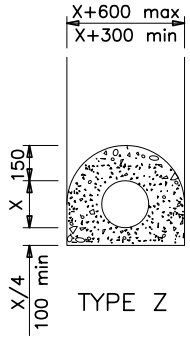
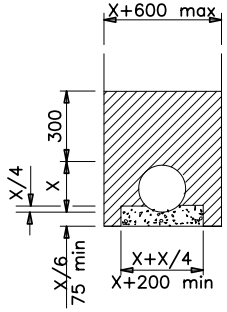
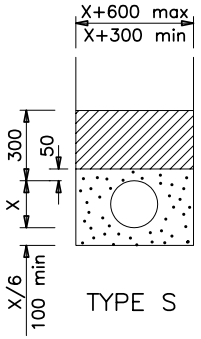


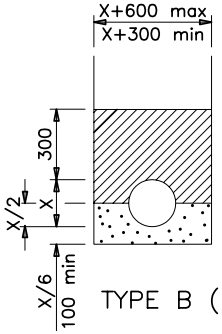
TYPE Z



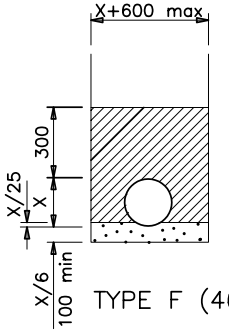
TYPE A (120°)



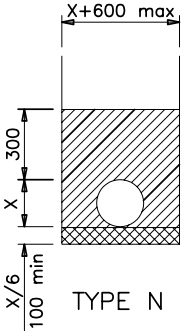
TYPE S



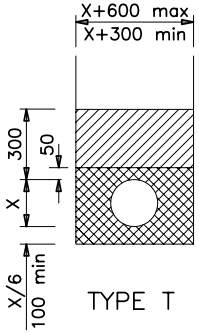
TYPE B (180°)



TYPE F (46°)



TYPE N



TYPE T

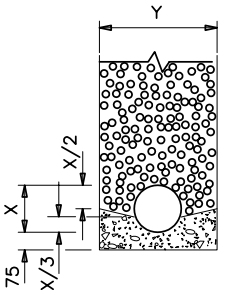
KEY

- 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).

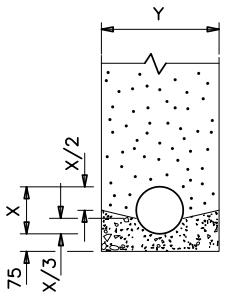
NOTES

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.

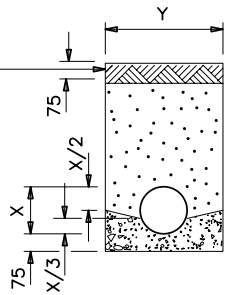
HIGHWAY CONSTRUCTION DETAILS	DRAINAGE			SURFACE WATER DRAINS – TRENCH AND BEDDING DETAILS	Drawing No.
		A	DEC 91		F1
		Issue	Date		



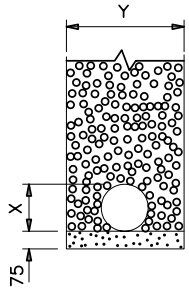
TYPE G



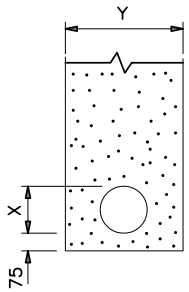
TYPE J



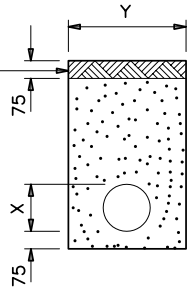
TYPE L



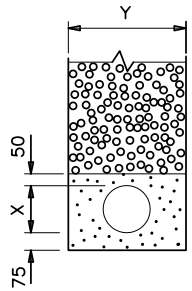
TYPE H



TYPE K



TYPE M



TYPE I

Turf or seed on topsoil as described in Appendix 5/1

KEY

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

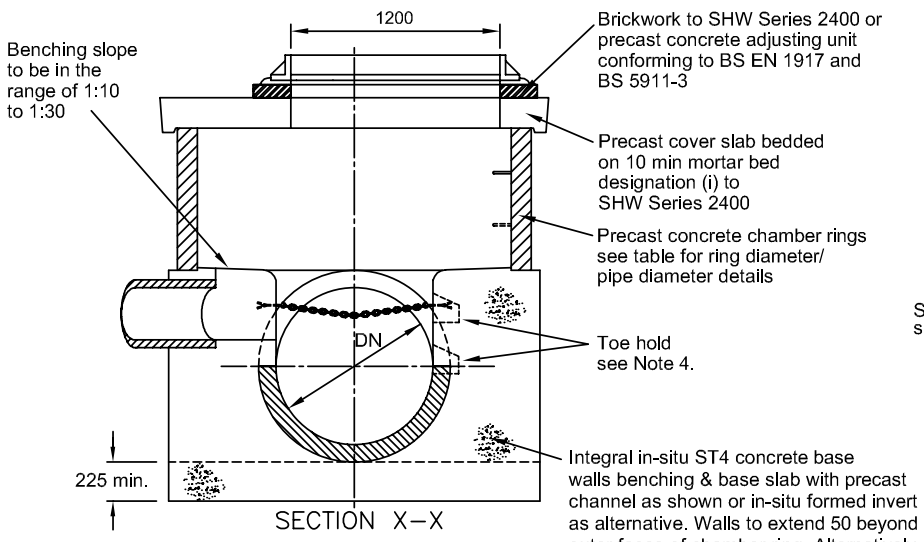
Type B filter material to S.H.W. Clause 505.

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

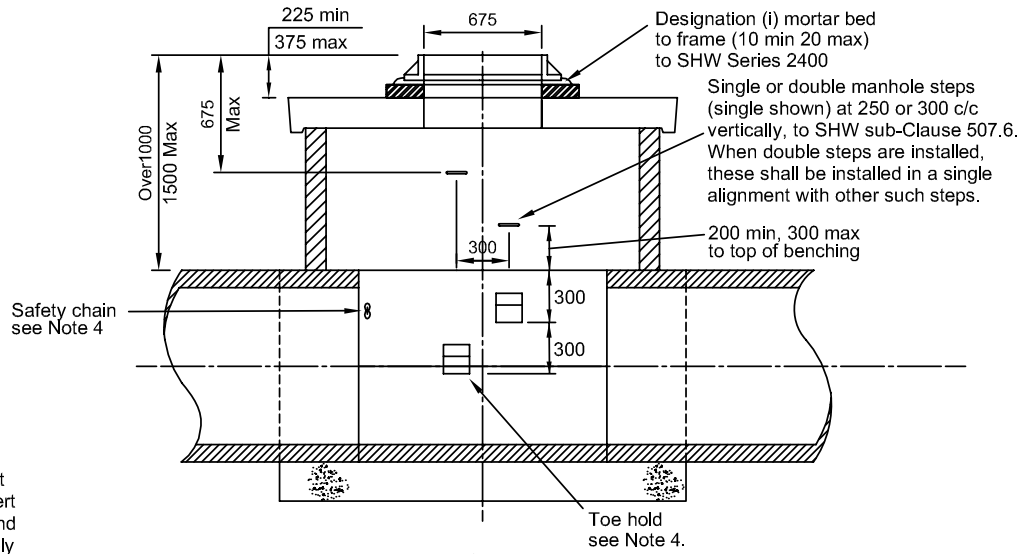
NOTES

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.

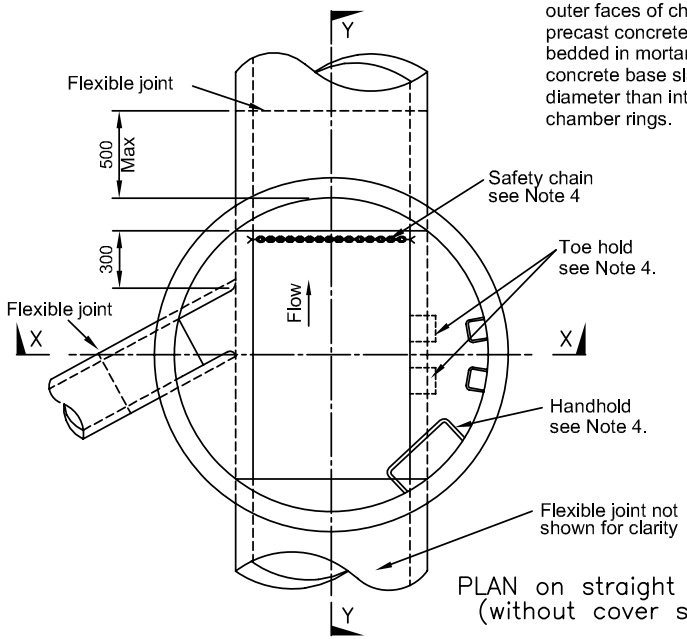
HIGHWAY CONSTRUCTION DETAILS	DRAINAGE	Issue	Date	FILTER DRAINS – TRENCH AND BEDDING DETAILS	Drawing No.
		C	NOV 03		F2
		B	MAR 98		
		A	DEC 91		



SECTION X–X



SECTION Y–Y



PLAN on straight invert (without cover slab)

Chamber Sub-Type			
Sub-Type	Minimum Chamber Ring dia.	Max. Pipe DN	Maximum No. of Branches
2a	1500	700	1
2b	1800	900	1

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 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 toe hold see Drawing Number F28.
5. See SHW regarding backfilling/ surround to chamber.
6. All ST concrete shall be to SHW, Clause 2602.

FOR PIPES 450+ TO 900 DIAMETER
DEPTH 1000+ TO 1500
+ PIPE DIAMETER

HIGHWAY CONSTRUCTION DETAILS

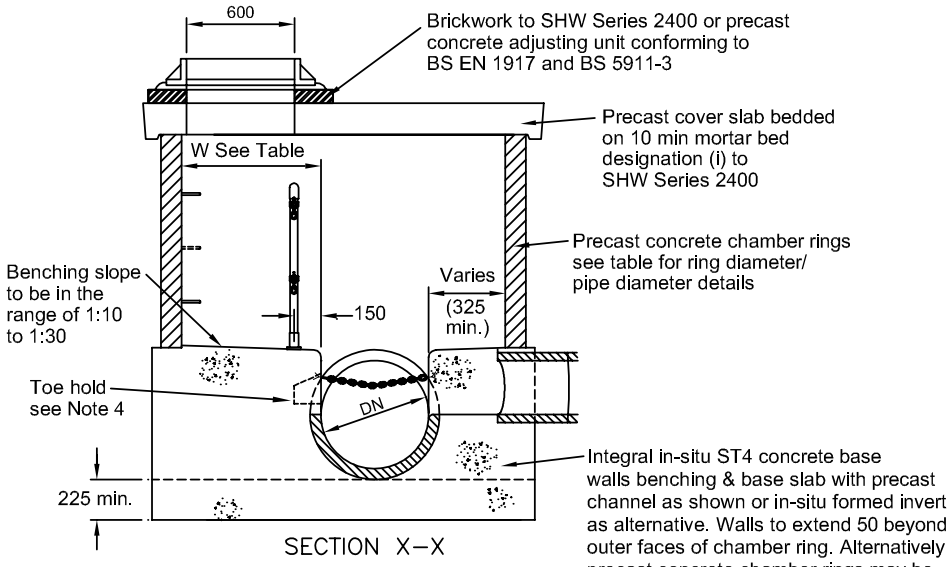
DRAINAGE

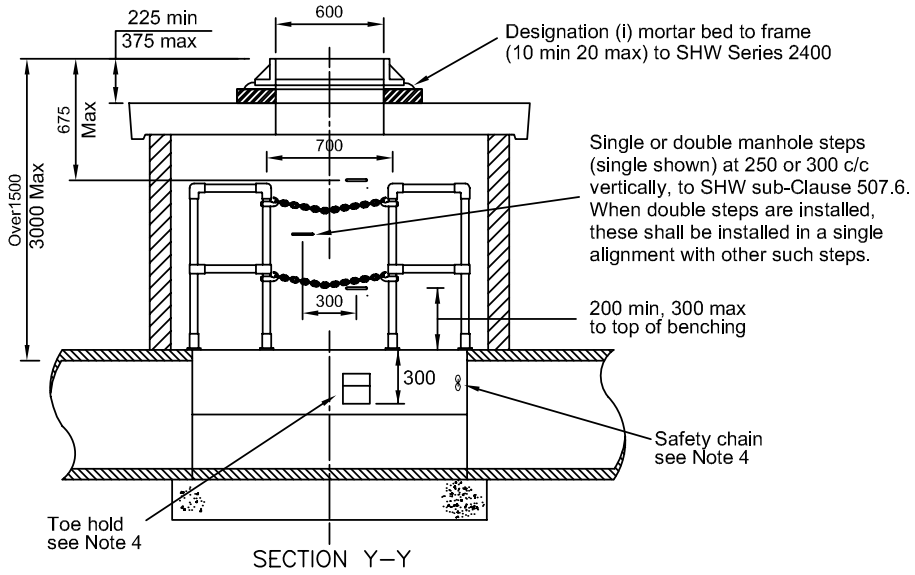
Issue	Date
E	MAY 06
D	NOV 04
C	NOV 03
B	MAY 01
A	DEC 91

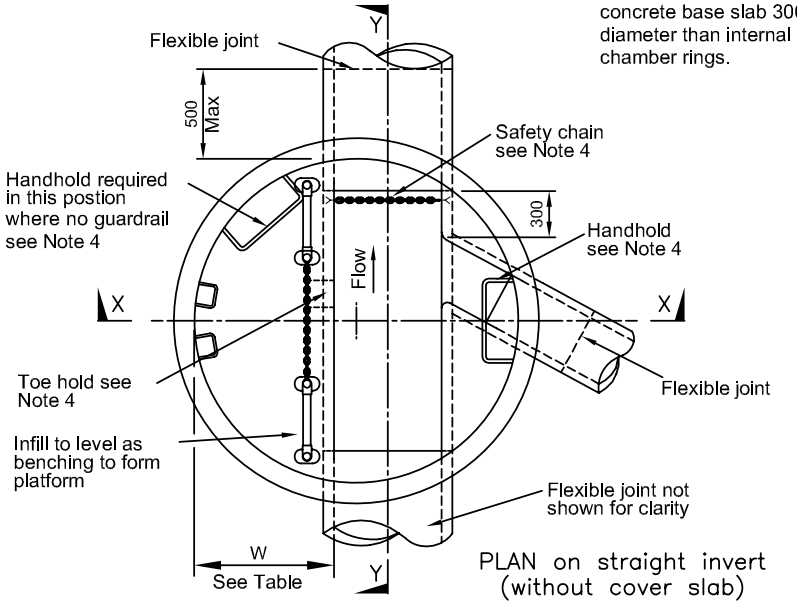
TYPE 2 CHAMBER (PRECAST CONCRETE MANHOLE)

Drawing No.

F4







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

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.

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

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

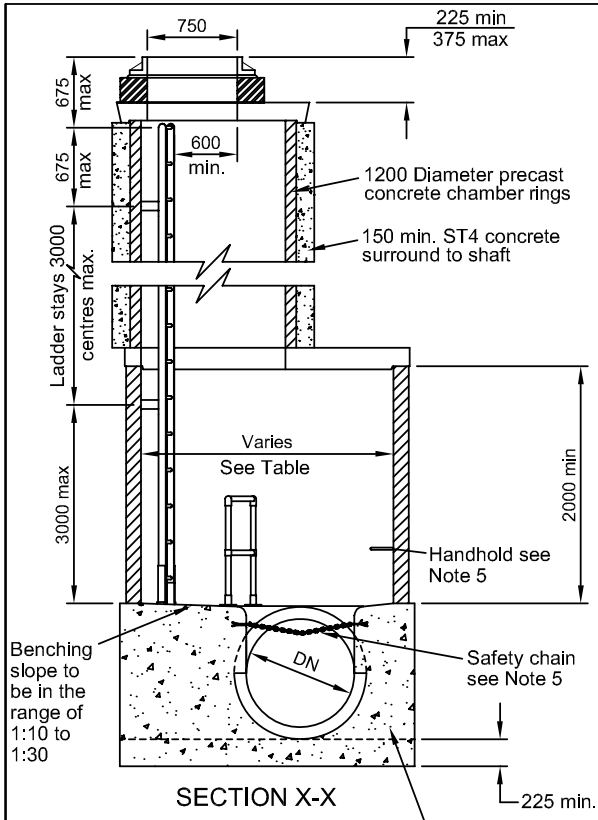
HIGHWAY CONSTRUCTION DETAILS

DRAINAGE

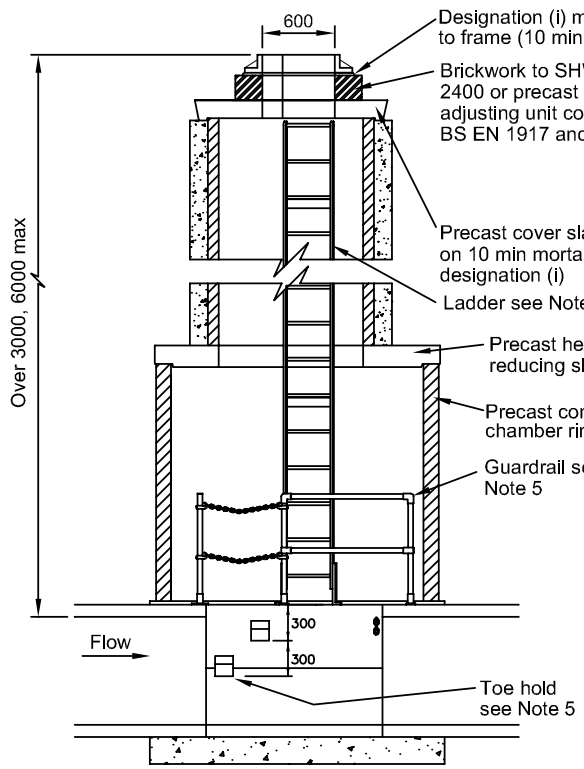
TYPE 3 CHAMBER (PRECAST CONCRETE MANHOLE)

Drawing No.

F5



SECTION X-X

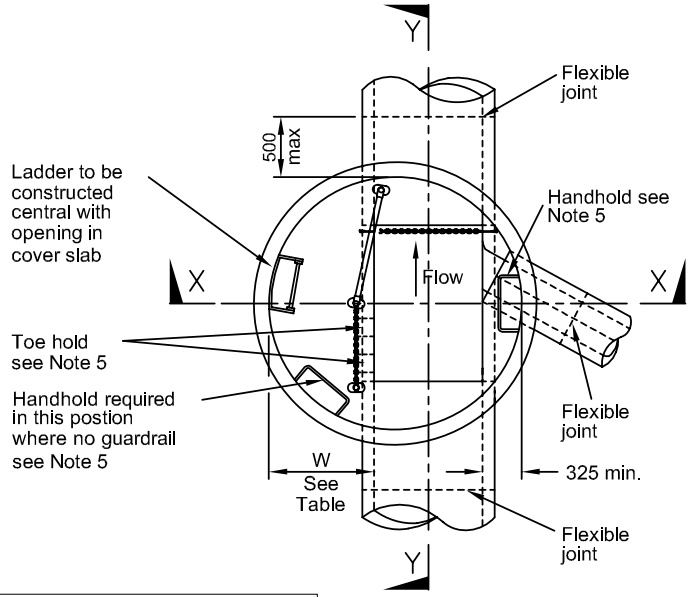


SECTION Y-Y

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.

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.



PLAN ON STRAIGHT INVERT
(Below reducing slab)

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	✓	✓	✓

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

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

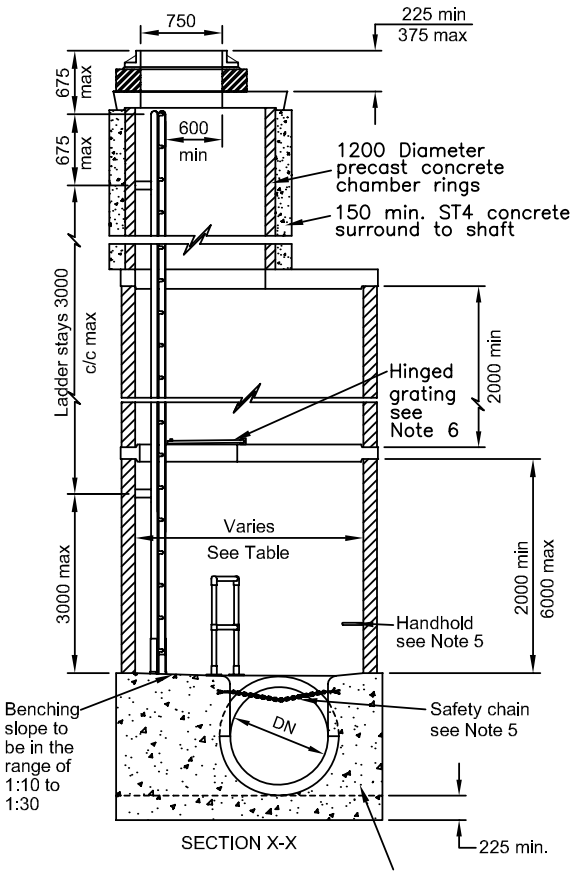
HIGHWAY CONSTRUCTION DETAILS

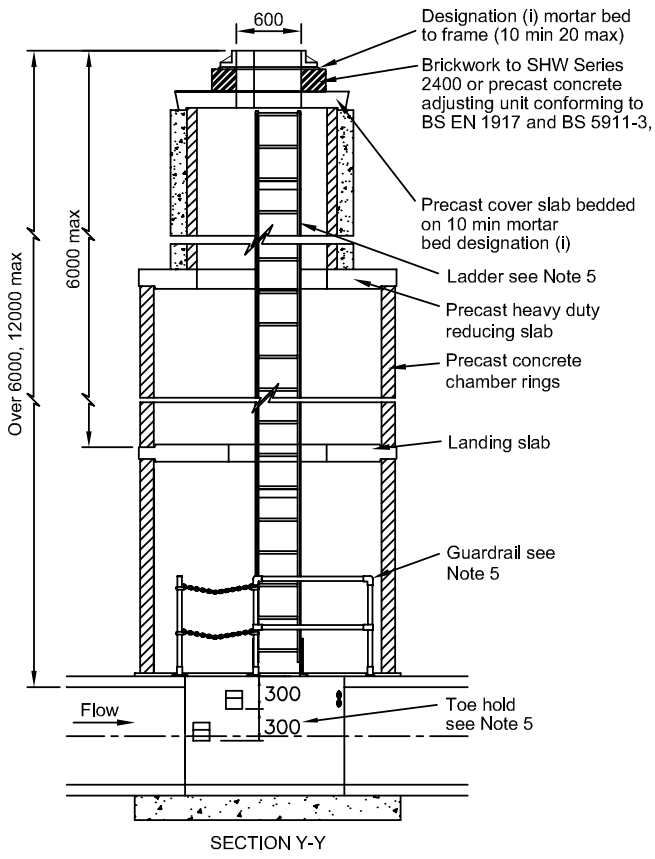
DRAINAGE

TYPE 4 CHAMBER (PRECAST CONCRETE MANHOLE)

Drawing No.

F6

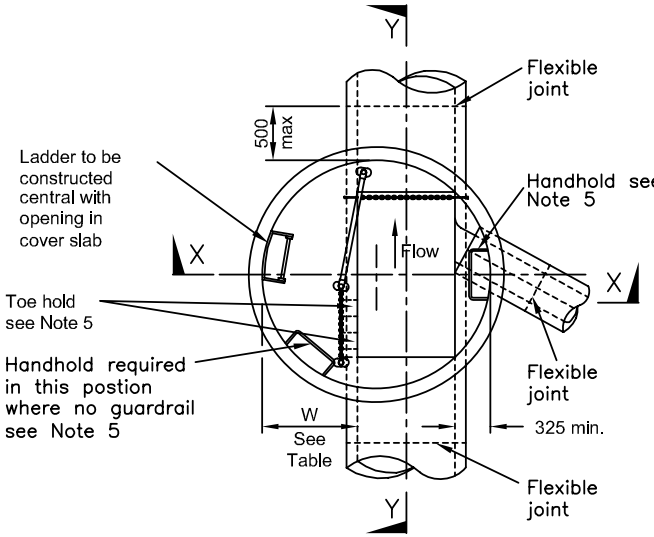




Integral in-situ ST4 concrete base walls benching and base slab with precast channel as shown or in-situ formed invert as alternative. Walls to extend 50 beyond outer faces of chamber ring. Alternatively precast concrete chamber rings may be bedded in mortar on an in-situ ST4 concrete base slab 300 greater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

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. For details of hinged grating see Drawing Number F9.
7. See SHW, sub-Clause 507.7 regarding backfilling/ surround to chamber.
8. All ST concrete shall be to SHW, Clause 2602.



PLAN ON STRAIGHT INVERT
(Below reducing slab)

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

HIGHWAY CONSTRUCTION DETAILS

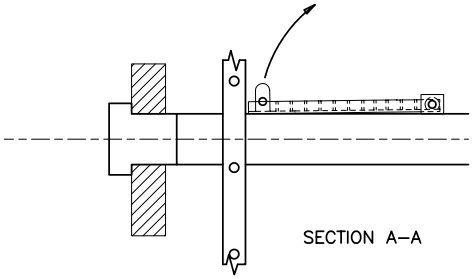
DRAINAGE

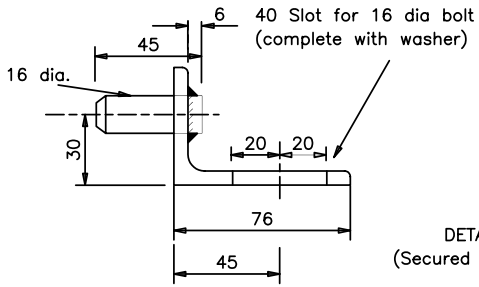
Issue	Date
E	MAY 06
D	NOV 04
C	NOV 03
B	MAY 01
A	DEC 91

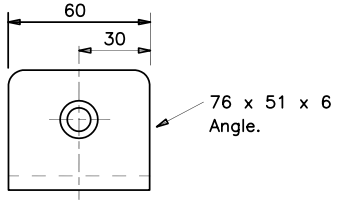
TYPE 5 CHAMBER (PRECAST CONCRETE MANHOLE)

Drawing No.

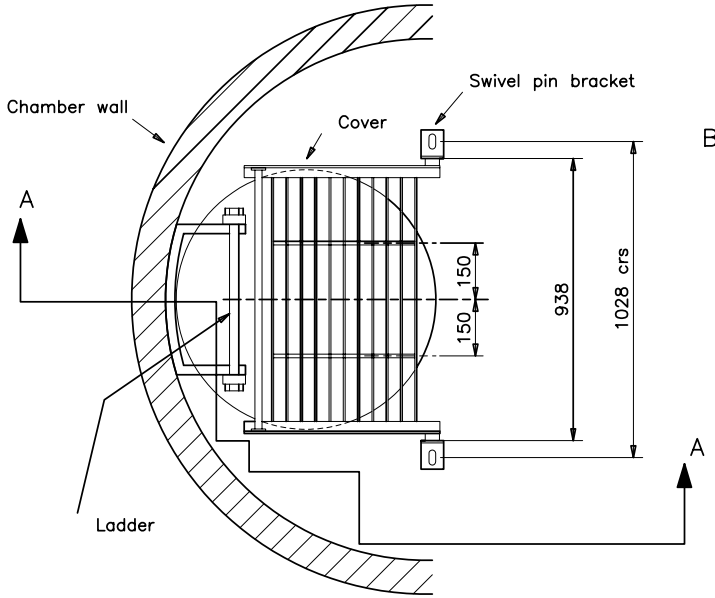
F7





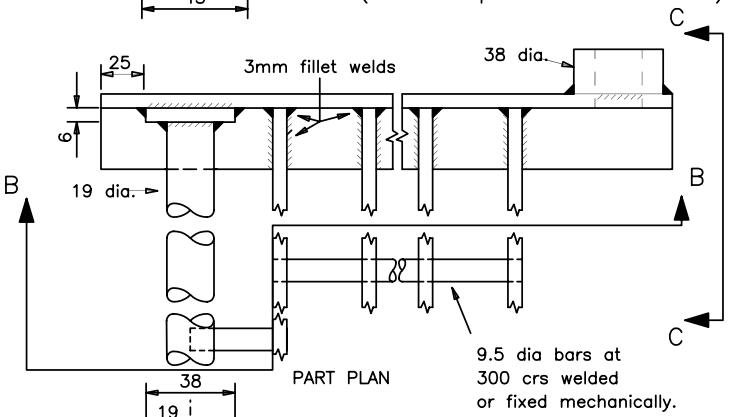


DETAILS OF SWIVEL PIN BRACKET
(Secured to platform with 16 dia bolt)

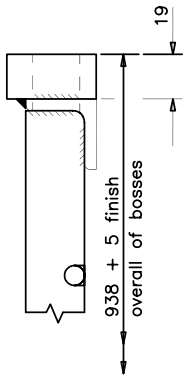


ASSEMBLY PLAN

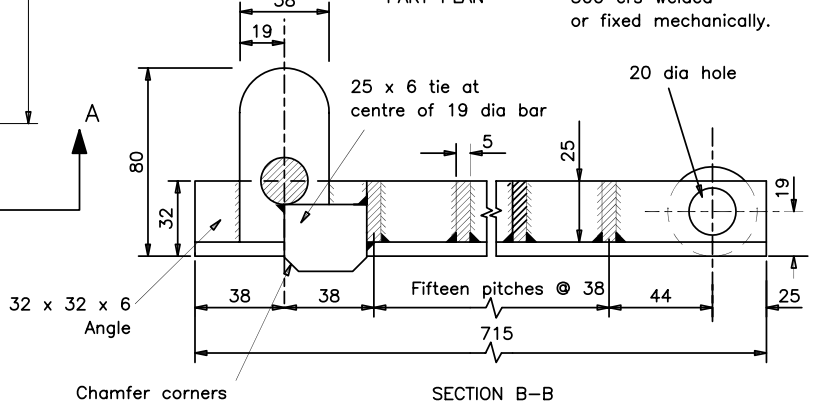
(Plan detail on grating positioned on landing slab.)



PART PLAN



VIEW C–C

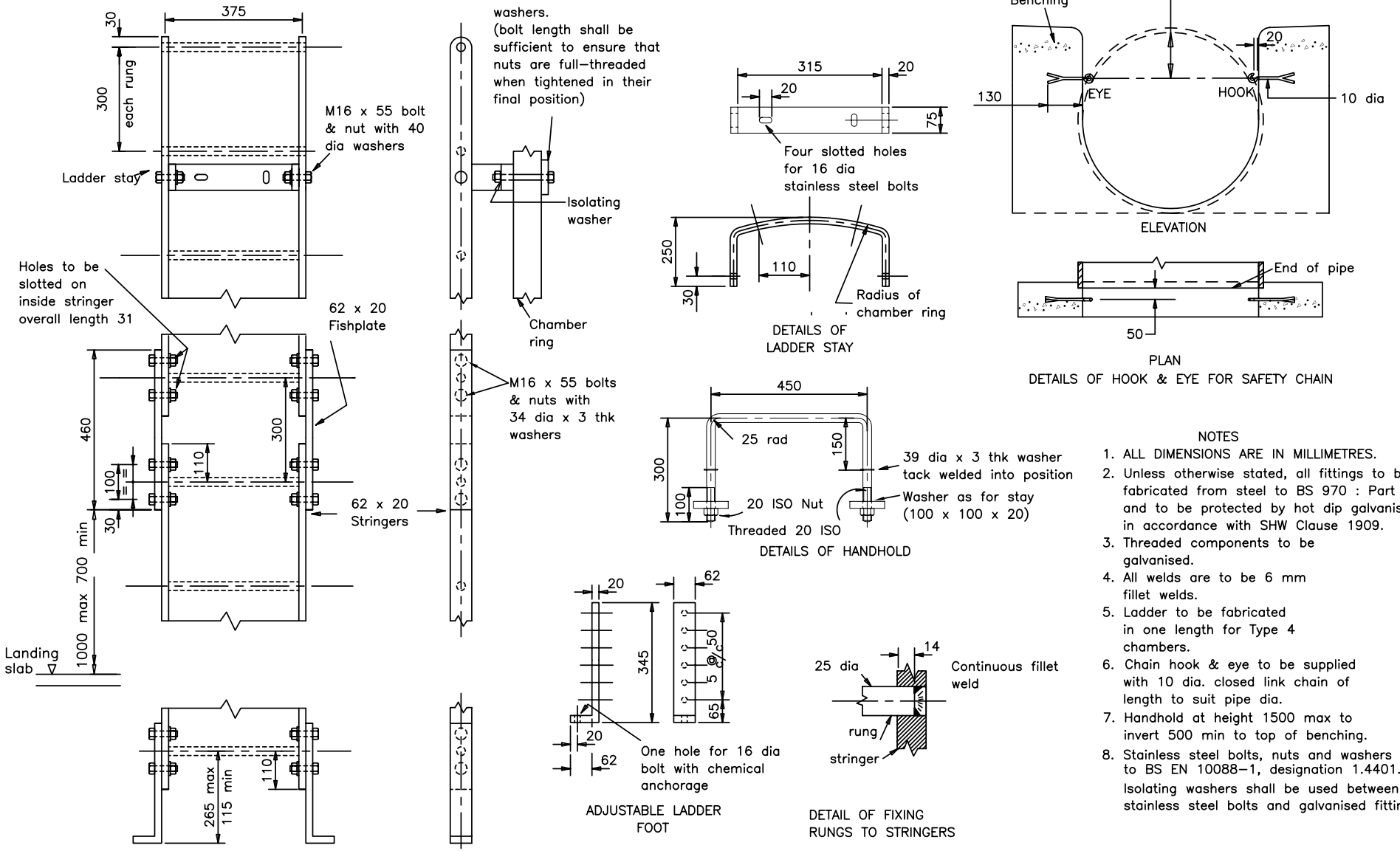


SECTION B–B

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.

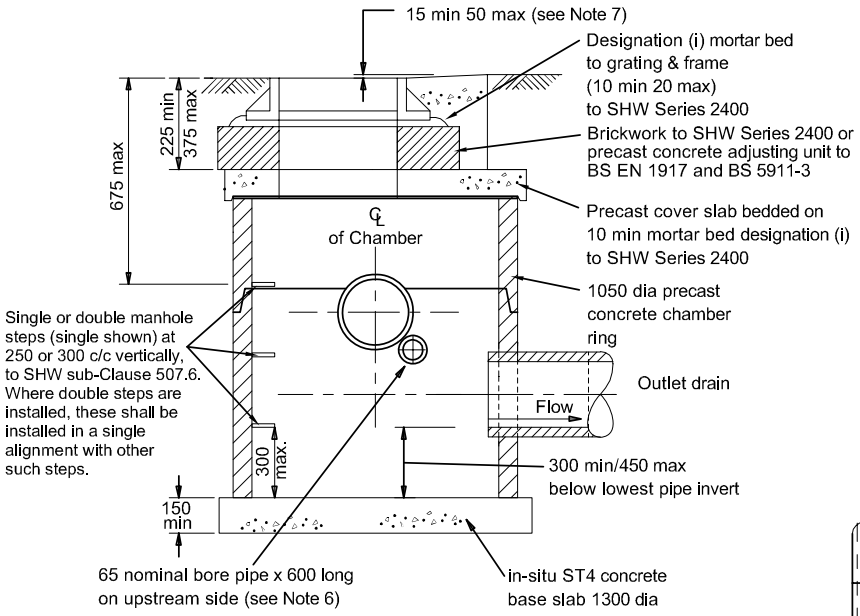
HIGHWAY CONSTRUCTION DETAILS	DRAINAGE	B	MAY 01	TYPE 5 CHAMBER GRATING DETAILS	Drawing No. F9
		A	DEC 91		
		Issue	Date		



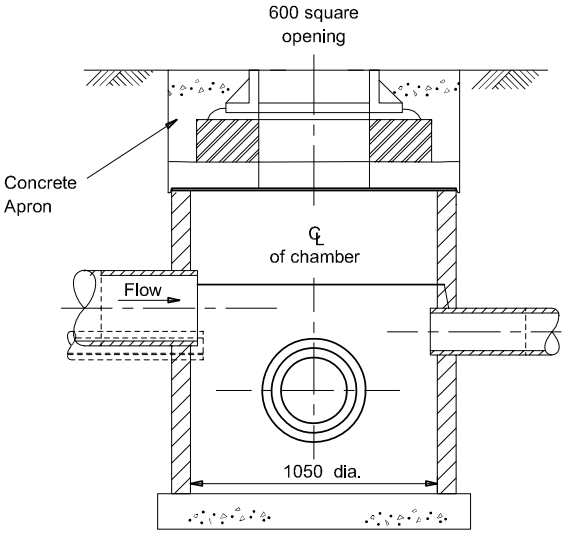
NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Unless otherwise stated, all fittings to be fabricated from steel to BS 970 : Part 1 and to be protected by hot dip galvanising in accordance with SHW Clause 1909.
3. Threaded components to be galvanised.
4. All welds are to be 6 mm fillet welds.
5. Ladder to be fabricated in one length for Type 4 chambers.
6. Chain hook & eye to be supplied with 10 dia. closed link chain of length to suit pipe dia.
7. Handhold at height 1500 max to invert 500 min to top of benching.
8. Stainless steel bolts, nuts and washers shall to BS EN 10088–1, designation 1.4401. Isolating washers shall be used between stainless steel bolts and galvanised fittings.

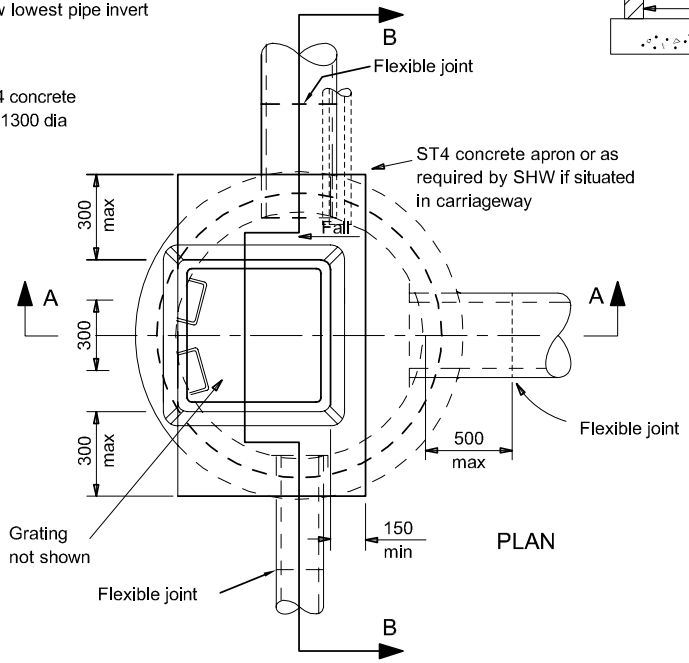
HIGHWAY CONSTRUCTION DETAILS	DRAINAGE	Issue	Date	CHAMBER FITTINGS – LADDER, HANDHOLD AND SAFETY CHAIN	Drawing No.
		C	NOV 03		F10
		B	MAY 01		
		A	DEC 91		



SECTION A-A



SECTION B-B



PLAN

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Catchpit to be constructed in precast concrete to BS EN 1917 and BS 5911-3.
3. Invert details, number of branches and type of gully top are shown on the Drawings and Appendix 5/1.
4. Mortar to be designation (i) to SHW Series 2400.
5. Pipes to be built into the catchpit with designation (i) mortar are shown on the Drawings and Appendix 5/1.
6. Pipe to be built into catchpit to drain lower portion of trench. Pipe is to be placed above any concrete bed to filter drain.
7. The gully top is to be set as dimensioned below the adjacent:
   a) hard shoulder (for verges)
   b) hard strip (for dual 2 central reserve)
   c) finished level in other locations.
8. See SHW, sub-Clause 507.7 regarding backfilling/surround to chamber.
9. All ST concrete shall be to SHW, Clause 2602.

Issue	Date	
F	MAY 06	FOR PIPES 450 MAX. DIAMETER
E	NOV 04	
D	NOV 03	
C	MAY 01	
B	APR 94	
A	DEC 91	

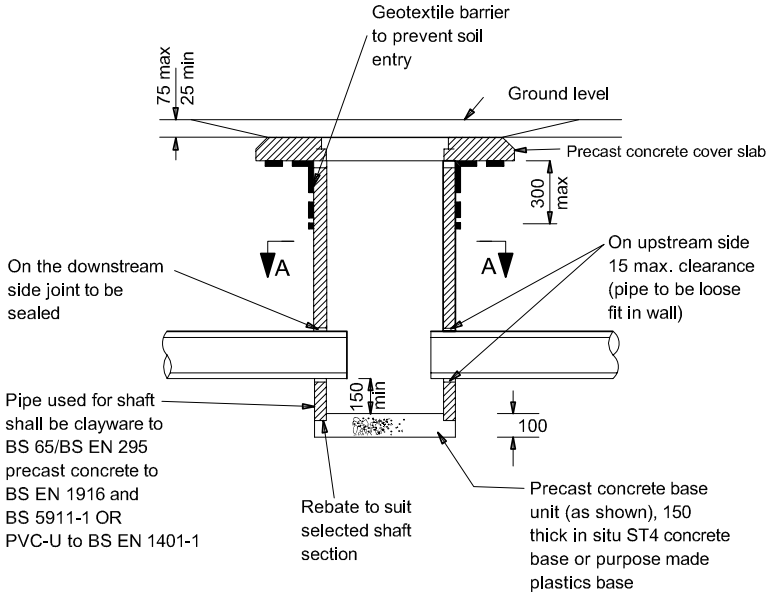
HIGHWAY CONSTRUCTION DETAILS

DRAINAGE

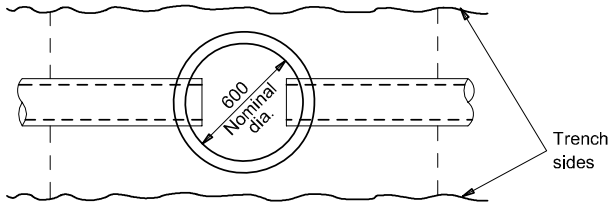
TYPE 7 CHAMBER (1050 CATCHPIT)

Drawing No.

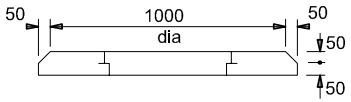
F11



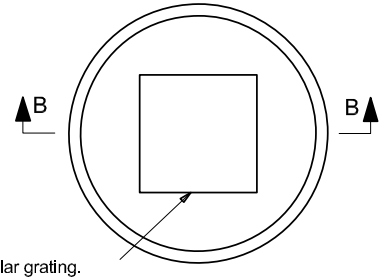
SECTION THROUGH CATCHPIT



SECTION A-A

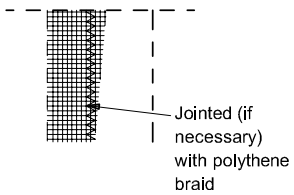


SECTION B-B

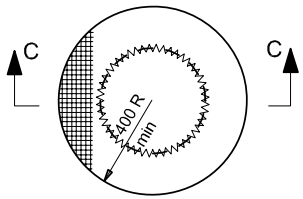


Rectangular or circular grating.

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^2 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.

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

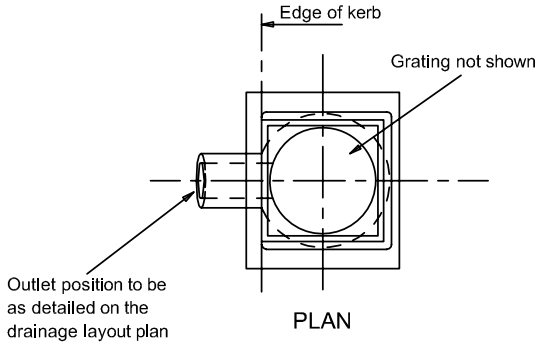
HIGHWAY CONSTRUCTION DETAILS

DRAINAGE

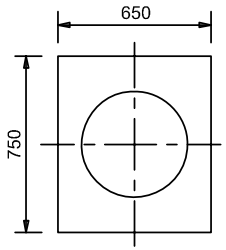
TYPE 8 CHAMBER (600 CATCHPIT)

Drawing No.

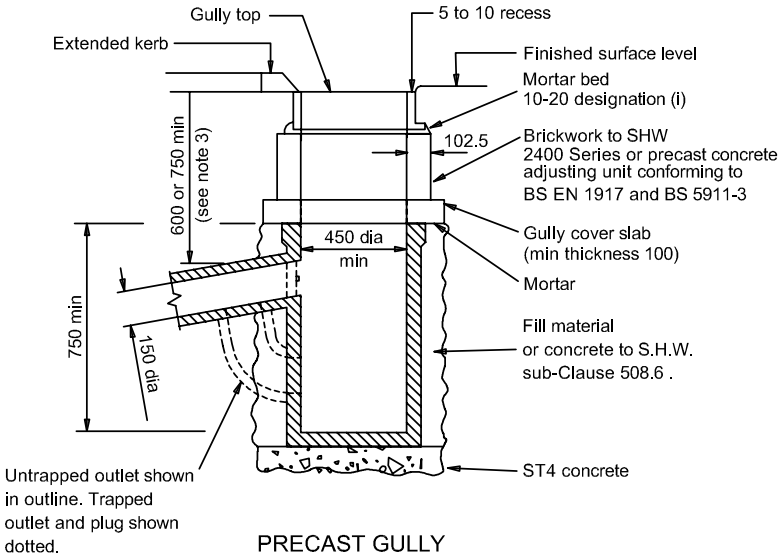
F12



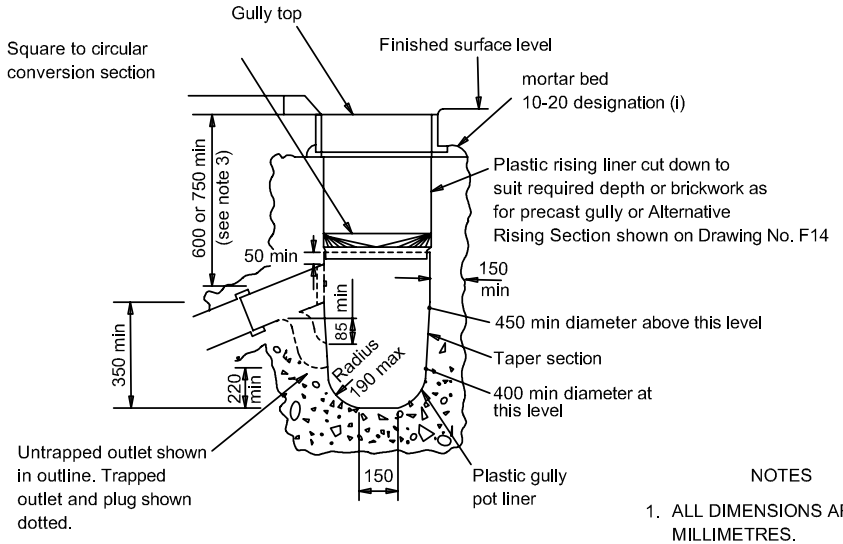
PLAN



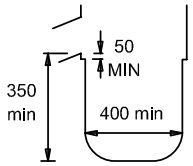
GULLY COVER SLAB



PRECAST GULLY



IN-SITU CAST GULLY



ALTERNATIVE IN-SITU CAST SUMP
(PARALLEL SIDES)

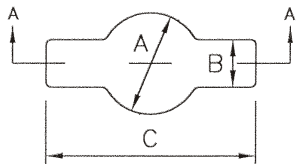
NOTES

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	PRECAST AND IN-SITU CAST GULLIES	Drawing No. F13
		D	MAY 05		
		C	NOV 03		
		B	MAR 98		
		A	DEC 91		
		Issue	Date		

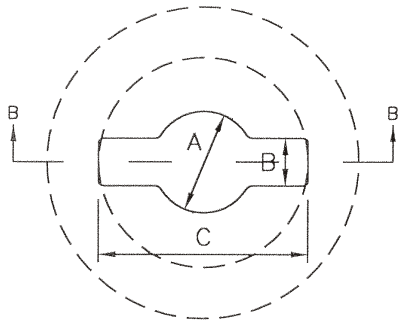
KEYWAYS:

Open

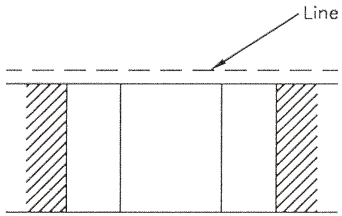


Plan

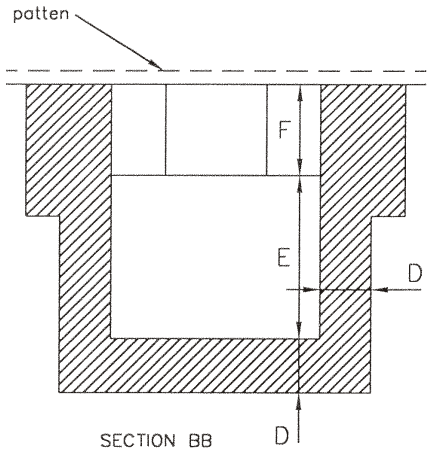
Closed



Plan

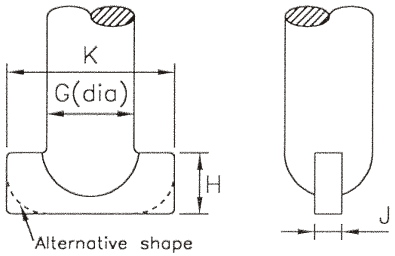


SECTION AA



SECTION BB

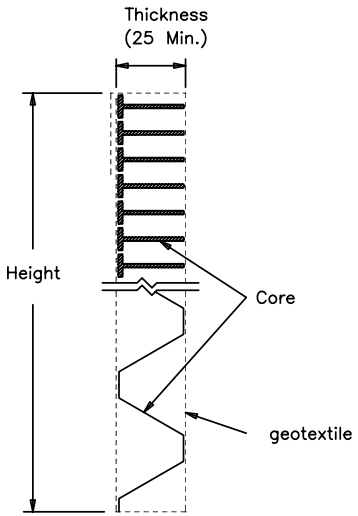
KEYS:



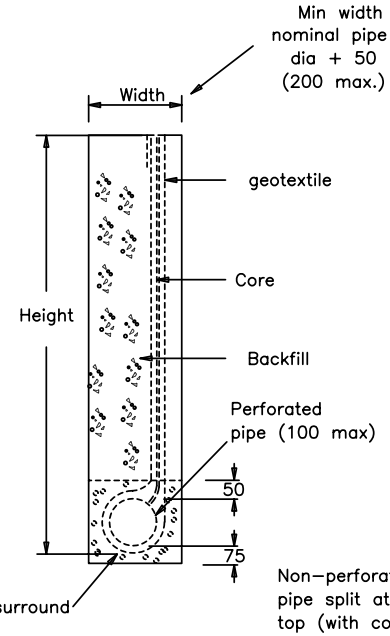
	Keyway							Key			
Type	A	B	C	D	E	F		G	H	J	K
	min./max.	min./max.	min.	min.	min.	min.					
Small	14–16	9–11	29	6	17	6		12	12	6	25
Large	22–25	9–13	44	6	35	10		20	15	6	40

All dimesions in millimetres.
NOTE: Small key for class B125 and kerb–type gully tops; large key for class D400 and class C250 covers.

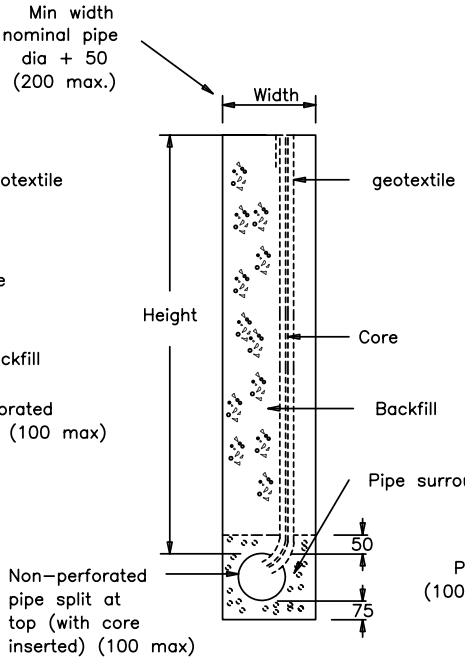
HIGHWAY CONSTRUCTION DETAILS	DRAINAGE			DETAIL OF KEYWAYS AND KEYS FOR MANHOLE TOPS AND KERB TYPE GULLY TOPS	Drawing No. F17
		A	MAR 98		
		Issue	Date		



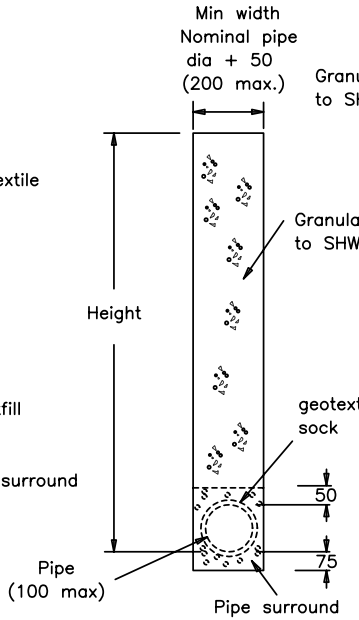
DRAIN TYPE 5



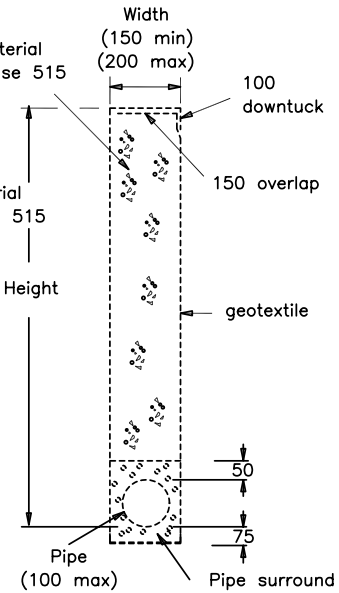
DRAIN TYPE 6



DRAIN TYPE 7



DRAIN TYPE 8



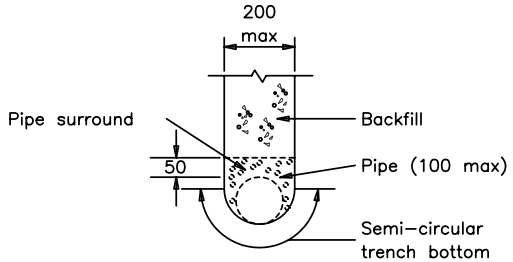
DRAIN TYPE 9

FIN DRAINS

Drain types 5, 6 and 7

NARROW FILTER DRAINS

Drain types 8 and 9

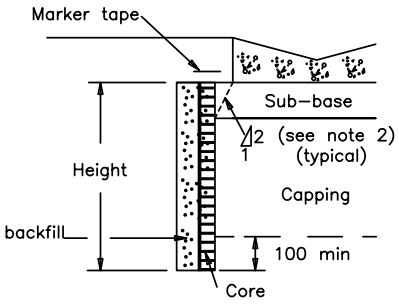


ALTERNATIVE TRENCH SHAPE
For drain types 6, 7, 8 and 9

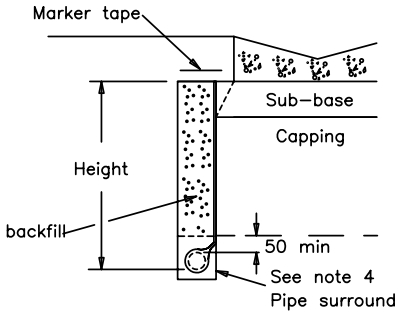
NOTES

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.

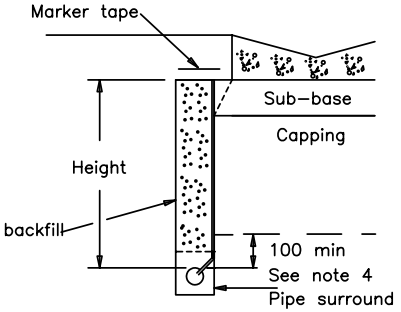
HIGHWAY CONSTRUCTION DETAILS	DRAINAGE	A	DEC 91	EDGE OF PAVEMENT DRAINS – FIN DRAINS AND NARROW FILTER DRAINS	Drawing No. F18
		Issue	Date		



DRAIN TYPE 5

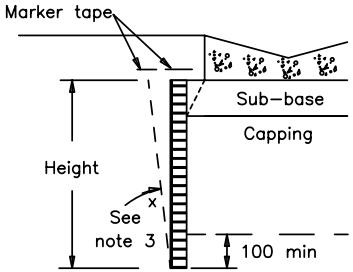


DRAIN TYPE 6

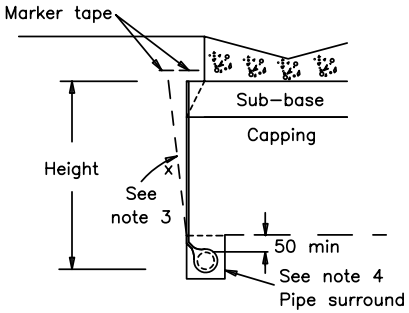


DRAIN TYPE 7

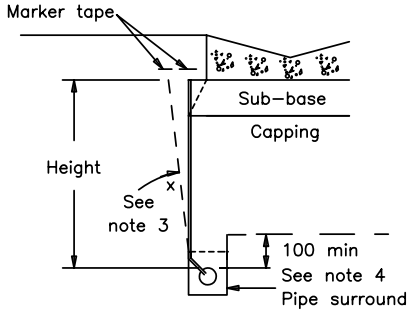
DRAINS LAID IN NARROW TRENCHES



DRAIN TYPE 5



DRAIN TYPE 6



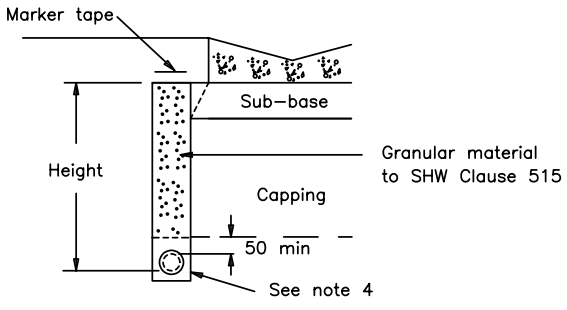
DRAIN TYPE 7

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

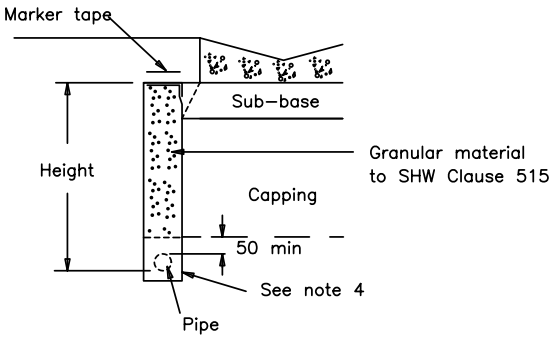
NOTES

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.
		A	DEC 91		F19
		Issue	Date		

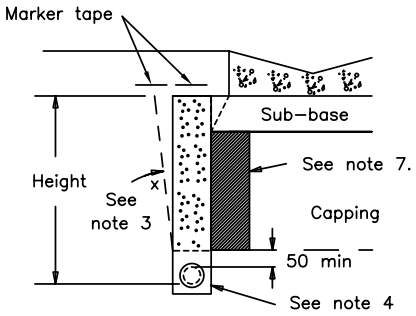


DRAIN TYPE 8

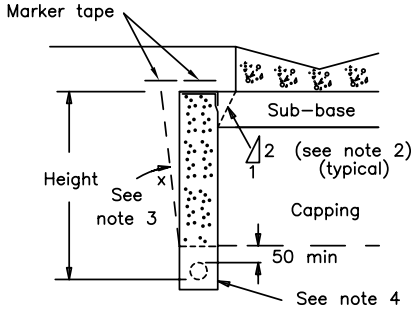


DRAIN TYPE 9

DRAINS LAID IN NARROW TRENCHES



DRAIN TYPE 8

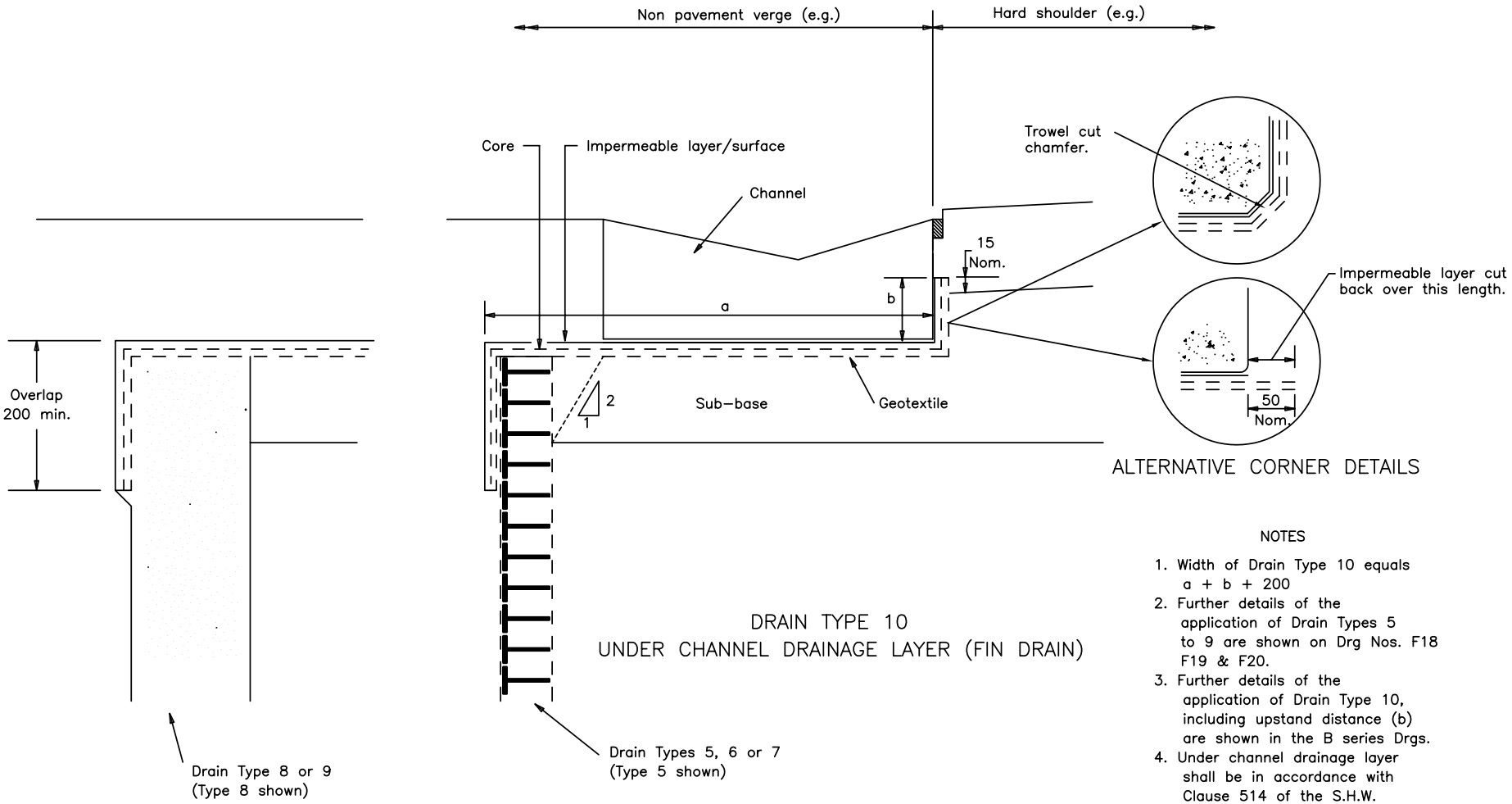


DRAIN TYPE 9

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	A	DEC 91	EDGE OF PAVEMENT DRAINS – INSTALLATION OF NARROW FILTER DRAINS	Drawing No. F20
		Issue	Date		



ALTERNATIVE CORNER DETAILS

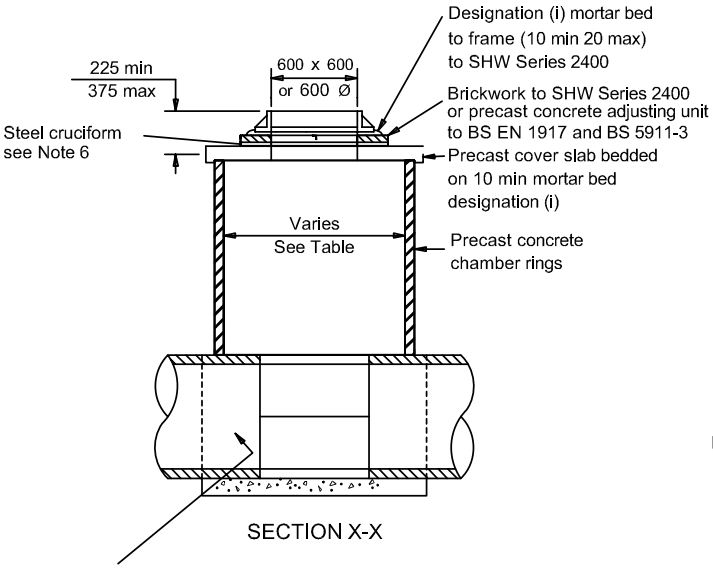
DRAIN TYPE 10
UNDER CHANNEL DRAINAGE LAYER (FIN DRAIN)

NOTES

1. Width of Drain Type 10 equals a + b + 200
2. Further details of the application of Drain Types 5 to 9 are shown on Drg Nos. F18 F19 & F20.
3. Further details of the application of Drain Type 10, including upstand distance (b) are shown in the B series Drgs.
4. Under channel drainage layer shall be in accordance with Clause 514 of the S.H.W.

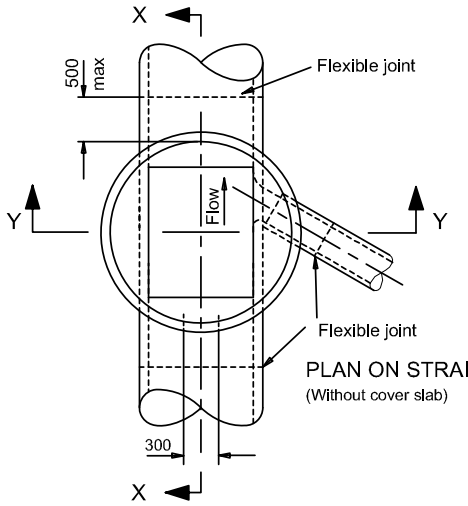
HIGHWAY CONSTRUCTION DETAILS	DRAINAGE			EDGE OF PAVEMENT DRAINS – UNDER CHANNEL DRAINAGE LAYERS	Drawing No.
		A	DEC 91		F21
		Issue	Date		

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

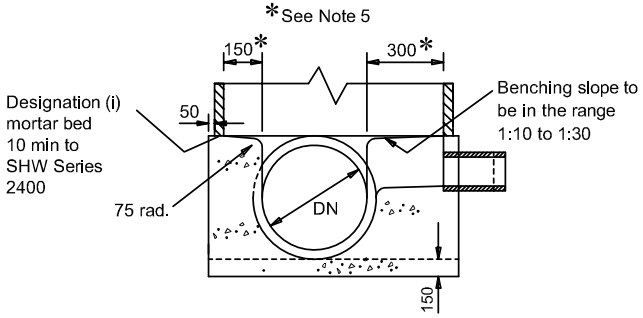


SECTION X-X

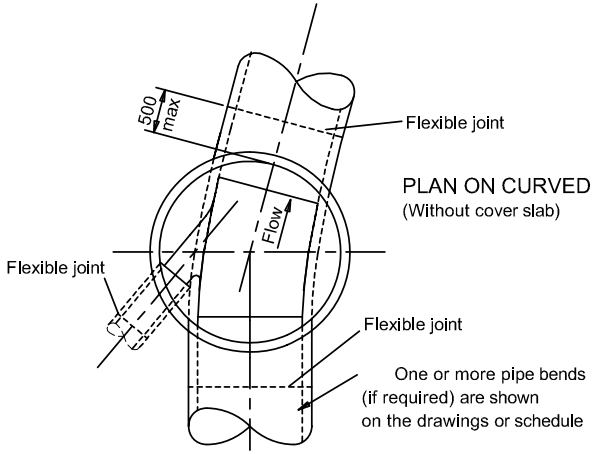
Integral in-situ ST4 concrete base walls benching & base slab with precast channel as shown or in-situ formed invert as alternative. Walls to extend 50 beyond outer faces of chamber ring. Alternatively precast concrete chamber rings may be bedded in mortar on an in-situ ST4 concrete base slab 300 greater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



PLAN ON STRAIGHT INVERT
(Without cover slab)



SECTION Y-Y



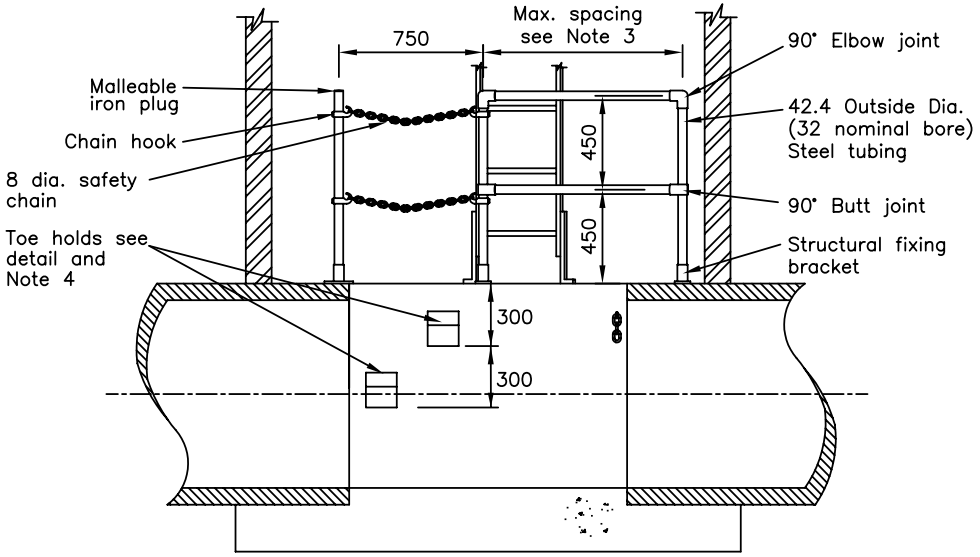
PLAN ON CURVED INVERT
(Without cover slab)

NOTES

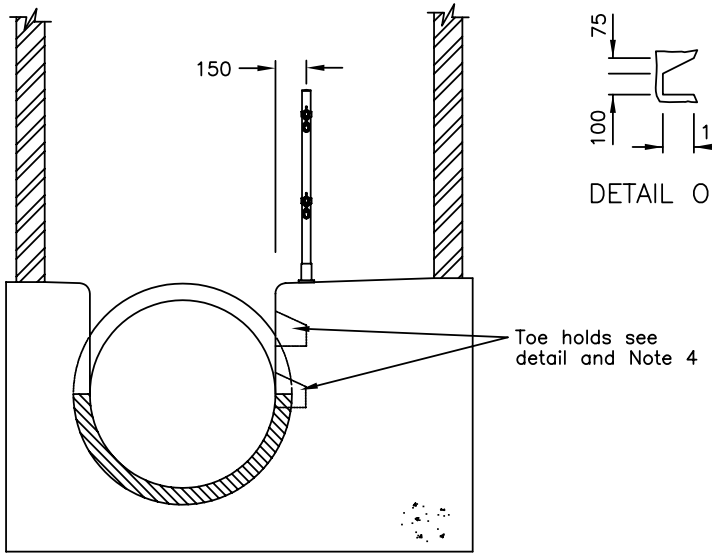
1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Chamber walls and cover slab to be constructed in precast concrete to BS EN 1917 and BS 5911-3.
3. For details of pipe size(s), invert level(s) and type of cover and frame, see cover and frame, see Drawings and Appendix 5/1.
4. See SHW regarding backfilling/surround to chamber.
5. Bencing 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

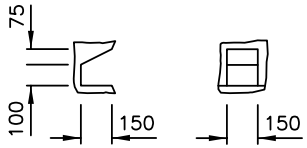
HIGHWAY CONSTRUCTION DETAILS	DRAINAGE	D	MAY 06	TYPE 11 CHAMBER (PRECAST CONCRETE DEEP INSPECTION CHAMBER)	Drawing No.
		C	NOV 04		F27
		B	NOV 03		
		A	MAY 01		
		Issue	Date		



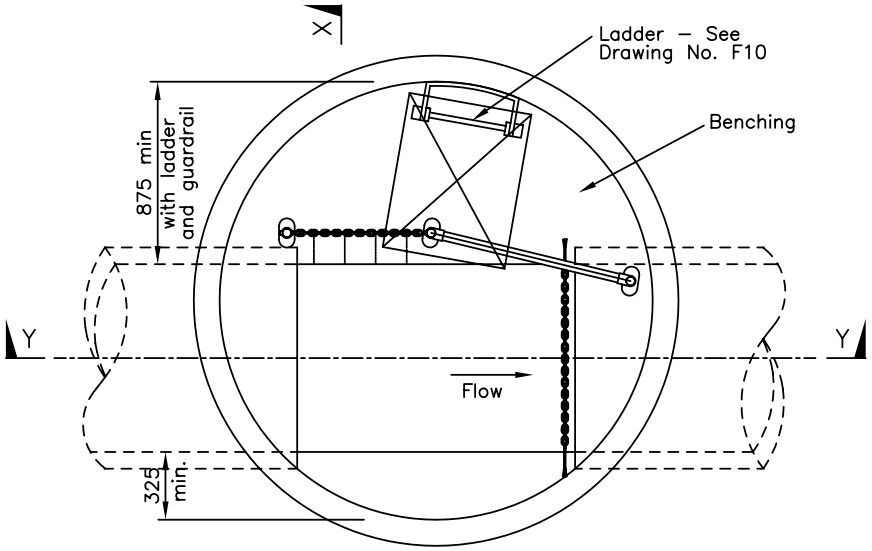
SECTION Y–Y



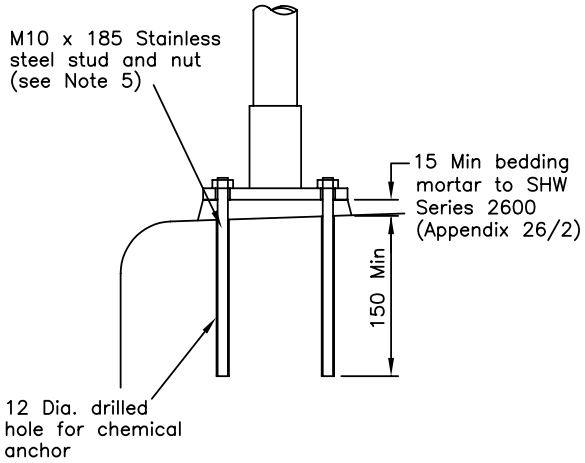
SECTION X–X



DETAIL OF TOE HOLD



TYPICAL LAYOUT



DETAIL OF BASE FIXING

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES
2. All steelwork for guardrails, posts, safety chains and hooks to be fabricated from steel to BS 970: Part 1 and to be protectected by hot dip galvanising in accordance with SHW Clause 1909.
3. Maximum spacing of guardrail posts to be 1550
   Maximum gap between chamber wall and posts to be 225
4. Toe hold detail shown for 900 pipe.
5. Stainless steel studs and nuts shall be to BS EN 10088–1, designation 1.4401. Isolating washers shall be used between stainless steel fixing stud and galvanised guardrail.

HIGHWAY CONSTRUCTION DETAILS	DRAINAGE	Issue	Date	CHAMBER FITTINGS – GUARDRAIL	Drawing No.
		B	NOV 03		F28
		A	MAY 01		