In Parliament – Session 2022 - 2023

HS2

High Speed Rail (Crewe – Manchester)

Supplementary Environmental Statement 1 and Additional Provision 1 Environmental Statement

Volume 5 Appendix: CT-001-00004

Traffic and transport

Technical note – Guidance on significance criteria for traffic and transport

Q35

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Department for Transport

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1 Introduction

1.1.1 This technical note provides further guidance to that contained in the Phase 2b Environmental Impact Assessment (EIA) Scope and Methodology Report[1] (SMR) on how traffic and transport effects will be determined. This guidance is based on criteria specified in the SMR published with the main ES (that is the ES submitted with the HS2 Phase 2b (Crewe – Manchester) Bill in January 2022).

1.1.2 The methodology builds on that described in the SMR and further describes the process by which the significance of traffic and transport impacts and effects will be determined and applied.

1.1.3 The assessment process includes:

- establishing a future baseline that includes traffic and transport; and
- undertaking an impact assessment to understand the ability of the receptors (modes and/or networks) to adapt to future transport demands during the construction and operation of the Proposed Scheme (where appropriate).

1.2 Use of this guidance

1.2.1 Use of this guidance will require analysis of transport data, technical assessments and professional judgments to be made and assessors should use this report to provide guidance rather than as a series of strict rules. Judgements which result in an effect being assessed as more than one category higher or lower than indicated should be exceptional and any variation will need clear justification.

1.2.2 Where specific types of information referred to in this guidance are not available, the assessments can be based on alternative datasets so long as these are judged to be robust and appropriate for the needs of the assessment, which should be agreed with HS2 Ltd.

1.3 Prediction and evaluation of impacts and effects

1.3.1 The assessment will describe the likely significant effects including the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the Proposed Scheme.

1.3.2 A distinction has been made in the assessment between impacts and effects, where:

[1] High Speed Two (HS2) Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement.* Available online at: https://www.gov.uk/government/collections/hs2-phase2b-crewe-manchester-environmental-statement.

- impacts are defined as the predicted change to the baseline environment attributable to the Proposed Scheme (e.g. changes in traffic levels or delays and their duration); and
- effects are the consequence of impacts on environmental resources or receptors of particular value or sensitivity and, most commonly for transport, the number of people affected or the importance of a link disrupted.

1.3.3 The primary objective of the assessment is to identify likely 'significant' effects. This will be achieved by firstly assessing the magnitude of an impact and then by reviewing the extent to which it affects receptors. The process for determining whether the result is deemed to be significant is described below.

1.4 Impact assessment

1.4.1 Table 1 shows the impacts that will be assessed, for both the construction and operational stages of the Proposed Scheme.

Table 1: Impacts to be assessed

Traffic and transport impacts
Public transport delay
Disruption at stations/interchanges
Traffic delays to vehicle occupants
Vulnerable road users (traffic related severance, non-traffic related severance, amenity and ambience)
Accidents and safety
Parking and loading
Waterways

1.4.2 The SMR identifies that significant effects may occur on receptors in two ways, when:

- a particular threshold is passed; or
- there is a particular combination of impacts that taken together create a likely significant effect.

1.4.3 The scheme-related impacts on the receptors can be measured on a spatial and temporal basis and will be numerically quantified or employ a qualitative judgement. Transport assessment data and relevant modelling should be used as the prime sources of information from which to identify the traffic and transport impacts.

1.4.4 The magnitude of an impact is a combination of the scale of the change (e.g. percentage increase in traffic) and the expected duration. Hence a large change over a short period could result in the same magnitude of impact as a smaller change but over a longer duration. Where considering changes to predicted impacts if the scheme for assessment changes, consideration will be given to whether, for example, a greater increase in HS2 traffic may be balanced by a reduced duration of impact. Similarly, if HS2 traffic levels were reduced this may not reduce the overall impact if the duration increased.

1.5 Thresholds

1.5.1 In assessing traffic and transport impacts, thresholds are needed to define the point at which such impacts become significant effects. These effects can then be classified as of minor, moderate or major significance. The level of 'graduation' employed to define significance is therefore a key consideration of how to measure each effect.

1.6 Impacts and effects

1.6.1 The significance of a traffic and transport effect can be considered as the combination of the magnitude of the impact, including the duration of the impact (temporal), and the sensitivity and/or value of the receptor affected. For traffic and transport, the sensitivity and/or value of the receptor will generally be represented by the number of travellers affected but will also recognise the extent of its locational impacts. These criteria and thresholds and their measurement will be defined based on professional judgement and existing industry accepted practice.

1.6.2 In considering the scale of effect resulting from any particular impact identified, this can be measured according to the typical generic definitions in Table 2.

Table 2: Impact magnitude criteria for traffic and transport

Receptor sensitivity	Definitions
Not significant	Unlikely to measurably affect the well-being of travellers so that the existing base case remains constant
Low	Likely to or may affect a low number of travellers (with the number depending on the local context)
Medium	Likely to affect a moderate number of travellers (with the number depending on the local context)
High	Very likely to affect a major number of travellers (with the number depending on the local context)

1.6.3 Further guidance on this aspect is given in the tables that follow for each criteria. In some cases, a proxy measure is included that reflects the number of travellers affected.

1.6.4 Where quantitative analysis is not possible, it will be necessary to use qualitative categories for assessing the number of travellers affected (e.g. low, medium, or high). Further guidance on this aspect is also given in the tables that follow for each criteria.

1.6.5 Where relevant, receptors may, in addition, be considered valuable and/or sensitive if:

- they could be easily affected by, or are dependent on, specific current traffic and transport characteristics or flows; and/or
- they could be adversely affected if they are subject to long-term changes in the traffic and transport flows that differ from historic norms.

1.7 Mitigation plan

1.7.1 For effects that are classified as major significant or moderate significant, a mitigation plan proportionate to the effects should be developed where there are reasonably practicable options that address the traffic and transport scenarios and potential impacts that have been identified. It is expected that minor effects will be mitigated during the detailed design process for the Proposed Scheme.

1.7.2 For any effects which cannot be mitigated within the scheme design (i.e. a residual impact) or through identified additional mitigation, the consequences of proceeding with the Proposed Scheme for the receptors (i.e. travellers) should be described.

2 Further definition of significance criteria

2.1 Approach to definition

2.1.1 The SMR criteria to judge significance are to be applied as:

- a binary threshold approach to significance, i.e. an effect is either significant or not significant; and
- a graduated approach which defines the 'degree' of significance.

2.1.2 The key issues addressed in this note in relation to the definition of the SMR significance criteria are:

- the assessment of each impact to determine the degree of significance; and
- where numerical measures can be applied.

2.1.3 When using the tables throughout this document, if a value lies exactly on the boundary between two categories, the upper (i.e. most severe) category should be used to provide a 'worst case' assessment.

2.1.4 The assessment is a two-stage process as follows:

Stage one – SMR criteria

2.1.5 Utilise the SMR criteria to determine whether the effect is significant and therefore should be reported within the ES.

Stage two – refinement of assessment

2.1.6 Where the effects are deemed to be significant in the Stage 1 assessment, the Stage 2 assessment will enable them to be further categorised as being of minor, moderate or major significance.

2.1.7 The Stage 2 criteria thus build on the Stage 1 assessment, and all criteria (i.e. tabulated, bulleted or in text) need to be considered and assessed.

2.1.8 Many of the criteria set out in the SMR have a temporal scope to the assessment of an impact, which is a 'fixed' criteria that should be applied in combination with all other 'variable' criteria such as changes in journey times, numbers, percentages etc.

2.1.9 While temporal scope is generally defined as a continuous period, where there are frequent shorter duration impacts (for example a large number of weekend closures of a busy passenger rail service) judgment will be needed to determine whether these impacts, when taken in combination, amount to significant effects even if individually each would not.

3 Significance criteria for construction assessment

3.1 Introduction

3.1.1 The criteria outlined below will be used to assess the significance of traffic and transport impacts and effects during construction of the Proposed Scheme.

3.1.2 Any permanent effects of construction will be considered in the operations phase assessments for traffic and transport. Thus, the impact of any ongoing permanent changes introduced during construction will be considered together with increases in travel demand and the wider effects of the operations phase. Only when there are expected to be different significant effects during construction or the permanent changes affect temporary impacts (such as routeing of traffic during construction) should they be assessed for construction.

3.2 Public transport delay

Stage 1 – SMR criteria

3.2.1 A significant impact on journeys by bus and heavy and light rail modes caused by the Proposed Scheme is defined as any of the following where this lasts for more than four consecutive weeks in any 12-month period:

- a change of more than 10% in a majority of (or typical) journey times by any public transport mode;
- a change in journey distance by bus of more than 400m in urban areas and 1km in rural areas;
- a relevant delay, disruption or overcrowding impact affecting the public transport network over a wide area; and
- a relevant change to service frequency, capacity, loss of through connections or reduction in hours of operation.

3.2.2 The journey times to be considered are the typical journey times that would be expected over the additional distance introduced as a result of the intervention, rather than specifically those of individual passenger journeys or the end-to-end route journey time.

Stage 2 – refinement of criteria

3.2.3 The criteria shown in Table 3 and Table 4 should be applied in Stage 2, with different criteria being applied in the rural and urban areas. The bus and train profiles relating to low, medium and high frequencies are used to reflect the numbers of people using the routes. If data is available on likely numbers of users, these should be considered in place of simple frequency.

Table 3: Criteria for Stage 2 assessment – public transport delay, rural

Assessment of public transport delay during construction – rural							
Magnitude of impacts							
Criteria		**Negligible**	**Low**		**Medium**		**High**
Percentage change in route end-to-end journey time		<10%	10-20%		20-40%		40% or more
Distance change		<1km	1-2km		2-4km		4km or more
No. of travellers affected/duration of impact		<4 weeks	4 weeks-4 months	4 months or more	4 weeks-4 months	4 months or more	>4 weeks
Significance of effect							
<3 buses or trains/hr	**Low**	Not significant	Minor	Minor	Minor	Moderate	Moderate
Between 3-6 buses or trains/hr	**Medium**	Not significant	Minor	Moderate	Moderate	Major	Major
>6 buses or trains/hr	**High**	Not significant	Moderate	Moderate	Major	Major	Major

Table 4: Criteria for Stage 2 assessment – public transport delay, urban

Assessment of public transport delay effects during construction – urban							
Magnitude of impacts							
Criteria		**Negligible**	**Low**	**Medium**	**High**		
Percentage change in typical journey times		<10%	10-20%	20-40%	40% or more		
Distance change		<400m	400-800m	800-1,200m	1,200m or more		
No. of travellers affected/duration of impact		<4 weeks	4 weeks-4 months	4 months or more	4 weeks-4 months	4 months or more	>4 weeks
Significance of effect							
<8 buses or trains/hr OR less than 5,000 passengers/day	**Low**	Not significant	Minor	Minor	Minor	Moderate	Moderate
Between 8-20 buses or trains/hr OR between 5,000 and 10,000 passengers/day	**Medium**	Not significant	Minor	Moderate	Moderate	Major	Major
>20 buses or trains/hr OR more than 10,000 passengers/day	**High**	Not significant	Moderate	Moderate	Major	Major	Major

Guidance on terminology

3.2.4 The following guidance on terminology is highlighted:

- relevant delay, disruption or overcrowding impact are those caused by the Proposed Scheme during the construction phase; and

- the loss of a through connection or direct linkage resulting in the inability to make a direct connection, so requiring some form of interchange to be made.

3.3 Disruption at stations/interchanges

Stage 1 – SMR Criteria

3.3.1 A significant impact on stations/interchanges is defined as a change in the vicinity that lasts for more than four consecutive weeks in any 12-month period including:

- loss of physical linkage for the next stage of the journey;
- loss of or relocation of more than 100m of bus facilities and operations (e.g. of bus stops, passenger waiting facilities, bus stands or operator facilities);
- loss of or relocation of more than 100m of taxi facilities and operations (e.g. taxi stands, passenger waiting facilities or operator facilities); and
- loss of or relocation of more than 100m of 'park-and-ride' facilities or operations (e.g. dropping off areas).

Stage 2 – refinement of criteria

3.3.2 The criteria shown in Table 5 should be applied in Stage 2.

Table 5: Criteria for Stage 2 assessment – disruption at stations/interchanges

Assessment of disruption at stations/ interchanges during construction							
Magnitude of impacts							
Criteria		**Negligible**	**Low**		**Medium**		**high**
Change in distance to replacement facility		<100m	100-200m		200-400m		400m or more
No. of travellers affected/duration of impact		<4 weeks	4 weeks-4 months	4 months or more	4 weeks-4 months	4 months or more	>4 weeks
Significance of effect							
See Table 6 below	**Low**	Not significant	Minor	Minor	Minor	Moderate	Moderate
See Table 6 below	**Medium**	Not significant	Minor	Moderate	Moderate	Major	Major
See Table 6 below	**High**	Not significant	Moderate	Moderate	Major	Major	Major

3.3.3 In considering relocation, the convenience of any alternative location should be taken account of and the distance should relate to the change in convenience. Where the relocation is likely to be similarly convenient to the original location or there are few, if any, passengers affected and the public transport operator would not be adversely affected, judgment should be used to determine whether there is any significant effect.

3.3.4 An example pen portrait for disruption at stations/interchanges is set out in Table 6; this distinguishes the number of people using the station per day in rural and urban situations.

The bus and train profiles relating to low, medium and high usage are again used to reflect the numbers of people using the routes.

Table 6: Pen portrait for disruption at stations/interchanges

	Rural	Urban
Low	<3 buses or trains/hr	<8 buses or trains/hr OR less than 5,000 passengers/day
Medium	Between 3-6 buses or trains/hr	Between 8-20 buses or trains/hr OR between 5,000 and 10,000 passengers/day
High	>6 buses or trains/hr	>20 buses or trains/hr OR more than 10,000 passengers/day

3.3.5 The loss of a through connection or physical linkage results in the inability to make a direct connection, requiring some form of interchange movement to be made. If this occurs, then a judgement should be made as to how the movement would be made and this should then be assessed using the public transport delay criteria in Tables 5 and 6.

3.4 Traffic delays to vehicle occupants

Stage 1 – SMR criteria

3.4.1 A significant change in driver/vehicle passenger delay (including delays to bus and coach passengers) that is expected to last for more than four consecutive weeks in any 12-month period is defined as any one of the following:

- a diversion that leads to an increase in journey length of more than 1km on a route carrying more than 100 vehicles per day, or 5km on a route carrying more than 40 vehicles per day, or 10km on any other route;
- where a significant change in delay relating to junction congestion resulting from the construction of the Proposed Scheme is forecast. This will be measured either as the forecast ratio of flow to capacity or degree of saturation. The junctions for consideration will be discussed with the local highways authority; and
- where there is a change in traffic flow along a road link and the capacity of that link is constrained to a greater extent than the junctions along it, then a similar approach to that set out below for junctions will be used to assess potential delays to road users.

Stage 2 – refinement of criteria

3.4.2 The above criteria will be used to reflect the impacts of changes to traffic flows in terms of changes to congestion and changes to journey lengths due to diversions.

3.4.3 Effects that are of duration less than four consecutive weeks in any 12-month period will be assessed as being not significant.

3.4.4 Changes in overall flows will be related to the Annual Average Weekday Traffic (AAWT) flows. Where AAWT flows are not available, the criteria should be applied for those periods

assessed (e.g. 12 hour, AM or PM peak hour), with the vehicle number thresholds adjusted accordingly. Congestion indicators will be measured based on the forecast ratio of flow to capacity (RFC), degree of saturation (DoS) or the practical reserve capacity (PRC), generally for the AM and PM peak hours. Where the impact on congestion is likely to be higher outside the AM and PM peaks due to HS2 impacts or background conditions such that the effect on congestion will be greater in such periods, relevant periods should be assessed.

3.4.5 The transport assessment will provide the following information where the capacities of a junction are assessed, as follows:

- the congestion indicator for an approach where it increases to over 85% during the construction of the Proposed Scheme and the increase above 85% is 2% or more due to the Proposed Scheme; or
- where the congestion indicator for an approach is over 85% in the baseline and during the construction of the Proposed Scheme increases by 2% or more due to the Proposed Scheme.

3.4.6 This criterion can be simplified to a single test where the congestion indicator for an approach is over 87% with HS2 construction traffic during the construction of the Proposed Scheme and the increase above 85% is 2% or more due to the Proposed Scheme.

3.4.7 This process will identify those junctions affected by construction of the scheme. The criteria shown in Table 7 to Table 9 should be applied in Stage 2 as appropriate. These tables relate to the changes associated with the introduction of the Proposed Scheme, over and above those without the scheme.

3.4.8 The assessment of the change in junction capacity will draw upon a range of techniques as appropriate to the location. Where a well validated network traffic model is available and network wide impacts can be expected, this would generally be used to identify the impacts.

3.4.9 In instances where a robust traffic model is not available (e.g. in some rural areas), there may be a difficulty in establishing the congestion indicators for the junctions potentially impacted by the additional traffic. In these situations, 'rule of thumb' assessments based on professional judgement (such as those set out in Table 9) of junction throughputs and link capacity can be used to identify potential areas of concern and, where this is the case, development of local models should be considered as necessary. Junction capacities of minor roads with other roads will not be modelled, although they may be qualitatively assessed.

3.4.10 Increases in traffic may also have other impacts which will be identified and may need to be assessed by other disciplines.

Table 7: Criteria for Stage 2 assessment – traffic delays to vehicle occupants (traffic diversions)

Assessment of traffic delays to vehicle occupants (traffic diversions) during construction							
Magnitude of impacts							
Criteria		**Negligible**	**Low**		**Medium**		**High**
Diversion distance change	**Roads carrying >100 veh/day**	<1km	1-2km		2-4km		>4km
	Roads carrying 40-100 veh/day	<5km	5-7.5km		7.5-15km		>15km
	Roads carrying <40 veh/day	<10km	10-15km		15-20km		>20km
No. of travellers diverted/duration of impact		<4 weeks	4 weeks-4 months	4 months or more	4 weeks-4 months	4 months or more	>4 weeks
Significance of effect							
<1,000 veh/day	**Low**	Not significant	Minor	Minor	Minor	Moderate	Moderate
Between 1,000-10,000 veh/day	**Medium**	Not significant	Minor	Moderate	Moderate	Major	Major
>10,000 veh/day	**High**	Not significant	Moderate	Moderate	Major	Major	Major

Table 8: Criteria for Stage 2 assessment – traffic delays to vehicle occupants (traffic congestion) where detailed traffic models not available, generally only in rural areas

Assessment of traffic delays to vehicle occupants (traffic congestion) during construction – where detailed traffic models not available								
Magnitude of impacts								
Criteria		**Negligible**	**Low**		**Medium**		**High**	
Change in peak hour two-way traffic flow		<5%	<100 veh/hr		100-250 veh/hr		>250 veh/hr	
Peak hour two-way traffic flow including Proposed Scheme traffic		<500 veh/hr	>500 veh/hr		>500 veh/hr		>500 veh/hr	
Reserve capacity (including Proposed Scheme traffic) at non-minor road junctions or links		>15%	8-15%		2-8%		<2%	
No. of travellers affected/duration of impact		<4 weeks	4 weeks – 4 months	more than 4 months	4 weeks – 4 months	more than 4 months	4 weeks – 4 months	more than 4 months
Significance of effect								
Change in reserve capacity where reserve capacity less than 15%								
<2% change	**Very Low**	Not significant	Not significant	Not significant	Not significant	Not significant	Not significant	Not significant
Between 2 - 5 % change	**Low**	Not significant	Minor	Minor	Minor	Minor	Minor	Moderate
Between 5-10% change	**Medi -um**	Not significant	Minor	Minor	Minor	Moderate	Moderate	Major
>10% change	**High**	Not significant	Minor	Minor	Moderate	Major	Moderate	Major

Table 9: Criteria for Stage 2 assessment – traffic delays to vehicle occupants (traffic congestion), where detailed traffic models available, generally urban areas

Assessment of traffic delays to vehicle occupants (traffic congestion) during construction - where detailed traffic models available								
Magnitude of impacts								
Criteria		**Negligible**	**Low**		**Medium**		**High**	
Future with-scheme Congestion Indicator (junction or link)		<87%	87 - 92%		92 - 98%		98% or more	
No. of travellers affected/duration of impact		<4 weeks	4 weeks – 4 months	more than 4 months	4 weeks – 4 months	more than 4 months	4 weeks – 4 months	more than 4 months
Significance of effect								
Change in congestion indicator above 85%								
<2% change	**Very Low**	Not significant	Not significant	Not significant	Not significant	Not significant	Not significant	Not significant
Between 2-5% change	**Low**	Not significant	Minor	Minor	Minor	Minor	Minor	Moderate
Between 5-10% change	**Medi-um**	Not significant	Minor	Minor	Minor	Moderate	Moderate	Major
>10% change	**High**	Not significant	Minor	Minor	Moderate	Major	Moderate	Major

3.5 Vulnerable road users

3.5.1 Vulnerable road users (also referred to as non-motorised users) include pedestrians, cyclists and equestrians. They are affected by traffic related severance, severance caused by extended travel distances or broken links (barriers to movement) and changes to amenity and ambience. Where such impacts are not expected to last for more than four consecutive weeks in any 12-month period they will be assessed as not significant.

Traffic related severance

Stage 1 – SMR criteria

3.5.2 A change in traffic levels can result in changes to traffic related severance for non-motorised road users, particularly pedestrians using or seeking to cross a road. A significant change is

defined as a 30% increase in traffic flows (either HGV or all vehicles)[2], where the increase is greater than 40 vehicles per day in urban areas or 10 vehicles per day in rural areas.

3.5.3 Where HGV traffic, including HS2 related traffic, is less than 10% of total traffic, the impact on vulnerable road users of changes in HGV traffic would be less as general traffic will be the dominant factor. As a consequence, the significance level of any effect due to HGV would also be reduced such that, for example, what would otherwise be assessed as a major effect may be considered to be a moderate effect. The assessment will take this into account.

3.5.4 Where the road affected by increased traffic levels is not, in any case, used by non-motorised users (such as a high speed dual carriageway) or safe and adequate crossing points already exist, increased traffic levels would not generally be considered significant in relation to traffic related severance for non-motorised users. Similarly, for example where there are existing crossings or segregated cycleways, the significance level of any effect may be reduced.

Stage 2 – SMR criteria

3.5.5 The above criteria will be used to reflect the traffic related severance impacts of changes to traffic level, including changes to the difficulty for pedestrians crossing the road, where there may be a lack of safe adequate pedestrian crossing facilities.

3.5.6 Effects that are of duration less than four consecutive weeks in any 12-month period will be assessed as being not significant.

3.5.7 The assessment criteria shown in Table 10 should be applied in Stage 2.

[2] Based on The Institute of Environmental Assessment, Guidelines for the Environmental Assessment of Road Traffic, 1993.

Table 10: Criteria for Stage 2 assessment – traffic related severance for non-motorised users due to changes in traffic flows

Assessment of traffic severance for non-motorised users due to changes in traffic flows during construction							
Magnitude of impacts							
Criteria		**Negligible**	**Low**		**Medium**		**High**
Increase in traffic flows (HGV or all vehicles), where the increase is greater than 40 vehicles per day in urban areas or 10 vehicles per day in rural areas		<30%	30-60%		60-120%		120% or more
No. of travellers affected/duration of impact		<4 weeks	4 weeks-4 months	4 months or more	4 weeks-4 months	4 months or more	>4 weeks
Significance of effect							
Road can be safely and easily crossed (<250 veh/hr inc. Proposed Scheme traffic) or there are safe crossing facilities available	**Low**	Not significant	Minor	Minor	Minor	Moderate	Moderate
Road moderately difficult to cross safely (250-750 veh/hr inc. Proposed Scheme traffic) and there is a lack of safe crossing facilities available	**Medium**	Not significant	Minor	Moderate	Moderate	Major	Major
Road difficult to cross safely, controlled crossing facility required (>750 veh/hr inc. Proposed Scheme traffic) and there is a lack of safe crossing facilities available	**High**	Not significant	Moderate	Moderate	Major	Major	Major

Non-traffic related severance

Stage 1 – SMR criteria

3.5.8 Severance due to, for example, extended travel distances or broken links can affect travellers using non-motorised modes, especially pedestrians. Where reasonably practicable, public footpaths and routes will be reinstated or convenient alternatives provided. Cyclists and equestrians are less susceptible to severance because they can travel more quickly than people on foot, although there may still be significant impacts on these groups. Severance[3]

[3] Based on Department for Transport (DfT) WebTAG Unit 3.6.2 now subsumed in Department for Transport, TAG Unit A4.1 Social Impact Appraisal, January 2014 and Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 8, June 1993.

impacts will be classified according to the following four broad levels: negligible, low, medium and high.

3.5.9 To ensure a consistent approach, the classification and assessment will be based only on the characteristics that would exist assuming the movement was made by a pedestrian unless a change in route is only relevant for cyclists and/or equestrians in which case the distances set out as having the potential to result in significant effects should be adjusted accordingly. The categories of impact are discussed below. Where the diversion routes are materially different and the assessed effects on pedestrians, cyclist and equestrians varies, the significant effect on each mode should be reported separately.

3.5.10 Low: In general, the current journey pattern is likely to be maintained, but there may be some hindrance to movement for example:

- pedestrians at-grade crossing of a new road carrying less than 8,000 vehicles per day (annual average daily traffic - AADT); or
- a new bridge which will need to be climbed or a sub-way traversed; and/or
- journey lengths being increased by up to 100-250m (less than 100m increase in journey length is considered to be a negligible change).

3.5.11 Medium: Some residents, particularly children and elderly people, are likely to be dissuaded from making trips. Other trips will be made longer or less attractive, for example:

- two or more of the hindrances set out under ‘minor’ applying to an individual journey; or
- pedestrians at-grade crossing of a new road accommodating between 8,000-16,000 vehicles per day (AADT) in the opening year; and/or
- journey lengths being increased by 250 – 500m.

3.5.12 High: People are likely to be deterred from making trips to an extent sufficient to induce a change in their habits. This could lead to a change in the location of centres of activity or in some cases to a permanent loss to a particular community. Alternatively, considerable hindrance will be caused to people making their existing journeys. Such impacts can result from:

- pedestrians at-grade crossing of a new road carrying over 16,000 vehicles per day (AADT) in the opening year; or
- journey lengths being increased by over 500m; and/or
- three or more of the hindrances set out under ‘minor' or two or more set out under ‘moderate'.

3.5.13 Table 11 sets out the criteria presented in the HS2 Phase One SMR Addendum[4]. This is equivalent to WebTAG's guidance on how severance without and with schemes are combined to estimate the significance of the effects in terms of severance.

Table 11: Assessment of change in severance scoring

	Change in severance scoring with the Proposed Scheme			
Numbers of travellers affected	**Negligible**	**Low**	**Medium**	**High**
<200 people/day	Not significant	Minor	Minor	Minor*/Moderate**
Between 200-1,000 people/day	Not significant	Minor	Moderate	Major
>1,000 people/day	Not significant	Minor	Major	Major

*Notes * duration between 4 weeks and 4 months; ** duration 4 months or more*

3.5.14 Effects that are of duration of less than four consecutive weeks in any 12-month period will be assessed as being not significant.

Stage 2 – refinement of criteria

3.5.15 The definition of significance in Table 12 includes the criteria in the paragraphs above under Stage 1 – SMR criteria to assess the change in severance impact and the numbers of travellers affected as from Table 11.

3.5.16 The assessment criteria shown in Table 12 should be applied in Stage 2.

[4] High Speed Two Ltd (2013), High Speed Rail (London – West Midlands), *Environmental Statement, Volume 5, Technical Appendices SMR Addendum, (CT-001-000/2).* Available online at: https://www.gov.uk/government/collections/hs2-phase-one-environmental-statement-documents.

Table 12: Criteria for Stage 2 assessment – severance

Assessment of severance during construction									
Magnitude of impacts									
Criteria		**Negligible**	**Low**		**Medium**		**High**		
Incremental hindrances: additional roads with at-grade pedestrian crossings or additional bridges/subway		None	One		2 or more minor		3 or more minor or 2 or more moderate		
Veh/day for additional at grade crossings to be traversed		N/A	<8,000		8,000-16,000		16,000 or more		
Change in journey length (pedestrians)		<100m	100-250m		250-500m		500-1,500m		1,500m or more
Change in journey length (equestrians)		<200m	200-500m		500-1,000m		1,000-3,000m		3,000m or more
Change in journey length (cyclists)		<300m	300-750m		750-1,500m		1,500-4,500m		4,500m or more
No. travellers affected/ Duration of impact		<4 weeks	4 weeks-4 months	4 months or more	4 weeks-4 months	4 months or more	4 weeks-4 months	4 months or more	4 weeks or more
Significance of effect									
<200 people/ day	**Low**	Not significant	Minor	Minor	Minor	Minor	Minor	Moderate	Moderate
Between 200-1,000 people/ day	**Medi -um**	Not significant	Minor	Minor	Moderate	Moderate	Major	Major	Major
>1,000 people/ day	**High**	Not significant	Minor	Minor	Major	Major	Major	Major	Major

Delays, amenity and ambience

3.5.17 Changes to travel time for vulnerable users due to, for example, increased crowding or additional traffic signals will be assessed against this topic. Changes due to changes to the length of the route will be assessed against the non-traffic severance topic. The convenience and attractiveness of the routes for vulnerable users will also be considered. This should be assessed in relation to the scale of any change although this will require a more qualitative

assessment. WebTAG Unit 3.3.13[5] The Journey Ambience Sub-objective, describes the assessment of ambience, which includes travellers' amenity. Travellers' journey ambience can be affected by:

- traveller care;
- travellers' views; and
- traveller stress.

3.5.18 Traveller care for pedestrians, cyclists, equestrians and others will be considered in relation to changes to the provision and design of facilities (e.g. footpaths, cycle lanes and crossings, information) as well as their cleanliness and environment.

3.5.19 The extent to which travellers can see the landscape or townscape view will vary with the relative height of the Proposed Scheme and the surrounding ground, vegetation, buildings and structures. Views can be categorised as providing:

- no view - where the route is in a deep cutting, a tunnel or surrounded by environmental barriers;
- restricted view - where there are frequent cuttings, tunnels or barriers;
- intermittent view - where there are shallow cuttings or barriers; and
- open view - where the view extends over many miles.

3.5.20 Traveller stress is the adverse mental and physiological effects experienced by travellers. Three main factors influence traveller stress:

- frustration;
- fear of potential accidents; and
- route uncertainty.

3.5.21 Taken together, these can lead to feelings of discomfort, annoyance, frustration or fear culminating in physical and emotional tension that detracts from the quality and safety of a journey.

3.5.22 Assessments will be made of the traveller care, travellers' views and traveller stress ambience factors in relation to the topics in Table 13. These assessments will consider changes due to the impact of the Proposed Scheme on each of these sub-factors as relevant using a simple three-point scale (i.e. better, neutral or worse than existing ambience).

[5] WebTAG Unit 3.3.13 The Journey Ambience Sub-objective now subsumed in Department for Transport, TAG Unit A4.1 Social Impact Appraisal, January 2014.

Table 13: Environment – journey ambience

Factor	Sub-factor	Better	Neutral	Worse
Traveller care	Facilities			
	Cleanliness			
	Information			
	Environment			
Travellers' views	-			
Traveller stress	Frustration			
	Fear of potential accidents			
	Route uncertainty			

3.5.23 An overall impact score for the quality of a journey will be determined using the following guidelines:

- the overall assessment is likely to be neutral if the assessment is neutral for all or most of the sub-factors, or improvements on some sub-factors are generally balanced by deterioration on others; and
- if the change in impact across the sub-factors is, on balance, for the better, the assessment is likely to be beneficial, and, conversely, it is likely to be adverse if there is an overall change for the worse.

3.5.24 The scale of effect will vary with both the numbers of travellers affected and the scale of the change in amenity and ambience as set out in Table 14. For example, major adverse effects will only occur when both the change in amenity and ambience and the number of travellers affected are major whereas moderate effects will occur when changes are major and numbers of travellers moderate or where changes are moderate and numbers of travellers major.

Table 14: Effect levels for travellers affected by changes to amenity and ambience during construction

Changes in amenity and ambience	High number of travellers affected	Medium number of travellers affected	Low number of travellers affected
Low	Minor	Neutral	Neutral
Medium	Moderate	Minor	Neutral
High	Major	Moderate	Minor

3.5.25 The methodology set out above will be applied to the Proposed Scheme on a locational basis where amenity or ambience issues for pedestrian, cyclists, equestrians and others are considered likely to be of concern.

Stage 2 – refinement of criteria

3.5.26 The impact on amenity and ambience will be assessed as described above. Where there are impacts in delays to vulnerable road users they will be assessed based on changes in the 'person-minutes' of the journey times of pedestrians and other non-motorised travellers.

3.5.27 As noted, to avoid double counting, increased journey times arising from, for example, diversion of footpaths or cycle routes, should be reported only once and this will be undertaken against the non-traffic related severance topic discussed above. Similarly, delays due to increased traffic should be reported against the traffic flows topic discussed in Section 3.4. Against this topic, changes in journey time due to delays arising from, for example, increased pedestrian crowding and congestion or new signal controls should be reported.

3.5.28 Effects that are of duration less than four consecutive weeks in any 12-month period will be assessed as being not significant.

3.5.29 The criteria shown in Table 15 should be applied in Stage 2.

Table 15: Criteria for Stage 2 assessment – amenity and ambience

Assessment of amenity and ambience effect during construction							
Magnitude of impacts							
Change to amenity and ambience		**Negligible**	**Low**		**Medium**		**High**
Additional journey time delay due to pedestrian crowding/congestion or additional barriers such as signals		< 1 min	1-2 mins		2-3 mins		3 or more mins
No. travellers affected/ Duration of impact		<4 weeks	4 weeks-4 months	4 months or more	4 weeks-4 months	4 months or more	>4 weeks
Significance of effect							
<200 /day	**Low**	Not significant	Not significant	Not significant	Not significant	Not significant	Minor
Between 200-1,000 /day	**Medium**	Not significant	Not significant	Not significant	Minor	Minor	Moderate
>1,000 /day	**High**	Not significant	Minor	Minor	Moderate	Moderate	Major

3.6 Accidents and safety

Stage 1 – SMR criteria

3.6.1 Significant impacts on accidents and safety risks will be defined for links and junctions for which data is available that have experienced on average more than nine personal injury accidents (PIA) in total, in a three-year period, and which would be subject to an increase of

30% or more in total traffic flow during construction for a period of more than four consecutive weeks in any 12-month period.

3.6.2 Where accident data has been collected for a period greater than three years, the number of accidents should be pro-rata to represent three years of data. Thus, for example, if five years of data were available, the number of accidents being considered would be multiplied by 3/5 (i.e. 0.6) and then the resultant number would be compared to the threshold of nine accidents in total in the desired three-year period. The grouping of accidents to establish whether the criteria of nine or more recorded PIA in total over a three-year period is exceeded should be based upon the following definition of clusters of accidents:

- nine or more recorded PIA in total over a three-year period within about 20m of any road junction; or
- nine or more recorded PIA in total over a three-year period within about 150m along any road link.

Stage 2 – refinement of criteria

3.6.3 The criteria shown in Table 16 should be applied in Stage 2. This requires that there is a history of some accidents and that there is increased traffic as a result of HS2 construction.

Table 16: Criteria for Stage 2 assessment – accidents and safety

Assessment of accidents and safety during construction						
Magnitude of impacts						
Criteria			**Negligible**	**Low**	**Medium**	**High**
Change in Annual Average Daily Traffic (AADT) flow			<30%	30-60%	60-120%	120% or more
Number of PIAs within 20m of any impacted junctions			<9	9 or more	9 or more	9 or more
Number of PIAs within any 150m section of impacted road links			<9	9 or more	9 or more	9 or more
Significance of effect						
No. of travellers affected	**10% or more below average benchmark national accident rate for category of road**	**Low**	Not significant	Minor	Minor	Moderate*
	Within +/- 10% of the average benchmark national accident rate for category of road	**Medium**	Not significant	Minor	Moderate*	Major*
	10% or more above average benchmark national accident rate for category of road	**High**	Not significant	Moderate*	Major*	Major*

*Note: * will be subject to further analysis within the transport assessment process.*

3.6.4 In undertaking this assessment, professional judgement should be used in considering whether or not the future flows are likely to increase the risks of accidents. This should

include consideration of the local conditions on the highways and junctions and the factors causing the recorded accidents. Sections of roads or junctions that have an identifiable cluster or gathering of accidents should be identified and addressed as necessary where there is additional HS2 related traffic. Consideration should be given to the expected typical national average accident rate on this category of road, and whether or not this is being exceeded.

3.6.5 In addition, regardless of past accident rates, consideration should be given to any factors that might result in increased accident risks due to HS2 construction traffic.

3.7 Parking and loading

Stage 1 – SMR criteria

3.7.1 The SMR defines the significance criteria as set out below:

3.7.2 A significant impact arising from the Proposed Scheme on parking and loading, where facilities are identified to be heavily used, is defined as a change for more than four consecutive weeks in any 12-month period of:

- a predicted increase of 10 or more, or 10%, whichever is the greater, in on-street parking demand in the vicinity of a station/interchange;
- a loss of any designated on-street or off-street spaces, including spaces for disabled persons, buses, taxis, doctors, ambulances, police vehicles and car club bays;
- a loss of ten or more, or 10%, whichever is the greater, of on-street parking or private off-street car parking spaces;
- a loss of ten or more, or 10%, whichever is the greater, off-street station car parking spaces;
- a loss of ten or more, or 10%, whichever is the greater, pedal or motorcycle parking spaces; and
- a loss of 10% or more designated loading bay spaces or facilities.

3.7.3 Where the parking facilities are not well used, there are reasonably convenient alternatives or the use can be expected to be removed as a result of the Proposed Scheme, then any loss should not be considered significant. In considering the availability of alternative facilities the use of the parking/loading spaces should be considered. For example, loading facilities for businesses are unlikely to be convenient if remote from the business but conversely acceptable alternatives to spaces used for breaks during a long journey could be a considerable distance from the lost spaces.

3.7.4 Any loss of parking should, where relevant, be judged against both the absolute and the percentage change and whichever calculation results in the greater number of spaces takes precedence. As an example, with a 50 space car park the absolute trigger would be a loss of 10 spaces while the 10% reduction would be five. The significance criteria would be met only with a 10 space reduction. Conversely, with a 1,000 space car park, a 10% reduction would

be 100 spaces and it is this level of reduction that would be required to create a significant effect.

3.7.5 Where the parking facilities are not designated or are not well used, or the use can be expected to be removed as a result of the Proposed Scheme, then any loss should not be considered significant.

Stage 2 – refinement of criteria

3.7.6 The criteria shown in Table 17 should be applied in Stage 2.

Table 17: Criteria for Stage 2 assessment – parking and loading

Assessment of parking and loading during construction							
Magnitude of impacts							
Criteria		**Negligible**	**Low**		**Medium**		**High**
Change in parking demand or reduction in the provision (number or %)		<10	10-20		20-40		>40
Change in number of designated parking spaces		0	1		2-4		4 or more
Change in availability of cycle or motorcycle spaces (number or %)		<10	10-20		20-40		>40
Proximity of alternative parking spaces/duration of impact		<4 weeks	4 weeks-4 months	4 months or more	4 weeks-4 months	4 months or more	>4 weeks
Significance of effect							
<100m	**Low**	Not significant	Minor	Minor	Minor	Moderate	Moderate
Between 100-250m	**Medium**	Not significant	Minor	Moderate	Moderate	Major	Major
>250m	**High**	Not significant	Moderate	Moderate	Major	Major	Major

Guidance on terminology

3.7.7 The following guidance on terminology is highlighted:

- heavily used – does a loss of spaces cause a deficit that cannot be accommodated; and
- loss of designated spaces – where possible these should be replaced and if necessary reallocated from other nearby provision.

3.8 Waterways

Stage 1 – SMR criteria

3.8.1 The Canal & River Trust (formerly known as British Waterways) document Code for Practice Works Affecting the Canal & River Trust[6] identifies the requirements that need to be followed in relation to works affecting the navigation or amenity of canals. In summary, these are that generally no stoppages of the canal or navigation or towpath will be allowable, except for technical reasons. Stoppages must be discussed and agreed in advance with Canal & River Trust and all the duration of stoppages must be minimised. For the purpose of the assessment, a significant stoppage is defined as occurring when an unbroken stoppage exceeding six weeks in duration is required, as this is when specific arrangements regarding the transfer of boats around the works by road may be required.

Stage 2 – refinement of criteria

3.8.2 For the purpose of the ES, a stoppage of less than six weeks will be considered not significant. Significant effects arising from stoppages are defined as:

- minor: when an unbroken stoppage exceeding six weeks but less than 12 weeks in duration is required;
- moderate: when an unbroken stoppage exceeding 12 weeks but less than 24 weeks is required; and
- major: when an unbroken stoppage exceeding 24 weeks is required.

3.8.3 The Canal & River Trust also require that towing paths must remain open wherever possible. If a diversion is unavoidable, these should be localised. They may be used by the Canal & River Trust maintenance plant and be of a standard to allow continued use by existing visitors – walkers, anglers, people with disabilities, cyclists etc. Only as an unusual event would towing paths be permitted to be used for access to the temporary and permanent works for the Proposed Scheme because of conflict with visitors and the unsuitability of the towing path for vehicular use. Impacts on pedestrians, cyclists, mobility impaired persons and equestrians using the towing paths should be assessed in relation to the vulnerable road user topic and associated criteria.

[6] Previous guidance from British Waterways, *Third Party Works' Procedures Section 2 Code of Practice*, British Waterways (2012) is now superseded by the Canal & River Trust (2017), *Code for Practice Works Affecting the Canal & River Trust*.

4 Significance criteria for operational assessment

4.1 Introduction

4.1.1 The criteria outlined in this chapter will be used to assess the significance of traffic and transport impacts and effects during the operational phase of the Proposed Scheme.

4.2 Public transport delay

Stage 1 – SMR criteria

4.2.1 Significant permanent impacts on journeys by bus and heavy and light rail affected by the Proposed Scheme are defined as any of the following:

- a change of more than 10% in a majority of (or typical) journey times by any public transport mode;
- a change in journey distance by bus of more than 400m in urban areas and 1km in rural areas;
- a relevant delay, disruption or overcrowding impact affecting the public transport network over a wide area; and
- a relevant change to service frequency, capacity, loss of through connections or reduction in hours of operation.

4.2.2 For the construction phase, as described in Section 3.2, changes in journey times and distances, delays, disruption, overcrowding, changes to service frequencies, capacity, loss of through connections and reductions in hours of services will be assessed. Whilst many of these impacts will be taken account of within the design of the facilities, they will also be assessed for the operational phase of the Proposed Scheme. If there are any significant effects these will be reported.

4.2.3 The journey times to be considered are the typical journey times that would be expected over the additional distance introduced as a result of the intervention, rather than specifically those of individual passenger's journeys or the end-to-end route journey times.

Stage 2 – refinement of criteria

4.2.4 The criteria shown in Table 18 and Table 19 should be applied in Stage 2, respectively in rural and urban situations.

Table 18: Criteria for Stage 2 assessment – public transport delay, rural

Assessment of public transport delay during operation - rural						
Magnitude of impacts						
Criteria			**Negligible**	**Low**	**Medium**	**High**
Percentage change in typical journey time			<10%	10-20%	20-40%	40% or more
Distance change			<1km	1-2km	2-4km	4km or more
Significance of effect						
No. of travellers affected	**<3 buses or trains/hr**	**Low**	Not significant	Minor	Moderate	Moderate
	Between 3-6 buses or trains/hr	**Medium**	Not significant	Moderate	Major	Major
	>6 buses or trains/hr	**High**	Not significant	Moderate	Major	Major

Table 19: Criteria for Stage 2 assessment – public transport delay, urban

Assessment of public transport delay effects during operation - urban						
Magnitude of impacts						
Criteria			**Negligible**	**Low**	**Medium**	**High**
Percentage change in typical journey time			<10%	10-20%	20-40%	40% or more
Distance change			<400m	400-800m	800-1,200m	1,200m or more
Significance of effect						
No. of travellers affected	**<8 buses or trains/hr OR <5,000 passengers/day**	**Low**	Not significant	Minor	Moderate	Moderate
	Between 8-20 buses or trains/hr OR Between 5,000 and 10,000 passengers/day	**Medium**	Not significant	Moderate	Major	Major
	>20 buses or trains/hr OR Over 10,000 passengers/day	**High**	Not significant	Moderate	Major	Major

4.3 Station/interchange impacts

Stage 1 – SMR criteria

4.3.1 The SMR defines the significance criteria as impacts that may be caused by changes resulting from the scheme design and from additional passengers of the Proposed Scheme arriving and departing at the stations/interchanges. This will be assessed taking account of:

- forecast numbers of additional passengers using the Proposed Scheme;
- local transport conditions at each location;
- resulting increases in crowding and congestion levels arising from increased usage or changed journey patterns arising from the arrival and departure, by all available modes, of passengers using the Proposed Scheme; and
- any loss of or change to physical linkage or facility for the next stage of the journey or access to public transport.

Stage 2 – refinement of criteria

4.3.2 The assessment will be used to identify if there are any significant journey time, interchange and accessibility changes for travellers. This will include consideration of:

- resulting increases in crowding and congestion levels arising from increased usage or changed journey patterns arising from the arrival and departure, by all available modes, of passengers using the Proposed Scheme. Where relevant these will be quantitatively assessed using the transport models developed within the transport assessment. Criteria that will be assessed include:
  - results of pedestrian capacity modelling, where there is a change (increase) of at least one Fruin Level of Service (LoS)[7]; and
  - likelihood of congestion causing delays at the kerbside or at station facilities e.g. bus station or taxi ranks.
- any loss of or changes to physical linkage for the next stage of the journey or access to public transport.

4.3.3 It is however expected that the new transport infrastructure will be designed to cater for the forecast levels of future demands and mitigate any impacts that the Proposed Scheme might otherwise have been expected to cause.

4.3.4 The criteria shown in Table 20 should be applied in Stage 2.

[7] John J Fruin (1971), *Pedestrian planning and design*.

Table 20: Criteria for Stage 2 assessment – station/interchange impacts

Assessment of disruption at stations/ interchanges during operation						
Magnitude of impacts						
Criteria			**Negligible**	**Low**	**Medium**	**High**
Pedestrian modelling (Fruin LoS)			C or less	D increased by 2 or more levels or E increased by 1 level	E increased by 2 or more levels or F increased by 1 level	F increased by 2 or more levels
Significance of effect						
No. of travellers affected	**See Table 6 above**	**Low**	Not significant	Minor	Moderate	Moderate
	See Table 6 above	**Medium**	Not significant	Moderate	Major	Major
	See Table 6 above	**High**	Not significant	Moderate	Major	Major

Guidance on terminology

4.3.5 The following guidance on terminology is highlighted:

- resulting increases in congestion levels will be as assessed and informed by the transport assessment and modelling; and
- the loss of a physical linkage is the inability to make a direct connection or an increase in travel distance to replacement/alternative facilities (the categorisation of magnitude of impact used for the construction phase should be applied to operation).

4.4 Traffic delays to vehicle occupants

Stage 1 – SMR criteria

4.4.1 The SMR criteria include that a significant change in driver and vehicle passenger delay will be defined as any of the following:

- a permanent diversion that results in an increase in journey length of more 1km;
- where a significant change in delay relating to junction congestion resulting from the operation of the Proposed Scheme is forecast, this will be measured with congestion indicators based on the forecast ratio of flow to capacity (RFC), degree of saturation (DoS) or the practical reserve capacity (PRC). The junctions for consideration will be discussed with the local Highways Authority; and
- where there is a change in traffic flow along a road link that cause the design capacity to become exceeded and the capacity of that link is constrained to a greater extent than the junctions along it, then a similar approach to that set out below for junctions will be used to assess potential delays to road users.

Stage 2 – SMR criteria

4.4.2 The criteria shown in Table 21 to Table 23 should be applied in Stage 2.

Table 21: Criteria for Stage 2 assessment – traffic delays to vehicle occupants (traffic diversion)

Assessment of traffic delays to vehicle occupants (traffic diversions) during operations						
Magnitude of impacts						
Criteria			**Negligible**	**Low**	**Medium**	**High**
Diverted distance			<1km	1-5km	5-10km	10km or more
Significance of effect						
No. of travellers affected	**Between 100-1,000 veh/day**	**Low**	Not significant	Minor	Moderate	Moderate
	Between 1,000-10,000 veh/day	**Medium**	Not significant	Moderate	Major	Major
	>10,000 veh/day	**High**	Not significant	Moderate	Major	Major

Table 22: Criteria for Stage 2 assessment – traffic flows and delays to vehicle occupants (traffic congestion), where detailed traffic models not available, generally only in rural areas

Assessment of traffic delays to vehicle occupants (traffic congestion) during operation - where detailed traffic models not available					
Magnitude of impacts					
Criteria		**Negligible**	**Low**	**Medium**	**High**
Change in peak hour traffic flow		<2%	N/A	N/A	N/A
Reserve junction capacity (including Proposed Scheme traffic)		>15%	8-15%	2-8%	<2%
Significance of effect					
Change in reserve capacity where reserve capacity less than 15%					
<2% change	**Very Low**	Not significant	Not significant	Not significant	Not significant
Between 2-5% change	**Low**	Not significant	Minor	Minor	Moderate
Between 5-10% change	**Medium**	Not significant	Minor	Moderate	Major
>10% change	**High**	Not significant	Minor	Major	Major

Table 23: Criteria for Stage 2 assessment – traffic delays to vehicle occupants (traffic congestion), where detailed traffic models available, generally urban areas

Assessment of traffic delays to vehicle occupants (traffic congestion) during operation - urban					
Magnitude of impacts					
Criteria		**Negligible**	**Low**	**Medium**	**High**
Future with-scheme Congestion Indicator (junction or link)		<87%	87 - 92%	92 - 98%	98% or more
Significance of effect					
Change in congestion indicator above 85%					
<2% change	**Very Low**	Not significant	Not significant	Not significant	Not significant
Between 2-5% change	**Low**	Not significant	Minor	Minor	Moderate
Between 5-10% change	**Medium**	Not significant	Minor	Moderate	Major
>10% change	**High**	Not significant	Minor	Major	Major

Guidance on terminology

4.4.3 The following guidance on terminology is highlighted: a significant change in delay will be as assessed and informed by the transport assessment.

4.5 Vulnerable road users

4.5.1 Vulnerable road users (also referred to as non-motorised users), which include pedestrians, cyclists and equestrians, are affected by traffic related severance, severance caused by extended travel distances or broken links (barriers to movement) and changes to amenity and ambience.

Traffic related severance

Stage 1 – Refinement of criteria

4.5.2 A change in traffic levels can result in changes to traffic related severance for non-motorised road users, particularly pedestrians using or seeking to cross a road. A significant change is defined as:

- a 10% increase in peak hour two-way traffic flows where the increase is greater than 40 vehicles per day in urban areas or 10 vehicles per day in rural areas; and

- a 30% increase in the average off-peak hour two-way traffic flows where the increase is greater than 40 vehicles per day in urban areas or 10 vehicles per day in rural areas.

4.5.3 Where the road affected by increased traffic levels is not, in any case, used by non-motorised users (such as a high speed dual carriageway) or safe and adequate crossing points already exist, increased traffic levels would not generally be considered significant in relation to traffic related severance for non-motorised users. Similarly, for example where there are existing crossings or segregated cycleways, the significance level of any adverse effect may be reduced.

Stage 2 – Refinement of criteria

4.5.4 The criteria shown in Table 24 should be applied in Stage 2 in relation to the impacts and effects during the operational stage of the Proposed Scheme.

4.5.5 These criteria have been developed, to include in the assessment of the operational scenario the same application of 'HGV' or 'all vehicle' thresholds as adopted in the assessment of the construction scenario. It is, however, not expected that HS2 will in operation generate substantial numbers of HGV trips.

4.5.6 The daily HGV or all vehicle thresholds in Table 24 are the same as those adopted for construction in Section 3.5 under Traffic related severance Stage 1 – SMR criteria, although these will, where relevant, be adjusted accordingly to peak hour flows, if necessary, to correspond with the peak hour data that will be used in this assessment.

Table 24: Criteria for Stage 2 assessment – traffic severance for non-motorised users due to changes in traffic flows

Assessment of traffic severance for non-motorised users due to changes in traffic flows during operation						
Magnitude of impacts						
Criteria			**Negligible**	**Low**	**Medium**	**High**
Increase in peak hour traffic flows (HGV or all vehicles) where the increase is greater than 40 vehicles per day in urban areas or 10 vehicles per day in rural areas			<10%	10-20%	20-40%	40% or more
Increase in off-peak hour traffic flows (HGV or all vehicles) where the increase is greater than 40 vehicles per day in urban areas or 10 vehicles per day in rural areas			<30%	30-60%	60-120%	120% or more
Significance of effect						
No. of travellers affected	**Road can be safely and easily crossed (<250 veh/hr inc. Proposed Scheme traffic), or there are, safe crossing facilities available**	**Low**	Not significant	Minor	Moderate	Moderate
	Road moderately difficult to cross safely (250-750 veh/hr inc. Proposed Scheme traffic) and there is a lack of safe crossing facilities available	**Medium**	Not significant	Moderate	Major	Major
	Road difficult to cross safely, controlled crossing facility required (>750 veh/hr inc. Proposed Scheme traffic) and there is a lack of safe crossing facilities available	**High**	Not significant	Moderate	Major	Major

Non-traffic related severance

4.5.7 The assessment criteria for the operational phase of the Proposed Scheme are the same as those described for the longer-term impacts that may occur during the construction phase. These are shown in Table 25. Where the diversion routes are materially different and the assessed effects on pedestrians, cyclist and equestrians varies, the significant effect on each mode should be reported separately.

Table 25: Criteria for Stage 2 Assessment – severance

Assessment of severance during operation							
Magnitude of impacts							
Criteria			**Negligible**	**Low**	**Medium**	**High**	
Incremental hindrances: additional roads with at-grade pedestrian crossings or additional bridges/subways.			N/A	As below	2 or more minor	3 or more minor or 2 or more moderate	
Veh/day for additional at grade crossings to be traversed			N/A	<8,000	8,000-16,000	16,000 or more	
Change in journey length (pedestrians)			<100m	100-250m	250-500m	500-1,500m	1,500m or more
Change in journey length (equestrians)			<200m	200-500m	500-1,000m	1,000-3,000m	3,000m or more
Change in journey length (cyclists)			<300m	300-750m	750-1,500m	1,500-4,500m	4,500m or more
Significance of effect							
No. of travellers affected	**<200 people/day**	**Low**	Not significant	Minor	Minor	Moderate	Moderate
	Between 200-1,000 people/day	**Medium**	Not significant	Minor	Moderate	Major	Major
	>1,000 people/day	**High**	Not significant	Minor	Major	Major	Major

Delays, amenity and ambience

4.5.8 The assessment criteria for the operational phase of the Proposed Scheme are the same as those described for the longer term effects that may occur during the construction phase. These are shown in Table 26.

Table 26: Criteria for Stage 2 assessment – amenity and ambience

Assessment of amenity and ambience effect during operation						
Magnitude of impacts						
Criteria			**Negligible**	**Low**	**Medium**	**High**
Change to amenity and ambience			**Negligible**	**Low**	**Medium**	**High**
Additional journey time delay due to pedestrian crowding/congestion or additional barriers such as signals			< 1 min	1-2 mins	2-3 mins	3 or more mins
Significance of effect						
No. of travellers affected	**<200 people /day**	**Low**	Not significant	Not Significant	Not Significant	Minor
	Between 200-1,000 people /day	**Medium**	Not significant	Not significant	Minor	Moderate
	>1,000 people /day	**High**	Not significant	Minor	Moderate	Major

4.6 Accidents and safety

4.6.1 The assessment criteria for the operational phase of the Proposed Scheme will be the same as those described in Section 3.7 for the construction phase (see Table 15).

4.7 Parking and loading

4.7.1 The assessment criteria for the operational phase of the Proposed Scheme will be the same as those described for the longer-term impacts that may occur during the construction phase. These are shown in Table 27.

Table 27: Criteria for Stage 2 assessment – parking and loading

Assessment of parking and loading during operation						
Magnitude of impacts						
Criteria			**Negligible**	**Low**	**Medium**	**High**
Change in parking demand or reductions in provision (number or %)			<10	10-20	20-40	>40
Change in number of designated parking spaces			0	1	2-4	4 or more
Change in availability of cycle or motorcycle spaces (number or %)			<10	10-20	20-40	>40
Significance of effect						
Proximity of alternative parking spaces	**<100m**	**Low**	Not significant	Minor	Moderate	Moderate
	Between 100-250m	**Medium**	Not significant	Moderate	Major	Major
	>250m	**High**	Not significant	Moderate	Major	Major

4.8 Waterways

4.8.1 The assessment criteria for the operational phase of the Proposed Scheme will be the same as those described above for the construction phase (see Section 3.9).

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