Proposed Elwick Bypass

Technical Review

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1 Introduction

1.1 Introduction

1.1.1 MJM Consulting Engineers Ltd. has been commissioned by Mr. M. Seymour to review the supporting technical information prepared in relation to the proposed Elwick bypass. This appraisal of the proposed road scheme has been undertaken to confirm and to better understand the rationale behind the currently promoted route, and to what extent this 'preferred' alignment can or should be amended.

1.1.2 The principal grounds for seeking an amendment to the alignment is borne out of concerns that it will result in a detrimental impact on road safety, particularly, along the route of the existing Elwick Road to the east of the connection between the proposed bypass and Elwick Road.

1.1.3 Prior to this review, and to inform it, a freedom of information (FOI) request was submitted to Hartlepool Borough Council (HBC) pursuant to the Freedom of Information Act (FIA) 2000; Environmental Information Regulations (EIR) 2004; and the INSPIRE Regulations 2009.

1.1.4 For the most part, the information requested of the Council was not provided given that, pursuant to Sections 1, 21 & 22 of the act, the Council either did not hold the information, it is available elsewhere, or it was intended for future publication.

1.1.5 With regard to information that is available via other sources, the Council has provided a link to the Local Plan Examination Library website and, in respect of traffic forecasting, to the Transport Assessment reports accompanying planning applications for major residential development to the northwest of Hartlepool. The Transport Assessments considered are the various iterations of those reports relating to:

- Upper Warren (500 new homes);
- High Tunstall (1,200 new homes);
- Quarry Farm Phase 1 (81 new homes); and
- Quarry Farm Phase 2 (220 new homes).

1.1.6 These reports have been considered particularly in respect of the operation of Elwick Road, the traffic volumes likely to use the proposed bypass and the proposed grade-separated junction between Elwick Road, North Lane and the A19 (T) and, hence, the traffic volumes likely to use the existing section of Elwick Road, currently shown to be unimproved.

1.1.7 As will be discussed in this report, the bypass scheme is included within the Hartlepool Borough Council's Local Plan; it is seen to be a critical piece of infrastructure required to bring forward the development and regeneration also required of the plan. However, the bypass cannot exist in isolation and it is very much dependant, and predicated, upon a connection with the A19 (T); hence the grade-separation of the proposed junction between the bypass and the A19 (T) is seen to furnish a potential solution to the following perceived issues:

- Local Authority and Highways England's concerns with regard to the operation of the existing at-grade junctions of Elwick Road and North Lane with the A19 (T);
- The concerning accident statistics associated with the operation of the existing junction;
- The arrested growth of the housing development in the borough; and
- The potential environmental impacts on the residents of Elwick as a consequence of new development related traffic likely to pass through the village.

1.1.8 As will be discussed later in this report, there are two iterations of the proposed bypass alignment in circulation, to our knowledge. The first iteration is that submitted as part of the Local Plan evidence base (or at least identified as such on the Council's web site) and the second is the alignment upon which local residents have been consulted.

1.1.9 Whilst both iterations require a connection with the A19 (T) via a grade separated junction, the alignment of the road between the A19 (T) and its tie in with Elwick Road, are fundamentally different.

2 Hartlepool

2.1 Local Area & Context

2.1.1 The town of Hartlepool lays on the North Sea coast, some 7.5 miles (12 km) to the north of Middlesbrough and 17 miles (27 km) south of Sunderland. The town is governed by Hartlepool Borough Council (HBC), a unitary authority that also controls the outlying villages including Elwick.

2.1.2 Since the mid-1940s, general industrialisation and the shipbuilding industry in the town has seen a steady decline. Consequently, Hartlepool's economic output and prosperity also declined until the 1990s saw major investment projects, and the redevelopment of the docks saw a rise in the town's popularity and prospects. Hartlepool has since experienced significant change, and the regeneration continues with ongoing investment in education, transport and housing renewal.

2.1.3 The town is served by a good range of housing provision, however, the Council recognises that there are specific issues relating to an oversupply of poor quality, low demand terraced housing and a shortage of affordable and executive housing. The Council is, therefore, seeking to provide new homes to meet the demands of growth in household formation and to support the continued economic growth.

2.1.4 In its Local Plan, the Council confirms that potential housing sites are available, within the existing built up area of the town, which can meet some of this demand; however, there is suggested to be a need for expansion also on to green-field land in order to meet these requirements and to support the economic growth ambitions of the Borough.

2.1.5 Hartlepool, then, is experiencing a resurgence in popularity and prospects. The resulting economic growth, allied with increasing prosperity and the demand for new housing will inevitably result in an increase in the need to commute in to, from and through the town. Other nearby towns and cities that might draw a proportion of employment trips to and from Hartlepool include, for example:

- Billingham (8 mi or 13 km):
- Darlington (25 mi or 40 km);
- Durham (17 mi or 27 km);
- Peterlee (8 mi or 13 km);
- Seaham (17 mi or 27 km);
- Sedgefield (13 mi or 21 km); and
- Stockton-on-Tees (10 mi or 16 km).

2.1.6 As will be discussed, the A19 (T) provides an important, key link between Hartlepool and these locations. **Figure 2.1** sets Hartlepool in its regional context.

Figure 2.1 Hartlepool in its Regional Context

(Source: © OpenStreetMap contributors)

2.1.7 The principal local highway network and key links connecting Hartlepool with these alternative centres of employment - and further afield - are set out below.

2.2 A179

2.2.1 The A179 provides a strategic route into Hartlepool from the north via it junction with the A19 (T). The distance, from the A179 junction with the A19 (T) to the junction of the A689 and Park Road, in the centre of Hartlepool, is 9.3km, or 8.8km if routing via Hart Lane.

2.2.2 The route is a single carriageway road from its junction with the A19 (T) up to its junction with Merlin Way, albeit, between Palace Row (Hart Village) and the A179 junction with Front Street, there is a climbing lane for vehicles travelling in the eastbound direction.

2.2.3 The single carriageway has a typical width of 7.3m and it is subject to the national speed limit (60mph), reducing to 40mph to the east of its junction with Merlin Way. From here on, the road becomes dual carriageway and routes into the centre of Hartlepool. The majority of the A179 from the A19 (T) up to its junction with Merlin Way does not have the benefit of adjacent footways.

2.3 A689

2.3.1 The A689 is also a strategic route into Hartlepool via the A19 (T), from the south. The distance, from the A689 junction with the A19 (T) to the junction of the A689 and Park Road, in the centre of Hartlepool, is 9.9km. The route is a dual carriageway road from the A19 (T) into the centre of Hartlepool; the typical, total carriageway width is 19.5m including the central reservation.

2.3.2 The road is subject to the national speed limit, albeit this reduces to 50mph through Newton Bewley. To the east of A689 junction with High Street, the speed limit reduces again as the A689 routes through residential areas. Through Newton Bewley there is footways provision to either side of the road and, from Dalton Back Lane to High Street, there is a footway to the north of the road. To the east of High Street, footways are provided on at least one side of the A689 and there is a segregated footway/cycleway along its southern side, in the vicinity of the Queens Meadow Business Park.

2.4 Elwick Road

2.4.1 Elwick Road provides access to the village of Elwick from the centre of Hartlepool; further, it facilitates local access to the A19 (T) from the west and central areas of Hartlepool. The distance to the A19 (T) from the junction of the A689 and Park Road, in the centre of Hartlepool, is 6.8km.

2.4.2 The route is a single carriageway road and is subject to the national speed limit (60mph). It has a typical carriageway width of 6.0m, there are no footways provided on either side of the road outside the village of Elwick up to Woodhouse Lane, and the route is sinuous with significant variation in its elevation. Together, these factors reflect a hilly terrain with poor forward visibility for drivers at some locations and a lack of overtaking opportunities.

2.4.3 The route is also subject to a 7.5 tonne weight limit which restricts HGV access to Hartlepool via the village of Elwick and Elwick Road. Nonetheless, local observations suggest that the weight limit is not observed and remains unenforced. Also, there are a number of private, vehicular access points off Elwick Road that are used by large farm vehicles as well as to access residential properties.

2.4.4 The junction of Elwick Road with the A19 (T) is an at-grade priority junction. Albeit relatively recently improved, the operation of the junction remains a concern for many in respect of road safety; the junction has experienced two fatal accidents in the past eleven years. The form of the junction and its accident statistics will be discussed further in **Section 4.**

2.5 A19 (T)

2.5.1 The A19 (T) is part of the country's Strategic Road Network (SRN). It routes to the west of Hartlepool and is the key strategic road link, north & south, connecting Hartlepool to the remainder of the region and beyond. As discussed above, the A19 (T) can be accessed from central Hartlepool via the A689, the A179 and Elwick Road. **Figure 2.2** identifies the routes of the A19 (T), A179, A689 and Elwick Road, relative to Hartlepool.

Figure 2.2 Local and Strategic Road Network, Hartlepool

(Source: © OpenStreetMap contributors)

3 The Hartlepool Local Plan 2018

3.1 Requirement

3.1.1 The Government requires all local authorities to have an up to date Local Plan in place to help guide development. As such, Hartlepool Borough Council set out a delivery framework for the Local Plan within its Local Development Scheme which was updated in November 2016 to reflect the delay in the production of its Publication Local Plan, later 'adopted' in May 2018. The plan period, therefore, is 2016-31 (15 years).

3.1.2 Based on the Council's vision, set out in its Sustainable Community Strategy 2014, that:

> *Hartlepool will be a thriving, respectful, inclusive, healthy, ambitious and outward-looking community, in an attractive and safe environment, where everyone is able to realise their potential.*

And that set out in the Hartlepool Local Plan 2018:

> *Hartlepool, by 2031, will be a more sustainable community having … raised the quality and standard of living; … maximised quality housing choices and health opportunities to meet,* ***in full,*** *the current and* ***future needs of all residents.*** *The built, historic and natural environment will have been protected, managed and enhanced, and will contribute to making Hartlepool a* ***safe and attractive place to live****, and* ***an efficient and sustainable transport***

network will integrate its communities within the Tees Valley City Region and beyond.

The plan seeks to achieve:

- The creation of a healthy local economy;
- The creation of mixed communities with all services to hand;
- The provision of opportunities for recreational activities
- Improvement of transport links;
- Improvements to the quality and design of housing and associated areas and the boroughs natural and historic environment;
- A reduction in the opportunities for crime; and
- Improvements in road safety.

3.2 Residential Development

3.2.1 As discussed earlier in this report, HBC recognises that it needs to address specific housing related issues, particularly:

- The oversupply of poor quality, low demand terraced housing;
- The shortage of affordable and executive housing; and
- The need to meet the demands of growth in household formation and to support economic growth.

3.2.2 The Local Plan reflects the national policy objectives, including recent changes towards encouraging sustainable growth and, in particular, seeking to address the unique issues facing the Borough including the continued expansion of its economy and providing a range and choice of housing.

3.2.3 The Council confirms that potential housing sites exist within built up areas of the town; nonetheless, there remains the requirement for some expansion on to green-field land in order to address the specific housing issues.

3.2.4 Hence, the Council's locational strategy adjacent to the existing boundary of the built up area is to prioritise economically viable brownfield land and other suitable, and available sites inside the existing urban areas for new housing, while allowing a controlled westward expansion into green-field land.

3.3 Extant Residential Planning Consents

Upper Warren (500 new homes)

3.3.1 The proposed development at Upper Warren will see 500 new homes built on a plot of 21.2 hectares, of which 14.9 hectares comprises the proposed developable area and 6.3 hectares is landscaping & open space. The developable site is split into two land parcels of 7.7 hectares to the north and 7.2 hectares to the south.

3.3.2 The primary access to the development will be from an existing give-way controlled priority junction off Merlin Way, located 120 metres to the south of the A179 Hart Road / Merlin Way / Westwood Way roundabout.

3.3.3 A secondary access will be provided off Viola Close; this will be restricted to emergency use only and will comprise a barrier / gate control to be activated by the emergency services.

3.3.4 The Transport Assessment which accompanied the planning application for development at Upper Warren considered the likely traffic generation from the proposed 500 houses and forecast that the development would likely generate in the order of 347 and 320 two-way trips in the morning and evening peak hour periods respectively. Of these two-way trips, none are forecast to assign on to Elwick Road, as the principal route to and from the development will be via Merlin Way and the A179. Consequently, trips to and from the A19 (T) are anticipated to join the SRN at the A179 grade-separated junction with the A19 (T). The trip generation rates and trips are summarised in **Table 3.1.**

Table 3.1 Upper Warren Derived Trip Generation Rates and Trips

Peak Period	Trip Rates		Trip Generation		
	Arrivals	Departures	Arrivals	Departures	Two-way
AM	0.142	0.552	71	276	347
PM	0.478	0.162	239	81	320

(Source: Milestone TA, June 2013)

Quarry Farm Phase 1

3.3.5 The first phase of the Quarry Farm development will see 81 new homes built.

3.3.6 The planning application for the development was refused by Hartlepool Borough Council, however an appeal against the refusal was subsequently upheld. The Council's objection to the development was based on the following issues:

- Highway safety; and,
- The living conditions of neighbouring occupiers, with particular reference to anti-social behaviour, crime and the fear of crime.

3.3.7 The Council's road safety concerns related to the potential intensification of use of the Elwick Road junction with the A19 (T).

3.3.8 The Transport Assessment which accompanied the planning application considered the likely traffic generation from the proposed 81 houses and forecast that the development would likely generate in the order of 48 two-way trips in the morning and 54 two-way trips in the evening peak hour periods. The trip generation rates and trips are summarised in **Table 3.2.**

Table 3.2 Quarry Farm Phase 1 Development Trip Generation Rates and Trips

Peak Period	Trip Rates		Trip Generation		
	Arrivals	Departures	Arrivals	Departures	Two-way
AM	0.160	0.432	13	35	48
PM	0.407	0.259	33	21	54

(Source: i-Transport TA, November 2015)

3.3.9 Of the total two-way trips, only 13 are forecast to assign westward, to and from the A19 (T) via Elwick; this is because the assignment assumes that westbound drivers would rather route eastward, and then north onto Cairnston Road in order to access the A19 (T) at its grade-separated junction with the A179. This view was accepted by the Inspector, Karen L Baker DipTP MA DipMP MRTPI, in her decision letter of 18th February 2015, in which she stated that:

> *"I acknowledge that an alternative route exists for traffic wishing to head north on the A19 (T) from the appeal site via Cairnston Road, to the east of the appeal site, and the A179. Given the quality and journey time of this route, I concur with the appellants' view that traffic travelling from the proposed development to the A19 (T) north would primarily use this route."*

3.3.10 As a consequence of the limited number of trips forecast to route through Elwick Village, and assign to either North Road or Elwick Road/Coal Lane, the Inspector concluded that the development would not result in a severe impact on the operation of the A19 (T), stating that:

> *"I acknowledge the concerns of the Council and local people relating to the impact of the proposed development on the junction of Elwick Road/Coal Lane with the A19 (T) and the accidents that have occurred in the vicinity of this junction. However, I note that the actual number of accidents at this junction has been lower than would be expected at this type of junction using the national accident rate forecasts and that the potential increase in the number of accidents as a result of the proposed development could also be lower/less frequent. Nevertheless, even if the proposal resulted in the worst case scenario presented by the appellants [HBC] of one additional accident every 10 years, I do not consider that such a small increase would be material and certainly would not represent a severe impact in the context of The Framework. I conclude, therefore, that the proposal would not unduly harm highway safety. As such, it would not be contrary to Local Plan Policies GEP1 and Tra15 and would accord with the guidance in The Framework, in this respect."*

3.4 Planning Applications

High Tunstall (1,200 new homes)

3.4.1 The High Tunstall application site is located on land to the western edge of Hartlepool; it is approximately 110 hectares of arable, agricultural land and it includes Tunstall Farm, located to the north-eastern corner. The farm is to be retained as part of the proposed development.

3.4.2 The site is bounded to the north by Elwick Road, to the east by access roads to Duchy Road and Tunstall Farm, and by an unnamed road to the west which routes south to the village of Dalton Piercy. It is proposed that access in to the development will be from Elwick Road; the form of the access is anticipated to be a simple priority 'T' junction in order to facilitate **Phase 1** of the development. Beyond this initial 20 – 30 new homes, **Phase 2**, up to a maximum of 1,200 houses (total Phase 1 plus Phase 2), is suggested to require a new link road between the development site and the A179 (the **'Western Relief Road'**) including the upgrading of the A179 / Hart Village Access Road Junction.

3.4.3 The first iteration of the Transport Assessment which accompanied the planning application and suggests the Western Relief Road, considers the likely traffic generation from the proposed 1,200 houses and forecasts that the development would likely generate in the order of 1,013 and 928 two-way trips in the morning and evening peak hour periods respectively. **Table 3.3** summarises the trip generation and derived trip rates.

Table 3.3 High Tunstall Development Trip Generation Rates and Trips

Peak Period	Trip Rates		Trip Generation		
	Arrivals	Departures	Arrivals	Departures	Two-way
AM	0.198	0.645	238	775	1,013
PM	0.471	0.301	566	362	928

(Source: Fore TA September 2014)

3.4.4 Of these, some 55 two-way trips were forecast to assign to Elwick Road in the morning peak hour period, to the west of its junction with the unnamed road to Dalton Piercy. The evening peak period is likely to see 51 two-way trips. It should be noted however that these trips relate only to **Phase 1** of the development.

3.4.5 As discussed, **Phase 2** of the development (up to 1,200 homes) would also have seen the implementation in part of the **Hartlepool Western Relief Road**. Hence, on its completion, development related traffic on Elwick Road was forecast to reduce to 2 two-way trips in the morning and evening peak periods respectively, as westbound trips were forecast to reassign northward, on to the proposed relief road, and onwards to the grade separated junction of the A179 with the A19 (T). The next iteration of the Transport Assessment, however, abandons the relief road scheme in favour of mitigation via the Elwick bypass scheme.

3.4.6 Importantly then, the proposed relief road would route development related traffic generation away from the Elwick Road route to the A19 (T), in favour of the A179 junction with the A19 (T). The second iteration of the Transport Assessment does not make provision for the relief road, to the same extent; rather, there is a reliance upon the proposed bypass.

Quarry Farm Phase 2 (220 new homes)

3.4.7 The Quarry Farm Phase 2 application site is located immediately to the west of Hartlepool, adjacent to the existing Nasiberry Park residential area and to the north of Quarry Farm Phase 1 which has the benefit of an extant planning consent.

3.4.8 The development will take access via an extension to Reedston Road which forms a junction with Cairnston Road which, in turn, forms a junction with Elwick Road.

3.4.9 The Transport Assessment that accompanied the planning application for the 220 home development considers its likely traffic generation and forecasts some 130 two-way trips in the morning peak hour period and 147 two-way in the evening peak. Of these two-way trips, some 22 two-way trips are forecast to route west, to and from the A19 (T) in the morning peak hour and 25 two-way trips are forecast to and from the A19 (T) in the evening peak hour. **Table 3.4** summarises the trip generation rates agreed between the Applicant and Hartlepool Borough Council.

Table 3.4 Quarry Farm Development Trip Generation Rates and Trips

Peak Period	Trip Rates		Trip Generation		
	Arrivals	Departures	Arrivals	Departures	Two-way
AM	0.160	0.432	35	95	130
PM	0.414	0.255	91	56	147

(Source: i-Transport TA, November 2015)

3.4.10 Clearly, on review of **Tables 3.1** to **3.4,** there is a significant variation in trip rates applied to the developments considered. Notwithstanding this, the forecast combined development flow, derived from these tables, is summarised below in **Table 3.5.**

Table 3.5 Combined Development Flow and Derived Trip Rates

Peak Period	Trip Rates		Trip Generation		
	Arrivals	Departures	Arrivals	Departures	Two-way
AM	0.178	0.590	357	1,181	1,538
PM	0.464	0.260	929	520	1,449

(Source: Consultant's Calculations)

3.4.11 It can be seen from **Table 3.5** that the combined developments are likely to generate in the order of 1,538 two-way trips in the morning peak periods and 1,449 two-way in the evening peak period. Of these, 90 and 93 two-way trips are forecast to route through Elwick village in the morning and evening peak hours respectively; this assumes only Phase 1 of the High Tunstall development is operational.

3.4.12 When High Tunstall **Phase 2** becomes operational, the two-way development related trips through Elwick village would reduce to 37 and 44 in the AM and PM peaks respectively if the full extents of the Western Relief Road, identified in the first iteration of the High Tunstall Transport Assessment, were to be implemented. This being the case, there would be an increase in traffic, through Elwick village, of 13.6% and 12.7% when compared to the then current peak period traffic flow data derived for the Quarry Farm Transport Assessment (2015). Whilst these are relatively small numbers in absolute terms, the forecast volume of two-way trips is great enough for Highways England to express its concerns with regard to the safety of the Elwick Road junction with the A19 (T).

Clearly then, should Phase 2 of the High Tunstall development come forward, without the implementation of the Western Relief Road, the percentage increase in traffic flow through the village, to and from the A19 (T), will further increase; accordingly, some form of mitigation would be required to ameliorate the impact. In this regard, the Council is reliant upon the Elwick bypass scheme, however, as alluded to earlier and as will be discussed in this report, the bypass scheme exhibits design issues which may simply transfer any road safety issues from the A19 (T) on to Elwick Road; furthermore, there are potentially other scheme that may provide the benefits attributed to the bypass.

4 Road Safety

4.1 Previously Highlighted Issues

4.1.1 All of the Transport Assessments for the above development have considered road safety issues; particularly those associated with the Elwick Road junction with the A19 (T). This reflects local concerns with regards to the operation, layout and safety record associated with the at-grade junction.

4.1.2 The Transport Assessment prepared to accompany the planning application for development at High Tunstall states that, in respect of the period 2009 to 2014, there had been five accidents recorded at the junction of which four were categorised as slight and one resulted in a fatality.

4.1.3 The report concludes that:

> *"There is no evidence to suggest that road layout, inadequate or masked signs, or poor or defective road surfaces were contributory factors in any of the accidents.'*

Moreover:

> *"The majority of the accidents are of slight severity... and are the result of human driving error.'*

As such, the report concludes:

> *"'It is unlikely that there are any common site-related causal factors."*

4.1.4 Similarly, the Transport Assessment prepared to accompany the planning application for Quarry Farm Phase 2 includes an analysis of accidents at the Elwick Road junction with the A19 (T) in respect of the period 2010 to 2015. The report confirms that *'a total of 8 accidents occurred: six slight, one serious and one fatal.'* Nonetheless, the report concludes that:

> *"There are no road safety concerns relating to the junction of the A19 (T) with North Lane. This was confirmed by Highways England and HBC in their responses to the Quarry Farm Phase 1 application, including in evidence presented by HBC to the Phase 1 appeal. With reference to the A19 (T) junction at Elwick Road, the occurrence of one fatal and one serious accident raises more of a concern and indeed both HBC and the Highways England requested that this TA consider the impact of the Quarry Farm Phase 2 proposals upon the safety of this junction. However, as set out in Section 6 of this TA, the number of accidents at the junction is lower than would typically be expected at this type and scale of junction and the fatality, whilst a tragic event, was a result of driver error rather than any potential deficiency at the junction. Overall, it is therefore considered that whilst it is appropriate to consider the impacts of the development upon the safety of the A19 (T)/Elwick Road junction, the historic accident records do not indicate a particular problem at the junction."*

4.1.5 This conclusion was endorsed by the Inspector in relation to the planning appeal against the refusal of the Quarry Farm planning application for 81 new homes. As discussed in **paragraph 3.4.11**, Karen L Baker DipTP MA DipMP MRTPI stated that:

> *"I note that the actual number of accidents at this junction has been lower than would be expected at this type of junction using the national accident rate forecasts."*

Hence:

> *"I do not consider that such a small increase [accidents] would be material and certainly would not represent a severe impact in the context of The Framework [NPPF]."*

4.1.6 To put the above in to context, the Hartlepool Local Transport Plan 3 (**LTP3**) 2011 – 2026 (April 2011), provides details of the borough wide accident statistics by mode over a period of five years, 2005 to 2009. For ease of reference, the data is replicated in **Table 4.1.** The acronym KSI refers to Killed or Seriously Injured.

Table 4.1 Hartlepool Casualty Statistics 2005 – 2009

Mode/Year	2005	2006	2007	2008	2009	Total
Car Occupants (including taxis)						
KSI	20	13	14	12	10	**69**
Slight	222	201	148	135	133	**839**
Pedestrians						
KSI	8	19	17	5	6	**55**
Slight	37	34	27	21	23	**142**
Cyclists						
KSI	2	5	2	5	5	**1**
Slight	18	16	12	11	13	**70**
Motorcyclists						
KSI	8	4	7	4	3	**26**
Slight	8	6	12	6	7	**39**

(Source: Hartlepool Local Transport Plan 3, 2011 – 2026, April 2011)

4.1.7 As can be seen from **Table 4.1**, over the five years 2005 to 2009, there were 1,241 recorded accidents (approximately 250 per annum) of which 151 were categorised as serious or involved a fatality; the remainder were categorised as slight, i.e. 30 per annum. In comparison, over a 5 year period the A19 (T) junction saw 1.6 accidents per annum.

Table 4.2 Total Accidents per Location Subject to Time Period

Period	Location	Total Accidents	KSI
2005 - 2009	Borough Wide	1,241	151
2010 - 2015	A19(T)/Elwick	8	2
Comparative percentage		0.6%	1.3%

(Source: Hartlepool Local Transport Plan 3, 2011 – 2026, April 2011, Development TAs)

4.1.8 The LTP3 goes on to state that the majority of the accidents recorded were as a consequence of driver error and, as such, will be mitigated against, *at the root, through education, speed management and enforcement.*

4.1.9 Notwithstanding the above, Hartlepool Borough Council considers that the combined grade-separation of the Elwick Road / North Lane junctions with the A19 (T), and the associated provision of an Elwick bypass, is now a 'critical' piece of infrastructure, required in order to bring forward the housing developments and economic benefits required of the Local Plan; a principal reason being the ***'very poor accident record associated the junction.'***

4.1.10 At the same time, the Western Relief Road, a scheme that is demonstrated to route traffic on to the A179, away from Elwick village and on to the A19 (T) at a safer, already grade separated junction, is not referred to in the Council's Local Plan nor in the Local Transport Plan

5 Highway Infrastructure

5.1 The Strategic Vision for the Tees Valley

5.1.1 The Tees Valley Combined Authority's vision for transport in the Tees Valley is stated to be:

> *'To provide a high quality, quick, affordable, reliable and **safe** transport network for people and freight to move within, to and from the Tees Valley'.*

5.1.2 Hence, the authority is currently developing a Strategic Transport Plan, due for publication in 2018, which, amongst other provisions, aims to:

- Maintain and improve roads so that they are **safe and less congested**;
- Provide **safe** walking and cycling routes to make it easier to travel on foot and by bike; and
- Make it easier and **safer** to transport freight by road, rail, sea and air.

5.2 Local Demands

5.2.1 The Council recognises that development and economic growth, together with a general trend of increasing car ownership, have increased traffic flows over recent years, particularly on the principal road network and in the urban areas. In addition, congestion and journey reliability are seen as issues at a number of locations in Hartlepool, especially during peak periods.

5.2.2 Also, the developments likely to come forward over the plan period will inevitably increase traffic levels and increase the pressures at certain pinch points leading to further delays journey unreliability, and increased costs. Given these issues, the Council's Local Transport Plan (LTP) sets out the improvements proposed to the local highway network over a 15 year period, which are regarded to facilitate development and increase economic output.

5.2.3 All of the improvement schemes considered by the Councils are discussed in more detail in its Local Infrastructure Plan. The plan seeks to address the pressures on the principal and local road networks that are likely to occur as a consequence of the development proposed in the Local Plan and it identifies where improvements to the road network will be required.

5.2.4 Further, Highways England has undertaken a modelling exercise to identify the implications for the SRN, including its junctions with the principal routes into Hartlepool, of the development proposals identified in the Council's Local Plan; particularly along the A19 (T) and its various access points around Hartlepool.

5.2.5 In particular, with regard to the likely traffic impacts of the High Tunstall development, the key housing allocation in the Local Plan, Highways England concluded that *"it would generate greater than 30 two-way trips"* and, hence, *"further assessments of potential impacts are required."*

5.2.6 The Council, however, considers that the traffic impact of the High Tunstall development, on the SRN, including the potential for additional accidents, will be mitigated by the provision of an ***improved link*** to the A19 (T) at Elwick, including a proposed bypass of Elwick village and a grade separated junction with the A19 (T).

5.2.7 The Hartlepool Local Transport Plan 3 (LTP3) 2011 – 2026, April 2011 sets out that:

> *Hartlepool's Local Development Framework the 2nd Preferred Options Core Strategy developed in November 2010, includes two policies related to transport. Policy CS3 relates to Strategic Transport and aims to support development which will contribute to the delivery of a sustainable transport network which, whilst reducing the need to travel, will:*
>
> - Improve connectivity within and beyond Hartlepool, including:
> - i between Hartlepool and the wider Tees Valley;
> - ii with Durham Tees Valley Airport;
> - iii with the Tyne and Wear city region.
> - Improve accessibility for all;
> - Facilitate and support the locational strategy identified in Preferred Option CS1;
> - Foster economic growth and inward investment;
> - Promote Hartlepool town centre as a strategic public transport hub; through
> - Continued investment within and linking to the public transport interchange;

- Improve the quality and reliability of the bus network;
- Promote alternative sustainable modes of transport other than the private car;
- Deliver significant improvements to the rail network; and
- Contain an integrated network of cycle and pedestrian routes.

5.3 Elwick bypass

5.3.1 As discussed, the Council regards the proposed grade-separated junction on the A19 (T) at Elwick as critical to bringing forward development and economic growth. This is expressed on the Council's website promoting community involvement (Elwick bypass Public Consultation Event) as follows:

> *"At present Hartlepool is highly reliant on the A689 and the A179 to provide access from the A19 into the town.*
>
> *There are other access points at present via Elwick and Dalton Piercy, however, this relies on drivers making right hand turns into the villages when heading to Hartlepool from the south, which is a dangerous manoeuvre over two lanes of 70mph traffic.*
>
> *Given the safety concerns and the numbers of accidents and fatalities which have historically occurred at the Elwick junctions, Highways England obtained funding to develop options to provide a new junction."*

5.3.2 As presented to borough residents, therefore, the purpose of the bypass is to resolve safety issues associated with the operation of the Elwick Road junction with the A19 (T); there is no mention of the potential for the bypass to benefit economic growth. Yet, as discussed previously, according to the Council's consultants, consultants acting on behalf of the house builders, Highways England's consultant and a Planning Inspector, the junction with the A19 (T) at Elwick does not exhibit a particularly onerous accident record.

5.3.3 The line of the proposed bypass is illustrated on the Council's unnamed drawing. For ease, an extract from the plan, provided by Hartlepool Borough Council pursuant to the Freedom of Information Request, is provided in **Figure 5.2.**

5.3.4 As can be seen, the alignment of the bypass routes to the north of Elwick village. Its junction with the A19 (T) is located to the north of the North Lane junction with the A19 (T) and the right turning facilities, on to Elwick Road and North Lane, are closed.

5.3.5 The alignment of the bypass ties into the existing Elwick Road to the east of the 'S' bend known locally as 'Devil's Elbow' and to the east of Dalton Beck. The Council's Local Infrastructure Plan (2016) describes the scheme as follows:

> *"Grade separated junction on A19 at northern Elwick junction & associated closure of existing accesses. Improvements to Elwick Road, including bypass to north of Elwick village."*

5.3.6 It is notable that the existing Elwick Road, between the bypass tie in and the new works associated with the High Tunstall residential development, is shown to be unimproved. Hence, the existing farm and residential access points off Elwick Road are also to be unimproved, yet these will form junctions with a potentially very busy bypass – bearing in mind the Council's view that the bypass with be a third radial route in to Hartlepool.

5.3.7 Equally, whilst the bypass scheme drawing indicates facilities for pedestrians (and likely cyclists), the existing section of Elwick Road does not include such provisions, leaving these road users vulnerable to the increase in traffic flow and, particularly, HGV traffic. This is contrary to the Strategic Vision for the Tees Valley (paragraph 5.1.2). In addition, there are no facilities shown on the scheme for the provision of protected areas along the unimproved section of Elwick Road for the servicing of existing properties. There are no provisions, for example, for the stopping of refuse and postal vehicles. Again, these road users are potentially made vulnerable due to the significant increase in traffic flow, high traffic speeds, poor visibility and lack of footways.

5.3.8 Elwick Road is shown, in one iteration of the scheme, to connect to the road network, to the east, via a simple priority 'T' junction, with Elwick Road being the minor arm. Yet, the same Local Infrastructure Plan describes the bypass scheme as critical, insofar as:

> *"The scheme will support growth ambitions and provide a new strategic route for road traffic from Hartlepool to the A19. It will relieve pressure on the existing A179 and A689 routes from Hartlepool to the A19 and overcome safety concerns with regard to existing at-grade junctions. The project will provide direct benefits to the residents of Elwick village by significantly reducing through traffic, helping to make it a safer environment. The scheme will also provide direct benefits for existing and new residents in the western areas of Hartlepool and have indirect benefits for residents and businesses throughout Hartlepool through reduced traffic congestion and reduced journey times. The scheme will facilitate full development of the High Tunstall strategic housing site."*

Forecast Traffic Flows

5.3.9 A relatively simplistic approach to traffic forecasting would suggest that the proposed bypass scheme will have insufficient capacity to accommodate potential traffic flows. Using a simple gravity model, the un-factored 2016 Annual Average Daily Flow (AADF) data available from Department for Transport, and assuming all other parameters are equal, the proposed bypass may need to accommodate an AADF of between 11,500 and 12,000 two-way trips, of which 577 trips would be HGVs. Bearing in mind that the existing Elwick Road is subject to a 7.5t weight restriction and given the sensitivity of the route through the village, the current HGV content is likely to be limited, if not non-existent; hence the environmental impact from HGV traffic movements needs to be considered in detail. The details of the gravity model are set out in **Tables 5.1** & **5.2** and the route nomenclature is illustrated in **Figure 5.1**.

Table 5.1 Simple Gravity Model Two-way Flow A19 (T)/Hartlepool

AADF (F)	Route	D (km)	D^2	F/D^2		Forecast AADF
	A19 (T) - A179					
***16,355**	A-E-B	8.82	77.7924	210.239	31.27%	5,114
	A-B	9.29	86.3041	189.5043	28.19%	4,610
	**A-D-B	8.53	72.7609	224.7773	33.43%	5,468
	A-D-C-B	18.5	342.25	47.78671	7.11%	1,162
				672.3074		***16,355**
	A19 (T) - A689					
***26,219**	C-B	9.91	98.2081	266.9739	46.35%	12,152
	**C-D-B	13.66	186.5956	140.5124	24.39%	6,396
	C-D-A-B	17.88	319.6944	82.0127	14.24%	3,733

	C-D-A-E-B	17.41	303.1081	86.50049	15.02%	3,937
				575.9995		***26,219**

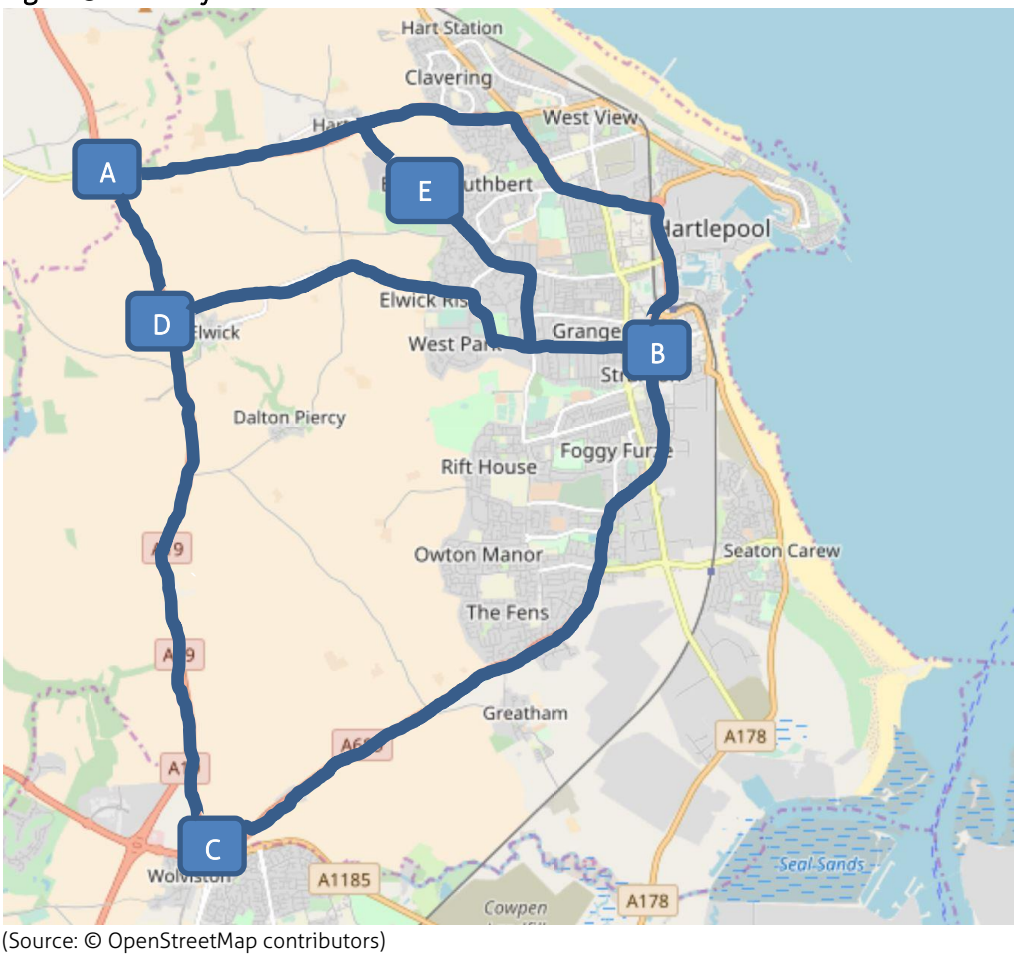
(Source: Consultant Calculation) *2016 DfT Data ** Route from A19 (T) to Hartlepool via Proposed bypass

Table 5.2 Simple Gravity Model Two-way HGV Flow A19 (T)/Hartlepool

AADF (F)	Route	D (km)	D²	F/D²		Forecast AADF
	A19 (T) - A179					
***772**	A-E-B	8.82	77.7924	9.923849	31.27%	241
	A-B	9.29	86.3041	8.945114	28.19%	218
	**A-D-B	8.53	72.7609	10.61009	33.43%	258
	A-D-C-B	18.5	342.25	2.255661	7.11%	55
				31.73472		***772**
	A19 (T) - A689					
***1,306**	C-B	9.91	98.2081	13.29829	46.35%	605
	**C-D-B	13.66	186.5956	6.999093	24.39%	319
	C-D-A-B	17.88	319.6944	4.085151	14.24%	186
	C-D-A-E-B	17.41	303.1081	4.308694	15.02%	196
				28.69123		***1,306**

(Source: Consultant Calculation) *2016 DfT Data ** Route from A19 (T) to Hartlepool via Proposed bypass

Figure 5.1 Gravity Model Route Nomenclature



(Source: © OpenStreetMap contributors)

5.3.10 Given the outcomes summarised in **Tables 5.1 & 5.2**, the proposed bypass would need to accommodate some 11,500 two-way trips on an average day; potentially more on weekdays if weekends are discounted from the AADF. As mentioned, this flow does not reflect annualised traffic growth. Again, with reference to the DfT AADF flows, the two-way AADF on the A179, immediately east of the A19 (T) in 2000, was recorded to be 10,418. In 2016, the same AADF was observed to be 16,355; this equates to an annual increase in traffic flow of 3.56 percent.

5.3.11 Assuming a 20 year design life **(HD26/06),** therefore, and an opening year of 2020, the route would need to accommodate some 13,000 two-way trips per day at opening, of which 915 would be HGV, and 21,300 two-way trips per day by 2040, including 1,300 HGV.

Link Capacity

5.3.12 The proposed bypass is currently designed to be a standard 7.3m single carriageway; however, the existing, unimproved section of Elwick Road is typically 6m in width, with no footways or street lighting, and is subject to the national speed limit.

5.3.13 With reference to the Design Manual for Roads and Bridges (DMRB) **TA79/99**, a 7.3m urban all-purpose 1 (UAP1) carriageway is anticipated to accommodate up to 1,590 vehicles (V) per hour in the busiest direction. The busiest direction is assumed to be 60 percent of the total two-way flow, hence, at 7.3m the carriageway would be able to accommodate 2,650 vehicles, two-way per hour. At 6.1m, as an urban all-purpose 3 (UAP3), the road would be expected to accommodate 900 vehicles per hour in the busiest direction or 1,500 two-way.

5.3.14 Given paragraph 5.3.11, the bypass may be required to accommodate 13,000 two-way vehicle movements per day at opening and 21,300 vehicles at 2040. A comparison of traffic flow data provided in the Transport Assessment for High Tunstall with the data derived from DfT, suggests that the average peak period flow on the A179 is 12.8 percent of the total daily flow; hence, applying this factor to the forecast flows on the bypass, the peak period flow would be in the order of 1,680 two-way in the opening year and 2,730 two-way in the design year.

5.3.15 In essence, therefore, the proposed 7.3m carriageway would be operating at capacity in 2038; however, the existing 6m carriageway would be expected to operate well beyond its capacity at opening in 2020. This is summarised in **Table 5.3.**

Table 5.3 - Comparison of Theoretical Capacity and Forecast Flow 2020

Road Type	Capacity One-Way* (V/hr)	Capacity Two-Way (V/hr)	Forecast Two-way Flow (V/hr)	Variance Two-way Flow (V/hr)
UAP1	1,590	2,650	1,682	968
UAP3	900	1,500	1,682	-182

(Source: Consultant Calculations/TA79/99) *Busiest Direction 60/40 split

Table 5.4 - Comparison of Theoretical Capacity and Forecast Flow 2040

Road Type	Capacity One-Way* (V/hr)	Capacity Two-Way (V/hr)	Forecast Two-way Flow (V/hr)	Variance Two-way Flow (V/hr)
UAP1	1,590	2,650	2,730	-80
UAP3	900	1,500	2,730	-1,230

(Source: Consultant Calculations/TA79/99) *Busiest Direction 60/40 split

5.3.16 Clearly, therefore, if the proposed bypass is indeed intended to operate as a third, principal route into Hartlepool, the existing section of Elwick Road, which is intended to be retained without improvement, will have insufficient capacity to accommodate the potential traffic movements.

5.3.17 In addition, it is highly unlikely that the suggested simple priority 'T' junction with the proposed Western Relief Road will be able to accommodate the volume of trips likely to route through it. For ease of reference, the definitions of UAP1 and UAP3 are as follows.

UAP1

5.3.18 High standard single/dual carriageway road carrying predominantly through traffic with limited access.

UAP3

5.3.19 Variable standard road carrying mixed traffic with frontage access, local traffic side roads, bus stops and at-grade pedestrian crossings.

Existing, Retained Route

5.3.20 DfT *Circular-01-2013 Setting Local Speed Limits* states that rural roads account for 66% of all road deaths, and 82% of car occupant deaths in particular, but only around 42% of the distance travelled. Of all road deaths in Britain in 2011, 51% occurred on National Speed Limit rural single carriageway roads (DfT, 2011). The reduction in road casualties and especially deaths on rural roads is therefore one of the key road safety challenges. Research has assessed the risk of death in collisions at various impact speeds for typical collision types on rural roads. This research suggests that the risk of a driver dying in a head on collision involving two cars travelling at 60 mph is around 90 percent.

5.3.21 The circular goes on to confirm that speed limit changes are unlikely to address such problems and should be considered only as one part of a rural safety management scheme. Traffic authorities should first seek to understand the particular risks of so as to allow the selection of effective solutions to reduce the risks.

5.3.22 Given the above, and the likely issues with Link Capacity discussed earlier, the existing road alignment, to the east of 'Devil's Elbow,' is unlikely to be of a sufficient standard to be regarded as a being suitable for use as a bypass. The route is sinuous and varies significantly in elevation, to the extent that forward visibility is compromised and does not meet the standard required of a route subject to a 60mph speed limit, and there is already a history of road traffic incidents on Elwick Road.

Horizontal Curvature

5.3.23 With reference to Table 3 of TD9/93, replicated below as Table 5.5, the desirable minimum stopping sight distance (SSD) at 60mph (100kph) is 215m. As can be seen from Figure 5.2, the desirable minimum SSD cannot be achieved on the approach to the proposed roundabout junction between the new section of road and the existing Elwick Road. Moreover, even at 30mph (60kph), the desirable minimum SSD would need to be 90m; this standard too cannot be achieved on the approach to the roundabout due to the constrained highway boundary. Hence, additional third party land would be required to achieve the currently proposed arrangement.

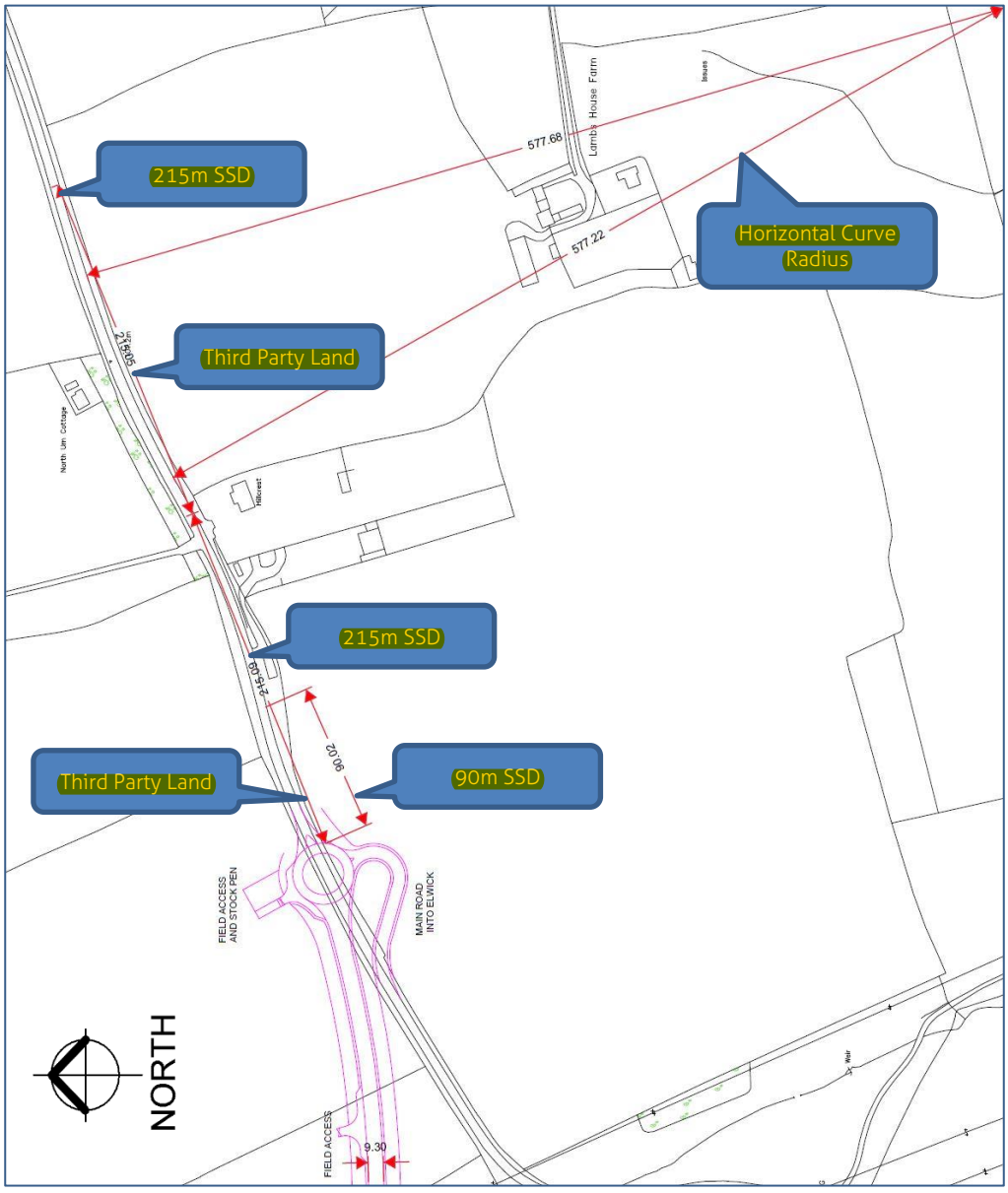
Table 5.5 DMRB TD9/93 Table 3

DESIGN SPEED kph	120	100	85	70	60	50	V^2/R
STOPPING SIGHT DISTANCE m							
Desirable Minimum	295	215	160	120	90	70	
One Step below Desirable Minimum	215	160	120	90	70	50	
HORIZONTAL CURVATURE m.							
Minimum R* without elimination of Adverse Camber and Transitions	2880	2040	1440	1020	720	520	5
Minimum R* with Superelevation of 2.5%	2040	1440	1020	720	510	360	7.07
Minimum R* with Superelevation of 3.5%	1440	1020	720	510	360	255	10
Desirable Minimum R with Superelevation of 5%	1020	720	510	360	255	180	14.14
One Step below Desirable Minimum R with Superelevation of 7%	720	510	360	255	180	127	20
Two Steps below Desirable Minimum Radius with Superelevation of 7%	510	360	255	180	127	90	28.28
VERTICAL CURVATURE							
Desirable Minimum* Crest K Value	182	100	55	30	17	10	
One Step below Desirable Min Crest K Value	100	55	30	17	10	6.5	
Absolute Minimum Sag K Value	37	26	20	20	13	9	
OVERTAKING SIGHT DISTANCES							
Full Overtaking Sight Distance FOSD m.	*	580	490	410	345	290	
FOSD Overtaking Crest K Value	*	400	285	200	142	100	

(Source: DMRB TD9/93)

5.3.24 Moreover, the largest horizontal radius, on the approach to proposed roundabout, is in the order of 580m; the desirable minimum curve radius, with a 5% superelevation, is 720m.

Figure 5.2 Extract from HBC bypass Scheme Drawing (Existing Elwick Road) NTS



(Source: Hartlepool Borough Council)

5.3.25 As can be seen from **Figure 5.2**, there are existing access points to the east of the proposed roundabout junction. These access points will be retained if the currently proposed scheme is implemented. As a consequence of the vertical and horizontal alignment issues discussed above, the required visibility splays, commensurate with a 60mph speed limit (2.4m x 215m) cannot be achieved from the existing access points.

Vertical Curvature

5.3.26 Without level information, the radius and K value of the vertical curves cannot be determined; however, it is the case that SSD standard is applicable in both the horizontal and vertical planes.

5.3.27 With regards to the vertical plane, TD9/93 requires that the stopping sight distance be measured from a minimum driver's eye height of between 1.05m and 2.00m, to an object height of between 0.26m and 2.00m both above the road surface; at 60mph, the SSD is 215m.

5.3.28 As can be seen from Plates 5.1 & 5.2, the SSD required on this section of the proposed bypass cannot be achieved.

Plate 5.1 Forward Visibility Elwick Road Westbound

(Source: Google Street View)

Plate 5.2 Forward Visibility Elwick Road Eastbound

(Source: Google Street View)

5.3.29 Whilst residents experience difficulties with access & egress at present as a consequence of the road engineering, these are legacy issues which have been established over decades. The concern is that these problems will significantly worsen if the bypass scheme is to come forward as proposed.

5.3.30 The very large increase in vehicle movements and the consequential increase in HGV movements, will likely exacerbate any pre-existing road safety problems. Hence, the matter should be considered in great detail, particularly in respect of the environmental impacts and, moreover, in respect of road safety and the potential for a transfer of such issues from the A19 (T) to this section of Elwick Road.

Full Overtaking Sight Distance

5.3.31 Table 5.5 also shows, for each design speed, the Full Overtaking Sight Distance (FOSD) required for overtaking vehicles using the opposing traffic lane on single carriageway roads. DMRB TD9/93 Paragraph 2.3 suggests that:

> *"Sufficient visibility for overtaking shall be provided on as much of the road as possible, especially where the daily traffic flows are expected to approach the maximum design flows."*

5.3.32 TD9/93 goes on to state that FOSD is considerably greater than stopping sight distance and can normally only be provided in relatively flat terrain. In addition, with regards to new roads of less than 2km in length, TD9/93 states that:

> *"Schemes less than 2km in length shall be integrated with the contiguous sections of existing road to provide the best overtaking opportunities that can be economically devised. Where contiguous sections afford little or no overtaking opportunities, it is* ***essential*** *that the requisite Overtaking Value be achieved for the scheme. On short bypasses this will result in the need to* ***provide at least one Overtaking Section in either direction****.*

5.3.33 TD9/93 is clear that single, 2 lane carriageways should be designed with the objectives of safety and uncongested traffic flow. With this in mind, and given that 'frustrated traffic tends to lead to unsafe conditions' paragraph 7.2 states that:

> *"Clearly identifiable Overtaking Sections for either direction of travel are required to be frequently provided throughout the single carriageway according to design flow, so that vehicles can maintain the Design Speed in off peak conditions."*

5.3.34 Given both the horizontal and vertical alignments of the existing section of Elwick Road that is shown not to be improved, opportunities for overtaking are non-existent and, with the likely increase in traffic as a consequence of the bypass, including a significant increase in HGV traffic, driver frustration is likely to be exacerbated, resulting in errant and dangerous manoeuvres.

5.3.35 Furthermore, the proposed road, less than 2km in length is not designed to accommodate overtaking. The stopping sight distance, at 60mph, is 215m and this appears to be achievable on the new section of road; nonetheless, the full overtaking sight distance, at the same design speed, is 580m, which cannot be achieved within the land/highway constraints indicated or along the existing section of Elwick Road to be retained. Consequently, the bypass does not accord with DMRB requirements, is potentially unsafe and, thus, is contrary to local and regional policies to *'maintain and improve roads so that they are safe and less congested.'*

5.3.36 Albeit that the a principal reason for the provision of the bypass is to reduce the potential for accidents at the existing A19 (T) junction with Elwick Road, as designed, the scheme is likely to transfer an accident location from the A19 (T) on to Elwick Road. Yet, there is currently no Road Safety Audit of the scheme which considers the potential for incidents on the route of the bypass.

Funding

5.3.37 The Council's LOCAL INFRASTRUCTURE PLAN (November 2016) states that a bid to fund the bypass scheme, through the Local Growth Fund, has been submitted. It is intended that the LGF3 bid for the bypass & the grade separated junction (cost est. £18m) will take the form of a loan that will be repaid through Developer contributions.

5.3.38 The North East LEP confirmed in November 2016 that the Government, through the Local Growth Fund (tranche 3) (LGF3) has awarded the LEP £49,600,000. The award is intended to deliver:

- The International Advanced Manufacturing Park at Sunderland; and
- A Business, Innovation and Skills Infrastructure Programme

5.3.39 It would seem, therefore, that the funding of the bypass scheme through this route has not been successful; however, the Council does suggest that other potential funding sources are available, including the Growing Places Fund; Building Fund; Tees Valley Patient Capital Investment Fund; Prudential Borrowing; and Tees Valley Investment Fund (Devolution Deal).

Business Case

5.3.40 The Council has commissioned a Consultancy to prepare a Business Case for the implementation of the bypass; the same Consultancy prepared the Transport Assessment to accompany the planning application for the 1,200 new homes at High Tunstall. That Transport Assessment confirmed that the High Tunstall development would not result in a material impact on the operation of the Elwick Road junction with the A19 (T) and that the existing junction does not exhibit an undue road safety issue. The report concludes, with regards to the Elwick Road junction with the A19 (T), that:

> *'There is no evidence to suggest that* ***road layout****, inadequate or masked signs, or poor or defective road surfaces were contributory factors in any of the accidents.'*

In addition,

> *'The majority of the accidents are of slight severity... and are the result of human driving error. It is unlikely that there are any common site-related causal factors.'*

5.3.41 Contrary to the above, Section 2.2.2 of the Business Case states that:

> *'Safety concerns have been an ongoing concern at the at-grade junctions in question for a number of years.'*

And,

> *'The existing at-grade staggered junction continues to have a poor safety record'*

5.3.42 Section 2.2.2 goes on to confirm that a GD04 Safety Risk Assessment has been prepared for Highways England that provides a "more detailed" analysis of the safety issues. The Business Case does not, however, present the findings of the GD04 assessment, other than to include the document in the appendices.

5.3.43 Dr Mark Powell BSc (Eng.), MSc (Eng.), PhD, CMILT who prepared the GD04 assessment, concluded, with regards to the replacement of the existing at-grade junction with a grade-separated junction, that the:

> *'Cost of [this] option is disproportionate and should not be promoted on safety grounds.'*

5.3.44 Despite the elimination of the perceived hazard at the junction, the grade-separated junction option would result in:

- Additional risks for workers during construction;
- High costs; and
- A safety BCR of just 0.27.

5.3.45 A BCR (Benefit Cost Ratio) is the ratio of the benefits of a project or proposal, expressed in monetary terms, relative to its costs, also expressed in monetary terms. The total discounted benefits are divided by the total discounted costs, hence projects with a benefit-cost ratio greater than 1 have greater benefits than their costs i.e. they have positive net benefits. The higher the ratio, the greater the benefits relative to the costs.

5.3.46 Proposals are judged to offer poor, low, medium, high, and very high value for money (VfM) based upon the BCR values set our below:

- Poor VfM, BCR is below 1;
- Low VfM, BCR is between 1 and 1.5;
- Medium VfM, BCR is between 1.5 and 2;
- High VfM, BCR is between 2 and 4.

5.3.47 In essence, therefore, there are potentially other, more cost effective, options to reduce the risk of accidents at the Elwick Road junction with the A19 (T). The GD04 document suggests that the following option should be considered in more detail:

- Closure of both gaps in the central reservation at Elwick Crossroads; and
- Prohibition of the right turn movement from the A19 northbound into Elwick Road.

5.3.48 Notwithstanding the above, the Business Case determines that the BCR for the entire scheme, when also taking into consideration the economic benefits and environmental and social impacts, is **3.52** i.e. it sits within the **High** value for money category.

5.3.49 The Business Case also presents the Net Present Value (NPV) of the scheme. The NPV is equal to the difference between the present value of the benefits (PVB) and the present value of the costs (PVC); in this case, the NPV is £49,810,000.

5.3.50 It should be noted, however, that whilst both NPV and BCR will provide the same positive or negative outcome for a considered option, where a number of options are to be considered, the two methods will not always give the same outcome. This is an important point as option appraisal using only one of these methods could result in the Business Case not considering an alternative that actually offers a more positive outcome. This can be illustrated as shown in **Table 5.6:**

Table 5.6 Example Scheme Cost Benefit Analysis

Project	Cost (£m)	Benefit (£m)	NPV (£m)	BCR
1.	70	100	30	1.43
2.	7	12	5	1.71

(Source: Consultant Calculation)

5.3.51 As can be seen from **Table 5.6**, both projects provide a net positive result, however, the NPV and BCR methods of scheme appraisal provide different outcomes. Comparing only the NPV suggests that Project 1 provides the better outcome as the NPV of £30m is greater than the NPV of Project 2 (£5m). Using only the BCR method, however, Project 2 would have been chosen as its BCR of 1.7 is greater than the Project 1 BCR of 1.43.

5.3.52 In this situation then, the overall result of the cost benefit analysis can be determined either by considering the costs involved in Project 1, which are much greater, or by considering the overall benefits obtained by Project 1, which are significantly greater.

5.3.53 The point here then, is that the Business Case presented for the bypass scheme considers only one option in respect of its cost and benefit, yet there were a number of other options mentioned that were discounted for reasons not fully explained. It maybe that one of these other options actually results in a greater benefit than the option currently considered.

5.3.54 For example, bypass Option 4 involves the creation of a new road between the junction of Elwick Road & Dalton Back Lane and the A179 at the northern Hart access. The business case states that this option would provide better access from existing and proposed housing developments to the A179 but does not link with any improvements at the Elwick junctions with the A19 (T) and would not, therefore, provide a third safe access into Hartlepool.

5.3.55 However, it is possible that the cost of this option could be lower than the currently preferred scheme and, it is inferred, the benefits in terms of access and economy will also be obtained. This option has been discounted, however, on the basis that the safety benefits would not be realised at the Elwick Road junction with the A19 (T). Yet, there is a general consensus between the Transport Assessments prepared to accompany the planning applications for housing that the road safety issues experienced at the A19 (T) are not unduly onerous given the nature of the junctions and traffic flows. This assertion accords with the view of the Planning Inspector for the Quarry Farm planning application, and the GD04 assessment undertaken on behalf of Highways England also confirms that the BCR for the grade-separated junction on the A19 (T) is **0.27**; i.e. it is categorised as **Poor** value for money when considered as an accident remediation scheme, and should not be promoted as such.

5.3.56 Whilst it is appropriate to address road safety concerns at the A19 (T), there are other options identified in the Business Case and in the GD04 assessment, that potentially offer significantly better value for money with a reduced environmental impact, bearing in mind that paragraph 3.6.2 of the Business Case confirms that:

> *"The provision of the grade-separated junction and overbridge is likely to cause some visual intrusion in the existing landscape as a result of the bridge structure, slip roads and lighting. The design will seek to mitigate these impacts as far as possible through landscaping and planting. In addition the bypass and junction may cause fragmentation of field pattern and landform and some loss of arable land and/or detachment of other arable land."*

5.4 Other Mitigation Schemes

5.4.1 The Council considers that, a particular weakness for Hartlepool is its reliance on only two principal access points to & from the A19 (T), namely the A179 and the A689. The Hartlepool Local Plan – Local Infrastructure Plan (LIP) (Nov.2016) states that both of these access points are becoming increasingly congested and are physical constraints on to specific development proposals. A key strategic aim for the Council, therefore, is to provide the proposed grade-separated junction on the A19 (T) at Elwick.

5.4.2 The LIP goes on to confirm that a number of other projects will also be undertaken in order to provide the necessary infrastructure to accommodate the developments proposed in the Plan. The schemes particularly relevant to this study are summarised below.

Table 5.7 Hartlepool Local Plan – Local Infrastructure Plan (LIP) (Nov.2016)

Location	Infrastructure Requirement	HBC Comments
A19 (T)/A179	Improvements at the A19 (T)/A179 junction – there is currently congestion at this junction due to capacity constraints. A scheme has been agreed for signalisation of the A19 northbound exit slip road onto the A179 and other capacity improvements.	The planned capacity improvements will be funded by the developer and will exceed the requirement generated by, the Upper Warren housing development
Western Relief Road.	Arterial route along western fringe of urban area.	**Not critical** for delivery of High Tunstall and Quarry Farm but will provide significant benefits as housing is developed in the later stages of the plan period in terms of reducing congestion and providing accessibility options.
Elwick Road/Park Road/Wooler Road junction.	Improvement scheme TBC	This junction will operate at excess capacity. The developer will need to provide an impact assessment and submit a scheme to mitigate for traffic generated by the development
Hart Lane/Duke Street/Jesmond Road junction.	Improvement scheme TBC	This junction will operate at excess capacity. The developer will need to provide an impact assessment and submit a scheme to mitigate for traffic generated by the development.
Hart Lane/Serpentine Road junction.	Improvement scheme TBC	This junction will operate in excess of practical capacity during the PM peak. The developer will need to provide an impact assessment and will need to submit a scheme to mitigate for traffic generated by the development.

(Source: HBC Local Infrastructure Plan (LIP) Nov.2016 Appendix 1.)

5.4.3 As discussed previously, there are four principal residential development sites located in Hartlepool, these are:

- Upper Warren (500 new homes);
- High Tunstall (1,200 new homes);
- Quarry Farm Phase 1 (81 new homes); and
- Quarry Farm Phase 2 (220 new homes).

5.4.4 The Council has confirmed that the traffic impact of the Upper Warren development, at the A19 (T)/A179 junction, will be mitigated by the Upper Warren Developer to the extent that the mitigation exceeds that which is required to accommodate the proposed 500 new homes.

5.4.5 Equally, the Transport Assessment prepared for the **High Tunstall** development states, with regards to the 'West Side' of the junction that:

- *The junction will operate at close to practical capacity in the 2024 Do Minimum scenario. In particular, the modelled DoS value is close to the normal practical capacity threshold of 90.0% for the A19 Northbound Exit Slip Road and the A179 Westbound Ahead during the PM peak hour.*
- *In the 2024 With Phase 2 Development scenario, with the addition of traffic associated with Phase 2 of the proposed development as well as background traffic growth, the modelled DoS values will slightly exceed the normal practical capacity threshold of 90% for the A19 Northbound Exit Slip Road and the A179 Westbound Ahead during the PM peak hour (92.1% and 90.9%, respectively). The queue lengths, however, would be accommodated without impacts on the mainline A19 carriageway and analysis of the LinSig queue graphs indicates that the queues will fully discharge before the end of the associated green phase*; and
- *In both review year assessment scenarios, the junction will operate with a degree of spare capacity during the AM peak hour, with modelled DoS values below the normal practical capacity threshold of 90.0% for all links.*

5.4.6 Hence, with regards to mitigation of the West Side, the Transport Assessment states that:

- *With regards to the modelling assessments undertaken, it is considered that the committed Upper Warren scheme for the west side of the A19 / A179 Interchange Junction would satisfactorily accommodate traffic associated with both* ***Phases 1 and 2*** *of the proposed [High Tunstall] development,* ***without further mitigation****;*
- *Although the combination of background traffic growth and Phase 2 development associated traffic is such that the A19 Northbound Exit Slip Road and the A179 Westbound Ahead operate with a DoS value slightly in excess of practical capacity in the 2024 review year, in practice, any impacts will be short-term, occurring only during intermittent periods of the PM peak hour and without impacts on upstream junctions; and*
- *Given that these approaches operate at close to practical capacity in the 2024 Do Minimum scenario, these impacts are considered to be acceptable and do not represent a severe impact.*

5.4.7 The conclusion to be drawn from the High Tunstall Transport Assessment, therefore, is that with the committed mitigation scheme associated with the Upper Warren development, some 1,700 of the 2,001 new homes to be built in Hartlepool (85%) can be accommodated at the A19 (T) junction with the A179 without a severe impact. This assumes, we understand, that the Western Relief Road is built in part.

5.4.8 The next largest housing development, 220 new homes at Quarry Farm, assigns only 26 two-way trips through the A179 junction in the AM peak period and 43 two-way trips in the PM peak. Hence, the Transport Assessment does not consider the impact of the additional traffic at the junction.

5.4.9 It is the case that other junctions in Hartlepool would also need to be improved, as highlighted in **Table 5.7**, but it is likely that these junctions would require improvement irrespective of the provision of the Elwick bypass; in fact, the bypass may even exacerbate congestion as the A179, Hart Lane and Elwick Road concatenate towards the centre of Hartlepool.

5.4.10 This being the case then, the argument that the proposed bypass is required to facilitate housing development in Hartlepool, that would otherwise stall, seems somewhat contrived.

Western Relief Road

5.4.11 As discussed, the first iteration of the Transport Assessment for High Tunstall refers to the provision of a Western Relief Road. The report suggests that:

> *"A key aspect of the proposed development, which provides a wider long term benefit for Hartlepool, is the proposed new road link between the development site [High Tunstall] and the A179 to the north. Crucially, this would provide an initial, but substantial section of a Western Relief Road for Hartlepool.*
>
> *In addition, the road through the development site will also be designed to contribute towards the provision of this route which, in total, would represent around 3.5km, or half of the total route to the A689. Drawing 2035/SK001/002 provides an indicative alignment for the Western Relief Road."*

5.4.12 Completion of the Western Relief Road, both through the site and to the A689 (by others) was suggested to be in **Phase 3** of the development i.e. up to 2,000 new homes. Nonetheless, a substantial section of the relief road would be built in Phase 2 of the development i.e. up to 1,200 homes and, this being the case, it was assumed that all those accessing the A19 would do so via the Western Relief Road and the A179.

5.4.13 The Western Relief Road was forecast to accommodate some 39% of the traffic generation from the development, including traffic routing south via the A689 on completion of Phase 3, thus diverting traffic away from the A19 (T)/A179 junction; the only trips westward on Elwick Road, therefore, would be to access Elwick village or to Hart and Dalton Piercy. In fact, Figure 22 of the report indicates no traffic movements to and from Elwick village after completion of Phase 2 of the development, and Figure 19 too indicates that development related traffic will route north onto the Hart Access Road rather than route through Elwick village.

5.4.14 Given the increase in traffic movements to and from the A19 (T) via the A179, the Transport Assessment considered the potential for mitigation. The report concluded, with regards to the eastern side of the A19/A179 junction that:

> *"With regards to the modelling assessments undertaken, it is considered that committed Upper Warren [mitigation] scheme for the west side of the A19 / A179 Interchange Junction would satisfactorily accommodate traffic associated with Phases 1 and 2 of the proposed development, without further mitigation. Although the combination of background traffic growth and Phase 2 development associated traffic is such that the A19 Northbound Exit Slip Road and the A179 Westbound Ahead operate with a DoS value slightly in excess of practical capacity in the 2024 review year, in practice, any impacts will be short-term, occurring only during intermittent periods of the PM peak hour and without impacts on upstream junctions. Given that these approaches operate at close to practical capacity in the 2024 Do Minimum scenario, these impacts are considered to be acceptable and do not represent a severe impact. The modelling undertaken therefore represents an extremely robust assumption."*

5.4.15 With regards to the western side of the A19/A179 junction the report confirms that:

> *"With regards to the modelling assessments undertaken, the impacts of the changes in traffic flows associated with Phases 1 and 2 of the proposed development are considered to be satisfactorily accommodated within the operation of east side of the A19 / A179 Interchange, without mitigation."*

5.4.16 Hence, the initial Transport Assessment for High Tunstall concluded that the development – up to completion of 1,200 homes – plus the already committed Upper Warren development could be accommodated on the existing road network with some mitigation work required at the A19 (T)/A179 junction and the provision, in part, of the 'Western Relief Road.' Both the Upper Warren development and the High Tunstall development then assign no trips through Elwick village (paragraph 3.3.4.).

5.4.17 In conclusion therefore, the Transport Assessment states that:

- *Traffic associated with the proposed development can be adequately accommodated on the Strategic Road Network without material impacts. In particular, junction capacity assessments indicate the A19 / A179 Interchange would accommodate traffic associated with the proposed development satisfactorily.*
- *The northern section of the Western Relief Road, which will be delivered as part of the proposed development, will reduce traffic through the villages of Elwick and Dalton Piercy by providing more attractive access to the A19 / A179 Interchange.*

5.4.18 The second iteration of the Transport Assessment also refers to the provision of at least part of the Western Relief Road; it states that:

> *"The road through the site will provide an initial, but substantial, section of a new western bypass for Hartlepool, which is identified as an option in the emerging Local Plan. The western bypass would run along the western fringe of the town between the A689 in the south and the A179 to the north.*

The internal layout of the proposed development will be designed to contribute towards the provision of this route."

5.4.19 However, the AIMSUN modelling provided does not indicate the provision of the Western Relief Road and relies instead on the provision of the Elwick bypass as mitigation. All other planned transport improvements are confirmed to be considered in the Do Something scenario but the Western Relief Road, albeit a long term aspiration for the Council (LIP) and demonstrated to be a potential alternative relief for Elwick village, is not.

A179 Widening

5.4.20 Also identified in the Local Infrastructure Plan is the widening of the A179 on its approach to the A19 (T); the scheme is suggested to improve traffic flow to the north of the Borough. The scheme includes the widening of existing single carriageway section to dual carriageway, from Middle Warren to the A19 (T).

5.4.21 The proposed infrastructure works, to be funded through Developer contributions, is suggested to be:

"A desirable improvement that may be needed in the long term towards the ends of the plan period to improve traffic flows."

A19 (T)/A179 Junction

5.4.22 In response to the planning applications for Quarry Farm and High Tunstall, both HBC and Highways England raised concerns relating to the potential impact of both developments upon the safe operation of the existing A19 (T) junction at Elwick Road and Coal Lane, particularly following the evidence of significant queueing traffic on the A19 (T) mainline, reducing the effective deceleration length and increasing the 'potential' for collisions on the main line.

5.4.23 Given these concerns, i-Transport, on behalf of Cecil m Yuill Ltd., presented further details of the rationale for mitigation proposals to come forward in advance of the provision of the Elwick bypass and grade-separated junction on the A19 (T).

5.4.24 These 'short term' mitigation works include the closure of the central reserve gaps at three junction on the A19 (T), including Elwick Road/Coal Lane and North Lane and the provision of full signalisation at the A19 (T)/A179 junction.

5.4.25 Overall, the report concludes that the proposed package of measures will alleviate significant safety concerns relating to the operation of the existing Elwick and Dalton Piercy junctions with the A19 (T) and enable additional capacity to be provided at the A179 junction with the A19 (T) thus enabling the delivery of [an element of] housing within Hartlepool. The report suggests also that journey times to and from Elwick would increase by only 3-4 minutes on the shortest route i.e. a U-turn at the existing grade-separated junction

5.4.26 All of the proposed works are suggested to be deliverable within highway and would be funded by Developers.

6 Alternative Arrangements

6.1.1 Given the findings identified by others in their assessments of traffic impacts, as summarised in **Section 5**, there would appear to be a combination of works that would have a potentially more limited environmental impact and achieve the outcomes attributed to the proposed bypass scheme.

6.1.2 The operational principles of the works have been identified to be appropriate in the work undertaken by the Consultants representing the housing developers, yet these combined options, some of which are identified by the Council in its Local Infrastructure Plan (LIP), have not been considered as an alternative to the bypass scheme, particularly in respect of the business case. The combination of works can be summarised as follows:

- Provision of the Western Relief Road (LIP);
- Improvement of the A179/Hart Road roundabout;
- Widening of the A179 (LIP);
- Further improvement to the A179/A19 (T) junction; and
- Closure of gaps on the A19 (T).

6.1.3 The accumulated benefits would appear to be:

- The curbing of accidents at the Elwick Road junction with the A19 (T);
- Facilitating the housing development required of the Local Plan;
- The use of an existing grade separated junction (GSJ) rather than the construction of a further GSJ with its associated environmental impacts as identified in the business case.

7 Summary and Conclusion

7.1 Summary

7.1.1 MJM Consulting Engineers Ltd. has been commissioned by Mr. M. Seymour to review the supporting technical information prepared in relation to the proposed Elwick bypass so as to confirm and to better understand the rationale behind the currently promoted route, and to what extent this 'preferred' alignment can or should be amended.

7.1.2 The principal grounds for seeking an amendment to the alignment is borne out of concerns that it will result in a detrimental impact on road safety, particularly, along the route of the existing Elwick Road.

7.1.3 A freedom of information (FOI) request was submitted to Hartlepool Borough Council (HBC) pursuant to the Freedom of Information Act (FIA) 2000; Environmental Information Regulations (EIR) 2004; and the INSPIRE Regulations 2009.

7.1.4 For the most part, the information requested of the Council was not provided; particularly in respect of the detailed design of the bypass, design compliance and departures from standard, and associated Road Safety Audits.

7.1.5 The Council did provide a link to the Local Plan Examination Library website and, in respect of traffic forecasting, to the Transport Assessment reports accompanying planning applications for major residential development to the northwest of Hartlepool.

7.1.6 There is an accident problem at the junction of the A19 (T) and Elwick Road that is perceived to be particularly onerous and requires to be ameliorated. There is no doubt that a problem exists, however, the various Transport Assessments prepared to accompany development proposals all confirm that the problem is not unduly onerous given the location and type of junction and the volume of traffic observed to use it. This view was endorsed by the Planning Inspectorate.

7.1.7 The safety assessment undertaken on behalf of Highways England does not recommend the provision of a grade separated junction to ameliorate the accident problem; moreover, such a scheme would not be considered to reflect good value for money. Rather, the suggested mitigation would be the prohibition of right turns and the closure of the existing gaps in the A19 (T) central reserve at Elwick Road and North Lane. This alternative option has been considered by i-Transport and has been demonstrated to be achievable.

7.1.8 The proposed Elwick bypass scheme is also considered to be a critical piece of infrastructure required to bring forward much needed housing development. However, the Transport Assessments accompanying the housing planning applications confirm that the forecast traffic generation form these sites can be accommodated at the A179/A19 (T) junction and that traffic would assign away from Elwick as a consequence of the provision of the Western Relief Road. The impact of remaining trips from Quarry Farm have not been considered at the junction, however, these trips are relatively limited and, if required to accommodate the traffic, further mitigation of the junction may be possible.

7.1.9 In addition, the Council has identified a number of schemes in its Local Infrastructure Plan, these include the widening of the A179 and the provision, in the longer term, of the Western Relief Road. Given these works, there is the potential to provide the capacity required to accommodate the proposed housing developments without the need for another environmentally sensitive grade separated junction on the A19 (T) and a new road through the rural land scape around Elwick; the environmental impact of which has not, to our knowledge, been considered in an Environmental Statement.

7.1.10 Notwithstanding the above, the design of the preferred alignment of the bypass scheme appears to be deficient in respect of stopping sight distance (SSD) and full overtaking sight distance (FOSD), this is as a consequence of both the horizontal alignment of the new road and the horizontal and vertical alignment of Elwick Road, on to which the bypass connects. These two design issues are fundamental and essential.

7.1.11 Equally, the new road is designed to be a 7.3m single carriageway. A broad brush assessment of traffic use in the design year suggests that the carriageway width is insufficient to accommodate the likely volume of traffic; this is compounded further as the width of the unimproved Elwick Road reduces to 6m and would likely be operating in excess of capacity at opening.

7.1.12 Notwithstanding that the route currently has a weight limit of 7.5tonnes, Elwick Road would also see a significant increase in heavy goods vehicle movements where such movements are currently limited. The increase in traffic volumes on the unimproved route, particularly HGV traffic and the deficiencies in the design of the bypass and, moreover, the existing, unimproved Elwick Road, suggests the potential to relocate an accident problem from the A19 (T) on to Elwick Road, particularly in respect of the minor junctions that provide access to private residential development. Again, there is no Road Safety Audit of the proposals to refer to in this regard.

7.1.13 All alternatives to the proposed bypass have been discounted without full explanation; certainly the Business Case considers only one option in respect of its Cost/Benefit. It may be that an alternative scheme, as discussed in this report, may provide a more cost effective improvement that achieves the same outcomes attributed to the bypass.

7.2 Conclusion

7.2.1 In conclusion, therefore:

- The significance of the accident problem at the Elwick Road junction with the A19 (T) may be overstated given the conclusions of the Planning Inspector and the Highway Consultants employed to consider the transport impacts of new housing development;
- The principle of the bypass scheme has been represented to the public, through consultation, as an accident remediation scheme. There was no mention in the consultation document of bringing forward housing development;
- The bypass scheme incorporates a number of departures from design standards that could result in a relocation of an accident black spot from the A19 (T) on to Elwick Road;
- Elwick Road has insufficient capacity to accommodate the traffic volumes likely to use it, as a third principal route into Hartlepool;
- The provision of a new grade separated junction on the A19 (T) will have significant environmental impacts, as recognised by the accompanying Business Case; yet
- The Business Case does not consider and compare the cost & benefit of other options which exist and have been demonstrated to deliver the benefits of the bypass in respect of road safety and delivery of housing development; and therefore
- These alternative options require further consideration in the Business Case, as at present the fundamental need for the bypass scheme do not appear to have been demonstrated.