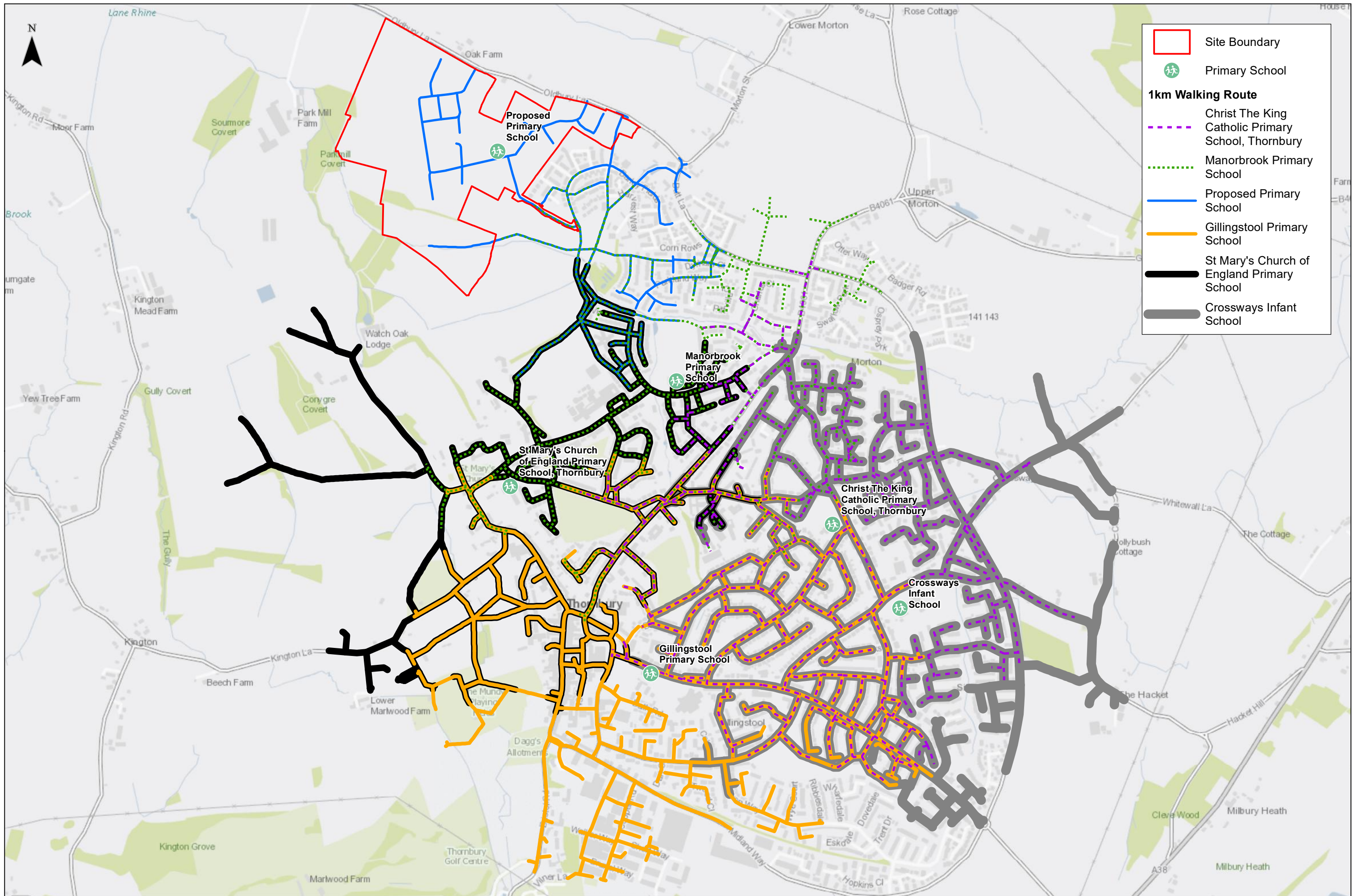
Technical Note No	Rev	Date	Prepared	Checked	Reviewed (Discipline Lead)	Approved (Project Director)
39209/5577/TN007	-	30.04.2020	KS	JHa	NT	NT

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## TECHNICAL NOTE

### Figures



Client  
Barwood Development  
Securities Ltd & North West  
Thornbury Landowner  
Consortium

**West of Park Farm, Thornbury**  
1km Walking Route from Local Primary Schools

0 0.5 1 km

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1:11,000 @ A3	Date: 30/04/2020
Drawn: IB	Checked: KS
Figure 10.1	Rev A

## TECHNICAL NOTE

### Appendix A

**From:** Myles Kidd <Myles.Kidd@southglos.gov.uk>  
**Sent:** 28 August 2019 17:14  
**To:** Stock, Katie  
**Cc:** Christopher Rose; Holloway, Rob; Thorne, Neil; Catherine Loveday  
**Subject:** RE: PT18/6540/O Land West of Park Farm, Thornbury - Clarification following meeting

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Hi Katie

Chris and my agreements and requests on this email are as below.

Thanks

Myles

Myles Kidd B.Eng. (Hons) MCIHT, CMILT, MTPS

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**From:** Stock, Katie [<mailto:Katie.Stock@stantec.com>]  
**Sent:** 07 August 2019 10:35  
**To:** Christopher Rose <[Christopher.Rose@southglos.gov.uk](mailto:Christopher.Rose@southglos.gov.uk)>; Myles Kidd <[Myles.Kidd@southglos.gov.uk](mailto:Myles.Kidd@southglos.gov.uk)>  
**Cc:** Holloway, Rob <[rob.holloway@stantec.com](mailto:rob.holloway@stantec.com)>; Thorne, Neil <[neil.thorne@stantec.com](mailto:neil.thorne@stantec.com)>; Catherine Loveday <[Catherine.Loveday@southglos.gov.uk](mailto:Catherine.Loveday@southglos.gov.uk)>  
**Subject:** RE: PT18/6540/O Land West of Park Farm, Thornbury - Clarification following meeting

Chris

Thanks for your email and comments. Please see attached table within which we have added our comments for ease of reference. In summary:

- Traffic flow diagrams and a schedule of diagrams was provided on 1<sup>st</sup> August. Traffic flow diagrams for the 'residential to other' trips (internal and external) are attached. **Currently being manually reviewed.**
- Figure 5.1 of the TA shows a relocated bus stop within the Park Farm site just south of the Sustainable Transport Link. All dwellings are therefore within 400m of a bus stop and a further stop is not required along the STL. **Noted and agreed. Thank you.**
- We have compared our traffic surveys results to those recorded for Cleve Park and Crossways Lane and conclude that there are comparable for the Tytherington Road crossroads. This suggests that the Land South of Gloucester Road surveys are in fact the anomaly and the junction modelling within the TAA is therefore acceptable. **The LWoPF PBA observed 2017 traffic flows are significantly lower than those observed in 2015 and 2016. We agree that the traffic flows provided show observed flows in 2017 that are lower than previous years, however in order to provide robust information for Members we require a sensitivity using the higher flows from previous years as there is no logical explanation for reduced traffic flows given the on-going development in Thornbury. This request has been set out previously.**

**TECHNICAL NOTE**  
**Appendix B**

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 04 - EDUCATION  
 Category : A - PRIMARY  
 VEHICLES

Selected regions and areas:

03	SOUTH WEST	
	CW CORNWALL	1 days
04	EAST ANGLIA	
	SF SUFFOLK	1 days
05	EAST MIDLANDS	
	DS DERBYSHIRE	1 days
	LN LINCOLNSHIRE	1 days
07	YORKSHIRE & NORTH LINCOLNSHIRE	
	NE NORTH EAST LINCOLNSHIRE	1 days
08	NORTH WEST	
	CH CHESHIRE	1 days
10	WALES	
	MT MERTHYR TYDFIL	1 days
11	SCOTLAND	
	DU DUNDEE CITY	1 days
	SR STIRLING	1 days

*This section displays the number of survey days per TRICS® sub-region in the selected set*

Primary Filtering selection:

*This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.*

Parameter: Number of pupils  
 Actual Range: 147 to 440 (units: )  
 Range Selected by User: 100 to 450 (units: )

Parking Spaces Range: All Surveys Included

Public Transport Provision:

Selection by: Include all surveys

Date Range: 01/01/12 to 25/11/19

*This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.*

Selected survey days:

Monday	3 days
Tuesday	1 days
Wednesday	2 days
Thursday	2 days
Friday	1 days

*This data displays the number of selected surveys by day of the week.*

Selected survey types:

Manual count	9 days
Directional ATC Count	0 days

*This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaken using machines.*

Selected Locations:

Suburban Area (PPS6 Out of Centre)	3
Edge of Town	4
Neighbourhood Centre (PPS6 Local Centre)	2

*This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.*

Selected Location Sub Categories:

Residential Zone	9
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*This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.*

Secondary Filtering selection:

Use Class:

D1 9 days

*This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.*

Population within 1 mile:

1,001 to 5,000	1 days
5,001 to 10,000	1 days
10,001 to 15,000	3 days
15,001 to 20,000	3 days
20,001 to 25,000	1 days

*This data displays the number of selected surveys within stated 1-mile radii of population.*

Population within 5 miles:

5,001 to 25,000	1 days
50,001 to 75,000	4 days
75,001 to 100,000	1 days
125,001 to 250,000	3 days

*This data displays the number of selected surveys within stated 5-mile radii of population.*

Car ownership within 5 miles:

0.6 to 1.0	2 days
1.1 to 1.5	7 days

*This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.*

Travel Plan:

No 9 days

*This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.*

PTAL Rating:

No PTAL Present 9 days

*This data displays the number of selected surveys with PTAL Ratings.*



LIST OF SITES relevant to selection parameters

1	CH-04-A-01 WESTON GROVE CHESTER UPTON Edge of Town Residential Zone Total Number of pupils: <i>Survey date: MONDAY</i>	PRIMARY SCHOOL       219 17/11/14	CHESHIRE         <i>Survey Type: MANUAL</i>
2	CW-04-A-03 TREVBYN RISE PENRYN  Suburban Area (PPS6 Out of Centre) Residential Zone Total Number of pupils: <i>Survey date: THURSDAY</i>	PRIMARY ACADEMY       440 28/03/19	CORNWALL         <i>Survey Type: MANUAL</i>
3	DS-04-A-01 VICARAGE ROAD DERBY MICKLEOVER Edge of Town Residential Zone Total Number of pupils: <i>Survey date: THURSDAY</i>	PRIMARY SCHOOL       387 25/06/15	DERBYSHIRE         <i>Survey Type: MANUAL</i>
4	DU-04-A-01 FALKLAND CRESCENT DUNDEE BROUGHTY FERRY Suburban Area (PPS6 Out of Centre) Residential Zone Total Number of pupils: <i>Survey date: MONDAY</i>	PRIMARY SCHOOL       412 21/05/12	DUNDEE CITY         <i>Survey Type: MANUAL</i>
5	LN-04-A-01 GONERBY HILL FOOT GRANTHAM  Neighbourhood Centre (PPS6 Local Centre) Residential Zone Total Number of pupils: <i>Survey date: WEDNESDAY</i>	PRIMARY SCHOOL       312 12/06/13	LINCOLNSHIRE         <i>Survey Type: MANUAL</i>
6	MT-04-A-01 BRECON ROAD MERTHYR TYDFIL  Suburban Area (PPS6 Out of Centre) Residential Zone Total Number of pupils: <i>Survey date: FRIDAY</i>	PRIMARY SCHOOL       184 18/10/13	MERTHYR TYDFIL         <i>Survey Type: MANUAL</i>
7	NE-04-A-01 SUNNINGDALE ROAD SCUNTHORPE  Edge of Town Residential Zone Total Number of pupils: <i>Survey date: TUESDAY</i>	PRIMARY SCHOOL       147 20/05/14	NORTH EAST LINCOLNSHIRE         <i>Survey Type: MANUAL</i>
8	SF-04-A-03 ENSTONE ROAD LOWESTOFT KIRKLEY Neighbourhood Centre (PPS6 Local Centre) Residential Zone Total Number of pupils: <i>Survey date: WEDNESDAY</i>	PRIMARY SCHOOL       234 10/12/14	SUFFOLK         <i>Survey Type: MANUAL</i>
9	SR-04-A-01 PULLAR AVENUE STIRLING BRIDGE OF ALLAN Edge of Town Residential Zone Total Number of pupils: <i>Survey date: MONDAY</i>	PRIMARY SCHOOL       386 16/06/14	STIRLING         <i>Survey Type: MANUAL</i>

*This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.*

TRIP RATE for Land Use 04 - EDUCATION/A - PRIMARY  
VEHICLES

Calculation factor: 1 PUPILS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	312	0.000	1	312	0.000	1	312	0.000
06:00 - 07:00	1	312	0.013	1	312	0.003	1	312	0.016
07:00 - 08:00	9	302	0.036	9	302	0.012	9	302	0.048
08:00 - 09:00	9	302	0.183	9	302	0.128	9	302	0.311
09:00 - 10:00	9	302	0.037	9	302	0.049	9	302	0.086
10:00 - 11:00	9	302	0.011	9	302	0.013	9	302	0.024
11:00 - 12:00	9	302	0.020	9	302	0.015	9	302	0.035
12:00 - 13:00	9	302	0.022	9	302	0.025	9	302	0.047
13:00 - 14:00	9	302	0.018	9	302	0.022	9	302	0.040
14:00 - 15:00	9	302	0.039	9	302	0.022	9	302	0.061
15:00 - 16:00	9	302	0.110	9	302	0.130	9	302	0.240
16:00 - 17:00	9	302	0.029	9	302	0.058	9	302	0.087
17:00 - 18:00	9	302	0.010	9	302	0.029	9	302	0.039
18:00 - 19:00	8	317	0.001	8	317	0.007	8	317	0.008
19:00 - 20:00	1	312	0.000	1	312	0.000	1	312	0.000
20:00 - 21:00	1	312	0.000	1	312	0.032	1	312	0.032
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
<b>Total Rates:</b>			0.529			0.545			1.074

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is:  $COUNT/TRP*FACT$ . Trip rates are then rounded to 3 decimal places.

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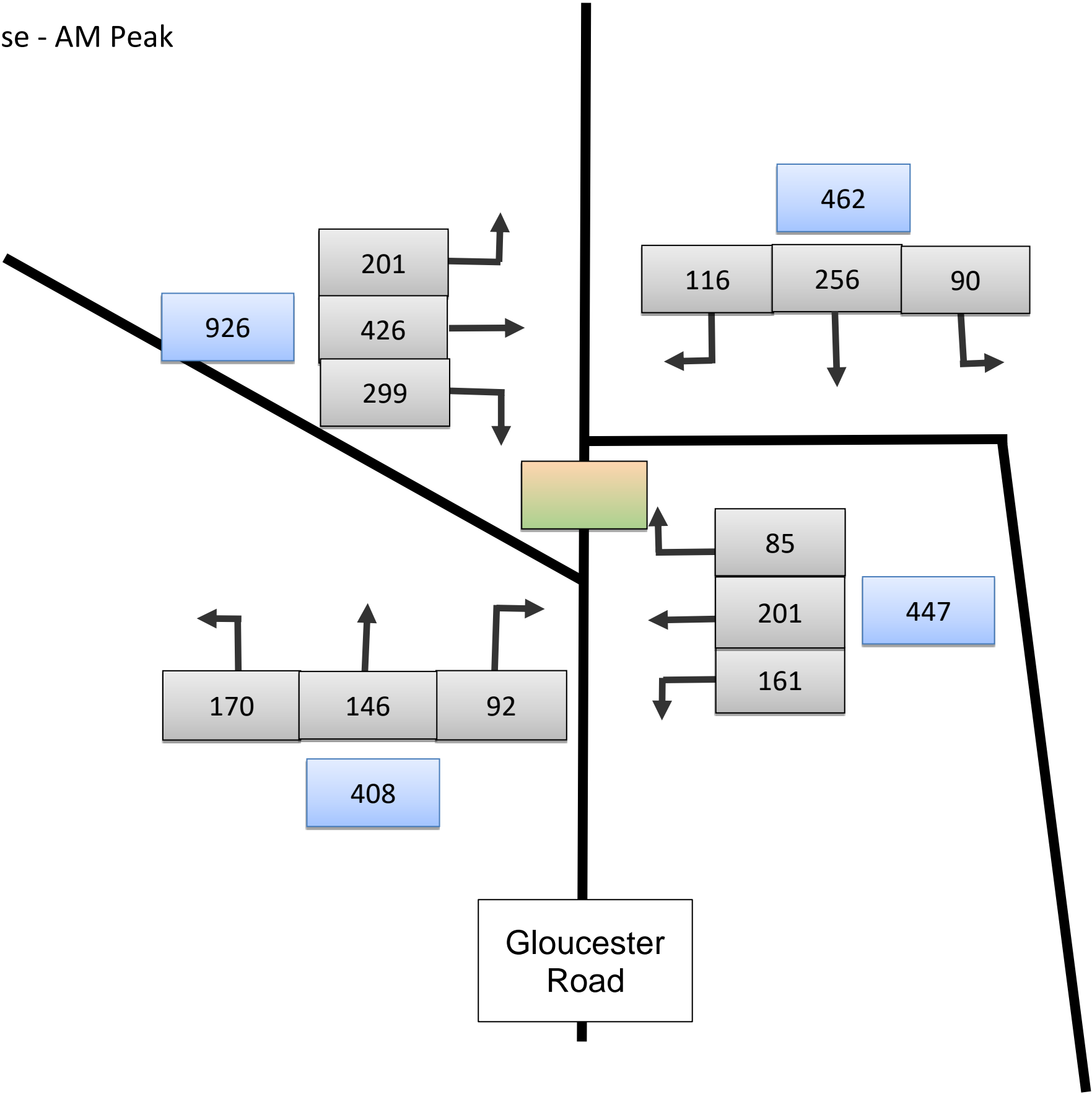
## Parameter summary

Trip rate parameter range selected: 147 - 440 (units: )  
Survey date range: 01/01/12 - 25/11/19  
Number of weekdays (Monday-Friday): 9  
Number of Saturdays: 0  
Number of Sundays: 0  
Surveys automatically removed from selection: 0  
Surveys manually removed from selection: 0

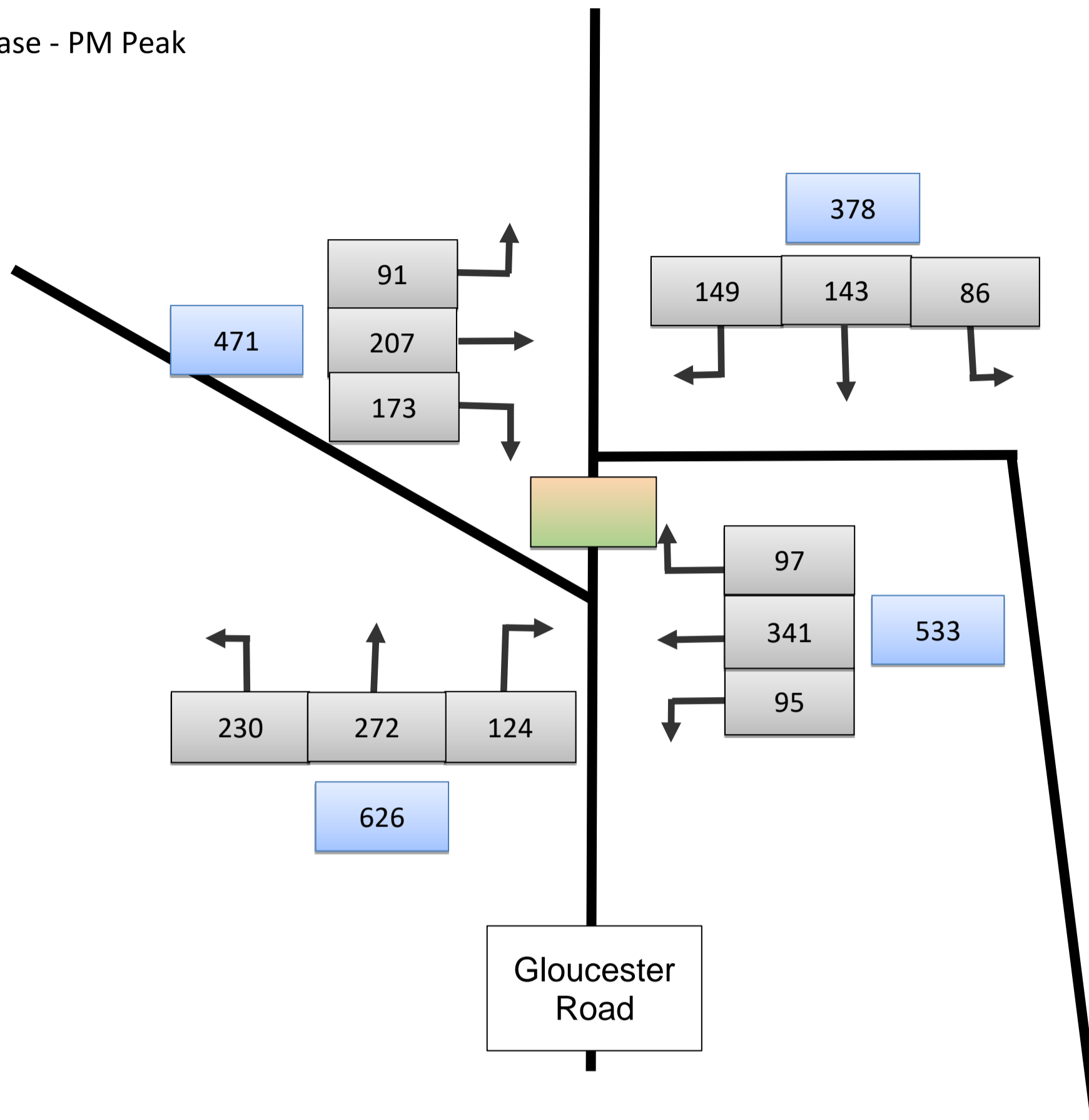
This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are shown. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

**TECHNICAL NOTE**  
**Appendix C**

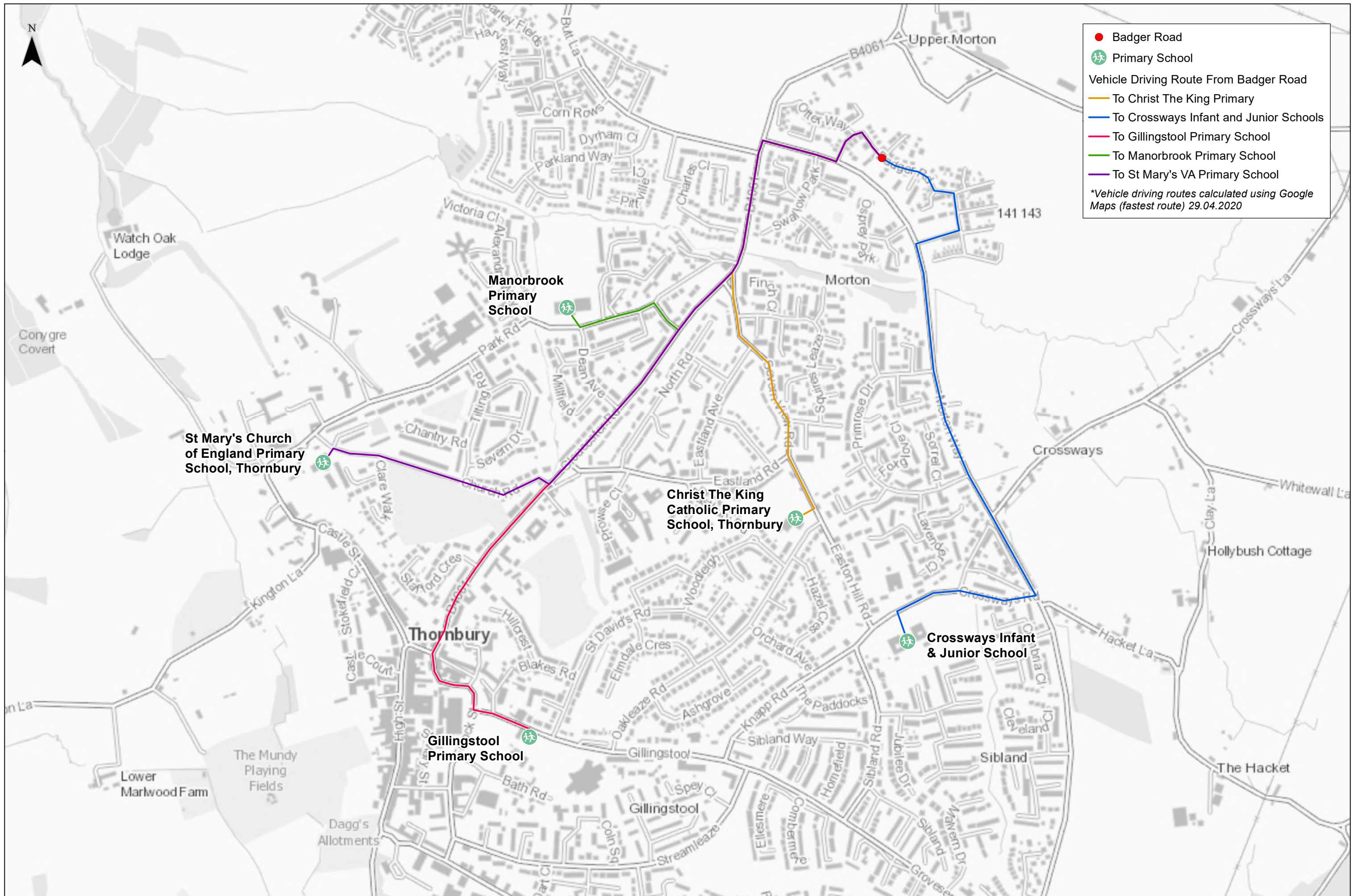
2028 Test Case - AM Peak



2028 Test Case - PM Peak



**TECHNICAL NOTE**  
**Appendix D**



**TECHNICAL NOTE**  
**Appendix E**



## Stock, Katie

---

**From:** Stock, Katie  
**Sent:** 28 February 2020 11:25  
**To:** Myles Kidd  
**Cc:** Catherine Loveday; Thorne, Neil; Nick Matthews; Rebecca Mitchell; Christopher Rose  
**Subject:** RE: PT18/6450/O Land West of Park Farm - Butt Lane mitigation (SK08-F) [EXTERNAL]  
**Attachments:** 39209\_5501\_SK08-G.zip

Hi Myles

Thanks for your recent email and comments. Please see our response below:

1. Morton Way crossing –
  - a. your request for this to be located at the stop line is noted and this has been updated on the proposed layout drawing and within the LinSig model – see attached drawing 39209/5501/SK08-G. We will obtain a RSA for this version of the design.
  - b. The addition of the crossing affects the intergreen calculations previously provided – updated spreadsheet attached.
2. Hedge on northern side of Butt Lane –
  - a. A section of the hedgerow may need to be removed in order to provide the footway on the northern side of Butt Lane due to the limited land available within the adopted highway.
  - b. It should be noted that there are discrepancies between the extent of the adopted highway (drawn based on OS) and the fence lines shown on topographical survey, on both the northern and southern side of Butt Lane. The discrepancies may result in further land being available to the north and south of Butt Lane and the extent of the adopted highway based on the topographical survey will need to be investigated with SGC at the appropriate design stage. At this stage it is considered that the Butt Lane layout provides the optimum alignment based on the available information and demonstrates a suitable alignment can be provided, subject to detailed design.
3. LinSig Analysis – Geometries
  - a. We have updated the radii within the model, as requested.
  - b. Please note that the crossing width for Phase G is 13.68m, not 17.68m as suggested in your email (see below)



4. LinSig Analysis – Traffic Flows

- a. As set out in Chapter 9 of the updated Transport Assessment (December 2019), the 2028 test case traffic flows have been revised for the purpose of this assessment to take account of the updated planning application which replaces 35 dwellings with a primary school. This results in 45 fewer vehicle trips at the Butt Lane junction in the AM peak and 31 fewer in the PM peak.

5. LinSig Analysis – Intergreens

- a. We note that the spreadsheet you have provided converts negative distance values to positive before retrieving the intergreen from the table (e.g. E-B which has a total distance of -35m). TAL 01/06 does suggest that negative values are possible and that values less than the table should be used with caution. As the conflict distance is negative an intergreen of 5 seconds has been used which is in line with the guidance from TAL 01/06. The opposite conflict from B-E as a positive values as the phase losing right of way has the longer distance to travel, in this case the intergreen is calculated normally.
- b. We have updated the pedestrian intergreens, as per your suggestion, at 1.2m per second.

6. Linsig Analysis – Updated results

- a. Following the above updates, please see the below summary of results for the 2028 test case scenario for all 3 pedestrian options:

Modelled Scenario	Gloucester Rd S			Butt Lane			Gloucester Rd N			Morton Way		
	DoS	Queue (PCU)	Delay (Secs)	DoS	Queue (PCU)	Delay (Secs)	DoS	Queue (PCU)	Delay (Secs)	DoS	Queue (PCU)	Delay (Secs)
Revised Signalised Layout SK08-G – AM Peak Hour (0800 – 0900)												
2028 Test Case	73.5%	8.4	449.7	118.7%	101.2	353.1	114.9%	48.1	328.7	115.1%	46.6	337.2
2028 Test Case (ped stage every other cycle)	63.1%	8.2	41.7	102.6%	50.3	133.6	102.7%	29.0	167.6	102.9%	28.5	175.4

2028 Test Case (no ped stage)	58.0%	7.1	36.4	92.7%	24.5	55.4	92.8%	17.6	80.4	90.2%	15.8	76.4
Revised Signalised Layout SK08-G – PM Peak Hour (1700 – 1800)												
2028 Test Case	89.1%	51.0	16.8	118.5%	38.5	277.2	102.3%	20.3	160.2	119.2%	65.0	382.2
2028 Test Case (ped stage every other cycle)	90.1%	21.8	63.9	91.5%	14.0	81.6	89.3%	14.3	80.0	91.5%	20.6	70.8
2028 Test Case (no ped stage)	80.5%	13.7	39.3	80.6%	11.2	59.6	79.3%	10.1	53.3	81.1%	16.2	49.1

- This demonstrates that the AM peak results are not materially affected by the changes and the PM peak continues to operate within capacity. As set out previously, it is considered that in reality the crossings are likely to be called less frequently than every other cycle, which would increase the available capacity at the junction across the peak hours.

I hope this is helpful and you are able to confirm that the proposed scheme shown on 39209/5501/SK08-G and the accompanying LinSig modelling is acceptable, and we will arrange for a RSA to be undertaken asap. I look forward to hearing from you asap, but please let me know if you have any queries in the meantime.

Kind regards,

**Katie Stock**

Principal Transport Planner

[Bristol](#)

[Redacted]  
[Redacted]

[katie.stock@stantec.com](mailto:katie.stock@stantec.com)



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**From:** Myles Kidd <Myles.Kidd@southglos.gov.uk>

**Sent:** 26 February 2020 12:11

**To:** Stock, Katie <Katie.Stock@stantec.com>

**Cc:** Catherine Loveday <Catherine.Loveday@southglos.gov.uk>; Thorne, Neil <neil.thorne@stantec.com>; Nick Matthews <NMatthews@savills.com>; Rebecca Mitchell <rebecca.mitchell@barwoodland.co.uk>; Christopher Rose <Christopher.Rose@southglos.gov.uk>

**Subject:** RE: PT18/6450/O Land West of Park Farm - Butt Lane mitigation (SK08-F) [EXTERNAL]

Hi Katie

Thank you for the revised layout plan, the LinSig files and some of the workings.

We've discussed internally and can agree the principle of the new design, subject to:

- The requested pedestrian crossing on Morton Way forming part of the design: we appreciate from your designs and explanation that this will involve a departure from DMRB guidance of the intervisibility envelope, but unless the required safety audit suggests otherwise, would like the fourth arm to be included;
- The hedge on the northern side of Butt Lane seems to overlap the proposed footway and will require review. Perhaps moving Butt Lane a bit further south may help address;
- Confirming the LinSig analysis.

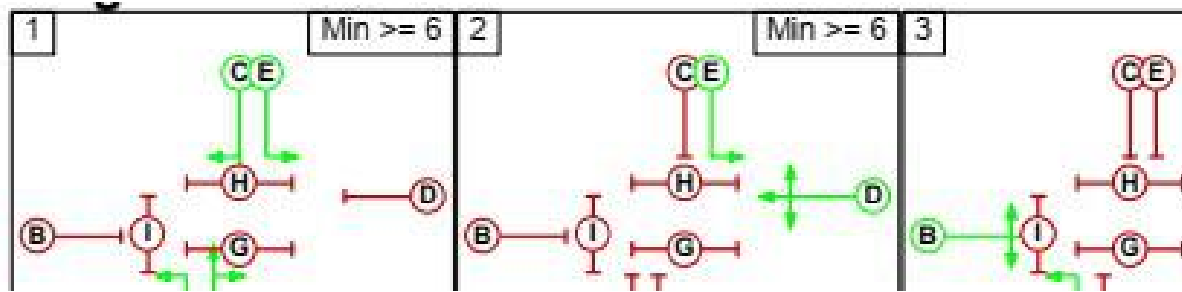
## LinSig review

I have reviewed the majority of the LinSig work and note the following:

As currently modelled, in operational terms it shows (for peds every 2<sup>nd</sup> cycle) a solution that we could accept. However I have a few queries with the LinSig modelling further below and believe the results may be affected, potentially with reduced operational performance - we need to be in a position to understand its theoretical operation and the level of delay depending on pedestrian usage before we can confirm acceptance.

	Spare capacity %; maximum queue any arm (pcu)	
	AM	PM
Peds every cycle	-29.1%; 93	-25.1%; 48
Peds every 2 <sup>nd</sup> cycle	-12.0%; 38	+1.1%; 19
No peds	+0.2%; 23	+13.4%; 15

	zone	arms		Phases		Ped X
Gls Rd sth	A	7/1 - left	7/2 straight&right	F	A	G
Butt Ln	B	1/1 - left and straight stagger	1/2 right	B		I
Gls Rd nth	C	3/1 - left	3/2 - straight and right	E	C	H
Morton Wy	D	5/1 - left and straight stagger	5/2 right	D		



## Geometries

As below, the radius should be provided for the straight ahead movements from Butt Lane and Morton Way – this will slightly reduce the lane capacity. Also the length of Morton Way flare appears to be less than the 8.5 pcus modelled.

PCU = 5.75m (reference section of LinSig V3 user guide)

- 7/1 11 pcu = 63m long x 3.0m wide; nearside; infinite radius? turning left
- 7/2 inf long x 3.25m wide; nearside as next to short lane; 10m radii right; infinite straight
- 1/1 20.5 pcu = 118m long x 3.0m wide; nearside; 10m radii left; infinite radius straight
- 1/2 inf long x 3.0m wide; nearside as next to short lane; 10m radii right
- 3/1 7 pcu = 40m long x 3.0m wide; nearside; infinite radius; turning radii left
- 3/2 inf long x 3.25m wide; nearside as next to short lane; 10m radii right; infinite straight
- 5/1 inf long x 3.25m wide; nearside; 10m radii left; infinite radius? straight
- 5/2 8.5 pcu = 49m long [less than this] x 3.25m wide; not nearside; 10m radii right

Storage in front of stopline for 7/2 and 3/2 8 pcus, 2pcus (almost 3) can store without blocking straight ahead movement.

## Traffic Flows

The 2028 test flows are lower than shown in the TAA figures: 4% less in AM peak; 2.3% less in PM peak – the reason for this needs to be confirmed.

## Intergreens

“Intergreen Measurements.xlsx” shows net distances and related intergreens for traffic to traffic from TAL 01/06.

Distance "x" (metres)	9	10-18	19-27	28-37	38-46	47-55	56-64	65-73
Intergreen (seconds)	5	6	7	8	9	10	11	12

Intergreen times (i.e. blackout and all red) for peds is time to clear the crossing @ 1.2m per second.

Sheet "SK08F Intergreen check" of *LWoPF - butt lane\_glouc cross roads.xlsx* shows several traffic to traffic intergreens to be below what TAL01/06 suggests – i.e. less lost time than there should be.

The ped crossings intergreens are also different my calculations, but the effect (as all peds run in one stage) should be to reduce the ped lost time by 1 second.

Please see attached spreadsheet.

I will continue the LinSig review and, if other work allows, will complete later this week, with any changes considered and re-modelled if / as necessary.

Kind Regards

Myles

Myles Kidd B.Eng. (Hons) MCIHT, CMILT, MTPS

Transport Development Control Manager

South Gloucestershire Council

☒: PO Box 1954, Bristol, BS37 0DD



🌐: www.southglos.gov.uk

---

**From:** Stock, Katie [<mailto:Katie.Stock@stantec.com>]

**Sent:** 12 February 2020 16:40

**To:** Myles Kidd <[Myles.Kidd@southglos.gov.uk](mailto:Myles.Kidd@southglos.gov.uk)>; Christopher Rose <[Christopher.Rose@southglos.gov.uk](mailto:Christopher.Rose@southglos.gov.uk)>

**Cc:** Catherine Loveday <[Catherine.Loveday@southglos.gov.uk](mailto:Catherine.Loveday@southglos.gov.uk)>; Thorne, Neil <[neil.thorne@stantec.com](mailto:neil.thorne@stantec.com)>; Nick Matthews <[NMatthews@savills.com](mailto:NMatthews@savills.com)>; Rebecca Mitchell <[rebecca.mitchell@barwoodland.co.uk](mailto:rebecca.mitchell@barwoodland.co.uk)>

**Subject:** PT18/6450/O Land West of Park Farm - Butt Lane mitigation (SK08-F) [EXTERNAL]

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Myles / Chris

Following our recent discussions, please find attached a .zip folder containing the following for your review / agreement:

1. Revised mitigation scheme for the A38 / Butt Lane / Morton Way junction (Stantec drawing 39209/5501/SK08-F)
2. LinSig model files
3. LinSig summary reports
4. Excel spreadsheet containing intergreen calculations.

In order to consider your previous comments (which included the investigation of a footway on the northern side of Butt Lane to connect to a signalised crossing at the stop line, and a signalised crossing on Morton Way at the stop line) we have obtained topographical survey of the junction to inform the mitigation scheme in this location.

### Butt Lane

Our review confirms that a footway can be provided within highway land on the northern side of Butt Lane and a signalised crossing provided at the stop line without the need for significant realignment of the carriageway. This includes the removal of the footway on the southern side which would no longer be required.

Please note that with the exception of tidying up the drawing to correspond with the topo survey base, which has resulted in some minor adjustments to the proposed traffic islands on the Gloucester Road arms to accommodate the tracking of large vehicles, the remainder of the mitigation scheme remains unchanged.

### Morton Way Signalised Crossing

As discussed previously, our preceding scheme provided for all pedestrian desire lines at the junction. However, as requested we have reviewed the possibility of providing a signalised crossing at the stop line on Morton Way. As demonstrated on inset 2 on drawing SK08-F, this is not deliverable without third party land or reducing the intervisibility envelope.

### Junction Capacity Assessment

As a result of the changes to the Butt Lane signalised crossing, the junction is forecast to operate at capacity (100% DoS) in the test case scenario (with development) in the AM peak and below capacity in the PM peak periods when the crossings are called every other cycle. A summary of the results for the AM (0800-0900) and PM (1700-1800) peak periods is set out below.

Modelled Scenario	Gloucester Rd S	Butt Lane	Gloucester Rd N	Morton Way
-------------------	-----------------	-----------	-----------------	------------

	DoS	Queue (PCU)	Delay (Secs)	DoS	Queue (PCU)	Delay (Secs)	DoS	Queue (PCU)	Delay (Secs)	DoS	Queue (PCU)	Delay (Secs)
Revised Signalised Layout SK08-F – AM Peak Hour (0800 – 0900)												
2028 Test Case	66.3%	7.8	43.1	116.2%	92.6	320.1	114.1%	46.9	317.8	115.1%	46.5	337.9
2028 Test Case (ped stage every other cycle)	63.5%	8.2	40.1	100.0%	37.9	99.3	100.0%	26.4	139.0	100.8%	24.3	145.5
2028 Test Case (no ped stage)	57.4%	7.0	35.8	89.8%	22.6	49.1	89.1%	16.0	68.0	89.6%	15.3	75.1
Revised Signalised Layout SK08-F – PM Peak Hour (1700 – 1800)												
2028 Test Case	86.2%	15.7	46.1	112.6%	34.9	248.2	108.8%	28.4	236.7	110.6%	48.0	265.4
2028 Test Case (ped stage every other cycle)	85.3%	16.7	46.0	89.0%	14.1	75.5	87.5%	12.4	72.2	88.9%	19.0	64.6
2028 Test Case (no ped stage)	79.4%	13.6	68.3	76.5%	10.8	56.1	75.3%	9.6	49.0	77.7%	15.3	46.5

You will note that relocating the crossing to the stop line on Butt Lane increases the degree of saturation at the junction due to the length of the crossing (16 metres across) and resultant 'all red' time required. However, in reality the crossings are likely to be called less frequently, which would increase the available capacity at the junction across the peak hours.

### Summary

The proposed signalised mitigation scheme shown on Stantec drawing 39209-5501-SK08-F has been updated on to topographical survey base and to provide a crossing at the stop line on Butt Lane. The proposed mitigation scheme is considered acceptable to accommodate baseline and development traffic, whilst allowing for active modes to negotiate the junction safely with signalised crossings on key desire lines and advance stop lines on all arms.

We would be grateful if you could review the above and attached and confirm that the proposed mitigation scheme is acceptable at your earliest convenience. If you have any queries in the meantime please do not hesitate to contact us.

Kind regards

**Katie Stock**

Principal Transport Planner

[Bristol](#)



[Redacted]  
[katie.stock@stantec.com](mailto:katie.stock@stantec.com)



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**TECHNICAL NOTE**  
**Appendix F**

## TECHNICAL NOTE

**Job Name:** PT18/6450/O Land West of Park Farm, Thornbury  
**Job No:** 39209  
**Note No:** TN006 v.1  
**Date:** 23 April 2020  
**Prepared By:** K. Stock  
**Subject:** **M5 Junction 14 VISSIM Forecast Modelling Note – Update (Version 1)**

---

### 1. Introduction

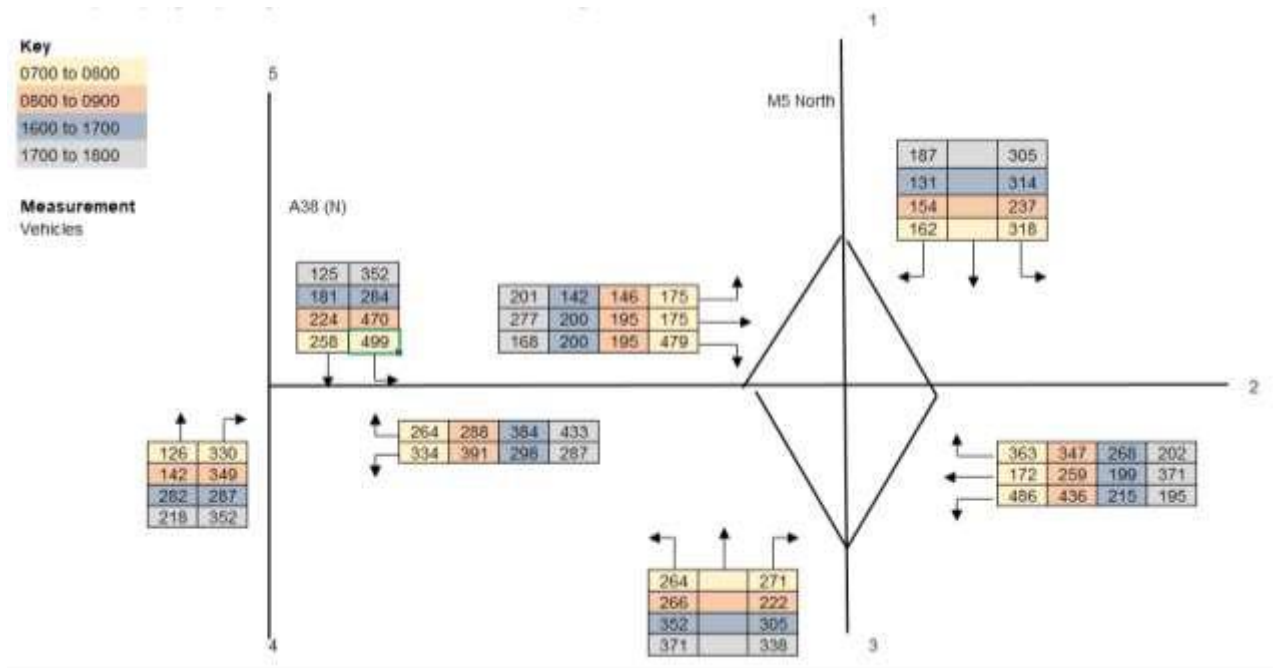
- 1.1. Stantec has been commissioned by Barwood Development Securities Ltd & North West Thornbury Landowner Consortium (the Developer) to provide highway and transport advice in support of a mixed use residential-led development on Land West of Park Farm, Thornbury.
- 1.2. The development proposals comprise up to 595 dwellings and land for a primary school. However, for the purpose of the assessment of the strategic road network (SRN), the development flows within the model are unchanged (from the previous proposals of 630 dwellings and no school) and the model therefore reflects an overestimate of development impacts at Junction 14 and the A38. The assessment is therefore robust.
- 1.3. Following submission of the planning application, Highways England (HE) confirmed that mitigation is required to address the increase in queuing on the M5 northbound off-slip. Discussions have been ongoing with HE to confirm the mitigation required.
- 1.4. Stantec Technical Note '39209-STN-ZZ-XX-RP-T-0001\_M5J14ForecastNote' (dated January 2020) sets out the proposed mitigation scheme to extend the length of two lanes on the M5 northbound off-slip. HE has confirmed that, in terms of design, the mitigation scheme proposed as part of the Land West of Gloucester Road scheme is considered to be suitable in principle, subject to a Stage 1 Road Safety Audit (RSA). However, HE identified additional queuing within the model on the A38, which is within the control of South Gloucestershire Council (SGC) as local highway authority, as a result of the proposed mitigation.
- 1.5. Stantec have since reviewed the modelling assumptions with HE's consultants, Jacobs, and identified discrepancies in the traffic flows between the 2016 validated model and the 2017 HE traffic surveys at the A38 / B4059 junction.
- 1.6. This Technical Note has been prepared to present updated modelling results and to set out additional proposed mitigation at the A38 junction for agreement with SGC and HE.

### 2. Modelled Traffic Flows

- 2.1. The VISSIM model provided to Stantec by Jacobs includes 2016 baseline flows and has been validated and verified using these flows. The validation and calibration statistics are summarised within the CH2M (now Jacobs) report '679475 ST 16 14 05\_M5 J14 VISSIM Nov 2016 Update LMV\_Mar2017\_V5'. The flows are shown below in **Figure 2.1**.

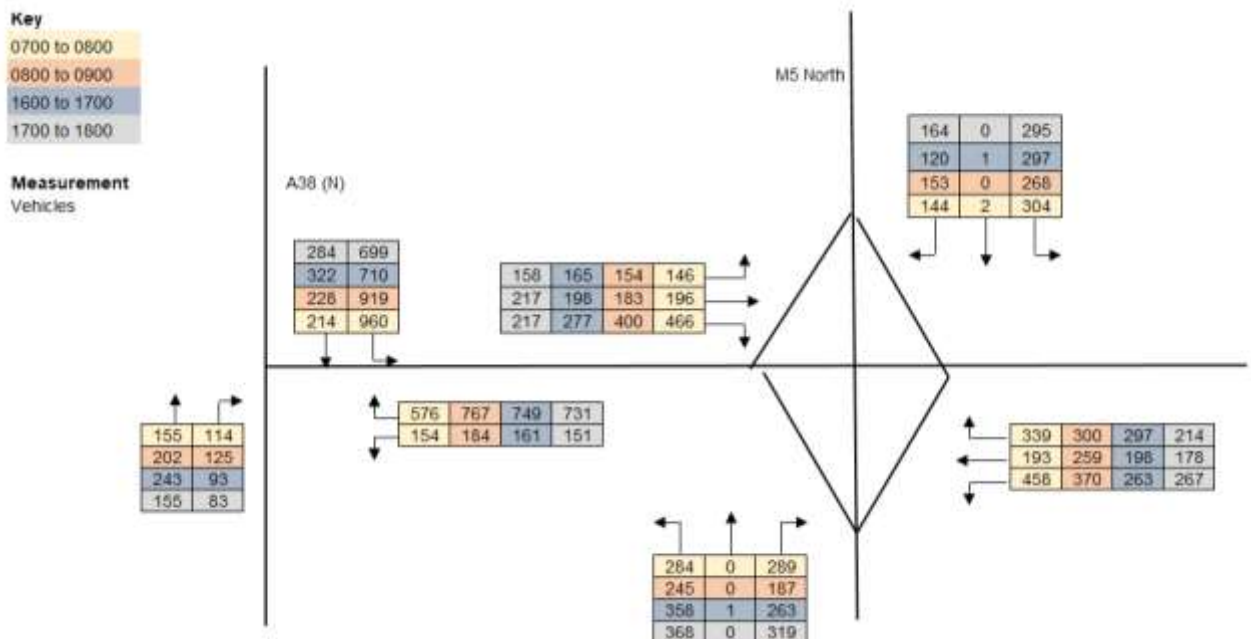
# TECHNICAL NOTE

Figure 2.1: 2016 Baseline (validated model) Flows



2.2. During the course of pre-application discussions with HE, a spreadsheet called “M5 J14 - Dev Tracker (Issued) v.3 final” was provided to Stantec. This included committed development flows and background traffic growth through the junctions and a tab setting out 2017 baseline flows. These are shown in **Figure 2.2** below.

Figure 2.2: 2017 baseline flows (from M5 J14 – Dev Tracker spreadsheet)

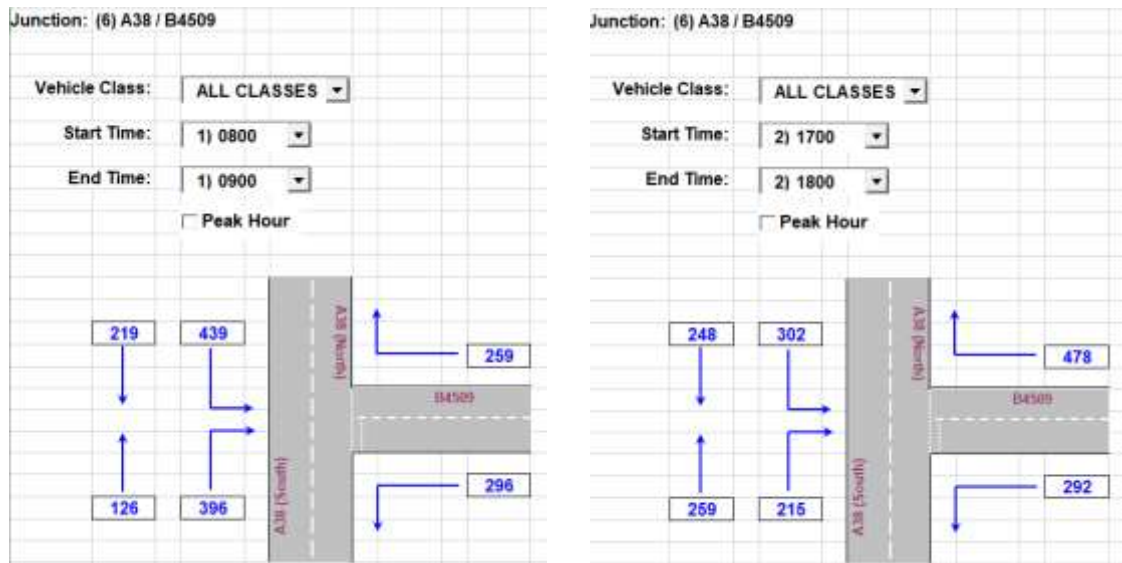


2.3. The flows in **Figure 2.2** were used to create the 2021 forecast year assessments reported in the previous Technical Notes provided as part of the planning submission. As can be seen from the above extracts, whilst the traffic flows at M5 J14 are broadly similar, the flows to and from the A38 North are significantly higher in the 2017 scenario than those included within the validated VISSIM model.

## TECHNICAL NOTE

- 2.4. The 2016 validated flows are also comparable to those recorded by an independent surveyor on behalf of the West of Park Farm application in November 2017, as shown in **Figure 2.3** below.

Figure 2.3: Recorded Traffic Flows at A38/B4509 Junction



- 2.5. The use of the 2016 flows in assessing the existing and forecast operation of the A38 junction is therefore considered to be most appropriate and an updated model run including these flows has been undertaken to provide an assessment of the impact of the development.
- 2.6. Other than the changes to the baseline flows, there have been no further changes made to the previously agreed VISSIM model. The traffic growth, committed development and development traffic flows therefore remain the same as the previous assessment.

### 3. Updated Modelling Results – Reference and Test Case

#### Overview

- 3.1. This section provides a summary of the revised Queue results for the AM and PM peak periods for the 2021 Reference Case and Development Scenarios using the validated 2016 flows across the junction.
- 3.2. The analysis focusses on the 2021 assessment year as the development opening year, in line with the DfT Circular 02/2013 The Strategic Road Network and the Delivery of Sustainable Development. A 2028 test period, as 10 years after opening, has previously been considered for SGC's purposes for those junctions in close proximity to the development site. During the course of the planning application, it was agreed that growth at local junctions should only include committed development growth, and not TEMPro. Therefore, the 2021 assessment set out within this TN is considered to provide a robust assessment for SGC's purposes as it includes both committed development and TEMPro growth in this location.
- 3.3. As with the previous assessment, to inform the modelling outputs, each model was run for a total of 20 iterations starting at a random seed of 42 with an increment of 1 after each run.

## TECHNICAL NOTE

### Queues

- 3.4. Queue counters have been positioned within the network at give way lines or at signal stop lines. In VISSIM queues are counted from this point upstream until the end of the queue or link, whichever is greater. The locations of these have not been amended and have been retained from the base model, as developed by Jacobs. **Table 3.1** and **Table 3.2** summarise the average maximum queue lengths for each scenario for the AM and PM peak hours respectively.

Table 3.1: AM Peak Ave. Maximum Queue Length (metres)

Location	Reference Case	Development	Difference from Reference Case
A38 SB to B4509 EB	993	1000	7
A38 SB Ahead	355	410	55
B4509 WB Junction with A38	56	58	2
A38 NB Ahead	329	535	206
A38 NB to B4509 EB	463	652	189
M5 SB Off-Slip	25	28	3
M5 NB Off-Slip	1184	1187	3

- 3.5. In the AM the largest predicted increase in the maximum queue length between the reference case and with development is 206m (36 PCUs) on the A38 NB Ahead. The next largest increases are on the A38 NB to B4509 EB with an increase of up to 189 metres (33 PCUs).
- 3.6. Queuing on the SB off-slip is not forecast to extend beyond the extent of the slip road in the either scenario.

Table 3.2: PM Peak Ave. Maximum Queue Length (metres)

Location	Reference Case	Development	Difference from Reference Case
A38 SB to B4509 EB	37	38	1
A38 SB Ahead	32	33	1
B4509 WB Junction with A38	101	99	-2
A38 NB Ahead	41	56	15
A38 NB to B4509 EB	72	90	18
M5 SB Off-Slip to B4509 EB	87	91	4
M5 NB Off-Slip	123	132	9

## TECHNICAL NOTE

- 3.7. In the PM peak, the maximum queue length between the reference case and with development is not predicted to change significantly, with a maximum increase of 3 PCUs on the A38 Northbound.
- 3.8. The above results confirm that in the PM peak, queuing on all approaches, including the M5 NB and SB off slips and A38, will not be significantly affected by the proposed development. Queuing on both the NB and SB off-slips is not forecast to extend beyond the extent of the slip road in the reference case or with development scenarios.

### 4. Proposed Mitigation

#### Overview

- 4.1. The modelling outputs as reported in the PBA Technical Note 5519-PBA-ZZ-XX-RPTP-0002, and reviewed by Highway England's consultants, Jacobs, indicated that a scheme to mitigate the impact of the development at Thornbury on the northbound off-slip would be required.
- 4.2. The updated modelling outputs set out in Section 3 above also suggest that mitigation will be required on the A38 northbound approach to the junction.
- 4.3. The following section outlines the proposed mitigation that has been put forward and tested within the model.

#### The Schemes

##### M5 Northbound Off-Slip

- 4.4. It is proposed to lengthen the two lanes on the off-slip to a total of 350m. A drawing of the scheme is provided within **Appendix A**.
- 4.5. HE has confirmed that, in terms of design, the mitigation scheme is believed to be suitable in principle, subject to a Stage 1 Road Safety Audit (RSA).

##### A38 Northbound

- 4.6. The updated modelling suggests that queuing on the A38 northbound will increase as a result of the proposed development. Discussions with SGC have also indicated that this is an existing issue with vehicles mounting the verge to pass queuing right turning traffic.
- 4.7. It is therefore proposed to lengthen the two-lane approach to the junction with the B4509. The two-lanes will extend from the existing stop line to the Sundayshill Lane junction. The existing bus layby will be converted to an on-carriageway bus cage. Existing right turn lanes will be unchanged as a result of the proposals.
- 4.8. A drawing of the scheme is provided within **Appendix B**.

### 5. Updated Modelling Results – Mitigation

#### Overview

- 5.1. This section provides a summary of the revised Queue results for the AM peak period, as the most congested peak, for the with mitigation Scenario using the validated 2016 base flows across the junction.
- 5.2. **Table 5.1** summarises the average maximum queue lengths for each scenario for the AM peak hour.

## TECHNICAL NOTE

Table 5.1: AM Peak Ave. Maximum Queue Length (metres) – With M5 NB and A38 NB mitigation

Location	Reference Case	Development	Difference from Reference Case	Development with Mitigation	Difference from Reference Case
A38 SB to B4509 EB	993	1000	7	1014	21
A38 SB Ahead	355	410	55	390	35
B4509 WB Junction with A38	56	58	2	64	8
A38 NB Ahead	329	535	206	364	35
A38 NB to B4509 EB	463	652	189	474	11
M5 SB Off-Slip	25	28	3	33	8
M5 NB Off-Slip	1184	1187	3	839	-345

- 5.3. In the AM peak with the proposed mitigation in place, queuing on the M5 SB off slip will increase by around one PCU when compared to the reference case which is not considered to be material.
- 5.4. With the mitigation schemes in place, queueing on the A38 NB lanes will increase by up to six PCUs when compared to the reference case. The mitigation proposed has a significant beneficial impact on queues on this approach, reducing queues to the same region as the reference case.
- 5.5. The mitigation schemes result in an increase of 35m on the A38 SB Ahead compared to the reference case; this equates to a reduction of 20 metres when compared to the with development scenario. This equates to around 6 PCUs and is therefore not considered to be material.
- 5.6. The above results confirm that the proposed mitigation schemes reduce the overall queue on the NB off-slip by 348m from the 2021 AM Test (no mitigation) scenario, and therefore more than mitigates the impact of the proposed development. Furthermore, the scheme represents a benefit of 345 metres when compared to the reference case and therefore over-mitigates the development impacts. The mitigation scheme will therefore reduce the length of mainline queuing on the northbound carriageway in the AM peak.
- 5.7. **Table 5.2** summarises the average maximum queue lengths for each scenario for the PM peak hour.

Table 5.2: PM Peak Ave. Maximum Queue Length (metres) – With M5 NB mitigation

Location	Reference Case	Development	Difference from Reference Case	Development with Mitigation	Difference from Reference Case
A38 SB to B4509 EB	37	38	1	35	-2



## TECHNICAL NOTE

A38 SB Ahead	32	33	2	32	-1
B4509 WB Junction with A38	101	99	-1	102	2
A38 NB Ahead	41	56	15	46	-10
A38 NB to B4509 EB	72	90	18	84	-6
M5 SB Off-Slip	87	91	5	90	-2
M5 NB Off-Slip	123	132	9	120	-12

- 5.8. In the PM peak with the proposed mitigation in place, queuing on all approaches will reduce by when compared to the reference case. which is not considered to be material.

## 6. Conclusions

### Overview

- 6.1. The model utilises PTV VISSIM 8 micro-simulation software which includes connections with PC MOVA for signal operation and includes both AM (07:00 to 09:00) and PM (16:00 to 18:00) peak periods.
- 6.2. This note summarises the impact on the A38 and M5 J14 using the validated 2016 baseline flows included in the VISSIM model and the proposed mitigation schemes proposed on the M5 northbound off-slip and A38 northbound approach.
- 6.3. Given the resultant reductions in traffic generation as a result of the revised development proposals, the development traffic flows included in the model reflect an overestimate of development impacts and therefore a robust assessment.

### Results

- 6.4. The results demonstrate the mitigation scheme, which includes the lengthening of the M5 J14 northbound two lane off-slip section to a total of 350m, adequately mitigates the forecast queues associated with the development at West of Park Farm, Thornbury. The mitigation scheme is shown to significantly reduce the queue lengths to levels seen in the reference case, more so in the AM peak, which is identified to be the peak period most affected by queuing at this location.
- 6.5. It has been demonstrated that the net impact of the development following mitigation on the A38 NB is immaterial and therefore that there is no severe impact on the operation of the local highway network in this location. The mitigation scheme proposes to extend the length of two lanes on the approach to the junction.
- 6.6. As such it is deemed that the mitigation agreed in principle with HE is sufficient to offset the impact of the proposed development on the northbound off-slip. Agreement with SGC is sought on the A38 mitigation proposals.

## TECHNICAL NOTE

- 6.7. It is therefore concluded that there are no adverse impacts on M5 Junction 14 and that the impact of development can be mitigated at the A38 junction with the B4509. The proposed mitigation will provide a betterment to the operational performance of the combined junction as a whole, most significantly in the AM peak hour on the northbound off-slip. We therefore suggest that HE and SGC should be in a position to offer no objection to the proposals, subject to the proposed mitigation scheme for the M5 J14 northbound off-slip and A38 NB being secured.

### DOCUMENT ISSUE RECORD

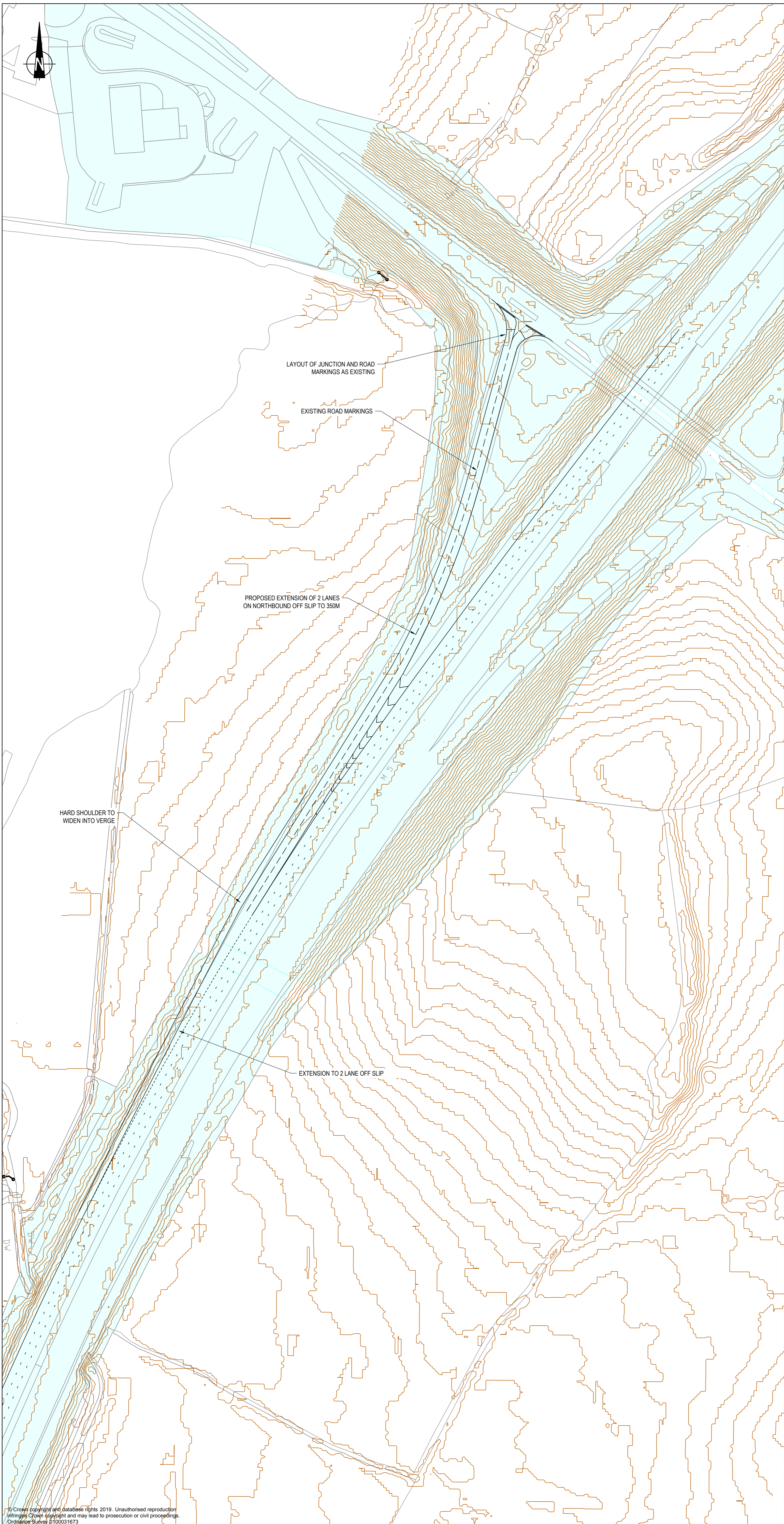
Technical Note No	Rev	Date	Prepared	Checked	Reviewed (Discipline Lead)	Approved (Project Director)
39209/5571/TN006	-	31.03.2020	KS	NT	KS	NT
39209/5571/TN006	1	23.04.2020	KS			

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# TECHNICAL NOTE

## APPENDIX A



**NOTES:**

1. THE LAYOUT IS SUBJECT TO DETAILED DESIGN, CAPACITY TESTING, GROUND INVESTIGATIONS RESULTS & EARTHWORKS MODELLING, UTILITIES & SERVICES AND CONFIRMATION OF LAND OWNERSHIP;
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6. FOR FULL DETAIL ON THE UTILITIES REFER TO PBA DRAWINGS 39209/2514/001 - 003

HIGHWAYS ENGLAND LAND OWNERSHIP TAKEN FROM DATA.GOV.UK. DERIVED FROM LAND REGISTER CADASTRAL PARCEL. LAST UPDATED AUGUST 2019  
 0.5M CONTOURS DERIVED FROM LIDAR INFORMATION TAKEN FROM ESRI DATABASE OCTOBER 2019

HARD SHOULDER TO WIDEN INTO VERGE

LAYOUT OF JUNCTION AND ROAD MARKINGS AS EXISTING

EXISTING ROAD MARKINGS

PROPOSED EXTENSION OF 2 LANES ON NORTHBOUND OFF SLIP TO 350M

EXTENSION TO 2 LANE OFF SLIP

Mark	Revision	Date	Drawn	Chkd	Appd

SCALING NOTE: Do not scale from this drawing. If in doubt, ask.  
 UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect their operations.

Drawing Issue Status **FOR INFORMATION**

**LAND TO THE WEST OF PARK FARM  
 THORNBURY  
 M5 JUNCTION 14 MITIGATION SCHEME  
 350m 2 LANE N/B OFFSLIP**

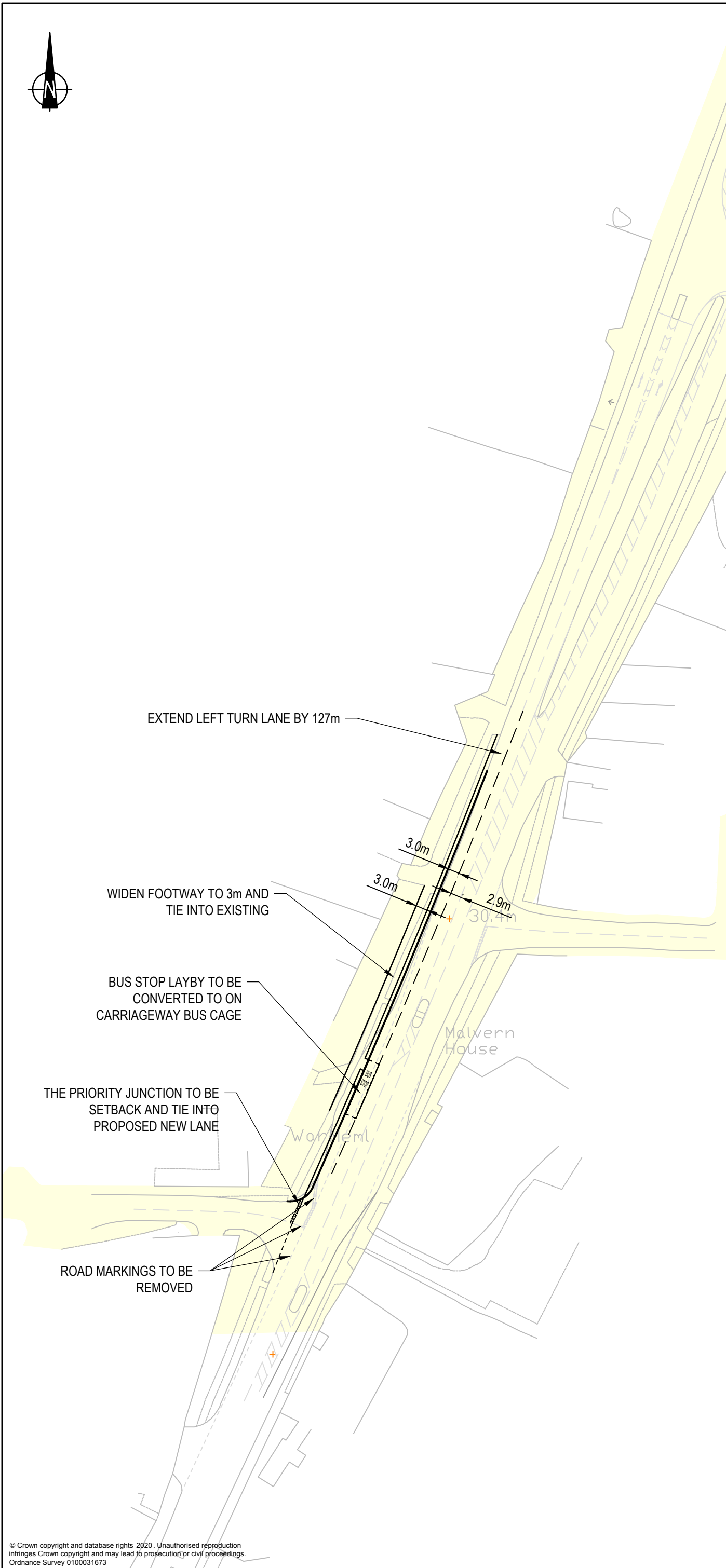
Client  
**BARWOOD  
 DEVELOPMENT  
 SECURITIES**  
 Date of 1st Issue 08.11.19  
 A1 Scale 1:500  
 Drawing Number **39209/5501/SK31**

  
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# TECHNICAL NOTE

## APPENDIX B



**NOTES:**

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**KEY:**

HIGHWAY BOUNDARY INFORMATION RECEIVED FROM SGC 22.09.2015 AND INTERPRETED BY STANTEC

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Drawing Issue Status **CONCEPT**

**WEST OF PARK FARM, THORNBURY**

**A38 B4509 JUNCTION MITIGATION  
EXTENDED N/B FLARE BY 127m**

Client  
**BARWOOD  
DEVELOPMENT  
SECURITIES LTD**



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Date of 1st Issue 19.03.2020	Designed JHo	Drawn JHo
A3 Scale 1:1000	Checked KS	Approved -
Drawing Number <b>39209/5501/SK37</b>	Revision -	