DEVON COUNTY COUNCIL

# CULLOMPTON TRAFFIC MODEL

# LOCAL MODEL VALIDATION REPORT

MAY 2013

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# 1. INTRODUCTION

## 1.1 Introduction

1.1.1 Devon County Council have developed a new traffic model for Cullompton to identify and design transport schemes and measures to support the LDF / Local Plan process and to assist in the improvement of M5 Junction 28.

1.1.2 A new SATURN highway assignment model has been developed for the working weekday AM and PM peak hours and an average inter peak hour for the 2012 base year. The network is based on the previous Cullompton model developed by Parsons Brinckerhoff in 2007 for DCC, and updated to represent 2012 conditions. The previous zoning was retained as it provides the appropriate level of detail for present trip generation and attraction and the likely future development areas.

1.1.3 To fulfil the requirements of the new traffic model a comprehensive survey and data collection programme has been completed as described in the accompanying Report of Surveys.

1.1.4 This report describes the development and validation of the base year transport model. The data presented shows that the model meets the required WebTAG validation criteria of networks, traffic flows, journey time, model convergence and trip distribution.

## 1.2 Town Centre

1.2.1 Congestion is experienced within Cullompton, particularly during the AM and PM peak periods. Due to its location 15 miles north of Exeter and 19 miles south-west of Taunton, M5 Junction 28 provides a major route for commuters from Cullompton to these locations. There is currently approximately two thirds of car trips commuting out from Cullompton, of these approximately 75% use Junction 28. The B3181 provides an alternate route from Cullompton to Exeter which avoids the motorway and is predominantly used by vehicles originating from the south of the town travelling to Exeter.

1.2.2 Access to the south and north of Cullompton is only achievable via the town centre route (High Street). In addition, the Tiverton Road / Fore Street Junction is frequently congested which creates a bottleneck and consequently causes further congestion on other local roads.

1.2.3 Fore Street has been identified as an Air Quality Management Area (AQMA) within the Mid Devon Preferred Options Report. Any solutions which improve traffic flow along Fore Street in the future will help to improve the air quality situation.

## 1.3 M5 Junction 28

1.3.1 Congestion at M5 Junction 28 is currently experienced during the morning and evening peak periods, particularly at the western 6-arm roundabout of Junction 28 which causes queuing along the Station Road approach towards

the M5. The main concern is the impact of congestion at this junction adversely affecting the motorway; in the evening peak period queues can develop on the northbound off-slip at Junction 28. An increase in traffic will exaggerate this problem further and could result in additional traffic queuing on the northbound M5 slip road.

1.3.2 Therefore there is a requirement to improve the M5 Junction 28. The Improvements would allow the current junction to be signalised and subsequently increase capacity. This would relieve the existing congestion experienced at the junction, and would allow future development within Cullompton to come forward.

# 2. PREVIOUS TRAFFIC MODEL

## 2.1 Highway Network

2.1.1 The study area and base year network are identified in Figure 1. The model included all the major routes within the study area, as well as key routes leading into and out of Cullompton. The M5 can be seen to the east of the study area. All existing areas of significant housing and employment development are also included.

2.1.2 The model incorporated both of the possible routes from Cullompton to Exeter, namely the M5 and the B3181. The B3181, beginning in the south of Cullompton, is a slightly shorter but slower route than the M5. The route costs (distances and speeds) are detailed in Table 1 below.

**Table 1: Alternative Routes to Exeter**

| Route | Length (km) | Free Flow Speed (km/hr) |
|---|---|---|
| B3181 from Exeter Road to Exeter | 19.2 | 80 |
| M5 from J28 to Exeter | 23.2 | 115 |

## 2.2 Data Collection

2.2.1 Manual Classified Counts (MCC) were undertaken at the major junctions in the study area between the hours of 0700 to 1900. Following this, a 2007 base year traffic model of the study area was developed using SATURN traffic modelling software to represent average weekday AM peak (08:00-09:00) conditions, as traffic demand within this period is at its greatest. However it was noted that traffic counts at Junction 28 indicate that flows during the hour from 07:00-08:00 are of a similar order to those during the period from 08:00-09:00.

## 2.3 Matrix Estimation

2.3.1 The traffic counts were used to develop a trip matrix for the AM peak period. This was calculated using the SATME2 matrix estimation program within SATURN. This program derived the total number of trips between each of the zones so that the traffic counts were reproduced as accurately as possible.

2.3.2 In several locations it was possible to place constraints on the number of trips originating and terminating in each of the zones. This process was used to ensure that the base model did not estimate excessive amounts of traffic for zones with low levels of housing or employment.

## 2.4 Model Validation

2.4.1 The model was accurately validated against the traffic counts. The validation outputs from SATURN are given in Table 2 and show traffic flow validation to a level in excess of the DMRB Volume 12 85% pass rate for each test.

**Table 2: 2007 Model Traffic Flow Validation**

| Test | % Links Meeting Criteria |
|---|---|
| Flow < 700: Modelled within +-100 of observed count | 98.5% |
| Flow between 700 and 2700: Modelled with 15% of observed count | 100.0% |
| Compliance summed over all flow ranges | 98.6% |
| All links - GEH Statistic < 5 | 91.4% |

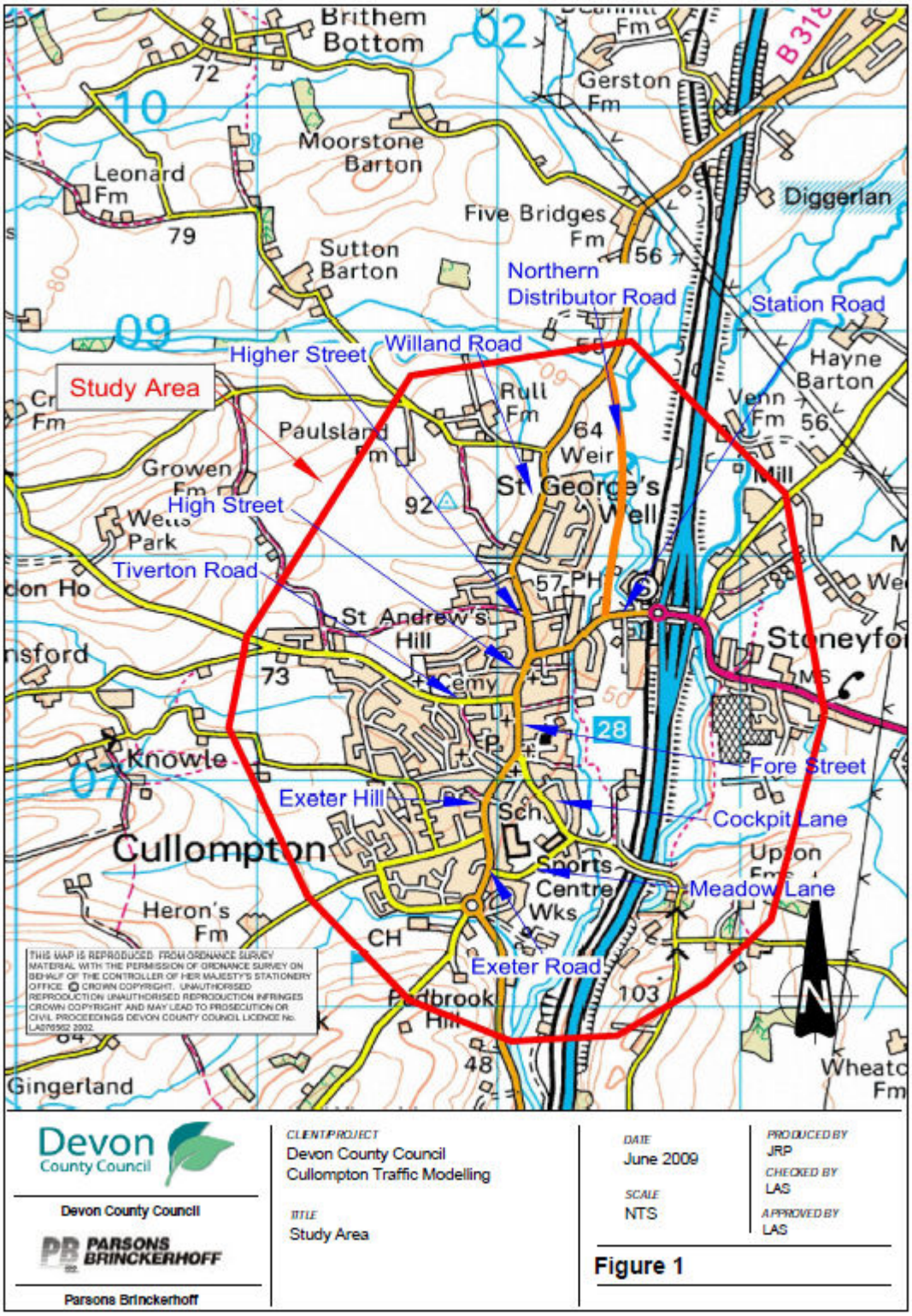
2.4.2 Comparison of modelled and observed base traffic flows at M5 Junction 28 showed that the majority of the turning movements in the model were within 10 pcu/hour of the traffic counts, though flows for a few movements deviated by up to +/- 30 pcu/hour from the counts. However all flows were well within +/-100 pcu/hour of the counts, which was the DMRB validation criterion for flows <700 pcu/hour.

2.4.3 In addition, the origin-destination trip matrix distribution in the model was validated against journey to work data from the 2001 Census which provided an approximate distribution for all purpose trips travelling into and out of Cullompton in the AM peak hour. Table 3 below compares trips entering and leaving Cullompton within the model and shows reasonable agreement apart from significant underestimation of traffic volumes on Tiverton Road. The model was also found to display similar trip patterns as a previous SATURN model of the Cullompton area produced by a developer and based on registration plate surveys.

**Table 3: Model & Census Journey to Work Trip Distribution**

| Zone Number | Route into / out of Cullompton | Outbound | | Inbound | |
|---|---|---|---|---|---|
| | | Census | Model | Census | Model |
| 1 | King's Mill Road | 3% | 2% | 4% | 4% |
| 3 | Honiton Road | 14% | 13% | 20% | 15% |
| 5 | M25 North | 11% | 21% | 8% | 11% |
| 6 | M25 South | 31% | 30% | 16% | 17% |
| 7 | Willand Road | 11% | 13% | 15% | 22% |
| 16 | Old Hill | 0% | 2% | 0% | 5% |
| 17 | Exeter Road | 9% | 9% | 3% | 9% |
| 18 | Bradninch Road | 5% | 3% | 7% | 6% |
| 20 | Colebrooke Lane | 0% | 2% | 0% | 3% |
| 22 | Knowle Lane | 0% | 1% | 2% | 3% |
| 24 | Tiverton Road | 17% | 4% | 24% | 6% |

**Figure 1: 2007 Model Area**



# 3. UPDATED TRAFFIC MODEL

## 3.1 Zoning & Highway Network

3.1.1 The 2007 model zoning, Figure 2, and highway network structure, Figure 3, was retained for the updated traffic model. The traffic zones were not changed but a number of revisions were made to the network to improve the representation of travel time and queuing:

- Speed / flow relationships included on the longer links outside of the town centre;
- 15 mph average link speeds on High Street, Fore Street and Tiverton Road in the town centre;
- Reduction in saturation capacity from 1800 to 1500 pcu/hour on the single lane Station Road approaches to the Tesco and M5 / Services roundabouts;
- Observed staging and timings at the High Street / Station Road traffic signal junction.

3.1.2 The whole model area was included in the simulation area and all junctions, apart from minor and access roads, were simulated in SATURN. Junction simulation parameters generally followed a simplified coding method with standardised saturation capacities and gap sizes to ensure consistency across the network, Table 4.

**Table 4: SATURN Junction Simulation Parameters**

| Parameter | Saturation Flow (pcu/hr) | Minimum Gap (sec) |
|---|---|---|
| 1. Priority: | Minor Arm<br>Left Turn 800 Right Turn 700<br><br>Major Arm<br>Left Turn 1200 Right Turn 1800<br>(in each direction) | 3.5 |
| 2. Roundabout | Approach: Flared 1500<br>1 lane 800<br>Circulation: 1800 | 3.5 |
| 3. Traffic Signals | Left turn 1500<br>Straight 1800<br>Right turn 1500 | Opposed right turn: 3.5 |

**Figure 2: Traffic Zones**

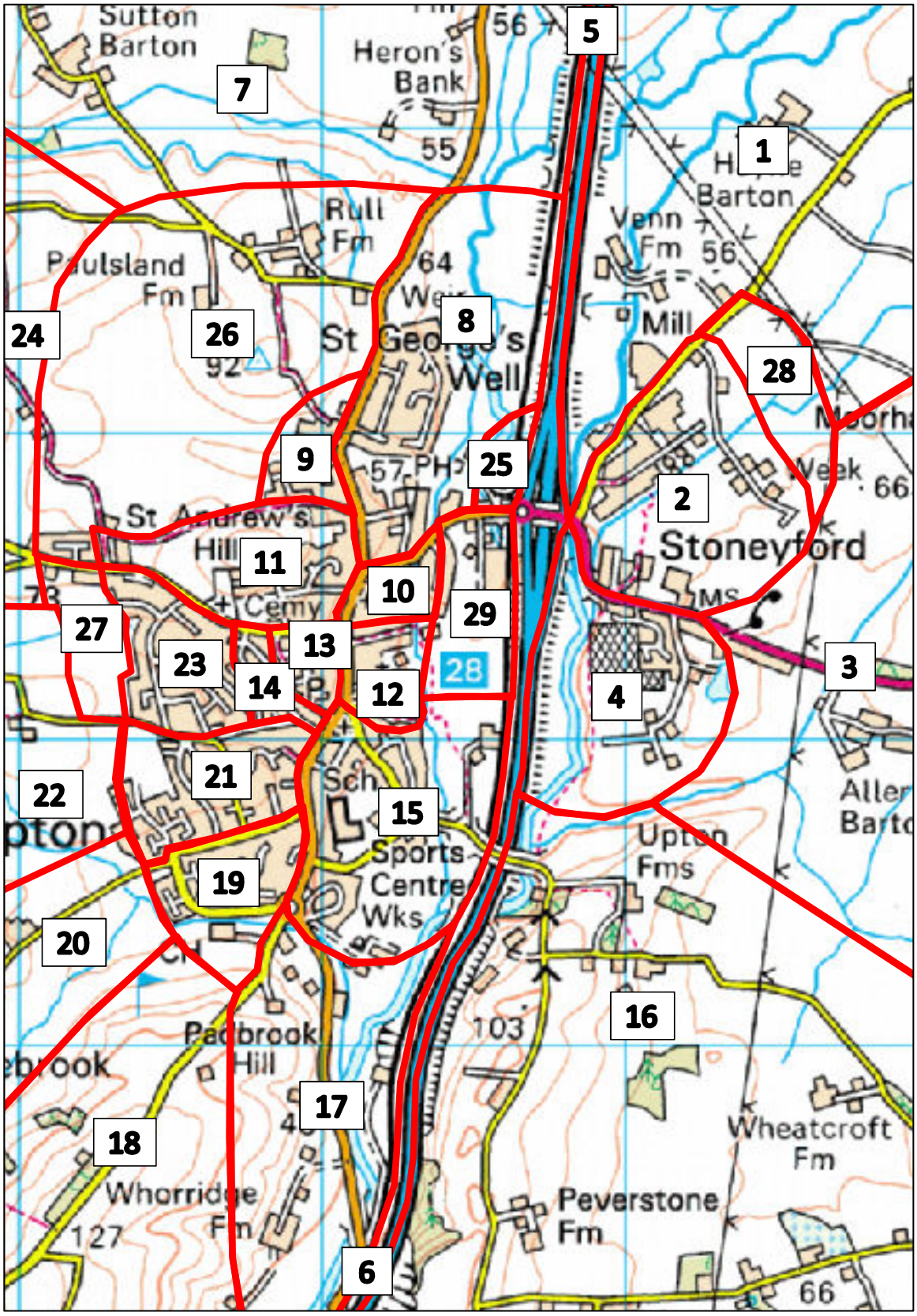
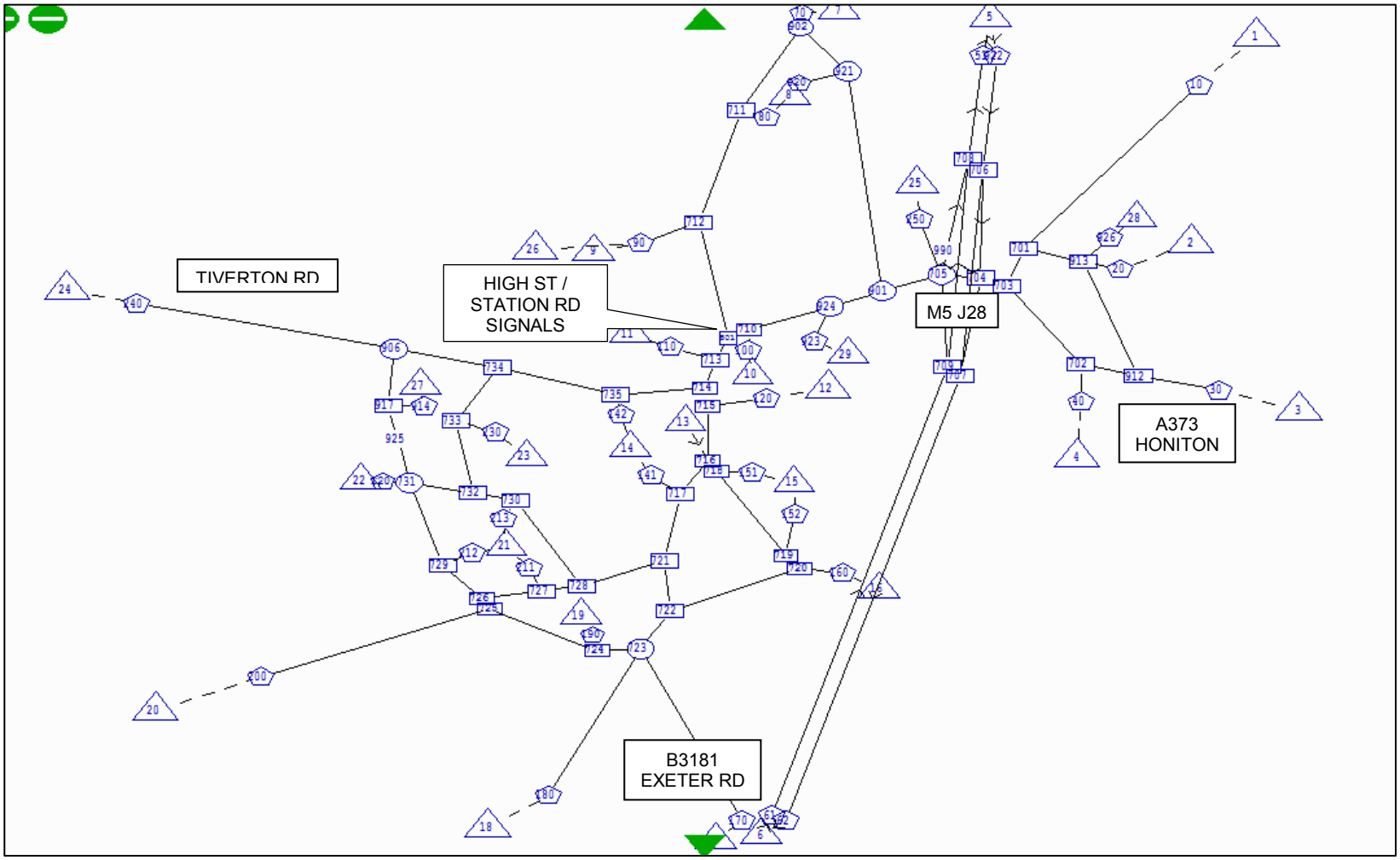


**Figure 3: Base Year SATURN Highway Network**



## 3.2 Trip Matrix Building

3.2.1 Roadside interviews were carried out in June 2012 on the High Street at the Station Road signals and on the B3181 Exeter Road to the south of Cullompton. The expanded data provided fully observed origin-destination movements from zones 11 to 24 and 27 to zones 1 to 10, 25 to 26 and 28 to 29 for the High Street RSI and from zones 1 to 16 and 18 to 29 to zone 17 for the Exeter Road RSI. Site trip matrices were built for the 07:00 to 08:00 hours and 08:00 to 09:00 hours AM peak hours and the 17:00 to 18:00 PM peak hour.

3.2.2 Synthesised data was generated for the non-interview directions at the two RSI sites by reversing the origin-destination movements for the opposite peak hour and factoring to the total traffic flow in the non-interview direction as follows:

- 08:00 to 09:00 hours AM peak hour trip matrix reversed and factored to form non-interview direction PM peak hour trip matrix;
- PM peak hour trip matrix reversed and factored to form non-interview direction 07:00 to 08:00 hours and 08:00 to 09:00 hours AM peak hour trip matrices.

3.2.3 The observed and synthesised trip matrices were then combined with High Street RSI trip matrices being used in preference to the B3181 Exeter Road RSI data where the same movements were fully observed at both sites, i.e. between zone 17 and zones 1 to 10, 25 to 26 and 28 to 29.

3.2.4 The 2007 model AM peak matrix was then factored to 2012 data to represent the 07:00 to 08:00 hours and 08:00 to 09:00 hours AM peak hours and reversed and factored for the PM peak hour and the inter peak hour.

3.2.5 Finally the 2007 model and the 2012 RSI matrices were combined, with the RSI matrices being used in preference to the 2007 model matrices for fully observed movements.

3.2.6 Sector trip matrices for all vehicles for the two RSI sites are shown in Table 5 and Table 6, and the combined sector trip matrices for the model time periods are shown in Table 7 to Table 10.

3.2.7 The interview and synthesised data was processed to build vehicle matrices by 5 separate user classes (private vehicle home based work, employers business and other purposes plus LGV and HGV). The user class matrices were kept separate for multi user class assignment in SATURN. The 2007 model matrices were all vehicle and the movements used in the combined matrices were split into the 5 user classes using classified count data.

**Table 5: Expanded B3181 Exeter Rd RSI 12 Hour Trip Matrix**

| Sector Description | From Sector | Traffic Volume (all vehicles) To Sector | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | All |
| Town Centre & South | 1 | 0 | 0 | 0 | 0 | 0 | 5 | 2 | 16 | 11 | 0 | 373 | 406 |
| North Cullompton | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 8 | 11 | 0 | 103 | 124 |
| East (of M5) Cullompton | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 0 | 43 | 52 |
| Willand Area | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 18 | 11 | 5 | 173 | 211 |
| Tiverton Area | 5 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 6 | 4 | 2 | 31 | 45 |
| East | 6 | 0 | 0 | 0 | 0 | 0 | 5 | 4 | 15 | 15 | 2 | 209 | 250 |
| West | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 2 | 0 | 48 | 57 |
| South- West of M5 | 8 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 6 | 23 | 0 | 476 | 518 |
| South- East of M5 | 9 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 6 | 7 | 0 | 160 | 178 |
| M5 North | 10 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 37 | 23 | 0 | 110 | 175 |
| M5 South | 11 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 6 | 2 | 0 | 4 | 14 |
| | All | 0 | 0 | 0 | 0 | 0 | 44 | 6 | 128 | 111 | 9 | 1731 | 2030 |

**Table 6: Expanded High St RSI 12 Hour Trip Matrix**

| Sector Description | From Sector | Traffic Volume (all vehicles) To Sector | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | All |
| Town Centre & South | 1 | 46 | 778 | 91 | 591 | 119 | 414 | 0 | 0 | 103 | 345 | 451 | 2937 |
| North Cullompton | 2 | 0 | 64 | 6 | 6 | 0 | 6 | 0 | 0 | 7 | 40 | 6 | 135 |
| East (of M5) Cullompton | 3 | 0 | 21 | 16 | 0 | 0 | 6 | 0 | 0 | 0 | 12 | 0 | 56 |
| Willand Area | 4 | 6 | 19 | 6 | 14 | 0 | 0 | 0 | 0 | 5 | 0 | 11 | 61 |
| Tiverton Area | 5 | 0 | 53 | 11 | 34 | 13 | 86 | 0 | 0 | 17 | 55 | 88 | 357 |
| East | 6 | 6 | 90 | 14 | 33 | 6 | 41 | 0 | 0 | 6 | 29 | 13 | 237 |
| West | 7 | 0 | 82 | 41 | 27 | 27 | 53 | 0 | 0 | 25 | 33 | 31 | 318 |
| South- West of M5 | 8 | 12 | 207 | 12 | 144 | 42 | 91 | 0 | 0 | 13 | 155 | 51 | 727 |
| South- East of M5 | 9 | 5 | 88 | 0 | 41 | 20 | 28 | 0 | 0 | 5 | 81 | 104 | 374 |
| M5 North | 10 | 0 | 23 | 6 | 36 | 11 | 14 | 0 | 0 | 0 | 25 | 22 | 137 |
| M5 South | 11 | 1 | 154 | 29 | 201 | 52 | 82 | 6 | 0 | 11 | 181 | 12 | 730 |
| | All | 76 | 1579 | 232 | 1128 | 290 | 821 | 6 | 0 | 194 | 955 | 788 | 6070 |

**Table 7: 07:00 to 08:00 AM Peak Hour Trip Matrix**

| Sector Description | From Sector | Traffic Volume (all vehicles) To Sector | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | All |
| Town Centre & South | 1 | 157 | 69 | 42 | 8 | 46 | 67 | 27 | 16 | 44 | 42 | 79 | 597 |
| North Cullompton | 2 | 91 | 16 | 30 | 18 | 16 | 58 | 11 | 43 | 14 | 134 | 55 | 486 |
| East (of M5) Cullompton | 3 | 15 | 9 | 4 | 3 | 1 | 10 | 1 | 4 | 4 | 29 | 23 | 104 |
| Willand Area | 4 | 38 | 28 | 19 | 0 | 5 | 26 | 0 | 16 | 14 | 28 | 59 | 233 |
| Tiverton Area | 5 | 20 | 23 | 1 | 15 | 0 | 16 | 5 | 1 | 3 | 20 | 10 | 114 |
| East | 6 | 49 | 48 | 23 | 11 | 8 | 10 | 3 | 11 | 49 | 88 | 73 | 372 |
| West | 7 | 14 | 10 | 10 | 0 | 4 | 6 | 1 | 1 | 20 | 6 | 11 | 82 |
| South- West of M5 | 8 | 4 | 19 | 3 | 0 | 0 | 0 | 0 | 0 | 134 | 39 | 6 | 205 |
| South- East of M5 | 9 | 14 | 6 | 24 | 16 | 0 | 0 | 2 | 25 | 30 | 60 | 10 | 186 |
| M5 North | 10 | 19 | 39 | 19 | 15 | 5 | 25 | 0 | 9 | 16 | 0 | 1623 | 1771 |
| M5 South | 11 | 24 | 89 | 29 | 15 | 3 | 38 | 5 | 3 | 0 | 1284 | 0 | 1490 |
| | All | 444 | 354 | 203 | 101 | 89 | 256 | 54 | 131 | 328 | 1730 | 1949 | 5639 |

**Table 8: 08:00 to 09:00 AM Peak Hour Trip Matrix**

| Sector Description | From Sector | Traffic Volume (all vehicles) To Sector | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | All |
| Town Centre & South | 1 | 194 | 116 | 41 | 41 | 60 | 14 | 35 | 21 | 77 | 48 | 151 | 800 |
| North Cullompton | 2 | 123 | 59 | 29 | 42 | 24 | 40 | 16 | 61 | 17 | 137 | 72 | 620 |
| East (of M5) Cullompton | 3 | 21 | 26 | 5 | 5 | 2 | 13 | 1 | 6 | 10 | 37 | 31 | 156 |
| Willand Area | 4 | 60 | 47 | 25 | 0 | 8 | 34 | 0 | 27 | 40 | 37 | 77 | 354 |
| Tiverton Area | 5 | 26 | 42 | 2 | 17 | 0 | 9 | 6 | 2 | 3 | 9 | 26 | 141 |
| East | 6 | 79 | 64 | 30 | 14 | 13 | 13 | 6 | 19 | 48 | 116 | 95 | 497 |
| West | 7 | 19 | 12 | 1 | 0 | 5 | 9 | 2 | 1 | 7 | 9 | 26 | 90 |
| South- West of M5 | 8 | 5 | 6 | 4 | 0 | 0 | 0 | 0 | 0 | 103 | 0 | 27 | 146 |
| South- East of M5 | 9 | 19 | 6 | 6 | 6 | 0 | 6 | 2 | 34 | 37 | 41 | 36 | 192 |
| M5 North | 10 | 27 | 51 | 25 | 20 | 8 | 33 | 0 | 16 | 13 | 0 | 2128 | 2320 |
| M5 South | 11 | 35 | 117 | 38 | 20 | 6 | 50 | 8 | 6 | 0 | 1683 | 0 | 1961 |
| | All | 608 | 544 | 205 | 166 | 126 | 220 | 76 | 193 | 354 | 2117 | 2670 | 7279 |

**Table 9: 17:00 to 18:00 PM Peak Hour Trip Matrix**

| Sector Description | From Sector | Traffic Volume (all vehicles) To Sector | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | All |
| Town Centre & South | 1 | 226 | 154 | 24 | 64 | 30 | 84 | 22 | 5 | 21 | 31 | 39 | 698 |
| North Cullompton | 2 | 206 | 99 | 38 | 97 | 72 | 101 | 22 | 11 | 2 | 67 | 136 | 850 |
| East (of M5) Cullompton | 3 | 51 | 36 | 6 | 29 | 2 | 35 | 1 | 4 | 6 | 29 | 44 | 244 |
| Willand Area | 4 | 56 | 53 | 5 | 0 | 24 | 16 | 0 | 1 | 9 | 23 | 23 | 209 |
| Tiverton Area | 5 | 70 | 29 | 2 | 8 | 0 | 14 | 6 | 1 | 0 | 8 | 6 | 144 |
| East | 6 | 17 | 50 | 15 | 39 | 12 | 15 | 12 | 0 | 17 | 38 | 58 | 274 |
| West | 7 | 41 | 19 | 2 | 0 | 7 | 6 | 2 | 0 | 2 | 0 | 8 | 87 |
| South- West of M5 | 8 | 25 | 76 | 6 | 28 | 2 | 20 | 1 | 0 | 33 | 16 | 6 | 214 |
| South- East of M5 | 9 | 82 | 18 | 4 | 78 | 3 | 20 | 8 | 113 | 39 | 61 | 14 | 440 |
| M5 North | 10 | 64 | 168 | 43 | 43 | 12 | 135 | 12 | 0 | 21 | 0 | 1954 | 2452 |
| M5 South | 11 | 203 | 84 | 36 | 90 | 36 | 111 | 36 | 37 | 4 | 2471 | 0 | 3106 |
| | All | 1040 | 785 | 182 | 477 | 199 | 556 | 121 | 172 | 154 | 2745 | 2287 | 8718 |

**Table 10: 10:00 to 16:00 Average Inter Peak Hour Trip Matrix**

| Sector Description | From Sector | Traffic Volume (all vehicles) To Sector | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | All |
| Town Centre & South | 1 | 152 | 170 | 27 | 53 | 46 | 33 | 27 | 17 | 29 | 37 | 60 | 652 |
| North Cullompton | 2 | 183 | 74 | 30 | 58 | 33 | 46 | 16 | 35 | 9 | 115 | 55 | 654 |
| East (of M5) Cullompton | 3 | 18 | 18 | 6 | 3 | 6 | 11 | 5 | 5 | 3 | 31 | 23 | 130 |
| Willand Area | 4 | 62 | 41 | 19 | 0 | 4 | 26 | 3 | 9 | 16 | 28 | 59 | 268 |
| Tiverton Area | 5 | 20 | 32 | 5 | 4 | 0 | 8 | 5 | 1 | 3 | 9 | 13 | 101 |
| East | 6 | 38 | 42 | 24 | 11 | 8 | 10 | 4 | 7 | 15 | 88 | 73 | 321 |
| West | 7 | 14 | 15 | 5 | 3 | 4 | 4 | 1 | 1 | 3 | 2 | 4 | 57 |
| South- West of M5 | 8 | 5 | 33 | 4 | 9 | 0 | 7 | 0 | 0 | 26 | 8 | 9 | 102 |
| South- East of M5 | 9 | 30 | 16 | 3 | 23 | 3 | 8 | 3 | 26 | 31 | 12 | 21 | 177 |
| M5 North | 10 | 45 | 53 | 21 | 15 | 9 | 25 | 2 | 8 | 15 | 0 | 1623 | 1817 |
| M5 South | 11 | 61 | 89 | 29 | 15 | 13 | 38 | 5 | 9 | 1 | 1284 | 0 | 1544 |
| | All | 628 | 583 | 173 | 195 | 127 | 218 | 71 | 120 | 152 | 1614 | 1941 | 5821 |

## 3.3 Matrix Estimation

3.3.1 Because of the limited amount of roadside interview data and the amount of synthesised origin destination data it was necessary to use matrix estimation to calibrate the trip matrices to count data at the interview and synthesised roadside sites and available data at other locations. Six iterations of SATURN assignment and within each 30 iterations of the SATME2 program, was performed using traffic count data for 46 turns and links obtained from the MCC and ATC data on Tiverton Road, Fore Street, High Street, Station Road and at M5 Junction 28 comprising the main traffic movements over the model area.

3.3.2 The traffic count data was for Wednesday 11 July 2012. Comparisons with ATC data on Station Road over the whole of 2012, presented in the Report of Surveys, showed that neutral month weekday average traffic volumes were only a few percent different to 11 July and well within normal traffic variation. Consequently it was considered unnecessary to adjust the count data before input to matrix estimation.

3.3.3 Consideration was given to incorporating the queue survey data on the Fore Street / High Street / Station Road route with the count data to give demand data for use in matrix estimation. However, analysis of the queue data, which is presented in the Report of Surveys, showed that queues built up and dissipated over the peak hours and there were no residual over capacity queues at the end of the peak hours. This showed that there was sufficient capacity for traffic demand in the peak hours, and this was confirmed by SATME2 which did not calculate any residual queuing and consequently considered the count flows to be demand flows.

3.3.4 The trip matrices for the car and van user classes 1 to 3 (work, business and other purposes) were combined for comparison with the car and van traffic counts in the matrix estimation process. After matrix estimation the updated car and van matrices were split into the three user classes using the same proportions as the original trip matrices. Separate matrix estimation was carried out for LGV and HGV (user classes 4 and 5) using LGV and HGV traffic count data.

3.3.5 It was found that the matrices before SATME2 produced a good correspondence with observed data and after matrix estimation the correspondence was close, as shown on Table 11 to Table 14.

3.3.6 Changes to the car and van matrices (user classes 1 to 3) caused by SATME2 were quite small and although there were large percentage changes to the LGV and HGV matrices (user classes 4 and 5) the absolute totals and changes were small and the overall results were considered satisfactory.

**Table 11: SATME2 Results – AM 07-08 Peak Hour**

| Measure | Cars, Vans UC1-3 | | LGV UC4 | | HGV UC5 | |
|---|---|---|---|---|---|---|
| | Before | After | Before | After | Before | After |
| Observed/Modelled Flows Total | -3% | 0% | -433% | -71% | -39% | -43% |
| Average Difference – Absolute | 7 | 1 | 10 | 3 | 1 | 1 |
| Regression - R-squared | 0.94 | 1 | 0.21 | 0.93 | 0.87 | 0.97 |
| Average GEH | 3.7 | 0.15 | 2.58 | 1.06 | 2.42 | 0.76 |
| GEH – 0 to 6 | 79% | 100% | 92% | 96% | 100% | 100% |
| GEH – 6 to 10 | 19% | 0% | 4% | 4% | 0% | 0% |
| GEH – above 10 | 2% | 0% | 4% | 0% | 0% | 0% |
| Matrix Total | 5,126 | 5,494 7% | 63 | 207 229% | 189 | 219 16% |
| Cells – Unchanged | - | 70% | - | 91% | - | 93% |
| Cells – 0 to +/- 20 | - | 28% | - | 9% | - | 7% |
| Cells - > +/- 20 | - | 1% | - | 0% | - | 0% |

**Table 12: SATME2 Results – AM 08-09 Peak Hour**

| Measure | Cars, Vans UC1-3 | | LGV UC4 | | HGV UC5 | |
|---|---|---|---|---|---|---|
| | Before | After | Before | After | Before | After |
| Observed/Modelled Flows Total | -4% | -1% | -476% | -108% | -479% | -252% |
| Average Difference – Absolute | 11 | 4 | 9 | 4 | 7 | 4 |
| Regression - R-squared | 0.96 | 1 | 0.23 | 0.91 | 0 | 0.16 |
| Average GEH | 3.43 | 0.25 | 2.46 | 1.35 | 2.82 | 1.54 |
| GEH – 0 to 6 | 79% | 100% | 86% | 100% | 90% | 90% |
| GEH – 6 to 10 | 21% | 0% | 11% | 0% | 10% | 10% |
| GEH – above 10 | 0% | 0% | 4% | 0% | 0% | 0% |
| Matrix Total | 6,959 | 6,726 -3% | 58 | 192 231% | 54 | 74 37% |
| Cells – Unchanged | - | 69% | - | 89% | - | 97% |
| Cells – 0 to +/- 20 | - | 30% | - | 11% | - | 3% |
| Cells - > +/- 20 | - | 1% | - | 0% | - | 0% |

**Table 13: SATME2 Results – PM 17-18 Peak Hour**

| Measure | Cars, Vans UC1-3 | | LGV UC4 | | HGV UC5 | |
|---|---|---|---|---|---|---|
| | Before | After | Before | After | Before | After |
| Observed/Modelled Flows Total | -10% | -1% | -248% | -67% | -881% | -852% |
| Average Difference – Absolute | 34 | 2 | 4 | 1 | 2 | 2 |
| Regression - R-squared | 0.94 | 1 | 0.59 | 0.94 | 0 | 0 |
| Average GEH | 4.43 | 0.36 | 1.53 | 0.63 | 1.74 | 1.16 |
| GEH – 0 to 6 | 76% | 100% | 97% | 100% | 100% | 100% |
| GEH – 6 to 10 | 19% | 0% | 3% | 0% | 0% | 0% |
| GEH – above 10 | 5% | 0% | 0% | 0% | 0% | 0% |
| Matrix Total | 8,388 | 7,694<br>-8% | 61 | 119<br>95% | 42 | 45<br>7% |
| Cells – Unchanged | - | 69% | - | 89% | - | 98% |
| Cells – 0 to +/- 20 | - | 30% | - | 11% | - | 3% |
| Cells - > +/- 20 | - | 2% | - | 0% | - | 0% |

**Table 14: SATME2 Results – IP 10-16 Average Hour**

| Measure | Cars, Vans UC1-3 | | LGV UC4 | | HGV UC5 | |
|---|---|---|---|---|---|---|
| | Before | After | Before | After | Before | After |
| Observed/Modelled Flows Total | -2% | 0% | -342% | -42% | -21% | -3% |
| Average Difference – Absolute | 4 | 0 | 9 | 3 | 4 | 0 |
| Regression - R-squared | 0.97 | 1 | 0.14 | 0.84 | 0 | 0.98 |
| Average GEH | 2.95 | 0.15 | 2.13 | 0.96 | 2.35 | 0.75 |
| GEH – 0 to 6 | 95% | 100% | 91% | 100% | 91% | 100% |
| GEH – 6 to 10 | 5% | 0% | 3% | 0% | 3% | 0% |
| GEH – above 10 | 0% | 0% | 6% | 0% | 6% | 0% |
| Matrix Total | 5,289 | 5,418<br>2% | 60 | 226<br>277% | 466 | 339<br>-27% |
| Cells – Unchanged | - | 56% | - | 79% | - | 91% |
| Cells – 0 to +/- 20 | - | 43% | - | 20% | - | 9% |
| Cells - > +/- 20 | - | 1% | - | 0% | - | 0% |

**Table 15: Trip Matrix Totals After Matrix Estimation**

| User Class | AM 07 Peak | AM 08 Peak | PM Peak | Inter Peak |
|---|---|---|---|---|
| UC1 – Car etc - Home Based Work | 2,691 (45.5%) | 2,650 (37.9%) | 2,864 (36.4%) | 1,055 (17.6%) |
| UC2 – Car etc - Employers Business | 88 (1.5%) | 381 (5.4%) | 422 (5.4%) | 606 (10.1%) |
| UC3 – Car etc - Other Purposes | 2,715 (45.9%) | 3,696 (52.9%) | 4,409 (56.1%) | 3,757 (62.8%) |
| UC4 – LGV | 207 (3.5%) | 192 (2.7%) | 119 (1.5%) | 226 (3.8%) |
| UC5 – HGV | 219 (3.7%) | 74 (1.1%) | 45 (0.6%) | 339 (5.7%) |
| Total (veh/hr) | 5,920 (100.0%) | 6,992 (100.0%) | 7,859 (100.0%) | 5,983 (100.0%) |

# 4. TRAFFIC MODEL CALIBRATION

## 4.1 Procedure

4.1.1 The traffic model calibration was an iterative process consisting of the estimation of essential parameters defining the SATURN traffic model, and related to the following main items:

- Highway network;
- 2012 base year origin-destination matrices;
- Traffic assignment techniques and assumptions.

4.1.2 The accuracy of the developing model was assessed by comparing observed and assigned traffic movements at key junctions and analysing the volume and distribution of traffic at each RSI site.

## 4.2 Highway Network

4.2.1 The SATURN network was checked to ensure important roads were included to provide the necessary level of detail within the study area, and that it was consistent with the traffic zoning system. All coded link lengths were checked to ensure that they were correct as well as the saturation flows and signal timings within the simulated network. Similarly all banned movements were reviewed and checked and that all possible movements at junctions were included. The loading points of zones onto the network were also reassessed and if need be altered to allow for sensible and accurate traffic flows.

4.2.2 The High Street / Station Road traffic signal junction was represented with average green times for the modelled time periods obtained from the video surveys.

4.2.3 SATURN plots of 'trees', the routes used by traffic between origins and destinations, were checked to ensure that the selected routes were logical and valid. In reality there is very little route choice on the small road network in Cullompton. It was found that modelled paths are consistent with known routes in the area.

## 4.3 Traffic Assignment

4.3.1 Calibration of traffic assignment in the model firstly concentrated on identifying the most appropriate type of traffic assignment to use. Available options within SATURN were the Wardrop equilibrium and the stochastic user (SUE) equilibrium assignments, with also the possibility of using all or nothing and pure stochastic assignments.

4.3.2 It was considered appropriate to use an equilibrium assignment to take account of and optimise capacity restraint effects. The Wardrop equilibrium assignment seemed to be most appropriate because there is already congestion in the peak hours and there are limited route options within Cullompton.

4.3.3 The appropriateness of using the different assignment methods was assessed using the procedures recommended in the SATURN user manual. In particular, the level of congestion on the network was investigated in assessing the merits of using either the Wardrop or stochastic user methods. It was found that the 'epsilon-2' value of 2% in the AM peak hour was much lower than the recommended maximum of 25% that indicates the upper limit of the use of stochastic assignment. However the values were distorted by many roads that are largely uncongested during the peaks but as there is congestion on the key High Street / Station Road route the use of the Wardrop equilibrium method was considered appropriate. The 'epsilon-2' value was 75% in the PM peak which justified the use of the Wardrop equilibrium method.

4.3.4 Assignment convergence of the traffic model met the DMRB convergence criteria in each time periods. Delta values were considerably less than 1% and there were more than four final iterations when over 97% of flows on links changed by less than 5%. SATURN parameter 'delta' values for the final iteration of 0.0% for all other model periods indicated very good assignment convergence. The values of significant assignment parameters used were:

- MASL = 35 Maximum number of assignment/simulation loops.
- NITA = 35 Maximum number of iterations within each assignment.
- NITS = 15 Maximum number of iterations within each simulation.

4.3.5 Minimum cost assignments were carried out with equal PPM and PPK values so that time in minutes and distance in km were equally weighted. This combination was found to best represent known routes and deterred longer distance rat run detours that do not occur in Cullompton.

**Table 16: Convergence Results – Base Year**

| Loop No. (MASL) | Delta (%) / No. of Assignment Iterations | | | | % of Link Flows Differing by < 5% | | | |
|---|---|---|---|---|---|---|---|---|
| | AM 07-08 | AM 08-09 | IP | PM | AM 07 | AM 08 | IP | PM |
| 1 | 0.0084/4 | 0.0065/4 | 0.0000/3 | 0.0003/3 | - | - | - | - |
| 2 | 0.0002/3 | 0.0012/3 | 0.0000/3 | 0.0000/3 | 91.3 | 93.6 | 95.3 | 91.8 |
| 3 | 0.0000/3 | 0.0001/3 | 0.0000/3 | 0.0000/3 | 100.0 | 98.8 | 100.0 | 100.0 |
| 4 | 0.0000/3 | 0.0000/4 | 0.0000/3 | 0.0000/3 | 100.0 | 100.0 | 100.0 | 100.0 |
| 5 | 0.0000/3 | 0.0000/3 | 0.0000/3 | 0.0000/3 | 100.0 | 100.0 | 100.0 | 100.0 |
| 6 | 0.0000/3 | 0.0000/4 | 0.0000/3 | 0.0000/3 | 100.0 | 100.0 | 100.0 | 100.0 |

# 5. TRAFFIC MODEL VALIDATION

## 5.1 General

5.1.1 Validation of the traffic model has been carried out in accordance with DMRB /WebTAG procedures.

5.1.2 The aims of model validation are to:

- Compare model estimates with information not used in model calibration;
- Directly measure the accuracy of the model estimates.

5.1.3 The following elements have been validated in detail:

1) Network : link details, link length, routes and journey times;
2) Assignment : sector movements, screenline and link counts.

5.1.4 Assignment routes for zone to zone movements have been checked to ensure that logical and known routes are used that take account of signposting, major roads, rat-runs etc.. The aim was to ensure that the assignment model gives an adequate representation of routes chosen by traffic in the Cullompton area.

5.1.5 Modelled times for the 2012 base year on the Fore Street / High Street / Station Road route were compared with those observed on the same routes from the video queue surveys of July 2012. The aim was to achieve differences between modelled and observed journey times within the 95% confidence interval of +/- 20%.

5.1.6 Select link assignments have been used to identify the distribution of movements assigned through the RSI stations and these have been compared with the origin-destination distributions found from the roadside surveys and presented as sector to sector comparisons.

5.1.7 Traffic counts on important roads that were not used in calibration of the traffic model provide independent data for validating the performance of the traffic model. Comparisons have been made across screenlines by model time period.

5.1.8 Assigned flows were compared with survey volumes at each of the RSI sites. The GEH statistic has been used to compare observed and assigned flow:

$$GEH = ( ( Va - Vo )^2 / ( 0.5 ( Va + Vo ) ) )^{0.5}$$

Where Va = observed link volume
Vo = observed link volume

5.1.9 GEH is based on the chi-squared parameter and takes account of both the absolute and relative difference and provides a practical measure of important differences at both low and high traffic levels. For transport models it is recommended that GEH values of less than 5 indicate a good fit between

assigned and observed flows while GEH values greater than 10 require closer attention.

## 5.2 Network Validation

5.2.1 Following calibration of the traffic model, the finalised link characteristics of the highway network were checked to ensure valid classification for each link. The speed/flow relationships allocated to each link were confirmed as appropriate. It was confirmed that no exceptions to the standard values for speed/flow relationships were used. Junction coding was checked to confirm the correct interpretation of priorities, lane allocation, saturation flow etc..

5.2.2 Link lengths were checked by comparing coded lengths with crow-fly distances derived from the co-ordinates coded for network plotting. Co-ordinates were based on OS grid references modified for short links to assist visibility for plotting. Those links where the coded link length was greater than 1.3 times the crow-fly distance, and where the difference was greater than 100 metres, were screened and checked. Only a few such exceptional links were identified and these were located in the extremities of the modelled area and were all bendy rural roads with fairly long link lengths.

## 5.3 Journey Time Validation

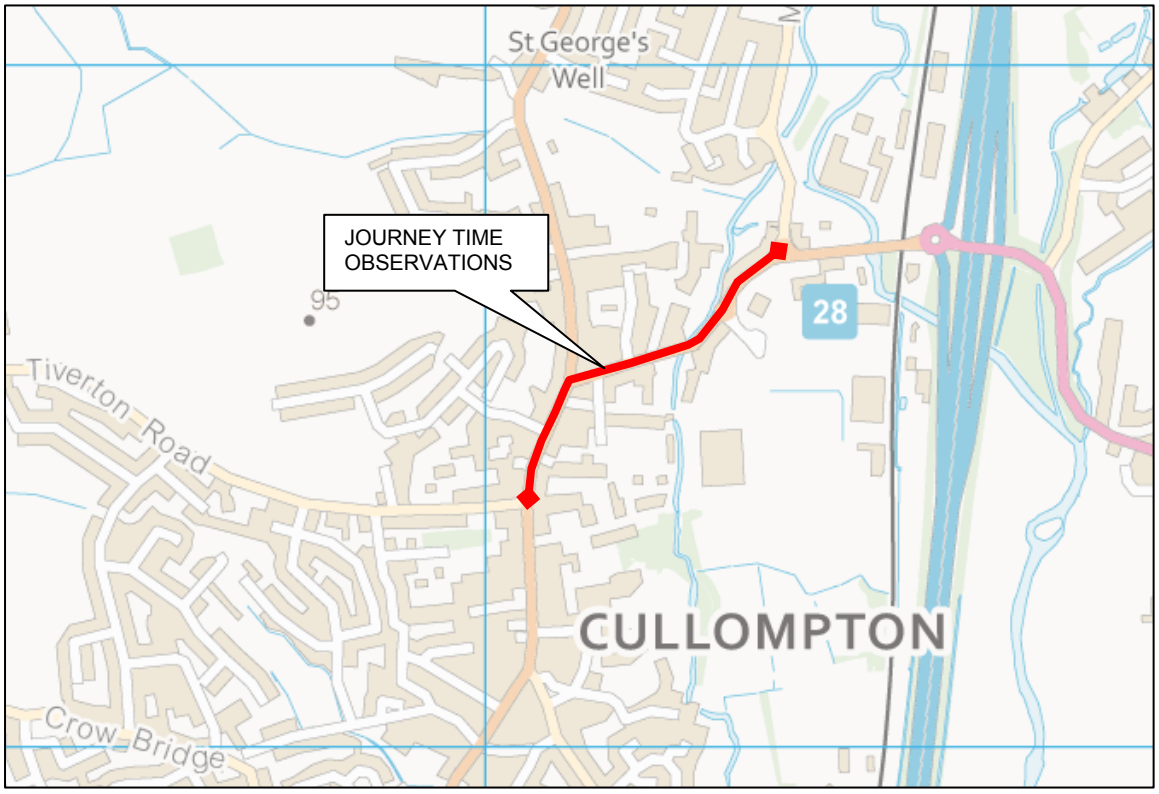
5.3.1 Journey time data on the key Fore Street / High Street / Station Road route was obtained from the video survey carried out on Wednesday 11 July 2012 which was used primarily to obtain turning movement traffic volume data. A sample of vehicles travelling eastbound were identified and times recorded on the High Street at the Tiverton Road junction and on the give way to the Millenium Way roundabout, see Figure 4. Journey times were thus obtained on the most congested road section including the right turn to Station Road at the High Street traffic signals and the Tesco and Millenium Way roundabouts. It was not possible to extend the timing point to the M5 northbound slips roundabout because of difficulties in identifying vehicles from the video.

5.3.2 The observed journey time for the 07:00 to 08:00 hours AM peak was for the first quarter hour when traffic was low, and the modelled time over the whole hour was much higher, which would be expected. All other modelled journey times were within 10% of average observed times indicating satisfactory journey time validation.

**Table 17: Observed Journey Times**

| Observed | | | Modelled | | %age Difference |
|---|---|---|---|---|---|
| Time Period | Average Time (s) | Standard Deviation (s) | Time Period | Modelled Time (s) | |
| AM 7am-7.15am | 70 | 15 | AM 7am-8am | 89 | +27% |
| AM 8am-9am | 97 | 22 | AM 8am-9am | 94 | -3% |
| IP 11am-12am | 96 | 28 | IP 11am-12am | 88 | -8% |
| PM 5pm-6pm | 101 | 24 | PM 5pm-6pm | 94 | -7% |

**Figure 4: Location of Journey Time Observations**



## 5.4 Validation at RSI Sites

5.4.1 Model calibration consisted of choosing network and assignment parameters with the aim of closely matching observed and assigned volumes at each of the roadside interview stations. An essential element of model validation not included in calibration was to ensure that the distribution of traffic movements assigned through the RSI station links corresponded to the origin-destination distribution found from the roadside surveys.

5.4.2 The 29 base model zones were compressed into a 11 sector presentation system, see Table 19, in order to make a practical and understandable comparison between surveyed and assigned movements. Expanded survey data at each RSI station was compressed to the 11 sector system and select link analysis used to establish the modelled movements. The resulting origin and destination totals for each roadside station, illustrated on Figure 5 and Figure 6, show close correspondence between survey and assignment for most movements with only a few that show significant differences.

5.4.3 The correspondence between observed and modelled volumes at the RSI sites for each sector movement was also analysed by the distribution of flow differences and GEH values calculated for each non-zero sector to sector movement, Table 18. Only 10 or 6.4% out of the 156 non-zero sector to sector movements at the two RSI sites had GEH values greater than 5 and none were greater than 10. All flow differences were within the validation criteria. These results showed very good correspondence between observed and modelled sector to sector volumes at the roadside interview sites.

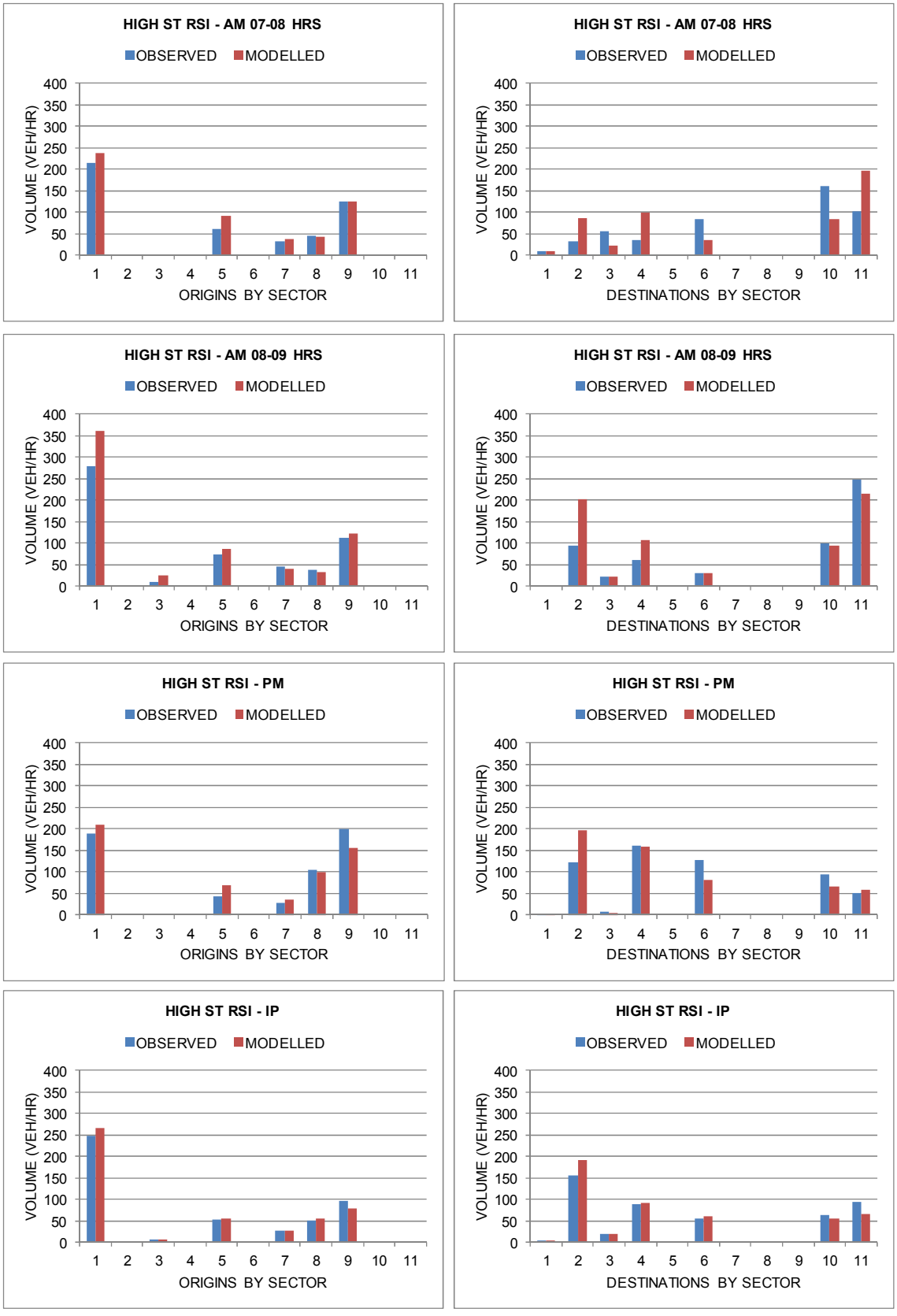
**Table 18: Validation of Sector Movements at RSI Sites**

| Time Period | Total Non-Zero Movements | | | GEH>5 & GEH<10 | | |
|---|---|---|---|---|---|---|
| | High St | Beare Rd | Both | High St | Beare Rd | Both |
| AM 07 | 10 | 25 | 35 | 2 | 3 | 5 |
| AM 08 | 10 | 27 | 37 | 1 | 2 | 3 |
| PM | 9 | 27 | 36 | 0 | 1 | 1 |
| IP | 11 | 37 | 48 | 1 | 0 | 1 |
| All | 40 | 116 | 156 | 4 | 6 | 10 |

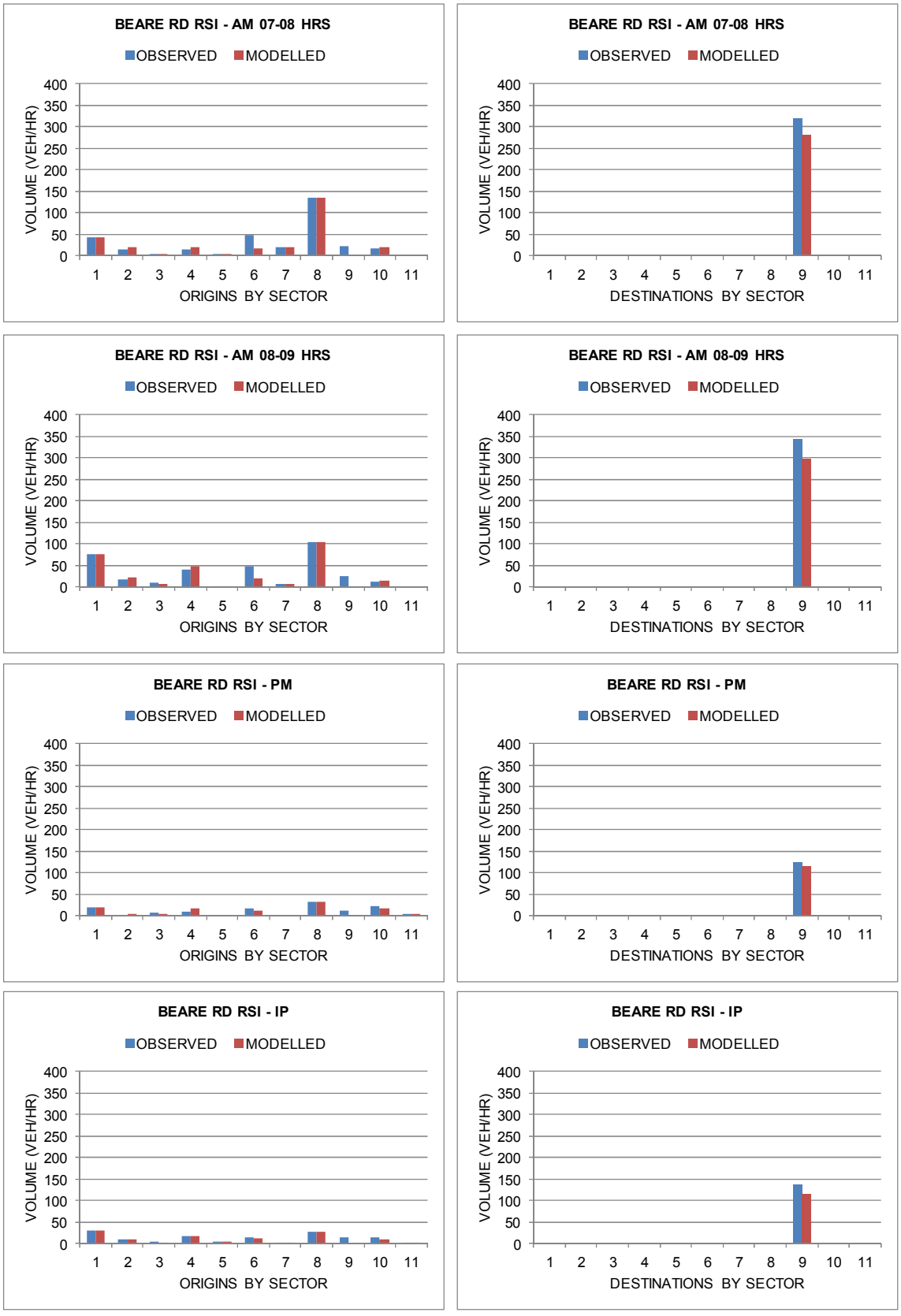
**Table 19: Sector System**

| Sector | Description | Zones |
|---|---|---|
| 1 | Town Centre & South Cullompton | 10-15,19,21,23,27 |
| 2 | North Cullompton | 8,9,25,26,29 |
| 3 | East (of M5) Cullompton | 2,4,16,28 |
| 4 | Willand Area | 7 |
| 5 | Tiverton Area | 24 |
| 6 | East | 1,3 |
| 7 | West | 20,22 |
| 8 | South- West of M5 | 18 |
| 9 | South- East of M5 | 17 |
| 10 | M5 North | 5 |
| 11 | M5 South | 6 |

## Figure 5: Sector Movements at High Street RSI Site



## Figure 6 Sector Movements at Beare Road RSI Sites



## 5.5 Traffic Flow Validation

5.5.1 Comparison of traffic counts and assigned flows for each of the traffic count movements for each model time period,are given in Table 21.

5.5.2 According to DfT's DMRB / WebTAG validation acceptability guidelines modelled and observed traffic volumes should be within certain GEH and flow difference criteria for at least 85% of cases. It can be seen from Table 20 that the requirements were met in all of the modelled time periods.

**Table 20: Traffic Flow Validation Summary**

| Acceptability Criteria | %age of Flows Within Acceptability Criteria | | | |
|---|---|---|---|---|
| | AM 07-08 Peak Hour | AM 08-09 Peak Hour | PM Peak Hour | Inter Peak Hour |
| Individual Flows (<15%, 700-2700 vph) (<100 vph, <700 vph) (<400 vph, >2700 vph) | 98% | 98% | 98% | 98% |
| GEH Statistic (<5) | 100% | 98% | 100% | 100% |

## Table 21: Traffic Flow Validation – Traffic Count Sites

| From | To | Count | | | | Model | | | | GEH | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | AM 07 | AM 08 | PM | IP | AM 07 | AM 08 | PM | IP | AM 07 | AM 08 | PM | IP |
| Fore St | Tiverton Rd | 11 | 17 | 23 | 16 | 11 | 17 | 23 | 16 | 0.0 | 0.0 | 0.1 | 0.0 |
| Fore St | High St | 344 | 439 | 406 | 317 | 338 | 436 | 386 | 311 | 0.3 | 0.1 | 1.0 | 0.3 |
| Tiverton Rd | High St | 188 | 209 | 159 | 125 | 190 | 213 | 157 | 127 | 0.1 | 0.3 | 0.1 | 0.2 |
| Tiverton Rd | Fore St | 15 | 18 | 18 | 14 | 17 | 24 | 24 | 15 | 0.6 | 1.4 | 1.4 | 0.2 |
| High St | Fore St | 237 | 338 | 472 | 310 | 228 | 318 | 470 | 304 | 0.6 | 1.1 | 0.1 | 0.3 |
| High St | Tiverton Rd | 107 | 116 | 228 | 120 | 103 | 108 | 233 | 120 | 0.3 | 0.8 | 0.3 | 0.1 |
| High St | Higher St | 122 | 214 | 234 | 171 | 119 | 211 | 227 | 168 | 0.3 | 0.2 | 0.5 | 0.3 |
| High St | Station Rd | 417 | 460 | 357 | 321 | 414 | 463 | 341 | 320 | 0.1 | 0.2 | 0.8 | 0.0 |
| Higher St | Station Rd | 47 | 77 | 59 | 48 | 46 | 78 | 57 | 47 | 0.2 | 0.1 | 0.3 | 0.3 |
| Higher St | High St | 149 | 231 | 227 | 163 | 141 | 228 | 223 | 160 | 0.6 | 0.2 | 0.2 | 0.2 |
| Station Rd | High St | 202 | 324 | 516 | 334 | 200 | 299 | 527 | 329 | 0.1 | 1.4 | 0.5 | 0.2 |
| Station Rd | Higher St | 19 | 34 | 56 | 40 | 20 | 31 | 58 | 40 | 0.3 | 0.5 | 0.2 | 0.1 |
| Town Centre | M5/A376 | 403 | 422 | 285 | 257 | 407 | 465 | 310 | 269 | 0.2 | 2.0 | 1.4 | 0.8 |
| Town Centre | Tesco | 69 | 101 | 149 | 122 | 67 | 99 | 147 | 124 | 0.2 | 0.2 | 0.2 | 0.2 |
| M5/A376 | Tesco | 113 | 137 | 271 | 175 | 110 | 136 | 276 | 176 | 0.3 | 0.1 | 0.3 | 0.1 |
| M5/A376 | Town Centre | 180 | 309 | 346 | 244 | 206 | 325 | 412 | 248 | 1.9 | 0.9 | 3.4 | 0.3 |
| Tesco | Town Centre | 99 | 103 | 203 | 168 | 97 | 102 | 202 | 170 | 0.2 | 0.1 | 0.1 | 0.2 |
| Tesco | M5/A376 | 128 | 161 | 280 | 187 | 121 | 160 | 280 | 191 | 0.6 | 0.1 | 0.0 | 0.3 |
| Town Centre | Millenium Way | 20 | 48 | 143 | 88 | 20 | 48 | 141 | 86 | 0.0 | 0.0 | 0.2 | 0.2 |
| Town Centre | M5/A376 | 527 | 545 | 438 | 362 | 508 | 577 | 449 | 374 | 0.8 | 1.3 | 0.5 | 0.6 |
| Millenium Way | M5/A376 | 256 | 249 | 120 | 108 | 251 | 267 | 127 | 113 | 0.3 | 1.1 | 0.6 | 0.5 |
| Millenium Way | Town Centre | 52 | 90 | 107 | 82 | 49 | 83 | 106 | 80 | 0.4 | 0.8 | 0.1 | 0.2 |
| M5/A376 | Town Centre | 269 | 394 | 614 | 372 | 267 | 379 | 582 | 344 | 0.1 | 0.8 | 1.3 | 1.5 |
| M5/A376 | Millenium Way | 73 | 87 | 245 | 107 | 71 | 84 | 254 | 107 | 0.3 | 0.3 | 0.5 | 0.0 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Town Centre | Services | 0 | 0 | 0 | 0 | 15 | 4 | 5 | 4 | 0.0 | 0.0 | 0.0 | 0.0 |
| Town Centre | M5 NB On Slip | 166 | 230 | 200 | 132 | 166 | 229 | 171 | 130 | 0.0 | 0.1 | 2.1 | 0.1 |
| Town Centre | Honiton | 583 | 622 | 421 | 356 | 578 | 611 | 400 | 353 | 0.2 | 0.5 | 1.0 | 0.2 |
| Services | M5 NB On Slip | 84 | 110 | 133 | 126 | 84 | 108 | 118 | 126 | 0.1 | 0.2 | 1.3 | 0.0 |
| Services | Honiton | 57 | 73 | 64 | 54 | 55 | 68 | 61 | 51 | 0.3 | 0.6 | 0.4 | 0.5 |
| Services | Town Centre | 14 | 25 | 13 | 27 | 13 | 24 | 11 | 25 | 0.1 | 0.1 | 0.4 | 0.4 |
| Honiton | Town Centre | 208 | 320 | 459 | 284 | 209 | 294 | 448 | 283 | 0.1 | 1.5 | 0.5 | 0.1 |
| Honiton | Services | 0 | 0 | 0 | 55 | 57 | 70 | 76 | 54 | 0.0 | 0.0 | 0.0 | 0.1 |
| Honiton | M5 NB On Slip | 136 | 147 | 125 | 111 | 116 | 120 | 113 | 95 | 1.8 | 2.3 | 1.1 | 1.5 |
| M5 NB Off Slip | Town Centre | 131 | 160 | 381 | 146 | 116 | 144 | 377 | 143 | 1.3 | 1.3 | 0.2 | 0.2 |
| M5 NB Off Slip | Services | 83 | 112 | 116 | 107 | 77 | 98 | 108 | 106 | 0.6 | 1.4 | 0.7 | 0.2 |
| M5 NB Off Slip | M5 NB On Slip | 0 | 1 | 4 | 4 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | 0.0 | 0.0 |
| M5 NB Off Slip | Honiton | 79 | 68 | 97 | 66 | 70 | 55 | 86 | 57 | 1.0 | 1.7 | 1.2 | 1.1 |
| Honiton Rd W | Honiton Rd E | 233 | 360 | 379 | 319 | 225 | 341 | 351 | 307 | 0.5 | 1.1 | 1.5 | 0.7 |
| Honiton Rd W | M5 South | 487 | 402 | 203 | 158 | 478 | 392 | 195 | 154 | 0.4 | 0.5 | 0.6 | 0.3 |
| M5 North | Honiton Rd E | 101 | 83 | 65 | 129 | 95 | 75 | 59 | 117 | 0.6 | 0.9 | 0.6 | 1.1 |
| M5 North | M5 South | 3 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | 0.0 | 0.0 |
| M5 North | Honiton Rd W | 181 | 236 | 296 | 118 | 177 | 207 | 296 | 121 | 0.3 | 2.0 | 0.0 | 0.2 |
| Honiton Rd E | M5 South | 135 | 125 | 87 | 55 | 121 | 112 | 80 | 55 | 1.2 | 1.2 | 0.8 | 0.0 |
| Honiton Rd E | Honiton Rd W | 229 | 297 | 342 | 331 | 204 | 277 | 341 | 311 | 1.7 | 1.2 | 0.0 | 1.1 |
| M5 North | M5 South | 1799 | 2110 | 1867 | 1509 | 1799 | 1985 | 1720 | 1509 | 0.0 | 2.8 | 3.5 | 0.0 |
| M5 South | M5 North | 1416 | 1737 | 2262 | 1663 | 1246 | 1506 | 2140 | 1601 | 4.7 | 5.7 | 2.6 | 1.5 |
| All | All | 10171 | 12342 | 13470 | 10002 | 9903 | 11869 | 13167 | 9843 | 2.7 | 4.3 | 2.6 | 1.6 |
| | GEH<5 | | | | | | | | | 100% | 98% | 100% | 100% |
| | 5<GEH<10 | | | | | | | | | 0% | 2% | 0% | 0% |
| | GEH>10 | | | | | | | | | 0% | 0% | 0% | 0% |
| Acceptability of flow differences | | | | | | | | | | 98% | 98% | 98% | 98% |