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 B 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 or horizontal surface. Min. cover of concrete shall be 150.

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 B material to S.H.W. Clause 503.3(iv).

HIGHWAY CONSTRUCTION DETAILS

DRAINAGE

SURFACE WATER DRAINS – TRENCH AND BEDDING DETAILS

Drawing No. F1

A DEC 91
Issue Date
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 %x = X+300 for drains not exceeding 1.5m cover below finished level.
%y = X+450 for drains exceeding 1.5m cover below finished level.

KEY
- Type A or C filter material to S.H.W. Clause 505 or granular material to S.H.W. Clause 503.3.
- 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. 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.
5. See SHW regarding backfilling/ surrounding to chamber.
6. All ST concrete shall be to ShW, Clause 2602.
Brickwork to SHW Series 2400 or precast concrete adjusting unit conforming to BS EN 1917 and BS 5911-3

Precast cover slab bedded on 10 min mortar bed designation (I) to SHW Series 2400

Precast concrete chamber rings see table for ring diameter/pipe diameter details

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. 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.

Plan on straight invert (without cover slab)

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

<table>
<thead>
<tr>
<th>Sub-Type</th>
<th>Minimum Chamber Ring dia.</th>
<th>Max. Pipe DN</th>
<th>Maximum No. of Branches</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>3a</td>
<td>1200</td>
<td>300</td>
<td>1</td>
<td>575</td>
</tr>
<tr>
<td>3b</td>
<td>1500</td>
<td>450</td>
<td>1</td>
<td>575</td>
</tr>
<tr>
<td>3c</td>
<td>1800</td>
<td>700</td>
<td>1</td>
<td>775</td>
</tr>
<tr>
<td>3d</td>
<td>2100</td>
<td>900</td>
<td>1</td>
<td>875</td>
</tr>
</tbody>
</table>

Designation (I) mortar bed to frame (10 min 20 max) to SHW Series 2400

Single or double manhole steps (single shown) at 250 or 300 c/c vertically, to SHW sub-Clause 507.6.
When double steps are installed, these shall be installed in a single alignment with other such steps.

SECTION X-X

SECTION Y-Y

HIGHWAY CONSTRUCTION DETAILS

DRAINAGE

TYPE 3 CHAMBER
(PRECAST CONCRETE MANHOLE)

Issue Date

Drawing No. F5

MAY 06
NOV 04
NOV 03
MAY 01
AUG 94
DEC 91

E
D
C
B
A

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

50 min.
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 5X.
4. Mortar to be designation (i) to SHW Series 2400.
5. Safety chain and handrail required where outfall pipe is 600 diameter or greater.
   Toe hold and handrail required where outfall pipe is 500 diameter or greater.
   For details of ladder, safety chain and handrail 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' surrounding to chamber.
8. All ST concrete shall be to SHW, Clause 2602.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sa</td>
<td>450</td>
<td>1600</td>
<td>625</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Sb</td>
<td>550</td>
<td>1600</td>
<td>625</td>
<td>x</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>Sc</td>
<td>900</td>
<td>2100</td>
<td>675</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

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

TYPE 5 CHAMBER
(PRECAST CONCRETE MANHOLE)

<table>
<thead>
<tr>
<th>Drawing No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>F7</td>
</tr>
</tbody>
</table>

HIGHWAY CONSTRUCTION DETAILS | DRAINAGE |

<table>
<thead>
<tr>
<th>Issue Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>E MAY 05</td>
</tr>
<tr>
<td>C NOV 03</td>
</tr>
<tr>
<td>B MAY 01</td>
</tr>
<tr>
<td>A DEC 01</td>
</tr>
</tbody>
</table>
F8 not used
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.
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. Iso-lating washers shall be used between stainless steel bolts and galvanised fittings.
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.

HIGHWAY CONSTRUCTION DETAILS

DRAINAGE

TYPE 7 CHAMBER
(1050 CATCHPIT)

FOR PIPES 450 MAX. DIAMETER

Drawing No.

F11
1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. For details of gully top, see Appendix 5.
3. The minimum depth from the top of the gully 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 5911-4.
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.
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 gully 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 plastic 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 S14 to SHW, Clause 2602.
5. Sumpless gully may also be precast concrete conforming to the concrete requirements of BS 5911-6.
NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. Blocks to be made of pressed concrete to BS EN 1340.
KEYWAYS:

Open

Closed

Plan

SECTION AA

Line of raised potten

SECTION BB

KEYS:

Alternative shape

G(dia)

K

H

J

<table>
<thead>
<tr>
<th>Type</th>
<th>Keyway</th>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Key</td>
<td></td>
</tr>
<tr>
<td></td>
<td>G</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H</td>
<td></td>
</tr>
<tr>
<td></td>
<td>J</td>
<td></td>
</tr>
<tr>
<td></td>
<td>K</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>14–16</td>
<td>9–11</td>
<td>29</td>
<td>6</td>
<td>17</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Large</td>
<td>22–25</td>
<td>9–13</td>
<td>44</td>
<td>6</td>
<td>35</td>
<td>10</td>
<td>20</td>
</tr>
</tbody>
</table>

All dimensions in millimetres.

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

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

ALTERNATIVE TRENCH SHAPE

For drain types 6, 7, 8 and 9

HIGHWAY CONSTRUCTION DETAILS

DRAINAGE

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

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. 84 & 89 to 910.
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.
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.
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.
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 Z shall be as defined in Appendix 6/3.

SECTION A–A

Concrete apron slab

Triangular S.W. Channel

Transverse joint (see note 6)

In situ mix ST4 concrete base slab

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 Z shall be as defined in Appendix 6/3.
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 U 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

IN–LINE OUTLET TO TRAPEZOIDAL S.W. CHANNEL

<table>
<thead>
<tr>
<th>Drawing No.</th>
<th>B NOV 03</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A MAR 98</td>
</tr>
<tr>
<td></td>
<td>Issue</td>
</tr>
<tr>
<td></td>
<td>Date</td>
</tr>
</tbody>
</table>

F23
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 as defined in Appendix 5/3. Apron slab, channel and sump to be designed to withstand the accidental wheel loading defined in BD 37 (DMR9 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 5831. 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.
Designation (f) mortar bed to frame (10 min 20 max) to SHW Series 2400

Brickwork to SHW Series 2400
Strength class C 32/40 in situ concrete cover slab

Brick arch for pipes of diameter greater than 225.
Benching slope to be in the range 1:10 to 1:30

In-situ mix ST4 concrete benching with precast channel as shown or in-situ formed invert as alternative

PERMITTED ALTERNATIVE COVER DETAIL FOR SUB-TYPE 9a

<table>
<thead>
<tr>
<th>Chamber Sub-Type</th>
<th>No. of Branches</th>
<th>Length L</th>
<th>Width W</th>
<th>Max. Pipe DN</th>
<th>Reinforcement T20 bars at 50 c/c</th>
</tr>
</thead>
<tbody>
<tr>
<td>9e</td>
<td>0</td>
<td>450</td>
<td>450</td>
<td>150</td>
<td>Nil</td>
</tr>
<tr>
<td>9b</td>
<td>0</td>
<td>450</td>
<td>600</td>
<td>300</td>
<td>4 No. 800 long</td>
</tr>
<tr>
<td>9c</td>
<td>1</td>
<td>1000</td>
<td>600</td>
<td>150</td>
<td>10 No. 950 long</td>
</tr>
<tr>
<td>9d</td>
<td>1</td>
<td>1000</td>
<td>750</td>
<td>300</td>
<td>10 No. 1100 long</td>
</tr>
<tr>
<td>9e</td>
<td>2</td>
<td>1000</td>
<td>750</td>
<td>150</td>
<td>6 No. 1350 long</td>
</tr>
</tbody>
</table>

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 (f) mortar or In-situ ST4 concrete to SHW, Clause 2002.
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 backfiling/surround to chamber.
5. Benching width to be 300 for branch connection.

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)
<table>
<thead>
<tr>
<th>CHAMBER SUB-TYPE</th>
<th>No. of Branches</th>
<th>Chamber ring dB</th>
<th>Max. Pipe DN</th>
</tr>
</thead>
<tbody>
<tr>
<td>11a</td>
<td>1</td>
<td>900</td>
<td>450</td>
</tr>
<tr>
<td>11b</td>
<td>1</td>
<td>1050</td>
<td>600</td>
</tr>
<tr>
<td>11c</td>
<td>1</td>
<td>1200</td>
<td>750</td>
</tr>
<tr>
<td>11d</td>
<td>1</td>
<td>1500</td>
<td>900</td>
</tr>
</tbody>
</table>

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 rings. 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 X-X**

Designation (i) mortar bed to frame (10 min 20 max) to SHW Series 2400
Brickwork to SHW Series 2400 of precast concrete adjusting unit to BS EN 1917 and BS 5911-3
Precast cover slab bedded on 10 min mortar bed designation (i)
Precast concrete chamber rings

**SECTION Y-Y**

Plan on straight invert (without cover slab)
Flexible joint
Flexible joint

**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, drawings and Appendix 5.1.
4. See SHW regarding backfilling around chamber.
5. Benching width to be 300 for branch connection.
6. Cruciform comprising 2 No. 78 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**

<table>
<thead>
<tr>
<th>HIGHWAY CONSTRUCTION DETAILS</th>
<th>DRAINAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>D MAY 06</td>
<td></td>
</tr>
<tr>
<td>C NOV 04</td>
<td></td>
</tr>
<tr>
<td>B NOV 03</td>
<td></td>
</tr>
<tr>
<td>A MAY 01</td>
<td></td>
</tr>
</tbody>
</table>

**DRAWING NO.**

F27
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 protected 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.