



Strategic City Transport **Transport Development Management (TDM)** *Application Response*

To: Gary Collins, Development Management
From: Laurence Fallon, Transport Development Manager
Ext: x36846
Date: **21 February 2020**
Address: Arnold Laver Brabazon Hangar and Surrounding Land
Application Nos: 19/05500/P & 19/05514/F
Proposal: Hybrid planning application comprising: demolition of existing ancillary buildings and structures; full details associated with the change of use and associated external alterations to the Brabazon Hangar buildings from Class B8 use to a mixture of Class D1, D2, A1, A3, A4 and B1a uses, along with outline details associated with infrastructure works: revised vehicular access arrangements; redevelopment and reorganisation of the former aircraft apron to provide parking, servicing and associated infrastructure provision.
Construction of new pedestrian bridge linking the former Filton Airfield and the Brabazon Hangar site over the Henbury railway line, including associated demolition, earthworks and landscaping.
Response: **Final Response**

1.0 PREAMBLE

- 1.1** The above proposals have the potential to generate severe and substantial traffic impacts that require to be comprehensively addressed and therefore minimised. This is in the interests of: tackling congestion and the consequent effects this would have on air quality and public health; the environmental quality of the wider area and the immediate impacts that would be felt by local residents and businesses.
- 1.2** The critical policy requirement is therefore the reduction of the above impacts through the early and targeted delivery of effective and robust travel options that effectively mandate as many of the maximum 17,000 spectators and employees as is possible to reach the site by means other than the private car.
- 1.3** The development is situated within an already congested peak hour highway network and therefore TDM will not support development that it considers will fail to make public transport, park and ride, walking or cycling the easiest form of travel to reach the development.

- 1.4** Some of these interventions will rely on separate processes, agreements and consultation with third parties, not all of which can be secured through the planning process. Therefore, the necessity of having an operational rail station and park and ride/rail services and sites, together with the ability of the site to manage 17,000 visitors is a major concern. This will be addressed through planning conditions and within the section 106 Heads of Terms.
- 1.5** TDM has worked with the applicant and neighbouring highway authorities, South Gloucestershire Council (SGC) and Highways England (HE) with the objective of mandating the applicant to implement robust mechanisms to deliver infrastructure and connectivity at the right time to serve this development.
- 1.6** The conditions and planning obligations referred to here are required for this development to demonstrate compliance with planning policy. They comprise financial contributions and physical improvements in addition to restrictive conditions that are required to minimise the extent to which the development gives rise to unacceptable transport impacts.
- 1.7** This report should be read in conjunction with TDM's initial response to the application (provided at the end). This was submitted prior to the initial response deadline of 24th December and prior to the assessment of the application by the 17 other specialist teams within Transport and Highways, upon which TDM relies to formulate its comments.
- 1.8** The previous response therefore confirms the agreed scoping parameters, trip generation of the development and initial impacts, whilst highlighting what further evidence was either missing or required in order to reach a conclusion on transport matters. The further detailed submission was received by TDM in the period between 27th January and 3d February and is detailed below alongside TDM's observations and recommendations.

2.0 FURTHER TECHNICAL SUBMISSIONS

- 2.1** This response updates the matters outstanding from the initial response and summarises the further technical discussions that have happened to date, setting out the package of measures that is required to make this development acceptable in transport terms.

Modelling outputs and presentation

- 2.2** The analysis presented in the original TA submission compared forecasted traffic flow changes across the wider highway network resulting from the development, based on a number of scenarios, including the no development (reference case) a 7,000 capacity double event (matinee & evening performance) and a 17,000 event, the latter tested with and without sustainable travel measures.
- 2.3** This analysis used the GBATS-SATURN model, which covers the West of England region. However, the presentation of the analysis by the consultant omitted a large part of Bristol's highway network. Therefore, whilst it was possible to see the routes and flows that were attributed directly to arena trips – for example the A38 north of Toronto Road and Southmead Road north of Pen Park Road, it failed to convey the 'ripple' effect of background traffic displacement to other locations, highlighted in **Para 3.39** of the previous response.

2.4 The information has now been presented for those locations and is provided in the table below alongside the major routes for completeness. The differences between the Do Minimum and Do Something scenarios are explained in *paras 2.1-2.3* of the previous response.

2022 Evening Peak Hour (1700-1800) – Traffic Flows (*NB = northbound, SB = southbound)

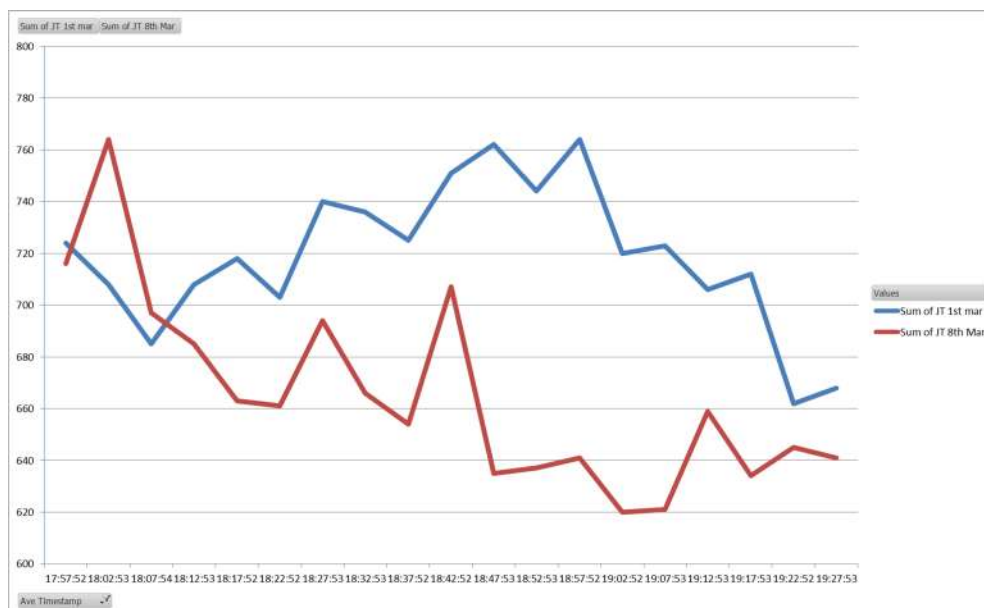
Location	2022 Baseline	7,000 Double Event	17,000 Event Do Minimum	17,000 Event Do Something
A38 Gloucester Road, north of Monks Park Avenue	719 NB 1019 SB	770 NB 1006 SB	806 NB 1020 SB	764 NB 1026 SB
Toronto Road, east of Gloucester Road	320 EB 303 WB	313 EB 304 WB	323 EB 313 WB	322 EB 312 WB
Wessex Avenue, east of Gloucester Road	232 EB 164 WB	233 EB 190 WB	229 EB 202 WB	229 EB 190 WB
Filton Avenue, north of Muller Road	388 NB 338 SB	415 NB 349 SB	417 NB 337 SB	408 NB 343 SB
Filton Avenue, north of Toronto Road	336 NB 524 SB	336 NB 565 SB	336 NB 538 SB	335 NB 540 SB
Kellaway Avenue, west of Gloucester Road	397 NB 614 SB	411 NB 643 SB	384 NB 609 SB	387 NB 607 SB
Muller Road, south of Filton Avenue	888 SB 614 NB	882 SB 638 NB	884 SB 640 NB	879 SB 632 NB
Monks Park Avenue, west of Gloucester Road	364 EB 396 WB	362 EB 413 WB	369 EB 380 WB	369 EB 383 WB
B4056 Southmead Road, north of Pen Park Road	910 NB 1040 SB	952 NB 1184 SB	973 NB 1092 SB	957 NB 1083 SB
Pen Park Avenue west of Southmead Rd	755 SB 851 NB	786 SB 937 NB	758 SB 868 NB	753 SB 861 NB
B4056 Southmead Road south of Pen Park Road	671 NB 664 SB	691 NB 729 SB	734 NB 685 SB	723 NB 687 SB
A4018 Wyck Beck Road, north of Crow Lane	1225 NB 1143 SB	1221 NB 1149 SB	1231 NB 1143 SB	1220 NB 1143 SB

Locations of material impact – 5-10% increase in traffic, 10%+ increase in traffic

- 2.5 When reviewing the above analysis, it must be borne in mind that the **GBATS-SATURN** tool represents only a single hour (**17:00-18:00**) within the evening peak period, despite weekday congestion occurring along the network between 16:00 and 19:00.
- 2.6 Secondly, and as confirmed in previous comments, only **15%** of arena traffic is forecasted to use the highway network during the 17:00-18:00 period, with around double this figure (31%) arriving between 18:00 and 19:00 and a further 31% arriving between 19:00 and 20:00, as quantified in *para 3.27* of the previous response.
- 2.7 Journey time data obtained from BCC Highway Network Management for the Massive Attack concerts held at Filton in March 2019 provides an indication of how the holding of a major event at this location effectively extends the duration of the peak hours of demand across a longer period as illustrated below.

Extension of Peak Hour Conditions - A38 Average Journey Times

Friday 1st March 2019 (Massive Attack concert) vs Friday 8th March 2019 (no event)
Stokes Croft – Filton Avenue, period between 17:57- 19:27 hours – (y-axis = time in seconds)



2.8 The above findings indicate how journey times increased along the A38 beyond 18:00 as a result of the Massive Attack concert in contrast to a non-event day where journey times reduce from this point onwards as the evening progresses. The impact of this extension of the peak period of demand is the consequential extended periods of congestion and reduced air quality, increased bus journey times (and therefore unreliability) and localised impacts where background traffic attempts to avoid the main route, generating increased traffic along residential streets. An average additional delay per vehicle of two minutes is considered by TDM to be a significant and material impact where it occurs on an already congested network.

2.9 For clarification purposes, the table below illustrates the number of new trips that are forecast to be generated across the overall highway network for a 17,000 capacity weekday evening event, confirming how the level of development traffic during the hours of 18:00-19:00 and 19:00-20:00 is approximately double that of the traditional peak hour period of 17:00-18:00 captured in the GBATS-SATURN model.

Development Traffic Arrival Profile

Time Period	Vehicle Trips (including Park and Ride traffic)			Percentage
	2022 Do Minimum	2022 Do Something	2036 Do Something	
16:00-17:00	236	205	157	5%
17:00-18:00	708	614	472	15%
18:00-19:00	1464	1269	976	31%
19:00-20:00	1464	1269	976	31%
20:00-21:00	331	287	220	7%
TOTAL	4,723	4,093	3,149	

- 2.10** The A38 VISSIM microsimulation model covers a two –hour period (16:30-18:30) and was required to be utilised for precisely this reason, in addition to its ability to scrutinise the highway network in much greater detail. Following its extension (see below), the baseline A38 VISSIM model (which was calibrated to 2016) was considered robust and fit for purpose in order to test the impacts of the development in question.
- 2.11** The above model was extended at the request of TDM to include the Gloucester Road / Toronto Road / Monks Park Avenue signal junction and the Southmead Road / Pen Park Road / Monks Park Avenue dual mini-roundabout, as reported previously in *para 3.29* of the previous response. These locations, and the arms leading up to them currently experience considerable congestion at peak times and are therefore sensitive to increases in traffic, for which congestion often increases exponentially, as opposed to a linear increase – for example, where an additional twenty vehicles join the end of a queue, the overall increase in queuing will become greater than twenty given the additional delay that each vehicle generates. TDM’s particular concern in this respect relates to public transport unreliability and negative environmental knock-on effects in residential areas.
- 2.12** Within the Transport Assessment Addendum (TAA) submitted in January, further analysis is provided of the VISSIM modelling, where the supporting commentary assesses the ability of the model (and therefore the future highway network) to accommodate levels of traffic that are forecast in each of the development scenarios. Within the TAA, *paras 3.3.6-3.3.7* make reference to latent demand – i.e.. traffic that is unable to enter the VISSIM-modelled network as a result of congestion. The analysis below relates to the entirety of the VISSIM-modelled area.

3.3.6 Table 3.2 highlights that a significant amount of Latent Delay is forecast in the 2022 ‘with Arena’ Scenarios and also in the 2036 ‘Reference’ and ‘Do Something Scenarios’. Again, the ‘Everyday’ Scenario sees the biggest change relative to the ‘Reference Case’

3.3.7 Table 3.3 shows that in the 2022 ‘Reference Case’ the Latent Demand is minimal. All other scenarios show significant latent demand..... with latent demand even higher than in the 2036 Scenarios. Furthermore, the results show that with each hour modelled, the latent demand gets higher, suggesting the network does not recover during the modelled time period.

- 2.13** A summary of the above analysis is provided in the table below.

A38 / B4056 VISSIM model Total Network Delay Statistics – Evening Peak Period 16:30-18:30

Hour Beginning	2022 Do Minimum	2022 Do Something	2022 Double Event	2036 Do Something
	Total Network Delay Change	Total Network Delay Change	Total Network Delay Change	Total Network Delay Change
16:00	15%	15%	82%	9%
17:00	35%	35%	219%	15%
18:00	72%	65%	383%	29%
Average	43%	41%	241%	19%

- 2.14** These impacts are particularly concerning and cannot be overlooked, representing a material worsening of conditions on Bristol’s highway network, specifically along the A38 Gloucester Road and the B4056 Southmead Road at times when events occur.

TDM Response to Transport Assessment Findings

- 2.15** TDM, alongside SGC and HE has insisted on an increased package of highways and transport measures over and above those already proposed and confirmed in the previous TDM comments in **2.1 paras a) – j)** that mitigate this situation in order to minimise these impacts going forward. These are summarised below and referred to later.
- **The funding and design of an Intelligent Transport Network, including but not limited to: active CCTV monitoring, potential Urban Traffic Control (UTC) and SCOOT network management, increased Variable Message Signage (VMS), signal junction upgrades and collaborative Control Centre management between HE, SGC and BCC.**
 - **The funding of a Southmead-area study to assess in greater detail traffic routing and behaviour to provide recommendations and designs on area-wide improvements.**
 - **Increasing of the number of rail users to the site through increased rail station capacity and/or service frequency and event-specific rail ‘shuttle’ services.**
 - **Public Transport / Shuttle Bus / Park and Ride bus priority within the CPNN site**
 - **Shuttle Bus and Park and Ride services for 7,000 capacity events upwards**
 - **Dedicated and permanent Arena Public Transport facilities in the City Centre**
 - **Funding of additional Public Transport where current / future services are unable to meet arena demand, or are unviable without financial support.**
 - **The funding of Walking and Cycling Improvements**
 - **The funding of an Event-Day Residents-only Parking Scheme**
 - **Failsafe Travel Plan Penalties, payable upon failure of TP to meet mode share targets.**
 - **The avoidance of clashes with major events nearby i.e.: Bristol Rovers matches and International Cricket fixtures / concerts at Gloucestershire County Cricket Club.**
 - **The setting up of a Transport Steering Group to meet regularly, including members of HE, BCC, SGC, Network Rail, YTL & the West of England Combined Authority (WECA).**
- 2.16** It is recognised several of the above interventions result in wider benefits to the local area and are therefore arguably required to meet wider growth in the future, particularly with regards to rail provision, network management, walking and cycling and bus priority. Similar to other venues elsewhere in the UK, the funding of some of the above infrastructure, particularly rail cannot be secured entirely through the planning process.
- 2.17** Nevertheless, the arena proposals have been demonstrated to generate material and acute impacts on the highway greater than that of neighbouring developments, given that these proposals deposit up to 17,000 visitors to and from the highway and public transport networks within a single 2-3 hour period prior to an event and in a single 1-hour period following it. Furthermore, the submitted arena events schedule forecasts the staging of 130no. 7,000+ capacity events annually. TDM cannot consider such impacts to be occasional or negligible.

On-site Arrival and Departure Infrastructure

- 2.18** The safe arrival and departure of spectators from the venue is critical. It must also serve to encourage, rather than prohibit or obstruct those who are wishing to travel to and from the venue by sustainable modes. The infrastructure, as approved for the approved outline application for the airfield will therefore require in the future to be adapted / revised to accommodate up to 11,890 arena spectators catching trains, coaches, buses, taxis, shuttle buses and park and ride services at the same time. Conflict would therefore be inevitable where this not got right. This is critical to the success of the transport package, the visitor experience, and arguably the success of the arena and therefore needs to be designed for.

Transport Hub

- 2.19** A multi-modal 'Transport Hub' was identified within the ground and first floors of the 1,500 capacity car park established as part of the airfield outline planning permission. However, no details were provided for this at submission as it is outside of the red line boundary of this planning application. This was a matter of concern for TDM as it had not been demonstrated that the space allocated was fit for purpose and would accommodate demand.

- 2.20** It has therefore been crucial for TDM to insist upon greater level of detail being provided on how a design for a multi-modal transport hub could operate. The applicant has subsequently provided an indicative arrangement for how the ground floor of the car park will look. The submitted drawing **M000527-2-1-DR-004 Rev A** provides some detail of the ground floor, as follows:

- Vehicular Access / Egress
- Dedicated bays for 5 Park and Ride buses to board / alight at a time
- Dedicated bays for 5 City Centre Shuttle buses to board / alight at a time
- Dedicated bays for up to 10 coaches (with 5 boarding alighting at a time)
- Waiting (holding) bays for a further 44 buses to wait at a time.
- Priority for buses / coaches ahead of car access to / from the car park
- Associated circulation turning space for vehicles
- Safe waiting / queueing space for passengers

- 2.21** The above drawing indicates how the above provision alongside the proposed railway station could look. It is therefore necessary to reference this drawing in a condition for indicative purposes alongside an itinerary of requirements for this space to ensure that such facilities are delivered as part of the car park. There are however two matters that, at present are unclear:

- **The timescales for delivery of the transport hub.** The applicant has sought from SGC a temporary permission for up to 2,000 car parking spaces (to include 500 staff and disabled spaces) on the site of the current runway. It is understood that there will be a time limit imposed on this application of 10 years from the date of the application. Assuming a 2023 opening year, the transport hub can therefore expect to be delivered no later than 2030. TDM would be concerned with the effectiveness of the transport hub in encouraging sustainable transport were the temporary facilities to be in place for this length of time.

- **Drop off movements** - it remains to be demonstrated whether the first floor of the car park can accommodate the 630 drop-off / pick up movements forecast as part of a 17,000 event. Given the problems this either could cause on the highway (i.e. safety / public transport delay), it is therefore necessary to condition this provision alongside that of the ground floor, alongside an area suitable for use by the 850 taxis that a maximum-capacity event is forecast to generate.

Filton North Railway Station – current design

- 2.22** It is recognised that the proposed MetroWest 2 rail service frequency is unlikely to be fit for purpose to serve the level of acute demand that could be generated, and therefore should be encouraged by rail. This would fail to maximise access to the site by rail and would be contrary to **paragraph 110** of the **NPPF**.
- 2.23** The current MetroWest 2 package for Filton North station was conceived prior to the Arena proposals and includes hourly trains that comprise a three-carriage service and therefore a maximum of around 300 passengers at any one time (1.7% of total demand for a 17,000 maximum-capacity event). This **Do Minimum** scenario would provide only a single 300-capacity train at the end of an evening event before services terminate.
- 2.24** TDM’s central concern – as demonstrated by the modelling (referred to below) is that where any more than 510 visitors attempt to board what is likely to be a single train, they will not be able to do so and will be turned away regardless of whether they have a rail ticket, generating overcrowding around the station and potentially missing onward rail connections. This is not acceptable in planning policy terms and risks attracting substantial negative publicity.
- 2.25** TDM is concerned that without intervention, the rail strategy would therefore be to effectively ‘manage down’ rail use to avoid overcrowding, rather than to manage-up the demand to help deliver on reducing congestion and other negative environmental impacts. This is not an acceptable outcome. The applicant concurs that this is not in their best interests or that of the wider area and has expressed willingness and best endeavours to work with BCC, SGC and WECA to avoid this situation.

Filton North Railway Station - enhancements

- 2.26** The applicant forecasts that 510 rail passengers will attend a 17,000 event in the 2022 opening year Do Something scenario (increasing the rail mode share from 1% to 3%). This would rely upon increasing rail services by a further 2 carriages from what is currently envisaged. BCC, SGC, and WECA require the applicant to contribute financially to increasing this capacity once the implications / costs of this are fully known in addition to the provision of event ‘shuttles’ as provided by other venues.
- 2.27** In response to this, the applicant has modelled a scenario using LEGION crowd dynamics software, based upon 2,040 arena visitors (a 12% mode share) arriving at the station up to an hour after an event and held in 500-capacity ‘pens’ before being allowed onto the platform to catch one of four 500-capacity trains, assuming a theoretical 15-minute frequency.
- 2.28** TDM recognises that to increase either rail services of platform lengths / station capacity is not a straightforward matter and unlikely to be resolved over the course of this planning application, given the reliance on third parties including rail operators and regulators and the mechanisms necessary to secure it. A financial contribution will therefore be sought at a later date.

City Centre Shuttle buses

- 2.29** As part of the previous Massive Attack concerts, the applicant in conjunction with BCC arranged for the management and provision of shuttle-bus services from Bristol City Centre to Filton to carry passengers to and from the Massive Attack concerts via a route comprising The Centre, Redcliffe Way, Bond Street and the M32. This was successful in terms of numbers, but resulted in large queues forming along the city centre promenade and at other stops, for which existing scheduled buses / passengers needed to be relocated. This resulted in the need for additional space to be allocated for queuing passengers and BCC staff resource to manage.
- 2.30** The above situation comprised a one-off event and may have been tolerable for two days in one year. However, as part of these proposals, the applicant is intending to run 130 events each year with a 7,000 or more capacity, resulting in much more regular demands being placed on city centre infrastructure (up to three times a week) that cannot be accommodated without severe disruption to other services, risking the safety and convenience of *all* bus passengers in the city centre.
- 2.31** The applicant's transport strategy and mode share target of 16% for this mode equates to 2,720 City Centre shuttle passengers and is therefore required to fund entirely the provision of two arena-specific bus stop facilities in central Bristol. These would comprise the necessary and minimum requirements of high capacity bus services, including maximum length shelters, real time information, lighting, seating, display cases, and all associated civil engineering works, including ducting, raised kerb platforms, concrete landing pads and associated TROs.

Park and Ride (P&R)

- 2.32** As with the City Centre shuttle buses, the applicant's transport strategy relies on around 2,000 park and ride spaces to serve 30% of arena visitors approaching the site, largely from the motorway network. This equates to a 5,100 visitors (1,889 cars) for a 17,000-capacity event. The P&R locations are identified as follows, and are strategically chosen in order to effectively intercept trips that approach from the motorway network to avoid congestion in the local area.

Park and Ride Locations

No	P&R Location	Arena Visitors routing from	Total Number of spaces	Spaces required for arena use	No. of P&R Passengers (2.7 per vehicle)
1	The Mall, Cribbs Causeway	M5 (N)	6,900	500	1,350
2	Parkway Station	M4 (E)	1,883	300	810
3	Lyde Green Park and Ride	A4174 (E)	246	246	664
4	Portway Park and Ride	M5 (S), M49	500	500	1,350
5	M32 (UWE)	M4 (E), M32	2,300	343	926
Total			11,829	1,889	5,100

- 2.33** TDM considers the selection of these sites to be broadly sensible in that they are geographically spread to offer a viable P&R option for those approaching from each direction of the motorway network. For trips originating within the BCC urban area, visitors would be required to select a public transport option at the point of ticket purchase, either by rail, the city centre shuttle bus service or local (i.e.: MetroBus) services, both of which will serve the arena directly. Walking and Cycling is also a realistic mode for some visitors and this is covered later.

Shuttle Buses and Park and Ride – Requirements

2.34 A number of key factors emerge when considering the Park and Ride and Shuttle bus services:

Minimum requirements P&R and Shuttle Bus Services

- i. Firstly, and in order for the development to meet its mode share targets, TDM requires these services to be provided at all events that attract a minimum capacity of 7,000 or more. It would not be acceptable, as has been suggested for a 12,000 event not provide P&R, or a 14,000 event to not provide a City Centre shuttle. A sliding scale of provision has therefore been shared with the applicant, determining the minimum number of buses / P&R spaces required alongside the number of passengers expected in order to meet the mode share targets as set out by the applicant. For this to work, the applicant will be required to inform BCC, SGC and the car park owners of the capacity of the event prior to selling tickets to ensure sufficient provision can be arranged in time. The number of buses required for this level of service is shown below and is based upon the Massive Attack provision. This will be incorporated into the section 106.

Minimum Service provision of Park and Ride and City Centre Shuttle buses

CAPACITY OF EVENT *not the attendance	Park and Ride					City Centre Shuttle Buses		
	Mode Share	visitors	per car	Min. parking spaces	Min. no of buses (pre: post-event)	Target Mode Share	visitors	Min. No of buses (pre: post-event)
17000	30%	5100	2.7	1889	21:54	16%	2720	37:93
16000	30%	4800	2.7	1778	20:51	16%	2560	35:88
15000	30%	4500	2.7	1667	19:48	16%	2400	33:82
14000	30%	4200	2.7	1556	17:45	16%	2240	30:77
13000	30%	3900	2.7	1444	16:41	16%	2080	28:71
12000	30%	3600	2.7	1333	15:38	16%	1920	26:66
11000	30%	3300	2.7	1222	14:35	16%	1760	24:60
10000	30%	3000	2.7	1111	12:32	16%	1600	22:55
9000	30%	2700	2.7	1000	11:29	16%	1440	20:49
8000	30%	2400	2.7	889	10:26	16%	1280	17:44
7000	30%	2100	2.7	778	9:22	16%	1120	15:38

- ii. In the event that any of the above is found to be inadequate, adjustments / changes to this provision will be agreed through the Transport Steering group, in liaison with bus operators.

Bus Specification

- iii. It is BCC and SGC's requirement that every P&R and Shuttle bus will be required to: be linked to the Real-Time passenger information (RTPI) system; benefit from RTPI displays at both ends of the journey; have a minimum capacity of 70 passengers, and be compliant with the Euro 6 emissions standards. This is the minimum that we should expect for public transport passengers and there is no reason this should not apply to arena visitors whose experience of the Filton Arena will not be solely confined to the event itself. The applicant will also be required to demonstrate satisfactory passenger facilities at each of the P&R sites to include bus shelters, seating, lighting, real time information displays, toilets, EV charging facilities and bus kerbs to allow easy access onto P&R services.

Portway Park and Ride

- iv. It should be noted that of the five P&R sites selected, only one of these (Portway) is in BCC ownership. Whilst there is a reasonable argument that arena demands on the P&R sites compliment (and fall outside) the predominantly daytime demands of P&R sites, this does not apply to daytime events and is not a risk that BCC should take, as it would severely deplete the capacity of Portway P&R should BCC wish to extend its hours of use in the future. Furthermore, and following implementation of the forthcoming railway station at this location, the site becomes much more attractive for trips to the city centre - which is the primary objective of the P&R site.
- v. For BCC to be able to allow the applicant to use Portway P&R it cannot ring-fence all of its 500 spaces for exclusive arena use 130 times annually. Much like the City Centre shuttle requirement, the applicant is therefore required to provide a contribution towards the expansion of the Portway Park and Ride car parks to ensure that BCC can grant the exclusive use of up to 500 spaces to the applicant.

Cribbs Causeway (The Mall) Park and Ride

- vi. It is concerning to each of the highway authorities that very little controls exist now (or potentially in the future) to prevent visitors from parking at Cribbs Causeway, the Vue Cinema, or any other of the surrounding retail parks and simply walking to the arena. It is understood that The Mall car park currently closes its barriers at 21:00. It may however be the case that such operators impose parking controls to prohibit this.
- vii. Therefore, in order to rely on the stated 500 spaces, the applicant will be required to enter into an agreement with The Mall that allows for the 500 spaces to be effectively managed so that only those with a valid arena P&R ticket can enter, and secondly, that barrier controls are managed to allow visitors back out after an event, whilst the remaining 6,400 remain gated at 21:00, as at present. BCC, SGC and HE will need to see evidence of this agreement and operation prior to any events at the arena.
- viii. The risk to this operation is that these matters are not within any of the highway authorities' control. Secondly, any unquantified demand (particularly at The Mall or

other surrounding car parks) will not have been taken account of as part of the Transport Assessment scoping or outputs.

Parkway Station Park and Ride

- ix. As with The Mall, this Car Park is operated by a private company and therefore not within any of the Highway Authorities' control. The securing of spaces would need to form a separate agreement between the applicant and the operator, and again evidence will require to be presented to ensure that the use of this car park is secured.
- x. On a related matter, TDM understands that some investigation has been made towards the ability to provide a passenger rail line between Parkway Station and Filton North which would effectively convert this to a Park and Rail and also potentially serve the wider Cribbs Patchway New Neighbourhood (CPNN). The rail link is currently a freight-only route and therefore would require substantial upgrading to track, signalling, points and other infrastructure. The investigation found that the upgrading to a passenger line is of a cost that is unable to be secured by this planning permission. It may however be something that can be considered in the future, but is not considered to be deliverable in the short-medium term and in the current funding climate.

Lyde Green and M32 (UWE) Park and Ride

- xi. As with The Mall and Parkway Station, the securing of spaces in these car parks would need to form a separate agreement between the applicant and the operator, and again evidence will be required to be presented to ensure that the use of these car parks are secured.

Future changes to Park and Ride provision

- xii. From time to time it may be necessary to alter, improve or expand the provision of Park and Ride facilities in the interests of meeting the 30% P&R mode share target set out by the applicant. For instance, where new P&R sites are delivered or sites become unavailable, a mechanism is necessary through the Transport Steering Group (considered later) that seeks to enhance (rather than argue down or diminish) the offer. The applicant indicates there are up to a further twenty sites that could be used, but these have not been shared and therefore cannot be assumed to be acceptable.
- xiii. Therefore some flexibility is required to allow for the applicant to consider more appropriate sites, whilst BCC, SGC and HE will need to ensure that any changes to the established schedule does not inhibit or discourage Park and Ride use in the interests of protecting the highway network from additional congestion.
- xiv. Further to the above, in the event that a change to the geographical extent of available P&R is proposed, this could trigger the need to undertake additional transport modelling. Each of the highway authorities are therefore in agreement that an established process needs to be followed for the consideration and selection of alternative sites, should changes be required in the future and that such changes are

ultimately up to the applicant to demonstrate to the highway authorities' satisfaction that any changes do not serve to discourage the use of P&R or generate unacceptable impacts. The above process will form a planning obligation / condition.

Ticket Purchase / Travel interface

- 2.35** It is of critical importance that given the deliberately low levels of parking on site and the need to minimise highway impacts, that visitors to the arena are given the easiest, convenient and most cost-effective public transport alternatives to reach the site. For this to work, BCC, SGC and HE require as many visitors as possible to be locked into travelling by sustainable modes at the point of ticket purchase.
- 2.36** Following the previous request for further information on this matter, the applicant has undertaken some further work and produced an Event Ticket Sales Strategy, found within **chapter 14** of the Transport Assessment Addendum (TAA) submitted in January. Within this strategy, it is outlined how spectators purchasing event tickets are then given a range of transport options, indicating the relative journey time, frequency, location and cost of each travel option available to them. Following this the visitor then proceeds to the final payment screens where the ticket and travel are then secured through a single payment.
- 2.37** The above process will require full control of the ticketing interface by the applicant, for which TDM is informed will be the case, given that the arena is proposed to be an owner-operated venue. This is important and will need to form a planning obligation, referencing the Venue Hire Agreement arrangements set out in **para 15.1.2** of the TAA. It is however encouraging that spectators are advised to consider their travel at an early date. This in turn gives useful early information about demand and whether the venue is likely to reach its mode share targets. It will also give an early warning for any modes of travel that are not attracting sufficient interest.
- 2.38** In the event that a spectator proceeds to the ticket purchase page without selecting or purchasing a travel option, they are sent an email a week before the event that serves as a reminder that they are yet to choose / purchase their travel to the arena and would again set out the range of options alongside costs and journey times, encouraging them to purchase travel. In either of the above events, the visitor is sent travel information and a venue map, informing them that there will be no parking available on the day (unless pre-booked) and the area is surrounded by an event-day residents' parking scheme.
- 2.39** In terms of pricing, it is critical that the modes of travel that generate the greatest impacts (i.e. private car travel) are also the most cost-prohibitive. The applicant has set out how the 1,500 space on-site car park will be the most expensive option, followed by: the closest Park and Ride (The Mall); Parkway and UWE Park and Rides; Portway and Lyde Green Park and Rides, with the City Centre Shuttle buses being the cheapest bespoke travel option. The pricing strategy will need to be agreed by BCC, SGC and HE prior to the selling of any tickets at the venue, with the potential for coach travel also accounted for and included within the travel-booking interface.

Walking and Cycling

- 2.40** Any walking and cycling to the site is currently confined to the A38, which TDM consider is an inhospitable and potentially dangerous route when considering the behaviours of mass numbers of spectators approaching an event, which becomes more magnified at the end of an event as spectators depart en masse. Cycle routes in this area are generally confined to shared

footways and this is not representative of current thinking with regard to the need to encourage and increase walking and cycling. The current deficit of active travel opportunities in this area is further heightened by the presence of the railway line, the Airbus site and the Filton Golf Course which serve as significant barriers to movement from the south.

- 2.41** Whilst high quality and direct walking and cycling linkages will in time form an intrinsic part of the wider airfield redevelopment, this does not override the need to improve and upgrade what is currently a paucity of adequate and sufficient quality walking and cycling infrastructure to the south of the site.
- 2.42** The applicant's approach to walking and cycling is somewhat contradictory in that the TA illustrates in Figure 3.1 that a substantial part of the urban area is located within a reasonable cycling distance of 20 minutes, yet the only identified formal cycle routes within the BCC area are Concorde Way (between St Werburgh's and Filton Avenue North), the route through Westbury Village (between The Downs and Henbury) and others within South Gloucestershire, as described above.
- 2.43** The above analysis leaves a significant gap of dedicated provision to the south, between the site and the areas of Brentry, Henbury, Southmead, Westbury, Henleaze, Redland, Horfield, Bishopston and Lockleaze that, despite being within a reasonable cycling distance have no direct and convenient cycle route to the site that doesn't involve either sharing heavily trafficked roads or busy footways (at the time of an arena event), in each case generating the conflict that serves to deter cycling and walking.
- 2.44** Referring to the 2011 census population data, the above areas comprise a population of around 93,000 residents and therefore it is not accepted that cycling to the venue should be overlooked on the basis that most events will finish at night time. The only barrier this should present is the need to deliver safe, secure and lit routes, to go with the safe and secure (and covered) 500+ cycle parking facilities on-site which will require to be conditioned and will lie empty (with the operator seeking their removal) if no improvements are made to the surrounding area. This would represent an unacceptable failure of the applicant to meet policy requirements.
- 2.45** At 850 visitors (5% mode share), rising to 1,360 (8%) in 2036, the active travel percentage is nevertheless greater than the number of residents that are expected to travel by rail. TDM do not consider this a reason for this matter to be overlooked, given the demonstrable and material impacts on the local highway network that are forecasted to occur alongside the policy requirement to maximise access by active travel in the interests of improving health.
- 2.46** TDM has shared with the applicant a piece of work undertaken previously by BCC to assess existing walking and cycling linkages to the airfield from areas within the BCC boundary to the south. Within this document are a number of suggestions to better connect and knit the wider CPNN development into the existing urban area in the interests of encouraging healthy and active travel.
- 2.47** Access to the site by walking and cycling from the south is currently very poor (an unsurfaced, unlit public right of way crosses the Filton Golf Course), or is along or alongside unhospitable and heavily trafficked routes. Whilst it is acknowledged that there will be no public access to the building directly from the south, access through to the site from Charlton Road by foot or by bike and via the airfield development (also owned by the applicant) will be possible. TDM recognises this is as much a wider CPNN issue as much as it is an arena issues and therefore

requires a financial contribution towards improving cycling facilities along Charlton Road and in the area of Southmead. This is intended to compliment the £2.875m (2014 prices) BCC has agreed with SGC to provide improvements to this area as part of CPNN.

Travel Plan Targets and Failsafe Penalties

- 2.48** TDM welcomes the ambitious mode share targets that have been presented as part of the development proposals (with the exception of that for walking and cycling) but recognises that if these percentages were to not be achieved, further investment would be required in the sustainable travel infrastructure and options available to all visitors and employees.
- 2.49** A series of failsafe triggers have been agreed between BCC, SGC, HE in addition to a Travel Plan monitoring fee. The triggers are reflective of the requirements of the travel plan, and the responsibilities of the applicant to deliver the travel plan, to monitor the modes of travel used to reach the arena for different events, to report these findings and the need to take action where the mode share targets are not being met through the Arena Transport Steering Group. The agreed mode share targets for the opening year onwards are as set out in **Table 10.8** of the TA and are repeated below.

Arena Event Mode Share Targets

Scenario / Mode share	Car				Coach	Rail	Bus	City Centre Shuttle Bus	Taxi	Ped Cycle
	Park on Site	Park and Ride	Pick up / dropped off	On street parking						
Do Something	25%	30%	10%	0%	3%	3%	3%	16%	5%	5%

- 2.50** The applicant will be obligated through the section 106 agreement to meet these mode share targets with the penalty clauses requiring payment for BCC / SGC to either undertake or commission work on the applicants behalf as a result of any of the following:
- **Failure to complete monitoring to agreed methodology**
 - **Failure to meet vehicle mode share for each class of Event in any year during the travel plan, requiring:**
 - **a review of event traffic management plan, parking policy and onsite parking charges to be agreed with the LA**
 - **the funding of an off-site parking survey to understand any unintended consequences in terms of parking behaviour**
 - **Failure to arrange and attend regular travel plan steering group meetings as part of the travel plan audit may result in failure of the travel plan audit for that year.**
 - **Failure to provide evidence of compliance with any action plan measure within 15 working days of being requested**
 - **Failure of the Travel Plan audit in any given year**

- 2.51** Any funds drawn down will be repurposed to support the travel plan objectives at the discretion of the Transport Steering Group which will have ultimate power over the agreed way forward. This will require agreement from the Steering Group and can be spent on further travel plan measures or for improvements to the local transport network.

3.0 FURTHER TRANSPORT INTERVENTIONS

- 3.1** This section of the report comprises the matters listed in *para 2.15* that were not subject to requests for further information, but are considered to be necessary and directly linked to the development and therefore require consideration here. These matters, as above have been subject to detailed discussions between TDM and counterparts at SGC, HE and the applicant over the preceding weeks.

Intelligent Transport Network

- 3.2** This application generates impacts that require the highway network surrounding this site to be substantially upgraded to manage and respond to the demands generated by an arena. Highway officers at BCC, SGC and HE have been discussing the need to properly monitor the highway network when events are held. The majority of the area around the development is not currently subject to central control, CCTV oversight or the ability to adjust signal timings, re-route traffic, divert public transport or provide driver information through Variable Message (VMS) signs before or after an event, or respond to events happening elsewhere that cause a knock-on effect.
- 3.3** 3. This intervention becomes critical to managing the A38 and adjoining junctions / routes at the time of an event. It also becomes even more valuable where incidents occur away from the venue – i.e.. on the M5 where traffic on the local network can be seriously delayed by diverting traffic, or where the seasonal demands generate serious congestion at Cribbs Causeway.
- 3.4** 4. TDM recommend that to not incorporate modern technology to deal with these impacts would represent a failing in the duty of the highway authorities to minimise congestion and maintain a safe and efficient highway network as one rather than three separate entities.
- 3.5** To upgrade the current highway network to incorporate current technology, most notably fibre optic communications would allow the authorities to:
- **deliver / extend existing bus priority measures;**
 - **deliver / extend the existing bus real-time information system;**
 - **allow signal junctions to communicate with one another to maximise the efficiency of the network;**
 - **undertake CCTV surveillance to understand and manage in real-time traffic and public order incidents and congestion as it occurs;**
 - **communicate with other networks – ie: Highways England**
 - **co-ordinate responses to sudden and additional demands.**

- 3.6** Serious investment has already been made by BCC in recent years to develop the traffic control centre at Temple Street along with the BNET communications network, whilst similar facilities are available to the HE. In order to utilise such facilities for their intended purpose, significant upgrades are required to the highway network around the site. However, this can only be implemented with the necessary funding and in agreement with neighbouring highway authorities. Whilst the applicant may be able to manage what happens in and around the airfield, it is not their responsibility (or within their ability) to manage traffic and incidents taking place on the highway network.
- 3.7** A contribution is therefore required towards a wider-scale study and the modernisation of the highway network across an area which can be broadly described as follows:
- **M5 Junction 16, Aztec West roundabout and the A38 between the M5 and Toronto Road, Horfield**
 - **M5 Junction 17 and Cribbs Causeway, Hayes Way, Gipsy Patch Lane, Lysander Road and Merlin Road**
 - **B4056 Southmead Road, between the A4174 Ring Road and Pen Park Road**
 - **Filton Avenue North, between the A38 and the A4174 Ring Road**
- 3.8** The design will be informed by, but not be limited to: the reviewing and adaptation of any existing transport models, the undertaking of further survey work, as appropriate to inform the above models; further development impact and scenario testing as necessary, the publishing of a report, setting out recommended options going forward and the agreement of its findings between BCC the HE and SGC to an agreed way forward.
- 3.9** The agreed design will be implemented and open to traffic in time for the first event at the site in accordance with findings of the report and could include, but not be limited to:
- **Terms of reference between Highway Authorities on matters of Network Management**
 - **An agreed strategy for the management of different scale events occurring at the development site**
 - **The delivery of a communications network for the management of junctions, cameras and permanent / temporary signage**
 - **Highway infrastructure improvements as recommended by the design including:**
 - i. **Appropriate an reliable signal hardware able to communicate and be remotely managed, including signal heads and controllers**
 - ii. **Potential linkage between signalised junctions**
 - iii. **Additional CCTV / ANPR cameras or similar**
 - iv. **Measures to enable control centre management**
 - v. **The cutting of new inductive loops and ducting to suit**
 - vi. **Junction realignment and adjusted kerbing to take account of revisions**
 - vii. **Variable Message signs or similar to enable efficient use of the network and allow for managed routing scenarios.**

Southmead Area Impacts

- 3.10** In addition to the problems of potential overspill parking (covered below) the area of Southmead is demonstrably impacted by the arena proposals, given the extended queues as represented in the modelling supplied by the applicant.
- 3.11** To take account of this, and any revisions to Network Management Study referenced above, the funding of a Southmead-area study is also considered necessary for BCC to assess in greater detail traffic routing and behaviour to provide recommendations and designs on area-wide improvements, given that no designed or agreed scheme currently exists.
- 3.12** As mentioned earlier BCC has secured the agreement of SGC to provide **£2.875m** (2014 prices) of its section 106 income for CPNN specifically to address impacts in the Southmead / A38 area. In this instance it is considered that the arena forms part of a larger major development of CPNN and therefore, any interventions must have regard to the 5,700 new homes in addition to the impacts of the arena. A financial contribution from the applicant is agreed towards this.

Regular Bus Service viability

- 3.13** Notwithstanding the need to ensure sufficient passenger capacity for regular bus services is properly considered and subsidised, it is conceivable that the arena may be in operation prior to the delivery of certain future bus routes, given that the build programme for the arena (at 2-3 years) is significantly shorter than a fully built-out CPNN. Whilst the arena will increase patronage on bus services adding to viability of future additional service provision, the Transport Steering Group will closely monitor this and potentially bridge any gaps in demand through a financial contribution towards delivering additional services and/or duplicate services to meet the demands of the development.

Avoidance of other events (Bristol Rovers, Gloucestershire County Cricket Club)

- 3.14** Due to the detrimental environmental effect that the impacts of two large events can have on the surrounding area TDM has insisted that no events at the arena can take place on a Saturday afternoon between specific times. This is not only to avoid worsening an already congested A38, Muller Road and Filton Avenue in the immediate run-up to and aftermath of a Bristol Rovers or international cricket match, but also in the interests of the detrimental effect this has on public transport journey times and bus patronage and capacity in the Gloucester Road area.
- 3.15** For these reasons it is not considered sensible to allow these clashes to occur. It would lead to worsening air quality, defeat the aims of the arena public transport strategy and generate problems for emergency services. Furthermore, international cricket matches are also heavily reliant on temporary bus services to serve park and ride facilities around the north fringe and this therefore becomes a problem for each use to develop its transport strategies.
- 3.16** Saturday and Tuesday evening events in every month except June and July must therefore be restricted in terms of their timings unless otherwise agreed by Bristol City Council as follows, based on the standard 3pm and 19:45 kick offs, respectively.

- **Saturday Events must not finish between 13:00 and 15:00 & 16:30 and 18:30**
- **Saturday Events must not start between 13:30 and 15:30 & 18:00 and 20:00**
- **Tuesday Evening events must be agreed in writing with BCC prior to ticket sales**

- **Arena events must not clash with International Cricket fixtures and concerts at the County Ground, Nevil Road.**

3.17 To provide an example, where the applicant is intending to run two Saturday daytime events (assuming 2 hours), which often have two or more performances, these could in effect run between 13:00 – 15:00 and 17:00 – 19:00 without generating conflict with football traffic, as the major traffic impacts and public transport demands of the arena would be felt outside of the peaks generated by a football match, which are 13:00-15:00 and 17:00-18:30. An evening event could start no earlier than 20:30. The relocation of either of the two sports clubs would allow for this to be re-negotiated should this arise.

Event-Day Residents-only Parking Scheme

3.18 The applicant recognises the detrimental impact that major event venues can have on the lives of neighbouring residents and has accepted the payment of a financial contribution to BCC towards the consultation, design, installation and enforcement of an event-day residents only parking scheme to cover areas within a 20-minute walking radius of the development.

3.19 The exact geographical scope of the area is subject to further analysis and consultation and the provision of sensible, legible boundaries to the zone. However, both BCC and SGC requested that the area of scope be expanded to a 30-minute walking distance in order to form a sensible basis to inform the consultation and the potential boundaries of the zone. The indicative plan includes the residential areas closest to the site including the entirety of Brentry and Charlton Hayes, along with areas of Southmead, Filton, Henbury and Patchway.

Transport Steering Group

3.20 A Transport Steering Group is required as part of this development and it will be necessary to meet regularly to ensure that all steps are being made to reduce the impact of the arena, whilst ensuring the development meets its transport obligations. This will need to include members of BCC, HE, SGC, Network Rail, YTL & the West of England Combined Authority (WECA) and will assemble on a regular basis in order to enhance and adapt the transport offer to arena visitors going forward and insist upon interventions in the event that the Travel Plan fails to meet its targets. The exact Terms of Reference are intended to feature in the s106 planning agreement.

4.0 SUMMARY and CONFIRMATION OF TRANSPORT FINANCIAL OBLIGATIONS

4.1 As mentioned earlier, the success of the arena transport package will depend on obligations and conditions for which the applicant will be entirely responsible for, and those matters which are of a more strategic nature for which the wider sub-regional body (WECA) and the authorities themselves (BCC and SGC) will need to pool funding, given the wider benefits.

4.2 An assessment has been carried out of the list of infrastructure requirements in order to establish which of these, and to what extent, are required to directly mitigate the specific impacts of the arena development. It is only these elements of the infrastructure requirements that can be formally secured by the s106 agreement, in the form of financial contributions from the applicant. The total financial exposure from the applicants through the s106 agreement amounts to £3.65m, including Travel Plan penalties, whilst the total infrastructure package identified to be just over £5m. This does not however include future rail or bus investment.

4.3 In order to deliver this wider infrastructure package, the two councils and WECA will work together to meet the financial gap.

Issue	Requirement	TOTAL COST	% s106 contribution	YTL (s106)	BCC / SGC / WECA
Rail	Contribution towards potential expansion of Filton North Station subject to Transport Working Group to accommodate increased capacity where appropriate and agreed	UNKNOWN	SUBJECT TO ARENA MONITORING, TRAVEL PLAN PERFORMANCE AND DEMAND		
	Provision of Special Event 'shuttle trains', subject to a 'best endeavours' condition	UNKNOWN	PLANNING CONDITION		TBC
Highway Network Management	Installation of a fibre optic communications network (to convey fast broadband, Bus RTI, signal control and CCTV) to the Arena along Charlton Road (to connect the Arena) and along Southmead Road and the A38 to M5.	£1,250,000	25%	£312,500	£937,500
	Assessment of options, surveys, modelling, cross-party working to determine requirements for A38 / J16 corridor & Junction 17 area - one year consultancy sum	£200,000	50%	£100,000	£100,000
	Continuation of joint-working and training of control centre operatives, whether SGC / BCC or HE	£25,000	100%	£25,000	£0
	SCOOT / UTC or similar to be delivered, this could require upgrades to each signal junction	£100,000	50%	£50,000	£50,000
	CCTV Cameras on key points of route	£200,000	100%	£200,000	£0
	additional VMS signage within BCC 2x A38, 2x Southmead Road	£140,000	100%	£140,000	£0
	Junction 16 & Junction 17 scheme	UNKNOWN	PLANNING CONDITION		TBC
	additional VMS or similar within SGC signage subject to future study	£300,000	100%	£300,000	£0
	Network Impact Mitigation	Upgrade A38 / Toronto Rd signals	£10,000	25%	£2,500
A38 / Combination Ground junction - Signal equipment upgrade	£35,000	25%	£8,750	£26,250	
A38 / A4174 Filton Roundabout - signal equipment upgrade	£100,000	25%	£25,000	£75,000	
Southmead Road / Golf Course Lane - signal equipment upgrade	£150,000	25%	£37,500	£112,500	
Shields Centre Staggered Toucan Crossing - signal equipment upgrade	£25,000	25%	£6,250	£18,750	
Funding a Southmead area study to investigate solutions to development	£75,000	100%	£75,000	£0	

Public Transport Services	Financial Contributions: to MetroBus or other services if they were detrimentally affected / if additional costs of operation were incurred by the Arenas activities that couldn't be met on a commercial basis; contributions to bus services relied upon by the Arena if those services were not provided commercially	UNKNOWN	PLANNING CONDITION		TBC
Public Transport Priority	Management of bus gates along North-South link and TRO restrictions at San Andreas roundabout	PLANNING CONDITION			£0
Public transport Infrastructure	Contribution towards the expansion of Portway P&R to secure 500 spaces	£750,000	75%	£562,500	£187,500
	Funding of 2x large bus stop facilities in City Centre to provide Shuttle services to the arena	420,000	100%	£420,000	£0
	Funding of additional staff to resource the management of buses, crowds and highway network	£30,000	100%	£30,000	£0
	The delivery of passenger infrastructure across P&R sites as confirmed above	PLANNING CONDITION			£0
Walking and Cycling Infrastructure	Funding of cycling improvements along Charlton Road to the south west of the development	£300,000	25%	£75,000	£225,000
Parking Restraint Measures	Funding of the design, consultation and implementation of an Event Day Residents Parking Scheme across Brentry, Henbury, Southmead, Filton, Charlton Hayes	£750,000	100%	£750,000	£0
Travel Plan	Monitoring Fee, based on D1 / D2 / A1 / A3 / A4 / B1a @ £5,165 per use	£30,990	100%	£30,990	£0
	Monitoring Fee for SGC	TBC	100%	TBC	
	Penalty trigger - for every event that YTL fail to monitor to agreed scope (5 years)	£200,000		£200,000	
	Penalty trigger - per annum for failure to meet vehicle mode share for each event (5 years)	£100,000		£100,000	
	Penalty trigger - in the event of the above, triggers funding of off-site parking survey	£100,000		£100,000	
	Penalty trigger - Failure of the Travel Plan in any given year - BCC to undertake travel plan	£100,000		£100,000	

		TOTAL REQUIRED		YTL FUNDING	BCC / SGC / WECA FUNDING
	TOTAL BCC REQUIREMENTS	£1,755,990		£1,335,990	£420,000
	TOTAL SGC REQUIREMENTS	£610,000		£377,500	£232,500
	TOTAL CROSS BOUNDARY REQUIREMENTS	£2,525,000		£1,437,500	£1,087,500
	TRAVEL PLAN PENALTIES	£500,000		£500,000	£0
	TOTAL EXPOSURE	£5,390,990		£3,650,990	£1,740,000

- 4.4** There are a number of contributions the applicant will need to make to local infrastructure, which, as detailed above will need to be made in future years, and in conjunction with BCC, SGC, WECA, Network Rail and bus / rail companies. For clarity, these are repeated as follows:
- **Funding and delivery of increased rail capacity at Filton North station, comprising increased train frequency, potential additional facilities and / or arena-specific rail shuttle services.**
 - **Funding of additional bus services where future bus services are either not yet implemented, or where public transport to the site is not sufficient to meet demand.**
- 4.5** The key determinants of the success of the proposed development in transport terms will be measured in the following terms:
- **The meeting (or otherwise) of mode-share targets by the development**
 - **The visitor experience of transport to and from the site**
 - **The ability of the highway authorities to actively manage the development's demands on the surrounding transport networks and within the city centre.**
 - **The ability to enhance, improve and adapt over time the sustainable transport access to the venue as additional development and infrastructure is delivered over time.**
- 4.6** The above financial interventions, of which the majority are required to be contributed prior to the commencement of development, together with a detailed schedule of planning conditions are considered suitable and reasonable in the interests of minimising the negative impacts of the development.
- 4.7** Subject to the above transport package, and sufficient and timely cross-boundary working between the three highway authorities and the combined subregional authority (WECA) alongside Network Rail, train and bus companies, TDM consider the development to be acceptable in transport terms and therefore are in a position to recommend the application for approval.



Strategic City Transport

Transport Development Management (TDM)

Application Response

To: Gary Collins, Development Management
From: Laurence Fallon, Transport Development Manager
Ext: x36846
Date: 23 December 2019
Address: Arnold Laver Brabazon Hangar and Surrounding Land
Application No: 19/05500/P
Proposal: Hybrid planning application comprising: the demolition of existing ancillary buildings and structures; full details associated with the change of use of, and associated external alterations to, the Brabazon Hangar buildings from Class B8 use to a mixture of Class D1, D2, A1, A3, A4 and B1a uses, along with outline details associated with infrastructure works including: revised vehicular access arrangements; redevelopment and reorganisation of the former aircraft apron to provide parking, servicing and associated infrastructure provision.
Response: **Initial Holding Response**

1. PREAMBLE

- 1.1** The above proposals have the potential to generate severe and substantial traffic impacts that require to be comprehensively addressed and therefore minimised. This is in the interests of: tackling congestion and the consequent effects this would have on air quality and public health; the environmental quality of the wider area and the immediate impacts that would be felt by local residents and businesses.
- 1.2** The critical policy requirement is therefore the reduction of the above impacts through the early and targeted delivery of effective and robust sustainable travel alternatives that effectively mandate as many of the 17,000 spectators and employees as is possible to reach the site by means other than the private car.
- 1.3** The development is situated within an already congested peak hour highway network and therefore TDM will not support a sustainable travel package that we consider will fail to make public transport, park and ride, walking or cycling the easiest form of travel to reach the development.
- 1.4** However, some of these interventions will rely on separate processes, agreements and consultation with third parties, not all of which can be secured through the planning process. Therefore, the necessity of having an operational rail station and park and ride/rail services and sites, together with the ability of the site to manage 17,000 visitors is of major concern.

1.5 TDM requires the applicant to implement robust mechanisms to deliver infrastructure and connectivity at the right time to serve this development in policy compliant a way that:

- **delivers safe and suitable access for all users, prioritising those with specific mobility requirements and those who have travelled by public transport, walking or cycling;**
- **offers viable, realistic and attractive alternatives to car use that are of high quality and that compliment events taking place at the arena relative to spectator catchment;**
- **delivers effective marketing and promotion of incentives for sustainable travel and secures the selection of and payment for travel to the arena at the point of ticket sale;**
- **successfully prohibits excessive private car travel to the site through a restrictive level of parking on site and an effective package of local area parking deterrents around the airfield and in the adjoining areas of Henbury, Brentry and Filton;**
- **effectively manages the movement of visitors / spectators / deliveries and performers to and from the arena in such a way as not to compromise their safety and that of those unconnected to the development.**
- **delivers a travel plan that considers the operation of all uses on site throughout the year, in the interests of minimising negative impacts at all times.**
- **avoids the holding of events at times that generates significant traffic when the highway network already experiences considerable congestion, such as the early evening peak period (ie: 6-7pm) and before / after football matches at the Memorial Stadium.**
- **ensures the adoption of safe and practical measures during the construction of the development that avoids detriment to the surrounding highway network or nearby businesses / residents.**

2.0 PROPOSED TRANSPORT PACKAGE

2.1 To address the above concerns, the applicant has offered the following interventions, upon which the transport modelling and assessment work has been progressed in pre-application discussions with ourselves, SGC and HE. The following measures are included within the **'Do Something'** transport modelling scenario and represent a starting point for further discussions.

- a) Specific and purpose-built pedestrian access to the future Filton North railway station, including a bridge over the railway and associated infrastructure and management. (The rail station is expected to be delivered as part of the MetroWest 2 project in advance of the arena).
- b) The operation of event-specific Park and Ride bus services from a number of locations including existing park and ride sites at Portway and Lyde Green and utilisation of existing car parks at Parkway Station, UWE (M32) and Cribbs Causeway shopping centre.
- c) The provision of a spectator shuttle-bus service from the City Centre (and potentially other areas) before and after events and other complimentary coach-travel services.
- d) The implementation of restrictive parking controls in local areas that would be negatively impacted by short-term mass demand for on-street parking;

- e) The implementation of safe facilities for picking up and dropping off movements by taxis, buses, coaches, disabled users and general traffic;
- f) A safe and convenient car-free environment for pedestrians and cyclists within and around the site which encourages rather than deters walking and cycling;
- g) The limiting of arena event timings, so as to avoid conflict with periods of peak existing demand on the local highway network, including weekday evening peak hours, Saturday afternoons and some Tuesday nights (to avoid clashing with congestion prior to and following Bristol Rovers matches).
- h) The restriction of parking on-site to a maximum of 1,500 pre-booked car parking spaces.
- i) The agreement to the funding of an Event-day Residents' Parking Scheme (ERPS) and other waiting restrictions in surrounding areas likely to be affected by overspill parking;
- j) The allocation and securing of travel choices at the point of sale for all spectators through the purchasing of event and travel tickets at the same time.

2.2 In order to understand and quantify the effectiveness of the above measures, the applicant has also modelled a **"Do Minimum"** scenario. This analysis (described later) forecasts what the effects would be were the applicant to deliver a minimal level of interventions and is largely based upon the measures offered (and the resultant mode shares observed) as part of the Massive Attack concerts held at the site in March 2019, referred to in section 3.

2.3 The **Do Minimum** scenario therefore omits items b), d), f), g), h) and i), in view that the the above concerts provided: shuttle buses (from the city centre) and on-site parking of around 2,000 car spaces. The access bridge and access to the rail station forms part of the package of applications and is therefore assumed as a given in all development scenarios.

3.0 TRANSPORT ASSESSMENT SCOPING

Transport Assessment (TA) inputs and output summary

3.1 This extent of development requires that a detailed transport modelling study and analysis is required. Throughout much of 2019, TDM officers have been engaged with the applicant and their transport consultants, in addition to our counterparts at SGC and HE to agree the scoping assumptions and outputs required to assess the application.

Massive Attack Concerts

3.2 The Massive Attack concerts referred to above generated the potential for understanding the impacts of such a use in this area. A range of evidence was collected and this included a number of traffic counts in the surrounding areas affected (on the event days, non-event days, and with/without a Bristol Rovers match). This was in addition to spectator origin (postcode) data and modal share information, including the numbers of tickets sold for the city centre shuttle bus.

3.3 There are however two important distinctions to make with regard to the Massive Attack concerts. These took place on a Friday and Saturday night and would have attracted crowds of a particular demographic that, in TDM's consideration would have been more likely to take up the offer of public transport due to the timing of the concerts (Friday and Saturday) and the geographical draw of this artist.

3.4 It would therefore be conceivable, that in the event that these concerts had taken place on a weekday evening with a more global / family / teenage-oriented artist and attracted a younger audience whether the obtained data would have been different.

3.5 This issue has been raised with the applicant who has subsequently undertaken further comparison work with other events held in the city. This is covered later.

Locations of material congestion and impact

3.6 Nevertheless, of particular concern to TDM during these events, and in the context of the current proposals was the impact of additional congestion along the following highway links and junctions, noting that whilst not all are within the BCC area (these are shown *italic*), their capacity and operation *do* have an effect upon the routing further to the south as motorists attempt to avoid congestion through re-routing.

i. A38 Gloucester Road + junctions with:

- a. Toronto Road / Monks Park Avenue*
- b. B4468 Kellaway Avenue
- c. Muller Road
- d. Filton Avenue
- e. *A4174 Ring Road / Southmead Road (Air Balloon roundabout)*

ii. Filton Avenue + junctions with:

- a. Wessex Avenue
- b. Toronto Road / Bridge Walk*
- c. *A4174 Ring Road*

iii. B4056 Southmead Road + junctions with:

- a. Pen Park Road / Monks Park Avenue*
- b. *A4174 Ring Road / A38 Gloucester Road (Air Balloon roundabout)*

iv. B4469 Muller Road + junctions with:

- a. Filton Avenue

***sites of accident concentration**

3.7 A number of assumptions were agreed between the applicant and the highway authorities in advance of the Transport Assessment being undertaken. These assumptions form the inputs to the detailed traffic modelling assessment which forecasts the combined impacts of arena and non-arena uses on the local highway network.

3.8 The outputs from the modelling are covered later. However, it is considered helpful at this stage to firstly summarise the agreed inputs. The following scenarios have been considered in the submitted TA. For reference, 2022 comprises the opening year with 2036 tested in a future scenario including a fully built out Cribbs Patchway New Neighbourhood (CPNN). With the exception of 5, the modelling scenarios forecasted the impacts occurring during the weekday evening peak periods.

Modelled Scenarios

1. **2022 Baseline – No development** (*Reference Case*)
2. **2022 Double Event – 7,000 Capacity** (*two 'family' events: early afternoon & evening*)
3. **2022 Do Minimum – 17,000 Capacity** (see parag 2.2)
4. **2022 Do Something – 17,000 Capacity** (see parag 2.1)
5. **2022 Weekend Do Something (Sensitivity Test) – 17,000 Events**
6. **2036 Baseline – No development**
7. **2036 Do Something – 17,000 Capacity** (see parag 2.1)

3.9 Each of the above scenarios has been modelled for the following periods and using the software appropriate to the level of analysis required for both strategic routing and distribution purposes (GBATS- SATURN model) and more detailed highway network operation and congestion modelling (VISSIM Microsimulation Model).

1. **Weekday Evening Peak Hour (17:00-18:00) – GBATS SATURN**
2. **Weekday Evening Peak Period (16:30 - 18:30) - VISSIM**

3.10 The **GBATS** (Greater Bristol Area Transport Study) SATURN model is a regional tool devised by the West of England authorities to understand the behaviour of traffic routing across the wider network. It can identify changes in routing patterns according to congestion and resulting from major developments but due to its regional coverage, further detailed modelling is required to inform assessment of localised congestion and junction operation. The hours of analysis contained within the GBATS model are between 0800-0900 and 1700-1800 during a weekday, with the latter being used in this case, due to the relatively low morning peak hour traffic associated with the proposed uses.

3.11 **VISSIM** modelling provides significantly more detail and drawing on inputs relating to driver behaviour, the interaction between junctions, carriageway widths, road markings, minor roads and pedestrian phasing and therefore provides a far more detailed and visual simulation of how a highway network operates, allowing the user to see how traffic flows along a route or network, together with where and how blockages arise.

3.12 At TDM's insistence, the existing SGC / YTL A38 VISSIM model has been expanded in scope to include BCC's highway network, to include the A38 Gloucester Road junction with Toronto Road / Monks Park Avenue and the B4056 Southmead Road / Monks Park Avenue / Pen Park Road mini-roundabout junction, both of which are sensitive to congestion. Previously this model only considered the A38 between the Aztec West and the A4174. HE requested similarly that the model be expanded to the north to include junction 16 of the M5.

Use of reference sites

3.13 As with most forecasting procedures, the relevance of historical and comparative data from similar operations elsewhere informs the degree of confidence that can be placed upon the

outputs of the transport modelling exercise. In this respect, it is of some comfort that there are numerous arenas of a comparable size already operating in other UK cities from which data can be sifted to ensure the most robust assessment is being made.

Mode of Travel – Worst-case (Do Minimum)

- 3.14** Current guidance on Transport Assessment requires that the worst-case transport scenario of a major development is subject to assessment in the interests of calculating the value of sustainable travel interventions. The Do Minimum scenario described earlier is therefore not a situation that TDM would support as it is more car reliant than is acceptable and fails to maximise travel to the arena by sustainable modes, offering around 3,500 parking spaces on site and assuming a minimal (two-carriage) rail service from Filton North station. For reference, the maximum allowable number of parking spaces for these uses under current BCC Planning Policies is around 1,500.

Mode of Travel – Transport Package (Do Something)

- 3.15** The availability and proposed increased coverage of rail, bus and park and ride provision in 2022 has been taken into account, along with the potential for increasing the capacity of late-night rail connections from the proposed Filton North Station. In addition to the above, an event day controlled parking zone is factored in, alongside increased coach provision, a greater coverage of shuttle bus services and improved walking and cycling linkages.
- 3.16** However, it cannot be overstated that the above travel alternatives and infrastructure need to be in place upon first occupation in order to realise these car mode share reductions.

Modelling assumptions – Traffic Generation

- 3.17** A summary of the mode share assumptions is provided in Table 10.8 of the submitted TA (page 75) and summarised below for the 7,000 (double) and 17,000 full-capacity events.

Forecasted Mode Shares by scenario tested

Scenario / Mode share	Car				Coach	Rail	Bus	City Centre Shuttle Bus	Taxi	Ped Cycle
	Park on Site	Park and Ride	Pick up / dropped off	On street parking						
Double Event (2022)	45%	25%	10%	0%	3%	5%	3%	0%	5%	4%
Do Minimum (2022)	55%	0%	10%	10%	1%	1%	2%	14%	5%	2%
Do Something (2022)	25%	30%	10%	0%	3%	3%	3%	16%	5%	5%
Do Something (2036)	15%	30%	5%	0%	4%	12%	5%	16%	5%	8%

3.18 The mode shares proposed for the Do Minimum scenario reflect those that were collected for the Massive Attack concerts with the exception of the rail and coach figures given that these were not available alternatives at that time. In terms of car trips, the above mode shares relate to the following demands, with the figures in brackets indicating the number of vehicles that for the purpose of this assessment, and in line with the application will be parked on site:

- **Double Event 2022** – 1,867 car trips 4-8pm (**1,050 parking at site**)
- **Do Minimum 2022** – 4,723 car trips 4-8pm (**3,500 parking at site**)
- **Do Something 2022** – 4,093 car trips 4-8pm (**1,500 parking at site**)
- **Do Something 2036** – 3,149 car trips 4-8pm (**945 parking on site**)

3.19 The above assumptions for the *Do Something* scenarios rely heavily on a number of factors which are summarised below:

- **An average car occupancy of 2.7 persons per vehicle (3.0 for the double events)**
- **The restriction of on-street parking in the surrounding areas**
- **The limiting and further reduction of arena parking on site**
- **The full utilisation of around 1,900 Park and Ride spaces**
- **A modal shift to Park and Ride of 30% from the Do Minimum Scenario**
- **A modal shift to rail, bus, shuttles, walking and cycling of 10% in 2022 and 15% in 2036 from the Do Minimum Scenario**

Modelling Assumptions – Geographical distribution of movements

3.20 In order to forecast the assignment of traffic to the local highway network, a number of assumptions were discussed and agreed between the applicant and highway authorities, using the Massive Attack postcode data, but also in comparison with recent events at Ashton Gate which attracted sizeable crowds for Take That, the Spice Girls, Muse and Rod Stewart. In summary, it was found that the Massive Attack concert attracted the majority (41%) of its spectators from Bristol, with a further 31% arriving from the remainder of the South West and Wales. Other findings indicated 16% from Greater London and the South East and 7% from the Midlands. The analysis presented in the TA confirms that this is comparable with findings from the other concerts and therefore a realistic basis for further assessment.

GBATS - Assignment of Trips to the Local Highway Network

3.21 In order to inform the traffic modelling software within GBATS-SATURN, the origins of spectator trips have been fed into the strategic model, which in turn distributes the traffic to the highway network according to the availability of highway capacity. This has been conducted for both the *do minimum* and *do something* scenarios for 2022 and the *do something* scenario for 2036. It is re-iterated here that GBATS only covers the hours of 17:00-18:00.

GBATS - TA Analysis of traffic increases

- 3.22** Using the outputs from the GBATS model, the TA summarises in section **13.2** where increases in traffic have been modelled in order to derive where the impacts of the development are greatest. It does this by subtracting the 2022 and 2036 baseline (without development) flows for each link from the modelled flows in the with development scenarios.
- 3.23** Were the highway network in this area to have limitless capacity and be free flowing during these hours, this would be a credible form of analysis. However, it overlooks the significant matter that where a network is already saturated with traffic and has reached capacity it cannot accommodate additional traffic. Therefore, what may seem like modest increases, or even reductions in traffic can also be a result of the network failing and therefore reducing in capacity. This is evident on sections of the A38 and also at junction 17 of the M5.
- 3.24** It is of further concern that the increase / decrease analysis ignores BCC's highway network, only referencing a total of 26 highway links limited to just SGC and HE's network as shown in **Figure 13.1**. This needs to be redressed as part of a further submission to include the A38 as far as the Muller Road junction and the B4056 as far as Pen Park Road / Monks Park Avenue.

GBATS - Select Link Analysis

- 3.25** At the request of TDM, Select Link Analyses (SLA) have been provided given the flaws of only considering the difference in total traffic explained above and to better understand the routing of development traffic and the ripple effect that displaces background traffic onto alternate, potentially less appropriate routes. SLA provides a distribution analysis that separates the development-only traffic, confirming the routing behaviour of trips associated with the development proposed. A summary of that routing is provided below for the 17:00-18:00 weekday evening peak hour. The **Double Event** scenario comprises two 7,000-capacity events, the first occurring from 14:00-16:00 and the second being 20:30-22:30. The abbreviations NB and SB relate to the direction of trips whilst the traffic numbers given below relate to all uses proposed.

Development-only traffic, 17:00-18:00 Weekday peak hour

Development-only traffic, 17:00-18:00	2022 Double Event		2022 Do Minimum		2022 Do Something		2036 Do Something	
	NB	SB	NB	SB	NB	SB	NB	SB
A38 Filton Rd, n/o Monks Park Avenue	64	112	123	50	69	51	42	41
B4056 Southmead Rd, n/o Pen Park Rd	42	71	57	23	47	23	33	29
A4018 Wyck Beck Rd, n/o Crow Lane	7	28	9	7	3	7	0	2

- 3.26** For comparative purposes a similar analysis is presented below for a number of key links on HE and SGC's highway network. This is shown for arena arrivals only. The abbreviation **CC** relates to Cribbs Causeway, whilst 'Port' relates to traffic using the Portway Park and Ride.

Arena arrival traffic, 17:00-18:00 Weekday peak hour

Development-only traffic, 17:00-18:00	2022 Double Event (2x7,000)	2022 Do Minimum (17,000)	2022 Do Something (17,000)	2036 Do Something (17,000)
From east (M4)	90	181	194	160
leaving M4 J19 (M32)	9	1	103	103
leaving M4 J20 (M5)	84	180	91	57
From north (M5)	85	120	162	139
leaving M5 J16 (A38)	208	367	190	120
leaving M5 J17 (CC)	151	134	161	136
From west (M4)	68	67	37	24
From west (M49)	0	0	43	43
From A38 n/o A4174	120	203	129	85

- 3.27** The reduction in trips that can be seen between the *Do Something* and *Do Minimum* scenarios explains the reduction in car reliance as a result of the measures to increase the use of park and ride, public transport, walking and cycling alongside parking restrictions. However, one of the limitations of the GBATS model is that it only considers a single hour and therefore, a large percentage of arena traffic will occur outside of 17:00-18:00, as explained in the table below, which compares the assumptions made here with the previous arena proposal in the City Centre.

Arena Arrival Profiles and comparison with Temple Island

Time Period	Temple Island Arena	Filton Arena
16:00-17:00		5%
17:00-18:00	30%	15%
18:00-19:00	30%	31%
19:00-20:00	40%	30%
20:00-21:00		7%

VISSIM – Summary of Impacts on BCC's network

- 3.28** A further level of analysis is necessary for the reasons given above, and to allow for the wider peak period to be assessed. The VISSIM model covers the period from 16:30-18:30 and therefore can provide greater confidence on the operation of the highway network at periods when demands are currently the greatest.
- 3.29** The VISSIM modelling programme has been interrogated to provide outputs relating to journey times and queue lengths across the two hour weekday period from 16:30-18:30 for the model area shown below, which includes M5 junction 16 and the entirety of the A38 and B4056 as far as Monks Park Avenue.

3.30 As described earlier, following scoping discussions the A38 VISSIM model was extended to include the BCC area (shown yellow, right) to include Gloucester Road south of Toronto Road and Southmead Road, south of Pen Park Road. This involved further traffic surveys and journey time data collection in order for the model to be constructed.

3.31 For the model to be considered robust and fit for purpose a calibration and validation exercise must be undertaken. This compares the modelled outputs with the actual situation. A Local Model Validation Report (LMVR) was therefore submitted and indicated that the model represented an acceptable ‘fit’ to local conditions. This baseline situation, or ‘*reference case*’ has since been interrogated by Jacobs on behalf of SGC and BCC who, using government guidance (WebTag) deemed the model acceptable to proceed with and undertake the opening year (2022) and future year (2036) scenarios.



3.32 A summary of the results for BCC’s network is provided below for each of the four scenarios tested, reproduced from **section 13** of the submitted TA. The Reference case relates to the scenario where this development is not constructed and has been modelled for both 2022 and 2036. Journey time and queue length results are the key indicators of network performance in VISSIM models, where a an average maximum journey time (in seconds) is calculated between two points to understand the impact that additional traffic has upon a network, whereas a queue length output provides the length of a static queue of traffic on an approach to a junction.

Average Journey Times, weekday 16:30-18:30 – (seconds)

Route / Direction		Ref Case 2022	Double Event 2022	Do Minimum 2022	Do Something 2022	Ref Case 2036	Do Something 2036
Southmead double-mini to A38 / A4174 rbt	NB	193	315	190	189	189	191
	SB	281	919	413	388	731	805
Gloucester Road / Toronto Road signals to A38 / A4174 roundabout	NB	283	846	367	403	348	390
	SB	475	261	483	484	451	443

Average Maximum Queue Lengths, weekday 16:30-18:30 - (metres)

Junction / Arm		Ref Case 2022	Double Event 2022	Do Minimum 2022	Do Something 2022	Ref Case 2036	Do Something 2036
A38 / Toronto Road signal junction	N	507	462	508	507	507	499
	E	117	199	116	134	231	337
	S	268	511	470	470	470	470
	W	120	166	149	140	265	282
B4056 / Monks Park Avenue / Pen Park Road double-mini rbt	N	509	510	510	509	510	510
	E	135	166	131	126	155	171
	S	449	511	509	509	511	511
	W	124	204	134	128	173	191

- 3.33** The above results provide an average of the maximum impacts (in terms of queueing and journey times) for each of the locations identified on BCC's highway network.
- 3.34** It should be noted here that TDM has consulted with colleagues in strategic transport, sustainable transport and traffic & highways for further comments on these outputs and other matters for specialist advice relating to network management, public transport, road safety and traffic management for further comment, as referred to later.
- 3.35** However, The most significant impacts in terms of congestion, from the above results are noted in terms of the following impacts which TDM consider to be material:
- i. Double Event 2022 impact upon Southmead Rd (SB) & Gloucester Rd (NB)**
 - ii. Do Minimum 2022 impact upon Southmead Rd (SB) & Gloucester Rd (NB)**
 - iii. Do Something 2022 impact upon Gloucester Rd (NB)**
 - iv. Do Something 2036 impact - Toronto Road (WB) & Southmead Rd (SB)**
- 3.36** The above locations are of concern to BCC in terms of the increase in congestion modelled in VISSIM. This provides a robust forecast of queue length and journey times and requires to be considered and addressed. The improvements (reductions) in congestion and queueing resulting from the implementation of improved sustainable transport connections are modest when the *do minimum* and *do something* scenarios are compared. This may be in part resulting from visitors from within the urban area and originating from north of the city centre already using public transport, but further confirmation is sought on this.
- 3.37** A situation where flows / outputs are similar could also be a symptom of the analysis where an already congested highway network has reached saturation point and therefore is unable to accommodate additional traffic, which results in the following possible outcomes:
- i. Development traffic is avoiding the major routes (B4056 & A38), instead using minor routes.**
 - ii. Development traffic uses the major routes, displacing previous (background) traffic onto more minor routes.**
 - iii. Changes in travel behaviour occur where trips are either delayed or not made.**

Impacts in areas not covered by VISSIM model

- 3.38** In reality, it is likely that each of the situations explained in 3.37 i)-iii) will occur to varying extents. In order to analyse and understand whether displacement of traffic is forecasted to occur, it is necessary to return to the GBATS-SATURN modelling to understand the routing of traffic undertaken, not just by development-related traffic, but also by background traffic as it seeks to avoid congested major routes.
- 3.39** From viewing the SATURN analysis for 2022 *do something* scenario, a number of highway links are subject to increases in traffic, but the additional flows are yet to be properly quantified by the applicant for the weekday evening peak hour. This was requested in advance of submission but the SATURN outputs provided to date are unclear and lack detail. For reference, the impact on the following highway links are therefore yet to be quantified.
- i. **Toronto Road, between Gloucester Road and Filton Avenue**
 - ii. **Wessex Avenue, between Gloucester Road and Filton Avenue**
 - iii. **Filton Avenue, between Gloucester Road and the A4174**
 - iv. **Coldharbour Lane, between A4174 and Frenchay Park Road**
 - v. **Muller Road, east of Gloucester Road**
 - vi. **Muller Road, south of Filton Avenue**
 - vii. **Kellaway Avenue, west of Gloucester Road**
 - viii. **Southmead Road, south of Pen Park Road / Monks Park Avenue**
 - ix. **Pen Park Avenue, west of Southmead Road**
 - x. **Monks Park Avenue, between Southmead Road and Gloucester Road**

4.0 NEXT STEPS

- 4.1** More detailed analysis of the modelling outputs are currently being undertaken, and it has been necessary for TDM (as with all major applications) to consult with colleagues in other areas of the Transport, Traffic and Highways departments.
- 4.2** The input of the following teams over the course of the next few weeks will be critical to our recommendations on this project, given that these work areas and infrastructure would be required to accommodate a significant level of increased demand resulting from 17,000 visitors for a major event:
- **Passenger Transport Infrastructure & Services**
 - **Parking Services**
 - **Travel Planning**
 - **Traffic Management and Road Safety**
 - **Walking and Cycling**
 - **Network Management and Traffic Signals**
 - **Strategic Transport and Policy**

4.3 TDM is currently awaiting responses from the above teams and expects to receive these by **Thursday 9th January**. TDM will then require further time to assess these comments and meet internally to discuss concerns, impacts, issues and potential mitigation measures and financial contributions. We are therefore seeking to undertake this on the week commencing **13th January**.

5.0 FURTHER INFORMATION REQUIRED

5.1 TDM is mindful that in order to meet what are already challenging deadlines, it is necessary to indicate now what further information is required, resulting from our *initial* assessment of the application. This does carry some risk in that the comments of our colleagues are not yet known.

5.2 Nevertheless, it is clear from the current submission, and discussions with neighbouring highway authorities and the applicant that the following information is not contained within the application and requires to be submitted in January for our consideration. These matters were discussed with the applicant and their transport consultants at a meeting in Bristol on 19th December.

Modelling outputs and presentation

5.3 As has been raised earlier, it is not understood why the analysis in **section 13.2** and illustrated in **Figure 13.1** of the TA omits to cover BCC's highway network, but this needs to be presented in order for BCC officers to sufficiently present these findings to its members.

5.4 TDM has asked previously to see the original Select Link Analysis plots as the figures given within the TA, particularly **Appendix B** omit these flows from large areas of the highway network, only concentrating on major links, as explained above in **paragraph 3.35**. Some further analysis has been presented in response to this. However, the flows shown along many of the links are unclear, and favours 'differential' plots instead of development only traffic.

5.5 In addition to the above, a tabulated analysis of the flow differences along the links identified in 3.39 for each scenario modelled is required in order to understand impacts away from major routes, as traffic becomes displaced by increased congestion generated by the development proposals.

5.6 The need to accurately communicate the modelling results and analysis to colleagues, senior officers and elected members is vitally important, particularly where microsimulation is employed. The benefit of VISSIM microsimulation is the ability to provide a representation of the highway network that is both visual and understandable.

5.7 TDM therefore requests that footage is provided of each of the three modelled scenarios (**2022 Reference Case, 2022 Do Minimum, 2022 Do Something & 2036 Do Something**) for the following locations on BCC's highway network:

- **Gloucester Road / Toronto Road / Monks Park Avenue junction**
- **Southmead Road / Monks Park Avenue / Pen Park Road junction**

5.8 BCC expects five minutes of footage to be provided for each of the following time periods, ensuring that this includes the entirety of the queue length modelled.

- 16:45, 17:00, 17:15, 17:30, 17:45, 18:00, 18:15, 18:30

Arrival and Departure Infrastructure

- 5.9** The safe arrival and departure of spectators from the venue is critical. It must also serve to encourage, rather than prohibit or obstruct those who are wishing to travel to and from the venue by sustainable modes.
- 5.10** The infrastructure, as approved for the approved outline application for the airfield has not been designed to accommodate 11,390 arena spectators catching coaches, buses, taxis, shuttle buses and park and ride services at the same time and conflict is inevitable where such competing demands will occur. This is critical to the success of the transport package and therefore needs to be designed for.
- 5.11** Likewise, TDM is not confident that the number of vehicles necessary to transport these spectators have been factored into any design work, given that there could be significant congestion and conflict as these vehicles (mainly buses) are vying for position. How buses / park and ride / shuttles will be prioritised ahead of general traffic is also a matter of concern.
- 5.12** TDM recognises that the outline masterplan for the airfield is not part of this application, although it is referenced. It is therefore of major concern, and in view of member's concerns regarding the same issue during the previous arena project that this requires resolution as requested during the pre-application process so that a robust solution can be presented at an early enough stage.

City Centex bus stop infrastructure

- 5.13** We await the contributions of our passenger transport team, but it is very likely, given the need to expand upon the previously successful shuttle services, that such a measure will require attention and potential changes in the city centre where kerb space per buses is already at a premium. Whether this necessitates a financial contribution or undertaking of works will need to be discussed further.

Park and Ride locations, securing and obligations

- 5.14** TDM is seeking advice on how these facilities will be secured and delivered through the planning process. The need to secure and mandate the applicant to occupy up to 2,000 car parking spaces off site and on specific third party-owned locations is critical, given that the assumptions, trip distribution and impacts of the submitted TA are predicated on this.
- 5.15** Whilst it would be possible to set through condition / or obligation a number of spaces to be provided, this becomes challenging where neither BCC, SGC or the applicant is fully in control of the land or the processes to secure it.
- 5.16** Whilst a number of certainties could be provided around *existing* Park and Ride sites such as Portway and Lyde Green, the most attractive number and location of spaces for spectators are likely to be within Cribbs Causeway Car Park, around the M32 junction 1 and Bristol Parkway Railway Station due to their ease of access from the Motorway network and in the case of the latter, the potential to provide a fast rail connection to and from the arena that avoids highway congestion.

- 5.17** Further discussions are therefore requested on this as another critical matter that requires detailed consideration if TDM is able to provide members with sufficient comfort that this transport package is achievable.

Ticket Purchase / Travel interface

- 5.18** TDM and counterparts at SGC have requested further information on the ability of the applicant to effectively control the ticket sales process in a way that secures the purchase of travel to the venue at the point of sale. In all cases we will expect car parking on site to be the most restricted (in terms of number) and cost-prohibitive choice, whilst the purchaser is automatically directed to a public transport, park and ride, coach, or bus shuttle website that requires tickets for these modes to be purchased.
- 5.19** It is not fully understood how the applicant can insist upon being wholly in charge of the ticketing interface and therefore, where ticket sales partners, artist promoters and separate ticket websites all play a role in this, it again appears to rely upon third parties agreeing to the mechanisms we seek to protect the local movement networks.

Walking and Cycling

- 5.20** TDM has shared with the applicant a piece of work undertaken previously by BCC to assess existing walking and cycling linkages to the airfield from areas within the BCC boundary to the south. Within this document are a number of suggestions to better connect and knit the new development into the existing urban area in the interests of encouraging healthy and active travel. For this to take place, walking and cycling routes must be direct, wide, well-surfaced, lit and segregated from traffic.
- 5.21** The development is proposing around 500 cycle parking spaces, whilst a 5% mode share target for walking and cycling is targeted for the 2022 opening year. This relates to around 850 spectators arriving and departing at the site by these modes. In the 2036 scenario, this percentage is forecasted to rise to 8%, or over 1,300 spectators arriving by foot or by bicycle. This seems very unlikely unless investment is made in surrounding infrastructure from all directions to support the development.
- 5.22** Access to the site by walking and cycling from the south is currently very poor (an unsurfaced, unlit public right of way crosses the Filton Golf Course), or is along or alongside unhospitable and heavily trafficked routes (the A38). This is partly due to the secure compound surrounding the adjacent Airbus site which generates a barrier to movement. Whilst it is acknowledged that there will be no public access to the building directly from the south, access through to the site from Charlton Road by foot or by bike and via the airfield development (also owned by the applicant) *will* be possible. TDM therefore requires this to be considered from all directions in the interests of devising a high quality linkage from this direction.
- 5.23** Those wishing to access the arena from Filton, Northville or Horfield will have no option but to walk or cycle alongside or on the A38 and this will do very little to encourage active travel in line with local and central government policy, nor will it result in use of bicycle by more vulnerable cyclists (ie: children, women and the elderly). Where this situation has occurred in the past, developers have argued to reduce cycle parking due to its lack of use and this risks being a similar situation unless the complimentary investment in surrounding infrastructure is made.

Travel Plan Bond

- 5.24** TDM welcomes the ambitious mode share targets that have been presented as part of the development proposals, but recognises that if these percentages were to not be achieved, further investment would be required in the sustainable travel infrastructure and options available to all visitors and employees of the proposed development.
- 5.25** TDM is therefore liaising with colleagues in Sustainable Transport and counterparts at SGC and HE to understand the implications of the development and the likely sum of money that would need to be set aside as a failsafe bond or surety to call upon in the event that the applicant can be held to the mode share assumptions made in this application.

Please note that the above comments are made on the basis and the quality of the information reviewed to date and in advance of the assessment of the application by colleagues within other teams representing the highway authority. As such, they are made without prejudice to other issues which may raise further detailed questions or matters that are not currently considered within this response.