

Building a Relief Road: Relieving Congestion – Reducing CO₂?

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Outline

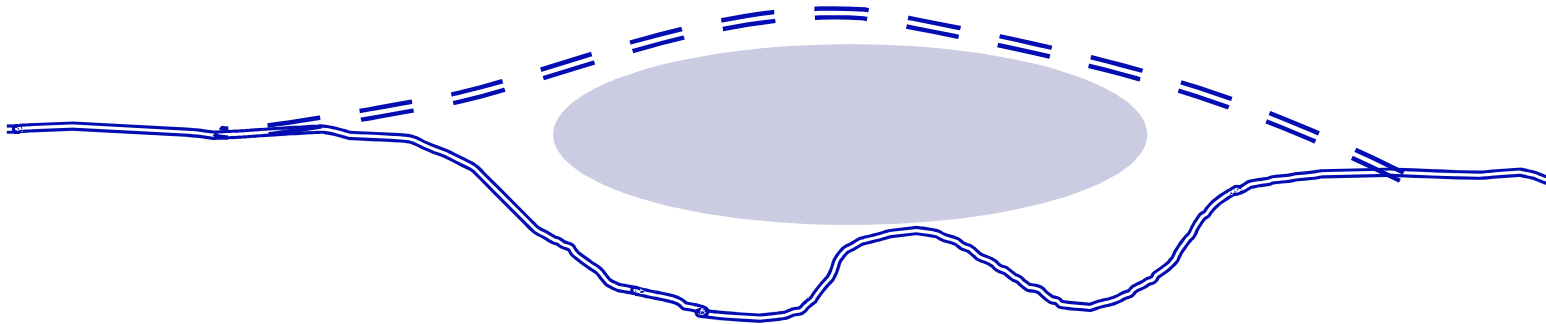
- **Introduction**
- **Study Project**
- **Emissions Modelling**
- **Instantaneous Emissions Modelling**
- **Microsimulation Model**
- **Study Results**
- **Other Applications**
- **Conclusions**

Introduction

- **CO₂ and Climate Change**
- **Road Transport 21.7% of UK CO₂ Emissions**
- **10 Year Trends**
- **'Traditional Thinking'**
 - More Roads
 - More Cars
 - More Pollution

Study Project

- **Sub-standard Motorway**
- **Peak Time Congestion**
- **Proposed Parallel Motorway**
- **Confidential**



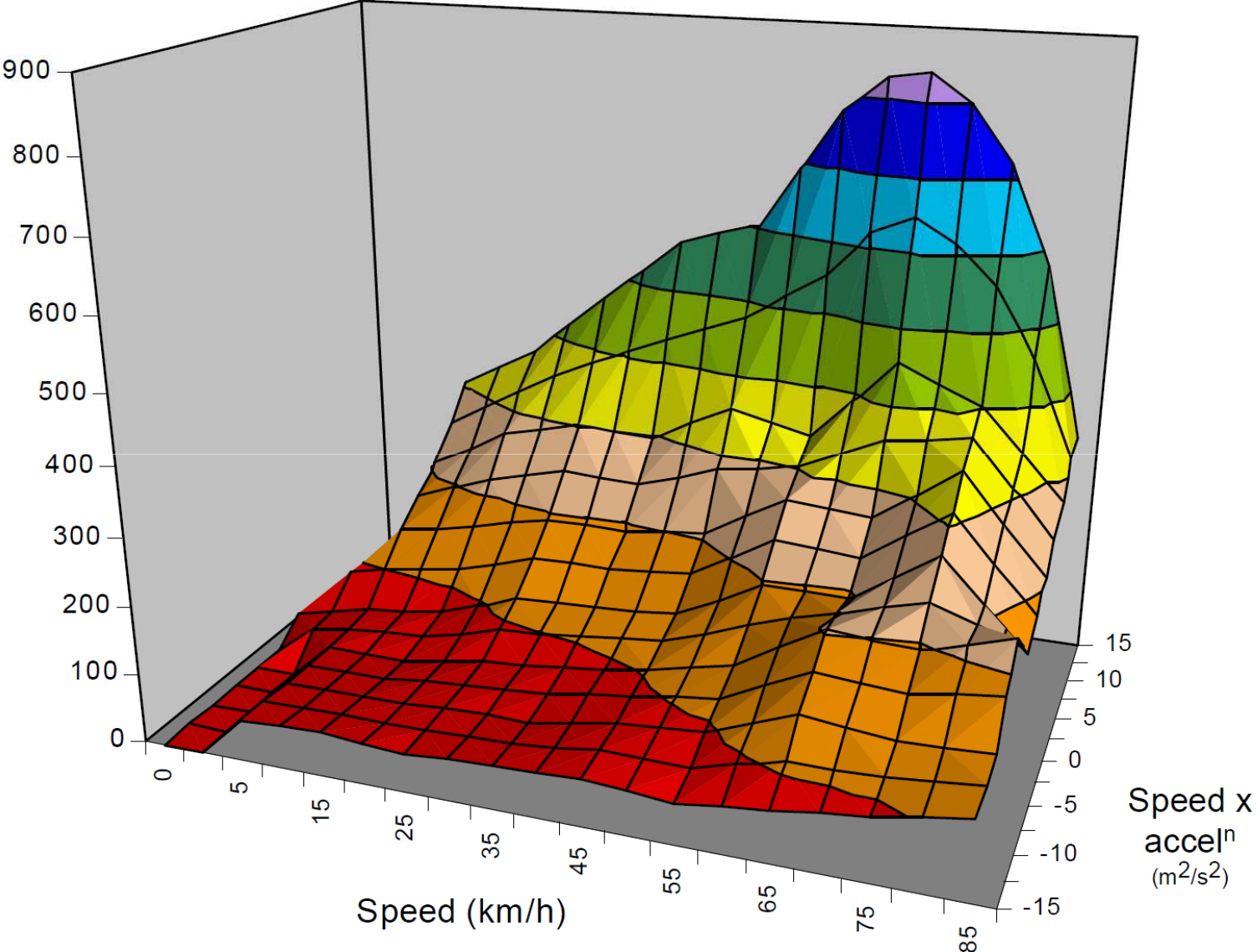
Emissions Modelling

- **Strategic Traffic Model (SATURN)**
 - Average Flow
 - Average Speed
- **TUBA and Bespoke Tool**
- **4%-7% Increase in Traffic Volumes**
- **3%-7% Increase in CO₂ Emissions**
- **Over Simplification**

Instantaneous Emissions Modelling

- **DMRB requirement for 'complex situations'**
- **Vehicle Emissions Database**
- **MODEM**
 - 150 vehicles
 - 12 vehicle classes
 - Matrix of Measured Emissions
 - HC, NO_x, CO, CO₂, PM
- **VERSIT+, PHEM**

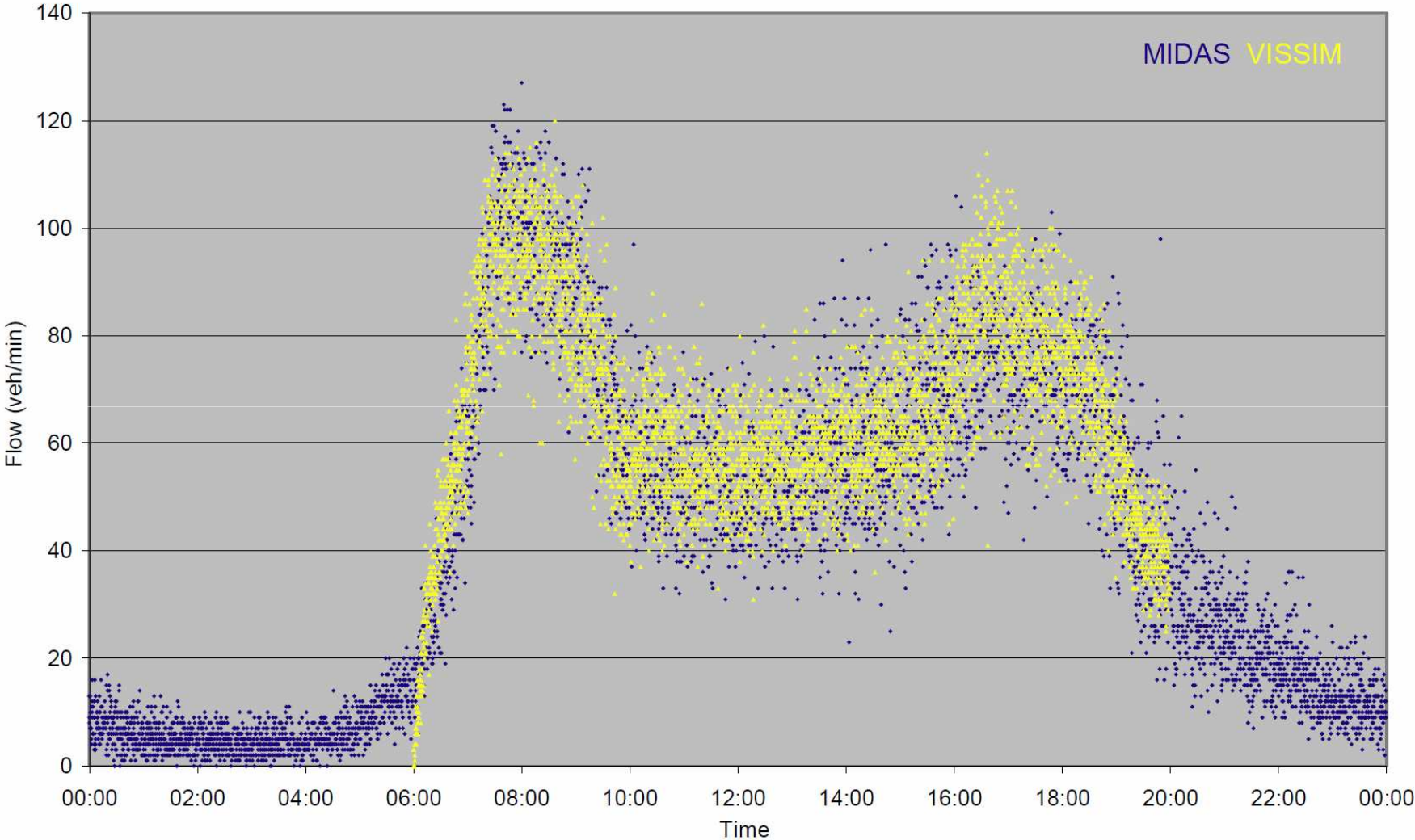
Instantaneous Emissions Modelling



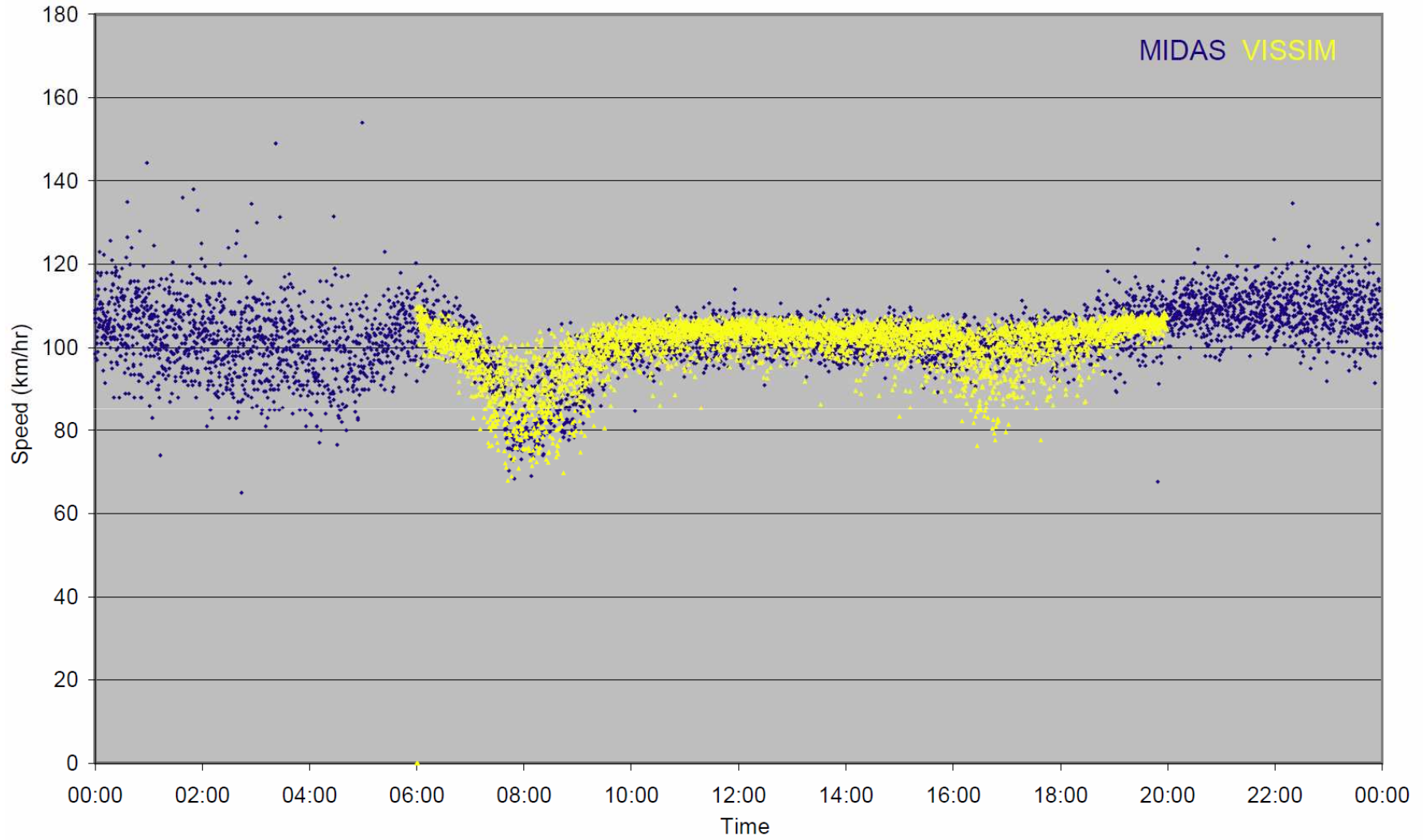
Microsimulation Model

- **VISSIM**
- **14 Hour Modelled Period**
- **Driver Behaviour**
- **Random Variation**
- **Calibration**
- **Validation (MIDAS)**
 - Hourly Flow
 - Instantaneous Flow
 - Instantaneous Speed

Microsimulation Model



Microsimulation Model



Study Results

- 4-7% Increase in Traffic Volumes
- 5-7% Reduction in Total CO₂
- 14% Reduction in g/km CO₂

- Tonnes of CO₂ per day

| | 2016 | 2031 |
|--------------|------|------|
| Do Minimum | 261 | 271 |
| Do Something | 241 | 256 |

Other Applications

- **‘Traditional Thinking’**
 - More Roads
 - More Cars
 - More Pollution
- **Study Outcome**
 - More Roads
 - More Cars
 - **Less** Pollution
 - Reduced Congestion
- **Other Highway Improvement Schemes**
- **Individual Merit**

Conclusions

- **Focus CO₂ Emissions**
- **'Traditional Thinking'**
- **May Reduce Emissions**
- **Case-By-Case Basis**
- **Embodied Carbon**

Questions?