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DEVON GATEWAY AT M5 JUNCTION 27  
TRANSPORT ASSESSMENT  
SCOPING REPORT

286897A-HHC

*Final*



# **Devon Gateway at M5 Junction 27 Transport Assessment Scoping Report**

**286897A-HHC**

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**CONTENTS**

|  | <b>Page</b> |
|--|-------------|
| <b>1 Introduction</b>                        | <b>9</b>    |
| 1.1 Purpose of this Report                   | 9           |
| <b>2 Development Details</b>                 | <b>9</b>    |
| 2.1 Site Location                            | 9           |
| <b>3 Transport Assessment Methodology</b>    | <b>10</b>   |
| 3.1 Trip Rates – Generation and Interception | 10          |
| 3.2 Study Area                               | 12          |
| 3.3 Access by Sustainable Modes Assessment   | 12          |
| 3.4 Traffic Impact Analysis Proposal         | 13          |
| 3.5 Trip Distribution                        | 15          |
| 3.6 Sensitivity Tests                        | 18          |
| 3.7 Forecast Years                           | 18          |
| <b>4 Summary and Recommendation</b>          | <b>18</b>   |
| 4.1 Summary of Approach                      | 18          |
| 4.2 Recommendation                           | 19          |

**List of Tables**

|  |    |
|--|----|
| Table 1: Summary of Proposed Development .....             | 10 |
| Table 2: Interception and Diversion of Trips .....         | 12 |
| Table 3: Development Peak Hours .....                      | 13 |
| Table 4: Hour Flow Volume .....                            | 15 |
| Table 5: Trip Distribution Rules.....                      | 16 |
| Table 6: Summary of Trip Distribution and Assignment ..... | 18 |

**List of Figures**

|   |    |
|---|----|
| Figure 1: Traffic by Day of the Week – March 2012 (M5J26-J27) ..... | 14 |
| Figure 2: Friday Traffic Profile – March 2012 (M5J26-J27) .....     | 14 |





**1 INTRODUCTION****1.1 Purpose of this Report**

- 1.1.1 This report sets out the key assumptions associated with the Devon Gateway project at M5 Junction 27 that are relevant to preparing a transport assessment for the development. The report also includes a proposed methodology to undertake the transport assessment and fulfil the requirements of the local and strategic highway authorities.

**2 DEVELOPMENT DETAILS****2.1 Site Location**

- 2.1.1 The site is located immediately adjacent to the M5 Junction 27 interchange. The site lies to the east of the junction on land which is presently mixed use, the majority being agricultural land with a small area of commercial adjacent to the junction itself.
- 2.1.2 The draft schedule of development being proposed is summarised in Table 1 below. This is subject to change but each change will be reported to the highway authorities such that the technical assessment can be adjusted appropriately.

**Table 1: Summary of Proposed Development**

| Designation                         | Primary Users        | Secondary Users      | Size   | Units | Features   |
|-------------------------------------|----------------------|----------------------|--------|-------|--|
| Intermodal traveller services       | Travellers           | Tourists             | 21000  | sq ft | High quality services with parking and refuelling  |
| Regional showcase visitor centre    | Tourists             |                      | 21000  | sq ft | Visitor centre with high definition sound and vision facilities promoting the South West and housing Visit Devon, Visit Cornwall and Visit Britain exhibitions |
| The "Taste of Devon"                | Tourists             |                      | 125000 | sq ft | Permanent food festival site for local produce including cafes and demonstration areas   |
| Devon outdoor leisure destination   | Tourists             |                      | 13     | Ha    | Surf Park, treetop adventure course, mountain bike track, exhibition farm  |
| Hotel                               | Business travellers  | Tourists             | 150    | Rooms |  |
| Conference centre                   | Local businesses     |                      | 500    | Seats | Conference / concert hall  |
| Outdoor activity demonstration area | Tourists             | Residents for retail | 90000  | sq ft | Sports and activity retail and demonstration space (walking, cycling, skate boarding, surfing)   |
| Cinema / IMAX                       | Residents            | Tourists             | 50000  | sq ft | Eight to ten screens   |
| Plant / horticultural centre        | Residents            |                      | 50000  | sq ft |  |
| Designer retail outlet              | Residents            | Tourists             | 200000 | sq ft |  |
| Regional distribution centre        | Residents employment | Business for goods   | 25     | Ha    | Employment   |
| Retirement Village                  | Residents            |                      | 300    | units |  |

2.1.3 As this schedule demonstrates the site is primary focussed at the tourism, retail and leisure sectors but also provides a substantial quantum of land for employment.

### **3 TRANSPORT ASSESSMENT METHODOLOGY**

#### **3.1 Trip Rates – Generation and Interception**

3.1.1 The national trip rate database, TRICS, will be utilised in the first instance to identify whether there are appropriate developments to employ in the transport assessment. The land uses which are included in the database include:

- Motorway / A road services;
- Hotel and conference centre;
- Cinema;
- Garden centre;
- Regional distribution centre; and
- Retirement Village

3.1.2 The other uses are either not explicitly included in TRICS or have few sites observed which may not be directly comparable to this specific development. The land uses within this development site to which these caveats apply include:

- Regional tourist promoting facilities;
- Specialist food retail;
- Outdoor leisure complex including wave garden, aerial treetop adventure, mountain bike trail and adventure playground;
- Farm and rare breeds centre; and
- Outdoor demonstrator and retail area.

3.1.3 For each of these we will seek examples of similar facilities elsewhere in the UK and experience from the types of facilities that are already in place in Devon and Cornwall.

3.1.4 Given the range of uses the transport assessment will include an assessment of trip rates by walking, cycling, bus, rail, car and goods vehicles.

**Observation 1: The approach to developing trip rates will be agreed before the technical assessments commences and will include evidence bases provided by the development team.**

3.1.5 This assessment will determine the overall number of trips that the site will be expected to generate at its threshold. However, not all of the trips will have been generated as a completely new trip to the network. An assessment will be made based on TRICS research of the propensity that each development type has to intercept or divert trips. In this context, *intercept* means a trip that would otherwise pass the site but is now attracted to use the facilities and *divert* means a trip that is already happening for a specific purpose but is now diverting from the usual place to this specific development.

3.1.6 Of the uses on the site it is expected that the pattern of interception and diversion shown in Table 2 below would be expected.

**Table 2: Interception and Diversion of Trips**

|                                     | <b>Interception</b> | <b>Diversion</b> | <b>Generation</b> |
|-------------------------------------|---------------------|------------------|-------------------|
| Traveller facilities                | Yes                 | Yes              | No                |
| Tourist facilities                  | Yes                 | Yes              | No                |
| Retail outlets                      | Yes                 | Yes              | Yes               |
| Employment functions (employees)    | No                  | No               | Yes               |
| Employment functions (non-employee) | No                  | No               | Yes               |
| Retirement Village                  | No                  | No               | Yes               |

**Observation 2: The approach to diversion and interception will be agreed before the assessment work is undertaken.**

### **3.2 Study Area**

3.2.1 Whilst the development has a large footprint and a range of different uses, the study area for the assessment is relatively small. The key transport network access to the site will be from the M5 and A361 for motorised transport and across the M5 on the potential foot / cycle bridge immediately south of the Junction 27 south facing slip roads for walking and cycling – including from Tiverton Parkway.

**Observation 3: The extent of the study area will be agreed before the technical assessments can commence**

### **3.3 Access by Sustainable Modes Assessment**

3.3.1 A potential component of the scheme to support sustainable travel will be the consideration of a bridge spanning the M5 and connecting to footways / cycle ways that will link the site to Tiverton Parkway station. There is presently a bridge crossing the M5 south of the proposed development which allows pedestrians and cycle users to cross the motorway from Tiverton Parkway station and Sampford Peverell. However it does not provide direct access to the development site with indirect connection via the B3181 and a country lane.

3.3.2 The potential structure would cross the M5 immediately adjacent to the south facing slip roads and reduce the distance between the railway station and National Cycle Network route 3. Both of these facilities offer the potential to access the development by modes other than the car.

3.3.3 The phasing and beneficial use of this structure, by those working or choosing to use the development as a leisure / retail destination, will be considered as part of the technical analysis in the transport assessment Other means of connecting the development to Tiverton Parkway will also be assessed.

3.3.4 It is proposed to identify whether there are origins and destinations that are within walking and cycling distance of the development by adopting a walk time and cycle time threshold of 20 minutes. This threshold approximates to 1 mile walking and 4 miles cycling.

3.3.5 The nature of the infrastructure will also be considered, to take into account whether it is safe, direct and well-lit.

### 3.4 Traffic Impact Analysis Proposal

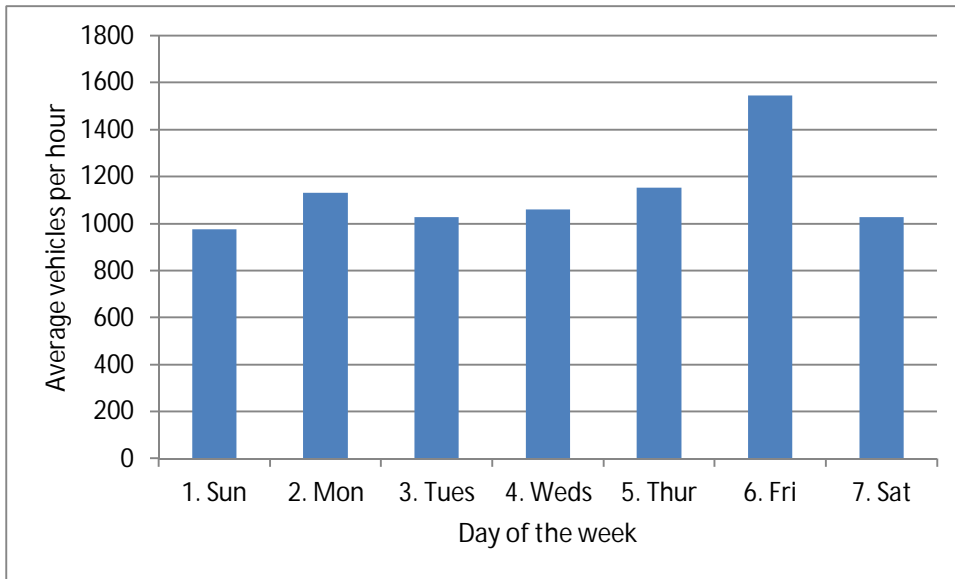
- 3.4.1 It is proposed to test M5 Junction 27 using LINSIG3. The opportunity to use the traffic model developed to support the recent successful Pinch Point Funding bid will be explored as this model uses recent traffic data (March 2012) and provides accurate information on the junction scheme.
- 3.4.2 The junction is the critical connection between the development site and both the local and strategic road networks. At present, the junction has the benefit of an approved Highways Agency Pinch Point scheme, and as such the modelling will be based on the scheme which is being implemented for its base year assessment.
- 3.4.3 The development will have some facilities operating every hour of the day, every day of the year. The peak hours for each type of activity will vary across the site making the identification of the assessment hours more difficult than a traditional mono-culture development. It is expected that the peak hours for the different types of uses will be as shown in Table 3 below:

**Table 3: Development Peak Hours**

|                                     | <b>Morning</b>         | <b>Evening</b>         | <b>Weekend</b>          |
|-------------------------------------|------------------------|------------------------|-------------------------|
| Traveller facilities                | No significant peak    | Friday 18:00 to 19:00  | Saturday 10:00 to 11:00 |
| Tourist facilities                  | No significant peak    | Friday 17:00 to 18:00  | Saturday 10:00 to 11:00 |
| Retail outlets                      | No significant peak    | Friday 17:00 to 18:00  | Sunday 11:00 to 12:00   |
| Employment functions (employees)    | Weekday 07:00 to 08:00 | Weekday 16:00 to 17:00 | No significant peak     |
| Employment functions (non-employee) | Weekday 06:00 to 07:00 | Weekday 15:00 to 16:00 | No significant peak     |

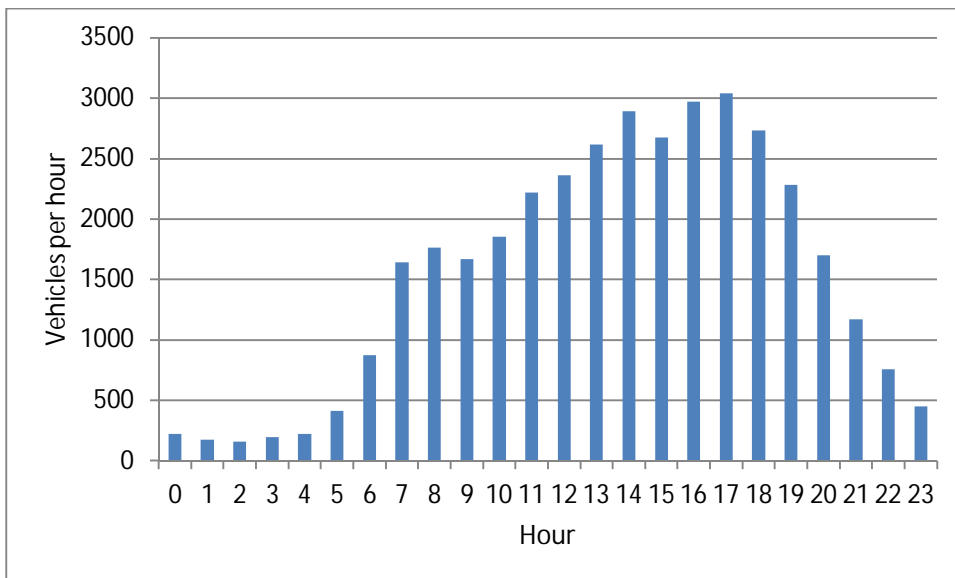
- 3.4.4 These peak hours will be tested, in TRICS and against development specific evidence, and confirmed as appropriate before any technical analysis work is undertaken.
- 3.4.5 The immediate impression from the information in Table 3 is that the Friday evening period from 15:00 to 19:00 and Saturday or Sunday morning between 10:00 and 12:00 will be the most suitable candidate modelled periods.
- 3.4.6 A review of traffic count data collected on the M5 in March 2012 has been undertaken. The initial assessment indicates that Friday is the busiest day of the week. This is shown in Figure 1 below.

Figure 1: Traffic by Day of the Week – March 2012 (M5 J26-J27)



3.4.7 As Friday is the busiest day of the week for traffic, it is proposed that junction capacity testing is undertaken by converting the junction traffic count data (to be supplied by Devon County Council) to the equivalent hour on Friday. This profile is shown in Figure 2 below.

Figure 2: Friday Traffic Profile – March 2012 (M5J26-J27)



3.4.8 The use of the existing model for these periods will be based on appropriate conversion factors between the actual modelled periods and the required model periods. Therefore, if the actual model period for the afternoon is 16:00 to 17:00 on a Thursday in March and the required period is 17:00 to 18:00 on a Friday in March, the conversion factor would be calculated by considering the ratio of flow between the two hours. The applicable values are shown in Table 4 below.

Table 4: Hour Flow Volume

| Month | Day      | Hour Start | Flow |
|-------|----------|------------|------|
| March | Thursday | 16:00      | 2271 |
| March | Friday   | 17:00      | 3040 |

3.4.9 The conversion factor in this instance would be 1.34. This value could either be applied to all the junction turning movements or specifically to those movements that are immediately downstream of the observation point.

**Observation 4: Before the analysis is undertaken, we will agree the methodology for converting between the existing model flows and required model flows.**

### 3.5 Trip Distribution

3.5.1 It is proposed that the trip distribution will be determined one of three methods which will depend on the type of user a facility is aimed at attracting. The users can be split into the following categories, taken from Table 1:

- Tourists – using the motorway and the North Devon Link Road, primarily holiday makers staying at least one night away from home or day trippers;
- Travellers – using the motorway and North Devon Link Road making trips for business or leisure purposes but not tourists (i.e. visiting family or attending events);
- Local businesses – employers which have a local base and would use the facilities on site for meetings, demonstrations and events;
- Residents – the resident population within a reasonable catchment area of the development site that would make trips to and from home within one day;
- Employees – individuals employed on the site primarily in the commercial functions but also for operating the other land uses;
- Businesses – occupiers of the commercial units on the site.

3.5.2 Each of these users will have a different set of 'rules' applied within the trip distribution estimation. These rules are set out below in Table 5:

Table 5: Trip Distribution Rules

|                | Rule for 'to' site trips  | Rule for 'from' site trips        |
|----------------|---|-----------------------------------|
| Tourists       | All from M5 north (as tourists are not expected to stop en route home)                              | Continuation of intercepted trip. |
| Travellers     | Relative to the proportion of traffic using the M5 J26 to J27, M5 J27 to J28 and the A361 two-way.  | Continuation of intercepted trip. |
| Local business | Relative to the proportion of traffic using the M5 J26 to J27, M5 J27 to J28 and the A361 two-way.  | Return via 'to' direction.        |
| Residents      | Relative to the population of main centres controlled by distance from development (gravity model). | Return via 'to' direction.        |
| Employees      | Relative to the population of main centres controlled by distance from development (gravity model). | Return via 'to' direction.        |
| Businesses     | Relative to the national population.  | Return via 'to' direction.        |

3.5.3 Based on the above assumptions a coarse worked example can be provided to explain how trips for travellers would be estimated. This would be examined against development specific evidence as part of the assessment process.

- Step 1: Traffic flows on the three sections of highway
  - M5 J26-J27 28,981 one way (source: HATRIS)
  - M5 J28-J27 28,934 one way (source: HATRIS)
  - A361 west of M5 J27 7,500 one way (guessed)
- Step 2: Proportion of traffic approaching the development
  - M5 J26-J27 45%
  - M5 J28-J27 44%
  - A361 west of M5 J27 11%

3.5.4 Therefore, we conclude that trips 'to' the traveller facilities at the development can be distributed to the on the basis of the approach road. Trips leaving these facilities will be allocated in the reverse proportions to complete their journey.

3.5.5 The distribution of retail trips is more complex, but a typical example could follow these steps. Further evidence, in the form of a Retail Impact Assessment, is being prepared by the development team which would be used as an integral part of the assessment.



- Step 1: Population estimates for catchment area (source: <http://www.nomisweb.co.uk/reports/lmp/la/1946157359/report.aspx>)
  - Taunton Deane 103,000 people
  - Exeter City 119,400 people
  - East Devon 134,400 people
  - Mid-Devon 78,300 people
  - Total catchment population 435,100 people
- Step 2: Distance deterrent (assume distance squared)
  - Taunton 14 miles 196 (dimensionless)
  - Exeter City 18 miles 324 (dimensionless)
  - East Devon 30 miles 900 (dimensionless)
  - Mid-Devon 7 miles 49 (dimensionless)
  - Total deterrent value 1469 (dimensionless)
- Step 3: Deterrence values = population / distance squared
  - Taunton Deane 525.5
  - Exeter City 368.5
  - East Devon 465.1
  - Mid-Devon 1598.0
  - Total deterrence 2957.0
- Step 4: Weighted deterrence values; specific value as a proportion of the total
  - Taunton Deane 18%
  - Exeter City 12%
  - East Devon 16%
  - Mid-Devon 54%

3.5.6 Therefore, we conclude that the majority of visitors to the retail elements of the development will be drawn from Mid Devon, using the A361 as their approach and return routes. The remaining 46% of users are divided with 18% arriving from the M5 north and 28% from the M5 south – the sum of Exeter and East Devon residents.

3.5.7 It is accepted that this is not a precise science, but it does take into consideration the potential for areas with larger populations to generate greater demand whilst tamping this demand down by distance from the retail site. An alternative approach would be to use time as opposed to distance. This would provide the following values:

- Taunton Deane 25 minutes 14%
- Exeter City 23 minutes 19%
- East Devon 31 minutes 12%
- Mid-Devon 11 minutes 54%

3.5.8 The impact of using time rather than distance is the relationship strengthens for Exeter and weakens for Taunton.

3.5.9 Using a similar methodology the distributions for all activities can be estimated as shown in Table 6 below.

**Table 6: Summary of Trip Distribution and Assignment**

|                                     | M5 north | M5 south | A361 |
|-------------------------------------|----------|----------|------|
| Travellers' services functions      | 45%      | 44%      | 11%  |
| Tourist activities                  | 51%      | 49%      | 0%   |
| Retail functions                    | 18%      | 28%      | 54%  |
| Employment functions (employees)    | 19%      | 28%      | 53%  |
| Employment functions (non-employee) | 45%      | 44%      | 11%  |
| Retirement Village                  | 19%      | 28%      | 53%  |

**Observation 5: The trip distribution methodology will be agreed before the technical assessments commence and use development specific evidence where available**

### 3.6 Sensitivity Tests

3.6.1 One period that will be a sensitivity test is the summer Saturday. The M5 Junction 27 lies on the key tourist route from the motorway network to North Devon and is at its busiest on summer Saturdays.

3.6.2 It is proposed to test the development against an agreed traffic volume from a suitable summer Saturday – either based on directly observed traffic data, if available, or factored data if turning counts are not available.

3.6.3 The purpose of this test is to identify the risk of congestion causing unacceptable queues on the motorway slip roads. The test is not primarily intended to identify suitable infrastructure mitigation for such a situation – if it were to materialise – but to give the Highways Agency information about the potential impacts.

**Observation 6: Sensitivity tests will be agreed.**

### 3.7 Forecast Years

3.7.1 It is expected that the development will be substantially complete by 2021. This will become the base year. A test will be undertaken to consider the likely network conditions in 2024, which will be 10 years after the registration of the planning application. Further forecast years, if required will be negotiated with the highway authorities to understand the purpose to which they will put further information to.

**Observation 7: Forecast years will be agreed.**

## 4 SUMMARY AND RECOMMENDATION

### 4.1 Summary of Approach

4.1.1 *Trip generation:* The development includes a combination of uses, some of which are unique to the site and will require individual estimation based on the demand forecasts estimated outside of the transport stream of the project. Uses which are more common can be estimated from TRICS.

- 4.1.2 *Trip interception and diversion:* The development features a number of land uses which are specifically designed to intercept traffic already on the network or divert trips from other locations. Estimates will be made for both of these features, acknowledging that in each case the implication will be different patterns of trips at the assessed junction.
- 4.1.3 *Study area:* The study area will be focussed on the immediate environs of the development site as there are few junctions or transport nodes that will be impacted by travel demand.
- 4.1.4 *Access by sustainable modes assessment:* This assessment will primarily consider the links that the site will require to ensure the development can be accessed by active modes (walk and cycle) as well as considering whether public transport access would be feasible.
- 4.1.5 *Traffic impact analysis:* Traffic impacts will be considered at M5 Junction 27 and for the access junction into the site itself. Analysis will be based on the committed pinch point scheme and test local plan development allocations as the “do minimum” test in comparison to the “do something” of development traffic.
- 4.1.6 *Trip distribution:* This aspect of the assessment is proposed to have a relationship to catchment populations for all purposes, either based on traffic flows, resident populations or development specific evidence.
- 4.1.7 *Sensitivity tests:* A sensitivity test is proposed based on uplifting traffic demand by a ratio of March (when the traffic surveys were undertaken) to August. This uplift will be based on Highways Agency TRADS data.
- 4.1.8 *Forecast years:* The tested years will be those years by which the site starts to be occupied (2017), the year in which the site is substantially complete (2021) and 10 years after the application is registered (2024).
- 4.2 Recommendation**
- 4.2.1 It is recommended that the above proposals are accepted as the basic principles for the transport assessment.