Modelling for Local Plans in the Black Country

Addendum 1 – Response to National Highway Queries

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Client	Wolverhampton City Council
Author	Fred van Vuren
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Change list

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1 Introduction

This addendum has been prepared by Sweco for Black Country Transport and Sandwell Metropolitan Borough Council, in response to queries raised by National Highways during the Regulation19 submission of the Sandwell Local Plan.

This addendum lists the queries raised by National Highways, and provides a response to aid with the understanding and analysis of the transport modelling conclusions raised in the full transport modelling report, *"Transport Modelling to Support Local Plans within the Black Country".*

2 Queries and Response

This section presents the full query from National Highways in italics, with the Sweco response underneath.

2.1 Covid-19 Impacts on Forecasting

Clarification on how the impacts of Covid-19 on forecasts have been accounted for, ideally with reference to the guidance in TAG M4. We note that the report highlights that the previous local plan did not account for it, and that this was a red risk factor, but there is no reference to correcting for this, except for asserting that some elements of the lingering effects of Covid-19 are considered as part of NTEM 8.0. That is true, for the Behavioural Change CAS only (ref: Uncertainty Toolkit, para 5.30), but it's a different issue from assessing whether the base from which forecasting is undertaken needs adjustment (which is what M4 appendix B looks at).

There are several factors that contribute to the approach taken to forecasting the Local Plan(s). Forecasting was undertaken for a single Core scenario only, to assess the level of highway traffic expected upon full buildout of the Local Plans. It is a "Worst Case" model under Core DfT assumptions, using Core parameters and NTEM 8 Core population projections.

The intention of the development of the Local Plan models was to retain consistency to the adopted PRISM Reference Case models as much as possible. Whilst the LMVR for PRISM makes reference to the introduction of a new VDM process to accommodate changes to forecasting as a result of Covid-19, the associated files through which to do this are not apparent in the provided data, and the process could not be found in the manual. As such, it was reasonably assumed that in the adopted Reference Case, no adjustments had been made, and therefore to retain consistency, no adjustments were applied to the Local Plan forecasts.

Following a review of the guidance in TAG Unit M4 and its appendices, it is not thought that assessing the impacts of Covid-19 on Core Local Plan modelling is a requirement, although it is good practice for forecasting. It would be expected, however, that any impact of Covid-19 would reduce the overall level of traffic in the network, to reflect new working patterns. As such, the conclusions drawn about the impacts of Local Plan traffic (comparisons between Do Minimum and Do Something) would be even less significant than they already are, requiring fewer interventions. As such, we retain the logic of modelling the "Worst Case" for highway traffic across the Black Country.

Due to time and budget constraints, the focus by the Local Authorities, Sweco and Black Country Transport has been to deliver the Core scenario in time for the Sandwell Regulation19 submission deadline, with the potential for sensitivity testing to follow according to the needs of the Local Authorities. It was proposed by Sweco at

commencement of the project that assessing the impacts of Covid-19 via method 3 (global adjustment) would be the most appropriate as part of this series of Local Plan sensitivity tests, which may also include some of the Common Analytical Scenarios as set out in the "Modelling Review" section of the Local Plan report. The decision whether to undertake these sensitivity tests, and what the tests may assess, has not yet been made, but is being reviewed by Black Country Transport and the officers from the Local Authorities in line with guidance from DfT and the needs of the districts.

2.2 National Trip End Model

Clarification on when NTEM is referred to, which specific version and scenario is being used.

In all cases, where NTEM is referred to in the main body of the text it is referring to the Core scenario in the NTEM8 dataset.

2.3 Exploring Uncertainty

Clarification on the forecasting approach: this appears to be presenting the results of a single forecast. In line with the advice in the Uncertainty Toolkit, what was the decision process for not exploring uncertainty?

As in Section 2.1, there are multiple factors that influenced the approach to uncertainty during this Local Plan assessment.

A single, "Core" scenario was developed due to time constraints, specifically meeting the Regulation 19 consultation deadline for Sandwell Local Plan. As such, modelling for uncertainty was deemed outside the scope of Core Local Plan assessment.

Additionally, when this project was commissioned and the specification was prepared, the model environment in PRISM to assess the Common Analytical Scenarios had not been released. As such, the scope of work did not account for this in the Core modelling. Brief discussions were held highlighting the understanding of the need for uncertainty modelling to be completed, but completion of the Core scenario modelling was prioritised to meet consultation timelines.

Current guidance (Uncertainty Toolkit) and advice from the DfT would suggest that the application of the Common Analytical Scenarios is primarily applicable to appraisal activities and there is little guidance on the application of CAS in the context of Local Plan modelling. However, Sweco and Black Country Transport do recognise that the level of uncertainty present in the future years should lead us to explore alternative scenarios which may be considered as an additional phase, as discussed in Section 2.1.

2.4 Calculation and Derivation of Forecast Parameters

Information on the derivation of any new parameters developed (e.g. how were the parameters for new forecast years created, including the sources of inputs to the parameter calculations).

Where new parameters were calculated, this was undertaken using pre-established procedures using TAG Databook 1.21 May 2023 (as the adopted version at the start of the project and as the Databook consistent with the PRISM6.0 Reference Case models), or, where appropriate, using linear interpolation between forecast years in the PRISM6.0 Reference Case models.

The list of parameters requiring updates were taken from the PRISM6 User Manual published by Mott MacDonald and issued to Sweco by TfWM. These are listed below:

- Excel Validation – on the UI

- Demand model parameters
- Test input files
- Visum highway model parameters
- Python code (for LGV/HGV and through-trip growth)
- Factors for long distance rail growth.
- Standard Inputs

A full list of updated parameters and their method of calculation is provided below.

Table 2-1: Updated PRISM Parameters

Parameter	Method of Calculation	Source of Inputs
Excel UI – Model Year	Updated to reflect model year being assessed (2042)	
Demand Model Parameters – Cost and Price Deflators	Interpolated between existing 2036 and 2046 values	PRISM Reference Case files
Demand Model Parameters – Car Values of Time	Interpolated between existing 2036 and 2046 values	PRISM Reference Case files
Demand Model Parameters – Airport	Interpolated between existing 2036 and 2046 values	PRISM Reference Case files
Test Input Files	Derived using spreadsheet tool used previously to generate PRISM input files	PRISM Uncertainty Log v34
VoT and VOCs	Update of existing PRISM tool using the same TAG Databook	TAG Databook (v1.21 May 2023)
LGV and HGV Growth factors	Linearly interpolated between calculated values for 2041 and 2046	PRISM Reference Case files
Long distance rail trips	Linearly interpolated between calculated values for 2041 and 2046	PRISM Reference Case files
Standard Inputs – PT model skims	Pre-VDM run for Reference Case and Do Minimum scenarios to generate new skims	PRISM Reference Case files
Standard Inputs – PT model parameters (fares, bus speeds etc)	Fares updated to 2042 values interpolating between deflation in the TAG databook. Bus speeds assumed to be the same as 2046. Minimal change expected	TAG Databook (v1.21 May 2023) PRISM Reference Case Files
Standard Inputs - Model Network	Assumed to be the same for RC and DM as adopted PRISM Reference Case Model	PRISM Reference Case files

2.5 Stability of Model Outputs

Information that allows us to understand the stability of model outputs, how these change by area, etc. We would expect to see, as a bare minimum, demand model convergence, highway model convergence and stability, and network statistics (ideally by sector).

In some cases, the models do not converge in the number of loops specified in the model set up. However, in these instances, performance has been compared against the existing PRISM 6 Reference Case model and has found to be in line with these models and as such, is not considered to materially impact the conclusions drawn from the Local Plan models.

2.5.1 Reference Case Model

2.5.1.1 Demand Model Convergence:

The VDM convergence statistics have been taken from the outputted "gap_table" file, and are presented below.

Table 2-2: Demand Model Convergence - 2042 Ref Case

It	Overall GAP	Overall GAP Car	Overall GAP PT	Flow_change MAX	Max Flow Change (total_Xn-Xn+1)	Min Flow Change (total_Xn-Xn+1)
2	9.94104	11.97724	3.04811	-255.82794	152.42359	-255.82794
3	4.11543	4.99185	0.96555	-213.83134	165.64580	-213.83134
4	5.62040	6.89070	1.24546	211.55111	211.55111	-87.61012
5	2.39391	2.91992	0.54338	-115.75806	60.64724	-115.75806
6	2.19213	2.68979	0.47765	-83.02109	19.37483	-83.02109
7	2.53822	3.11469	0.56051	-98.08453	29.29979	-98.08453
8	1.24512	1.53018	0.27175	-44.00839	14.56107	-44.00839
9	0.68728	0.83732	0.17379	-44.47542	21.77769	-44.47542
10	0.46296	0.56253	0.12181	-57.59839	17.38629	-57.59839
11	0.27701	0.33852	0.06628	36.16010	36.16010	-11.85114
12	0.23740	0.29363	0.04482	22.65902	22.65902	-18.17691
13	0.18665	0.22576	0.05262	24.69787	24.69787	-24.40277
14	0.20040	0.24639	0.04282	-59.90166	14.30863	-59.90166
15	0.13470	0.16440	0.03294	39.20487	39.20487	-9.17744

2.5.1.2 Highway Model Convergence

The PRISM6.0 Reference Case highway model convergence statistics as reported in the PRISM documentation are provided below for reference.

Table 2-3: Highway Model Convergence – 2036 PRISM 6.0 Reference Case

Time Period	Iteration	Criteria			
		%GAP	(P)<1%	(P2)<1%	Delta
AM	27	0.03%	99.10%	99.70%	0.00%
	28	0.02%	98.90%	99.70%	0.00%
	29	0.02%	98.90%	99.60%	0.00%
	30	0.03%	98.70%	99.60%	0.00%
IP	9	0.03%	98.40%	99.50%	0.00%
	10	0.02%	98.90%	99.60%	0.00%
	11	0.03%	99.00%	99.60%	0.00%
	12	0.03%	98.80%	99.60%	0.00%
PM	27	0.10%	96.80%	98.70%	0.00%
	28	0.17%	97.10%	98.80%	0.00%

Time Period	Iteration	Criteria			
	29	0.10%	96.90%	98.70%	0.00%
	30	0.17%	96.50%	98.60%	0.00%
Target	-	<0.1%	>98%	>98%	<0.05%

The 2042 Reference Case highway model convergence statistics are reported below.

Table 2-4: Highway Model Convergence – 2042 Reference Case

Time Period	Iteration	Criteria			
		%GAP	(P)<1%	(P2)<1%	Delta
AM	18	0.03%	98.20%	99.30%	0.00%
	19	0.03%	98.50%	99.50%	0.00%
	20	0.03%	98.90%	99.60%	0.00%
	21	0.03%	99.00%	99.60%	0.00%
IP	7	0.03%	96.90%	99.20%	0.00%
	8	0.03%	98.20%	99.50%	0.00%
	9	0.02%	98.60%	99.50%	0.00%
	10	0.02%	98.60%	99.50%	0.00%
PM	27	0.07%	98.10%	99.30%	0.00%
	28	0.07%	98.30%	99.40%	0.00%
	29	0.07%	97.10%	99.00%	0.00%
	30	0.07%	98.00%	99.30%	0.00%
Target	-	<0.1%	>98%	>98%	<0.05%

2.5.2 Do Minimum Model

2.5.2.1 Demand Model Convergence

The VDM convergence statistics have been taken from the outputted “gap_table” file, and are presented below.

Table 2-5: Demand Model Convergence - 2042 Do Minimum

It	Overall GAP	Overall GAP Car	Overall GAP PT	Flow_change MAX	Max Flow Change (total_Xn-Xn+1)	Min Flow Change (total_Xn-Xn+1)
2	10.47247	12.55717	3.38709	-259.48525	146.96798	-259.48525
3	4.21932	5.10138	1.01483	-221.89983	166.27667	-221.89983
4	5.85964	7.17623	1.29389	244.36906	244.36906	-94.07075
5	2.51488	3.06248	0.57300	-118.40590	58.00412	-118.40590
6	2.32365	2.84724	0.50755	-108.42131	20.39549	-108.42131
7	2.67745	3.27618	0.60984	-100.29331	26.36812	-100.29331
8	1.27983	1.56730	0.29200	-55.11091	40.42695	-55.11091
9	0.74251	0.90231	0.19207	-45.32557	27.49937	-45.32557
10	0.44209	0.53810	0.11099	24.65004	24.65004	-21.58773
11	0.27150	0.33184	0.06338	18.53939	18.53939	-18.27807
12	0.20482	0.25156	0.04359	19.49299	19.49299	-15.74768
13	0.18626	0.22833	0.04112	-62.48822	15.58086	-62.48822
14	0.20605	0.25273	0.04498	33.71520	33.71520	-23.66544

It	Overall GAP	Overall GAP Car	Overall GAP PT	Flow_change MAX	Max Flow Change (total_Xn-Xn+1)	Min Flow Change (total_Xn-Xn+1)
15	0.19292	0.23646	0.04273	16.18589	16.18589	-11.24456
16	0.20228	0.24144	0.06718	-56.19465	10.63826	-56.19465
17	0.15829	0.18365	0.07082	36.86198	36.86198	-11.90808
18	0.15049	0.18464	0.03272	17.92638	17.92638	-17.69824
19	0.16551	0.20174	0.04057	-25.72319	22.95414	-25.72319
20	0.21003	0.24945	0.07407	-54.91936	27.72372	-54.91936

2.5.2.2 Highway Model Convergence

The 2042 Do Minimum highway model convergence statistics are reported below.

Table 2-6: Highway Model Convergence - 2042 Do Minimum

Time Period	Iteration	Criteria			
		%GAP	(P)<1%	(P2)<1%	Delta
AM	21	0.03%	98.80%	99.60%	0.00%
	22	0.02%	98.80%	99.50%	0.00%
	23	0.02%	99.00%	99.60%	0.00%
	24	0.02%	99.10%	99.60%	0.00%
IP	8	0.03%	97.80%	99.40%	0.00%
	9	0.02%	98.20%	99.40%	0.00%
	10	0.02%	98.60%	99.60%	0.00%
	11	0.02%	98.80%	99.60%	0.00%
PM	27	0.13%	95.10%	98.20%	0.00%
	28	0.17%	95.70%	98.40%	0.00%
	29	0.10%	95.30%	98.30%	0.00%
	30	0.16%	96.60%	98.60%	0.00%
Target	-	<0.1%	>98%	>98%	<0.05%

2.5.3 Do Something Model

2.5.3.1 Demand Model Convergence:

As a fixed, post-VDM assignment was undertaken, no demand model convergence is available. A fixed assignment was deemed to be appropriate in accordance with the time and budget constraints, due to the minimal implementation of Local Plan mitigation schemes, and to provide least amount of modal shift to assess the Do Something schemes with the same amount of Local Plan traffic as the Do Minimum, to gauge their effectiveness.

As such, no demand model convergence is reported.

2.5.3.2 Highway Model Convergence

The 2042 Do Something highway model convergence statistics are reported below. These were extracted from model after the fixed assignment. The control of the number of assignments was increased to allow the model longer to converge.

Table 2-7: Highway Model Convergence - 2042 Do Something

Time Period	Iteration	Criteria			
		%GAP	(P)<1%	(P2)<1%	Delta
AM	97	0.04%	99.23%	99.70%	0.00%
	98	0.04%	99.13%	99.66%	0.00%
	99	0.05%	98.64%	99.46%	0.00%
	100	0.04%	98.99%	99.61%	0.00%
IP	46	0.02%	98.45%	99.56%	0.00%
	47	0.02%	99.02%	99.65%	0.00%
	48	0.02%	99.20%	99.73%	0.00%
	49	0.02%	98.67%	99.56%	0.00%
PM	97	0.14%	96.22%	98.56%	0.00%
	98	0.12%	97.29%	98.83%	0.00%
	99	0.14%	97.14%	98.99%	0.00%
	100	0.12%	97.22%	98.92%	0.00%
Target	-	<0.1%	>98%	>98%	<0.05%

2.5.4 Network Statistics

The network statistics for the Reference Case, Do Minimum and Do Something models are presented below. No sector system could be identified so the results have been disaggregated by Black Country Local Authority.

Table 2-8: 2042 Model Network Statistics – Full PRISM Model

		2042 RC	2042 DM	2042 DS	Diff DM - RC	Diff DS - DM	% Diff DM - RC	% Diff DS - DM
Volume PrT	**AM**	25,220,208	25,455,160	25,468,145	234,952	12,985	0.93%	0.05%
	IP	22,200,383	22,436,248	22,447,635	235,865	11,387	1.06%	0.05%
	PM	26,647,940	26,911,475	26,897,511	263,535	-13,964	0.99%	-0.05%
Veh-hour	**AM**	241,297	242,332	242,787	1,034	455	0.43%	0.19%
	IP	203,247	204,072	204,272	826	200	0.41%	0.10%
	PM	254,102	255,385	256,342	1,283	957	0.51%	0.37%
Veh-Km	**AM**	15,101,985	15,082,512	15,095,426	-19,473	12,914	-0.13%	0.09%
	IP	13,204,361	13,197,557	13,198,592	-6,804	1,035	-0.05%	0.01%
	PM	15,504,332	15,479,692	15,477,685	-24,640	-2,007	-0.16%	-0.01%

Table 2-9: 2042 Model Network Statistics - Black Country Districts

		2042 RC	2042 DM	2042 DS	Diff DM - RC	Diff DS - DM	% Diff DM - RC	% Diff DS - DM
Volume PrT	**AM**	6,967,911	7,235,851	7,242,897	267,940	7,046	3.85%	0.10%
	IP	6,273,572	6,527,556	6,538,502	253,984	10,946	4.05%	0.17%
	PM	7,423,122	7,721,329	7,712,905	298,207	-8,424	4.02%	-0.11%
Veh-hour	**AM**	33,191	35,261	35,526	2,070	265	6.24%	0.75%
	IP	27,849	29,403	29,596	1,554	193	5.58%	0.66%
	PM	35,915	38,269	38,746	2,354	476	6.56%	1.24%
Veh-Km	**AM**	1,290,755	1,336,902	1,338,083	46,147	1,180	3.58%	0.09%
	IP	1,160,681	1,203,304	1,203,509	42,623	205	3.67%	0.02%
	PM	1,373,244	1,424,084	1,422,014	50,841	-2,070	3.70%	-0.15%

Table 2-10: 2042 Model Network Statistics - Dudley

		2042 RC	2042 DM	2042 DS	Diff DM - RC	Diff DS - DM	% Diff DM - RC	% Diff DS - DM
Volume PrT	**AM**	1,727,622	1,780,738	1,785,245	53,116	4,507	3.07%	0.25%
	IP	1,570,398	1,621,581	1,624,737	51,183	3,156	3.26%	0.19%
	PM	1,859,616	1,917,136	1,919,649	57,520	2,513	3.09%	0.13%
Veh-hour	**AM**	8,514	8,951	8,970	437	19	5.13%	0.21%
	IP	7,291	7,648	7,657	357	9	4.90%	0.12%
	PM	9,372	9,897	10,002	524	105	5.59%	1.06%
Veh-Km	**AM**	309,714	319,150	318,809	9,436	-341	3.05%	-0.11%
	IP	280,191	288,946	289,156	8,756	210	3.12%	0.07%
	PM	332,313	341,906	342,324	9,593	417	2.89%	0.12%

Table 2-11: 2042 Model Network Statistics - Sandwell

		2042 RC	2042 DM	2042 DS	Diff DM - RC	Diff DS - DM	% Diff DM - RC	% Diff DS - DM
Volume PrT	**AM**	2,093,174	2,175,806	2,202,750	82,632	26,944	3.95%	1.24%
	IP	1,881,137	1,965,337	1,981,315	84,200	15,978	4.48%	0.81%
	PM	2,230,592	2,328,934	2,341,320	98,342	12,386	4.41%	0.53%
Veh-hour	**AM**	9,610	10,210	10,267	599	57	6.24%	0.56%
	IP	8,056	8,549	8,583	493	34	6.12%	0.40%
	PM	10,268	10,974	11,122	706	148	6.88%	1.35%
Veh-Km	**AM**	417,538	431,763	434,672	14,225	2,909	3.41%	0.67%
	IP	377,529	391,603	391,631	14,074	28	3.73%	0.01%
	PM	441,826	458,820	457,975	16,994	-845	3.85%	-0.18%

Table 2-12: 2042 Model Network Statistics - Walsall

		2042 RC	2042 DM	2042 DS	Diff DM - RC	Diff DS - DM	% Diff DM - RC	% Diff DS - DM
Volume PrT	**AM**	1,659,301	1,707,365	1,700,450	48,064	-6,915	2.90%	-0.41%
	IP	1,465,052	1,509,491	1,507,575	44,439	-1,916	3.03%	-0.13%
	PM	1,762,412	1,813,755	1,808,787	51,343	-4,968	2.91%	-0.27%
Veh-hour	**AM**	8,824	9,203	9,234	379	30	4.30%	0.33%
	IP	7,135	7,429	7,468	294	39	4.13%	0.53%
	PM	9,523	9,965	10,054	443	88	4.65%	0.89%
Veh-Km	**AM**	335,410	344,884	346,426	9,475	1,542	2.82%	0.45%
	IP	296,235	304,802	306,340	8,567	1,538	2.89%	0.50%
	PM	357,157	367,260	368,611	10,104	1,351	2.83%	0.37%

Table 2-13: 2042 Model Network Statistics - Wolverhampton

		2042 RC	2042 DM	2042 DS	Diff DM - RC	Diff DS - DM	% Diff DM - RC	% Diff DS - DM
Volume PrT	**AM**	1,487,814	1,571,942	1,554,452	84,128	-17,490	5.65%	-1.11%
	IP	1,356,985	1,431,147	1,424,875	74,162	-6,272	5.47%	-0.44%
	PM	1,570,502	1,661,504	1,643,149	91,002	-18,355	5.79%	-1.10%
Veh-hour	**AM**	6,242	6,896	7,055	654	159	10.48%	2.30%
	IP	5,368	5,777	5,888	409	111	7.62%	1.91%
	PM	6,752	7,433	7,568	681	135	10.09%	1.81%
Veh-Km	**AM**	228,093	241,104	238,175	13,011	-2,930	5.70%	-1.22%
	IP	206,727	217,953	216,382	11,227	-1,571	5.43%	-0.72%
	PM	241,948	256,097	253,105	14,150	-2,993	5.85%	-1.17%