

INFORMATION NOTE

SHEFFIELD AND ROTHERHAM CLEAN AIR ZONES

A630 SHEFFIELD PARKWAY SPEED FLOW CURVES

IDENTIFICATION TABLE

Project	Sheffield and Rotherham Clean Air Zones
Title of Document	A630 Sheffield Parkway Speed Flow Curves
Type of Document	Information Note
Date	17/06/2019

1. INTRODUCTION

- 1.1.1 The UK Government identified Sheffield and Rotherham as one of a number of areas in England which contains locations where the annual average concentrations of Nitrogen Dioxide (NO₂) exceed statutory limits and are projected to continue to do so for a number of years.
- 1.1.2 The Sheffield and Rotherham Clean Air Feasibility Study was carried out to develop a strategy for achieving legal compliance within the statutory limits in the shortest possible time. The Preferred Option that emerged from the study was presented in the Outline Business Case.
- 1.1.3 The Preferred Option contained a number of location-specific measures that would be required to ensure compliance. In Rotherham this included a reduction of the speed limit on the A630 Sheffield Parkway from 70mph to 50mph.
- 1.1.4 This brief note sets out the assumptions included in the modelling to represent this change in speed limit.

2. TRAFFIC SPEED REPRESENTATION

- 2.1.1 The traffic models contained within the SRTM3B Multi-Modal Transport Model used in this study make use of the SATURN highway assignment modelling software. Within this software, vehicle speeds are derived from traffic flows using calibrated speed-flow relationships, with additional delays added to represent the time taken to get through the junctions at each of any particular road.
- 2.1.2 The key point to note is that the speed flow curves used on any particular road take account of the speed limit, the number of lanes and lane width. They are typically derived from 'industry-standard' curves for different link types/standards, calibrated (adjusted) during model development to reproduce locally observed journey times across the network at different times of the modelled day. The speed-flow based modelling is therefore based on UK-average observance of the various different speed limits (by road type/lanes/width), rather than assuming 100% observance of the stated speed limit.

- 2.1.3 The modelling of road speeds reflects a distribution of speeds around the advertised speed limit, whether that is 70mph or 50mph as in the case of the A630 Sheffield Parkway.
- 2.1.4 Given that the Saturn model uses a single average speed for a given level of traffic, it is not possible to identify or report what proportion of these vehicles are (or are not) obeying the modelled speed limit, nor is it appropriate to attempt to adjust this proportion.

3. MODEL OUTPUTS

- 3.1.1 Figure 1 below shows in red (solid and dashed) the two speed flow curves (70mph and 50mph) used on the relevant section of the A630 Sheffield Parkway.
- 3.1.2 The blue speed-flow curve is the 'industry-standard' curve for a Rural 2-lane dual carriageway all-purpose road taken from the Design Manual for Road and Bridges (DMRB) for a 70mph speed limit. Note that at free flow (zero pcu/hr) the average all-vehicle speed is around 65mph.
- 3.1.3 The solid red curve is the calibrated speed-flow curve, adjusted to match locally observed journey times across the network at different times of the modelled day.
- 3.1.4 The dotted red curve is the adjusted curve used to represent the speed-flow curves if the speed-limit is adjusted from 70mph to 50mph. Note that when traffic flow reaches capacity, represented by the black vertical line, the associated speed is the same for each of the 70mph and 50mph curves.

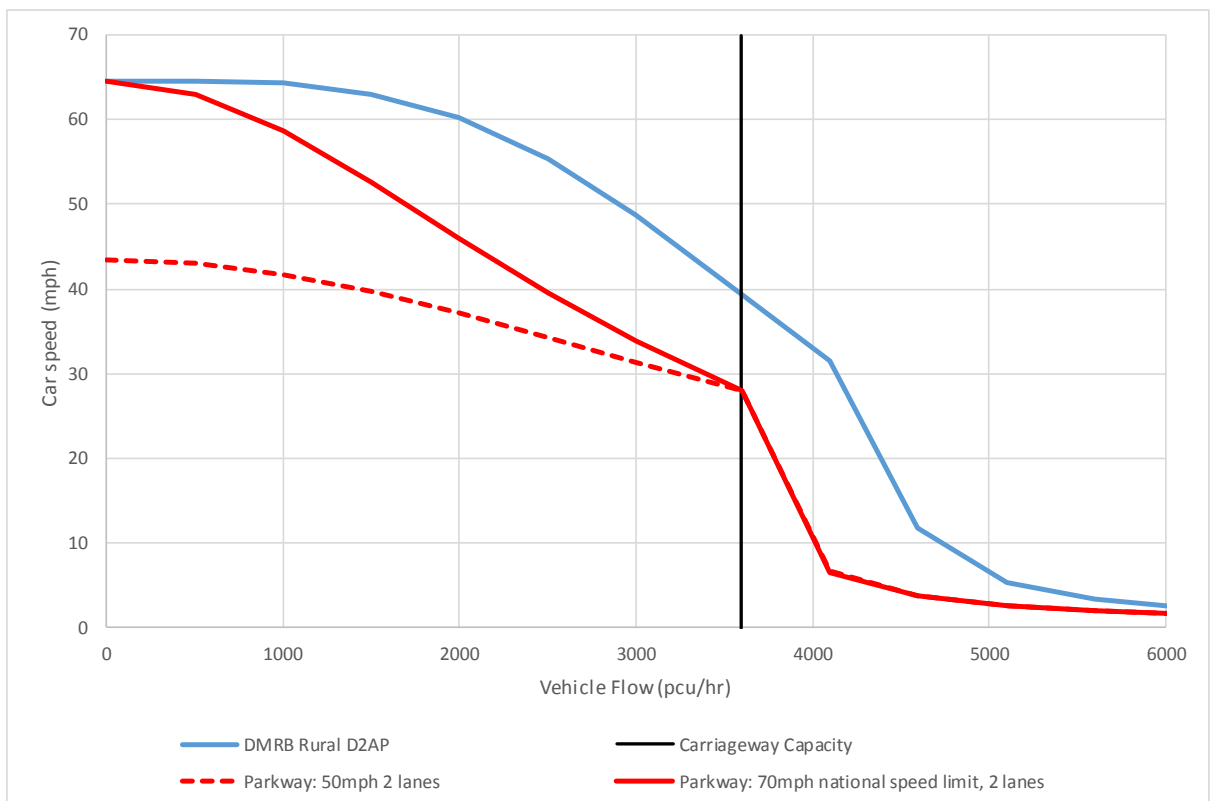


Figure 1. A630 Sheffield Parkway Speed-Flow Curves

- 3.1.5 Table 1 below shows the traffic speeds output from the model in mph in different modelled time periods for the:

- 2017 base year (70mph speed-limit);
- 2021 Baseline (70mph speed-limit); and
- 2021 Preferred Option (50 speed-limit).

3.1.6 In each scenario the road operates below capacity. The flow increases due to background traffic growth between 2017 and 2021 and hence the speeds are forecast to reduce during this period. The traffic speeds with the 50mph speed limit are lower than those with the 70 mph speed-limit.

Table 1. A630 Sheffield Parkway Modelled Traffic Speeds (mph)

	MORNING PEAK (08:00-09:00)	INTER PEAK (AVERAGE HOUR 10:00-16:00)	EVENING PEAK (17:00-18:0)
2017 Base Year (70 mph speed-limit)	46	53	49
2021 Baseline (70mph speed-limit)	42	48	45
2021 Preferred Option (50mph speed limit)	34	40	37

APPROVAL

Version	Name		Position	Date	Modifications
1	Author	Pete Kidd	Associate Director	17/06/2019	
	Checked by	Erik Olofsson	Consultant	17/06/2019	
	Approved by	Chris Robinson	Associate	17/06/2019	