Lancashire County Council Planning Application Reference: 11/05/1584 Completion of the Heysham M6 Link Road

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Proof of evidence: Accidents & safety

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Evidence prepared for:

The Environmental and Sustainable Transport Alliance (ESTA)

Consisting of:
The Campaign to Protect Rural England (CPRE)
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Friends of the Earth (FOE) North West
North West Transport Activists Roundtable
(NW TAR)
Sustrans
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1 Introduction

1.1 My name is John Whitelegg and I am Visiting Professor of Sustainable Transport at Liverpool John Moores University, Professorial staff member of the Stockholm Environment Institute at the University of York and Managing Director of the transport consultancy, Eco-Logica Ltd. I have lived in Lancaster for 30 years and am a Lancaster City councillor. My evidence and appearance at this inquiry is in my capacity as a transport professional and a transport consultant

1.2 I am the author of ten books on transport and of reports on transport policy and practice including "Roads, Jobs and the economy", "Driven to Destruction: absurd freight movement and European road building", "Driven to Shop: transport intensity and the environment", "Freight transport, logistics and sustainable development" and "Traffic and Health"

1.3 I have presented evidence on various matters at the public inquiries into the Birmingham Northern Relief Road, the Broughton (Lancashire) Bypass, Heathrow Terminal 5, Manchester Runway 2, the Thames Gateway Bridge, Walton Bridge (Surrey) and the BAA appeal against the decision of Uttlesford District Council to refuse planning permission for the expansion of Stansted Airport

1.4 In this proof of evidence I will examine the case presented by Lancashire County Council for this road on accidents and safety. I will also present evidence to this Inquiry on noise, climate change and air quality.

1.5 Road safety in respect of the Heysham M6 Link Road is dealt with in the Environmental Statement, Volume 1, Part A, Report 2 in section 2.2.71. The road safety assessment predicts a reduction in accidents of 691 over a 60 year period (para 2.2.75). The reduction in accidents includes a reduction of 22 fatalities (over 60 years) and a total monetary benefit (again over 60 years) of £31.5 million at 2002 prices and values.

1.6 Any reduction in accidents and personal injuries from any source or intervention is welcome but in this evidence we wish to point out that the settled view of national and international road safety professional experience and advice is that the majority of these benefits can be achieved on a much shorter time scale and at a much lower cost by other more sustainable interventions than building roads.

1.7 The importance and urgency of road safety interventions to eliminate deaths and serious injuries and reduce all injuries is so important that this intervention should not be dependent on building a new road. Indeed the use of a bypass to "solve" a road safety problem is akin to using a hammer to crack a nut.

2 Reducing deaths and serious injuries

2.1 Speed is crucially important in reducing injuries in the road traffic environment. This has a two-fold significance for the purposes of this Inquiry. Firstly it is well established that if public bodies wish to move rapidly to a reduction in personal injury accidents then serious speed control and enforcement through engineering, 20mph limits and enforcement can achieve this. This stands out as head and shoulders above a blunt instrument such as building a bypass and building a bypass is not a credible road safety intervention. Secondly the bypass will be a fast road. A new road linking a motorway to well-defined destinations on raised embankments and with good sight lines and with an absence of slower moving traffic on the road (e.g. cyclists) will encourage speed. This will add to road traffic danger at intersections and, possibly, on the existing highway network as drivers struggle to adapt to lower speeds as they move from the “fast” environment to a “slow” environment.

2.2 The key problem in road safety debate is speed and the WHO has identified the need to reduce speed fundamentally and in a system-wide manner:

> **Risk factors influencing crash involvement**
>
> Speed
>
> The speed of motor vehicles is at the core of the road injury problem. Speed influences both crash risk and crash consequence.
>
> “Excess speed” is defined as a vehicle exceeding the relevant speed limit; “inappropriate speed” refers to a vehicle travelling at a speed unsuitable for the prevailing road and traffic conditions. While speed limits only declare higher speeds to be illegal it remains for each driver and rider to decide the appropriate speed within the limit.
>
> The speed drivers choose to travel at is influenced by many factors (see Table 3.3). Modern cars have high rates of acceleration and can easily reach very high speeds in short distances. The physical layout of the road and its surroundings can both encourage and discourage speed. Crash risk increases as speed increases, especially at road junctions and while overtaking – as road users underestimate the speed, and overestimate the distance, of an approaching vehicle.

Crash risk

There is a large amount of evidence of a significant relationship between mean speed and crash risk:

- The probability of a crash involving an injury is proportional to the square of the speed. The probability of a serious crash is proportional to the cube of the speed. The probability of a fatal crash is related to the fourth power of the speed (*38, 39*).
- Empirical evidence from speed studies in various countries has shown that an increase of 1 km/h in mean traffic speed typically results in a 3% increase in the incidence of injury crashes (or an increase of 4–5% for fatal crashes), and a decrease of 1 km/h in mean traffic speed will result in a 3% decrease in the incidence of injury crashes (or a decrease of 4–5% for fatal crashes) (*40*).
- Taylor et al. (*41, 42*), in their study on different types of roads in the United Kingdom, concluded that for every 1 mile/h (1.6 km/h) reduction in average traffic speed, the highest reduction achievable in the volume of crashes was 6% (in the case of urban roads with low average speeds). These are typically busy main roads in towns with high levels of pedestrian activity, wide variations in speeds and high frequencies of crashes.

- A meta-analysis of 36 studies on speed limit changes showed, at levels above 50 km/h, a decrease of 2% in the number of crashes for every 1 km/h reduction in the average speed (*43*).
- A variation in speeds between different vehicles travelling at different speeds within the traffic stream is also associated with crash occurrence (*44*).
- A study of crashes within rural 60 km/h zones involving injuries to car occupants found that the relative risk of crash involvement doubles, or more, for each increase of 5 km/h of travelling speed above 60 km/h (*45*) (see Table 3.4). Travelling at 5 km/h above a road speed limit of 60 km/h results in an increase in the relative risk of being involved in a casualty crash that is comparable with having a blood alcohol concentration (BAC) of 0.05 gram per decilitre (g/dl) (*45*).

Severity of crash injuries

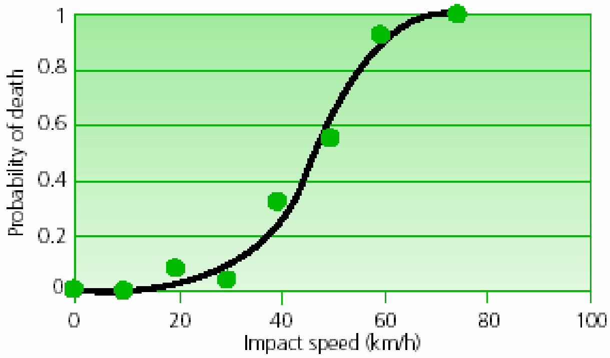
Speed has an exponentially detrimental effect on safety. As speeds increase, so do the number and severity of injuries. Studies show that the higher the impact speed, the greater the likelihood of serious and fatal injury:

- For car occupants, the severity of crash injury depends on the change of speed during the impact, usually denoted as Δv. As Δv increases from about 20 km/h to 100 km/h, the probability of fatal injuries increases from close to zero to almost 100% (*46*).
- The probability of serious injury for belted front-seat occupants is three times as great at 30 miles/h (48 km/h) and four times as great at 40 miles/h (64 km/h), compared with the risk at 20 miles/h (32 km/h) (*47*).
- For car occupants in a crash with an impact speed of 50 miles/h (80 km/h), the likelihood of death is 20 times what it would have been at an impact speed of 20 miles/h (32 km/h) (*48*).
- Pedestrians have a 90% chance of surviving car crashes at 30 km/h or below, but less than a 50% chance of surviving impacts at 45 km/h or above (*49, 50*) (see Figure 3.3).

- The probability of a pedestrian being killed rises by a factor of eight as the impact speed of the car increases from 30 km/h to 50 km/h (*51*).
- Older pedestrians are even more physically vulnerable as speeds increase (*52*) (see Figure 3.4).
- Excess and inappropriate speed contributes to around 30% of fatal crashes in high-income countries (*53*).

FIGURE 3.3

Pedestrian fatality risk as a function of the impact speed of a car



Everywhere, speed limits are widely flouted (*37*). At high speeds, environmental damage from exhaust emissions and traffic noise are greater at higher than at moderate speeds.

Figure 3.5 summarizes the main effects of speed on the risk of crashes and crash injury.

FIGURE 3.5

Summary of the effects of speed on crashes and crash injury

In highly-motorized countries, excessive and inappropriate speed is a major cause of around one in three of all fatal and serious crashes (53). Speed affects the risk of a crash occurring: the greater the speed, the less time there is to prevent a collision. At the same time, the greater the speed, the more severe the consequences, once a crash has occurred. Various studies have indicated that:

- An average increase in speed of 1 km/h is associated with a 3% higher risk of a crash involving an injury *(40, 41)*.
- In severe crashes, the increased risk is even greater. In such cases, an average increase in speed of 1 km/h leads to a 5% higher risk of serious or fatal injury *(40, 41)*.
- Travelling at 5 km/h above a road speed limit of 65 km/h results in an increase in the relative risk of being involved in a casualty crash that is comparable with having a BAC of 0.05 g/dl *(45)*.
- For car occupants in a crash with an impact speed of 50 miles/h (80 km/h), the likelihood of death is 20 times what it would have been at an impact speed of 20 miles/h (32 km/h) *(48)*.
- Pedestrians have a 90% chance of surviving car crashes at 30km/h or below, but less than a 50% chance of surviving impacts at 45 km/h or above *(50)*.
- The probability of a pedestrian being killed rises by a factor of 8 as the impact speed of the car increases from 30 km/h to 50 km/h *(51)*.

Source: WHO (2004) World Report on Road Traffic Injury prevention, pages 76-78

http://www.who.int/world-health-day/2004/infomaterials/world_report/en/chapter3.pdf

2.3 It is possible to achieve the total accident and casualty savings in Table 2.2.11 on a shorter time scale, at lower costs and at a much improved benefit cost ratio then is possible through linking this dimension of public policy with road building.

3 Interventions

3.1 The intervention s that can produce dramatic savings in personal injury rates without road building have been summarised by the WHO:

Area-wide urban safety management

Engineering measures applied on an area-wide basis in towns and cities create safer conditions for pedestrians and cyclists, as well as avoiding the displacement of traffic which could lead to crashes elsewhere. Research is urgently needed in developing countries into area-wide urban safety management relating to motorized two-wheelers.

The principal road safety engineering techniques for improving the safety of pedestrians and cyclists are the provision of safer routes – through segregation and separation – and area-wide speed reduction or traffic-calming measures (*22, 23*). These are discussed below.

Safer routes for pedestrians and cyclists. The creation of networks of connected and convenient pedestrian and cyclist routes, together with the provision of public transport, can lead to greater safety for vulnerable road users (*47*). The routes will typically consist of footpaths or cycle paths separate from any carriageway, pedestrian-only areas with or without cyclists being admitted, footpaths or cycle tracks alongside carriageways, and carriageways or other surfaces shared with motor vehicles. Where pedestrian or cycle routes cross significant flows of motor vehicle traffic, the location and design of the crossing point needs special attention. Where routes are not separated from carriageways, or where space is shared with motor vehicles, the physical layout will need to manage speeds (*15*).

Pedestrian footpaths and pavements are used more in high-income than in low-income countries and tend to be in urban rather than rural areas. The risk of a crash on roads without pavements separating pedestrians from motorized traffic is twice that on a road with a pavement (*48*). Pavements in poor condition or obstructed

by parked vehicles may force pedestrians to walk on the street, thus significantly increasing crash risk. This danger is particularly great for people carrying heavy loads, pushing prams, or who have difficulty in walking. Studies in low-income and middle-income countries have shown that even where pavements exist, they are often blocked – for instance, by street vendors' stalls (*18, 49*).

Providing pavements for pedestrians is a proven safety measure, which also helps the flow of motorized traffic. Bicycle paths have also been shown to be effective in reducing crashes, particularly at junctions (*22*). Danish studies have found reductions of 35% in cyclist casualties on particular routes, following the construction of cycle tracks or lanes alongside urban roads (*50*).

Traffic-calming measures. At speeds below 30 km/h pedestrians can coexist with motor vehicles in relative safety. Speed management and traffic-calming include techniques such as discouraging traffic from entering certain areas and installing physical speed-reducing measures, such as roundabouts, road narrowings, chicanes and road humps. These measures are often backed up by speed limits of 30 km/h, but they can be designed to achieve various levels of appropriate speed.

In Europe, there has been much experimentation with these measures and crash reductions of between 15% and 80% have been achieved (*44, 51–54*). In the town of Baden, Austria, about 75% of the road network is now part of a 30 km/h zone, or else a residential street with an even lower speed limit. Since integrated transport and a wide-ranging safety plan were introduced in 1988, the town has seen a 60% reduction in road casualties (*55*).

Most of the principles incorporated into design guidelines for traffic calming in high-income countries also apply to low-income countries, though in practice the guidelines will need to be modified because of the much higher proportion of non-motorized traffic (*23*). As Table 4.1, which summarizes the effects of measures undertaken in a British town, shows, area-wide speed and traffic

management can be highly effective, particularly in residential areas, where benefits have been found to exceed costs by a factor of 9.7 (*56*).

A systematic review of 16 controlled studies from high-income countries also showed that area-wide traffic calming in urban areas could reduce road traffic injuries. No similar studies from low-income or middle-income countries were found (*57*).

Source:

Source: WHO (2004) World Report on Road Traffic Injury prevention, pages 116-117

http://www.who.int/world-health-day/2004/infomaterials/world_report/en/chapter3.pdf

3.2 The conclusion of the WHO is that road traffic crashes are predictable and can be prevented:

> Road traffic crashes are predictable and therefore preventable. In order to combat the problem, though, there needs to be close coordination and collaboration, using a holistic and integrated approach, across many sectors and many disciplines.

Source: as above, page 164

3.3 It is illogical and unnecessary to associate road safety improvements with the building of a new road. The improvements should be done now and on a much accelerated time scale

3.4 It is illogical to claim road safety benefits in monetary terms from the new road when these could have been achieved without the new road at a lower costs and in manner more consistent with government guidelines on best value/value for money

3.5 Carrying out the road safety interventions recommended by the WHO (on a time scale that will be 4-5 years ahead of the bypass scheme) will save lives and injuries that will be "lost" if we put our road safety eggs into the HM6L basket

4 Local circumstances

4.1 The HM6L will create a number of increased traffic flows on links in the highway system. A summary of this information is presented in table 12.4.1 in ES, Volume 1, part A, Report 12, Traffic Noise and Vibration. Eight of the road links quoted show traffic increases in the range 28-120%

4.2 These increases in traffic flow will feed directly into increases in road danger. An increased volume of traffic will present pedestrians with greater difficulties in crossing roads (e.g. reduced gaps in which to cross between moving traffic) and increased interaction between pedestrian flows and increased vehicle flows. This does not appear to have been quantified by the proposer.

4.3 We also need to review this information on traffic flows in the light of the evidence of TSLM and the degree of induced traffic that might be expected from a scheme of this kind when benchmarked against similar schemes.

4.4 This is especially problematic for the staff and students of the Lancaster and Morecambe College. There are 5000 students and 660 staff at the College and many of these will have daily travel routines involving arriving and departing on foot, by bike or from a bus stop. Many will move off site during the day to use local food and retail outlets. There appears to have been no assessment of these institutional and geographically specific risks.

4.5 Road safety issues often bear down disproportionately on population sub-groups. Children at play or on journeys to and from school are particularly vulnerable as are elderly people. People in low income groups are more vulnerable than those in high income groups. Solving road safety problems for these groups requires system wide attention, great attention to detail in relevant residential and institutional areas and many hundreds of small scale projects to bring about an effective solution. A combination of Portsmouth's blanket 20mph speed limit on residential roads and Hull's 100+ traffic calmed areas would provide an effective solution. A bypass cannot do this.

4.6 There appears to be no assessment of the transformation in risk to be brought about by this road. The new "risk landscape" can only be constructed and evaluated and communicated to local residents through a detailed analysis of population sub-groups, daily pedestrian flows and the interaction between population numbers in vulnerable sub-groups and traffic volumes.

4.7 A general finding that accidents and injuries will be reduced by a new road is not necessarily consistent with the outcome that geographically and population group specific rates go up. This view is supported by government guidance in WebTag:

As the number of vehicle-kms on the network change as a result of the introduction of an intervention, so the number of accidents will also alter. Thus, if the impact of an intervention is to reduce the number of vehicle-kms travelled, then this will tend to reduce the number of accidents on the network. Similarly, if the intervention causes a reduction in the number of vehicle-kms on one type of road but an increase for a second type of road, then the net impact on the number of accidents will depend upon the relative accident rates for the two types of road.

Source: WebTag

The Accidents Sub-Objective

TAG Unit 3.4.1 June 2005

http://www.webtag.org.uk/webdocuments/3_Expert/4_Safety_Objective/3.4.1.htm#4

5 Conclusions

5.1 The road safety benefits claimed to be associated with the construction of the HM6L can be delivered earlier, more cheaply, more effectively and at an increased benefit-cost ratio than in the road building option

5.2 There is no justification for delaying these road safety improvements until a road is built when they can be delivered earlier and save more lives and injuries by so doing

5.3 In light of the evidence from the World Health Organisation presented above, given the increased traffic flows generated by the road, and the increased speeds travelled by vehicles on the road itself, claims that this scheme will increase road safety and decrease accidents, injuries and fatalities do not seem likely to be robust.

5.4 The road safety assessment carried out by the proposer does not seem to take into account geographically and institutionally specific factors which are special to this area. There is an increased risk of accident and injury in the vicinity of the College and no account has been taken of potentially damaging interactions between pedestrian flows and increased vehicle flows

5.5 There appears to be no consideration of the needs and interests of vulnerable groups especially children and the elderly

5.6 Building a bypass at a cost of £156 million to produce road safety benefits is not a good example of best value or value for money (VFM) and is at variance with government instructions to produce VFM