Greater Exeter Further Modelling

DATE:	09 December 2024	**CONFIDENTIALITY:**	Internal
SUBJECT:	Greater Exeter Further Modelling		
PROJECT:	70105008 – Exeter Strategic Model Update	**AUTHOR:**	Edward Dawn
CHECKED:	Kerry Hellewell	**APPROVED:**	Tom Metcalfe

INTRODUCTION

WSP has been commissioned by Devon County Council (DCC) to update the 2040 Core scenario for the Greater Exeter model. The Greater Exeter strategic modelling work was carried out to understand the cumulative and individual impacts of the emerging Local Plans from Teignbridge District Council (TDC), Exeter City Council (ECC), Mid Devon District Council (MDDC) and East Devon District Council (EDDC) upon the highway network within the Greater Exeter area. Details of this strategic modelling work is reported in the '*Greater Exeter Model Update'* report (final version dated October 2023), prepared by WSP.

This technical note details the matrix and network updates made to represent the latest development allocations for each district.

MODEL UPDATES

Matrices

The 2040 Step 02A matrices (as described in the 2023 model update report) were used as the starting point for this update. The 2040 Step 02A matrices include local background traffic adjustments for 2017-2040, windfall developments, and upcoming local plan allocations from each Greater Exeter district.

1. LOCAL PLAN ALLOCATIONS

The first step was to update the local plan allocations with the latest information from each district:

- TDC – provided a Teignbridge local plan allocation list on 23/04/2024. This was the publication version, and is therefore not expected to change significantly.
- ECC – provided an Exeter local plan allocation list on 09/08/2024. This was an updated draft list of potential site allocation informing the emerging publication version of the Exeter Plan. The most significant allocations are included in this list however a final set of allocations will need to be considered in future.
- MDDC – provided Mid Devon housing and employment targets on 02/07/2024. Mid Devon does not yet have draft site allocations. For the purpose of modelling, it has been assumed that the housing and employment will be distributed across the district in the same proportions as in the Mid Devon Local Plan 2013-2033.
- EDDC – provided an East Devon local plan allocation list on 23/04/2024. Further changes were provided on 13/09/2024, of which only the removal of a 1,000 dwelling site (Brcl_31a) was

implemented in the modelling as this was the only significant change. This was a draft version, and the publication version may be different.

Table 1 below compares the housing and employment included in the previous Greater Exeter modelling and in this 2024 update. A full list of the developments modelled in this updated is included in Appendix A.

Table 1 - Modelled Local Plan Allocations

District	Dwellings		Employment Area / ha	
	2023 model	2024 update	2023 model	2024 update
Exeter	6,211	5,799	0.0	15.5
Teignbridge	4,560	4,320	64.7	63.3
Mid Devon	3,250	7,620	12.0	38.0
East Devon	7,159	12,754[1]	62.5	136.0

The trip rates used to estimate the trip generation for each development site were mostly unchanged. The only change was to B8 employment trip rates so that they are more representative of a typical B8 development. Trip rate data for alternative B8 sites was extracted from TRICS, and is shown in Table 2. Further details on the other residential and employment trip rates can be found in the 2023 model update report.

Table 2 - B8 trip rates

		Arrival trip rate (per 100sqm GFA)			Departure trip rate (per 100sqm GFA)		
		Car	LGV	OGV	Car	LGV	OGV
AM	2023 model	0.800	0.010	0.000	0.020	0.010	0.000
	2024 update	0.106	0.029	0.037	0.015	0.011	0.029
PM	2023 model	0.420	0.025	0.005	1.357	0.026	0.005
	2024 update	0.023	0.000	0.024	0.088	0.004	0.018

For consistency with the previous work, the trip distribution for each development site was based on the distribution from an existing model zone near to the site. However, for larger sites the distributions were manually adjusted to align them more closely with 2011 census journey to work data. These distribution adjustments are described in the *Greater Exeter Distribution Checks technical note* (dated November 2024), provided in Appendix B.

2. WINDFALL DEVELOPMENT SITES

The Step 02A matrices included windfall growth for movements in East Devon given TEMPRO predicts more jobs and houses will be allocated within the district than included through point loaded development. The latest East Devon local plan allocation list included significantly more housing and employment than in

[1] This figure includes 8,000 dwellings from the East Devon New Community allocation. 3,300 of these dwellings are expected to be built by the end of the East Devon plan period (2042).

the prior modelling, and so it was considered that the windfall growth was no longer necessary. The windfall growth was removed from the 2040 matrices as part of this update.

3. SRN TRAFFIC ADJUSTMENT

Following the local plan allocation and windfall updates, SRN trips travelling through the fully modelled area were constrained to 2022 National Road Traffic Projections (NRTP)[2]. The SATURN select link screenline function was used to select traffic travelling through the Greater Exeter area via the SRN in the 2017 base and 2040 forecast models. This was SRN through-trips only – that is, trips travelling from a zone outside the Greater Exeter area to another zone outside the Greater Exeter area via the M5, A38 or A30. Figure 1 shows the screenline links used. The target 2040 SRN traffic was calculated by multiplying the 2017 select link traffic by the NRTP Core growth for all vehicles for 2017-2040 on South-West motorways and trunk roads (30.9%). The through-traffic in the 2040 select link was then factored up to match the target 2040 total. Table 3 shows the impact of the SRN traffic adjustment on the matrix totals.

Figure 1 - Screenline links for SRN traffic factoring

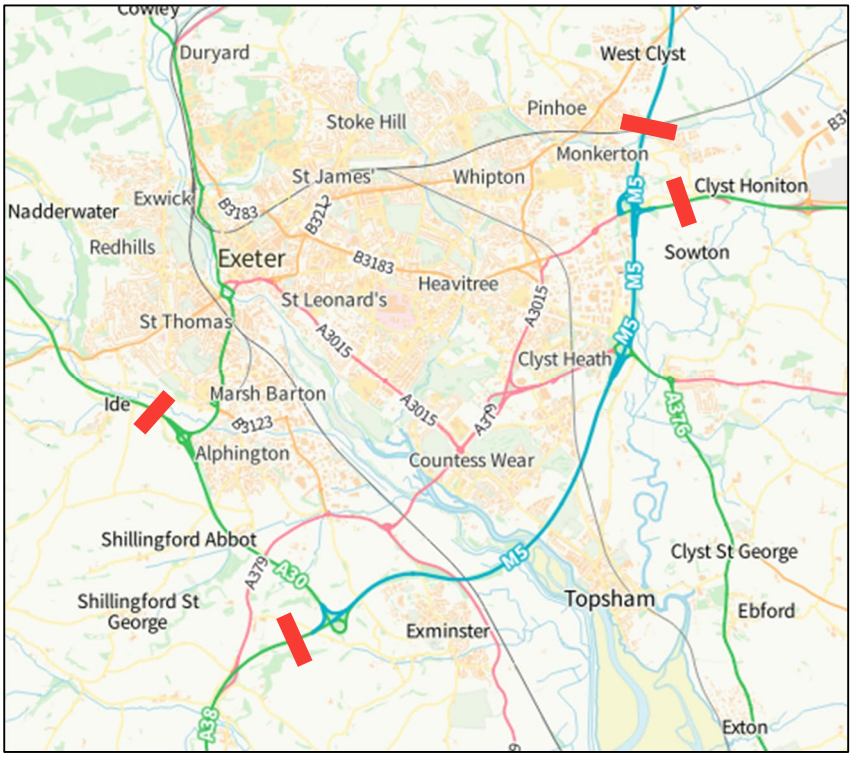

Table 3 – Matrix totals before and after SRN traffic factoring

Time period	Pre-SRN growth total	SRN trips added	Post-SRN growth total
AM	61,443	1,012	62,455
PM	56,542	1,126	57,668

[2] https://www.gov.uk/government/publications/national-road-traffic-projections

Network

Table 4 shows what adjustments were made to the existing 2040 network.

Table 4 - Network changes

Network refinement	Reason
New zone connectors to represent access points for development sites not previously included in the 2023 model.	To allow development site traffic to access the network.
The capacity of the A38 Kennford overbridge was increased from 100 to 800 pcus/hour.	Some traffic on the southbound A38 carriageway u-turns at Kennford in order to access the A379 to the north. The 100 pcu/hour capacity was causing unrealistic behaviour with some of this traffic having to u-turn in the buffer network further to the south. An 800 pcu/hour capacity better represents the bridge layout and stops the buffer u-turning.
The capacity of the roundabouts connecting the EDNC spine road to Bishop's Court Lane and the A3052 was increased.	To allow all EDNC development traffic to be able to access the rest of the network, and therefore show the full impact of this traffic.
The capacity of the link connecting Crediton to Tedburn St Mary was reduced from 9,999 to 200.	To account for the various country roads represented by this link being narrow and therefore having a very limited capacity.
The capacity of the A396 link just south of Bickleigh Bridge was reduced from 1,353 to 600.	To account for Bickleigh Bridge being narrow and therefore having a more limited capacity.
The Tithebarn Way/Honiton Road junction was converted from a priority junction to a signalised junction.	To represent the current layout of the junction.

MODEL RESULTS

Matrix Totals

Table 5 shows the resulting growth in total vehicle trips in the model between base and future years.

Table 5 - Base and Future Year Matrix Totals

Vehicle Type	AM Peak				
	Trips			% Growth	
	2017	2030	2040	2017-30	2017-40
Car	34,824	39,814	46,759	14%	34%
LGV	5,390	6,797	7,537	26%	40%
HGV	5,483	6,263	8,160	14%	49%
All Vehicles	45,697	52,874	62,456	16%	37%
	PM Peak				
	2017	2030	2040	2017-30	2017-40
Car	34,027	39,471	45,813	16%	35%
LGV	4,453	5,712	6,441	28%	45%
HGV	3,561	4,174	5,414	17%	52%
All Vehicles	42,041	49,357	57,669	17%	37%

Network Plots

The following network plots have been produced for the AM and PM peak hours: In addition, plots showing differences between the scenarios are provided in Appendix C:

- Actual flow plots (2030, 2040)
- Actual flow difference plots (2040 vs 2030)
- Worst turn V/C ratio plots (2030, 2040)
- Worst turn V/C ratio difference plots (2040 vs 2030)

The Volume / Capacity ratio (V/C) plots identify junctions where at least one turning movement at the junction has a V/C ratio over 95%.

Flow Differences

The largest increases in traffic flow are forecast to occur on the SRN routes such as the A30 between M5 J29 and Honiton, and the M5 between J29 and J31. The single largest contributor to the traffic growth is the East Devon New Community (EDNC) development (8,000 homes), but most other local developments contribute as the A30 and M5 are the primary corridors for access to Exeter and other areas further afield. Other large increases are seen on Honiton Road between M5 J29 and Cranbrook and on the A3052 between M5 J30 and EDNC.

Within Exeter, the forecast flow increases between 2030 and 2040 are typically less than 200 vehicles per hour. These flow increases occur on the main corridors into the city such as Honiton Road and the A379 to the east, and Alphington Road to the south-west. The model also shows an increase in traffic on the B3181 and A377 routes to the north, which are due to developments at Broadclyst and Crediton respectively.

Junction V/C Differences

In 2040 many of the junctions in Exeter show an increased V/C ratio due to higher traffic flows on the network. There are some junctions which were already over-capacity in 2017 and/or 2030 and remain so in the future years, but others which were below capacity and now have at least one turn that is over-capacity. For example, several SRN junctions between the A30 airport junction, M5 J29 and M5 J30 had worst turn V/C ratios below 95% in 2030 that go over 95% in 2040. Junctions that were already over-capacity in 2030 and get worse in 2040 include Clyst St Mary roundabout, Clyst St George roundabout, and the A38 northbound approach to M5 J31.

Impact on the Strategic Road Network

In addition to the network plots above, separate diagrams have been prepared to demonstrate the traffic impact on the Strategic Road Network around the Greater Exeter study area. These are included within Appendix D.

Note on Development Allocations

As mentioned earlier in this technical note, the 2040 forecast model includes all traffic from the allocated district developments. However, not all of these allocations are expected to be fully built by the end of the district plan periods. For example, only 3,300 out of the total of 8,000 allocated homes at EDNC are expected to be built by the end of the East Devon plan period (2042). The purpose of this model is to represent the full impact of the allocated developments, and therefore when considered as a 2040 forecast it overestimates the amount of traffic in the Greater Exeter network.