APPENDIX 2:

Bristol Grammar School: Additional Comments September 2020 and Rebuttal letter from University

Contents:

I. Technical Note from IMA Transport Planning on behalf of Bristol Grammar School dated September 2020.
II. Response to IMA Transport Planning Technical Note prepared by Arup, dated 3rd November 2020

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Job Name:	**Bristol Grammar School**	Job Nº.	**IMA-19-043**
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Review of Transport Information – Planning Application 20/00433/F - The Hawthorns Woodland Road Bristol BS8 1UQ

1 Executive Summary

1.1 This Technical Note (TN) reviews the highway and transport information submitted by University of Bristol in support of the proposed redevelopment of The Hawthorns (reference 20/00433/F) which is located directly opposite to the school.

1.2 The key points of the review are summarised as follows:

- **The closure of Woodlands Road and the closure of Tyndall Avenue to eastbound traffic with the exception of buses, will increase traffic flows on Elton Road past the school and increase pedestrian movements to and from the new Library.**
- **Traffic flows on Elton Road are predicted to be 17% and 32% higher in the AM and PM peaks, respectively, which is a significant increase.** After reviewing the predicted traffic flows it is considered likely that some traffic assumed to divert onto the wider network will actually remain on the roads surrounding the school and hence traffic flows on Elton Road will be even higher than those predicted.
- **Pupils from the school (as young as four years) cross Elton Road frequently throughout the day when passing to and from the main school site and the teaching space in properties on the north side of the road**. The school is concerned for the safety of its pupils with regards to any increase in traffic along Elton Road. Pedestrians already have to step into the road on a regular basis to pass during peak periods and this can only become a more frequent occurrence as pedestrian movements along Elton Road increase as a result of the proposed development.
- **The Tyndall Avenue/St Michael's Hill junction will not function effectively, and due to geometry constraints can only be resolved by removing traffic**. The University has agreed to provide a contribution towards a traffic reduction feasibility study but there is no guarantee that such a study would be able to identify improvements which would sufficiently mitigate the impacts of the development nor is there any commitment given towards funding any improvements identified. The rerouting of the U1 bus services due to the closure of Woodland Road means that there will a significant increase in the number of buses using the Tyndall Avenue/St Michael's Hill junction and a significant delay to existing scheduled bus services.
- **It is considered the wider consequences and impacts of closing Woodland Road and Tyndall Avenue to eastbound traffic with the exception of buses have not yet been robustly tested within the application**. The limited benefits of proposed realm scheme, which provides a localised improvement to the pedestrian environment adjacent to the University, is not considered sufficient to justify the significant impact on the operation of the local highway network, including pedestrian safety and the delay to public transport users.

2 Background

2.1 IMA Transport Planning has been commissioned by Bristol Grammar School (BGS) to advise on transport and highways matters which have day to day operational implications for the school.

2.2 The proposed redevelopment of The Hawthorns (reference 20/00433/F) is for a new library building with associated public realm proposals, which include the closure of a section of Woodland Road and the closure of Tyndall Avenue to eastbound traffic, with the exception of buses.

2.3 A Transport Assessment and Addendum prepared by Arup has been submitted in support of the scheme. Bristol City Council (BCC) Transport Development Control has provided consultation comments regarding the proposed development in May 2020 and August 2020.

2.4 The key transport implications of the proposed development on the day-to-day operation of the school are the closure of Woodlands Road and the closure of Tyndall Avenue to eastbound traffic with the exception of buses, which will increase traffic flows on Elton Road past the school and increase pedestrian movements to and from the new Library.

2.5 This review will also consider the predicted operation of the local highway network and whether the impact of the proposals has been fully considered on the wider highway network which is already congested.

3 Review of Assumed Redistribution of Existing Traffic Flows

3.1 Within the Arup TA the redistribution of traffic flows was based on a scheme in which Woodland Road was closed but Tyndall Avenue remained open to two-way traffic and predicted traffic flows in the TA Addendum relate to the current scheme in which Tyndall Avenue is also closed to eastbound traffic with the exception of buses.

3.2 The additional closure of Tyndall Avenue to eastbound traffic means that any northbound traffic on Woodland Road will have no alternative but to turn down Elton Road and, comparing the two sets predicted traffic flows, it can be seen that in the peak periods the closure of Tyndall Avenue to eastbound traffic more than doubles the traffic predicted to divert past the school from 30 to 67 vehicles.

3.3 Compared to the 2024 Do Minimum scenario the 2024 Do Something scenario traffic flows on Elton Road are 17% and 32% higher in the AM and PM peaks, respectively, which is a significant increase.

3.4 The general assessment methodology set out in the Arup TA and Addendum for the redistribution of traffic flows as a result of the UoB proposals based on the results of the ANPR appears to be an appropriate approach. However, the assumed re-routing of traffic of individual movements has been reviewed and it is considered likely that some of the traffic assumed to divert onto the wider network will actually remain on the roads surrounding the school and hence traffic flows on Elton Road will be higher than those assessed.

3.5 In relation to the assumed re-routing of individual traffic movements the following diversion assumptions the AM peak flows are queried:

Movement 1: Woodlands Road Northbound

- **Flows from Queen's Avenue** - 14 vehicles diverted via Elmdale Road (N), from existing routes via Elmdale Rd(S)/University Road/Priory Rd/Tyndalls Park Road the existing routes are longer so it is possible that these trips have an underlying reason to go via the existing route (possibly school/University drop-off or deliveries) and might instead circle the school and divert via Elton Road.
- **Flows from Upper Maudlin Street** - 28 vehicles are diverted via St Michaels Hill from existing routes via Woodlands Rd/St Michaels Park/Tyndalls Park Road. The existing routes are longer so it is possible that these trips have an underlying reason to go via these existing routes and it is likely that these vehicles would go via Elton Road /Tyndall Avenue instead.
- **U1 Buses** are proposed to be re-routed via Tyndall Avenue but there are no HV diversions from Woodlands Rd (S) onto Tyndall Avenue shown on the flow figure.

Movement 6: St Michael's Park Left Turn

- **Flows from St Michael's Hill (N) to Upper Maudlin St** - 32 vehicles diverted from the existing route via Woodlands Rd to continue along St Michaels Hill. The existing route is longer so it is possible that these trips have an underlying reason to go via existing route. It is likely that these vehicles would divert via Tyndall Avenue instead.

Movement 7: Woodland Road (S) Right-Turn

- **Flows Upper Maudlin St** - 33 vehicles are diverted from the existing route via Woodlands Rd and Tyndall Avenue and 28 continue along St Michaels Hill (5 head westbound on Tyndall Avenue. The existing route is longer so it is possible that these trips have an underlying reason to go via existing route or St Michaels Hill is already too congested and is avoided.

3.6 There are similar queries regarding the PM peak re-distribution flows:

Movement 1: Woodlands Road Northbound

- **Flows from Queen's Avenue** - 17 vehicles diverted from existing routes via Elmdale Rd(S)/University Road/Priory Rd/Tyndalls Park Road to Elmdale Road (N), the existing routes are longer so it is possible that these trips have an underlying reason to go via the existing route and are likely to continue to circle the school and then divert along Elton Road instead.
- **Flows from Upper Maudlin Street** - 40 vehicles are diverted via St Michaels Hill from existing routes via Woodlands Rd/St Michaels Park/Tyndalls Park Road. The existing routes are longer so it is possible that these trips have an underlying reason to go via these existing routes and it is likely that these vehicles would go via Elton Road /Tyndall Avenue instead.
- **U1 Buses** are proposed to be re-routed via Tyndall Avenue but there are no HV diversions from Woodlands Rd (S) onto Tyndall Avenue shown on the flow figure.

Movement 6: St Michael's Park Left Turn

- **Flows from St Michael's Hill (N) to Upper Maudlin St** - 8 vehicles diverted from the existing route via Woodlands Rd to continue along St Michaels Hill. The existing route is longer so it is likely that these trips have an underlying reason to go via existing route. It is likely that these vehicles would divert via Tyndall Avenue instead.

Movement 7: Woodland Road (S) Right-Turn

- **Flows Upper Maudlin St** - 53 vehicles are diverted from the existing route via Woodlands Rd and Tyndall Avenue and 50 continue along St Michaels Hill (3 head westbound on Tyndall Avenue. The existing route is longer so it is possible that these trips have an underlying reason to go via existing route or that the route along St Michael's Hill is already too congested and is avoided.

3.7 If fewer trips are diverted from the Woodlands Road/Elton Road/Tyndall Avenue junction than predicted and, as a worst case, all the above traffic stayed on roads in the vicinity of the school then traffic flows on Elton Road could potentially be around 100 vehicles higher than currently assessed within the Arup TA Addendum.

3.8 Pupils from the school (as young as four years) cross Elton Road frequently throughout the day when passing to and from the main school site and the teaching space in properties on the north side of the road. The school is concerned for the safety of its pupils with regards to any increase in traffic along Elton Road.

3.9 Elton Road is also used by the school's coaches, which make a number of trips between the school and its off-site sporting facilities throughout the school day, and it is also used for school deliveries/servicing. Therefore, any increase in flows on Elton Road, both pedestrian and vehicular, will have an impact on the day to day operation of the school.

4 Review of Impact of Pedestrian Flows along Elton Road

4.1 The proposed development will lead to an increase in east/west pedestrian movements to and from the Hawthorns site. The Arup TA indicates a potential peak increase of 800 pedestrian movements per hour. This prediction is based on a net increase in study spaces provided on the Hawthorns site and based on the existing pattern of arrivals and departures at the existing Arts and Social Services Library on Tyndall Avenue.

4.2 However, no allowance in the predicted pedestrian flows appears to be made regarding the other facilities provided within the Library development, which includes a significant amount of event and exhibition space and a large café.

4.3 The assumed distribution of pedestrian trips on the local highway network has been based on a cordon survey of pedestrian flows into and out of the study area, which assumes that 11% of pedestrian trips will be via Elton Road. Whilst, the existing distribution of pedestrian movements is a good starting point to estimate the distribution of additional pedestrian movements on the local highway network it does not take into consideration the impact of relocating a big generator of trips such as the Library within the study area from Tyndall Avenue to the corner of Woodland Road/Elton Road. The adopted sensitivity test assessment of 22% of pedestrian trips being via Elton Road is considered to be a more realistic of distribution of additional pedestrian movements as a result of the proposed development.

4.4 There are existing capacity issues on Elton Road, and on the network beyond, at the times when peak student and pupil movements coincide. Both student and pupil movements are peaked in relation to the start and end of the school day and also lectures/lesson change-over periods.

4.5 Pedestrians regularly have to step into the road to pass (the footpath reduces to only 1.35m in places). This is exacerbated by the tendency of both students and pupils to walk in groups and the fact that north/south School pupil movements will clash with east/west student movements.

4.6 TDM requested in its May 2020 consultation response that *the applicants are asked to explore the provision of a widened footway on the north side of Elton Road, which is the side of the road where the majority of younger pupils are based, and the side that the new Library will be located on, so will be likely to take feel the effects of the increased pedestrians. Any widening should retain adequate width for contraflow cycling. Buildouts may need to be reduced to accommodate this but speed tables will reduce traffic speeds and allow for localised crossing activity.*

4.7 A technical note was submitted by the applicant and TDM commented in its August 2020 consultation that *Whilst TDM did not agree with the methodology of the survey, TDM subsequently undertook alternative modelling which demonstrated that pedestrian flows would sit within acceptable levels according to Transport for London's Pedestrian Comfort Level guidance, apart from peak periods when coaches are embarking / disembarking, which is to be expected.*

4.8 It is agreed that the TfL Pedestrian Comfort Level guidance (version 2 2019) is a more appropriate basis of assessment than that provided within Arup's TA Addendum. However, no information regarding the alternative assessment undertaken by TDM has been provided and so it is not possible to verify what assumptions have been made in this assessment and, hence, whether the conclusions drawn are valid.

4.9 The TfL guidance is based on hourly flows and as both student and pupil movement are highly peaked in nature compared to general pedestrian movements in residential areas it is considered appropriate to consider pedestrian capacity of the footways on Elton Road for these peak periods. The TDM assessment indicates that during peak periods that the predicted pedestrian flows on Elton Road would not meet the acceptable criteria.

4.10 Given the peaked nature of the conflicting pedestrian movements on Elton Road and the fact that pupils and students tend to move in groups it is considered that a dynamic pedestrian assessment would provide a more accurate assessment of the impact of the proposed development rather than the static assessments undertaken by Arup and TDM. Pedestrians are already observed having to step into the road on a regular basis to pass during peak periods and this can only become a more frequent occurrence as pedestrian movements along Elton Road increase.

4.11 TDM also indicated the need to retain coach and car parking for the school as a reason why footways on Elton Road could not be widened. The school was, and is still, willing to engage with both the University and the Council to explore options for how pedestrian safety on Elton Road could be improved without adversely impacting the school's day-to-day operation, possibly involving the relocation of coach parking to University Road.

4.12 The reallocation of road space to provide improved pedestrian and cycle safety is entirely in line with local and government transport policy and with the recent measures put in place around the city to ensure people can safely socially distance in order to comply with Covid-19 guidelines and re.

5 Review of Impact on the Operation of the Local Highway Network

5.1 The closure of Woodland Road and Tyndall Avenue to eastbound traffic will affect the routing of traffic to the school from the north-east and push traffic onto sensitive parts of the highway network (such as St Michaels Hill, Queen Avenue, Queens Road, The Triangle and Park Row) which already suffer from congestion.

5.2 The predicted change in traffic flows associated with the proposed development has been considered for the local highway network surrounding the site. Further assessment in the form of junction capacity testing has been undertaken for those junctions which experience an increase in 5% of traffic and an increase of 100 vehicles/hr, on any approach in any peak period.

5.3 The threshold criteria do not take into consideration the impact on junctions of the increase in pedestrian movements, such as the Queen's Avenue/Queen's Road junction at which the existing zebra crossing adjacent to the give-way on Queen's Avenue has a significant impact on the operation of the junction. Nor does it take into account whether or not an existing junction is already operating at capacity or not.

5.4 Within the original Arup TA a total of six junctions were the subject of detailed junction modelling but within the TA Addendum only four junctions were assessed. The two junctions which were not assessed again in the TA Addendum were Queen's Avenue/Queen's Road and the B4051 Upper Maudlin Street/St Michael's Hill junctions, both of which would be additionally affected by change in traffic flows resulting from the closure of Tyndall Avenue to eastbound traffic with the exception of buses.

5.5 Within the original Arup TA it is noted that at the Queen's Avenue/Queen's Road PICADY is not able to model a zebra crossing located directly adjacent to the give way line and that, therefore, the results should be treated with some caution. Unlike the other junctions assessed the 2019 Do Minimum results have not been calibrated against the observed queue lengths at this junction. It has therefore not been demonstrated that the PICADY model of the Queen's Avenue/Queen's Road junction properly reflects the current operation of this junction.

5.6 The PICADY results do not appear to reflect that the left turn into Queen's Avenue is affected by the operation of zebra crossing, which leads to congestion on Queen's Road as well as Queen's Avenue. If the operation of the junction cannot be fully assessed using PICADY then, in a similar manner to the Woodland Road/Tyndall Avenue junction, a VISSIM model, calibrated against the observed queuing at this junction, should be used to assess the implications of the proposed development.

5.7 The summary of BCC Consultation Feedback in Table 1 of the TA Addendum indicates that the Tyndall Avenue/St Michael's Hill junction will not function effectively, and due to geometry constraints can only be resolved by removing traffic.

5.8 The University has agreed in principle to provide a contribution towards a traffic reduction feasibility study as part of the Section 106 Agreement with the scope of such a study to be agreed between University and BCC post-determination.

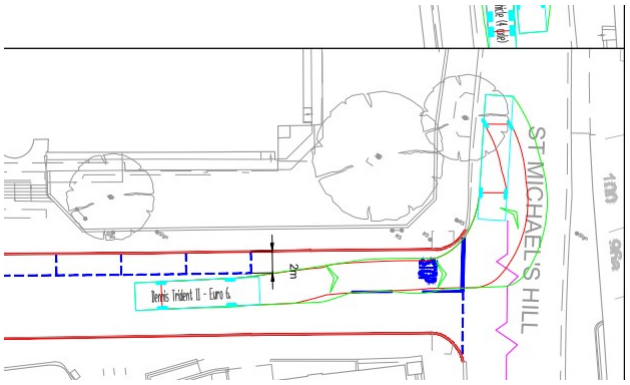
5.9 There is no guarantee that such a study would be able to identify improvements which would sufficiently reduce the traffic in order for the Tyndall Avenue/St Michael's Hill junction to operate effectively nor is there any commitment given that the University would fully fund any improvements identified.

5.10 Looking in detail at the junction assessment of the for the Tyndall Avenue/St Michael's Hill junction it can be seen, from the extract from the Arup TA Addendum below, that as a result of the proposed development, the junction is predicted to go from operating within capacity with only minimal queuing in the 2024 Do Minimum scenario to being predicted to be operating over practical capacity and close to theoretical capacity in the AM peak period. The right turn queue on St Michael's Hill is precited to increase from around 2 PCU to 17 PCU with delay predicted to increase from 11.29s to 80.61s.

Link	Weekday AM (07:45-08:45)			Weekday PM (17:00-18:00)		
	Queue (PCU)	Average Delay (s)	RFC	Queue (PCU)	Average Delay (s)	RFC
2019 Do Minimum (Existing Arrangement)						
Tyndall Avenue	0.3	8.23	0.23	0.4	8.35	0.28
St Michael's Hill	1.3	10.19	0.51	0.2	6.25	0.15
2024 Do Minimum (Existing Arrangement)						
Tyndall Avenue	0.4	8.56	0.25	0.4	8.73	0.30
St Michael's Hill	1.6	11.29	0.56	0.3	6.31	0.16
2024 Do Something (Superseded Proposals – Two-Way Tyndall Avenue)						
Tyndall Avenue	0.4	10.16	0.25	0.6	10.57	0.34
St Michael's Hill	15.6	73.12	0.96	0.6	7.82	0.32
2024 Do Something (Revised Proposals – Tyndall Avenue Bus Gate)						
Tyndall Avenue	0.1	11.96	0.04	0.1	10.71	0.06
St Michael's Hill	17.2	80.61	0.97	0.7	8.01	0.33

5.11 It is noted that the closure of Tyndall Avenue to eastbound traffic with the exception of buses is demonstrated within the TA Addendum to worsen the predicted operation of the critical Tyndall Avenue/St Michael's Hill junction rather than improve it.

5.12 It should also be appreciated the vehicle tracking in the Arup TA and Addendum, as shown in the extract overleaf, shows that a large vehicle turning left from Tyndall Avenue to St Michael's Hill can only do so by crossing over the centre line of St Michael's Hill i.e. where vehicles will be waiting to turn right. The proposed re-routing of the U1 bus service will significantly increase the number of bus services turning left out of Tyndall Avenue onto St Michael's Hill with this service running at a frequency of a bus every 6 minutes in peak periods.



5.13 Therefore, **it is expected that in reality the Tyndall Avenue/St Michael's Hill will operate significantly worse than is predicted within the TA Addendum and will be over-capacity. It should be appreciated that once a junction exceeds its theoretical capacity that the predicted level of queuing and vehicle delay rise exponentially.**

5.14 The benefits given for the closure of Tyndall Avenue to eastbound traffic with the exception of buses is a reduction in the impact on regular bus services of the scheme. From the junction assessments presented in the TA Addendum closing Tyndall Avenue for eastbound traffic decreases the predicted average delay on Tyndall Avenue but this is offset by an increase in vehicle delay on the right-turn into Tyndall Avenue from St Michael's Hill which means that by keeping Tyndall Avenue two-way buses would only be delayed by around an additional 10s, which is not a significant difference.

5.15 The predicted delay to vehicles, including regular bus services, turning right into Tyndall Avenue from St Michael's Hill as a result of the proposed closure of Woodland Road increases by around 70s and therefore if delay to regular bus services is a significant cause for concern to BCC it would be more appropriate that Woodland Road remains open rather than to further restrict traffic movements with the closure of Tyndall Road to eastbound traffic.

5.16 In summary it is considered that the wider consequences and impacts of closing Woodland Road and Tyndall Avenue to eastbound traffic with the exception of buses have not yet been robustly tested within the application. The limited benefits of proposed realm scheme, which provides a localised improvement to the pedestrian environment adjacent to the University, is not considered sufficient to justify the significant impact on the operation of the local highway network, including pedestrian safety and the delay to public transport users.

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Subject	Response to IMA Transport Planning Technical Note		

1 Introduction

1.1 Background

Ove Arup and Partners Ltd. (Arup) has been commissioned by the University of Bristol (UoB) to provide transport planning advice and highways design services in support of proposals to deliver a New Library and Public Realm Scheme on the site of The Hawthorns.

A planning application was submitted by UoB to Bristol City Council (BCC) on 30 January 2020 for the proposed development (planning reference: 20/00433/F). As part of the planning application, a detailed Transport Assessment (TA) was submitted, which assessed the impacts of the development on the local transport network. The scope and content of the TA was agreed between Arup and BCC officers during pre-application discussions.

Subsequent to the original planning application, changes were made to the proposed scheme in response to consultation feedback and the formal comments provided by BCC on the application (dated 06 May 2020). A TA Addendum (dated 24 July 2020) was submitted detailing the changes to the scheme and updating the relevant areas of assessment. In addition to this, further detail was provided at the request of BCC on the impacts of the development on pedestrian flows on Elton Road. A Technical Note (dated 28 April 2020) and Memorandum (dated 11 June 2020) were provided to BCC setting out a detailed assessment of the predicted impacts on pedestrian flows on Elton Road.

Throughout this process, Arup and UoB have engaged collaboratively with BCC to discuss and resolve potential transport issues with the scheme.

As a result of the process described above, final comments were received from BCC's Transport Development Management (TDM) team in response to the updated application (dated 28 August 2020), in which it was stated that:

"the applicants have satisfactorily addressed the concerns and the application is considered acceptable, subject to a number of conditions and mitigation measures."

Similarly, the conclusion of the BCC committee report (dated 16 September 2020), also stated:

"The proposed highway alterations, including the new pedestrian square, the design of the segregated cycleway and the introduction of one way systems have undergone detailed consideration and are all judged acceptable."

Subsequent to this, a Technical Note was submitted to BCC by IMA Transport Planning Ltd. (henceforth referred to as 'the IMA Note') (dated September 2020), on behalf of Bristol Grammar School (BGS), reviewing the transport materials provided by Arup in support of the application.

1.2 Purpose and Contents

This Technical Note provides responses and clarifications to the points raised by the IMA Note on the following three topics:

- Review of assumed redistribution of existing traffic flows;
- Review of impact of pedestrian flows along Elton Road; and
- Review of impact on the operation of the local highway network.

In examining the matters summarised above, this Technical Note demonstrates that the findings recorded within the application materials to-date are unchanged, and that as a result BCC's assertion that the "*application is considered acceptable"* remains valid.

2 Review of Assumed Redistribution of Existing Traffic Flows

2.1 Background

The proposed changes to the local highway network, including the creation of the public square and the introduction of traffic prohibitions on Tyndall Avenue necessitated the development of a methodology to determine the reassignment of traffic through the area. The detail of this methodology and the key assumptions have been detailed previously in the TA and TA Addendum.

When developing this methodology, Arup engaged with BCC during the TA scoping process, including presenting the methodology and interim results to BCC on 06 December 2019.

Following this, Arup also set out the methodology and results during a meeting with IMA Transport Planning on 11 December (based on the development proposals outlined in the original TA).

2.2 Arup Response

2.2.1 Traffic Reassignment Methodology

The IMA Note raises queries relating to the assumed redistribution of existing traffic flows from a number of the identified turning movements. The queries principally assert that a greater percentage of traffic would utilise Elton Road than has been estimated by the TA Addendum. Paragraph 3.4 of the IMA Note states that:

"The general assessment methodology set out in the Arup TA and Addendum for the redistribution of traffic flows as a result of the UoB proposals based on the results of the ANPR appears to be an appropriate approach. However, the assumed re-routing of traffic of individual movements has been reviewed and it is considered likely that some of the traffic assumed to divert onto the wider network will actually remain on the roads surrounding the school and hence traffic flows on Elton Road will be higher than those assessed"

The methodology employed by the TA and TA Addendum takes an approach in which traffic is reassigned onto alternative routes based on a consistent and quantitative basis. This approach identifies alternative routes based on Google directional data, journey distance, journey times, and quantity of right turning manoeuvres. In general, the IMA Note describes this approach, at paragraph 3.4 as "*appropriate*".

Nevertheless, it is recognised that an alternative approach could have been employed, where movements are rerouted based on an estimate of the particular land uses and activities they are associated with, such as for example BGS parents during pick-up /drop-off periods, or shoppers visiting the Co-op on St Michael's Hill. In adopting such an approach, the TA and TA Addendum would have been required – in theory – to understand the journey purpose and activities associated with all of the land uses within the study area.

Such an approach would not be robust as it requires large assumptions to be made on an irregular and qualitative basis. Indeed, in the IMA Note the evidence presented that certain trips would use

Elton Road is reliant on an assumption (used numerously within the IMA Note in paragraphs 3.5-3.6) that:

"it is possible that these trips have an underlying reason to go via [an] existing route"

No further evidence is presented in the IMA Note to support the assertion that traffic would still approach the Woodland Road junction and instead use Elton Road. This is because there is not an empirical or quantifiable basis to the assumption.

It is considered that were the TA and the TA Addendum to employ assumptions such as that quoted above, in the interests of consistency this approach would have had to have been employed throughout the study area. Had the assessment been undertaken in this way the findings of the TA and the TA Addendum would be less robust and auditable than is currently the case.

As such this Technical Note does not accept the assertions within the IMA Note regarding trip reassignment.

2.2.2 Traffic Reassignment and Pedestrian Impacts

The IMA Note considers that the reassignment of traffic will impact upon pedestrian amenity and safety on Elton Road, stating in paragraph 3.8:

"Pupils from the school (as young as four years) cross Elton Road frequently throughout the day when passing to and from the main school site and the teaching space in properties on the north side of the road. The school is concerned for the safety of its pupils with regards to any increase in traffic along Elton Road."

It is accepted that traffic flows are an important consideration when understanding pedestrian amenity and safety.

As can be seen in Figure 1, observed two-way traffic flows on Elton Road in term-time are significantly higher during the AM and PM peak hours, coinciding with school pick-up/drop-off times, but still extremely low overall (five vehicles per minute on average across the AM peak hour). However, during the remainder of the school day when pupils are more likely to be crossing between different teaching premises, traffic flows are significantly lower and so the impacts of any additional traffic on the convenience of pupils waiting to cross the road would be minimal.

Notwithstanding this, improved raised table crossing points have been proposed as part of the scheme to reduce traffic speeds and improve pupil convenience and safety when crossing Elton Road.

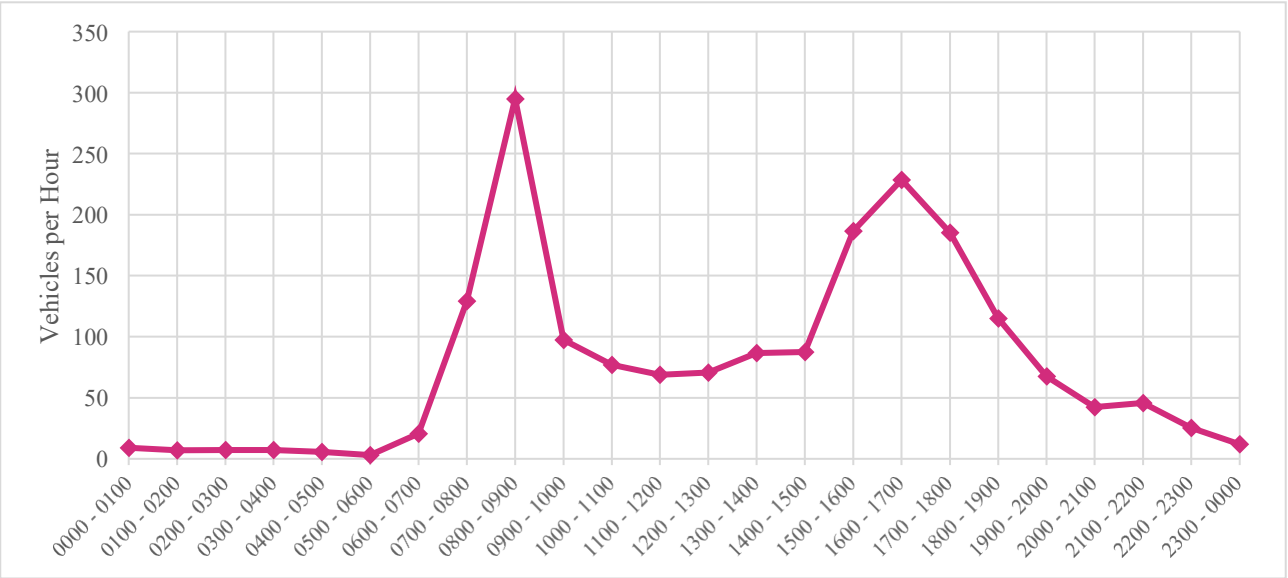

Figure 1: Average weekday traffic flows on Elton Road (October 2019 ATC data)

Neither UoB, as the applicant, nor Arup as their appointed transport consultants, would put forward a scheme if it represented a risk to road safety.

The findings of the independent Stage 1 Road Safety Audit have not identified a road safety concern relating to increased road traffic flows. Similarly, BCC as Highways Authority has not raised concerns relating to pupil safety on Elton Road, based on the magnitude of forecast increase in traffic flows.

It is noted that the IMA Note does not discuss the findings of the Road Safety Audit or present evidence which challenges its findings directly.

2.2.3 Bus Reassignment Methodology

The IMA Note identifies that no bus diversions onto Tyndall Avenue are shown on the '2024 Do Something (Term-time) - Redistribution of Movement 1' sheets (TA Addendum, Appendix I).

Whilst this point is correct, it has no bearing on the overall assessment results as it was a necessary simplification used when completing the redistribution. Due to the limited number of HGVs within the study area, at some locations small numbers of HGVs could not be split accurately by the same observed proportions as the overall general traffic.

Therefore, for simplicity, the diverted U1 buses were included as an additional overlay when summing the combined redistribution (which was not included within Appendix I).

The combined impact of the redistribution, as shown in the '2024 Do Something (Term-time)' sheets in Appendix I of the TA Addendum, includes the redistribution of buses (converted to PCU for the purposes of the junction modelling).

In summary, the bus reassignment was included in the assessment scenario considered by the TA and TA Addendum, but it is accepted that this was not clear in some of the reporting appended to those documents.

2.3 Conclusion

This Technical Note demonstrates that the methodology and findings of the traffic redistribution reported in the TA Addendum are robust. The methodology has been agreed with BCC through a collaborative scoping process, and the findings of the TA Addendum are supported by BCC Highways Officers and Planning Officers, and have been described within the September 2020 Committee Report as "*acceptable*".

Whilst there is always an inherent element of uncertainty in any traffic forecast, the existing traffic flows on Elton Road are sufficiently low that the capacity of the road could readily accommodate any margin of error in the results reported in the TA Addendum.

The concerns described by the IMA Note relating to road safety, whilst noted, are strongly rejected on the basis of the above points and with reference to the introduction of traffic calming measures, and the findings of an independent Road Safety Audit.

3 Review of Impact of Pedestrian Flows along Elton Road

3.1 Background

Following the initial planning submission in January 2020, Arup was asked by BCC to provide additional information relating to pedestrian flows on Elton Road. This resulted in the submission of a Technical Note (dated 28 April 2020) and Memorandum (dated 11 June 2020), which concluded that whilst pedestrian flows would increase on Elton Road, they would not result in footways exceeding capacity and thus footway widening was not required as part of the planning application.

BCC undertook their own analysis utilising a different methodology (TfL Pedestrian Comfort Levels) and reached the same conclusion, as stated in BCC's August 2020 final comments:

"TDM [do] not consider that it is proportional or reasonable to require footway widening in Elton Road to support this planning application."

3.2 Arup Response

The IMA Note states in paragraph 4.2 that when assessing the pedestrian trip generation of the new library:

"no allowance in the predicted pedestrian flows appears to be made regarding the other facilities provided within the Library development, which includes a significant amount of event and exhibition space and a large café."

This assertion is not correct. As described in Section 5.2.2 of the TA, the existing usage profile of the Arts and Social Sciences Library (ASSL) has been calculated from turnstile data at the entrance to the building, which records all entries from staff, students and visitors. Within the ASSL building a mixture of uses are present, including; a large café area, communal and private study areas, book and journal storage, research workspace, staff facilities and meeting rooms, and a special collections area. As the best available data, this is judged to represent a suitably similar usage profile to the proposed new library, to enable a synthetic usage profile to be derived based on the proportional increase in study spaces, as was reported in the TA. The frequency and timing of any events held in the proposed new library would be inconsequential in overall pedestrian trip generation in comparison to the regular term-time peak pedestrian trip generation that has been reported.

In paragraph 4.3 of the IMA Note, it is stated that the pedestrian trip generation:

"does not take into consideration the impact of relocating a big generator of trips such as the Library within the study area from Tyndall Avenue to the corner of Woodland Road/Elton Road."

The pedestrian assessment has not sought to estimate the impact of relocating the existing ASSL library because the planning application does not seek to do so. No plans have been developed or planning applications submitted with regards to the ASSL, and so the application for the new library must be assessed on its own terms.

In paragraph 4.8 of the IMA Note, it is stated that:

"It is agreed that the TfL Pedestrian Comfort Level guidance (version 2 2019) is a more appropriate basis of assessment than that provided within Arup's TA Addendum."

However, paragraph 4.8 of the IMA Note goes on to state that no information regarding the alternative assessment has been provided. It is therefore unclear how this conclusion has been reached without the ability to objectively compare the two approaches.

Given that paragraph 4.9 of the IMA Note goes on to state that a weakness of the TfL guidance is that it refers only to hourly flows, this supports the Arup methodology, which not only assessed peak hour flows, but also examined peak 15-minute and an assumed peak 5-minute periods.

As stated in the 11 June Memorandum, Arup recognise that different methodologies exist, including dynamic modelling, but stand by the methodology and findings of the assessment as previously reported.

Paragraph 4.5 of the IMA Note states that:

"*Pedestrians regularly have to step into the road to pass".*

However, no empirical data has been supplied within the IMA Note to support this assertion. Arup's assessment was completed on the basis of detailed pedestrian survey data, which included video footage recorded during the peak periods in question, and so provided an objective view of the existing conditions, which do not support the position put forward in the IMA Note. Furthermore, the independent Stage 1 Road Safety Audit has not raised any concerns relating to pedestrian safety on Elton Road.

In paragraph 4.11 of the IMA Note, it is stated that:

"The school was, and is still, willing to engage with both the University and the Council to explore options for how pedestrian safety on Elton Road could be improved without adversely impacting the school's day-to-day operation, possibly involving the relocation of coach parking to University Road."

To clarify, throughout late 2019 Arup and the University consulted extensively with IMA and BGS on the subject of coach parking options. The proposals included within the planning application were developed through this process. It was understood by Arup and UoB that all parties agreed on the proposed coach parking arrangements that have been included within the proposed development - and correspondence can be provided which illustrates this point.

Finally, in paragraph 4.12 of the IMA Note it is stated that:

"The reallocation of road space to provide improved pedestrian and cycle safety is entirely in line with local and government transport policy."

Arup and UoB support this statement and current wider Government policy to prioritise active travel. However, as has been stated by BGS and its stakeholders during the public consultation, the catchment of the school is significantly wider than that of a state school, and so walking and cycling are not viable travel options for large number of pupils, resulting in a significant proportion of car trips for school pick-up/drop-off being undertaken by car. Therefore, a balance must be struck between accommodating school-related car traffic, pedestrian movements, and spatial constraints of the conservation area. It is considered that the proposed scheme achieves such a balance and thus has the support of BCC, as evidenced by its support in the September 2020 Committee Report.

3.3 Conclusion

The IMA Note raises a number of points that have previously been covered by Arup's pedestrian flows assessment, documented in the 28 April Technical Note and 11 June Memorandum. Those documents describe in full how the methodology and findings of their assessment as previously reported, and the independent Stage 1 Road Safety Audit similarly, has not raised any concerns relating to pedestrian safety.

It is not judged that any new information has been presented (e.g. survey data) that would contradict these findings, or result in a change to BCC's previous conclusions as stated in their August 2020 formal comments.

BCC may wish to share the detail of its own pedestrian flow assessment with IMA for further discussion (and in this event Arup would request to attend these discussions), but it is considered that BCC is already satisfied that the development proposals – as they relate to pedestrian flows – are acceptable and would presumably require new information from IMA were they to modify their position.

4 Review of Impact on the Operation of the Local Highway Network

4.1 Background

The approach to assessing the impact of the proposed development on the local highway network was agreed during pre-application scoping discussions between Arup and BCC, and has been consistently applied across the original TA and subsequent TA Addendum. Following the redistribution of traffic within the study area, a threshold test was agreed as a suitable method to identify the junctions most impacted by the proposals, with detailed junction modelling to be completed for the identified locations.

The criteria for modelling were an increase of 5% of traffic and an increase of 100 vehicles/hr. The rationale behind the threshold is that general traffic levels frequently fluctuate at around 5% either side of the average traffic level. As such, it is considered that increases in traffic that do not exceed 5% and 100 vehicles will fall within the standard variance in junction performance and would not materially impact on the operation of the road network.

4.2 Arup Response

Section 5 of the IMA Note challenges a number of elements of the junction assessments undertaken in the original TA and TA Addendum. Paragraph 5.3 of the IMA Note states that:

"The threshold criteria do not take into consideration the impact on junctions of the increase in pedestrian movements, such as the Queen's Avenue/Queen's Road junction at which the existing zebra crossing adjacent to the give-way on Queen's Avenue has a significant impact on the operation of the junction."

The usage of, and criteria for, the threshold test were agreed with BCC officers as part of the TA scoping process.

Paragraph 5.4 of the IMA Note states that:

"Within the original Arup TA it is noted that at the Queen's Avenue/Queen's Road PICADY is not able to model a zebra crossing located directly adjacent to the give way line and that, therefore, the results should be treated with some caution."

However, with a nearside lane width of approximately 6m on Queen's Road, it is judged that the PICADY model representation of stacking space for 1 PCU (the minimum allowable in PICADY) before the pedestrian crossing is suitable, as all but the largest vehicles continuing southbound on Queen's Road would be able to pass a single vehicle waiting at the pedestrian crossing without leaving the nearside lane. Indeed, this behaviour can helpfully be seen on Google Earth, as reproduced in Figure 2.

Figure 2: Aerial imagery of Queen's Road / Queen's Avenue junction, demonstrating positioning taken by vehicles turning left into Queen's Avenue (source: Google Earth)

Paragraph 5.4 of the IMA Note also states that two junctions assessed in the original TA were not subsequently assessed in the TA Addendum (Queen's Avenue / Queen's Road T-junction and the B4051 Upper Maudlin Street / St Michael's Hill signalised junction).

The initial Scoping Note for the Transport Assessment (26 June 2019) agreed between Arup and BCC did not include either junction within the scope of the traffic assessment, as it was not considered likely that the development proposals would have a significant impact on their operation. However, following discussions with BGS in the summer of 2019, Arup and UoB agreed to include the Queen's Avenue / Queen's Road junction within the TA to provide information to BGS and to estimate what the impact of the development proposals might be at this location. Similarly, discussions with TDM regarding the preliminary results of the traffic redistribution resulted in the inclusion of the assessment of the Upper Maudlin Street / St Michael's Hill junction within the TA.

Considering first the Queen's Avenue / Queen's Road junction, the material presented within the TA found that the traffic impact at this junction is limited. The junction model prepared within PICADY includes volumetric information relating to pedestrians using the zebra crossing. This information was recorded on the day of the surveys and is reflected within the junction model. While it is noted that pedestrian movements can be more readily calibrated using microsimulation tools, this exercise was not deemed necessary since the findings of the TA with respect to this junction are found to be representative of the likely impact associated with the proposed development. The finding that the junction will not be significantly impacted by the development is supported by the following points:

- There is only one traffic movement at this junction which is opposed by other traffic; the left turn out of Queens Avenue. The traffic reassignment associated with the proposed development does not increase the volume of vehicles performing this manoeuvre. As such this opposed movement will not be affected detrimentally by the proposed development.
- It is accepted that both traffic movements at this junction are opposed by pedestrians using the zebra crossing. However, there is no reason to consider that the development proposals would significantly increase the volume of pedestrians using this crossing. This is because, in contrast to (for example) the Woodland Road / Tyndall Avenue / Elton Road junction, it is relatively remote from the proposed development site. Those pedestrians who would approach the Queens Avenue / Queens Avenue junction from the east would be able to choose to walk on the footway which better serves their onward route (thus forgoing the need to cross the road at the bell-mouth) and the same is true in reverse for those pedestrians approaching the proposed development site from the west.
- As a result of the two points above, it is intuitively correct to say that there is no increase in opposing movements at the junction.

Considering the Upper Maudlin Street / St Michael's Hill junction, the forecast change in traffic flows from the updated traffic redistribution were not sufficient to meet the agreed threshold test requiring assessment. Given the junction was reported in the TA to experience minimal impacts on performance between the 'Do Minimum' and 'Do Something' scenarios, no further assessment has been undertaken give the limited change to forecast traffic flows arising from the revised development proposals.

For these reasons therefore, it has not considered necessary to model either junction further, the results of which have already been presented in the TA and are considered sufficient to provide information to IMA on this matter. It is noted that BCC has accepted the findings of the TA and TAA with respect to traffic impact, and thus can be considered to be satisfied with the findings relating to these junctions.

Paragraphs 5.10-5.15 of the IMA Note focus on the impacts on the Tyndall Avenue / St Michael's Hill junction, on the basis that vehicle tracking shows that buses turning left from Tyndall Avenue must cross the centreline to make the turn. However, with the inclusion of the bus gate at the western end of Tyndall Avenue, the only vehicular traffic making this turn during peak hours would be U1 buses, with a headway of six minutes during the AM peak. The additional delays to right-turning traffic on St Michael's Hill above that reported in the TA Addendum would be minimal, given only 10 buses would make this manoeuvre in the whole of the peak hour.

Paragraphs 5.8 and 5.9 of the IMA Note question whether the proposed financial obligations of the Section 106 agreement are sufficient to mitigate the residual highway impacts of the scheme on St Michael's Hill. Ultimately this is a matter for BCC to determine.

However, it is clear that a significant package of S106 contributions have been agreed with BCC to mitigate impacts of the development on the wider area and immediate area including contribution toward a scheme on St Michaels Hill and a wider comprehensive study of traffic and transport within the wider area. This mitigation has included contributions toward the improvement of Elton Road in terms of safety, pedestrian movement and coach parking.

Finally, paragraph 5.16 of the IMA Note concludes that:

"The limited benefits of proposed realm scheme, which provides a localised improvement to the pedestrian environment adjacent to the University, is not considered sufficient to justify the significant impact on the operation of the local highway network".

The transport benefits of the scheme extend far beyond the localised pedestrian environment on the new civic square, which in itself is a significant benefit to BGS and the local community, as well as the University. Significant investment would be provided to improve public transport infrastructure for both University and local buses through the proposed bus hub. Formalised coach parking on Elton Road is proposed specifically for the benefit of BGS, with raised table pedestrian crossings also proposed on Elton Road to improve amenity for pupils when crossing between school buildings. Furthermore, the scheme would see a step-change in cycle parking spaces across the wider area (an additional c.500 spaces).

Local, regional and national planning policy clearly support developments that prioritise active and public transport over the private car, as the proposed development does. It is accepted that there will be some minor impacts on the local highway network, as TDM stated in their August 2020 formal comments:

"it is acknowledged that it will be less convenient to drive through this area by car."

However, the severity of these impacts is not judged to be significant, given the anticipated avoidance of the area by through-traffic and the proposed mitigation measures supported by the Section 106 agreement.

4.3 Conclusion

The IMA Note has challenged the findings of the TA and TA Addendum on a number of technical matters relating to impacts on the operation of the local highway network. Whilst it is accepted that there are inevitable limitations to the traffic forecasts and junction modelling, the matters raised would not result in a change to the overall findings of the assessment. Namely that there will be some impacts on the local highway network, but they are not judged to be severe, especially given the anticipated avoidance of the area by through-traffic and the proposed mitigation package for St Michael's Hill included within the Section 106 agreement.

Instead, the proposed scheme represents a necessary reordering of the hierarchy of transport users through the area, prioritising active and public transport over the private car.

3 Conclusion

This Technical Note provides responses and clarifications to the points raised by the IMA Note on the following three topics:

- Review of assumed redistribution of existing traffic flows;
- Review of impact of pedestrian flows along Elton Road; and
- Review of impact on the operation of the local highway network.

The IMA Note has challenged the findings of the TA and TA Addendum on a number of technical matters across these three areas. However, following a detailed review of the matters raised, the overall position of the applicant has not changed with regards to the reported transport impacts of the proposed scheme. No additional information has been provided (e.g. survey data) by IMA that would substantively change the findings of the assessments undertaken, whilst some of the minor technical points would result in minor changes well within the expected margin of error associated with traffic forecasts.

For that reason, it is considered that BCC's position to support the proposals, as set out in the
committee report, should remain unchanged by the IMA Note.

Paragraph 109 of the National Planning Policy Framework (NPPF), states the following with regards to the key policy test for the acceptability of transport impacts:

"Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe."

On the basis of the findings of the independent Stage 1 Road Safety Audit, there are no grounds relating to unacceptable impacts on highway safety, including on Elton Road. Considering the cumulative impacts on the road network, it is accepted that there will be some minor negative impacts arising from the redistribution of vehicular traffic due to the closure of Woodland Road and introduction of a bus gate on Tyndall Avenue. However, in the context of the Section 106 agreement, the residual cumulative impacts cannot be judged to be severe.

The scheme is compliant with adopted local policies relating to transport, including BCS10 and DM23, and prioritises travel by pedestrians, cyclists and public transport users. As such there is no reason that BCC would change their recommendation to grant planning permission (subject to planning agreement) as a result of the matters raised by the IMA Note.