

Brent Cross Cricklewood Planning Application  
November 2008

**BXC20 —**  
*Revised Approval in Principle  
Plan and Report for Bridge B6  
(Previously Referenced B7)*



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The planning application for the redevelopment of BXC is accompanied by a range of technical and supporting documents/reports. This is explained in full in the Development Specification and Framework (**Volume BXC1**). However, it may be useful, if viewing this document in isolation, to first read a short note on the 'Introduction to the Planning Application', which can be found on BXC Development Partners website ([www.brentcrosscricklewood.com](http://www.brentcrosscricklewood.com)).



**Brent Cross Cricklewood Regeneration**

**A406/M1 Pedestrian/Cycleway Bridge (B6)  
(previously referenced B7)**

**Structure Key 0000**

**Approval in Principle**

**Report No: D112186/AIP/361**

**Issue 4**

**October 2008**

# Brent Cross Cricklewood Regeneration

## A406/M1 Pedestrian/Cycleway Bridge (B6) (previously referenced B7)

### Structure Key 0000

### Approval in Principle

**Report No: D112186/AIP/361**  
**Issue 4**  
**October 2008**

Issue No	Current Status	Date	Prepared By	Reviewed By	Approved By
1	A	January 2007	FK	C McKenna	C McKenna
2	A	February 2008	C McKenna	C McKenna	C McKenna
3	A	October 2008	A Wignall	C McKenna	C McKenna
4	A	October 2008	A Wignall	C McKenna	C McKenna


Status Code	Description
D	Draft
P	Preliminary
A	Submitted for Review
C	For Construction

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<b>Name of Project</b>	Brent Cross Cricklewood Regeneration			
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## Contents

<b>1</b>	<b>HIGHWAY DETAILS.....</b>	<b>1</b>
<b>2</b>	<b>SITE DETAILS .....</b>	<b>1</b>
<b>3</b>	<b>PROPOSED STRUCTURE.....</b>	<b>1</b>
<b>4</b>	<b>DESIGN CRITERIA.....</b>	<b>5</b>
<b>5</b>	<b>STRUCTURAL ANALYSIS.....</b>	<b>7</b>
<b>6</b>	<b>GEOTECHNICAL CONDITIONS.....</b>	<b>8</b>
<b>7</b>	<b>CHECKING .....</b>	<b>9</b>
<b>8</b>	<b>DRAWINGS AND DOCUMENTS .....</b>	<b>10</b>
<b>9</b>	<b>THE ABOVE IS SUBMITTED FOR ACCEPTANCE .....</b>	<b>11</b>
<b>10</b>	<b>THE ABOVE IS REJECTED/AGREED SUBJECT TO THE AMENDMENTS AND CONDITIONS SHOWN BELOW.....</b>	<b>12</b>
	<b>APPENDIX A: TECHNICAL APPROVAL SCHEDULE ‘TAS’ (AUGUST 2006).....</b>	<b>13</b>
	<b>APPENDIX B: STRUCTURE LOCATION MAP .....</b>	<b>33</b>
	<b>APPENDIX C: GENERAL ARRANGEMENT DRAWING.....</b>	<b>35</b>
	<b>APPENDIX D: DIAGRAM OF IDEALISED STRUCTURE.....</b>	<b>36</b>
	<b>APPENDIX E: INDICATIVE FORM C .....</b>	<b>37</b>
	<b>APPENDIX F: CDM QUALITATIVE RISK ASSESSMENT .....</b>	<b>38</b>

## Approval In Principle

<b>Name of Project</b>	Brent Cross Cricklewood Regeneration			
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### 1 HIGHWAY DETAILS

#### 1.1 Type of highway

Over structure: Not applicable – Pedestrian/cycleway crossing

Under structure: A406 – M1 Junction

#### 1.2 Permitted traffic speed

Over Structure: N/A

Under Structure: 40mph (TBC)

#### 1.3 Existing restrictions

None

### 2 SITE DETAILS

#### 2.1 Obstacles crossed

The proposed structure crosses the A406 - M1 Junction just east of the existing railway arch structure carrying the Midland Main Line over the A406.

At the south end of the bridge the pedestrian/cycleway continues onto a high level ramp which will rise from the proposed bridge level to approximately +49.0m (see parameter plan 006 Proposed Finished Site Levels) The design of the vertical alignment of the pedestrian /cycleway is not yet detailed at this time. The high level pedestrian/cycleway will continue to the new Brent Cross Cricklewood Transport Interchange (New BXC Railway Station).


See Structure Location Map in Appendix B.

### 3 PROPOSED STRUCTURE

#### 3.1 Description of structure

The proposed footbridge is a two span Vierendeel truss type supporting a steel orthotropic deck.

## Approval In Principle

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<b>Structure ref no</b>	???	<b>Key no</b>	0000	

The orthotropic steel deck comprises a deck plate supported by longitudinal stiffeners, and transverse box beam members at approximately 3.6m centres.

The Vierendeel truss consists of a box beam and light fitting top chord, and a fabricated steel angle bottom chord.

The deck is supported on reinforced concrete piers and abutments. The piers and abutments are supported on spread foundations (or piled foundations, subject to ground investigations).

All steelwork will be prefabricated and lifted into position on site.

### 3.2 Structural type

Two span continuous structure

### 3.3 Foundation type

The structure will be supported on spread foundations (or piled foundations subject to GI)

### 3.4 Span arrangements

Two spans of 29m each.

### 3.5 Articulation arrangements


TBC

### 3.6 Types of road restraint systems

Structural members of the footbridge, i.e. vierendeel truss and screen predominantly serve as pedestrian restraints. Additionally, glass balustrades and stainless steel handrails are employed on the inside of the trusses to act as pedestrian guardrails.



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### 3.7 Proposed arrangements for Maintenance and Inspection

#### 3.7.1 Traffic management

Maintenance/replacement of the structure will be carried out during lane closures put in place for general routine maintenance to the road network. If required, specially arranged lane closures will be implemented to carry out the appropriate maintenance/replacement works.

Routine inspection and maintenance works to elements of the structure on top of the bridge may be carried out with suitable controls in place to protect operatives and users.

Access for inspection and maintenance of the trusses and deck soffit will require special arrangements to be made with Transport for London.

#### 3.7.2 Access

Access to the outside of the bridge will be achieved using lane closures and mobile hydraulic lifts.

Buried foundations are not accessible.

### 3.8 Sustainability issues considered. Materials and finishes assumed and basis of assumptions

Proposed Materials:

Conventional construction materials are proposed and therefore no significant sustainability issues are foreseen.

#### Steel

Structural items Grade S355  
Non-structural items Grade S275


#### Deck and Abutments Wearing Surface

The surface shall comply with the requirements of BD 29/04 Chapter 10 and Clause 12.15, including durability, slip resistance and sound attenuation.

#### Concrete

Concrete shall be in accordance with Series 1700 of the Specification for Highway Works, BRE Special Digest SD1 Second Edition 2003, IAN 48/03 and IAN 95/07.

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Element	Grade	Exposure Class
Sub structure walls	C40/50	XC3/4,
Sub structure bases	C32/40	XD2

### Reinforcement

Reinforcement to be Grade B500B or B500C complying with BS 4449:2005 and IAN 70/06.

### Concrete Finishes:

Classes of formed concrete finish:

Buried substructure Class F1

Exposed substructure Class F4

Classes of unformed concrete finish:

Buried substructure Class U1

Elsewhere Class U3

Exposed wing walls and abutments to receive anti-graffiti coating.

### Waterproofing

Below ground, concrete surfaces will be waterproofed in accordance with Series 2000 of the Specification for Highway Works.


The top of the steel bridge deck will be protected with factory applied epoxy non-slip surfacing/waterproofing material.

All exposed concrete surfaces will be impregnated in accordance with BD 43/03.

## 3.9 Risks and hazards considered

Refer to the Design Risk Assessment. A copy is included in Appendix F.

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### 3.10 Estimated cost of proposed structure together with other structural forms considered, including where appropriate proprietary manufactured structure, and the reasons for their rejection including comparative whole life costs with dates of estimates

The capital cost for the proposal is approximately £??????. Whole life costs have not been calculated as the proposed works are considered the only viable option.

### 3.11 Proposed arrangements for construction

#### 3.11.1 Traffic Management

TBC

#### 3.11.2 Services Diversions

TBC -The existence of Statutory Undertakers services in the vicinity of this structure may require diversions however this would be part of the main highway works and would not affect the form of the structure.

#### 3.11.3 Interface with existing structures

None

## 4 DESIGN CRITERIA

### 4.1 Live loading, Headroom


#### 4.1.1 Loading relating to normal traffic under AW regulations and C&U regulations

Not applicable

#### 4.1.2 Loading relating to General Order traffic under STGO regulations

Not applicable

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### 4.1.3 Footway or footbridge live loading

Footway or footbridge live loading: in accordance with BD 37/01. Vibration serviceability of the structure shall comply with the requirements of BD 37/01 Appendix B and BD 49/01.

### 4.1.4 Loading relating to Special Order Traffic, provision for exceptional abnormal indivisible loads including location of vehicle track on deck cross section

Not applicable

### 4.1.5 Any special loading not covered above

Not applicable

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

No additional heavy load requirement. The structure does not cross a high load route.


### 4.1.7 Minimum headroom provided

5.70m absolute minimum will be provided after an allowance for deck deflection from permanent loads and differential settlement.

### 4.1.8 Authorities consulted and any special conditions required

Authority	Services Affected by Works (Y/N)	Special Conditions
Transport for London	TBC	
London Borough of Brent	TBC	
British Telecommunications plc	TBC	
Transco	TBC	
EA	TBC	
?? Water	TBC	

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### 4.2 List of relevant documents from the TAS

Refer to Appendix A.

#### 4.2.1 Additional relevant standards

Refer to Appendix A.

### 4.3 Proposed departures from Standards given in 4.2 and 4.2.1

None

### 4.4 Proposed methods for dealing with aspects not covered by Standards in 4.2 and 4.2.1

None

## 5 STRUCTURAL ANALYSIS

### 5.1 Methods of analysis proposed for superstructure, substructure and foundations

#### Superstructure

The effects of dead and superimposed dead loads, live loads, temperature, and wind, will be analysed using a 3 dimensional model in the LUSAS or SAM-LEAP5 computer programs.

#### Substructures

Manual methods


#### Foundations

Manual methods

### 5.2 Description and diagram of idealised structure to be used for analysis

TBA

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### 5.3 Assumptions intended for calculation of structural element stiffness

For concrete elements, gross uncracked sections will be used in accordance with BS5400 Part4: 1990 Clause 4.4.2.1.

For steel elements, gross cross section properties will be used in accordance with BS 5400, Part 3.

### 5.4 Proposed earth pressure coefficients (Ka, Ko or Kp) to be used in the design of earth retaining elements

TBC

## 6 GEOTECHNICAL CONDITIONS

### 6.1 Acceptance of recommendations of the Section 8 of the Geotechnical Report to be used in the design and reasons for any proposed changes

The Geotechnical Report is not yet available.

### 6.2 Geotechnical Report Highway Structure Summary Information (Form C)

Refer to Appendix E.


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

A maximum anticipated differential settlement of 10mm between abutments of is allowed for in the design.

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

A ground investigation is planned to commence in ??. It is expected that the Geotechnical Report will be available in the ??.

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### 7 CHECKING

#### 7.1 Proposed Category

Category 2


#### 7.2 If Category 3, name of proposed Independent Checker.

Not applicable

#### 7.3 Erection proposals or temporary works for which an independent check will be required, listing parts of the structure affected with reasons for recommending an independent check.

None required

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## 8 DRAWINGS AND DOCUMENTS

### 8.1 List of drawings (including numbers) and documents accompanying the submission.

Appendix A List of relevant documents (Technical Approval Schedule (TAS)). Refer to Sections 4.2 and 4.2.1.

Appendix B Structure Location Map

Appendix C General Arrangement Drawing: D112186/AIP/361B


Appendix D Diagram of Idealised Structure

Appendix E Indicative Form C

Appendix F CDM Qualitative Risk Assessment



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### 9 THE ABOVE IS SUBMITTED FOR ACCEPTANCE

Signed \_\_\_\_\_

Name C J McKenna


Design Team Leader

Engineering Qualifications CEng, MICE

Name of Organisation SCOTT WILSON LTD

Date \_\_\_\_\_

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**10 THE ABOVE IS REJECTED/AGREED SUBJECT TO THE AMENDMENTS AND CONDITIONS SHOWN BELOW**

Signed \_\_\_\_\_

Name \_\_\_\_\_


Position Held \_\_\_\_\_

Engineering Qualifications \_\_\_\_\_

TAA \_\_\_\_\_


Date \_\_\_\_\_

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<b>Structure ref no</b>	???	<b>Key no</b>	0000	

## APPENDIX A: TECHNICAL APPROVAL SCHEDULE 'TAS' (AUGUST 2006)

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<b>Name of Project</b>	Brent Cross Cricklewood Regeneration			
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<b>Structure ref no</b>	???	<b>Key no</b>	0000	

### APPENDIX A TECHNICAL APPROVAL SCHEDULE 'TAS'

#### SCHEDULE OF DOCUMENTS RELATING TO DESIGN OR ASSESSMENT OF HIGHWAY BRIDGES AND STRUCTURES.


BS 5268	<del>Part 2: 2002</del>	<del>Part 2 – Structural Use of Timber</del>
BS 5400		Steel, Concrete and Composite Bridges
	Part 1 : 1988	General Statement (see BD 15 (DMRB 1.3.2))
	Part 2 : 2006	Specification for Loads (as implemented by BD37 (DMRB 1.3))
	Part 3: 2000	CP for Design of Steel Bridges (see BD 13 (DMRB 1.3))
	<del>Part 4 : 1990</del>	<del>CP for Design of Concrete Bridges (see BD 24 (DMRB 1.3.1))</del>
	<del>Part 5: 1979</del>	<del>CP for Design of Composite Bridges (see BD 16 (DMRB 1.3))</del>
	Part 9: 1983	Bridge Bearings (see BD 20 (DMRB 2.3.1))
	Part 10: 1980	CP for Fatigue (see BD 9 (DMRB 1.3))
BS 5628	<del>Part 1: 1992</del>	<del>Structural Use of Unreinforced Masonry</del>
BS 5930	1999	Site Investigations
BS 6031	1981	Earthworks
BS 7818	1995	Specification for Pedestrian Restraint Systems in Metal
BS 8002	1994	Earth Retaining Structures

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BS 8004	1986	Foundations
BS 8006	1995	Code of Practice for Strengthened / Reinforced Soils and Other Fills
<del>BS 8118</del>	<del>1991</del>	<del>The Structural Use of Aluminium</del>
BS 8500	Part 1: 2002	Concrete – Complementary British Standard to BS EN 206-1 – Method of Specifying and Guidance for the Specifier. (Incorporating Amendment No. 1)
BS 8500	Part 2: 2002	Concrete – Complementary British Standard to BS EN 206-2 – Specification for the Constituents, Materials, and Concrete. (Incorporating Amendment No. 1)
BS 8666	2005	Scheduling, dimensioning, bending and cutting of steel reinforcement for concrete - Specification
BS EN 10025 - 1993		Specification for Hot Rolled Products of Non-alloy Structural Steels - Technical Delivery Conditions
BS EN 10080 - 2005		Steel for the reinforcement of concrete – Weldable reinforcement steel - General
BS EN 10113 – 1993 – Pts. 1, 2 and 3		Hot Rolled Products in Weldable Fine Grain Structural Steels
BS EN 10155 - 1995		Structural Steels with Improved Atmospheric Corrosion Resistance
BS EN 10210 – 1994 – Pt. 1		Hot Finished Structural Hollow Sections of Non-alloy and Fine Grained Structural Steels
BS EN 10005 - 1995		Quality Management – Guidelines for Quality Plans
BS EN 1317-1-1998 Road Restraints Systems – Part 1		Terminology and General Criteria for 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
<del>BS EN 1317-4-2002 Road Restraints Systems – Part 4</del>		<del>Terminals and Transitions</del>

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BS EN 14388 - 2005

Road Traffic Noise Reducing Devices - Specification

## MISCELLANEOUS

Circular Roads No 61/72 - Routes for Heavy and High Abnormal Loads.

~~Railway Group Approved Code of Practice GC/RC5510: Recommendations for the Design of Bridges (2000)~~

~~Railway Group Approved Code of Practice GC/RT5204: Structure Gauging and Clearances~~

~~Simplified Tables of External Loads on Buried Pipelines (1986). Published by TSO~~

Traffic Management Act 2004

Health and safety at works etc. Act 1974

British Standard Code of Practice - CP 2 (Earth retaining structures)

## THE MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS (MCDHW)

- |          |                                                                                                |
|----------|------------------------------------------------------------------------------------------------|
| Volume 1 | Specification for Highway Works (Including November 2006 Amendments)                           |
| Volume 2 | Notes for Guidance on the Specification for Highway Works (Including November 2006 Amendments) |
| Volume 3 | Highway Construction Details (Including November 2006 Amendments)                              |

## THE DESIGN MANUAL FOR ROADS AND BRIDGES (DMRB)


List compliant to Highways Agency DMRB dated May 2006 unless stated otherwise

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

BA 9/81 The use of BS 5400 Part 10:1980. Code of Practice for Fatigue.  
[Incorporating Amendment No.1 dated November 1983]


~~BA 16/97 The Assessment of Highway Bridges and Structures. [Incorporating  
Amendment No. 1 dated Nov 1997 and Amendment No. 2 dated Nov 2001]~~

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BA 19/85	The Use of BS 5400:Part 3:1982
BA 24/87	Early Thermal Cracking of concrete. [Incorporating Amendment No.1 dated August 1989]
<del>BA 26/94</del>	<del>Expansion Joints for use in Highway Bridge Decks</del>
BA 27/99	Quality Assurance Scheme for Paints and Similar Protective Coatings
BA 28/92	Evaluation of Maintenance Costs in Comparing Alternative Designs for Highway Structures
<del>BA 30/94</del>	<del>Strengthening of Concrete Highway Structures using Externally Bonded Plates</del>
<del>BA 34/90</del>	<del>Technical Requirements for the Assessment and Strengthening Programme for Highway Structures.</del>
<del>BA 35/90</del>	<del>Inspection and Repair of Concrete Highway Structures</del>
<del>BA 36/90</del>	<del>The Use of Permanent Formwork</del>
<del>BA 37/92</del>	<del>Priority Ranking of Existing Parapets</del>
<del>BA 38/93</del>	<del>Assessment of the Fatigue Life of Corroded or Damaged Reinforcing Bars</del>
<del>BA 39/93</del>	<del>Assessment of Reinforced Concrete Half Joints</del>
BA 40/93	Tack Welding of Reinforcing Bars
BA 41/98	The Design and Appearance of Bridges [Incorporating Amendment No.1 dated May 2003]
<del>BA 42/96</del>	<del>The Design of Integral Bridges</del>
<del>BA 43/94</del>	<del>Strengthening, Repair and Monitoring of Post-tensioned Concrete Bridge Decks</del>
<del>BA 44/96</del>	<del>The Assessment of Concrete Highway Bridges and Structures</del>
<del>BA 47/99</del>	<del>Waterproofing and Surfacing of Concrete Bridge Decks</del>
BA 48/93	Pedestrian Protection at Headwalls, Wing Walls and Retaining Walls
<del>BA 50/93</del>	<del>Post tensioned Concrete Bridges, Planning, Organisation and Methods for Carrying Out Special Inspections</del>
<del>BA 51/95</del>	<del>The Assessment of Concrete Structures Affected by Steel Corrosion</del>

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<del>BA 52/94</del>	<del>The Assessment of Concrete Highway Structures Affected by Alkali Silica Reaction</del>
BA 53/94	Bracing Systems and the Use of U-Frames in Steel Highway Bridges
<del>BA 54/94</del>	<del>Load Testing for Bridge Assessment</del>
<del>BA 55/06</del>	<del>The Assessment of Bridge Substructures and Foundations, Retaining Walls and Buried Structures</del>
<del>BA 56/96</del>	<del>The Assessment of Steel Highway Bridges and Structures</del>
BA 57/01	Design for durability
<del>BA 58/94</del>	<del>Design of Bridges and Concrete Structures with External Unbonded Prestressing</del>
<del>BA 59/94</del>	<del>Design of Highway Bridges for Hydraulic Action.</del>
<del>BA 61/96</del>	<del>The Assessment of Composite Highway Bridges and Structures</del>
<del>BA 63/94</del>	<del>Inspection of Highway Structures</del>
<del>BA 67/96</del>	<del>Enclosure of Bridges</del>
<del>BA 68/97</del>	<del>Crib Retaining Walls</del>
<del>BA 72/03</del>	<del>Maintenance of Road Tunnels</del>
<del>BA 74/06</del>	<del>Assessment of Scour at Highways Bridges</del>
<del>BA 80/99</del>	<del>Use of Rock Bolts</del>
<del>BA 82/00</del>	<del>Formation of Continuity Joints in Bridge Decks</del>
<del>BA 83/02</del>	<del>Cathodic Protection for Use in Reinforced Concrete Highway Structures</del>
<del>BA 84/02</del>	<del>Use of Stainless Steel Reinforcement in Highway Structures</del>
<del>BA 85/04</del>	<del>Coatings for Concrete Highway Structures &amp; Ancillary Structures</del>
<del>BA 86/06</del>	<del>Advice Notes on the Non-Destructive Testing of Highway Structures</del>
<del>BA 87/04</del>	<del>Management of Corrugated Steel Buried Structures</del>
<del>BA 88/04</del>	<del>Management of Buried Concrete Box Structures</del>

## Bridges and Structures, Standards (BD Series)




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<b>Name of Structure</b>	A406/M1 Pedestrian/Cycleway Bridge (B6) (previously referenced B7)			
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BD 2/05	Technical Approval of Highway Structures
<del>BD 7/01</del>	<del>Weathering Steel for Highway Structures</del>
BD 9/81	Implementation of BS 5400: Part 10:1980. Code of Practice for Fatigue
<del>BD 10/97</del>	<del>Design of Highway Structures in Areas of Mining Subsidence</del>
<del>BD 12/01</del>	<del>Design of Corrugated Steel Buried Structures with Spans Greater than 0.9 Metres and up to 8.0 Metres</del>
BD 13/06	Design of Steel Bridges. Use of BS 5400: Part 3:2000
BD 15/92	General Principles for the Design and Construction of Bridges. Use of BS 5400: Part1: 1988
<del>BD 16/82</del>	<del>Design Of Composite Bridges. Use of BS 5400:Part 5:1979 [Incorporating Amendment No.1 dated August 1987]</del>
BD 20/92	Bridge Bearings. Use of BS 5400:Part 9:1983
<del>BD 21/01</del>	<del>The Assessment of Highway Bridges and Structures.</del>
<del>BD 24/92</del>	<del>Design of Concrete Bridges. Use of BS 5400:Part 4:1990</del>
<del>BD 26/04</del>	<del>Design of Lighting Columns</del>
<del>BD 27/86</del>	<del>Materials for the Repair of Concrete Highway Structures</del>
BD 28/87	Early Thermal Cracking of Concrete. [Incorporating Amendment No.1 dated August 1989]
BD 29/04	Design Criteria for Footbridges
BD 30/87	Backfilled Retaining Walls and Bridge Abutments
<del>BD 31/01</del>	<del>The Design of Buried Concrete Box and Portal Frame Structure</del>
BD 33/94	Expansion Joints for Use in Highway Bridge Decks
<del>BD 34/90</del>	<del>Technical Requirements for the Assessment and Strengthening Programme for Highway Structures.</del>
BD 35/06	Quality Assurance Scheme for Paints and Similar Protective Coatings
<del>BD 36/92</del>	<del>Evaluation of Maintenance Costs in Comparing Alternative Designs for Highway Structures</del>

## Approval In Principle

<b>Name of Project</b>	Brent Cross Cricklewood Regeneration			
<b>Name of Structure</b>	A406/M1 Pedestrian/Cycleway Bridge (B6) (previously referenced B7)			
<b>Structure ref no</b>	???	<b>Key no</b>	0000	


<del>BD 36/** (Not yet issued)</del>	<del>Application of whole life costs for design and maintenance of highway structures (September 2003).</del>
<b>BD 37/01</b>	<b>Loads for Highway Bridges</b>
<del>BD 41/97</del>	<del>Reinforced Clay Brickwork Retaining Walls of Pocket Type and Grouted Cavity type Construction</del>
<b>BD 42/00</b>	<b>Design of Embedded Retaining Walls and Bridge Abutments</b>
<del>BD 43/03</del>	<del>The Impregnation of Reinforced and Prestressed Concrete Highway Structures using Hydrophobic Pore Lining Impregnants</del>
<del>BD 44/95</del>	<del>The Assessment of Concrete Highway Bridges and Structures</del>
<del>BD 45/93</del>	<del>Identification Marking of Highway Structures</del>
<del>BD 46/92</del>	<del>Technical Requirements for the Assessment and Strengthening Programme for Highway Structures. Stage 2 Modern Short Span Bridges</del>
<del>BD 47/99</del>	<del>Waterproofing and Surfacing of Concrete Bridge Decks</del>
<del>BD 48/93</del>	<del>The Assessment and Strengthening of Highway Bridge Supports</del>
<b>BD 49/01</b>	<b>Design Rules for Aerodynamic Effects on Bridges</b>
<del>BD 50/92</del>	<del>Technical Requirements for the Assessment and Strengthening Programme for Highway Structures. Stage 3 Long Span Bridges</del>
<del>BD 51/98</del>	<del>Design Criteria for Portal and Cantilever Sign/Signal Gantries</del>
<del>BD 52/93</del>	<del>The Design of Highway Bridge Parapets</del>
<del>BD 53/95</del>	<del>Inspection &amp; Records for Road Tunnels.</del>
<del>BD 54/93</del>	<del>Post-tensioned Concrete Bridges Prioritisation of Special Inspections</del>
<del>BD 56/96</del>	<del>The Assessment of Steel Highway Bridges and Structures</del>
<b>BD 57/01</b>	<b>Design for Durability</b>
<del>BD 58/94</del>	<del>Design of Bridges and Concrete Structures with External and Unbonded Prestressing</del>
<b>BD 60/04</b>	<b>The Design of Highway Bridges for Vehicle Collision Loads</b>
<del>BD 61/96</del>	<del>The Assessment of Composite Highway Bridges and Structures</del>

## Approval In Principle

<b>Name of Project</b>	Brent Cross Cricklewood Regeneration			
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BD 62/94	As Built, Operational and Maintenance Records for Highway Structures [Incorporating Amendment No.1 to Appendix D dated February 2003]
<del>BD 63/94</del>	<del>Inspection of Highway Structures</del>
<del>BD 65/97</del>	<del>Design Criteria for Collision Protection Beams</del>
<del>BD 67/96</del>	<del>Enclosures of Bridges</del>
<del>BD 68/97</del>	<del>Crib Retaining Walls</del>
<del>BD 70/03</del>	<del>Strengthened/Reinforced Soils and Other Fills for Retaining Walls and Bridge Abutments, (Use of B58006: 1995), incorporating Amendment No.1 (Issue 2 March 1999)</del>
<b>BD 74/00</b>	<b>Foundations</b>
<del>BD 78/99</del>	<del>Design of Road Tunnels</del>
<del>BD 79/06</del>	<del>The Management of Sub-Standard Highway Structures</del>
<del>BD 81/02</del>	<del>Use of Compressive Membrane Action in Bridge Decks</del>
<del>BD 82/00</del>	<del>Design of Buried Rigid Pipes</del>
<del>BD 83/01</del>	<del>Design of CCTV Masts</del>
<del>BD 84/02</del>	<del>Strengthening of Concrete Bridge Supports for Vehicle Impact Using Fibre Reinforced Polymers</del>
<del>BD 86/04</del>	<del>The Assessment of Highway Bridges &amp; Structures for The Effects of Special Types General Order (STGO) and Special Order (SO) Vehicles</del>
<b>BD 87/05</b>	<b>Maintenance Painting of Steelwork</b>
<del>BD 88/05</del>	<del>Design of Cantilever Masts for Traffic Signals and/or Speed Cameras</del>
<del>BD 89/03</del>	<del>The Conservation of Highway Structures</del>
<del>BD 90/05</del>	<del>Design of FRP Bridges and Highway Structures</del>
<del>BD 91/04</del>	<del>Unreinforced Masonry Arch Bridges</del>

## Approval In Principle

<b>Name of Project</b>	Brent Cross Cricklewood Regeneration			
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### Bridges and Structures, Technical Memoranda (BE Series)


BE 13	Fatigue Risk in Bailey Bridges
BE 23	Shear Key Decks [Incorporating Amendment No. 1 to Annex dated June 1971]
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

### Interim Advice Notes

The requirements of the following Interim Advice Notes are not included in the DMRB but are listed as requested by BD 2/05, Annex B

<del>IAN 83/06</del>	<del>Principal and General Inspection of Sign/Signal Gantries, and Gantries with low handrails or open mesh flooring</del>
<del>IAN 82/06</del>	<del>Reporting</del>
<del>IAN 81/06</del>	<del>Management of Environmental Effects</del>
<del>IAN 80/06</del>	<del>Scoping</del>
<del>IAN 79/06</del>	<del>Screening</del>
<b>IAN 78/06</b>	<b>Environmental Assessments</b>
<del>IAN 77/06</del>	<del>Introduction</del>
<b>IAN 76/06</b>	<b>Aims &amp; Objectives of Environmental Assessment</b>
<del>IAN 75/06</del>	<del>Code of Practice for Emergency Access to and Egress from the Trunk Road Network in England</del>
<del>IAN 74/06</del>	<del>Revised Guidance Regarding The Use Of BS8500 For The Design And Construction Of Structures Using Concrete</del>
<del>IAN 73/06</del>	<del>Design of Pavement Foundations</del>
<del>IAN 72/06</del>	<del>Interim Advice On The Upgrading Of Existing Parapets</del>
<del>IAN 71/06</del>	<del>Marker Posts On Lay-By Segregation Islands</del>
<b>IAN 70/06</b>	<b>Implementation Of New Reinforcement Standards (BS 4449:2005, BS</b>


## Approval In Principle

<b>Name of Project</b>	Brent Cross Cricklewood Regeneration			
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4482:2005, BS 4483:2005 and BS 8666:2005)

IAN 69/05	Designing for Maintenance
<del>IAN 68/05</del>	<del>Infrastructure changes to improve emergency access to and egress from the trunk road network in England</del>
IAN 67/05 SMIS	Structures Management Information System (SMIS) - The operational use of SMIS
<del>IAN 66/05</del>	<del>Advice Regarding The Assessment Of Sites For Ramp Metering</del>
<del>IAN 65/05</del>	<del>Design Of Vehicle Recovery Operations At Road Works</del>
<del>IAN 64/05</del>	<del>Driver Information At Road Works</del>
<del>IAN 63/05</del>	<del>Asbestos Management Applicable To The Strategic Road Network</del>
<del>IAN 62/05</del>	<del>Management Of Highway Structures Handover And Related Inspections</del>
<del>IAN 61/05</del>	<del>Guidance For Undertaking Environmental Assessment Of Air Quality For Sensitive Ecosystems In Internationally Designated Nature Conservation Sites And SSSIs</del>
<del>IAN 59/04</del>	<del>Replacement Of SA 10/01, The New Roads And Highway Works Act 1991 - Diversionary Works</del>
<del>IAN 57/04 Rev 1</del>	<del>The Use Of Temporary Speed Limits At Road Works On High Speed Roads</del>
<del>IAN 56/04</del>	<del>Maintenance Of Traffic Signs With Dew Resistant Coatings</del>
<del>IAN 54/04</del>	<del>Revision to "GOMMMS" Local Air Quality Assessment Procedure</del>
<del>IAN 53/04</del>	<del>Concrete Half Joint Deck Structures</del>
<del>IAN 51/03</del>	<del>Hinge Deck Structures</del>
<del>IAN 49/03</del>	<del>Use of Warning Signs For New Asphalt Road Surfaces</del>
IAN 48/03	Measures To Minimise The Risk of Sulphate Attack (Including Thaumasite) - New Construction and Structures Under Construction
<del>IAN 47/02</del>	<del>Post Tensioned Grouted Duct Concrete Bridges</del>
<del>IAN 43/02</del>	<del>Cantilever and Portal Gantry VMS</del>
<del>IAN 42/05</del>	<del>Traffic Speed Condition Surveys (TRACS): Revised Assessment Criteria</del>

## Approval In Principle


<b>Name of Project</b>	Brent Cross Cricklewood Regeneration			
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IAN 41/02	European Cement Standards
IAN 39/04	Post Opening Project Appraisal (POPE)
IAN 36/04	The Use and Application of Micro Simulation Traffic Models
IAN 30/00	Advice Manual for the New Roads & Street Works Act 1991 – Diversionary Works
IAN 29/00	HD 26 – Indeterminate Life Flexible Pavements
IAN 28/00	Highway Features – Trunk Road Calming
IAN 27/99	Motorway Signalling
IAN 09/97	Linear Drainage Channel Systems
IAN 08/96	BA 63/94 Inspection of Highway Structures
IAN 07/96	BD 63/94 Inspection of Highway Structures
IAN 06/96	BD 62/94 As Built, Operative and Maintenance Records
IAN 05/96	BD 24/92 The Design of Concrete Highway Bridges and Structures. Use of BS 5400: Part 4:1990
IAN 04/96	BD 44/95 The Assessment of Concrete Highway Bridges and Structures
IAN 03/96	BA 50/93 Post Tensioned Concrete Bridges
IAN 02/95	The Non-Technical Summary
IAN 01/95	TD 37/93 Scheme Assessment Reporting

### Traffic Engineering and Control, Advice Notes (TA Series)


TA 8/80	Carriageway Markings: Markings for Right Turning Movements at Cross-Road Junctions
TA 11/81	Traffic Surveys by Roadside Interview
TA 12/81	Traffic Signals on High Speed Roads
TA 15/81	Pedestrian Facilities at Traffic Signal Installations
TA 16/81	General Principles for Control by Traffic Signals

## Approval In Principle

<b>Name of Project</b>	Brent Cross Cricklewood Regeneration			
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TA 19/81	Reflectorisation of Traffic Signs
TA 22/81	Vehicle Speed Measurement on All Purpose Roads
TA 23/81	Junctions and Accesses: Determination of Size of Roundabouts and Major/Minor Junctions
TA 30/82	Choice Between Options for Trunk Road Schemes
TA 44/92	Capacities, Queues, Delays and Accidents at Road Junctions Computer Programs ARCADY/3 and PICADY/3 (TRRL)
TA 45/85	Treatment of Gaps in Central Reserve Fences
TA 46/97	Traffic Flow Ranges for Use in the Assessment of New Rural Road.
TA 49/86	Appraisal of New and Replacement Lighting on Trunk Roads and Trunk Road Motorways Amendment No.3
TA 56/87	Hazardous Cattle Crossings: Use of Flashing Amber Lamps
TA 57/87	Roadside Features [Chapter 2 superseded by TA 69/96]
TA 58/92	Traffic Signs and Road Markings for Lane Gains and Lane Drops on All Purpose Dual Carriageway and Motorway Trunk Roads
TA 60/90	The Use of Variable Message Signs on All Purpose and Motorway Trunk Roads
TA 61/94	Currency of the Traffic Signs Manual
TA 63/97	Convey Working
TA 64/94	Narrow Lanes and Tidal Flow Operations at Roadworks on Motorways and Dual Carriageway Trunk Roads with Full Width Hard Shoulders
TA 66/95	Police Observation Platforms on Motorways
TA 68/96	The Assessment and Design of Pedestrian Crossings
TA 69/96	The Location and Layout of Lay bys
TA 70/97	Motorways: Introduction
TA 71/97	Motorways: Overview


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<del>TA 72/97</del>	<del>National Motorway Communication Systems (NMCS)</del>
<del>TA 73/97</del>	<del>Motorway Emergency Telephones</del>
<del>TA 74/05</del>	<del>Motorway Signalling</del>
<del>TA 75/97</del>	<del>Motorway Transmission Design</del>
<del>TA 76/97</del>	<del>Motorway Control Offices</del>
<del>TA 77/97</del>	<del>Motorways</del>
<del>TA 78/97</del>	<del>Design of Road Markings at Roundabouts</del>
<del>TA 79/99</del>	<del>Traffic Capacity of Urban Roads [Incorporating Amendment No.1 dated May 1999]</del>
<del>TA 80/99</del>	<del>Surface Drainage of Wide Carriageways</del>
<del>TA 81/99</del>	<del>Coloured Surfacing in Road Layout (Excluding Traffic Calming)</del>
<del>TA 82/99</del>	<del>The Installation of Traffic Signals and Associated Equipment</del>
<del>TA 83/05</del>	<del>Guide to the Use of Variable Message Signs for Strategic Traffic Management on Trunk Roads and Trunk Road Motorways Amendment No.1</del>
<del>TA 84/06</del>	<del>Code of Practice for Traffic Control &amp; Information systems for All Purpose Roads</del>
<del>TA 85/01</del>	<del>Guidance on Minor Improvements to Exiting Roads</del>
<del>TA 86/03</del>	<del>Layout of Large Signal Controlled Junctions.</del>
<del>TA 87/04</del>	<del>Trunk Road Traffic Calming</del>
<del>TA 89/05</del>	<del>Use of Passively Safe Signposts to BS EN 12767:2000</del>
<del>TA 90/05</del>	<del>The Geometric Design of Pedestrian, Cycle and Equestrian Routes</del>
<del>TA 91/05</del>	<del>Provision for Non-Motorised Users</del>
<del>TA 92/03</del>	<del>Crossover and Changeover Design</del>
<del>TA 93/04</del>	<del>Traffic Signs to Tourist Attractions and Facilities in England: Guidance for Tourist Signing—General Information</del>



## Approval In Principle

<b>Name of Project</b>	Brent Cross Cricklewood Regeneration			
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TA 94/04      ~~Traffic Signs to Tourist Attractions and Facilities in England: Guidance for Tourist Signing—Local Roads~~

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

~~TD 7/80      Type Approval of Traffic Control Equipment~~

~~TD 9/93      Highway Link Design [Incorporating Amendment No.1 dated February 2002]~~

~~TD 11/82      Use of Certain Departmental Standards in the Design and Assessment of Trunk Road Schemes~~

~~TD 16/93      Geometric Design of Roundabouts~~

~~TD 17/85      Criteria for the Provision of Closed Circuit Television on Motorways~~

~~TD 18/85      Criteria for the Use of Gantries for Traffic Signs and Matrix Traffic Signals on Trunk Roads and Trunk Road Motorways~~

**TD 19/06      Requirement for Road Restraint Systems**

~~TD 22/06      Layout of Grade Separated Junctions~~

~~TD 23/99      Trunk Roads and Trunk Road Motorways Inspection and Maintenance of Road Lighting~~

~~TD 24/97      All Purpose Trunk Roads  
Maintenance of Traffic Signals~~

~~TD 25/01      Inspection and maintenance of traffic signs on motorway and all-purpose trunk roads~~

~~TD 26/05      Inspection & Maintenance of Road Markings & Road Studs on Motorways and All purpose Trunk Roads~~

**TD 27/05      Cross Sections and Headrooms**


~~TD 30/87      Design of Road Lighting for All Purpose Trunk Roads~~

~~TD 32/93      Wire Rope Safety Fence~~

~~TD 33/05      The Use of Variable Message Signs on All Purpose and Motorway Trunk Roads~~

~~TD 34/91      Design of Road Lighting for Motorway Trunk Roads~~

## Approval In Principle


<b>Name of Project</b>	Brent Cross Cricklewood Regeneration			
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<del>TD 35/91</del>	<del>All Purpose Trunk Roads: MOVA System of Traffic Control at Signals</del>
<del>TD 36/93</del>	<del>Subways for Pedestrians and Pedal Cyclists. Layout and Dimensions</del>
<del>TD 37/93</del>	<del>Scheme Assessment Reporting</del>
<del>TD 39/94</del>	<del>The Design of Major Interchanges</del>
<del>TD 40/94</del>	<del>Layout of Compact Grade Separated Junctions</del>
<del>TD 41/95</del>	<del>Vehicular Access to All Purpose Trunk Roads</del>
<del>TD 42/95</del>	<del>Geometric Design of Major/Minor Priority Junctions</del>
<del>TD 45/94</del>	<del>Automatic Signalling (MIDAS)</del>
<del>TD 46/94</del>	<del>Motorway Signalling</del>
<del>TD 49/03</del>	<del>The Mobile Lane Closure Technique for use on Motorways and other Dual Carriageway Trunk Roads Amendment No.1</del>
<del>TD 50/04</del>	<del>The Geometric Layout of Signal Controlled Junctions and Signalised Roundabouts</del>
<del>TD 51/03</del>	<del>Segregated Left Turn Lanes and Subsidiary Deflection Islands at Roundabouts</del>
<del>TD 52/04</del>	<del>Traffic Signs to Tourist Attractions and Facilities in England: Guidance for Tourist Signing—Trunk Roads</del>
<del>TD 53/05</del>	<del>Traffic Signs to Retail Destinations and Exhibition Centres in England and Wales</del>

## Highways, Advice Notes (HA Series)


<del>HA 12/81</del>	<del>Management of Contractual Claims</del>
<del>HA 13/81</del>	<del>The Planting of Trees &amp; Shrubs</del>
<del>HA 19/82</del>	<del>Engineer/Contractor Relationship on Trunk Road Contracts</del>
<del>HA 37/97</del>	<del>Hydraulic Design of Road Edge Surface Water Channels</del>
<del>HA 39/98</del>	<del>Edge of Pavement Details</del>

## Approval In Principle

<b>Name of Project</b>	Brent Cross Cricklewood Regeneration			
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HA 40/01	Determination of Pipe and Bedding Combinations for Drainage Works
HA 41/90	A Permeameter for Road Drainage Layers
HA 43/91	Geotechnical Considerations and Techniques for Widening Highway Earthworks
HA 44/91	Design and Preparation of Contract Documents [Incorporating Amendment No.1 dated April 1995]
HA 55/92	Landform and Alignment
HA 56/92	Planting, Vegetation and Soils
HA 57/92	Integration with Rural Landscapes
HA 58/92	New Roads: The Road Corridor. Incorp Amendment No. 1 Feb 1997
HA 59/92	Mitigating effects on badgers
HA 60/92	New Roads Heritage
HA 63/92	Improving Existing Roads Improvement techniques
HA 65/94	Design Guide for Environmental Barriers
HA 66/95	Environmental Barriers: Technical Requirements
HA 67/93	The Wildflower Handbook
HA 68/94	Design Methods for the Reinforcement of Highway Slopes by Reinforced Soil and Soil Nailing Techniques
HA 70/94	Construction of Highway Earthworks
HA 71/06	The Effects on Flooding of Highway Construction On Flood Plains
HA 73/95	Site Investigation for Highway Works on Contaminated Land
HA 74/00	Treatment of fill and capping materials using either lime or cement or both
HA 75/01	Trunk Roads and Archaeological Mitigation
HA 78/96	Design of Outfalls for Surface Water Channels
HA 79/97	Edge of Pavement Details for Porous Asphalt Surface Courses

## Approval In Principle

<b>Name of Project</b>	Brent Cross Cricklewood Regeneration			
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<b>Structure ref no</b>	???	<b>Key no</b>	0000	

HA 80/99	Nature Conservation Advice in Relation to Bats
HA 81/99	Nature Conservation Advice in Relation to Otters
HA 83/99	Safety Aspects of Road Edge Drainage Features
HA 84/01 (1)	Nature Conservation & Biodiversity
HA 85/01	Road improvement within Limited Land Take
HA 86/01	Principles & Guidance
HA 87/01	Environmental Functions
HA 88/01	Landscape Elements
HA 89/01	Environmental Elements
HA 90/01	Planning & Policy features
HA 91/01	Environmental database system
HA 92/01	Scheme development implementation & management
HA 93/01	Contract performance requirements
HA 94/01	Glossary of terms
HA 97/01	Nature conservation management Advice in relation to Dormice
HA 98/01	Nature conservation management Advice in Relation to Amphibians
HA 99/01	Policy and guidance
HA 102/00	Spacing of Road Gullies
HA 103/06	Vegetative Treatment Systems for Highway Runoff
HA 104/02	Chamber Tops & Gully Tops for Road Drainage & Services: Installation & Maintenance
HA 105/04	Sumpless Gullies
HA 106/04	Drainage of Runoff from Natural Catchments
HA 107/04	Design of Outfall and Culvert Details

## Approval In Principle


<b>Name of Project</b>	Brent Cross Cricklewood Regeneration			
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HA 108/04	The Landscape Management Handbook
HA 113/05	Combined Channel and Pipe System for Surface Water Drainage.
HA 115/05	The Establishment of An Herbaceous Layer In Roadside Woodland.
HA 116/05	Nature Conservation Advice in Relation to Reptiles and Toads.
HA 118/06	Design of Soakaways
HA 119/06	Grassed Surface Water Channels for Highway Runoff
HA 216/06	Road Drainage and the Water Environment

## Highways Standards (HD Series)


HD 19/03	Road Safety Audit
HD 20/05	Loop Detectors for Motorways
HD 22/02	Managing Geotechnical Risk
HD 23/99	General Information
HD 24/06	Traffic Assessment
HD 25/94	Foundations
HD 26/06	Pavement design
HD 27/04	Pavement Construction methods
HD 28/04	Skidding Resistance
HD 29/94	Structural Assessment Methods Amendment No. 1
HD 32/94	Surfacing Materials for New and Maintenance Construction (Incorporating Maintenance of Concrete Roads Amendment No 1 dated August 2001)
HD 30/99	Maintenance Assessment Procedure
HD 33/06	Surface and Sub-surface Drainage Systems for Highways
HD 34/03	Bituminous Surfacing Materials and Techniques Amendment No.1
HD 31/94	Maintenance of Bituminous Roads
HD 35/04	Implementation and Use of the Standards Improvement System Concrete Surfacing Materials Amendment No. 1
HD 36/99	Amendment No. 2 Feb 1998 Concrete Design and the use of secondary and recycled Materials

## Approval In Principle

<b>Name of Project</b>	Brent Cross Cricklewood Regeneration			
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<del>HD 40/01</del>	<del>Footway Maintenance</del>
<del>HD 41/03</del>	<del>Maintenance of Highway Geotechnical Assets</del>
<del>HD 42/05</del>	<del>Non-Motorised User Audits</del>
<del>HD 43/04</del>	<del>Drainage Data Management System for Highways Agency</del>
<del>HD 46/05</del>	<del>Quality Management Systems for Highway Design</del>

## Approval In Principle


<b>Name of Project</b>	Brent Cross Cricklewood Regeneration			
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## APPENDIX B: STRUCTURE LOCATION MAP






## Approval In Principle

<b>Name of Project</b>	Brent Cross Cricklewood Regeneration			
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## APPENDIX C: GENERAL ARRANGEMENT DRAWING

## Approval In Principle

<b>Name of Project</b>	Brent Cross Cricklewood Regeneration			
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<b>Structure ref no</b>	???	<b>Key no</b>	0000	


## APPENDIX D: DIAGRAM OF IDEALISED STRUCTURE

## Approval In Principle

<b>Name of Project</b>	Brent Cross Cricklewood Regeneration			
<b>Name of Structure</b>	A406/M1 Pedestrian/Cycleway Bridge (B6) (previously referenced B7)			
<b>Structure ref no</b>	???	<b>Key no</b>	0000	

## APPENDIX E: INDICATIVE FORM C

## Approval In Principle

<b>Name of Project</b>	Brent Cross Cricklewood Regeneration			
<b>Name of Structure</b>	A406/M1 Pedestrian/Cycleway Bridge (B6) (previously referenced B7)			
<b>Structure ref no</b>	???	<b>Key no</b>	0000	

## APPENDIX F: CDM QUALITATIVE RISK ASSESSMENT