

Transport Assessment Content

The following sections comprise our requirements for the preparation of Transport Assessments (TAs). This details what we consider to be best practice alongside a review of current national guidance, research and advice documents. The following sections are provided in the same order as the scoping information provided in *TDMG 2.1.3 (TAs and TPs)* for ease of use. In each case, it is advised that you agree the scope of the TA in advance in the interests of selecting which of the following assessment tools and methods is relevant to your proposals.

The majority of the following advice relates to (and signposts) more detail information contained elsewhere in the Transport Development Management Guide (TDMG) and other documents, but is provided here, given the need for the TA to demonstrate how the proposed development meets policy, design and engineering objectives.

Stage 1 TA

Stage 1 TA – Summary of Development Proposals

We will need to understand the full extent of what is being proposed: the floorspaces or number of residential units; the likely levels of usage in terms of staff, visitors, residents, students etc. and how the masterplan will successfully accommodate the development's various movement needs, primarily by pedestrians, disabled users, cyclists and public transport users. Please refer to section 2.1.1 *Concept and Masterplanning* for further requirements in relation to this.

Stage 1 TA – Policy Background

The applicant will be required to demonstrate how the proposals will achieve compliance with local and national policy, as highlighted in *TDMG sections 1.2 and 2.1*. In this respect we do not expect to see a copy and paste summary of policies we are already familiar with, but instead a demonstration of how the development will set out to fulfil these requirements through positive interventions and measures.

Stage 1 TA – Existing Transport Conditions – Qualitative Walking, Cycling and Public Transport Audit

Not everywhere in Bristol benefits from high quality walking, cycling and public transport access. We require all Transport Statements and Transport Assessments to include a qualitative audit of the surrounding pedestrian, cycle and public transport networks upon which a development will rely. Particular attention will be paid where sites which lie on or close to established local or national walking or cycling routes, and where connections from the development to essential facilities such as schools, shops and public transport can be exploited. Pedestrian isochrones will be expected to support each TA and should take into account topography. You should be mindful that we will not accept concentric circles around a development site to constitute an accurate assessment. To assist with this, the TravelWest website includes a *walking / cycling and public transport isochrones mapping tool*, whilst we have access to the *BrisTAL public transport accessibility mapping*, which is shown below in Figure 1.



Fig 1: BrisTAL (Transport Accessibility Level) mapping tool

We will require an objective and qualitative assessment of the existing surrounding walking, cycling and public transport infrastructure, highlighting the locations where deficiencies exist in addition to where high quality infrastructure is already located. This is a crucial assessment given the need for future users of the development to benefit from legible, safe and high quality surrounding infrastructure. A simple and quantitative description of the surrounding movement networks in the absence of the above analyses will not be accepted as this does not constitute an assessment.

The themes of congestion and poor sustainable travel infrastructure are not mutually exclusive. It is often the case that the highest levels of congestion occur in locations where there is inadequate provision for walking, cycling and public transport. Such deficiencies require to be identified for further consideration and discussion with ourselves within the TA.

In relation to public transport, as with walking and cycling we require evidence to support whether a certain location is viable in terms of offering effective bus or rail accessibility. This will assist us in coming to a view on whether enhancements to public transport, infrastructure (bus stops, shelters, laybys or bus lanes) or services (increased

frequencies, re-routing or financial support) may be necessary to achieve desirable sustainable development and travel patterns.

In some locations, where bus and rail connections are infrequent, and pedestrians and cyclists are required to undertake convoluted, circuitous and hostile routes to reach local facilities we may consider development to be unacceptable in the absence of substantial interventions.

Further information on how to plan for successfully for walking, cycling and public transport are provided in *TDMG sections 3.4 and 3.5*



Fig 2: Qualitative assessment of pedestrian linkages



Fig 3: Qualitative assessment of local cycle network

Stage 1 TA – Existing Transport Conditions – movement volumes and observed behaviour

It is strongly recommended that contact is made with TDM prior to the collection of any traffic flow or other source of data. This may require new traffic, pedestrian or parking surveys to be undertaken. In some cases, it will be necessary to undertake manual turning counts of local junctions, or pedestrian crossing surveys to inform the Stage 1 TA. In respect of junction turning counts, we expect queue length surveys to be undertaken at the same time to verify any junction modelling submitted as part of a Stage 2 TA. The absence of queue length data immediately calls into question the accuracy of any baseline modelling with the potential consequence of invalidating any future year forecasts.

The timing of surveys is significant. We require that data collection is undertaken during periods of maximum demand on the surrounding highway network, in addition to (if necessary) times when the development in question will be generating its own peak demand, as indicated in the table below. Weekday surveys must avoid school and public holidays, and be conducted within a neutral month, defined by the DfT as being from March through to November (excluding August). Mondays and Fridays must also be avoided (except for Fridays in the case of retail proposals). The table below is provided as a guide to typical assessment scenarios. However, where individual and specific issues are apparent we may agree to more bespoke alternative periods of assessment.

Table 2.1.4: Traffic and Movement Survey critical demand periods

Proposed Use	Baseline survey requirements – days	Baseline survey requirements – hours	Likely peak movement periods	Trip Generation Assessment Scope
Residential	Tue – Thu during term time	07:00–10:00 16:00–19:00	08:00–09:00 17:00–18:00	Weekday (excl. Mon and Fri) 07:00–19:00
Employment				
Educational – Nurseries / Universities		08:00–09:30 14:30–16:00	08:15–09:15 14:30–15:30	
Educational – Schools				
Food Retail	Fri, Sat and Sun during term time	Fri: 16:00–19:00	Fri: 16:00–19:00	Fri, Sat and Sun 07:00–19:00
Non-food retail		Sat: 09:00–18:00 Sun: 09:00–17:00	Sat: 09:00–18:00 Sun: 09:00–17:00	
Leisure / Recreation Facilities	Weekday, Sat and Sun, dependent upon proposals	Dependent upon individual characteristics of proposals	Dependent upon individual characteristics of proposals	Weekday, Sat and Sun 07:00–19:00
Public Buildings / Attractions				

In each case, and in the interests of verifying the outputs of future assessment work, we will need to see evidence that the applicant demonstrates their understanding of the current transport situation surrounding a site and the pedestrian, cyclist and

motorist behaviours that are apparent prior to submission. The collection of baseline transport data is critical to understanding whether or not a development will be safe and sustainable or whether interventions will be necessary.

We will use video and photographic evidence where necessary to challenge any reporting or assessment work that we consider does not accurately reflect the baseline situation with regard to congestion, and the quality of local walking, cycling and public transport networks.

Stage 1 TA – Existing Transport Conditions – Historic Collision Data

We expect any transport analysis carried out to be accompanied by a road traffic collision report which provides an assessment of historic casualty patterns over the three preceding years, which can extend to five years where we consider it necessary (for instance, where there has been a particular concentration of accidents).

Stage 1 TA – Proposed Site Constraints, Access and Indicative Layout

The following information is provided to assist with the commentary required as part of a Stage 1 Transport Assessment. Further specific and detailed information on what is acceptable in specific geometric and design terms is provided in the *TDMG Section 3 (Design Guidance)*.

Existing Site Constraints

To avoid the potential for disconnect between the planning process and the delivery of a development, existing site constraints and solutions to them must be made clear at the pre-application stage (and sometimes earlier than this) for avoidance of doubt. This may lead to additional preparatory work, but we consider this is time well spent. If TDM has asked for further detail at this stage, this is not to be obstructive, but in order for us to assist you in achieving a successful development.

It has been common for a lack of engineering detail or assessment during the pre-application or planning stage to result in the overlooking of critical issues in a timely manner, leading to serious delay to the delivery of development, resulting in unforeseen costs and resource implications for developers as well as ourselves, both of whom rely on certainty.

Specialist appointed transport planners and engineers have an obligation to their client to highlight any constraints to the delivery of development (or accompanying works) from the outset and we expect to be involved in these discussions at the earliest possible stage. It has been common for the following issues to lead to serious delays in the delivery of development:

- **Topography** – achieving acceptable gradients is critical to delivering safe access for the most vulnerable members of our community and reducing social exclusion. We will require longitudinal and cross-sections early on where it is necessary to resolve these issues and progress an access proposal that is compliant with the Equalities Act.

Fig 4: Topographical Assessment of development site



- **Widths and Radii** – we must be confident at the pre-application stage that sufficient geometries are available to ensure a safe and adoptable access proposal is deliverable alongside an acceptable layout that accommodates all vehicles expected to serve the development.

- **Utilities** – A survey of utilities is as equally important as the above two requirements. Positioning, diversion or relocation of subterranean cables, pipes and other apparatus in or adjacent to the highway, including street lighting columns and communications equipment will not be apparent on an Ordnance Survey Plan or internet mapping site (such as Google Street view). These matters need to be identified.
- **Drainage** – affected by each of the above considerations, we will be looking for details on how the development intends to manage water within and off the site.
- **Structures** – If the development necessitates excavations or the creation of basements, supporting walls or other retaining structures such as embankments on or near to the highway, this will be required to be taken through our formal Approval in Principle (AIP) process. This commences prior to construction and will need to involve BCC's Structures team from an early stage. Where such features are constructed without this we are unable to adopt them. Similarly where basements or foundations are excavated adjacent to the highway and without our oversight this could seriously undermine the stability of the adopted highway. We ask that such issues are raised at the pre-application stage so that all parties are aware of the necessary procedures.

Form of Access

In order for a planning application to be validated, any development taking access from the highway must have its access up to the extent of adopted highway included within the red line boundary. You will need to demonstrate on a General Arrangement drawing, preferably based upon a topographical survey rather than the Ordnance Survey (OS) base at a 1:200 or 1:500 scale how safe vehicular, pedestrian and cycle access to the surrounding transport network can be achieved.

For new and intensified accesses this will require confirmation that the required visibility requirements can be met, whilst also ensuring the proposed access (whether private or offered for adoption) is sufficient to cater for the needs of the vehicles that will access the development.

A Stage 1 / 2 Road Safety audit is required where material changes are being proposed to the highway. We will require the scope of this to be agreed with us in advance. See *TDMG Section 2.1.6* for further information.

Facilities for Pedestrians, Disabled users and Cyclists

Providing direct and accessible (maximum 1:20 gradient) access for pedestrians, disabled users and cyclists are requirements that will need to be demonstrated for all forms of development. Further guidance on this is provided in *TDM Sections 3.4* and *3.5*. It is not acceptable to provide uncovered or unsecure long-stay cycle parking as this will not meet our standards and will do very little to encourage cycling. Long and short-stay (visitor) cycle parking which is either inaccessible to visitors or located in poorly lit areas that do not benefit from adequate natural surveillance will not be accepted.

Turning Space

We will require evidence of how the development will satisfactorily accommodate not just cars and car parking, but also how the layout / masterplan will ensure safe access by delivery, service and emergency vehicles. In some cases we will insist that pre-application agreement is reached with Bristol Waste and the emergency services. We expect to see a vehicle swept path analysis for the most onerous vehicles likely to require regular access to the development and this must consider the need for forward visibility in addition to the avoidance of blind spots and the overrunning of kerbs and footways in a way that would cause damage to the adopted highway.

Parking

Car, cycle and disabled parking requirements are set out in the Local Plan and quantify the maximum allowable number of car parking spaces permitted and the minimum requirement for disabled parking, Electric Vehicle (EV) parking and cycle parking provision. Only in exceptional circumstances would we consider departing from those standards. Requirements for the size of parking spaces are contained in *section 3* of the *TDMG* and we will require to see all forms of parking carefully designed *into* the scheme in some locations and designed *out of* the scheme in others to avoid the blight caused by footway parking, overspill parking and insufficient provision. On residential schemes, we will expect a small percentage of the parking spaces to be enlarged to be accessible by vans to prevent damage to kerbs and footways.

Electric Vehicle Charing and Car Club Vehicles

As part of our commitment to reducing car reliance and emissions, we will insist upon the provision of Electric Vehicle (EV) charging spaces and accompanying infrastructure for all developments in line with planning policy and car club parking spaces and/or vehicles as part of residential development. Car clubs provide a dual benefit through promoting the sustainability of development to an extent where we may consider a reduced parking provision in favour of a potential increase to floorspace or the number of units on site whilst reducing the demand of residents to own a car. This will of course be subject to the effectiveness of the wider sustainable travel package offered.

Refuse Storage and Collection

Under no circumstances will it be acceptable for new development to result in refuse containers being stored on the highway, either on collection days or at other times. This not only results in an unsatisfactory visual appearance but can also obstruct the path of pedestrians and disabled

users whilst causing harm to public health and encouraging pests. Likewise, sufficient room must be made available (and kept clear) for waste collection vehicles to service the development.

The minimum requirements for the provision of refuse storage and the maximum allowable distances that waste collection operatives are expected to carry/wheel refuse, amongst other requirements are contained within the Bristol Waste Guide.

Stage 1 TA – Current Site and Trip Generation

Where the development site has an existing and operational use, we will require that the trip generation of this use is taken into account and presented as part of the TA. This is for the purposes of understanding the net transport impacts of the proposed development.

Where an existing use is either demolished, derelict or has been vacant for a period of time we are unlikely to take into account any ‘extant’ trip generation given that when considering the proposals against the baseline situation, all development trips will be new to the network.

Furthermore, any re-use or rebuilding of the existing site in its original context and floorspace arrangement is likely to require a planning application (or accompanying TA) of its own. Similarly, where disused employment sites come forward for redevelopment, the consideration of existing trips is often in direct contrast to the applicant’s accompanying marketing exercise, which commonly set out the case why the extant use has become economically unviable.

Stage 1 TA – Committed Transport Schemes and Developments

An applicant submitting a medium-large development proposal will need to be aware of our major schemes and priorities for the wider area as well as the locality in which the

development is situated. This will assist in achieving a masterplanning solution and pattern of development that is integral to our corporate aims of reducing the impact of climate change and delivering better public transport, walking and cycling infrastructure. We are happy to assist on these matters but would suggest, as a starting point that you become familiar with priorities and proposals set out in the [West of England Joint Local Transport Plan](#), [The Bristol Transport Strategy](#), the [Local Cycling and Walking Infrastructure Plan](#) and the [West of England Bus Strategy](#), in addition to the [City Centre Framework](#) and the [Temple Quarter Spatial Framework](#) where applicable. Other information on projects can be found on our [Transport Plans and Projects](#) webpage.

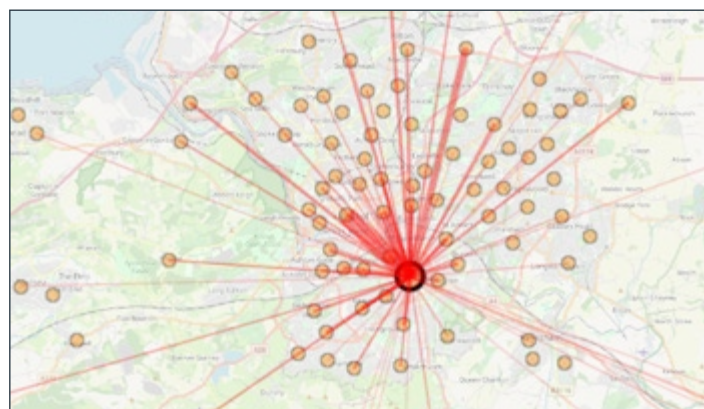
The traffic generated by known nearby and relevant committed development requires consideration as part of the scoping process. This can comprise trip generation data taken from approved planning applications and also the use of strategic growth factors using the TEMPRO software program. Where it is agreed by both parties that the use of data from individual committed developments alongside the use of TEMPRO growth factors may lead to double counting, TDM will seek to confirm to what extent the above methods should be utilised.

Stage 1 TA – Proposed Development Multi-Modal Trip Generation

We require applicants to confirm the forecasted hourly arrival and departure profile of trips by all modes of travel generated by the development throughout the day as identified in *Table 2.1.4*. This may be dictated by the likely trip generation of the land use in question (see below) but also local travel patterns. We will expect trip generation assumptions to be based on credible and robust evidence, using either the *Trip Rate Information Computer System (TRICS)* or more preferably, data drawn from relevant local uses comparable to the development proposed.

Stage 1 TA – Proposed Development Multi-Modal Trip Distribution and Assignment

Fig 5: **Census Travel to Work Data**, courtesy **datashine.org**



We will seek to agree with you a methodology for assigning new trips to the transport network at the outset and would expect to see a diagrammatic analysis that confirms the forecasted walking, cycling, public transport and vehicular trips associated with a development, quantifying the destinations and directions these movements will be departing to and arriving from during the peak hours and also a 12-hour day (from 07:00-19:00).

In order to assign development trips, we will accept the following underpinning evidence, depending upon the scale of development and the availability of data:

- Census Place of Work / journey to work data, relevant to the development location
- Wider strategic modelling (i.e. a SATURN model) for major strategic developments.
- Existing assessments – ie: staff / visitor postcode data, previous travel surveys etc.

If the distribution and assignment of traffic is taken from a wider regional SATURN model we will expect Select Link Analysis to be provided, in addition to difference plots and demand plots. The representation of traffic distribution and assignment in a format that is readily understandable to all is particularly valuable where there are major developments that are likely to be scrutinised by key stakeholders and decision-makers.

We will require traffic movements to be broken down into turning movements at local junctions, as necessary. Once the trip generation forecasts are compared with the baseline movements we will be in a position to agree the peak (worst-case) hours of study. These analyses will inform whether it will then be necessary to undertake any junction capacity assessment or other related modelling work as part of a Stage 2 TA, but more importantly, will start to build a picture of the impacts and demands of the development in the local area with reference to the outcomes-based solution we will seek. This is referenced in *TDMG section 2.1.3*.

Following on from this, and where necessary the Stage 1 TA is able to set out the scope of any modelling assessments required as part of the Stage 2 TA. In most cases we would expect the opening year and five years thereafter to be acceptable, but this will depend on the specifics of the site in question and may also be influenced by National Highways who may require alternative additional assessment scenarios, depending upon the impact on the Strategic Road Network (SRN).

Stage 1 TA – Potential Transport Interventions and Improvements

Following the correct execution of the above scoping assessments, we would expect the applicant to be in a position where there is suitable evidence upon which to formulate a package of transport interventions to support and mitigate the proposed development. Whilst it may be necessary to further qualify and test these measures as part of the Stage 2 TA, an agreed Stage 1 TA at the pre-application stage will provide a greater level of certainty moving forward and will establish clearly what areas require further consideration moving forward.

Stage 1 TA – Transport for New Homes Assessment

Where new housing is proposed, we have obtained agreement from the Foundation for Integrated Transport (FIT) for applicants in Bristol requiring a Stage 1 TA to carry out the [Checklist for New Housing Developments](#). The requirement for this at Stage 1 is deliberately timed to ensure that any matters that have not been addressed in the initial stages of the development proposal are considered and actioned upon in good time to be presented and evaluated as part of the Stage 2 TA.

Fig 6: Transport for New Homes Summary Report, FIT, 2018



Where a Stage 2 TA is not required, this checklist will help form the evaluation of the development from a sustainable transport perspective and will also assist in discussions about what measures and enhancements are required in respect of either the site masterplan or the supporting off-site infrastructure.

Given the importance of these issues, we will reject submissions for Housing developments of 20 dwellings or more that do not undertake this assessment.

Stage 1 TA – Travel Planning Proposals

As part of the above, it is reasonable at this time to expect the applicant to have thought through and presented a range of Travel Planning interventions and actions that can be taken forwards to comprise a Full Travel Plan or Travel Plan statement, given the evidence already provided in relation to the level of movement generated by its residents / visitors. Our [Travel Plans for New Developments](#) web page sets out best practice on how these aims can be achieved.

Stage 2 TA

We expect the content and scope of a Stage 2 TA to have been agreed following the receipt of the Stage 1 TA in discussions between TDM, the applicant, their consultants and any specialist engineers and officers brought in to advise accordingly.

Stage 2 TA – Further Survey Work (as agreed following Stage 1)

It is likely that where material impacts or changes to movement are established by the Stage 1 TA that further data collection is needed. Each of the following examples are representative of where a Stage 1 TA has indicated the need for further areas of assessment as part of a Stage 2 TA:

- **Pedestrian Crossing and Volume Surveys** – i.e. where a high-density development with low levels of car parking generates significant additional demand along a route or across a road where current pedestrian crossing facilities are currently inconvenient for the development and their relocation is being considered.
- **Cycle Surveys** – to ascertain the current desire line(s) of cyclists in the area in order to understand the likely level of usage of a new or diverted route.
- **Public Transport Patronage and Reliability Surveys** – where the Stage 1 TA has found the current bus or rail options to serve a site to be either over-subscribed or infrequent, unused and

unreliable.

- **Parking Surveys** – particularly on high density developments with low levels of parking in areas that are not currently subject to restrictive parking controls (CPZ / RPS), TDM will require that an assessment is made of the likely impact of overspill parking arising from new development.
- **Traffic Volume, Turning Count, Queue Length and Speed Surveys** – in the event that further data collection or junction assessment / transport modelling work is required to satisfactorily assess the development proposal in line with the guidance provided at Stage 1.

Stage 2 TA – Modelling Assessments and forecast reports for baseline and future years

Where an assessment is required of the operational performance of the local highway network, this should be agreed at Stage 1 along with the years of testing. A TA must include a reasonable opening year of assessment, as indicated by the applicant, and a suitable future year, taking into account all other known growth occurring in the area. The use of TEMPRO growth forecasts is accepted practice in such scenarios, as detailed in Stage 1.

Stage 2 TA – Junction and Network Capacity Assessment

The previously assumed method of deriving whether or not junction assessment is required on the basis of a whether 5% or 10% increase in trips is realised (when compared to background traffic) is no longer relevant, particularly in congested scenarios where congestion increases exponentially and a relatively small number of trips may push a junction over capacity.

The scope and methodology of any junction assessment should have already been agreed at Stage 1, with the application of the most appropriate modelling tools established. When submitting modelling to us as part of a TA, we will expect the modelling outputs information to be included / submitted electronically in their original file format.

Stage 2 TA – Pedestrian and Cycle Modelling

We have insisted on pedestrian modelling where developments generate high concentrations of footfall and in particular where the current environment close to the development may struggle to accommodate these movements and require alterations. The use of LEGION or similar pedestrian microsimulation tools is relatively common and has been used in Bristol as part of the assessment of large entertainment and sporting venues as well as proposals for a university campus. Cycling models will also be considered given the importance of providing sufficient infrastructure for this mode of travel.

Stage 2 TA – Network Models

On major development schemes that have material movement impacts across the city we will insist that wider strategic modelling tools are used. This should be agreed as part of Stage 1. Each model submitted needs to be:

- Appropriately scoped and agreed with us (and other highway authorities as appropriate) in advance, to allow sufficient time for any data collection.
- Demonstrated to be fit for purpose – i.e. calibrated / validated in line with DfT WebTAG guidance.
- Submitted via an online file sharing site for our assessment.
- Include the full inputs / outputs of the model comprising the assumptions that are made with regard to trip rates, as well as the methodology for forecasting the origin and destination of development trips, as well as traffic growth.
- Incorporate any individual junction modelling (eg. LINSIG) as appropriate to inform traffic signal timings within the model – please refer to Individual models (below) for guidance on LINSIG modelling.

Sub-regional Modelling (SATURN)

The use of the Greater Bristol Area Transport Study (GBATS) *SATURN* model, covering the West of England sub-region has been developed over a number of years and includes future year baseline traffic flow forecasts for 2021, 2026, 2031 and 2036 to inform strategic land use allocations, development plan preparation and wider transport interventions such as MetroWest and MetroBus. As such, the model contains within it the expected levels of land-use growth and the movements associated with it over a series of future year scenarios.

Fig 7: GBATS-SATURN Model Select Link Analysis, Hengrove Park



The GBATS model can be used to establish how major developments affect patterns of movement across the wider area, analysing the ripple effect that is caused when a significant number of new trips are added to the network or where roads are either closed or re-purposed. This will reveal not only the routing of traffic associated with the development but also the displacement and re-routing that occurs as background traffic changes its behaviour as a result of major development and transport interventions.

It is therefore critical that we receive geographical plots (in addition to tables) confirming each of the following for each scenario that has been run, as follows:

- **Total Traffic Volumes** – with and without development
- **Difference Plots** – comparing with development / without development scenarios
- **Select Link Analysis** – confirming the assignment of development trips

The Select Link Analysis is particularly important, as it helps us to understand along which routes the development is forecasted to attract movements and where specific interventions can be targeted. This is just as important as understanding where non-development background traffic may divert.

In congested locations, a SATURN model will often show no (or very little) change to traffic flows resulting from major development. This must not be confused or assumed to be ‘minimal impact’, but instead often serves as confirmation that the baseline situation is already at capacity and therefore no (or very little) additional traffic is able to be accommodated on the network. In these instances, and when comparing Select Link Analyses with Difference Plots, the development traffic can be seen to have displaced background traffic elsewhere.

For SATURN models, we will require the following files to be submitted to us:

- UFS, UFC, UFN, UFM, and DAT files
- Development Coding details
- Confirmation of the Zone numbers used to represent development plots

It should be remembered at this stage that a SATURN model is strategic in its nature. It will provide a useful forecast of traffic patterns across a wider area, taking into account highway network supply and demand. Further, the GBATS-SATURN model is also limited in that it only covers the weekday periods from 8:00–9:00 hours, an ‘interpeak hour’ and the evening peak hour of 17:00–18:00, and therefore other assumptions must be made on highway network operation for

periods outside of these times.

In the case of a planning application, whilst it is essential for understanding wider impacts, a SATURN model will not provide all the information that is necessary for determination of a development proposal. Further more detailed modelling will be necessary as set out in the following sections.

Stage 2 TA – Microsimulation Modelling (VISSIM and S-PARAMICS)

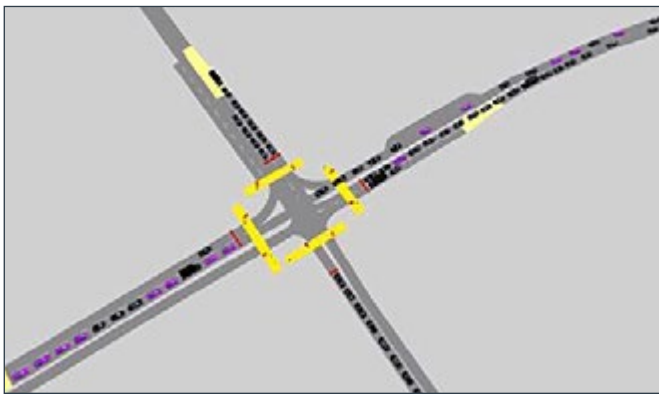
The wider Bristol urban area accommodates a population of over 600,000 inhabitants. In common with other core cities, our movement network comprises numerous and interdependent arterial and circulatory routes where congestion regularly occurs, often at the expense of our population’s propensity to use sustainable forms of travel. The operation of the highway network in one location can therefore directly impact on other locations much further downstream and often impacts on neighbouring authorities’ networks, including those managed and maintained by National Highways.

Fig 8: PARAMICS Microsimulation Model Output, Bristol City Centre



We will insist upon the use of microsimulation models (i.e. **VISSIM** and **S-PARAMICS**) in built-up urban areas and other locations where: major development is proposed and congestion is common; where numerous junctions of differing nature and priorities (ie: signals, roundabouts, T-junctions, slip-roads) impact one another; and where undertaking individual modelling would fail to properly represent the operation of the highway network.

Fig 9: Microsimulation Model Output for Filton Arena, Southmead Road



Microsimulation modelling can be lengthy and this is for good reason: it provides significantly more detail and draws on inputs relating to journey times, routing, driver behaviour, the interaction between junctions, the impact of minor road junctions and pedestrian phasing (amongst other things). Microsimulation models therefore provide a far more reliable and visual representation of how a highway network operates at present and may operate in the future, allowing the user to visually understand how traffic flows along a route or network, together with where and how congestion arises. It also helps for improved and better informed decision-making, providing officers with the ability to accurately inform stakeholders and elected members on the impacts of development and the likely success of interventions that are necessary to mitigate it.

We may insist that existing microsimulation models are extended or new models are constructed in areas which are sensitive to congestion.

It is common practice for such models to be utilised to inform developments such as city centre shopping redevelopments, arena and stadia proposals, and intricate / complicated public transport interventions where a traditional standalone junction model is considered unsuitable or unreliable.

We expect both **VISSIM** / **S-PARAMICS** modelling to be carried out using the latest versions of the software, with the following outputs submitted for each scenario tested as a minimum:

a) A Local Model validation Report (LMVR)

b) A submitted Modelling Report, including:

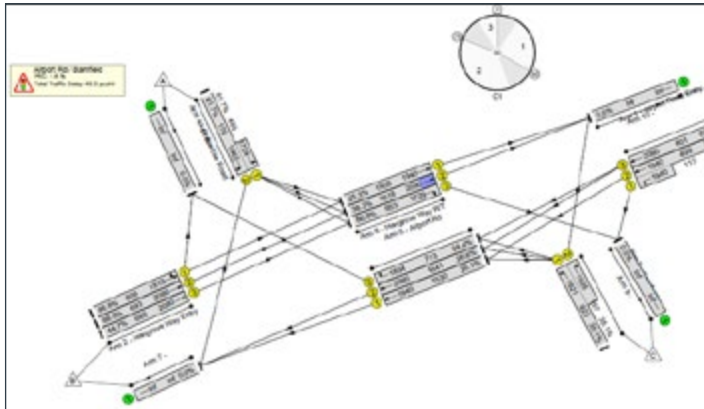
- i. Summaries of network performance
- ii. Journey time forecasts
- iii. locations where the network is over-saturated (known as 'unreleased' demand)

c) Video-footage of the operation of the network
(to a scope previously agreed by ourselves)

d) Paramics / Vissim modelling files.

Stage 2 TA – Individual Junction Models (i.e. PICADY / ARCADY / LINSIG)

Fig 10: LINSIG Junction Assessment Diagram, Hengrove Park



Where it is forecasted that a development will have a material traffic impact upon a nearby standalone junction, or a collection of independently operating junctions where it is demonstrated that congestion at one junction does not affect the other(s), we will accept the use of individual junction models to understand and forecast net development impacts using the following software tools. We will also expect any new T-junction, roundabout or signal junction to the highway network to be tested in this manner.

- Standalone T-junction, crossroads or staggered junction: **PICADY**
- Mini-roundabout or other non-signal controlled roundabout: **ARCADY**
- Signal-controlled roundabout, crossroads or T-junction: **LINSIG**
- A number of Signal and priority junctions lying in close proximity: **LINSIG**

We expect this modelling to be carried out using the latest version of the software and will require the modelling files to be submitted to TDM in addition to the modelling output summaries.

Before any ‘with development’ scenarios are run, we must be satisfied that the baseline model reflects existing conditions. As referenced at Stage 1 and as per more complex modelling, we are unlikely to accept a model that has not been validated against a queue length survey.

The geometric parameters used should be submitted and shown on a scaled plan to include road markings / hatched areas in order to allow for checking and validation. We will expect to see plans submitted in CAD format for any new junction designs that are tested.

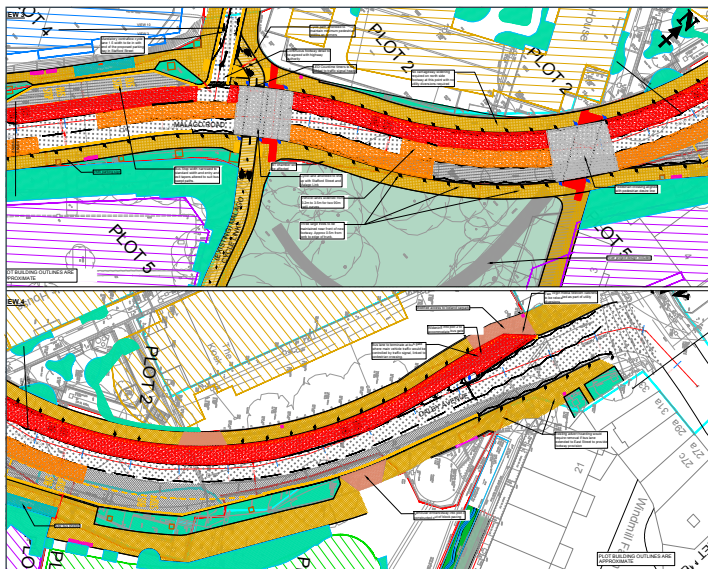
For modelling of existing signal junctions, the latest version of the controller specification should be submitted within the Stage 2 TA. Modelling inputs should reflect the signal timing and sequences that operate during the relevant periods of assessment.

For locations where there is more than one signal junction in close proximity, LINSIG may be used, subject to guidance from our Traffic Signals team. However, in a congested urban context we may instead require a microsimulation model where impacts are significant and congestion occurs across a much wider area than is possible to be captured in LINSIG.

Stage 2 TA – Confirmation of Package of Transport Interventions

We expect all developments requiring a Stage 1 TA or Stage 2 TA to come forward with a range of enhancement and improvement measures in order to make the development acceptable in planning terms, the scope and range of interventions reflective to their material impact. Any alterations to the highway will require at the planning stage, the submission of a Stage 1 / 2 Road Safety Audit. Further information on this is provided in *TDMG 2.1.6*.

Fig 11: Sustainable Transport intervention, Bedminster Green



The list of measures, as set out in *TDMG 2.1.3* is not exhaustive but it is likely that several of these may be necessary in order to obtain approval. Further information on these measures is summarised in *TDMG section 2.1.5* and provided in greater detail (in relation to their design) in *TDMG section 3 – Design Guidance*.

Stage 2 TA – Transport for New Homes Assessment

For Housing developments we require that the assessment carried out at Stage 1 TA using the [Checklist for New Housing Developments](#) is revisited as part of the Stage 2 Assessment. This allows for a consistent evaluation to be made of any positive changes that have taken place to the development proposals since Stage 1 and crucially, how the transport interventions covered in the previous section have enhanced the sustainability of the development.

Given the importance of these issues, we will reject submissions for Housing developments of 50 dwellings or more that do not undertake this assessment, on the basis that a 20-dwelling development is unlikely to require a Stage 2 TA.

Stage 2 TA – Framework Travel Plan

Travel Plans comprise both a developer and employer's commitment to minimising the harmful impacts upon communities in Bristol of further continued and unmitigated reliance on the private car. We take this responsibility very seriously and will reject Travel Plans that we feel will be ineffectual, and/or have been submitted to simply 'tick a box'.

Travel plans that do not provide a detailed scope of measures and responsibilities, or those that are not underpinned by a robust and credible regime of targets, monitoring, and 'failsafe' interventions will not be effective, and therefore not be recommended for approval.

For further detail on Travel Plans please refer to the [Travel Plan Guide for New Developments](#).