

National Highways and City of York Council modelling tools

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Overview

The City of York Council [CYC] Local Plan is subject to Examination in Public, which is taking place in 2022. Several different traffic models have been used to identify the impacts of the Local Plan with the aim of identifying mitigation measures.

This note provides a brief summary of each model and the differences between them.

CYC Visum

Previous testing of the CYC Local Plan was based on a 2016 Saturn model.

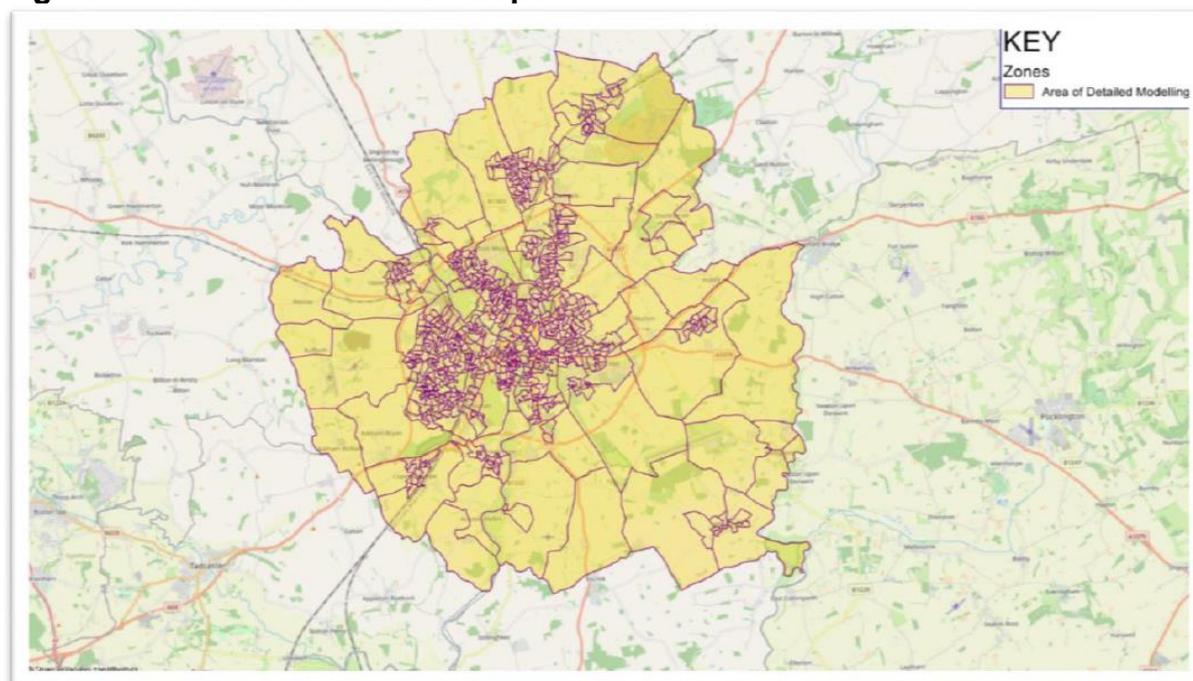
CYC later commissioned a new base Visum model, built as part of the Smart Travel Evolution Programme [STEP] and completed in February 2021. The model comprises a Highway Assignment Model [HAM] and Public Transport Assignment Model [PTAM]. This allows the impacts of mode shift to be assessed, as well as rerouting impacts across the whole city. The scope of the model is shown below.

The STEP Visum model is built using traffic data from a range of years between 2016 and 2019, and represents a 2019 base year. It includes three modelled time periods:

- Morning peak hour (08:00-09:00);
- An interpeak hour representing an average hour between 10:00 and 16:00; and
- Evening peak hour (17:00-18:00).

JSJV has reviewed the model and supporting documentation and consider the model an appropriate tool for assessing the strategic and routing impacts of the CYC Local Plan on the network in and around York.

Figure 1 – York Visum model scope



STEP Local Model Validation Report (Wood / Relative Gap / CYC)

With the availability of this more up-to-date model, in late 2021 CYC moved their Local Plan assessment from the older Saturn model to the STEP Visum model.

CYC Vissim

CYC has produced two detailed microsimulation models for locations which were likely to require mitigation measures: Fulford and Grimston Bar. Both base models are calibrated and validated to 2019 traffic conditions using TAG standards, and have been reviewed by JSJV on behalf of National Highways. They are considered appropriate for the purpose of testing the impacts of the Local Plan on these locations, and testing potential mitigation measures.

The Fulford model has a base year of 2019 and covers the two peaks:

- Morning peak hour (07:45-08:45); and
- Evening peak hour (16:30-17:30).

The Grimston Bar model also has a base year of 2019 and covers the two peaks:

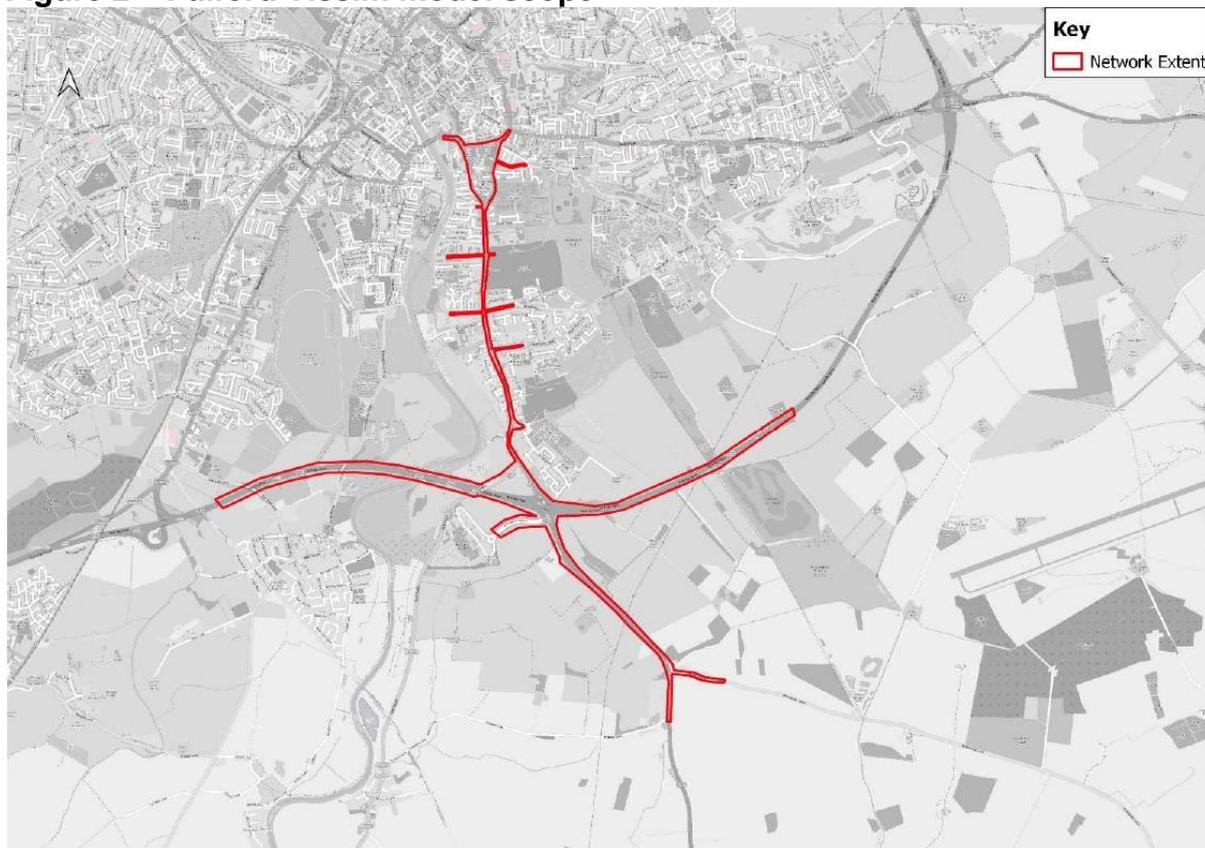
- Morning peak hour (07:30-08:30); and
- Evening peak hour (16:45-17:45)

Microsimulation provides a more detailed assessment of network operation, including interactions between individual vehicles.

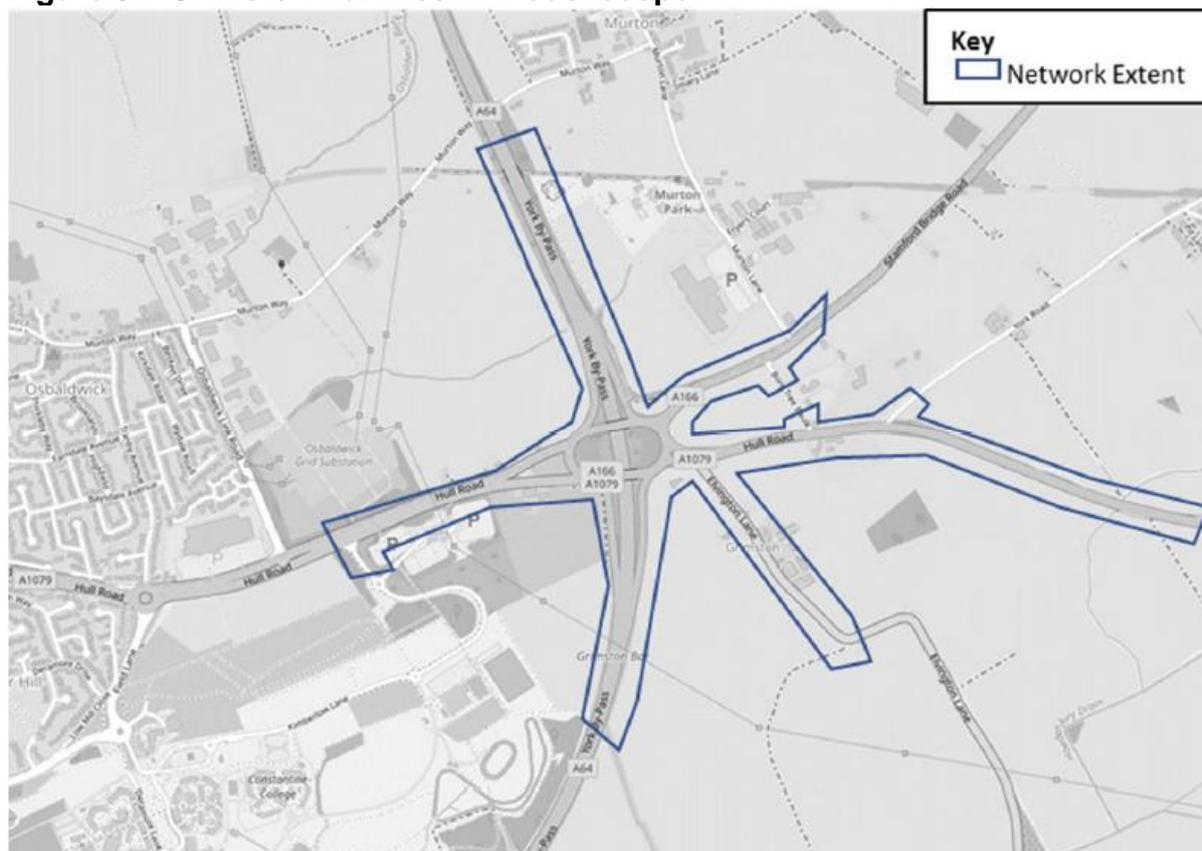
The Fulford Vissim model in particular includes complex interactions between junctions, parked vehicles and other factors which lead to existing delays on Selby Road. This is a key area of interest for National Highways – although the origin of the delays is on the local road network, the congestion has been observed to block back to the A64 dual carriageway, causing a queue on the mainline which is a safety concern.

These models allow the testing of schemes such as reallocation of road space, widening, changes to lane allocations and detailed signal operation.

Figure 2 – Fulford Vissim model scope



(CYC Fulford LMVR V5.1.1)

Figure 3 – Grimston Bar Vissim model scope

(CYC Grimston Bar LMVR V2.0)

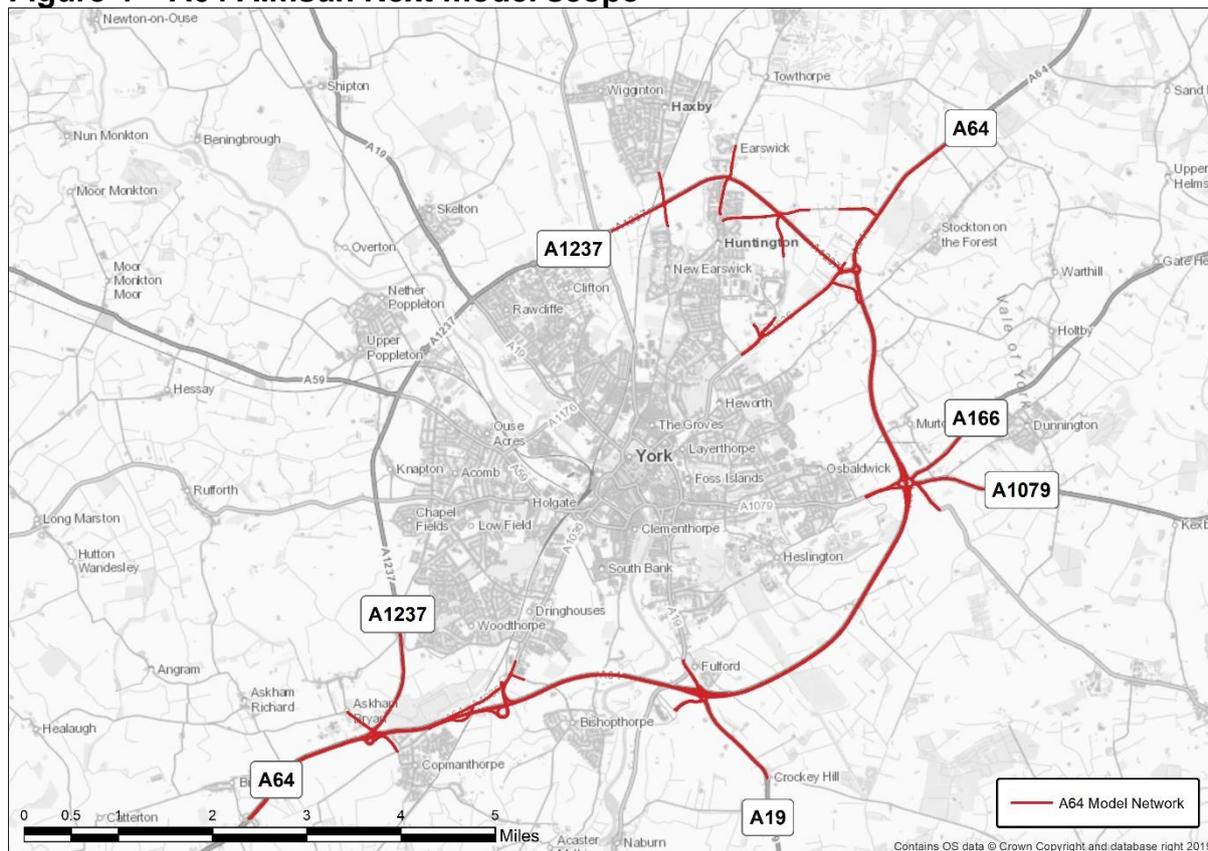
National Highways Aimsun Next

In 2019 SYSTRA Ltd built a mesoscopic Aimsun Next model of the A64 around York, on behalf of National Highways and CYC. The model also includes the A1237 around the north of the city. The Aimsun model includes all SRN junctions and their approaches and has a base year of 2019. It covers a full 12-hour period from 07:00 to 19:00, to ensure that impacts throughout the day can be identified and addressed. More than a single hour is often required for an SRN model, as peaks can be localised and vary across the network.

A mesoscopic model provides a level of detail between strategic (such as Visum) and microsimulation (such as Vissim). The functionality of Aimsun Next allows a powerful “mix and match” approach where potential mitigation schemes at different locations can be “turned on” as required. This allows multiple option testing within a single model, ensuring a consistent approach.

To test the impact of the Plan, the traffic growth associated with the Plan has been taken from the CYC Visum model using a cordon matrix. This allows National Highways to benefit from the additional level of detail of the SRN and its junctions, while maintaining consistency with CYC’s forecast traffic patterns.

Figure 4 – A64 Aimsun Next model scope



(SYSTRA / CYC / National Highways)

Summary and Conclusions

A range of different modelling tools have been used to investigate the impacts of the CYC Local Plan. The key attributes for each are summarised in Table 1 below.

CYC have used a strategic Visum model for high level testing. This gives a good estimate of routing and allows problem areas to be identified, but does not provide detail of junction operation.

CYC has also used microsimulation models at two key locations, Grimston Bar and Fulford. These detailed models include vehicle-to-vehicle interactions and provide a detailed assessment of network operation within a smaller area. After the Vissim models are used to identify a mitigation scheme, the scheme should then be coded into the strategic Visum model to identify diversionary impacts (for instance more traffic may use the junction if delays are reduced) before a further microsimulation run (in this instance with the additional vehicle demand) to ensure the scheme continues to operate well. This stage has not been carried out, as schemes have not yet been agreed.

National Highways has used a mesoscopic model of the A64 corridor along with the A1237 around the north of the city. This provides a middle level of detail, allowing assessment of junction and mainline operation of the SRN. As for the microsimulation model, routing impacts should be based on the strategic Visum model.

Table 1 – Key model attributes

Parameter	Visum	Vissim	Aimsun Next
Owner	CYC	CYC	National Highways
Level of detail	Low	High	Medium
Base year	2019	2019	2019
Time periods	AM peak hour 08:00-09:00 Average interpeak hour 10:00-16:00 PM peak hour 17:00-18:00	AM peak hour (Fulford 07:45- 08:45, Grimston Bar 07:30-08:30) PM peak hour (Fulford 16:30- 17:30, Grimston Bar 16:45-17:45)	Full 12 hours 07:00-19:00
Calibrated to TAG?	Yes	Yes	Yes
Purpose	Strategic assessment including routing	Detailed assessment at Grimston Bar and Fulford	SRN testing of the A64 and its junctions