

Technical Note 2
Technical Summary

Project Cullompton Traffic Modelling		Date	August 2009	
Note	Technical Note 2: Technical Summary	/	Ref	HPE98131A/15.1

1 INTRODUCTION

1.1 Introduction

- 1.1.1 Parsons Brinckerhoff (PB) was commissioned by Devon County Council (DCC) to undertake a study of the transportation impact of proposed development in Cullompton to 2026 as outlined in the Mid Devon District Council publication 'Preferred Options Document', dated November 2008.
- 1.1.2 The purpose of this Technical Note is to consider the scale of development proposed in Cullompton by 2026 and to establish what impact this development is likely to have in transportation terms on the town and it's highway network. This technical note therefore summarises these development impacts and the effect of the proposed highway improvements in Cullompton. In doing so it also sets out the evidence in respect of delivery and phasing and provides a more detailed assessment of their viability and robustness.

1.2 Policy

- 1.2.1 Devon County Council responded to Mid Devon Council in regard to their District Allocations and Infrastructure Development Plan Document (DPD) in January 2009. Their comments relating to Cullompton were as follows:
 - Level of Development Both the lower (1,600 Dwellings) and higher levels of development (1,900 Dwellings) appear acceptable. The Plans should however make provision for the recommended allocation set out in the adopted Mid Devon Core Strategy i.e. 1,900 dwellings including 325 already built and with planning permission.
 - Eastern Relief Road The Plan should make provision for the delivery of the Eastern Relief Road (Meadow Lane to Station Road) as an essential requirement for Cullompton for both the lower and higher growth LDF strategy options.
 - Western Relief Road Devon County Council's view is that without the
 Eastern Relief Road the proposed Western Relief Road would not meet the
 transportation strategy objectives for the town. The Western Relief Road
 should primarily serve 'local' traffic, complimenting the construction of the
 Eastern Relief Road. The alignment of the route (which should be assumed
 to become a bus route) should allow optimum access to bus stops for the
 surrounding development by walking. The linking of phase 1 and 2 of the
 Western Relief Road should be via site CU3 (local plan site).
 - M5 Junction 28 and associate roads The junction and associated roads will need to be upgraded to accommodate existing and new development. Devon County Council is currently investigating the potential options with the Highways Agency.
 - **New infrastructure** New infrastructure is required to serve the new development in Cullompton: including a new primary school, town centre

06/08/2009 Page 1 of 19



Technical Note 2
Technical Summary

enhancement, a new library this will also involve safeguarding the rail station site.

2 EXISTING CONDITIONS

2.1 Town Centre

- 2.1.1 The following section outlines the existing conditions within the study area (see Figure 1).
- 2.1.2 During the morning and evening peak periods, Cullompton town centre currently experiences congestion within the local transport network. Due to its strategic location 15 miles north of Exeter and 19 miles south-west of Taunton, the M5, accessed via Junction 28, is a major route for commuters from Cullompton to these major employment centres.
- 2.1.3 The Special Workplace Statistics (SWS) (2001 National census data) indicate that approximately two thirds of all work related car trips originating from within Cullompton are commuter trips out of the town, and of these, approximately 75% use Junction 28. The B3181 provides an alternate route from Cullompton to Exeter which avoids the motorway.
- 2.1.4 Access between the south and north of Cullompton is only achievable via the Tiverton Road / Fore Street Junction. This junction is constrained and is often congested in the peak hour on all approaches to the junction creating a bottleneck which consequently causes further congestion and delay on other local roads.
- 2.1.5 An area of the town centre comprising the B3181, Station Road and a section of Tiverton Road has been identified as an Air Quality Management Area (AQMA) within the Mid Devon District Council's Preferred Options DPD. The most effective solutions to the air quality problem would be to significantly reduce traffic volumes passing through the town centre and/or improve average vehicle speeds by relieving congestion. A reduction in large vehicles travelling through the centre through the provision of alternative routes would also be beneficial.

2.2 Millennium Way

- 2.2.1 The recently opened Millennium Way forms an important link road for through traffic between the northern end of Willand Road to Station Road east of the Tesco entrance. The road also serves the new residential areas at Court Farm and North of Head Weir Road.
- 2.2.2 Millennium Way was provided to give environmental, transport and economic benefits to Cullompton. The scheme has reduced traffic problems at the Station Road / High Street / Higher Street junction, which previously experienced significant congestion issues especially during the evening peak period.

2.3 M5 Junction 28

2.3.1 The SATURN model identifies the existing congestion problems at M5 Junction 28 during the AM peak, particularly at the western 6-arm roundabout of the Junction which causes significant queuing along Station Road towards the M5. In planning for future development in the town an important objective is to ensure that the additional pressures on Junction 28, do not have an adverse affect on the operational effectiveness of the M5. In the PM peak, queues can currently develop on the northbound off-slip at Junction 28, and in the absence of improvements to the road layout, the SATURN model shows that an increase in traffic would

06/08/2009 Page 2 of 19





exacerbate this problem and potentially result in additional traffic queuing on the northbound M5 slip road which would be unacceptable to the Highways Agency and Devon County Council.

3 DEVELOPMENT PROPOSALS AND INFRASTRUCTURE REQUIREMENTS

3.1 Introduction

3.1.1 The Mid Devon Local Development Framework (LDF) Preferred Options Document was published in November 2008. The document outlines the Strategic development proposals for Cullompton between 2006 and 2026, identifying a in 'Lower Growth Option' and 'Higher Growth Option'. The development areas are illustrated in Figure 2.

3.2 Strategic Requirements 2006-2026

- 3.2.1 The Core Strategy requires (but can allow 10% flexibility on all figures) Cullompton to provide;
 - 105 dwellings per year, totalling 2,100.
 - 4,475 square metres of employment floorspace per year, totalling 89,500 square metres.
 - Improved air quality by promoting walking and cycling and removing traffic from the town centre by provision of relief roads.
 - Town centre economic and environmental enhancements.
 - Improvements to the motorway junction and public transport.
- 3.2.2 Of the 2,100 dwellings required overall, 315 have already been built or granted planning permission. Similarly of the 89,500 sqm of employment floorspace required, 35,000 sqm has already been built or has planning permission.
- 3.2.3 Each of the main development areas are detailed below. Studies undertaken on behalf of the County Council have identified a number highway improvements that would be required to allow for the new developments to come forward in a sustainable manner, and these points are highlighted below.

Main development proposals assessed

3.3 North West Cullompton

3.3.1 The proposed development in northwest Cullompton consists of 1,100 dwellings; 45,000 sqm office/light industry floor space; a primary school; other local facilities and significant areas of public open space. This development will need to provide Phase 2 of the Western Relief Road. To the south, the development accesses the network from Tiverton Road and would form a junction with Phase 1 of the Western Relief Road (see paragraph 3.8.1 for further details). The northern end would form a junction with Willand Road and Millennium Way.

3.4 Knowle Lane

3.4.1 The Knowle Lane site to the west of Cullompton will accommodate approximately 620 dwellings (Higher Growth Option). The development could provide an early

06/08/2009 Page 3 of 19





Technical Note 2
Technical Summary

phase of housing development and would deliver Phase 1 of the Western Relief Road. The Cullompton Preferred Options Document advises a limit of approximately 300 dwellings will need to be maintained until the Western Relief Road, Phase 2 is completed.

3.5 Court Farm

3.5.1 This is a site of 34,000sqm and allocated for approximately 150 dwellings, between the new housing at Court Farm and Willand Road. It includes the remainder of Local Plan site CU1 and provides additional housing close to the town centre. This site is adjacent to and served by the recently opened Millennium Way.

3.6 Padbrook

3.6.1 This site will accommodate approximately 30 dwellings. This site could provide housing early in the plan period on a previously developed site, close to a number of local facilities.

3.7 King's Mill Road

3.7.1 This site, already allocated in the Local Plan but excluded from the Lower Growth Option, would provide 15,000 sq.m. of employment floorspace. Whilst not ideally located in terms of delivering sustainable transport links and being remote from the main residential areas of the town, this site does provide scope for the early delivery of employment investment.

Transport Infrastructure Proposals

3.8 Western Relief Road/Western Access Route

3.8.1 The proposed Western Relief Road is located to the north west of Cullompton and forms a central spine through the North West urban extension and the Knowle Lane development site. The preferred options report states that the Western Relief Road would be funded by these developments.

The Western Relief Road is proposed to be brought forward in two phases:

- Phase 1 (Swallow Way to Tiverton Road) which is contained within the Knowle Lane Development.
- Phase 2 (Willand Road to Tiverton Road) This phase is scheduled to be completed by 2018 alongside the delivery of the North West Cullompton Development
- 3.8.2 Phase 1 has been granted planning permission and will extend the existing Swallow Way. As a result Phase 1 will link Exeter Road with Knowle Lane through a large area of residential developments.

3.9 Eastern Relief Road

3.9.1 The Eastern Relief Road is proposed to be located to the south east of Cullompton - connecting Millennium Way to the Meadow Lane Junction with Duke Street. The SATURN model shows that the Eastern Relief Road will create a substantial reduction in town centre traffic which would directly address the air quality issues

06/08/2009 Page 4 of 19





Technical Note 2
Technical Summary

in the town centre AQMA, provide scope for town centre environmental enhancement and reduce the risk of congestion / delay.

- 3.9.2 The exact route of the Eastern Relief Road is yet to be finalised but will aim to cause minimum impact to the Cullompton Community Association fields. The Eastern Relief Road would pass through a flood plain and therefore careful consideration will need to be taken in finalising the route and gaining the acceptance of the Environment Agency. A flood risk assessment is currently being undertaken in consultation with the Environment Agency.
- 3.9.3 Two preliminary schemes for the Eastern Relief Road were identified and are detailed below:
 - Preliminary Scheme A (see Figure 3) shows the proposed alignment avoiding the football ground and playing fields and is estimated at £10.7m in Quarter 1 2009. This sum includes for contingencies and risk factors for uncertainties.
 - **Preliminary Scheme B** (see Figure 4) shows a proposed alignment closer to the railway line. The estimated works cost for this option is £10.5m in Quarter 1 2009 and includes for contingencies and risk factors for uncertainties.

3.10 M5 Junction 28

- 3.10.1 Studies have indicated that development at Cullompton could be accommodated on the scale proposed subject to the improvement of M5 Junction 28 including the conversion of the junction at the top of the southbound and northbound slip roads to a signalised crossroads.
- 3.10.2 The bridge over the M5 would also need to be increased from 1 lane in each direction plus a right turn lane for the southbound on slip to 2 lanes in each direction. In addition a new footbridge would need to be constructed over the railway line to the north of the existing railway bridge.
- 3.10.3 The detailed delivery of the M5 Junction 28 improvement scheme will require further consideration of the following issues:
 - The improvement provides an additional lane on the bridge over the M5. Whilst this lane can be accommodated by the existing bridge width, a structural assessment will need to be undertaken to establish any measures required to ensure that additional loading closer to the edge of the bridge can be accommodated.
 - Land ownership issues may be identified once the detailed scheme design is finalised identifying any impact on adjacent land owners.
 - Negotiations with Network Rail will be required regarding the bridge on Station Road, as the flare length would need to be extended over the existing bridge. Detailed structural investigation will be required to determine what (if any) structural improvements are required to allow the flare over the bridge. As part of the improvement scheme, a new cycle / pedestrian bridge will be required over the railway adjacent to the existing bridge.
 - · Cost estimates and potential for external public funding support

06/08/2009 Page 5 of 19



- Funding agreements and delivery mechanism. This will be negotiated with Network Rail and the Highways Agency.
- 3.10.4 The scheme proposal for M5 Junction 28 is displayed in Figure 5. This design has been estimated at a cost of approximately £9m.

3.11 Town Centre Air Quality and the role of Fore Street

3.11.1 The Mid Devon Preferred Options report proposes two potential relief roads for Cullompton - a Western Relief Road and an Eastern Relief road. The provision of these routes is intended to accommodate the scale of new development proposed in the town while removing traffic from the town centre, enabling town centre environmental enhancement and addressing the air quality issues.

TECHNICAL ASSESSMENTS: THE BASE YEAR SATURN MODEL

3.12 Base Network

3.12.1 The network assumed for the Base Year SATURN model included all the major routes within the study area, as well as other key routes leading into and out of Cullompton. The M5 is located to the east of the study area. All existing areas of significant housing and employment development in Cullompton are also included, see Figure 1.

3.13 Data Collection

- 3.13.1 Manual Classified Counts (MCC) were undertaken at the major junctions in the study area between the hours of 07:00 to 19:00. The locations and dates of the counts are detailed Table 1 below.
- 3.13.2 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 hour (08:00-09:00) conditions, the period during which travel demand in the town is at its greatest.

Survey Site	Date of Survey
Honiton Road / Kings Mill Road	
Honiton Road / M5	10/07/07
Station Road / M5	
Tiverton Road / Fore Street	11/07/07
Tiverton Road/ Langlands Road	11/07/07
Exeter Road / Swallow Way	
Fore Street / Duke Street	12/07/07
Station Road / Willand Road	

Table 1: Manual Classified Counts (Locations and Dates)

3.14 Matrix Estimation

- 3.14.1 The traffic counts were used to develop a trip matrix for the AM peak period. This was calculated using the Matrix Estimation. This updated the pattern of trips between zones in the model in such a way that they match, as best possible, the observed data.
- 3.14.2 In several locations it was possible to place constraints on the number of the trip ends. This process was used to ensure that the base model did not assume that

06/08/2009 Page 6 of 19



zones with low levels of housing or employment generate significant amounts of traffic. All outputs were reviewed for logic and consistency.

3.15 Model Validation

3.15.1 The models converged satisfactorily and were validated against traffic counts. The validation outputs from SATURN are given in Table 2. It should be noted that DMRB Volume 12 states that for all 4 of the tests set out below, at least 85% of links should meet the specified criteria. As can be seen below, the model validates to a level in excess of the recommended 85% pass rate. This suggests that the model is fit-for-purpose.

Test	% of Links meeting DMRB Criteria	DMRB Criteria
Flow < 700: Modelled within +/-100 of observed count	98.5%	85%
Flow between 700 and 2700: Modelled within 15% of observed count	100.0%	85%
Compliance summed over all flow ranges	98.6%	85%
All links - GEH Statistic < 5	91.4%	85%

Table 2: Model Validation against Traffic Counts (Flows in pcus/hr)

3.15.2 The SWS data provided an approximate distribution for car trips travelling into and out of Cullompton. Table 3 below compares trips entering and leaving Cullompton within the model to that demonstrated from the Census. The model has been developed on a link basis and not validated against SWS data. However it is considered to be fit for purpose.

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

Table 3: Model Validation against Census Journey to Work

3.15.3 It should be noted that this traffic model has been built specifically to inform Devon County Council on the impacts of developments detailed within the LDF. As a

06/08/2009 Page 7 of 19



Technical Note 2
Technical Summary

result the model is not WebTAG compliant, however it is considered to be fit for purpose to inform decision making at this point in the LDF process.

06/08/2009 Page 8 of 19





4 TECHNICAL ASSESSMENT: FUTURE YEAR MODEL

4.1 Horizon Year - 2026

4.1.1 A future model was developed to establish potential traffic conditions in Cullompton in 2026, at which time all of the development proposed in the LDF Core Strategy is assumed to have been delivered. The future scenario only considers the impacts of development within the study area and the potential growth in through-traffic.

4.2 Future Network

- 4.2.1 Millennium Way, which links Willand Road with Station Road has been completed and was therefore included in the model. It was assumed that the speed limit on Millennium Way was 30mph.
- 4.2.2 The two new roundabouts were assumed to be constructed on Station Road, one situated at the junction with Millennium Way and the other at the access to the new Tesco superstore. The layout of the roundabouts was based on junction plans obtained from Devon County Council.
- 4.2.3 Three model scenarios were tested to determine the implications of various infrastructure improvements for the Higher Growth Option.
 - Do Minimum Full Development with no new transport infrastructure.
 - Option 1 Full Development with the Western Relief Road and Improvements to M5 Junction 28.
 - Option 2 Full Development with the Western Relief Road, the Eastern Relief Road and Improvements to M5 Junction 28.

4.3 Future Matrix

- 4.3.1 The future development incorporated within the model was based on the LDF Core Strategy for Mid Devon to 2026. This represents a total of 2100 dwellings (315 already consented) and 89,500 sqm employment floorspace (35,000 sqm already consented).
- 4.3.2 Trips associated with new developments have been estimated from surveys in the TRICS database. Where available, sites from the Southwest of England were selected. Where such data was not available, edge of town or neighbourhood centres in rural England were chosen instead. In order to get a realistic picture of future trips, average trip rates were applied. Average trip rates are aimed towards more sustainable developments and therefore include a degree of trip reduction due to mode shift. In addition, given that AM peak trips in Cullompton appear to be evenly distributed over the period from 07:00-09:00, it was considered appropriate to adopt average TRICS trip rates for the 07:00-09:00 period. The trip rates generated by this methodology are detailed in Table 4.

06/08/2009 Page 9 of 19



		AVEF	RAGE TRIP	RATE
LAND USE TYPE	TRICS SITES SELECTED	ARRIVE	DEPART	TRIP RATE PER
Residential	Sites in South West England	0.16	0.52	Dwelling
Offices	Sites in Edge of Town Locations	1.74	0.23	100 sq m GFA
Industrial Units	Sites in Edge of Town Locations	0.34	0.07	100 sq m GFA
Warehousing	Sites in South West England	0.16	0.11	100 sq m GFA
Primary School	Sites in Edge of Town / Neighbourhood Centre Locations	0.29	0.25	Pupil
Local Shops	Sites in Edge of Town / Neighbourhood Centre Locations	4.08	3.36	100 sq m GFA
Supermarket	Sites in South West England	2.46	1.59	100 sq m GFA

Table 4: Land Use Trip Rates Used in Forecasting Assessment

4.3.3 The following assumptions were made with regard to the split of employment uses likely to come forward in Cullompton, see Table 5.

	B1	B2	B8
NE Industrial Area – Consented	-	20000 sq m	30000 sq m
NE Industrial Area – Proposed	-	10000 sq m	10000 sq m
Town Centre	5000 sq m	15000 sq m	-

Table 5: Employment Site Usage

- 4.3.4 It was assumed that trips to and from each development would be distributed similarly to existing trips from the local area. Therefore the existing matrix was updated to match the predicted future number of trips using average trip rates to and from each zone.
- 4.3.5 TEMPRO was used to provide background growth factors from 2007 to 2026 which was 1.167. TEMPRO has then been adjusted to account for the known development areas and applied to the local road network. The National Transport Model (NTM) has been used to growth the Motorway. Following this, the developments were assigned to zones within the model and development trips were added to existing trips associated with the relevant zones.

06/08/2009 Page 10 of 19



5 MODELLING RESULTS

5.1 Introduction

- 5.1.1 In order to determine the impact of the proposed new developments and the proposed highway infrastructure outlined in chapter 3, a "Do Minimum" option and two "Do Something" scenarios have been developed, as defined below.
 - Do Minimum Full Development with no new transport infrastructure.
 - Option 1 Full Development with the Western Relief Road and Improvements to M5 Junction 28.
 - Option 2 Full Development with the Western Relief Road, the Eastern Relief Road and Improvements to M5 Junction 28.
- 5.1.2 Options 1 and 2 were compared to the Do Minimum option in flow terms in order to determine the implications of each scheme proposal on the surrounding network.
- 5.1.3 It should be noted that during the initial stages of this technical assessment it was clearly evident that the Western Relief Road would be required in order to accommodate the proposed development to the north west of Cullompton. However to ensure that the level of impact is fully understood the Do Minimum option, excluding this scheme, has been assessed. It was also assumed that there was no restriction on traffic along Fore Street.

5.2 Data Examined

- 5.2.1 In order to determine the implications of each option, consideration was given to the following traffic information for each option:
 - Traffic flow information along screenlines within Cullompton
 - Overall network travel time, distance and speed
 - Economic Performance

5.3 Screenlines

- 5.3.1 To evaluate the information extracted from the traffic model, three screenlines were developed to indicate the impact of each option on the surrounding network. The screenline locations have been provided in Figure 6.
 - Screenline 1 provides link information on the Western Relief Road Phase 2, Willand Road and Millennium Way
 - Screenline 2 –. provides link information on the Western Relief Road Phase 1, Longlands Road, Shortlands Road, Fore Street and the Eastern Relief Road.
 - Screenline 3 provides link information on Swallow Way, Orchard Way, Exeter Hill and Meadow Lane.

06/08/2009 Page 11 of 19



TECHNICAL ASSESSMENT: ANALYSIS OF SCREENLINE DATA

Screenline 1

5.3.2 The 2-way traffic flows for Screenline 1 are shown in Table 6 for 2026.

	Option					
Link	Do M	1inimum	Option 1		Option 2	
Description	NB	SB	NB	SB	NB	SB
Western Relief						
Road	-	-	600	200	200	150
Willand Road	550	400	50	350	150	300
Millennium						
Way	250	700	250	650	300	500
Total	800	1100	900	1200	650	950
Two Way Total	1900		2100		1600	

Table 6: Screenline 1 Demand Flows pcu/hr (rounded to the nearest 50 pcu/hr)

- 5.3.3 Table 6 shows that the introduction of the Western Relief Road (in Option 1) attracts 800 pcu/hr (2way) and reduces the flows on Willand road by two thirds, from 950 to 400 vehicles 2-way. The flows on Millennium Way remain virtually unchanged. In this option the flows assigned to the Western Relief Road represent a significant volume of traffic and this would have significant implications for the design standard of that road.
- 5.3.4 In Option 2, the introduction of the Eastern Relief Road reduces flows on the Western Relief Road by 60% as traffic in Option 1 previously travelled around the north of Cullompton to avoid congestion in the town centre would now use the Eastern Relief Road. The residual traffic on the Western Relief Road can therefore be attributed to the local impact of the development proposed in northern Cullompton.
- 5.3.5 The total volume of trips across the screenlines vary due to traffic reassigning in the different options in order to avoid congestion in the town centre. In Option 1 traffic accesses Junction 28 by travelling northbound along the Western Relief Road onto Millennium Way, this results in trips crossing the screenline on two occasions. Whereas traffic in Option 2 uses the Eastern Relief Road to access Junction 28 and therefore does not need to use the Western Relief Road.

Screenline 2

5.3.6 Table 7 shows the traffic volumes for screenline 2.

06/08/2009 Page 12 of 19

	Option					
Link	Do Mir	nimum	Opti	on 1	Option 2	
Description	NB	SB	NB	SB	NB	SB
Western Relief Road Phase 1	200	150	350	350	300	350
Langlands Road	100	50	550	450	400	350
Shortlands Road	0	100	100	50	50	50
Fore Street	1150	1350	350	750	150	400
Eastern Relief Road					450	400
Total	1450	1650	1350	1600	1350	1550
Two Way Total	31	00	29	50	29	00

Table 7: Screenline 2 Demand Flows pcu/hr(rounded to the nearest 50 pcu/hr)

- 5.3.7 Table 7 shows that in the Do Minimum scenario demand flows on Fore Street are 2600 pcu/hr (2way) which is likely to be in excess of the existing highway capacity. The lack of alternative routes at this point would therefore result in extensive queuing, congestion and delay.
- 5.3.8 The introduction of the Western Relief Road in Option 1 as an alternative route within Cullompton potentially reduces demand on Fore Street by 60% to 1000 pcu/hr (2way) assuming that the relief road is designed at a standard that can accommodate the flows indicated. Flows to the west of Cullompton increase on the Western Relief Road to 700 pcu/hr (2way) and Langlands Road to 1000 pcu/hr (2way) as traffic reassigns. These are significant flows passing through residential areas, and in the case of Langlands Road represents an increase of some 600% as compared to the "Do Minimum" scenario.
- 5.3.9 In Option 2 the Eastern Relief Road attracts 900 pcu/hr which, as compared to Option 1, further reduces the demand on Fore Street to 550 pcu/hr and on the Western Relief Road and Langlands road reducing the flow to 650 and 750 pcu/hr respectively. Traffic flows on Fore Street in this option are therefore some 80% lower than in the "Do Minimum" scenario.
- 5.3.10 In the Do Minimum option traffic from the west of the town would have to access the north of Cullompton by travelling southbound on Langlands Road, along Orchard Way and through the town centre. However by relieving congestion at the Tiverton Road junction and by providing alternative routes to access the north of Cullompton (in Options 1 and 2) traffic from the south of the town is now travelling northbound along Langlands Road. This explains the large increase in flows compared to the Do Minimum option on Langlands Road.
- 5.3.11 While Option 1 reduces traffic in the town centre when compared to the Do Minimum option, Option 2 effectively halves the volume of town centre traffic from the levels indicated for Option 1. This further reduction in traffic would therefore not only directly assist in improving air quality conditions in the town centre but also provides greater scope for town centre enhancement and for the creation of a safer environment for vulnerable road users. Option 2 also results in lower traffic flows on Langlands Road as compared to Option 1 (25% lower) and avoids inappropriate levels of traffic travelling through residential areas.

Screenline 3

06/08/2009 Page 13 of 19



5.3.12	Table 9 chows	the traffic volumes	for corponling 2
0.5.TZ	Table o Shows	the traffic volumes	TOT SCIENTIFIE 3

	Option					
Link	Do Mi	nimum	Opti	on 1	Ор	tion 2
Description	NB	SB	NB	SB	NB	SB
Swallow Way	300	350	500	500	350	450
Orchard Way	150	250	100	250	0	200
Exeter Hill	900	1350	300	600	150	350
Meadow Lane	250	150	100	200	400	450
Total	1600	2100	1000	1550	900	1450
Two Way Total	37	00	25	50	2	350

Table 8: Screenline 3 Demand Flows pcu/hr (rounded to the nearest 50 pcu/hr)

- 5.3.13 Table 8 shows that in the Do Minimum scenario demands on Exeter Hill heading towards the town centre are 2200 pcu/hr. This is being fed by Swallow Way and Orchard Way where traffic from the west of Cullompton is travelling around the south of the town to avoid delays at the Tiverton Road/Fore Street junction.
- 5.3.14 In Option 1 the introduction of the Western Relief Road reduces demand on Exeter Hill by 60% with flows reduced to 900 pcu/hr. However flows on Swallow Way increase by more than 50% to 1000 pcu/hr. The 1000 pcu/hr also includes traffic travelling along the Western Relief Road and Millennium Way to avoid residual congestion.
- 5.3.15 In Option 2 the Eastern Relief Road attracts 800 pcu/hr which, in comparison to Option 1, reduces the flows on Exeter Hill by 55% and reduces the flows on Swallow Way by 20%. Flows along Meadow Lane are necessarily higher in Option 2 as a result of the need to access the Eastern Relief Road.
- 5.3.16 Screenline 3 overall flow totals vary significantly between the Do Minimum and Options 1 and 2. In the Do Minimum scenario traffic is travelling south along Swallow Way and Orchard Way then north on Exeter Hill to access the North of Cullompton therefore trips are crossing the screenline twice. Whereas in Options 1 and 2 traffic to the south can now use either relief road to access the north of Cullompton and therefore fewer trips cross the screenline twice in these options.

TECHNICAL ASSESSMENT: OVERALL TRAVEL TIME, DISTANCE AND SPEED

5.3.17 Table 9 below demonstrates changes in travel time and distance in the overall network between the Do Minimum and the two Options tested within this study. It should be noted that this is net of the M5 to remove any bias caused by the large number of vehicles on the M5. This therefore provides travel information within the Cullompton area only.

	Do	Option	Option
SATURN Summary Results	Minimum	1	2
Total Travel Time (pcu-hr/hr)	3000	2000	1900
Travel Distance (pcu-km/hr)	61800	62300	61600
Overall Average Speed (km/hr)	20	30	33

Table 9: Overall Network Travel Time, Distance and Speed

5.3.18 As compared to the Do Minimum scenario, Option 1 improves the travel time within Cullompton by approximately 33% whereas Option 2 increases the overall

06/08/2009 Page 14 of 19

travel times further to provide a 37% improvement in travel times within Cullompton. This also shows that while a similar distance is travelled in Options 1 and 2 there is a 3 km/hr increase in average speed in Option 2.

- 5.3.19 Option 1 indicates that there will be an increase in travel distance compared to the Do Minimum scenario. This is due to trips using the Western Relief Road to access the North of Cullompton which is a longer route that if they were to use the Fore Street of the Eastern Relief Road.
- 5.3.20 Option 1 also improves the travel speeds within the network compared to the Do Minimum scenario by approximately a third. However Option 2 provided further benefit to the operation of Cullompton's transport network by increasing the average speed from 30 km/hr to 33km/hr.

6 ECONOMIC ASSESSMENT

6.1 Methodology

- 6.1.1 The delivery of the Western Relief Road is essential to ensure access to the new development to the north of Cullompton and therefore will come forward naturally through developer contributions. However the Eastern Relief Road is proposed in order to relieve existing congestion and air quality problems within the Cullompton town and thus enhance economic and retail vitality in the town as the ERR is not required to access new development careful consideration in needed to ensure that is economically viable.
- 6.1.2 Therefore the economic assessment has assumed that the Western Relief Road will necessarily come forward alongside the development areas and as such, Option 1 has been used as the base line in order to assess the economic benefit of the Eastern Relief Road Option 2.
- 6.1.3 It should be noted that no assessment of accidents has been undertaken when reviewing the economic benefits of the scheme.
- 6.1.4 Extracting the volume of trips, average journey times and average trip length from the traffic models, the following economic benefits were calculated from TUBA. This is not a full assessment of benefits accrued over the whole assessment period, as the annual benefits have only been calculated for the AM peak hour. A further more detailed assessment will be required as the scheme develops. However, it does provide an indication of the likely economic benefits of the scheme.

6.2 Results

Travel Time	
Consumers User Benefits:	£10.8m
Business User Benefits:	£13.1m
Vehicle operating costs	
Consumers User Benefits:	£1.1m
Business User Benefits:	£0.6m
Carbon Benefits	
Carbon Emissions	£0.9m
PVB	£26.5m

Table 10: Present Value of Benefits (PVB, 2002 prices)

06/08/2009 Page 15 of 19



Technical Note 2
Technical Summary

Local Government Funding:	
Investment costs	£7.7m
Central Government Funding:	
Indirect Tax Revenues	£0.7m
PVC	£8.4m

Table 11: Present Value of Costs (PVC, 2002 prices)

Present Value of Benefits (PVB)	£26.5m
Present Value of Costs (PVC)	£8.4m
Net Present Value (NPV)	£18.1m
Benefit to Cost Ratio (BCR)	3.1

Table 12: Analysis of Monetised Costs and Benefits(2002 prices)

- 6.2.1 In terms of benefits the scheme offers a Present Value of Benefit (PVB) of £26.5m. In addition the Present Value of Cost (PVC) is £8.4 which in turn results in a positive Benefit to Cost Ratio for the Eastern Relief Road of approximately 3.1.
- 6.2.2 It also indicates that the Eastern Relief Road would provide a carbon benefit of £0.9m which equates to a decrease of 2.8m tonnes of carbon over 60 years.
- 6.2.3 This indicates that the Eastern Relief Road scheme realises positive economic benefits and is therefore likely to be justifiable in terms of economic efficiency.

06/08/2009 Page 16 of 19





7 CONCLUSIONS

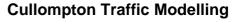
7.1 Do Minimum

- 7.1.1 In the Do Minimum scenario, Fore Street traffic travelling in the northbound direction exceeds the capacity of the road. This is due to the High Street being the only link from the town centre and south Cullompton to M5 Junction 28 and north Cullompton. Therefore the junction with Fore Street and Tiverton Road forms a bottleneck which can only allow 60% of the desired traffic through the junction. In the southbound direction, traffic flows are lower and therefore congestion levels are less.
- 7.1.2 As a result of the high volumes of traffic within the town centre, this congestion causes an adverse impact on the surrounding road network, in particular for northbound traffic on Exeter Hill, Exeter Road and Cockpit Lane south of the town centre. It also impacts on southbound traffic on Higher Street, and Willand Road and westbound traffic on Station Road to the north of the Town Centre.
- 7.1.3 Of the main development areas the largest single site is the northwest Cullompton site containing 1,100 dwellings and 45,000sqm of employment. In the Do Minimum scenario the development accesses the network via Willand Road. Due to queuing on Willand Road as a result of the congestion in the town centre a large proportion of this traffic is unable to access the network.

7.2 Option 1 - Western Relief Road

- 7.2.1 The findings indicate that the inclusion of the Western Relief Road results in vehicles that previously used the town centre route to access the northern end of Cullompton from the south reroute via the Western Relief Road. Due to congestion along Fore Street, vehicles would opt to use the Western Relief Road as this route is less congested and is a faster route to take. It should be noted that vehicles are then travelling a significantly longer distance to reach their destination. As a result there is a reduction in vehicles travelling along Fore Street in the northbound direction. The extra distance travelled also increases the carbon impact of transport, this would be against national policy aims towards a reduction in carbon emissions from transport.
- 7.2.2 Overall, with the Western Relief Road, traffic levels along Fore Street are reduced and a decrease would be seen in congestion levels within the town centre. The inclusion of the Western Relief Road does reduce overall congestion levels within Cullompton in comparison to the Do Minimum situation the network benefits from a reduction in delay, a reduction in travel time and an overall improvement in congestion levels. However vehicles are now rerouting to use the Western Relief Road and are travelling a longer distance in order to reach their destination, so there is a disbenefit in terms of journey times.
- 7.2.3 The inclusion of the Western Relief Road enables more vehicles to travel across the network in the AM peak that previously would be queued elsewhere within the network and as a result more traffic access M5 Junction 28 during this time period.
- 7.2.4 The completion of the Western Relief Road will serve two purposes. It could act as a route for development traffic to the south of Cullompton to access the north of the town and Junction 28. It will also form an access point for the proposed development to the west of Cullompton to enter the road network. Therefore this route could serve some through vehicles travelling to and from southern

06/08/2009 Page 17 of 19





Technical Note 2
Technical Summary

Cullompton to M5 Junction 28 as well as catering for local movements. The Western Relief Road leaves a residual amount of traffic on Fore Street that would continue to cause congestion problems and would not improve air quality in the area.

7.2.5 In this scenario, the Western Relief Road could function as a part of the wider town road network. However, this will have significant implications for its design and consequent impact on the residential area through which it passes. There are also significant additional flows using Langlands Road which passes through a predominantly residential area.

7.3 Option 2 - Eastern Relief Road

- 7.3.1 The inclusion of the Eastern Relief Road has a major positive impact on traffic volumes within the Town Centre. Overall there is a reduction in vehicles of approximately 80% along Fore Street. The Eastern Relief Road removes traffic travelling from the south of Cullompton intending to access M5 Junction 28 from Fore Street, potentially enabling Fore Street to be used for more localised movements within Cullompton or closed in it's entirety and pedestrianised.
- 7.3.2 Reducing the traffic volumes in the town centre will help to promote a better environment for all non motorised users and help to improve air quality. It should be noted that the removal of through traffic from the town centre would meet an objective of both Mid Devon District Council's Preferred Options and Core Strategy LDF documents.
- 7.3.3 As detailed above the Western Relief Road could accommodate some of the through movements from the south of Cullompton and cater for development traffic generated in the west of the town. However through the implementation of the Eastern Relief Road vehicle patterns change on the Western Relief Road. Vehicles that would have used the Western Relief Road as a route for through movements would now use the Eastern Relief Road to access Junction 28 and therefore the Western Relief Road is able to function as a local road to provide access to traffic from development areas to the west of Cullompton. To reflect this functionality, it should therefore be referred to not as the Western Relief Road but rather as the Western Development Access Road.
- 7.3.4 Overall the Eastern Relief Road scheme has a major beneficial impact on the entire road network for Cullompton. This is summarised below:
 - Queuing within the network has been significantly reduced especially at significant junctions such as the Fore Street and Tiverton Road Junction.
 - Reduction in congestion levels within Cullompton has been achieved and provides a more reliable and improved journey time during the AM peak.
 - Allows the central area of Cullompton to be partially pedestrianised with greater priority being given to pedestrians, cyclists and public transport.
- 7.3.5 The results of these tests between the network with and without the Eastern Relief Road show that there is a requirement for the Eastern Relief Road to be included as a provision for the delivery of the planned development proposals. It has also shown that the Western Development Access Road is only required as a development access, though it could accommodate some through traffic in the early phases of the development prior to the Eastern Relief Road.

06/08/2009 Page 18 of 19



Technical Note 2
Technical Summary

7.4 Town Centre Air Quality Management Area

- 7.4.1 Within the Mid Devon LDF Cullompton Preferred Options Report an area of the town centre is highlighted as an Air Quality Management Area. The reduction in traffic and queuing along this route due to the inclusion of the Eastern Relief Road and the Western Relief Road, would significantly improve the quality of air within the town centre whilst providing visual and physical environmental improvements to the town in accordance with LDF Core Strategy objectives.
- 7.4.2 In combination, the Eastern Relief Road and Western Relief Road schemes also reduce congestion levels throughout Cullompton as vehicles are queuing less and delays are reduced, therefore promoting better air quality conditions for Cullompton as a whole.

7.5 Summary

- The Western Relief Road is required to deliver the proposed development in North Cullompton and Knowle Lane.
- The Western Relief Road does not however deliver a solution to the problems of congestion and air quality in the town centre.
- The Eastern Relief Road directly relieves congestion in the town centre and plays a significant role in the achievement of air quality management goals.
- The Eastern Relief Road allows for a better environment for all users.

06/08/2009 Page 19 of 19