# APPROVAL IN PRINCIPLE (Permanent works design)

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| Name/ Address of Project | 17 South Eaton Place, Belgravia, London SW1W 9ER |
| Type or Structure | Basement vault alteration involving lowering of floor slab + Underpinning and new structural floor slab (Permanent works) - Dwelling with Grade II Listed Status |
| Structure Ref No. | |

## 1. HIGHWAY DETAILS

1.1 Type of highway — London local distributor road networks

1.2 Permitted traffic speed — 48 km/h (30 mph)

1.3 Existing restriction

** To lists whether environmental, width, weight, no parking, bollards, other barriers, double yellow lines or height restriction is present in the vicinity of the property or construction site.*

## 2. SITE DETAILS & EXISTING STRUCTURE

2.1 Description of existing structure / sub-structures layout/configuration: type of foundations, retaining walls, masonry arches, construction type in relation to the highway boundaries and any obstacles crossed.

2.2 Provide reasons for alteration/repairs/strengthening.

## 3. PROPOSED STRUCTURE

3.1 Description of structure and design working life

** To provide a general description of the proposed structure or sub-structures development or redevelopment – including the overall dimensions, - length, width and depth in relation to the highway.*

*The design working life of the structure, including temporary structure, and replaceable structural parts to be given. They should be expressed as a number of years.*

3.2 Structural type

** To provide dimensional details (thickness, height, sizes, grades of concrete or steel) of proposed structural components. To take into consideration of the slenderness ratios of supporting elements that provides stability to the structures or sub-structures.*

3.3 Foundation type

** To provide information relating to proposed foundation (including diameter of piles, or sizes for driven pile type, total length, embedment depth and the types of piles construction or raft foundation). For replacement type piles, provide information about the extent of the reinforcement.*

3.4 Span arrangements

** To specify the span arrangements/configuration of proposed structural elements including horizontal, vertical and or inclined components.*

3.5 Articulation arrangements

** To specify proposed fixities types at the supports, connections or joints (either as built-in, sliding, free, pin or restraint in one or two directions). To indicate the proposed fixity in the idealized force diagram as per section 5.2*

3.6 Proposed classes/levels

3.6.1 Consequences class

** (Refer to BS EN 1990:2002+A1:2005 Table B1)*

3.6.2 Reliability class

** (Refer to BS EN 1990:2002+A1:2005 Table B2)*

3.6.3 Inspection level

** (Refer to BS EN 1990:2002+A1:2005 Table B5)*

3.7 Road restraint systems requirements

3.8 Proposed arrangements for future maintenance and inspection

3.8.1 Traffic management

3.8.2 Arrangements for future maintenance and inspection of structure.

Access arrangements for structure

3.9 Environment and Sustainability issues considered. Materials and finishes

3.10 Durability. – Material and finishes

** For concrete structures, give applicable exposure classes for particular structural elements. For all material strengths given, list the relevant codes/standards*

3.11 Risks and hazards considered for design, execution, maintenance and demolition. Consultation with and /or agreement from Principal Designer.

** Designer to name the Principal Designer (PD) and to append an endorsed statement from PD confirming that the risks and hazards identified in the AIP permanent works design proposal are appropriate and compliance with the latest CDM Regulations 2015.*

3.12 Estimated cost of proposed structure together with other structural forms considered and the reasons for their rejection including comparative whole life costs with dates of estimates

3.13 Proposed arrangements for construction

3.13.1 Construction of structure

3.13.2 Traffic management

3.13.3 Service diversions

3.13.4 Interface with existing structures

## 4. DESIGN CRITERIA

4.1 Actions (to specify design load safety factors to ULS where applicable)

4.1.1 Permanent Actions (axial & lateral loadings)

** To specify respective loadings and associate design safety factors @ ULS*

4.1.2 Snow, wind and thermal actions

4.1.3 Actions relating to normal traffic under Authorized Weight (AW) Regulations 1998 and Construction & Use (C&U) Regulations 1996

4.1.4 Actions relating to General Order Traffic under Special Types General Order (STGO) Regulations 2003

4.1.5 Footway or footbridge variable actions

4.1.6 Actions relating to Special Order Traffic, provision for exceptional abnormal indivisible loads including location of vehicle track on deck cross-section

4.1.7 Accidental actions

4.1.8 Actions during construction

4.1.9 Any special action not covered above *(e.g. seismic action, atmospheric icing, floating debris etc)*

4.2 Heavy or high load route requirements and arrangements being made to preserve the route, including any provision for future heavier loads or future widening

4.3 Minimum headroom provided (including allowance for vertical sag compensation and maximum deflection of structures).

4.5 Standards and documents

4.5.1 List of relevant documents from the Technical Approval Schedule (TAS)

* *(To strike out those standards that are not relevant with the design but need to incorporate BD 2/12)*

Refer to Annex B1

- Mandatory – CDM Regulations 2015
- BD 2/12 – Technical Approval of Highway Structures

4.5.2 Additional relevant Standards and publications

4.6 Proposed Departures relating to departures from standards given in 4.5 *(If applicable, provide reasons or supporting documents)*

4.7 Proposed Departures relating to methods for dealing with aspects not covered by standards and documents in 4.5

## 5 STRUCTURAL ANALYSIS

5.1 To provide design philosophy approach and methods of analysis proposed for superstructure, sub-structure and foundations.

* *Lists the main structural elements for superstructure, sub-structure and foundation.*
* *If the designs of the superstructure, sub-structure and /or foundation are to be implemented by an independent Organization Design Team / Sub-Consultant, the Main Structural Designer must provide and specify all relevant loading conditions, constraints and external actions to be taken into account. The conditions and actions must be covered in the AIP.*
* *This will define the respective designers' responsibilities in association with the different sub-structures proposal.*
* *(Notes: Calculations sheets are NOT required with the submission)*

5.2 Description and diagram of idealised structure to be used for analysis - Diagram should:

- Indicate nodes are fixed or pinned
- Illustrate support points and direction of restraints
- Illustrate external loading
- To provide force diagrams (triangular and rectangular shapes representing the relevant applied loadings to the structural elements)
- To indicate type of restraints at the supports

5.3 Assumptions intended for calculation of structural element stiffness

- To provide characteristic properties' of proposed structural elements

5.4 Proposed range of soil parameter to be used in the design of earth retaining elements and sub-structures associate with the foundation.

## 6 GEOTECHNICAL CONDITIONS

6.1 Acceptance of recommendations of the Geotechnical Design Report to be used in the design and reasons for any

proposed changes. *Specify soil parameters for the design*.

6.2 Summary of design for highway structure in the Geotechnical Design Report.

6.3 Differential settlement to be allowed for in the design of the structure

6.4 If the Geotechnical Design Report (GDR) is not yet available, state when the results are expected and list the sources of information used to justify the preliminary choice of foundations

** When the GDR becomes available, an addendum to the AIP, covering section 6, must be submitted to the TAA. The addendum must have its own sections 8, 9 and 10 to provide a list of drawings, documents and signatures.*

## 7 CHECKING

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| 7.1 Proposed Category of checking and Design Supervision level | Category 1 |
| 7.2 If Category 3, to provide name of proposed Independent Checker *(need to be approved by the TAA)* | Not applicable. |
| 7.3 Erection proposals or temporary works for which Types S and P proposals will be required, listing structural parts of the permanent structure affected with reasons. | *IF temporary works AIP submission is not required during the construction stage, please provide justification.*<br>*Otherwise insert 'Refer to separate Temporary Works AIP submission by Main Contractor'* |

## 8 DRAWINGS AND DOCUMENTS

8.1 List of drawings: *(Notes: - Calculation sheets are not required with the submission).*

- Footprint of Scheme (Plan) and Location Plan – scale 1:500 or 1:1250
- And other approvals documents accompanying the submission (like - planning consent, temporary hoarding or lane closure).
- Departures
- Relevant correspondence and documents from consultations.
- Drawing size – A3 in pdf format

| Drawing No/Report Ref | Drawing Title / Planning Consent / Report | Stage | Rev | Organization |
|---|---|---|---|---|
| | Footprint of Scheme (Plan) and Location Plan – scale 1:500 or 1:1250 | | | ? |
| | Copy of WCC Planning Consent | | | |
| | Endorsed statement from Principal Designer | ? | ? | ? |
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Notes:

- 'Stage column' – Please insert one of the followings - for Tender or Outline Design or Approval or Construction?
- To append endorsed statement from the Principal Designer

## 9 THE ABOVE IS SUBMITTED FOR ACCEPTANCE

Signed _____

Name _____

( Design Team Leader )

Professional Engineering Membership Qualifications [13] (Including membership number) _____

Name of Designer Organization _____

Submission date _____



Notes:

*13* *CEng MICE, CEng MIStructE or equivalent*

*14* *AIP is valid for three years after the date of agreement by the TAA. If construction has not yet commenced within this period, the AIP shall be re-submitted to the TAA for review.*

**10 The above is rejected / agreed subject to the amendments and conditions shown below**

10.1 Agreed by WCC Service Provider Structural Engineer

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| Signed | |
| Name | Desmond K K Chew |
| Position held | Senior Principal Structural Engineer |
| Professional Engineering Membership Qualifications | BEng (Hons) CEng MICE |
| Organization | FM Conway Limited |
| Endorsed Date | |

## 10.2 Acceptance by Westminster City Council

I have considered the submission for Approval In Principal (AIP) of the above scheme in order to be satisfied that the applicable criteria have been adequately addressed by the Designer and my comments on the submission are shown below. These comments relate principally to the elements of the structure that lie within the Westminster City Council Boundary



Provided these comments are adequately addressed, I hereby accept the Approval In Principle submission.

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| Signed | |
| Name | Andy S. Foster |
| Position held | Asset Manager (Bridges & Structures), City Management and Communities |
| Professional Engineering Membership Qualifications | BEng (Hons) CEng MICE |
| Technical Approval Authority (TAA) | City of Westminster |
| Approval date | |

Note: Signature of this document does not imply any obligation to adopt this structure.

# Annex B1 – Technical Approval Schedule (TAS)

(Do not delete and remove the original list of standards from the template)
(Strike out those documents that are NOT associate with the design proposal)

## Schedule of Documents Relating to Design or Assessment of Highway Bridges & Structures using National Standards (Eurocodes)

### *British Standards (non–conflicting with Eurocodes)*

| | |
|---|---|
| BS 449: 2005 + A2:2009 | Steel for the reinforcement of concrete. Weldable reinforcing steel Bar coil and decoiled product. Specification (and Amendment No 2:2009) |
| BS 6031:2009 CORR: August 2010 | Code of Practice for Earthworks |
| BS 8006-1:2010 CORR June 2012 | Code of Practice for Strengthened/Reinforced soils and other fills |
| BS 8500-1:2015 | Concrete – Complementary British Standard to BS EN 206-1 Part 1: Method of specifying and guidance for the Specifier. |
| BS 8500-2:2015 | Concrete - Complementary British Standard to BS EN 206-1 Part 2 Specification for constituent materials and concrete. |
| BS 8666: 2005 (Incorporating Amendment No. 1) | Specification for scheduling, dimensioning, bending and cutting of steel reinforcement for concrete |
| BS EN 1317-1-1998 Road Restraints Systems – Part 1 | Terminology and general criteria and test methods. |
| BS EN 1317-2-1998 Road Restraints Systems – Part 2 | Performance classes, impact test acceptance criteria and test methods for safety barriers. |
| BS EN 1317-3-2000 Road Restraints Systems – Part 3 | Performance classes, impact test acceptance criteria and test methods for crash cushions. |
| DD ENV 1317-4-2002 Road Restraints Systems – Part 4 | Performance classes, impact test acceptance criteria and test methods for crash cushions. Terminals and transitions of Safety Barriers |
| BS EN 14388 – (Date) | Road traffic noise reducing devices Specifications. |
| BS EN 15050 – (Date) | Precast concrete products. Bridge elements |

### *Eurocode 0* *Basic of structural design*

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| BS EN 1990 (2005)* | Eurocode - **Basis of structural design (+A1:2005)** (incorporating corrigendum December 2008 and April 2010). Establishes principles and requirements for the safety, serviceability and durability of structures, describes the basis for their design and verification. |

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| NA to BS EN 1990 (2005)* | UK National annex for Eurocode - Basis of structural design (incorporating National amendment No. 1)<br>Gives the nationally defined parameters (NDPs) for certain clauses where national choice is allowed. These are applicable to buildings only. |

## *Eurocode 1* *Actions on structures*

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| BS EN 1991-1-1 (2002)* | Eurocode 1: Actions on structures.<br>**General actions - Densities, self-weight, imposed loads for buildings** (incorporating corrigenda December 2004 and February 2010)<br>Offers design guidance and actions for the structural design of buildings and civil engineering works including some geotechnical aspects for the densities of construction materials |
| NA to BS EN 1991-1-1 (2005)* | UK National annex to Eurocode 1 - Actions on structures<br>General actions - Densities, self-weight, imposed loads for buildings. Gives the nationally determined parameters (NDPs) for certain sub-clauses where national choice is allowed |
| BS EN 1991-1-2 (2002)* | Eurocode 1: Actions on structures.<br>**General actions - Actions on structures exposed to fire** (incorporating corrigendum March 2009)<br>Deals with thermal and mechanical actions on structures exposed to fire - the methods given are applicable to buildings, with a fire load related to the building and its occupancy |
| NA to BS EN 1991-1-2 (2007)* | UK National Annex to Eurocode 1: Actions on structures.<br>General actions - Actions on structures exposed to fire<br>Gives the nationally determined parameters (NDPs) for certain sub-clauses where national choice is allowed |
| BS EN 1991-1-3 (2003)* | Eurocode 1 - Actions on structures<br>**General actions - Snow loads** (incorporating corrigenda December 2004 and March 2009)<br>Gives guidance for determining the values of loads due to snow which can be used in the structural design of buildings and civil engineering works |
| NA to BS EN 1991-1-3 (2005)* | UK National annex to Eurocode 1 - Actions on structures<br>General actions - Snow loads (AMD Corrigendum 17172).<br>Gives guidance for determining the values of loads due to snow which can be used in the structural design of buildings and civil engineering works |
| BS EN 1991-1-4 (2005) + A1:2010* | Eurocode 1: Actions on structures.<br>**General actions - Wind actions** (+A1:2010) (incorporating corrigenda July 2009 and January 2010)<br>Provides guidance on the determination of natural wind actions for the structural design of building and civil engineering works for each of the loaded areas under consideration |
| NA to BS EN 1991-1-4:2005 + A1: (2010)* | UK National Annex to Eurocode 1: Actions on structures. General actions - Wind actions (+A1:2010) (incorporating National Amendment No. 1)<br>Gives the nationally determined parameters (NDPs) for certain sub-clauses where national choice is allowed |
| BS EN 1991-1-5 (2003)* | Eurocode 1 – Actions on structures – Part 1-5:<br>**General actions – Thermal actions** (incorporating corrigenda December 2004 and February 2010) |

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| | Details are given for the calculation rules of thermal actions on buildings, bridges and other structures including their structural elements and cladding and other appendages of buildings |
| NA to BS EN 1991-1-5 (2007)* | UK National Annex for Eurocode 1 - Actions on structures – Part 1-5: - General actions – Thermal actions. Gives the nationally determined parameters (NDPs) for certain sub-clauses where national choice is allowed |
| BS EN 1991-1-6 (2005)* | Eurocode 1: Actions on structures.<br>**General actions - Actions during execution** (incorporating corrigendum February 2010 & February 2013)<br>Provides principles and general rules for the determination of actions which should be taken into account during the execution of buildings and civil engineering works |
| NA to BS EN 1991-1-6 (2008)* | UK National annex to Eurocode 1: Actions on structures.<br>General actions - Actions during execution<br>Gives the nationally determined parameters (NDPs) for certain sub-clauses where national choice is allowed. |
| BS EN 1991-1-7 (2006)* | Eurocode 1: Actions on structures.<br>**General actions - Accidental actions** (incorporating corrigendum April 2010)<br>Provides strategies and rules for safeguarding buildings and other civil engineering works against identifiable and unidentifiable accidental actions Including IAN 124/11 Annex A additional guidance |
| NA to BS EN 1991-1-7 (2008)* | National annex to Eurocode 1: Actions on structures - Accidental actions. Gives the nationally determined parameters (NDPs) for certain sub-clauses where national choice is allowed |
| BS EN 1991–2 (2003)* | Eurocode 1: Actions on structures.<br>**Traffic loads on bridges** (incorporating corrigenda December 2004 and April 2010)<br>Defines imposed loads (models and representative values) associated with road traffic, pedestrian actions and rail traffic which include, when relevant, dynamic effects and centrifugal, braking, etc. |
| NA to BS EN 1991-2 (2008)* | UK National annex to Eurocode 1: Actions on structures. Traffic loads on bridges (incorporating Corrigendum No. 1)<br>Gives the nationally determined parameters (NDPs) for certain sub-clauses where national choice is allowed |

## *Eurocode 2* *Design of concrete structures*

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| BS EN 1992–1-1 (2004)* | Eurocode 2: Design of concrete structures – Part 1-1<br>**General rules and rules for buildings** (incorporating corrigendum June 2008 and August 2011)<br>Applies to the design of buildings and civil engineering works in plain, reinforced and prestressed concrete |
| NA to BS EN 1992-1-1 (2005)* | UK National annex to Eurocode 2: Design of concrete structures. General rules and rules for buildings Part 1-1 (incorporating National amendment No. 1). Gives the UK decisions for the nationally determined parameters (NDP) for listed sub-clauses |
| BS EN 1992–1-2 (2004)* | Eurocode 2: Design of concrete structures – Part 1-2 |

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| | **General rules - Structural fire design** (incorporating corrigendum July 2008). Covers the resistance, serviceability, durability and fire resistance of concrete structures |
| NA to BS EN 1992-1-2 (2005)* | UK National annex to Eurocode 2: Design of concrete structures. General rules - Structural fire design.<br>Gives the UK decisions for the Nationally determined parameters (NDP) for listed sub-clauses |
| BS EN 1992–2 (2005)* | Eurocode 2: Design of concrete structures – Part 2<br>**Concrete bridges - Design and detailing rules** (incorporating corrigendum July 2008)<br>Gives a basis for the design of bridges and parts of bridges in plain, reinforced and prestressed concrete made with normal and light weight aggregates |
| NA to BS EN 1992-2 (2007)* | UK National Annex to Eurocode 2: Design of concrete structures. Concrete bridges – Part 2. Design and detailing rules<br>Gives the nationally defined parameters (NDPs) for certain clauses where national choice is allowed. These are applicable to buildings only. |
| BS EN 1992–3 (2006)* | Eurocode 2: Design of concrete structures – Part 3<br>**Liquid retaining and containment structures**<br>Covers additional rules for the design of structures constructed from plain or lightly reinforced concrete, reinforced concrete or prestressed concrete for the containment of liquids or granular solid |
| NA to BS EN 1992-3 (2007)* | UK National Annex to Eurocode 2: Design of concrete structures – Part 3. Liquid retaining and containment structures<br>Gives the UK decisions for the Nationally determined parameters (NDP) for listed sub-clauses |

## *Eurocode 3* *Design of steel structures*

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| BS EN 1993–1-1 (2005)* | Eurocode 3: Design of steel structures – Part 1-1<br>**General rules and rules for buildings** (incorporating corrigenda September 2006 and February 2010).<br>Gives requirements for resistance, serviceability, durability and fire resistance of steel structures |
| NA to BS EN 1993-1-1 (2008)* | UK National Annex to Eurocode 3: Design of steel structures – Part 1-1. General rules and rules for buildings<br>Gives the nationally determined parameters (NDPs) for certain sub-clauses where national choice is allowed |
| BS EN 1993–1-2 (2005)* | Eurocode 3: Design of steel structures – Part 1-2<br>**General rules – Structural fire design** (incorporating corrigenda December 2005, September 2006 and March 2009). Gives requirements for resistance, serviceability, durability and fire resistance of steel structures |
| NA to BS EN 1993-1-2 (2008)* | UK National Annex to Eurocode 3: Design of steel structures. General rules - Structural fire design. Provides the Nationally determined parameters (NDPs) for certain sub-clauses where national choice is allowed, including partial factors for the fire situation in terms of mechanical and thermal properties. |
| BS EN 1993–1-3 (2006)* | Eurocode 3: Design of steel structures – Part 1-3 |

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| | **General rules - Supplementary rules for cold-formed members and sheeting** (incorporating corrigendum November 2009)<br>Gives design requirements for cold-formed members and sheeting, applying to cold-formed steel products made from coated or uncoated hot or cold rolled sheet or strip, that have been cold-formed |
| NA to BS EN 1993-1-3 (2009)* | UK National Annex to Eurocode 3: Design of steel structures. General rules - Supplementary rules for cold-formed members and sheeting. Gives the nationally determined parameters (NDPs) for certain sub-clauses where national choice is allowed |
| BS EN 1993–1-4 (2006)* | Eurocode 3: Design of steel structures – Part 1-4<br>**General rules - Supplementary rules for stainless steels.**<br>Gives supplementary provisions for the design of buildings and civil engineering works covering applications involving austenitic, austenitic-ferritic and ferritic stainless steels |
| NA to BS EN 1993-1-4 (2009)* | UK National Annex to Eurocode 3: Design of steel structures – Part 1-4. General rules - Supplementary rules for stainless steels<br>Gives the nationally defined parameters (NDPs) for certain clauses where national choice is allowed. |
| BS EN 1993–1-5 (2006)* | Eurocode 3: Design of steel structures – Part 1-5<br>**Plated structural elements** (incorporating corrigendum February 2010)<br>Gives design requirements of stiffened and unstiffened plates which are subject to in-plane forces. Also covers the effects due to shear lag, in-plane load introduction and plate buckling for I-section. |
| NA to BS EN 1993-1-5 (2008)* | UK National annex to Eurocode 3: Design of steel structures – Part1-5. Plated structural elements<br>Gives the nationally determined parameters (NDPs) for certain sub-clauses where national choice is allowed. |
| BS EN 1993–1-6 (2007)* | Eurocode 3: Design of steel structures – Part 1-6.<br>**Strength and stability of shell structures** (incorporating corrigendum February 2010)<br>Provides basic design rules for plated steel shell structures, in particular design against buckling, fatigue and cyclic plasticity. |
| BS EN 1993–1-7 (2007)* | Eurocode 3: Design of steel structures – Part 1-7.<br>**Plated structures subject to out of plane loading** (incorporating corrigendum February 2010)<br>For structural design of unstiffened and stiffened plates which form part of plated structures such as silos, tanks or containers. Details given for design, properties, durability, structural analysis |
| BS EN 1993–1-8 (2005)* | Eurocode 3: Design of steel structures – Part 1-8.<br>**Design of joints** (incorporating corrigenda December 2005, June 2006, September 2006, July 2009, February 2010 and August 2010)<br>Gives design methods for the design of joints subject to predominantly static loading using steel grades S235, S275, S355, S420, S450 and S460. |
| NA to BS EN 1993-1-8 (2008)* | UK National Annex to Eurocode 3: Design of steel structures – Part 1-8. Design of joints<br>Provides the Nationally determined parameters (NDPs) for certain sub-clauses where national choice is allowed, including group 6 rivets, partial safety factors for joints, types of bolt class |
| BS EN 1993–1-9 (2005)* | Eurocode 3: Design of steel structures – Part 1-9.<br>**Fatigue** (incorporating corrigenda December 2005, September 2006 and April 2009) |

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| | Gives methods for the assessment of fatigue resistance of members, connections and joints subjected to fatigue loading. |
| NA to BS EN 1993-1-9 (2008)* | UK National annex to Eurocode 3: Design of steel structures – Part 1-9 Fatigue. Gives the nationally determined parameters (NDPs) for certain sub-clauses where national choice is allowed |
| BS EN 1993–1-10 (2005)* | Eurocode 3: Design of steel structures – Part 1-10.<br>**Material toughness and through-thickness properties** (incorporating corrigenda December 2005, June 2006, September 2006 and February 2010)<br>Contains design guidance for the selection of steel for fracture toughness and for through thickness properties of welded elements where there is a significant risk of lamellar tearing during fabrication. |
| NA to BS EN 1993-1-10 (2009)* | National annex (informative) to Eurocode 3 - Design of steel structures – Part 1-10<br>Material toughness and through thickness properties<br>Gives the nationally determined parameters (NDPs) for certain sub-clauses where national choice is allowed. |
| BS EN 1993–1-11 (2006)* | Eurocode 3 - Design of steel structures – Part 1-11<br>**Design of structures with tension components** (incorporating corrigendum February 2010)<br>Gives design rules for structures with tension components made of steel, which, due to their connections with the structure, are adjustable and replaceable |
| NA to BS EN 1993-1-11 (2008)* | UK National Annex to Eurocode 3 - Design of steel structures – Part 1-11 Design of structures with tension components |
| BS EN 1993–1-12 (2007)* | Eurocode 3 - Design of steel structures- Part 1-12<br>**Additional rules for the extension of EN 1993 up to steel grades S 700** (incorporating corrigendum April 2010). |
| NA to BS EN 1993-1-12 (2008)* | UK National annex to Eurocode 3: Design of steel structures – Part 1-12. Additional rules for the extension of EN 1993 up to steel grades S 700. Gives the nationally determined parameters (NDPs) for certain sub-clauses where national choice is allowed |
| BS EN 1993–2 (2006)* | Eurocode 3: Design of steel structures – Part 2.<br>**Steel bridges** (incorporating corrigendum January 2010).<br>Provides a general basis for the structural design of steel bridges, steel parts of composite bridges and also steel temporary works in bridges |
| NA to BS EN 1993-2 (2008)* | UK National annex to Eurocode 3: Design of steel structures – Part 2. Steel bridges (+A1:2012)<br>Gives the nationally determined parameters (NDPs) for certain sub-clauses where national choice is allowed |
| BS EN 1993–3-1 (2006)* | Eurocode 3 - Design of steel structures – Part 3-1<br>**Towers, masts and chimneys - towers and masts** (incorporating corrigendum July 2009)<br>Applies to the structural design of lattice towers and guyed masts, and the structural design of this type of structures supporting prismatic, cylindrical or other bluff elements |
| NA to BS EN 1993-3-1 (2010)* | UK National Annex to Eurocode 3: Design of steel structures – Part 3-1. Towers, masts and chimneys - towers and masts<br>Gives the nationally defined parameters (NDPs) for certain clauses where national choice is allowed. |

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| BS EN 1993–5 (2007)* | Eurocode 3 – Design of steel structures – Part 5: **Piling** (incorporating corrigendum August 2009) |
| NA to BS EN 1993-5 (date)* | UK National Annex for Eurocode 3 - Design of steel structures – Part 5: Piling (+ A1:2012) |

## *Eurocode 4* *Design of composite steel & concrete structures*

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| BS EN 1994-1-1 (2004)* | Eurocode 4: Design of composite steel and concrete structure – Part 1-1. **General rules and rules for buildings** (incorporating corrigendum October 2009). |
| NA to BS EN 1994-1-1:2004 | UK National Annex to Eurocode 4: Design of composite steel and concrete structures – Part 1-1. General rules and rules for buildings |
| BS EN 1994–2 (2005)* | Eurocode 4 – Design of composite steel and concrete structures – Part 2: **General rules and rules for bridges** (incorporating corrigendum February 2010) |
| NA to BS EN 1994-2 (2005)* | UK National Annex for Eurocode 4 - Design of composite steel and concrete structures – Part 2: General rules and rules for bridges |

## *Eurocode 5* *Design of timber structures*

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| BS EN 1995–1-1 (2004)* +A1:2008 | Eurocode 5 – Design of timber structures – Part 1-1: **General – Common rules and rules for buildings** (incorporating corrigendum July 2006). |
| NA to BS EN 1995-1-1 (2008)* | UK National Annex for Eurocode 5 - Design of timber structures – Part 1-1: General – Common rules and rules for buildings (National Amendment No.2) |
| BS EN 1995–2 (2004)* | Eurocode 5 – Design of timber structures – Part 2: **Bridges** |
| NA to BS EN 1995-2 (2004)* | UK National Annex for Eurocode 5 - Design of timber structures – Part 2-Bridges |

## *Eurocode 6* *Design of masonry structures*

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|---|---|
| BS EN 1996–1-1 (2005)* + A1:2012 | Eurocode 6 – Design of masonry structures – Part 1-1: **General rules for reinforced and unreinforced masonry structures** (incorporating corrigendum February 2006 and December 2009). |
| NA to BS EN 1996-1-1 (2005)* + A1:2012 | UK National Annex for Eurocode 6 - Design of masonry structures – Part 1-1: General rules for reinforced and unreinforced masonry structures |
| BS EN 1996–2 (2006)* | Eurocode 6 – Design of masonry structures – Part 2: |

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| | **Design considerations, selection of materials and execution of masonry** (incorporating corrigendum March 2010). |
| NA to BS EN 1996-2 (2006)* | UK National Annex for Eurocode 6 - Design of masonry structures – Part 2: Design considerations, selection of materials and execution of masonry (incorporating corrigendum June 2007) |
| BS EN 1996–3 (2006)* | Eurocode 6 – Design of masonry structures – Part 3:<br>**Simplified calculation methods for unreinforced masonry structures** (incorporating corrigendum March 2010) |
| NA to BS EN 1996-3 (2006)* | UK National Annex for Eurocode 6 - Design of masonry structures – Part 3: Simplified calculation methods for unreinforced masonry structures |

## *Eurocode 7* *Geotechnical Design*

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| BS EN 1997–1 (2004)* | Eurocode 7: Geotechnical design - Part 1.<br>**General rules** (incorporating corrigendum February 2010) Intended to be used as a general basis for the geotechnical aspects of the design of buildings and civil engineering works. |
| NA to BS EN 1997-1 (2004)* | UK National annex to Eurocode 7: Geotechnical design – Part 1. General rules (incorporating Corrigendum December 2007). Gives the nationally defined parameters (NDPs) for certain clauses where national choice is allowed (incorporating corrigendum December 2007) |
| BS EN 1997–2 (2007)* | Eurocode 7 – Geotechnical design – Part 2:<br>**Ground investigation and testing** (incorporating corrigendum October 2010) |
| NA to BS EN 1997-2 (2007)* | UK National Annex for Eurocode 7 - Geotechnical design – Part 2: Ground investigation and testing |

## *Eurocode 8* *Design of structures for earthquake resistance*

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| BS EN 1998–1 (2004)*<br>+ A1:2013 | Eurocode 8 – Design for structures for earthquake resistance – Part 1.<br>**General rules, seismic actions and rules for buildings** (incorporating corrigendum February 2010 and January 2011) |
| NA to BS EN 1998-1 (2004)* | UK National Annex for Eurocode 8 - Design for structures for earthquake resistance – Part 1: General rules, seismic actions and rules for buildings |
| BS EN 1998–2 (2005)*<br>+ A2:2011 | Eurocode 8 – Design for structures for earthquake resistance – Part 2.<br>**Bridges** (incorporating corrigendum May 2010 and February 2012) |
| NA to BS EN 1998-2 (2005)* | UK National Annex for Eurocode 8 - Design for structures for earthquake resistance – Part 2: Bridges |
| BS EN 1998–5 (2004)* | Eurocode 8 – Design for structures for earthquake resistance – Part 5<br>**Foundations, retaining structures and geotechnical aspects** |
| NA to BS EN 1998-5 (2004)* | UK National Annex for Eurocode 8 - Design for structures for earthquake resistance – Part 5: Foundations, retaining structures and geotechnical aspects |

## *Eurocode 9* *Design of aluminium structures*

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|---|---|
| BS EN 1999 – 1-1 (2007)* +A1: 2009 | Eurocode 9 – Design of aluminum structures – Part 1-1: **General – common rules** (+A1 2009) |
| NA to BS EN 1999-1-1 (2007)* +A1:2009 | UK National Annex for Eurocode 9 - Design of aluminum structures – Part 1-1: General – common rules |
| BS EN 1999–1-3 (2007)* | Eurocode 9 – Design of aluminum structures – Part 1-3 Additional rules for structures susceptible to fatigue (+A1:2011) |
| NA to BS EN 1999-1-3 (2007)* +A1:2011 | UK National Annex for Eurocode 9 - Design of aluminum structures – Part 1-3: Additional rules for structures susceptible to fatigue (+ A1:2011) |
| BS EN 1999–1-4 (2007)* +A1:2011 | Eurocode 9 – Design of aluminum structures – Part 1-4 **Cold formed structural sheeting** (+ A1:2011 and incorporating corrigendum August 2010) |
| NA to BS EN 1999-1-4 (2007)* | UK National Annex for Eurocode 9 - Design of aluminum structures – Part 1-4: Cold formed structural sheeting |

## *BSI Published Documents (PD)*

*(For guidance only unless clauses are otherwise specified in IAN 124/11)*

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|---|---|
| PD 6688-1-1 (2011)* | Recommendations for the design of structures to BS EN 1991-1-1 Gives non-contradictory complementary information to BS EN 1991-1-1 and its UK National Annex |
| PD 6688-1-2 (2007)* | Background paper to the UK National Annex to BS EN 1991-1.2 (AMD Corrigendum 17225) Gives complementary information to BS EN 1991-1.2 and its National Annex |
| PD 6688-1-4 (2009)* | Background information to the National Annex to BS EN 1991-1-4 and additional guidance (including IAN 124/11) |
| PD 6688-1-5 (2009)* | Background paper to the UK National Annex to BS EN 1991-1-5 |
| PD 6688-1-7 (2009)* | Recommendations for the design of structures to BS EN 1991-1-7 Gives non-contradictory complementary information for use in the UK with BS EN 1991-1.7:2006 and its UK National Annex (including IAN 124/11 clause 2.15) |
| PD 6688-2 (2011)* | Recommendations for the design of structures to the UK National Annex to BS EN 1991-2 Traffic loads on bridges. Gives non-contradictory complementary information to BS EN 1991-2 and its UK National Annex |
| PD 6687-1 (2010)* | Background paper to the UK National Annex to BS EN 1992-1 and BS EN 1992-3 Provides background information and non-contradictory complementary information for use in the UK with BS EN 1992-1-1:2004, BS EN 1992-1-2:2004, BS EN 1992-3:2006 and their UK National Annexes. |

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| PD 6687-2 (2008)* | Recommendations for the design of structures to BS EN 1992-2:2005. Provides background information relating to decisions for the Nationally Determined Parameters (NDPs) in the National Annex of BS EN 1992-2 |
| PD 6694-1 (2011)* | Recommendations for the design of structures subject to traffic loading to BS EN 1997-1:2004.<br>Gives non-contradictory complementary information, covers geotechnical aspects of bridges and other structures subject to traffic loading designed to BS EN 1997-1. |
| PD 6695-1-9 (2008)* | Recommendations for the design of structures to BS EN 1993-1-9<br>Refer to IAN 124/11 Annex B for additional guidance. |
| PD 6695-1-10 (2009)* | Recommendations for the design of structures to BS EN 1993-1-10<br>Refer to IAN 124/11 Annex B for additional guidance. |
| PD 6695-2 (2008)*<br>+A1:2012 | Recommendations for the design of structures to BS EN 1993<br>Refer to IAN 124/11 Annex B for additional guidance (incorporating corrigendum January 2010 and February 2013) |
| PD 6696-2 (2007)*<br>+A1:2012 | Background paper to BS EN 1994-2 and the UK National Annex to BS EN 1994-2<br>Refer to IAN 124/11 Annex B for additional guidance. |
| PD 6698 (2009)* | Recommendations for the design of structures for earthquake resistance to BS EN 1998<br>Refer to IAN 124/11 Annex B for additional guidance. |
| PD 6703 (2009)* | Structural bearings – Guidance on the use of structural bearings |
| PD 6705-2 (2010)*<br>+A1:2013 | Recommendations for the execution of steel bridges to BS EN 1090-2. Provides non-contradictory complementary information (NCCI) and guidance for use of BS EN 1090-2, focusing on selection of options and alternative information (Amended 30 April 2013) |
| PD 6705-3 (2009)* | Recommendations for the execution of steel bridges to BS EN 1090-3 |

## *Execution Standards*

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|---|---|
| BS EN 1090-1:2009 + A1:2011 | Execution of steel structures and aluminium structure – Part 1<br>Requirements for conformity assessment of structural components (Refer to IAN124/11 clause 2.19 for additional guidance) |
| BS EN 1090-2:2008 + A1:2011 | Execution of steel structures and aluminium structure – Part2<br>Technical requirements for the execution of steel structures (Refer to IAN124/11 clause 2.19 for additional guidance) |
| BS EN 1090-3:2008 | Execution of steel structures and aluminium structure – Part 3.<br>Technical requirements for the execution of aluminium structures (Refer to IAN124/11 clause 2.19 for additional guidance) |
| BS EN 13670:2009 | Execution of concrete structures<br>(Refer to IAN124/11 clause 2.19 for additional guidance) |

## *Miscellaneous*

Circular Roads No 61/72 – Routes for heavy and high abnormal loads

Traffic Management Act 2004

Construction (Design and Management) Regulations 2015 **(Mandatory requirement)**

## *The Manual of Contract Documents for Highway Works (MCDHW)*

Volume 1: Specification for Highway Works (2008)*

Volume 2: Notes for Guidance on the Specification for Highway Works (Date)*

Volume 3: Highway Construction Details (Date)*

## *The Design Manual for Roads and Bridges (DMRB)*

*(Non-conflicting with Eurocodes)*

### *General Requirements, Standards (GD Series)*

GD 01/08 Introduction to the Design Manual for Roads and Bridges (DMRB)

GD 02/08 Quality Management System for Highway Design

GD 04/12 Standard for Safety Risk Assessment on the Strategic Road Network

### *Bridges and Structures, Advice Notes (BA Series)*

BA 26/94 Expansion joints for use in highway bridge decks
(Refer to IAN 124/11 Annex C for additional guidance)

BA 28/92 Evaluation of Maintenance Costs in Comparing Alternative Design for Highway Structures

BA 35/90 Inspection and Repair of Concrete Highway Structures using Externally Bonded Plates

BA 36/90 The use of permanent formworks
(Refer to IAN 124/11 Annex C for additional guidance)

BA 37/92 Priority Ranking of Existing Parapets

BA 41/98 The Design and Appearance of Bridges

BA 42/96 The Design of Integral Bridges
Incorporating Amendment No.1 dated May 2003
(Refer to IAN 124/11 Annex C for additional guidance)

BA 43/03 Strengthening, Repair and Monitoring of Post-tensioned Concrete Bridge Decks

BA 47/99 Waterproofing and Surfacing of Concrete Bridge Decks
(Refer to IAN 124/11 Annex C for additional guidance)

BA 57/01 Design for Durability
(Refer to IAN 124/11 Annex C for additional guidance)

BA 59/94 Design of highway bridges for hydraulic action
(Refer to IAN 124/11 Annex C for additional guidance)

BA 67/96 Enclosure of Bridges
(Refer to IAN 124/11 Annex C for additional guidance)

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|---|---|
| BA 68/97 | Crib retaining walls |
| BA 72/03 | Maintenance of Road Tunnels |
| BA 80/99 | Use of Rock Bolts |
| BA 82/00 | Formation of Continuity Joints in Bridge Decks |
| BA 83/02 | Cathodic Protection for use in Reinforced Concrete Highway Structures |
| BA 84/02 | Use of Stainless Steel Reinforced Concrete in Highway Structures<br>(Refer to IAN 124/11 Annex C for additional guidance) |
| BA/85/04 | Coatings for Concrete Highway Structures & Ancillary Structures |
| BA 86/06 | Advice Notes on the Non-destructive testing of Highway Structures |
| BA 92/07 | The Use of Recycled Concrete Aggregates in Structural Concrete |

### *Bridges and Structures, Standards (BD Series)*

| | |
|---|---|
| BD 2/12 | Technical Approval of Highway Structures (**Compulsory**) |
| BD 7/01 | Weathering Steel for Highway Structures<br>(Refer to IAN 124/11 Annex C for additional guidance) |
| BD 10/97 | Design of Highway Structures in Areas of Mining Subsidence<br>(Refer to IAN 124/11 Annex C for additional guidance) |
| BD 12/01 | Design of corrugated steel buried structures with spans greater than 0.9 metres and up to 8.0 metres (Refer to IAN 124/11 Annex C for additional guidance) |
| BD 20/92 | Bridge Bearings<br>Use of BS 5400: Part 9- 1983 |
| BD 21/01 | The Assessment of Highway Bridges and Structures |
| BD 27/86 | Materials for the Repair of Concrete Highway Structures |
| BD 28/87 | Early Thermal Cracking of Concrete<br>Amendment No. 1 (August 1989) |
| BD 29/04 | Design Criteria for Footbridges<br>(Refer to IAN 124/11 Annex C for additional guidance) |
| BD 30/87 | Backfilled Retaining Walls and Bridge Abutments |
| BD 31/01 | The Design of Buried Concrete Box and Portal Frame Structures |
| BD 33/94 | Expansion joints for use in highway bridge decks<br>(Refer to IAN 124/11 Annex C for additional guidance) |
| BD 35/14 | Quality Assurance Scheme for Paints and Similar Protective Coatings<br>(Refer to IAN 124/11 Annex C for additional guidance) |
| BD 36/92 | Evaluation of Maintenance Costs in Comparing Alternative Designs for Highway Structures |
| BD 37/01 | Loads for Highway Bridges |
| BD 42/00 | Design of Embedded Retaining Walls and Bridge Abutments |

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| BD 43/03 | The Impregnation of Reinforced and Prestressed Concrete Highway Structures using Hydrophobic Pore-Lining Impregnants |
| BD 45/93 | Identification markings of highway structures |
| BD 47/99 | Waterproofing and Surfacing of Concrete Bridge Decks<br>(Refer to IAN 124/11 Annex C for additional guidance) |
| BD 49/01 | Design Rules for Aerodynamic Effects on Bridges |
| BD 51/14 | Design Criteria for Portal and Cantilever Sign / Signal Gantries<br>(Refer to IAN 124/11 Annex C for additional guidance) |
| BD 53/95 | Inspection and Records for Road Tunnels |
| BD 54/15 | Management of Post-Tensioned Concrete Bridges |
| BD 57/01 | Design for Durability<br>(Refer to IAN 124/11 Annex C for additional guidance) |
| BD 60/04 | Design of Highway Bridges for Vehicle Collison Loads |
| BD 62/07 | As-built, operational and maintenance records for highway structures<br>(Refer to IAN 124/11 Annex C for additional guidance) |
| BD 63/07 | Inspection of Highway Structures |
| BD 65/14 | Design Criteria for Collison Protection Beams |
| BD 67/96 | Enclosure of Bridges<br>(Refer to IAN 124/11 Annex C for additional guidance) |
| BD 68/97 | Crib retaining walls |
| BD 74/00 | Foundations |
| BD 78/99 | Design of Road Tunnels<br>(Refer to IAN 124/11 Annex C for additional guidance) |
| BD 79/13 | The Management of Sub-standard Highway Structures |
| BD 81/02 | Use of Compressive Membrane Action in Bridge Deck |
| BD82/00 | Design of buried rigid pipes |
| BD 84/02 | Strengthening of Concrete Bridge Supports Vehicle Impact Using Fibre Reinforced Polymers |
| BD 85/08 | Strengthening Highway Structures Using Externally Bonded Fibre Reinforced Polymers |
| BD 87/05 | Maintenance Painting of Steelwork |
| BD 90/05 | Design of FRP bridges and highway structures |
| BD 91/04 | Unreinforced Masonry Arch Bridges |
| BD 94/07 | Design of Minor Structures |
| BD 95/07 | Treatment of Existing structures on highway widening schemes |

***Bridges and Structures, Technical Memoranda (BE Series)***

| | |
|---|---|
| BE 5/75 | Rules for the Design and use of Freyssinet Concrete Hinges in Highway Structures |
| BE 7/04 | Departmental Standard (Interim) Motorway Sign / Signal Gantries |
| BE 13 | Fatigue Risk in Bailey Bridges |
| BE 23 | Shear Key Decks<br>Amendment No. 1 (June 1971) |

### *Traffic Engineering and Control, Standards (TD Series)*

| | |
|---|---|
| TD 9/93 | Highway Link Design<br>Highway Link Design Amendment No. 1 (February 2002) |
| TD 19/06 | Requirement for Road restraint Systems<br>Correction No. 1 (February 2008) |
| TD 27/05 | Cross - Sections and Headroom |
| TD 36/93 | Subways for Pedestrians and Pedal Cyclists, Layout and Dimensions |
| TD 49/07 | Requirements for Lorry Mounted Crash Cushions |
| TD 89/08 | Use of Passively Safe Signposts, lighting Columns & Traffic Sign Posts to BS EN 12767 |

### *Highways, Advice Notes (HA Series)*

| | |
|---|---|
| HA 59/92 | Mitigation against Effects on Badgers |
| HA 65/94 | Design Guide for Environmental Barriers |
| HA 66/95 | Environmental Barriers – Technical Requirements (Refer to IAN 124/11 Annex C for additional guidance) |
| HA 80/99 | Nature Conservation Advice in Relation to Bats |
| HA 81/99 | Nature Conservation Advice in Relation to Otters |
| HA 84/01 | Nature Conservation and Biodiversity |
| HA 97/01 | Nature Conservation Management Advice in Relation to Dormice |
| HA 98/01 | Nature Conservation Management Advice in Relation to Amphibians |

### *Highways, Standards (HD Series)*

| | |
|---|---|
| HD 22/08 | Managing Geotechnical Risk |
| HD 26/06 | Pavement Design |
| HD 27/04 | Pavement Construction Methods |

## *Interim Advice Notes Standards (IAN Series)*

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|---|---|
| IAN 41/102 | European cement standards |
| IAN 47/02 | Post tensioned grouted duct concrete bridges |
| IAN 48/03 | Measures to minimize the risk of sulphate attack (including thaumasite) – New construction and structures under construction. |
| IAN 53/04 | Concrete half-joint deck construction |
| IAN 69/05 | Designing for maintenance |
| IAN 70/06 | Implementation of new reinforcement standards (BS 4449:2005, BS 4482:2005, BS 4483:2005 and BS 8666:2005) |
| IAN 83/06 | Principal and General Inspection of Sign/ Signal gantries and Gantries with low handrails or open mesh flooring |
| IAN 85/07 | Design of Passively safe portal signal gantries |
| IAN 86/07 | Amendments to the design requirements for portal and cantilever sign/signal gantries |
| IAN 81/07 | Interim Advice on the identification of 'Particularly at Risks' Supports |
| IAN 95/07 | Revised guidance regarding the use of BS 8500(2006) for the design and construction of structures using concrete |
| IAN 96/07 r 1 | Guidance on implementing results of research on bridge deck waterproofing |
| IAN 97/07 | Assessment and upgrading of existing parapets |
| IAN 104/07 | The anchorage of reinforcement and fixings in hardened concrete |
| IAN 105/08 | Implementation of construction (design and management) 2007 and the withdrawal of SD 10 and SD 11 |
| IAN 116/08 | Nature conservation advice in relation to bats |
| IAN 117/08 r 2 | Certification of combined kerb and drainage products |
| IAN 123/10 | Use of Eurocodes for the design highway structures |
| IAN 124/11 | Eurocodes: Implementation of Eurocodes for the design of new and existing highway structures |
| IAN 127/10 r 1 | The use of foamed concrete |
| IAN 130/10 | Ecology and Nature Conservation<br>Criteria for Impact Assessment |
| IAN 131/11 | Deflection of Permanent Formwork |
| IAN 136/10 | Structural safety reporting |
| IAN 149/11 | Existing motorway minimum requirements |
| IAN 161/13 | Managed motorway requirements – All lane running |
| IAN 168/12 | Strategy for the repair/replacement of Bridge Expansion Joints |
| IAN 169/12 r 1 | Temporary cover plates over bridge expansion joints |

### *Chief Highway Engineer Memoranda*

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|---|---|
| CHE239/09 | The Implementation of Eurocodes |
| CHE 227/08 | The Implementation of Reinforced and Prestressed Concrete Highway Structures using Hydrophobic Pore Lining Impregnants |

### *CIRIA Publications*

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|---|---|
| C453 | Bridge detailing guide |
| C660 | Early age thermal crack control in concrete |
| C686 | Safe access for maintenance and repair |

***** *The compiler of the AIP should insert the current date of publication of the asterisked British Standards. MCHW and DMRB Standards and Advice Notes. This should be in the form of the year of publication for British Standards, the month and year of publication for MCHW, and the last two digits of the year of publication for DMRB Standards and Advice Notes. The dates of any Amendments should also be included.*