

# HS2

## Phase One Highways Sub- group

18 March 2019, London

# HS2

## Introductions

All

# HS2

## Cycling – Update from the DfT

Dr Kevin Golding-Williams | Head of Cycling and Walking Policy |  
Active Accessible Travel, Department for Transport



Department  
for Transport

# Cycling update

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Kevin Golding-Williams  
Head of Cycling and Walking Policy



# We have a statutory Cycling and Walking Investment Strategy.

The first statutory Cycling and Walking Investment Strategy was published in April 2017.

## The ambition for England by 2040

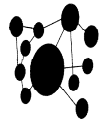
To make cycling and walking the natural choices for shorter journeys, or as part of a longer journey

### Better Safety



A safe and reliable way to travel for short journeys

### Better Mobility



More people cycling and walking - easy, normal and enjoyable

### Better Streets



Places that have cycling and walking at their heart.

### Ambition



### Objectives



### Indicators



### Governance



Action Plan



Financial Resources

## Objectives (by 2020)



### Increase cycling activity

Where cycling activity is measured as the total number of cycle stages made in England.



### Increase walking activity

Where walking activity is measured as the total number of walking stages per person.



### Reduce the rate of cyclists killed or seriously injured on England's roads

Measured as the number of fatalities and serious injuries per billion miles cycled.



### Increase the percentage of children aged 5 to 10 that usually walk to school

## Aims and Targets (by 2025)



### We aim to double cycling

From 0.8 billion cycling stages in 2013 to 1.6 billion stages in 2025.



### We aim to increase walking activity

To 300 walking stages per person per year in 2025.



### We will increase the percentage of children aged 5 to 10 that usually walk to school

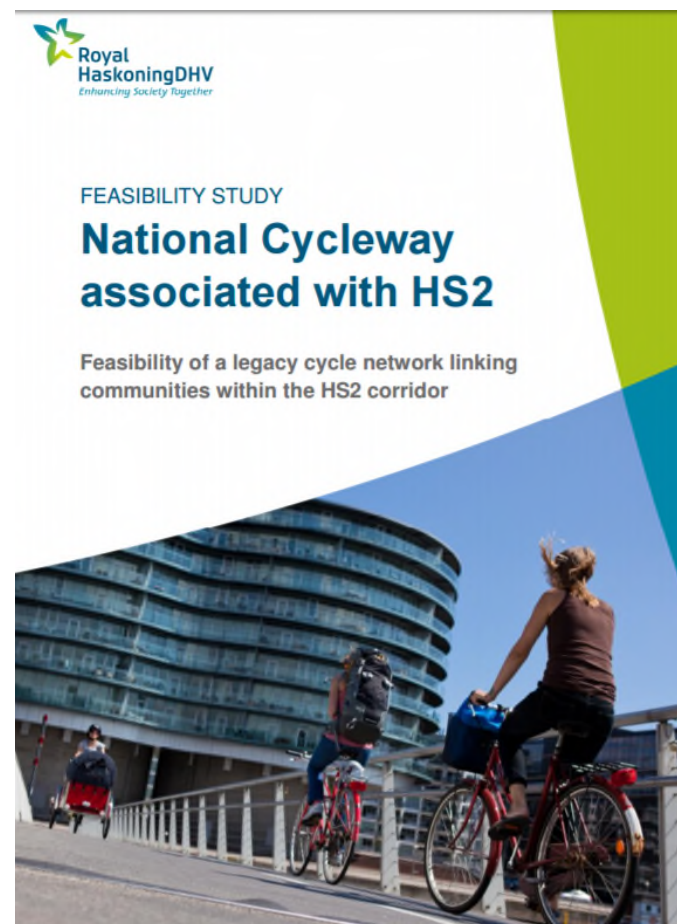
From 49% of children in 2014 to 55% in 2025.





## National cycleway feasibility study associated with HS2

- ▶ Study into the potential for new and improved cycle routes within a corridor of the HS2 route commissioned in 2013 .
- ▶ Delivered by Royal Haskoning DHV in partnership with John Grimshaw & Associates and Phil Jones Associates.
- ▶ At the outset a route directly alongside the whole of the HS2 railway was considered but quickly ruled out because HS2 avoids settlements between major cities.
- ▶ A study area was therefore identified that consisted broadly of a three-mile corridor either side of the new railway.
- ▶ Detailed route options were also produced
- ▶ Letter sent to all LA along the route from DfT in autumn 2017 and also highlighted by HS2
- ▶ Study and detailed route options published on DfT website in October 2018





## Detailed route options

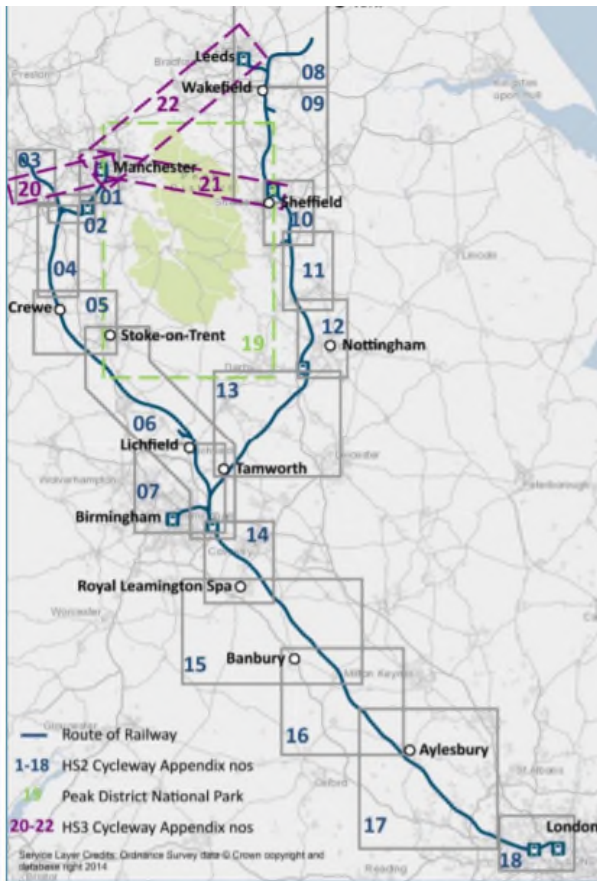


Figure 7.1 – Overview of Fieldwork Annexes

The series of Annexes are listed in Table 7.1 and shown indicatively on Figure 7.1.

Ref.	Study Area Section	Ref.	Study Area Section
B01	Manchester Piccadilly to Manchester International Airport	B12	Kirkby to Long Eaton
B02	Manchester International Airport to Knutsford	B13a	Long Eaton to Tamworth
B03	Wigan to Knutsford	B14a	Birmingham to Leamington
B04	Knutsford to Crewe	B14b	Solihull
B05	Crewe to Stoke	B15	Leamington to Banbury
B06	Stoke to Birmingham International Airport	B16	Banbury to Waddesdon
B07	Birmingham (Lichfield to City Centre and onto Airport)	B17	Waddesdon to Uxbridge
B08	Leeds to Wakefield	B18	Uxbridge to Euston
B09a	Wakefield to Meadowhall	B19	Peak District National Park
B09b	Wakefield to Meadowhall	B20	Liverpool to Manchester
B10	Meadowhall to Staveley	B21	Manchester to Sheffield
B11	Staveley to Kirkby	B22	Manchester to Leeds
		B23	Various detailed place making work





# Detailed route options -

Proposals for a Waddesdon Parkway Avenue from Waddesdon to Aylesbury Parkway Station following the course of Akeman Street | Page 13

### Detail arrangement of the Aylesbury Vale Station area and link to the existing cycling routes

- Existing Network Rail works access to remain, although it would be fractionally more convenient if it was rearranged to run up to the track a little further to the north of the accommodation bridge.
- Fence off the Rail access track, construct a low retaining wall to allow the path to run out at an easy slope, and surface through the subway to complete the Avenue through to the station.
- Possible area for future bike hire.
- Avenue route along field edge to Waddesdon
- Extend existing brick walkway through to the Avenue, so as to provide a direct pedestrian route to the station entrance.
- Rearrange the existing car parking. Note that vehicles can park across the works entrance except when it is in use. Alternatively arrange the security gates so that the public can emerge at the same point as he works access.
- Remove three existing parking spaces to create space for the circulation in the car park
- Mark cycle logos down these two aisles of the carpark to lead cycles through to the cycle track to Aylesbury.
- Remove one carpark space to provide for the dedicated route.
- Construct new link up slight slope to join existing cycling routes
- Ruby Way to the centre of Aylesbury
- Existing station buildings.



ry Parkway Station following the course of Akeman Street | Page 12

worth while to reinforce the ng the wide verge to the A41 reduce the impact of traffic on The path itself should be lined trees in order to maintain the a grand approach to Waddesdon fence should be carefully as to ensure that there is no f livestock breaking through to id. So we are showing a double id with hedging in between in e have security in depth.



Parkway Avenue avoids the A41 completely



End of planning application



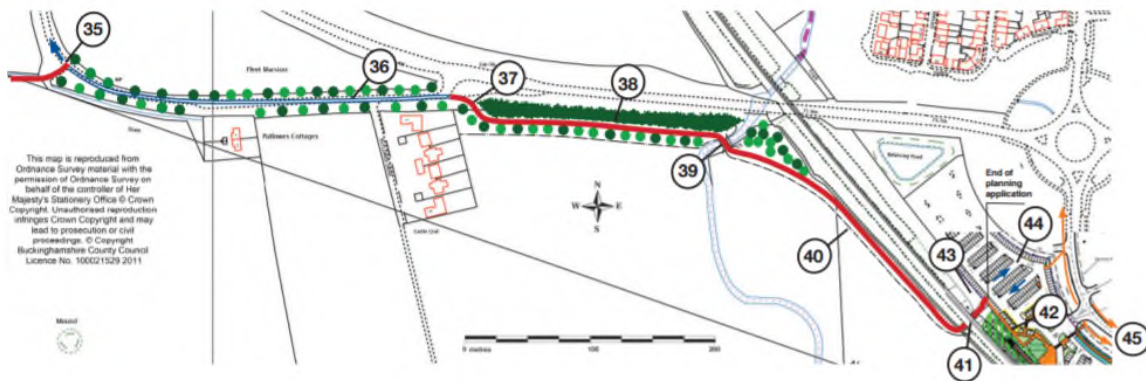
mail bridge

- Turn the Avenue to run up the side of the Thames Water field. Here the railway embankment provides protection against the A41. The boundary would again comprise a double fence and hedge
- This existing railway accommodation bridge provides a particularly convenient link to Aylesbury Parkway Station. Although it is not large, it is sufficient, and its floor could possibly be slightly lowered to give more headroom. This bridge might also be a useful link to the down platform if the railway tracks are doubled.



View through station bridge

- Make a level link to the station building. This will require a small alteration to the existing car parks, and even here the avenue planting should feature.
- This would be a good location for the Waddesdon Bike Hire Centre. As the distance to the Manor is quite a long way, and too far for many to walk, the provision of Waddesdon Bikes (trailers and even motorised wheelchairs) will be essential if large numbers of the public are to visit the Manor and Estate this way. Whilst this is not the place to discuss Bike Hire in detail, a satisfactory operation might include hire at each end, so that bikes could be returned to the station for reuse maybe 2 or 3 times each day, each way, whilst the public were exploring the House and gardens on foot.
- Mark out a link across the car park to join the existing Ruby Way Cycling route to Aylesbury -see detail.
- Incorporate a continuation of the Parkway, through future development to reach the Thame Valley.



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February 2018

February 2018







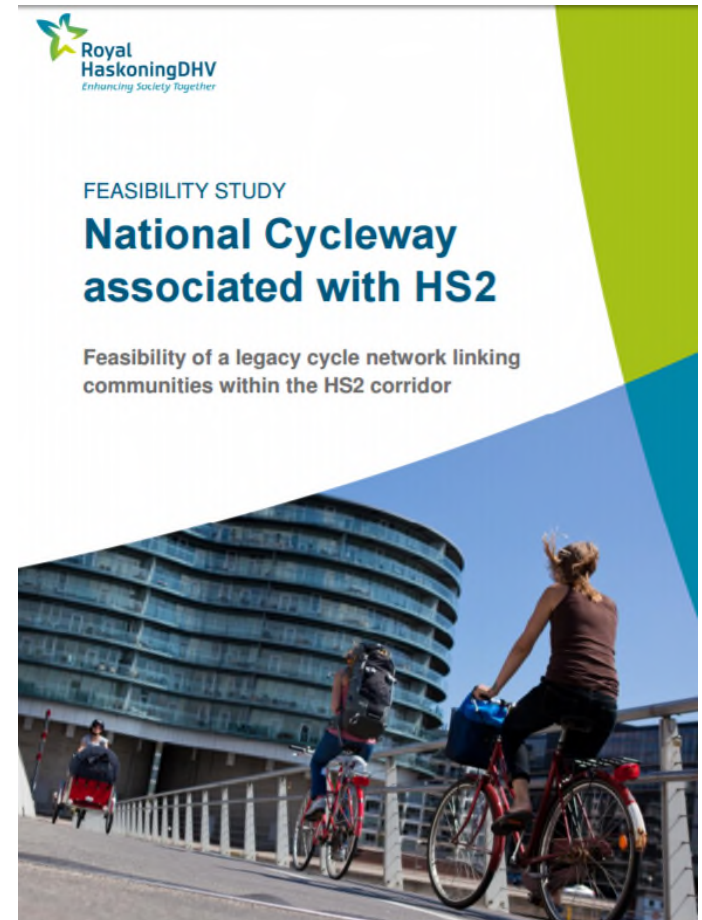
## Into reality – Waddesdon Cycleway





## Funding

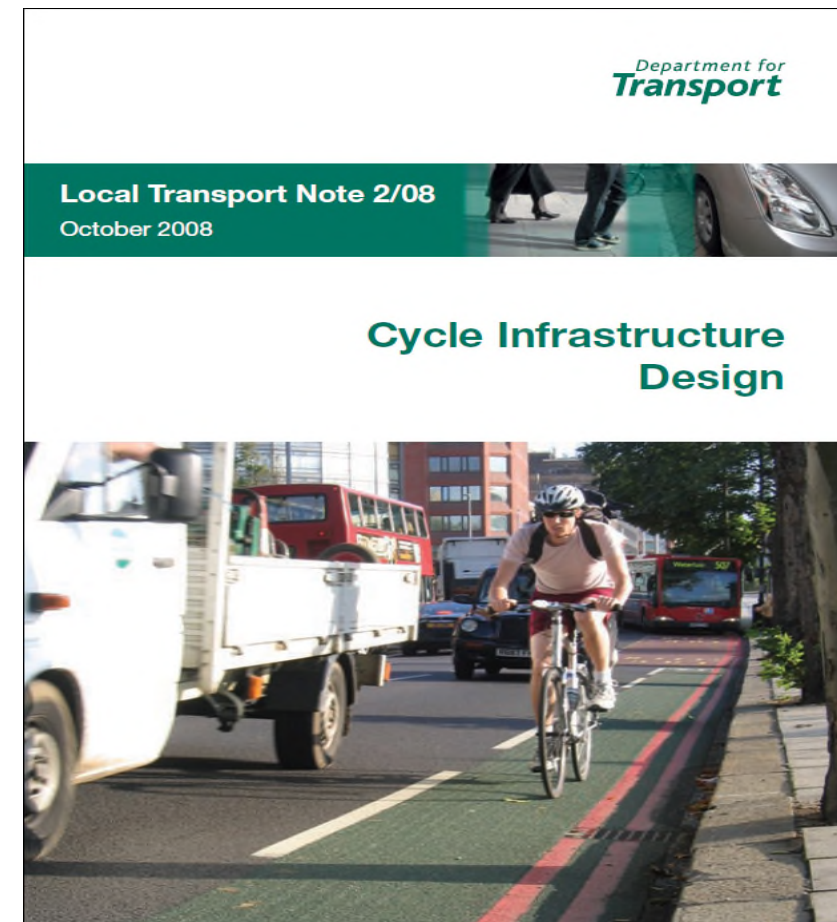
- ▶ Department for Transport nor HS2 Ltd. have any current plans to fund the national cycleway outlined in the study.
- ▶ The study was carried out independently of HS2 Ltd. and this report has no financial impact on the ongoing HS2 rail project.
- ▶ Link local routes identified into Local Cycling and Walking Infrastructure Plans and explore funding opportunities with their Local Enterprise Partnership, and other potential funders.
- ▶ Funding options arising from the Community and Environment Fund and the Business and Local Economy Fund
- ▶ Funding options through allocation of the HS2 Road Safety Fund
- ▶ HS2 Ltd. has undertakings and assurances on cycling provision, and some of the options set out in this report may be deliverable through collaboration between HS2 Ltd. and local authorities.





## Cycle Design Infrastructure Guidance Revision – LTN/208

- ▶ Department commissioned consultants early 2018 to undertake technical refresh of cycleway infrastructure design guidance LTN 2/08 published in 2008.
- ▶ Widely regarded as national technical guide for designing cyclway infrastructure
- ▶ Redraft has been substantial to take account of best practice, relevant legislation, standards and publications that have been released or revised in last ten years
- ▶ DfT convened a Steering Group to oversee the redraft including CPWG, DPTAC and LGA
- ▶ DfT working with stakeholders on dissemination plan to maximise benefits of revised LTN. Part of wider workstream to develop national guidance.





## Contact details:

**Kevin Golding-Williams**

Active and Accessible Travel Division

Department for Transport

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# HS2

## Previous minutes and action

Chair

# HS2

## HS2 2018 end of year summary

HS2 Ltd

# HS2

## Section 85 (and 58) notices

HS2 Ltd

# Section 85 Notices

## Background

HS2's Phase 1 Engineering Delivery Partner has been contracted to submit Safeguarding Notices to relevant highways and planning authorities as per Section 58 and Section 85 of the New Roads and Streetworks Act 1991.

The service will be provided by Itertek.





# Section 85 Notices

## Section 85 Sharing of cost of necessary measures

Where an undertaker's apparatus in a street is affected by major highway works, major bridge works or major transport works, the allowable costs of the measures needing to be taken in relation to the apparatus in consequence of the works, or in order to facilitate their execution, shall be borne by the highway, bridge or transport authority concerned and the undertaker in such manner as may be prescribed.

The regulations may make provision as to the costs allowable for this purpose. Provision may, in particular, be made for disallowing costs of the undertaker—

- a) where the apparatus in question was placed in the street after the authority had given the undertaker the prescribed notice of their intention to execute the works, or
- b) in respect of measures taken to remedy matters for which the, authority were not to blame, and for allowing only such costs of either party as are not recoverable from a third party.



# Section 85 Notices

## Schedule 4 of HS2 Phase One Act

7 ...within the Act limits

8 (1) Works executed under this Act in relation to a highway which consists of or includes a carriageway are to be treated for the purposes of Part 3 of the New Roads and Street Works Act 1991 (street works) as major transport works if—

(a) they are of a description mentioned in section 86(3)(a), (c) to (e), (g) or (h) of that Act (which defines what highway authority works are major highway works), or

(b) they are works which, had they been executed under the powers of the highway authority, might have been carried out in exercise of the powers under section 64 (dual carriageways and roundabouts) or 184 (vehicle crossings over footways and verges) of the Highways Act 1980.



# Section 85 Notices

## Activity

### Initial Actions

- Identify all streets (gazetteer USRNs) intersected by HS2. This is a relatively simple GIS query that Itertek will carry out, and should take into account whether the sections are bored tunnel, green tunnel or surface.
- Identify relevant highway authorities and utility companies that diversionary works notices should be sent to.
- EDP to approach the relevant authorities and determine whether a single notice would suffice.

### Section 85 Notices Actions

- Send section 85 notices to all highway authorities and statutory undertakers identified for each street (Appendix A).
- Extract report showing each notice (works reference) and send to each receipt, and hand out at TLG.



# Section 58 Notices

## Section 58 Restriction on works following substantial road works

Where it is proposed to carry out substantial road works in a highway, the street authority may by notice in accordance with this section restrict the execution of street works during the twelve months following the completion of those works.

For this purpose substantial road works means works for road purposes, or such works together with other works, of such description as may be prescribed.

The notice shall be published in the prescribed manner and shall specify the nature and location of the proposed works, the date (not being less than three months after the notice is published, or first published) on which it is proposed to begin the works, and the extent of the restriction.



# Section 58 Notices

## Schedule 24 of HS2 Phase One Act

No restriction under section 58(1) of that Act (power to impose restriction on execution of street works following completion of substantial road works) has effect in relation to works carried out under the powers conferred by this Act.



# Section 58 Notices

## Activity

- Compile a list of streets, split by highway authority that will need a section 58 restriction.
- Identify start date of works for each location.
- Submit this list to the highway authorities for them to generate the Section 58A proposed notices.  
Unlike the Section 85 notices that can be issued by HS2, Section 58 can only be issued by the highway authority as it is their asset (the road) that it's protecting.
- Confirm with the highway authorities that the restriction has come into force at the relevant date.



# HS2

## Review of TORs for Local Traffic Liaison group meetings

HS2 Ltd

# Review of TORs of Local TLG meetings

Request for written feedback sent 31/1/19, with a request for responses by 22/2/19 but no responses received.





# HS2

## Lorry routes/highway condition – HS2 obligations and liabilities

All

# HS2

## **Pavement Design & Construction 1 - Use of Geogrids on permanent highways**

Eiffage Kier and HS2 Ltd, Area Central

**EIFFAGE**  
**KIER**

Let's go to

exceptional,

together

# HS2 Highways Sub-Group #32

## March 2019

Maria Andritsou HS2 Ltd  
Carlos Quaresma EK  
Matthew Pygott EK

# Presentation Agenda

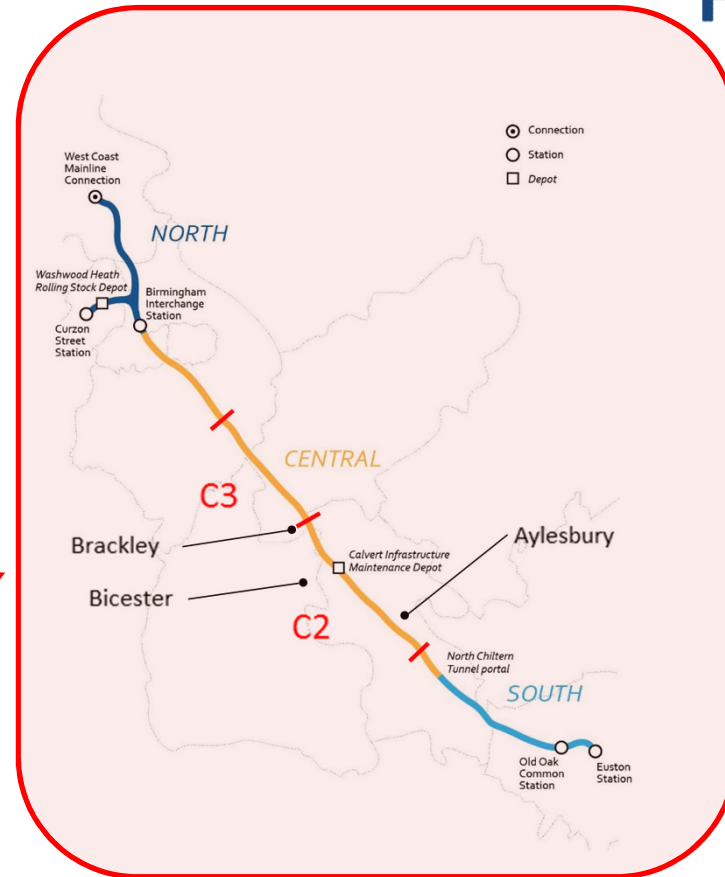
- Introduction
- Setting the scene
- Geo-grid applications
- Benefits
- EK proposed applications
- Case Studies and Potential Savings
- Contractual Requirements
- Some indicators we measure
- Practical Uses
- Previous Applications
- Suppliers of Geogrids in the UK
- Conclusions
- Recommendations

## Introduction

- To seek Highways Authorities pre-approval for the use of geosynthetic materials (Geogrids) as subbase material for permanent highway works, constructed as part of the HS2 Phase One Act
- Geogrid is a geosynthetic polymer material used to reinforce soils and similar materials
- CBR (California Bearing Ratio) test is a method of classifying and evaluating subsoil grade and base course materials for flexible pavements

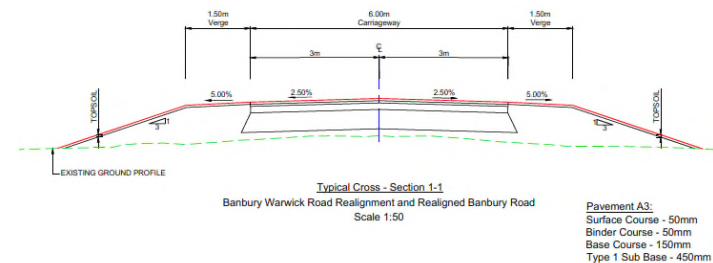
# Introduction

## Location



## Setting the Scene

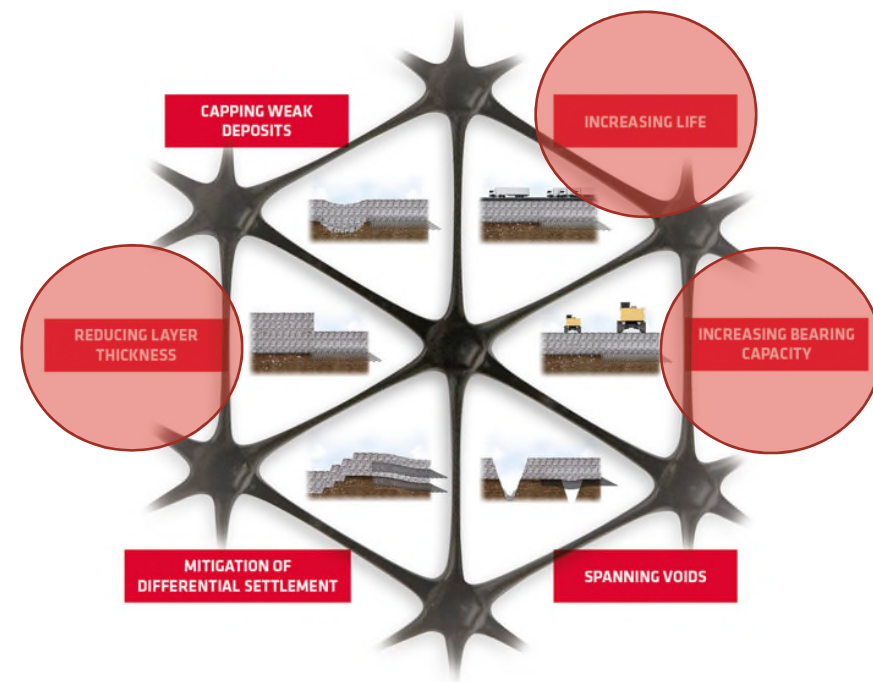
- Initial CBR value assumed across C2/C3 was 2.5%
- Resulting pavement structure for both temporary and permanent works
- Market tested rates for Subbase were significantly higher than the tender rates used, therefore reductions in Subbase thickness would provide significant savings for the project



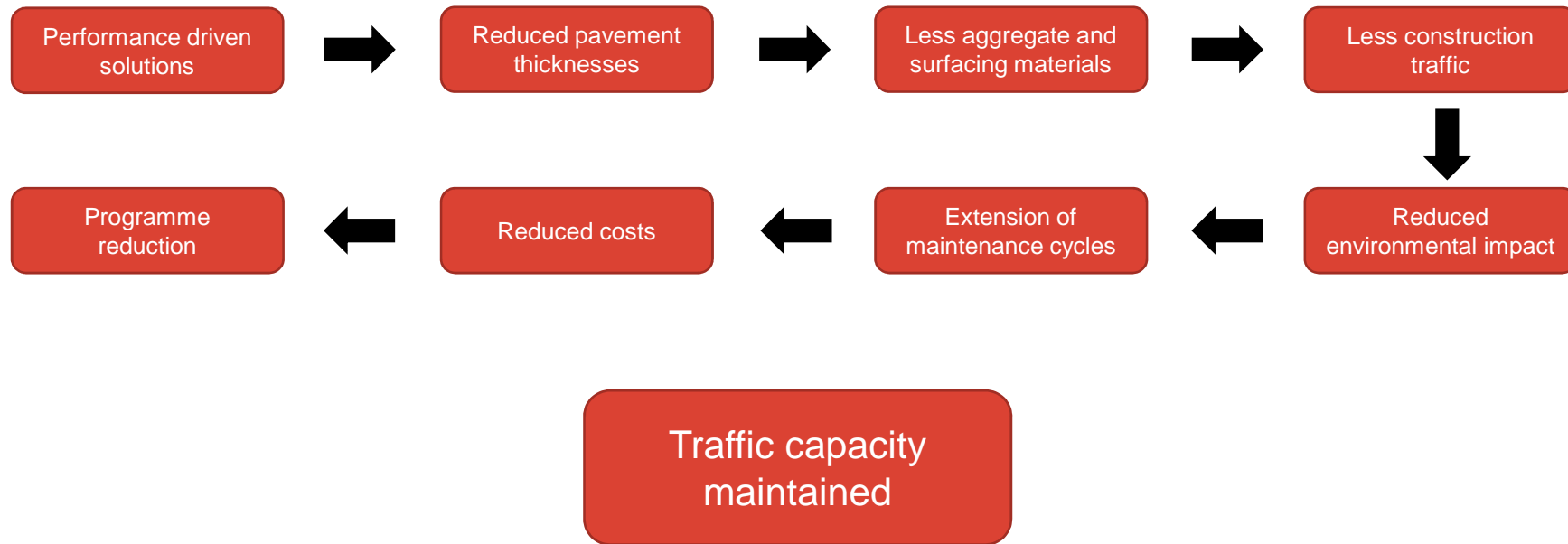


## Geogrid applications

- Stabilised access over low strength soils
- Construction and in-service trafficking
- Temporary or **permanent** applications



## Benefits (technical aspects)

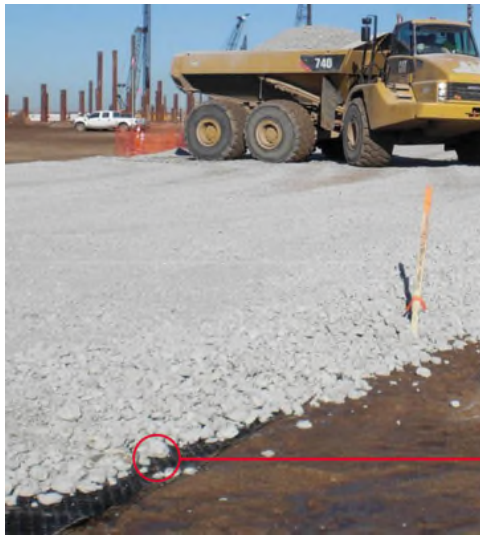


# Benefits (technical aspects)



# Benefits (technical aspects)

How it works



### Mechanical Stabilisation

The confinement effect - on an aggregate - resulting from the interlocking mechanism provided by a stiff geogrid aperture



Mechanical Stabilisation

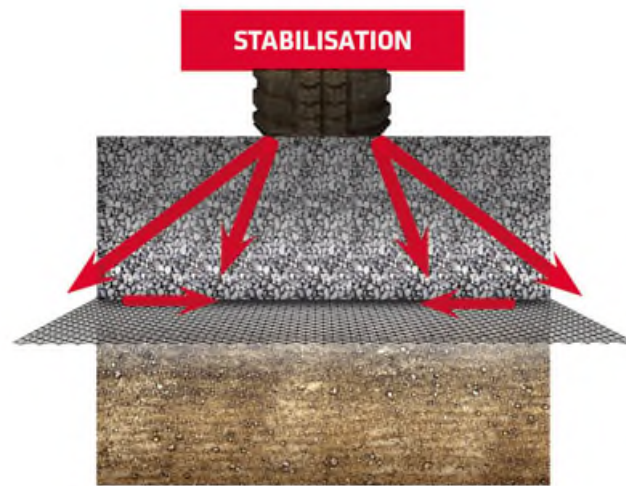
vs

Tensile Strengthening

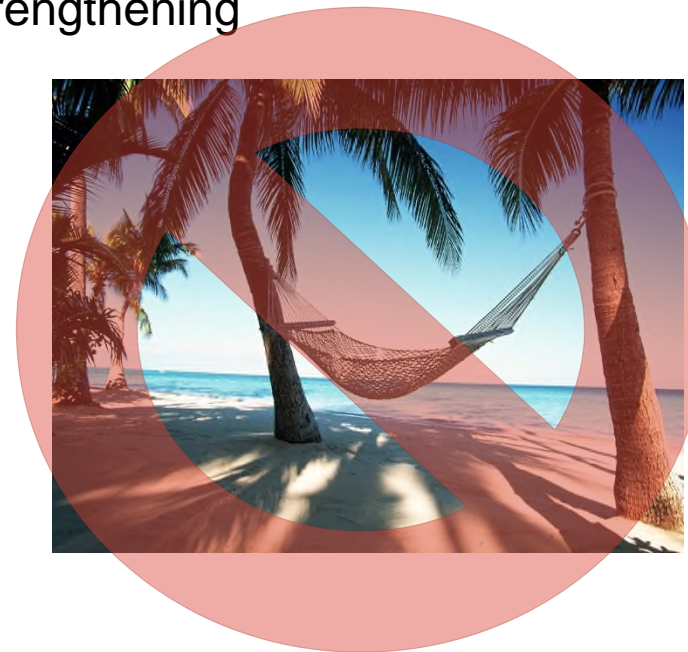


# Benefits (technical aspects)

Mechanical Stabilisation vs Tensile Strengthening



- | Lateral Restraint
- | Interlock
- | Confinement
- | Radial Stiffness



# Benefits

Application

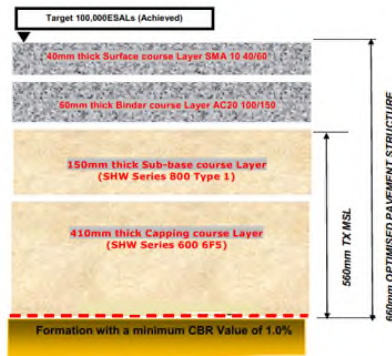


## **EK Proposed Applications**

- Temporary Highway Alignments – Design will be progressed with Geogrid Manufacturer, however, savings have been projected to reflect these
- Permanent Highway Alignments – Proposal to extend the application to permanent works
- A Departure from Standard will be required

# Case Study – Site Access Road

**Optimised Road Pavement  
CBR 1.0%**



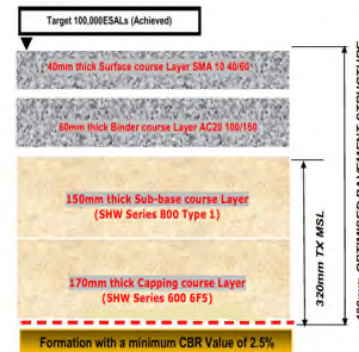
**Total pavement thickness after optimisation = 660mm**

**Expected capacity 350,000ESALs**

\*Non-stabilised Pavement thickness 835mm from AASHTO 93.

Reduction of 175mm

**CBR 2.5%**



**Total pavement thickness after optimisation = 420mm**

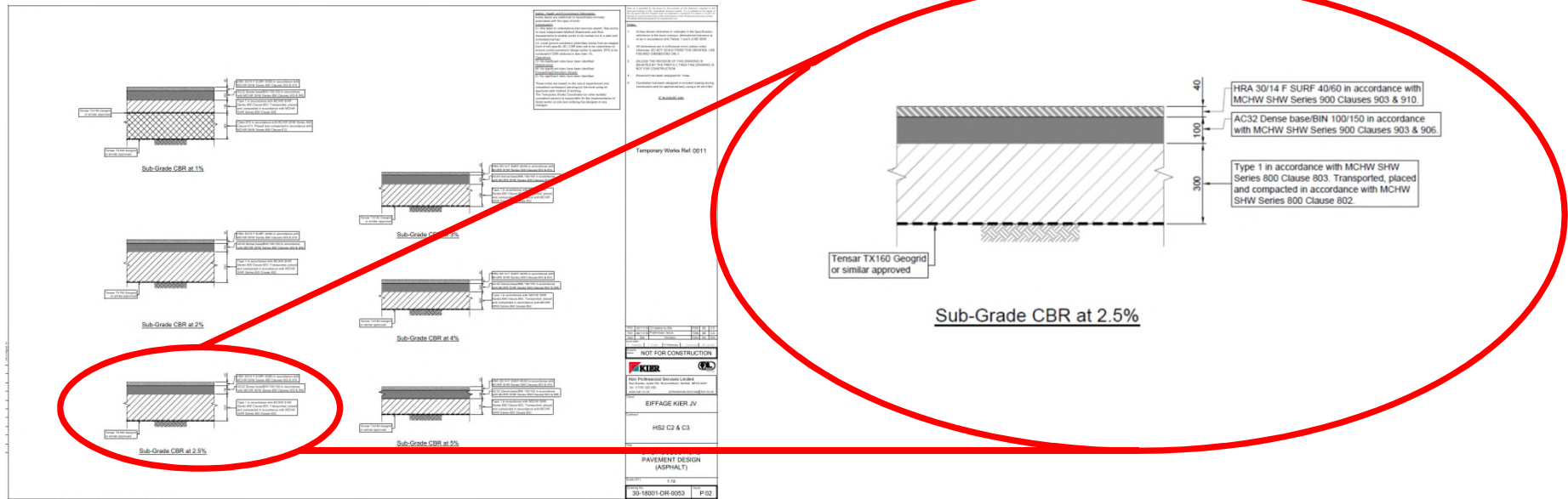
**Expected capacity 290,000ESALs**

\*Non-stabilised pavement thickness 570mm from AASHTO 93

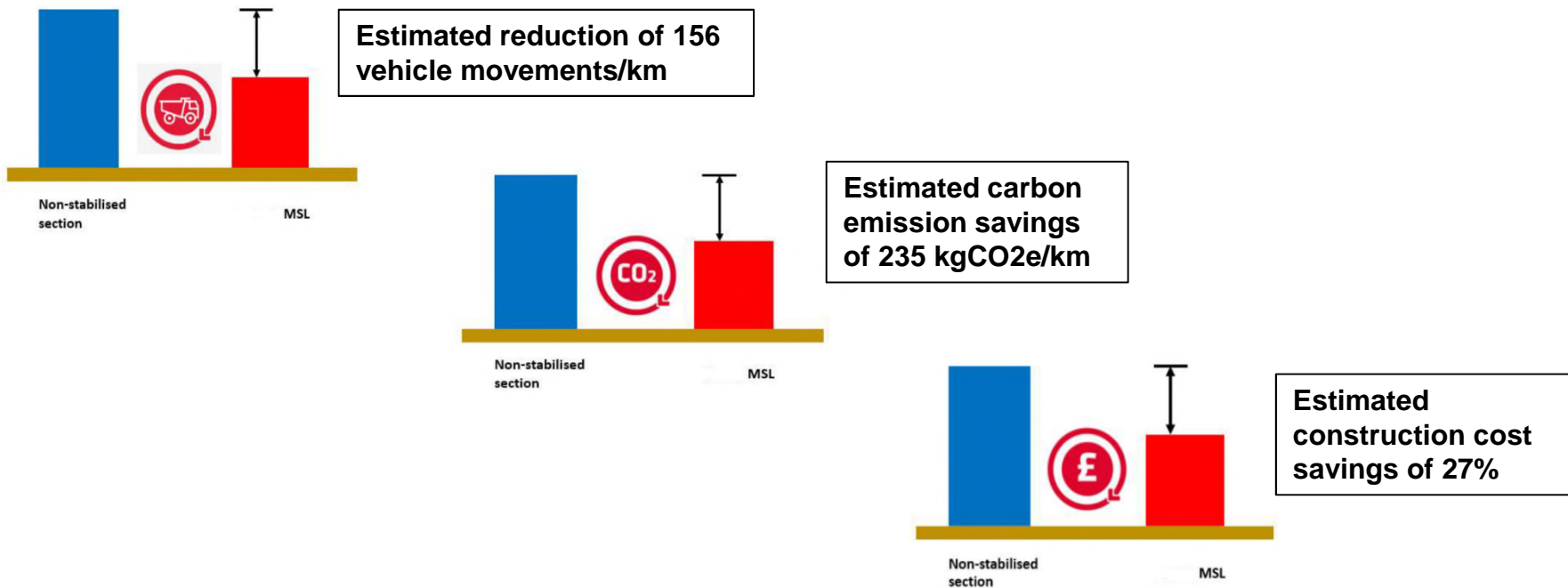
Reduction of 150mm



# Case Study – Site Access Road



# Case Study – Site Access Road



# Case Study – Potential Benefits

## Temporary Alignment Example

The screenshot displays a pavement design software interface with three main sections:

- Design Traffic and Other Requirements:**

4.43	4.43	Structural Number
3,281,564	3,281,564	ESAL = 2,900,000
OK	OK	Design result
- Select pavement layers:**

Non-stabilised		Design result
35 mm	35 mm	
60 mm	60 mm	
70 mm	70 mm	
284 mm	150 mm	TXS (at base)
50 mm	50 mm	Mr = 31.03
50 mm		Mr = 31.03
- Unbound layer 1:**
  - Material: Well graded gravel (crushed)
  - a value: 0.140
  - m value: 1.000
  - Maximum: <40mm
  - Stabilised:  TXS
  - Use in design:
  - Use in non-stabilised design:
  - Thickness (mm) vs Structural Number SN table:

Thickness (mm)	Structural Number SN
150	1.56
284	1.56

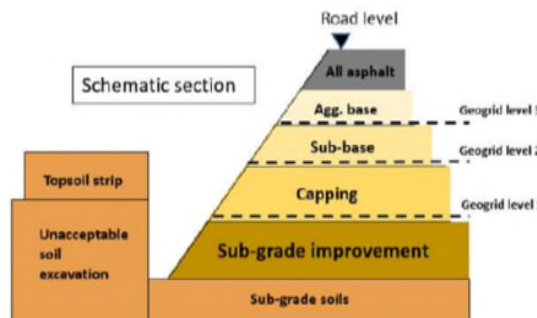
Design Requirements: R = 80%, So = 0.49, po = 4.20, pt = 2.00, Units SI, customised geogrid layout

C2 – School End  
Based on a 600m long diversion giving an overall 3200m<sup>2</sup> carriageway and priced to include the removal of the temporary alignment and removal off-site of the Geogrid, our Estimator has verified a 27% cost saving

# Case Study – Potential Benefits

## Permanent Alignment Example

<b>Client</b>	Hs2	
<b>Project Name</b>	Stoke Mandeville	
<b>Project Reference</b>	JDC19003	
<b>Document Reference</b>	15/02/2019	
<b>Date</b>		
<b>Geosynthetics Used</b>	Non-stabilised	MSL
Position 3	-	N
Position 2	-	Y
Position 1	N	N



### Summary of Benefits

Construction Cost	27% Saving
Volume of Aggregate	33% Saving
Mass of Aggregate	33% Saving
Truck Deliveries	22% Reduction
Programme Saving	15% Saving
Carbon Usage (kgCO <sub>2</sub> e)	32% Reduction

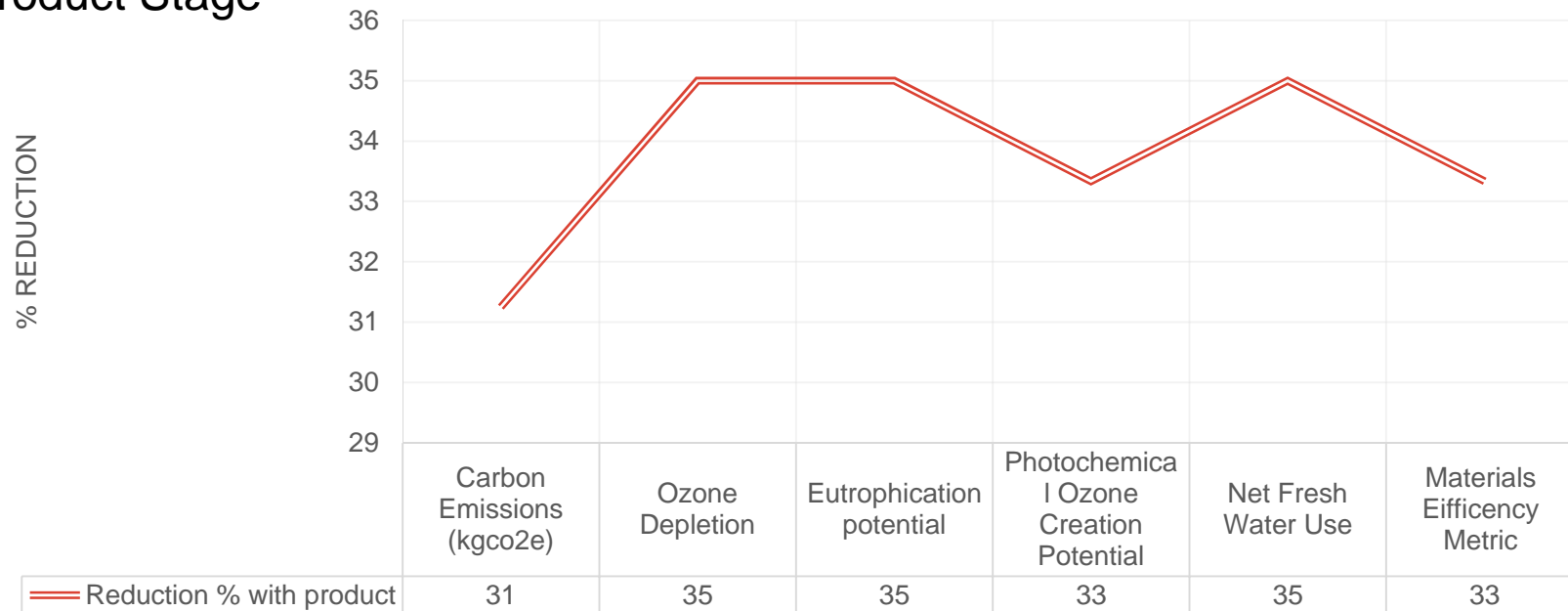
## Contractual Requirements

- Achieve a 50% carbon reduction from an agreed baseline through design to construction - Baselines have been locked down in early 2018
- Achieve EXCELLENCE in BREEAM – 13 indicators (examples next slide)
- Measure and Reduce Material Efficiency Metric

$$ME_{asset} = \sum_{elements} \frac{M_v + 0.7 M_{rec} + 0.7 M_{ren} + 0.49 M_{ren+rec} + 0.2 M_{reu} + 0.14 M_{ren+reu}}{Life\ span\ of\ element\ (years)}$$

# Some of the indicators we measure

Product Stage



## Some of the indicators we measure

Transport kgCO<sub>2</sub>e (RICS used)

Without Geogrid 142,022 kgCO<sub>2</sub>e



With Geogrid 94,669 kgCO<sub>2</sub>e



33.34% reduction in transport carbon with aggregates



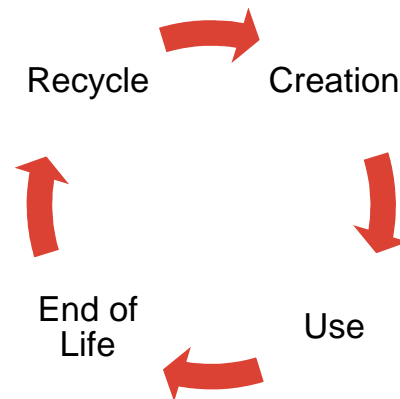
## Some of the indicators we measure

Recyclability and designing out waste

During manufacture: EPD Data

The polypropylene is bulk delivered in 24 tons batches – the pellet is blown into the silo. Therefore there is no packaging waste for the polypropylene.

Lifecycle:

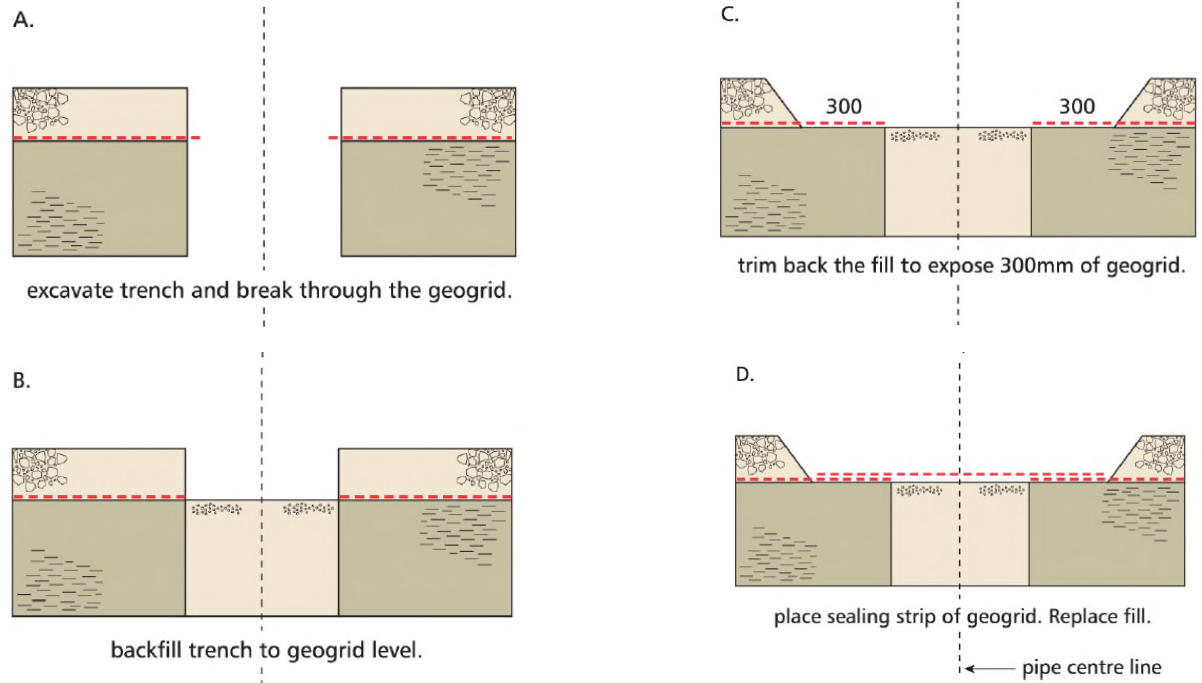


Proving its clean it can be sent to a plastic specialist who will shred it down into re-mouldable pieces



# Practical Uses

## Repairs



# Previous Applications

Geogrids have been used in the UK since 1981

Local Highway Authorities With-in HS2 Phase 1	Pavement Design (Yes/No)	Asphalt Reinforcement (Yes/No)
London Borough of Camden	No	Yes
London Borough of Ealing	No	Yes
London Borough of Hammersmith & Fulham	No	Yes
London Borough of Kensington & Chelsea	No	Yes
London Borough of Westminster	No	Yes
London Borough of Brent	No	No
London Borough of Hillingdon	No	Yes
Hertfordshire County Council	No	Yes
Buckinghamshire County Council	Yes	Yes
Northamptonshire County Council	Yes	Yes
Oxfordshire County Council	Yes	Yes
Warwickshire County Council	No	No
Staffordshire County Council	No	Yes
Solihull Metropolitan Borough Council	No	No
Birmingham City Council	No	Yes
Transport for London	No	Yes
Highways England	Yes	Yes

Other Local Authorities Who Have Previously Used Geo-grids in Permanent Road design
Norfolk CC
Essex
Kent
Chester
Thornton
Leicestershire CC
Bristol CC
Bicester
Cambridgeshire
Barnett
Bampton
Harwell
Olympic Stadium
Hownslow
Dorset
Surrey
Hull

Project name	Client	Year of installation
Bugsbys Way, Greenwich Peninsular Link Road, Greenwich	London Borough of Greenwich	1981
A51 Tarvin Bypass	Dept of Transport/Cheshire CC	1983
A5111 Derby Ring Road	Dept of Transport/Derbyshire	1986
Newcastle Western Bypass	Dept of Transport	1988
Second Severn Crossing – approach roads	UK Highways Agency	1993
A5 Tamworth	Staffordshire CC	1996
A500 Crewe	UK Highways Agency	2002

## Suppliers of Geogrids in the UK

- Tensar UK
- Geosynthetics
- TCS Geotechnics
- Terram
- Naue Geosynthetics (Germany – operates in the UK)

## Conclusions

- Safety benefits through reduced deliveries of imported material and reduced traffic level into site
- Environmental benefits through reduction in the project's carbon footprint
- Considerable time and cost savings realised through geogrid application within temporary diversions and temporary access roads within C2/C3

## Recommendations

- EK/HS2 recommend highways authorities to consider this proposal as an opportunity to be used on the construction of permanent highways to be built under the HS2 Act
- This will be a Departure from Standard (departure from SHW (or SCEW) Series 700)
- Pre-approval by all highway authorities will enable Contractors not to apply for individual departures every time Geogrid material is proposed
- Pre-approval doesn't preclude designers from deciding on the most appropriate locations where geogrids are cost-effective to use. Justification for choice of material to be provided to highway authorities during the pre-application discussions

# Discussion and Questions



# HS2

## **Pavement Design & Construction 2 – Use of Low Temperature Asphalt**

Laing Murphy and DJV, Area North

# Pavement Construction with Lower Temperature Asphalt (LTA)

## Highways Planning Forum

Highways Subgroup – 18<sup>th</sup> March 2019, London

Dermott Doyle – Associate Director, DJV for LM (Enabling Works Contractor, Area North)





# Lower Temperature Asphalts

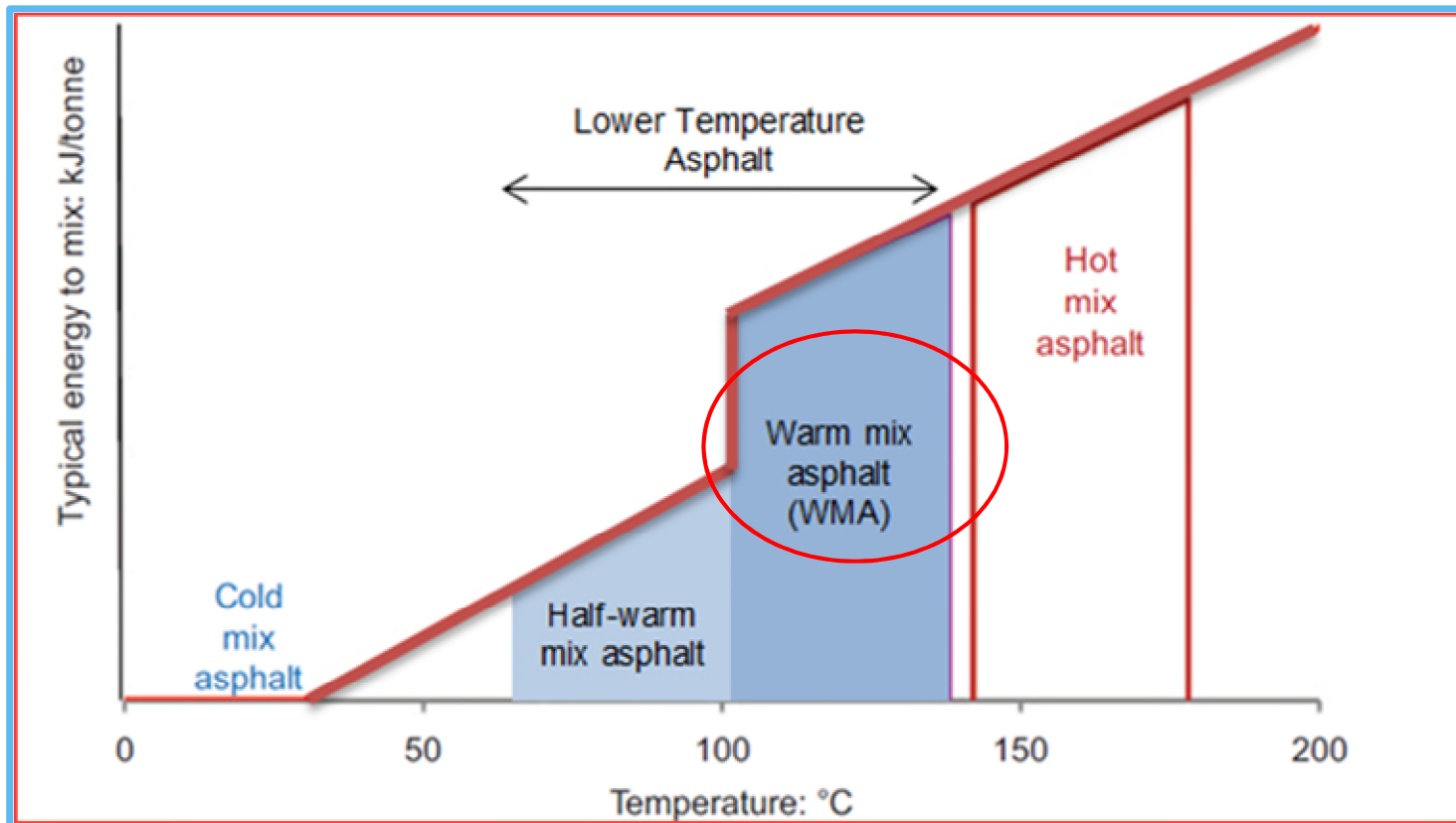
## LTA Defined

The term LTA covers proprietary and also standard Local Authority highway asphalt products such as Asphalt Concrete, Stone Mastic Asphalt and Hot Rolled Asphalt

LTA is often referred to as lower temperature asphalt, warm mix asphalt, half-warm (or semi-warm) mix asphalt and cold mix asphalt. **For consideration within the EW packages we are considering only the warm mix temperature range.** A key point with lower temperature versions of any asphalt material is the technology/production process which enables the asphalt to be mixed and installed at temperatures lower than those typically used for hot mix asphalt.



# Lower Temperature Asphalts



Energy profile demonstrating typical range of production temperatures for LTA

(Image based on Nicholls J. C., et al, *Specification for Low Temperature Asphalt Mixtures, PPR666, TRL, Figure 1.1 (2014)*)

# Lower Temperature asphalts

Approach		How does it work?	Considerations	Typical production temperature range
Additive systems	Specialist bitumen	Additives are pre-blended into the bitumen to alter bitumen viscosity or modify frictional resistance to compaction.	Generally a large scheme or regular supply is needed to justify ordering a full tanker of LTA specific bitumen.	100°C to ~130°C
	Additive technology (chemical or organic additives)	Some technologies alter bitumen viscosity, whilst others act as surfactants at the bitumen-aggregate interface to enhance mixing and compaction	Asphalt plant requires an additive addition system. These systems can offer flexibility in asphalt production. Some also include adhesion enhancers.	100°C to ~130°C
Foaming Processes	Foaming bars	Some technologies use bespoke bitumen foaming bars fitted at the asphalt plant. Bitumen is sprayed through nozzles in the presence of water and under pressure to create foamed bitumen containing micro air bubbles.	Generally the setup is asphalt plant specific and requires significant investment from the supply chain.	70°C to 100°C ('half-warm' LTA) 100°C to ~130°C ('warm' LTA)
	Moisture releasing additives	Moisture releasing additives cause a foaming action creating micro bubbles in the bitumen.	Additive system may be required on the asphalt plant.	70°C to 100°C ('half-warm' LTA) 100°C to ~130°C ('warm' LTA)
	Control of aggregate moisture content	Careful control of aggregate moisture creates a foaming action of the bitumen when cold RAP or aggregates combine with hot aggregate and bitumen components.	RAP/cold aggregate feed may be required on the asphalt plant.	90°C to 100°C

# LTA- Drivers



Working on  
behalf of



Sustainability	Clearly LTA has potential to offer energy savings over conventional asphalt. Perhaps surprisingly, our survey of MHA members found that sustainability isn't always the main driver for using LTA, but it did in general feature in the top 5 drivers for use by MHA survey respondents. Carbon footprint and wider sustainability considerations are discussed in Section 8 of this document.
Early Trafficking	Some LTA products offer benefits such as faster overlay and have proved to be particularly effective for schemes with short possession times. LTA can reduce traffic management time and associated delays to traffic. LTA can also offer increased volumes of laying over hot mix asphalt in a shift, due to a reduction in time prior to removal of traffic management.
Durability	<b>Research suggests that heating materials at lower temperatures reduces the level of bitumen hardening and oxidation. This is generally viewed by the industry as benefitting long term performance</b>
Recyclability	Some LTA technologies incorporate recycled material; however, high recycled content is not always synonymous with LTA technologies. At the end of their life, LTA products can be recycled in the same manner as their hot asphalt counterparts.
Cost	<b>LTA's are understood to be cost neutral relative to hot mix asphalt, but there may be installation savings associated with reduced traffic management time. In addition, it is thought that some materials may offer whole life cost savings, due to reduced bitumen ageing during production.</b>
Targets	Most Local Authorities have already set targets that drive them to make more sustainable choices. LTA can help to achieve those targets, in terms of recycling and carbon footprint. West Midland Highway Alliance members have committed to reduce CO <sub>2</sub> emissions by 20% by 2020. Included within this, is the target for 20% of all asphalt used to be low temperature asphalt.
Safety	<b>LTA offers reduced fumes compared to hot mix asphalt, offering improved visibility and working environment especially when working in damp conditions.</b>



# LTA- Performance (Trial sites)



Long term Stiffness



# LTA Benefits



A number of benefits can be gained when using LT

- Reduced hot working
- Improved visibility
- Faster placement
- Improved programme of construction



# LTA- Specification

**Transport Research Laboratory**  
Creating the future of transport



**PUBLISHED PROJECT REPORT PPR666**

**Specification for Low Temperature Asphalt Mixtures**

**J C Nicholls (TRL), H Bailey (TRL), N Ghazireh (Lafarge Tarmac) and D H Day (Nynas)**

Appendix7/1 Additional Requirements

Standard specification for warm mix asphalt

Scope

This Specification sets out requirements for mixtures of warm mix asphalt for use on roads and other trafficked areas. It includes requirements for the selection of the constituent materials. Warm mix asphalt can be used for binder courses and bases.

Normative references

This Specification incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this Specification only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies (including amendments).

BS 594987, Asphalt for roads and other paved areas. Specification for transport, laying, compaction and type testing protocols

BS EN 12697-13, Bituminous mixtures – Test methods for hot mix asphalt – Part 13: Temperature measurement

BS EN 13108-1, Bituminous mixtures – Material specifications – Part 1: Asphalt concrete

BS EN 13108-20, Bituminous mixtures – Material specifications – Part 20: Type testing of asphalt mixes

BS EN 13108-21, Bituminous mixtures – Material specifications – Part 21: Factory production control

# LTA- Departure

HS2

## DEPARTURES FORM

The contractor makes the following departure submission in accordance with sub-section 5.2 of the 'Guidance Note – Highway-related Departures' (HS2-HS2-HW-GDE-000-00003) in advance of the formal application for consent / approval under the relevant Act.

General Details	
Phase	Phase 1
Unique reference ID (or Unique asset ID if applicable)	WP 010 Lawley Middleway CE Enabling Works North Contract <del>DFS</del> Ho1
Proposer details	LMJV / DJV
HS2 Ltd document reference / version	<del>[xxxx-xxxx-HW-ERM-xxxx-xxxxxx Pool]</del>
Highway authority name	Birmingham City Council

Project Details	
Road number (where applicable)	A4540
Road name(s)	Lawley Middleway & Garrison Junction
Location	Birmingham
Road category and type	Dual Carriageway
Design speed	60/70kph
Speed limit	40mph
Summary description of existing conditions and key design issues	To further support the reduction in Carbon footprint with HS2 Road Pavement packages, the use of the Low Temperature Asphalt technology in new hot mixed asphalt is proposed through all pavement material options. This poses no technical deficiency in the supplied materials but requires a departure from BS594987 in the working temperature range only. Ultimately, the use of LTA could result in a positive reduction of up to 8% in total Carbon.

## Departures applied for

- Birmingham CC
- Solihull MBC

## Main requirement

- Departure from BS594987 regarding temperature range.

## Annex A (informative) Recommended delivery and rolling temperatures for recipe AC, HRA and SMA to BS EN 13108

Table A.1 shows the minimum delivery and rolling temperatures for recipe AC, HRA and SMA mixtures.

Table A.1 — Minimum delivery and rolling temperatures for recipe AC, HRA and SMA mixtures

Material type	Binder grade	Minimum temperature °C			
		On arrival <sup>A)</sup>	Immediately prior to rolling <sup>B)</sup>		
AC <sup>C)</sup>	Open surf and bin	160/220	95	75	
		250/330	85	65	
	Close, fine, medium, dense surf	70/100	130	100	
		100/150	120	95	
		160/220	110	85	
		250/330	100	80	
		Dense bin, base <sup>D)</sup>	40/60	130	100
			70/100	125	95
		100/150	120	90	
		160/220	110	80	



# HS2

## Consents and Approvals Procedure – Permanent Highways – Update March 2019

HS2 Ltd

# Consents and Approvals Procedure - Permanent Highways - Update - 1/5

## General - 1/2

- HS2 Ltd has updated the flowchart of the Consents and Approvals Procedure flowchart
- The flowchart will now be issued as a standalone document (rather than as an Appendix to the Consents and Approvals Procedure document (HS2-HS2-HW-PRO-000-000001))
- The updated flowchart shows key steps broken down into several sub-steps for each of the 3 parties (Contractor/Designer, HS2 Ltd and the Highway Authority)
- Each sub-step is further explained in the explanatory notes provided – the key actions required for each sub-step are explained in more detail. Where applicable details of the relevant Guidance Note or Technical Standard are provided.
- The flowchart and the notes will be used as quick reference notes to enable design teams (and construction teams) to check the key interface points where they need to consult with the highway authorities as they are developing their designs.



# Consents and Approvals Procedure - Permanent Highways - Update - 2/5

## General - 2/2

- This procedure is used alongside the designers' own design assurance procedures as well as HS2 Ltd's design review and design assurance procedures
- Flowchart also provides highway authorities with key points where they should expect to be consulted by the design teams
- When reviewing the flowchart please note that the steps are not necessarily sequential.
  - Some steps could run in parallel
  - Others may run in a different order from that shown
  - Not all steps are required in all situations.
  - More steps than shown may be involved - only those considered key are shown in the flowchart.
- Key to emphasise - *the procedure has not changed; only clarity (hopefully) provided following feedback from stakeholders.*



# Consents and Approvals Procedure - Permanent Highways - Update - 3/5

## Example - Road Safety Audit steps - 1/2

- Detailed guidance is provided in the Guidance Note - Road Safety Audits and the relevant DMRB standards (HD 19 or GG119)
  - Flowchart provides key steps where the designers need to contact the highway authority or HS2 Ltd
    - **Step S09 - Design team decides whether an RSA is required**
    - **Step S09 - Design team receives RSA brief from client**
    - **Step S09 - HS2 Ltd prepares and approves the brief**
    - **Step S09 - Does Not Apply to the Highway Authority**
    - **Step S10 - RSA team conducts the RSA in accordance with the relevant standard and HS2 standards/guidance notes etc. The RSA team invites the HA to attend RSA as observer (if the HA wishes to do so). (Please note this may depend on the type of contract; EWC or MWCC.)**
    - **Step S10 - doesn't apply to HS2 Ltd**
    - **Step S10 - The HA sends a representative to attend the RSA as an observer (depending on contract type)**
-

# Consents and Approvals Procedure - Permanent Highways - Update - 4/5

## Example - Road Safety Audit steps - 1/2

- RSA steps continued
    - **Step S11 - Design team reviews RSA, prepares Response Report and updates the design as required.**
    - **Step S11 - HS2 reviews RSA report, provides input to and reviews Response Report. Also seeks assurance that the design team has updated the design in accordance with the RSA response where required.**
    - **Step S11 - The HA reviews the RSA report and the Responses report and provides any comments if necessary.**
    - Step S11 - Any key issues arising out of the RSA are discussed at this stage; and resolution to be agreed at this stage. Tripartite meetings (Designer/Contractor, HS2 Ltd and the HA) may be held to resolve issues resulting from RSA audits and reports.
    - Note to S11 - explains that even though resolution is preferred to be reached at this stage; since this is not a formal consent/approval application.
-

# Consents and Approvals Procedure - Permanent Highways - Update - 5/5

## Highway Authorities Consultations

- Highway Authorities to review the procedure and provide comments to HS2 Ltd before (date to be agreed at the meeting today)
- Comments to focus primarily on HA actions and the interface points; whether the authorities feel more (or less) interface points should be included (bearing in mind the requirements of the Act)
- Please note original flowchart has already been consulted on and any comments from the HAs have already been incorporated or a response provided
- Highways England has been consulted separately, and their comments and queries to be discussed during the ongoing bilateral discussions
- Due to time constraints the Highways Authorities consultations is being held in parallel with the internal review – so the final draft may be (slightly) different from the one provided today. Final draft to be shared with responses to comments received from HAs.



# HS2

## Technical Standards – update

HS2 Ltd

# Technical Standards (1)

## Updated documents previously circulated for review / comment:

- **Roads** (currently version P04)
  - Subject to changes arising from the ongoing DMRB update (e.g. HD 19 replaced by GG 119)
- **Bridge Design Basis** (version P06)
  - Comments received – response sheet to be issued
- **Highway and Access Drainage** (version P04)
  - Comments received from Highways England – response sheet to be issued





# Technical Standards (2)

## Documents being updated, as previously advised:

- **Public Rights of Way** (version P04 in preparation)
  - Addition of references to the Phase 2a hybrid Bill and information papers
  - Revised British Horse Society wording about bridleways
  - Other minor updates
- **Errant Vehicle Protection** (version P04 in preparation)
  - Improved typical detail drawings in appendices
- **Temporary Works** (version P04 in preparation)
  - Pending publication of updated version of BS 5975
- **Retaining Structures** (version P05 in preparation)
  - To be circulated for review / comment soon



# HS2

## Guidance notes – update

HS2 Ltd

# Guidance Notes (1)

## Document with no known changes at this stage

- **Highway-related Departures** (version P03)
- **Stopping-up of Highways** (version P01)

## Documents being updated, as previously advised:

- **Technical Approval of Highway Structures** (version P02)
- **Highway Earthworks Approvals / Certification** (version P02)
- **Technical Approval of Temporary Works with Highways Interface** (version P02)
  - To be circulated for review / comment when ready

## Further document being updated:

- **Road Safety Audits** (version P04)
  - P03 was ready for issue, but being revised again following recent replacement of HD 19 by GG 119



# Guidance Notes (2)

## Documents to be updated in due course, as previously advised:

- **Bridge Maintenance Demarcation Lines** (version P03)
  - Improved illustrations required – to be circulated for review / comment when ready

## New documents being drafted :

- **Handover Packages for Highway Authorities** (version P01)
- **Car Parking** (version P01) *NB – Previously listed as 'Car and Cycle Parking'*
- **HS2 Approach to Cycling Provision** (version P01)
  - To be circulated for review / comment when ready



# HS2

## Forms

HS2 Ltd

# Forms (1)

## Documents previously issued for review / comment:

- **Form BR1** (version P01)
- **Form HW1** (version P04)
- **Form HW3** (version P02)
- **Form HW4** (version P03)
- **Form HW5** (version P03)
- **Form HW10** (version P03)
- **Form HW11** (version P03)
- **Form HW12** (version P02)
  - Comments received from several highway authorities
  - Response sheets in preparation



# Forms (2)

## Documents previously issued for information:

- **Form HW16** (version P01)
  - Comments received from several highway authorities
  - Response sheets in preparation

## Documents in preparation:

- **Form HW15** (version P01)
  - To be circulated for review / comment when ready



# HS2

## TM1 and TM3 Forms



# TM1 And TM3 Revisions

The changes made to the **TM1 form** are:

- Additional instructions for use.
- Minor changes to the formatting to reduce the file size.
- Additional wording on page 1 to remove ambiguity.
- The addition of “Consultation / Consent” column in table 2.

The **TM3 form** has been developed in line with the RTMP and will only be used following an initial submission using a TM1 form.

As identified by the tick boxes in the TM3 form, it will cover:

- Amended dates for a period of Highway Possession / Temporary Interference for an obtained consent or consultation submission. For example the proposed end of consent on page 1 of the TM1 form needs to be amended as the works programme has changed.
- A minor change to an obtained consent or consultation submission. For example; a minor change to TM layout is required that does not have a material impact on road safety or further reduce public inconvenience.
- For major works submissions with multiple phases: the form will also be used to notify the highway authority of the implementation of a new traffic management phase.

The TM3 will be accompanied by the original TM1 form with all amendments highlighted. The consent reference remains the same but the form and submission documents are updated accordingly. In line with the RTMP the form will be submitted with a minimum 3 days’ notice but, contractors will be advised to provide as much notice as possible.



# HS2

## AOB

All