# Background Paper 12a – Transport Modelling

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# 1. Introduction

1.1 This topic paper supplements Transport Background Paper (012). This paper begins by providing a short contextual summary of Oxford's traffic issues. It then goes on to discuss the traffic modelling undertaken (using the County Council's Oxfordshire Strategic Model) in relation to the strategic and local road networks. It also highlights, in the case of the Strategic Road Network, discussions with relevant key stakeholders. It sets out how the use of traffic modelling has informed the development of the Oxford Local Plan 2045. Finally, it considers the implications of transport modelling that has been undertaken, on Oxford's Local Plan 2045, drawing some conclusions based on the findings.

### Context

1.2 As a medieval city, Oxford's often narrow streets are unsuited to motorised vehicles – particularly to high levels of motorised vehicle use. In fact, peak period traffic congestion has been a persistent problem. Within the city centre for instance, a clear conflict exists between cars, buses and delivery vehicles, all of which compete for the limited available space with pedestrians and cyclists. The city's tightly drawn administrative boundary means that access to the Strategic Road Network (SRN) is limited to several junctions on the A34. More details can be found in Background Paper 012: Transport.

### Traffic Modelling

1.3 The City Council has undertaken bespoke traffic modelling to look specifically at the impacts of planned growth contained within the Oxford Local Plan 2045, on the Strategic Road Network (SRN). This was carried out using the County Council's Oxfordshire Strategic Model (OSM). The OSM model outputs are expressed in terms of the change in Annual Average Daily Traffic (AADT) flows. This means they can be used to assess the impacts of planned growth in Oxford on the section of the SRN closest to Oxford – i.e. the A34. It is important to note that they are also very helpful in informing the air quality assessment as required by the Habitat Regulations Assessment (HRA).

1.4 In order to assess the impact of the Local Plan on the Local Road Network, the City Council has benefited from access to the local network modelling carried out by the County Council: Oxford Trail Traffic Filters Transport and Traffic Forecasting Report (October 2022). This modelling carried out to assess a proposed demand management intervention (see Background Paper 012: Transport for more details) takes account of assumed future growth across the five Districts of the County. For Oxford this modelling uses the levels of growth proposed in the Local Plan 2036, this included higher land use assumptions than are being proposed through the Oxford Local Plan 2045 (see section 4 below).

# 2. Strategic Road Network

### Modelling outputs

2.1 Significance thresholds are used to determine when changes in traffic volume - often from new development - require further assessment. The "significance" thresholds for both transport assessment work and air quality work are 1,000 AADT or more for cars/ LGVs (Light Goods Vehicles) and 200 AADT or more for HDVs.

2.2 Table 2.1 below shows the predicted change in Annual Average Daily Traffic (AADT) flows on the A34 resulting from the growth proposed in the Oxford Local Plan 2045. These outputs show that the two-way change for cars/ LGVs, on the A34 (northbound and southbound) is 274 AADT, while the change in Heavy Duty Vehicles (HDVs) is –49 AADT.

2.3 The AADT changes identified in Table 2.1 are therefore below their respective "significance" thresholds, both for air quality assessment work and for transport assessment work. This means that as the modelled outputs are below each of their respective thresholds, the impacts are not likely to be significant. In this instance, the change in AADT is used as a proxy for changes to the critical load or level of certain pollutants (e.g., Nitrous Oxides – NOx).

2.4 An advice note, published by Natural England entitled 'Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitat Regulations' sets out that widely acknowledged Environmental Benchmarks for imperceptible impacts are set at 1% of the critical load or level, which is considered to be roughly equivalent to the thresholds for changes in traffic flow, as set out in the Design Manual for Roads and Bridges.

***Table 2.1 Change in AADT on the A34 resulting from the Oxford Local Plan 2045***

| | AADT (DS-DM) Cars/ LGVs | AADT (DS-DM) HDVs |
|---|---|---|
| A34 (northbound) | -48 | -7 |
| A34 (southbound) | +322 | -42 |
| **Total (Two-way change)** | **+274** | **-49** |

Source: Oxford City Reg. 19 Habitat Regulations Assessment

### Discussions with key stakeholders: National Highways

2.5 Following representations made by National Highways at Regulation 18 stage of the Local Plan (a summary of which is contained in the Oxford Local Plan Regulation 18 Stage Consultation Report), City Council Officers met with colleagues from National Highways on 15 October 2025 to discuss the key issues raised.

2.6 At the meeting, officers explained that the neither the total (two-way) change, nor the individual (northbound or southbound) carriageway changes in AADT, exceeded the significance thresholds set out above (i.e., 1000AADT or more change for cars/ LGVs; or 200 or more change for HDVs). At the meeting, both parties agreed that all of the issues raised as part of the National Highways response to the Regulation 18 consultation had been satisfactorily resolved. Following the meeting, the City Council Officers provided colleagues from National Highways with a short note of the meeting which set out the key issues that were discussed, a short, written response those issues, and a note of the outcomes of the meeting.

2.7 On 4 November 2025, National Highways confirmed that they were happy with the note, which confirmed that all the issues raised within National Highways' response to the Oxford Local Plan Regulation 18 consultation had been satisfactorily resolved. One final point to note is that, at the meeting, both parties recognised the value of producing a Statement of Common Ground as a way of formally documenting the agreed position of each organisation going forward. The intention is to agree a Statement of Common Ground between National Highways and Oxford City Council on the Oxford Local Plan 2045 to accompany submission.

**Discussions with key stakeholders: Natural England**

2.8 Following the Regulation 18 consultation, the City Council received a response from Natural England. City Council Officers have met with Natural England on a number of occasions. A detailed account of the correspondence with Natural England is set out in the Regulation 19 version of the Habitat Regulations Assessment.

# 3. Local Road Network

### Modelling Outputs

3.1 The recent traffic modelling undertaken by Oxfordshire County Council (for the traffic filters project) has shown that, without intervention (i.e inclusive of predicted growth, but without the traffic filters project), there would be a negligible overall change to the current situation. Table 2.2 (below) includes data from the Oxford Trial Traffic Filters Transport and Traffic Forecasting Report (October 2022). It shows the predicted change in demand for car use both within, and to/ from the city between 2018 (the model base year) and 2024 (the assumed start year for the scheme (but without its implementation)).

***Table 2.2 Sectorised demand for car use (12-hour period, 2018 BY vs 2024 DM)***

| Mode/ Sector | 2018 BY | 2024 DM | Change | % Change |
|---|---|---|---|---|
| **Car (person trips)** | | | | |
| Within city | 130,675 | 123,307 | -7,368 | -6% |
| To/ from city | 159,323 | 164,909 | 5,586 | 4% |
| **Combined** | **289,988** | **287,785** | **-2,213** | **-1%** |

(Source: Oxfordshire County Council, Oxford Trial Traffic Filters Report (October 2022)

3.2 Additional spatial analysis undertaken within the report showed the main changes in the city were the result of re-routing due to the six East Oxford Low Traffic Neighbourhood Schemes. The report noted that elsewhere in the city, there was generally no change in traffic flows, or in some cases, small increases and recognised that maintaining the existing situation would not address the existing challenges faced by the city.

## Demand Management Measures

3.3 The County Councils "Core" Transport Schemes are a suite of transport demand management measures. These measures are needed because, on much of the city's road network, the amount of traffic has resulted in significant congestion, and associated problems relating to air quality, public transport service reliability and cycle and pedestrian safety issues. On-going traffic congestion issues also impact the ability of the County Council to achieve the vision, aims objectives and headline targets set out in the Local Transport and Connectivity Plan, which include to:

- Reduce 1 in 4 car trips by 2030
- Deliver a net-zero transport network by 2040 and
- Have zero, or as close as possible, road fatalities or life-changing injuries by 2050

3.4 Given Oxford's medieval origins, there is insufficient physical space to overcome the city's long-standing traffic and congestions problems through engineering efforts (e.g., through increasing road capacity or the introduction of basic bus priority measures. The implementation of the comprehensive suite of transport demand management measures (included within County Council's "Core" transport schemes) has been shown to reduce demand for private car use in the city. The Core transport schemes include:

- Traffic Filters
- Low Traffic Neighbourhoods
- Workplace Parking Levy
- Zero Emission Zone

3.5 The Oxford Trial Traffic Filters Report (October 2022) considered the change in overall demand for a variety of different sectors. Table 2.3 (below) shows the predicted change in demand for car trips within and to/ from the city. It shows the changes in demand both with (2024 DM) and without (2024 DM) scheme implementation for the assumed scheme start year (2024).

***Table 2.3 Sectorised demand for car use (12-hour period, 2024 DM vs 2024 DS)***

| Mode/ Sector | 2024 DM | 2024 DS | Change | % Change |
|---|---|---|---|---|
| **Car (person trips)** | | | | |
| Within city | 123,307 | 98,541 | -24,766 | -20% |
| To/ from city | 164,909 | 162,973 | -1,936 | -1% |
| **Combined** | **287,785** | **261,514** | **-26,271** | **-9%** |

(Source: Oxfordshire County Council, Oxford Trial Traffic Filters Report (October 2022)

3.6 The report shows that implementation of the traffic filters would reduce car person trips within the city by 20%. The spatial analysis accompanying the data shows that as a result of the route restrictions, car journeys through the city would be discouraged. This would result in a clear reduction of traffic volumes in the city centre, and on the majority of main 'arterial' routes into and out from the city centre, (e.g., Abingdon Road, London Road, Cowley Road). The report also showed reductions in traffic volumes at the Eastern Arc.

3.7 The reduction in some car person trips (particularly those to the city centre) would mean that some drivers would change their behaviour and travel by alternative modes (i.e., bus, rail, Park and Ride, walk or cycle). However, the report did note that there may be some increases of traffic of the ring road, as drivers chose to divert their route away from the restricted roads. In this context, it is important to note that the Traffic Filters modelling impacts were factored into the assessment of the growth proposed in the Oxford Local Plan 2045 on the Strategic Road Network, discussed above.

# 4. What this means for Oxford's Local Plan 2045

4.1 Oxford is in a somewhat unique position in identifying site allocations, they tend to be located in with existing access to (or at least close proximity to) the current road network, thus not requiring critical site-specific infrastructure interventions to be delivered. The site allocations proposed within the Local Plan 2045 are generally of a non-strategic nature, i.e., no sites are allocated for more than 500 homes, and no 'new' land is proposed for employment uses. In addition, many of the plan's site allocations were previously allocated within adopted development plans.

4.2 The County Council's comprehensive suite of demand management measures, mean that even with the inclusion of the predicted level of growth, the modelled outputs have demonstrated sizeable reductions in car trips associated with the city's resident population.

4.3 The Oxfordshire Strategic Model (OSM) (which was used to undertake the traffic and transport modelling and analysis that underpins the County's assessment of the traffic filters) contains within it, regularly updated housing and jobs figures for Oxford city. At the time the traffic filters transport and traffic modelling report was produced (i.e., October 2022), the OSM contained the housing and jobs numbers (or 'land use assumptions') that were used to inform the adopted Local Plan 2036.

4.4 The traffic modelling undertaken to inform the Local Plan 2036 included higher land use assumptions than are being proposed through the Oxford Local Plan 2045. As such, the County Council's assessment of traffic filters included assumptions that 11,724 homes would be delivered in the plan period, and 944,939sqm of commercial floorspace. The Local Plan 2045 however has a lower housing requirement (9,267 homes) and less commercial floorspace (circa 550,000sqm) than was assessed in the County Council's traffic and transport modelling that was undertaken to support the traffic filters. Therefore, even with

the later end date and accounting for previous delivery, the transport model factors in the assumed growth level to 2045.

4.5 As such, given that the traffic and transport modelling undertaken that underpins the suite of demand management measures being implemented by the County Council already includes, embedded with the modelled scenarios, more homes and jobs than are proposed within the Oxford Local Plan 2045. This, coupled with the inclusion of the bespoke traffic modelling undertaken for the primary purposes of Habitat Regulations Assessment. Also, by virtue of the location of the Oxford Meadows SAC, has assessed the impact of the Local Plan 2045 on the SRN.

4.6 As set out above, the package of demand management measures being implemented by the County Council, is the most suitable intervention for the levels of growth proposed in the Local Plan 2045 and the specific circumstances (outlined above) within Oxford.

4.7 It is worth noting that although the traffic filters trial has not yet commenced, the County Council has introduced a temporary congestion charge at the locations where the traffic filters are to be sited. While the temporary congestion charge was only introduced in October 2025 so, at the time of writing has only been operational several months, early indications are that traffic volumes in the city (particularly in the city centre), are lower, with associated traffic reductions at the main arterial routes into and out from the city. This, as predicted in the report, has increased the reliability of bus services as well as reducing traffic congestion, and its associated issue.