Title: Transport Model Review

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1.0 Introduction

1.1 Jubb have been commissioned by Rainier Developments to undertake a review of the Bedford Borough Transport Model Report which forms part of the evidence base for the Bedford Council Local Plan 2040 Draft Plan.

2.0 Bedford Borough Transport Model Local Plan Assessment

2.1 To support Bedford Borough Council in the development of their new Local Plan 2040, AECOM developed the Bedford Borough Transport Model (BBTM), a multi-modal transport model.

2.2 The modelling assessed four proposed development scenarios considering locations for growth based on potential locations for growth which were the subject of public consultation at the issues and options stage of the Local Plan 2040 review. Alongside the consultation the Council issued a call for sites, inviting landowners and developers to put forward sites which they considered suitable for residential and employment purposes.

2.3 The four development scenarios tested were:

- Grey (Dispersed growth): this scenario includes all sites identified as part of the Local Plan 2040 call for sites consultation with the size of the proposed developments scaled uniformly to ensure that the overall growth in the borough is considered to be in the likely range of the new Local Plan housing and employment targets.
- Pink, Yellow & Brown (Infrastructure-focused growth): this scenario concentrates growth along the A421 corridor and proposed East-West Rail corridor (including the 'Central Section' between Bedford and Cambridge) within Bedford Borough within the urban area and in areas which could form extensions to the Bedford urban area.
- Red & Orange (New settlement-focused growth): this scenario provides growth through the creation of one or more new settlements within the borough.
- Brown (Urban-focused growth): this scenario supports growth in locations which are primarily located within Bedford or in parishes which adjoin the current urban area boundary near existing urban areas, including urban extensions

2.4 The reference case (2030) includes growth of almost 11,000 dwellings between 2018 and 2030 identified from the adopted Local Plan. The proposed development scenarios add approximately 12,000 to 15,500 dwellings in addition to this by 2040.

2.5 As a result of the call for sites the Council received submissions proposing in excess of 70,000 dwellings, sites totalling 603 hectares with employment as the primary use and a further 97 hectares where employment is proposed as a secondary use. These totals significantly exceed the likely housing and employment targets of the plan. The scenario tests were therefore designed to reflect the location of the sites received as part of the submissions but were scaled to a more realistic development quantum.

2.6 The reference case (without the development scenarios) shows that at the following locations traffic flows are approaching or exceeding the capacity of the road network:

- Junctions along the A421 to the south of Bedford (between the junction at Renhold and the junction with the A6 near Elstow) - high volume-capacity ratios are forecast at the slip-road merge points at junctions on the A421 itself rather than around the gyratories at these junctions;
- A421 between the junction with the A6 and the A603/Cardington Road – link capacity of a two-lane A-road approaching capacity – between the A6 and Cardington Road in the AM peak hour and for additional sections to the east of Bedford in the PM peak hour;

- Junctions along Clapham Road in northern Bedford town - particularly PM peak hour at the Clapham Road / Manton Lane junction; and
- Caudwell Street / St Mary's Street junction to the south of the river crossing in Bedford town centre – AM peak hour.

2.7 The forecast for traffic flows to be approaching capacity on the A421 to the south of Bedford has also been identified as part of the documentation published for the Development Consent Order (DCO) submission for the proposed A428 improvements between Black Cat and Caxton Gibbet. Within Section 3.16 of the Transport Assessment Annex 2 discussing the forecast traffic flows at the A421 / A6 Junction, Highways England states that:

"The requirement for a dual 3-lane main carriageway to the east of this junction [A421 / A6 Junction], and the consequent requirement for a lane drop and lane gain and a two-lane westbound off-slip road are required by 2025, whether the Scheme [A428 Black Cat to Caxton Gibbet] goes ahead or not. The additional traffic arising from the Scheme does not require any further enhancement to the layout than would already be required in the DM [Do Minimum] scenario.

Highways England propose to adopt a 'monitor and manage' approach at the A421/A6 junction whereby the performance of the network will be monitored and consideration given to the potential need for interventions if required."

2.8 Whilst this does not state that Highways England is actively proposing improvements to this section of the A421, it does show that Highways England is aware of likely congestion problems in this area and that improvements in some form are likely to be required.

2.9 In addition to possible widening of this section of the A421, other improvements which could be considered are:

- creation of a 'digital corridor' to use technology, such as variable speed limits, to increase the throughput of the existing infrastructure;
- improvements to be merge / diverges to increase capacity for vehicles joining / leaving the A421; and
- use of signalling at A421 junctions to control the flow of traffic onto the A421 from the local road network.

2.10 Seven transport metrics were selected to inform the assessment of the development scenarios as set out in **Table 1**.

Metric		Description of Metric	What Impact Means
a	Forecast Vehicle Miles	Aggregate forecast traffic for car, LGVs and HGVs within Bedford Borough	A lower number of miles indicates a more efficient use and routeing of vehicles on the highway network
b	Forecast Average Network Speeds	The forecast average speed across Bedford Borough	Higher average speeds are an indication of a less disrupted highway network
c	Forecast Delays	The forecast delay at key junctions within Bedford Borough	Lower levels of delay are an indication of a less disrupted network
d	Forecast Volume-Capacity Ratios	The forecast ratio of the volume of vehicles to road capacity for key junctions within Bedford Borough	Lower volume-capacity ratios are an indication of a less disrupted network
e	Cross-Boundary Impacts	The forecast ratio of vehicle volume to road capacity measured at junctions outside Bedford Borough	Lower volume-capacity ratios are an indication of a less disrupted network
f	Routeing onto Less Appropriate Roads	An assessment of the magnitude and spread of routeing on less suitable roads within Bedford Borough Less suitable roads refer to rural, local and residential roads, or roads not defined as A- or B-roads	An increase in traffic on less appropriate routes is an indication that the more appropriate key roads (primary routes) may be congested
g	Impacts on Air Quality Management Areas (AQMA)	An assessment of the forecast change in traffic levels within the	An increase in traffic within the AQMA is likely to have additional negative impacts on air quality

		defined AQMA area in Bedford town centre	

Table 1: Assessment Metrics Summary

2.11 Each metric for each development scenario was given a Red, Amber, Green (RAG) rating.

2.12 It was concluded, based on the modelling work undertaken to date the 'Pink, Yellow & Brown' and the 'Brown' development scenarios are forecast to perform better against the defined metrics than the 'Grey' and 'Red & Orange' development scenarios. This conclusion was based on there being fewer red ratings within the assessment in both the AM and PM peak hours.

2.13 It was also concluded that the locations for growth in these two development scenarios provide greater opportunities for enhanced public transport provision and active mode measures.

3.0 Appraisal

3.1 The submissions from the call for sites resulted in approximately 4.5 – 6.0 times the required number of dwellings for the plan period 2030 – 2040. The 'Grey' scenario was then designed to reflect the location of the sites received as part of the submissions but were scaled to a more realistic development quantum.

3.2 If only the quantum of development at each provided location has been scaled down, then this is not representative of a dispersed growth scenario which would assess each of the sites to inform the best locations for the required delivery of housing. This could lead to 'Grey' development occurring spatially related, in a cluster in several locations in the borough, where public transport and active travel infrastructure could be introduced rather than the 'scatter gun' approach utilised.

3.3 ***The 'Grey' scenario does not accurately represent dispersed growth and additional work should be undertaken to assess the sites that have been submitted to ensure a balanced comparison of development scenarios.***

3.4 The seven transport metrics used to assess the four development scenarios includes metric (f) 'routing onto less appropriate roads' where less appropriate roads are deemed to be rural, local and residential roads, or roads not defined as A or B roads. The supposed outcome, where there is more traffic on these roads, is that it indicates that the more appropriate key roads (primary routes) may be congested.

3.5 This generalisation of non- A and B roads being inappropriate for the routing of traffic from the four development scenarios is not an appropriate metric for assessment. Many estate and rural roads are suitable for additional vehicle flows. The geometry of the road, the number and type of accesses, adjacent activity levels and the level of increased traffic all need to be considered when determining appropriateness of the road network. It is instantly apparent that the 'Grey' development scenario would need to travel by non-primary roads to access the primary network; this does not mean that the roads are unsuitable or that the primary network is congested.

3.6 Table 3.1 shows 'red' for metric (f) for the 'Grey' and 'Red & Orange' development scenarios and 'green' for metric (c) 'forecast delays'. For 'Pink, Yellow & Brown' and 'Brown' development scenarios both metrics (f) and (c) are amber. This indicates that when less appropriate roads are utilised there is less delay on the network than when the primary network is predominantly utilised. This does not justify the indication that where less appropriate roads are used that primary routes are congested.

3.7 ***The use of metric (f) as an assessment tool is considered to be inappropriate and the deemed outcome cannot be justified as correct. Metric (f) should be removed from the RAG assessment matrix.***

3.8 The conclusion of the report is based on the development scenarios that have 'the fewest red ratings'. However, at paragraph 2.4.2 it states, 'Green can, but does not always, imply a positive impact and similarly red does not necessarily imply a negative impact.' As shown above it is considered that red for metric (f) does not necessarily mean a negative impact in terms of the primary network assessment.

3.9 Additionally, if a scoring system were undertaken for 'Red', 'Amber' and 'Green', i.e. 3, 2, 1 it can be seen that there is very little difference between the four development scenarios which indicates that the current assessment does not provide adequate analysis to determine which scenario has the least effect on the highway network.

3.10 ***Further assessment of the 'Red', 'Green' and 'Amber' ratings is required to understand if their status is detrimental to the operation of the network. Further assessment and a suitable scoring system is required to enable comparison of the four development scenarios with .***

3.11 Whilst RAG assessments provide a tool for analysis they are generally used to identify 'rules' which if met provides suitable development i.e. access – 'red' no access achievable, 'amber' potential access concerns which are resolvable, 'green' no access concerns or impact on wider network – 'red' significant impact on the network with no possible mitigation, 'amber' impact on the network requiring achievable mitigation, 'green' no significant impact on the wider network.

3.12 Metric (c) assesses the number of key junctions where forecast delay exceeds 30 seconds. It does not provide a comparison between the four development scenarios as to the amount of delay at each node i.e. 31 seconds vs 60 seconds which would show a doubling of delay, which may affect the outcome of the assessment.

3.13 ***An additional metric should be provided to consider the level of delay at each node that is forecast to exceed 30 seconds.***

3.14 Due to the approach to the 'Grey' development scenario (scatter gun) there is very little mitigation proposed in terms of bus services and active travel routes and therefore, the opportunities for modal shift may not have been identified. For example, three or four larger residential sites in close proximity to one another, may be able to provide mitigation that would produce a modal shift.

3.15 ***The 'Grey' scenario does not accurately represent dispersed growth and additional work should be undertaken to assess the sites that have been submitted to ensure measures than can improve modal shift are identified.***

3.16 Whilst the proposed road mitigation measures increase the capacity of the network and improve average network speeds, they also increase traffic movements due to travel by car becoming quicker and therefore more attractive. This is contradictory to the provision of sustainable development.

3.17 ***Further assessment is required to balance network improvements against the promotion of travel by car.***

4.0 Summary

4.1 The approach used to assess the 'Grey' development scenario is flawed. It has proportionally reduced each site to attain the number of dwellings required to meet Bedford's housing allocation. In reality, the submitted sites would be assessed and the most appropriate sites would then be brought forward for assessment.

4.2 This approach has led to the assessment of modal shift for the 'Grey' development scenario possibly being underestimated where there is a possibility large sites could be geographically clustered to provide appropriate and meaningful mitigation.

4.3 Some of the metrics used for the assessment are either inappropriate or not analysed in sufficient detail which may lead to misunderstanding the impacts of the four development scenarios on the network.

4.4 The conclusion is based only on the number of 'red' metrics each development scenario has. This approach is too simplistic to offer a realistic assessment and further analysis is required to understand the impacts on the network.

4.5 The current level of road mitigation encourages travel by car and should be reassessed to ensure sustainable development is secured.

5.0 Conclusion

5.1 The Bedford Borough Transport Model Local Plan Assessment Report is not, in its current format, a suitable assessment to be used to consider the impact of the four development scenarios on the highway network and therefore, at this moment in time, it is not appropriate to use as an evidence base to support the Local Plan 2040 Draft Plan.