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**VOLUME 3    HIGHWAY  
CONSTRUCTION  
DETAILS**

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**HIGHWAY CONSTRUCTION DETAILS**

**AMENDMENT NOVEMBER 2008**

**SUMMARY**

This document contains the replacement pages and drawings for incorporation into the Highway Construction Details.

**INSTRUCTIONS FOR USE**

1. Insert the replacement pages and drawings listed on the Amendments sheet (Amendment - November 2008), remove the corresponding existing pages and drawings, which are superseded by this amendment, and archive as appropriate. (Advice on archiving is given in Standard SD 0/08)
2. Insert the latest Amendments sheet dated November 2008 at the front of the document.
3. Enter details of Amendment - November 2008 on the Registration of Amendments sheet, sign and date to confirm that the amendment has been incorporated.
4. Archive this sheet as appropriate.

Note: A quarterly index with a full set of Volume Contents Pages is available separately from The Stationery Office Ltd.

**MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS  
VOLUME 3 HIGHWAY CONSTRUCTION DETAILS**

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**MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS**

**A BRIEF DESCRIPTION OF NOVEMBER 2008 AMENDMENTS**

**VOLUME 3**

<b>DOCUMENT</b>	<b>DESCRIPTION</b>
<b>Volume 3</b>	<b>Highway Construction Details (MCHW 3)</b>
<b>General</b>	<p>The user's attention is drawn to the following note which has been abstracted from Implementing Standard SD 26/08:</p> <p>“Contracts for which tenders are to be invited after 1 May 2009 shall incorporate by reference the amendments implemented by this Standard, except where the preparation of a contract has reached a stage at which in the opinion of the Overseeing Organisation use of the amendments would result in significant additional expense or delay progress.”</p> <p>The user's attention is drawn to GD 03/08 (DMRB 0.2.2) Implementation and Use of the Standards Improvement System. This Standard superseded HD 34/03 which introduced the Standards Improvement System (SIS).</p> <p>SIS is a computerised database of reports generated from failures of specifications and design standards and other observations on these documents. The database records potential improvements using lists of components, symptoms, diagnoses and detailed descriptions. SIS is operated and maintained by the Highways Agency. Its prime objective is to improve the performance of the engineering standards and specifications published by the Highways Agency, both independently and jointly with other Overseeing Organisations.</p> <p><b>Feedback Arrangement</b></p> <p>To provide feedback on the Highways Agency's standards and specifications, please use this link: <a href="http://www.highways-net.co.uk/information/dmrbackcess.asp">http://www.highways-net.co.uk/information/dmrbackcess.asp</a></p>
<b>Section 1 Series D Drawings Carriageway Markings for Rural Motorways</b>	<p>Drawing Nos. D1 Issue C, D2 Issue D, D5 Issue E and D6 Issue D:</p> <p>1. White studs are amended from 'bidirectional' to 'unidirectional'.</p>

**MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS  
VOLUME 3 HIGHWAY CONSTRUCTION DETAILS**

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## **Manual of Contract Documents for Highway Works**

### **Amendment - November 2008 to Volume 3 - Highway Construction Details**

Replace existing pages: i/ii and vii/viii with new pages i/ii and vii/viii

For Series D: remove existing pages D1 to D2 and D5 to D6 and replace with new pages D1 to D2 and D5 to D6

#### *Publisher's Note*

1. *The Specification for Highway Works and its Notes for Guidance to which the Highway Construction Details relate are published by The Stationery Office in Volumes 1 and 2 of the Manual of Contract Documents for Highway Works, and are for use in Highway Works Contracts.*
2. *The Method of Measurement for Highway Works and a Library of Standard Item Descriptions to which the Highway Construction Details relate are published by The Stationery Office in Volume 4 of the Manual of Contract Documents for Highway Works.*

## **VOLUME 3 (with continuation binder 3a)**

### **HIGHWAY CONSTRUCTION DETAILS**

#### **Section 1 Carriageway and Other Details**

Drawings dated December 1991, August 1993, August 1994 and March 1998

Series A drawings (Highway Cross Sections) have been superseded by TD 27/96 in DMRB Volume 6

Amendment dated March 1999 - revision B to drawing D5

Amendment dated May 2001 - revisions to Series C, D, F, H and K drawings

Amendment dated May 2002 - revisions to Series B, C, G, I and K drawings

Amendment dated February 2003 - revisions to Series G drawings

Amendment dated August 2003 - revisions to Series D drawings

Amendment dated November 2003 - revisions to Series F and G drawings

Amendment dated May 2004 - revisions to Series B, C, E, G, H, I and K drawings

Amendment dated November 2004 - revisions to Series B and F drawings

Amendment dated May 2005 - revisions to Series F drawings

Amendment dated November 2005 - revisions to Series G drawings

Amendment dated May 2006 - revisions to Series B, C and F drawings

Amendment dated November 2006 - revisions to Series E and H drawings

Amendment dated November 2008 - revisions to Series D drawings

#### **Section 2 Not Used (05/04)**

#### **Section 3 National Motorway Communications System Installation Drawings**

Amendment dated May 2002 - revised all the National Motorway Communications System Installation Drawings which were introduced in the Amendment dated May 2001.

Amendment dated February 2003 - revisions to the National Motorway Communications System Installation Drawings

Amendment dated August 2003 - revisions to the National Motorway Communications System Installation Drawings

Amendment dated November 2003 - revisions to the National Motorway Communications System Installation Drawings

Amendment dated May 2004 - revisions to the National Motorway Communications System Installation Drawings



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Amendment dated November 2004 - revisions to the National Motorway Communications System Installation Drawings

Amendment dated May 2005 - revisions to the National Motorway Communications System Installation Drawings

Amendment dated November 2005 - revisions to the National Motorway Communications System Installation Drawings

Amendment dated May 2006 - revisions to the National Motorway Communications System Installation Drawings

Amendment dated November 2006 - revisions to the National Motorway Communications System Installation Drawings

**REGISTRATION OF AMENDMENTS**

Amendment No.	Page/Drg No.	Signature & Date of Incorporation of Amendment	Amendment No.	Page/Drg No.	Signature & Date of Incorporation of Amendment

## SCHEDULE OF NUMBERED PAGES AND RELEVANT PUBLICATION DATES

	Page Number	Publication Date
Introduction	1	March 1998
List of Drawings      Section 1	2	March 1998
	3	May 2004
	4	May 2006
	5	May 2001
	6	May 2004
	7	May 2001
	8	November 2005
	9	May 2001
	10	May 2002
	11	December 1991
	12	May 2001
Section 2	13 to 14 inclusive Not Used	May 2004
Section 3	15 to 18 inclusive	May 2006
	19 to 20 inclusive	May 2004
	21	May 2006
	22 to 25 inclusive	May 2004
	26 to 27 inclusive	May 2006
	28	November 2005



## SCHEDULE OF DRAWINGS - SECTION 1 AND RELEVANT PUBLICATION DATES

Series	Drawing Number	Issue	Publication Date
A	Not Used		
B	B1	B	May 2006
	B2	B	August 1993
	B3	C	May 2002
	B4 to B5 inclusive	C	May 2006
	B6 to B7	C	May 2002
	B8	B	May 2002
	B9	C	May 2006
	B10	F	May 2006
	B11	C	May 2002
	B12	D	May 2002
	B13	C	May 2006
	B14	E	November 2004
	B15	B	March 1998
	B16 to B17 inclusive	C	May 2004
	B18	C	May 2004
C	C1	E	May 2006
	C2	C	May 2006
	C3 to C4 inclusive	E	May 2006
	C5	C	May 2006
	C6	B	May 2001
	C7/1, C7/2, C7/3	E	May 2006
	C8/1, C8/2	C	May 2006
	C9	B	May 2006
	C10/1, C10/2	B	May 2006
	C11	B	March 1998
	C12 to C15 inclusive	C	May 2006
	C16	B	May 2006
	C17	C	May 2006
	C18	E	May 2002
	C19	C	May 2006
	C20	E	May 2006
	C21 to C22 inclusive	C	May 2006
	C23	D	May 2006
	C24	C	May 2006
	C25	C	May 2006
	C26	B	May 2006
D	D1	C	November 2008
	D2	D	November 2008
	D3 to D4 inclusive	C	August 2003
	D5	E	November 2008
	D6	D	November 2008
	(D7 Not Used)		
E	E1	A	December 1991
	E2	B	November 2006
	E3	B	August 1993
	E4 to E5 inclusive	B	May 2004

## SCHEDULE OF DRAWINGS - SECTION 1 AND RELEVANT PUBLICATION DATES *(continued)*

Series	Drawing Number	Issue	Publication Date
F	F1	A	December 1991
	F2	C	November 2003
	F3	E	May 2006
	F4	E	May 2006
	F5 to F6 inclusive	F	November 2004
	F7	E	May 2006
	(F8 Not Used)		
	F9	B	May 2001
	F10	C	November 2003
	F11 to F12 inclusive	F	May 2006
	F13 to F14 inclusive	E	May 2006
	F15	C	November 2004
	F16	B	November 2004
	F17	A	March 1998
	F18 to F21 inclusive	A	December 1991
	F22 to F23 inclusive	B	November 2003
	F24	C	November 2004
	F25 to F26 inclusive	C	May 2006
	F27	C	November 2004
	F28	B	November 2003
G	G1	E	November 2005
	G2	D	November 2005
	G3 to G4 inclusive	E	November 2005
	G5	D	November 2005
	G6	C	November 2005
	G7	G	November 2005
	G8 to G12 inclusive	E	November 2005
	G13	F	November 2005
	G14 to G15 inclusive	D	November 2005
	G16	F	November 2005
	G17	E	November 2005
	G18 to G22 inclusive	D	November 2005
	G23	E	November 2005
	G24	D	November 2005
	G25 to G28 inclusive	C	November 2005
	G29 to G30 inclusive	D	November 2005
	G31 to G32 inclusive	C	November 2005

## SCHEDULE OF DRAWINGS - SECTION 1 AND RELEVANT PUBLICATION DATES *(continued)*

Series	Drawing Number	Issue	Publication Date
H	H1	C	May 2004
	H2	B	May 2004
	H3	D	May 2004
	H4	C	May 2004
	H5	D	May 2004
	H6	C	May 2004
	H7	A	December 1991
	H8	B	May 2001
	H9 to H10 inclusive	A	December 1991
	H11	D	May 2004
	H12	B	August 1993
	H13 to H14 inclusive	E	May 2004
	H15	D	May 2004
	H16	C	May 2004
	H17 to H25 inclusive	B	May 2004
	H26	B	May 2001
	H27 to H33 inclusive	A	December 1991
	H34 to H35 inclusive	C	May 2004
	H36	B	November 2006
	H37	A	December 1991
	H38	B	March 1998
	H39 to H48	A	May 2001
I	I1 to I2 inclusive	B	May 2004
	I3 to I5 inclusive	A	May 2002
J	J1	A	December 1991
K	K1 to K3 inclusive	A	December 1991
	K4	C	May 2004
	K5	A	May 2001

**SECTION 2**  
**(Not Used)**



### SCHEDULE OF DRAWINGS - SECTION 3 AND RELEVANT PUBLICATION DATES

Series	Drawing Number	Issue	Publication Date
MCX	(MCX 0000 to MCX 0068 not used)		
	MCX 0069 Sheet 1	H	May 2006
	MCX 0069 Sheet 2 to Sheet 7 inclusive	F	May 2006
	(MCX 0070 to MCX 0130 not used)		
	MCX 0131 Sheet 1	N	May 2006
	MCX 0131 Sheet 2 to Sheet 3 inclusive	H	May 2006
	MCX 0132 Sheet 1	N	May 2006
	MCX 0132 Sheet 2	P	May 2006
	MCX 0132 Sheet 3	J	May 2006
	MCX 0132 Sheet 4 to Sheet 5 inclusive	K	May 2006
	MCX 0132 Sheet 6	F	May 2006
	MCX 0132 Sheet 7 to Sheet 8 inclusive	D	May 2006
	(MCX 0133 not used)		
	MCX 0134 Sheet 1	N	May 2006
	MCX 0135 Sheet 1	J	May 2006
	MCX 0135 Sheet 2	H	May 2006
	MCX 0135 Sheet 3	G	May 2006
	MCX 0135 Sheet 4	F	May 2006
	(MCX 0136 not used)		
	MCX 0137 Sheet 1	K	May 2006
	MCX 0138 Sheet 1	N	November 2005
	MCX 0138 Sheet 2	G	May 2004
	MCX 0139 Sheet 1	K	May 2006
	MCX 0140 Sheet 1	S	November 2005
	MCX 0141 Sheet 1	P	February 2003
	MCX 0142 Sheet 1	M	May 2006
	MCX 0142 Sheet 2	L	May 2006
	MCX 0142 Sheet 3	K	May 2006
	MCX 0142 Sheet 4	J	May 2006
	MCX 0143 Sheet 1	R	November 2005
	MCX 0144 Sheet 1 to Sheet 2 inclusive	J	November 2003
	MCX 0144 Sheet 3	F	May 2004
	MCX 0144 Sheet 4	E	May 2004
	MCX 0145 Sheet 1	S	May 2006
	MCX 0145 Sheet 2	L	November 2003
	MCX 0145 Sheet 3	G	May 2002
	MCX 0145 Sheet 4	L	May 2006
	MCX 0145 Sheet 5	F	May 2006
	MCX 0146 Sheet 1	L	February 2003
	MCX 0147 Sheet 1	N	May 2006
	MCX 0147 Sheet 2	K	May 2006
	(MCX 0148 not used)		
	MCX 0149 Sheet 1	H	May 2006
	MCX 0149 Sheet 2	G	May 2006
	MCX 0150 Sheet 1	H	May 2006
	MCX 0151 Sheet 1	L	May 2006
	MCX 0151 Sheet 2	K	May 2006
	MCX 0151 Sheet 3	L	May 2006
	MCX 0151 Sheet 4 to Sheet 5 inclusive	H	May 2006
	MCX 0151 Sheet 6	F	May 2006
	MCX 0151 Sheet 7	G	May 2006
	MCX 0151 Sheet 8	C	May 2006

**SCHEDULE OF DRAWINGS - SECTION 3  
AND RELEVANT PUBLICATION DATES (*continued*)**

Series	Drawing Number	Issue	Publication Date
MCX	MCX 0152 Sheet 1	M	May 2006
	MCX 0152 Sheet 2	H	May 2006
	MCX 0153 Sheet 1	M	November 2005
	MCX 0153 Sheet 2	F	November 2005
	MCX 0154 Sheet 1	N	May 2006
	(MCX 0155 not used)		
	MCX 0156 Sheet 1	S	May 2006
	MCX 0156 Sheet 2	P	May 2006
	MCX 0156 Sheet 3	N	May 2006
	MCX 0156 Sheet 4	Q	May 2006
	MCX 0156 Sheet 5	K	May 2006
	MCX 0157 Sheet 1	J	May 2006
	MCX 0157 Sheet 2	H	May 2006
	MCX 0157 Sheet 3	J	May 2006
	MCX 0157 Sheet 4	H	May 2006
	MCX 0157 Sheet 5	J	May 2006
	MCX 0157 Sheet 6	G	May 2006
	(MCX 0158 to MCX 0159 not used)		
	MCX 0160 Sheet 1	L	May 2004
	(MCX 0161 to MCX 0162 not used)		
	MCX 0163 Sheet 1	J	May 2006
	MCX 0164 Sheet 1	J	May 2004
	MCX 0164 Sheet 2	L	May 2006
	MCX 0164 Sheet 3	J	May 2006
	MCX 0164 Sheet 4	A	May 2004
	MCX 0165 Sheet 1	H	May 2006
	MCX 0165 Sheet 2	K	May 2006
	MCX 0165 Sheet 3	H	May 2006
	MCX 0165 Sheet 4	D	May 2006
	(MCX 0166 to MCX 0169 not used)		
	MCX 0170 Sheet 1	M	May 2006
	MCX 0170 Sheet 2	N	May 2006
	MCX 0170 Sheet 3	J	May 2006
	MCX 0170 Sheet 4 to Sheet 5 inclusive	E	May 2006
	MCX 0170 Sheet 6	D	May 2006
	MCX 0170 Sheet 7 to Sheet 8 inclusive	E	May 2006
	MCX 0170 Sheet 9	D	May 2006
	MCX 0171 Sheet 1	J	February 2003
	MCX 0171 Sheet 2	F	May 2006
	(MCX 0172 to MCX 0305 not used)		
	MCX 0306 Sheet 1 to Sheet 2 inclusive	J	May 2006
	MCX 0306 Sheet 3	H	May 2006
	(MCX 0307 to MCX 0336 not used)		
	MCX 0337 Sheet 1	S	May 2006
	MCX 0337 Sheet 2	J	May 2006
	MCX 0337 Sheet 3	G	May 2006
	MCX 0337 Sheet 4	F	May 2006
	MCX 0337 Sheet 5	K	May 2006
	MCX 0337 Sheet 6	H	May 2006
	MCX 0337 Sheet 7 to Sheet 8 inclusive	F	May 2006
	MCX 0337 Sheet 9 to Sheet 10 inclusive	D	May 2006
	MCX 0037 Sheet 11	C	May 2006

**SCHEDULE OF DRAWINGS - SECTION 3**  
**AND RELEVANT PUBLICATION DATES (*continued*)**

Series	Drawing Number	Issue	Publication Date
MCX	(MCX 0338 not used)		
	MCX 0339 Sheet 1 to Sheet 2 inclusive	K	May 2006
	MCX 0339 Sheet 3	G	May 2006
	MCX 0339 Sheet 4	F	May 2006
	(MCX 0340 to MCX 0425 not used)		
	MCX 0426 Sheet 1 to Sheet 2 inclusive	H	May 2006
	(MCX 0427 to MCX 0485 not used)		
	MCX 0486 Sheet 1	H	May 2006
	MCX 0486 Sheet 2	F	May 2006
	(MCX 0487 to MCX 0488 not used)		
	MCX 0489 Sheet 1	G	May 2006
	MCX 0489 Sheet 2	J	May 2006
	MCX 0489 Sheet 3	H	May 2006
	MCX 0489 Sheet 4	F	May 2006
	MCX 0489 Sheet 5 to Sheet 6 inclusive	J	May 2006
	MCX 0489 Sheet 7	B	May 2006
	MCX 0490 Sheet 1 to Sheet 2 inclusive	J	May 2004
	MCX 0490 Sheet 3	K	November 2005
	MCX 0490 Sheet 4	N	November 2005
	MCX 0490 Sheet 5	L	May 2006
	(MCX 0491 to MCX 0508 not used)		
	MCX 0509 Sheet 1	D	May 2006
	MCX 0509 Sheet 2	F	May 2006
	(MCX 0510 to MCX 0514 not used)		
	MCX 0515 Sheet 1 to Sheet 3 inclusive	E	May 2006
	(MCX 0516 to MCX 0541 not used)		
	MCX 0542 Sheet 1 to Sheet 4 inclusive	G	May 2006
	MCX 0543 Sheet 1	G	May 2006
	(MCX 0544 to MCX 0551 not used)		
	MCX 0552 Sheet 1 to Sheet 2 inclusive	E	May 2006
	(MCX 0553 to MCX 0559 not used)		
	MCX 0560 Sheet 1	F	May 2006
	(MCX 0561 to MCX 0564 not used)		
	MCX 0565 Sheet 1	F	May 2006
	MCX 0566 Sheet 1	F	February 2003
	(MCX 0567 to MCX 0574 not used)		
	MCX 0575 Sheet 1	F	November 2003
	(MCX 0576 to MCX 0581 not used)		
	MCX 0582 Sheet 1	K	May 2005
	MCX 0582 Sheet 2	E	May 2005
	MCX 0582 Sheet 3	D	May 2004
	MCX 0583 Sheet 1	K	February 2003
	MCX 0583 Sheet 2	J	February 2003
	MCX 0583 Sheet 3 to Sheet 4 inclusive	K	May 2006
	MCX 0583 Sheet 5	E	February 2003
	MCX 0583 Sheet 6 to Sheet 7 inclusive	E	May 2006
	MCX 0583 Sheet 8	G	May 2006
	MCX 0583 Sheet 9	D	May 2006
	MCX 0583 Sheet 10 to Sheet 11 inclusive	E	May 2006
	MCX 0583 Sheet 12	B	May 2006
	MCX 0584 Sheet 1	L	May 2006
	MCX 0584 Sheet 2	K	May 2006
	MCX 0584 Sheet 3 to Sheet 5 inclusive	L	November 2003
	MCX 0584 Sheet 6	J	May 2006
	MCX 0584 Sheet 7	K	May 2006

**SCHEDULE OF DRAWINGS - SECTION 3  
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Series	Drawing Number	Issue	Publication Date
MCX	MCX 0584 Sheet 8	H	February 2003
	MCX 0584 Sheet 9	H	May 2006
	MCX 0584 Sheet 10	J	May 2006
	(MCX 0585 to MCX 0586 not used)		
	MCX 0587 Sheet 1 to Sheet 3	D	May 2006
	MCX 0587 Sheet 4	C	May 2006
	(MCX 0588 to MCX 0589 not used)		
	MCX 0590 Sheet 1	H	May 2006
	MCX 0591 Sheet 1	H	May 2006
	MCX 0592 Sheet 1	G	May 2006
	MCX 0592 Sheet 2 to Sheet 4 inclusive	E	November 2005
	(MCX 0593 not used)		
	MCX 0594 Sheet 1 to Sheet 2 inclusive	G	May 2006
	MCX 0594 Sheet 3	G	November 2005
	MCX 0594 Sheet 4	C	May 2006
	(MCX 0595 to MCX 0601 not used)		
	MCX 0602 Sheet 1 to Sheet 2 inclusive	E	May 2006
	(MCX 0603 to MCX 0722 not used)		
	MCX 0723 Sheet 1	E	November 2005
	MCX 0723 Sheet 2	D	February 2003
	MCX 0723 Sheet 3	D	May 2006
	(MCX 0724 to MCX 0799 not used)		
	MCX 0800 Sheet 1 to Sheet 2	G	November 2005
	MCX 0800 Sheet 3	E	February 2003
	MCX 0801 Sheet 1 to Sheet 3 inclusive	H	May 2006
	MCX 0801 Sheet 4	H	November 2005
	MCX 0801 Sheet 5	H	May 2006
	MCX 0802 Sheet 1	F	May 2006
	(MCX 0803 to MCX 0809 not used)		
	MCX 0810 Sheet 1	F	May 2004
	MCX 0810 Sheet 2	F	February 2003
	MCX 0810 Sheet 3	D	May 2006
	MCX 0811 Sheet 1	E	May 2006
	MCX 0811 Sheet 2 to 3 inclusive	G	November 2005
	MCX 0811 Sheet 4	F	May 2006
	MCX 0812 Sheet 1	F	November 2005
	MCX 0812 Sheet 2	G	November 2005
	MCX 0813 Sheet 1	G	November 2003
	MCX 0814 Sheet 1 to Sheet 2 inclusive	F	February 2003
	MCX 0814 Sheet 3	F	May 2004
	MCX 0814 Sheet 4	F	February 2003
	MCX 0814 Sheet 5	F	May 2006
	MCX 0815 Sheet 1	H	November 2004
	MCX 0815 Sheet 2	F	February 2003
	MCX 0815 Sheet 3 to Sheet 4 inclusive	H	November 2004
	(MCX 0816 to MCX 0819 not used)		
	MCX 0820 Sheet 1	E	May 2006
	MCX 0821 Sheet 1 to Sheet 3 inclusive	F	May 2006
	MCX 0821 Sheet 4	F	February 2003
	MCX 0822 Sheet 1	G	May 2006
	MCX 0822 Sheet 2 to Sheet 4 inclusive	F	May 2006
	MCX 0822 Sheet 5	H	May 2006
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**SCHEDULE OF DRAWINGS - SECTION 3  
AND RELEVANT PUBLICATION DATES *(continued)***

Series	Drawing Number	Issue	Publication Date
MCX	MCX 0823 Sheet 1	E	May 2006
	MCX 0823 Sheet 2	F	February 2003
	MCX 0823 Sheet 3	H	May 2006
	MCX 0823 Sheet 4	F	May 2006
	MCX 0824 Sheet 1	E	May 2006
	(MCX 0825 to MCX 0829 not used)		
	MCX 0830 Sheet 1	E	February 2003
	MCX 0831 Sheet 1	F	May 2006
	MCX 0832 Sheet 1	H	May 2006
	MCX 0832 Sheet 2	E	May 2006
	MCX 0833 Sheet 1	F	February 2003
	MCX 0833 Sheet 2	E	February 2003
	MCX 0834 Sheet 1 to Sheet 3 inclusive	E	May 2006
	MCX 0834 Sheet 4 to Sheet 6 inclusive	E	November 2005
	MCX 0834 Sheet 7 to Sheet 10 inclusive	F	May 2006
	(MCX 0835 to MCX 0850 not used)		
	MCX 0851 Sheet 1	E	May 2006
	MCX 0851 Sheet 2	F	May 2006
	MCX 0851 Sheet 3 to Sheet 4 inclusive	E	May 2006
	MCX 0852 Sheet 1	F	May 2006
	MCX 0853 Sheet 1 to Sheet 3 inclusive	E	May 2006
	MCX 0854 Sheet 1 to Sheet 3 inclusive	E	May 2006
	(MCX 0855 to MCX 0860 not used)		
	MCX 0861 Sheet 1 to Sheet 3 inclusive	E	May 2006
	MCX 0862 Sheet 1 to Sheet 3 inclusive	E	May 2006
	MCX 0863 Sheet 1	F	May 2006
	MCX 0864 Sheet 1	F	May 2006
	MCX 0864 Sheet 2 to Sheet 3 inclusive	E	May 2004
	MCX 0864 Sheet 4	G	May 2004
	MCX 0864 Sheet 5	E	May 2004
	MCX 0864 Sheet 6	F	May 2004
	MCX 0864 Sheet 7	G	May 2006
	(MCX 0865 to MCX 0870 not used)		
	MCX 0871 Sheet 1	F	May 2006
	MCX 0871 Sheet 2 to Sheet 3 inclusive	E	May 2006
	MCX 0872 Sheet 1	E	May 2006
	MCX 0873 Sheet 1	F	May 2006
	MCX 0873 Sheet 2	D	May 2006
	(MCX 0874 to MCX 0898 not used)		
	MCX 0899 Sheet 1	F	May 2006
	(MCX 0900 to MCX 1021 not used)		
	MCX 1022 Sheet 1 to Sheet 3	B	May 2006
	MCX 1022 Sheet 4	C	May 2006
	MCX 1022 Sheet 5	B	May 2006
	(MCX 1023 to MCX 1025 not used)		
	MCX 1026 Sheet 1	B	November 2006
	MCX 1026 Sheet 2 to Sheet 4 inclusive	A	February 2003
	(MCX 1027 to MCX 1029 not used)		
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	MCX 1030 Sheet 11 to Sheet 18 inclusive	A	November 2005



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# HIGHWAY CONSTRUCTION DETAILS

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## Introduction

### Section 1: Carriageway and Other Details

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Series B	Edge of Pavement Details
Series C	Concrete Carriageway
Series D	Carriageway Markings for Rural Motorways
Series E	Distance Marker Posts
Series F	Drainage
Series G	Loop Detectors
Series H	Fences, Stiles and Gates
Series I	Underground Cable Ducts
Series J	Flexible Composite Carriageway
Series K	Miscellaneous

### Section 2: Not Used (05/04)

### Section 3: National Motorway Communications System

Series MCX	Installation Drawings
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## **Introduction**

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1. The Highway Construction Details (HCD) is published as Volume 3 of the Manual of Contract Documents for Highway Works and contains standard drawings for use in the construction, improvement and maintenance of trunk roads.
2. The numbers, titles and dates of the individual drawings, or parts of drawings, included in the Contract are listed in Appendix 0/4 to the Specification.
3. The following apply to each drawing unless otherwise stated thereon:
  - i. SHW means the Specification for Highway Works published by The Stationery Office as Volume 1 of the Manual of Contract Documents for Highway Works.
  - ii. Reference to a Clause is a reference to a Clause of the Specification for Highway Works.
  - iii. Reference to a Numbered Appendix (eg. Appendix 3/1) is a reference to a Numbered Appendix to the Specification.

The relevant publication date of each Clause is to be determined from the Schedule of Pages and Relevant Publication Dates in the Specification.

The relevant publication date of each British Standard (BS) and other reference document referred to in the HCD is to be determined in accordance with Clause 004 of the Specification.

**LIST OF DRAWINGS**  
**SECTION 1**  
**SERIES A - NOT USED**

**LIST OF DRAWINGS**  
**SECTION 1**  
**SERIES B - EDGE OF PAVEMENT DETAILS**

B1	Cuttings - Combined Surface Water and Groundwater Filter Drains
B2	Cuttings - Surface Water Channel for Rigid Carriageway
B3	Cuttings - Surface Water Channel for Flexible Carriageway
B4	Cuttings - Drainage Channel Blocks and Drains
B5	Central Reserve - Combined Surface Water and Groundwater Filter Drains
B6	Central Reserve - Surface Water Channel for Rigid Carriageway
B7	Central Reserve - Surface Water Channel for Flexible Carriageway
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B9	Embankments - Channels Formed by Kerbs
B10	Embankments - External Kerbs and Drainage Channel Blocks
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B13	Embankments - Verge Drainage or Verge and Carriageway Drainage over Embankment Slope
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G26	Loop (Inductive) All-Purpose Roads - Detail of Signal Duct Box Chamber
G27	Loop (Inductive) All-Purpose Roads - Chevron Loops
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H4	Motorway and Accommodation Works High Tensile Strained Wire Deer Fences 135
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H18	Steel Half Mesh Single Field Gate
H19	Steel Extra Wide Single Field Gate
H20	Steel Double Field Gate
H21	Timber Single Field Gate
H22	Timber Double Field Gate
H23	Timber Wicket Gate Type 1
H24	Timber Wicket Gate Type 2
H25	Timber Kissing Gate
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H27	'D' Latch, Type A for Steel Single Field Gates
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H33	Standard Gate Stops
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H36	Diagrammatic Methods of Attaching Fencing to Structures
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H38	Rules for The Selection Of Non-Structural Timber for Use In Environmental Barriers - Sheet 2
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K2	Bedding Mortar Test Apparatus for Flow between Glass Plates
K3	Flat Traffic Delineator Test Details
K4	Typical Bench Reinstatement Details for Bituminous and Concrete Pavements
K5	Planting Details for Planting Large Trees

**SECTION 2**  
**NOT USED** (05/04)



# LIST OF DRAWINGS

## SECTION 3

### NATIONAL MOTORWAY COMMUNICATIONS SYSTEM INSTALLATION DRAWINGS

Drg No.	Sheet No.	Title
MCX 0000 to MCX 0068		Not Used
MCX 0069	1	Installation Drawing NMCS 1 & 2, Signal Alignment & Sighting Post Details (Alignment of Motorway Matrix Indicators - Post Mounted)
MCX 0069	2	Installation Drawing NMCS 1 & 2, Gantry Signal Indicator Alignment Details
MCX 0069	3	Installation Drawing NMCS 2, Motorway Signals Mk3 and Message Signs, Cantilever Sign Setting Out and Optical Alignment
MCX 0069	4	Installation Drawing NMCS 2, Motorway Signals Mk3 and Message Signs, Cantilever Sign Setting Out and Optical Alignment
MCX 0069	5	Installation Drawing NMCS 2, Motorway Signals Mk3 and Message Signs, Cantilever Sign Setting Out and Optical Alignment
MCX 0069	6	Installation Drawing NMCS 2, Motorway Signals Mk3 and Message Signs, Cantilever Sign Setting Out and Optical Alignment
MCX 0069	7	Installation Drawing NMCS 2, Motorway Signals Mk3 and Message Signs, Cantilever Sign Setting Out and Optical Alignment
MCX 0070 to MCX 0130		Not Used
MCX 0131	1	Installation Drawing NMCS 1, Typical Schematic Drawings & Schedule of Symbols
MCX 0131	2	Installation Drawing NMCS 2, Symbol Schedule for Signals, Telephones & MIDAS Schematics
MCX 0131	3	Installation Drawing NMCS 2, Typical Layouts for Signals, Telephones & MIDAS Schematics
MCX 0132	1	Installation Drawing NMCS 1 & 2, Box 615 with Terminator Frame Fitted
MCX 0132	2	Installation Drawing NMCS 1 & 2, Terminator Frame Type 13C (Wiring)
MCX 0132	3	Installation Drawing NMCS 1 & 2, Terminator Frame Type 14C (Wiring)
MCX 0132	4	Installation Drawing NMCS 1 & 2, Termination of Transmission Circuits
MCX 0132	5	Installation Drawing NMCS 1 & 2, Terminator frame Type 13 and 14, Building Out and Tag Strip Wiring Details
MCX 0132	6	Installation Drawing NMCS 1, Terminator Frame Type 14C (Wiring 30 pr –20 pr)
MCX 0132	7	Installation Drawing NMCS 1, with 21 bit I/F Terminator Frame Type 14C
MCX 0132	8	Installation Drawing NMCS 2, Terminator Frame Type 14C (Wiring 30 pr –20 pr)
MCX 0133		Not Used
MCX 0134	1	Installation Drawing NMCS 1 & 2, Termination Arrangement Within Box 615 (Local Side)
MCX 0135	1	Installation Drawing NMCS, Telephone and Housing 611 (Armoured Cable)
MCX 0135	2	Installation Drawing NMCS, Telephone 352 (Armoured Cable) Fitting of Lightning Protection Device
MCX 0135	3	Installation Drawing NMCS, Telephone and Housing 611 (Non-Armoured Cable)
MCX 0135	4	Installation Drawing NMCS, Telephone 352 (Non-Armoured Cable) Fitting of Lightning Protection Device
MCX 0136	1	Not Used
MCX 0137	1	Installation Drawing NMCS, Method of Sealing Cable Ends
MCX 0138	1	Installation Drawing NMCS 1 & 2, Typical Access Steps
MCX 0138	2	Installation Drawing NMCS 1 & 2, Typical Safety Handrail Details

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### NATIONAL MOTORWAY COMMUNICATIONS SYSTEM INSTALLATION DRAWINGS (*continued*)

Drg No.	Sheet No.	Title
MCX 0139	1	Installation Drawing NMCS 1 & 2, Cabinet 609 with Box 615MCX 0140 01 Installation Drawing NMCS, Foundation for Cabinets (600, 609 & 617)
MCX 0141	1	Installation Drawing NMCS 1 & 2, Cable Trench for Armoured Cable
MCX 0142	1	Installation Drawing NMCS 1 & 2, Cable Arrangement on Gantry, Typical 2 or 3 Lane Arrangement (Schematic)
MCX 0142	2	Installation Drawing NMCS 2, Cable Arrangements on Gantry, Typical 4 or 5 Lane Arrangement (Schematic)
MCX 0142	3	Installation Drawing NMCS 1, Cable Arrangements on Gantry, Typical 4 or 5 Lane Arrangement (Schematic)
MCX 0142	4	Installation Drawing NMCS 1 & 2, Cable Arrangements on Gantry, Mounting Plate Details
MCX 0143	1	Installation Drawing NMCS 1 & 2, Post 71 with Hardstanding and Housing 611
MCX 0144	1	Installation Drawing NMCS, Post Mounted Signals, Foundation Parameters for Signal 111 (Post 75E)
MCX 0144	2	Installation Drawing NMCS, Post Mounted Signals, Foundation Parameters for Signal 113 (Post 75E)
MCX 0144	3	Installation Drawing NMCS, Post Mounted Signals, General Assembly of Signal Type 111 (Single)
MCX 0144	4	Installation Drawing NMCS, Post Mounted Signals, Brackets and Clamp (Signals 111 and 113)
MCX 0145	1	Installation Drawing NMCS 1 & 2, Labels for Cabinets 600, 609 & Post 75
MCX 0145	2	Installation Drawing NMCS 1 & 2, Labels for Signal Posts
MCX 0145	3	Installation Drawing NMCS 1 & 2, Labels for Gantries
MCX 0145	4	Installation Drawing NMCS 1 & 2, System Identification of Labels for Cabinets & Posts 75/85
MCX 0145	5	Installation Drawing NMCS, Type VI Label for Target Boards
MCX 0146	1	Installation Drawing NMCS, Cabinet 609/620 Set in Standard Motorway Fence
MCX 0147	1	Installation Drawing NMCS, Labels for Cables & Telephone Housing
MCX 0147	2	Installation Drawing NMCS, Telephone Instruction For Use Label
MCX 0148		Not Used
MCX 0149	1	Installation Drawing NMCS 1 & 2, Cabinet 609 - Typical Siting to Allow for Extra Cable Length
MCX 0149	2	Installation Drawing NMCS 1 & 2, Standard Transverse Cabling Arrangements at Cabinet Locations
MCX 0150	1	Installation Drawing NMCS 1 & 2, Cabinet 609 - Typical Siting to Allow for Extra Fibre Optic Cable Length
MCX 0151	1	Installation Drawing NMCS 1, Distributor 903B for Gantry Signals
MCX 0151	2	Installation Drawing NMCS 2, Data Link Connection Box Type 9903 for Gantry Signals
MCX 0151	3	Installation Drawing NMCS 2, Data Link Connection Box Type 9904 for Gantry Signals
MCX 0151	4	Installation Drawing NMCS 2, Data Link Connection Box Cable Pair Allocation
MCX 0151	5	Installation Drawing NMCS 2, 20/30 to 2 Pair Quad Cable Gland Conversion Kit
MCX 0151	6	Installation Drawing NMCS 2, Data Link Connection Box Type 9905 for Cantilever MS3 Signals
MCX 0151	7	Installation Drawing NMCS 2, Data Link Connection Box Type 9905 for Gantry Message Signs
MCX 0151	8	Installation Drawing NMCS 2, Data Link Connection Box Type 9903 for Cantilever Mk3 Signals



# LIST OF DRAWINGS

## SECTION 3

### NATIONAL MOTORWAY COMMUNICATIONS SYSTEM INSTALLATION DRAWINGS (*continued*)

Drg No.	Sheet No.	Title
MCX 0152	1	Installation Drawing NMCS 1, Distributor 902E & B (MK2) for Post Signals
MCX 0152	2	Installation Drawing NMCS 2, Data Link Connection Box Type 9902
MCX 0153	1	Installation Drawing, Layout of Communications Cabinets, Posts, Ducts & Hardstanding
MCX 0153	2	Installation Drawing NMCS 1 & 2, Communications Cable Trough Detail
MCX 0154	1	Installation Drawing NMCS, Typical Communications Cable Layout in Cabinet 609 (Plan View)
MCX 0155		Not Used
MCX 0156	1	Installation Drawing NMCS, Cabinet 600
MCX 0156	2	Installation Drawing NMCS, Cabinet 600, Cable Securing and Earthing Detail
MCX 0156	3	Installation Drawing NMCS 1, Cabinet 600, Wiring Details for Plessey TBU
MCX 0156	4	Installation Drawing NMCS 2, Cabinet 600 - Power Supply to PDU and Extended Mains Supply
MCX 0156	5	Installation Drawing NMCS 2, Cabinet 600 - Power Supply to PDU and Extended Mains Supply Alternative Arrangement for MS3
MCX 0157	1	Installation Drawing NMCS 2, Motorway Signals Interconnections of Equipment on Gantries (Config. P) (Type Numbers of Equipment Shown)
MCX 0157	2	Installation Drawing NMCS 2, Motorway Signals Interconnections of Equipment on Gantries (Config. P) (Type Numbers of Equipment Shown)
MCX 0157	3	Installation Drawing NMCS 2, Motorway Signals Interconnections of Equipment on Gantries (Config. F) (Type Numbers of Equipment Shown)
MCX 0157	4	Installation Drawing NMCS 2, Motorway Signals Interconnections of Equipment on Gantries (Config. F) (Type Numbers of Equipment Shown)
MCX 0157	5	Installation Drawing NMCS 2, Signals Interconnections of Equipment on Rural Sites (Config. P & F) (Type Numbers of Equipment Shown)
MCX 0157	6	Installation Drawing NMCS 2, Gantry Data Link Connection Boxes, Standard and Extension Arrangements
MCX 0158 to MCX 0159		Not Used
MCX 0160	1	Installation Drawing NMCS, Safety Barrier Protection of Cabinets - Guide
MCX 0161 to MCX 0162		Not Used
MCX 0163	1	Installation Drawing NMCS 1 & 2, Box Type 615B
MCX 0164	1	Installation Drawing NMCS 1 & 2, ESC Interface Cabinet, Layout for Non Transmission Station Locations
MCX 0164	2	Installation Drawing NMCS 1 & 2, ESC Interface Cabinet, Notes
MCX 0164	3	Installation Drawing NMCS 1 & 2, ESC Interface Cabinet, Parts List
MCX 0164	4	Installation Drawing NMCS 1 & 2, ESC Interface Cabinet, Layout for Transmission Station Locations
MCX 0165	1	Installation Drawing NMCS 1 & 2, Rural Power Cabinet, Typical Layout
MCX 0165	2	Installation Drawing NMCS 1 & 2, Rural Power Cabinet, Notes
MCX 0165	3	Installation Drawing NMCS 1 & 2, Rural Power Cabinet, Parts List
MCX 0165	4	Installation Drawing NMCS 1 & 2, Rural Power Cabinet, Rural Signal Interface
MCX 0166 to MCX 0169		Not Used
MCX 0170	1	Installation Drawing NMCS, Gantry Power Cabinet, Notes
MCX 0170	2	Installation Drawing NMCS, Gantry Power Cabinet, Circuit Diagrams
MCX 0170	3	Installation Drawing NMCS, Gantry Power Cabinet, Circuit Diagrams

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## SECTION 3

### NATIONAL MOTORWAY COMMUNICATIONS SYSTEM INSTALLATION DRAWINGS (*continued*)

Drg No.	Sheet No.	Title
MCX 0170	4	Installation Drawing NMCS, Gantry Power Cabinet, Standard Situation
MCX 0170	5	Installation Drawing NMCS, Cantilever Power Cabinet, Two Way Consumer Unit Arrangement
MCX 0170	6	Installation Drawing NMCS, Gantry Power Cabinet, Gantry with Auxiliary Supply
MCX 0170	7	Installation Drawing NMCS, Gantry Power Cabinet, Double Gantry (ESC Supply Side)
MCX 0170	8	Installation Drawing NMCS, Gantry Power Cabinet, Double Gantry
MCX 0170	9	Installation Drawing NMCS, Gantry Power Cabinet, Parts List
MCX 0171	1	Installation Drawing NMCS, Labels For Use on Electrical Switchgear Enclosures
MCX 0171	2	Installation Drawing NMCS, Parts
MCX 0172 to MCX 0305		Not Used
MCX 0306	1	Installation Drawing NMCS 1 & 2, Cabinet 617 Audio Transmission Stations
MCX 0306	2	Installation Drawing NMCS 1 & 2, Cabinet 617 Mini-Carrier Transmission Stations
MCX 0306	3	Installation Drawing NMCS 1 & 2, Cabinet 617 Labelling for Transmission Station
MCX 0307 to MCX 0336		Not Used
MCX 0337	1	Installation Drawing NMCS 1 & 2, Cabinet 600 Wiring
MCX 0337	2	Installation Drawing NMCS 1 & 2, Cabinet 600 Wiring for Interface Unit Type 2456
MCX 0337	3	Installation Drawing NMCS 1, Cabinet 600 (Pre 1974 only) Wiring for Interface Unit Type 2456
MCX 0337	4	Installation Drawing NMCS 1 & 2, Cabinet 600 Wiring for Interface Unit Type 9334
MCX 0337	5	Installation Drawing NMCS 2, MS3/Message Signs 600 Cabinet Termination NMCS 2 Control - Cantilever Sites
MCX 0337	6	Installation Drawing NMCS 2, MS3/Message Signs 600 Cabinet Termination NMCS 2 and Standalone Control - Cantilever Sites
MCX 0337	7	Installation Drawing NMCS 2, Message Signs 600 Cabinet Termination NMCS 2 Control - Gantry Sites
MCX 0337	8	Installation Drawing NMCS 2, Message Signs 600 Cabinet Termination Standalone Control Gantry Sites
MCX 0337	9	Installation Drawing NMCS, Parts
MCX 0337	10	Installation Drawing NMCS 1 & 2, TS Marshalling Cabinet 600 - 30 Pr Installation Notes
MCX 0337	11	Installation Drawing NMCS 1 & 2, TS Marshalling Cabinet 600 - 30 Pr Installation of Rear Frame
MCX 0338		Not Used
MCX 0339	1	Installation Drawing NMCS 2, MS3/Message Signs and Midas Box 615B Local Termination Arrangements
MCX 0339	2	Installation Drawing NMCS 2, MS3/Message Signs and Midas Box 615B Local Termination Arrangements
MCX 0339	3	Installation Drawing NMCS 2, MS3/Message Signs and Midas Box 615B Local Termination Arrangements
MCX 0339	4	Installation Drawing NMCS 2, MS3/Message Signs and Midas Box 615B Local Termination Arrangements
MCX 0340 to MCX 0425		Not Used

## LIST OF DRAWINGS

### SECTION 3

### NATIONAL MOTORWAY COMMUNICATIONS SYSTEM

### INSTALLATION DRAWINGS (*continued*)

Drg No.	Sheet No.	Title
MCX 0426	1	Installation Drawing, Transmission Wiring for Sector Switch and TLC (NMCS 2 Transmission Cabinet)
MCX 0426	2	Installation Drawing, Transmission Wiring for Sector Switch and TLC (NMCS 2 Transmission Cabinet)
MCX 0427 to MCX 0485		Not Used
MCX 0486	1	Installation Drawing NMCS 2, Cable Glands - Gland Types
MCX 0486	2	Installation Drawing NMCS, Cable Glands - Parts
MCX 0487 to MCX 0488		Not Used
MCX 0489	1	Installation Drawing, Cassette Termination Arrangement for Fibre Optic Communications Cables within Cabinet 609
MCX 0489	2	Installation Drawing, Cassette Termination Arrangement for Fibre Optic Communications Cables within Cabinet 609
MCX 0489	3	Installation Drawing, Cassette Termination Arrangement for Fibre Optic Communications Cables within Cabinet 609
MCX 0489	4	Installation Drawing, Cassette Termination Arrangement for Fibre Optic Communications Cables within Cabinet 609
MCX 0489	5	Installation Drawing, Cassette Termination Arrangement for Fibre Optic Communications Cables within Cabinet 609 Through and Local Sides
MCX 0489	6	Installation Drawing, Cassette Termination Arrangement for Fibre Optic Communications Cables within Cabinet 609
MCX 0489	7	Installation Drawing, Cassette Termination Arrangement for Fibre Optic Communications Cables 12 Fibre Armoured - 24 Fibre Unarmoured
MCX 0490	1	Installation Drawing, Termination Arrangement for Fibre Optic Cables Within Tx Stations and Control Office Buildings
MCX 0490	2	Installation Drawing, Termination Arrangement for Fibre Optic Communications Cables at Sites Without Computer Flooring
MCX 0490	3	Installation Drawing, Termination Arrangement for Fibre Optic Cables Within Tx Stations Control Office Buildings
MCX 0490	4	Installation Drawing, Termination Arrangement for Fibre Optic Communications Cables Within Tx Stations and Control Office Buildings
MCX 0490	5	Installation Drawing, Termination Arrangement for Fibre Optic Cables Within Tx Stations and Control Office Buildings
MCX 0491 to MCX 0508		Not Used
MCX 0509	1	Installation Drawing, Gantry Earthing and Bonding
MCX 0509	2	Installation Drawing NMCS 2, Typical Earth Bonding System for Gantry and Cantilever Structures
MCX 0510 to MCX 0514		Not Used
MCX 0515	1	Installation Drawing NMCS 2, Motorway VMS - Interconnection of Equipment on Gantries
MCX 0515	2	Installation Drawing NMCS 2, Motorway VMS - Interconnection of Equipment on 6 Lane Gantry & Single Sign
MCX 0515	3	Installation Drawing NMCS 2, Motorway VMS - Interconnection of Equipment on Posts

# LIST OF DRAWINGS

## SECTION 3

### NATIONAL MOTORWAY COMMUNICATIONS SYSTEM INSTALLATION DRAWINGS (*continued*)

Drg No.	Sheet No.	Title
MCX 0516 to MCX 0541		Not Used
MCX 0542	1	Installation Drawing, Cabinet 2303 - Terminations and Wiring (Transmission Station)
MCX 0542	2	Installation Drawing, Cabinet 2303 - Terminations and Wiring (Transmission Station) - Notes
MCX 0542	3	Installation Drawing, Cabinet 2303 - Terminations and Wiring (Control Office)
MCX 0542	4	Installation Drawing, Cabinet 2303 - Terminations and Wiring (Control Office) - Notes
MCX 0543	1	Installation Drawing, Cabinet 2304 - Cable Terminations
MCX 0544 to MCX 0551		Not Used
MCX 0552	1	Installation Drawing, Co-axial Cable Termination
MCX 0552	2	Installation Drawing, Co-axial Termination Component List
MCX 0553 to MCX 0559		Not Used
MCX 0560	1	Installation Drawing NMCS, Cabling Arrangement at Transmission Station Building Site
MCX 0561 to MCX 0564		Not Used
MCX 0565	1	Installation Drawing, Typical Layout for installing NMCS 2 Signal and Telephone Equipment within a Cabinet Type 600
MCX 0566	1	Installation Drawing NMCS 2, Showing Details of Providing Power from a Motorway Site to an All-Purpose Road Installation
MCX 0567 to MCX 0574		Not Used
MCX 0575	1	Installation Drawing, Typical 15 Metre and 10 Metre CCTV Mast and Cabinet Base with Paved Area
MCX 0576 to MCX 0581		Not Used
MCX 0582	1	Installation Drawing NMCS 2, Message Signs and Motorway Signals Mk3 Preferred Outstation Layout
MCX 0582	2	Installation Drawing NMCS 2, Message Signs and Motorway Signals Mk3 Preferred Highload Route Outstation Layout
MCX 0582	3	Installation Drawing NMCS 2, Message Signs and Motorway Signals Mk3 Preferred Outstation Layout for Restricted Space
MCX 0583	1	Installation Drawing NMCS 2, Motorway Signals Mk3 Cantilever Structures - Notes
MCX 0583	2	Installation Drawing NMCS 2, Motorway Signals Mk3 (3x18) Structures - Cantilever Elevation
MCX 0583	3	Installation Drawing NMCS 2, Motorway Signals Mk3 (3x18) Cantilever Structures - Sectional Plan at Walkway Level
MCX 0583	4	Installation Drawing NMCS 2, Motorway Signals Mk3 (3x18) Cantilever Structures - Typical Cross Section Through Walkway
MCX 0583	5	Installation Drawing NMCS 2, Motorway Signals Mk3 (2x16) Cantilever Structures - Cantilever Elevation
MCX 0583	6	Installation Drawing NMCS 2, Motorway Signals Mk3 (2x16) Cantilever Structures - Sectional Plan at Walkway Level

## LIST OF DRAWINGS

### SECTION 3

### NATIONAL MOTORWAY COMMUNICATIONS SYSTEM

### INSTALLATION DRAWINGS (*continued*)

Drg No.	Sheet No.	Title
MCX 0583	7	Installation Drawing NMCS 2, Motorway Signals Mk3 (2x16) Cantilever Structures - Typical Cross Section Through Walkway
MCX 0583	8	Installation Drawing NMCS 2, Motorway Signals Mk3 (2x16 & 3x18) Cantilever Structures - HD Arrangements
MCX 0583	9	Installation Drawing NMCS 2, Motorway Signals Mk3 (2x16 & 3x18) Cantilever Coupling - Casting Template
MCX 0583	10	Installation Drawing NMCS 2, Motorway Signals Mk3 (2x16 & 3x18) Cantilever Structures - HD Arrangement
MCX 0583	11	Installation Drawing NMCS 2, Motorway Signals Mk3 (2x16 & 3x18) Cantilever Structures - Standard Column
MCX 0583	12	Installation Drawing NMCS 2, Motorway Signals Mk3 (2x16 & 3x18) Holding Down Arrangement Coupler Detail
MCX 0584	1	Installation Drawing NMCS 2, Message Signs on Portal Gantries General Conceptual Metalwork
MCX 0584	2	Installation Drawing NMCS 2, Message Signs on Portal Gantries (Structure/Sign Interface)
MCX 0584	3	Installation Drawing NMCS 2, Message Signs - Alterations to HA Standard, Portal Gantries of 19 to 21m Span, Steelwork at Left Hand End
MCX 0584	4	Installation Drawing NMCS 2, Message Signs - Alterations to HA and SERO Standard, Portal Gantries of 23 to 35m Span, Steelwork at Left Hand End
MCX 0584	5	Installation Drawing NMCS 2, Message Signs - Alterations to HA and SERO Standard, Portal Gantries of 23 to 35m Span, Steelwork in Mid Span
MCX 0584	6	Installation Drawing NMCS 2, Message Signs - Standard Details Page 1 of 2
MCX 0584	7	Installation Drawing NMCS 2, Message Signs - Standard Details Page 2 of 2
MCX 0584	8	Installation Drawing NMCS 2, Message Signs - Alterations to HA Standard, Portal Gantries of 19 to 35m Span, Alterations to Sign Support Steelwork Page 1 of 2
MCX 0584	9	Installation Drawing NMCS 2, Message Signs - Alterations to HA Standard, Portal Gantries of 19 to 35m Span, Alterations to Sign Support Steelwork Page 2 of 2
MCX 0584	10	Installation Drawing NMCS 2, Message Signs - General Notes
MCX 0585 to MCX 0586		Not Used
MCX 0587	1	Installation Drawing, PW Interface Cabinet - Typical Arrangement for PSTN Connection Only, Non Armoured Cable
MCX 0587	2	Installation Drawing, PW Interface Cabinet - Typical Arrangement for PSTN Connection Only, Armoured Cable
MCX 0587	3	Installation Drawing, PW Interface Cabinet - Typical Arrangement for Private Wire Rented Circuit
MCX 0587	4	Installation Drawing, PW Interface Cabinet - Typical Arrangement for 2Mbt/s Private Rented Circuit
MCX 0588 to MCX 0589		Not Used
MCX 0590	1	Installation Drawing NMCS 2, Motorway Signal Mk3, Cantilever Site - Typical Arrangement
MCX 0591	1	Installation Drawing NMCS 2, Message Signs Portal Gantry Site with Lane Signalling - Typical Arrangement
MCX 0592	1	Installation Drawing NMCS 2, Midas Loops - Feeder Cable Joint
MCX 0592	2	Installation Drawing NMCS 2, Midas Outstation - Typical Arrangement



# LIST OF DRAWINGS

## SECTION 3

### NATIONAL MOTORWAY COMMUNICATIONS SYSTEM INSTALLATION DRAWINGS (*continued*)

Drg No.	Sheet No.	Title
MCX 0592	3	Installation Drawing NMCS 2, Midas Outstation - Typical Arrangement where more than 20 Loops per Site Exist
MCX 0592	4	Installation Drawing NMCS 2, Midas Outstation - Typical Arrangement where more than 20 Loops per Site Exist with MIDAS Transponder
MCX 0593		Not Used
MCX 0594	1	Installation Drawing NMCS 2, Midas Outstation, 600 Cabinet Arrangement
MCX 0594	2	Installation Drawing NMCS 2, Midas Transponder and Outstation 600 Cabinet Arrangement
MCX 0594	3	Installation Drawing NMCS 2, Midas System 600 Cabinet Feeder Cable Termination Examples
MCX 0594	4	Installation Drawing NMCS 2, Midas Transponder and Outstation Lightning Protection Unit Positioning
MCX 0595 to MCX 0601		Not Used
MCX 0602	1	Installation Drawing NMCS 2, Security Strap for Cabinet 600
MCX 0602	2	Installation Drawing NMCS 2, Security Strap for Cabinet 609
MCX 0603 to MCX 0722		Not Used
MCX 0723	1	Installation Drawing, Camera Site - Cabinet Layout
MCX 0723	2	Installation Drawing, Camera Site - Duct Arrangement
MCX 0723	3	Installation Drawing, Camera Site - Earthing Arrangement
MCX 0724 to MCX 0799		Not Used
MCX 0800	1	Installation Drawing NMCS (Ducted Cable), Network Design Typical Outstation Layout (Post Signals)
MCX 0800	2	Installation Drawing NMCS (Ducted Cable), Network Design Typical Outstation Layout (Gantry Signal)
MCX 0800	3	Installation Drawing NMCS (Ducted Cable), Network Design MCX 0800 Series Drawings
MCX 0801	1	Installation Drawing NMCS (Ducted Cable), Schematic Layout Emergency Telephone Sites
MCX 0801	2	Installation Drawing NMCS (Ducted Cable), Schematic Layout Post Mounted Signal Sites
MCX 0801	3	Installation Drawing NMCS (Ducted Cable), Schematic Layout Gantry and Cantilever Sites
MCX 0801	4	Installation Drawing NMCS (Ducted Cable), Schematic Layout, MIDAS Sites
MCX 0801	5	Installation Drawing NMCS (Ducted Cable), Schematic Layout, CCTV Sites
MCX 0802	1	Installation Drawing NMCS (Ducted Cable), Interface with Non Ducted Network, General Arrangement
MCX 0803 to MCX 0809		Not Used
MCX 0810	1	Installation Drawing NMCS (Ducted Cable), Network Ducts, Sections
MCX 0810	2	Installation Drawing NMCS (Ducted Cable), Network Ducts, Plan View
MCX 0810	3	Installation Drawing NMCS (Ducted Cable), Network Ducts, Deep Traverse Ducts
MCX 0811	1	Installation Drawing NMCS (Ducted Cable), Local Ducts To Cabinet Sites
MCX 0811	2	Installation Drawing NMCS (Ducted Cable), Local Ducts, Connections to Post Signals
MCX 0811	3	Installation Drawing NMCS (Ducted Cable), Local Ducts, Connection to Telephones

# LIST OF DRAWINGS

## SECTION 3

### NATIONAL MOTORWAY COMMUNICATIONS SYSTEM INSTALLATION DRAWINGS (*continued*)

Drg No.	Sheet No.	Title
MCX 0811	4	Installation Drawing NMCS (Ducted Cable), Local Ducts, Connection to Gantries and Cantilevers
MCX 0812	1	Installation Drawing NMCS (Ducted Cable), Cabinet Arrangements, General Layout
MCX 0812	2	Installation Drawing NMCS (Ducted Cable), Cabinet Arrangements, Plinth Details
MCX 0813	1	Installation Drawing NMCS (Ducted Cable), Transmission Stations, Chamber and Cabinet Arrangements
MCX 0814	1	Installation Drawing NMCS (Ducted Cable), Duct Installation, Longitudinal Ducts
MCX 0814	2	Installation Drawing NMCS (Ducted Cable), Duct Installation, Local Ducts
MCX 0814	3	Installation Drawing NMCS (Ducted Cable), Duct Installation, Transverse Ducts
MCX 0814	4	Installation Drawing NMCS (Ducted Cable), Duct Installation, Spacer and Strapping
MCX 0814	5	Installation Drawing NMCS (Ducted Cable), Duct Installation, Mechanical Duct Plug
MCX 0815	1	Installation Drawing NMCS (Ducted Cable), Chambers, Type A
MCX 0815	2	Installation Drawing NMCS (Ducted Cable), Chambers, Cable Supports for Type A
MCX 0815	3	Installation Drawing NMCS (Ducted Cable), Chambers, Type B
MCX 0815	4	Installation Drawing NMCS (Ducted Cable), Chambers, Type C
MCX 0816 to MCX 0819		Not Used
MCX 0820	1	Installation Drawing NMCS (Ducted Cable), Cable Joint Enclosure (CJE) -General Details
MCX 0821	1	Installation Drawing NMCS (Ducted Cable), Cable Joint Enclosure (CJE) - Layout Longitudinal Cable Joint
MCX 0821	2	Installation Drawing NMCS (Ducted Cable), Cable Joint Enclosure (CJE) - Layout Local Cable Joint
MCX 0821	3	Installation Drawing NMCS (Ducted Cable), Cable Joint Enclosure (CJE) - Layout Cable Joints RSI, HFC and T
MCX 0821	4	Installation Drawing NMCS (Ducted Cable), Cable Joint Enclosure (CJE) - Layout Fibre Optic Cable Joint
MCX 0822	1	Installation Drawing NMCS (Ducted Cable), CJE Internal Wiring Schematic Type 15-1 Unloaded Longitudinal Cable
MCX 0822	2	Installation Drawing NMCS (Ducted Cable), CJE Internal Wiring Schematic Type 15-2 Longitudinal Cable
MCX 0822	3	Installation Drawing NMCS (Ducted Cable), CJE Internal Wiring Schematic Type 15-3 Longitudinal Cable
MCX 0822	4	Installation Drawing NMCS (Ducted Cable), CJE Internal Wiring Schematic Type 15-4 Longitudinal Cable
MCX 0822	5	Installation Drawing NMCS (Ducted Cable), CJE Internal Wiring Schematic Local Cable Joint
MCX 0822	6	Installation Drawing NMCS (Ducted Cable), CJE Internal Wiring Schematic RSI, HFC, T
MCX 0823	1	Installation Drawing NMCS (Ducted Cable), CJE External Wiring Longitudinal Cable Joint
MCX 0823	2	Installation Drawing NMCS (Ducted Cable), CJE External Wiring Local Cable Joint
MCX 0823	3	Installation Drawing NMCS (Ducted Cable), CJE External Wiring Multipurpose Cable Joint - RSI and T
MCX 0823	4	Installation Drawing NMCS (Ducted Cable), CJE External Wiring Multipurpose Cable Joint - HFC

# LIST OF DRAWINGS

## SECTION 3

### NATIONAL MOTORWAY COMMUNICATIONS SYSTEM

#### INSTALLATION DRAWINGS (*continued*)

Drg No.	Sheet No.	Title
MCX 0824	1	Installation Drawing NMCS (Ducted Cable), Cable Joint Enclosure (CJE) Cable Pair Allocation
MCX 0825 to MCX 0829		Not Used
MCX 0830	1	Installation Drawing NMCS (Ducted Cable), 600/609/620 Cabinets General Installation Details
MCX 0831	1	Installation Drawing NMCS (Ducted Cable), 600 Cabinet Fitting Out Details, Termination Frame
MCX 0832	1	Installation Drawing NMCS (Ducted Cable), 600 Cabinet - Internal Wiring Details
MCX 0832	2	Installation Drawing NMCS (Ducted Cable), 600 Cabinet - Internal Wiring Schedule
MCX 0833	1	Installation Drawing NMCS (Ducted Cable), 600 Cabinet - External Wiring IDC Terminations
MCX 0833	2	Installation Drawing NMCS (Ducted Cable), 600 Cabinet - External Wiring MIDAS Loop Feeder Cable Terminations
MCX 0834	1	Installation Drawing NMCS (Ducted Cable), 600 Cabinet Equipment Configuration, Transponder (Signals Only)
MCX 0834	2	Installation Drawing NMCS (Ducted Cable), 600 Cabinet Equipment Configuration, Responder Only
MCX 0834	3	Installation Drawing NMCS (Ducted Cable), 600 Cabinet Equipment Configuration, Transponder and Responder
MCX 0834	4	Installation Drawing NMCS (Ducted Cable), 600 Cabinet Equipment Configuration, MIDAS Detector
MCX 0834	5	Installation Drawing NMCS (Ducted Cable), 600 Cabinet Equipment Configuration, MIDAS Transponder and Detector
MCX 0834	6	Installation Drawing NMCS (Ducted Cable), 600 Cabinet Equipment Configuration, MIDAS Detector and Transponder (Signals Only)
MCX 0834	7	Installation Drawing NMCS (Ducted Cable), 600 Cabinet Equipment Configuration, Gantry - NMCS 2 Control
MCX 0834	8	Installation Drawing NMCS (Ducted Cable), 600 Cabinet Equipment Configuration, Gantry - Standalone Control
MCX 0834	9	Installation Drawing NMCS (Ducted Cable), 600 Cabinet Equipment Configuration, MS3 Cantilever - NMCS 2 Control
MCX 0834	10	Installation Drawing NMCS (Ducted Cable), 600 Cabinet Equipment Configuration, MS3 Cantilever - Standalone Control
MCX 0835 to MCX 0850		Not Used
MCX 0851	1	Installation Drawing NMCS (Ducted Cable), 40 Pair to 30 Pair Interface, Notes
MCX 0851	2	Installation Drawing NMCS (Ducted Cable), 40 Pair to 30 Pair Interface Internal Wiring Schematic
MCX 0851	3	Installation Drawing NMCS (Ducted Cable), 40 Pair to 30 Pair Interface External Cabling 40 Pair
MCX 0851	4	Installation Drawing NMCS (Ducted Cable), 40 Pair to 30 Pair Interface External Cabling 30 Pair
MCX 0852	1	Installation Drawing NMCS (Ducted Cable) Interface Arrangements, Fibre Interface
MCX 0853	1	Installation Drawing NMCS (Ducted Cable), Marshalling Cabinet - TS Building, Notes
MCX 0853	2	Installation Drawing NMCS (Ducted Cable), Marshalling Cabinet - TS Building Cabinet 600/620 Rear



# LIST OF DRAWINGS

## SECTION 3

### NATIONAL MOTORWAY COMMUNICATIONS SYSTEM INSTALLATION DRAWINGS (*continued*)

Drg No.	Sheet No.	Title
MCX 0853	3	Installation Drawing NMCS (Ducted Cable), Marshalling Cabinet - TS Building Cabinet 620 Front
MCX 0854	1	Installation Drawing NMCS (Ducted Cable), Marshalling Cabinet 617 Site, Notes
MCX 0854	2	Installation Drawing NMCS (Ducted Cable), Marshalling Cabinet 617 Site, Cabinet 600/620 Rear
MCX 0854	3	Installation Drawing NMCS (Ducted Cable), Marshalling Cabinet 617 Site, Cabinet 600/620 External Cabling
MCX 0855 to MCX 0860		Not Used
MCX 0861	1	Installation Drawing NMCS (Ducted Cable), Transmission Station Cabinet 2303 Notes (1 of 2)
MCX 0861	2	Installation Drawing NMCS (Ducted Cable), Transmission Station Cabinet 2303 Notes (2 of 2)
MCX 0861	3	Installation Drawing NMCS (Ducted Cable), Transmission Station Cabinet 2303 Terminations & Wiring
MCX 0862	1	Installation Drawing NMCS (Ducted Cable), Control Office Cabinet 2303 Notes (1 of 2)
MCX 0862	2	Installation Drawing NMCS (Ducted Cable), Control Office Cabinet 2303 Notes (2 of 2)
MCX 0862	3	Installation Drawing NMCS (Ducted Cable), Control Office Cabinet 2303 Terminations and Wiring
MCX 0863	1	Installation Drawing NMCS (Ducted Cable), Control Office Cabinet 2304 Terminations and Wiring
MCX 0864	1	Installation Drawing NMCS (Ducted Cable), Fibre Optic Distribution Rack (ODF) Notes
MCX 0864	2	Installation Drawing NMCS (Ducted Cable), Fibre Optic Distribution Rack (ODF) Suspended Floor (Non Armoured Cable)
MCX 0864	3	Installation Drawing NMCS (Ducted Cable), Fibre Optic Distribution Rack (ODF) Solid Floor (Non Armoured Cable)
MCX 0864	4	Installation Drawing NMCS (Ducted Cable), Fibre Optic Distribution Rack (ODF) Armoured and Non Armoured Cable
MCX 0864	5	Installation Drawing NMCS (Ducted Cable), Fibre Optic Distribution Rack (ODF) Carrier and Coaxial Termination Frame
MCX 0864	6	Installation Drawing NMCS (Ducted Cable), Fibre Optic Distribution Rack (ODF) Fibre Optic Distribution Tray
MCX 0864	7	Installation Drawing NMCS (Ducted Cable), Fibre Optic Distribution Rack (ODF) Parts List
MCX 0865 to MCX 0870		Not Used
MCX 0871	1	Installation Drawing NMCS (Ducted Cable), Cable Termination and Continuity Kit
MCX 0871	2	Installation Drawing NMCS (Ducted Cable), Cable Termination and Continuity Kit
MCX 0871	3	Installation Drawing NMCS (Ducted Cable), Cable Termination and Continuity Kit
MCX 0872	1	Installation Drawing NMCS (Ducted Cable), Cable Installation, Cable Marking
MCX 0873	1	Installation Drawing NMCS (Ducted Cable), Cable Management, Joint Chamber
MCX 0873	2	Installation Drawing NMCS (Ducted Cable), Cable Management, Details
MCX 0874 to MCX 0898		Not Used

## LIST OF DRAWINGS

### SECTION 3

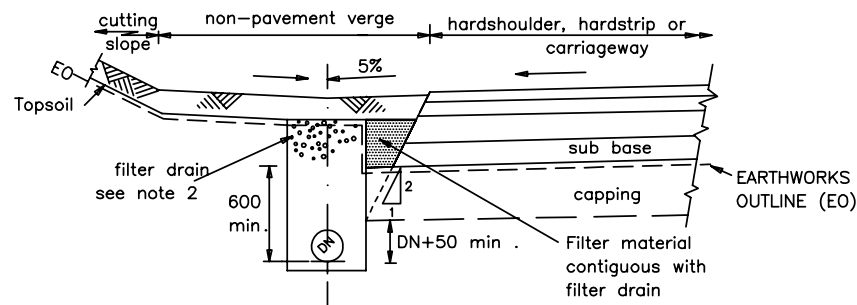
### NATIONAL MOTORWAY COMMUNICATIONS SYSTEM

### INSTALLATION DRAWINGS (*continued*)

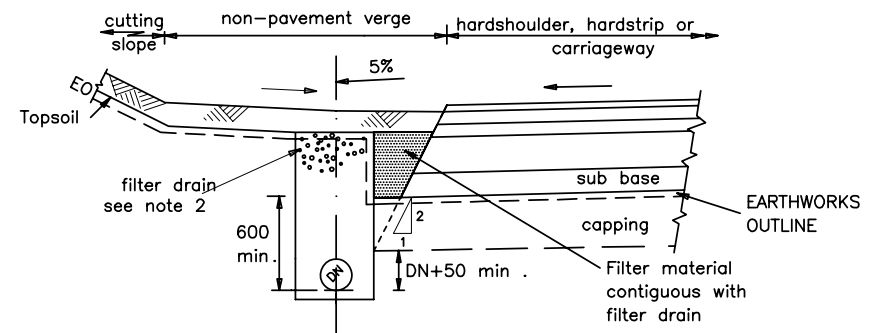
Drg No.	Sheet No.	Title
MCX 0899	1	Installation Drawing NMCS (Ducted Cable), Modification To Termination Frame, 600 Cabinet
MCX 0900 to MCX 1021		Not Used
MCX 1022	1	Installation Drawing NMCS2 Indicator Type 94XX Matrix Indicator (Including Signal Driver) Gantry D.L.C.B Standard & Extension Arrangements
MCX 1022	2	Installation Drawing NMCS2 Type 94XX Matrix Indicator (Including Signal Driver) Motorway Signals Interconnections of Equipment on Gantries
MCX 1022	3	Installation Drawing - NMCS2 Type 94XX Matrix Indicator (Including Signal Driver) Motorway Signals Interconnections of Equipment on Gantries
MCX 1022	4	Installation Drawing NMCS2 Type 94XX Matrix Indicator (Including Signal Driver) Motorway Signal Interconnections of Equipment on Rural Sites
MCX 1022	5	Installation Drawing NMCS2 Type 94XX Matrix Indicator (Including Signal Driver) Aspects
MCX 1023 to MCX 1025		Not Used
MCX 1026	1	Installation Drawing NMCS2 NOMAD Additional Asset Data NOMAD Duct Barcode Label Mounting Plate
MCX 1026	2	Installation Drawing NMCS2 NOMAD Additional Asset Data NOMAD Communications Asset Barcode Labels
MCX 1026	3	Installation Drawing NMCS2 NOMAD Additional Asset Data NOMAD Labels Placement in Typical Joint Chamber
MCX 1026	4	Installation Drawing NMCS2 NOMAD Additional Asset Data NOMAD Labels Placement in Typical Box 615
MCX 1027 to MCX 1029		Not Used
MCX 1030	1	Installation Drawing Unarmoured Copper Above Ground Cable Joint - General Notes and Cable Pair Allocation'
MCX 1030	2	Installation Drawing: Unarmoured Copper Above Ground Cable Joint - Telephone Sites - Schematic Layout
MCX 1030	3	Installation Drawing: Unarmoured Copper Above Ground Cable Joint - Signal Post Sites - Schematic Layout
MCX 1030	4	Installation Drawing: Unarmoured Copper Above Ground Cable Joint - Central Reserve and Entry Slip Signal Sites - Schematic Layout
MCX 1030	5	Installation Drawing: Unarmoured Copper Above Ground Cable Joint - Portal and Cantilever Sites - Schematic Layout
MCX 1030	6	Installation Drawing: Unarmoured Copper Above Ground Cable Joint - MIDAS Sites - Schematic Layout'
MCX 1030	7	Installation Drawing: Unarmoured Copper and Fibre Above Ground Cable Joint - CCTV Sites- Schematic Layout
MCX 1030	8	Installation Drawing: Unarmoured Copper and Fibre Above Ground Cable Joint - Dual Cabinet Sites Layout
MCX 1030	9	Installation Drawing: Unarmoured Copper and Fibre Above Ground Cable Joint - Multiple Cabinet Sites Layout
MCX 1030	10	Installation Drawing: Unarmoured Copper and Fibre Above Ground Cable Joint - Verges of Less Than 3.5 m - Multiple Cabinet Sites
MCX 1030	11	Installation Drawing: Unarmoured Copper and Fibre Above Ground Cable Joint - Interconnection details between cabinet 600 and AGCJ

**LIST OF DRAWINGS**  
**SECTION 3**  
**NATIONAL MOTORWAY COMMUNICATIONS SYSTEM**  
**INSTALLATION DRAWINGS (*continued*)**

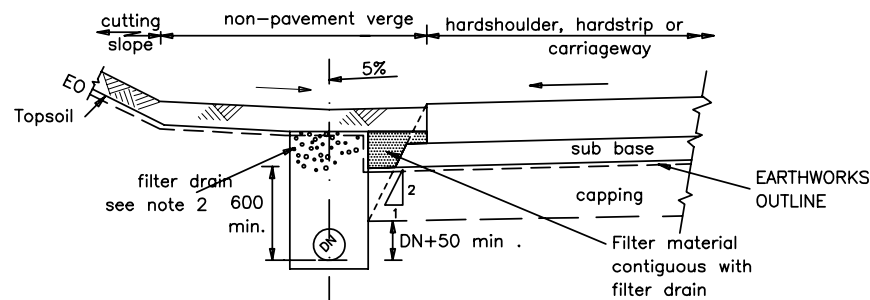
Drg No.	Sheet No.	Title
MCX 1030	12	Installation Drawing: Unarmoured Copper and Fibre Above Ground Cable Joint - Interconnection details between cabinet 600 ST and AGCJ
MCX 1030	13	Installation Drawing: Unarmoured Copper and Fibre Above Ground Cable Joint - Interconnection details between cabinet 600 TR and AGCJ
MCX 1030	14	Installation Drawing: Unarmoured Copper and Fibre Above Ground Cable Joint - Interconnection details between cabinet 600 ST and TR and AGCJ
MCX 1030	15	Installation Drawing: Unarmoured Copper and Fibre Above Ground Cable Joint - Interconnection details between cabinet 600 MD and AGCJ
MCX 1030	16	Installation Drawing: Unarmoured Copper and Fibre Above Ground Cable Joint - Interconnection details between cabinet 600 MT/MD and AGCJ
MCX 1030	17	Installation Drawing: Unarmoured Copper and Fibre Above Ground Cable Joint - Interconnection details between cabinet 600 ST/MD and AGCJ
MCX 1030	18	Installation Drawing: Unarmoured Copper and Fibre Above Ground Cable Joint - Interconnection details between cabinet 600 MS and AGCJ



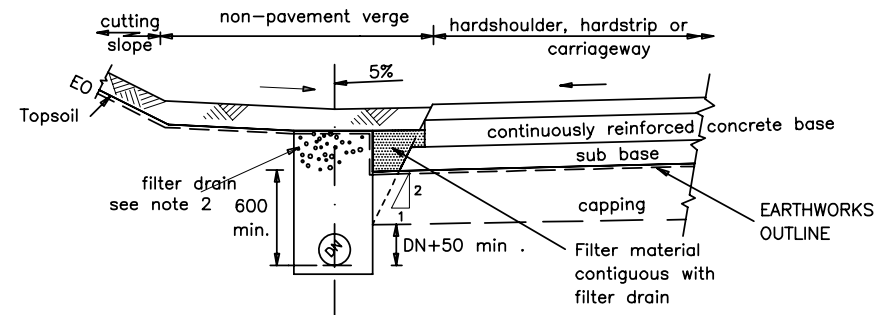
Type 1A (Flexible carriageway).



Type 1C (Flexible composite carriageway).



Type 1B (Rigid carriageway).



Type 1D (Rigid composite carriageway).

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Alternative treatments to top of filter drains are shown on Drawing No. B15. Type V is shown on this Drawing.
3. 'DN' represents nominal diameter of the pipe.
4. Pipes shall be laid to the levels shown on the Drawings and schedules.

HIGHWAY CONSTRUCTION DETAILS

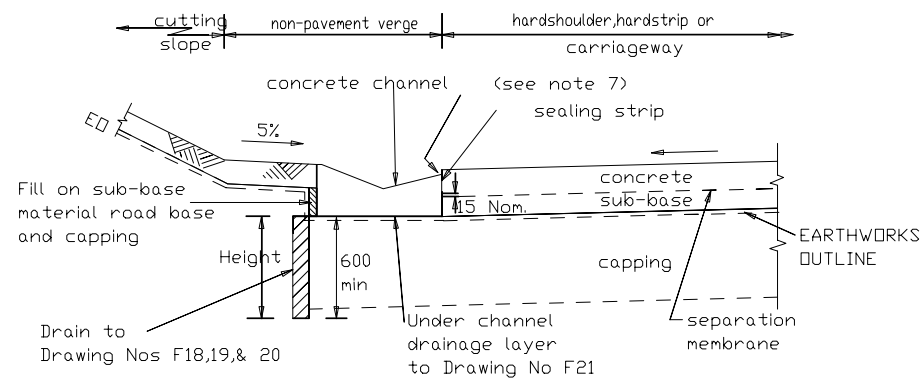
EDGE OF PAVEMENT  
DETAILS

B	MAY 06
A	DEC 91
Issue	Date

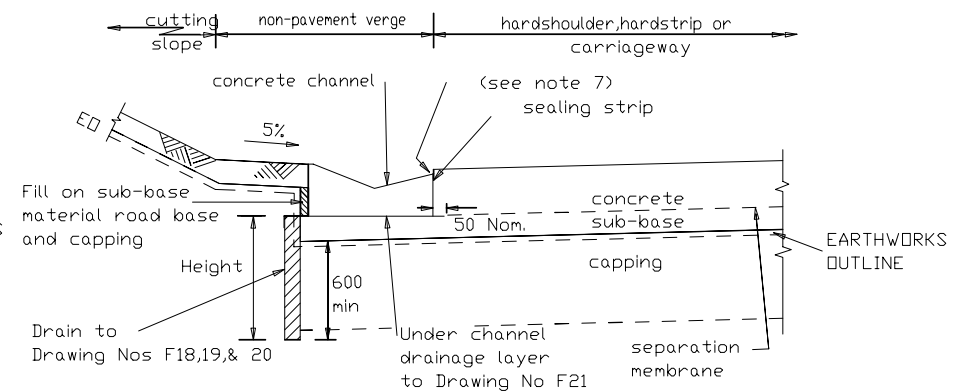
CUTTINGS – COMBINED SURFACE WATER  
AND GROUND WATER FILTER DRAINS

Drawing No.

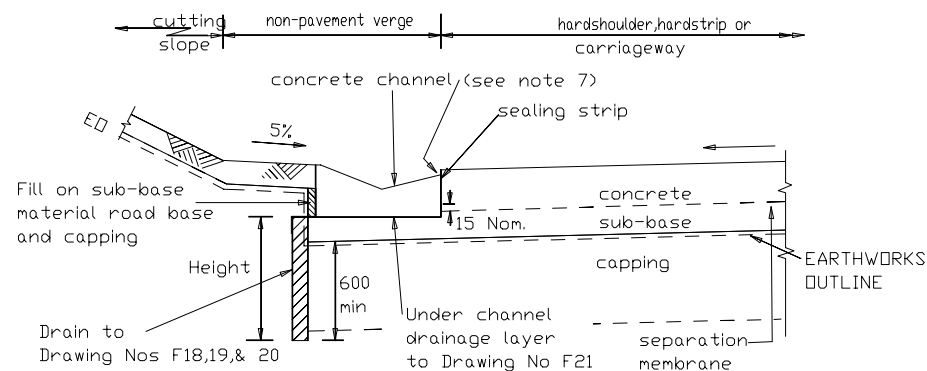
B1



TYPE 2A  
(Channel formed on capping or formation layer)



TYPE 2C  
(Channel formed on sub-base layer)



TYPE 2B  
(Channel base formed within sub-base layer)

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES. These details also apply to rigid composite carriageway with any necessary modifications.
2. For details of concrete channel see Drawing No B14.
3. The sealing strip and the vertical part of under channel drainage layer shown for when channel is cast before pavement. They shall be fixed to pavement edge when pavement cast before channel.
4. Sealing strip to be to Clause 1014 of S.H.W.
5. For details of under-channel drainage layer see Drawing No F21.
6. Channels may be freestanding or cast in one with the pavement. In the latter case the requirements of NOTES 3 & 4 may be ignored. Transverse joints in carriageway slabs shall be continued through channel sections cast in one with the slab.
7. Notwithstanding other tolerances in the Specification, the finished level of the channel shall not be higher nor more than 10mm lower than the finished level of the edge of the adjacent carriageway.

HIGHWAY CONSTRUCTION DETAILS

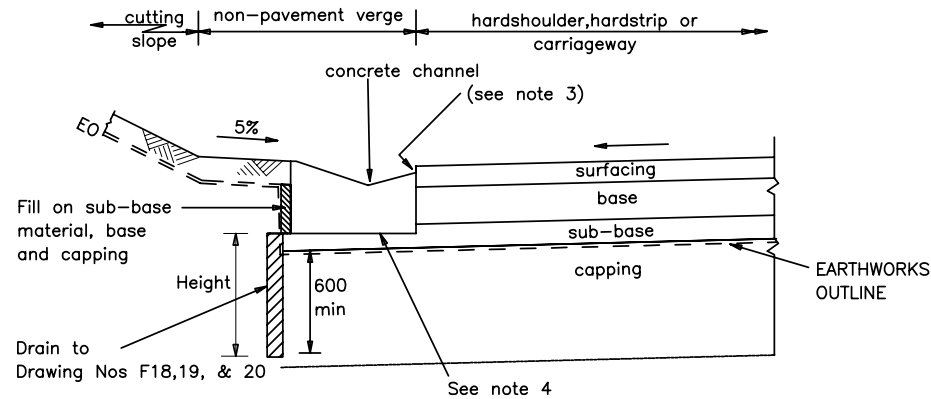
EDGE OF PAVEMENT  
DETAILS

B	AUG 93
A	DEC 91
Issue	Date

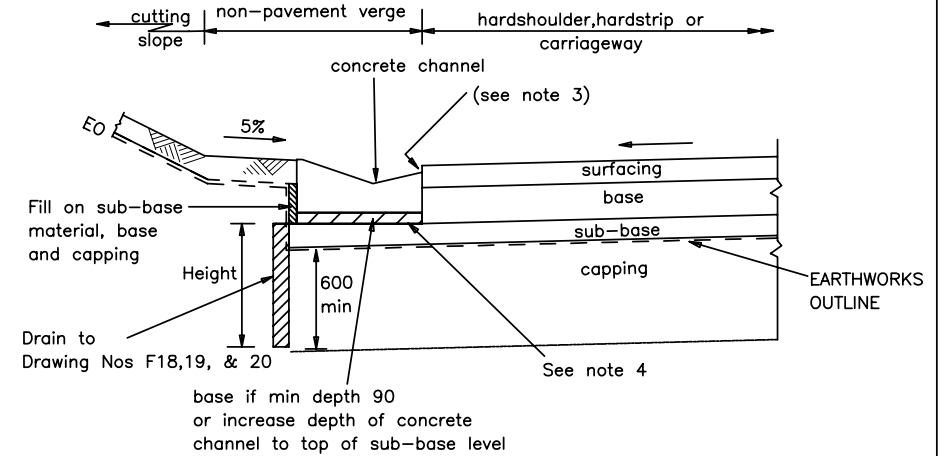
CUTTINGS - SURFACE  
WATER CHANNEL FOR RIGID  
CARRIAGEWAY

Drawing No.

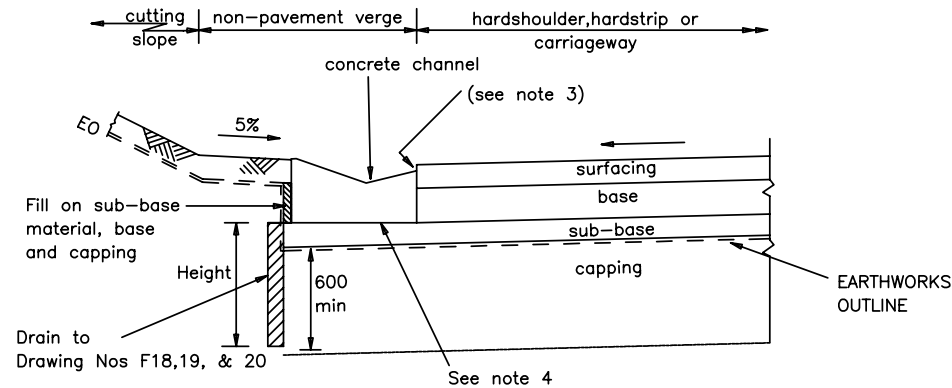
B2



TYPE 3A  
(Channel base formed within sub-base layer)



TYPE 3C  
(Channel base formed on first base layer)



TYPE 3B  
(Channel base formed on the sub-base layer)

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.  
These details also apply to flexible composite carriageway with any necessary modifications.
2. For details of concrete channel see Drawing No B14.
3. Notwithstanding other tolerances in the Specification the finished level of the channel shall not be higher nor more than 10mm lower than the finished level of the adjacent carriageway.
4. Where used in conjunction with thin surfacing the under drainage detail shown in F21 shall apply in full.

HIGHWAY CONSTRUCTION DETAILS

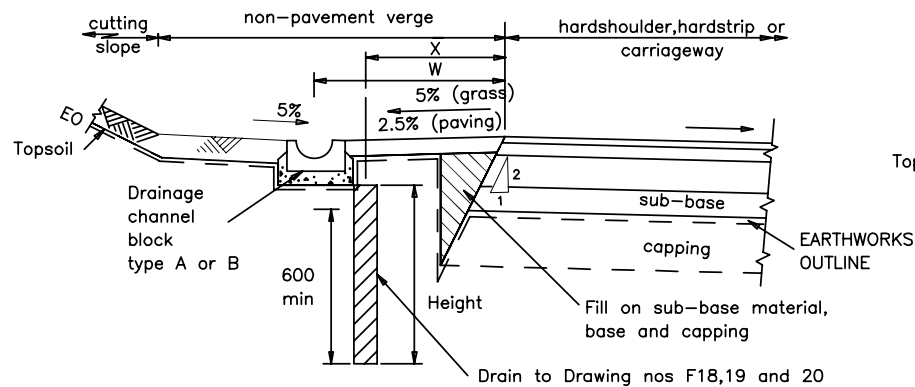
EDGE OF PAVEMENT  
DETAILS

C	MAY 02
B	AUG 93
A	DEC 91
Issue	Date

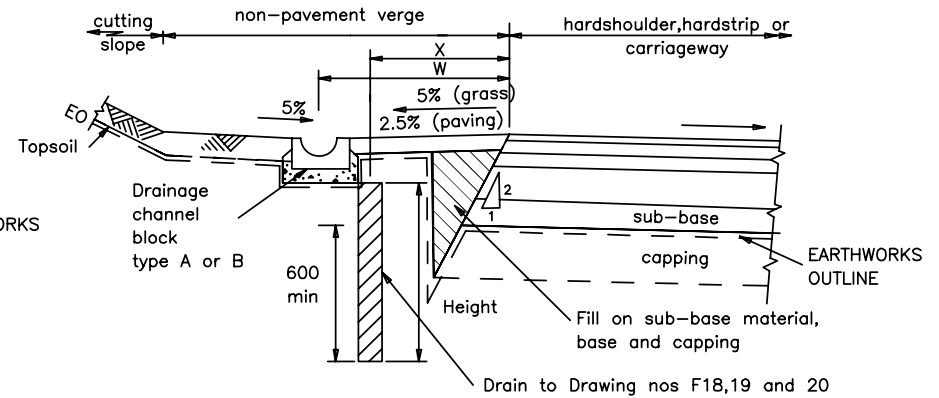
CUTTINGS – SURFACE  
WATER CHANNEL FOR FLEXIBLE  
CARRIAGEWAY

Drawing No.

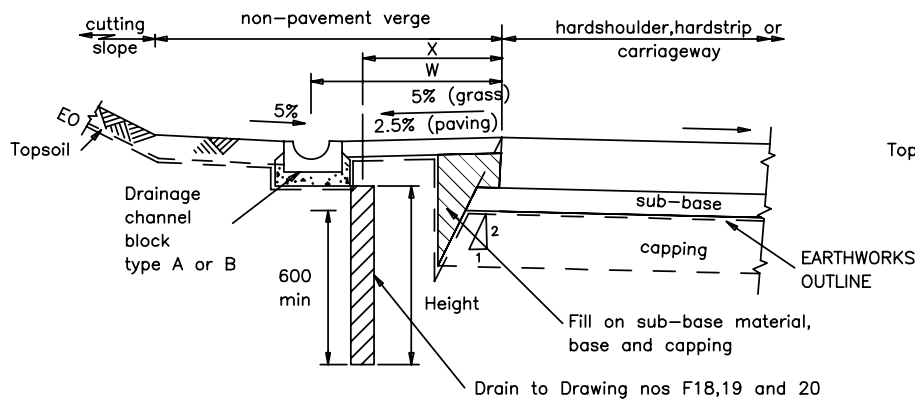
B3



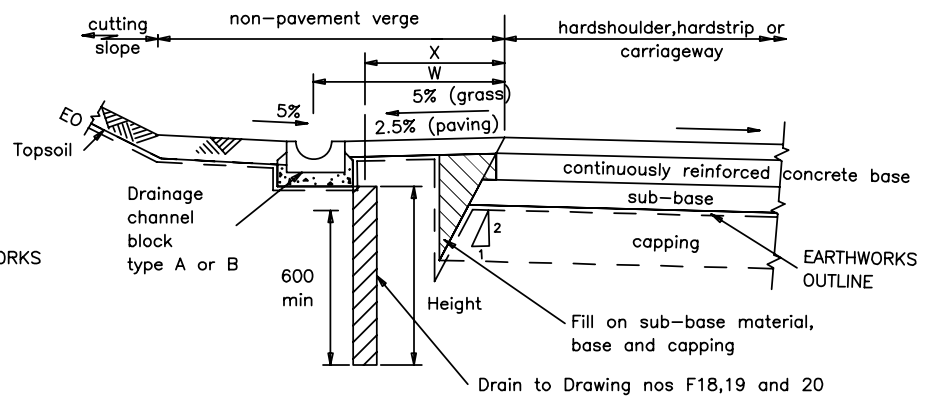
Type 4A (Flexible carriageway).



Type 4C (Flexible composite carriageway).



Type 4B (Rigid carriageway).



Type 4D (Rigid composite carriageway).

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.

2. Dimensions X & W to be as described in Appendix 5/3.

3. Topsoil or paving in verges shall be as described in Appendix 5/3.

4. For details of channel blocks A and B see Drawing No. F15.

HIGHWAY CONSTRUCTION DETAILS

EDGE OF PAVEMENT  
DETAILS

C	MAY 06
B	MAY 02
A	DEC 91
Issue	Date

CUTTINGS – DRAINAGE  
CHANNEL BLOCKS AND DRAINS

Drawing No.

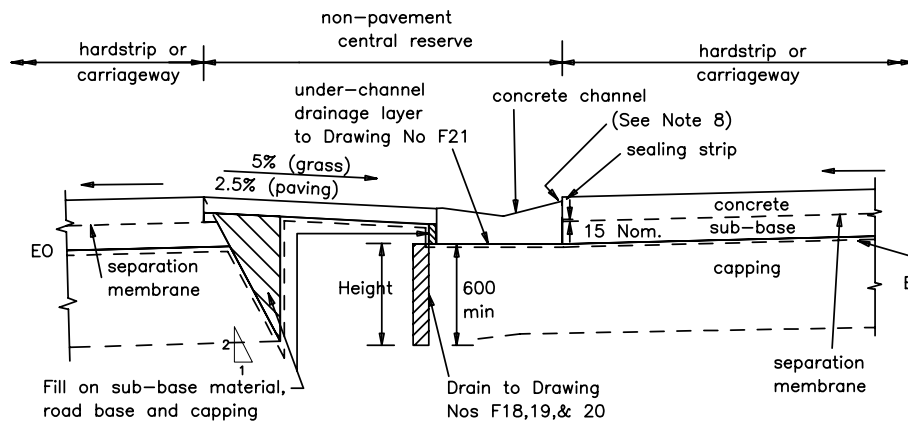
B4



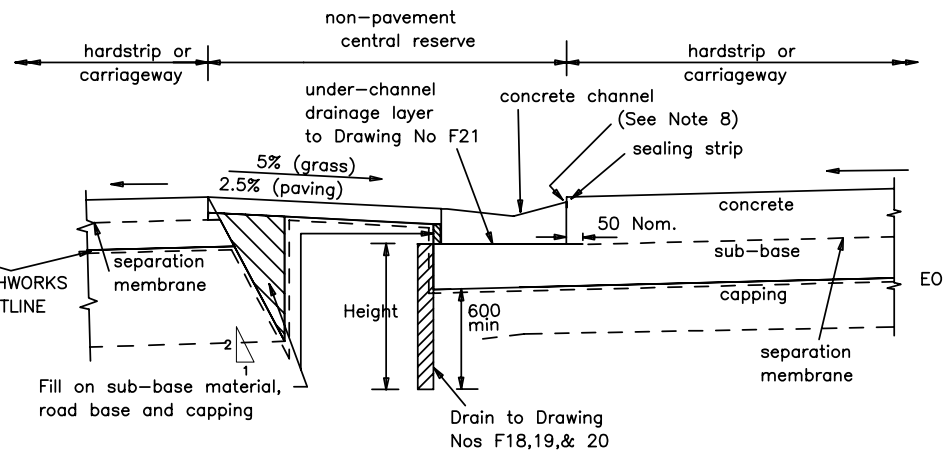
1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Alternative treatments to top of filter drains are shown on Drawing No. B15. Type V drain is shown on this Drawing.
3. 'DN' represents nominal diameter of pipe.
4. Pipes shall be laid to the levels shown on the Drawings and schedules.

HIGHWAY CONSTRUCTION DETAILS	EDGE OF PAVEMENT DETAILS	C	MAY 06	CENTRAL RESERVE – COMBINED SURFACE WATER AND GROUND WATER FILTER DRAIN	Drawing No.
		B	MAY 02		B5
		A	DEC 91		
		Issue	Date		





TYPE 12A  
(Channel formed on capping or formation layer)

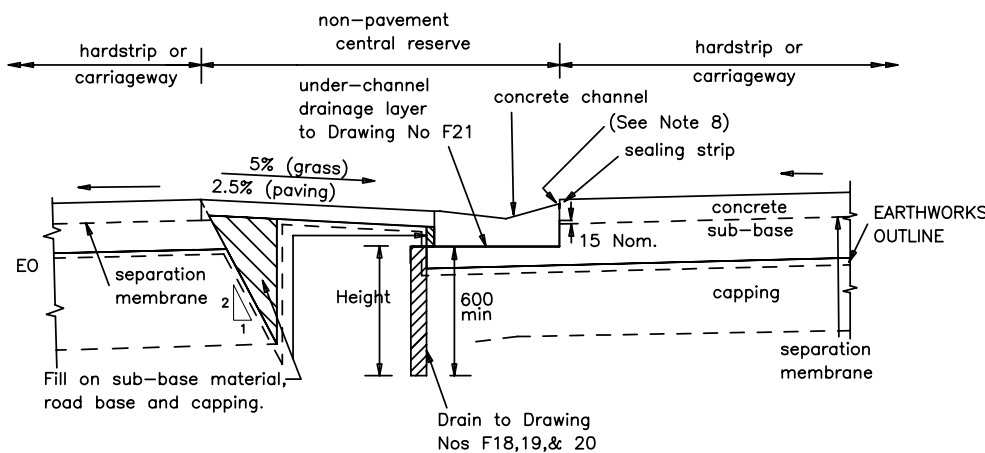


TYPE 12C  
(Channel formed on sub-base layer)

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES  
These details also apply to rigid composite carriageway with any necessary modifications.
2. For details of concrete channel see Drawing No B14.
3. The sealing strip and the vertical part of under channel drainage layer shown for when channel is cast before pavement. They shall be fixed to pavement edge when pavement cast before channel.
4. Sealing strip to be to Clause 1014 of S.H.W.
5. Where used in conjunction with a thin surfacing the under drainage detail shown in F21 shall apply in full.
6. Topsoil or paving in the central reserve shall be as described in Appendix 5/3

7. Channels may be freestanding or cast in one with the pavement. In the latter case the requirements of NOTES 3 & 4 may be ignored. Transverse joints in carriageway slabs shall be continued through channel sections cast in one with the slab.
8. Notwithstanding other tolerances in the Specification, the finished level of the channel shall not be higher nor more than 10mm lower than the finished level of the edge of the adjacent carriageway.



TYPE 12B  
(Channel base formed within sub-base layer)

HIGHWAY CONSTRUCTION DETAILS

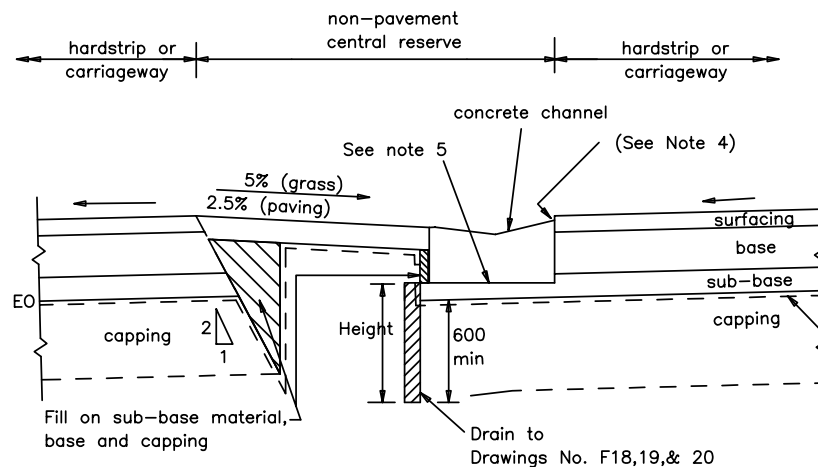
EDGE OF PAVEMENT  
DETAILS

C	MAY 02
B	AUG 93
A	DEC 91
Issue	Date

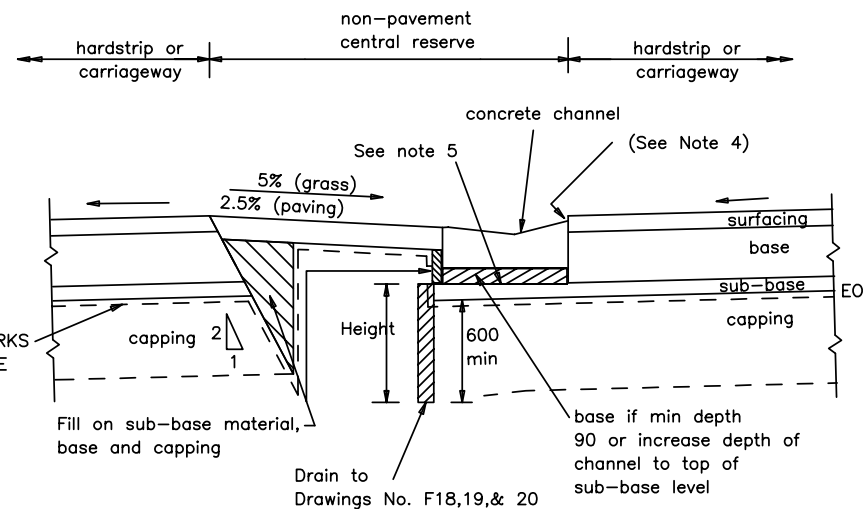
CENTRAL RESERVE –  
SURFACE WATER CHANNEL  
FOR RIGID CARRIAGEWAY

Drawing No.

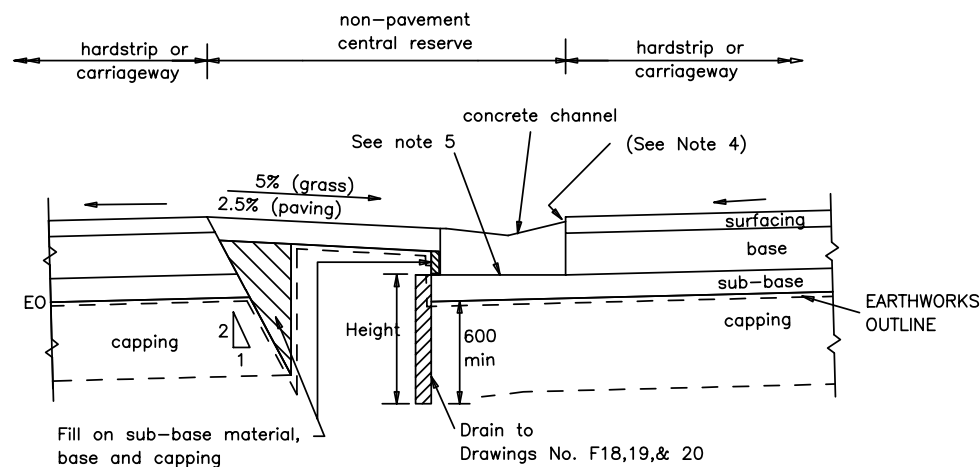
B6



TYPE 13A  
(Channel base formed within sub-base layer)



TYPE 13C  
(Channel formed on first base layer)



TYPE 13B  
(Channel formed on sub-base layer)

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES  
These details also apply to flexible composite carriageway with any necessary modifications.
2. For details of concrete channel see Drawing No B14.
3. Topsoil or paving in the central reserve shall be as described in Appendix 5/3
4. Notwithstanding other tolerances in the Specification the finished level of the channel shall not be higher nor more than 10mm lower than the finished level of the adjacent carriageway.
5. Where used in conjunction with a thin surfacing the under drainage detail shown in F21 shall apply in full.

HIGHWAY CONSTRUCTION DETAILS

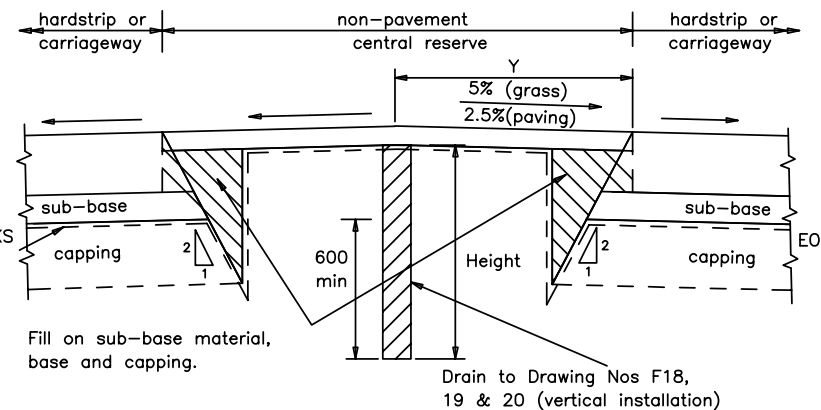
EDGE OF PAVEMENT  
DETAILS

C	MAY 02
B	AUG 93
A	DEC 91
Issue	Date

CENTRAL RESERVE –  
SURFACE WATER CHANNEL  
FOR FLEXIBLE CARRIAGEWAY

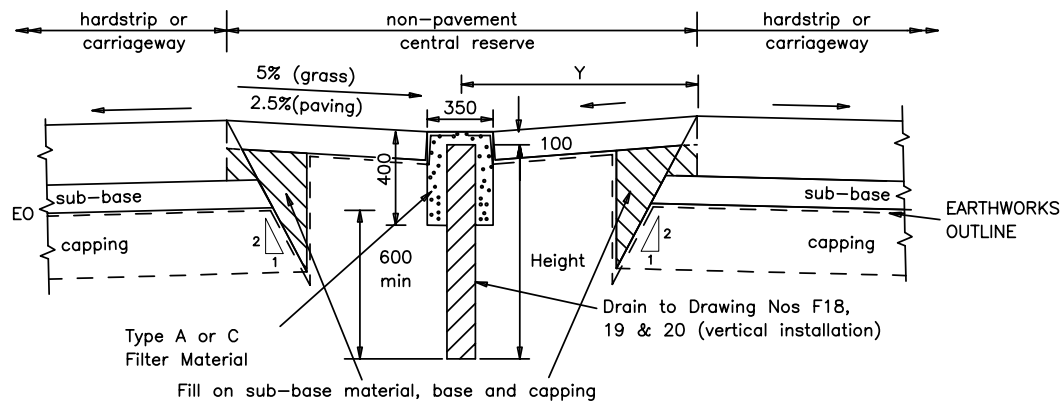
Drawing No.

B7



TYPE 14  
(Drainage Channel Block & Drain)

TYPE 16  
(Drain in Raised Central Reserve)

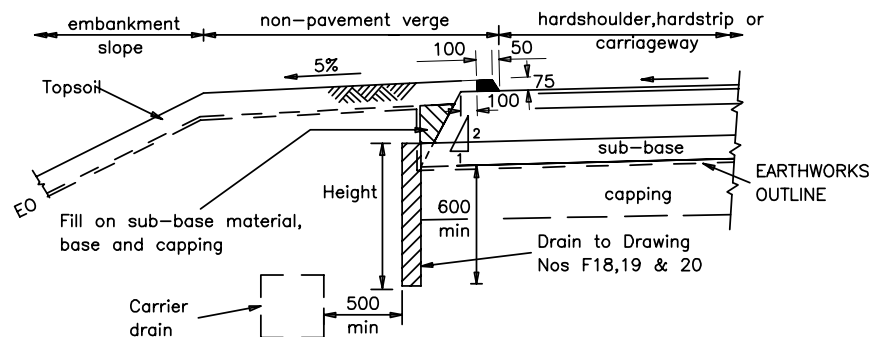


TYPE 15  
(Drain in Dished Central Reserve)

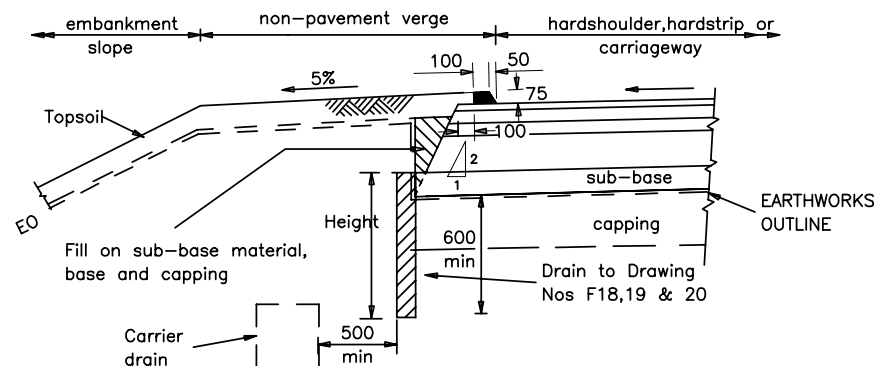
## NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Dimensions X & Y to be as described in Appendix 5/3.
3. For details of drainage channel blocks see Drawing No. F15.
4. Flexible carriageway construction is shown. Variations for other constructions to be as shown on Drawing No B1.
5. Topsoil or paving in the central reserve shall be as described in Appendix 5/3.
6. Where the central reserve is grassed and carriageway surface water is to flow over the edge the surface of the central reserve should be set 40mm below adjacent hardstrip or carriageway.

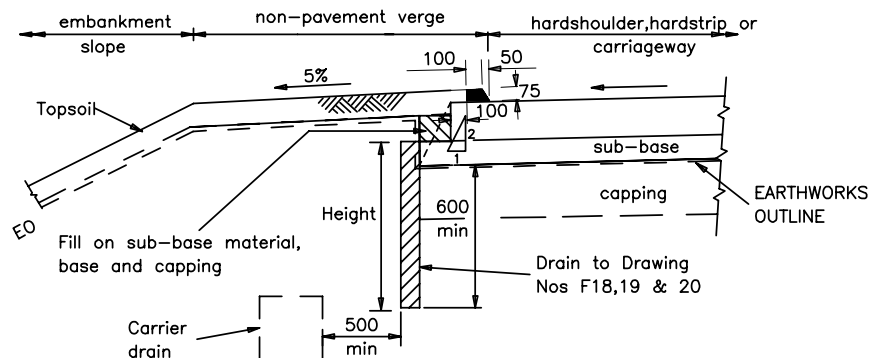
HIGHWAY CONSTRUCTION DETAILS	EDGE OF PAVEMENT DETAILS			CENTRAL RESERVE – DRAINAGE CHANNEL BLOCKS AND DRAINS	Drawing No.
		B	MAY 02		B8
		A	DEC 91		
		Issue	Date		



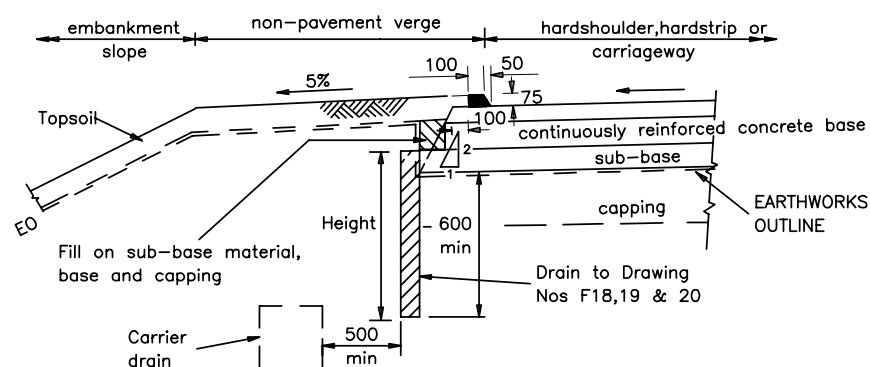
Type 21A (Flexible carriageway).



Type 21C (Flexible composite carriageway).



Type 21B (Rigid carriageway).



Type 21D (Rigid composite carriageway).

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Carrier drains shall be as detailed on the Drawings and schedules.

HIGHWAY CONSTRUCTION DETAILS

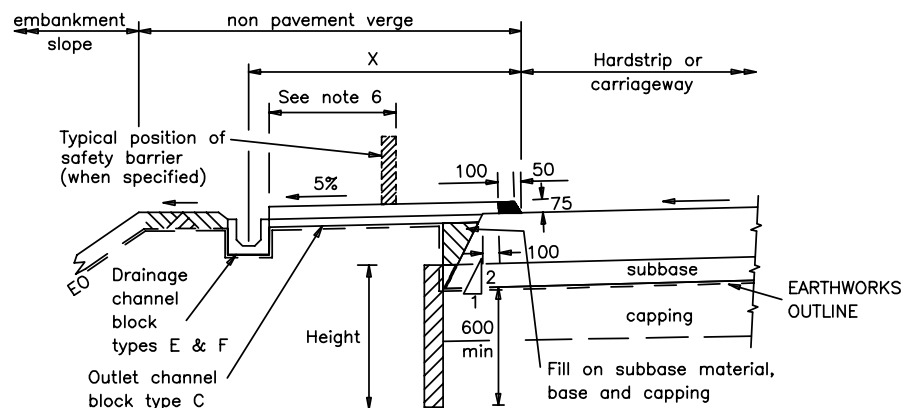
EDGE OF PAVEMENT  
DETAILS

C	MAY 06
B	MAY 02
A	DEC 91
Issue	Date

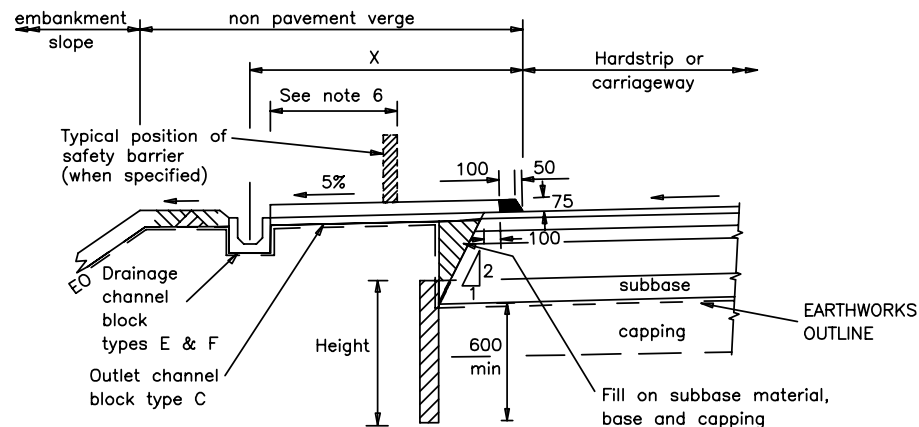
EMBANKMENTS – CHANNELS  
FORMED BY KERBS

Drawing No.

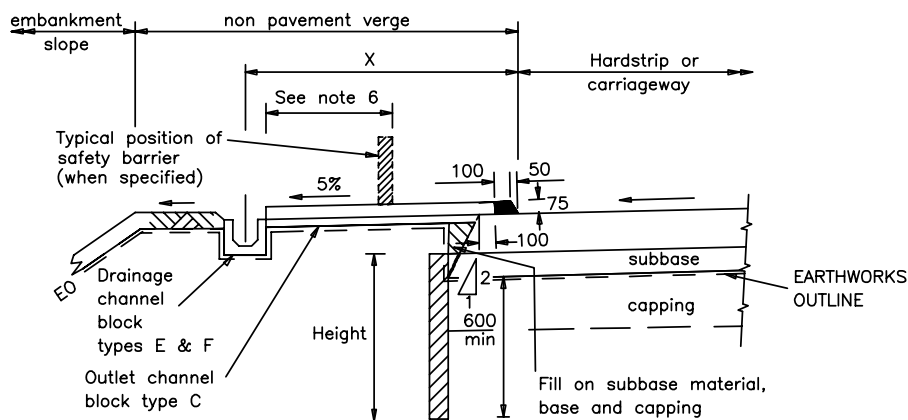
B9



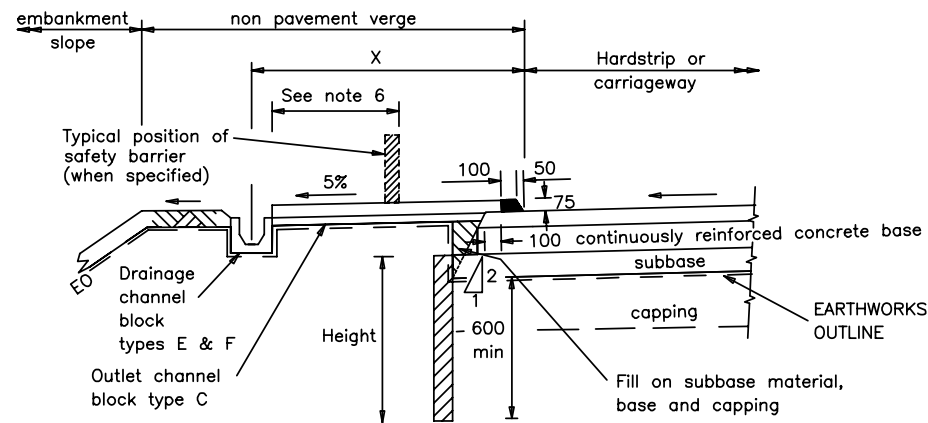
Type 21E (Flexible carriageway).



Type 21G (Flexible composite carriageway).



Type 21F (Rigid carriageway).



Type 21H (Rigid composite carriageway).

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Drains shall comply with Drawing Nos F18,19 and 20.
3. For details of drainage channel blocks see Drawing Nos F15 and F16.
4. Dimension X shall be as described in Appendix 5/3.
5. Not applicable on motorways.
6. The distance between the traffic face of the safety barrier and the nearest vertical face of the collecting channel shall not be less than 75% of the Working Width Class as specified in Appendix 4/1.

HIGHWAY CONSTRUCTION DETAILS

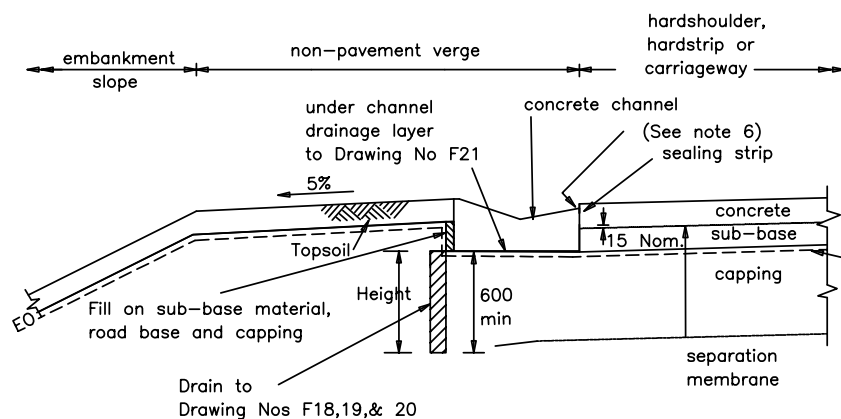
EDGE OF PAVEMENT  
DETAILS

F	MAY 06
E	NOV 04
D	MAY 04
C	MAY 02
B	MAR 98
A	DEC 91
Issue	Date

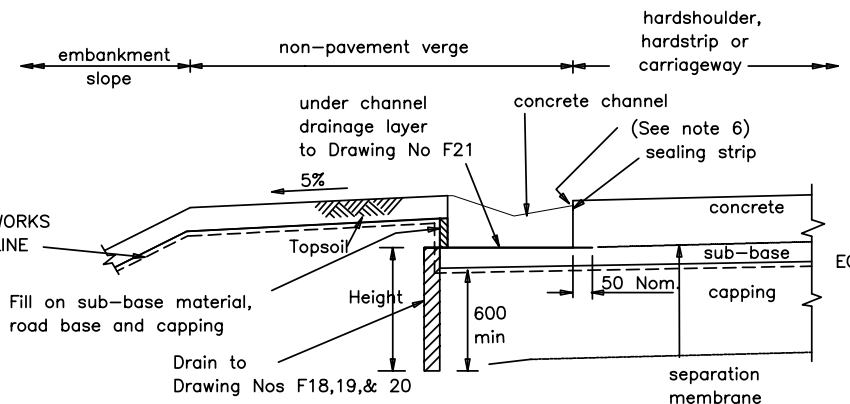
EMBANKMENTS – EXTERNAL  
KERBS AND DRAINAGE  
CHANNEL BLOCKS

Drawing No.

B10



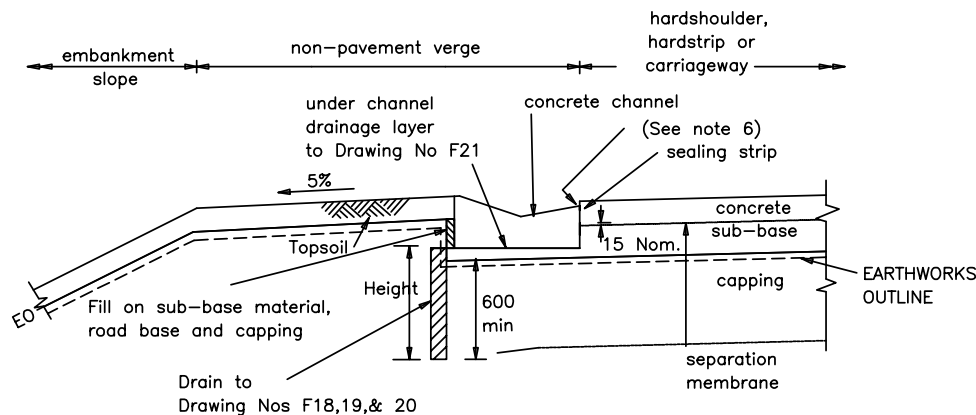
TYPE 22A  
(Channel formed on capping or formation layer)



TYPE 22C  
(Channel formed on sub-base layer)

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES. These details also apply to rigid composite carriageway with any necessary modifications.
2. For details of concrete channel see Drawing No. B14.
3. The sealing strip and the vertical part of under channel drainage layer shown for when channel is cast before pavement. They shall be fixed to pavement edge when pavement cast before channel.
4. Sealing strip to be to Clause 1014 of S.H.W.
5. Where used in conjunction with a thin surfacing the under drainage detail shown in F21 shall apply in full.
6. Notwithstanding other tolerances in the Specification, the finished level of the channel shall not be higher nor more than 10mm lower than the finished level of the edge of the adjacent carriageway.
7. Channel may be freestanding or cast in one with the pavement. In the latter case the requirements of NOTES 3 & 4 may be ignored. Transverse joints in carriageway slabs shall be continued through channel sections cast in one with the slab.



TYPE 22B  
(Channel base formed within sub-base layer)

HIGHWAY CONSTRUCTION DETAILS

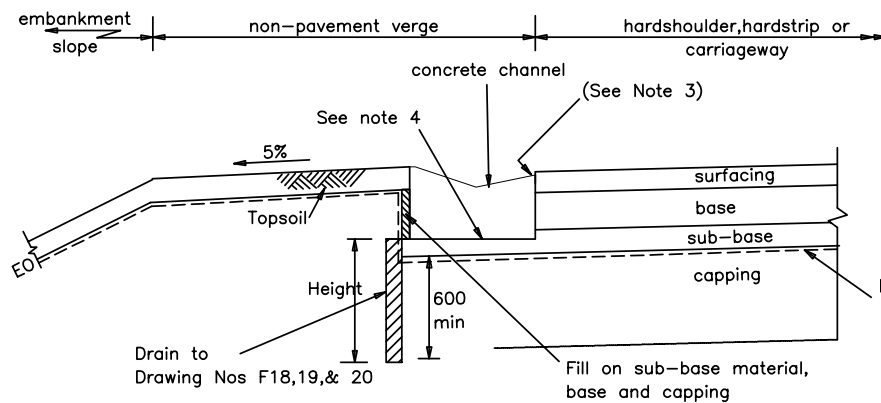
EDGE OF PAVEMENT  
DETAILS

C	MAY 02
B	AUG 93
A	DEC 91
Issue	Date

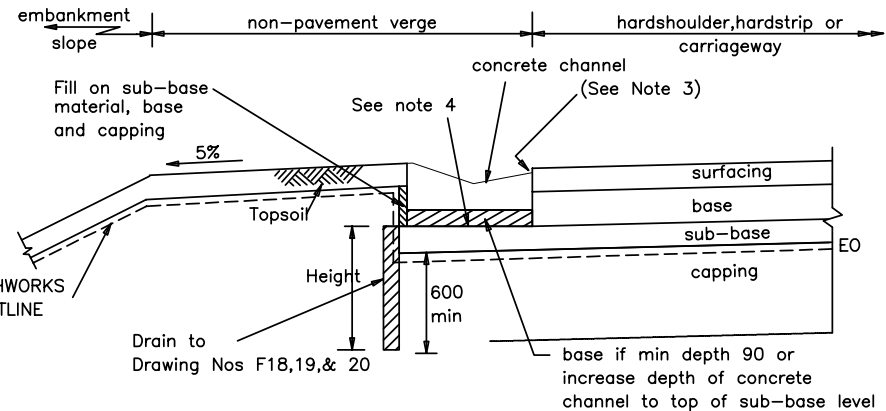
EMBANKMENTS –  
SURFACE WATER CHANNEL  
FOR RIGID CARRIAGEWAY

Drawing No.

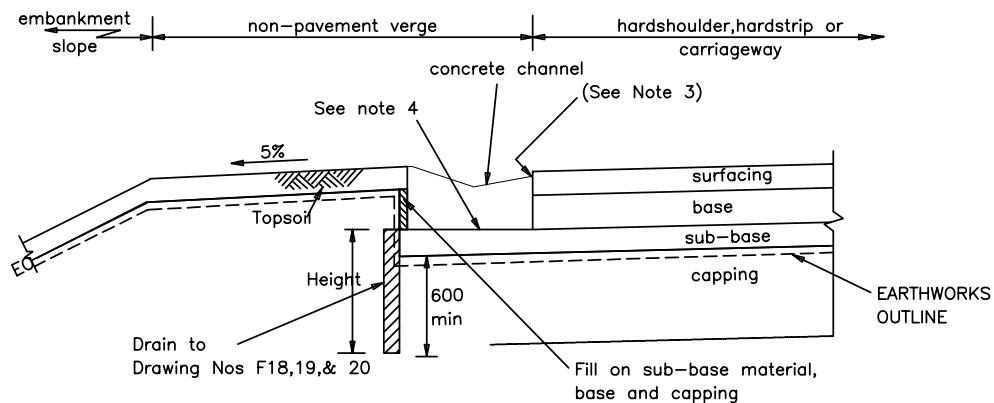
B11



TYPE 23A  
(Channel base formed within sub-base layer)



TYPE 23C  
(Channel formed on first base layer)



TYPE 23B  
(Channel formed on the sub-base layer)

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.  
These details also apply to flexible composite carriageway with any necessary modifications.
2. For details of concrete channel see Drawing No.B14.
3. Notwithstanding other tolerances in the Specification the finished level of the channel shall not be higher nor more than 10mm lower than the finished level of the edge of the adjacent carriageway.
4. Where used in conjunction with a thin surfacing the under drainage detail shown in F21 shall apply in full.

HIGHWAY CONSTRUCTION DETAILS

EDGE OF PAVEMENT  
DETAILS

D	MAY 02
C	MAR 98
B	AUG 93
A	DEC 91
Issue	Date

EMBANKMENTS – SURFACE  
WATER CHANNEL FOR FLEXIBLE  
CARRIAGEWAY

Drawing No.

B12



embankment

slope

5%

40

2

1

sub-base

capping

EO

Height

600 min

Drain to Drawing Nos. F18, F19 and F20.

Fill on sub-base material, base and capping.

Diagram illustrating the cross-section of a road structure, showing the embankment, non-pavement verge, and hard shoulder/hardstrip or carriageway. The diagram includes labels for the layers: Topsoil, sub-base, and capping. A 5% slope is indicated for the topsoil layer. The sub-base and capping layers are shown with a 2:1 slope. The embankment is labeled 'EO'.

Fill on sub-base material, base and capping.

The diagram illustrates a cross-section of a road pavement structure. The horizontal axis is divided into three main sections: 'embankment slope' on the left, 'non-pavement verge' in the middle, and 'hardshoulder, hardstrip or carriageway' on the right. The pavement structure consists of several layers: a 'continuously reinforced concrete base' (indicated by a hatched pattern), a 'sub-base' (indicated by a dotted pattern), and a 'capping' layer (indicated by a horizontal line pattern). A 'Topsoil' layer is shown above the concrete base. A 'Height' dimension is indicated for the concrete base. A '5%' slope is shown for the topsoil layer. A '40' dimension is indicated for the concrete base. A '600 min' dimension is indicated for the capping layer. A 'Drain to Drawing Nos. F18, F19 and F20.' is shown at the bottom. The right side of the diagram is labeled 'EO'.

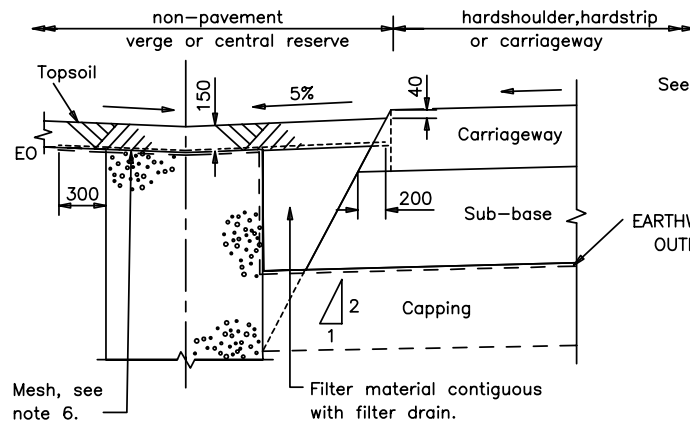
NOTES.

1. ALL DIMENSIONS ARE IN MILLIMETRES.

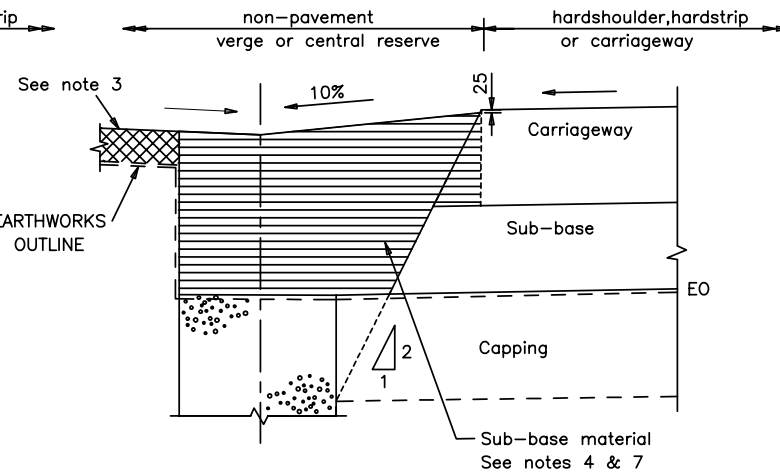
HIGHWAY CONSTRUCTION DETAILS	EDGE OF PAVEMENT DETAILS	C	MAY 06	EMBANKMENTS – VERGE DRAINAGE OR VERGE AND CARRIAGEWAY DRAINAGE OVER EMBANKMENT SLOPE	Drawing No.
		B	MAY 02		B13
		A	DEC 91		
		Issue	Date		



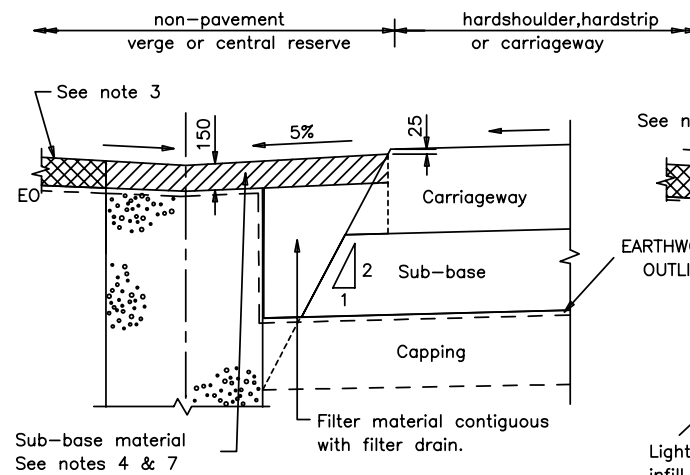




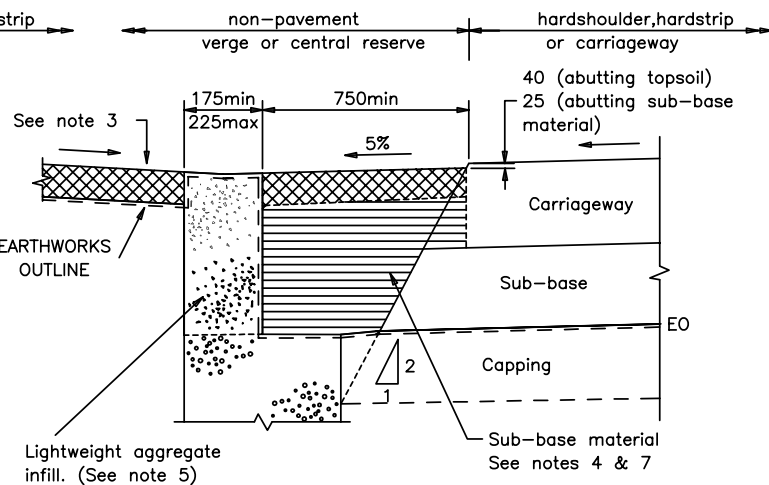
TYPE V



TYPE W



TYPE X



TYPE Y

# NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. The Drawing shows alternative treatments to top of drains shown on drawings B1 & B5 and is applicable to rigid and flexible carriageway options. Filter, sub-base and topsoil materials should be taken to the edge of pavement layer as appropriate.
3. Material in this layer may be topsoil or sub-base material and the depth and type shall be as described in Appendix 5/1
4. Sub-base material shall be unbound material as specified in Clause 801 of S.H.W.
5. Material in this infill shall be lightweight aggregate as described in Appendix 5/1.
6. The geotextile shall be as described in Appendix 5/1 and shall be fixed in a convenient pavement layer to give required topsoil thickness  $\pm 50$ mm.
7. Where described in Appendix 5/1 a geotextile membrane shall be provided between the type B filter material and overlaying layers for drain types W, X & Y.
8. For dimensions of filter drain relative to pavement layer see Drawings B1 & B5.
9. Detail of lower section of filter drain shall be as types G, H or I in Drawing F2 or as described in Appendix 5/1.

HIGHWAY CONSTRUCTION DETAILS

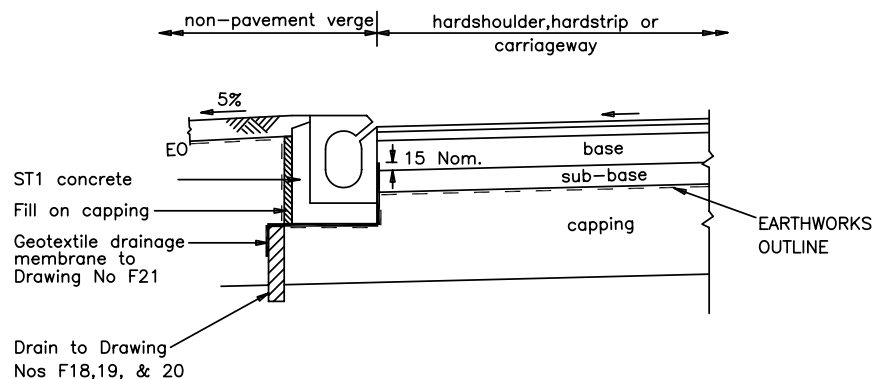
EDGE OF PAVEMENT  
DETAILS

B	MAR 98
A	DEC 91
Issue	Date

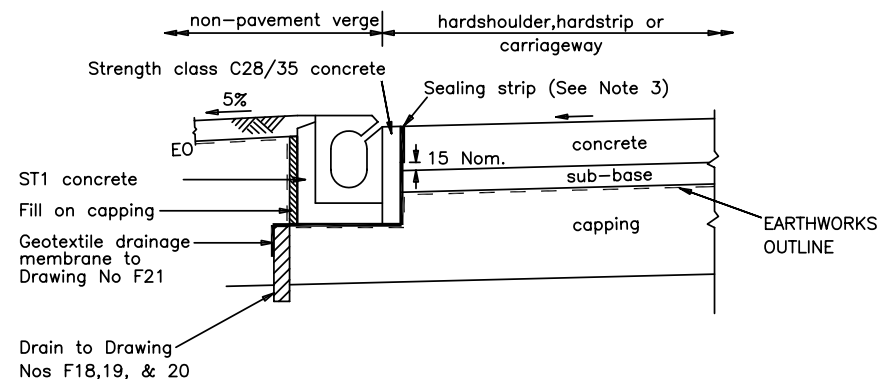
CUTTINGS AND CENTRAL RESERVE  
COMBINED SURFACE AND  
GROUND WATER FILTER DRAINS

Drawing No.

B15



TYPE 25A  
(Flexible carriageway)



TYPE 25B  
(Rigid carriageway)

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.  
These details also apply to flexible composite and rigid composite carriageway with necessary modification.  
Rigid composite as Type 25B but with bituminous surfacing laid up to front face of block as Type 25A, and without the sealing strip.  
Flexible composite as Type 25A down to top surface of base, lower details as Type 25B.
2. The sealing strip and vertical part of geotextile drainage membrane are shown for when block is constructed before pavement. They shall be fixed to pavement edge when pavement cast before block.
3. Sealing strip to be to Clause 1014 of S.H.W.
4. Where used in conjunction with a thin surfacing the under drainage shown in F21 shall apply in full.

HIGHWAY CONSTRUCTION DETAILS

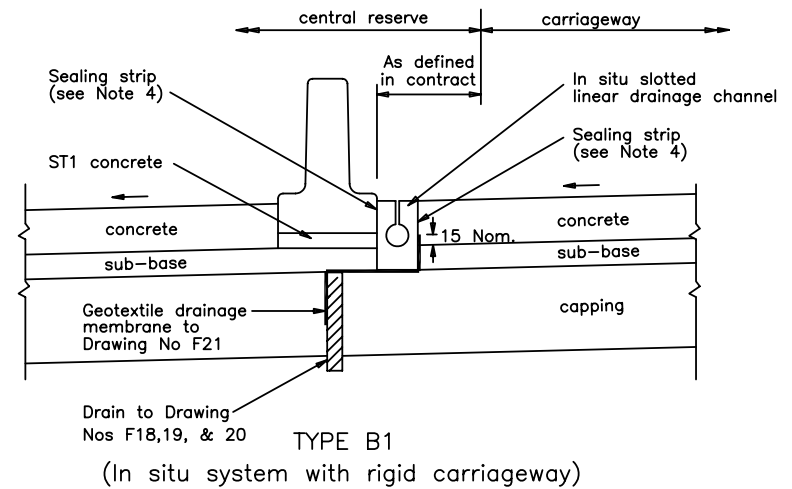
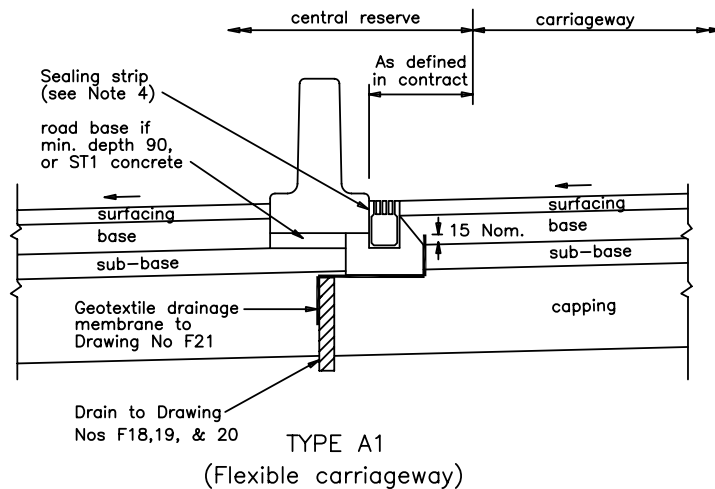
EDGE OF PAVEMENT  
DETAILS

C	MAY 04
B	MAY 02
A	MAR 98
Issue	Date

EMBANKMENTS – COMBINED  
DRAINAGE AND KERB BLOCKS

Drawing No.

B16



#### NOTES

- ALL DIMENSIONS ARE IN MILLIMETRES.
- Type A (proprietary precast) and Type B (in situ) systems are applicable to flexible, flexible composite, rigid or rigid composite carriageway with any necessary modifications.
- The sealing strips and the vertical part of the geotextile drainage membrane are shown for when the linear drainage system is constructed before the pavement and/or concrete safety barrier. They shall be fixed to the pavement and/or concrete safety barrier edge when the pavement and/or concrete safety barrier is cast before the linear drainage system.
- The geotextile drainage layer and drain to Drawing Nos. F18, 19 & 20 may be omitted if there is no drainage discontinuity in the pavement and capping layers.
- Sealing strip to be to Clause 1014 of S.H.W.
- Concrete between the proprietary system and the URC, JRC, CRCP or CRCR concrete slab shall be strength class C28/35 to a depth of not less than the thickness of the slab.
- Proprietary precast system and associated bed and backing concrete must be constructed in accordance with manufacturers' recommendations and be isolated from adjacent in situ concrete construction by suitable sealed expansion joints.
- Sealing strips required between in situ system and adjacent concrete safety barrier, and between in situ system and adjacent rigid or rigid composite carriageway.
- Notwithstanding other tolerances in the Specification, the finished level of the linear drainage system shall not be higher nor more than 10mm lower than the finished level of the edge of the adjacent carriageway or hardstrip.
- Notwithstanding the slot dimensions given in SHW sub-Clause 517.5, on motorways where single slotted linear drainage channels are used with a concrete safety barrier, straight slots between 10mm and 32mm may not be restricted to limitations in length.
- Where used in conjunction with a thin surfacing the under drainage shown in F21 shall apply in full.

HIGHWAY CONSTRUCTION DETAILS

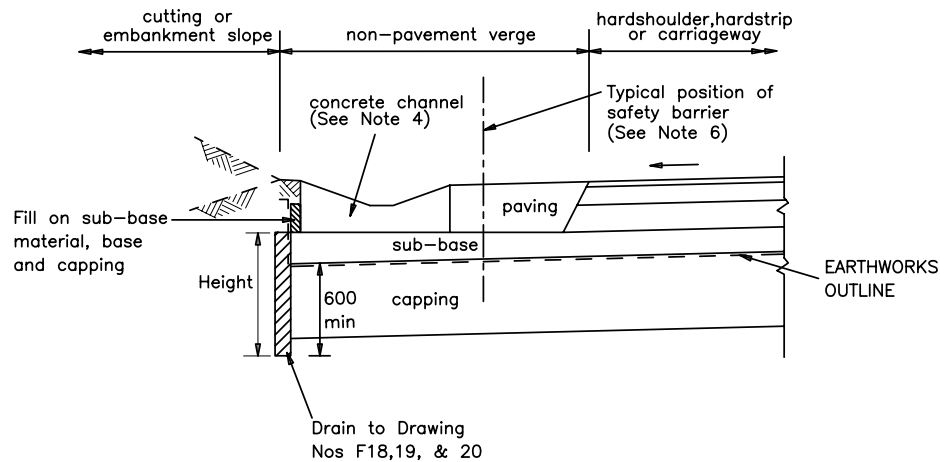
EDGE OF PAVEMENT  
DETAILS

C	MAY 04
B	MAY 02
A	MAR 98
Issue	Date

CENTRAL RESERVE  
LINEAR DRAINAGE SYSTEM  
WITH CONCRETE SAFETY BARRIER

Drawing No.

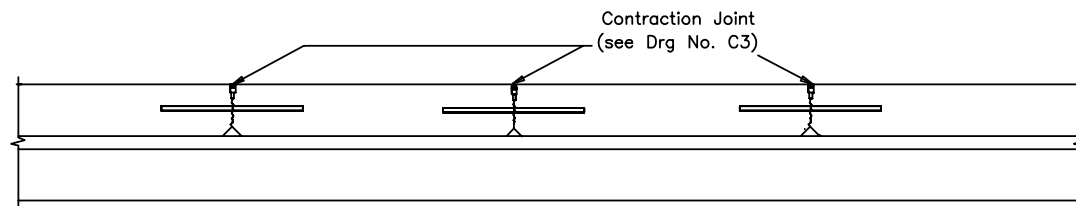
B17



#### NOTES

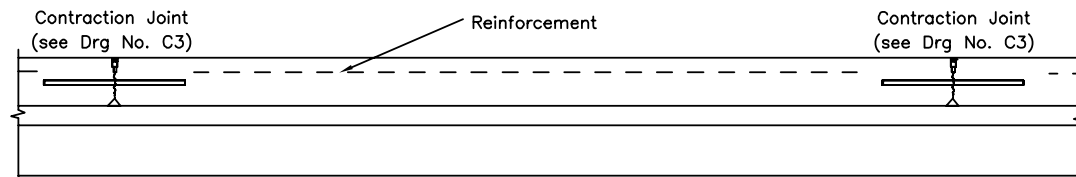
1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. These details also apply to rigid carriageway with addition of separation membrane and under channel drainage layer. Also applies to flexible composite carriageway with any necessary modifications.
3. Paving between the surface water channel and the hardshoulder, hardstrip or carriageway shall be as described in Appendix 5/3 or shown on the drawings.
4. Dimensions of concrete channel shall be as described in Appendix 5/3. General criteria for channel requiring safety barrier protection is that channel depth exceeds 150mm or that cross-falls exceed 1:4. Where used in conjunction with a thin surfacing the under drainage detail shown in F21 shall apply in full.
5. Notwithstanding other tolerances in the specification, the finished level of the channel shall not be higher than the finished level of the adjacent paving. Similarly the finished level of the paving shall not be higher than the finished level of the adjacent hardshoulder, hardstrip or carriageway.
6. Safety barriers to be as shown on the Drawings and scheduled in Appendix 4/1.
7. Detail shows channel in verge location. For channels in central reserve location, the post and concrete post foundations for a safety barrier must not be coincident with drain to drawings F18, 19 and 20.

HIGHWAY CONSTRUCTION DETAILS	EDGE OF PAVEMENT DETAILS	C	MAY 04	SURFACE WATER CHANNEL REQUIRING SAFETY BARRIER PROTECTION	Drawing No.
		B	MAY 02		B18
		A	MAR 98		
		Issue	Date		



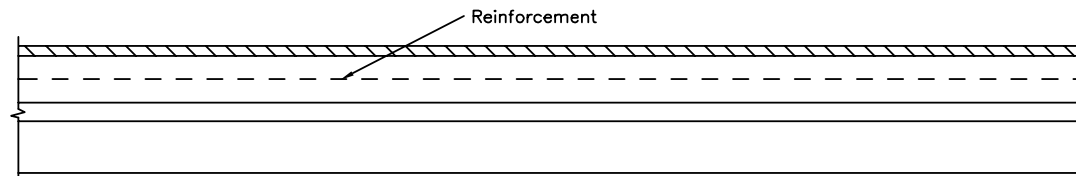
UNREINFORCED CONCRETE PAVEMENT (URC)

Unreinforced Concrete Pavement  
Sub-base  
Capping



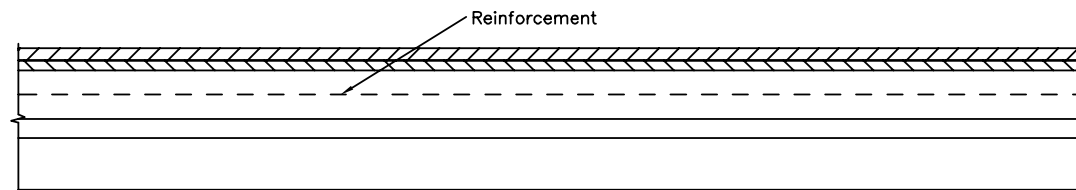
JOINTED REINFORCED CONCRETE PAVEMENT (JRC)

Jointed Reinforced Concrete Pavement  
Sub-base  
Capping



CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (CRCP)

Bituminous Overlay where specified in Appendix 7/1  
Continuously Reinforced Concrete Pavement  
Sub-base  
Capping



CONTINUOUSLY REINFORCED CONCRETE BASE (CRCB)

Bituminous Surface Course  
Bituminous Binder Course  
Continuously Reinforced Concrete Base  
Sub-base  
Capping

HIGHWAY CONSTRUCTION DETAILS

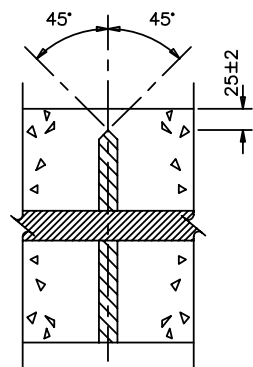
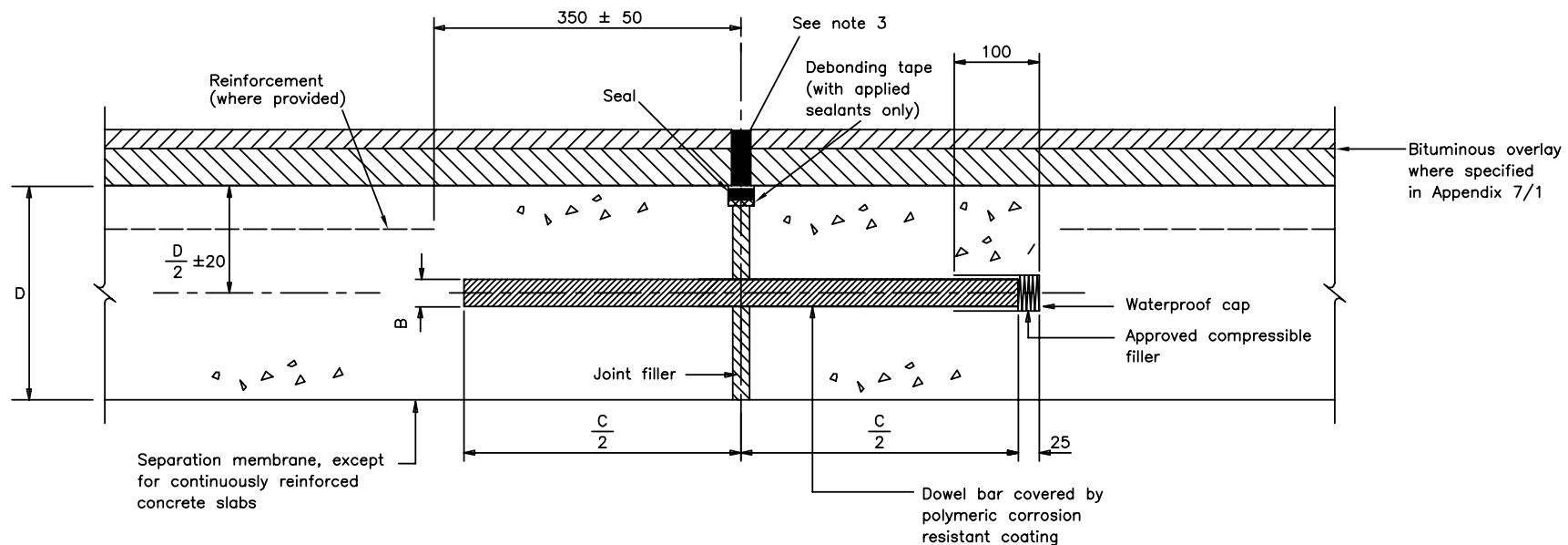
CONCRETE  
CARRIAGEWAY

E	MAY 06
D	MAY 02
C	MAY 01
B	MAR 98
A	DEC 91
Issue	Date

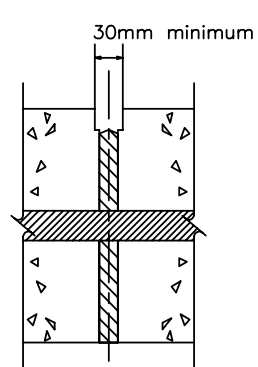
TYPES OF CONCRETE  
PAVEMENTS  
LONGITUDINAL SECTIONS

Drawing No.

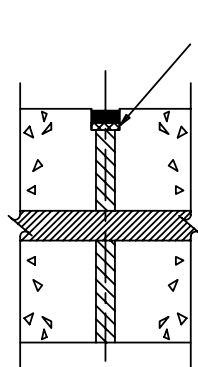
C1



1. Joint before sawing



2. Joint after sawing



3. Joint sealed

Debonding tape (with applied sealants only)

DOWEL BAR		
Slab thickness Dimension 'D'	Dimension 'B'	Dimension 'C'
150 to 239	25	600
240 and over	32	600

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. The dowel bars shall be placed at 300 centres. This spacing shall be varied where necessary so that no dowel bar is within 150 of a slab edge or a joint parallel to the bars.
3. When concrete pavement is overlaid with 40mm to 180mm thick bituminous surfacing, the overlay shall be saw-cut and sealed at the concrete pavement joint in accordance with Clause 713, except that the groove shall be 25mm for the full depth of the bituminous overlay.
4. Dowel bars shall conform to Clause 1011.

#### SAWN GROOVE FILLER DETAIL

HIGHWAY CONSTRUCTION DETAILS

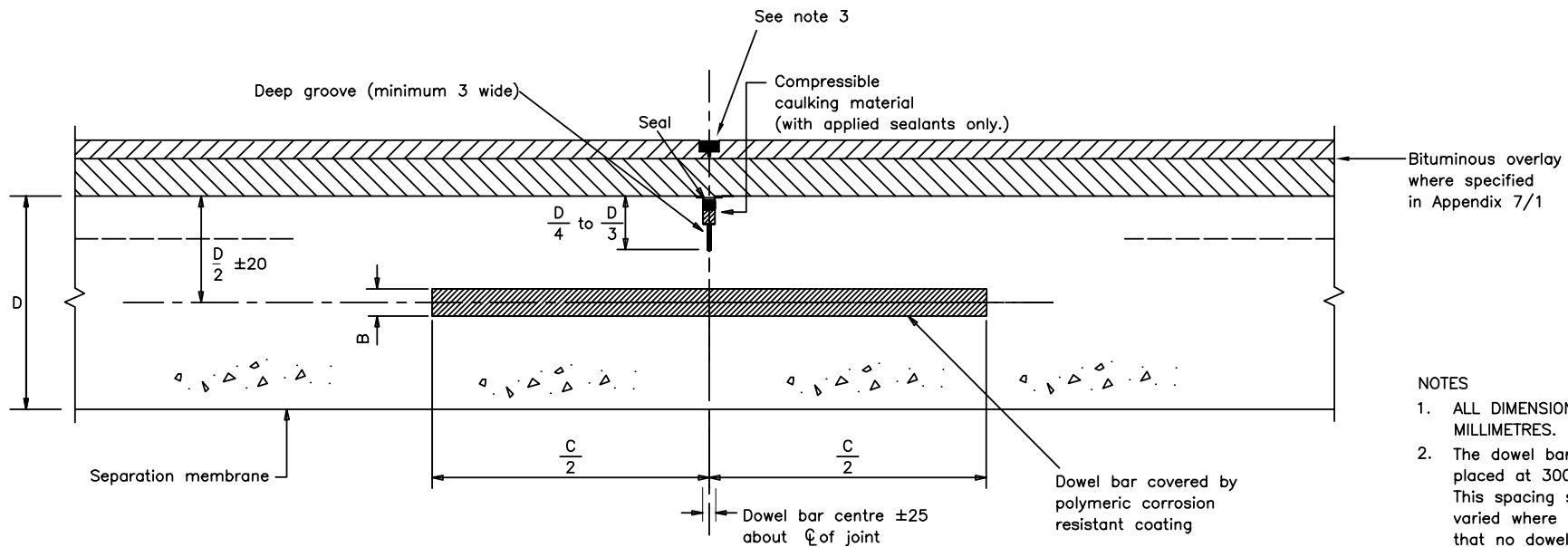
CONCRETE  
CARRIAGEWAY

C	MAY 06
B	MAY 01
A	DEC 91
Issue	Date

EXPANSION JOINTS  
REINFORCED AND UNREINFORCED  
CONCRETE SLABS

Drawing No.

C2



CONTRACTION JOINT – WITH SAWN GROOVE

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. The dowel bars shall be placed at 300 centres. This spacing shall be varied where necessary so that no dowel bar is within 150 of a joint parallel to the bars.
3. When concrete pavement is overlaid with 40mm to 180mm thick bituminous surfacing, the overlay shall be saw-cut and sealed at the concrete pavement joint in accordance Clause 713.
4. Dowel bars shall conform to Clause 1011.

DOWEL BAR – MIN DIMS.		
Slab thickness Dimension D	Dimension B	Dimension C
150 to 239	20	400
240 and over	25	600

HIGHWAY CONSTRUCTION DETAILS

CONCRETE  
CARRIAGEWAY

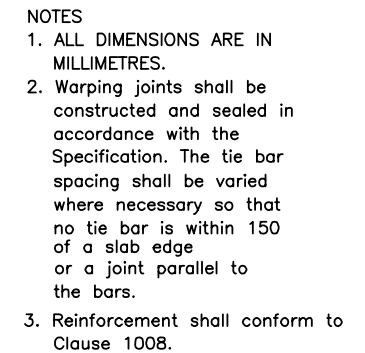
D	MAY 06
C	MAY 01
B	MAR 98
A	DEC 91
Issue	Date

CONTRACTION JOINTS

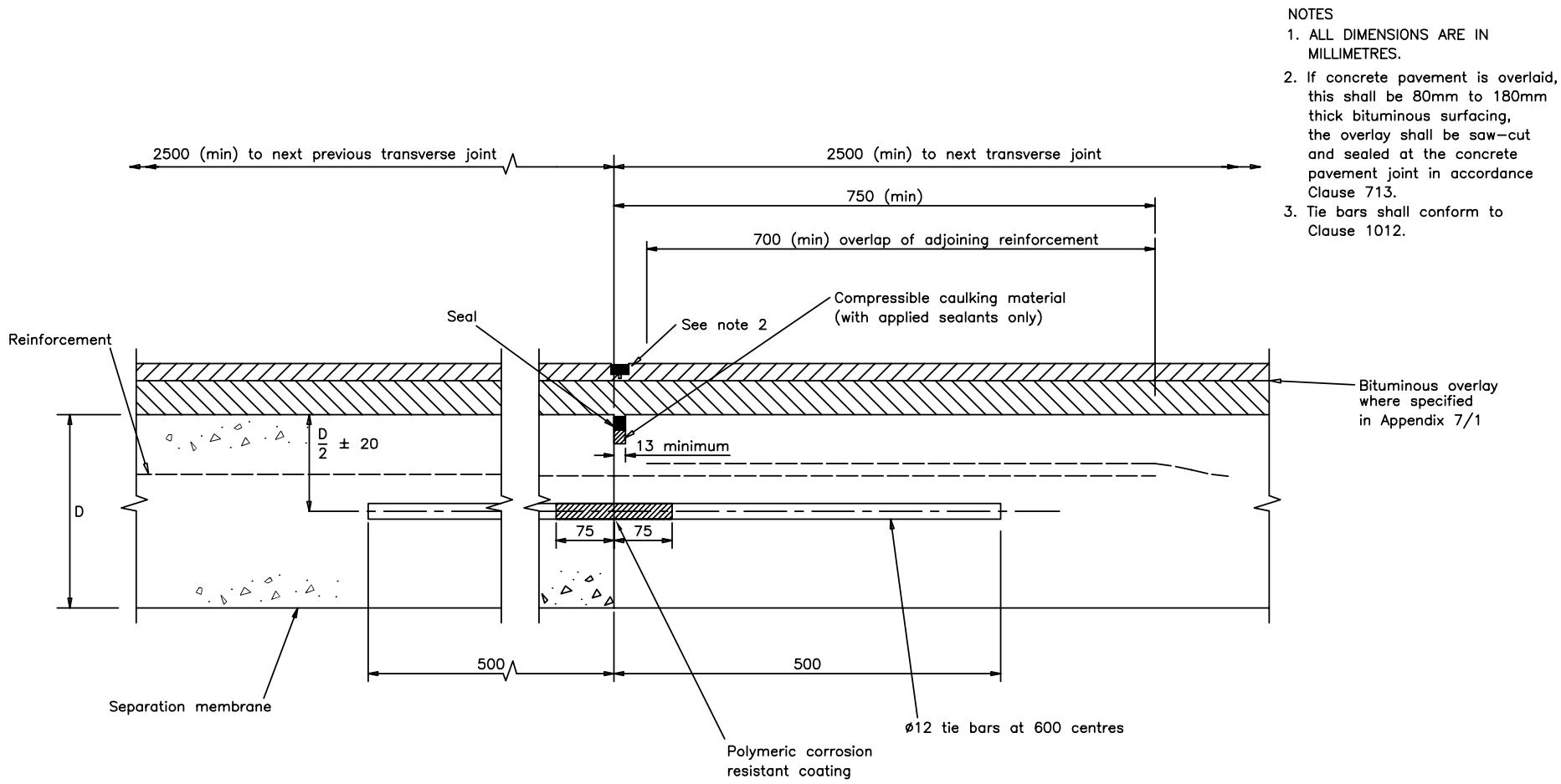
Drawing No.

C3



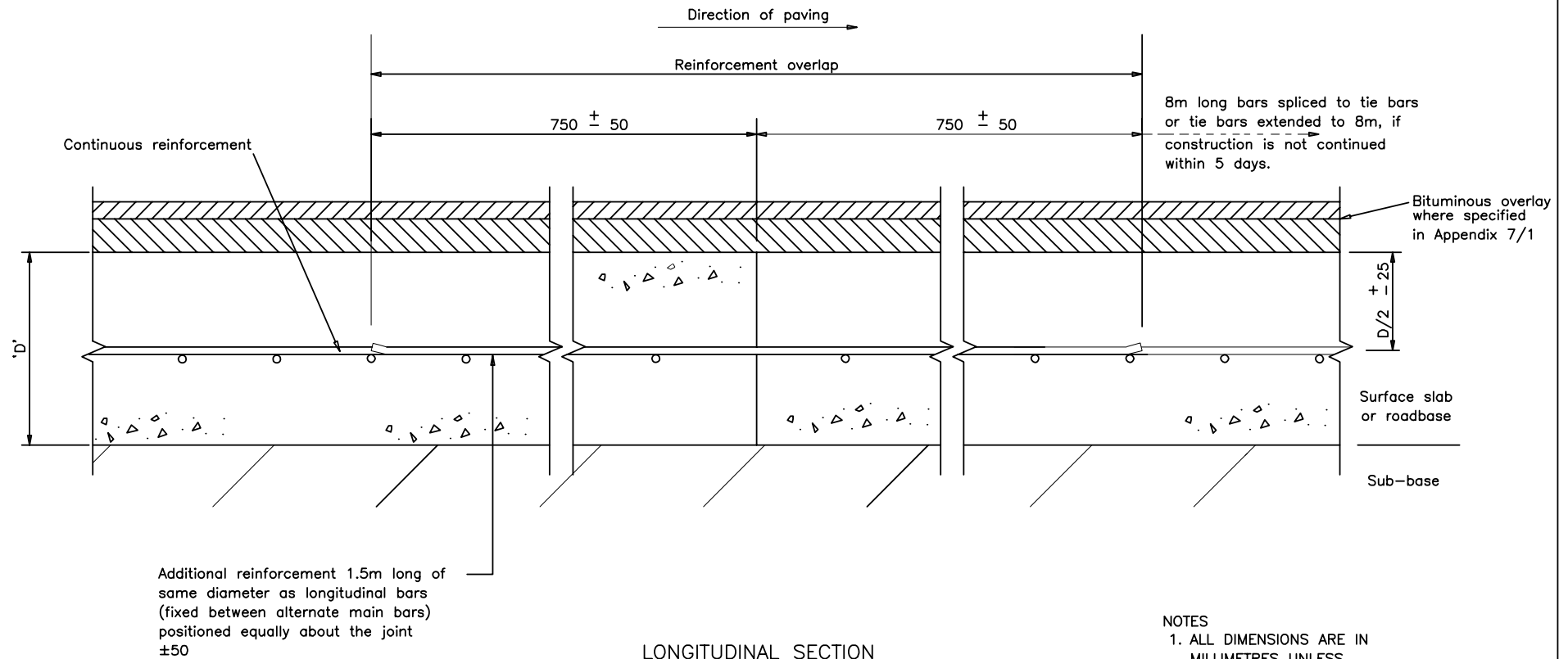


Cover to tie bars		
Slab thickness D	>200	<200
Cover x	30	20



- NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES.
  2. If concrete pavement is overlaid, this shall be 80mm to 180mm thick bituminous surfacing, the overlay shall be saw-cut and sealed at the concrete pavement joint in accordance Clause 713.
  3. Tie bars shall conform to Clause 1012.

HIGHWAY CONSTRUCTION DETAILS	CONCRETE CARRIAGEWAY	C	MAY 06	EMERGENCY TRANSVERSE CONSTRUCTION JOINT (JOINTED REINFORCED CONCRETE SLABS ONLY)	Drawing No.
		B	MAY 01		
		A	DEC 91		
		Issue	Date		C5



HIGHWAY CONSTRUCTION DETAILS

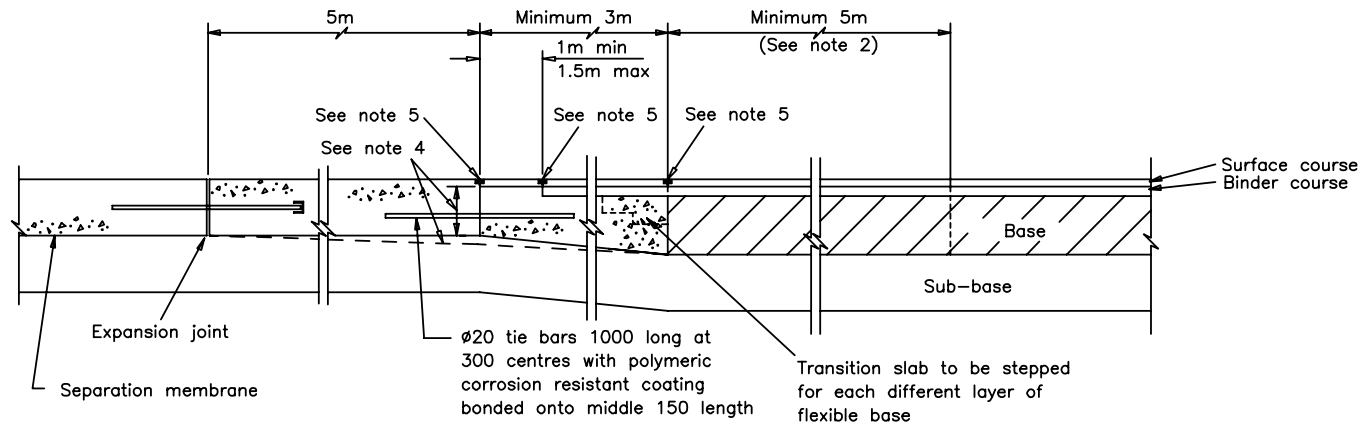
CONCRETE  
CARRIAGEWAY

B	MAY 01
A	DEC 91
Issue	Date

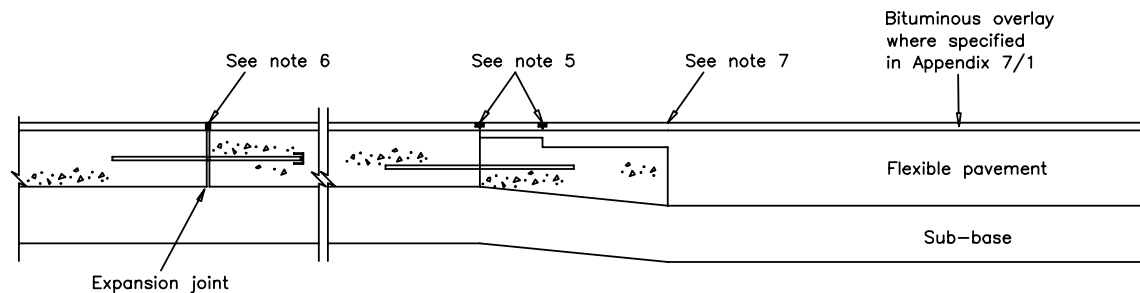
TRANSVERSE CONSTRUCTION JOINT  
(CONTINUOUSLY REINFORCED  
CONCRETE PAVEMENT OR ROADBASE)

Drawing No.

C6



RIGID URC OR JRC TO FLEXIBLE CONSTRUCTION (SURFACE SLABS)



RIGID TO FLEXIBLE CONSTRUCTION (SURFACE SLAB WITH BITUMINOUS OVERLAY)

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. At underbridges the base adjacent to the structure shall be a minimum of 5m of flexible base.
3. At buried structures the base and sub-base shall be continued over the structure. The sub-base shall be isolated from the structure by not less than 150mm of granular fill.
4. The depth of transition slab shall not be less than 200. If necessary, the thickness of the last bay of rigid pavement shall be tapered to match, so that the sub-base surface level is continuous without steps.
5. Bituminous construction to be saw-cut and sealed in accordance with Clause 713.
6. If concrete pavement is overlaid, this shall be 80mm to 180mm thick bituminous surfacing, the overlay shall be saw-cut and sealed at the concrete pavement joint in accordance with Clause 713, except that the groove shall be 25mm wide for the full depth of the bituminous overlay.
7. Bituminous overlay to be saw-cut and sealed in accordance with Clause 713, where existing surfacing is cracked.
8. Tie bars shall conform to Clause 1012.

HIGHWAY CONSTRUCTION DETAILS

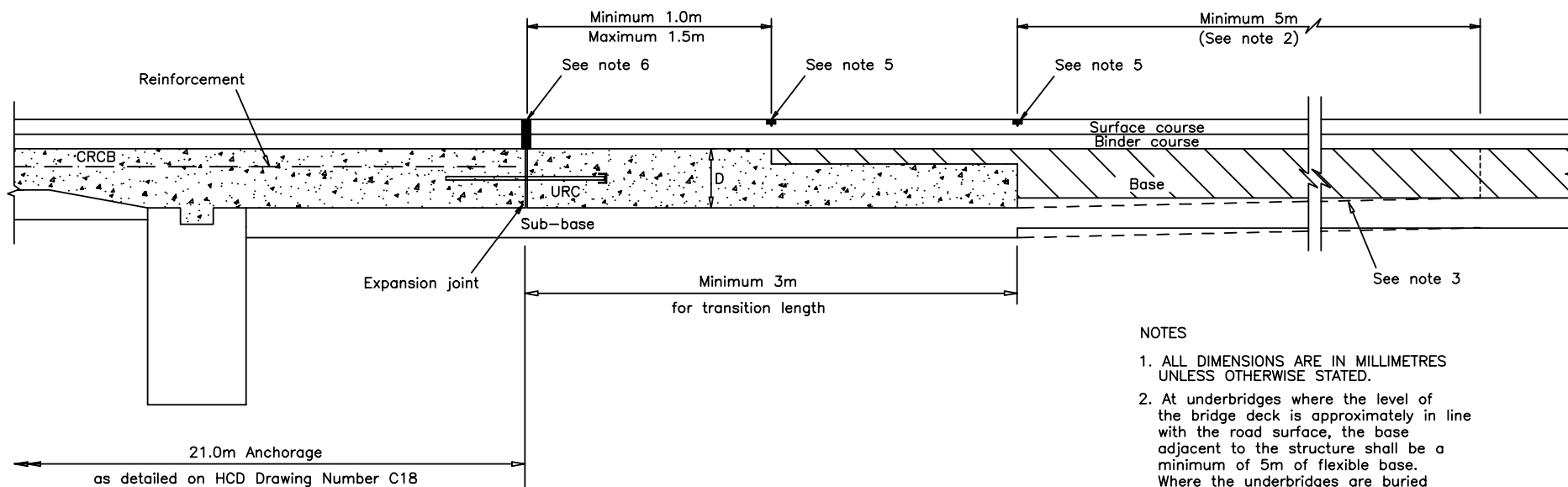
CONCRETE  
CARRIAGEWAY

E	MAY 06
D	MAY 02
C	MAY 01
B	MAR 98
A	DEC 91
Issue	Date

TRANSITION FROM  
RIGID URC OR JRC TO  
FLEXIBLE CONSTRUCTION

Drawing No.

C7/1



#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. At underbridges where the level of the bridge deck is approximately in line with the road surface, the base adjacent to the structure shall be a minimum of 5m of flexible base. Where the underbridges are buried underbridges such as box culverts, the CRCB can be laid continuously over the top.
3. The depth D of transition length shall not be less than 200. If necessary the thickness of the flexible construction base shall be tapered to match, so that the sub-base surface level is continuous without steps.
4. See Drawing No. C7/3 for details where porous asphalt is used for the surfacing.
5. Bituminous overlay to be saw-cut and sealed in accordance with Clause 713.
6. The overlay shall be saw-cut and sealed at the concrete pavement joint in accordance with Clause 713, except that the groove shall be 25mm wide for the full depth of the bituminous overlay.

HIGHWAY CONSTRUCTION DETAILS

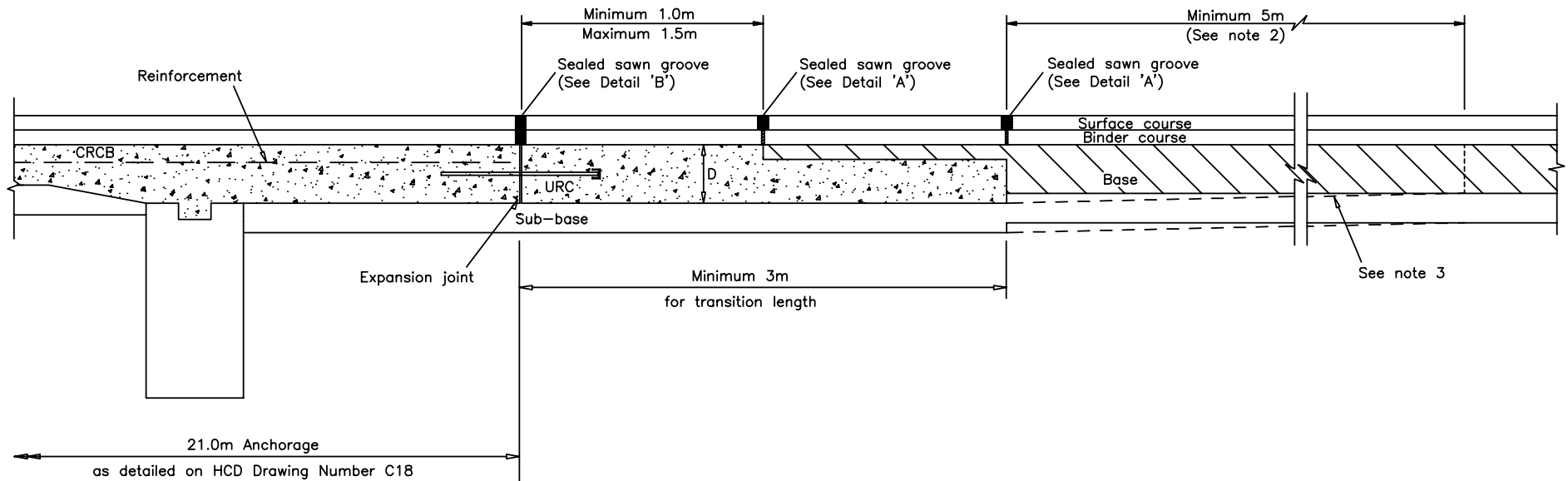
CONCRETE  
CARRIAGEWAY

E	MAY 06
D	MAY 02
C	MAY 01
B	MAR 98
A	AUG 94
Issue	Date

TRANSITION FROM RIGID CRCB  
TO FLEXIBLE CONSTRUCTION

Drawing No.

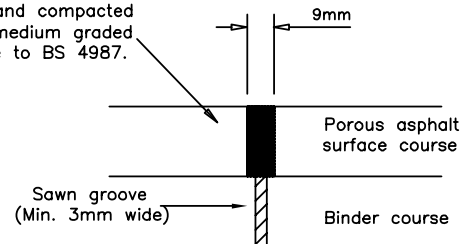
C7/2



#### NOTES

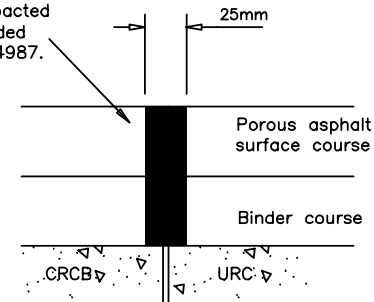
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. At underbridges where the level of the bridge deck is approximately in line with the road surface, the base adjacent to the structure shall be a minimum of 5m of flexible base. Where the underbridges are buried underbridges such as box culverts, the CRCB can be laid continuously over the top.
3. The depth of transition length shall not be less than 200. If necessary the thickness of the end section of the CRCB shall be tapered to match, so that the sub-base surface level is continuous without steps.

Sawn groove filled with well rammed and compacted 0/6mm size medium graded surface course to BS 4987.



DETAIL 'A'  
SEALED SAWN GROOVE

Sawn groove filled with well rammed and compacted 6mm size medium graded surface course to BS 4987.



DETAIL 'B'  
SEALED SAWN GROOVE  
OVER EXPANSION JOINT

HIGHWAY CONSTRUCTION DETAILS

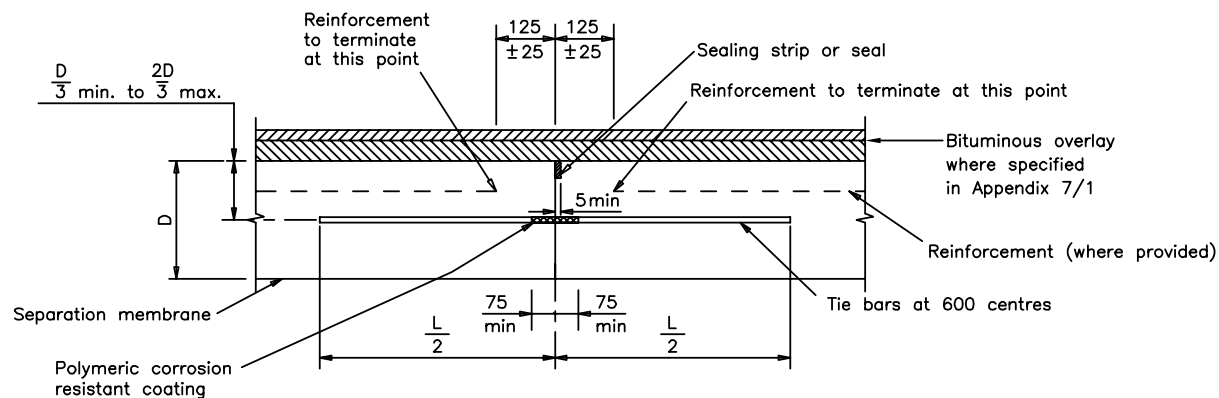
CONCRETE  
CARRIAGEWAY

E	MAY 06
D	MAY 02
C	MAY 01
B	MAR 98
A	AUG 94
Issue	Date

TRANSITION FROM RIGID CRCB  
TO FLEXIBLE CONSTRUCTION  
WITH POROUS ASPHALT SURFACING

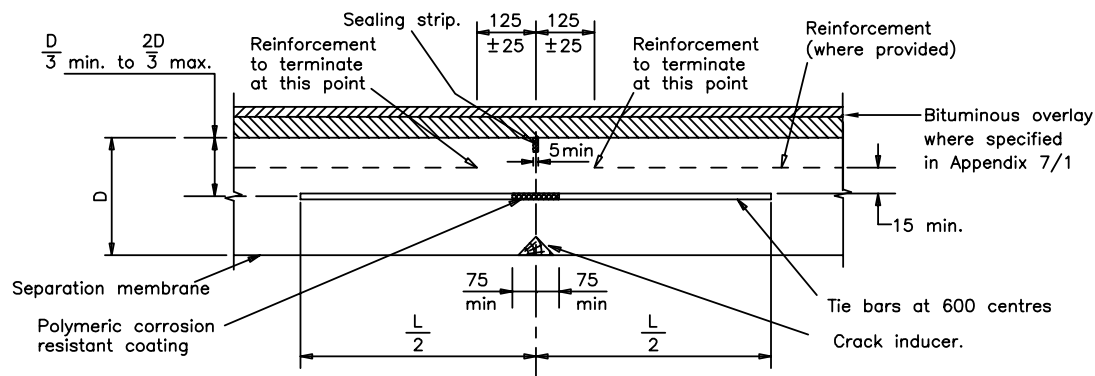
Drawing No.

C7/3



TYPE 1

Longitudinal construction joint between two separately constructed unreinforced or jointed reinforced slabs



TYPE 2

Wet formed longitudinal joint for slabs more than one lane width constructed in one operation

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Tie bars shall conform to Clause 1012.

TIE BARS		
Dia	Length L	Grade
12	750	B500B or B500C
16	600	B500B or B500C
20	500	B500B or B500C

HIGHWAY CONSTRUCTION DETAILS

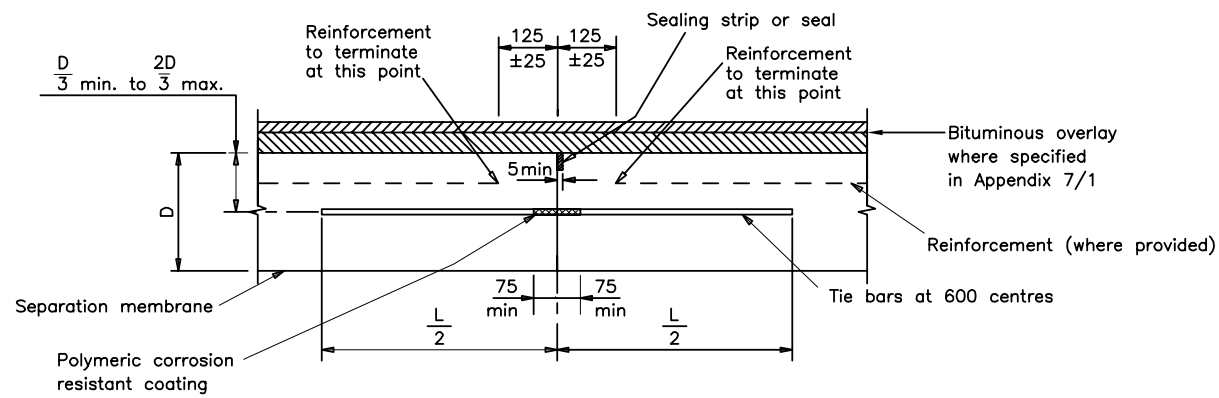
CONCRETE  
CARRIAGEWAY

C	MAY 06
B	MAY 01
A	MAR 98
Issue	Date

LONGITUDINAL JOINTS  
FOR URC OR JRC SLABS

Drawing No.

C8/1



TYPE 5  
Sawn longitudinal joint for unreinforced or jointed slabs  
(More than one lane width constructed in one operation)

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Tie bars shall conform to Clause 1012.

HIGHWAY CONSTRUCTION DETAILS

CONCRETE  
CARRIAGEWAY

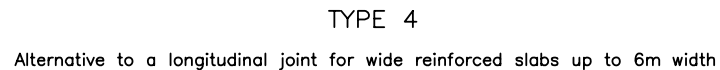
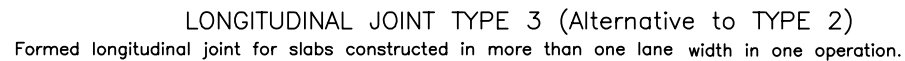
C	MAY 06
B	MAY 01
A	MAR 98
Issue	Date

LONGITUDINAL JOINTS  
FOR URC OR JRC SLABS

Drawing No.

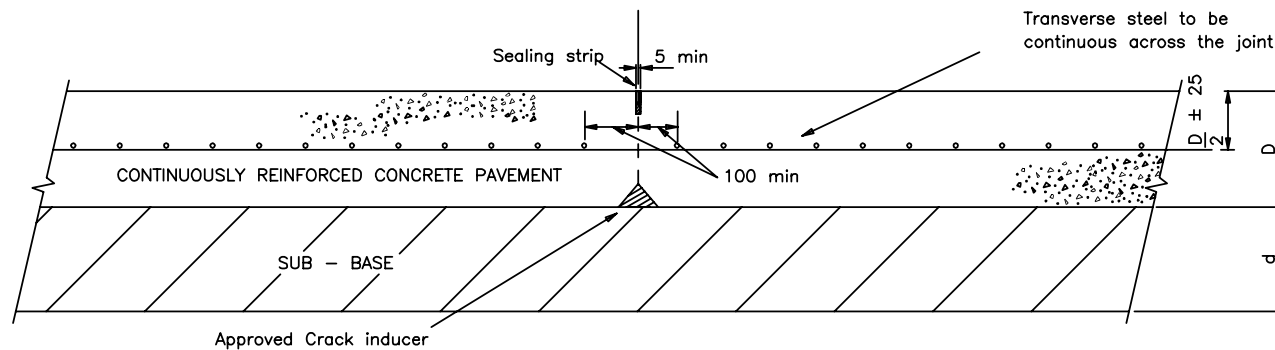
C8/2





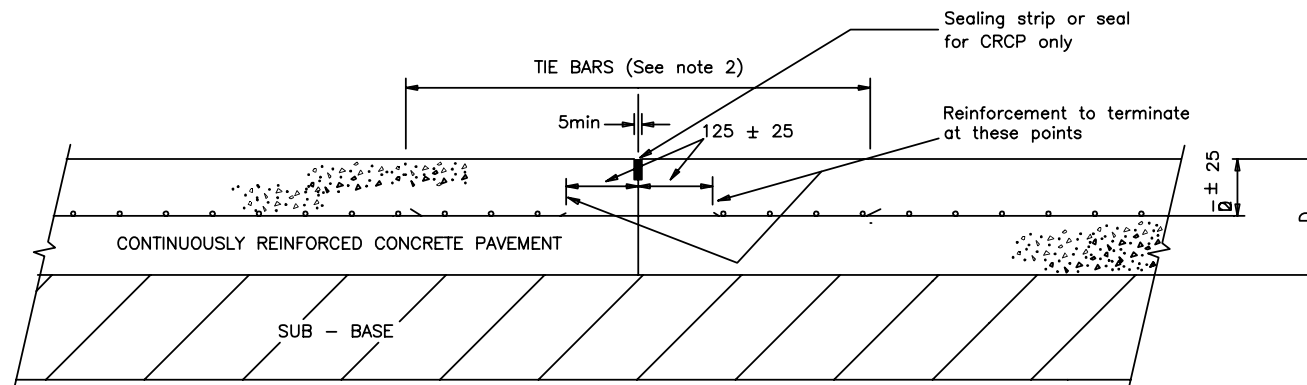
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. W equals slab width laid in one operation between 4m and 6m.
3. The special transverse reinforcement shall be lapped with or be continuous with the normal specified transverse reinforcement.
4. Reinforcement shall conform to Clause 1008.

HIGHWAY CONSTRUCTION DETAILS	CONCRETE CARRIAGEWAY			LONGITUDINAL JOINTS JOINTED REINFORCED CONCRETE SLABS	Drawing No.
		B	MAY 06		C9
		A	DEC 91		
		Issue	Date		



### FORMED LONGITUDINAL JOINT FOR CRCP OR CRCB

(constructed in more than one  
lane width in one operation)



### CRCP or CRCB BUTT TYPE CONSTRUCTION JOINT (between separately constructed slabs)

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. Tie bars shall be placed equally about the joint  $\pm 50$  at the same spacing as and adjacent to the transverse reinforcement. Protective coating to be applied to the centre 150 (min) of tie bars.
3. Reinforcement shall conform to Clause 1008.

#### TIE BARS

Dia	Length L	Grade
12	750	B500B or B500C
16	600	B500B or B500C
20	500	B500B or B500C

HIGHWAY CONSTRUCTION DETAILS

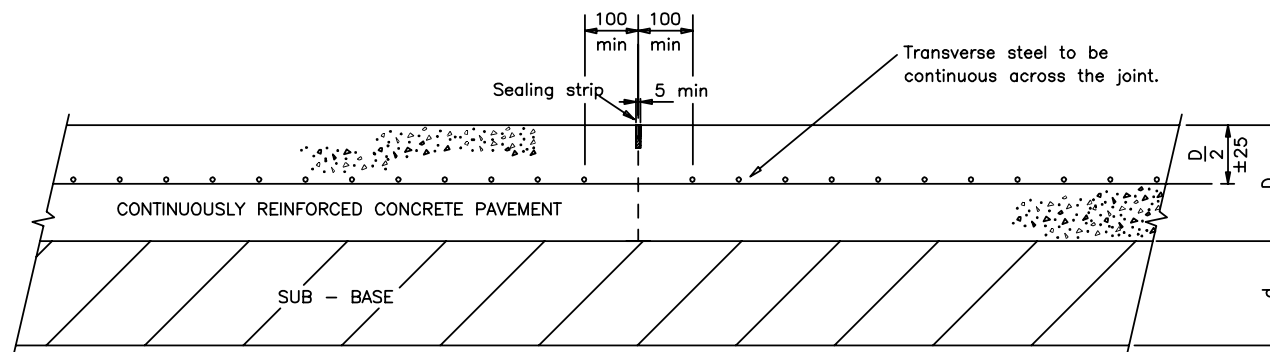
CONCRETE  
CARRIAGEWAY

B	MAY 06
A	MAR 98
Issue	Date

LONGITUDINAL JOINT  
(CONTINUOUSLY REINFORCED  
CONCRETE PAVEMENT OR BASE)

Drawing No.

C10/1



### SAWN LONGITUDINAL JOINT FOR CRCP OR CRCB

(constructed in more than one  
lane width in one operation)

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. Tie bars shall be placed equally about the joint  $\pm 50$  at the same spacing as and adjacent to the transverse reinforcement. Protective coating to be applied to the centre 150 (min) of tie bars.
3. Reinforcement shall conform to Clause 1008.

TIE BARS		
Dia	Length L	Grade
12	750	B500B or B500C
16	600	B500B or B500C
20	500	B500B or B500C

HIGHWAY CONSTRUCTION DETAILS

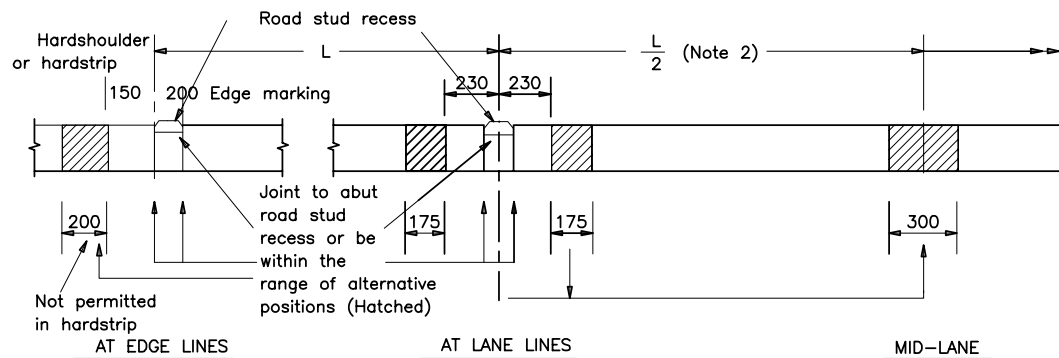
CONCRETE  
CARRIAGEWAY

B	MAY 06
A	MAR 98
Issue	Date

LONGITUDINAL JOINT  
(CONTINUOUSLY REINFORCED  
CONCRETE PAVEMENT OR BASE)

Drawing No.

C10/2



PERMITTED ALTERNATIVE LONGITUDINAL JOINT POSITIONS

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. L= Lane width. For dual carriageways joint position may be at L/2. For position of joints in single carriageways see drawing no. C12 to C17.
3. Maximum slab widths:  

Aggregate—	Limestone	All others
URC	5.0m	4.2m
JRC	7.3m	6.0m
CRCP		
4. For transverse joint arrangements in hardstrips see drg no C26.
5. Road stud recesses not to be within 150 min of transverse joints.

Longitudinal joint positions.

Joints shall be positioned beside or close to edge or lane markings, road studs or their recesses, or in mid-lane so that the maximum slab width is not exceeded (see note 3). Permitted alternative joint positions are shown by arrows above. Tolerances for alternative joint positions are shown by shading. Joints in CRC pavement shall only be construction joints at positions agreed by the Engineer, to suit the method of construction, avoiding positions under the wheeltracks.

Lane markings and reflecting road studs

Lane and edge markings shall be placed as shown on the Drawings. Reflecting road studs shall be placed centrally in lane markings or adjacent to edge markings unless otherwise shown on the Drawings.

Minor adjustments to the lane line position of up to 100mm may be made where the joint and lane line would conflict or otherwise fall outside the permitted tolerances, provided that there are no offset discontinuities in the markings and the adjustments are approved by the Engineer.

HIGHWAY CONSTRUCTION DETAILS

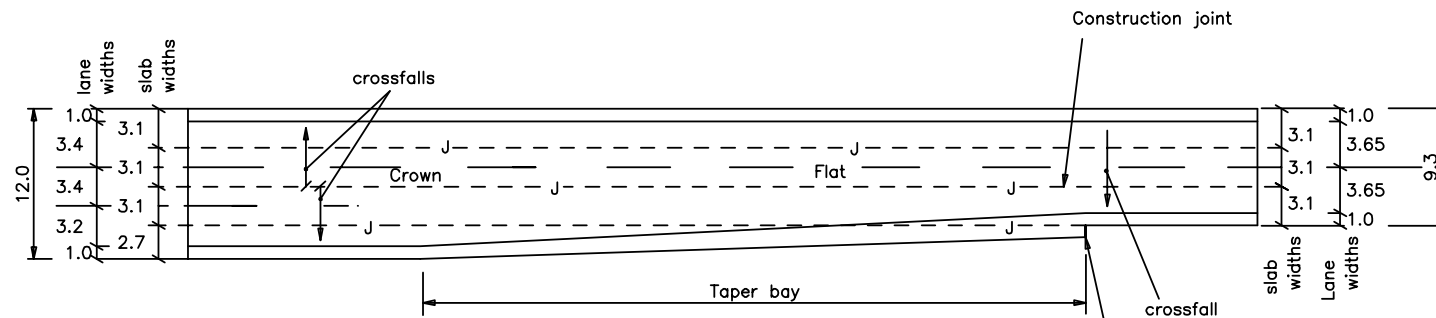
CONCRETE  
CARRIAGEWAY

A	DEC 91
Issue	Date

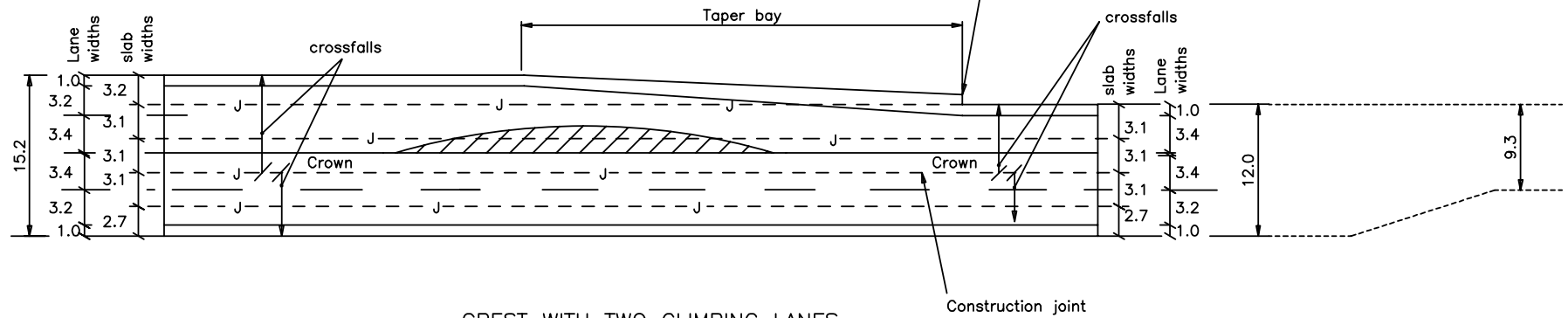
PERMITTED ALTERNATIVE  
LONGITUDINAL JOINT  
POSITIONS & TOLERANCES

Drawing No.

C11



START OF CLIMBING LANE



CREST WITH TWO CLIMBING LANES

#### NOTES

1. ALL DIMENSIONS ARE IN METRES.
2. — J — indicates longitudinal joint position.
3. Direction of cross-fall is dependent on curvature.
4. Crowns shall be along construction joints.

HIGHWAY CONSTRUCTION DETAILS

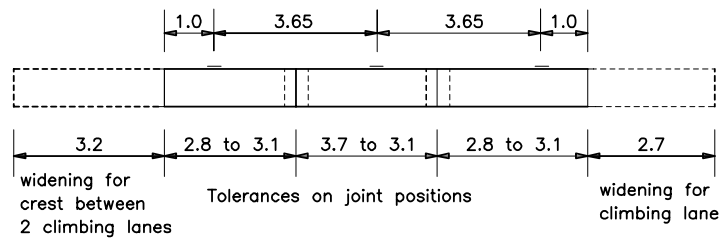
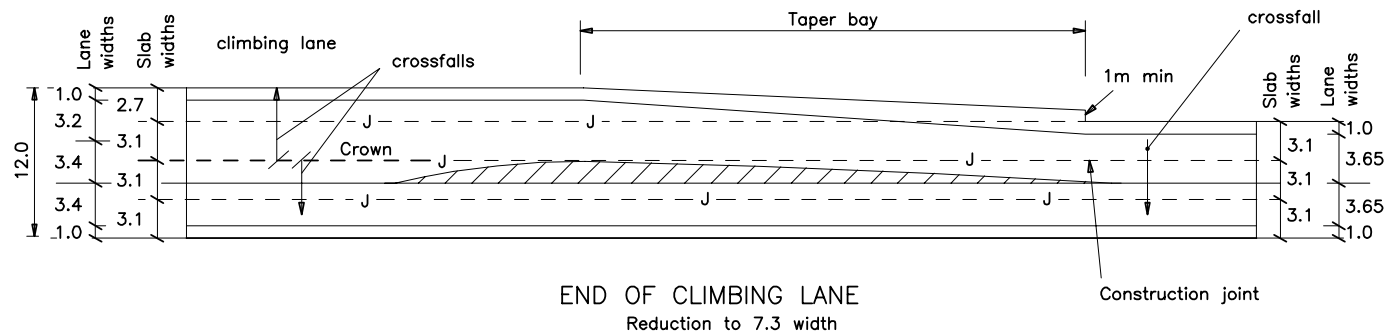
CONCRETE  
CARRIAGEWAY

C	MAY 06
B	MAR 98
A	DEC 91
Issue	Date

TYPICAL LONGITUDINAL JOINT  
POSITIONS, UNREINFORCED SLABS  
7.3m SINGLE CARRIAGEWAY WITH CLIMBING LANES

Drawing No.

C12



CROSS SECTION – SINGLE CARRIAGEWAY

- NOTES
1. ALL DIMENSIONS ARE IN METRES.
  2. – J – indicates longitudinal joint position.
  3. Direction of cross-fall is dependent on curvature.
  4. Crowns shall be along construction joints.

HIGHWAY CONSTRUCTION DETAILS

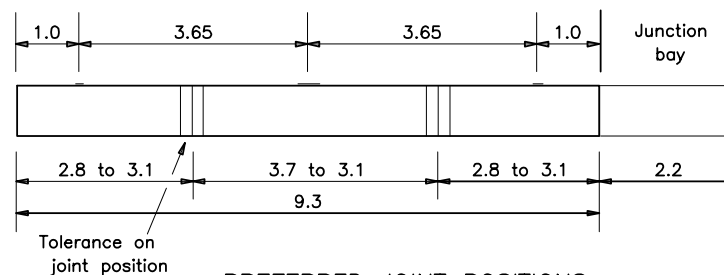
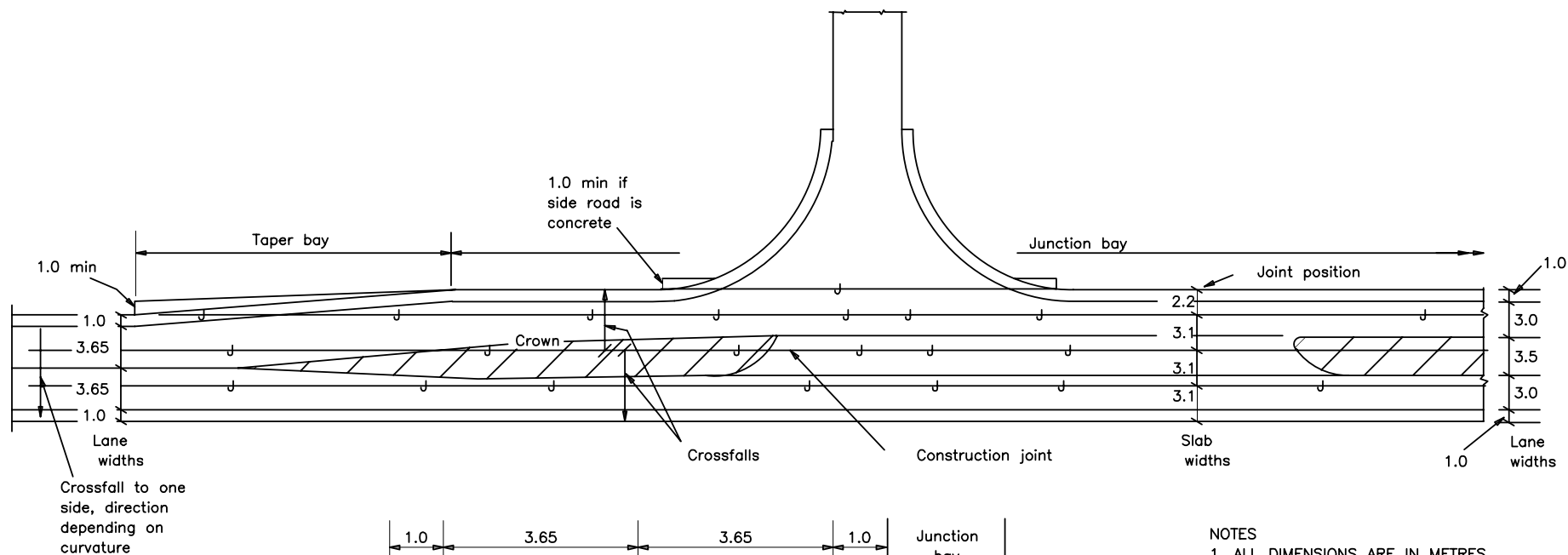
CONCRETE  
CARRIAGEWAY

C	MAY 06
B	MAR 98
A	DEC 91
Issue	Date

TYPICAL LONGITUDINAL JOINT  
POSITIONS, UNREINFORCED SLABS  
7.3m SINGLE CARRIAGEWAY WITH CLIMBING LANE

Drawing No.

C13



PREFERRED JOINT POSITIONS  
Diagrammatic only. Not to scale.

#### NOTES

1. ALL DIMENSIONS ARE IN METRES.
2. ——— J ——— indicates longitudinal joint position.
3. Crossfalls will depend on curvature.
4. Crowns shall be along construction joints.

HIGHWAY CONSTRUCTION DETAILS

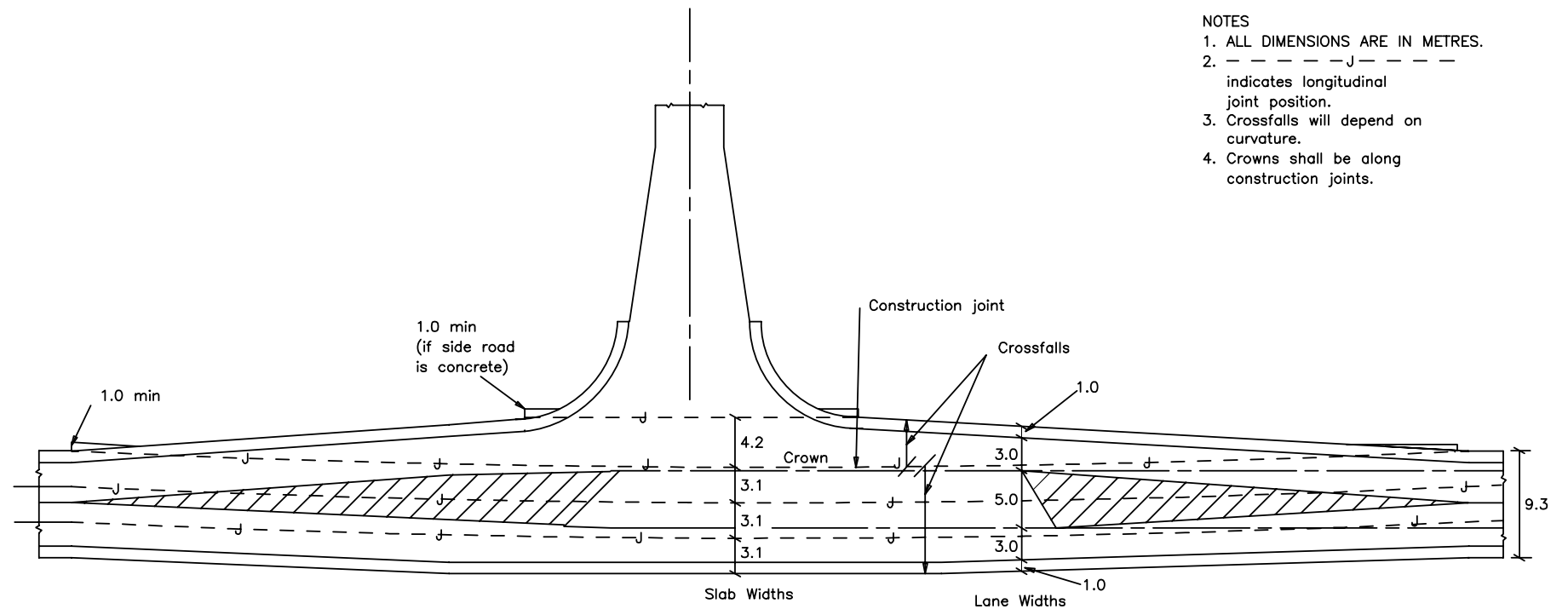
CONCRETE  
CARRIAGEWAY

C	MAY 06
B	MAR 98
A	DEC 91
Issue	Date

TYPICAL LONGITUDINAL JOINT  
POSITIONS, UNREINFORCED SLABS  
7.3m SINGLE CARRIAGEWAY WITH JUNCTION

Drawing No.

C14



#### NOTES

1. ALL DIMENSIONS ARE IN METRES.
2. — — — — — J — — — — —  
indicates longitudinal  
joint position.
3. Crossfalls will depend on  
curvature.
4. Crowns shall be along  
construction joints.

TYPICAL JOINT POSITIONS  
Diagrammatic only. Not to scale

HIGHWAY CONSTRUCTION DETAILS

CONCRETE  
CARRIAGEWAY

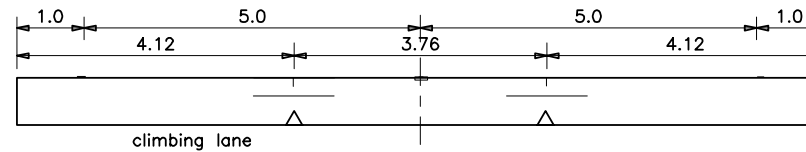
C	MAY 06
B	MAR 98
A	DEC 91
Issue	Date

TYPICAL LONGITUDINAL JOINT  
POSITIONS, UNREINFORCED SLABS  
7.3m SINGLE CARRIAGEWAY WITH JUNCTION

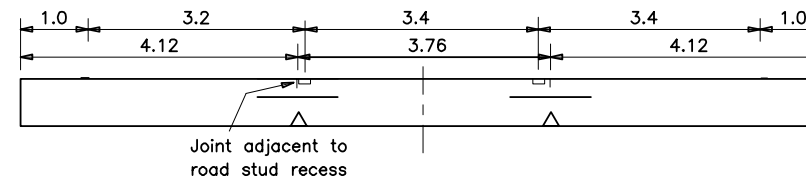
Drawing No.

C15

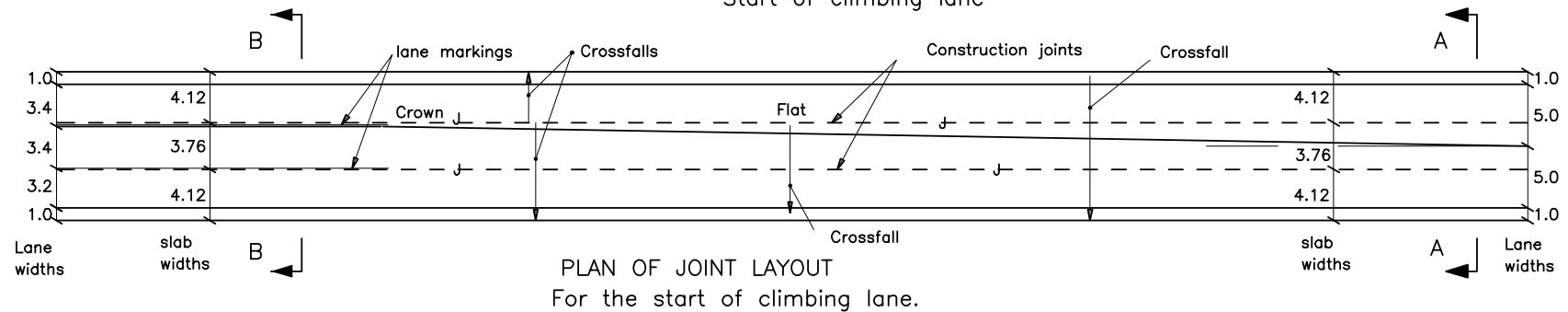




SECTION A-A  
Standard 10m carriageway



SECTION B-B  
Start of climbing lane



NOTES

1. All DIMENSIONS ARE IN METRES.
2. - - J - - denotes longitudinal joint position.
3. Crossfalls will depend on curvature.
4. Crowns shall be along construction joints.

HIGHWAY CONSTRUCTION DETAILS

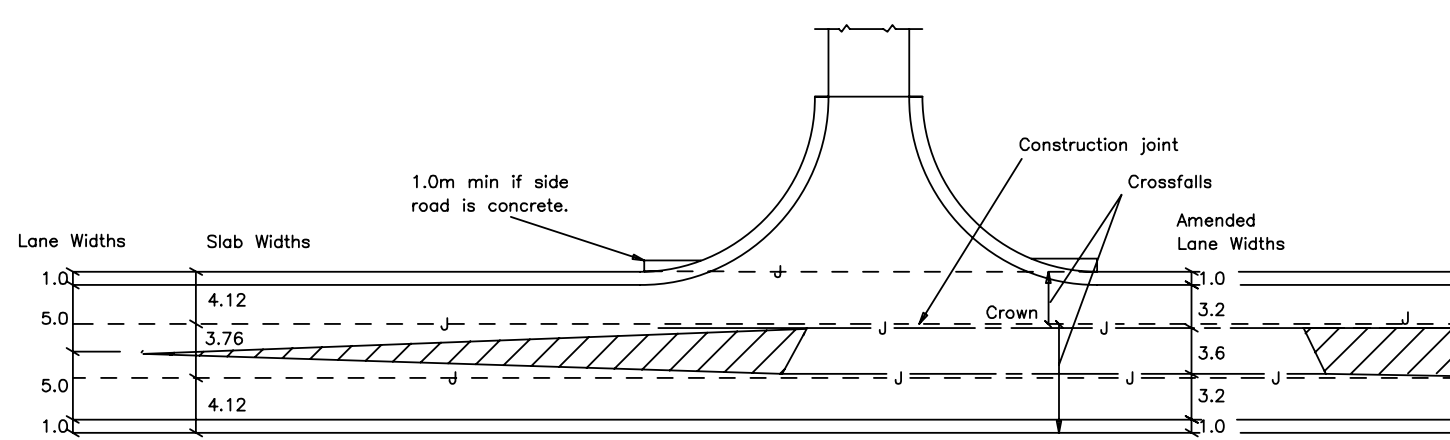
CONCRETE  
CARRIAGEWAY

B	MAY 06
A	DEC 91
Issue	Date

TYPICAL LONGITUDINAL JOINT  
POSITIONS, UNREINFORCED SLABS  
10m SINGLE CARRIAGEWAY HARDSTRIPS AND CLIMBING LANE

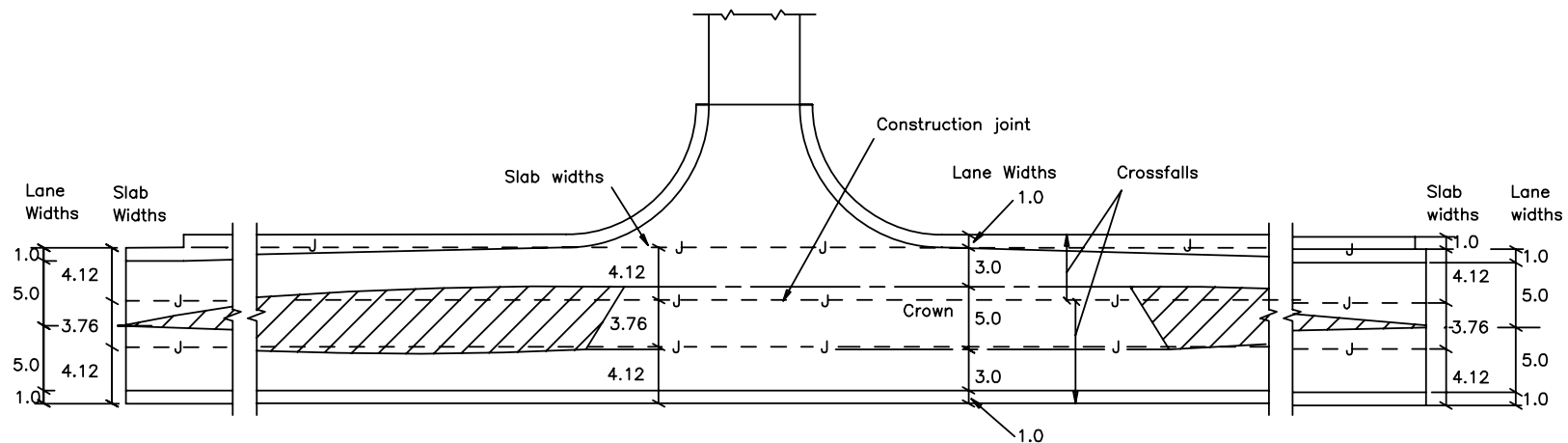
Drawing No.

C16



#### NOTES

1. ALL DIMENSIONS ARE IN METRES.
2. - - J - - denotes longitudinal joint position.
3. Crossfalls will depend on curvature.
4. Crowns shall be along construction joints.



JUNCTION LAYOUTS WITH JOINT SPACING FOR CLIMBING LANE  
Diagrammatic only. Not to scale.

HIGHWAY CONSTRUCTION DETAILS

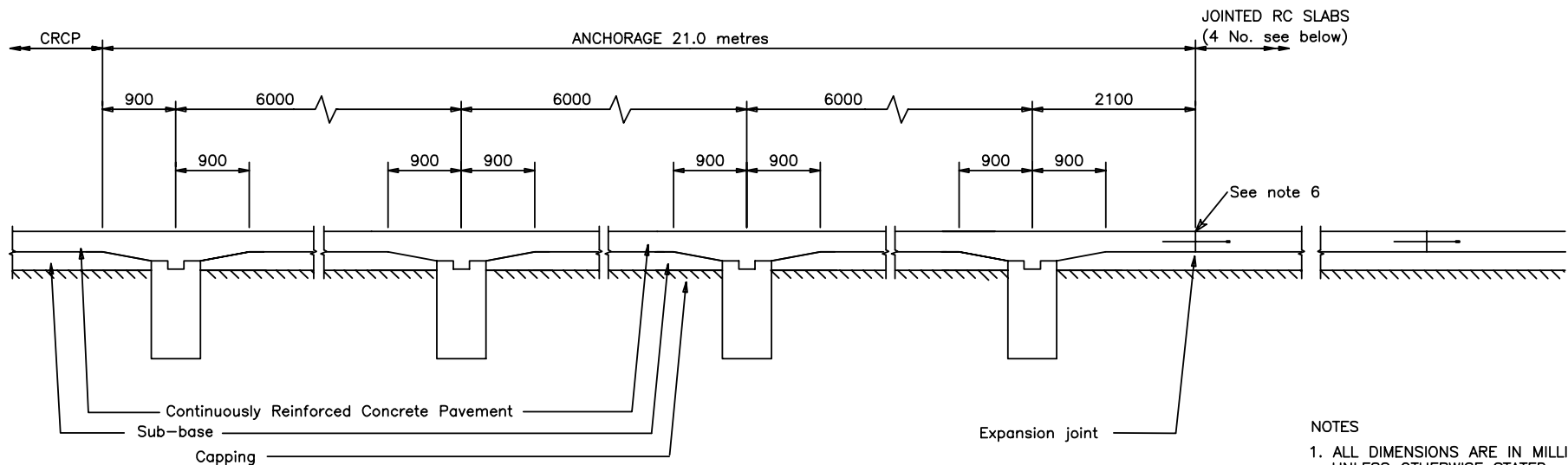
CONCRETE  
CARRIAGEWAY

C	MAY 06
B	MAR 98
A	DEC 91
Issue	Date

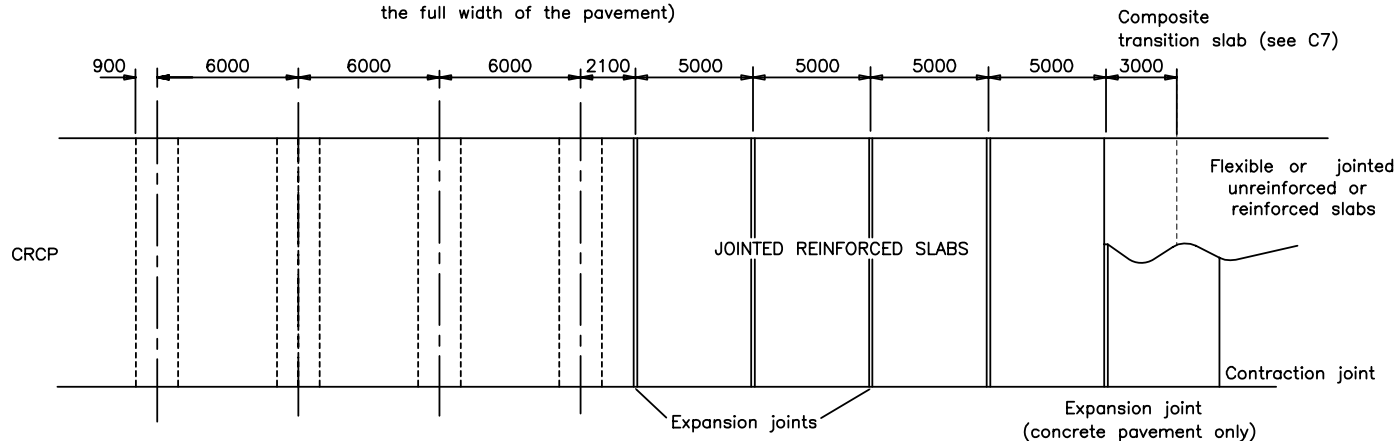
TYPICAL LONGITUDINAL JOINT  
POSITIONS, UNREINFORCED SLABS  
10m SINGLE CARRIAGEWAY WITH JUNCTION

Drawing No.

C17



LONGITUDINAL SECTION OF ANCHORAGE  
(Ground beams are to be constructed across the full width of the pavement)



PLAN OF ANCHORAGE AND ADJACENT SLABS

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. Anchorages are required at
  - (a) each end of a CRCP carriageway.
  - (b) close to both sides of underbridges where the level of the bridge deck is approximately in line with the road surface. Anchorages are not required adjacent to buried underbridges such as box culverts, where the CRCP can be laid over the top.
3. Where anchorages are provided close to underbridges, the base adjacent to the structure shall be a minimum of 5m of flexible base.
4. For details of ground beams see Drawing No. C19.
5. Where a kerb is required along the anchorage the additional width may be unreinforced if tied to the CRC slab.
6. When concrete pavement is overlaid with 40mm to 180mm thick bituminous surfacing, the overlay shall be saw-cut and sealed at the concrete pavement joint in accordance with Clause 713 and HCD Drawing Number C2 at expansion joints and HCD Drawing Number C3 at contraction joints.

HIGHWAY CONSTRUCTION DETAILS

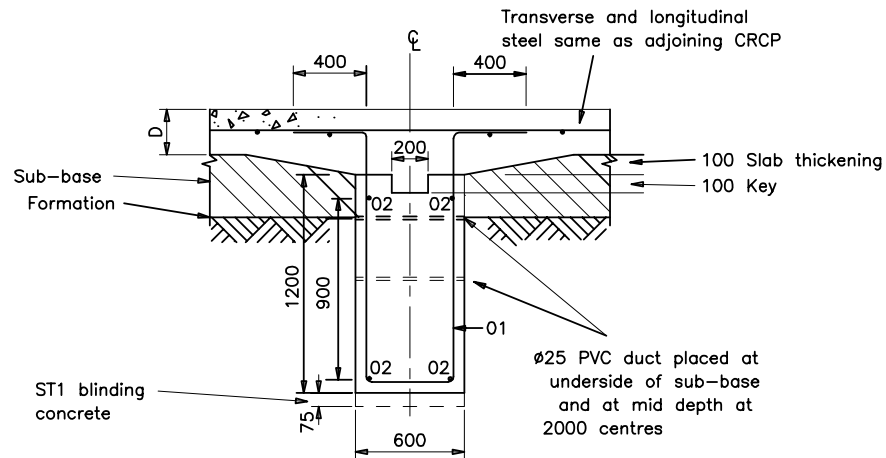
CONCRETE  
CARRIAGEWAY

E	MAY 02
D	MAY 01
C	MAR 98
B	AUG 94
A	DEC 91
Issue	Date

CONTINUOUSLY REINFORCED  
CONCRETE PAVEMENT  
GROUND BEAM ANCHORAGE

Drawing No.

C18



GROUND BEAM  
(4 No. in anchorage)

BAR SCHEDULE FOR REINFORCEMENT

MEMBER	BAR Mk	TYPE & SIZE	No.OF Mbrs	No.IN EACH	TOTAL No.	LENGTH OF EACH #	SHAPE CODE	A *	B *	C *	D *	E *
BEAMS	01	H16	4	**	**	3900	44	400	1375	480	1375	—
BEAMS	02	H16	4	4	16	**	00	**	—	—	—	—

\*\* Varies with width of anchorage

\* Specified to nearest 5mm

# Specified to nearest 25mm

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. Concrete in ground beams to be strength class C25/30 cast in trench below formation level or sub-base surface.
3. Reinforcement shall conform to Clause 1008.
4. Beam reinforcement cover to be  $60 \pm 10$ .

HIGHWAY CONSTRUCTION DETAILS

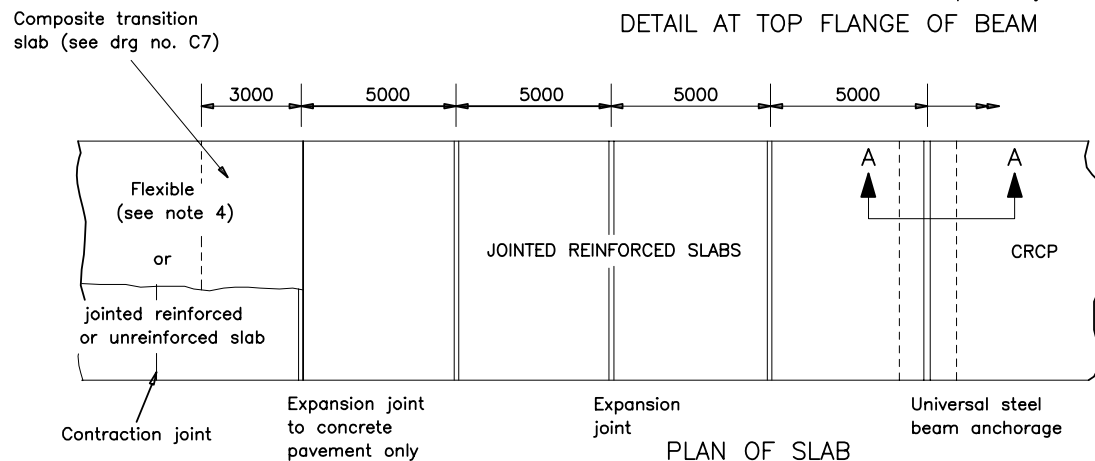
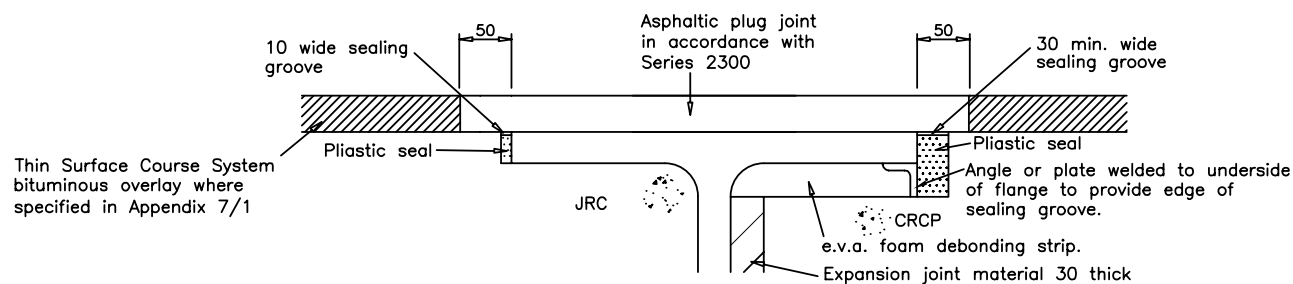
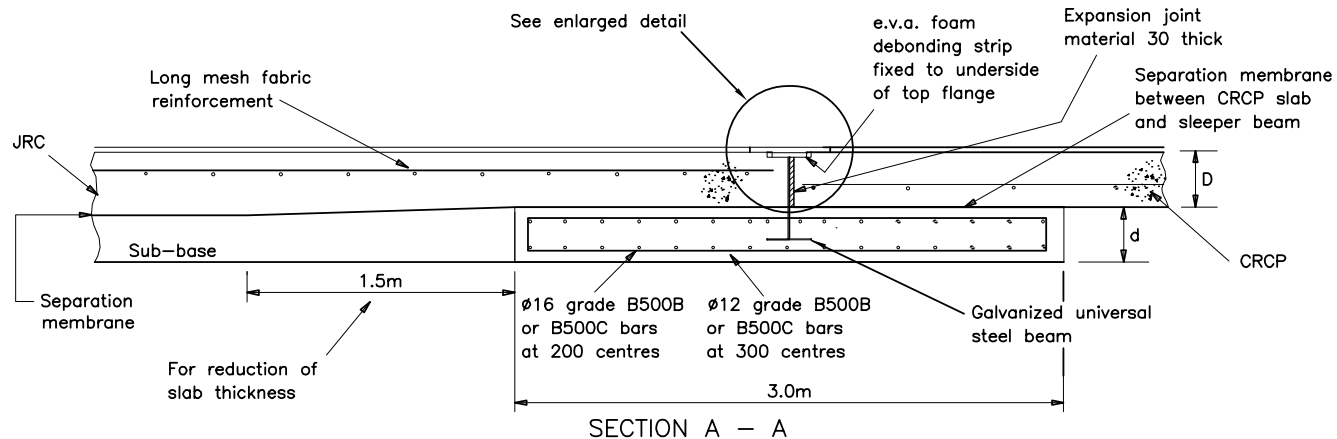
CONCRETE  
CARRIAGEWAY

C	MAY 06
B	FEB 04
A	DEC 91
Issue	Date

CONTINUOUSLY REINFORCED  
CONCRETE PAVEMENT  
GROUND BEAM ANCHORAGE DETAILS

Drawing No.

C19



#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. This type of anchorage is an alternative to the ground beam anchorage (see C18 and C19) for CRCP surface slabs only.
3. Minimum cover to sleeper beam reinforcement to be 50.
4. Anchorages are required at
  - (a) each end of a CRCP carriageway.
  - (b) close to both sides of underbridges where the level of the bridge deck is approximately in line with the road surface. Anchorages are not required adjacent to buried underbridges such as box culverts, where the CRCP can be laid over the top.
5. Where anchorages are provided close to underbridges, the base adjacent to the structure shall be a minimum of 5m of flexible base.
6. Reinforcement shall conform to Clause 1008.

CRCP Slab Depth D	Min Sleeper Beam Depth d	BS4 Universal Beam Size
200	210	
210	200	305 X 127 X 48
220	190	
230	180	
240	220	356 X 171 X 67
250	210	

HIGHWAY CONSTRUCTION DETAILS

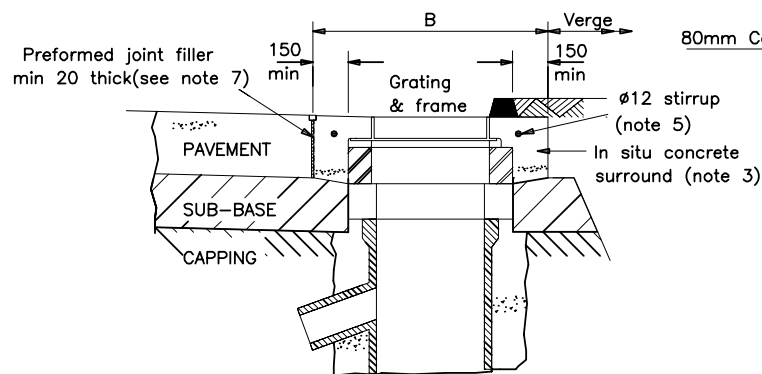
CONCRETE  
CARRIAGEWAY

E	MAY 06
D	MAY 01
C	MAR 98
B	AUG 94
A	DEC 91
Issue	Date

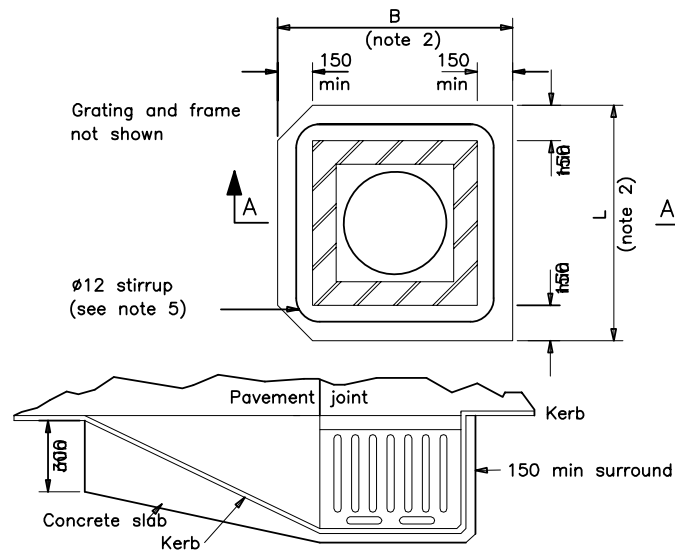
CONTINUOUSLY REINFORCED  
CONCRETE PAVEMENT SURFACE SLABS  
UNIVERSAL STEEL BEAM ANCHORAGE

Drawing No.

C20



SECTION A-A



GULLY OUTSIDE EDGE OF PAVEMENT  
Especially with CRCP & CRCB

## GULLIES WITHIN THE PAVEMENT

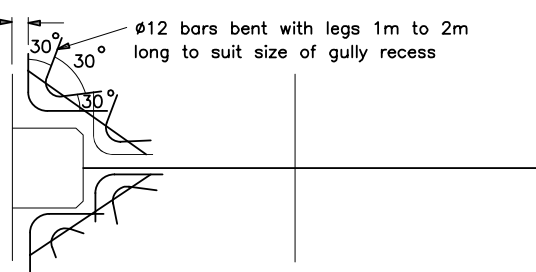


FIG. 1 JOINT WITHIN GULLY DIMENSION  
(Preferred position)

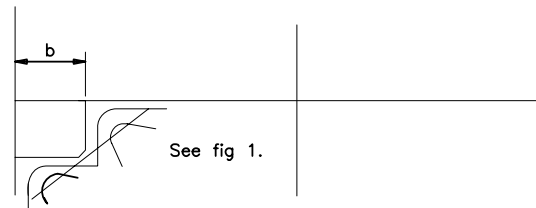


FIG. 2 JOINT ADJACENT TO GULLY

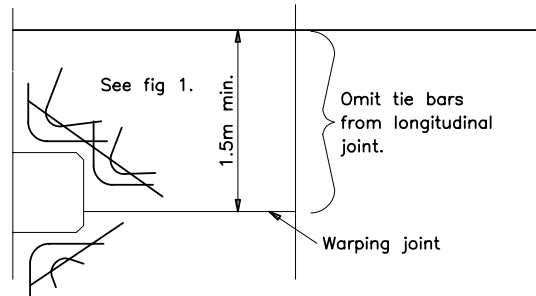


FIG. 3 EXTRA JOINT AT GULLY POSITION

## NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
2. The overall dimensions of the recess may vary in accordance with the type of grating used.
3. Concrete surround to be strength class C32/40.
4. All reinforcement to conform to Clause 1008.  
Cover to bars to be  $60 \pm 10$  vertically and horizontally.
5. The  $\phi 12$  stirrup shall be cut and bent to such dimensions as allow it to be placed centrally within the surround. An overlap of 450 shall be provided in closing the stirrup.
6. Normal joint positions may be adjusted by up to 1m so that the gully is astride or adjacent to the joint. If this is impossible an extra joint shall be formed in the lane at the gully position and shall be a tied warping joint.
7. The gully slab shall be isolated from the pavement at all joints by joint filler board for the full depth of the slab and joints shall be sealed.
8. For details of drainage see HCD, Series F drawings.

HIGHWAY CONSTRUCTION DETAILS

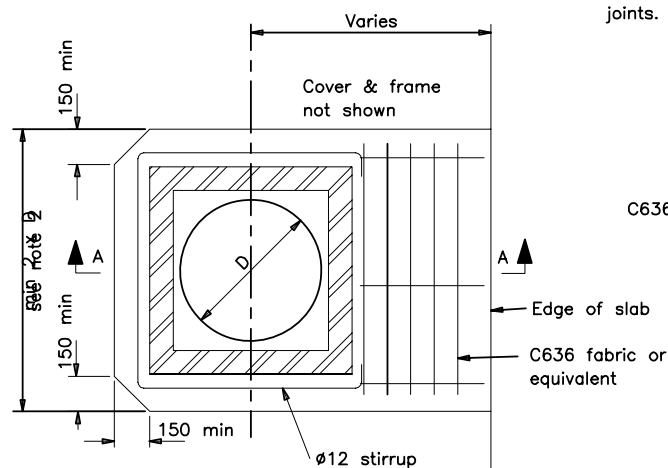
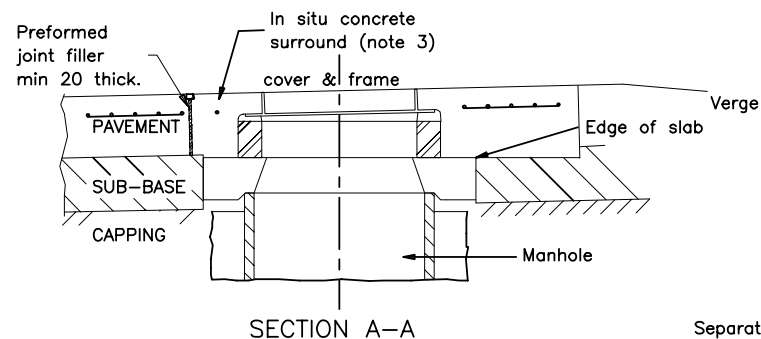
CONCRETE  
CARRIAGEWAY

C	MAY 06
B	MAY 04
A	DEC 91
Issue	Date

CONCRETE SURROUND TO GULLIES  
IN JOINTED CONCRETE PAVEMENT

Drawing No.

C21



INSITU CONCRETE SURROUND DETAILS

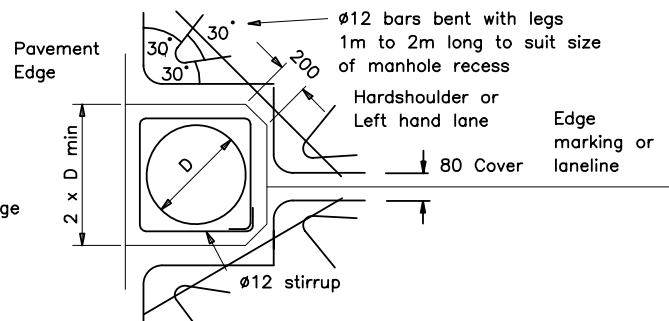


FIG. 1 JOINT WITHIN MANHOLE DIMENSION

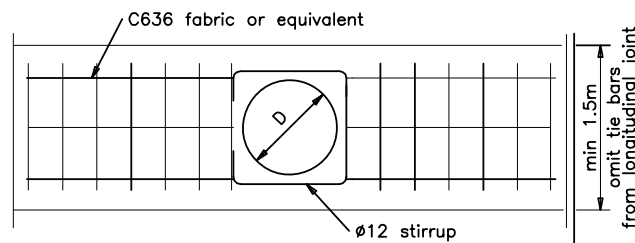


FIG. 2 JOINT ADJACENT TO MANHOLE SLAB

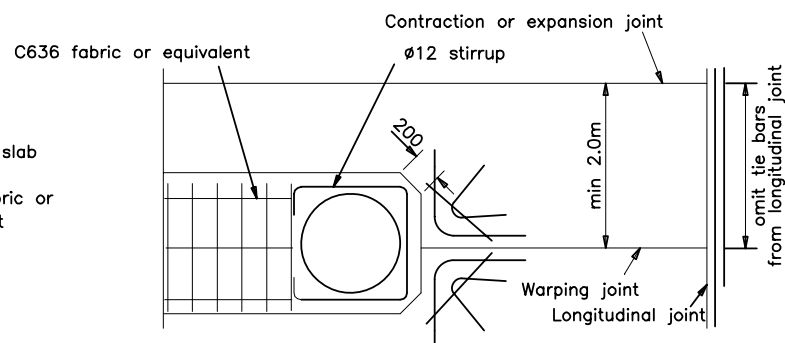


FIG. 3 EXTRA JOINT AT MANHOLE POSITION TO BE A WARPING JOINT

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
2. The overall dimensions of the recess may vary in accordance with the type of manhole and cover used.
3. Concrete surround to be strength class C32/40.
4. Reinforcement shall conform to Clause 1008. Cover to bars to be  $60 \pm 10$  vertically and  $80 \pm 10$  horizontally.
5. Normal joint spacings may be adjusted by up to 1m so that the manhole is astride or adjacent to the joint as shown in figs 1 & 2. If this is not possible an extra joint shall be formed in that lane at the manhole position as in fig 3, and that joint shall be a warping joint.
6. The manhole slab shall be isolated from the pavement by joint filler board at all joints, without dowels or tie bars, and the joint shall be sealed.
7. For manhole details see HCD, Series F drawings.

HIGHWAY CONSTRUCTION DETAILS

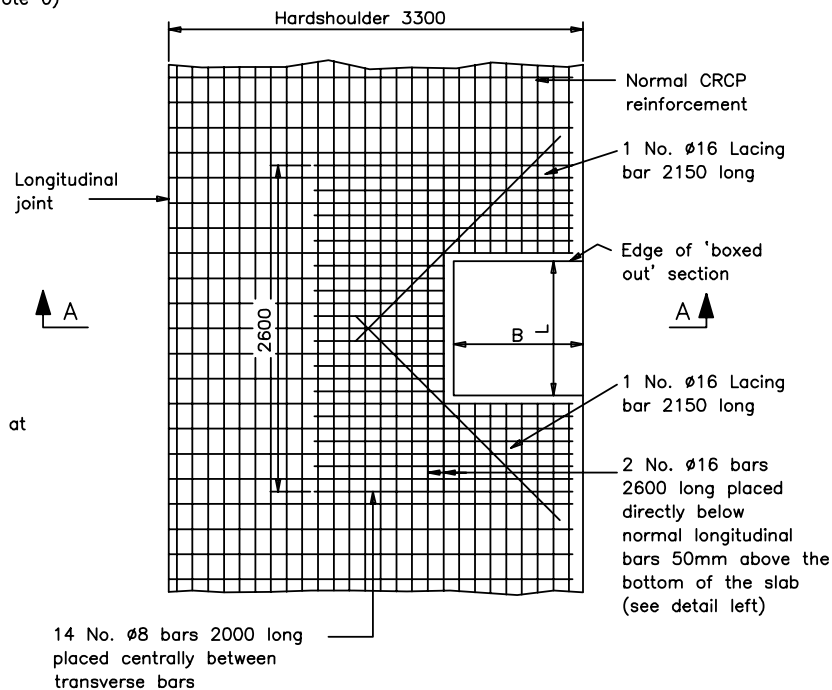
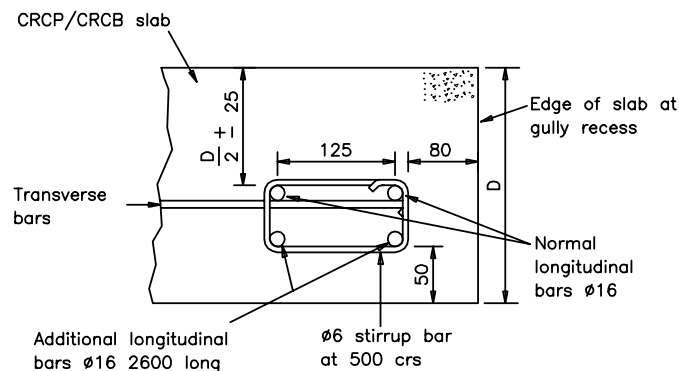
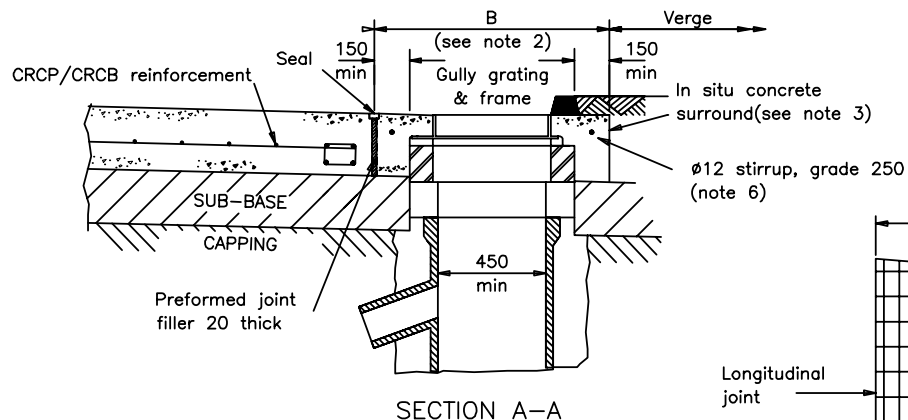
CONCRETE CARRIAGEWAY

C	MAY 06
B	FEB 04
A	DEC 91
Issue	Date

CONCRETE SURROUND TO MANHOLES IN JOINTED CONCRETE PAVEMENT

Drawing No.

C22



#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. The overall dimensions of the opening may vary in accordance with the type of gully grating used.
3. Concrete surround to be strength class C32/40.
4. Normal transverse reinforcement near opening to be strengthened by additional Ø8 bars placed centrally between the transverse bars.
5. Reinforcement shall conform to Clause 1008.
6. The Ø12 stirrup shall be cut and bent to such dimensions as allow it to be located centrally within the surround. 450 overlap shall be provided in closing the stirrup.
7. For gully details see HCD, Series F drawings.

HIGHWAY CONSTRUCTION DETAILS

CONCRETE  
CARRIAGEWAY

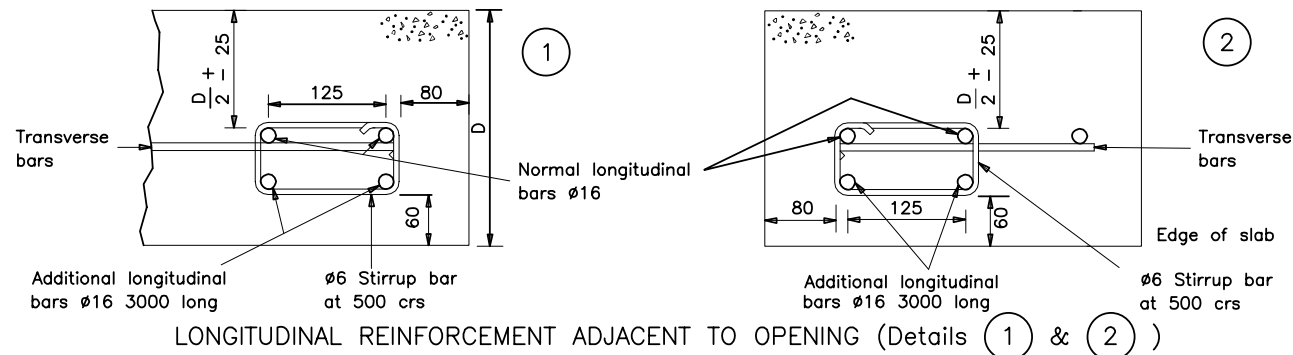
D	MAY 06
C	MAY 04
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A	DEC 91
Issue	Date

GULLIES IN CONTINUOUSLY  
REINFORCED CONCRETE PAVEMENT  
OR REINFORCED CONCRETE BASE

Drawing No.

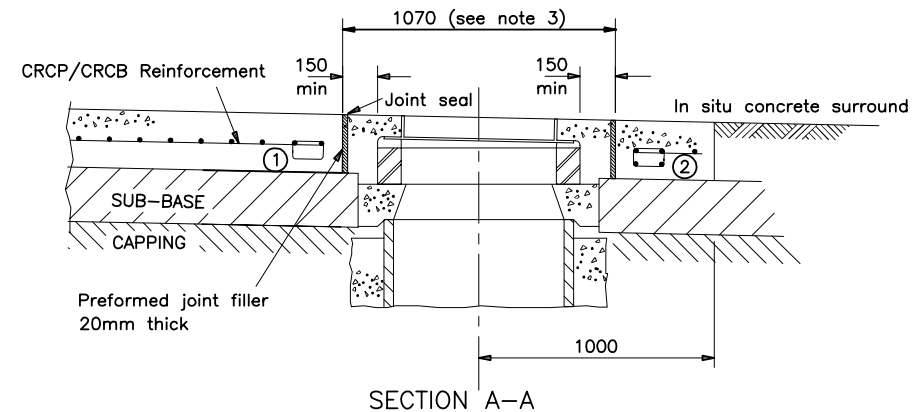
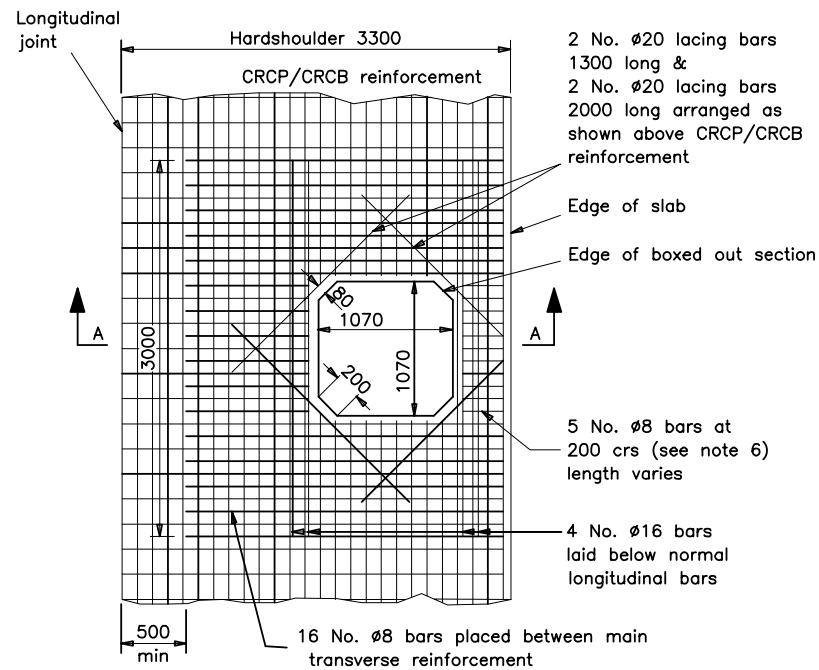
C23





#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. The dimensions of the sealing groove and the method of sealing shall comply with the Specification.
3. The overall dimensions the opening may vary in accordance with the type of manhole and cover used.
4. Concrete to be of pavement quality concrete strength class C32/40.
5. Normal transverse reinforcement near opening to be strengthened by additional  $\phi 8$  bars placed centrally between the transverse bars.
6. Reinforcement shall conform to Clause 1008.
7. For manhole details see HCD, Series F drawings.



DETAILS OF MANHOLE RECESS & CRCP/CRCB REINFORCEMENT

HIGHWAY CONSTRUCTION DETAILS

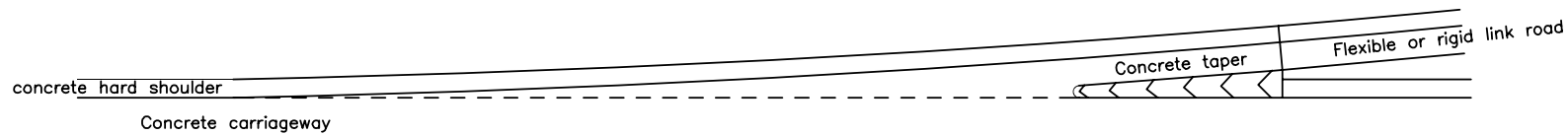
CONCRETE  
CARRIAGEWAY

C	MAY 06
B	FEB 04
A	DEC 91
Issue	Date

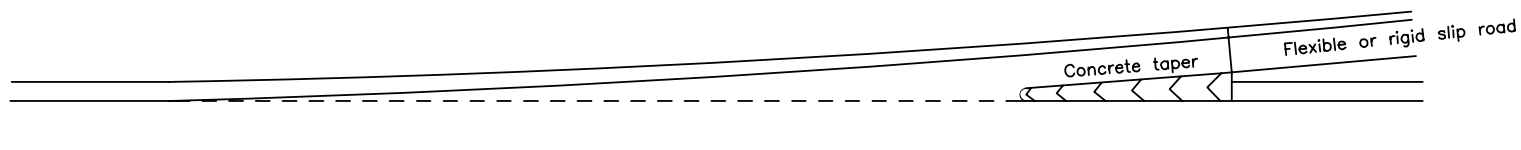
MANHOLES IN CONTINUOUSLY  
REINFORCED CONCRETE PAVEMENT  
OR REINFORCED CONCRETE BASE

Drawing No.

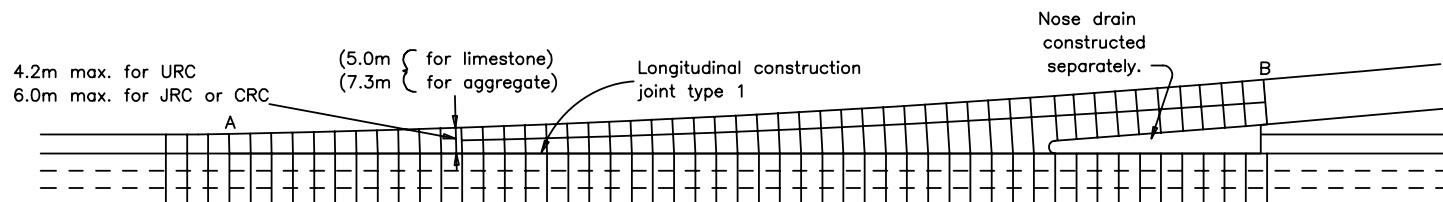
C24



LINK ROAD

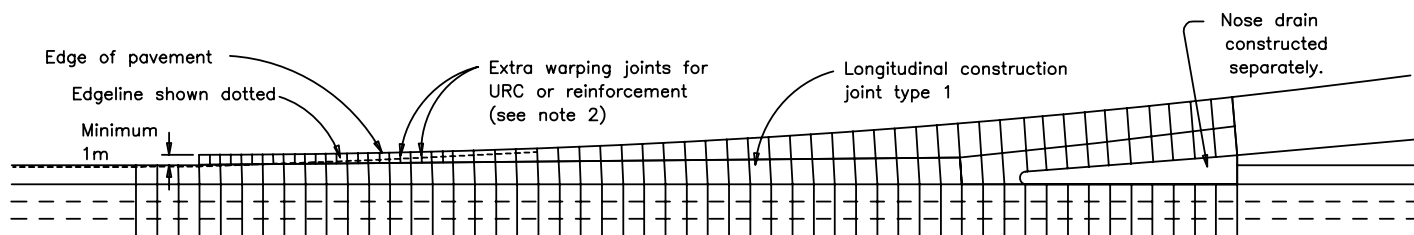


SLIP ROAD



TYPICAL JOINT LAYOUT – TAPER CONSTRUCTED SEPARATELY

Hardshoulder or hardstrip omitted between A and B



TYPICAL JOINT LAYOUT – TAPER ADDED TO STANDARD WIDTH PAVEMENT

NOTES

1. Typical layout only. See the Drawings for dimensioned layout.
2. Tapers shall be of the same thickness as the concrete carriageway. If unreinforced, slabs with an aspect ratio of  $>2.5$  (3.0 for limestone) shall be reinforced as in Drawing no. C26.
3. The transition between rigid and flexible construction shall be a transition bay as in Drawing nos. C7/1, C7/2 and C7/3.
4. Transverse joint spacings are shown as for URC. If the carriageway is JRC or CRC the taper shall be JRC, with appropriate joint spacings. If carriageway has CRCB, the taper shall have CRCB.

HIGHWAY CONSTRUCTION DETAILS

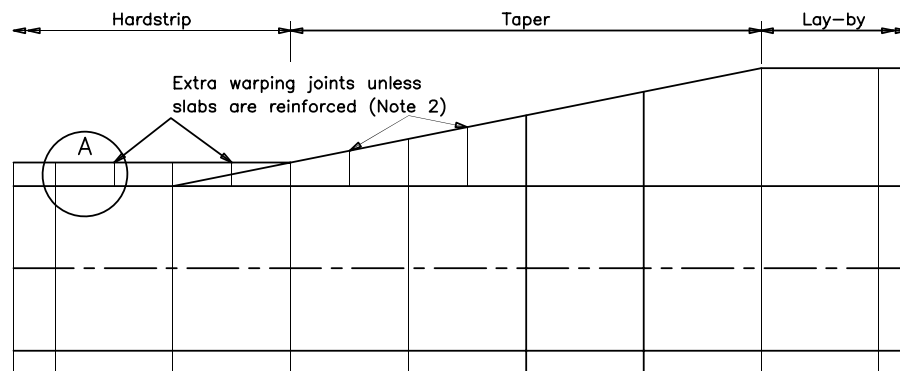
CONCRETE  
CARRIAGEWAY

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SLIP ROAD AND LINK ROAD TAPER  
CONSTRUCTION AND JOINT LAYOUT

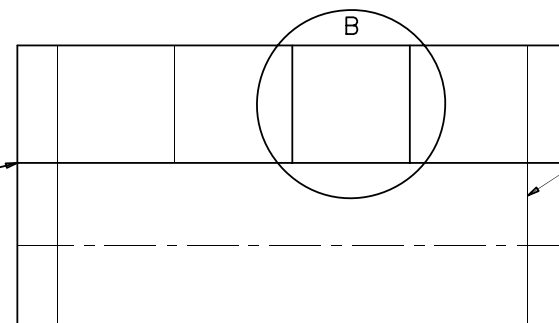
Drawing No.

C25

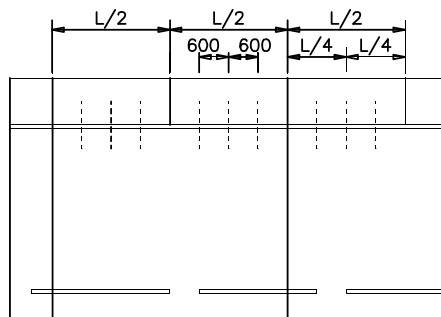


ROAD WITH HARDSTRIP, TAPER AND LAY-BY OR SLIP ROAD CONSTRUCTED SEPARATELY FROM CARRIAGEWAY

CONSTRUCTION JOINT

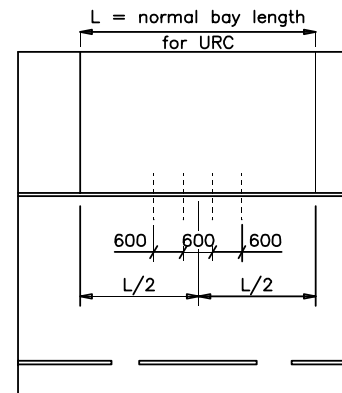


UNREINFORCED HARDSHOULDER, LAY-BY OR HARDSTRIP ADJACENT TO REINFORCED CARRIAGEWAY (JRC OR CRCP)



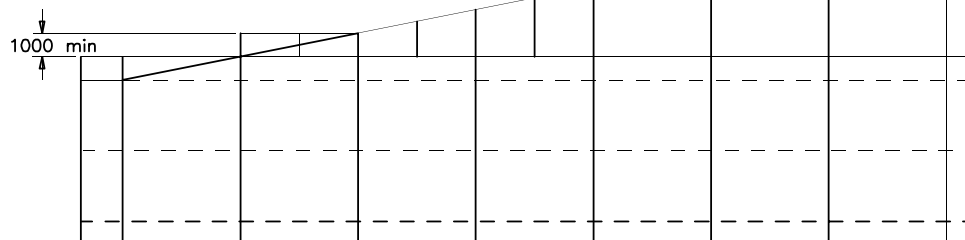
DETAIL AT A  
Unreinforced hardstrip.  
Layout of tie bars

DETAIL AT B  
Unreinforced bays next to  
reinforced carrieway.  
Layout of tie bars



#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Hardshoulders, hardstrips, Lay-bys and tapers shall be of the same thickness as the concrete carrieway. Surface slabs with an aspect ratio  $>2.5$  (3.0 for limestone) shall be reinforced with the same reinforcement as main slab, if JRC. If URC, minimum reinforcement shall be standard mesh C636, to Clause 1008.
3. Transverse joints at normal positions shall be expansion or contraction joints. Extra joints to reduce slab length shall be warping joints.
4. See the Drawings for dimensions for tapers, lay-bys, etc.



ALL PURPOSE ROAD CONSTRUCTED AS ONE PIECE WITH SEPARATE LAY-BY OR SLIP ROAD

LONGITUDINAL JOINT POSITIONS (See Drg no. C11)

- ← Type 1
- ← Type 1 or 2
- ← Type 1 or 2
- ← Type 1 or 2

HIGHWAY CONSTRUCTION DETAILS

CONCRETE  
CARRIAGEWAY

B	MAY 06
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JOINT LAYOUT FOR  
HARDSHOULDERS, HARDSTRIPS  
AND LAY-BYS

Drawing No.

C26

WHITE (Unidirectional)

Spacing	
18 metres	Main carriageway and 7.3 m link road lane markings (General use)
9 metres	(1) Main carriageway and 7.3 m link road lane markings where radius is less than 450 m. (2) Main carriageway and 7.3 m link road lane markings where fog is prevalent.

RED (unidirectional)

Spacing	
18 metres	Nearside edge of carriageways * (General use)
9 metres	(1) Nearside edge of carriageways * where radius is less than 450 m. (2) Nearside edge of carriageways * where fog is prevalent. (3) Nearside edge of merge and diverge – see Drawing No. D2.
3 metres	At both sides of nose at edge of carriageway * – see Drawing No. D2.

\* (Main, Slip and Link Roads)

AMBER/RED (bidirectional) Amber reflectors to face oncoming traffic in normal conditions

Spacing	
18 metres	Offside edge of carriageways * (General use)
9 metres	(1) Adjacent to offside hatching when number of lanes reduced. (2) Offside edge of carriageways * where radius is less than 450 m. (3) Offside edge of carriageways * where fog is prevalent. (EXCEPTION: When adjoining chevron markings for nose at a merge or diverge – see Drawing No. D2.

\* (Main, Slip and Link Roads)

GREEN (unidirectional)

Spacing	
8 metres	Across merging/diverging tapers at standard junctions – see drawing No. D2
8 metres	At lane drop junctions, commencing at final ADS – see drawing No. D5
18 metres	At lane drop junctions, commencing at 1/2 mile ADS – see drawing No. D5

Studs should not be used in permanent positions  
in the constructed carriageway where temporary  
ends occur and where the studs will conflict  
with temporary arrangements

HIGHWAY CONSTRUCTION DETAILS

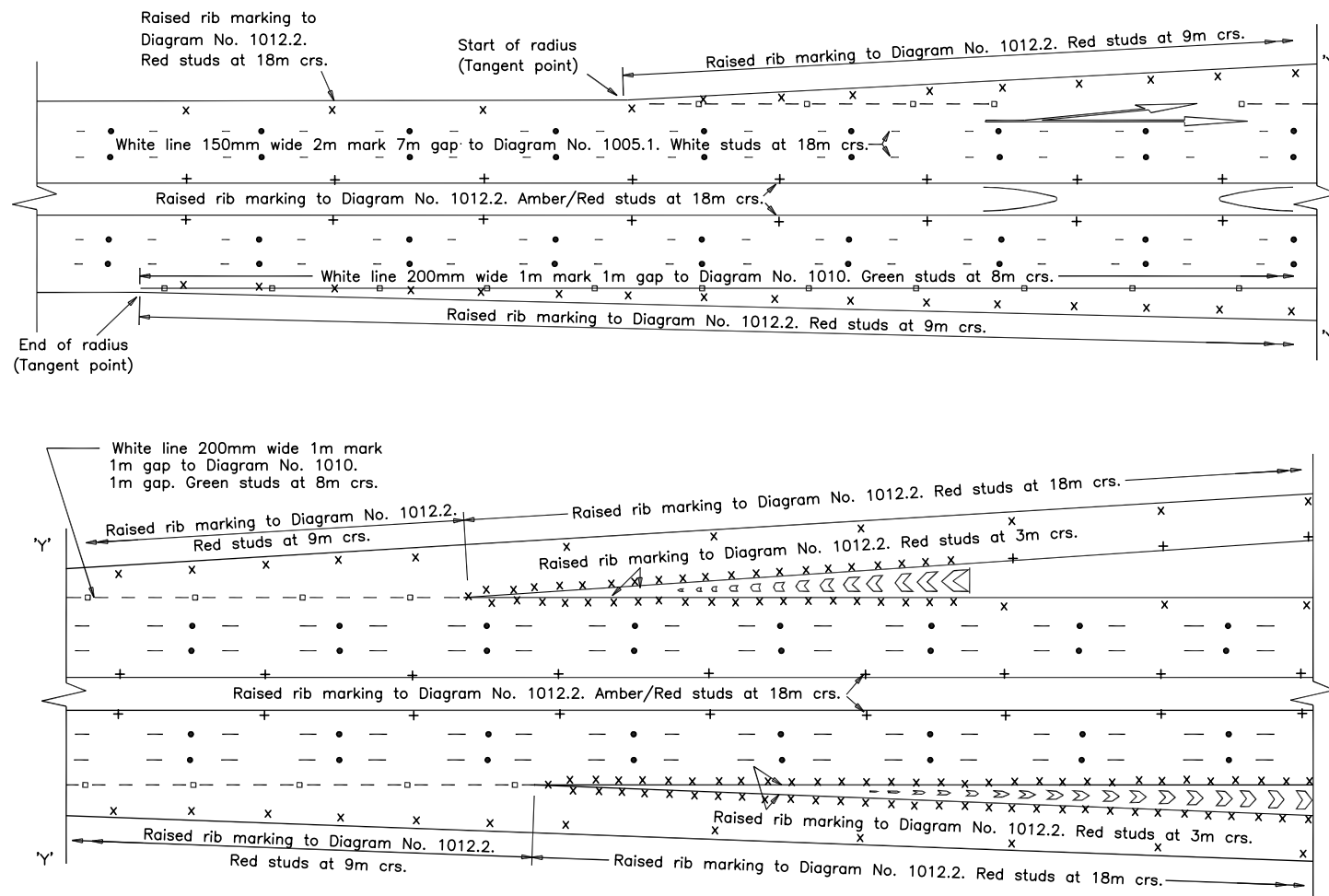
CARRIAGEWAY  
MARKINGS FOR  
RURAL MOTORWAYS

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GENERAL NOTES FOR  
RETROREFLECTING ROAD STUDS

Drawing No.

D1



#### NOTES

1. Road markings shall comply with The Traffic Signs Regulations and General Directions 2002 (Statutory Instrument 2002 No. 3113) or The Traffic Signs Regulations (Northern Ireland) 1997.
2. These details do not apply where the number of lanes is being altered. In these cases the layout will be shown on the Drawings. See also Drawing No. D5.
3. For details of individual lane markings see the Drawings.
4. For details of chevron markings see Drawing No. D4.
5. For details and location of arrow see Drawing No. D3.
6. Where amber/red, red retroreflecting road studs are of the depressible they shall be positioned in relation to the edge of carriageway lines as shown on the plan. Where non-depressible studs are used they shall be positioned on the opposite side of the edge-lines so as to reduce the effects of over-running, unless otherwise specified in Appendix 12/3.

#### KEY (Retroreflecting Road Studs)

- x = Red Unidirectional
- = White Unidirectional
- + = Amber/Red Bidirectional
- = Green Unidirectional

HIGHWAY CONSTRUCTION DETAILS

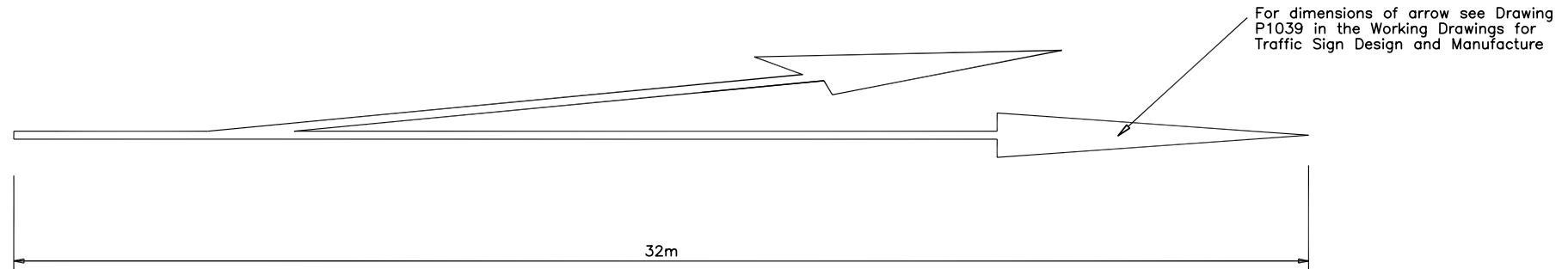
CARRIAGEWAY  
MARKINGS FOR  
RURAL MOTORWAYS

D	NOV 08
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B	MAY 01
A	DEC 91
Issue	Date

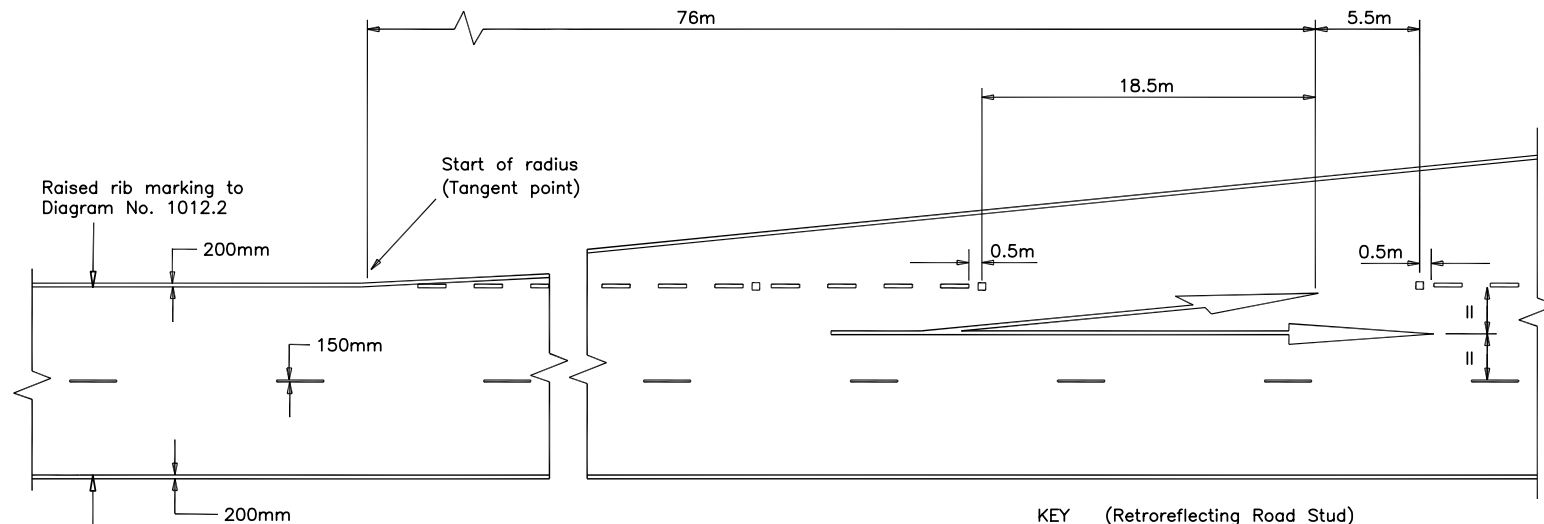
TYPICAL LAYOUT OF MARKINGS  
FOR STANDARD  
MERGING AND DIVERGING LANES

Drawing No.

D2



ARROW TO DIAGRAM No. 1039



LOCATION OF ARROW

KEY (Retroreflecting Road Stud)

□ Green Unidirectional

NOTE: Red, white and amber/red studs omitted for clarity.

NOTES

1. Road markings shall comply with The Traffic Signs Regulations and General Directions 2002 (Statutory Instrument 2002 No.3113) or The Traffic Signs Regulations (Northern Ireland) 1997.
2. This detail is associated with Drawing No. D2.

HIGHWAY CONSTRUCTION DETAILS

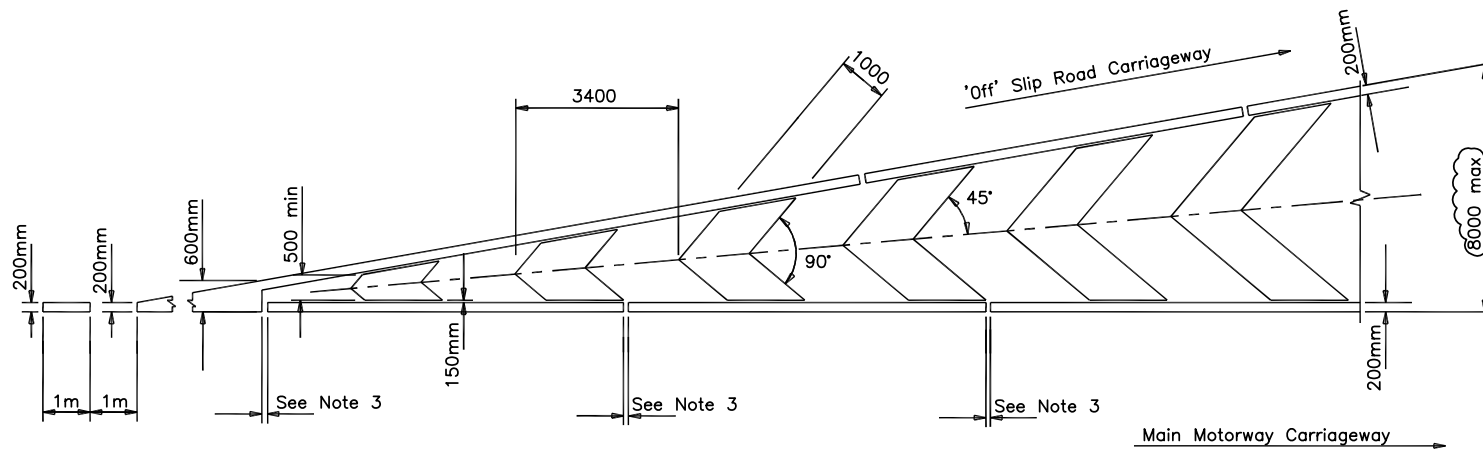
CARRIAGEWAY  
MARKINGS FOR  
RURAL MOTORWAYS

C	AUG 03
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A	DEC 91
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DETAIL AND TYPICAL LOCATION  
OF ARROW TO INDICATE TO TRAFFIC  
THE ENTRANCE TO A STANDARD  
DIVERGING LANE

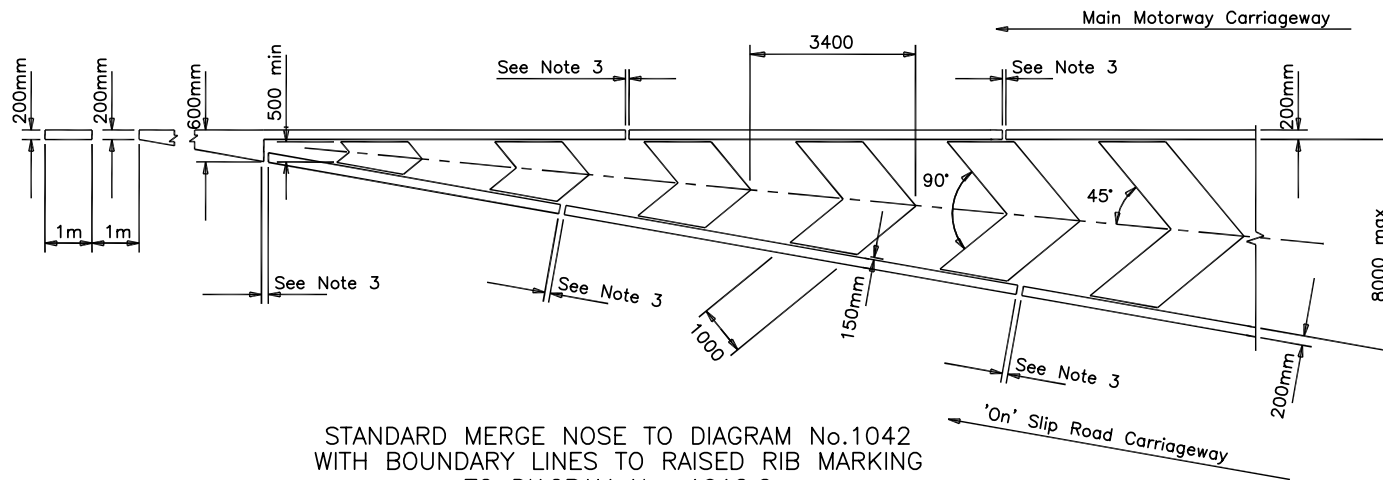
Drawing No.

D3



STANDARD DIVERGE NOSE TO DIAGRAM No.1042  
WITH BOUNDARY LINES TO RAISED RIB MARKING  
TO DIAGRAM No. 1012.2

NOTE:  
On both details studs  
omitted for clarity.



STANDARD MERGE NOSE TO DIAGRAM No.1042  
WITH BOUNDARY LINES TO RAISED RIB MARKING  
TO DIAGRAM No. 1012.2

#### NOTES

1. Road markings shall comply with The Traffic Signs Regulations and General Directions 2002 (Statutory Instrument 2002 No. 3113) or The Traffic Signs Regulations (Northern Ireland) 1997.
2. This detail is associated with Drawing Nos. D2 and D5.
3. The boundary lines may be provided with 25 to 50mm gaps at irregular intervals, where ponding is expected, to promote free surface water drainage.

HIGHWAY CONSTRUCTION DETAILS

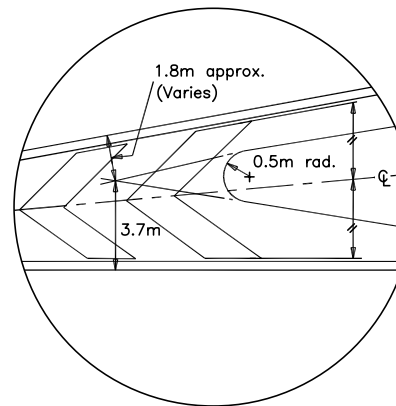
CARRIAGEWAY  
MARKINGS FOR  
RURAL MOTORWAYS

C	AUG 03
B	MAY 01
A	DEC 91
Issue	Date

TYPICAL CHEVRON MARKINGS FOR  
STANDARD NOSES

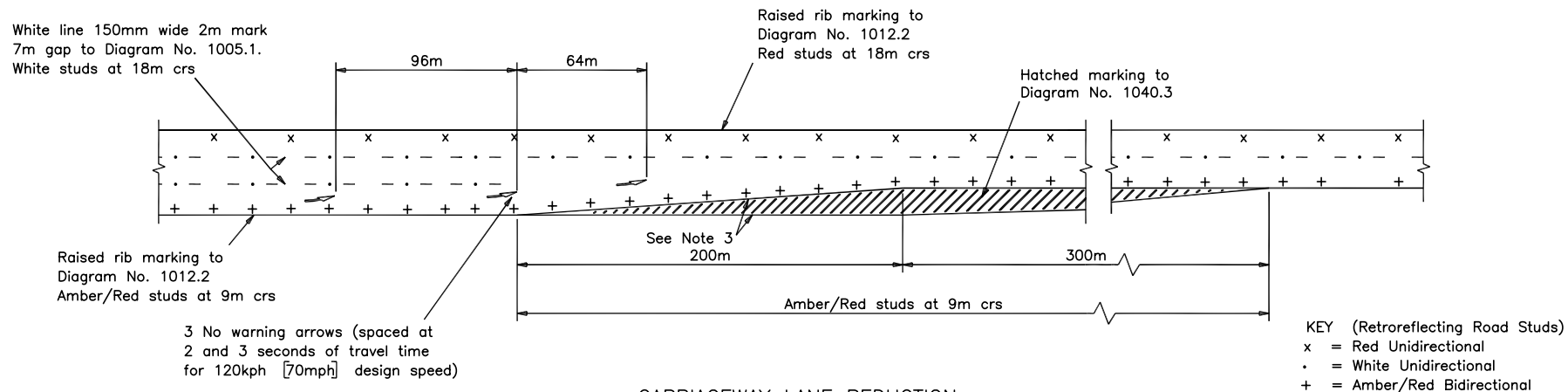
Drawing No.

D4



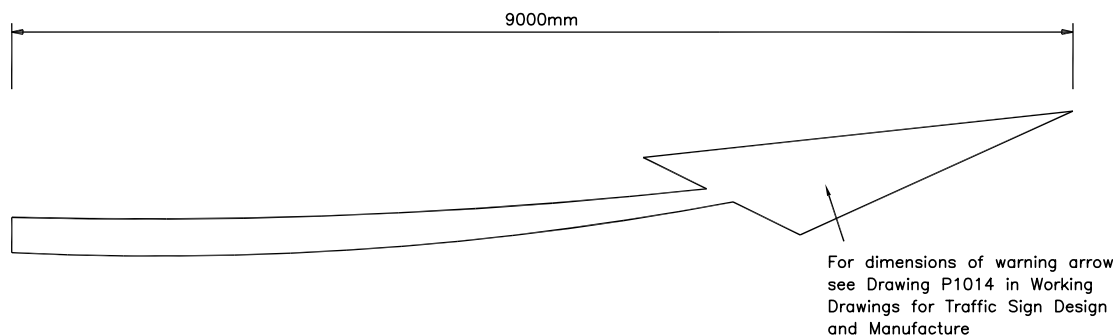
## HIGHWAY CONSTRUCTION DETAILS





#### CARRIAGEWAY LANE REDUCTION

3 to 2 lanes. Termination of offside lane shown.  
Authorization shall be required for reverse hatching for termination of nearside lane (in this case the nearside studs will be red at 9m centres adjacent to the hatching)



WARNING ARROW TO DIAGRAM No. 1014

#### NOTES

1. Road markings shall comply with The Traffic Signs Regulations and General Directions 2002 (Statutory Instrument 2002 No. 3113) or The Traffic Signs Regulations (Northern Ireland) 1997.
2. Wherever possible lane reduction should take place at interchanges (see Drawing No. D5).
3. The boundary lines may be provided with 25 to 50mm gaps at irregular intervals, where ponding is expected, to promote free surface water drainage.

HIGHWAY CONSTRUCTION DETAILS

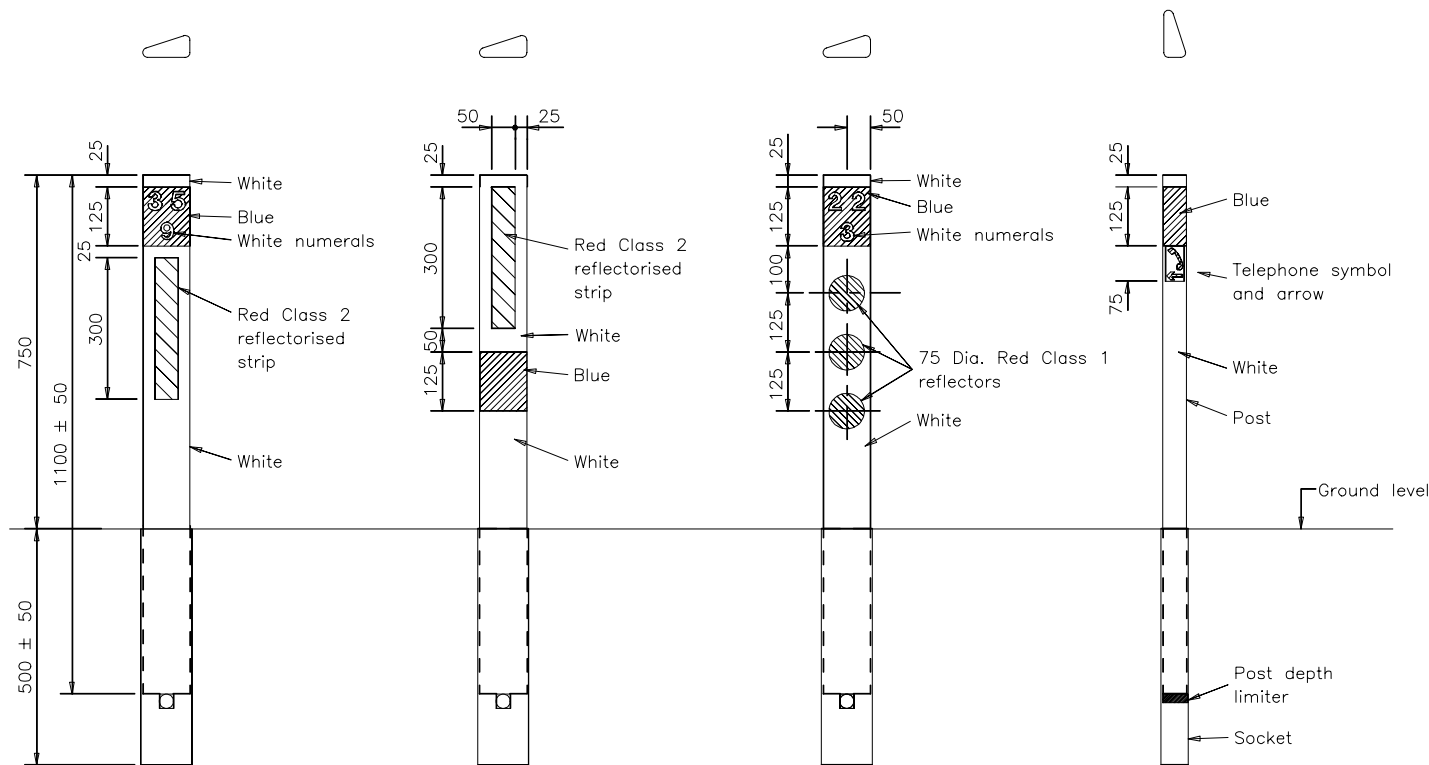
CARRIAGEWAY  
MARKINGS FOR  
RURAL MOTORWAYS

D	NOV 08
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B	MAY 01
A	DEC 91
Issue	Date

TYPICAL LANE REDUCTION  
(3 TO 2 LANE)  
AND DETAIL OF WARNING ARROW

Drawing No.

D6



TYPE 1  
VERGE  
(Traffic face)

TYPE 2  
SLIP ROAD VERGE  
(Traffic face)

TYPE 3 (see note 4)  
MOTORWAY VERGE AT  
EMERGENCY CROSSING POINT  
(Traffic face)

TYPES 1 & 3  
(Road face)

- NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES.
  2. Posts are to be located 300 to 400 outside of hardshoulder/hardstrip.
  3. Posts are to be spaced at 100m intervals along the Motorway.
  4. Type 3 posts to replace Type 1 posts on both approaches to emergency crossing point.
  5. Post faces are to be white except when shown otherwise
  6. Posts are to have PVC closed or capped tops.
  7. Type 3 post (as shown) to be fixed 300m from centre of crossing. Similar post but with lowest disc omitted to be fixed 200m from centre of crossing and a further post but with the lowest two discs omitted to be fixed 100m from the crossing point.
  8. See Drawing No. E3 for details of telephone symbol and arrow.
  9. See Drawing No. E2 for post and socket section details.

HIGHWAY CONSTRUCTION DETAILS

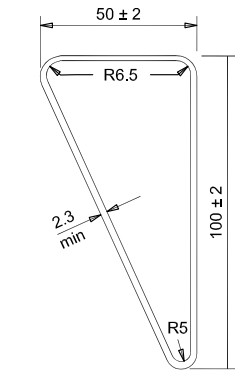
DISTANCE  
MARKER POSTS

A	DEC 91
Issue	Date

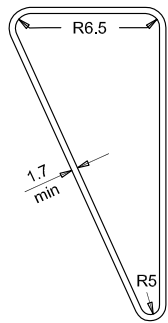
GROUND SOCKET MOUNTED  
POSTS  
TYPES 1, 2 AND 3

Drawing No.

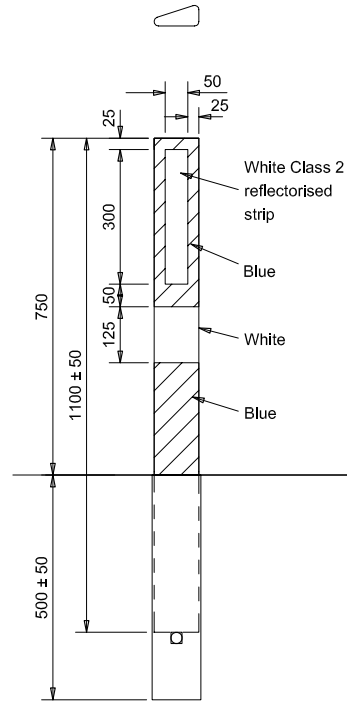
E1



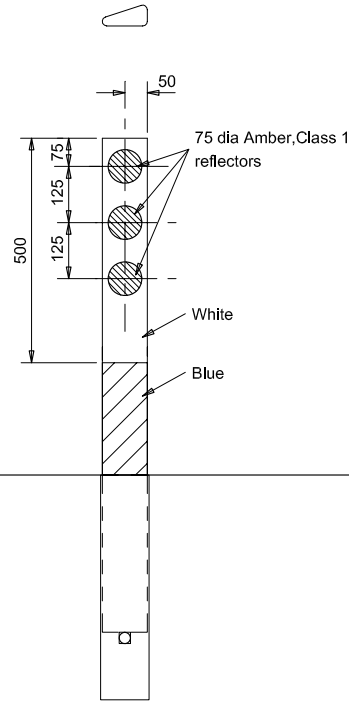
TYPES 1 TO 5  
POST SECTION



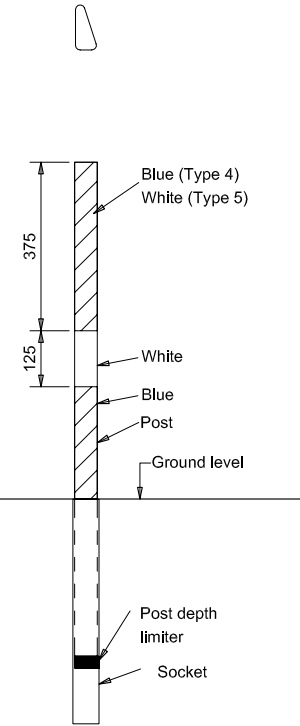
TYPES 1 TO 5  
SOCKET SECTION



TYPE 4  
CENTRAL RESERVE  
(With no safety barrier)  
AND SLIP ROAD OFFSIDE  
(Both traffic faces)



TYPE 5  
CENTRAL RESERVE  
(With no safety barrier)  
AT EMERGENCY CROSSING POINT  
(Both traffic faces)



TYPES 4 & 5  
(Both road faces)

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Posts are to be located on the centre-line of central reserves and 300 to 400 from the edge of carriageway/hardstrip on the offside of slip roads.
3. Type 5 posts to be installed on both approaches to emergency crossing point.
4. Posts are to be spaced at 100m intervals along Motorway.
5. Departure face of Type 5 post to be as Type 4 post.
6. Type 5 post (as shown) to be fixed <300m from centre of crossing. Similar post but with lowest disc omitted to be fixed <200m from centre of crossing and a further post with the lowest two discs omitted to be fixed <100m from the crossing point.
7. Post and socket sections to be similar triangular profiles with socket providing close fitting support for post.
8. Posts are to have PVC closed or capped tops.

HIGHWAY CONSTRUCTION DETAILS

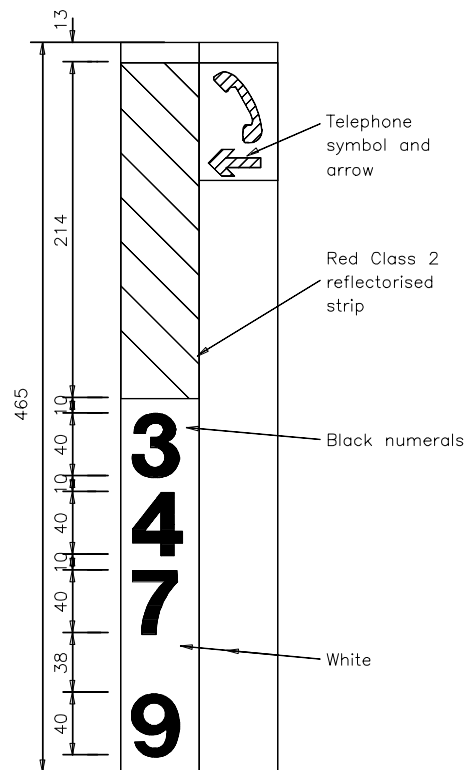
DISTANCE  
MARKER POSTS

B	NOV 06
A	DEC 91
Issue	Date

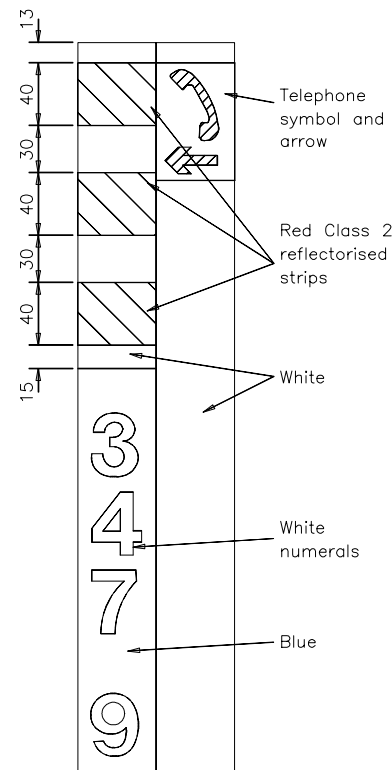
GROUND SOCKET MOUNTED  
POSTS  
TYPES 4 AND 5

Drawing No.

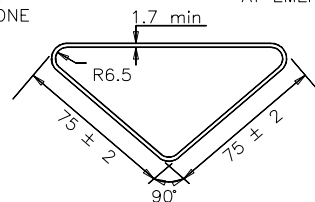
E2



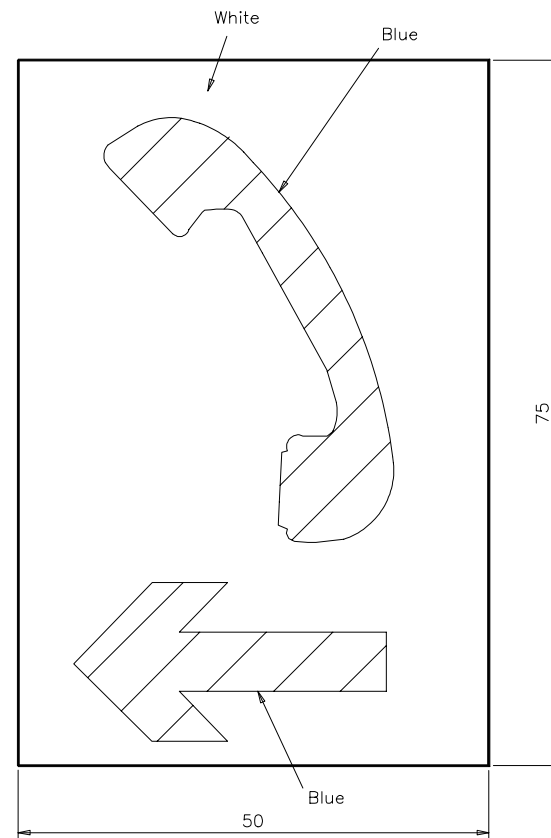
TYPE 6  
VERGE  
& SLIP ROAD VERGE (WITH  
NUMERALS & TELEPHONE  
SYMBOL OMITTED)



TYPE 7  
VERGE  
AT EMERGENCY CROSSING  
POINT



TYPES 6 & 7  
POST SECTION



TELEPHONE SYMBOL & ARROW

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Location of posts to be 50 below top of parapet or 450 above verge level in tunnels or on retaining walls
3. Type 7 posts to replace Type 6 posts on both approaches to emergency crossing point.
4. Type 7 post (As shown) to be fixed 4300m from centre of crossing. Similar post but with lowest red strip omitted to be fixed 4200m from centre of crossing and a further post with lowest two red strips omitted to be fixed 4100m from centre of crossing.
5. Posts are to have PVC closed or capped tops.
6. Posts to be fixed to wall etc. with 400x50 preformed sealant strip of tacky extruded butyl rubber.
7. The arrow under the telephone symbol shall be handed left or right according to the location of the nearest telephone. This requirement should be varied when required to direct motorists to the safest and not necessarily the nearest emergency telephone.

HIGHWAY CONSTRUCTION DETAILS

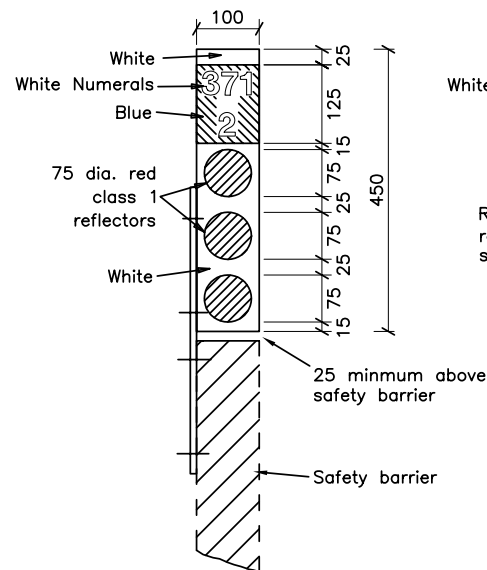
DISTANCE  
MARKER POSTS

B	AUG 93
A	DEC 91
Issue	Date

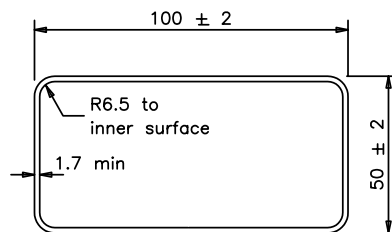
PARAPET/TUNNEL MOUNTED  
POSTS  
TYPES 6 AND 7

Drawing No.

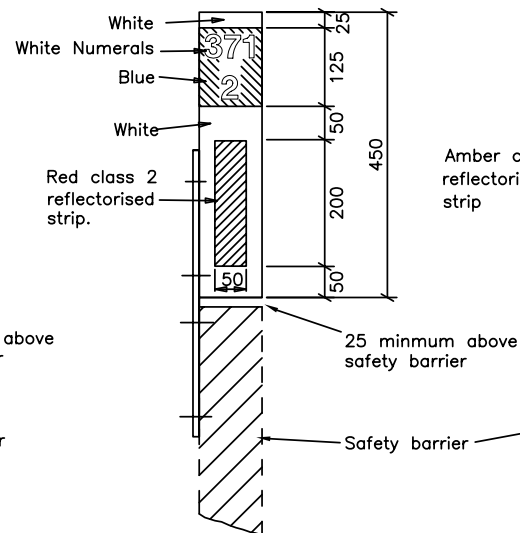
E3



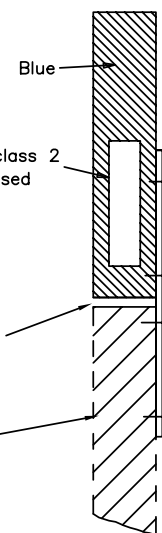
TYPE 8A  
Verge markers nearside  
at emergency crossing points  
(Traffic face)



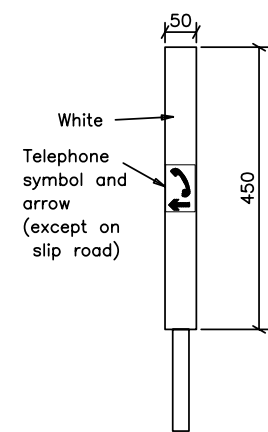
TYPES 8 POST SECTION



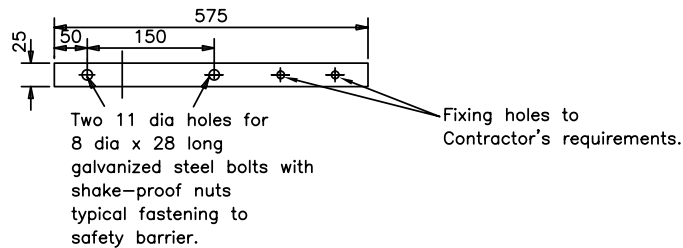
TYPE 8B  
Verge markers and slip  
road verge markers (with  
numerals omitted), nearside  
(Traffic face)



TYPE 8B  
Verge markers on  
off side of slip road  
(Traffic face)



TYPE 8A and 8B  
Verge marker  
(Road face)



TYPES 8 FIXING STRAP  
(Bracket)

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Type 8 posts are used in place of Types 1, 2 or 3 posts when they are located on safety barriers, or the nearside or offside verges of slip roads, not more than 1.5m from the edge of the hardshoulder or hardstrip.
3. See Drawing No. E3 for details of telephone symbol and arrow.
4. Type 8 posts with discs to be installed on both approaches to emergency crossing point. Posts as shown to be fixed not less than 300m from centre of crossing. Similar post but with lower disc omitted to be fixed not less than 200m from centre of crossing and further post with lower two red discs omitted to be fixed not less than 100m from crossing point.
5. Posts are to have PVC closed or capped tops.
6. Fixing straps shall be steel with galvanized finish to BS EN ISO 1461.
7. Post faces are to be white except where shown otherwise.

HIGHWAY CONSTRUCTION DETAILS

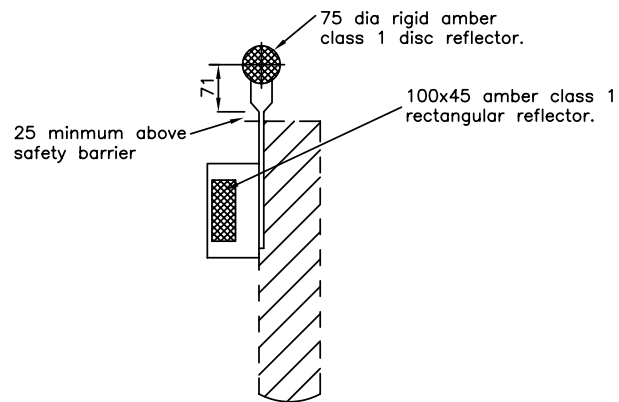
DISTANCE  
MARKER POSTS

B	MAY 04
A	DEC 91
Issue	Date

SAFETY BARRIER MOUNTED  
REFLECTORS  
TYPE 8

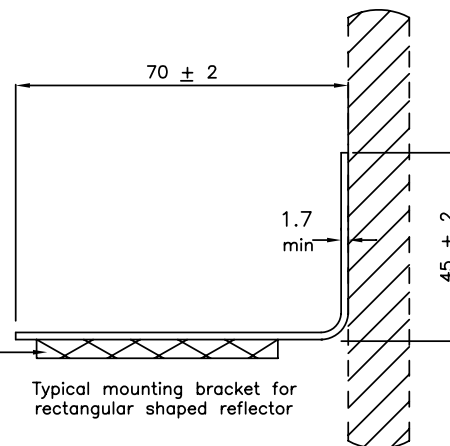
Drawing No.

E4

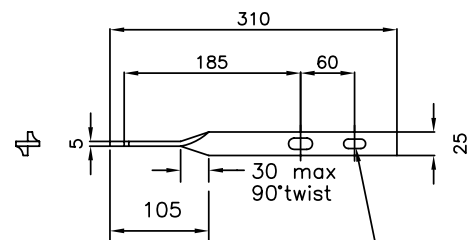


(Safety barrier)

100x45 amber class 1 rectangular reflector, see also Note 5.



**TYPE 9**  
Central Reserve at  
Emergency Crossing Points  
(Traffic face)



Two 12x40 long slotted hole for 10 dia x 30 long hexagon head steel bolt complete with 2 no. washers and self-locking nut, all galvanized finish, to secure strap to safety barrier.

**TYPE 9A FIXING STRAP**  
(Bracket)

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Fixing straps shall be steel with galvanized finish to BS EN ISO 1461.
3. Either rectangular shape or disc shape reflectors can be used on safety barriers.
4. One disc or rectangular reflector to be located not less than 100m from the centre of the emergency crossing point. Two discs or rectangular reflectors between 1.6m and 4.0m apart to be located not less than 200m from, and three discs or rectangular reflectors between 1.6m and 4.0m apart to be located not less than 300m from, the centre of the crossing respectively.
5. Type 9, advance warning reflectors shall be secured to the safety barrier by a separate fixing system. The use of any safety barrier beam to support post securing system (i.e. bolt/screw, washer and nut) to affix the advance warning reflectors, shall not be permitted.

HIGHWAY CONSTRUCTION DETAILS

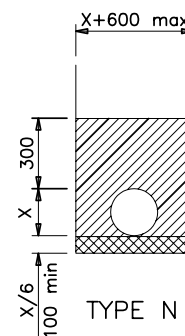
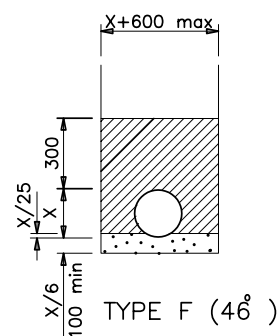
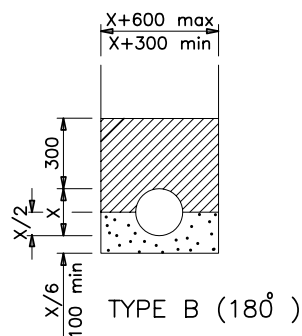
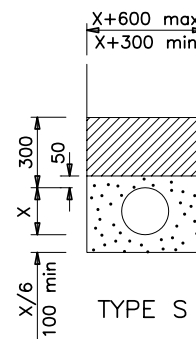
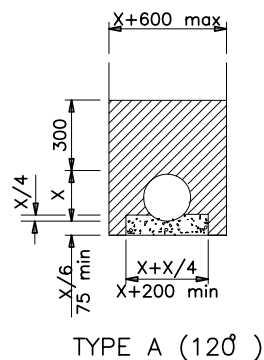
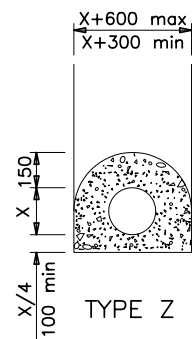
DISTANCE  
MARKER POSTS

B	MAY 04
A	DEC 91
Issue	Date

REFLECTORS ON APPROACHES  
TO EMERGENCY CROSSING  
POINTS TYPE 9

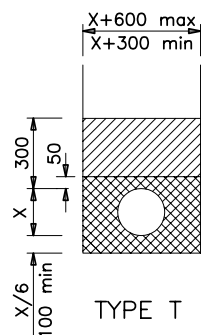
Drawing No.

E5



#### KEY

- Granular material to S.H.W. Clause 503.3(i).
- Concrete to S.H.W. Clause 503.3 (iii)
- Material to S.H.W. Clause 503.3(ii). e.g. sand
- Class 8 material to S.H.W. Clause 503.3(iv).



#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. This drawing is to be read in conjunction with Appendix 5/1
3. Dimension X is the external diameter of the pipe.
4. The minimum or maximum width of the trench applies on and below a line 300mm above the outside top of the pipe. Above the 300mm line the trench backfill material shall be as described in Clause 505 of SHW.
5. The concrete bed or surround may extend to the sides of the trench or be of minimum width. Class 8 material is to be used to fill any voids so formed.
6. For Type Z trench the concrete cover may be formed to a radius batter or horizontal surface. Min. cover of concrete shall be 150.

HIGHWAY CONSTRUCTION DETAILS

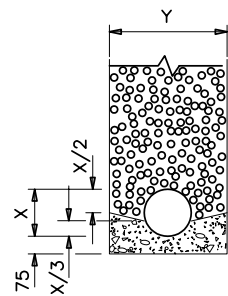
DRAINAGE

A	DEC 91
Issue	Date

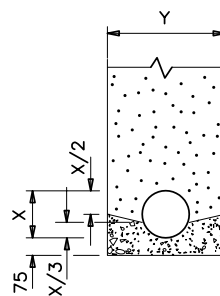
SURFACE WATER DRAINS –  
TRENCH AND BEDDING DETAILS

Drawing No.

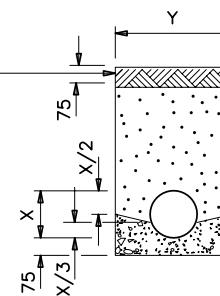
F1



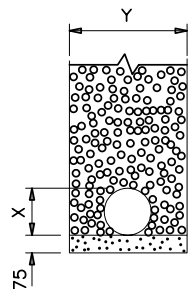
TYPE G



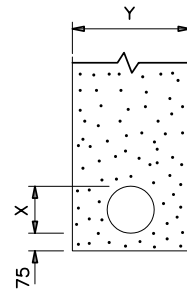
TYPE J



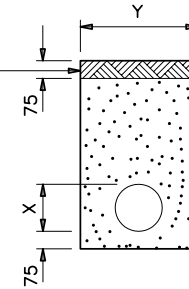
TYPE L



TYPE H



TYPE K



TYPE M

# KEY



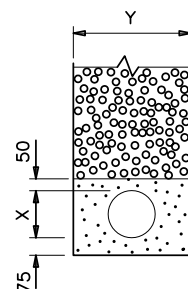
Type A or C filter material to S.H.W. Clause 505 or granular material to S.H.W. Clause 503.3(i).



Type B filter material to S.H.W. Clause 505.



ST2 concrete to S.H.W. Clause 2602.



TYPE I

## NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Dimension X is the external diameter of the pipe.
3. This drawing is to be read in conjunction with Appendix 5/1
4. For details of section of the drain at surface level refer to the 'B' series of drawings.
5. Pipes shall comply with the requirements for filter drain pipes in Table 5/1 of the S.H.W.
6. Pipes are to be laid with slots or perforations upwards where a concrete bed is used. For other beds the slots shall be orientated as described in Appendix 5/1.
7. Minimum drain width  
 $Y = X + 300$  for drains not exceeding 1.5m cover below finished level.  
 $Y = X + 450$  for drains exceeding 1.5m cover below finished level.

HIGHWAY CONSTRUCTION DETAILS

DRAINAGE

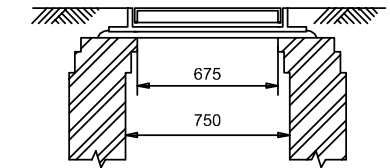
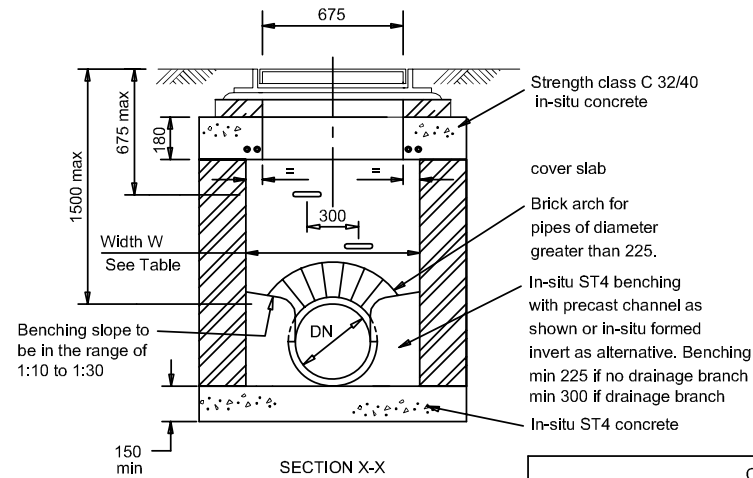
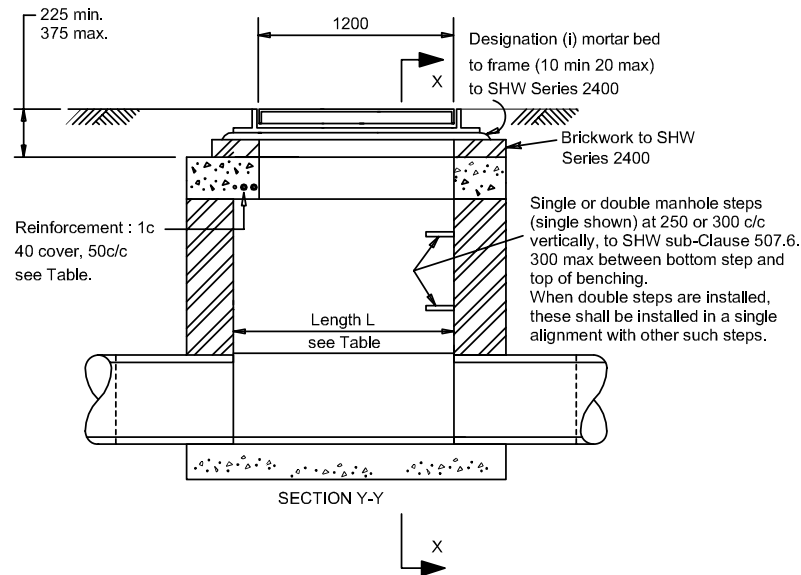
C	NOV 03
B	MAR 98
A	DEC 91
Issue	Date

FILTER DRAINS –  
TRENCH AND BEDDING DETAILS

Drawing No.

F2



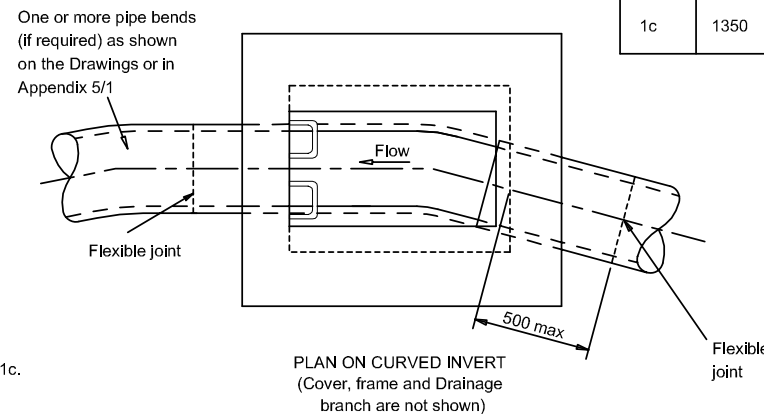
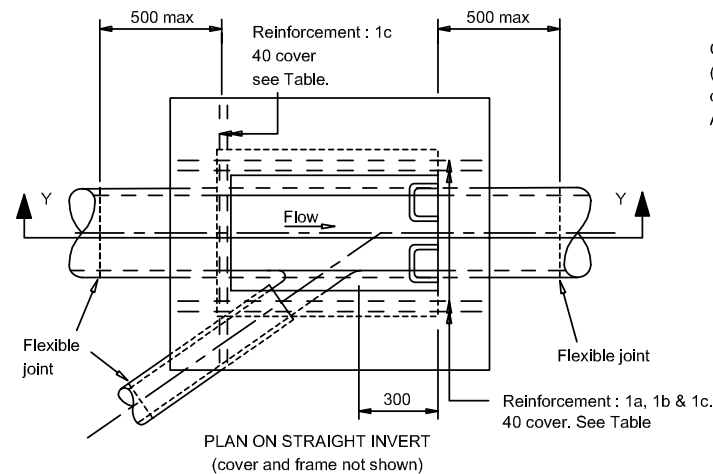


PERMITTED ALTERNATIVE COVER  
DETAIL FOR SUB-TYPE 1a

CHAMBER SUB-TYPE					
Sub-Type	Length L	Width W	Max. Pipe DN	Max. No. of Branches	Reinforcement T20 bars at 50 c/c
1a	1200	750	225	1 on either side	2 bars 1550 long
1b	1200	825	300	1 on either side	4 bars 1550 long
1c	1350	975	450	1 on either side	6 bars 1700 long 3 bars 1325 long

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Chamber walls 225 thick to be constructed in class B clay engineering bricks to SHW Series 2400 in designation (i) mortar or in-situ ST4 concrete to SHW, Clause 2602.
3. For details of pipe size(s), invert level(s) and type of cover and frame, see Drawings and Appendix 5/1.
4. See SHW, sub-Clause 507.7 regarding backfilling/surround to chamber.



FOR PIPES 450 MAX. DIAMETER  
MAX. DEPTH 1500 + PIPE DIAMETER

HIGHWAY CONSTRUCTION DETAILS

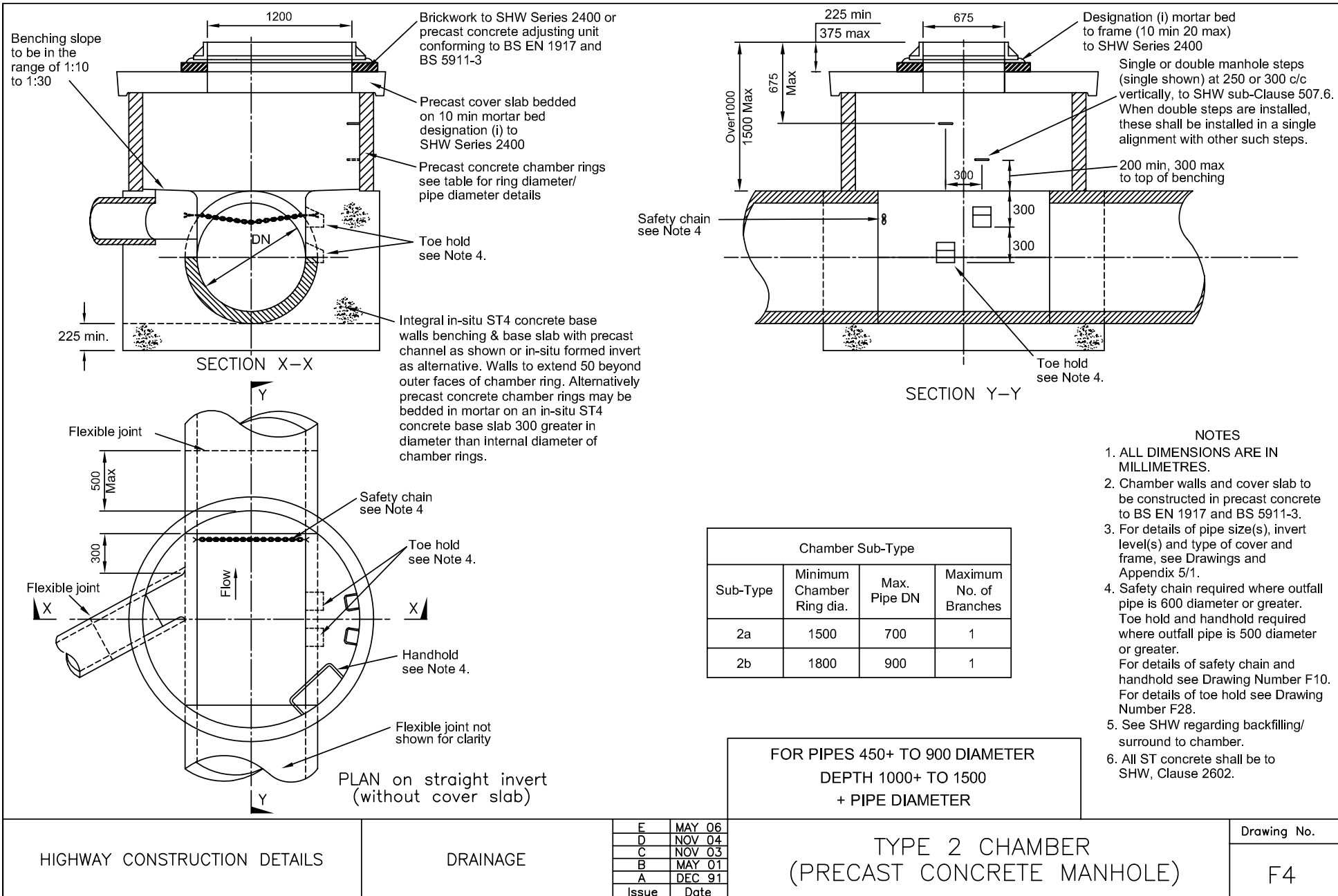
DRAINAGE

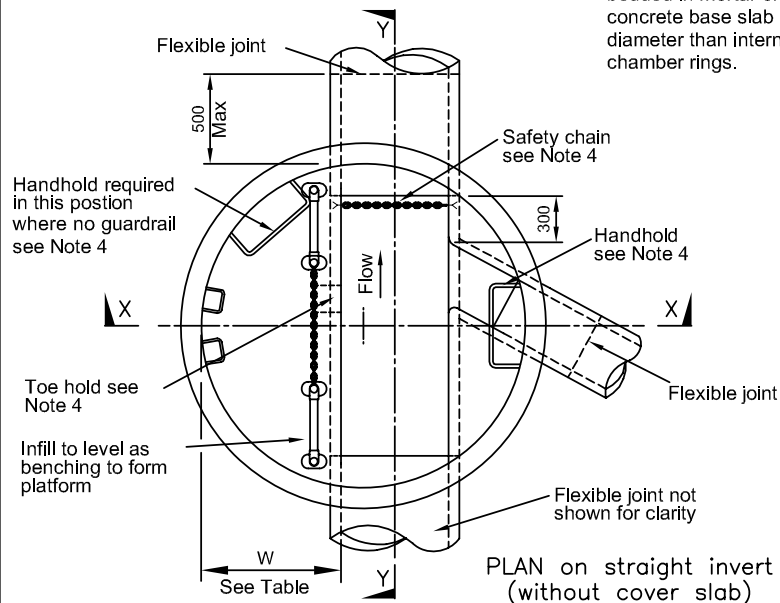
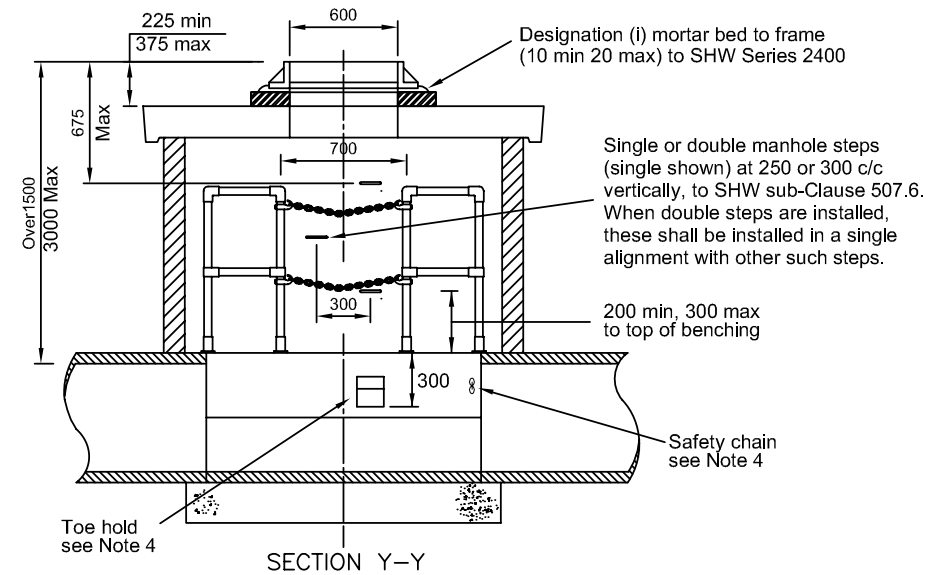
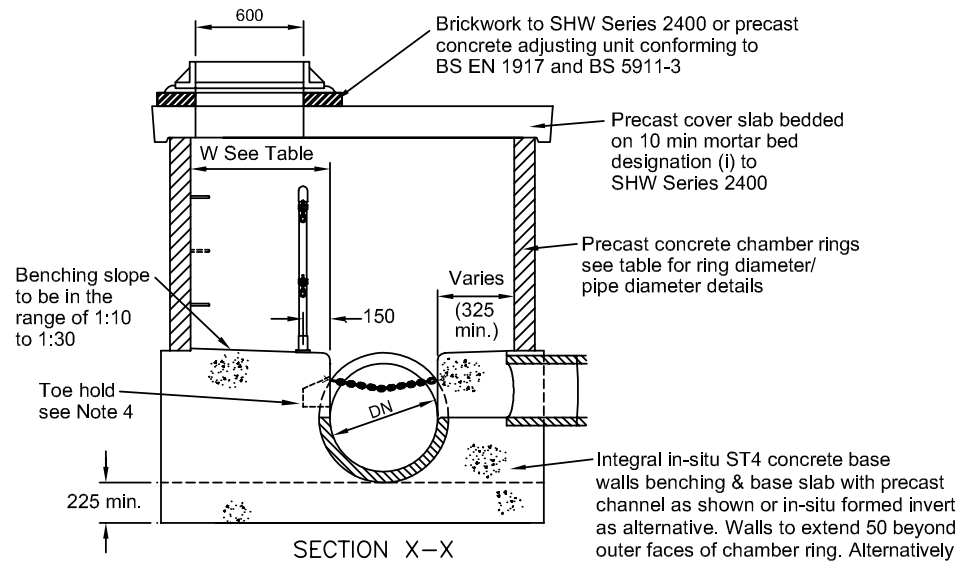
E	MAY 06
D	NOV 03
C	MAY 01
B	AUG 94
A	DEC 91
Issue	Date

TYPE 1 CHAMBER  
(BRICK OR IN-SITU CONCRETE  
MANHOLE)

Drawing No.

F3





#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Chamber walls and cover slab to be constructed in precast concrete to BS EN 1917 and BS 5911-3.
3. For details of pipe size(s), invert level(s) and type of cover and frame, see Drawings and Appendix 5/1.
4. Safety chain and guardrail required where outfall pipe is 600 diameter or greater. Toe hold and handhold required where outfall pipe is 500 diameter or greater. For details of safety chain and handhold see Drawing Number F10. For details of guardrail and toe hold see Drawing Number F28.
5. See SHW regarding backfilling/surround to chamber.
6. All ST concrete shall be to SHW, Clause 2602.

Chamber Sub-Type				
Sub-Type	Minimum Chamber Ring dia.	Max. Pipe DN	Maximum No. of Branches	W
3a	1200	300	1	575
3b	1500	450	1	575
3c	1800	700	1	775
3d	2100	900	1	875

FOR PIPES 900 MAX.  
DIAMETER. DEPTH 1500+ TO  
3000 + PIPE DIAMETER

F	MAY 06
E	NOV 04
D	NOV 03
C	MAY 01
B	AUG 94
A	DEC 91
Issue	Date

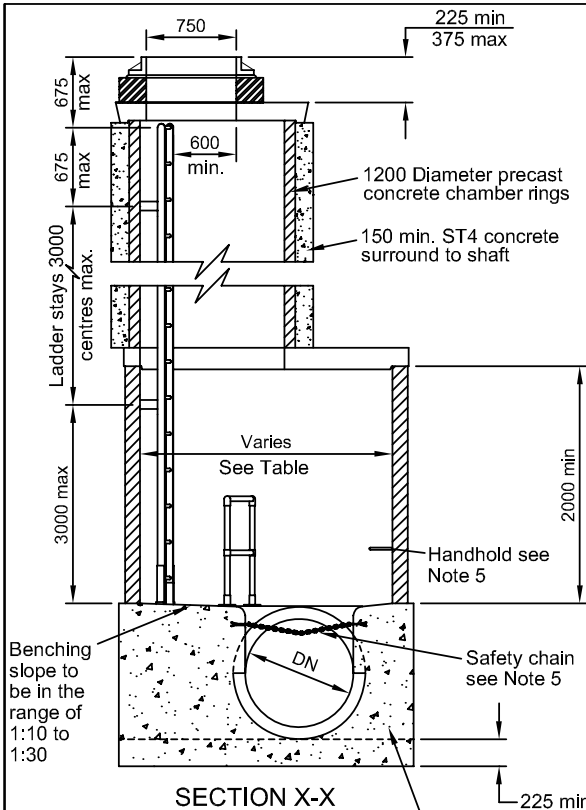
HIGHWAY CONSTRUCTION DETAILS

DRAINAGE

TYPE 3 CHAMBER  
(PRECAST CONCRETE MANHOLE)

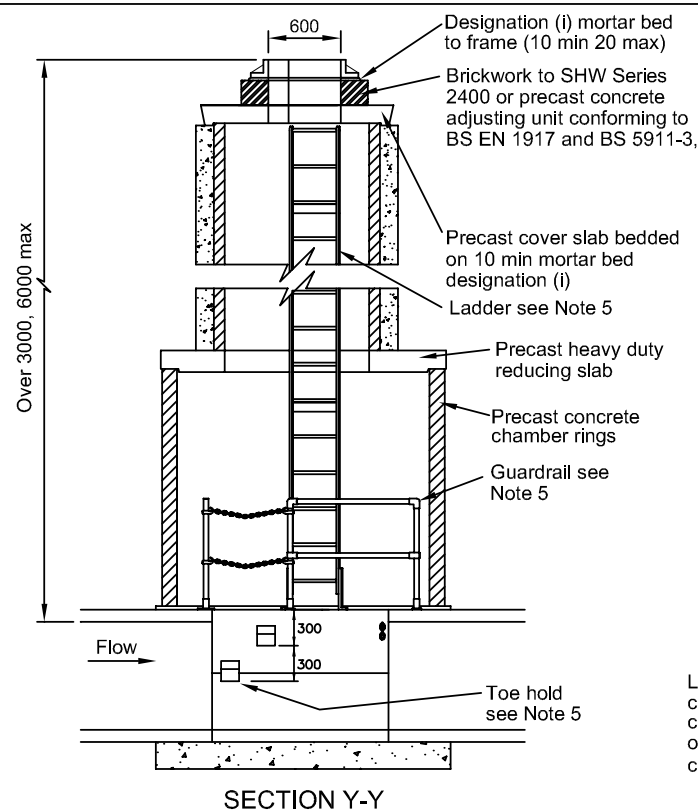
Drawing No.

F5



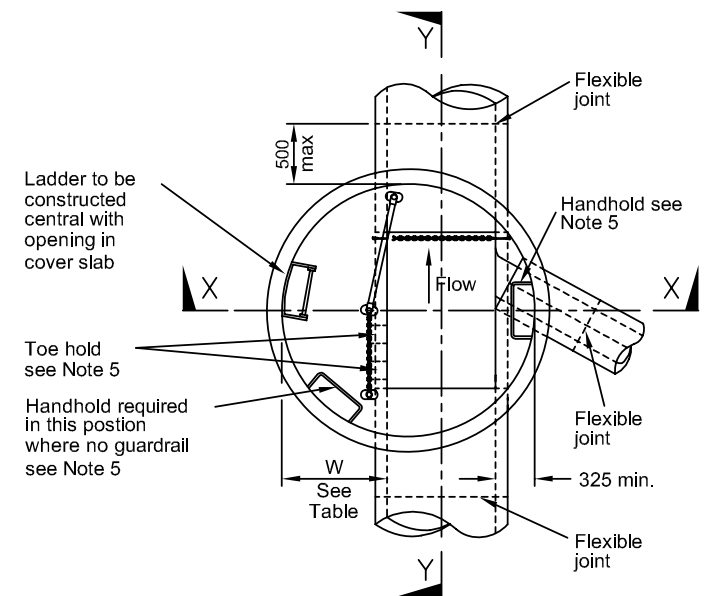
Integral in-situ ST4 concrete base walls benching & base slab with precast channel as shown or in-situ formed invert as alternative. Walls to extend 50 beyond outer faces of chamber ring. Alternatively precast concrete chamber rings may be bedded in mortar on an in-situ ST4 concrete base slab 300 greater in diameter than internal diameter of chamber rings.

CHAMBER SUB-TYPE						
Sub-Type	Max. Pipe DN	Minimum Chamber ring dia.	W	Guardrail reqd.	Safety chain reqd.	Toe hold reqd.
4a	450	1500	625	x	x	x
4b	550	1500	625	x	x	✓
4c	900	2100	875	✓	✓	✓



#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Chamber walls and cover slab to be constructed in precast concrete to BS EN 1917 and BS 5911-3.
3. For details of pipe size(s), invert level(s) and type of cover and frame see Drawings and Appendix 5/1.
4. Mortar to be designation (i) to SHW Series 2400.
5. Safety chain and guardrail required where outfall pipe is 600 diameter or greater. Toe hold and handhold required where outfall pipe is 500 diameter or greater. For details of ladder, safety chain and handhold see Drawing Number F10. For details of guardrail and toe hold see Drawing Number F28.
6. See SHW, sub-Clause 507.7 regarding backfilling/surround to chamber.
7. All ST concrete shall be to SHW, Clause 2602.



FOR PIPES 300 TO 900 DIAMETER.  
DEPTHS 3000+ TO 6000  
+ PIPE DIAMETER

PLAN ON STRAIGHT INVERT  
(Below reducing slab)

HIGHWAY CONSTRUCTION DETAILS

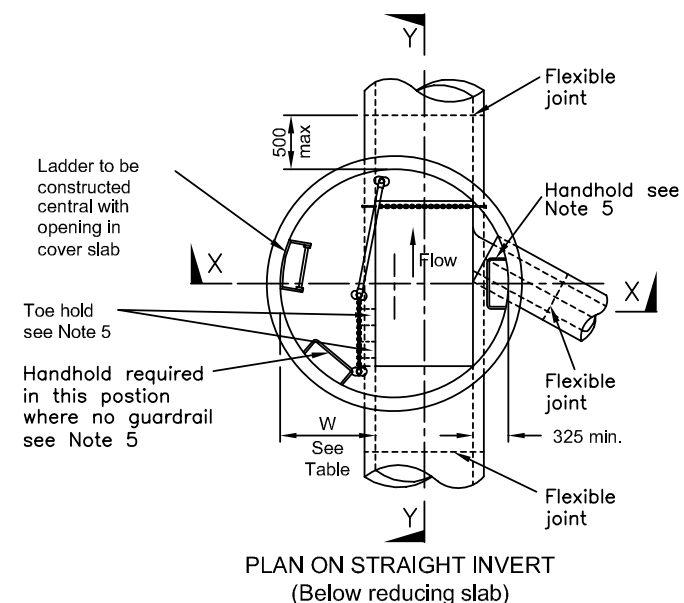
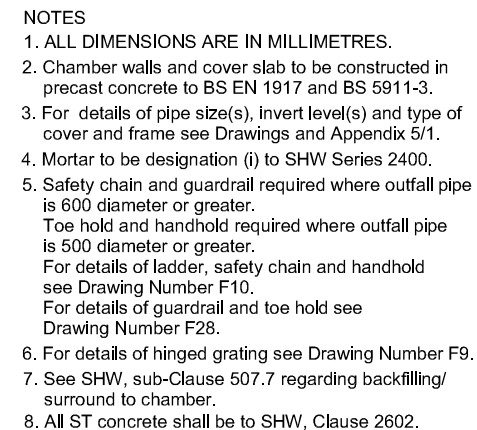
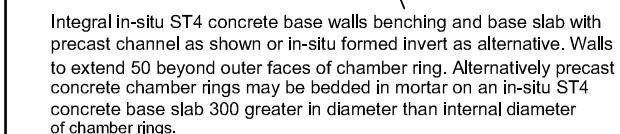
DRAINAGE

F	MAY 06
E	NOV 04
D	NOV 03
C	MAY 01
B	AUG 94
A	DEC 91
Issue	Date

TYPE 4 CHAMBER  
(PRECAST CONCRETE MANHOLE)

Drawing No.

F6



CHAMBER SUB TYPE						
Sub Type	Max. Pipe DN	Minimum Chamber ring dia.	W	Guardrail reqd.	Safety chain reqd.	Toe-hold reqd.
5a	450	1500	625	x	x	x
5b	550	1500	625	x	x	✓
5c	900	2100	875	✓	✓	✓

FOR PIPES 300 TO 900 DIAMETER.  
 DEPTHS 6000+ to 12000  
 + PIPE DIAMETER

TYPE 5 CHAMBER  
(PRECAST CONCRETE MANHOLE)

Drawing No.
-------------

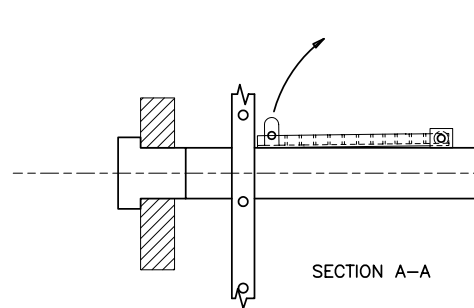
F7

## HIGHWAY CONSTRUCTION DETAILS

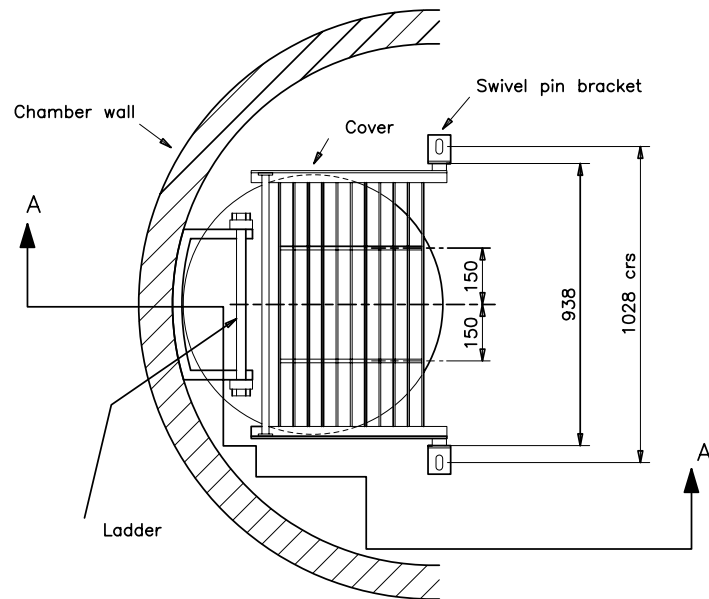
## DRAINAGE

E	MAY 06
D	NOV 04
C	NOV 03
B	MAY 01
A	DEC 91
Issue	Date

**F8 not used**

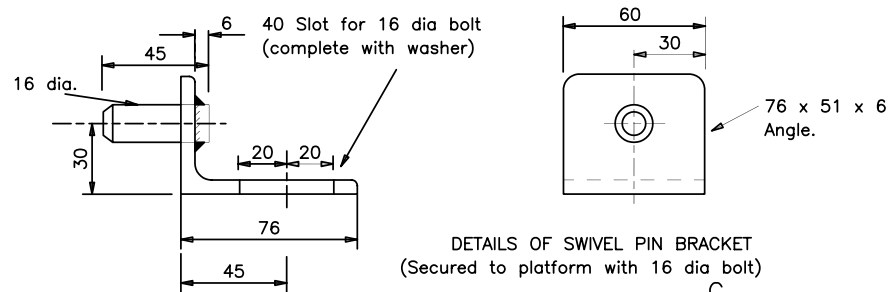


SECTION A-A

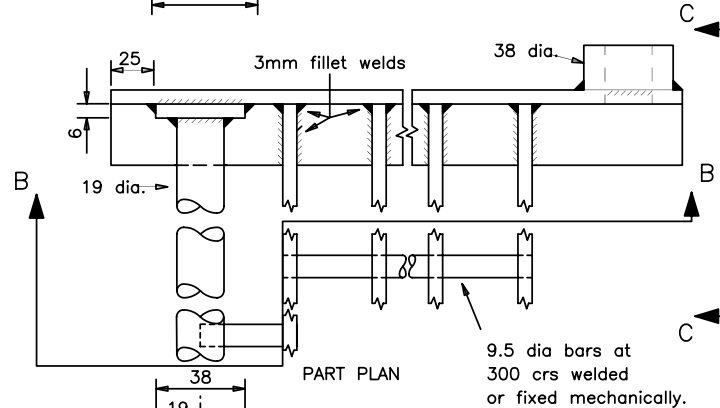


ASSEMBLY PLAN

(Plan detail on grating positioned on landing slab.)

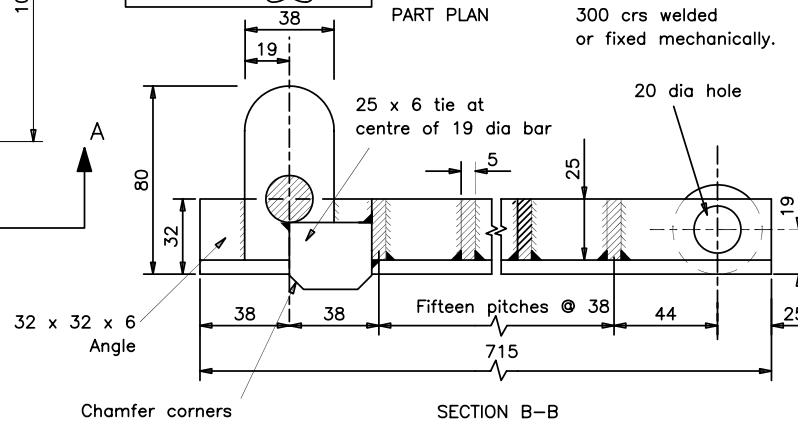


DETAILS OF SWIVEL PIN BRACKET  
(Secured to platform with 16 dia bolt)

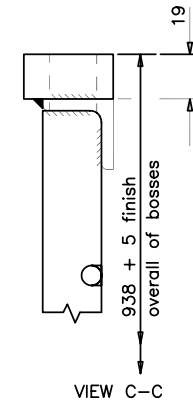


PART PLAN

9.5 dia bars at 300 crs welded or fixed mechanically.



SECTION B-B



VIEW C-C

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. All welds are to be 6mm fillet welds except where stated otherwise.
3. The gratings and brackets are to be fabricated from steel to BS 970 : Part 1 and to be protected by hot dip galvanising in accordance with SHW Clause 1909.

HIGHWAY CONSTRUCTION DETAILS

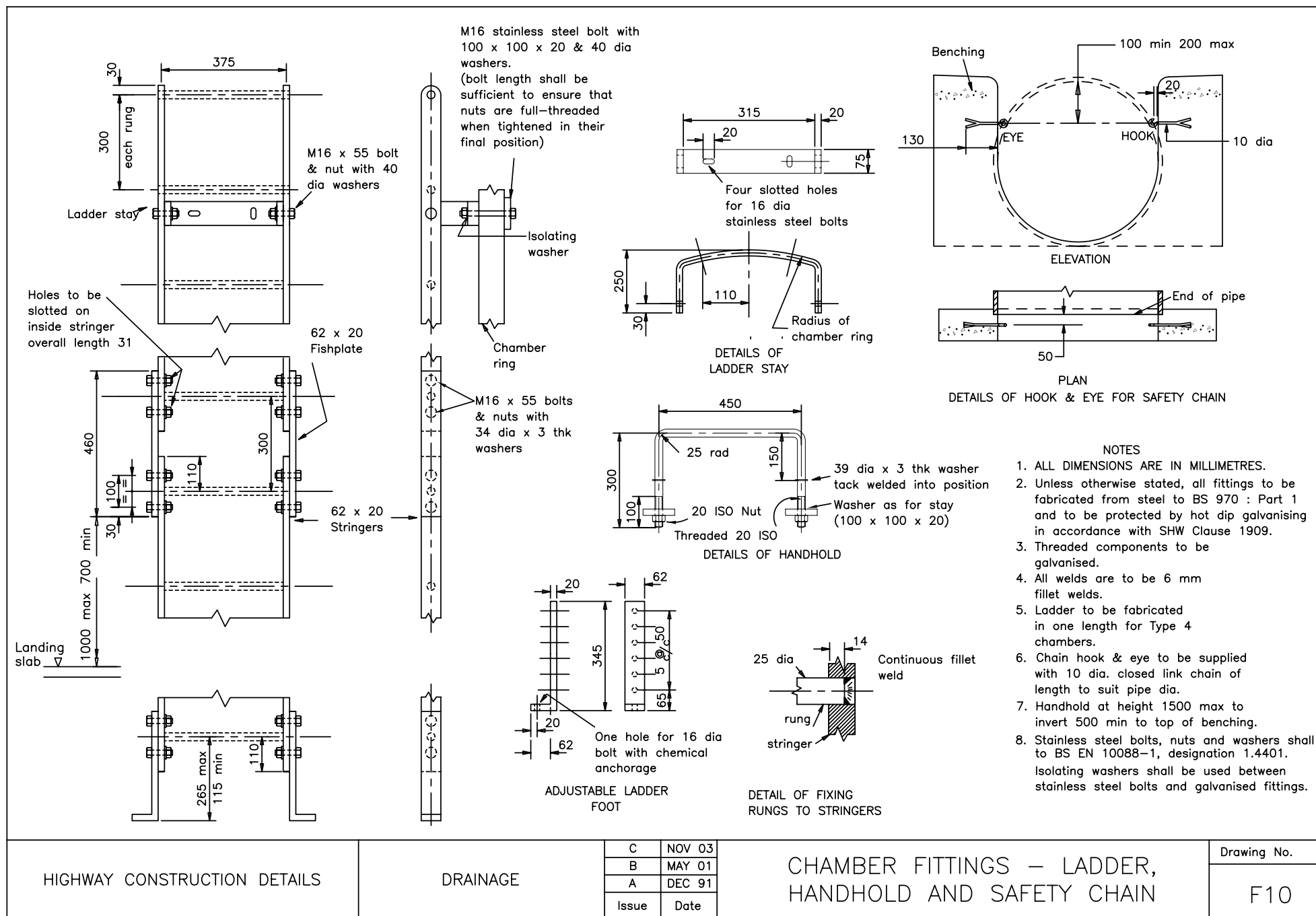
DRAINAGE

B	MAY 01
A	DEC 91
Issue	Date

TYPE 5 CHAMBER  
GRATING DETAILS

Drawing No.

F9



HIGHWAY CONSTRUCTION DETAILS

DRAINAGE

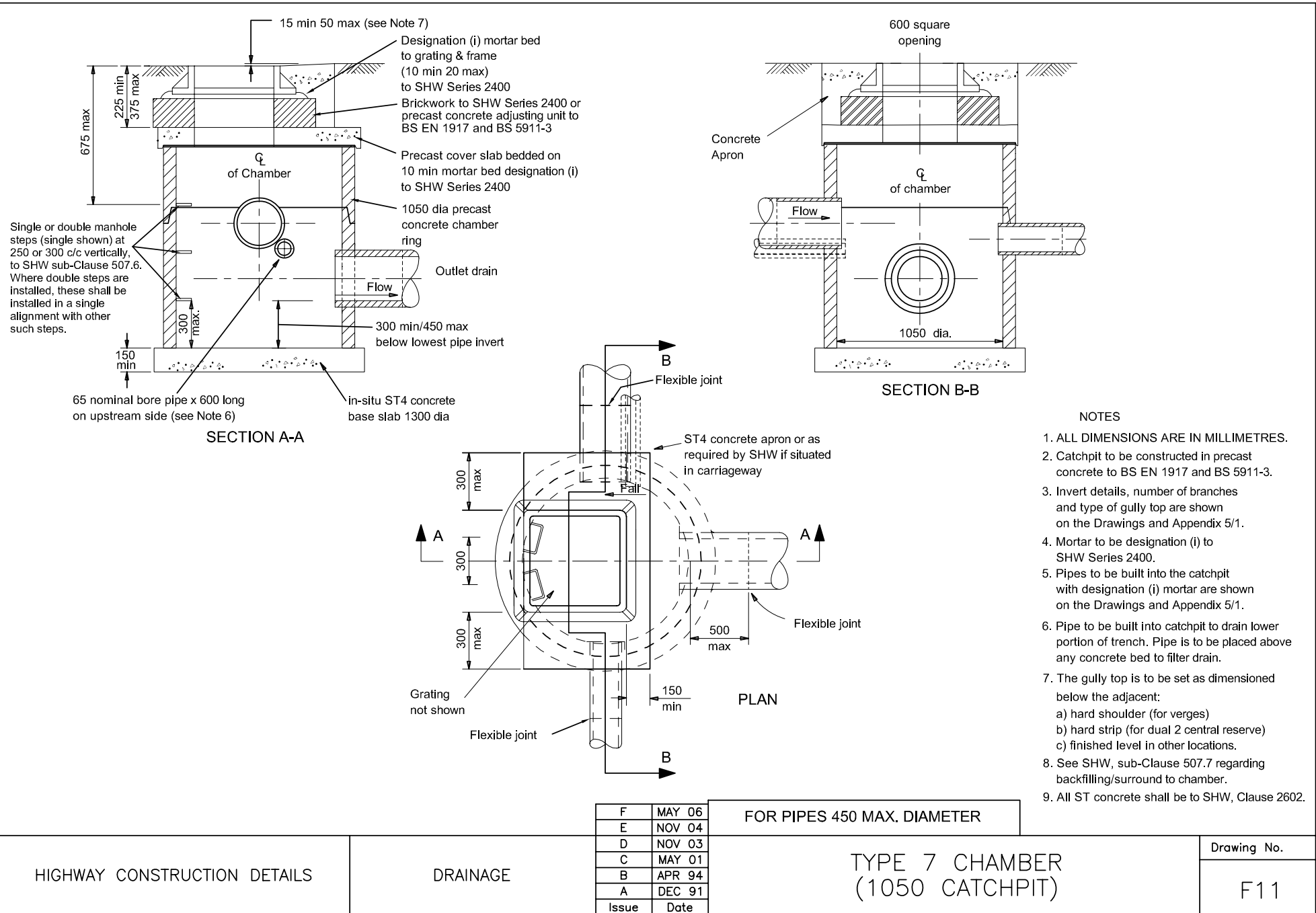
C	NOV 03
B	MAY 01
A	DEC 91
Issue	Date

CHAMBER FITTINGS – LADDER,  
HANDHOLD AND SAFETY CHAIN

Drawing No.

F10





F	MAY 06
E	NOV 04
D	NOV 03
C	MAY 01
B	APR 94
A	DEC 91
Issue	Date

FOR PIPES 450 MAX. DIAMETER

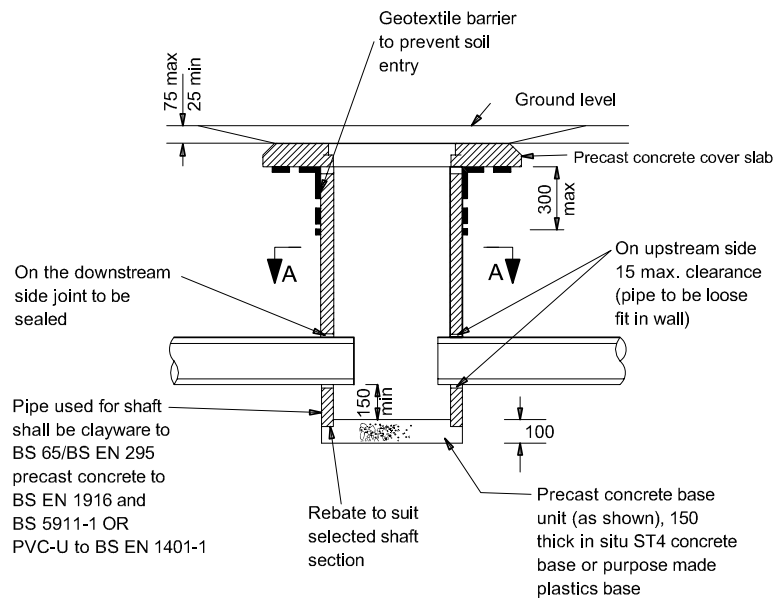
HIGHWAY CONSTRUCTION DETAILS

DRAINAGE

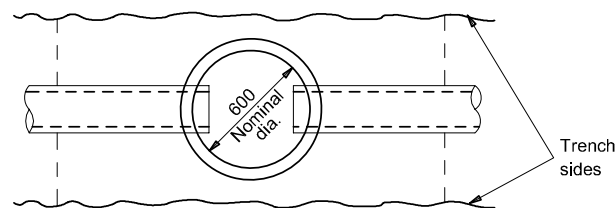
TYPE 7 CHAMBER  
(1050 CATCHPIT)

Drawing No.

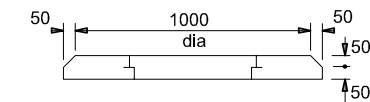
F11



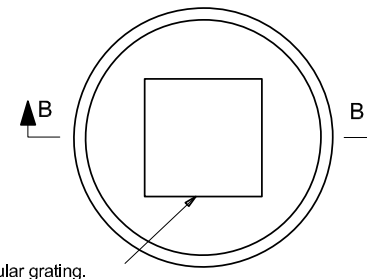
SECTION THROUGH CATCHPIT



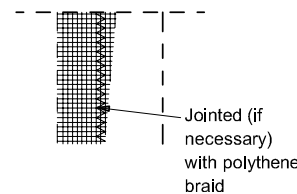
SECTION A-A



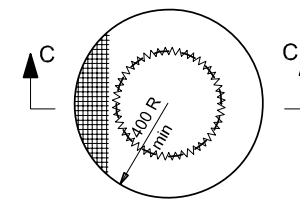
SECTION B-B



DETAILS OF COVER SLAB



SECTION C-C



PLAN

DETAILS OF GEOTEXTILE BARRIER

NOTE

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Gully top shall comply with BS EN 124 unless otherwise stated in Appendix 5/1. Grating to have minimum waterway area of 0.125 m<sup>2</sup> and to withstand BS EN 124 test load, described in Appendix 5/1.
3. Invert details are shown on the Drawings or Appendix 5/1.
4. Purpose made plastics upper sections with pre-fitted gratings to Note 2 may be used. Plastics upper sections shall be surrounded with ST4 concrete to SHW, Clause 2602. Dimensions shown for precast slab.
5. Sub-Clause 507.15 of the SHW need not be applied.

HIGHWAY CONSTRUCTION DETAILS

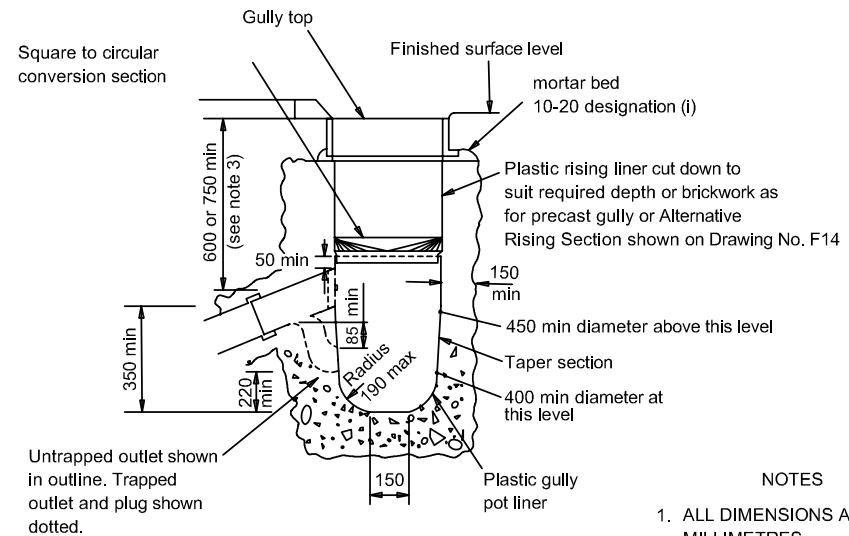
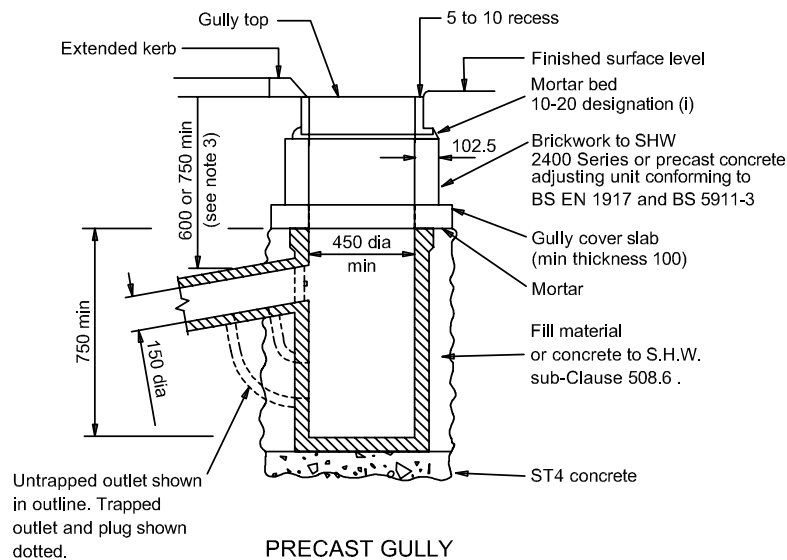
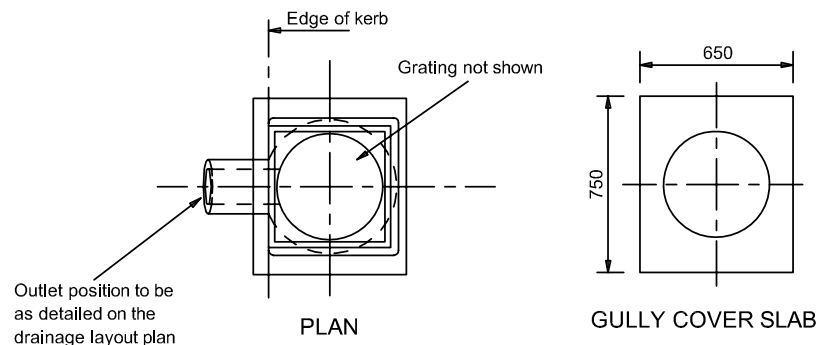
DRAINAGE

F	MAY 06
E	NOV 04
D	NOV 03
C	MAY 01
B	MAR 98
A	DEC 91
Issue	Date

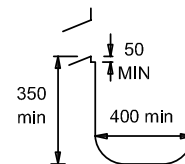
TYPE 8 CHAMBER  
(600 CATCHPIT)

Drawing No.

F12



IN-SITU CAST GULLY



ALTERNATIVE IN-SITU CAST SUMP  
(PARALLEL SIDES)

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. For details of gully top, see Appendix 5/1.
3. The minimum depth from the top of the grating to the top of the gully outlet is to be 750 when the connecting pipe is under a carriageway or a hard shoulder and 600 elsewhere.
4. Precast concrete gullies and cover slabs shall be to BS 5911-6.
5. When an in-situ cast gully has a trap, the stoppers shall comply with the requirements of BS 5911-4 and BS EN 1917.
6. Alternative rising section shown on Drawing No. F14 may be used.
7. All ST concrete shall be to SHW, Clause 2602.

HIGHWAY CONSTRUCTION DETAILS

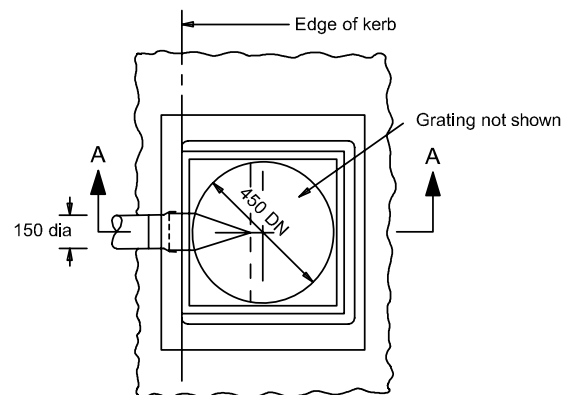
DRAINAGE

E	MAY 06
D	MAY 05
C	NOV 03
B	MAR 98
A	DEC 91
Issue	Date

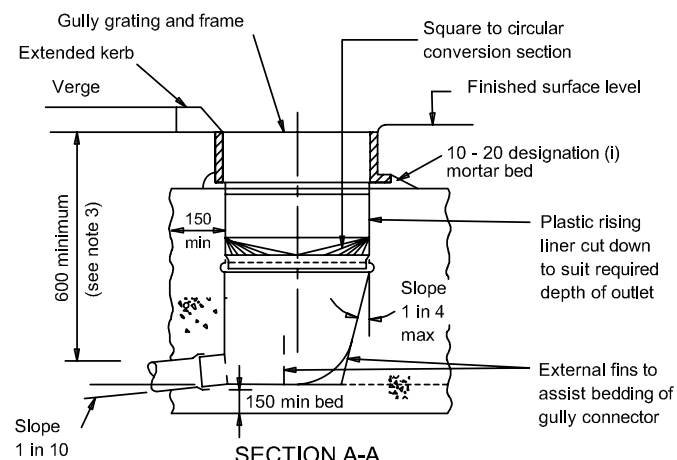
PRECAST AND IN-SITU CAST  
GULLIES

Drawing No.

F13

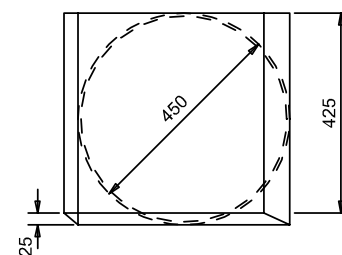


## PLAN

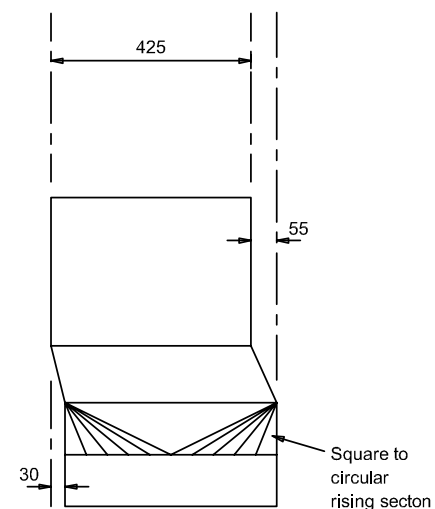


SECTION A-A

## SUMPLESS GULLY CHAMBER



## PLAN



ELEVATION  
ALTERNATIVE  
RISING SECTION

## NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. For details of gully top, see Appendix 5/1.
3. The minimum depth from the top of the grating to the top of the gully connector outlet is to be 750 when the connecting pipe is under a carriageway or hard shoulder and 600 elsewhere.
4. A plastics internal shutter shall be used as shown, bedded on an in-situ concrete slab of 150 minimum thickness and surrounded by concrete 150 minimum thickness extending to the sides of the excavation. The in-situ concrete shall be ST4 to SHW, Clause 2602.
5. Sumpless gully may also be precast concrete conforming to the concrete requirements of BS 5911 - 6.

## HIGHWAY CONSTRUCTION DETAILS

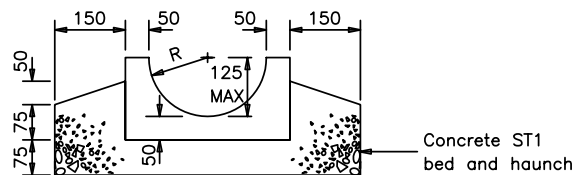
## DRAINAGE

D	MAY 06
C	NOV 03
B	MAR 98
A	DEC 91
Issue	Date

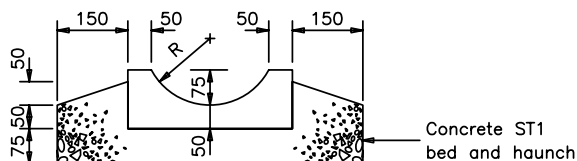
SUMPLESS GULLY CHAMBER  
AND ALTERNATIVE  
RISING SECTION

Drawing No.
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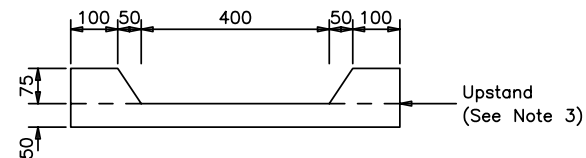
F14



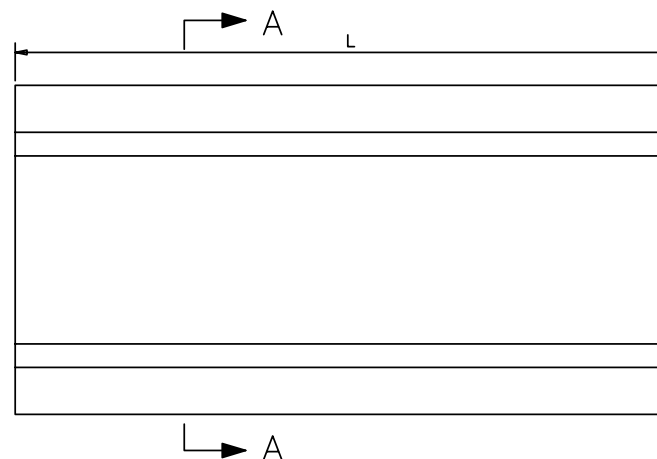
DRAINAGE CHANNEL BLOCK  
TYPE A



DRAINAGE CHANNEL BLOCK  
TYPE B



SECTION A-A



DRAINAGE CHANNEL BLOCK  
TYPE C

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Dimensions R & L shall be as described in Appendix 5/3.
3. Drainage channel blocks to be made of pressed concrete to BS EN 1340 or extruded in situ. For blocks Type C the upstand may be in situ concrete or the kerb type used for the carriageway.
4. All ST concrete shall be to SHW, Clause 2602.

HIGHWAY CONSTRUCTION DETAILS

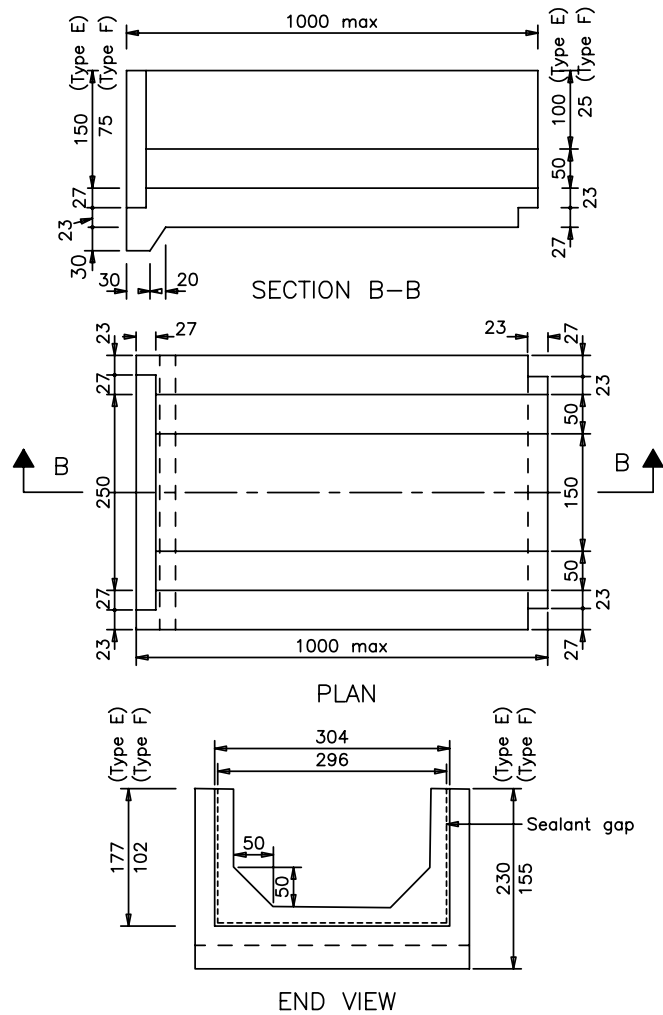
DRAINAGE

C	NOV 04
B	NOV 03
A	DEC 91
Issue	Date

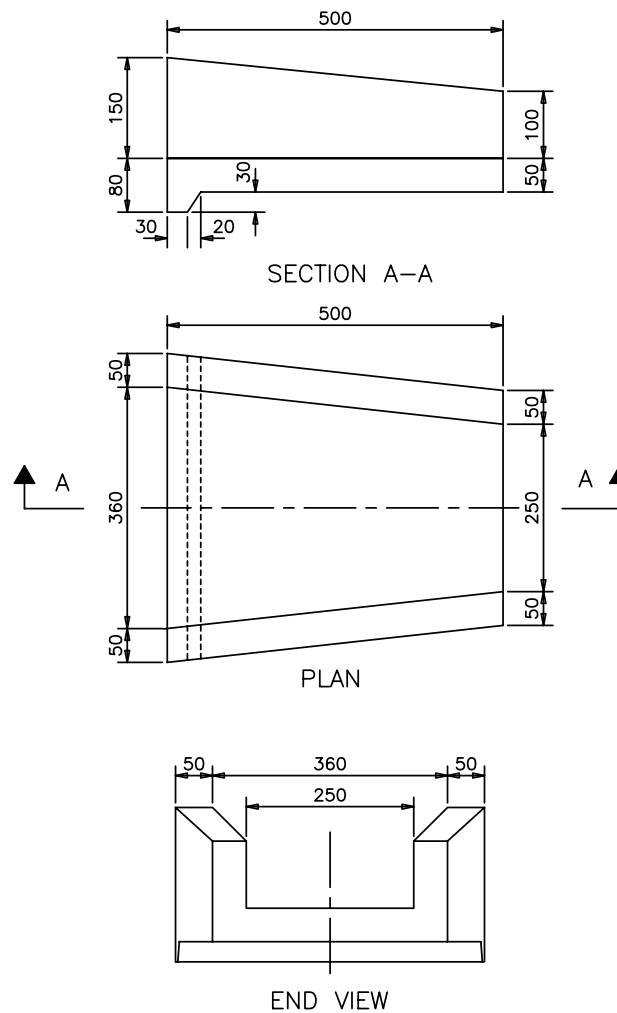
DRAINAGE CHANNEL BLOCKS  
TYPES A, B AND C

Drawing No.

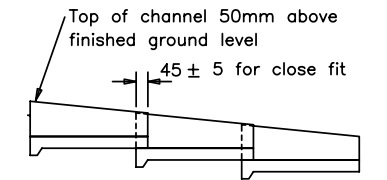
F15



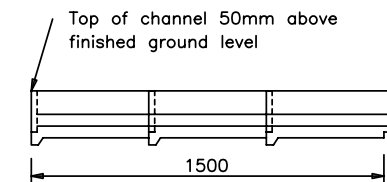
TYPE E & F Channel Block



TYPE D Channel Block



ASSEMBLED TYPE D BLOCKS



ASSEMBLED TYPE E & F BLOCKS

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Blocks to be made of pressed concrete to BS EN 1340.

HIGHWAY CONSTRUCTION DETAILS

DRAINAGE

B	NOV 04
A	DEC 91
Issue	Date

DRAINAGE CHANNEL BLOCKS  
TYPES D, E AND F

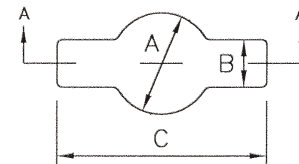
Drawing No.

F16

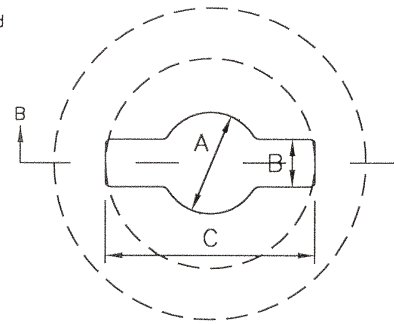
# KEYWAYS:

Open

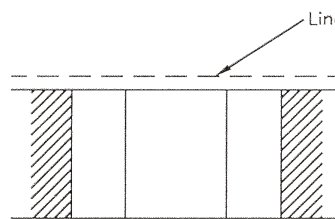
Closed



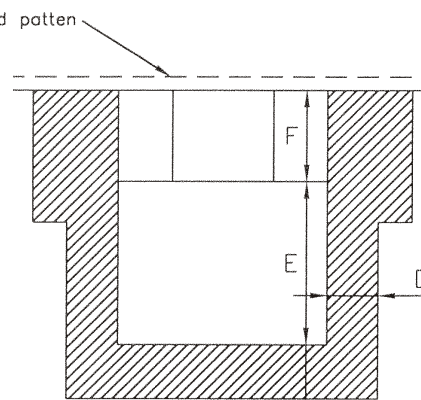
Plan



Plan

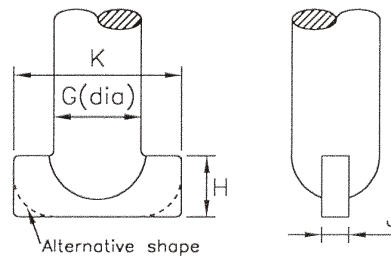


SECTION AA



SECTION BB

## KEYS:



Type	Keyway						Key			
	A	B	C	D	E	F	G	H	J	K
	min./max.	min./max.	min.	min.	min.	min.				
Small	14-16	9-11	29	6	17	6	12	12	6	25
Large	22-25	9-13	44	6	35	10	20	15	6	40

All dimensions in millimetres.

NOTE: Small key for class B125 and kerb-type gully tops; large key for class D400 and class C250 covers.

HIGHWAY CONSTRUCTION DETAILS

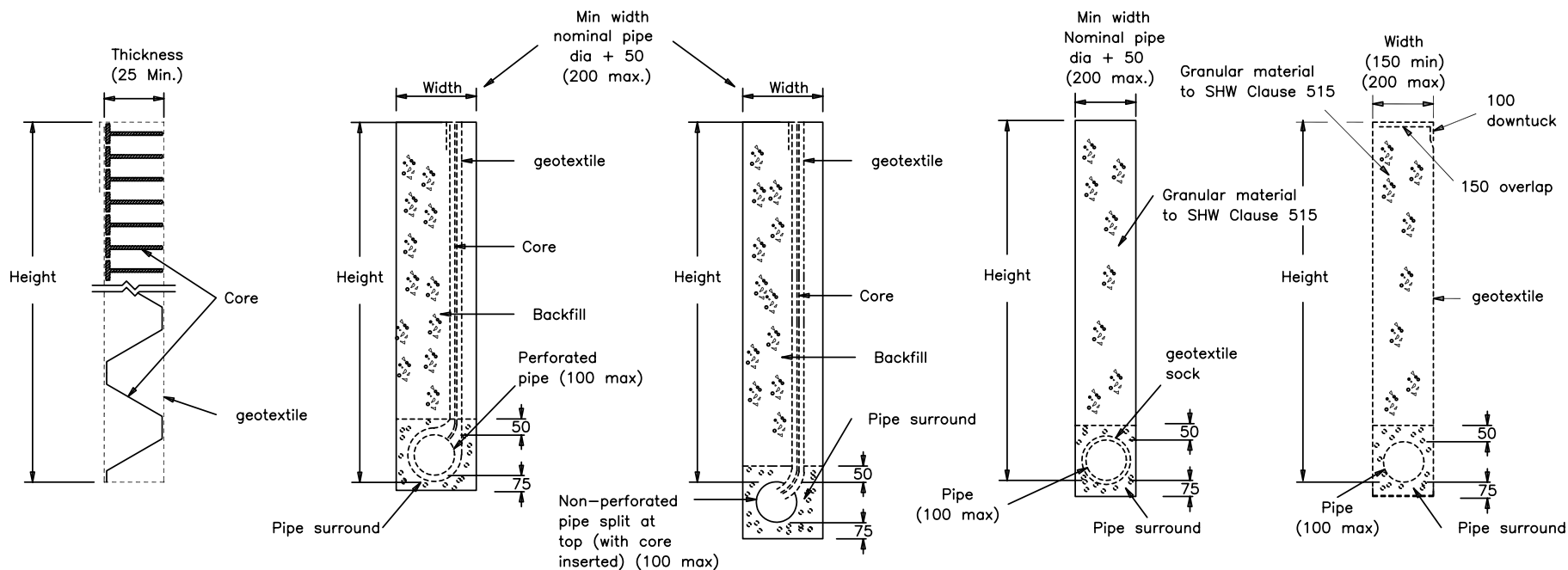
DRAINAGE

A	MAR 98
Issue	Date

DETAIL OF KEYWAYS AND KEYS  
FOR MANHOLE TOPS AND  
KERB TYPE GULLY TOPS

Drawing No.

F17



DRAIN TYPE 5

DRAIN TYPE 6

DRAIN TYPE 7

DRAIN TYPE 8

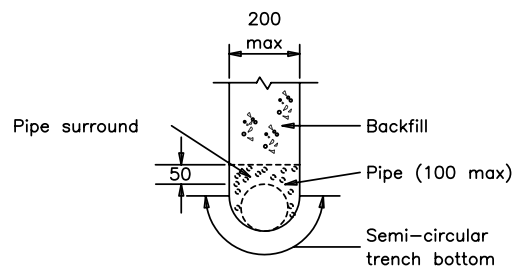
DRAIN TYPE 9

### FIN DRAINS

Drain types 5, 6 and 7

### NARROW FILTER DRAINS

Drain types 8 and 9



### ALTERNATIVE TRENCH SHAPE

For drain types 6, 7, 8 and 9

### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. The surround material and backfill to the pipes of drain types 6 and 7 shall comply with S.H.W. Clause 514. The surround material to pipes of drain types 8 and 9 shall be the granular material used as infill to the drain.

HIGHWAY CONSTRUCTION DETAILS

DRAINAGE

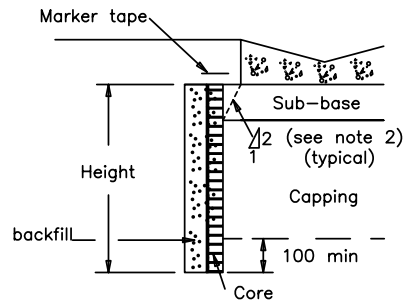
A	DEC 91
Issue	Date

EDGE OF PAVEMENT DRAINS —  
FIN DRAINS AND  
NARROW FILTER DRAINS

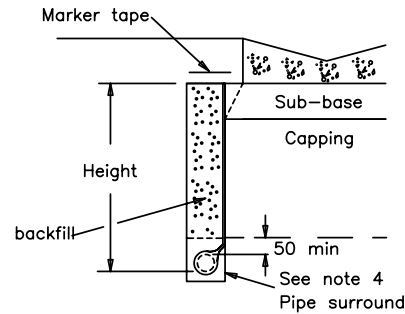
Drawing No.

F18

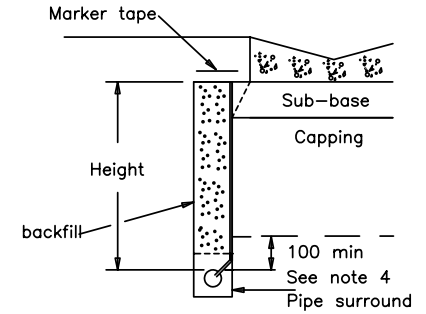




DRAIN TYPE 5

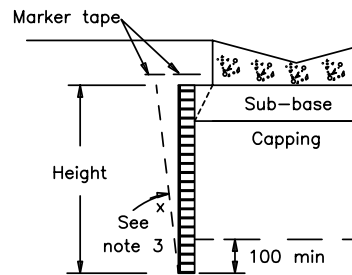


DRAIN TYPE 6

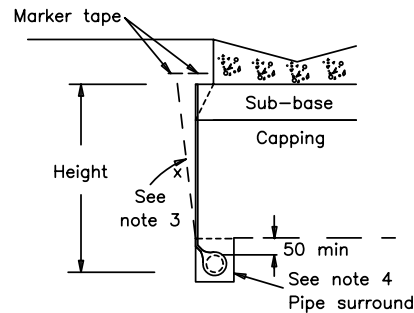


DRAIN TYPE 7

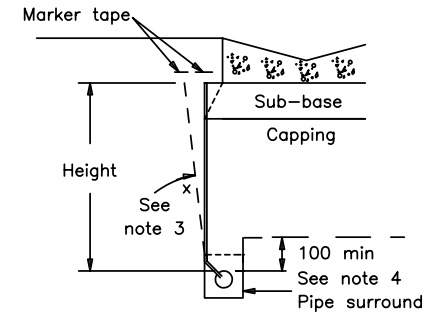
# DRAINS LAID IN NARROW TRENCHES



DRAIN TYPE 5



DRAIN TYPE 6



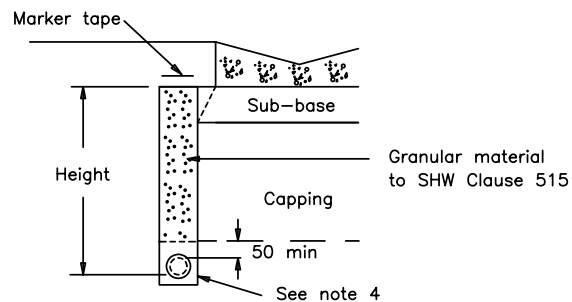
DRAIN TYPE 7

# DRAINS LAID IN THE SIDE OF EXCAVATION PRIOR TO THE PLACEMENT OF PAVEMENT/CAPPING LAYERS

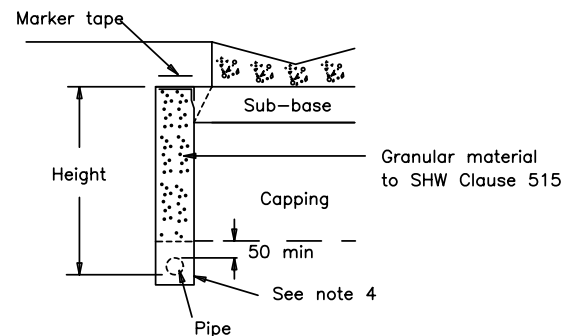
## NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES
2. Fin drains shall be a minimum of 75 from the edge of the surface water channel where appropriate.
3. Marker tapes, surround/backfill materials and maximum drain slope angle (x) shall be as described in the S.H.W. Clause 514.
4. Pipe surround material shall be as shown on Drg No. F18
5. Installation of the drains shall be modified accordingly when used in conjunction with the details shown on Drg Nos. B4 & B8 to B10.
6. The drain shall be constructed with one geotextile face in contact with the side of the excavation. The side having the greater permeability shall be facing towards and be in contact with the pavement construction where appropriate.
7. Slots in drain Type 7 shall be not more than 60' from the crown of the pipe.

HIGHWAY CONSTRUCTION DETAILS	DRAINAGE			EDGE OF PAVEMENT DRAINS — INSTALLATION OF FIN DRAINS	Drawing No.  F19
		A	DEC 91		
		Issue	Date		

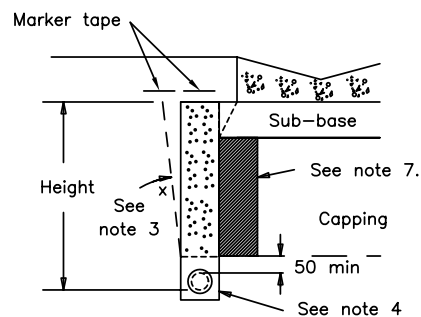


DRAIN TYPE 8

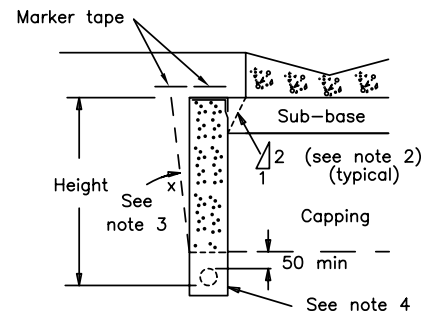


DRAIN TYPE 9

DRAINS LAID IN NARROW TRENCHES



DRAIN TYPE 8



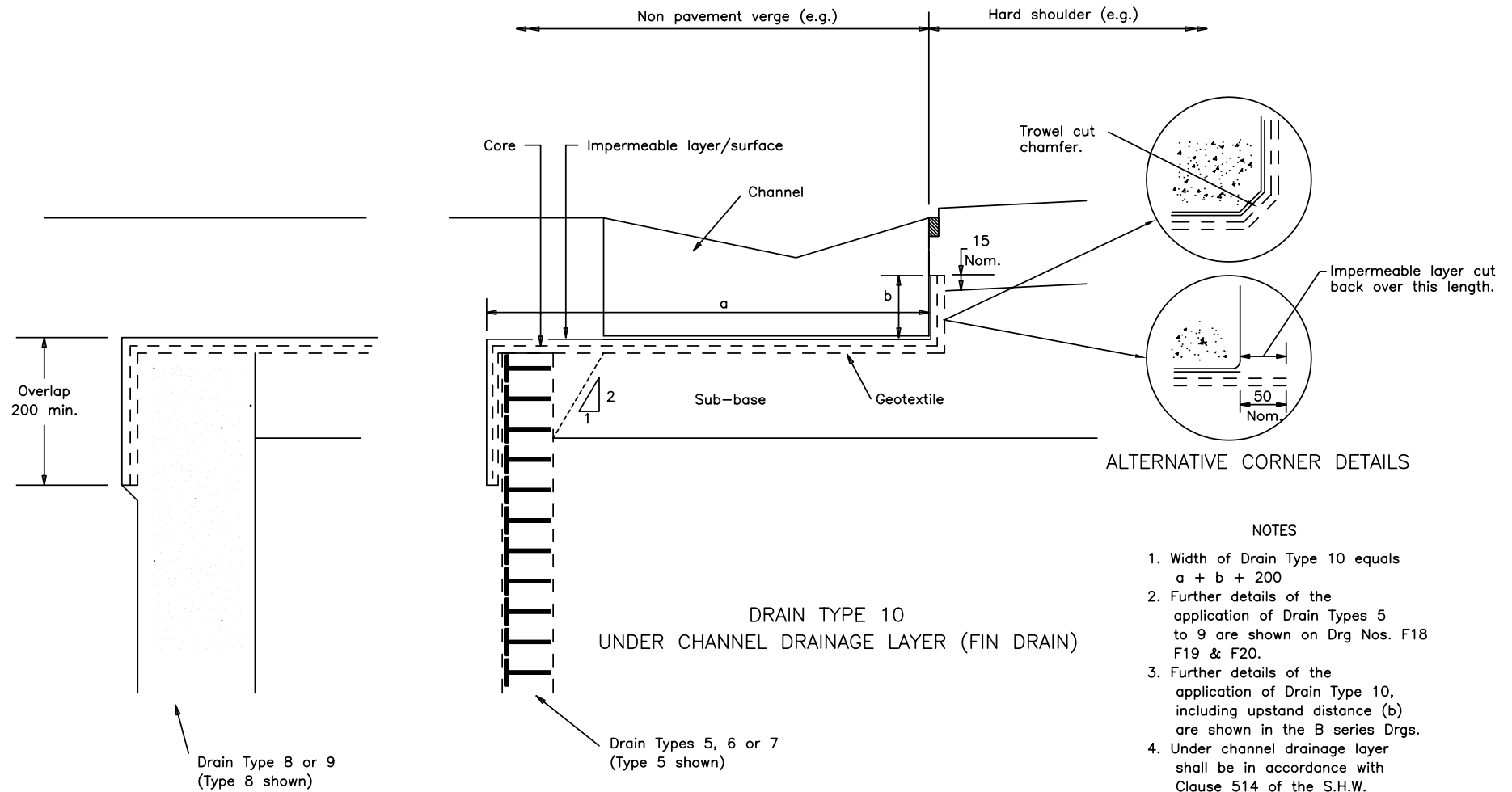
DRAIN TYPE 9

DRAINS LAID IN THE SIDE OF EXCAVATION PRIOR TO THE PLACEMENT OF PAVEMENT/CAPPING LAYERS

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES
2. Narrow filter drains shall be a minimum of 75 from the edge of the surface water channel where appropriate.
3. Marker tapes, and maximum drain slope angle (x) shall be as described in the S.H.W. Clause 514.
4. Pipe surround materials shall be as shown on Drg No. F18
5. Installation of the drains shall be modified accordingly when used in conjunction with the details shown on Drg Nos. B4 & B8 to B10.
6. The drain shall be constructed with one face in contact with the pavement construction.
7. The maximum increased width of filter material shall be 150. In this area either filter material or capping material may be placed.

HIGHWAY CONSTRUCTION DETAILS	DRAINAGE			EDGE OF PAVEMENT DRAINS — INSTALLATION OF NARROW FILTER DRAINS	Drawing No.
		A	DEC 91		
		Issue	Date		F20



HIGHWAY CONSTRUCTION DETAILS

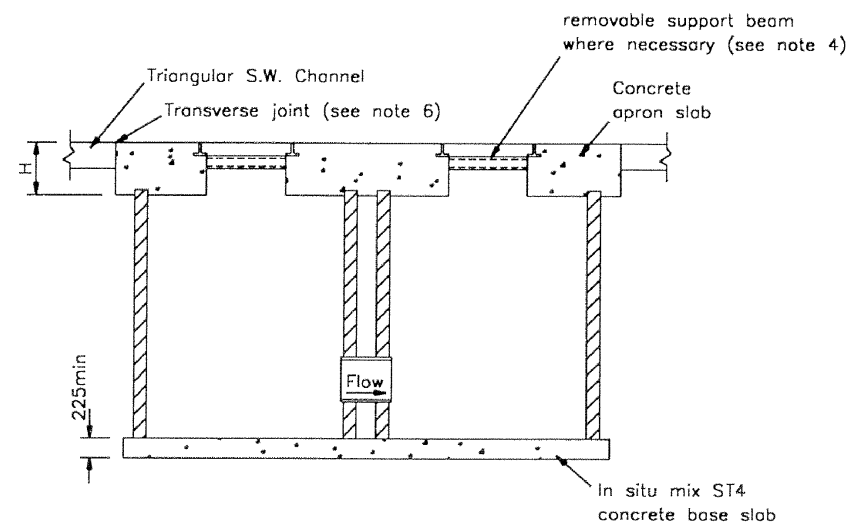
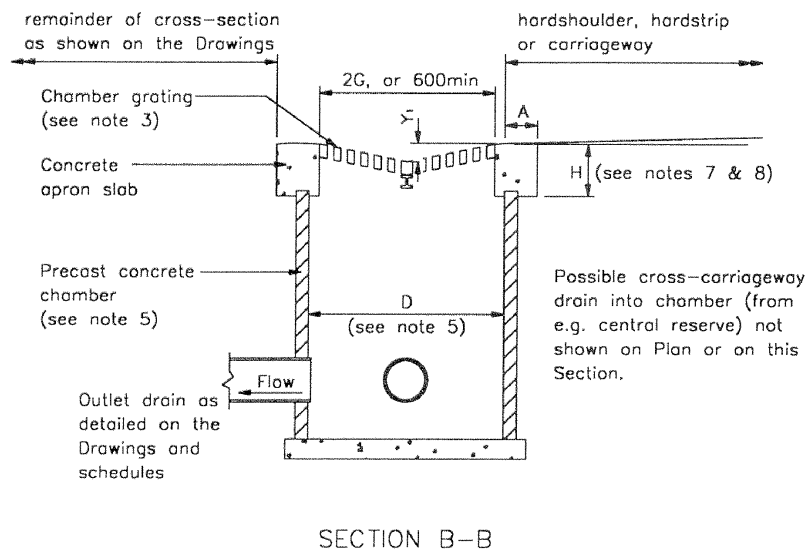
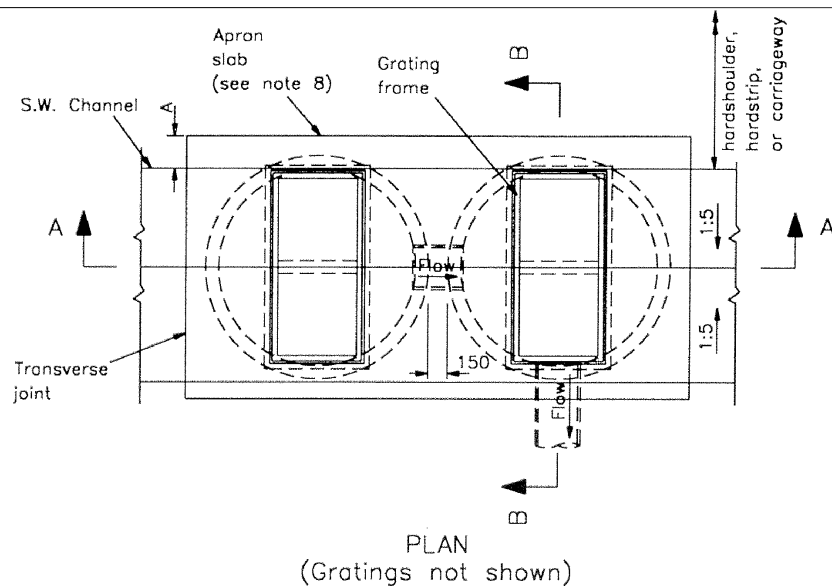
DRAINAGE

A	DEC 91
Issue	Date

EDGE OF PAVEMENT DRAINS —  
UNDER CHANNEL DRAINAGE LAYERS

Drawing No.

F21



#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Plan and Section A-A indicate outlet with twin grating installation and associated chambers. Detail can be modified for single or triple chamber installation. Associated drains and pipework shall be as detailed on the Drawings and schedules. Apron slab on Plan and Section B-B shown to suit verge installation. Slab width and profile differs when used in central reserve location.
3. Chamber gratings as specified to suit cross-section of apron. Minimum internal dimensions 600 x 600. Grating frames to be bedded on mortar and securely fixed to concrete apron by approved mechanical means. Frame to be otherwise bedded on epoxy resin mortar.
4. Support beam permissible beneath grating where necessary to withstand loading defined in Note 8. Beam to be removable where clear opening 600 x 600 not otherwise available for access purposes. Removable beams to be supported on purpose made steel brackets bearing upon grating frame rebates and bolted to the faces of the apron slabs within the access openings. Brackets shall restrain the beam from sideways movement. Beam rolling tolerances may be accommodated by use of purpose-made steel shims between the supporting brackets and the beams. All steelwork to be fabricated from steel to BS 970 : Part 1 and to be protected by hot dip galvanising to SHW, Clause 1909.
5. Chamber details beneath apron slab as HCD Drg. No. F11 for Type 7 chamber (1050 catchpit) but with internal diameter D as specified to provide minimum necessary clear opening beneath grating, and be not less than 1050.
6. A transverse joint shall be formed at each end of the apron slab in accordance with SHW, Clause 1009. Transverse joints shall not be permitted within the apron slab. No joints shall be permitted within adjacent lengths of concrete pavement slabs. Necessary joints in such slabs shall be spaced accordingly.
7. Dimension H to provide necessary support/bedding to removable support beam.
8. Apron slab and associated dimension H to be designed to withstand the accidental wheel loading defined in BD 37 (DMRB 1.3.14) paragraph 6.6. Dimension A to be minimised. Concrete to apron slab shall comply with SHW, Clause 1103, air-entrained in accordance with BS 5931. Plain concrete shall be a designed concrete, strength class C 28/35 to BS EN 206-1 and BS 8500. Reinforced concrete shall be strength class C 32/40 to SHW, Clause 1001. Concrete to apron slab cast in one with adjacent concrete pavement shall be as specified for the carriageway slab.
9. Dimensions Y and G shall be as defined in Appendix 5/3.

HIGHWAY CONSTRUCTION DETAILS

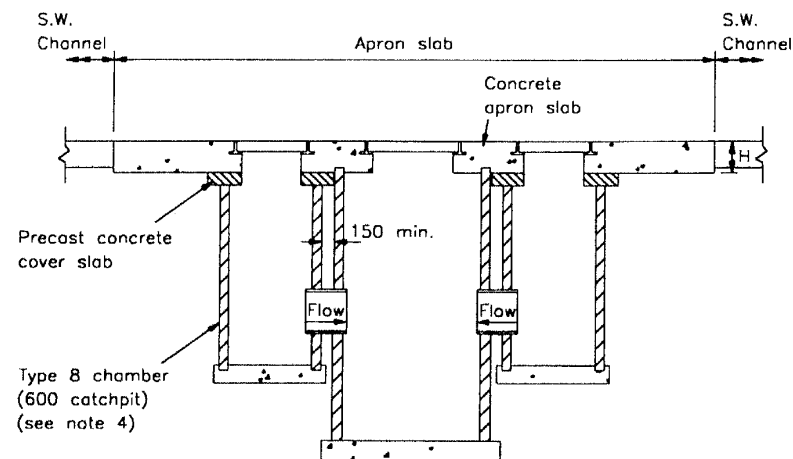
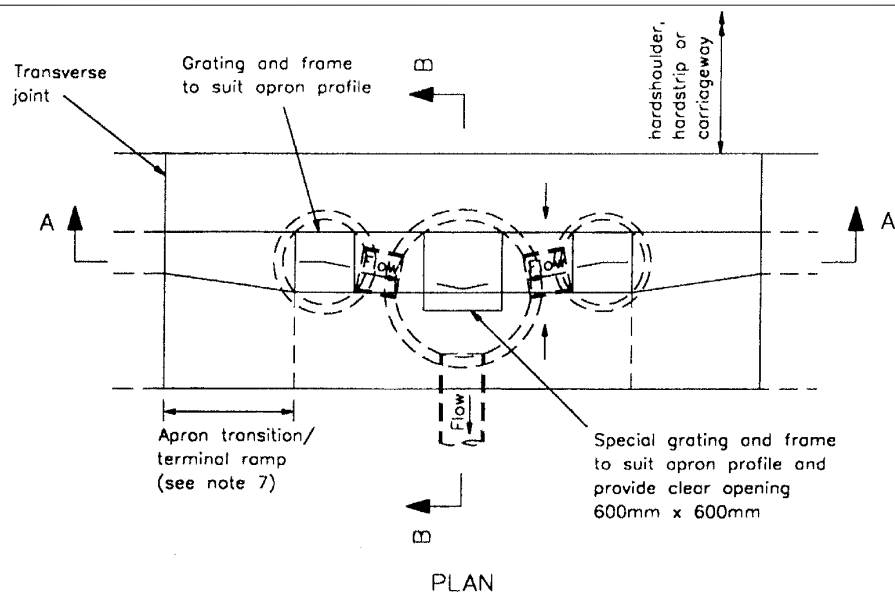
EDGE OF PAVEMENT  
DETAILS

B	NOV 03
A	MAR 98
Issue	Date

IN-LINE OUTLET  
TRIANGULAR S.W. CHANNEL

Drawing No.

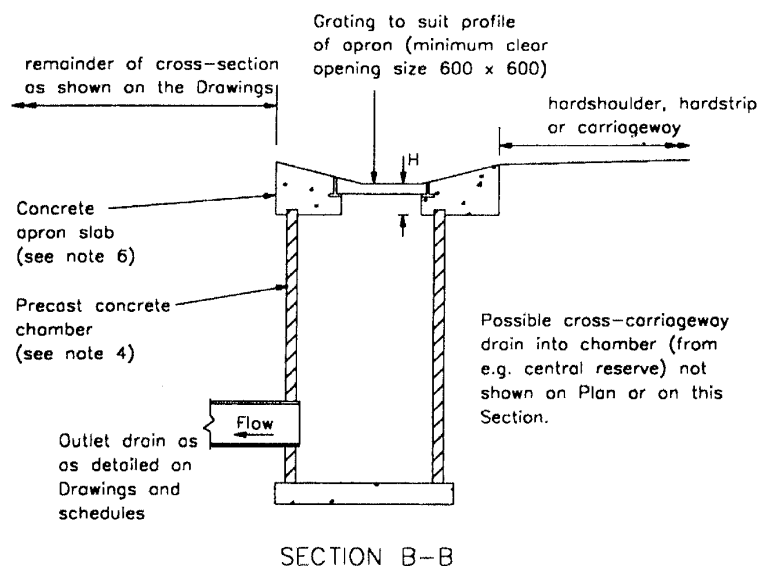
F22



SECTION A-A

# NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Plan and Section A-A indicate typical outlet in-line with triple grating installation and associated chambers. Detail can be modified for twin or single grating installation or for off-line outlets to trapezoidal or triangular S.W. channel. Associated drains and pipework shall be as detailed on the Drawings and schedules. Apron slab on Plan and Section B-B shown to suit verge installation. Slab width and profile differs when used in central reserve location.
3. Chamber gratings as specified in the chamber schedule to suit cross-section of apron. Grating frames to be bedded on mortar and securely fixed to rebates formed in concrete apron by approved mechanical means. Frame to be otherwise bedded on epoxy resin mortar.
4. Main chamber beneath apron slab to be as HCD Drg. No. F11 for Type 7 chamber (1050 catchpit). Subsidiary chambers shown on Plan and Section A-A to be as HCD Drg. No. F12 for Type 8 chamber (600 nominal dia.) beneath underside of apron slab. Diameter may be increased if necessary to accommodate larger grating. Where longitudinal carrier pipes in verge are connected to main chamber, Type 7 chambers with special gratings and frame (as for main chamber shown) should be substituted in place of Type 8 chambers.
5. A transverse joint shall be formed at each end of the apron slab in accordance with SHW, Clause 1009. Transverse joints shall not be permitted within the apron slab. No joints shall be permitted within adjacent lengths of concrete pavement slabs. Necessary joints in such slabs shall be spaced accordingly.
6. Apron slab and associated dimension H to be designed to withstand the accidental wheel loading defined in BD 37 (DMRB 1.3.14) paragraph 6.6. Concrete to apron slab shall comply with SHW, Clause 1103, air-entrained in accordance with BS 5931. Plain concrete shall be a designed concrete, strength class C 28/35 to BS EN 206-1 and BS 8500. Reinforced concrete shall be strength class C 32/40 to SHW, Clause 1001.
7. Transition/terminal ramp to be formed as an integral part of the apron slab.
8. Over-excavation for main chamber beneath subsidiary chambers to be backfilled with ST1 concrete to SHW, Clause 2602.



HIGHWAY CONSTRUCTION DETAILS

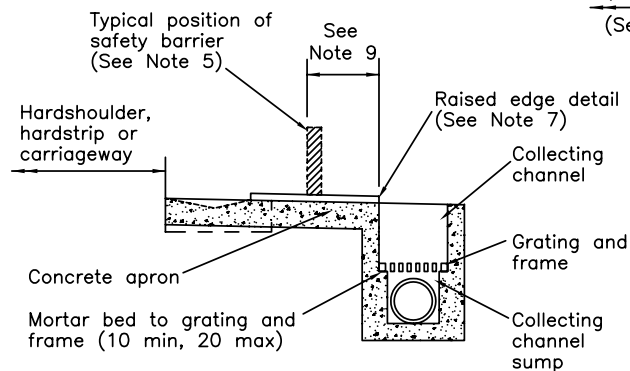
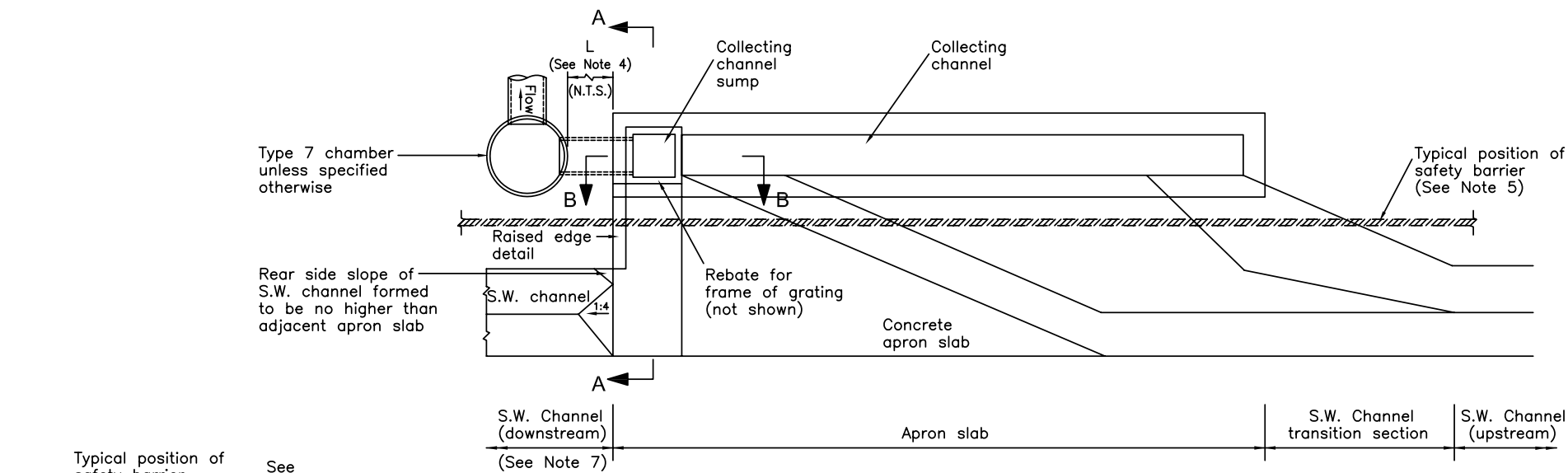
EDGE OF PAVEMENT  
DETAILS

B	NOV 03
A	MAR 98
Issue	Date

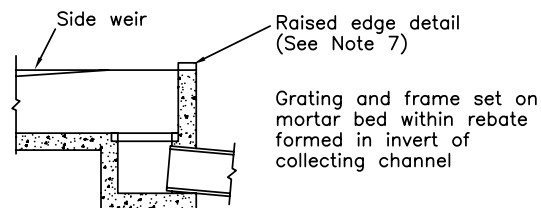
IN-LINE OUTLET TO  
TRAPEZOIDAL S.W. CHANNEL

Drawing No.

F23



SECTION A-A



SECTION B-B

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Detail shows weir outlet to triangular S.W. channel. Also applicable to trapezoidal S.W. channel with necessary minor modifications. Overall dimensions, crossfalls etc, of apron slab, collecting channel and collecting channel sump to be designed to withstand the accidental wheel loading defined in BD 37 (DMRB 1.3.14) paragraph 6.6.
3. A transverse joint in accordance with Clause 1009 shall be formed between the apron slab and S.W. channels at each end of the slab. No joints shall be permitted within adjacent lengths of concrete pavement slabs. Necessary joints in such slabs shall be spaced accordingly.
4. Dimension L between apron slab and outfall chamber to be not less than required by SHW, sub-Clause 507.15.
5. Safety barrier to be as shown on the Drawings and scheduled in Appendix 4/1.
6. Concrete to apron slab shall comply with SHW, Clause 1103, air-entrained in accordance with BS 5931. Plain concrete shall be a designed concrete, strength class C 28/35 to BS EN 206-1 and BS 8500. Reinforced concrete shall be strength class C 32/40 to SHW, Clause 1001.
7. 50mm high raised edge detail required where shown to protect verge from overspill from apron slab.
8. Surface water channels become discontinuous at each weir outlet. Details shown on this drawing indicate recommencement of surface water channel down-gradient from weir outlet.
9. The distance between the traffic face of any safety barrier and the nearest vertical face of the collecting channel should not be less than 75% of the Working Width Class as specified in Appendix 4/1.

HIGHWAY CONSTRUCTION DETAILS

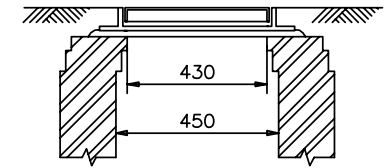
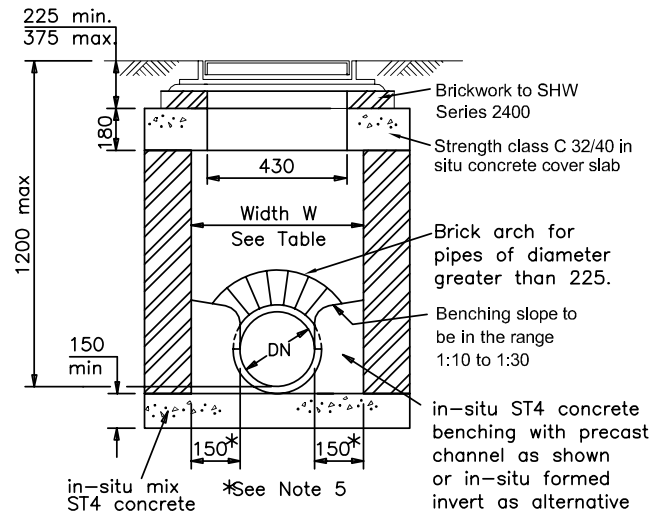
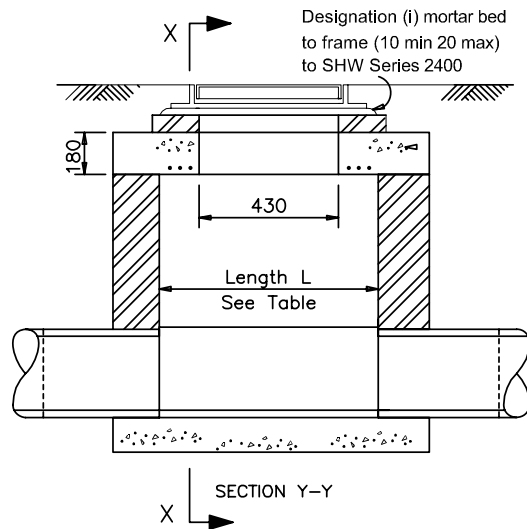
EDGE OF PAVEMENT  
DETAILS

C	NOV 04
B	NOV 03
A	MAR 98
Issue	Date

WEIR OUTLET TO  
S.W. CHANNEL

Drawing No.

F24

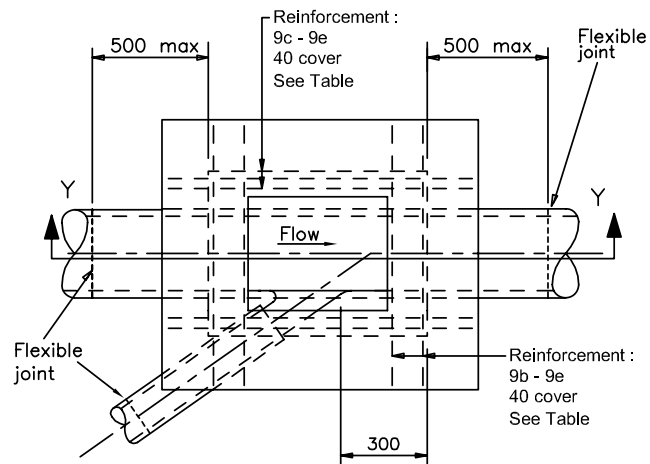


PERMITTED ALTERNATIVE COVER  
DETAIL FOR SUB-TYPE 9a

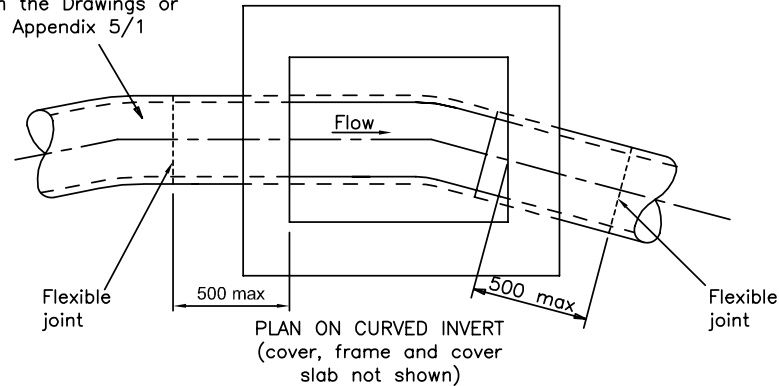
CHAMBER SUB-TYPE					
Sub-Type	No. of Branches	Length L	Width W	Max. Pipe DN	Reinforcement T20 bars at 50 c/c
9a	0	450	450	150	Nil
9b	0	450	600	300	4 No. 800 long
9c	1	1000	600	150	10 No. 950 long 4 No. 1350 long
9d	1	1000	750	300	10 No. 1100 long 6 No. 1350 long
9e	2	1000	750	150	

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Chamber walls 225 thick to be constructed in class B clay engineering bricks to SHW Series 2400 in designation (i) mortar or in-situ ST4 concrete to SHW, Clause 2602.
3. For details of pipe size(s), invert level(s) and type of cover and frame, see Drawings and Appendix 5/1.
4. See SHW, sub-Clause 507.7 regarding backfilling/surround to chamber.
5. Benching width to be 300 for branch connection.



One or more pipe bends  
(if required) as shown  
on the Drawings or  
in Appendix 5/1



FOR PIPES 300 MAX. DIAMETER  
MAX. DEPTH TO INVERT 1200  
UP TO SINGLE BRANCH NOT EXCEEDING 225

TYPE 9 CHAMBER  
(BRICK OR IN-SITU CONCRETE  
SHALLOW INSPECTION CHAMBER)

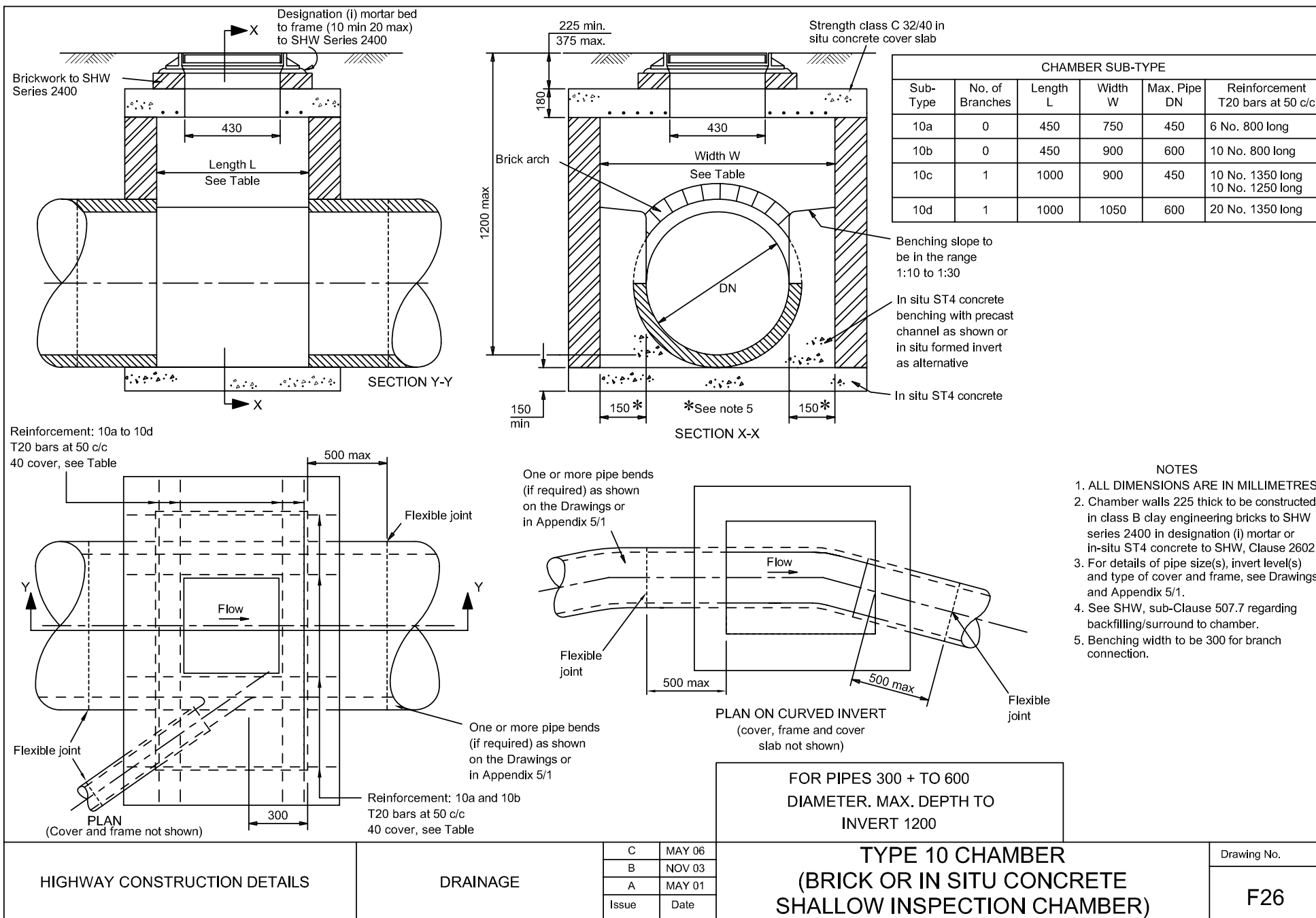
Drawing No.

F25

HIGHWAY CONSTRUCTION DETAILS

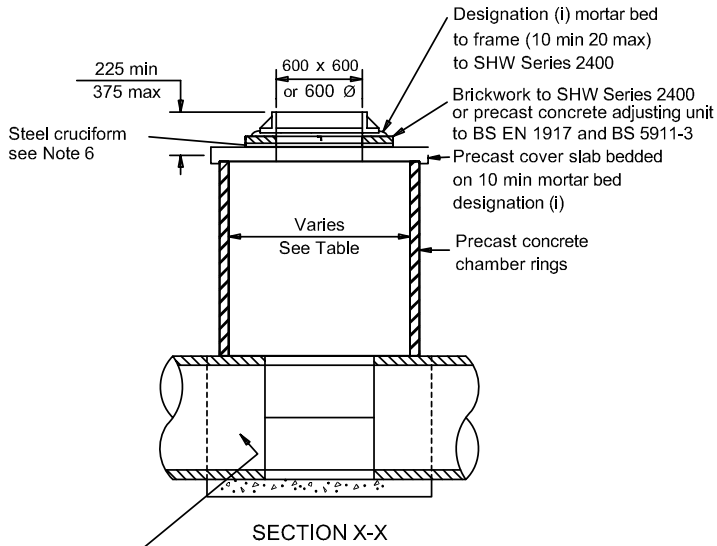
DRAINAGE

C	MAY 06
B	NOV 03
A	MAY 01
Issue	Date

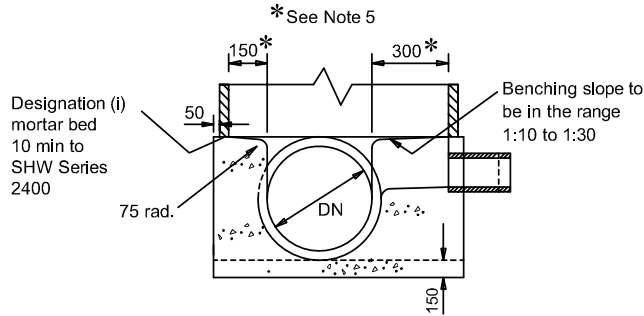
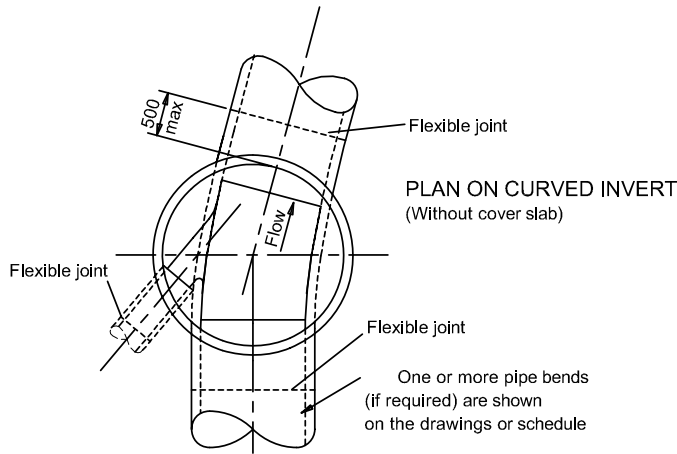
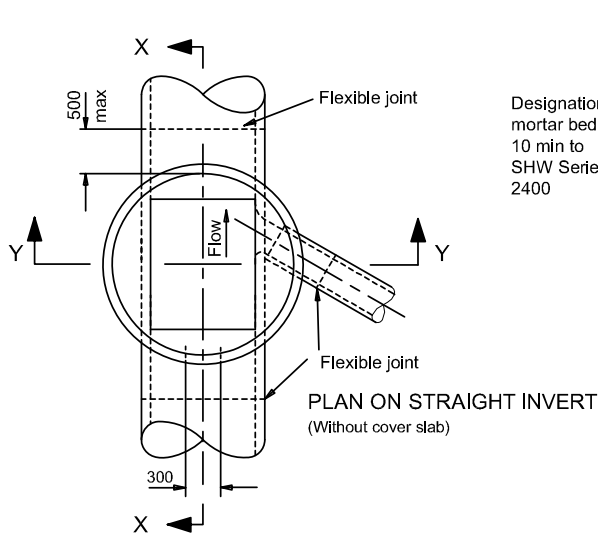




CHAMBER SUB-TYPE			
Sub-Type	No. of Branches	Chamber ring dia.	Max. Pipe DN
11a	1	900	450
11b	1	1050	600
11c	1	1200	750
11d	1	1500	900



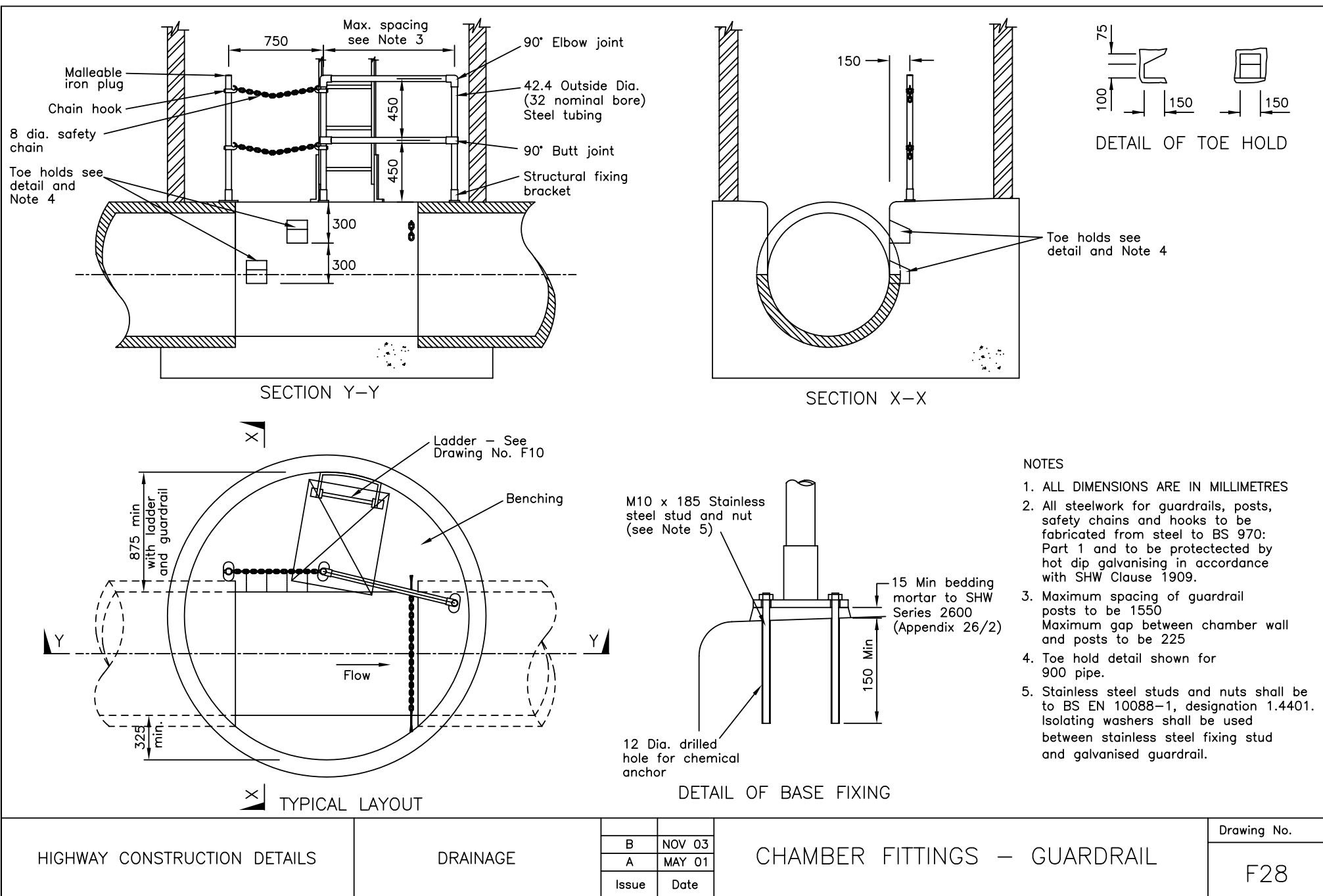
Integral in-situ ST4 concrete base walls benching & base slab with precast channel as shown or in-situ formed invert as alternative. Walls to extend 50 beyond outer faces of chamber ring. Alternatively precast concrete chamber rings may be bedded in mortar on an in-situ ST4 concrete base slab 300 greater in diameter than internal diameter of chamber rings.



SECTION Y-Y

- NOTES**
1. ALL DIMENSIONS ARE IN MILLIMETRES.
  2. Chamber walls and cover slab to be constructed in precast concrete to BS EN 1917 and BS 5911-3.
  3. For details of pipe size(s), invert level(s) and type of cover and frame, see cover and frame, see Drawings and Appendix 5/1.
  4. See SHW regarding backfilling/surround to chamber.
  5. Benching width to be 300 for branch connection.
  6. Cruciform comprising 2 No. 76 x 51 x 6 angle to BS 970 - 1 700 long and protected by hot dip galvanising in accordance with SHW Clause 1909. Cruciform built into brickwork across centre of access hole to prevent man entry.
  7. Inspection chambers are intended for use where maintenance is to be carried out using remotely operated equipment only. Deep inspection chambers impose limitations on these techniques and therefore should not be used in highways or other high use areas where excavation for repairs would be unacceptable.
  8. All ST concrete shall be to SHW, Clause 2602.

				FOR PIPES 900 MAX DIAMETER			
HIGHWAY CONSTRUCTION DETAILS	DRAINAGE	D	MAY 06	TYPE 11 CHAMBER (PRECAST CONCRETE DEEP INSPECTION CHAMBER)			Drawing No.
		C	NOV 04				
		B	NOV 03				
		A	MAY 01				
		Issue	Date	F27			



HIGHWAY CONSTRUCTION DETAILS

DRAINAGE

B	NOV 03
A	MAY 01
Issue	Date

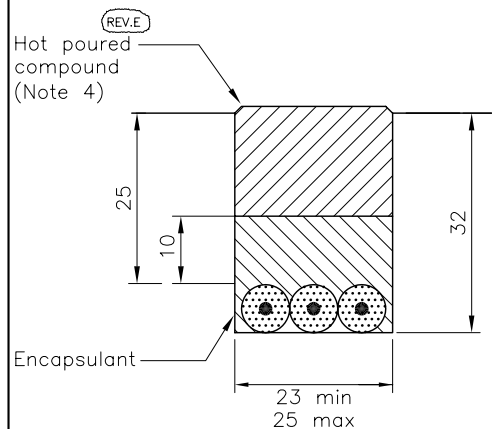
CHAMBER FITTINGS – GUARDRAIL

Drawing No.

F28

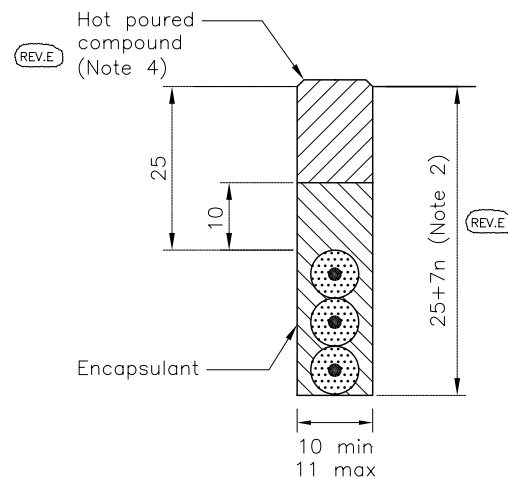
FOR LOOPS LAID IN REINFORCED  
CONCRETE CONSTRUCTION

TYPE S1



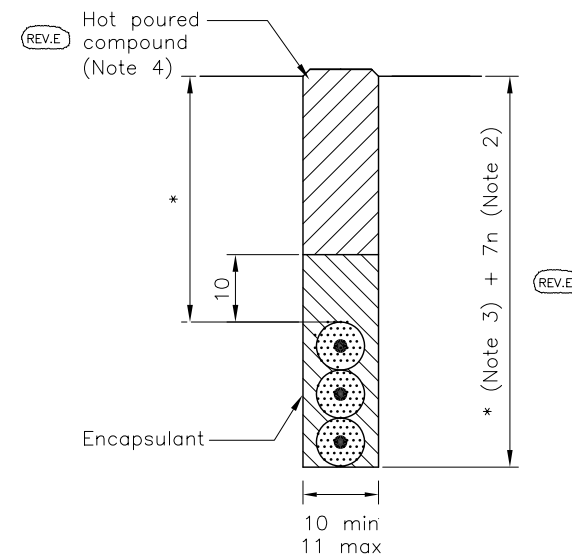
FOR LOOPS LAID IN  
NON-REINFORCED CONCRETE  
CONSTRUCTION

TYPE S2



FOR LOOPS LAID IN  
FLEXIBLE CONSTRUCTION  
(EXCLUDING POROUS SURFACES)

TYPE S3



NOTES

1. All dimensions are in millimetres.
2.  $n$  = Number of cables in the slot.
3. \* = Unless otherwise specified to be 80 for motorway applications and 65 for all-purpose roads.
4. Hot poured compound shall be oxidised grade bitumen to BS EN 13304 Grade S85/40 or Grade S85/25.
5. Loop tail slot width shall be 16 (+4/-0) where twisted loop tail pairs occupy the slot.
6. NMCS = National Motorway Communications System.
7. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

HIGHWAY CONSTRUCTION DETAILS

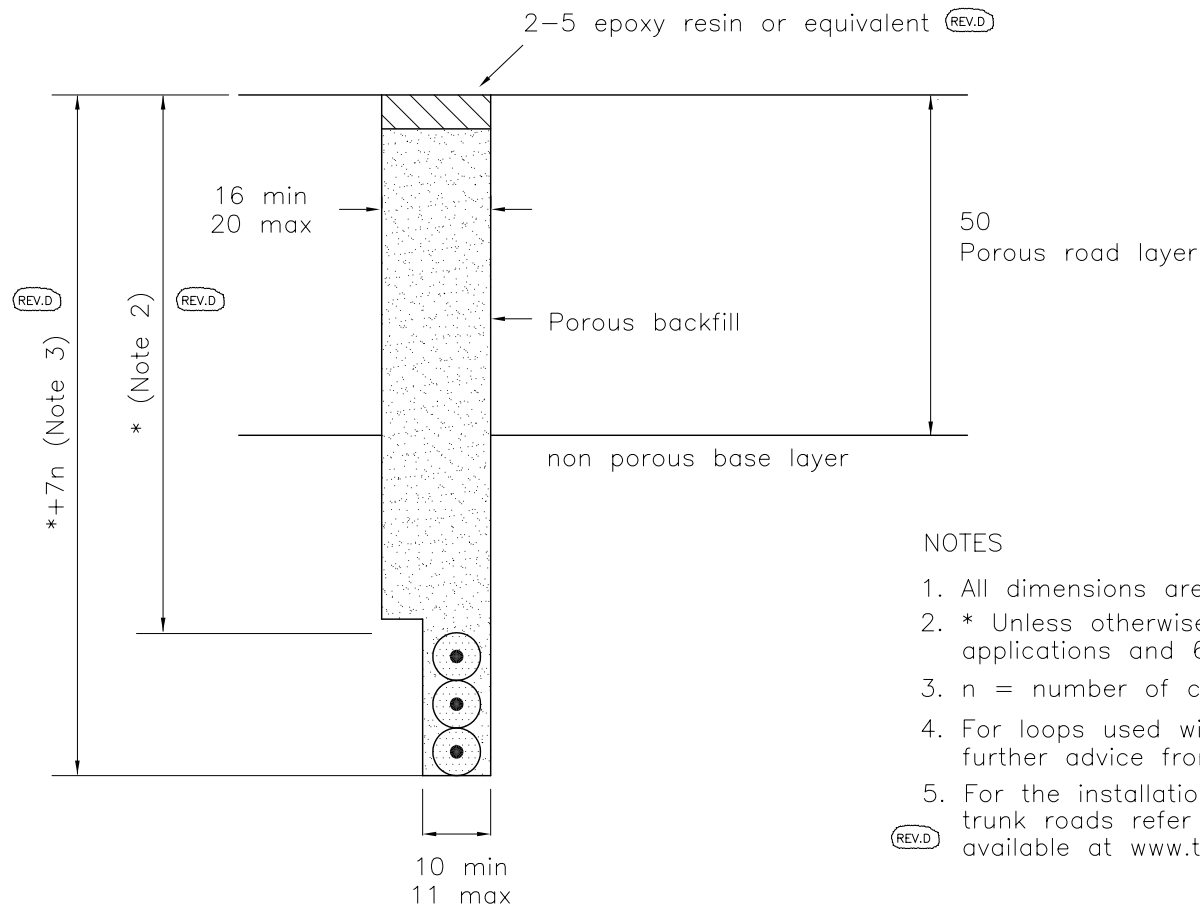
LOOP DETECTORS

E	Nov 05
D	Nov 03
C	Sept 03
A	Dec 91
Issue	Date

INSTALLATION DRAWING NMCS AND  
ALL-PURPOSE ROADS  
DETECTOR LOOP SLOT DETAILS-SHEET 1

Drawing No.

G1

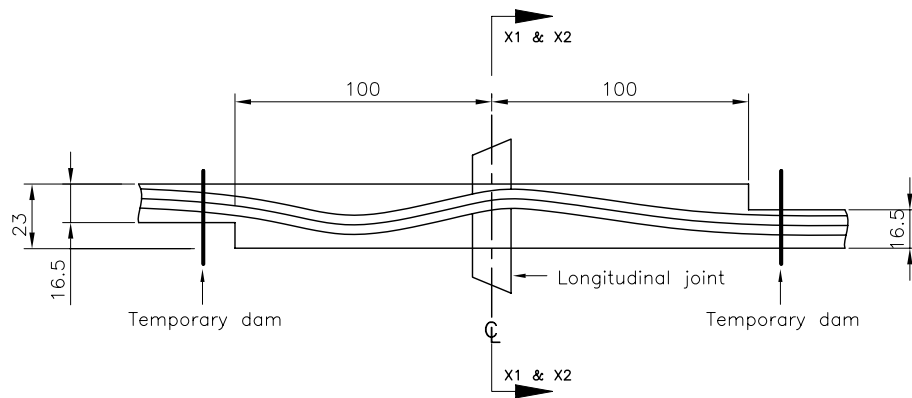


#### NOTES

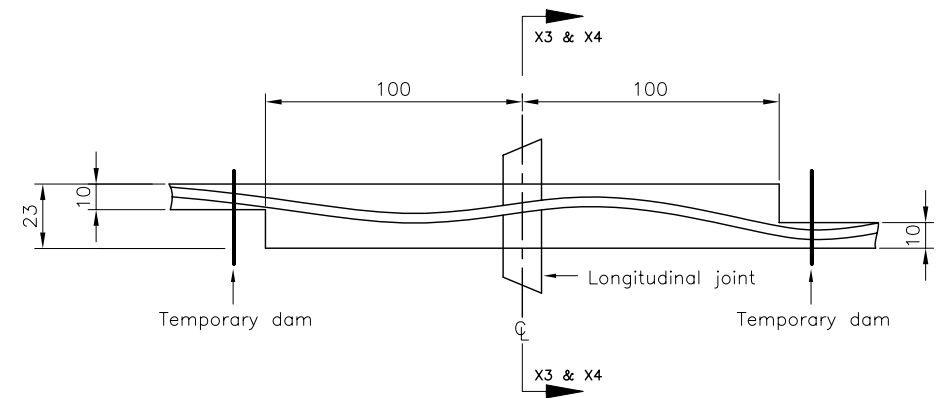
1. All dimensions are in millimetres.
2. \* Unless otherwise specified to be 80 for motorway applications and 65 for all-purpose roads.
3. n = number of cables in the slot.
4. For loops used with Automatic Data Collection equipment seek further advice from the Overseeing Organisation.
5. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

SLOT PROFILE – POROUS ROAD SURFACES

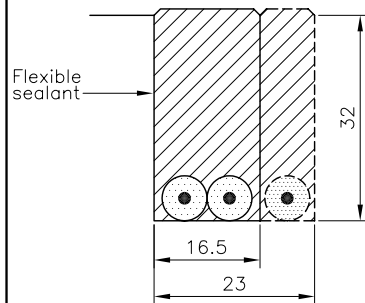
HIGHWAY CONSTRUCTION DETAILS	LOOP DETECTORS	D	Nov 05	INSTALLATION DRAWING NMCS AND ALL-PURPOSE ROADS DETECTOR LOOP SLOT DETAILS-SHEET 2	Drawing No.
		C	Nov 03		
		B	Aug 02		G2
		A	Dec 91		
		Issue	Date		



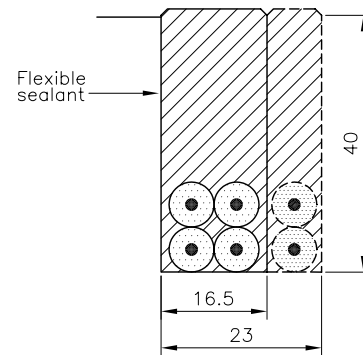
TYPE X1 & X2 (PLAN)



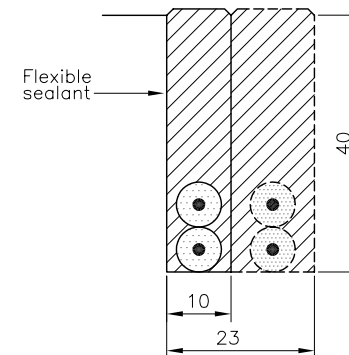
TYPE X3 & X4 (PLAN)



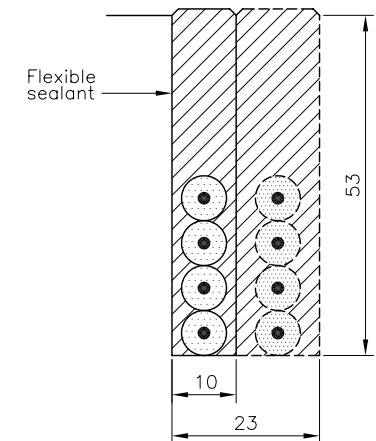
X1 SECTION



X2 SECTION



X3 SECTION



X4 SECTION

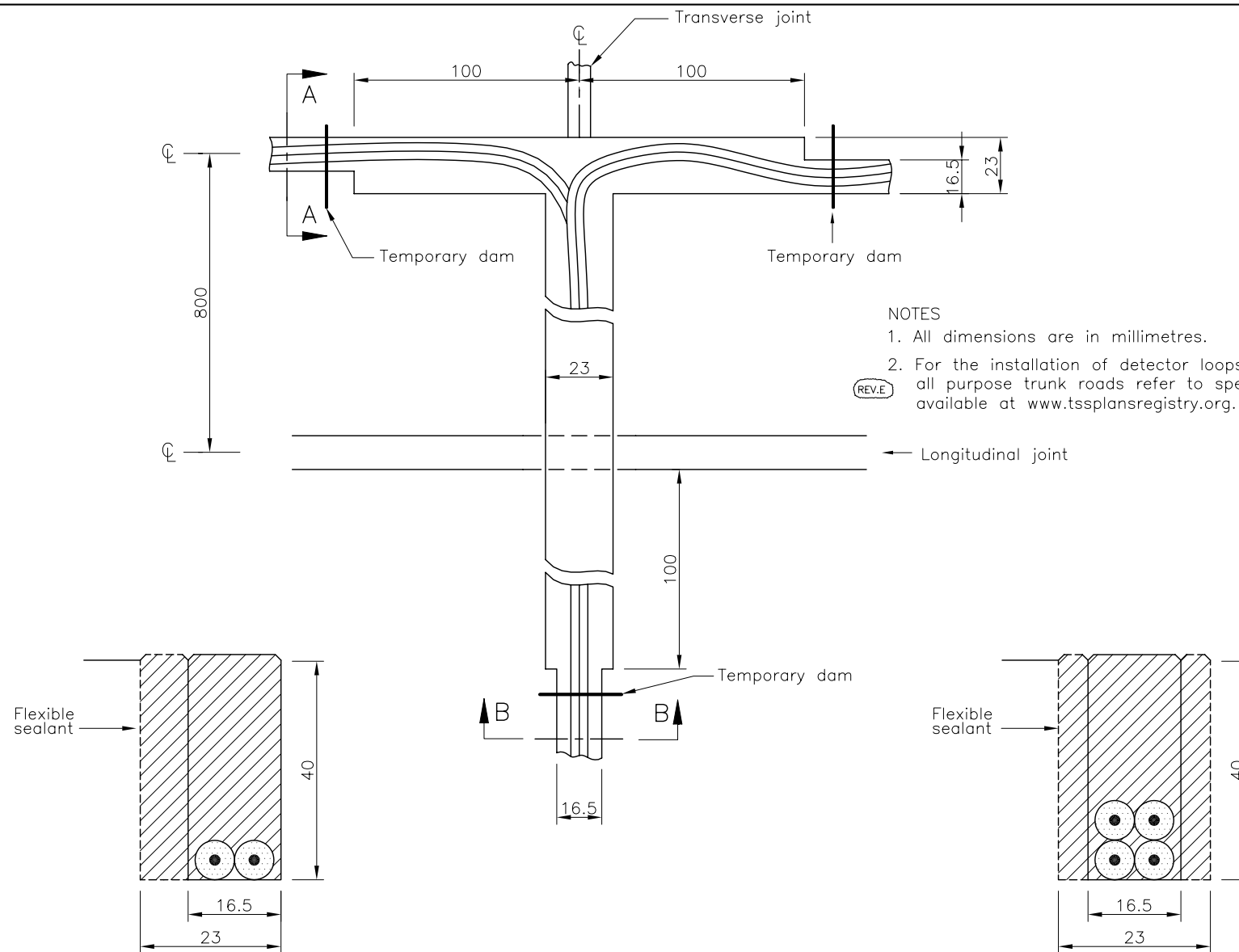
NOTES

1. All dimensions are in millimetres.

2. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

REV.E

HIGHWAY CONSTRUCTION DETAILS	LOOP DETECTORS	E	Nov 05	INSTALLATION DRAWING NMCS AND ALL-PURPOSE ROADS DETECTOR LOOP SLOT DETAILS-SHEET 3	Drawing No.
		D	Nov 03		
		C	Sept 03		G3
		A	Dec 91		
		Issue	Date		



#### NOTES

1. All dimensions are in millimetres.

2. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

REV.E

HIGHWAY CONSTRUCTION DETAILS

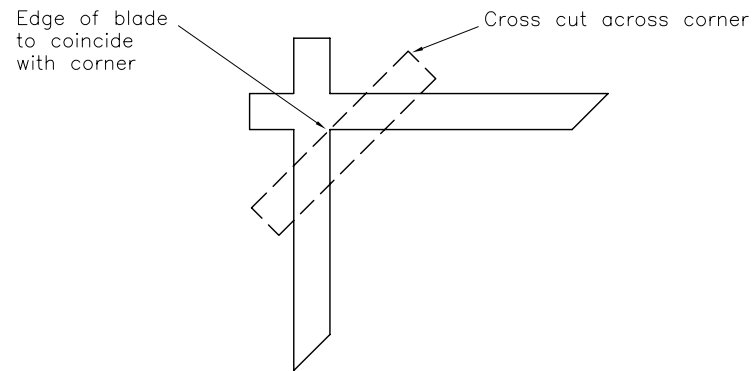
LOOP DETECTORS

E	Nov 05
D	Nov 03
C	Sept 03
A	Dec 91
Issue	Date

INSTALLATION DRAWING NMCS AND  
ALL-PURPOSE ROADS  
DETECTOR LOOP SLOT DETAILS-SHEET 4

Drawing No.

G4

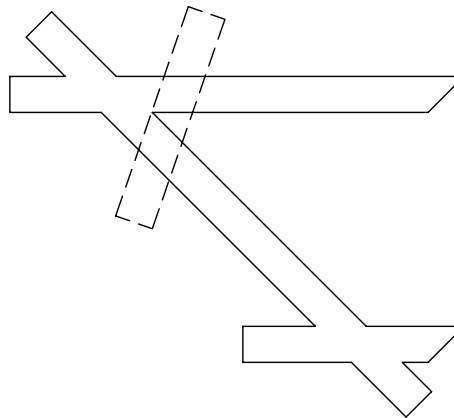


CROSS CUT 90° ANGLE

NOTES

1. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

(REV.D)



CROSS CUT 45° ANGLE

HIGHWAY CONSTRUCTION DETAILS

LOOP DETECTORS

D	Nov 05
C	Nov 03
B	Aug 02
A	Dec 91
Issue	Date

INSTALLATION DRAWING NMCS AND  
ALL-PURPOSE ROADS  
CROSS CUTTING CORNERS OF SLOTS

Drawing No.

G5

# INSTALLATION TEST CERTIFICATE FOR INDUCTIVE LOOP DETECTORS

Site address/reference: .....

Contractor: .....

Weather Conditions: .....

.....

Drawing number: .....

.....

.....

Date tested: .....

Temperature: .....

LOOP TESTS	Loop tail length	TEST 1 Series resistance. Measured into loop tails.		TEST 2 Resistance to earth of loop tails. Measured at 500V DC with all conductors connected together.		TEST 3 Inductance. Measured into loop tails.	Calculated Inductance (REV.C)
	metres	Max. 5 Ohms		Min. 100 Megohms		$\mu$ H	$\mu$ H
Designation		Reading	Pass/Fail	Reading	Pass/Fail		

COMPLETE CIRCUIT TESTS	Feeder length	TEST 1 Series resistance. Measured into feeder and loop tails.		TEST 2 Resistance to earth of cable armouring (armouring not connected).		TEST 3 Resistance to earth of cable armouring (armouring connected at detector housing).		TEST 4 Resistance to earth of feeder and loop tails. Measured at 500V DC with all conductors connected together.		TEST 5 Inductance. Measured into feeder and loop tails.
	metres	Max. 5 Ohms		Min. 100 Megohms		Max. 0.5 Ohms		Min. 100 Megohms		$\mu$ H
Designation		Reading	Pass/Fail	Reading	Pass/Fail	Reading	Pass/Fail	Reading	Pass/Fail	

Loop Dimensions

Test equipment used

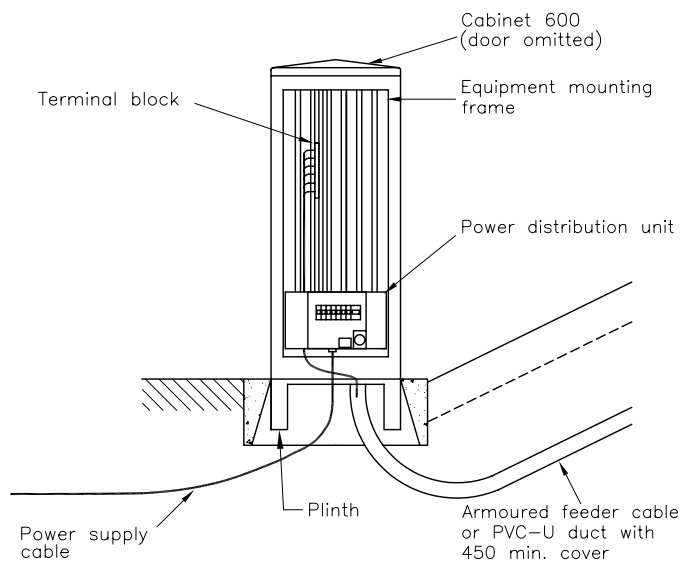
Resistance Make..... Type.....  
Inductance Make..... Type.....

(REV.C) I certify that this equipment has been installed and tested in accordance with specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

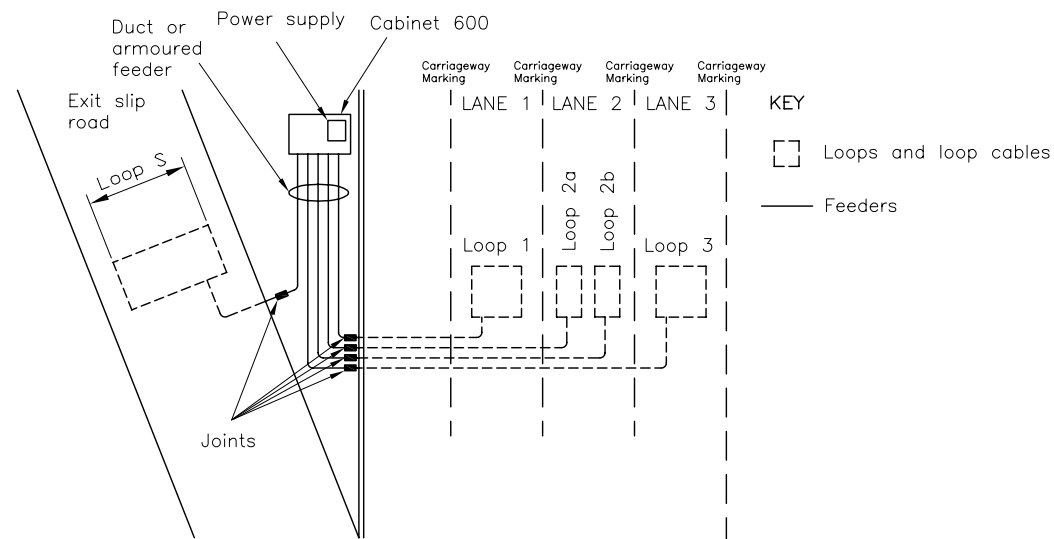
(REV.C) Signed on behalf of the Contractor..... Company.....Date.....

HIGHWAY CONSTRUCTION DETAILS	LOOP DETECTORS			INSTALLATION DRAWING NMCS AND ALL-PURPOSE ROADS TEST CERTIFICATE	Drawing No.
		C	Nov 05		
		B	Sept 03		
		A	Aug 02		
		Issue	Date		G6

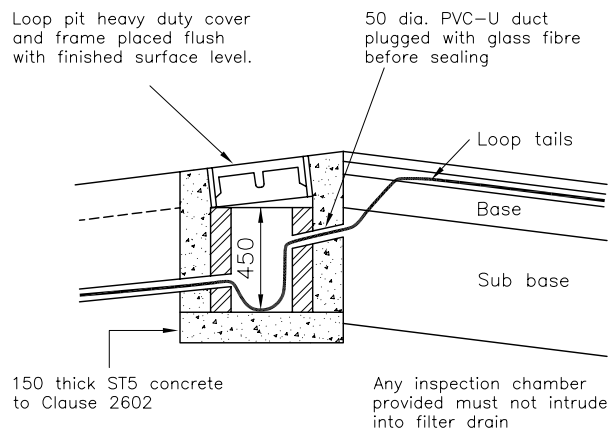




CABINET 600 LAYOUT



TYPICAL LAYOUT OF N+1 LOOPS



LOOP PIT  
EMBANKMENT ONLY

# NOTES

1. All dimensions in millimetres.
2. Where there is a kerb, the cover of the inspection chamber shall be set at kerb level.
3. The feeder cables shall be laid in the inspection chamber with between 0.25m and 0.5m slack.
4. A paved area consisting of 1 No. 900 x 600 x 50 paving slab shall be laid immediately in front of the cabinet 600.
5. Maximum intrusion into filter drain is 25% of drain material within 300 of surface.
6. A 50 dia. hole to be drilled at 45° if duct is to be below surface. A starter hole one slot cutting wheel dia. from end of slot, a 50 dia. PVC-U duct to be inserted and plugged with glass fibre to prevent encapsulant running into PVC-U duct.
7. Where two part loop pit is below surface, a joint marker slab is to be provided.
8. Feeder grooves shall be separated by a distance of 300 in bitumen and 500 in concrete.
9. Loop circuits shall be identified in the cabinet by labelling the feeders in pairs with appropriate loop letters.
10. On concrete roads care must be taken to avoid cutting near longitudinal joints. Loops shall be cut between transverse joints in the concrete slabs.
11. When loops are required, concrete reinforcement shall be omitted at the design and construction stage.
12. Loop widths may vary to accommodate a different lane width. Refer to spec. MCE 0115.
13. Loop tails to be twisted together 5 turns/metre within the inspection/roadside chamber.
14. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540.
15. All specifications available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

HIGHWAY CONSTRUCTION DETAILS

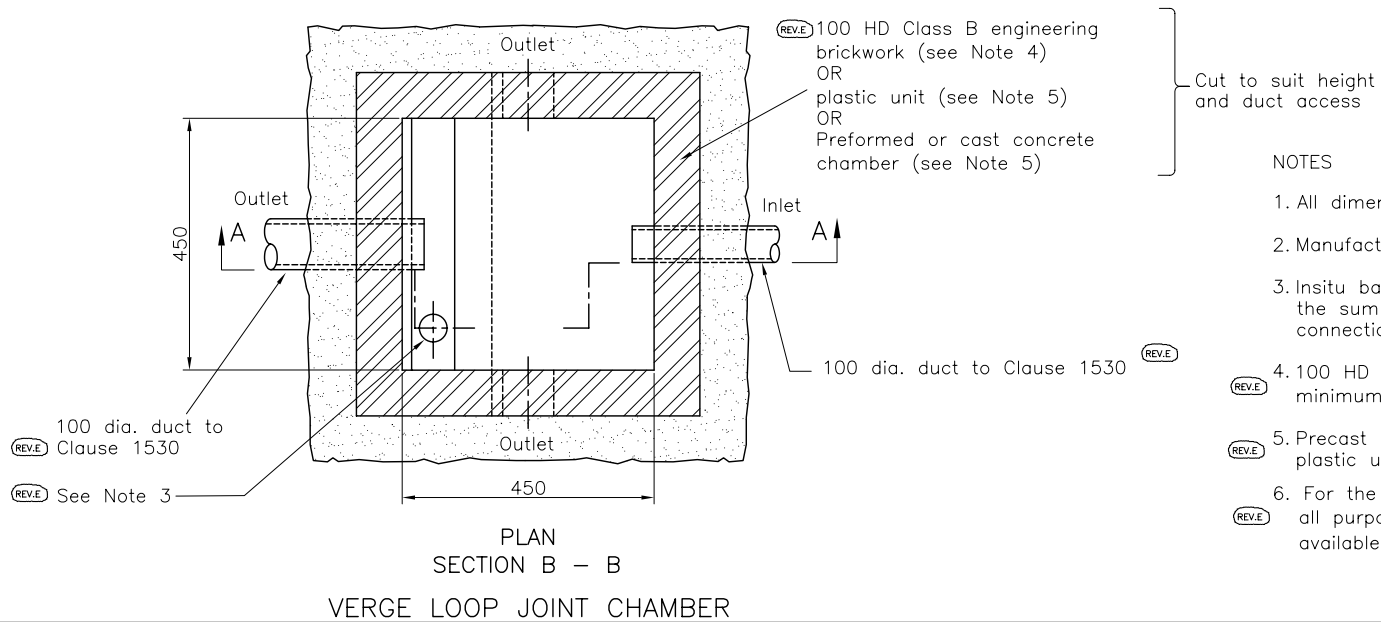
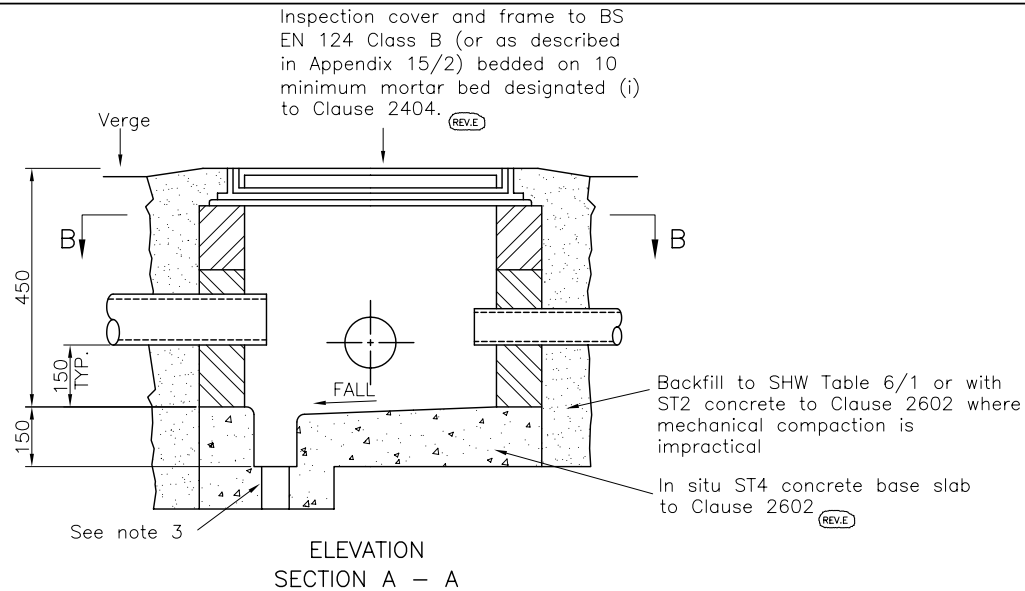
LOOP DETECTORS

G	Nov 05
F	Nov 03
E	Sept 03
D	Aug 02
C	May 02
A	Dec 91
Issue	Date

INSTALLATION DRAWING NMCS  
CABINET 600, LOOP PIT AND N+1  
LAYOUT DETAILS

Drawing No.

G7



#### NOTES

1. All dimensions are in millimetres.
2. Manufacturing tolerance +5mm unless otherwise stated.
3. In situ base slab to be cast with a minimum fall of 1:20 towards the sump. Positive drainage in the form of a soakaway or connection to the highway drainage network if required.
4. 100 HD Class B engineering brickwork to Clause 2406 on 10 minimum mortar bed designated (i) to Clause 2404. (REV.E)
5. Precast chamber to comply with BS 5911-3 and BS EN 1917 or plastic units or other units in equivalent material. (REV.E)
6. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org). (REV.E)

HIGHWAY CONSTRUCTION DETAILS

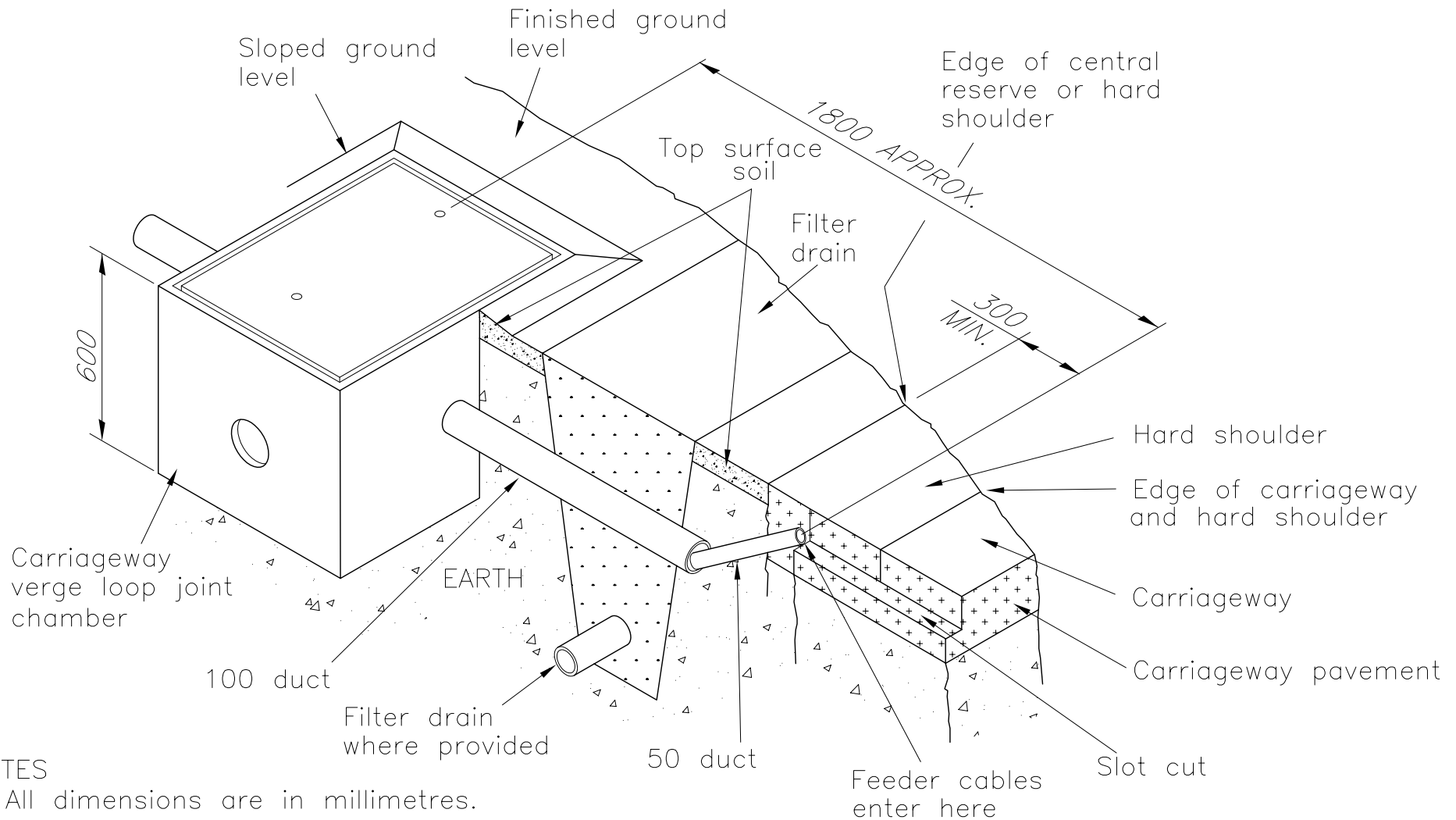
LOOP DETECTORS

INSTALLATION DRAWING NMCS  
LOOP JOINT CHAMBER - SHEET 1

Drawing No.

G8

E	Nov 05
D	Nov 03
C	Aug 02
A	Dec 91
Issue	Date



#### NOTES

1. All dimensions are in millimetres.
2. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

REV.E

## MOTORWAY ASSEMBLY

HIGHWAY CONSTRUCTION DETAILS

LOOP DETECTORS

E	Nov 05
D	Nov 03
C	Aug 02
A	Dec 91
Issue	Date

INSTALLATION DRAWING NMCS  
LOOP JOINT CHAMBER – SHEET 2

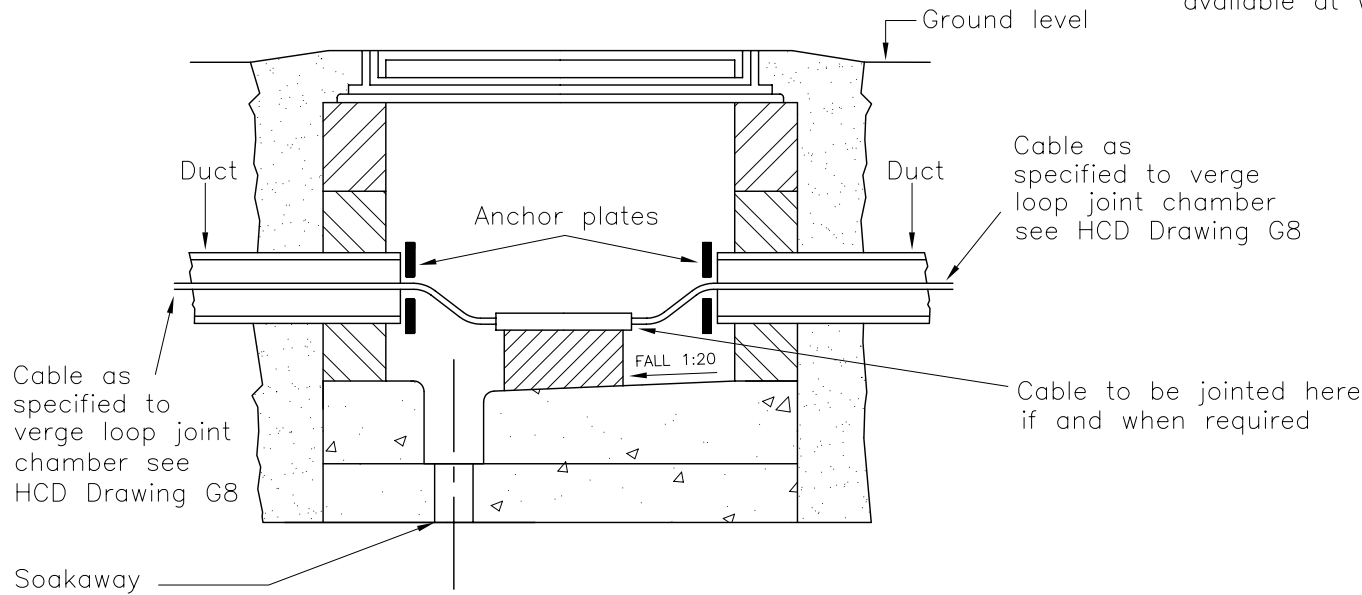
Drawing No.

G9

# NOTES

1. This arrangement may not be suitable for all site conditions. The scheme designer shall tailor other arrangements to suit individual locations.
2. Cable identification shall be fitted during installation.
3. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

(REV.E)



SECTIONAL ELEVATION OF CENTRAL RESERVE CHAMBER

HIGHWAY CONSTRUCTION DETAILS

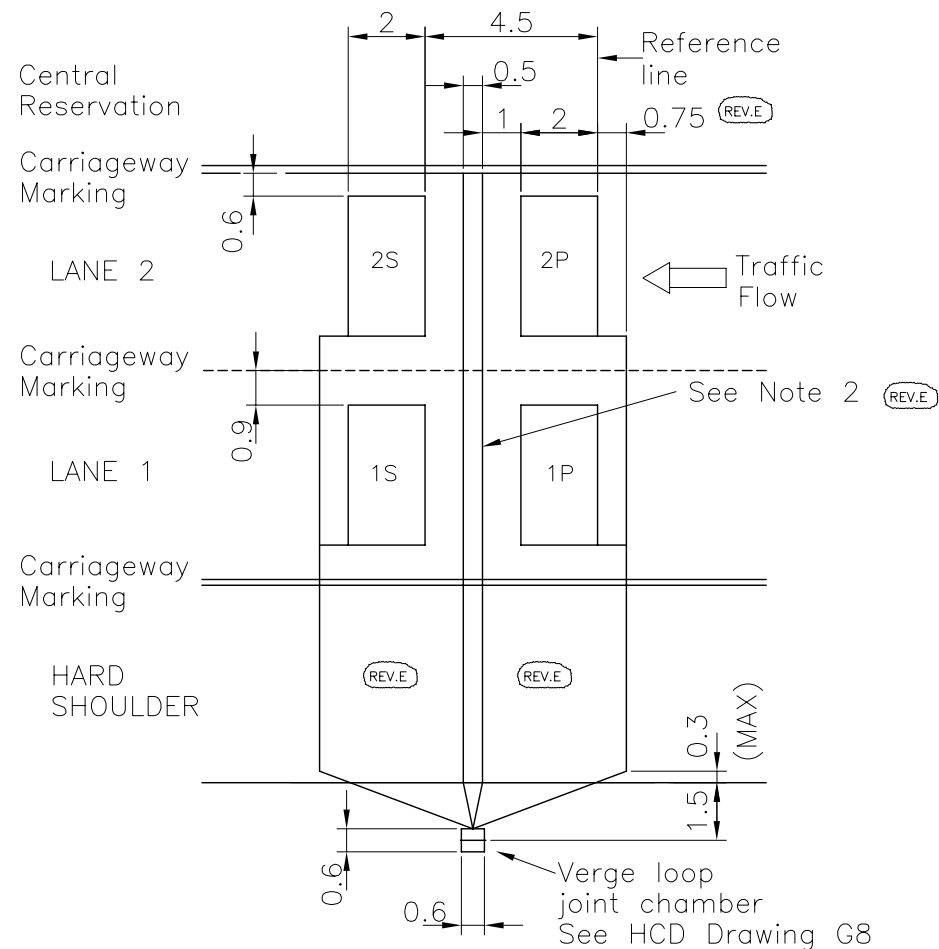
LOOP DETECTORS

E	Nov 05
D	Nov 03
C	Aug 02
A	Dec 91
Issue	Date

INSTALLATION DRAWING NMCS  
AND ALL-PURPOSE ROADS  
LOOP JOINT CHAMBER – SHEET 3

Drawing No.

G10

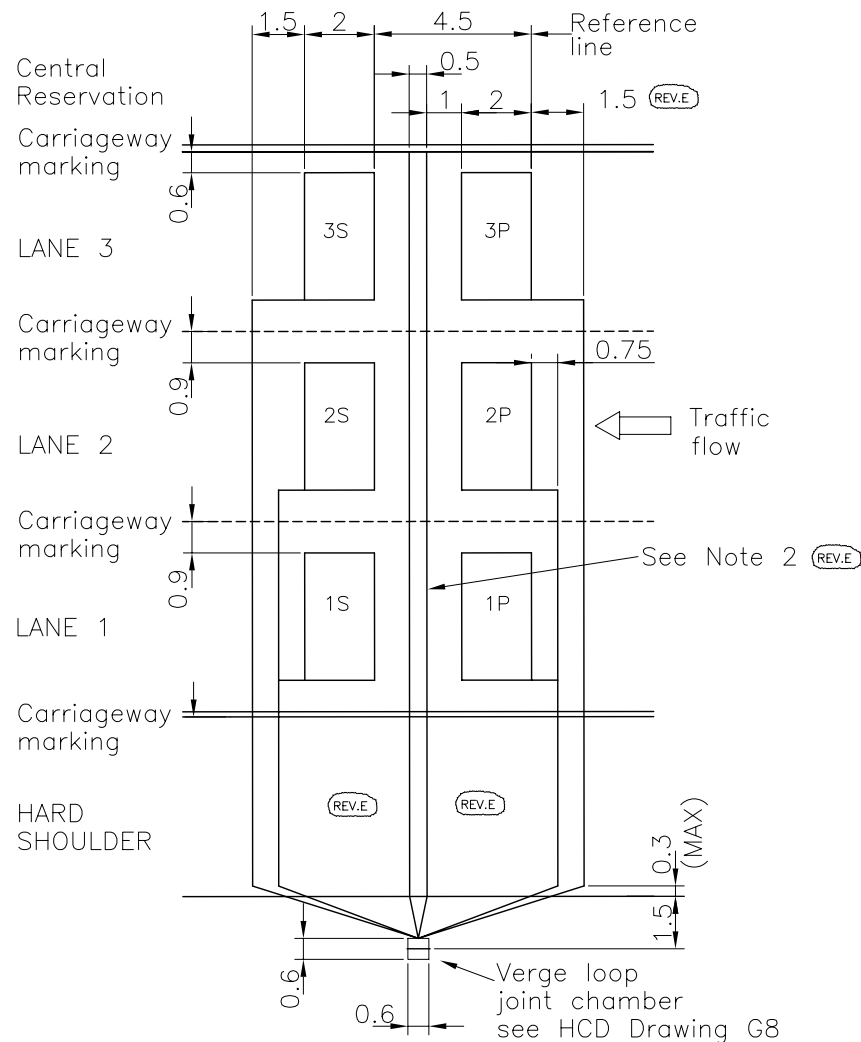


#### NOTES

1. All dimensions are in metres.
2. Slots for loop feeder cable to be minimum 0.3 apart.
3. All loops to be 3 turns.
4. Tolerance  $\pm 0.02$  metres unless otherwise stated.
5. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

### 2 LANE CARRIAGEWAY & HARD SHOULDER IN FLEXIBLE ROAD CONSTRUCTION FOR SLOTTED LOOP FEEDERS

HIGHWAY CONSTRUCTION DETAILS	LOOP DETECTORS	E	Nov 05	INSTALLATION DRAWING NMCS AND ALL-PURPOSE ROADS MIDAS AND MS3 LOOP DETAILS – SHEET 1	Drawing No.
		D	Nov 03		
		C	Aug 02		G11
		A	Dec 91		
		Issue	Date		



3 LANE CARRIAGEWAY & HARD SHOULDER  
IN FLEXIBLE ROAD CONSTRUCTION  
FOR SLOTTED LOOP FEEDERS

#### NOTES

1. All dimensions are in metres.
2. Slots for loop feeder cable to be minimum 0.3 apart.
3. All loops to be 3 turns.
4. Tolerance  $\pm 0.02$  metres unless otherwise stated.
5. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

HIGHWAY CONSTRUCTION DETAILS

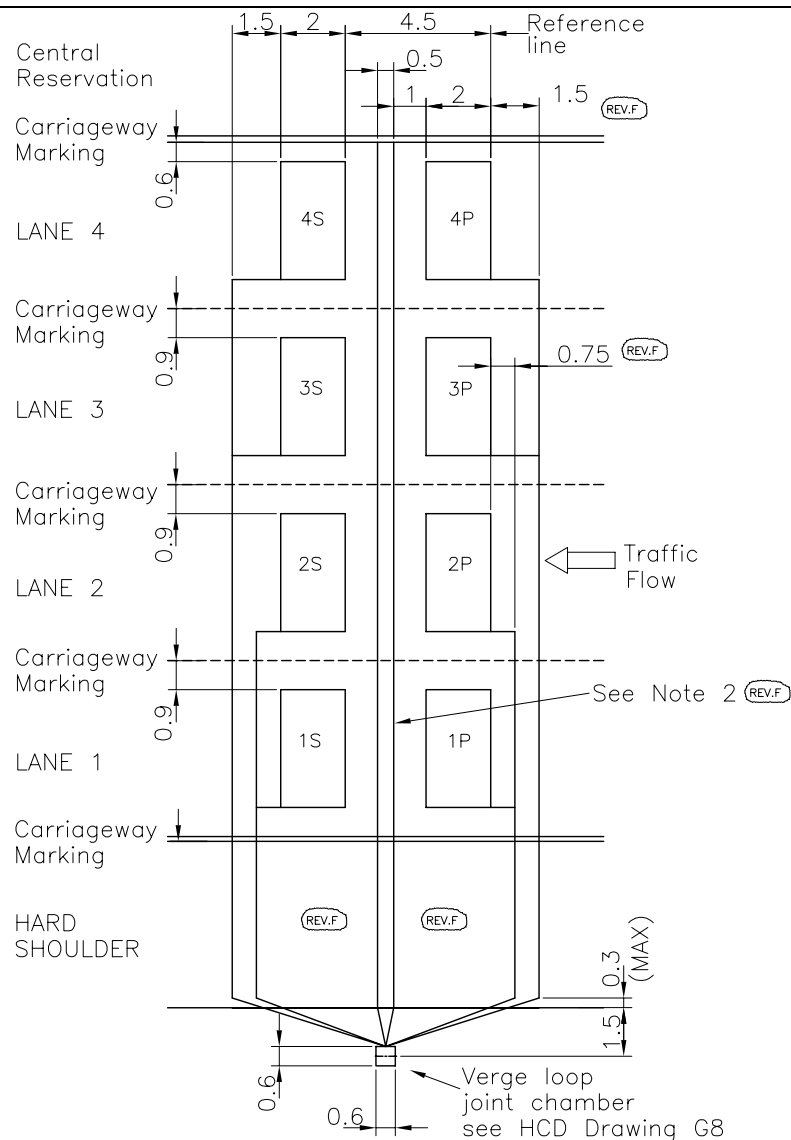
LOOP DETECTORS

E	Nov 05
D	Nov 03
C	Aug 02
A	Dec 91
Issue	Date

INSTALLATION DRAWING NMCS AND  
ALL-PURPOSE ROADS  
MIDAS AND MS3 LOOP DETAILS – SHEET 2

Drawing No.

G12



#### NOTES

1. All dimensions are in metres.
2. Slots for loop feeder cable to be minimum 0.3 apart.
3. All loops to be 3 turns.
4. Tolerance  $\pm 0.02$  metres unless otherwise stated.
5. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

### 4 LANE CARRIAGEWAY & HARD SHOULDER IN FLEXIBLE ROAD CONSTRUCTION FOR SLOTTED LOOP FEEDERS

HIGHWAY CONSTRUCTION DETAILS

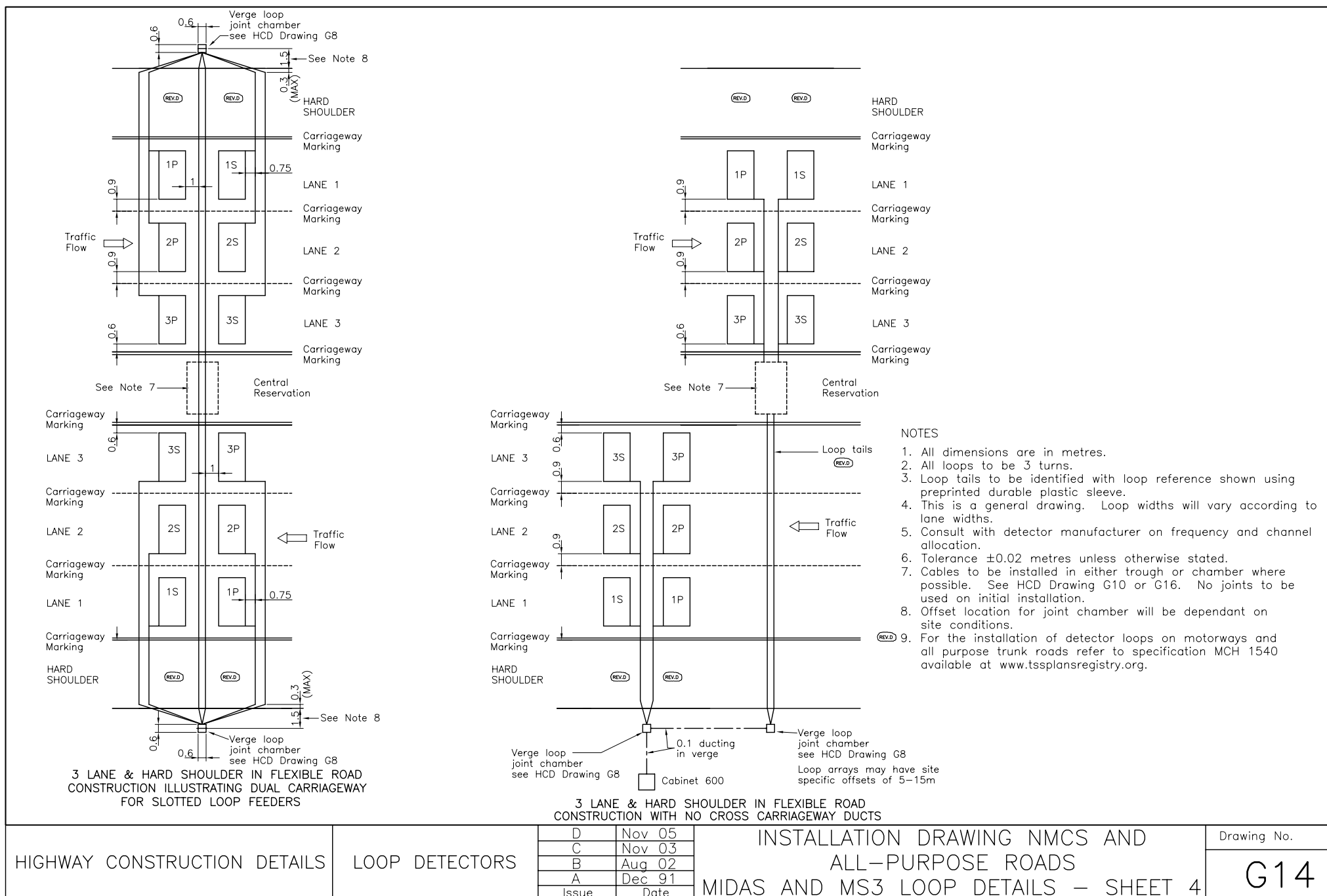
LOOP DETECTORS

F	Nov 05
F	Nov 03
D	Aug 02
C	May 02
B	Aug 94
A	Dec 91
Issue	Date

INSTALLATION DRAWING NMCS AND  
ALL-PURPOSE ROADS  
MIDAS AND MS3 LOOP DETAILS – SHEET 3

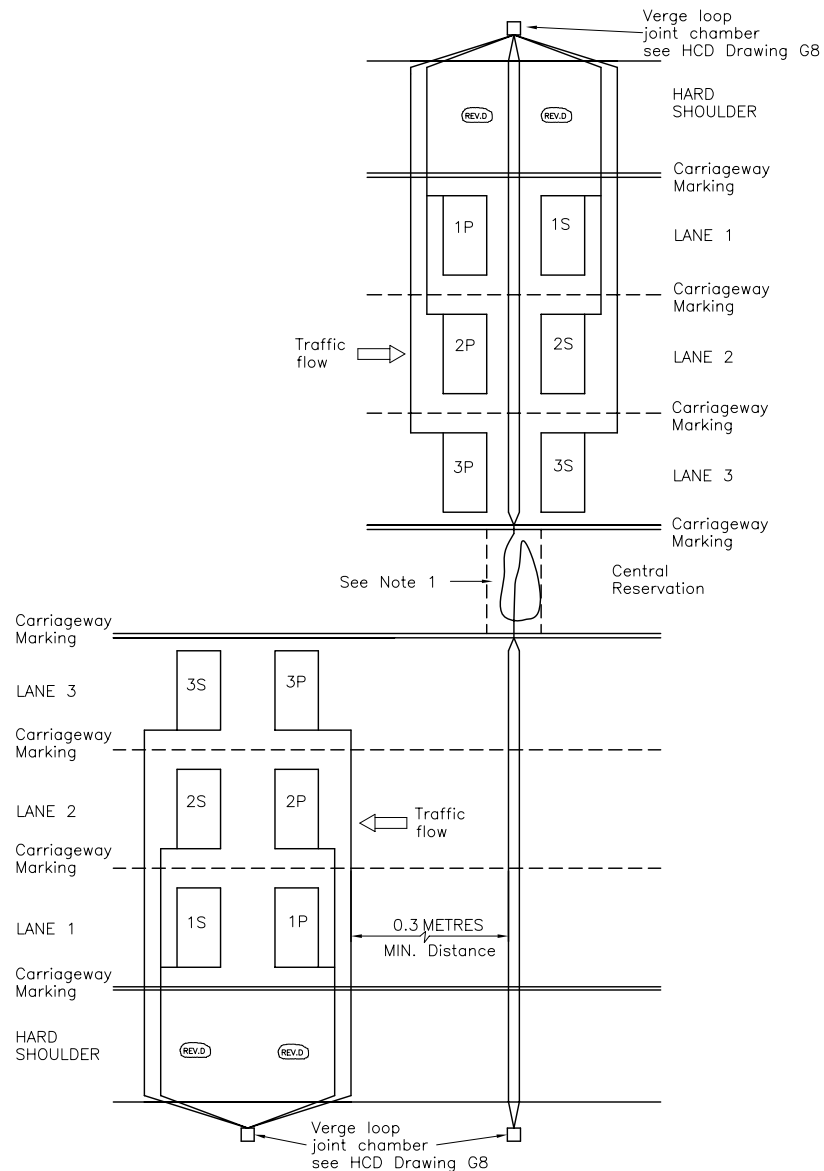
Drawing No.

G13



HIGHWAY CONSTRUCTION DETAILS	LOOP DETECTORS	D	Nov 05	INSTALLATION DRAWING NMCS AND ALL-PURPOSE ROADS MIDAS AND MS3 LOOP DETAILS – SHEET 4	Drawing No.  G14
		C	Nov 03		
		B	Aug 02		
		A	Dec 91		
		Issue	Date		





STAGGERED LOOP LAYOUT ARRANGEMENT  
FOR SLOTTED LOOP FEEDERS

#### NOTES

1. Cables to be installed in either trough or chamber where possible. See HCD Drawing G10 or G16. No joints to be used on initial installation.
2. Dimensions to be as HCD Drawing G14.
3. Tolerance  $\pm 0.02$  metres unless otherwise stated.
4. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org)

HIGHWAY CONSTRUCTION DETAILS

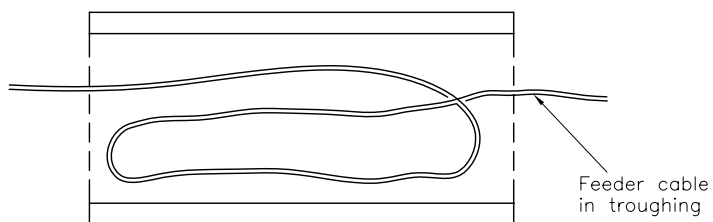
LOOP DETECTORS

D	Nov 05
C	Nov 03
B	Aug 02
A	Dec 91
Issue	Date

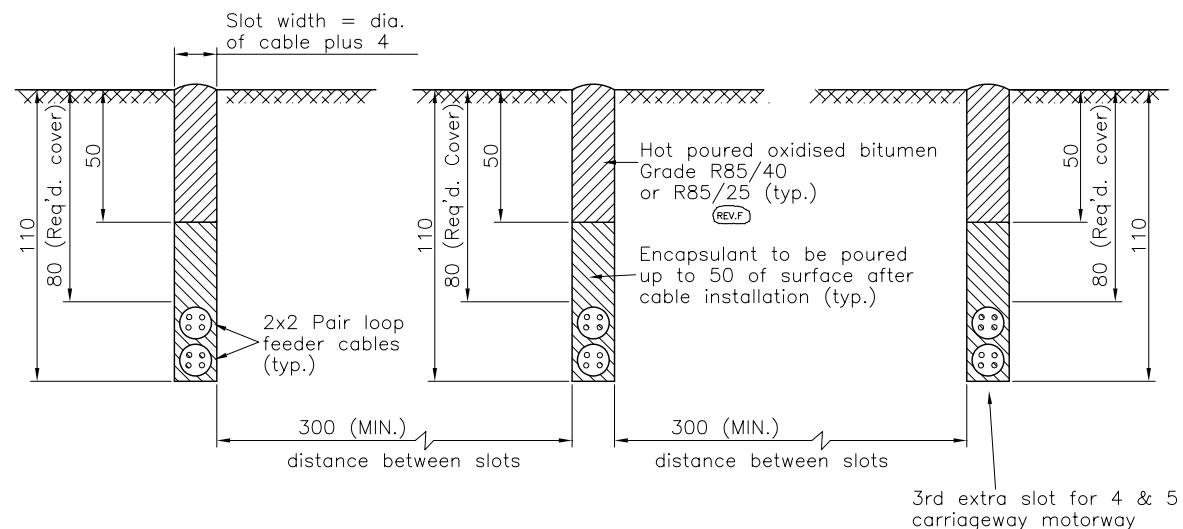
INSTALLATION DRAWING NMCS AND  
ALL-PURPOSE ROADS  
MIDAS AND MS3 LOOP DETAILS – SHEET 5

Drawing No.

G15



PLAN ELEVATION OF CENTRAL RESERVATION TROUGH



FEEDER CABLE SLOTS FOR UP TO 5 LANES  
& HARD SHOULDER (BITUMINOUS ROAD SURFACE)  
FOR SLOTTED LOOP FEEDERS

NOTES

1. All dimensions are in millimetres.
2. Feeder cable to be looped to enable jointing if required in future.
3. The above arrangement may not be suitable for all site conditions. The scheme designer shall tailor other arrangements to suit individual locations.
4. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

REV.F

HIGHWAY CONSTRUCTION DETAILS

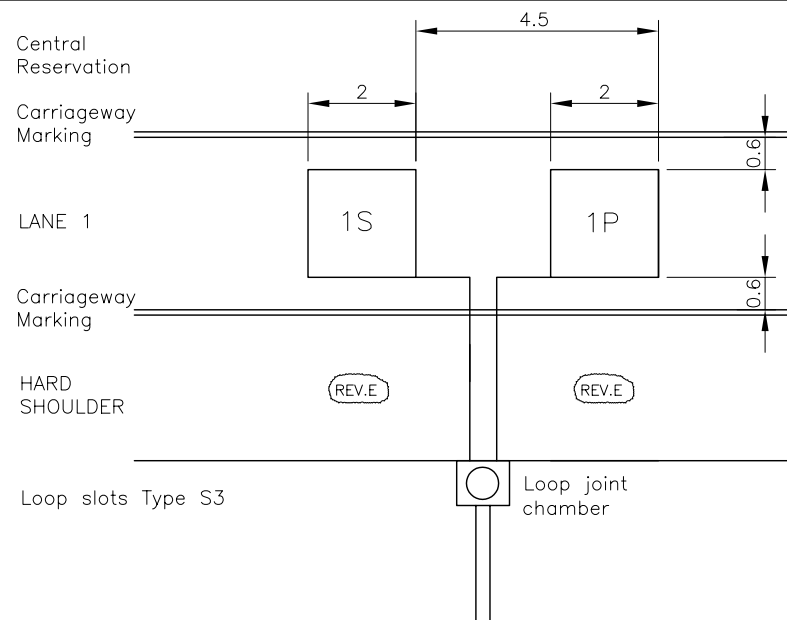
LOOP DETECTORS

F	Nov 05
E	Nov 03
D	Sept 03
C	Aug 02
A	Dec 91
Issue	Date

INSTALLATION DRAWING NMCS AND  
ALL-PURPOSE ROADS  
MIDAS AND MS3 LOOP DETAILS – SHEET 6

Drawing No.

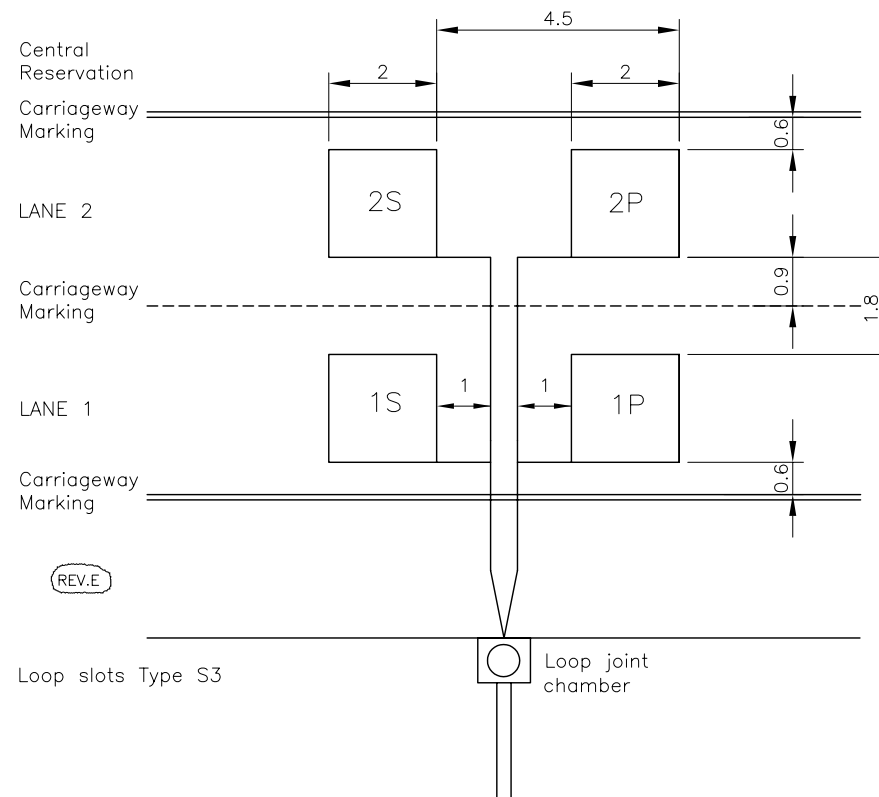
G16



1 LANE AND HARD SHOULDER IN FLEXIBLE CONSTRUCTION

NOTES

1. All dimensions are in metres.
2. All loops to be 3 turns.
3. Loop tails to be identified with loop reference shown using preprinted durable plastic sleeve.
4. This is a general drawing. Loop widths will vary according to lane widths.
5. Consult with detector manufacturer on frequency and channel allocation.
6. Quad armoured feeder cable is required for speed loops in each lane and hard shoulder.
7. Tolerance  $\pm 0.02$  metres unless otherwise stated.
8. Loop slot types S1 to S3 are shown on HCD drawing G1.
9. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).



2 LANE FLEXIBLE CONSTRUCTION

HIGHWAY CONSTRUCTION DETAILS

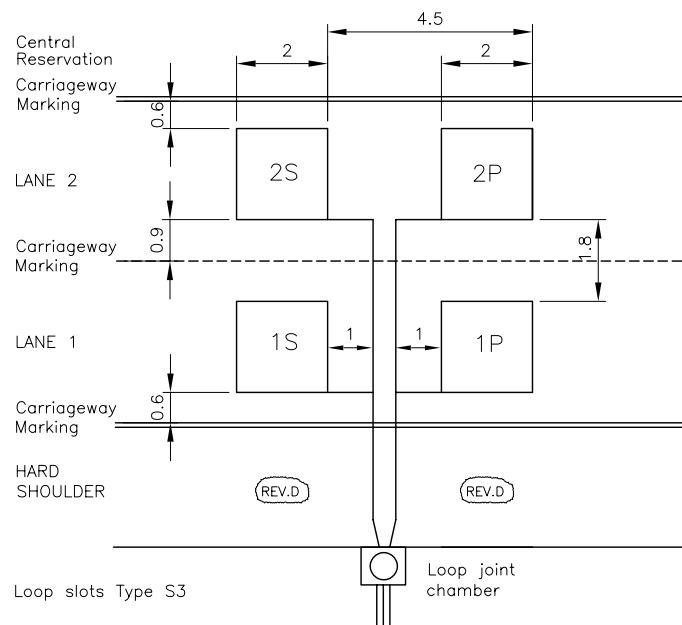
LOOP DETECTORS

E	Nov 05
D	Nov 03
C	Aug 02
A	Dec 91
Issue	Date

INSTALLATION DRAWING NMCS  
MOTORWAY LOOP LAYOUT – SHEET 1

Drawing No.

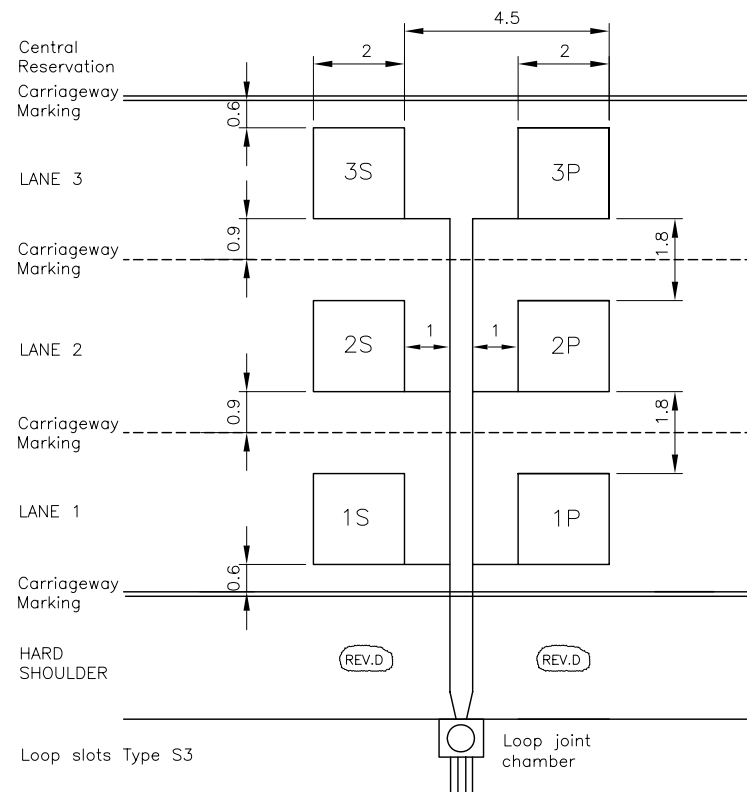
G17



## 2 LANE AND HARD SHOULDER IN FLEXIBLE CONSTRUCTION

### NOTES

1. All dimensions are in metres.
2. All loops to be 3 turns.
3. Loop tails to be identified with loop reference shown using preprinted durable plastic sleeve.
4. This is a general drawing. Loop widths will vary according to lane widths.
5. Consult with detector manufacturer on frequency and channel allocation.
6. REV.D Quad armoured feeder cable is required for speed loops in each lane.
7. Tolerance  $\pm 0.02$  metres unless otherwise stated.
8. Loop slot types S1 to S3 are shown on HCD drawing G1.
9. REV.D For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).



## 3 LANE AND HARD SHOULDER IN FLEXIBLE CONSTRUCTION

HIGHWAY CONSTRUCTION DETAILS

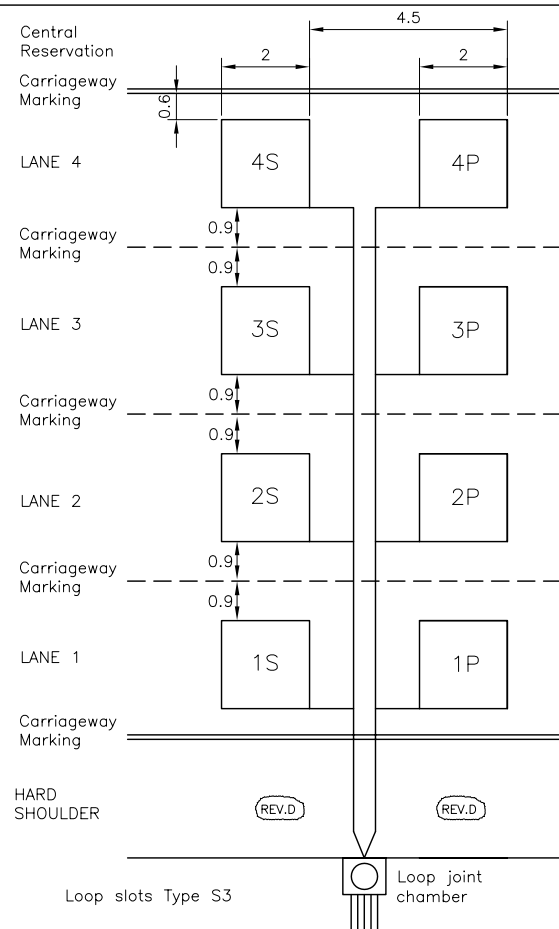
LOOP DETECTORS

D	Nov 05
C	Nov 03
B	Aug 02
A	Dec 91
Issue	Date

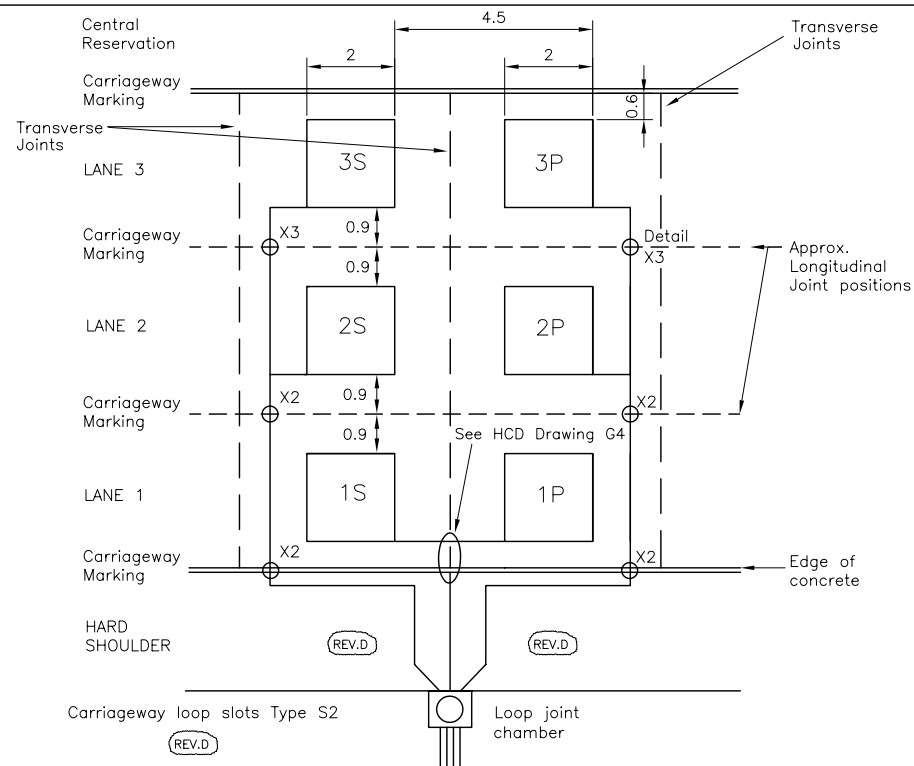
INSTALLATION DRAWING NMCS  
MOTORWAY LOOP LAYOUT – SHEET 2

Drawing No.

G18



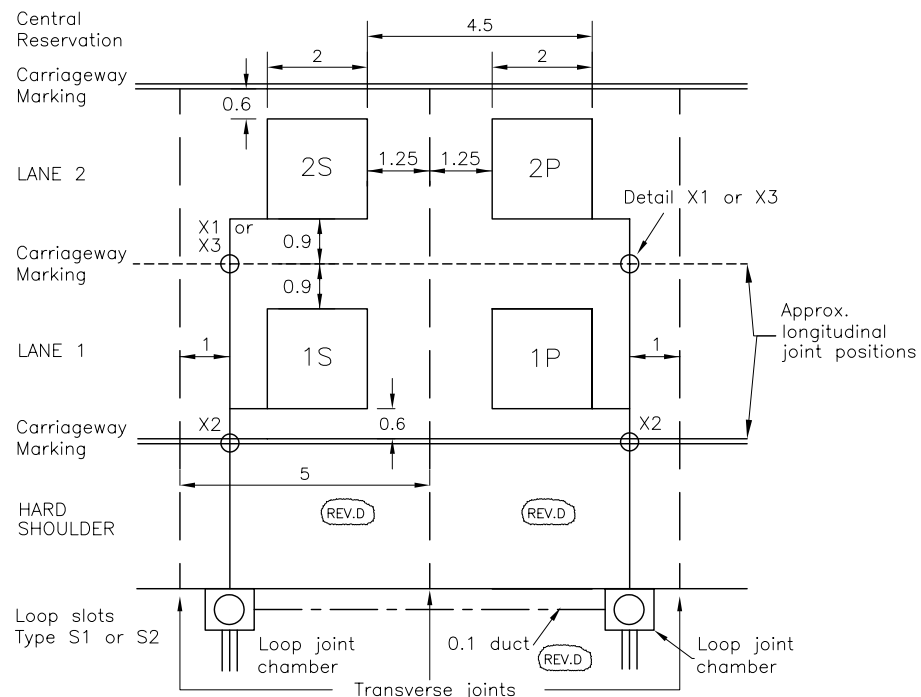
4 LANE AND HARD SHOULDER IN FLEXIBLE CONSTRUCTION



3 LANE CONCRETE WITH FLEXIBLE CONSTRUCTION  
HARD SHOULDER

#### NOTES

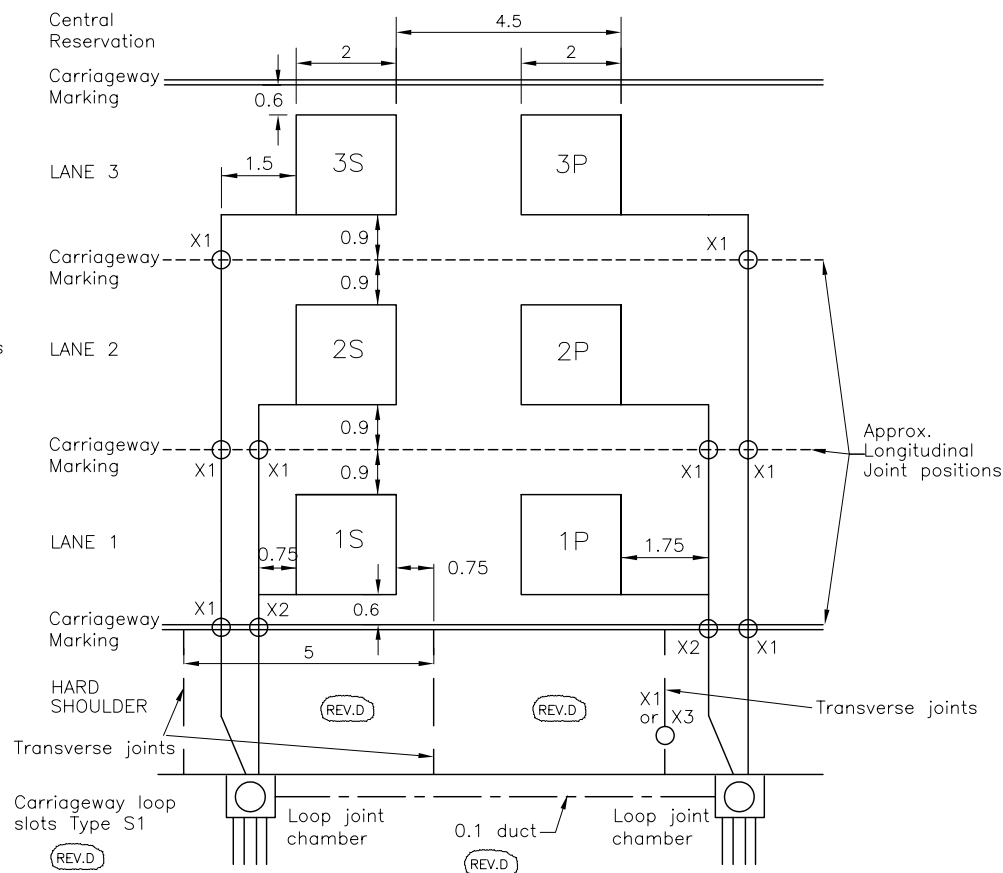
1. All dimensions are in metres.
2. All loops to be 3 turns.
3. Loop tails to be identified with loop reference shown using preprinted durable plastic sleeve.
4. This is a general drawing. Loop widths will vary according to lane widths.
5. Consult with detector manufacturer on frequency and channel allocation.
6. Quad armoured feeder cable is required for speed loops in each lane.
7. Tolerance  $\pm 0.02$  metres unless otherwise stated.
8. Details X2 and X3 are shown on HCD drawing G3.
9. Loop slot types S1 to S3 are shown on HCD drawing G1.
10. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).



## 2 LANE AND HARD SHOULDER IN CONCRETE OR CONTINUOUS REINFORCED CONCRETE

### NOTES

1. All dimensions are in metres.
2. All loops to be 3 turns.
3. Loop tails to be identified with loop reference shown using preprinted durable plastic sleeve.
4. This is a general drawing. Loop widths will vary according to lane widths.
5. Consult with detector manufacturer on frequency and channel allocation.
6. Single pair armoured feeder cable is required for speed loops in each lane.
7. Tolerance  $\pm 0.02$  metres unless otherwise stated.
8. Details X1, X2 and X3 are shown on HCD drawing G3.
9. Loop slot types S1 to S3 are shown on HCD drawing G1.
10. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).



## 3 LANE CONTINUOUS REINFORCED CONCRETE WITH CONTINUOUS REINFORCED OR CONCRETE HARD SHOULDER

HIGHWAY CONSTRUCTION DETAILS

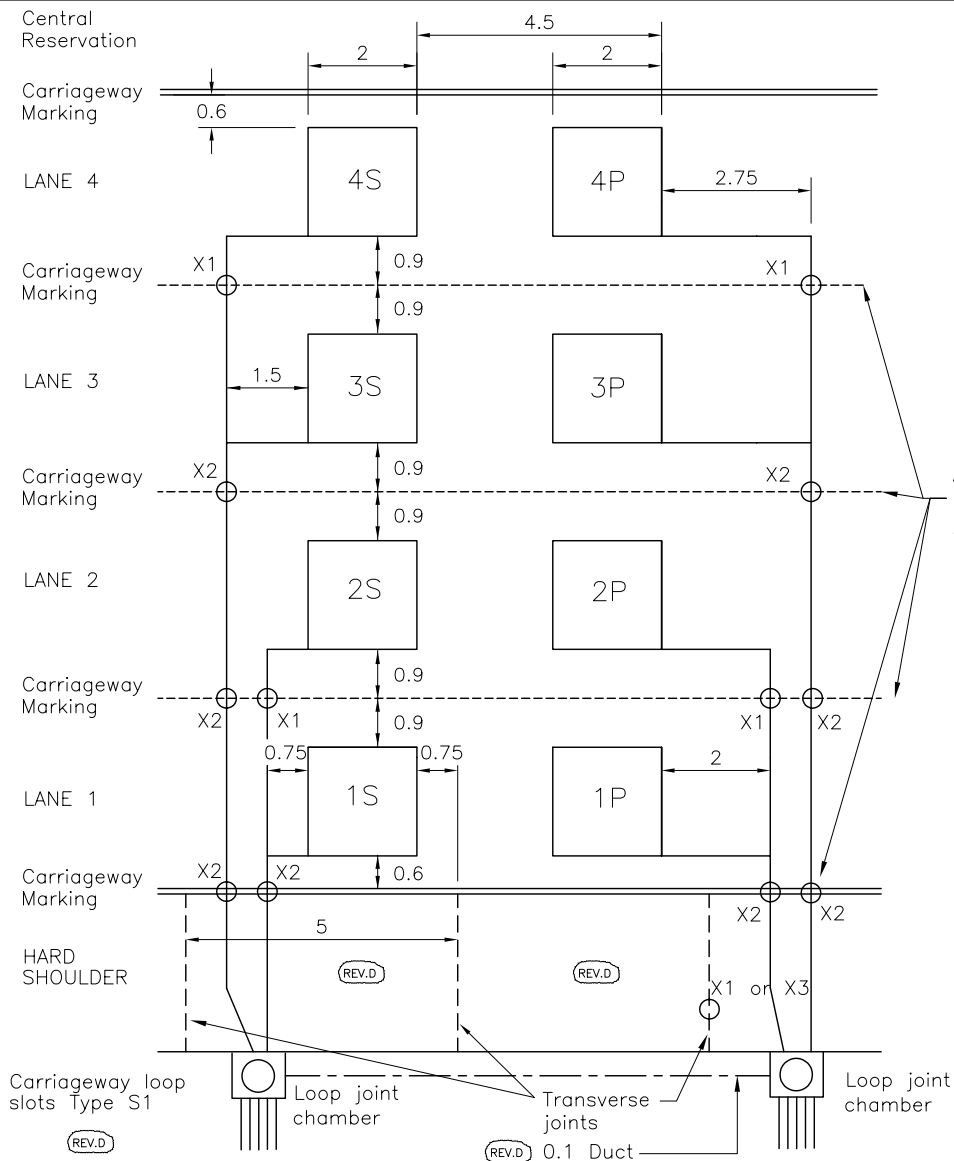
LOOP DETECTORS

D	Nov 05
C	Nov 03
B	Aug 02
A	Dec 91
Issue	Date

INSTALLATION DRAWING NMCS  
MOTORWAY LOOP LAYOUT – SHEET 4

Drawing No.

G20



4 LANE CONTINUOUS REINFORCED CONCRETE WITH  
CONTINUOUS REINFORCED OR CONCRETE HARD SHOULDER

#### NOTES

1. All dimensions are in metres.
2. All loops to be 3 turns.
3. Loop tails to be identified with loop reference shown using preprinted durable plastic sleeve.
4. This is a general drawing. Loop widths will vary according to lane widths.
5. Consult with detector manufacturer on frequency and channel allocation.
6. Single pair armoured feeder cable is required for speed loops in each lane.
7. Details X1 to X4 are shown on HCD drawing G3.
8. Tolerance  $\pm 0.02$  metres unless otherwise stated.
9. Loop slot types S1 to S3 are shown on HCD drawing G1.
10. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

HIGHWAY CONSTRUCTION DETAILS

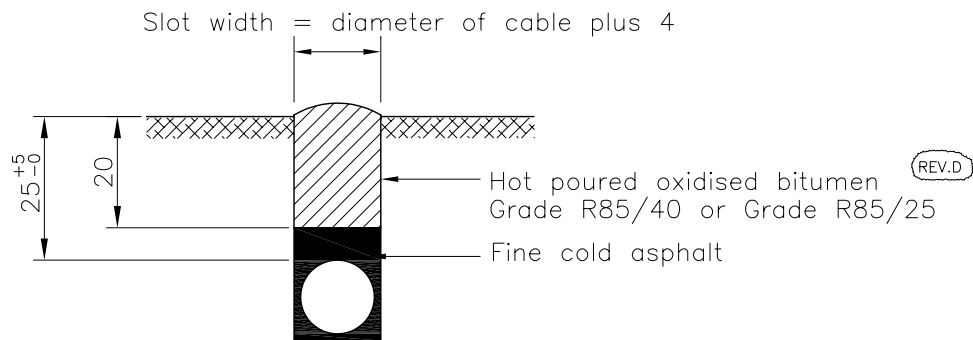
LOOP DETECTORS

D	Nov 05
C	Nov 03
B	Aug 02
A	Dec 91
Issue	Date

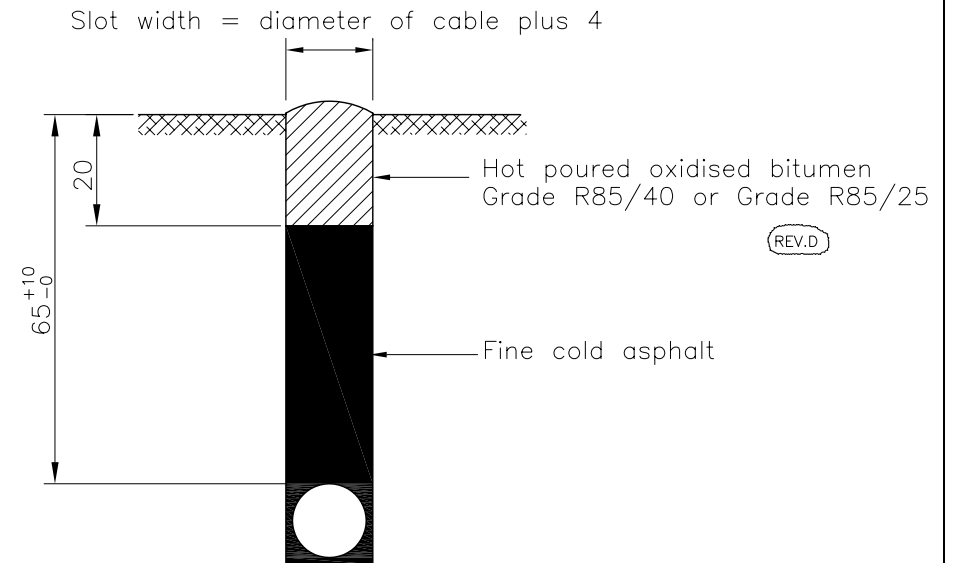
INSTALLATION DRAWING NMCS  
MOTORWAY LOOP LAYOUT – SHEET 5

Drawing No.

G21



CONCRETE ROAD SURFACE



BITUMINOUS ROAD SURFACE

NOTES

1. All dimensions are in millimetres.

2. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

(REV.D)

HIGHWAY CONSTRUCTION DETAILS

LOOP DETECTORS

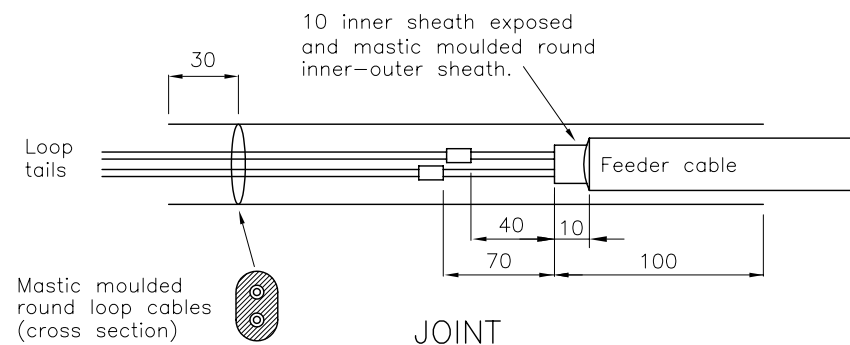
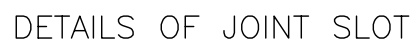
D	Nov 05
C	Nov 03
B	Aug 02
A	Dec 91
Issue	Date

LOOP (INDUCTIVE) ALL-PURPOSE ROADS  
DETAILS OF FEEDER CABLE SLOTS

Drawing No.

G22





1. All dimensions are in millimetres.
2. The width of the joint slot shall be 10 greater than the width for the completed joint.
3. Details of feeder cable slots are shown on HCD Drawing G22.
4. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

## HIGHWAY CONSTRUCTION DETAILS

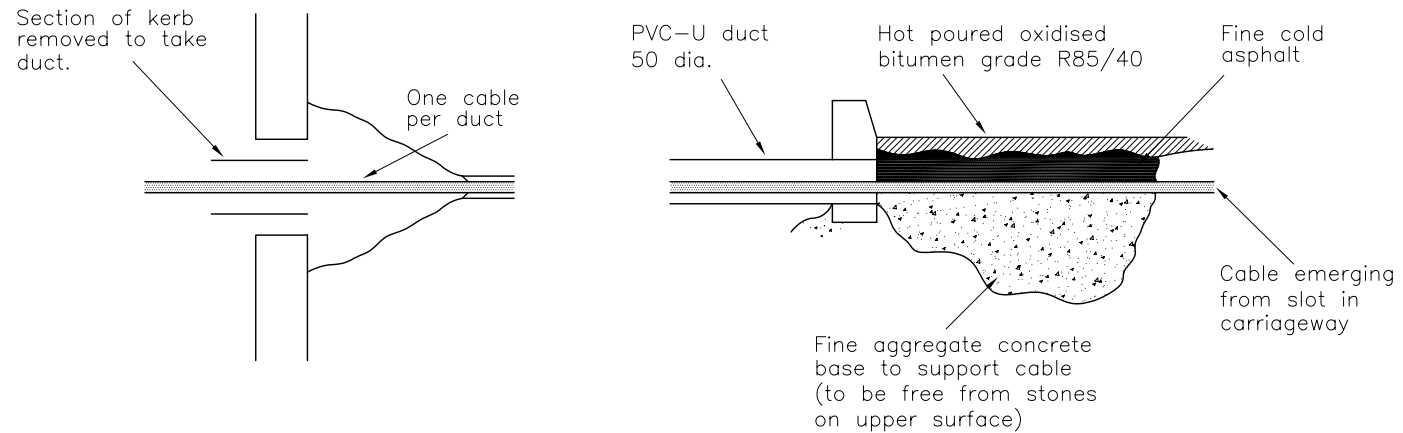
## LOOP DETECTORS

LOOP (INDUCTIVE) ALL-PURPOSE ROADS  
DETAIL OF SLOT FOR CABLE JOINT

Drawing No.
-------------

G23

## OPTION 1

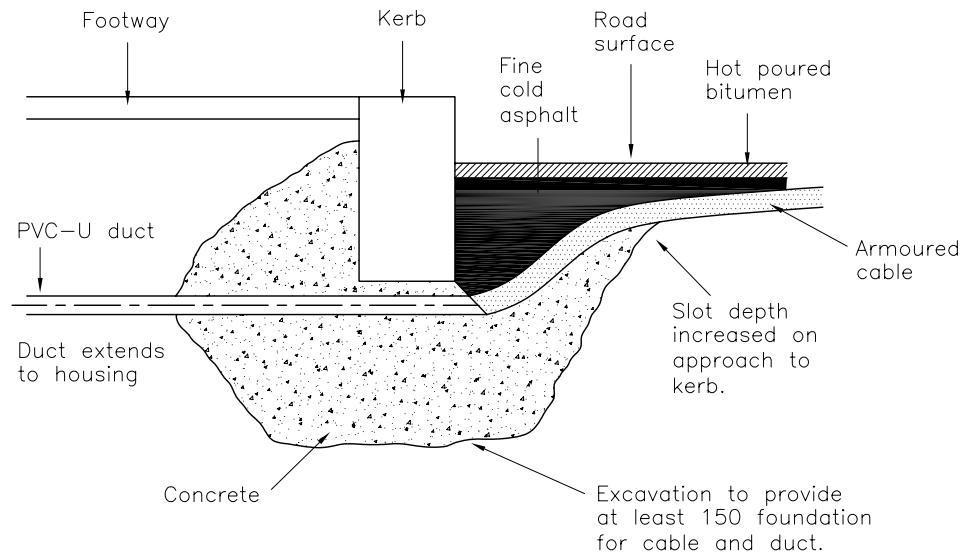


### NOTES

1. All dimensions are in millimetres.
2. For option 3 see HCD Drawing G25.
3. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

REV.D

## OPTION 2



HIGHWAY CONSTRUCTION DETAILS

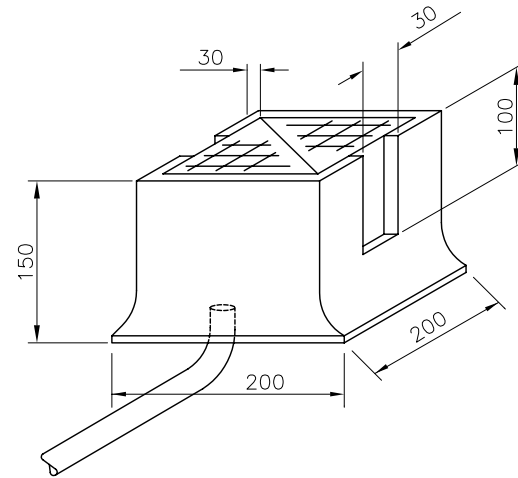
LOOP DETECTORS

D	Nov 05
C	Nov 03
B	Aug 02
A	Dec 91
Issue	Date

LOOP (INDUCTIVE) ALL-PURPOSE ROADS  
DETAIL OF CABLE ENTRY TO THE FOOTWAY

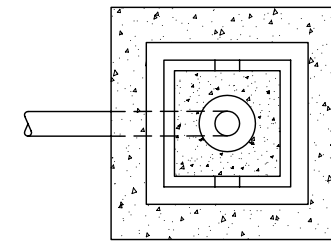
Drawing No.

G24

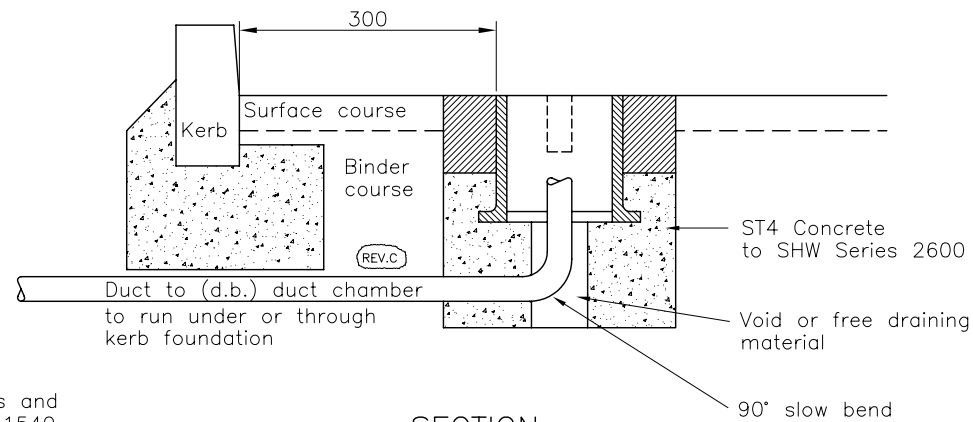


ISOMETRIC SKETCH

OPTION 3



PLAN



SECTION

NOTES

1. All dimensions are in millimetres.
2. For options 1 and 2 see HCD Drawing G24.
3. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

REV.C

REV.C

CARRIAGEWAY CHAMBER FOR DETECTOR LOOP TAILS (L.B.)

End of duct to be below the slots  
Base to be able to drain  
Slots to be parallel to kerb line

HIGHWAY CONSTRUCTION DETAILS

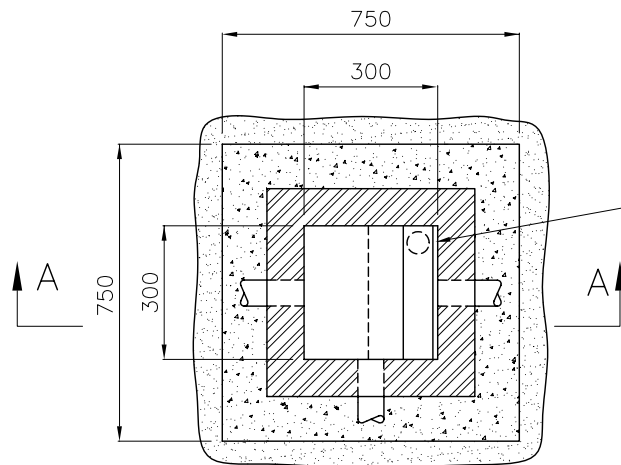
LOOP DETECTORS

C	Nov 05
B	Nov 03
A	Aug 02
Issue	Date

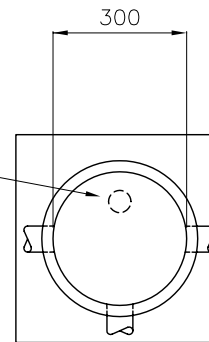
LOOP (INDUCTIVE) ALL-PURPOSE ROADS  
DETAIL OF CARRIAGEWAY CHAMBER REV.C

Drawing No.

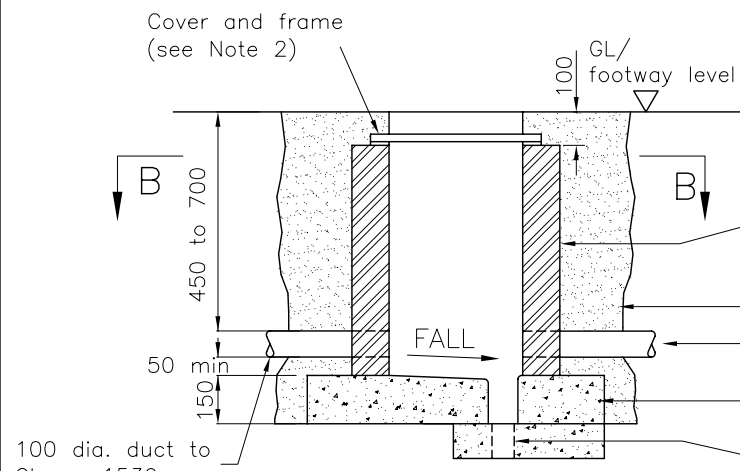
G25



PLAN  
SECTION B-B



PLAN  
SHOWING CONCRETE PIPE



SECTION A-A

- (REV.C) 100 HD Class B engineering brickwork (see Note 5)  
OR  
300 dia. concrete pipe  
OR  
Preformed or cast concrete chamber (see Note 7)  
OR  
Plastic units (see Note 7)
- Cut to suit height and duct access
- Backfill (see Note 4)
- 100 dia. duct to Clause 1530. (REV.C)
- In situ ST4 concrete base slab to Clause 2602 (REV.C)
- Soakaway (See Note 6)

#### NOTES

1. All dimensions are in millimetres.
2. Cover is 300 x 300 x 100 I/D. Inspection cover and frame to BS EN 124 Class B (or as described in Appendix 15/2) bedded on 10 minimum mortar bed designated (i) to Clause 2404. (REV.C)
3. Recommended depth of duct in footway is 450 minimum 700 maximum.
4. Backfill to SHW Table 6/1 or with ST2 concrete to Clause 2602 where mechanical compaction is impractical.
5. 100 HD Class B engineering brickwork to Clause 2406 on 10 minimum mortar bed designated (i) to Clause 2404. (REV.C)
6. In situ base slab to be cast with a minimum fall of 1:20 towards the sump. Positive drainage in the form of a soakaway or connection to the highway drainage network is required.
7. Precast chamber to comply with BS 5911-3 and BS EN 1917 or plastic units or other units in equivalent material. (REV.C)
8. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org). (REV.C)

HIGHWAY CONSTRUCTION DETAILS

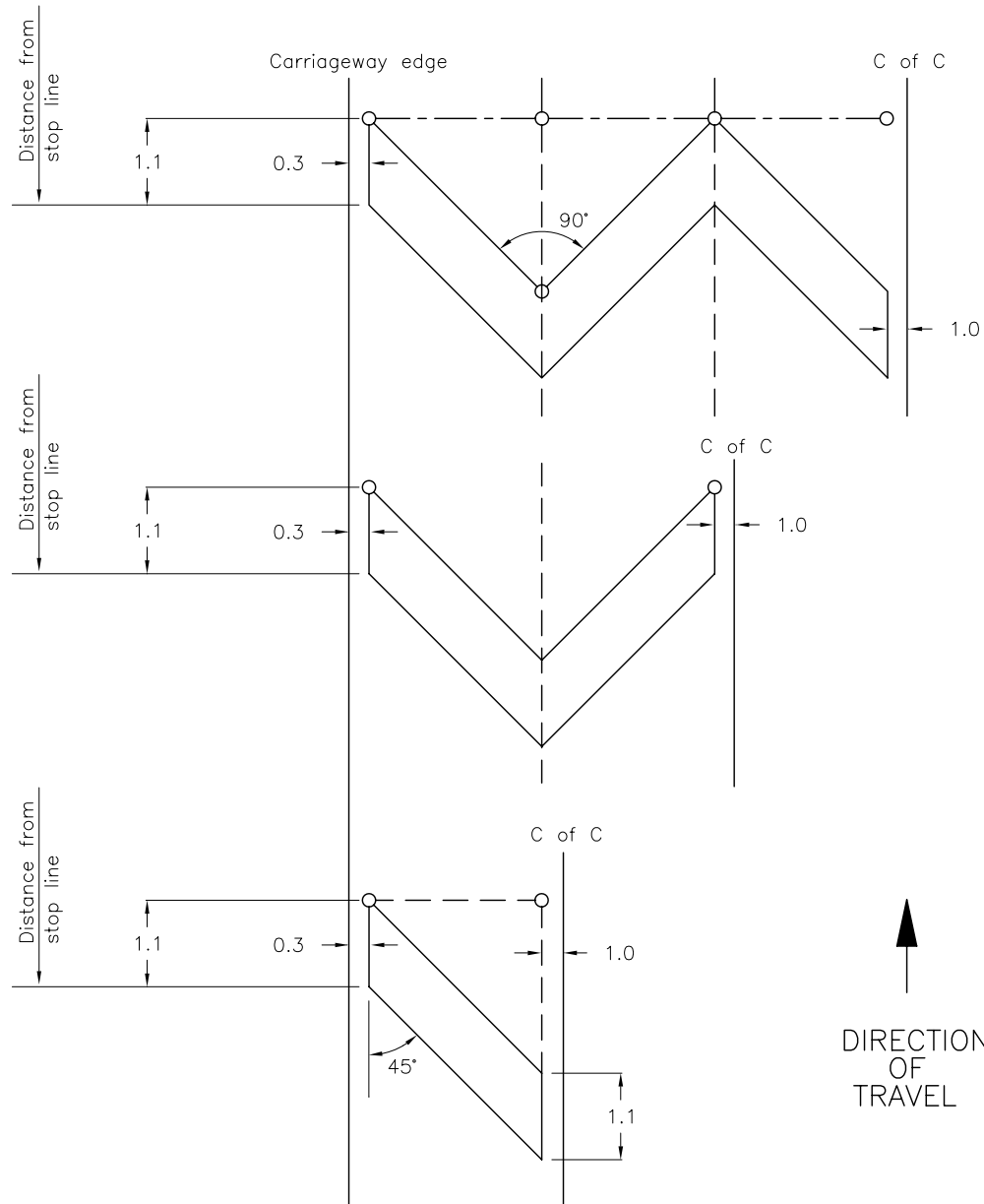
LOOP DETECTORS

C	Nov 05
B	Nov 03
A	Aug 02
Issue	Date

LOOP (INDUCTIVE) ALL-PURPOSE ROADS  
DETAIL OF SIGNAL DUCT CHAMBER (REV.C)

Drawing No.

G26



#### NOTES

1. All dimensions are in metres.
2. All loops to be 3 turns.
3. C of C indicates centre of carriageway.
4. See HCD Drawing G5 for details of cross-cut of corners of loop slot.
5. Loop configurations shown on this drawing are for control of traffic signals.
6. Distances from stop lines are contained in MCE 0108 Siting of Inductive Loops for Vehicle Detecting Equipments at Permanent Road Traffic Signal Installations specification.
7. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

HIGHWAY CONSTRUCTION DETAILS

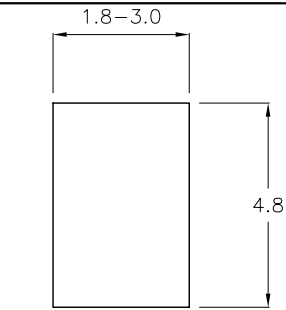
LOOP DETECTORS

C	Nov 05
B	Nov 03
A	Aug 02
Issue	Date

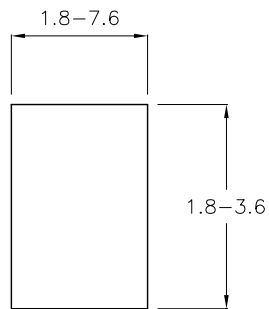
LOOP (INDUCTIVE) ALL-PURPOSE ROADS  
CHEVRON LOOPS

Drawing No.

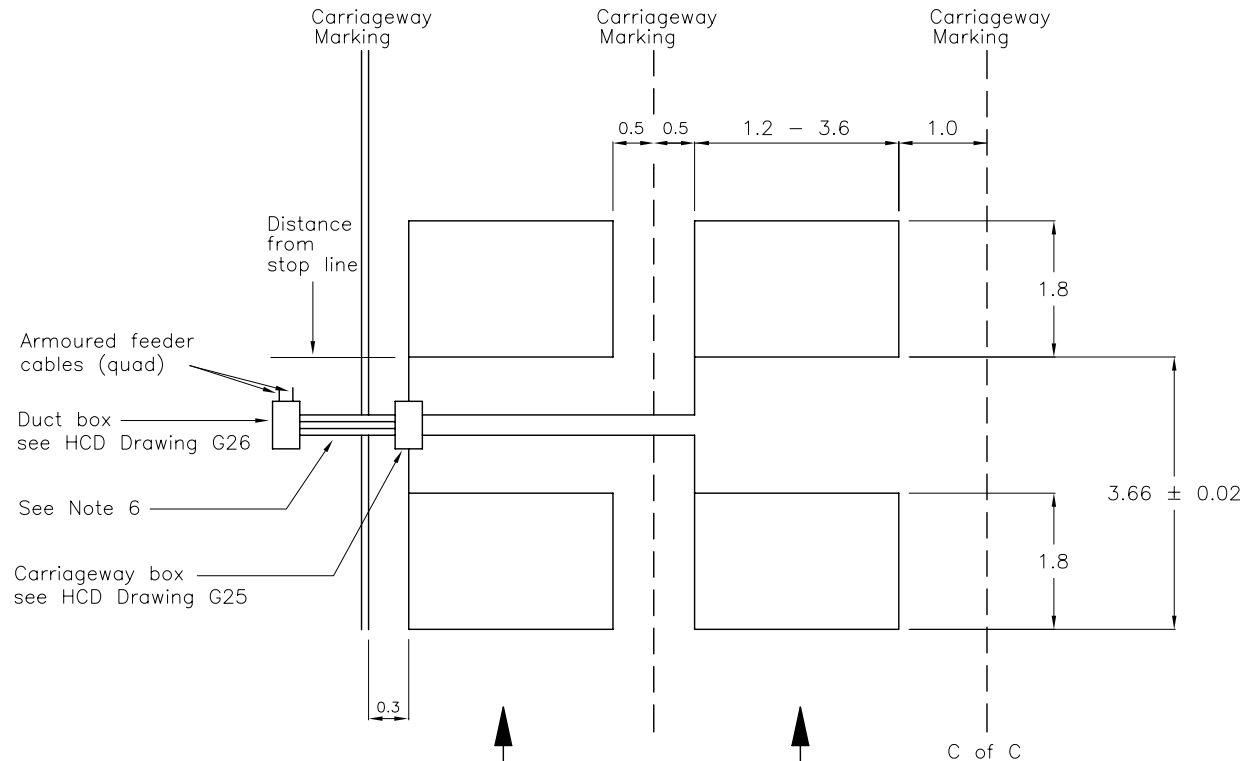
G27



QUEUE LOOP



TURNING LOOP



SPEED MEASURING LOOPS

NOTES

1. All dimensions are in metres.
2. All loops to be 3 turns.
3. C of C indicates centre of carriageway.
4. Refer to detector manufacturer for maximum feeder length.
5. See HCD Drawing G5 for details of cross-cut of corners of loop slot.
6. Each pair of loops to be twisted.
7. Distances from stop lines are contained in MCE 0108 Siting of Inductive Loops for Vehicle Detecting Equipments at Permanent Road Traffic Signal Installations specification.
8. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

HIGHWAY CONSTRUCTION DETAILS

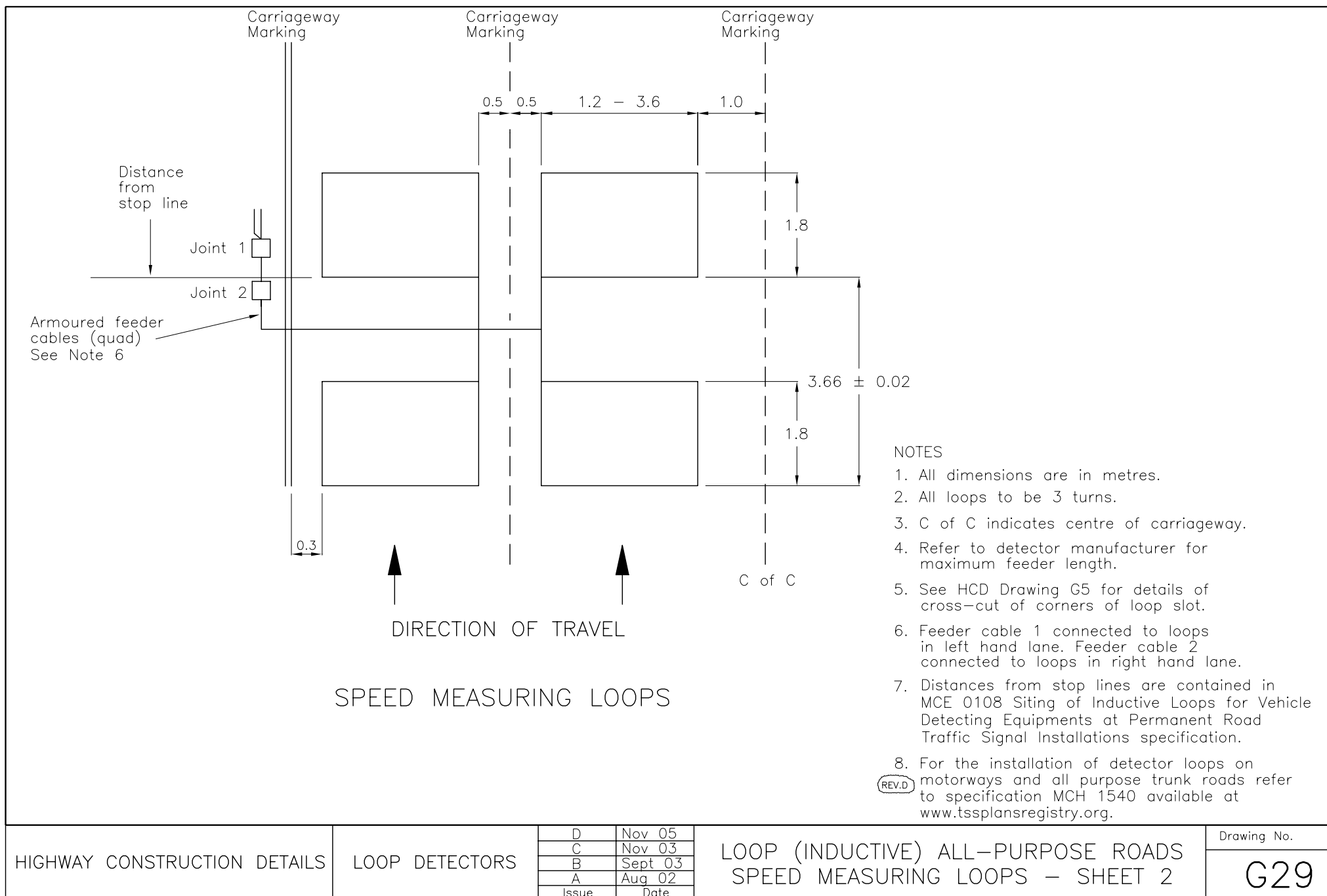
LOOP DETECTORS

C	Nov 05
B	Nov 03
A	Aug 02
Issue	Date

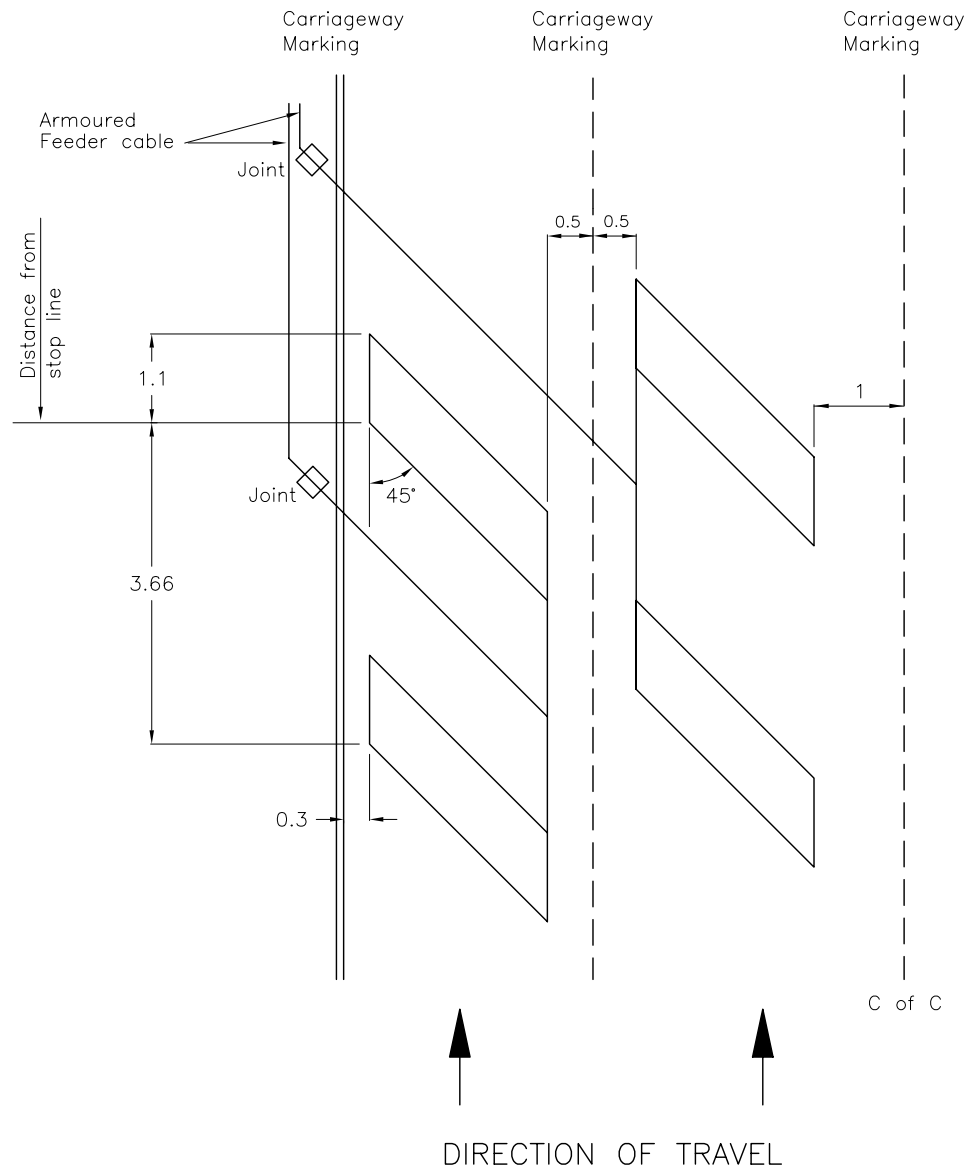
LOOP (INDUCTIVE) ALL-PURPOSE ROADS  
TURNING, QUEUE AND SPEED MEASURING  
LOOPS – SHEET 1

Drawing No.

G28



# ROADS WITH REINFORCING MESH



## NOTES

1. All dimensions are in metres.
2. All loops to be 3 turns.
3. C of C indicates centre of carriageway.
4. See HCD Drawing G5 for details of cross-cut of corners of loop slot.
5. Loop configurations shown on this drawing are for control of traffic signals.
6. Distances from stop lines are contained in MCE 0108 Siting of Inductive Loops for Vehicle Detecting Equipments at Permanent Road Traffic Signal Installations specification.
7. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

HIGHWAY CONSTRUCTION DETAILS

LOOP DETECTORS

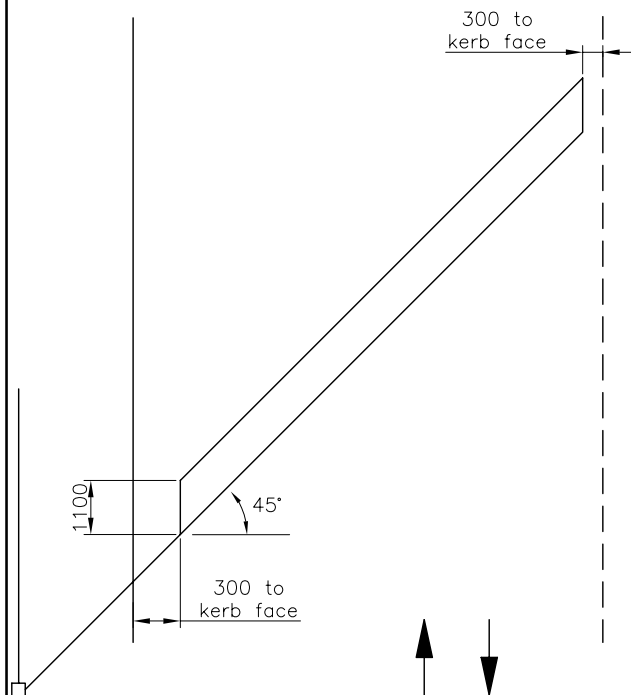
D	Nov 05
C	Nov 03
B	Sept 03
A	Aug 02
Issue	Date

LOOP (INDUCTIVE) ALL-PURPOSE ROADS  
SPEED MEASURING LOOPS – SHEET 3

Drawing No.

G30



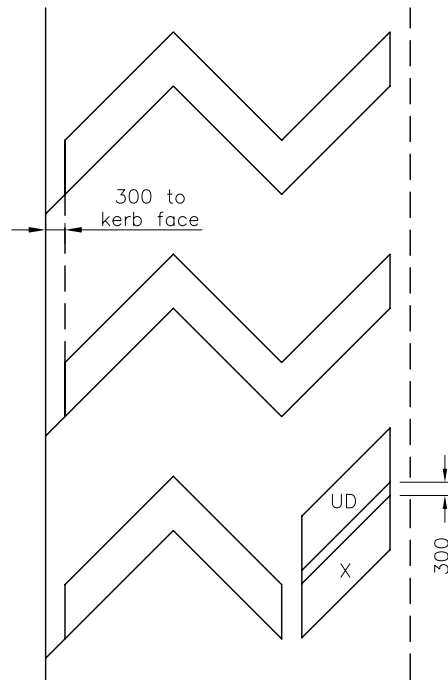


ALL RED LOOP(S)

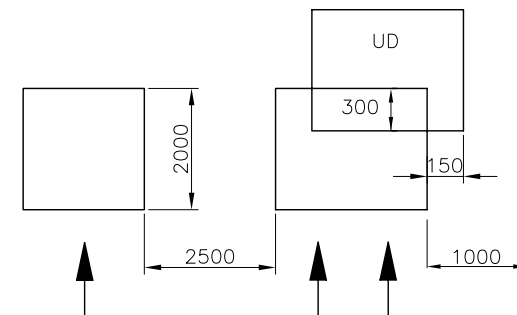
NOTES

1. All dimensions are in millimetres.
2. All loops to be 3 turns.
3. Refer to detector manufacturer for maximum feeder length.
4. See HCD Drawing G5 for details of cross-cut of corners of loop slot.
5. Loop configurations shown on this drawing are for control of traffic signals.
6. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

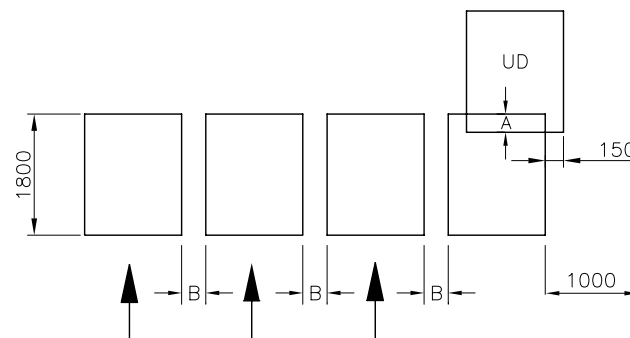
(REV.C)



UD loop overlaps X loop by 300 in direction of travel.



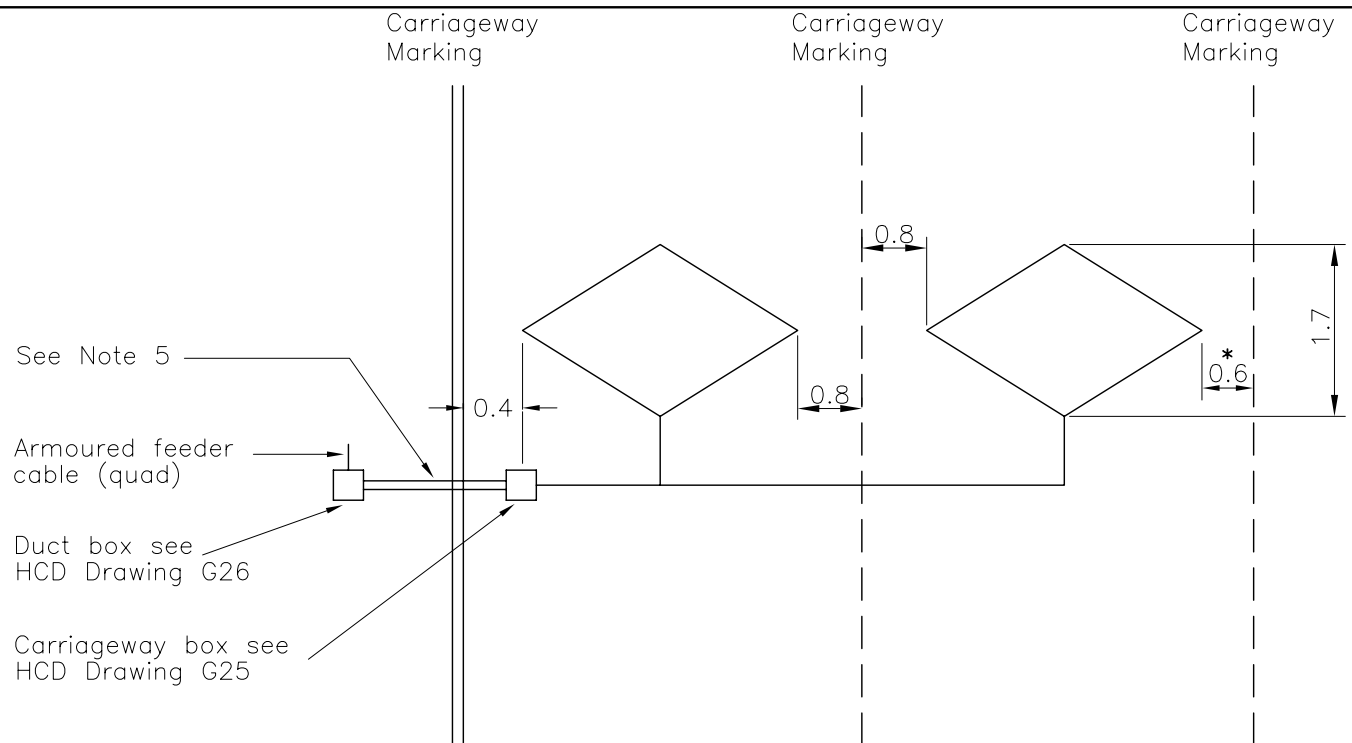
SCOOT LOOP DIMENSIONS



Dimension A = 270  
Dimension B = Refer to Highways Agency specification MCE 0115

COUNT LOOP DIMENSIONS

HIGHWAY CONSTRUCTION DETAILS	LOOP DETECTORS			LOOP (INDUCTIVE) ALL-PURPOSE ROADS TYPICAL LOOP CONFIGURATION WITH UD DIMENSIONS	Drawing No.
		C	Nov 05		
		B	Nov 03		
		A	Aug 02		
		Issue	Date		G31



#### NOTES

1. All dimensions are in metres.
2. All loops to be 3 turns.
3. \* Denotes where there is a central reserve the dimension may be reduced to 0.4m.
4. See HCD Drawing G5 for details of cross-cut of slot.
5. Each pair of loop tails to be twisted together.
6. For the installation of detector loops on motorways and all purpose trunk roads refer to specification MCH 1540 available at [www.tssplansregistry.org](http://www.tssplansregistry.org).

REV.C

HIGHWAY CONSTRUCTION DETAILS

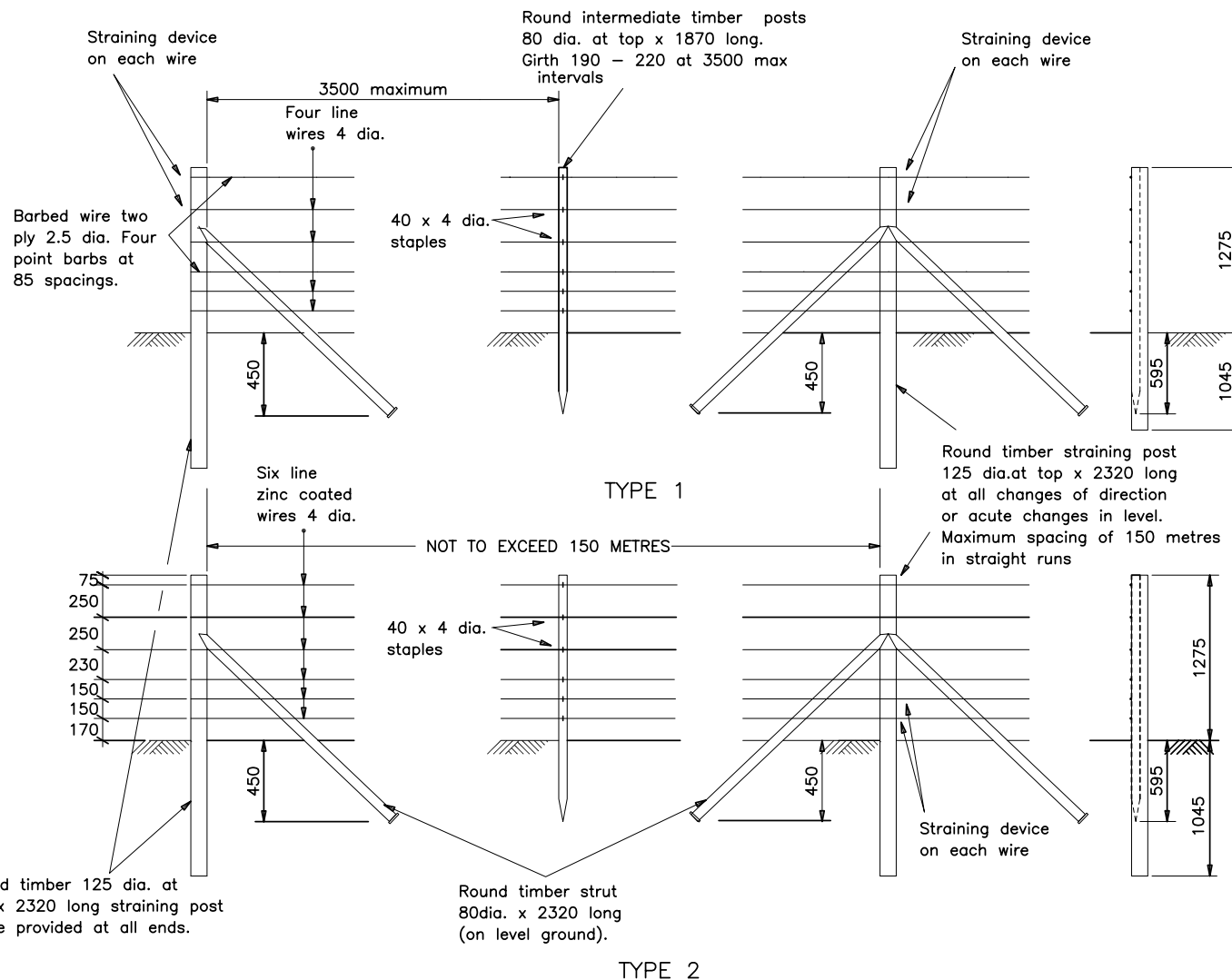
LOOP DETECTORS

C	Nov 05
B	Nov 03
A	Aug 02
Issue	Date

LOOP (INDUCTIVE) ALL-PURPOSE ROADS  
MOVA LOOPS

Drawing No.

G32



#### NOTES

1. The following are two of the four standard temporary fences that are suggested for highway works and the type required or any variations of these details shall be as shown on the Drawings:  
Type 1 - BS 1722 Part 2 Type SW120 with mild steel barbed wire complying with BS 4102 fixed to the top line wire and the third line wire from the ground and as shown on this detail;  
Type 2 - BS 1722 Part 2 and as shown on this detail.
2. All line wire, stirrup wire and barbed wire shall be zinc coated to comply with BS EN 10244-2.
3. When these type fences or variation of these are used for accommodation work fences, the requirements are included in Appendix 1/15 and on the Drawings.
4. ALL DIMENSIONS ARE IN MILLIMETRES.

HIGHWAY CONSTRUCTION DETAILS

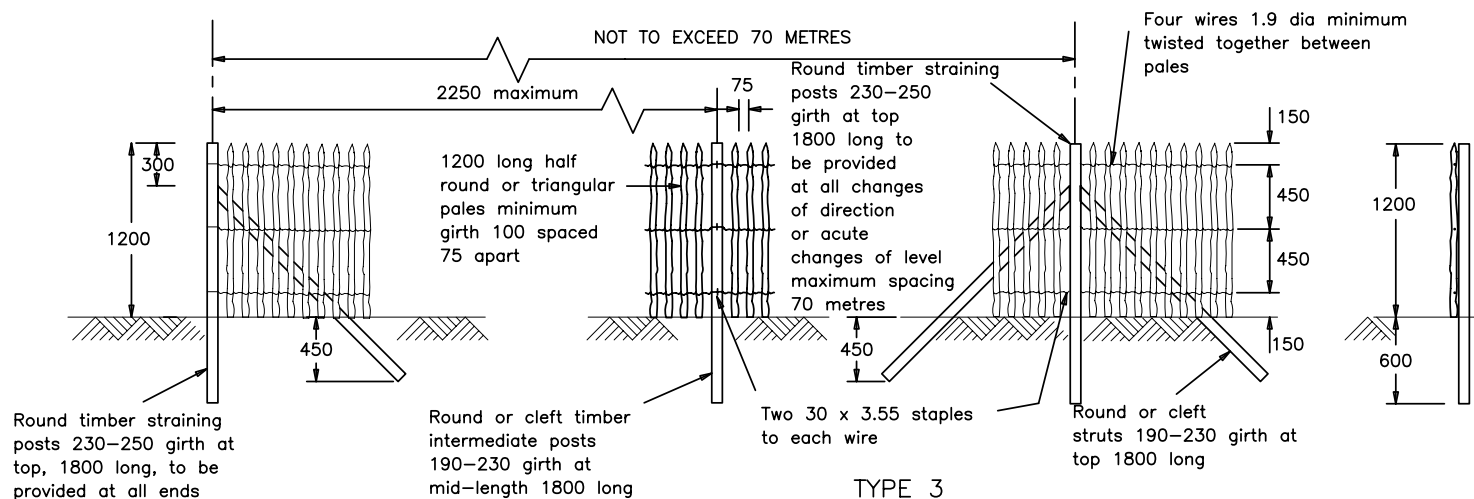
FENCES, STILES &  
GATES

C	MAY 04
B	MAY 01
A	DEC 91
Issue	Date

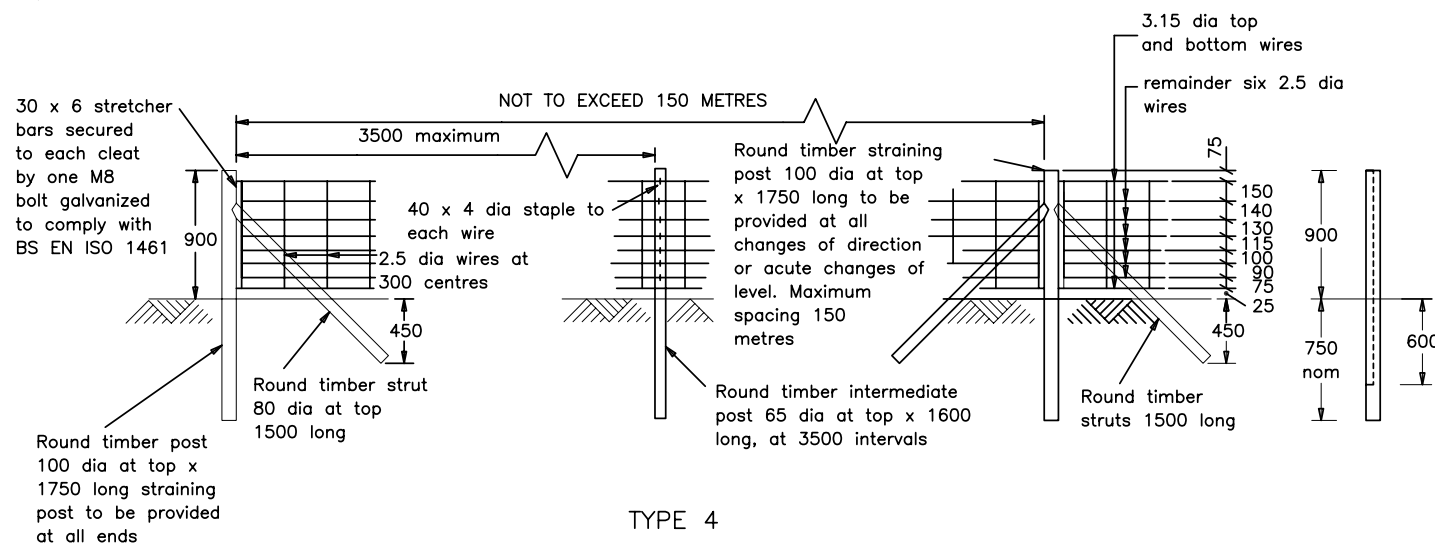
TEMPORARY FENCES  
TYPES 1 & 2

Drawing No.

H1



TYPE 3



TYPE 4

#### NOTES

1. The following are two of the four standard temporary fences that are suggested for highway works and the type required, or any variations of these details shall be as shown on the Drawings:  
Type 3 - BS 1722 Part 4 Type CW120 and as shown on this detail;  
Type 4 - BS 1722 Part 2 Type C8/80/30 and as shown on this detail.
2. All line wire, stirrup wire and barbed wire shall be zinc coated to comply with BS EN 10244-2.
3. If posts are to be driven then bottom end shall be pointed for 225.
4. When these type of fences or variations of these are used for accommodation work fences the requirements are included in Appendix 1/15 and on the Drawings.
5. ALL DIMENSIONS ARE IN MILLIMETRES.

HIGHWAY CONSTRUCTION DETAILS

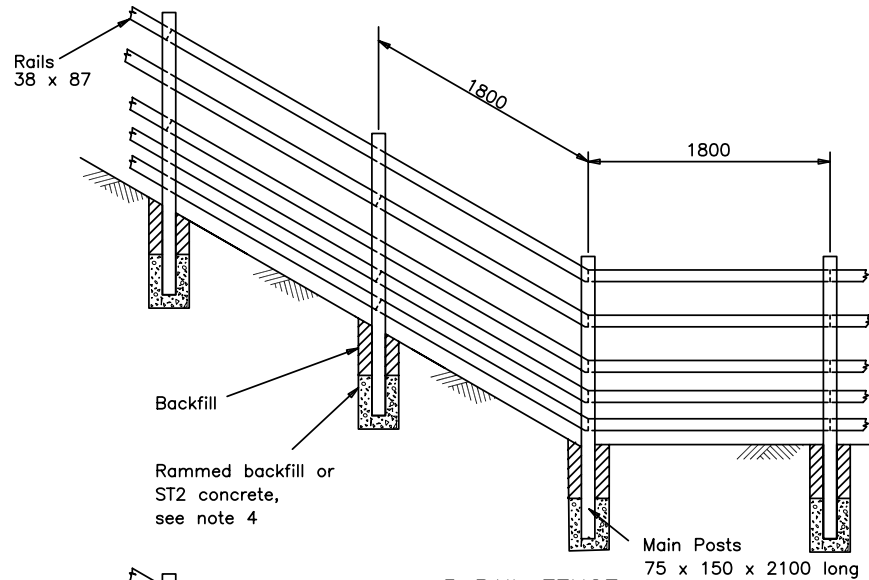
FENCES, STILES &  
GATES

B	MAY 04
A	DEC 91
Issue	Date

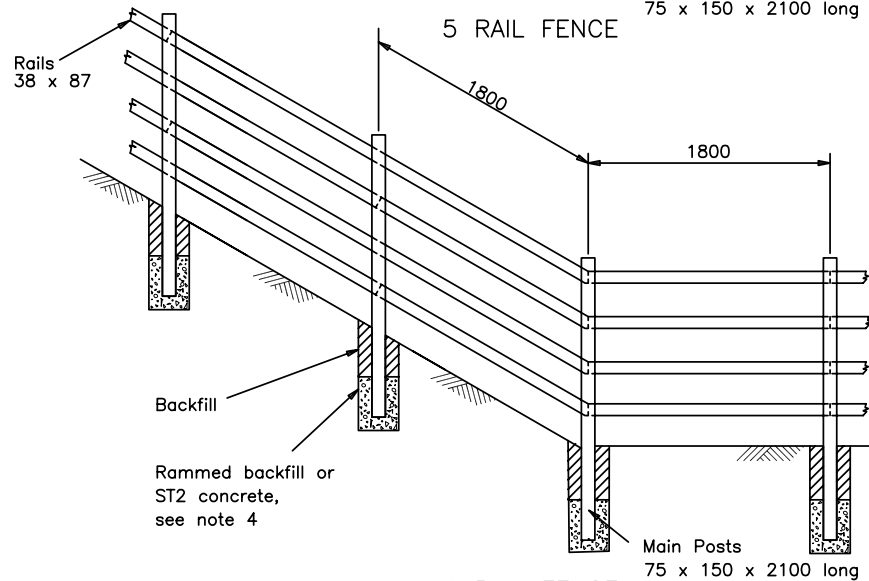
TEMPORARY FENCES  
TYPES 3 & 4

Drawing No.

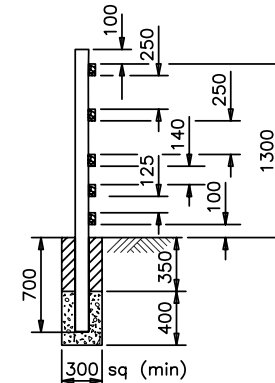
H2



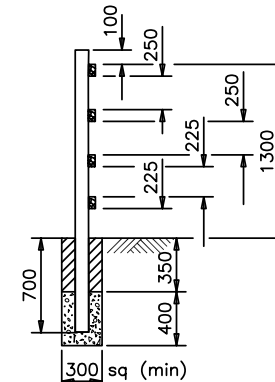
5 RAIL FENCE



4 RAIL FENCE



SECTION THROUGH  
Q OF MAIN POSTS



SECTION THROUGH  
Q OF MAIN POSTS

NOTES

1. Specification Clause 306 applies unless otherwise stated in Appendix 3/1 or Appendix 1/15.
- 2a). Where plain or barbed wire is required in Appendix 3/1 or Appendix 1/15 it shall be zinc coated and comply with BS 4102.
- 2b). 4 rail fence – BS 1722 Part 7 Type SPR 13/4 applies unless otherwise stated.
- 2c). 5 rail fence – BS 1722 Part 7 Type SPR 13/4 applies (except for the addition of a fifth rail, rails spaced as shown) unless otherwise stated.
3. Where the fence forms a boundary between the highway and private property, the rails shall be fixed to the private property side unless otherwise stated in Appendix 3/1 or 1/15.
4. Posts can be supported by rammed backfill or ST2 concrete unless Appendix 1/15 or Appendix 3/1 require ST2 concrete to be used.
5. ALL DIMENSIONS ARE IN MILLIMETRES.

HIGHWAY CONSTRUCTION DETAILS

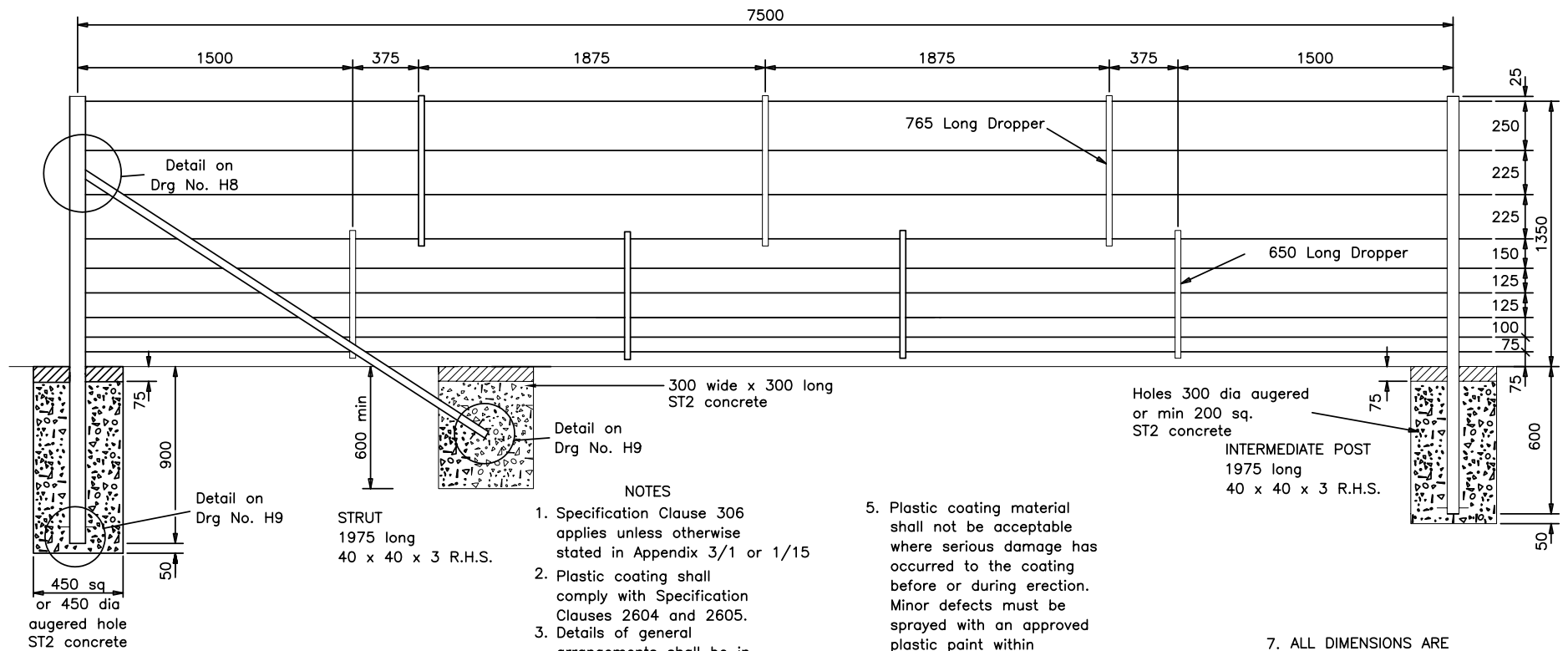
FENCES, STILES &  
GATES

D	MAY 04
C	MAR 98
B	AUG 93
A	DEC 91
Issue	Date

MOTORWAY AND ACCOMMODATION WORKS  
TIMBER POST AND 4 (OR 5)  
RAIL FENCES

Drawing No.

H3

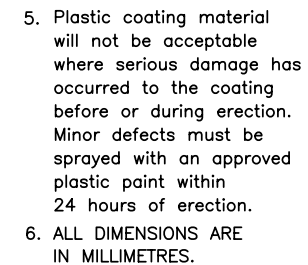


NOTES

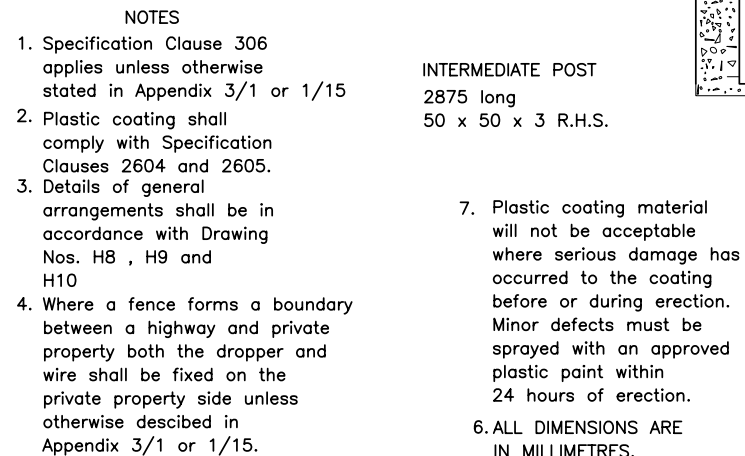
1. Specification Clause 306 applies unless otherwise stated in Appendix 3/1 or 1/15
2. Plastic coating shall comply with Specification Clauses 2604 and 2605.
3. Details of general arrangements shall be in accordance with Drawing Nos. H8 , H9 and H10
4. Where a fence forms a boundary between a highway and private property both the dropper and wire shall be fixed on the private property side unless otherwise described in Appendix 3/1 or 1/15.
5. Plastic coating material shall not be acceptable where serious damage has occurred to the coating before or during erection. Minor defects must be sprayed with an approved plastic paint within 24 hours of erection.
6. Where barbed wire is required in Appendix 3/1 or 1/15, unless otherwise stated, it shall consist of twin strand of zinc coated mild steel fixed to the top and third from top wire at 450 centres with zinc and plastic coated tie wire. It shall pass the intermediate posts and be secured to the straining posts as shown on Drawing No. H10

7. ALL DIMENSIONS ARE IN MILLIMETRES.

HIGHWAY CONSTRUCTION DETAILS	FENCES, STILES & GATES	C	MAY 04	MOTORWAY AND ACCOMMODATION WORKS HIGH TENSILE STRAINED WIRE DEER FENCES 135	Drawing No.
		B	MAR 98		
		A	DEC 91		H4
		Issue	Date		



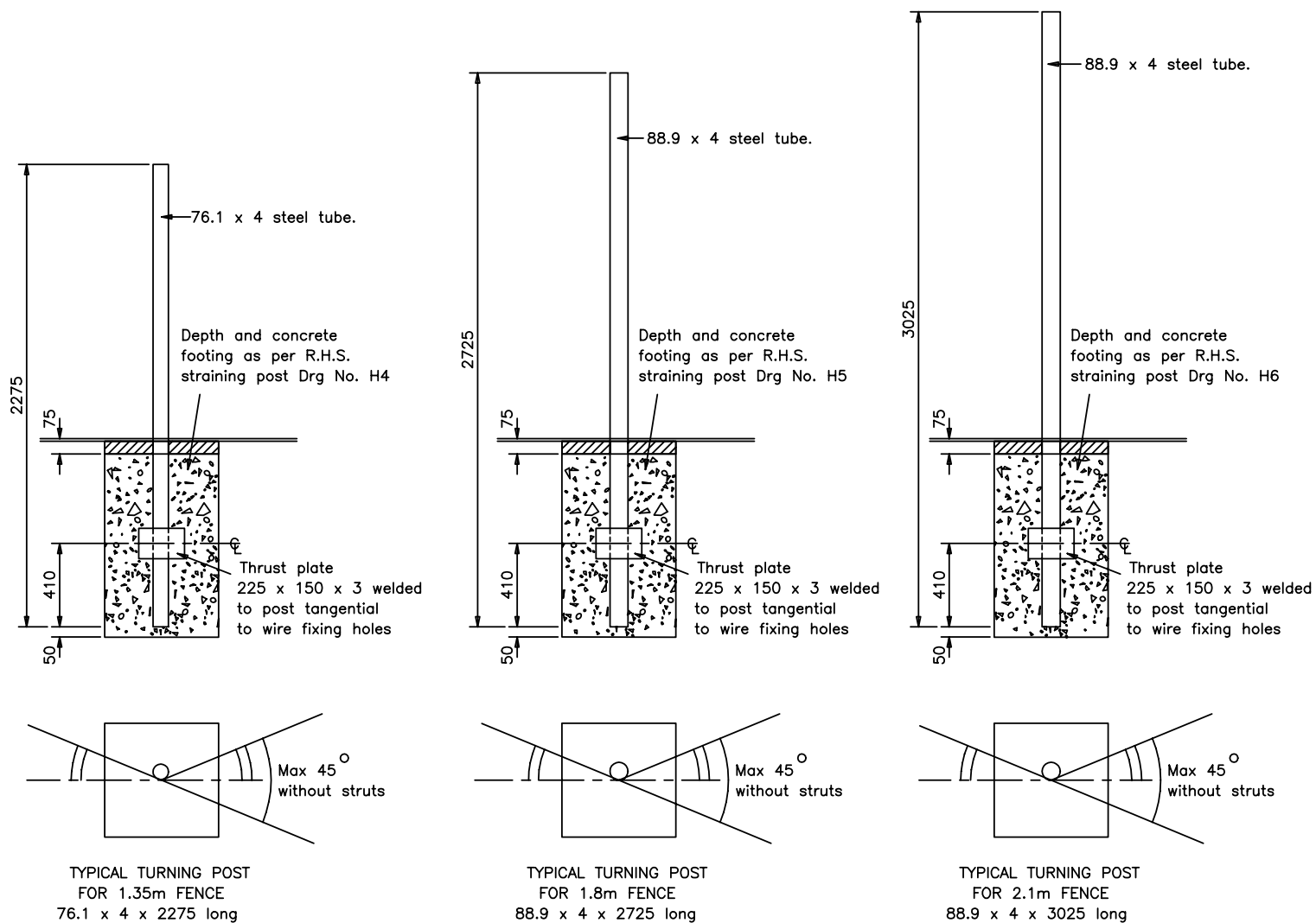
H5



STRAINING POST  
3025 long  
100 x 50 x 4 R.H.S.  
Max spacing 300m

HIGHWAY CONSTRUCTION DETAILS	FENCES, STILES & GATES	C	MAY 04	MOTORWAY AND ACCOMMODATION WORKS HIGH TENSILE STRAINED WIRE DEER FENCES 210	Drawing No.
		B	MAR 98		H6
		A	DEC 91		
		Issue	Date		





NOTE  
ALL DIMENSIONS ARE  
IN MILLIMETRES.

HIGHWAY CONSTRUCTION DETAILS

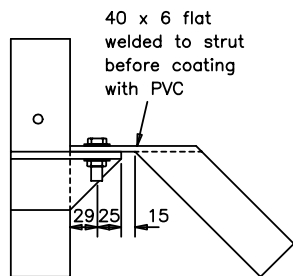
FENCES, STILES &  
GATES

A	DEC 91
Issue	Date

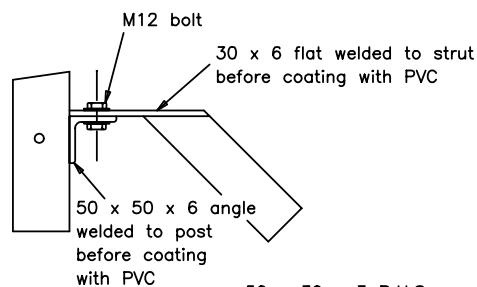
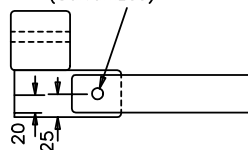
TURNING POSTS  
STRAINED WIRE FENCES

Drawing No.

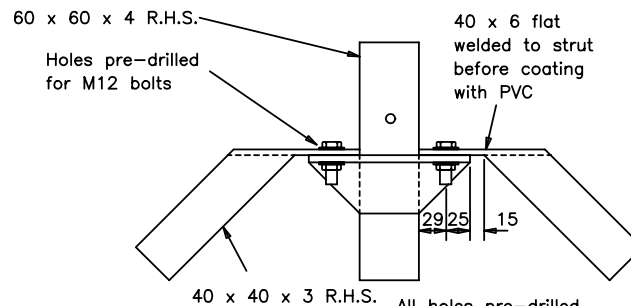
H7



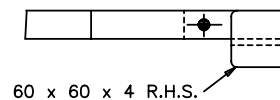
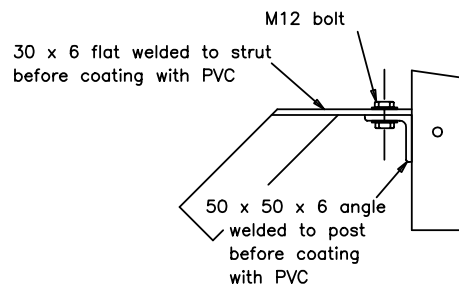
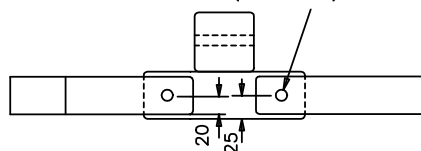
All holes pre-drilled for M12 x 45 bolts (Galvanized)



END POSTS

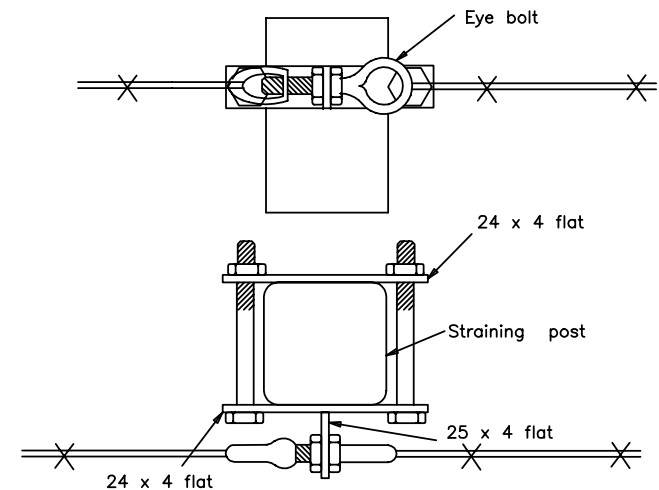


40 x 40 x 3 R.H.S. All holes pre-drilled for M12 x 45 bolts (Galvanized)

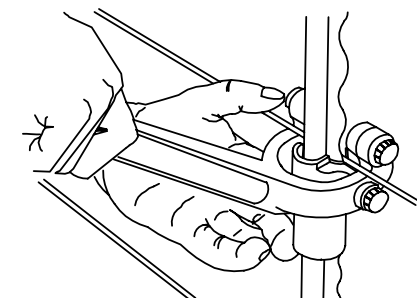


INTERMEDIATE POSTS

STRAINING ARRANGEMENT FOR STRAINING POSTS  
FENCE HEIGHT 1.35m



STRAINING ARRANGEMENT FOR  
BARBED WIRE



TYPICAL DROPPER CLIP TOOL  
AND DROPPER

#### NOTES

1. The dropper shall be made of steel not less than 0.66kg per metre galvanized to comply with Clause 1909. Dropper clip wire must be zinc coated and sprayed with plastic paint when required in Appendix 3/1.
2. ALL DIMENSIONS ARE IN MILLIMETRES.

HIGHWAY CONSTRUCTION DETAILS

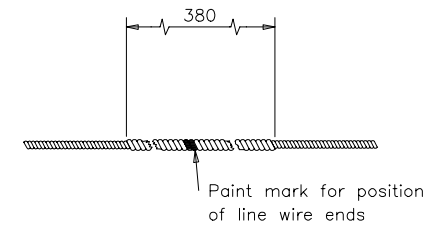
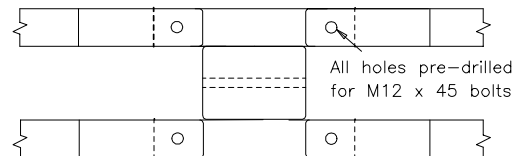
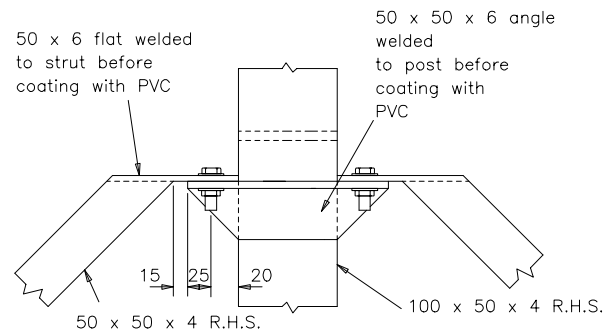
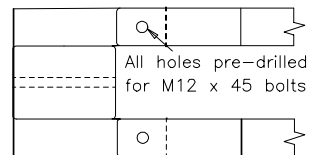
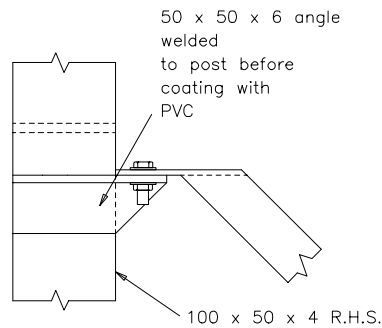
FENCES, STILES &  
GATES

B	MAY 01
A	DEC 91
Issue	Date

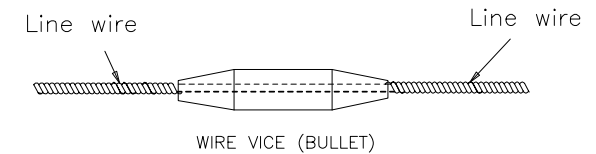
GENERAL DETAILS  
STRAINED WIRE FENCES  
SHEET 1

Drawing No.

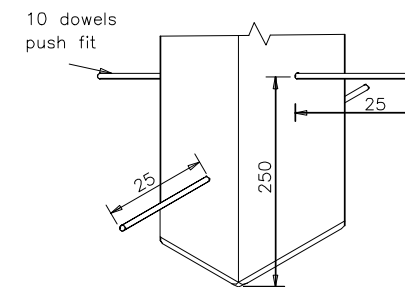
H8



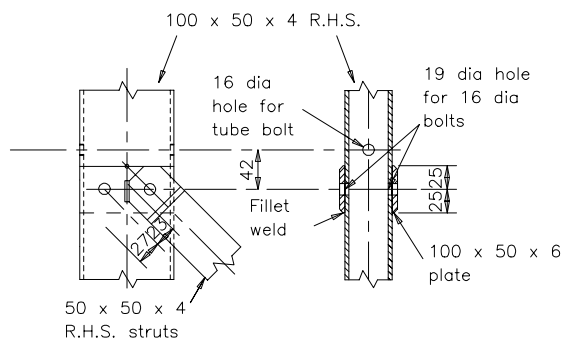
PREFORMED CONNECTOR  
NOTE - Extruded plastic coatings to be stripped off for lengths of spiral before applying the fixing and then coated with plastic on completion



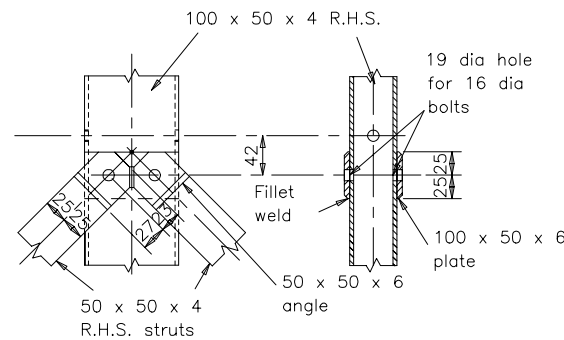
ALTERNATIVE METHODS OF JOINTING LINE WIRE



ARRANGEMENT OF DOWELS AT BASE OF POSTS AND STRUTS



END POSTS



INTERMEDIATE POSTS

ALTERNATIVE ARRANGEMENTS FOR STRAINING POSTS  
FENCE HEIGHT 1.8m AND 2.1m

NOTE : ALL DIMENSIONS ARE IN MILLIMETRES.

HIGHWAY CONSTRUCTION DETAILS

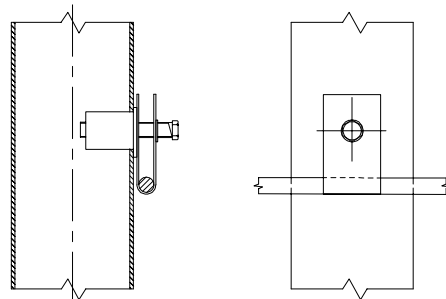
FENCES, STILES &  
GATES

A	DEC 91
Issue	Date

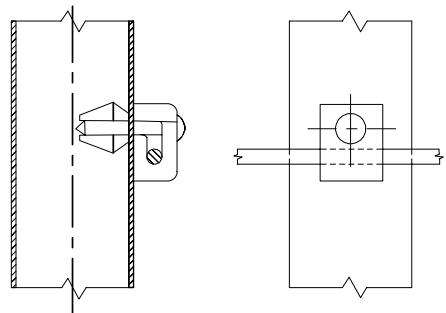
GENERAL DETAILS  
STRAINED WIRE FENCES  
SHEET 2

Drawing No.

H9

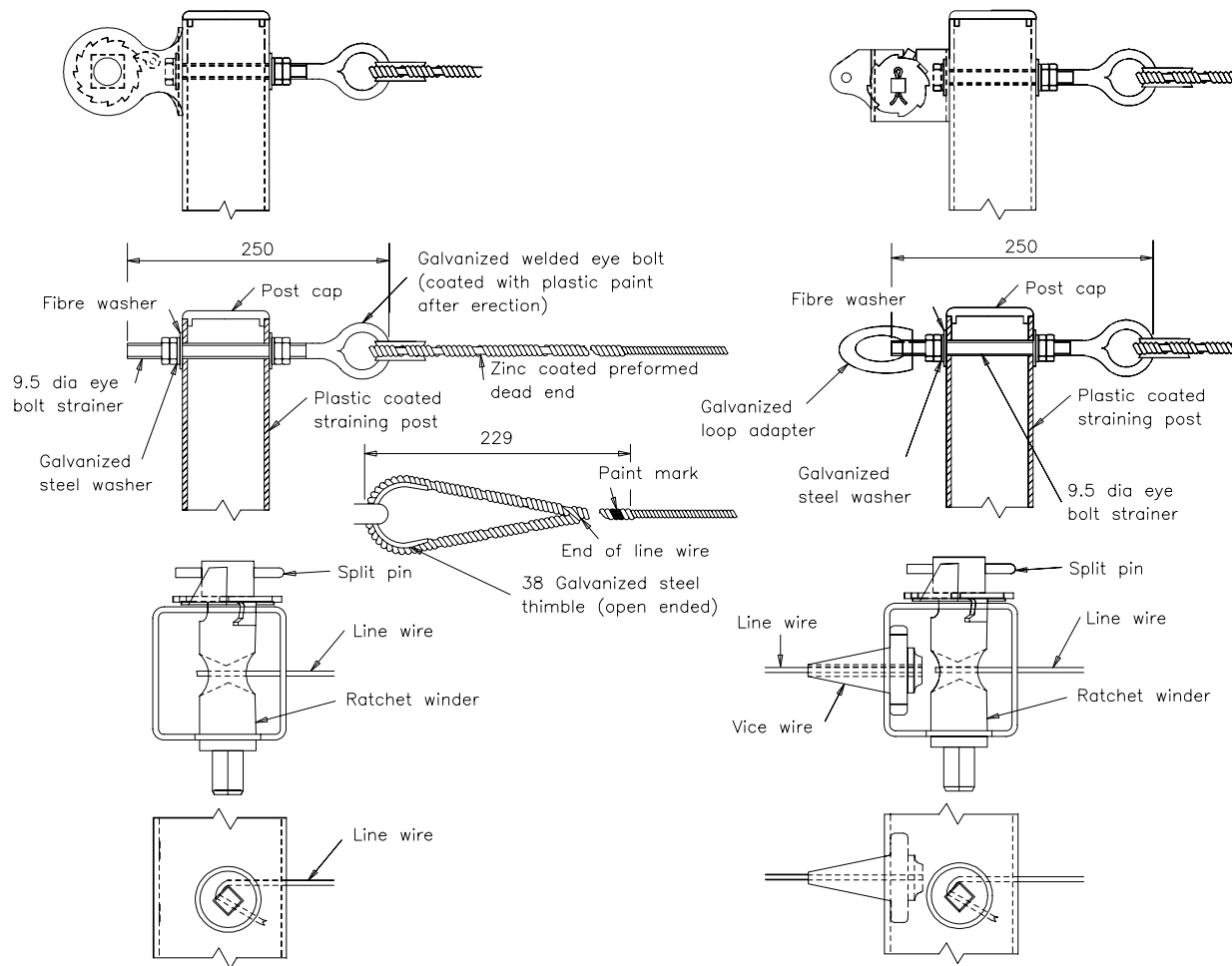


STAINLESS STEEL CLIP



PLASTIC PLUG

INTERMEDIATE POST – PLAIN WIRE FIXING  
(See Drg No. H8 for barbed wire)



ALTERNATIVE ARRANGEMENTS  
FOR WIRE CONNECTIONS TO  
END STRAINING POSTS

ALTERNATIVE ARRANGEMENTS FOR  
WIRE CONNECTIONS TO  
INTERMEDIATE STRAINING POSTS

NOTE : ALL DIMENSIONS ARE IN MILLIMETRES.

HIGHWAY CONSTRUCTION DETAILS

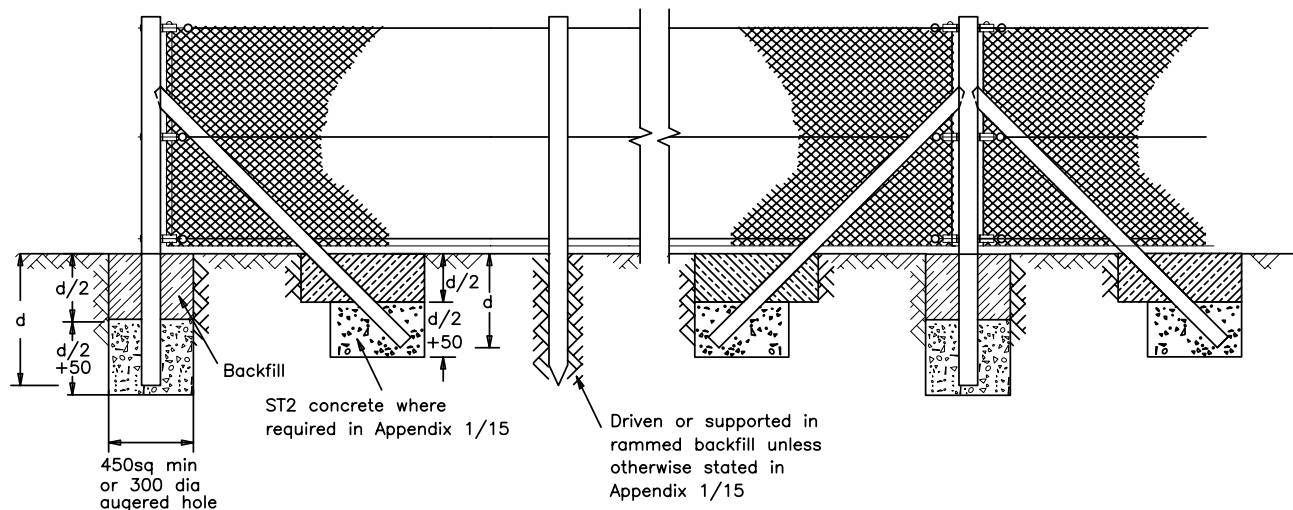
FENCES, STILES &  
GATES

A	DEC 91
Issue	Date

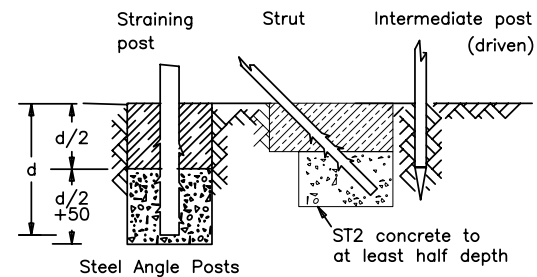
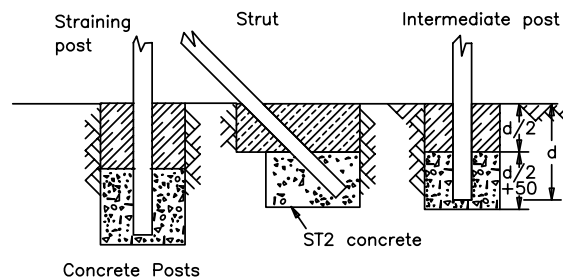
GENERAL DETAILS  
STRAINED WIRE FENCES  
SHEET 3

Drawing No.

H10



DETAIL FOR TIMBER POSTS



VARIATIONS FOR POSTS OF MATERIALS OTHER THAN TIMBER

# NOTES

1. B.S.1722 Part 1 applies unless otherwise stated.
2. Dimensions of foundation, type and size of posts, struts mesh, etc. shall be taken from B.S.1722 Part 1 appropriate to the height and with any other requirement described in Appendix 1/15 and on the Drawings.
3. Plastic coating when required in Appendix 1/15 shall comply with Specification Clauses 2604 and 2605.
4. Plastic coating material shall not be acceptable where serious damage has occurred to the coating before or during erection. Minor defects must be sprayed with an approved plastic paint within 24 hours of erection.
5. All timber shall comply with Specification Clause 304 unless otherwise stated in Appendix 1/15.
6. Where a fence forms a boundary between the highway and private property the wire shall be fixed to the highway side unless otherwise stated in Appendix 1/15.
7. Timber posts and struts may be supported in rammed backfill unless otherwise stated in Appendix 1/15.
8. ALL DIMENSIONS ARE IN MILLIMETRES.

HIGHWAY CONSTRUCTION DETAILS

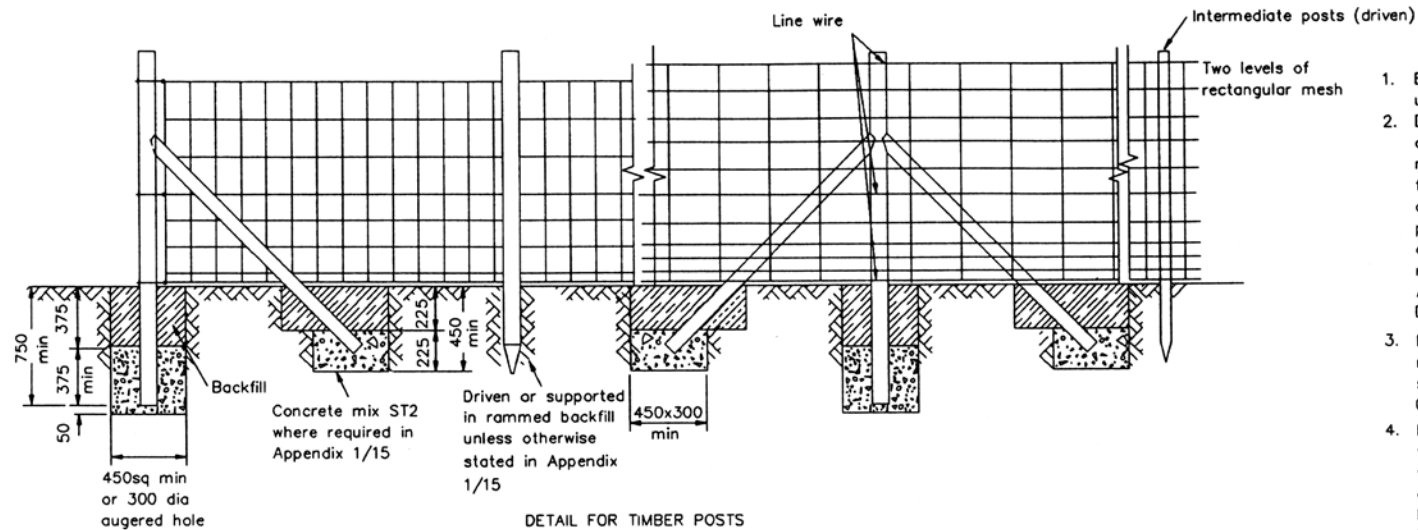
FENCES, STILES &  
GATES

D	MAY 04
C	MAR 98
B	AUG 93
A	DEC 91
Issue	Date

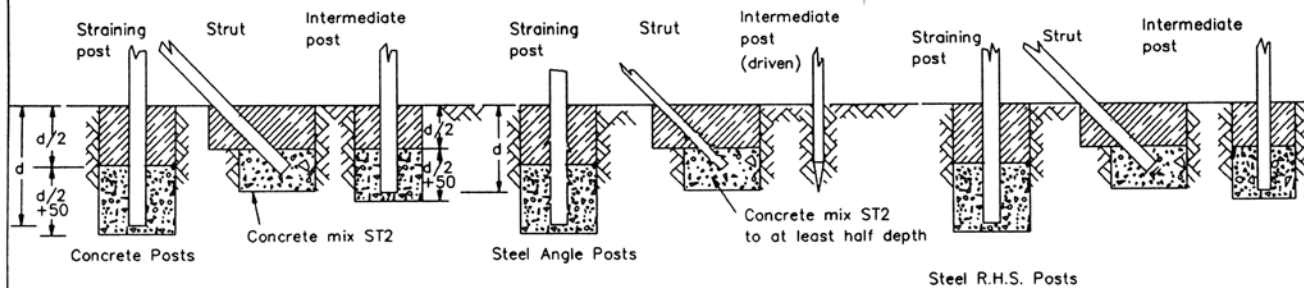
ACCOMMODATION WORKS  
CHAIN LINK FENCES

Drawing No.

H11



DETAIL FOR TIMBER POSTS



VARIATIONS FOR POSTS OF MATERIALS OTHER THAN TIMBER

NOTES

1. B.S.1722 Part 2 applies unless otherwise stated.
2. Dimensions of foundation, type and size of posts, struts, mesh, etc. shall be taken from B.S.1722 Part 2 appropriate to the height and purpose of the fence and with any other requirement described in Appendix 1/15 and on the Drawings.
3. Plastic coating when required in Appendix 1/15 shall comply with Specification Clauses 2604 and 2605.
4. Plastic coating material will not be acceptable where serious damage has occurred to the coating before or during erection. Minor defects must be sprayed with an approved plastic paint within 24 hours of erection.
5. All timber shall comply with Specification Clause 304 unless otherwise stated in Appendix 1/15.
6. Where a fence forms a boundary between the highway and private property the wire shall be fixed to the highway side unless otherwise stated in Appendix 1/15.
7. Timber posts and struts may be supported in rammed backfill unless otherwise stated in Appendix 1/15.
8. ALL DIMENSIONS ARE IN MILLIMETRES.

HIGHWAY CONSTRUCTION DETAILS

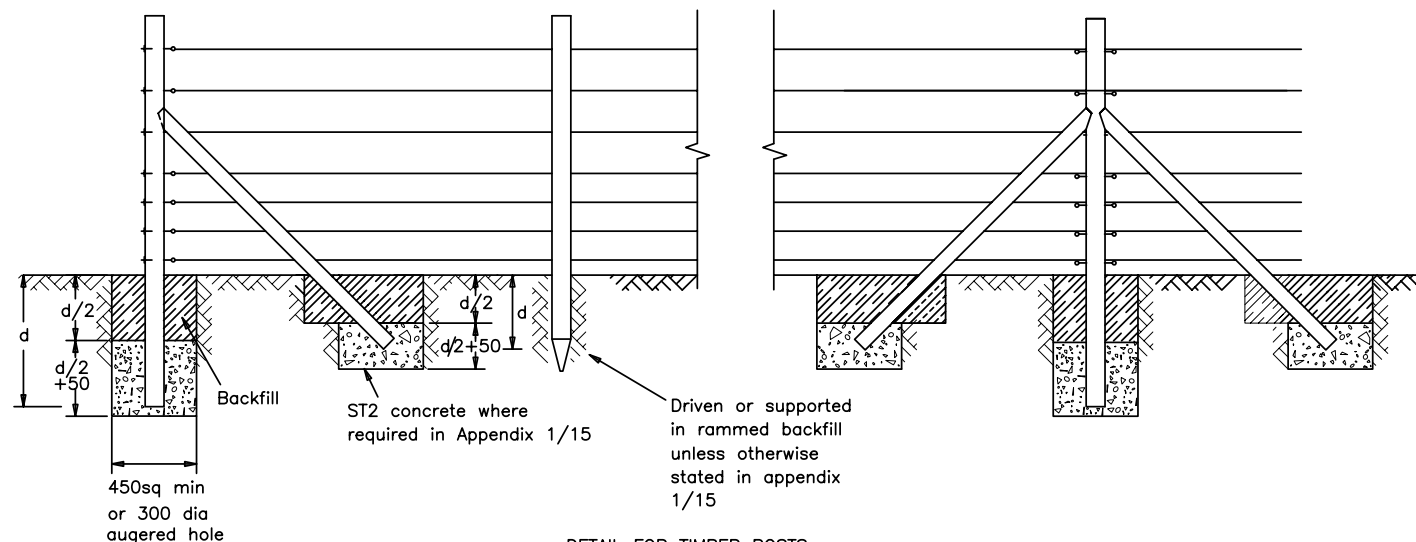
FENCES, STILES &  
GATES

B	AUG 93
A	DEC 91
Issue	Date

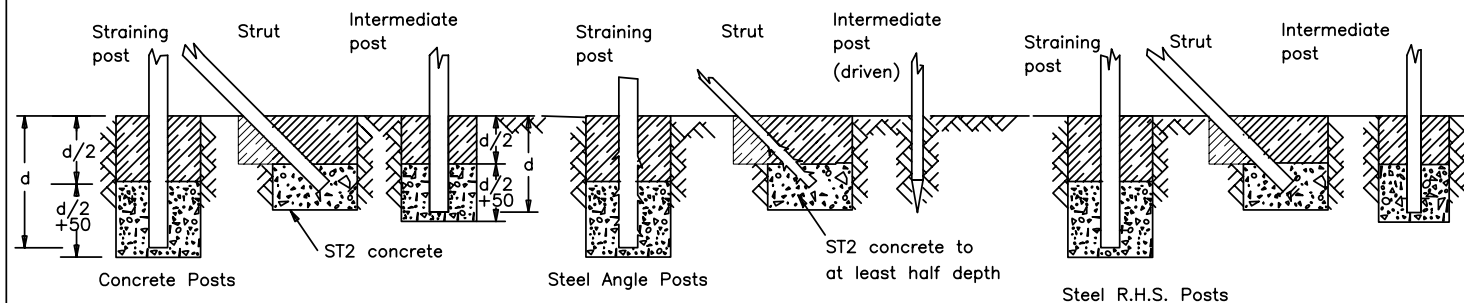
ACCOMMODATION WORKS  
RECTANGULAR WIRE MESH AND  
HEXAGONAL WIRE NETTING FENCES

Drawing No.

H12



DETAIL FOR TIMBER POSTS



VARIATIONS FOR POSTS OF MATERIALS OTHER THAN TIMBER

# NOTES

1. B.S. 1722 Part 2 applies unless otherwise stated.
2. Dimensions of foundation, type and sizes of posts, struts and wire etc. shall be taken from B.S.1722 Part 2 as appropriate to the height and purpose of the fence and with any other requirements described in Appendix 1/15 and on the Drawings.
3. All timber shall comply with Specification Clause 304 unless otherwise stated in Appendix 1/15.
4. When plastic coating is required in Appendix 1/15 it shall comply with Specification Clause 2604 and 2605.
5. Details of posts and connections shall be in accordance with Drawing Nos. H7 to H10.
6. Where a fence forms a boundary between the highway and private property, the wire shall be fixed on the highway side unless otherwise stated in Appendix 1/15
7. Plastic coating material will not be acceptable where serious damage has occurred to the coating before or during erection. Minor defects must be sprayed with an approved plastic paint within 24 hours of erection.
8. Timber posts and struts may be supported in rammed backfill unless otherwise stated in Appendix 1/15.
9. ALL DIMENSIONS ARE IN MILLIMETRES.

HIGHWAY CONSTRUCTION DETAILS

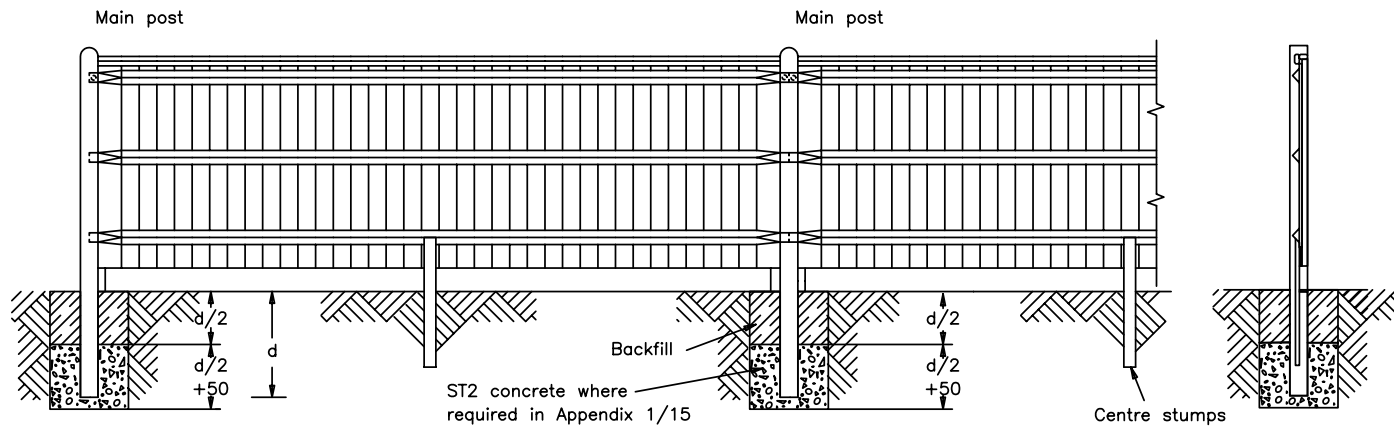
FENCES, STILES &  
GATES

E	MAY 04
D	MAY 01
C	MAR 98
B	AUG 93
A	DEC 91
Issue	Date

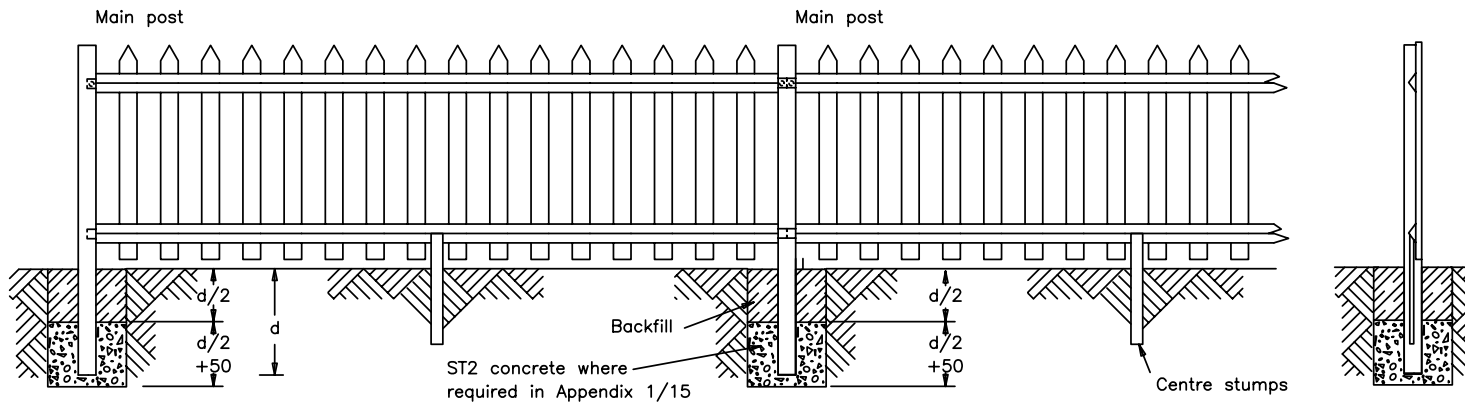
ACCOMMODATION WORKS  
STRAINED WIRE FENCES  
(GENERAL PATTERN)

Drawing No.

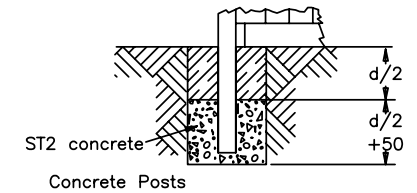
H13



FENCE - Timber Posts  
(B.S. 1722 Part 5)



FENCE - Timber Posts  
(B.S. 1722 Part 5)



- NOTES
1. B.S. 1722 Part 5 applies unless otherwise stated.
  2. Dimension d and types and sizes of posts, rails, palisades and feather edged board fitting shall be taken from B.S. 1722 Part 5 as appropriate to the height and type of fence and with any other requirements described in Appendix 1/15 and on the Drawings.
  3. All timber shall comply with Clause 304 unless otherwise stated in Appendix 1/15.
  4. Timber posts may be supported in rammed backfill unless otherwise stated in Appendix 1/15.
  5. ALL DIMENSIONS ARE IN MILLIMETRES.

HIGHWAY CONSTRUCTION DETAILS

FENCES, STILES &  
GATES

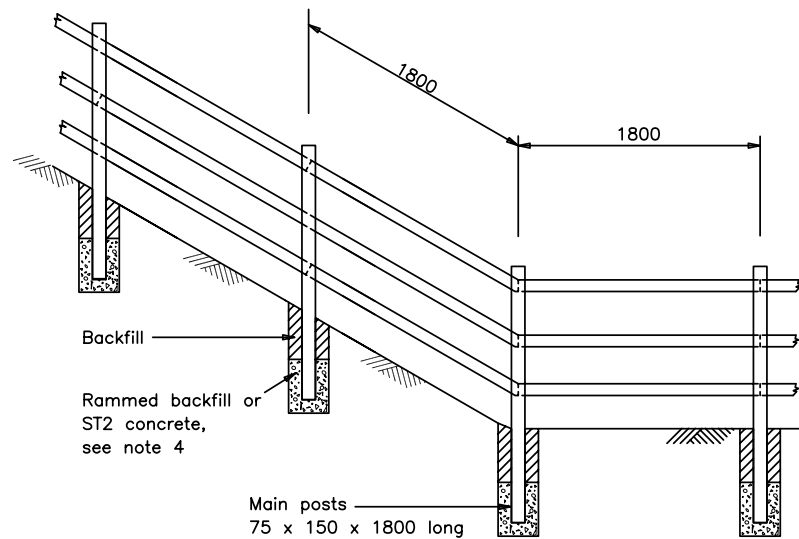
E	MAY 04
D	MAY 01
C	MAR 98
B	AUG 93
A	DEC 91
Issue	Date

ACCOMMODATION WORKS  
TIMBER PALISADE AND  
CLOSE BOARDED FENCES

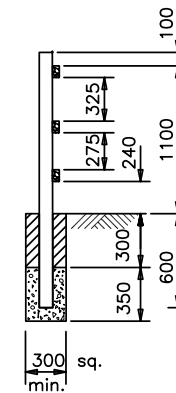
Drawing No.

H14





GENERAL ARRANGEMENT



SECTION THROUGH  
C OF MAIN POSTS

#### NOTES

1. B.S.1722 Part 7 applies unless otherwise stated.
2. Where plain or barbed wire is required in Appendix 1/15 it shall be zinc coated and comply with BS 4102
3. Where the fence forms a boundary between the highway and private property, the rails shall be fixed to the private property side unless otherwise stated in Appendix 1/15.
4. Posts may be supported by rammed backfill or ST2 concrete unless Appendix 1/15 requires ST2 concrete to be used.
5. ALL DIMENSIONS ARE IN MILLIMETRES.

HIGHWAY CONSTRUCTION DETAILS

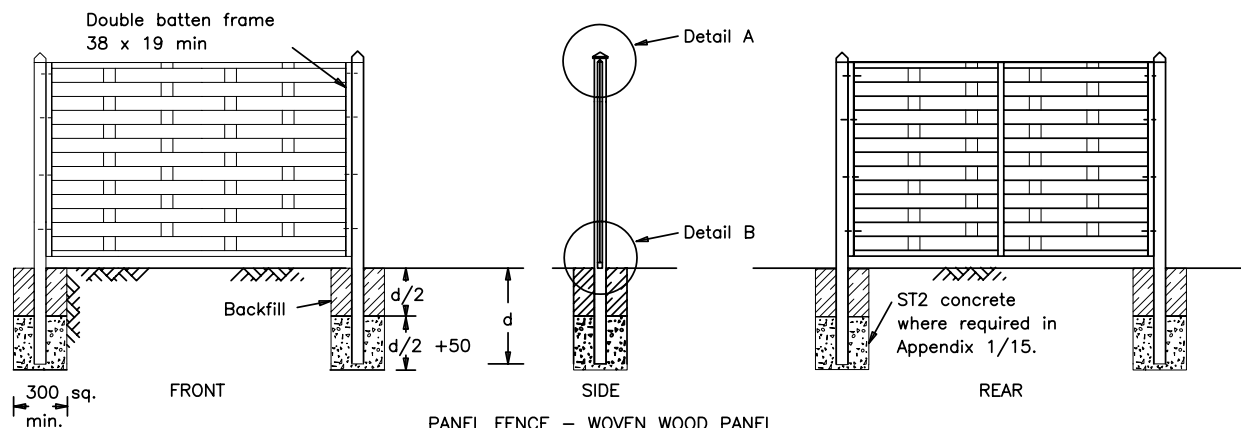
FENCES, STILES &  
GATES

D	MAY 04
C	MAR 98
B	AUG 93
A	DEC 91
Issue	Date

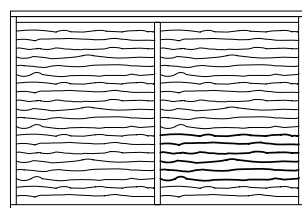
ACCOMMODATION WORKS  
WOODEN POST AND  
3 RAIL FENCES

Drawing No.

H15



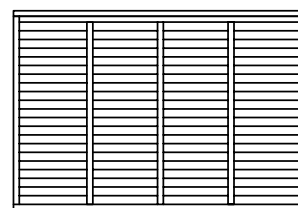
PANEL FENCE – WOVEN WOOD PANEL



FRONT

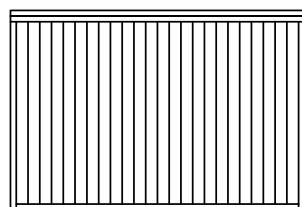


SIDE



REAR

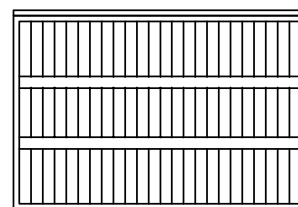
PANEL FENCE – OVERLAPPING HORIZONTAL BOARD PANEL



FRONT

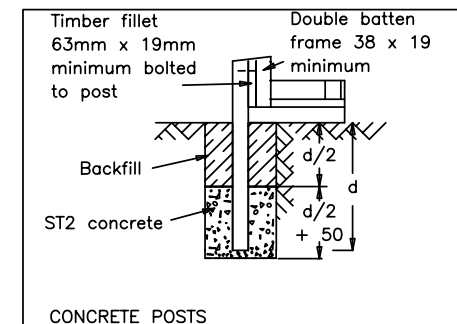
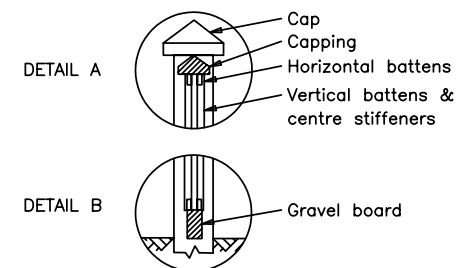


SIDE



REAR

PANEL FENCE – OVERLAPPING VERTICAL BOARD PANEL



CONCRETE POSTS

- NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES.
  2. BS 1722 Part 11 applies unless otherwise stated.
  3. Dimension d and sizes of posts, and infill shall be taken from BS 1722 Part 11 as appropriate to the height and type of fence described in Appendix 1/15 and on the Drawings.
  4. All timber shall comply with Specification Clause 304 unless otherwise stated in Appendix 1/15.
  5. Timber posts may be driven or supported in rammed backfill unless otherwise stated in Appendix 1/15.

HIGHWAY CONSTRUCTION DETAILS

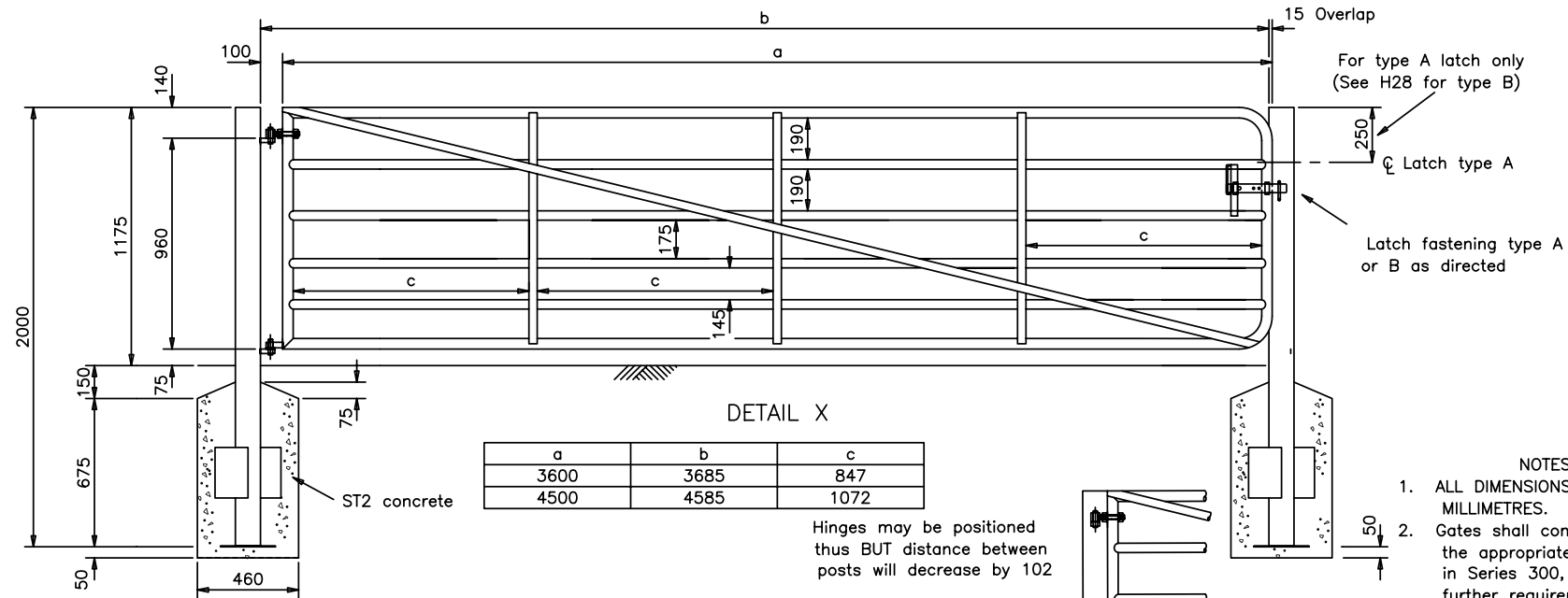
FENCES, STILES &  
GATES

C	MAY 04
B	AUG 93
A	DEC 91
Issue	Date

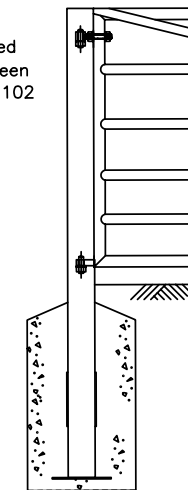
ACCOMMODATION WORKS  
WOVEN AND LAP BOARDED  
PANEL FENCES

Drawing No.

H16



DESCRIPTION OF MATERIAL	SIZE	FIXINGS AND FITTINGS
Hanging post (Tubular steel)	114.3 outer dia.x 3.6 thick	Top capping plate 4.8 thick Two 230x150x4.8 wing plates stitch welded to post
Shutting post (Tubular steel)	88.9 outer dia.x 3.2 thick	Base plate 250x250x4.8 Cap and base plates to be continuously flush welded to tube
Outer frames	48.3 outer dia.x 2.9 thick	Fillet welded to each gate member crossed by braces
Infilling horizontal rails (All tubular steel)	42.4 outer dia.x 2.6 thick	
Vertical braces (steel flat)	Three 38x4.8	
Diagonal braces (steel flat)	Two 38x4.8	



Alternative position of hinge to  
give a full 180° opening when  
required in Appendix 1/15 or 3/1

- NOTES
- ALL DIMENSIONS ARE IN MILLIMETRES.
  - Gates shall comply with the appropriate Clauses in Series 300, any further requirements in Appendix 1/15 or 3/1, and with BS 3470. (Cattle yard).
  - For details of latches and fittings see Drawing Nos. H26, H27 & H28.
  - Gate stops to be provided in accordance with Drawing No. H33.
  - The gate shall open into the owner's property.
  - The corners of the main frame may be rounded, rounded and mitred (as drawn), mitred, saddled or crimped.
  - Protective treatment to be as described in Appendix 1/15 or 3/1.

HIGHWAY CONSTRUCTION DETAILS

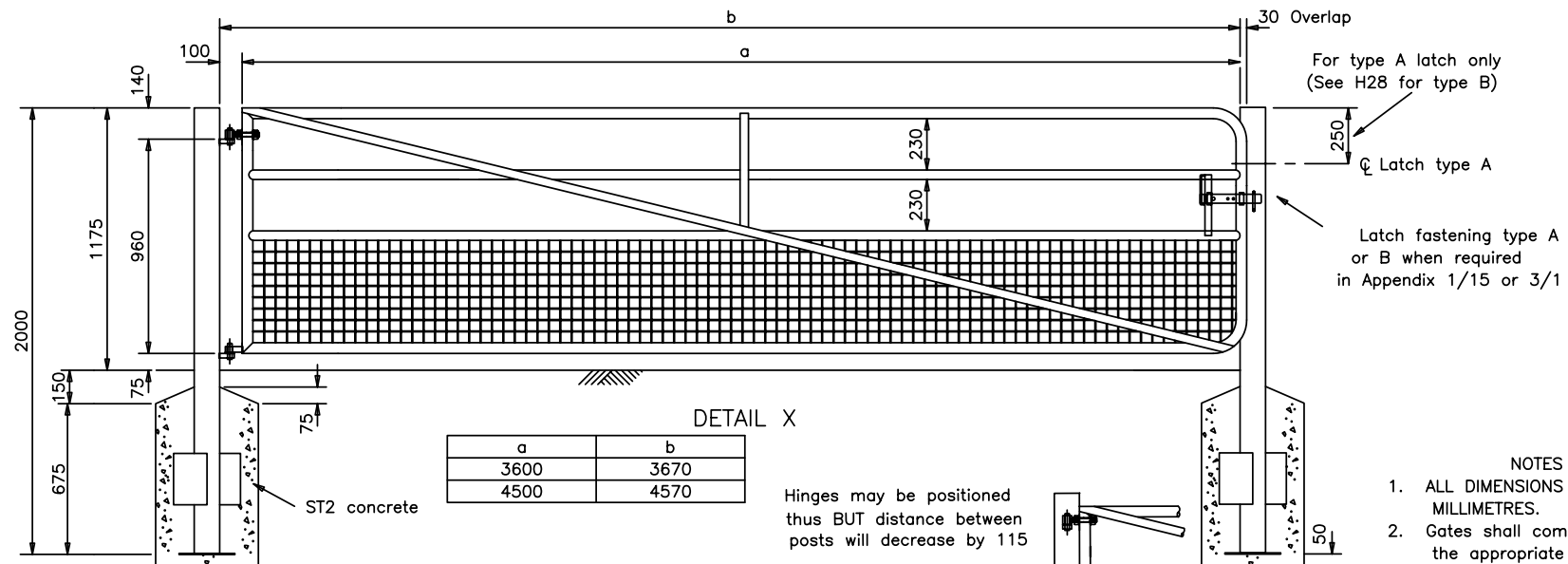
FENCES, STILES &  
GATES

B	MAY 04
A	DEC 91
Issue	Date

STEEL SINGLE FIELD GATE

Drawing No.

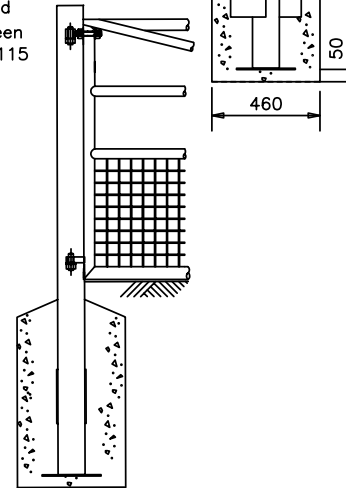
H17



DETAIL X

Hinges may be positioned thus BUT distance between posts will decrease by 115

DESCRIPTION OF MATERIAL	SIZE	FIXINGS AND FITTINGS
Hanging post (Tubular steel)	139.7 outer dia.x 4.5 thick	Top capping plate 4.8 thick Two 230x150x4.8 wing plates stitch welded to post
Shutting post (Tubular steel)	114.3 outer dia.x 3.6 thick	Base plate 250x250x4.8 Cap and base plates to be continuously flush welded to tube
Outer frames	48.3 outer dia.x 2.9 thick	Fillet welded to each gate member crossed by braces
Infilling horizontal rails (All tubular steel)	42.4 outer dia.x 2.6 thick	
Vertical braces (steel flat)	One 38x4.8	
Diagonal braces (steel flat)	Two 38x4.8	
Steel square welded mesh fabric	51 square x4.1dia.	



DETAIL Y

Alternative position of hinge to give a full 180° opening when required in Appendix 1/15 or 3/1

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Gates shall comply with the appropriate Clauses in Series 300, any further requirements in Appendix 1/15 or 3/1 and with BS 3470. (Cattle yard).
3. For details of latches and fittings see Drawing Nos. H26, H27 & H28.
4. Gate stops to be provided in accordance with Drawing No. H33.
5. The gate shall open into the owner's property.
6. The corners of the main frame may be rounded, rounded and mitred (as drawn), mitred, saddled or crimped.
7. Protective treatment to be as described in Appendix 1/15 or 3/1.

HIGHWAY CONSTRUCTION DETAILS

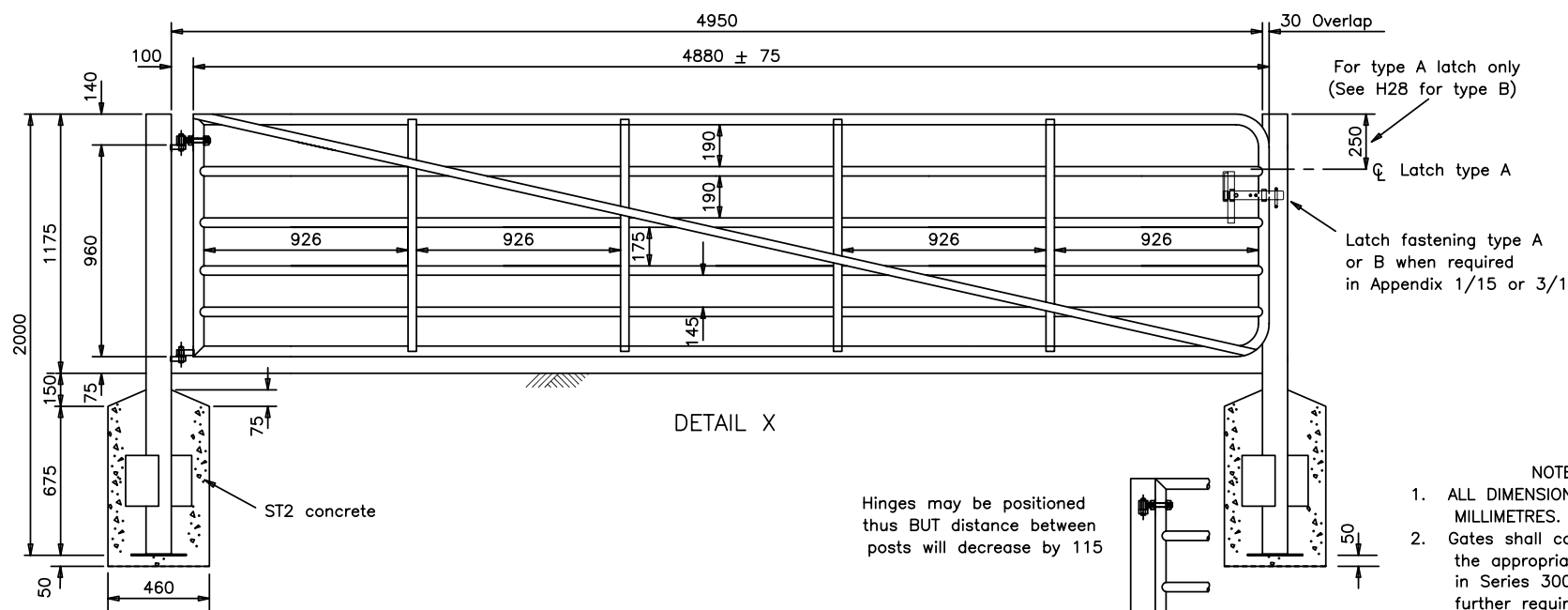
FENCES, STILES &  
GATES

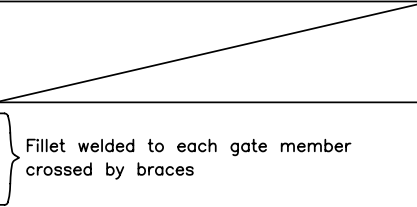
B	MAY 04
A	DEC 91
Issue	Date

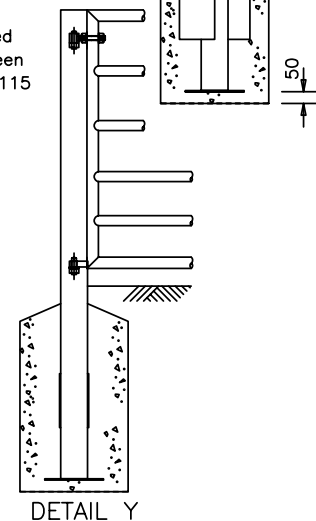
STEEL HALF MESH  
SINGLE FIELD GATE

Drawing No.

H18



DESCRIPTION OF MATERIAL	SIZE	FIXINGS AND FITTINGS
Hanging post (Tubular steel)	139.7 outer dia.x 4.5 thick	Top capping plate 4.8 thick Two 230x150x4.8 wing plates stitch welded to post Base plate 250x250x4.8 Cap and base plates to be continuously flush welded to tube
Shutting post (Tubular steel)	114.3 outer dia.x 3.6 thick	
Outer frames	48.3 outer dia.x 2.9 thick	
Infilling horizontal rails (All tubular steel)	42.4 outer dia.x 2.6 thick	
Vertical braces (steel flat)	Four 38x4.8	
Diagonal braces (steel flat)	Two 38x4.8	



Alternative position of hinge to  
give a full 180° opening when  
required in Appendix 1/15 or 3/1

- NOTES
- ALL DIMENSIONS ARE IN MILLIMETRES.
  - Gates shall comply with the appropriate Clauses in Series 300, any further requirements in Appendix 1/15 or 3/1, and with BS 3470. (Cattle yard).
  - For details of latches and fittings see Drawing Nos. H26, H27 & H28.
  - Gate stops to be provided in accordance with Drawing No. H33.
  - The gate shall open into the owner's property.
  - The corners of the main frame may be rounded, rounded and mitred (as drawn), mitred, saddled or crimped.
  - Protective treatment to be as described in Appendix 1/15 or 3/1.

HIGHWAY CONSTRUCTION DETAILS

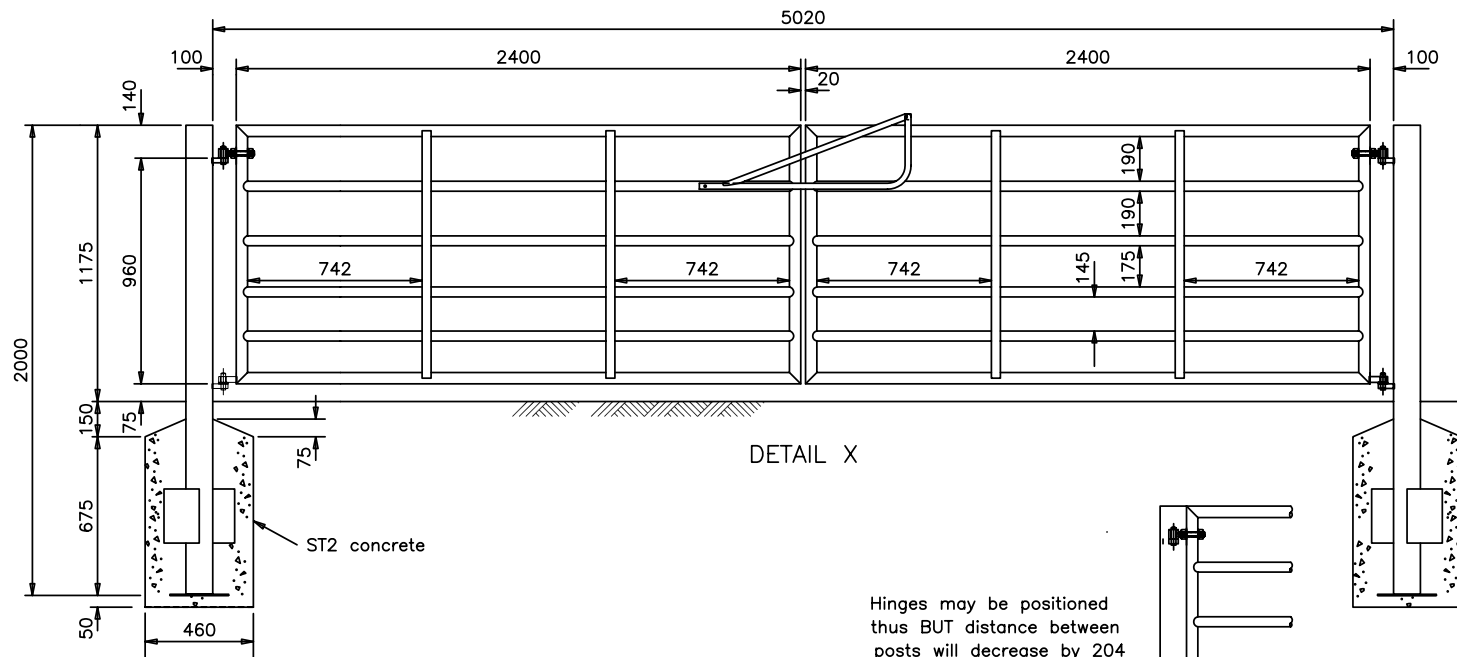
FENCES, STILES &  
GATES

B	MAY 04
A	DEC 91
Issue	Date

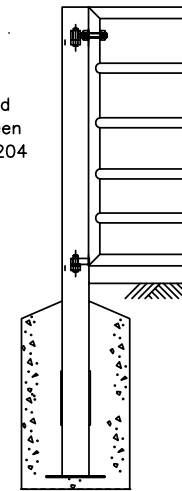
STEEL EXTRA WIDE  
SINGLE FIELD GATE

Drawing No.

H19



DESCRIPTION OF MATERIAL	SIZE	FIXINGS AND FITTINGS
Posts (Tubular steel)	114.3 outer dia.x 3.6 thick	Top capping plate 4.8 thick Two 230x150x4.8 wing plates stitch welded to post Base plate 250x250x4.8 Cap and base plates to be continuously flush welded to tube
Outer frames	48.3 outer dia.x 2.9 thick	
Infilling horizontal rails (All tubular steel)	42.4 outer dia.x 2.6 thick	
Vertical braces (steel flat)	Four 38x4.8	Fillet welded to each gate member crossed by braces



Alternative position of hinge to  
give a full 180 opening when  
required in Appendix 1/15 or 3/1

#### NOTES

- ALL DIMENSIONS ARE IN MILLIMETRES.
- Gates shall comply with the appropriate Clauses in Series 300, any further requirements in Appendix 1/15 or 3/1 and with BS 3470. (Cattle yard.)
- For details of latches and fittings see Drawing Nos. H26 and H29
- Gate stops to be provided in accordance with Drawing No. H33.
- The gate shall open into the owner's property.
- The corners of the main frame may be rounded and mitred, mitred (as drawn), saddled or crimped.
- Protective treatment to be as described in Appendix 1/15 or 3/1.

HIGHWAY CONSTRUCTION DETAILS

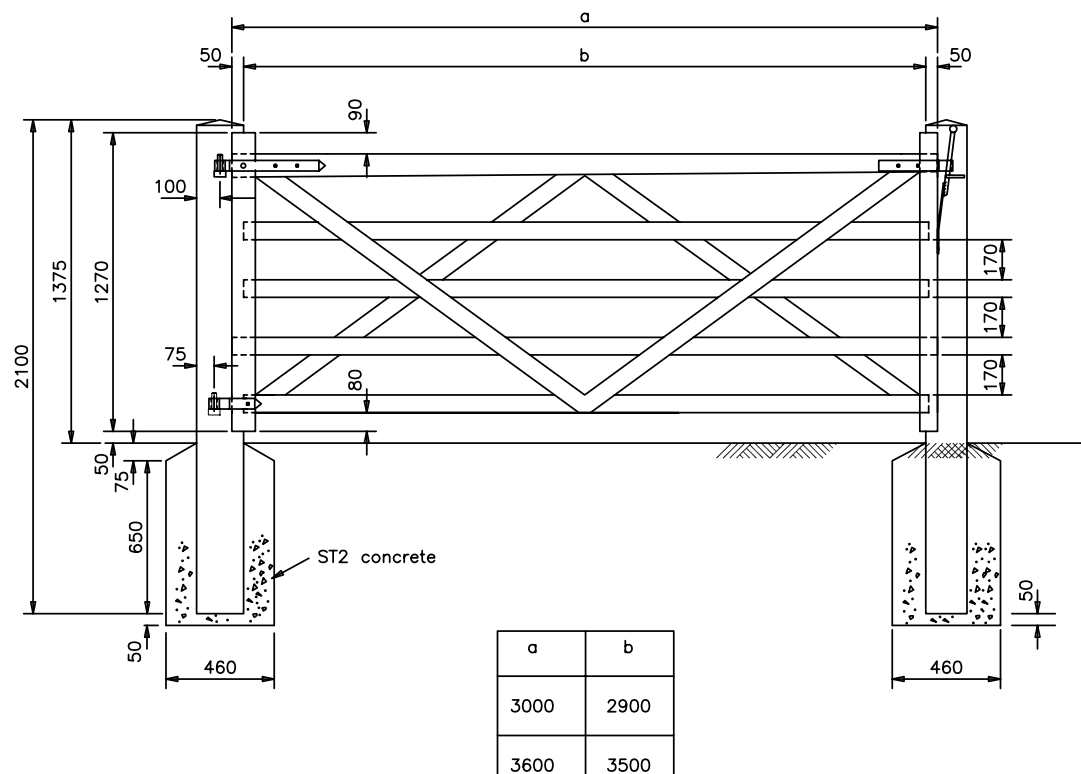
FENCES, STILES &  
GATES

B	MAY 04
A	DEC 91
Issue	Date

STEEL DOUBLE FIELD GATE

Drawing No.

H20



DESCRIPTION OF TIMBER MATERIALS	SIZE
Hanging post	200x200x2100 long
Shutting post	175x175x2100 long
Hanging stile	100x75 for 3m gate 125x75 for 3.6m gate
Shutting stile	75x75
Top rail	100x75 for 3m gate 125x75 for 3.6m gate both tapering to 75x75
Under rails	75x25
Braces housed in top rail	75x25

#### NOTES

- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
- Gates shall comply with the appropriate Clauses in Series 300, any further requirements in Appendix 1/15 or 3/1 and with BS 3470.
- All through tenons shall be pegged with 13 dia oak dowels.
- For details of fittings for hanging and fastening see Drawing Nos. H30 and H31.
- The gate shall be hung as shown for self closing with self latching stop post as shown on Drawing No. H33.
- The gate shall open into the owner's property.

HIGHWAY CONSTRUCTION DETAILS

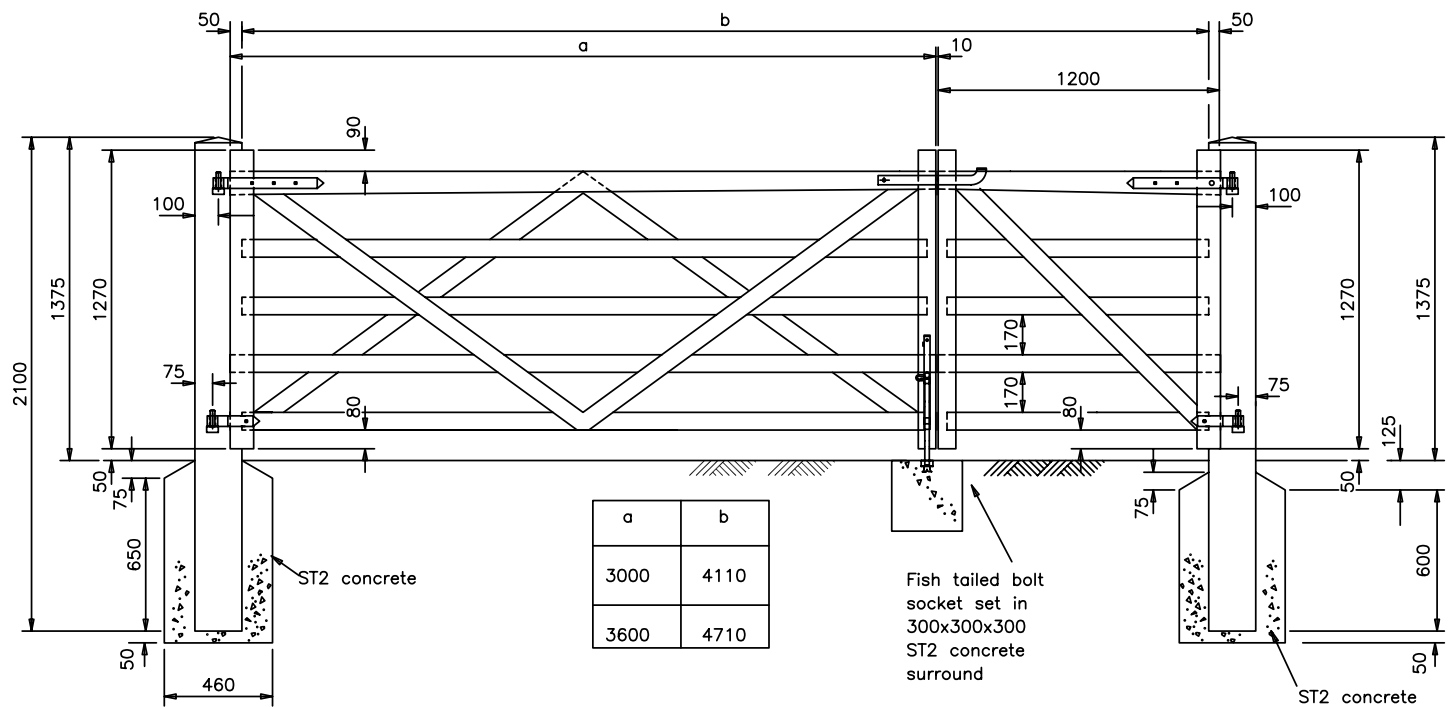
FENCES, STILES &  
GATES

B	MAY 04
A	DEC 91
Issue	Date

TIMBER SINGLE  
FIELD GATE

Drawing No.

H21



a	b
3000	4110
3600	4710

DESCRIPTION OF TIMBER MATERIALS	SIZE
Hanging post for both gates.	200x200x2100 long
Hanging stile	100x75 for 3m gate 125x75 for 3.6m gate
Shutting stile for both gates.	75x75
Top rail	100x75 for 3m & 1.2m gate 125x75 for 3.6m gate all tapering to 75x75
All other rails	75x25
Braces housed in top rail	75x25

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. Gates shall comply with the appropriate Clauses in Series 300, any further requirements in Appendix 1/15 or 3/1 and with BS 3470.
3. Drop bolts and catches shall be galvanized to comply with BS 729.
4. All through tenons shall be pegged with 13 dia oak dowels.
5. For details of fittings for hanging and fastening see Drawing Nos. H30 and H32.
6. The gate shall be hung as shown for self closing with self latching stop post as shown on Drawing No. H33.
7. The gate shall open into the owner's property.

HIGHWAY CONSTRUCTION DETAILS

FENCES, STILES &  
GATES

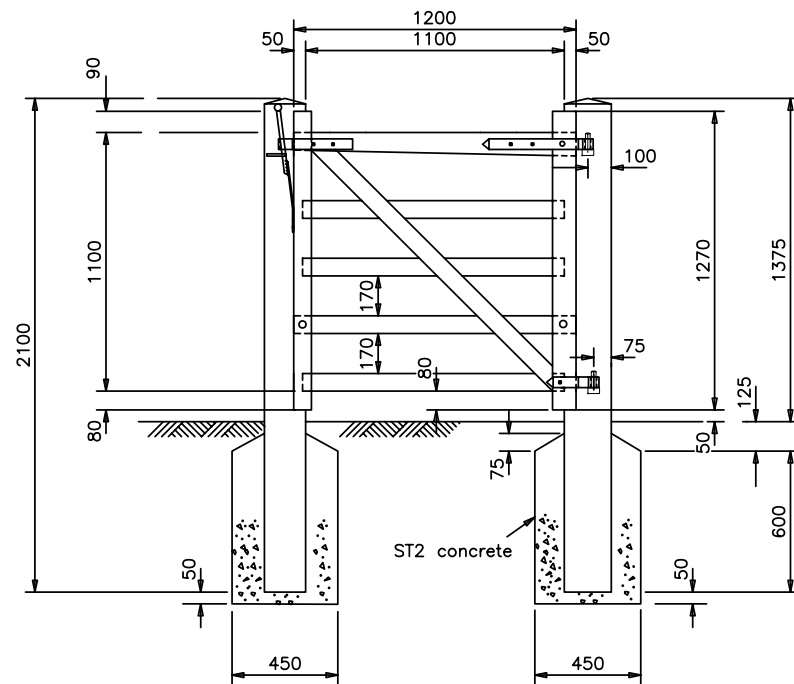
B	MAY 04
A	DEC 91
Issue	Date

TIMBER DOUBLE  
FIELD GATE

Drawing No.

H22





DESCRIPTION OF TIMBER MATERIALS	SIZE
Hanging post	200x200x2100 long
Shutting post	175x175x2100 long
Hanging stile	100x75
Shutting stile	75x75
Top rail	100x75 tapering to 75x75
Under rails	75x25
Brace housed in top rail	75x25

#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. Gates shall comply with the appropriate Clauses in Series 300, any further requirements in Appendix 1/15 or 3/1 and the appropriate Clauses in both BS 3470 and BS 5709.
3. All through tenons shall be pegged with 13 dia oak dowels.
4. For details of fittings for hanging and fastening see Drawing Nos. H30 and H31.
5. The gate shall open into the owner's property.

HIGHWAY CONSTRUCTION DETAILS

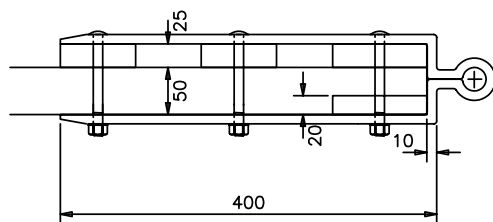
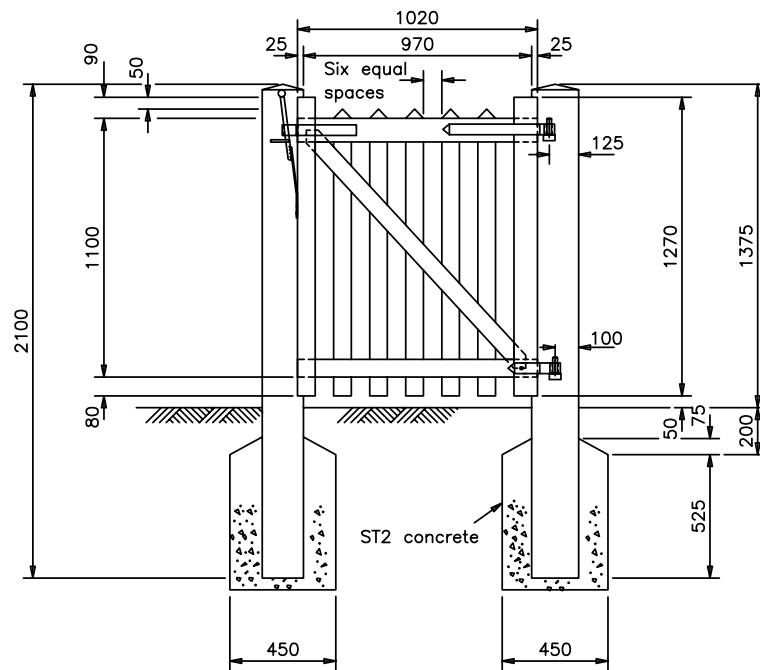
FENCES, STILES &  
GATES

B	MAY 04
A	DEC 91
Issue	Date

TIMBER WICKET GATE  
TYPE 1

Drawing No.

H23



Detail of joint between top & bottom rails and hanging stiles.

DESCRIPTION OF TIMBER MATERIALS	SIZE
Hanging post	200x200x2100 long
Shutting post	175x175x2100 long
Hanging stile	100x75
Shutting stile	75x75
Top rail	100x50
Bottom rail	75x50
Brace housed in both rails	75x25
Rails with pointed tops secured to each rail and the braces by two galvanized 63x10 s.w.g. nails dovetail driven.	75x25x1220 long

#### NOTES

- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
- Gates shall comply with the appropriate Clauses in Series 300, any further requirements in Appendix 1/15 or 3/1 and the appropriate Clauses in both BS 3470 and BS 5709.
- All tenons shall be pegged with 13 dia oak dowels.
- For details of fittings for hanging and fastening see Drawing Nos. H30 and H31.
- The gate shall open into the owner's property.

HIGHWAY CONSTRUCTION DETAILS

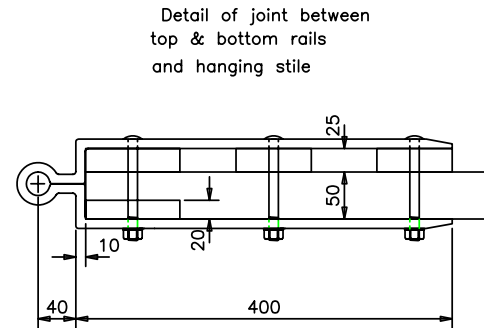
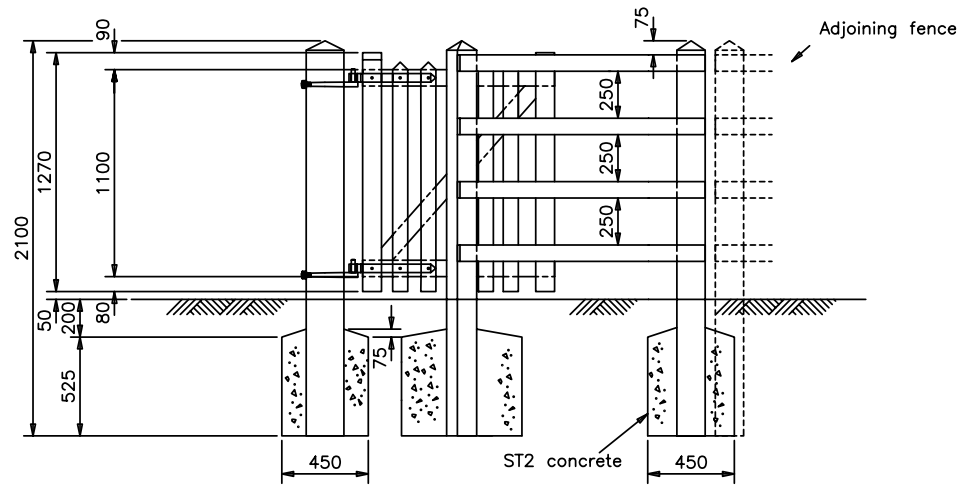
FENCES, STILES &  
GATES

B	MAY 04
A	DEC 91
Issue	Date

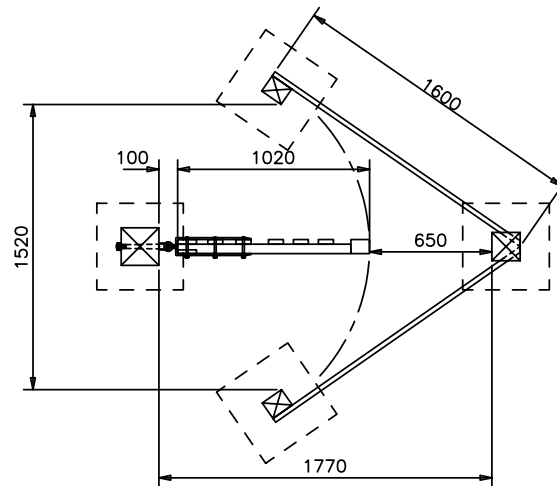
TIMBER WICKET GATE  
TYPE 2

Drawing No.

H24



DESCRIPTION OF TIMBER MATERIALS	SIZE
Wing posts	125x100x2100 long
Apex posts	150x150x2100 long
Fence rails cut to length and housed in the apex post	87x38x1600 long



#### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. Gates shall comply with the appropriate Clauses in Series 300, any further requirements in Appendix 1/15 or 3/1 and the appropriate Clauses in BS 5709.
3. Gate itself shall be wicket gate Type 2 (Drawing No. H24).
4. All nails shall be galvanized.
5. All tenons shall be pegged with 13 dia oak dowels.

HIGHWAY CONSTRUCTION DETAILS

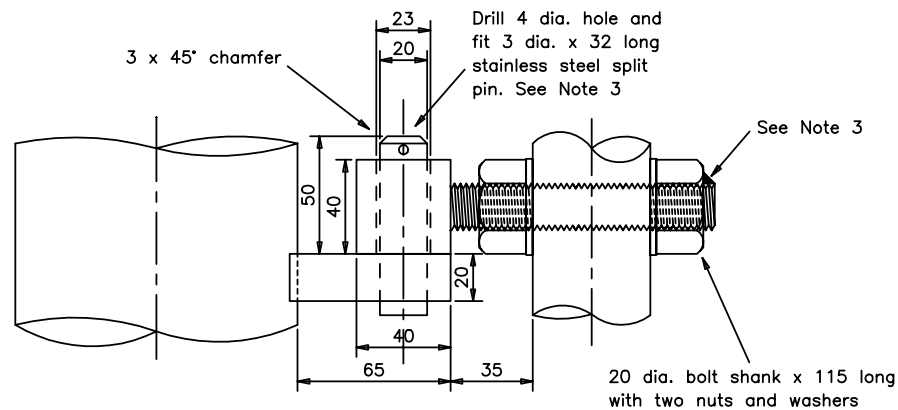
FENCES, STILES &  
GATES

B	MAY 04
A	DEC 91
Issue	Date

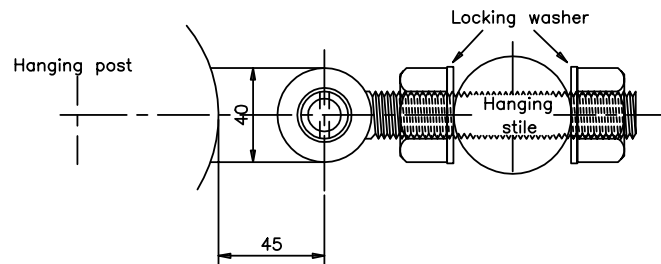
TIMBER KISSING GATE

Drawing No.

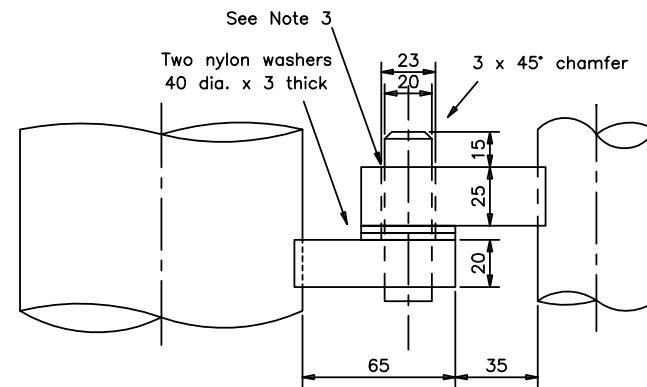
H25



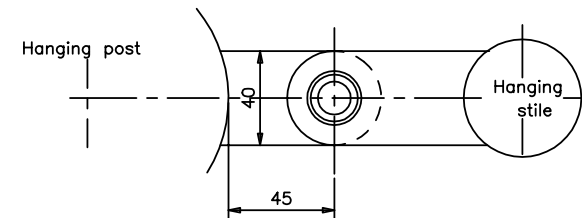
ELEVATION



PLAN  
TOP HINGE



ELEVATION



PLAN  
BOTTOM HINGE

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. Gates shall comply with BS 3470 and any further requirements in Appendix 1/15 or 3/1.
3. Where stated in Appendix 1/15 or 3/1 the split pin on top hinge shall be omitted and replaced with washers welded to both top and bottom hinges, together with a spot weld to the top hinge locking nut.
4. All fittings and bolts shall be galvanized steel.

HIGHWAY CONSTRUCTION DETAILS

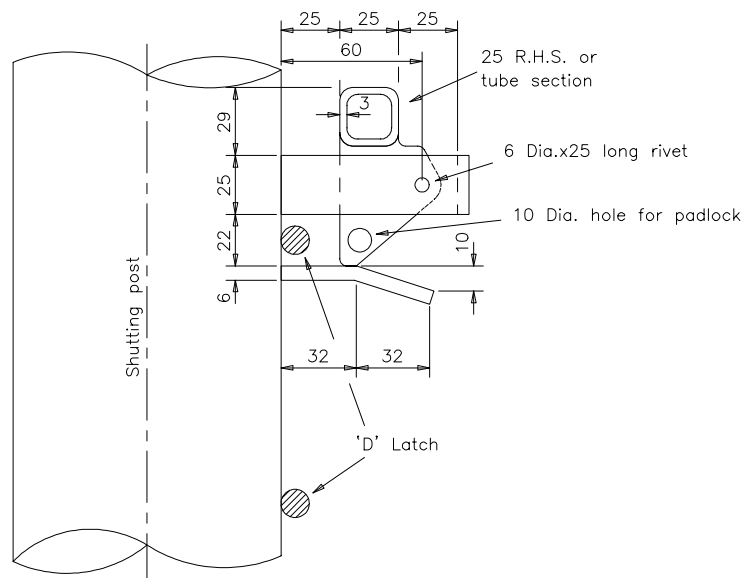
FENCES, STILES &  
GATES

B	MAY 01
A	DEC 91
Issue	Date

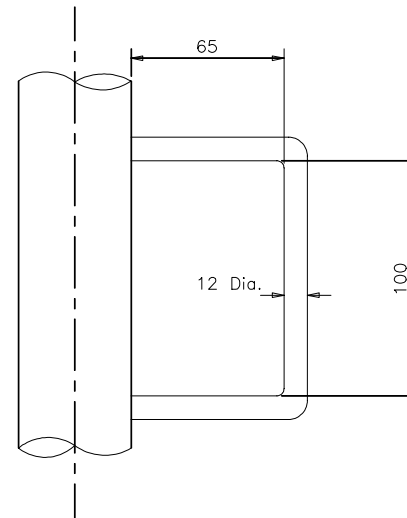
HINGES FOR STEEL  
FIELD GATES

Drawing No.

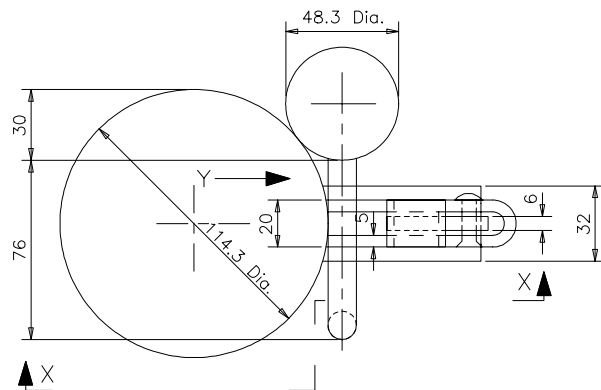
H26



ELEVATION X-X

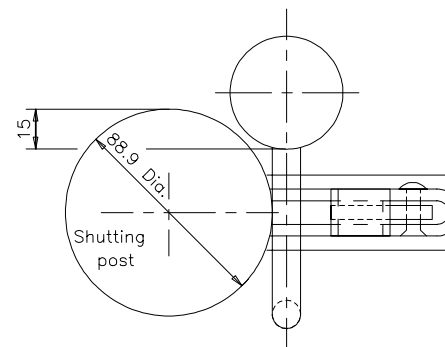


VIEW ON ARROW Y



PLAN

(With 114.3 dia. shutting post)



PLAN

(With 88.9 dia. shutting post)

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. Gate fittings shall comply with BS 3470 and any further requirements in Appendix 1/15 or 3/1.
3. All fittings shall be galvanized steel.

HIGHWAY CONSTRUCTION DETAILS

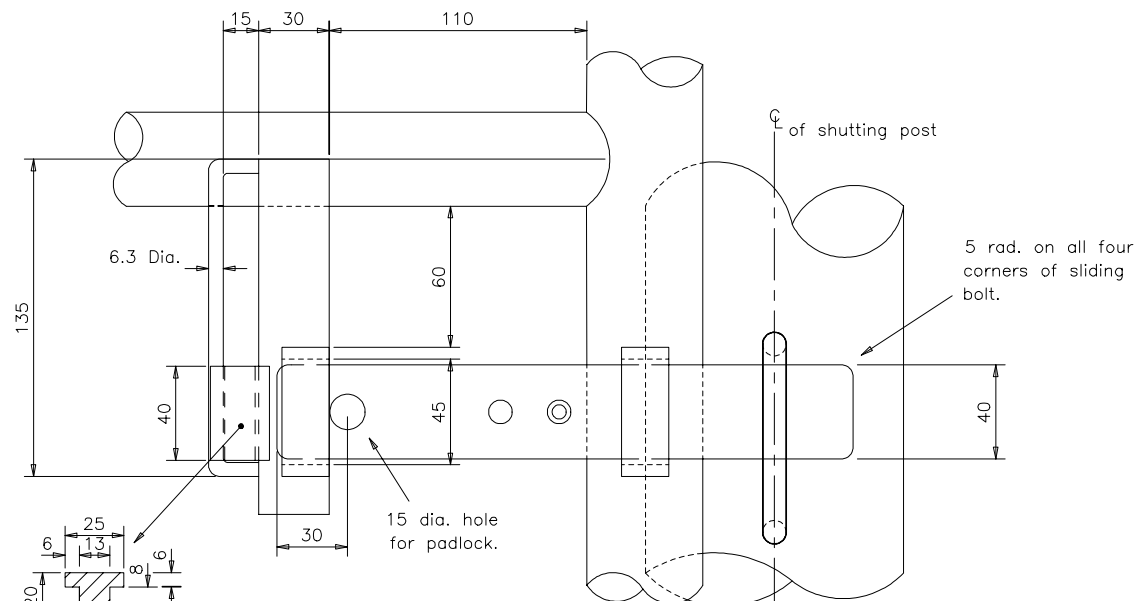
FENCES, STILES &  
GATES

A	DEC 91
Issue	Date

'D' LATCH, TYPE A  
FOR STEEL  
SINGLE FIELD GATES

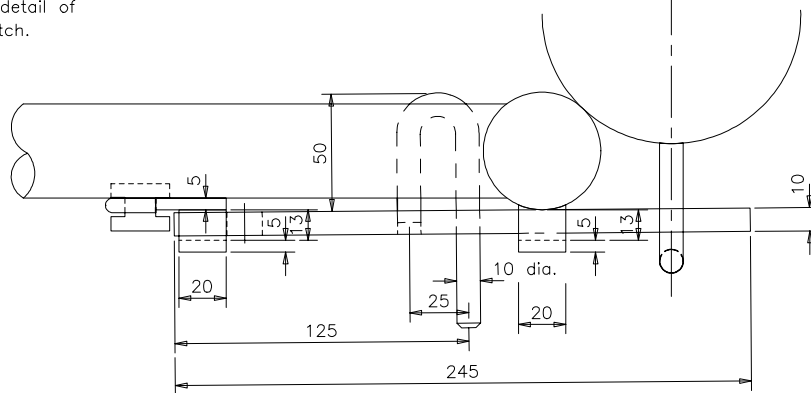
Drawing No.

H27

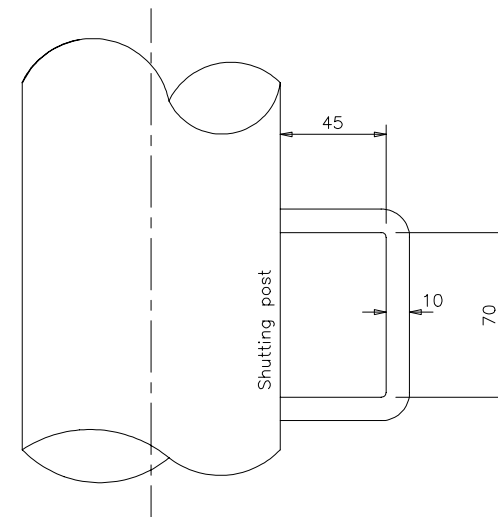


ELEVATION

Sectional detail of sliding catch.



PLAN



DETAIL AT SHUTTING POST  
(Positioned on shutting post to suit sliding bolt)

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. Gate fittings shall comply with BS 3470 and any further requirements in Appendix 1/15 or 3/1.
3. All fittings shall be galvanized steel.

HIGHWAY CONSTRUCTION DETAILS

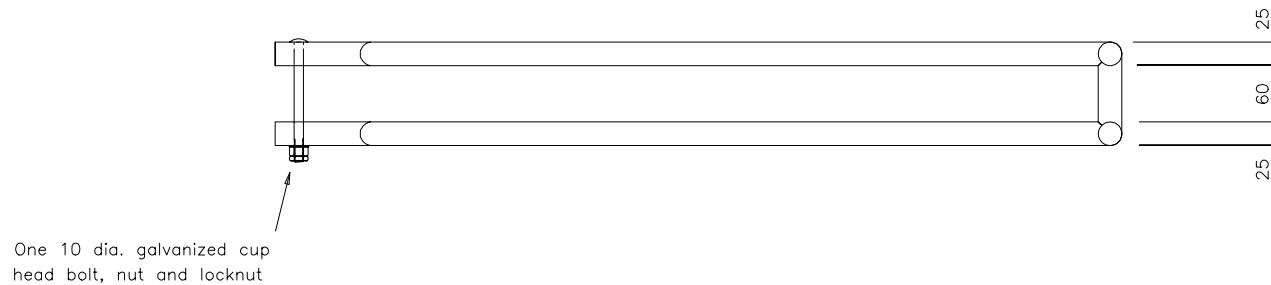
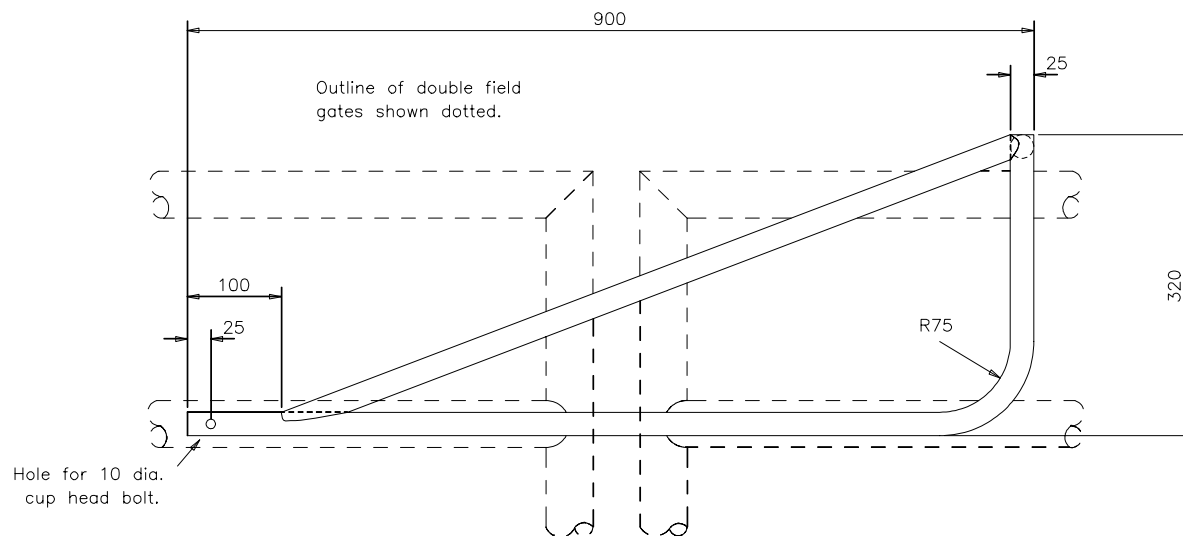
FENCES, STILES &  
GATES

A	DEC 91
Issue	Date

SLIDING BOLT LATCH,  
TYPE B  
FOR STEEL SINGLE FIELD GATES

Drawing No.

H28



- NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
  2. Gate fittings shall comply with BS 3470 and any further requirements in Appendix 1/15 or 3/1.
  3. Steel tubes shall be 25 dia. x 3.25 thick to comply with BS 6323.
  4. The latch shall be galvanized.

HIGHWAY CONSTRUCTION DETAILS

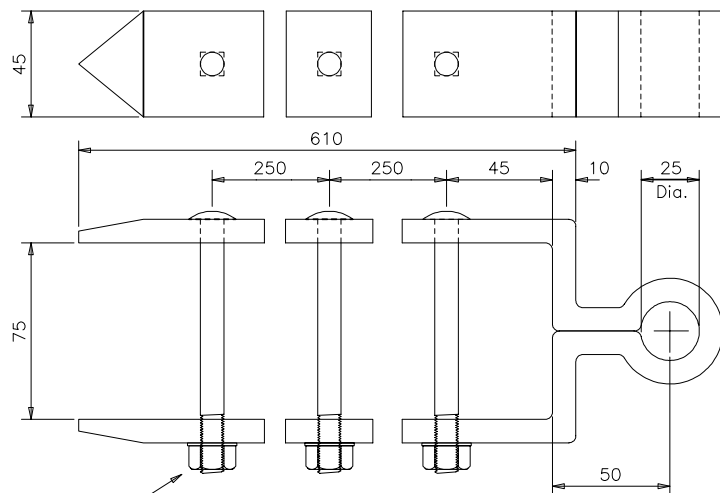
FENCES, STILES &  
GATES

A	DEC 91
Issue	Date

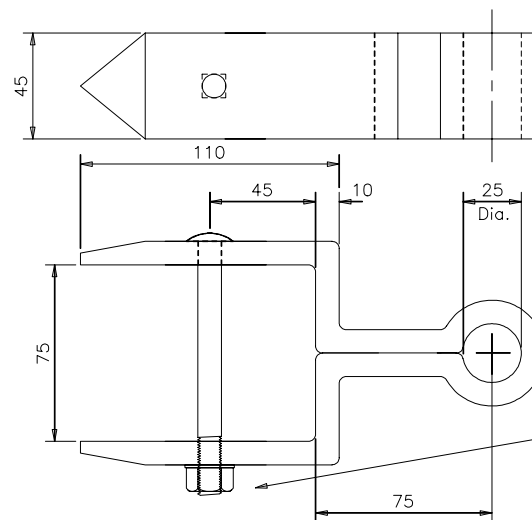
TUBULAR STEEL LATCH  
FOR STEEL  
DOUBLE FIELD GATES

Drawing No.

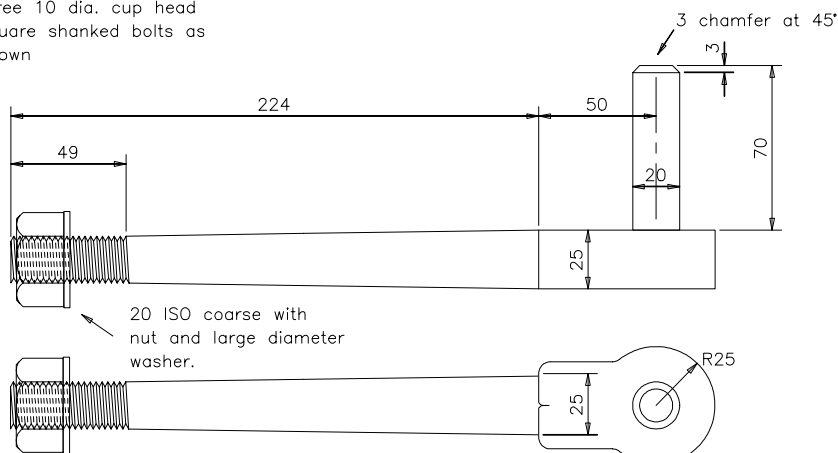
H29



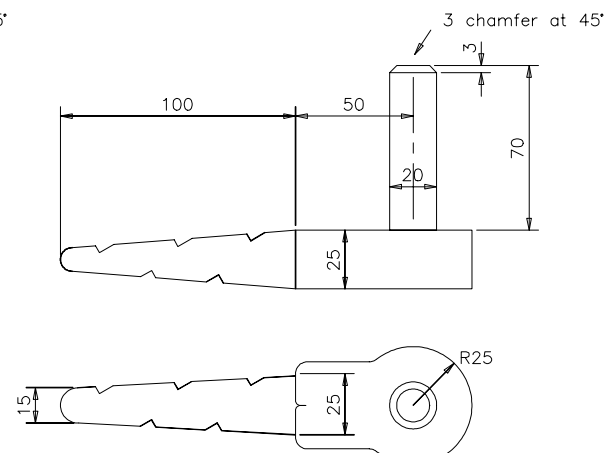
TOP HINGE



BOTTOM HINGE



TOP CROOK



BOTTOM CROOK

- NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
  2. Gate fittings shall comply with BS 3470 or BS 5709 and any other further requirements in Appendix 1/15 or 3/1.
  3. Fittings shall be malleable iron or steel galvanized.

HIGHWAY CONSTRUCTION DETAILS

FENCES, STILES &  
GATES

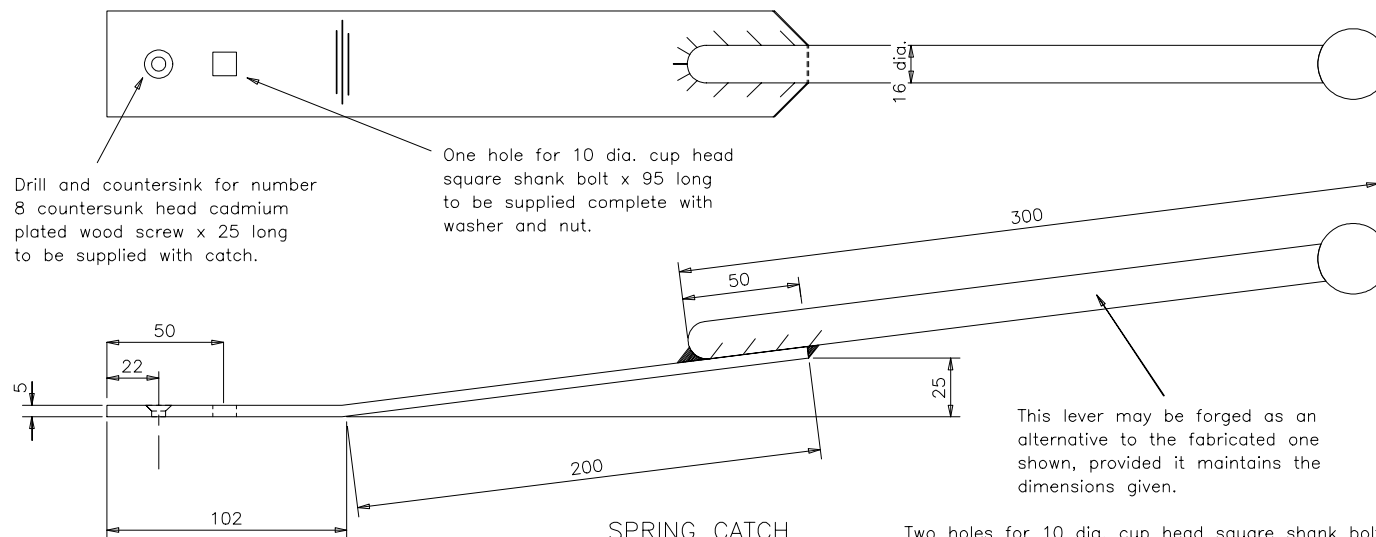
A	DEC 91
Issue	Date

HINGES FOR  
TIMBER FIELD GATES

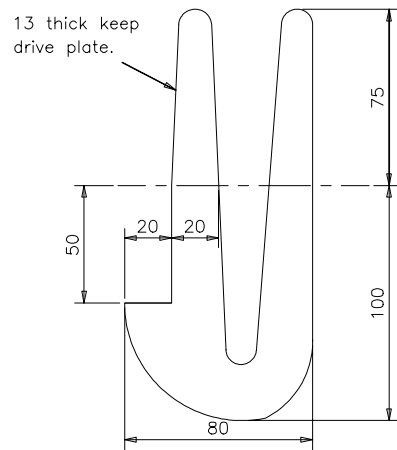
Drawing No.

H30

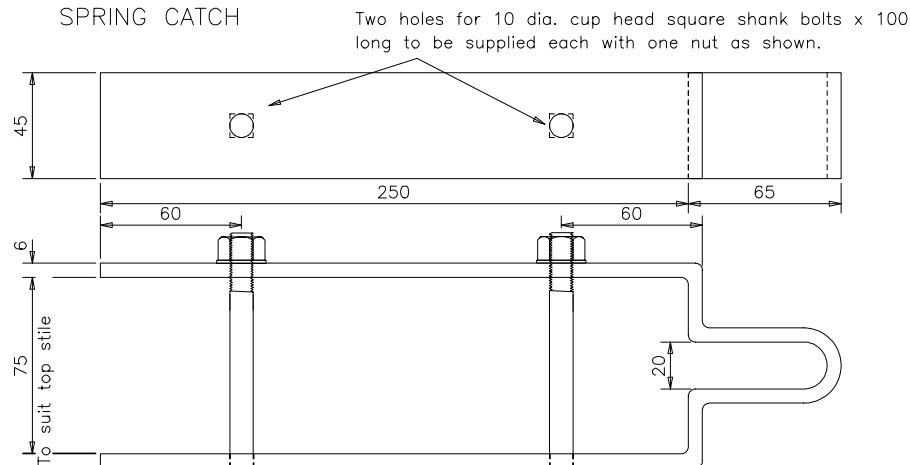




SPRING CATCH



DRIVE CATCH



HEAD STRAP

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. Gate fittings shall comply with BS 3470 or BS 5709 and any other further requirements in Appendix 1/15 or 3/1.
3. Fittings shall be malleable iron or steel with the exception of the spring catch which shall be tempered steel, preset as shown.
4. All ferrous metal shall be galvanized.

HIGHWAY CONSTRUCTION DETAILS

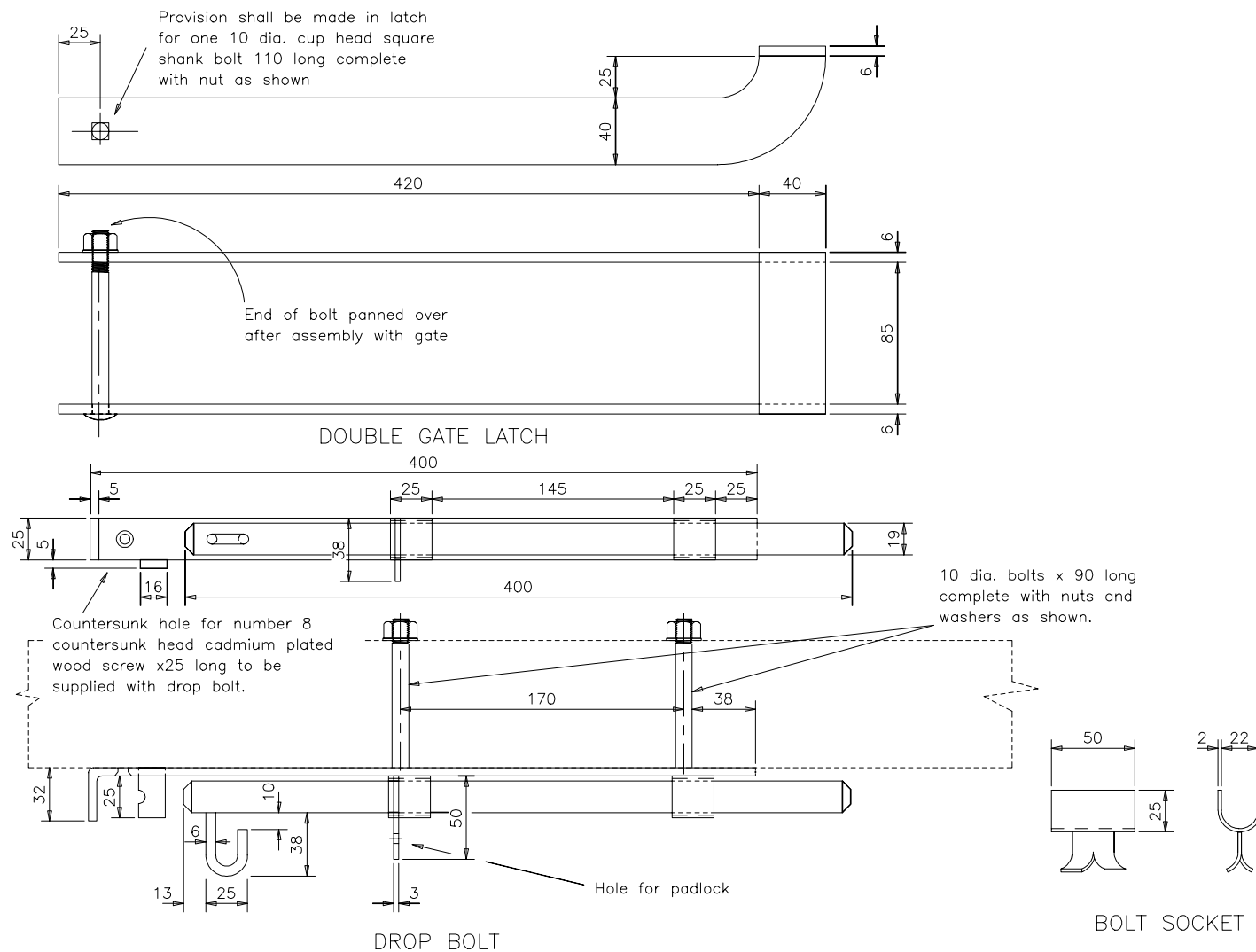
FENCES, STILES &  
GATES

A	DEC 91
Issue	Date

SPRING CATCH FOR TIMBER  
SINGLE FIELD GATES

Drawing No.

H31



- NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
  2. Gate fittings shall comply with BS 3470 or BS 5709 as appropriate and any other further requirements in Appendix 1/15 or 3/1.
  3. All metal fittings and bolts shall be galvanized mild steel

HIGHWAY CONSTRUCTION DETAILS

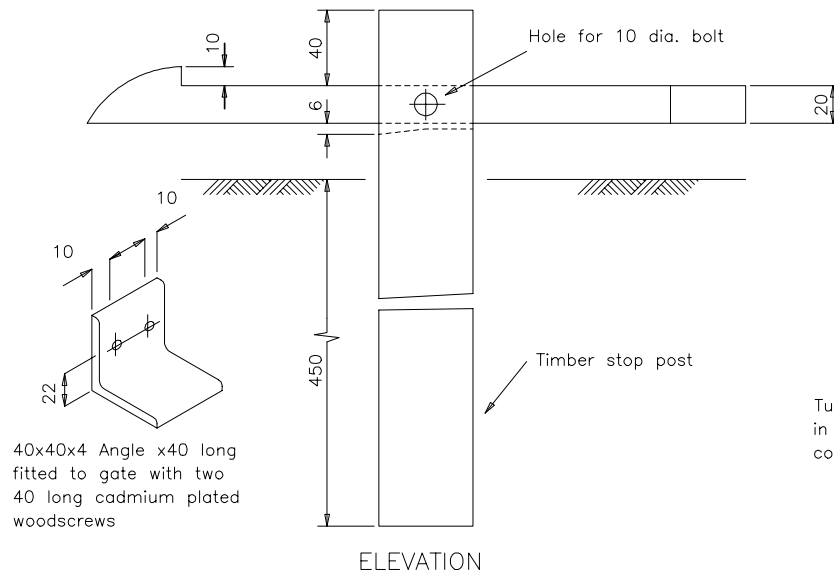
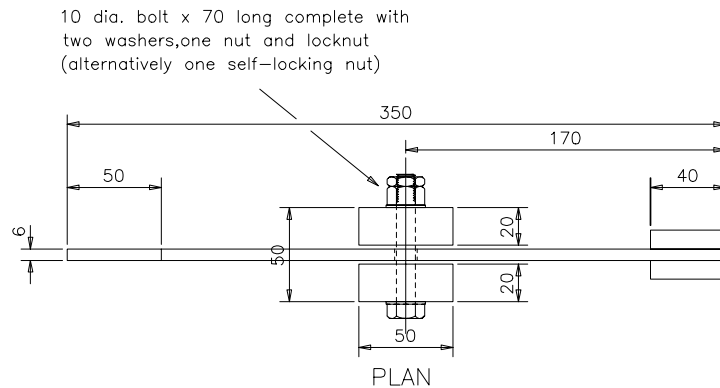
FENCES, STILES &  
GATES

A	DEC 91
Issue	Date

LATCH AND DROP BOLT  
FOR  
TIMBER DOUBLE FIELD GATES

Drawing No.

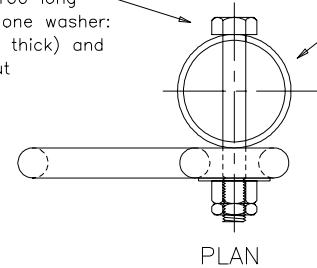
H32



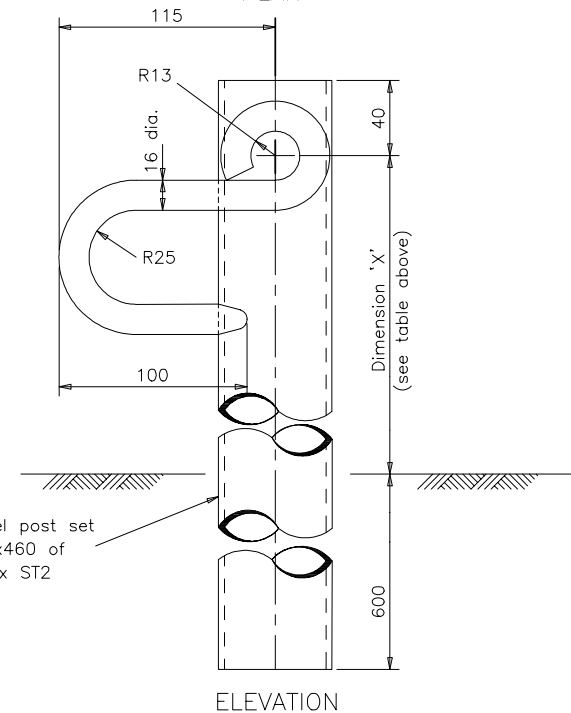
SELF LATCHING STOP POST  
FOR TIMBER GATES

12 dia. bolt x100 long complete with one washer: (38 o/dia x 2 thick) and nut and locknut

60.3 o/dia. tube 3.2 minimum wall thickness.



Dimension 'X'	Suitable for gates on Drawing nos.
500 mm	H17 , H19 , H20
635 mm	H18



HOLDING BACK STOP POST  
FOR STEEL GATES

- NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
  2. Gate fittings shall comply with BS 3470 or BS 5709 as appropriate, and any other further requirements in Appendix 1/15 or 3/1.
  3. All metal fittings and bolts shall be galvanized steel.

HIGHWAY CONSTRUCTION DETAILS

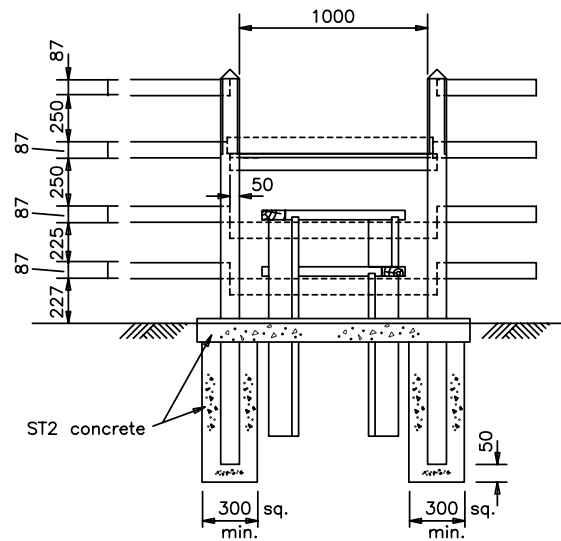
FENCES, STILES &  
GATES

A	DEC 91
Issue	Date

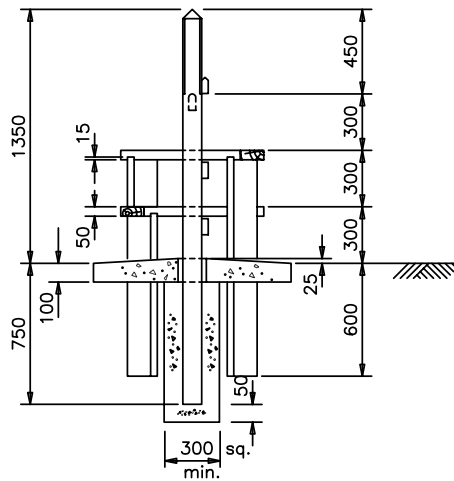
STANDARD GATE STOPS

Drawing No.

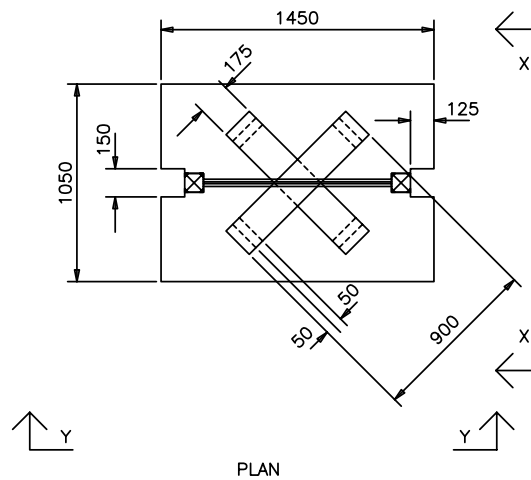
H33



SECTION Y-Y



SECTION X-X



PLAN

DESCRIPTION OF TIMBER MATERIALS	SECTION SIZE
Posts top doubled chamfered	100x100
Crosshead wrought.Top edge double chamfered	87x38 minimum
Steps	175x50
Supports Secured by two 100 long x 4 galvanized round wire nails skew driven	175x50

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. All timber shall be in accordance with the appropriate Clauses in Series 300 and any other requirements in Appendix 1/15 and 3/1 and BS 5709.
3. All steelwork shall be galvanized to comply with BS EN ISO 1461
4. Stile posts shall be set in line of fence.

HIGHWAY CONSTRUCTION DETAILS

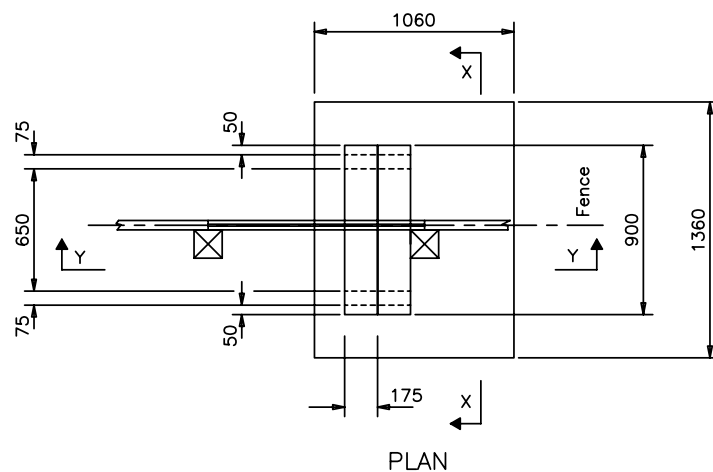
FENCES, STILES &  
GATES

D	MAY 04
C	MAY 93
B	AUG 93
A	DEC 91
Issue	Date

TIMBER STILE – TYPE 1

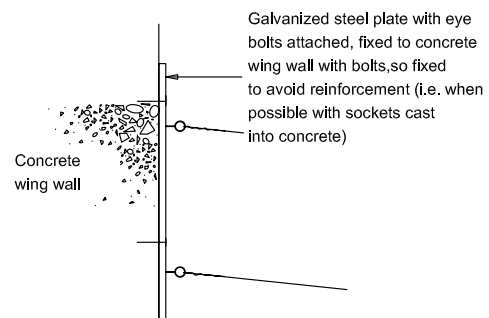
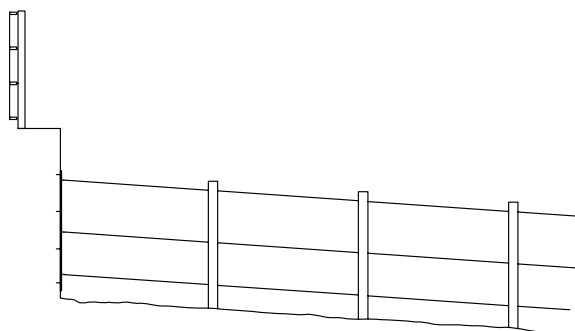
Drawing No.

H34

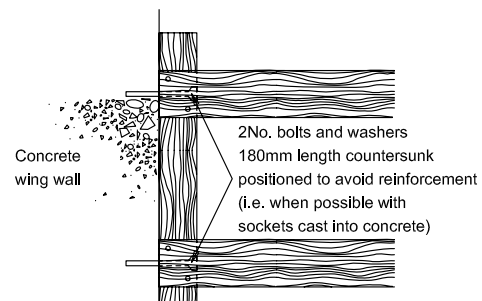
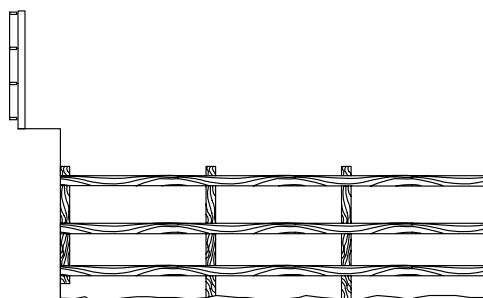


### NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. All timber shall be in accordance with the appropriate clauses in Series 300 and any further requirements in Appendix 3/1 or 1/15 and BS 5709.
3. All steelwork shall be galvanized to comply with BS EN ISO 1461.



WING WALL TO POST AND WIRE FENCE



WING WALL TO POST AND RAIL FENCE

Note: See also TD 19 (DMRB 2.2.8) for guidance relating to pedestrian restraint and protection at head walls, wing walls and retaining walls.

HIGHWAY CONSTRUCTION DETAILS	FENCES, STILES & GATES	B	NOV 06	DIAGRAMMATIC METHODS OF ATTACHING FENCING TO STRUCTURES	Drawing No.
		A	DEC 91		H36
		Issue	Date		

# 1 Knots (live)

Edge knot



Acceptable  
If  $x$  is less than  $2b/3$

Splay knot



Acceptable  
If  $x$  is less than  $2b/3$

Arris knot



Acceptable  
If  $x + y/3$  is less than  $d/3$

Face knot



Acceptable if the largest dimension of  $x$  or  $y$  is less than  $d/2$  and knot is contained within the middle half of face.

Margin knot



Acceptable  
If knot of type  $x_1$  occurs and  $x_1$  is less than  $d/3$

Acceptable  
If knot of type  $x_2$  occurs and  $x_2$  is less than  $d/3$

Acceptable  
If both types occur together as illustrated and if  $x_1 + x_2$  is less than  $d/3$

Knots showing both on the edge and within the outer quarter of the face



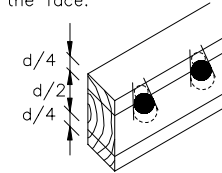
Consider as margin knot. Acceptable if maximum dimension of knot appearing on face is less than  $d/3$

Shallow knots on heart side.



Acceptable

Face knots other than those contained within the middle half of the face.



Acceptable  
If maximum dimension of knot is less than  $d/3$

Knot cluster

Knots overlapping when viewed on section



Consider as one knot. Acceptable if overall dimension  $x$  is less than  $d/2$

Groups of knots  
No overlapping of knot when viewed on section



Consider separately providing grain recovery between knots. Otherwise treat as knot cluster.

HIGHWAY CONSTRUCTION DETAILS

FENCES, STILES &  
GATES

A DEC 91  
Issue Date

RULES FOR THE SELECTION OF NON  
STRUCTURAL TIMBER FOR USE  
IN ENVIRONMENTAL BARRIERS—SHEET 1

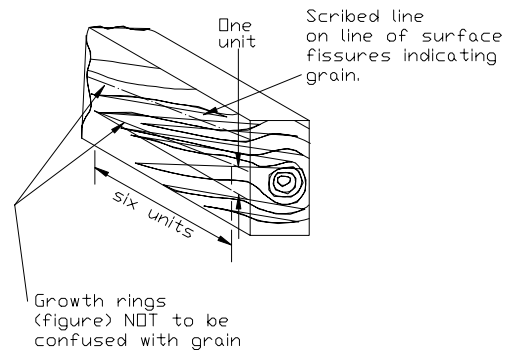
Drawing No.

H37

## 2 Knots (dead)

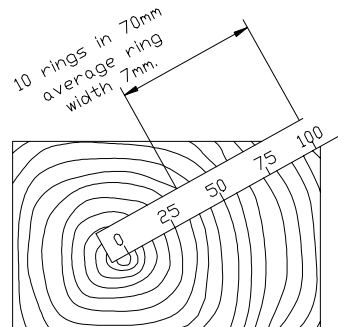
A knot whose fibres are intergrown with those of the surrounding wood to an extent of less than 1/4 of the cross sectional area

Acceptable  
If the largest diameter is less than 20mm.



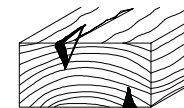
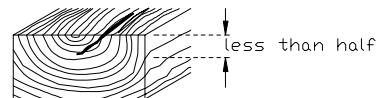
Acceptable if less than 1:6 excluding local deviations and grain swirling about knots.

## 4 Rate of Growth



Acceptable if average ring width is not greater than 10mm

## 5 Checks



Treat together

Treat separately

Checks on opposing surfaces.  
Acceptable if less than 1/2 penetration

## 6 Wormholes

Acceptable if scattered wormholes are less than 4mm diameter.

## 7 Stain

Evidence of black or blue discolouration is acceptable.

## 8 Mechanical Damage

Not acceptable.

## 9 Rot

Any evidence of brown or white discolouration which when probed appears softer or weaker than the surrounding timber is not acceptable

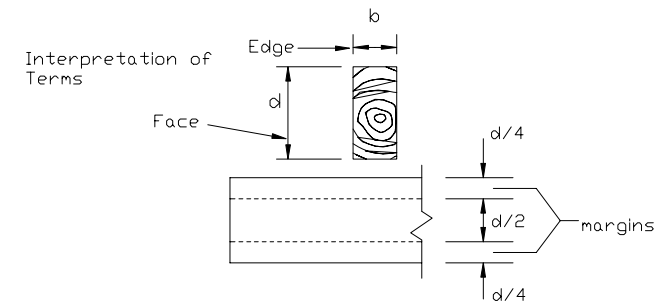
(N.B. Pith is not to be considered a defect under this rule.)

## 10 Distortion

Excessive distortion which would render the piece incapable of meeting the tolerances required by the design or end product is not acceptable.

## 11 Wane

Not acceptable.



HIGHWAY CONSTRUCTION DETAILS

FENCES, STILES &  
GATES

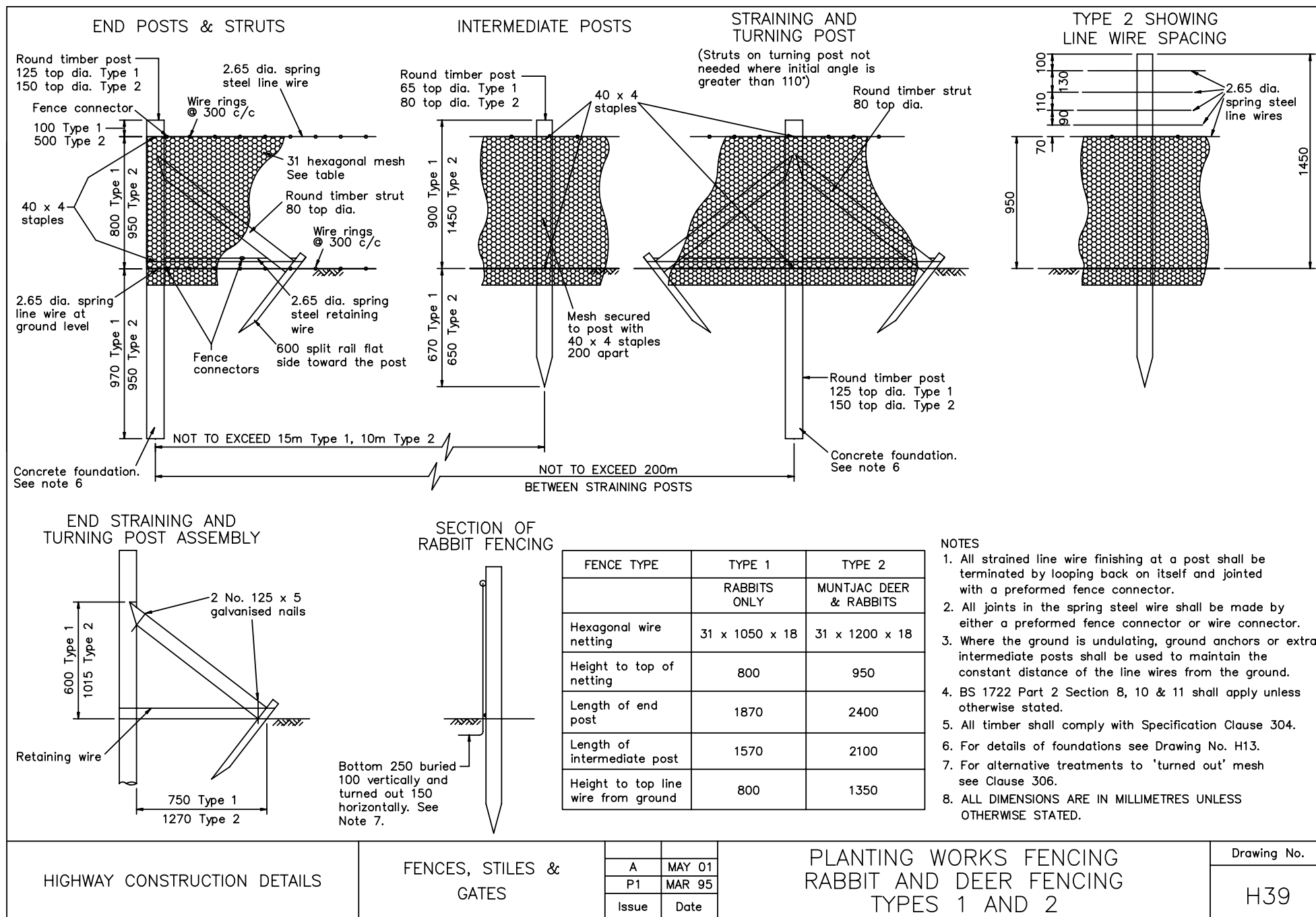
B	MAR 98
A	DEC 91
Issue	Date

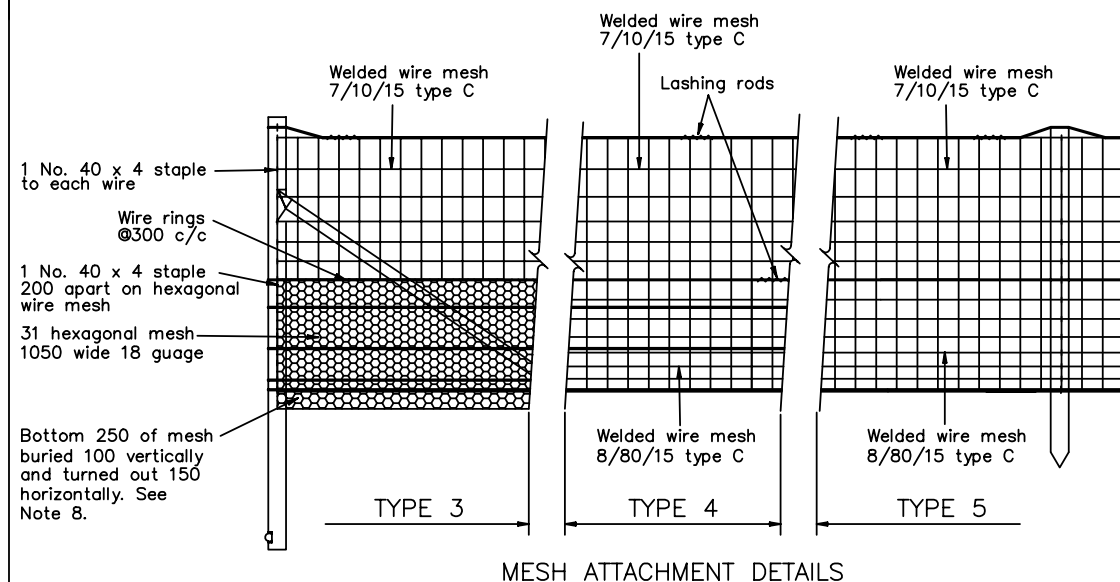
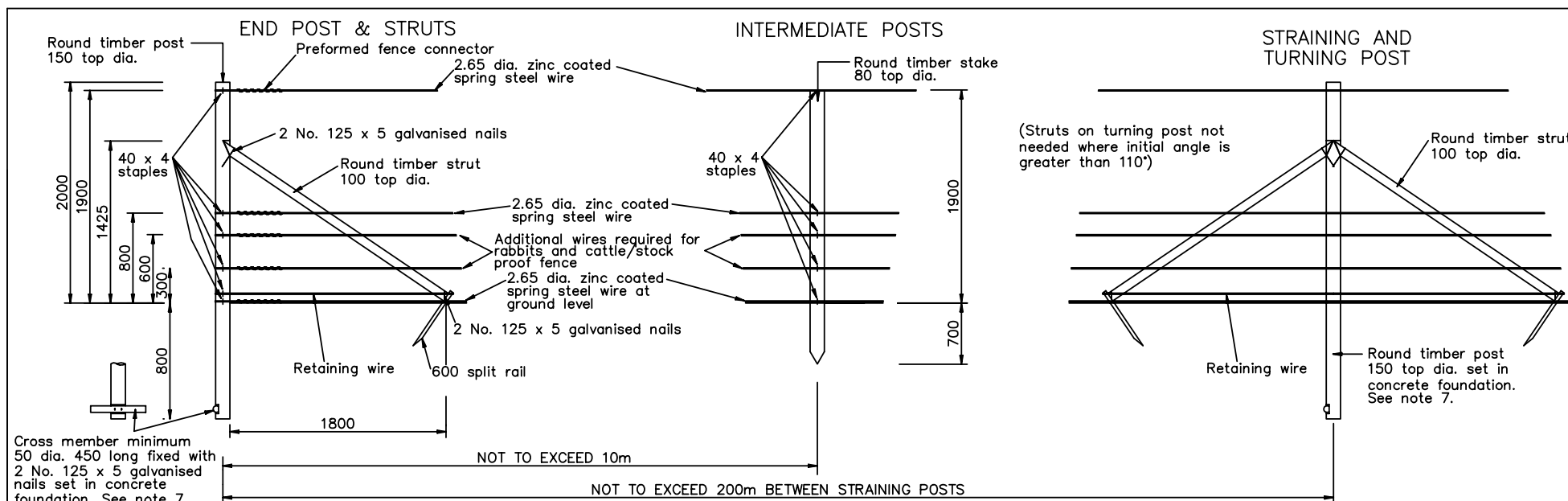
RULES FOR THE SELECTION OF NON  
STRUCTURAL TIMBER FOR USE  
IN ENVIRONMENTAL BARRIERS-SHEET 2

Drawing No.

H38





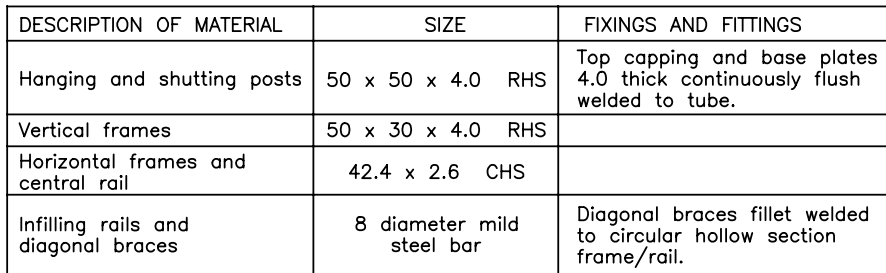


FENCE TYPE	SPECIES
TYPE 3	DEER & RABBITS
TYPE 4	DEER & CATTLE/OTHER STOCK
TYPE 5	DEER ONLY

#### NOTES

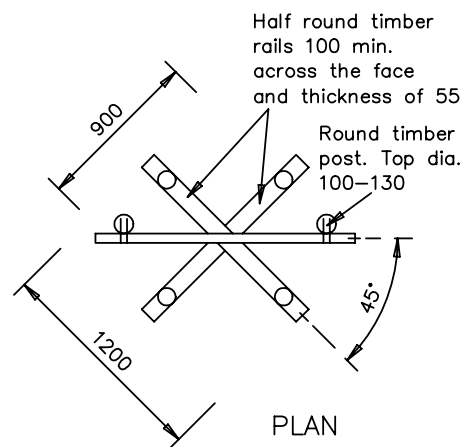
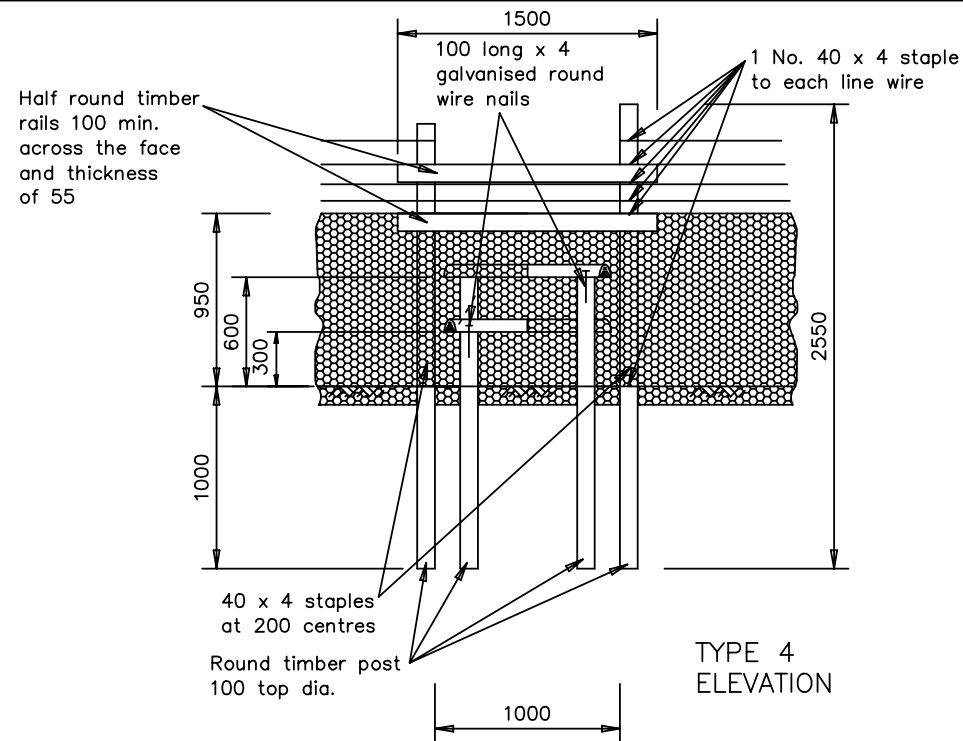
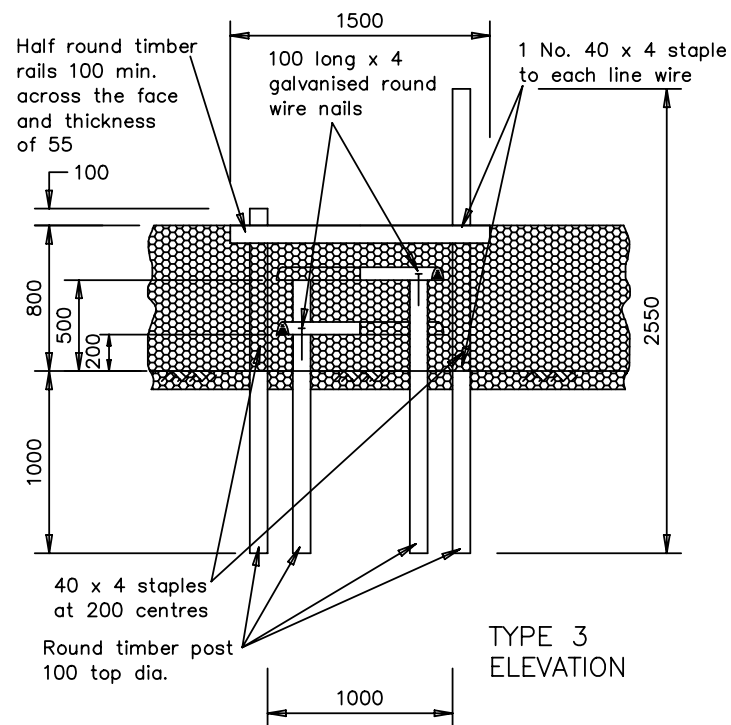
1. All strained line wire finishing at a post shall be terminated by looping back on itself and jointed with a preformed fence connector.
2. All joints in the spring steel wire shall be made by either a preformed fence connector or wire connector.
3. Where the ground is undulating, ground anchors or extra intermediate posts shall be used to maintain the constant distance of the line wires from the ground.
4. BS 1722 Part 2 Sections 8, 10 & 11 shall apply unless otherwise stated.
5. Wire mesh detailed separately for clarity.
6. All timber shall comply with Specification Clause 304.
7. For details of foundations see Drawing No. H13.
8. For alternative treatments to 'turned out' mesh see Clause 306.
9. Deer species are: Roe, Red, Fallow or Sika.
10. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.

HIGHWAY CONSTRUCTION DETAILS	FENCES, STILES & GATES	A	MAY 01	PLANTING WORKS FENCING RABBIT AND DEER FENCING TYPES 3, 4 AND 5	Drawing No.
		P1	MAR 95		
		Issue	Date		H40



1. Gates shall comply with the appropriate Clauses in the 300 Series and any additional requirements in Appendix 3/1.
2. Gates shall be set in line of the fence as shown.
3. All gate fittings shall be galvanised steel.
4. Mesh and netting shall be fixed in accordance with the appropriate HCD drawing.
5. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.

HIGHWAY CONSTRUCTION DETAILS	FENCES, STILES & GATES			PLANTING WORKS FENCING GATE	Drawing No.
		A	MAY 01		H41
		P1	MAR 95		
		Issue	Date		



- ## NOTES

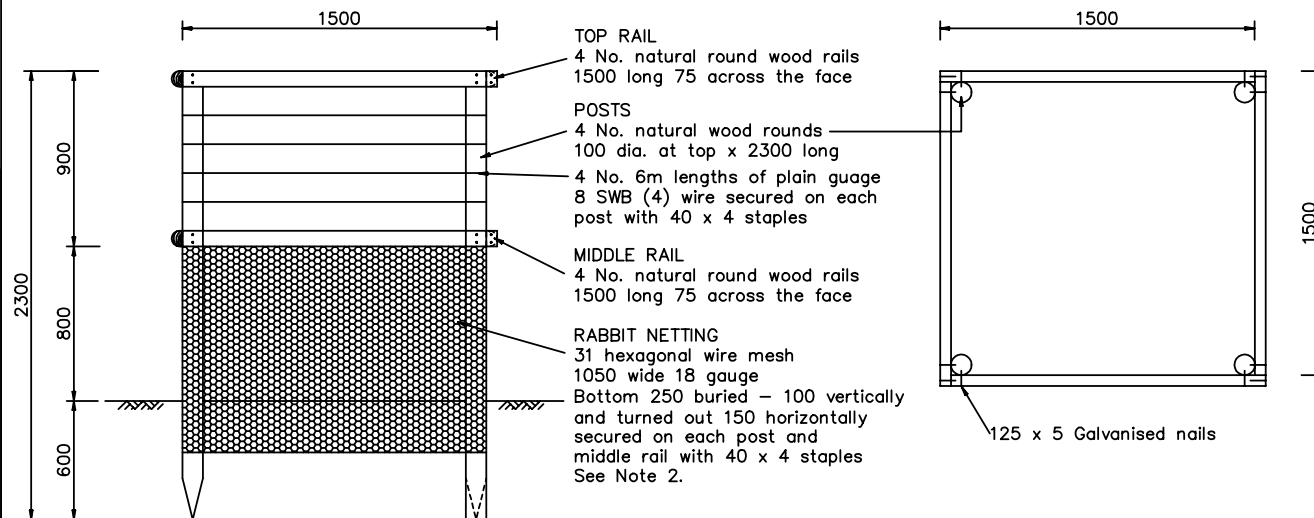
1. All timber shall be in accordance with the appropriate clauses in the Specification.
2. Stile posts shall be set in the line of the fence.
3. Stile posts may be used to substitute an intermediate post in the fence.
4. Fence mesh and netting shall be fixed in accordance with the appropriate HCD drawing.
5. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.

HIGHWAY CONSTRUCTION DETAILS	FENCES, STILES & GATES			PLANTING WORKS FENCING STILE TYPES 3 AND 4	Drawing No.
		A	MAY 01		H42
		P1	MAR 95		
		Issue	Date		

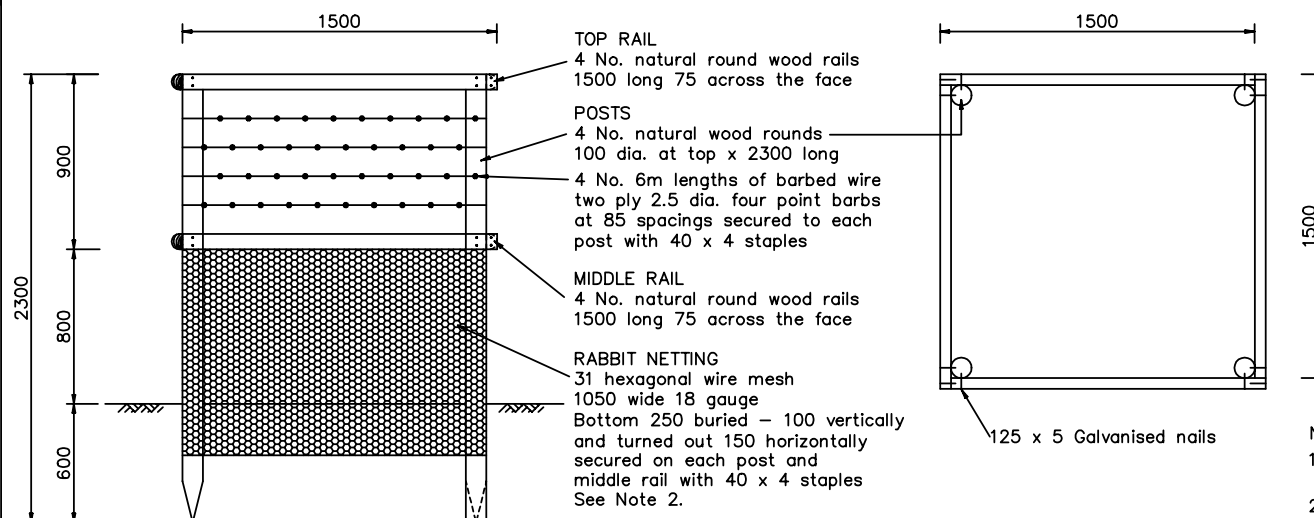
HIGHWAY CONSTRUCTION DETAILS	FENCES, STILES & GATES			PLANTING WORKS FENCING STILE TYPES 3 AND 4	Drawing No.
		A	MAY 01		H42
		P1	MAR 95		
		Issue	Date		

HIGHWAY CONSTRUCTION DETAILS	FENCES, STILES & GATES			PLANTING WORKS FENCING STILE TYPES 3 AND 4	Drawing No.
		A	MAY 01		H42
		P1	MAR 95		
		Issue	Date		

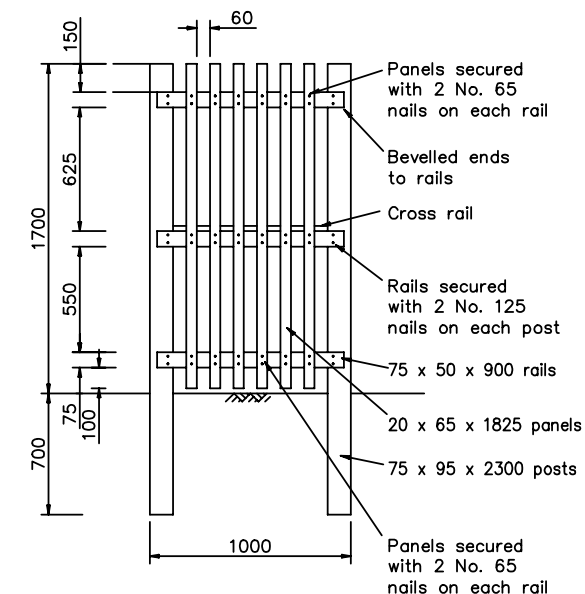
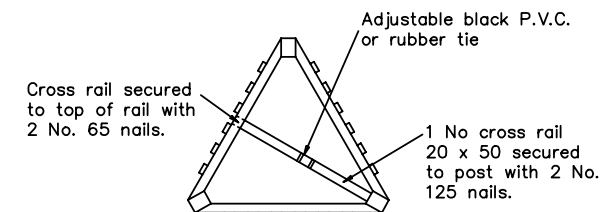
HIGHWAY CONSTRUCTION DETAILS	FENCES, STILES & GATES			PLANTING WORKS FENCING STILE TYPES 3 AND 4	Drawing No.
		A	MAY 01		H42
		P1	MAR 95		
		Issue	Date		



TYPE 1



TYPE 2



TYPE 3

NOTES

1. All timber shall be in accordance with the appropriate Series 300 Clauses in the Specification.
2. For alternative treatments to 'turned out' mesh see Clause 306.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.

HIGHWAY CONSTRUCTION DETAILS

FENCES, STILES &  
GATES

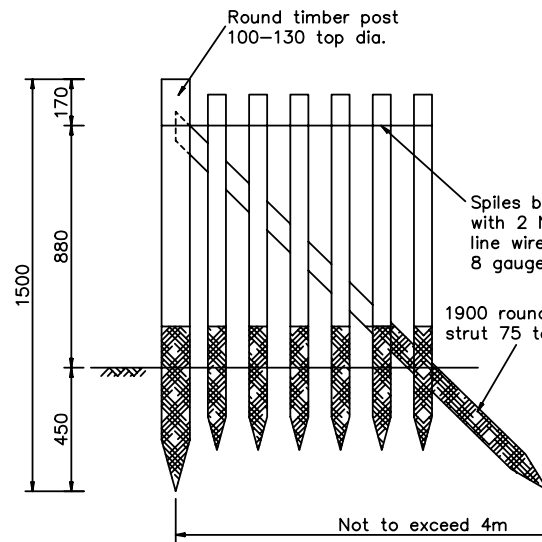
A	MAY 01
P1	MAR 95
Issue	Date

PLANTING WORKS FENCING  
FENCED TREE GUARDS  
TYPES 1, 2 AND 3

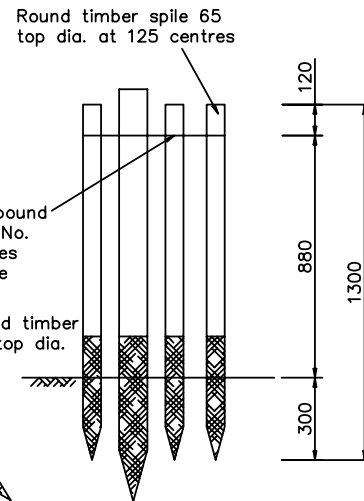
Drawing No.

H43

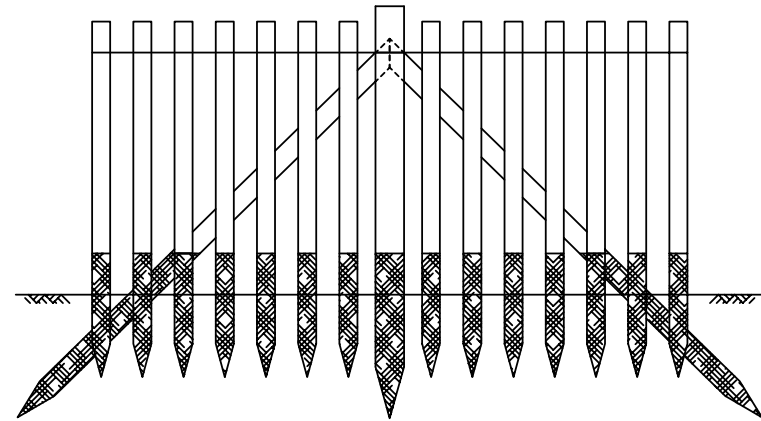
END POSTS & STRUTS



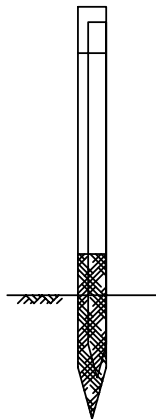
INTERMEDIATE STAKES



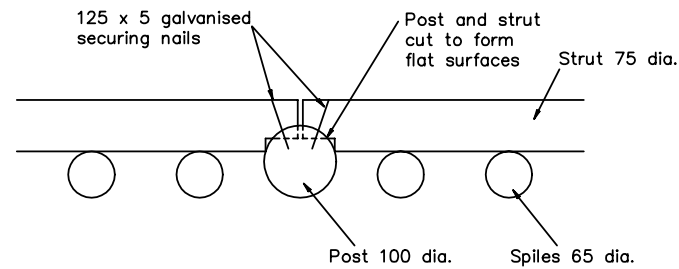
STRAINING AND TURNING POST



SECTION



FIXING DETAIL



NOTES

1. The bottom 450 of spiles, the bottom 600 of posts and the bottom 850 of struts shall be coated with a cold applied black bitumen material complying with the requirements of BS 3416.
2. Straining and turning posts shall be erected at corners and changes of direction.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.

HIGHWAY CONSTRUCTION DETAILS

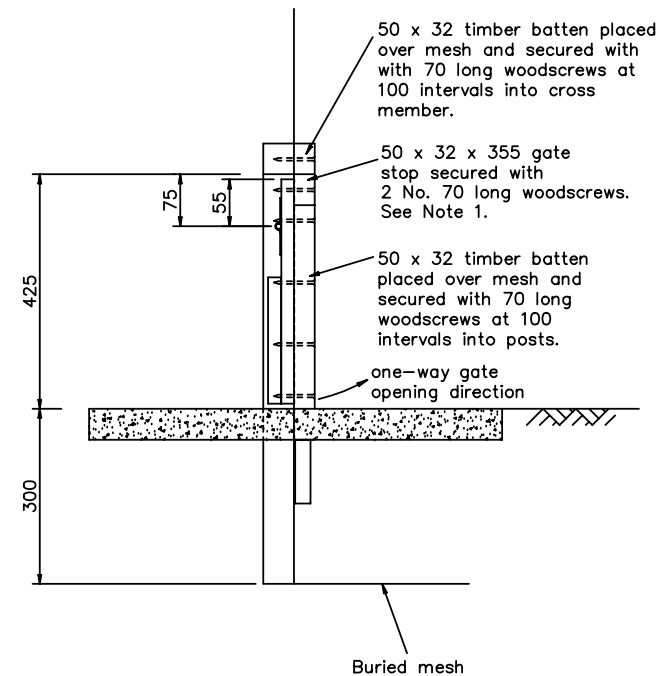
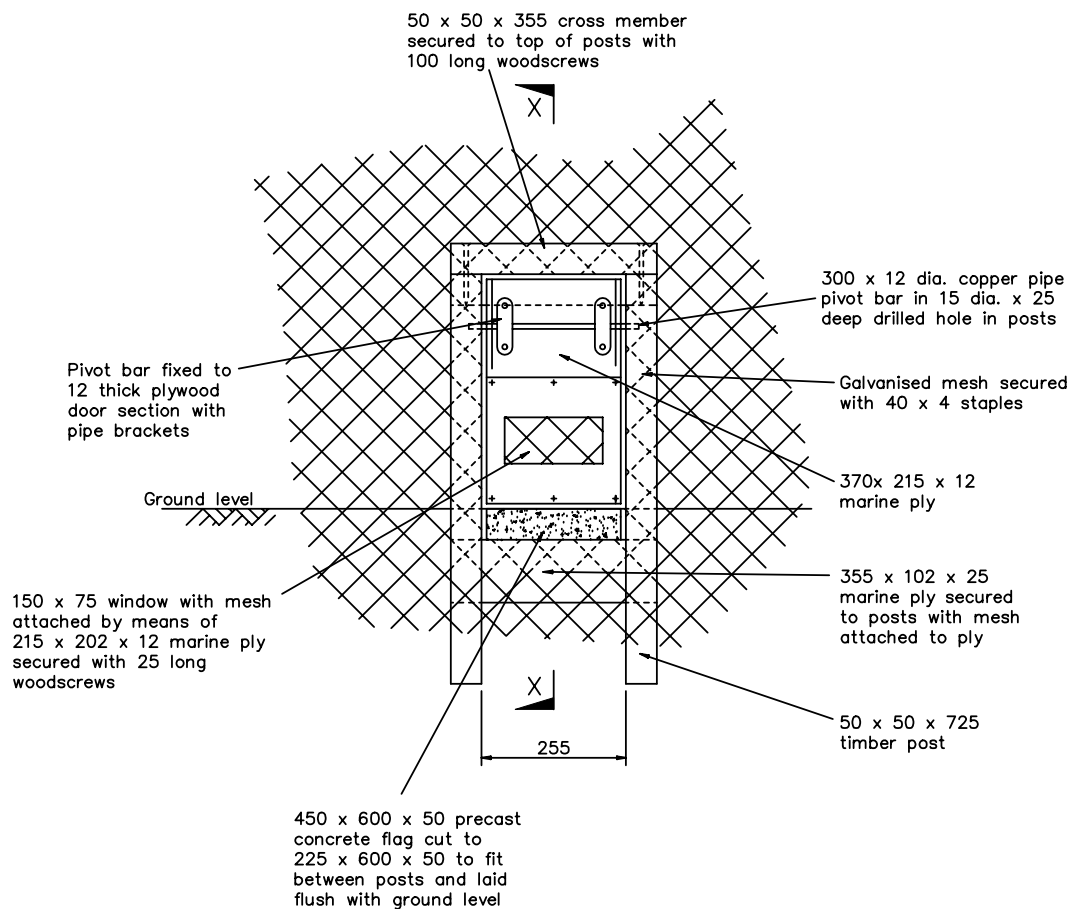
FENCES, STILES &  
GATES

A	MAY 01
P1	MAR 95
Issue	Date

PLANTING WORKS FENCING  
URBAN AREA FENCING

Drawing No.

H44



SECTION X-X

NOTES

1. Gate stop shall be omitted where two-way access gate is specified in Appendix 3/1.
2. All woodscrews to be galvanised or similarly treated to prevent rust.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.

HIGHWAY CONSTRUCTION DETAILS

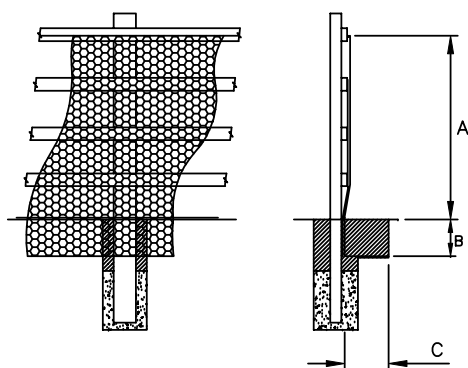
FENCES, STILES &  
GATES

A	MAY 01
P1	MAR 95
Issue	Date

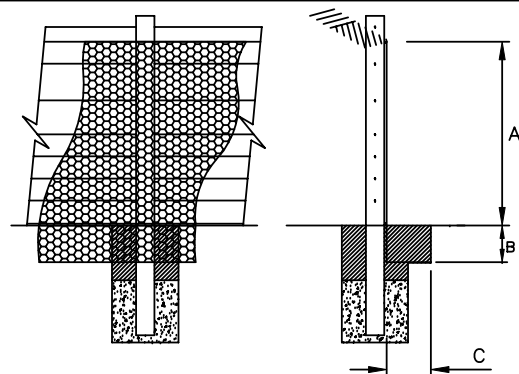
BADGER GATE

Drawing No.

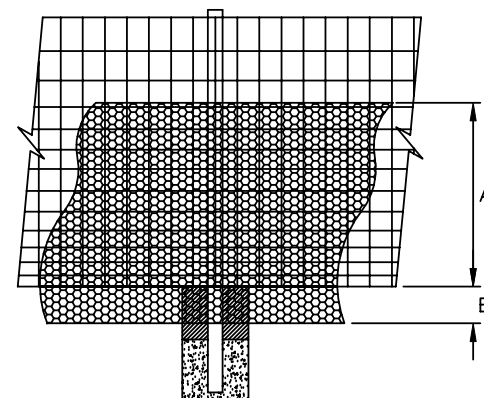
H45



ATTACHMENT OF MESH  
TO WOODEN POST AND 4/5 RAIL FENCE



ATTACHMENT OF MESH TO  
A STRAINED WIRE FENCE

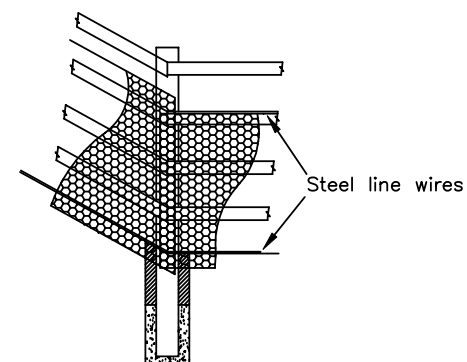


ATTACHMENT OF MESH TO A  
RECTANGULAR WIRE MESH FENCE

	WIRE MESH	DIMENSION A	DIMENSION B	DIMENSION C	LINE WIRES See Note 6
Type 1 - Rabbit	Hexagonal steel wire netting to BS EN 10223-2 Classification 31 x 1050 x 18	800	100	150	2 No.
Type 2 - Muntjac Deer (+ Rabbit)	Hexagonal steel wire netting to BS EN 10223-2 Classification 31 x 1200 x 18	950	100	150	2 No.
Type 3 - Badger See Note 3	Steel wire woven hinged joint fencing to BS EN 10223-5 Classification H2. 160/15/8. See Note 4	1000	300	300	0
	Steel wire chain link fencing to BS EN 10223-6 Zinc/zinc alloy and black organic coating 50 mesh x 2.5/3.55 gauge, 1800 height	1250	250	300	2 No.
Type 4 - Badger & Rabbit See Note 3	Hexagonal steel wire netting to BS EN 10223-2 Classification 31 x 1200 x18 AND	950	250	0	0
	Steel wire woven hinged joint fencing to BS EN 10223-5 Classification H2. 160/15/8. See Notes 4 & 5	1000	300	300	0
	Hexagonal steel wire netting to BS EN 10223-2 Classification 31 x 1200 x18 AND Steel wire chain link fencing to BS EN 10223-6 Zinc/zinc alloy and black organic coating 50 mesh x 2.5/3.55 gauge, 1800 height. See Note 5	1250	250	300	2 No.

#### NOTES

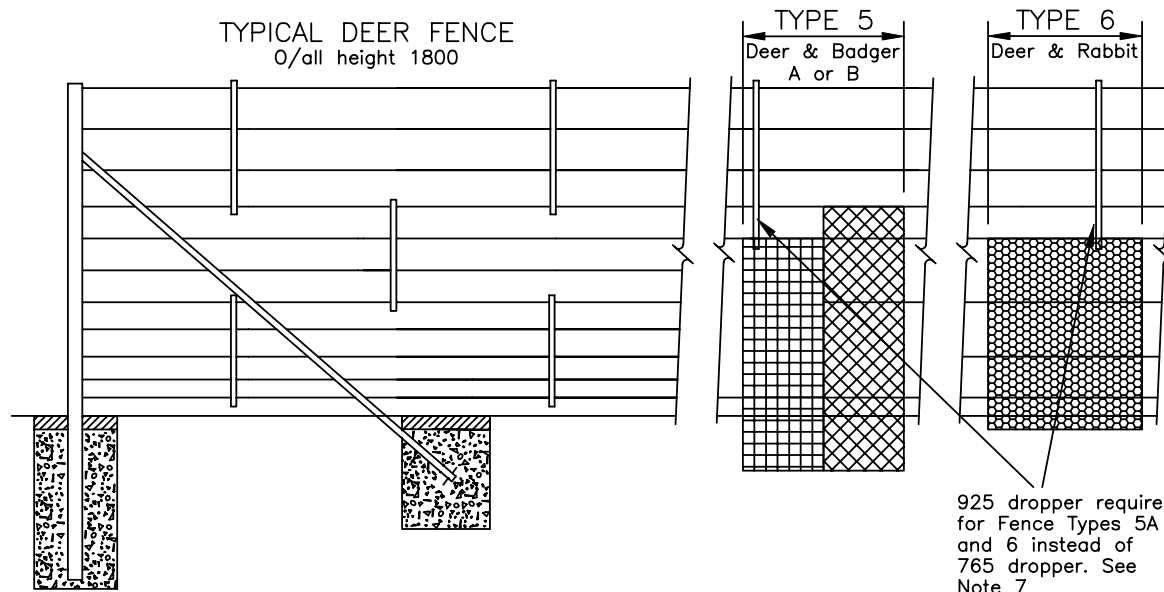
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. Fencing Types 1, 3 and 4 apply to new fencing and to the attachment of wire mesh (and additional line wires) where the existing fence height is greater than Dimension A. Fencing Type 6 is required instead of Type 2 if the existing fence height is less than 1350.
3. Two alternatives are given for this type.
4. Alternatives within height range 1580 to 1700 are acceptable, but horizontal spacing of vertical stay wires must not exceed 100.
5. Where two layers of wire mesh are required, dimensions A, B & C are given in order inner/outer mesh.
6. Hexagonal mesh and chain link fencing attached to additional line wires at top of mesh and at ground level.
7. BS 1722:Part 2 shall apply unless otherwise stated. Wire mesh to be attached to fence with a minimum of 16 No. anchorages per square metre of mesh.



MESH TO BE JOINED AND  
SECURED TO POSTS AS  
REQUIRED BY PROFILE  
OF FENCING

HIGHWAY CONSTRUCTION DETAILS	FENCES, STILES & GATES	A	MAY 01	ATTACHMENT OF WIRE MESH TO FENCING (SHEET 1 OF 3)	Drawing No.
		P1	MAR 95		H46
		Issue	Date		





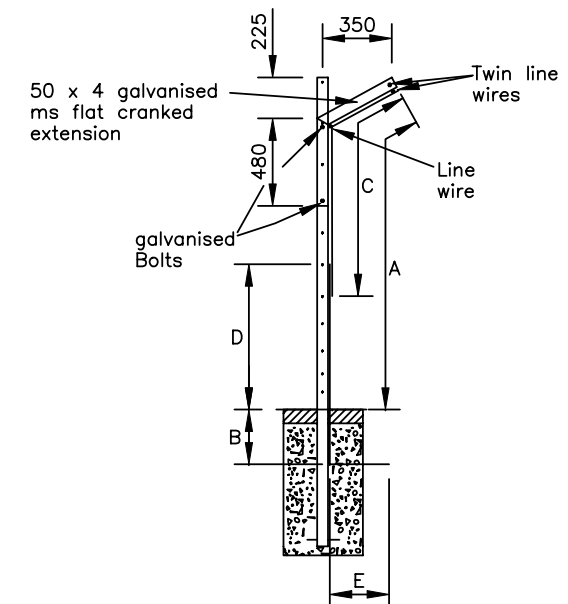
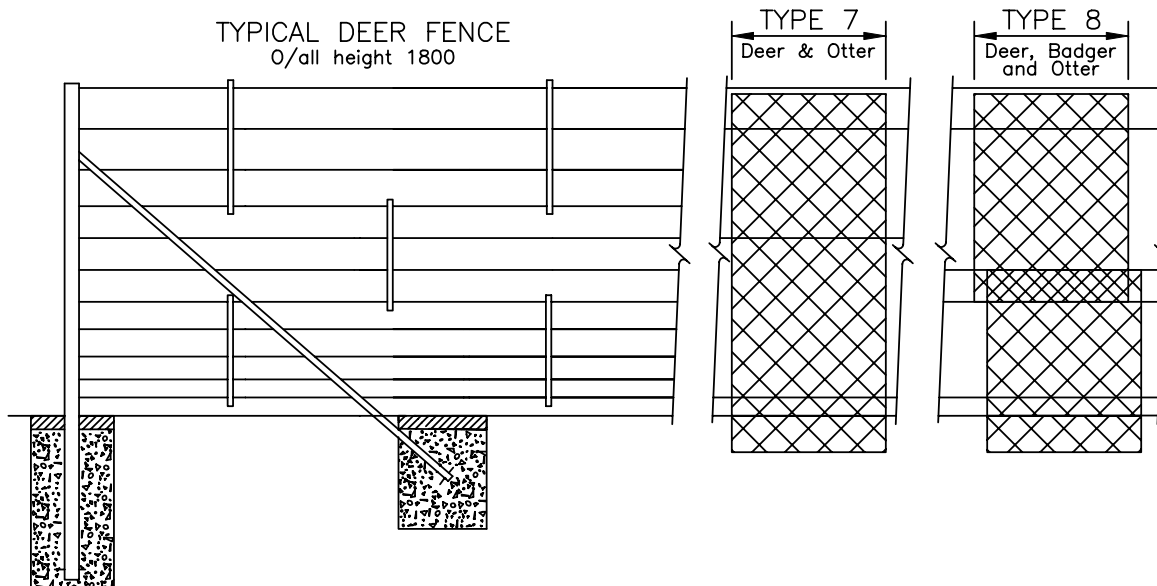
ATTACHMENT OF MESH  
TYPES 5 & 6

#### NOTES

1. Specification Clause 306 applies unless otherwise stated in Appendix 3/1 or 1/15.
2. Details of general arrangements shall be in accordance with Drawing Nos. H8, H9 & H10.
3. When a fence forms a boundary between a highway and private property the wire mesh shall be fixed on the private property side unless otherwise described in Appendix 3/1 or 1/15.
4. Plastic coating shall comply with Specification Clauses 2604 and 2605. Plastic coated material will not be acceptable where damage has occurred to the coating before or during erection unless the Overseeing Organisation agrees that minor defects can be sprayed with a plastic paint within 24 hours of erection.
5. Two alternatives are given for Type 5 fence.
6. Alternatives within height range 1580 to 1700 are acceptable, but horizontal spacing of vertical stay wires must not exceed 100. Dimension C to be adjusted accordingly.
7. Where wire mesh is attached at time of erection of high tensile strained wire fencing, some wires may be omitted as shown and longer droppers incorporated where necessary.
8. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.

FENCE TYPE	WIRE MESH	DIM A	DIM B	DIM C
Type 5 – Deer & Badger See Note 5	Steel wire woven hinged joint fencing to BS EN 10223–5 classification H2. 160/15/8. see Note 6.	975	300	325
	Steel wire chain link fencing to BS EN 10223–6 zinc/zinc alloy and black organic coating 50 mesh x 2.5/3.55 gauge, 1800 height.	1150	300	350
Type 6 – Deer & Rabbit	Hexagonal steel wire netting to BS EN 10223–2 classification 31 x 1200 x18	975	75	150

HIGHWAY CONSTRUCTION DETAILS	FENCES, STILES & GATES			ATTACHMENT OF WIRE MESH TO FENCING (SHEET 2 OF 3)	Drawing No.
		A	MAY 01		H47
		Issue	Date		



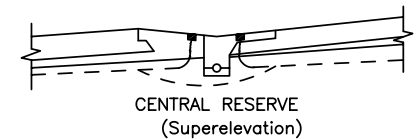
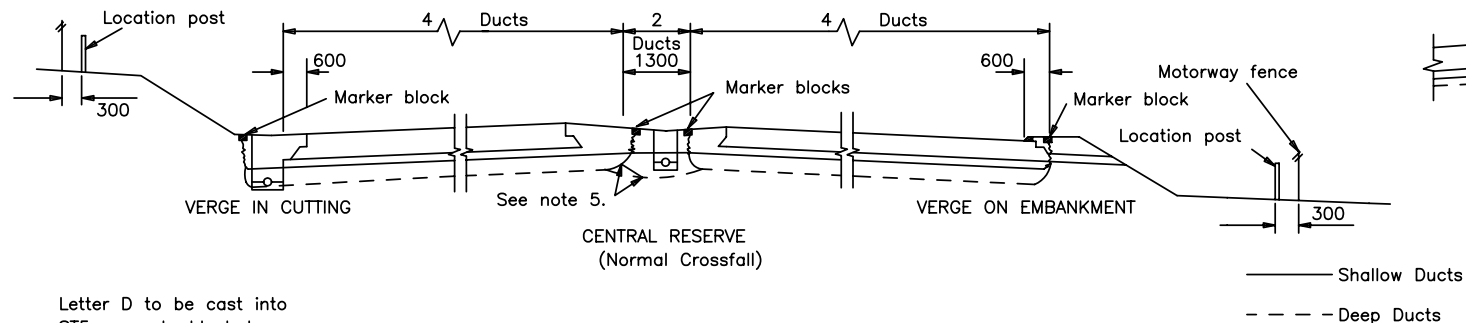
ATTACHMENT OF MESH  
TYPES 7 & 8

	WIRE MESH	DIM A	DIM B	DIM C	DIM D	DIM E
Type 7 – Deer & Otter	Steel wire chain link fencing to BS EN 10223-6 zinc/zinc alloy and black organic coating 50 mesh x 2.5/3.55 gauge, 2150 height.	1950	200	–	–	–
Type 8 – Deer, Badger & Otter	Steel wire chain link fencing to BS EN 10223-6 zinc/zinc alloy and black organic coating 50 mesh x 2.5/3.55 gauge, 1400 height x 2 No.	–	300	1400	800	300

#### NOTES

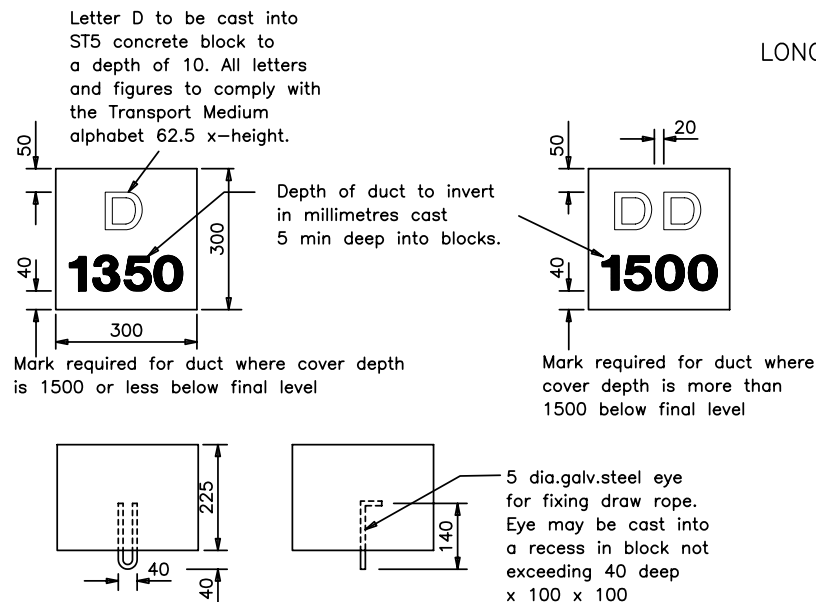
1. Specification Clause 306 applies unless otherwise stated in Appendix 3/1 or 1/15.
2. Details of general arrangements shall be in accordance with Drawing Nos. H8, H9 & H10.
3. When a fence forms a boundary between a highway and private property the wire mesh shall be fixed on the private property side unless otherwise described in Appendix 3/1 or 1/15.
4. Plastic coating shall comply with Specification Clauses 2604 and 2605. Plastic coated material will not be acceptable where damage has occurred to the coating before or during erection unless the Overseeing Organisation agrees that minor defects can be sprayed with a plastic paint within 24 hours of erection.
5. Where wire mesh is attached at time of erection of high tensile strained wire fencing, droppers and some line wires may be omitted as shown.
6. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.

HIGHWAY CONSTRUCTION DETAILS	FENCES, STILES & GATES			ATTACHMENT OF WIRE MESH TO FENCING (SHEET 3 OF 3)	Drawing No.
		A	MAY 01		H48
		Issue	Date		



- NOTES**
1. ALL DIMENSIONS ARE IN MILLIMETRES.
  2. Ducts to be a minimum of 90mm nominal diameter.
  3. For details of location of ducts see the layout plans.
  4. For details of the permitted forms of construction for ducts see Drawing No. I2.
  5. Ducts are to be laid straight except when they have to curve around obstacles and at the end of ducts. No change of direction to be greater than 1 in 30. The mandrel shown on Drawing No. I2 shall be drawn through the completed duct.
  6. All ducts shall extend a minimum of 500mm beyond the pavement construction and where possible the drainage pipes.
  7. Ducts and markers shall not be sited under safety fence posts.
  8. Where descibed in Appendix 5/2, 14/4 or 15/1 marker block terminals shall be replaced with duct chambers.
  9. For motorway communications cable ducts, see HCD Drawing Number MCX 0814.

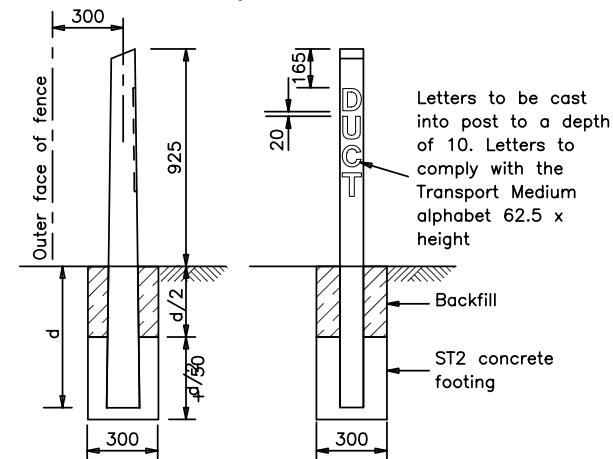
### LONGITUDINAL SECTIONS



### DETAIL OF MARKER BLOCK

To be positioned over duct in verges and on centre line in central reserve. Slack in draw rope (minimum 1m) to be coiled under block

Close boarded fence post to comply with BS 1722 Pt.5 Type PCR. 105 or similar without recess, with the addition of cast lettering as detailed below.



### DUCT LOCATION POST

To be installed on  $\mathcal{L}$  of duct group

HIGHWAY CONSTRUCTION DETAILS

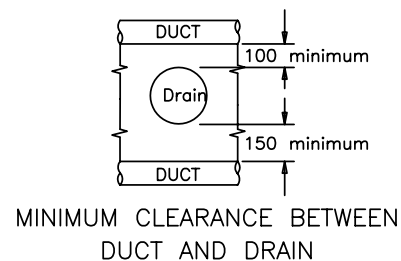
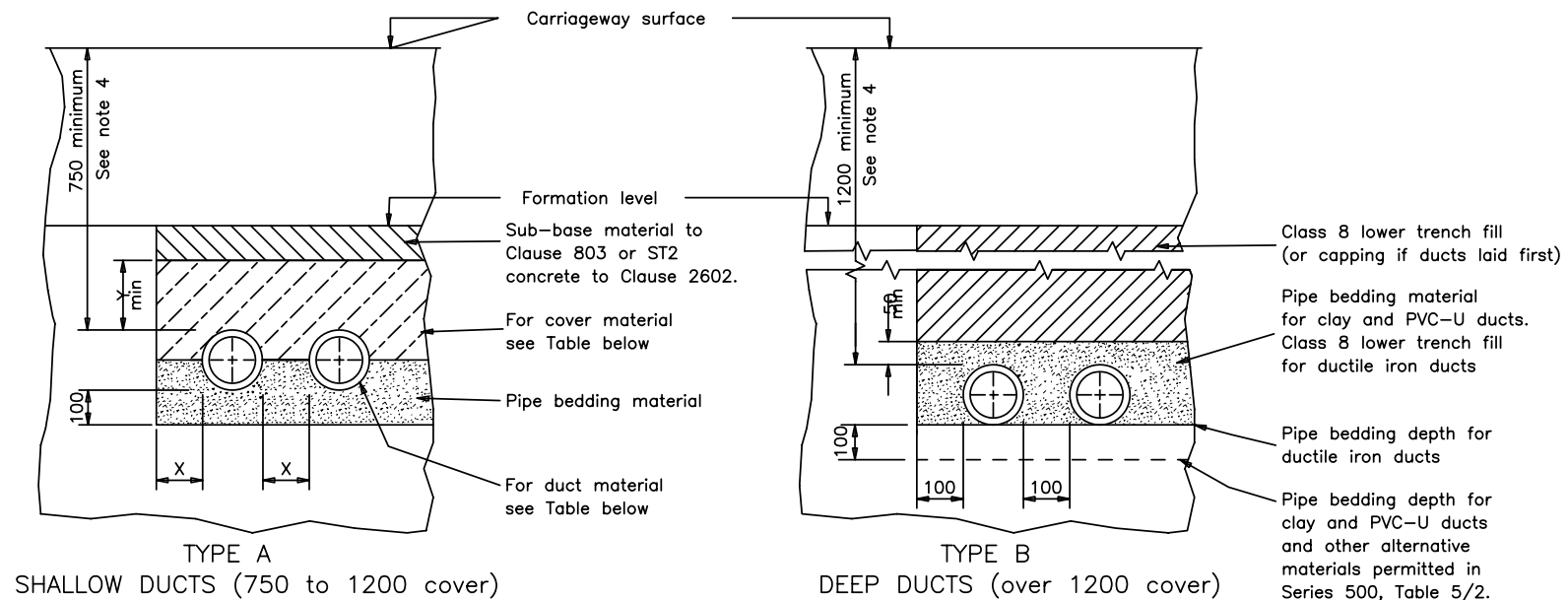
UNDERGROUND  
CABLE DUCTS

B	MAY 04
A	DEC 91
Issue	Date

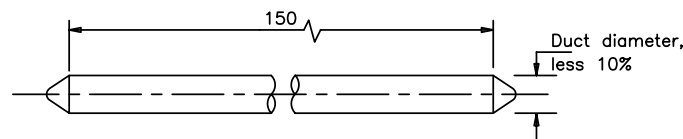
LONGITUDINAL SECTIONS AND  
DETAILS OF  
TRANSVERSE DUCTS

Drawing No.

I1



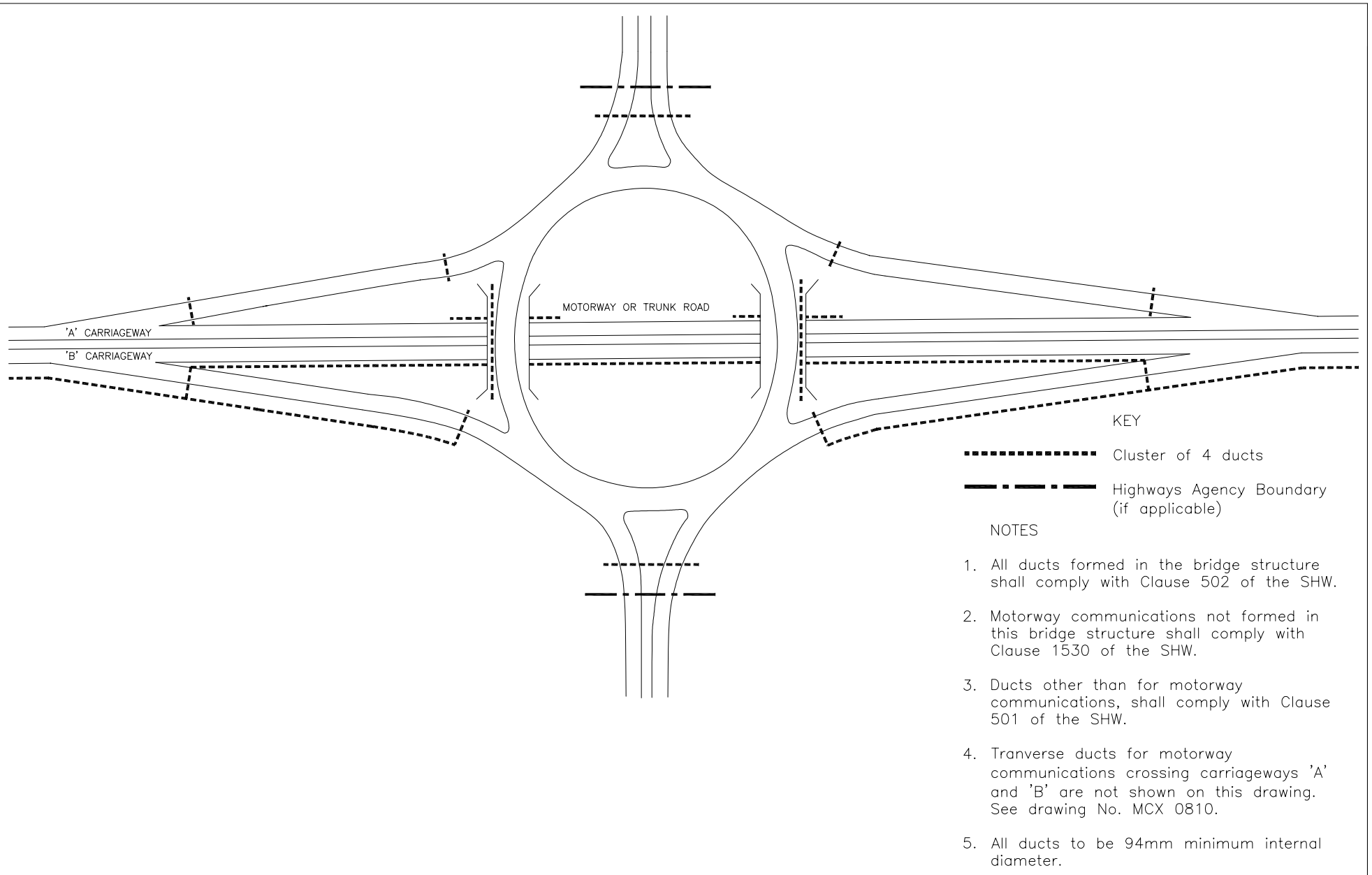
Duct Material	Cover Material	X	Y
Clay	Pipe bedding material	100	50
PVC-U and other alternative materials permitted in Series 500, Table 5/2	ST2 concrete to Clause 2602	75	150
Ductile iron	Either of above materials or sub-base material to Clause 803	as above 150	0



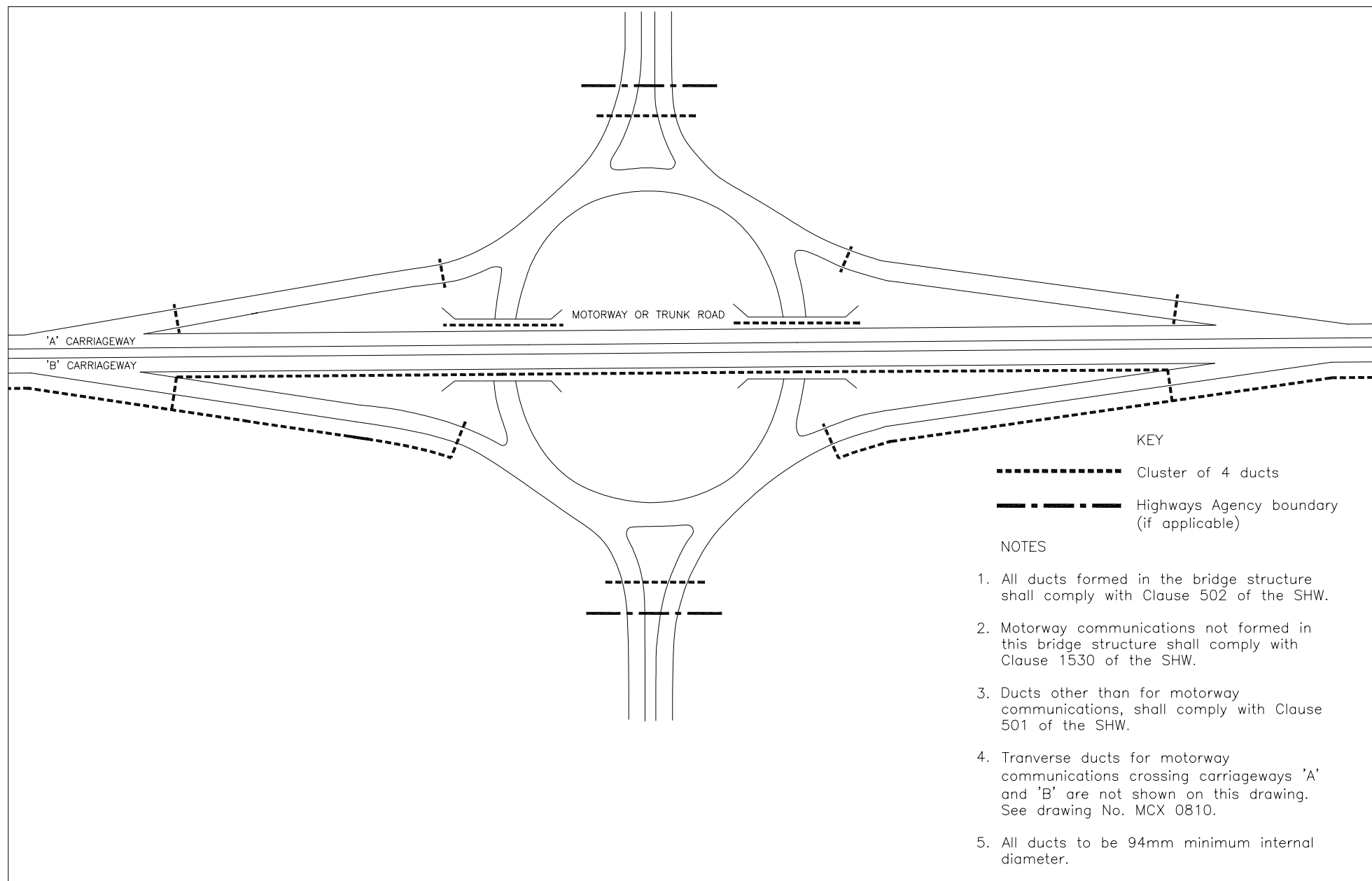
**DETAIL OF MANDREL**  
(Required to pass through the whole length of completed ducts with curved ends)

- NOTES**
1. ALL DIMENSIONS ARE IN MILLIMETRES.
  2. Pipe bedding material shall comply with Clause 503 of the S.H.W.
  3. Class 8 lower trench fill shall comply with Table 6/1 of the S.H.W.
  4. Alternatively ducts shall be laid to limits described in Appendices 5/2, 14/4 or as shown on the Drawings.
  5. For motorway communications cable ducts, see HCD Drawing Number MCX 0814.

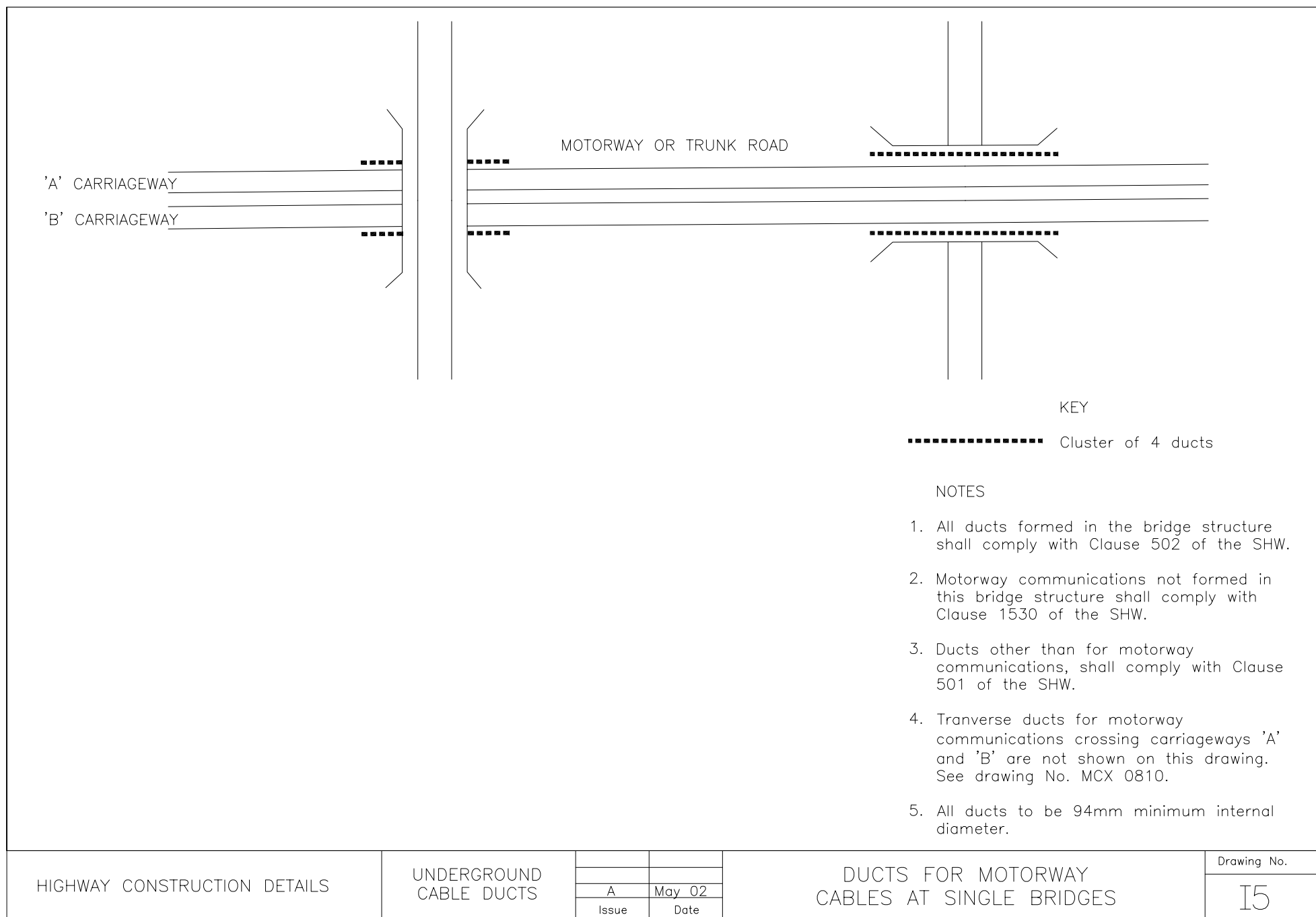
HIGHWAY CONSTRUCTION DETAILS	UNDERGROUND CABLE DUCTS	B	MAY 04	DUCT TRENCH CROSS SECTIONS AND DETAILS OF MANDREL	Drawing No.
		A	DEC 91		I 2
		Issue	Date		

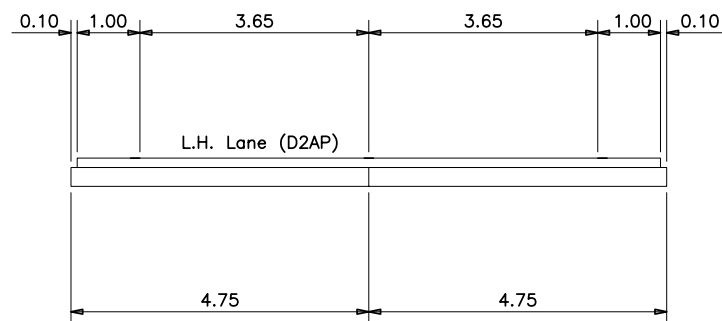


HIGHWAY CONSTRUCTION DETAILS	UNDERGROUND CABLE DUCTS			DUCTS FOR MOTORWAY CABLES AT INTERCHANGE OVERBRIDGES	Drawing No.
		A	May 02		I3
		Issue	Date		

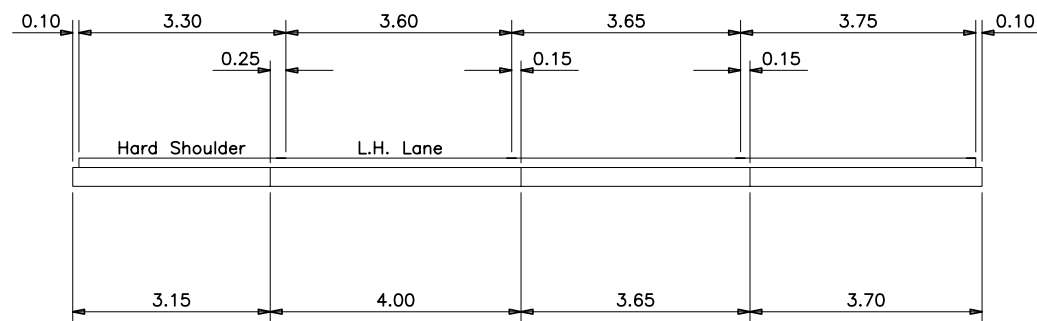


HIGHWAY CONSTRUCTION DETAILS	UNDERGROUND CABLE DUCTS			DUCTS FOR MOTORWAY CABLES AT INTERCHANGE UNDERBRIDGES	Drawing No.
		A	May 02		I4
		Issue	Date		

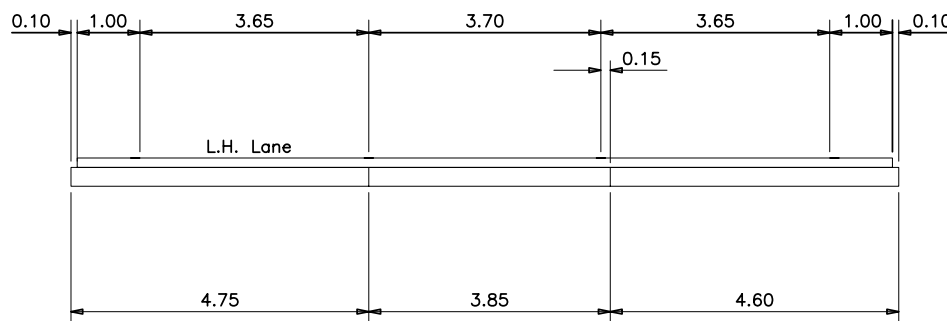




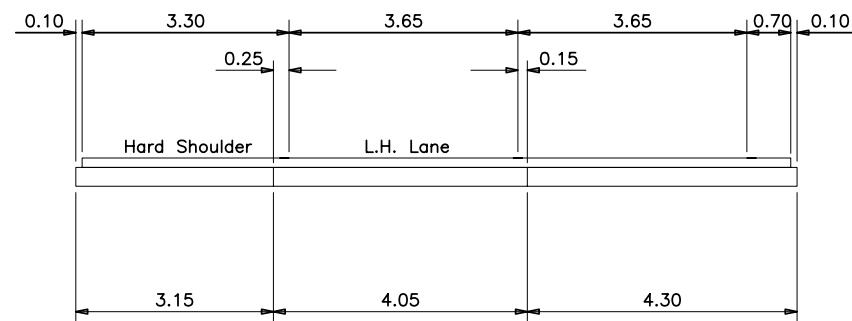
SINGLE ALL-PURPOSE (S2)  
DUAL TWO LANE ALL-PURPOSE (D2AP)



DUAL THREE LANE MOTORWAY (D3M)  
(D4M Similar)



DUAL THREE LANE ALL-PURPOSE (D3AP)



DUAL TWO LANE MOTORWAY (D2M)

NOTES

1. ALL DIMENSIONS ARE IN METRES.
2. Example layouts shown meet the requirements of Clause 1042.

HIGHWAY CONSTRUCTION DETAILS

FLEXIBLE  
COMPOSITE  
CARRIAGEWAY

A	DEC 91
Issue	Date

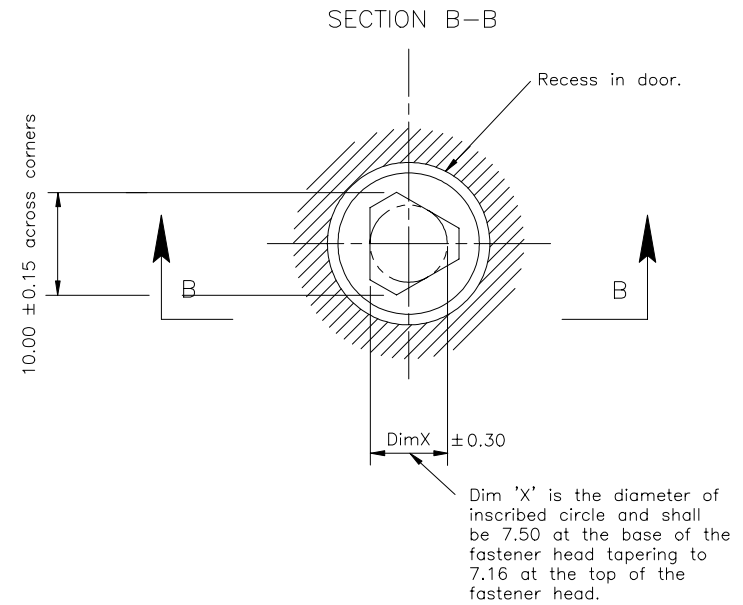
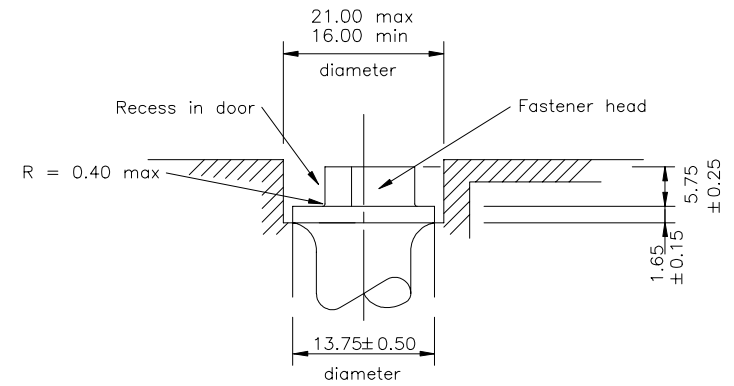
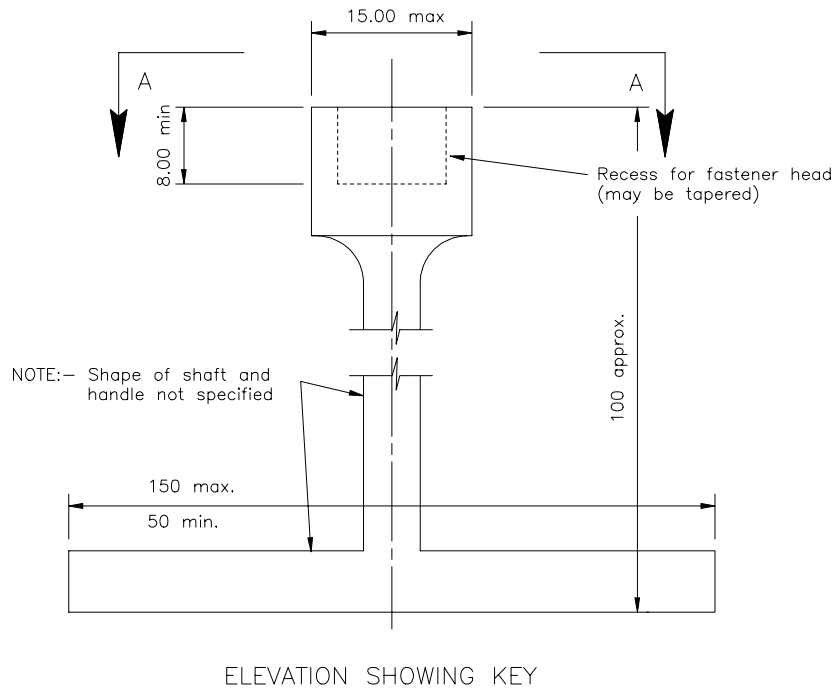
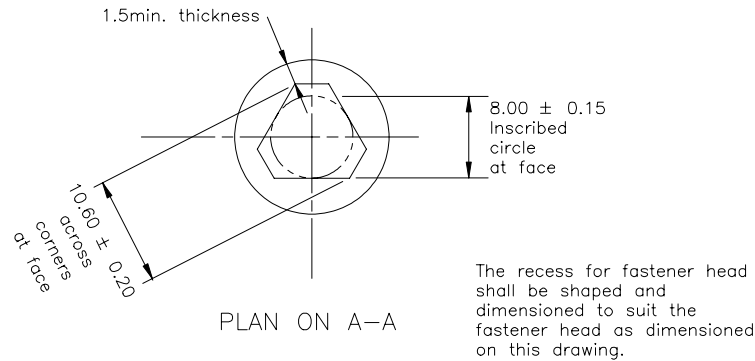
EXAMPLE LAYOUTS FOR  
LONGITUDINAL CONSTRUCTION JOINTS  
IN CEMENT-BOUND ROADBASES

Drawing No.

J1



- NOTES: 1. All dimensions are in millimetres.  
2. The key shall be capable of releasing without damage all tri-head fasteners as dimensioned on this drawing.



PLAN SHOWING FASTENER HEAD IN DOOR RECESS

HIGHWAY CONSTRUCTION DETAILS

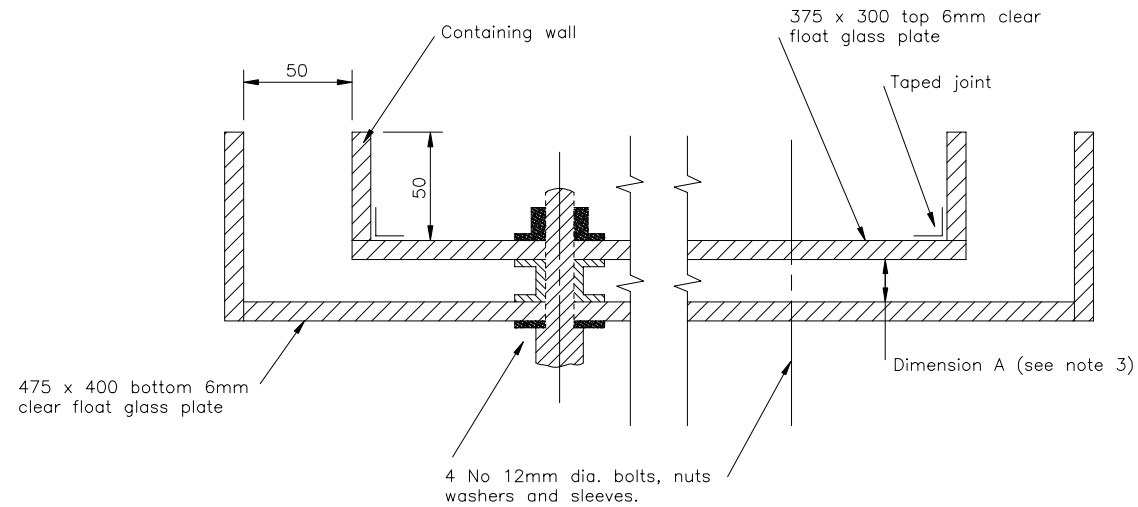
MISCELLANEOUS

A	DEC 91
Issue	Date

ROAD LIGHTING COLUMNS-FASTENER HEAD IN DOOR RECESS AND KEY

Drawing No.

K1



**NOTES:**

1. This apparatus is to be used for the test described in Clause 2601.4(iii).
2. Dimension A is 10mm for grouts appropriate to plinth height 10–25mm and 20mm for grouts appropriate to plinth height 20–50mm.
3. Grout is to be mixed and poured using the Contractor's proposed site method until it reaches the underside of the top plate and has risen up the containing walls to a depth of at least 10mm.
4. Plates are to be horizontal during pouring and curing, and are not to be moved once pouring has commenced until dismantling.
5. All dimensions are in mm.

HIGHWAY CONSTRUCTION DETAILS

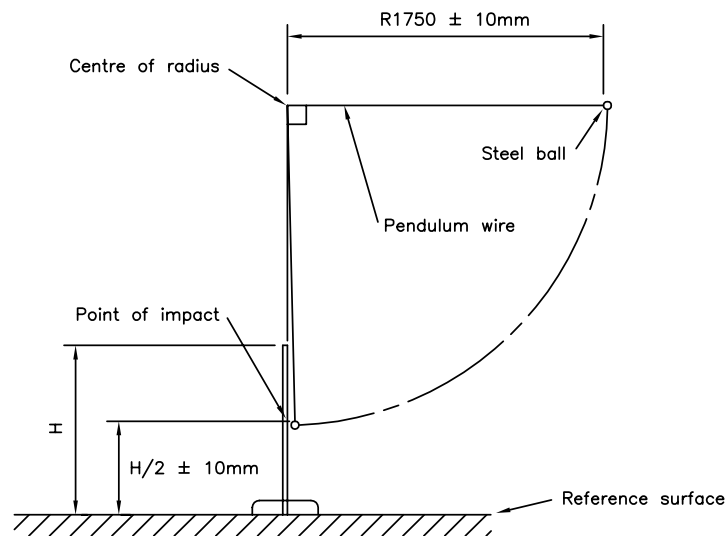
MISCELLANEOUS

A	DEC 91
Issue	Date

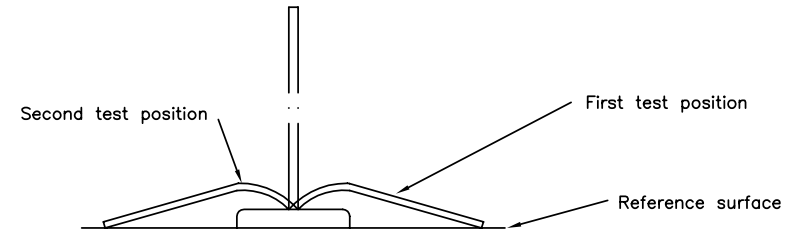
BEDDING MORTAR TEST APPARATUS  
FOR FLOW BETWEEN GLASS PLATES

Drawing No.

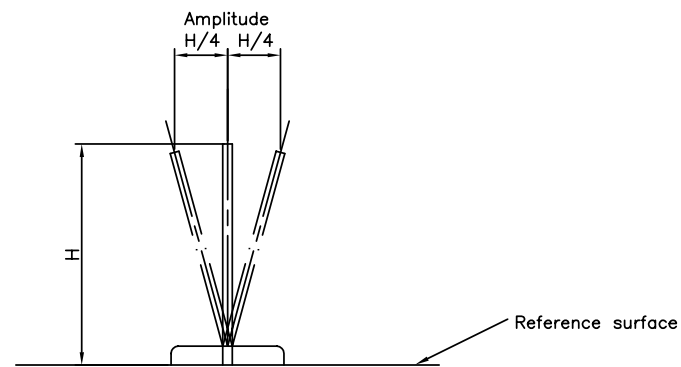
K2



APPARATUS FOR LOW TEMPERATURE IMPACT TEST  
ON FLAT TRAFFIC DELINEATOR

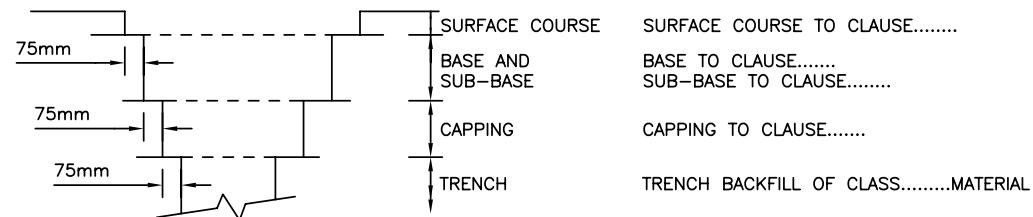


MOVEMENT OF FLAT TRAFFIC DELINEATOR IN  
BENDING TEST

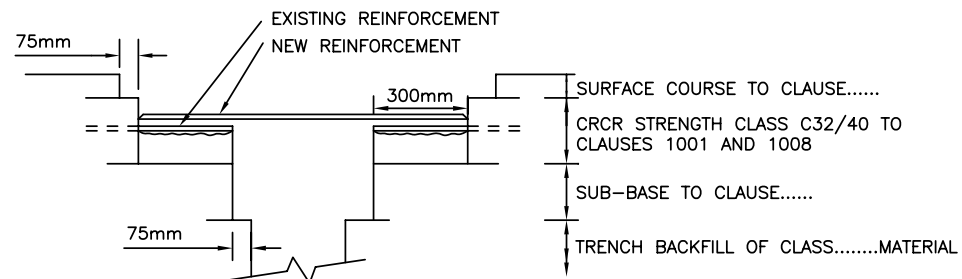


MOVEMENT OF FLAT TRAFFIC DELINEATOR IN FATIGUE TEST

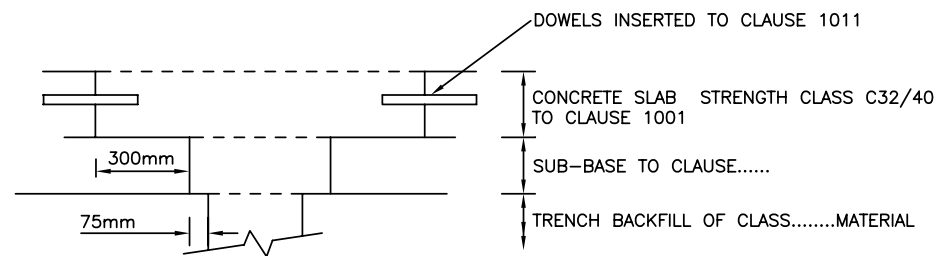
HIGHWAY CONSTRUCTION DETAILS	MISCELLANEOUS			FLAT TRAFFIC DELINEATOR TEST DETAILS	Drawing No.
		A	DEC 91		
		Issue	Date		K3



BITUMINOUS

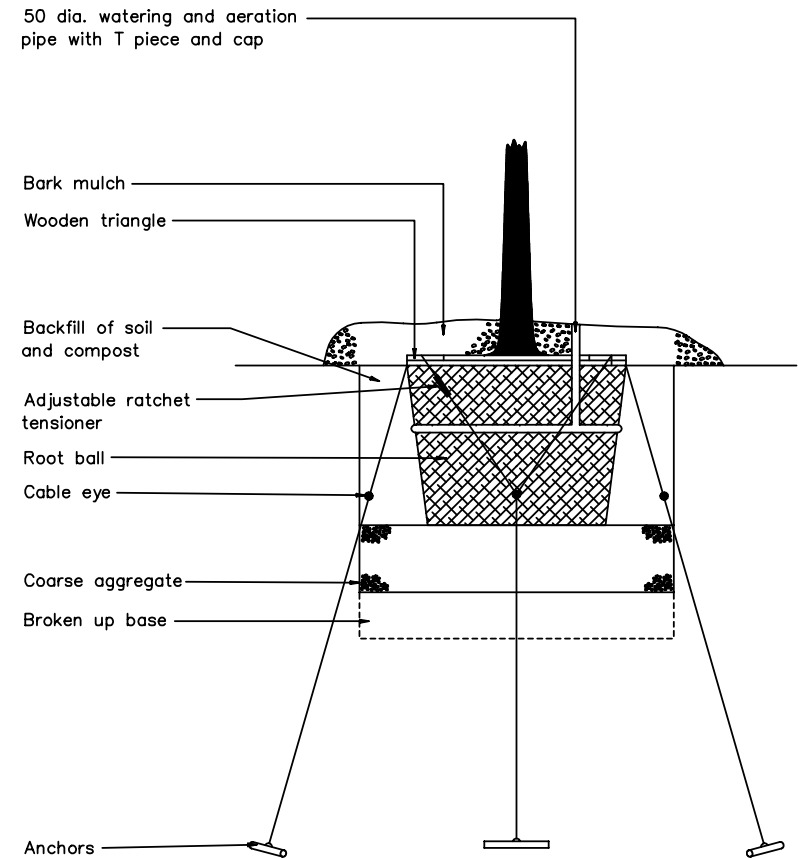
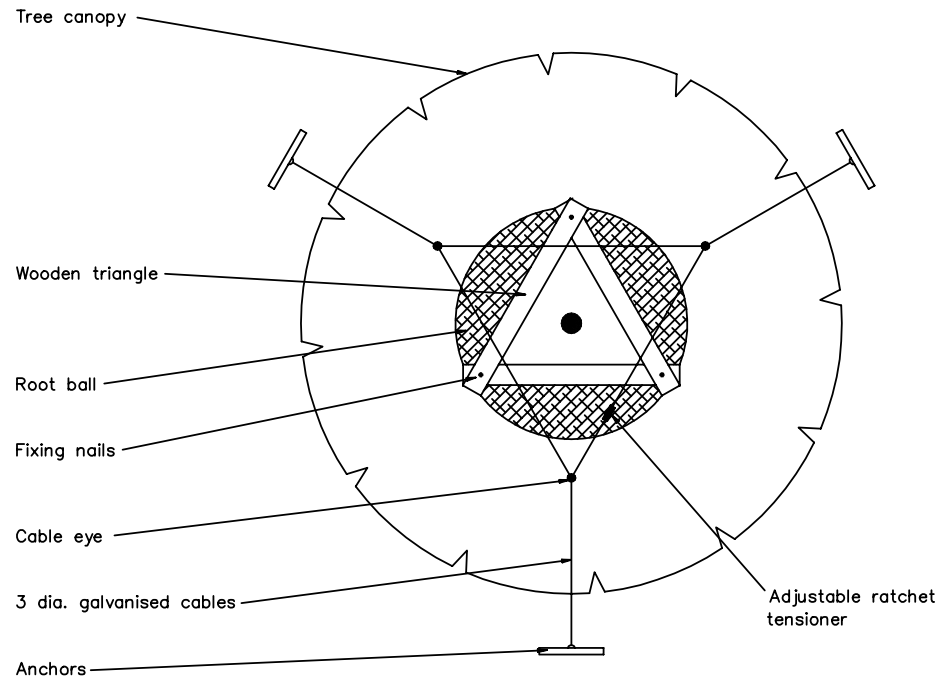


REINFORCED CONCRETE ROADBASE



UNREINFORCED CONCRETE SLAB

HIGHWAY CONSTRUCTION DETAILS	MISCELLANEOUS	C	MAY 04	TYPICAL TRENCH REINSTATEMENT DETAILS FOR BITUMINOUS AND CONCRETE PAVEMENTS	Drawing No.  K4
		B	MAY 02		
		A	DEC 91		
		Issue	Date		



SECTION THROUGH PLANTING PIT

NOTES

1. Dimensions of planting pit varies.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.

HIGHWAY CONSTRUCTION DETAILS	MISCELLANEOUS			PLANTING DETAILS FOR PLANTING LARGE TREES	Drawing No.
		A	MAY 01		
		P1	MAR 95		K5
		Issue	Date		