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Status			
Preliminary			
No.	Revision	Date	Drawn

Notes:

- This drawing is to be read in conjunction with all relevant architect's and engineer's drawings.
- It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement.

- DO NOT SCALE THIS DRAWING. ALL DIMENSIONS MUST BE CHECKED/ VERIFIED ON SITE. IF IN DOUBT ASK.

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS AND SPECIFICATIONS.

- ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE. ALL LEVELS IN METRES UNLESS NOTED OTHERWISE.

- ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

- FILLED GROUND MUST BE FILLED AND CONSOLIDATED UNDER THE SUPERVISION AND TO THE SATISFACTION OF UNITED UTILITIES BEFORE ANY SEWER WORKS ARE CARRIED OUT.

- MANHOLES SHOULD BE A MINIMUM OF 0.5m FROM KERB FACES AND SERVICE MARGINS.

- DRAINS MUST HAVE 5m CLEARANCE FROM TREES AND HEDGES, WHERE IT IS NOT POSSIBLE TO ACHIEVE THIS CLEARANCE CONCRETE BED AND SURROUND IS REQUIRED.

- THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION IN THEM MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTIONS AND BENDS.

- ALL HIGHWAY AND DRAINAGE DETAILS ARE SUBJECT TO THE APPROVAL OF THE RELEVANT AUTHORITIES PRIOR TO CONSTRUCTION.

- COVER SLABS MUST CARRY THE BSI KITEMARK OR WILL BE REJECTED BY THE United Utilities INSPECTOR. WHERE THE CLEAR OPENING OF THE KITEMARKED PRODUCT IS DIFFERENT TO THAT OF THE COVER AND FRAME, A

- LOADING BEARING SLAB SHOULD BE FITTED ABOVE THE COVER SLAB TO BRING THE SIZE DOWN TO 600mm x 600mm FOR THE United Utilities SPECIFIED COVER SIZE. PLEASE REFER TO CONCRETE PIPE SYSTEMS ASSOCIATION (CPSA), 'TECHNICAL BULLETIN' ISSUED AUTUMN 2004 FOR KITEMARKED COVER SLAB OPENING SIZES.

- ALL SEWERS TO BE LAID IN CLASS "S" BEDDING (150mm GRANULAR BED AND SURROUND), WHERE DEPTH OF COVER TO TOP OF THE SEWER IS LESS THAN 1.2m IN HIGHWAYS AND VERGES (OR LESS THAN 900mm IN NON-VEHICULAR AREAS) THEN A 150mm REINFORCED CONCRETE BED SHOULD BE PROVIDED ABOVE THE GRANULAR BED AND SURROUND. BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENT OF WATER INDUSTRY SPECIFICATION 4-08-02 (TABLE A2).

13. THE FOLLOWING CONCRETE MIXES ARE TO BE USED (IN ACCORDANCE WITH BS5328). THEY ARE SELECTED FOR BRE 363 CLASS 1 SULPHATES:

STANDARD MIX	STRENGTH CLASS OF CONCRETE	DETAILS (WHERE APPLICABLE)
GEN1	C10	FILLINGS, BLINDINGS, SOFT SPOTS AND DRAINAGE SUMPS
GEN3	C20	ALL OTHER APPLICATIONS

14. GRANOLITHIC CONCRETE BENCHING TO BE STEEL TROWELLED TO A DENSE SMOOTH FACE NEATLY SHAPED AND FINISHED TO ALL BRANCH CONNECTIONS AND LAID IN ACCORDANCE WITH THE SPECIFICATION.

15. ALL CONNECTIONS TO BE TURNED IN DIRECTION OF FLOW USING PIPE BENDS.

16. MANHOLE COVERS AND FRAMES TO BE DUCTILE IRON HEAVY DUTY GRADE D400 DOUBLE TRIANGULAR TO BS EN124 AND ARE TO BE GRADE A STANDARD IN VEHICULAR TRAFFICKED AREAS.

17. FIRST FLEXIBLE JOINT IN PIPES ADJACENT TO A MANHOLE SHALL BE A MAXIMUM OF 600mm FROM INSIDE THE FACE OF THE MANHOLE, CONNECTING TO A ROCKER PIPE. THE LENGTH OF THE ROCKER PIPE IS TO BE SUBJECT TO FOLLOWING TABLE:

PIPE DIAMETER	LENGTH OF ROCKER PIPE
150mm-600mm	600mm
675mm-750mm	1000mm
825mm +	1250mm

18. THE PRINCIPLE CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING THE EXISTING LINE AND INVERT LEVELS OF ANY CONNECTION POINT PRIOR TO UNDERTAKING INSTALLATION OF ANY NEW DRAINAGE WORKS. ANY DEVIATION TO THE LEVELS AND POSITIONS INDICATED ON THE DRAWING SHOULD BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE PROJECT ENGINEER.

19. ALL CONNECTIONS TO BE MADE BY PURPOSE MADE JUNCTIONS AS FAR AS PRACTICABLE.

20. ALL DRAINS TO BE TESTED PRIOR TO BACKFILLING. AFTER BACKFILLING AND UPON COMPLETION OF HARD LANDSCAPING. IN ADDITION ALL DRAINS TO BE INSPECTED BY CCTV METHODS PRIOR TO HARD LANDSCAPING IF REQUIRED BY THE EMPLOYER.

21. SEWERS MUST HAVE 5m CLEARANCE FROM TREES AND HEDGES.

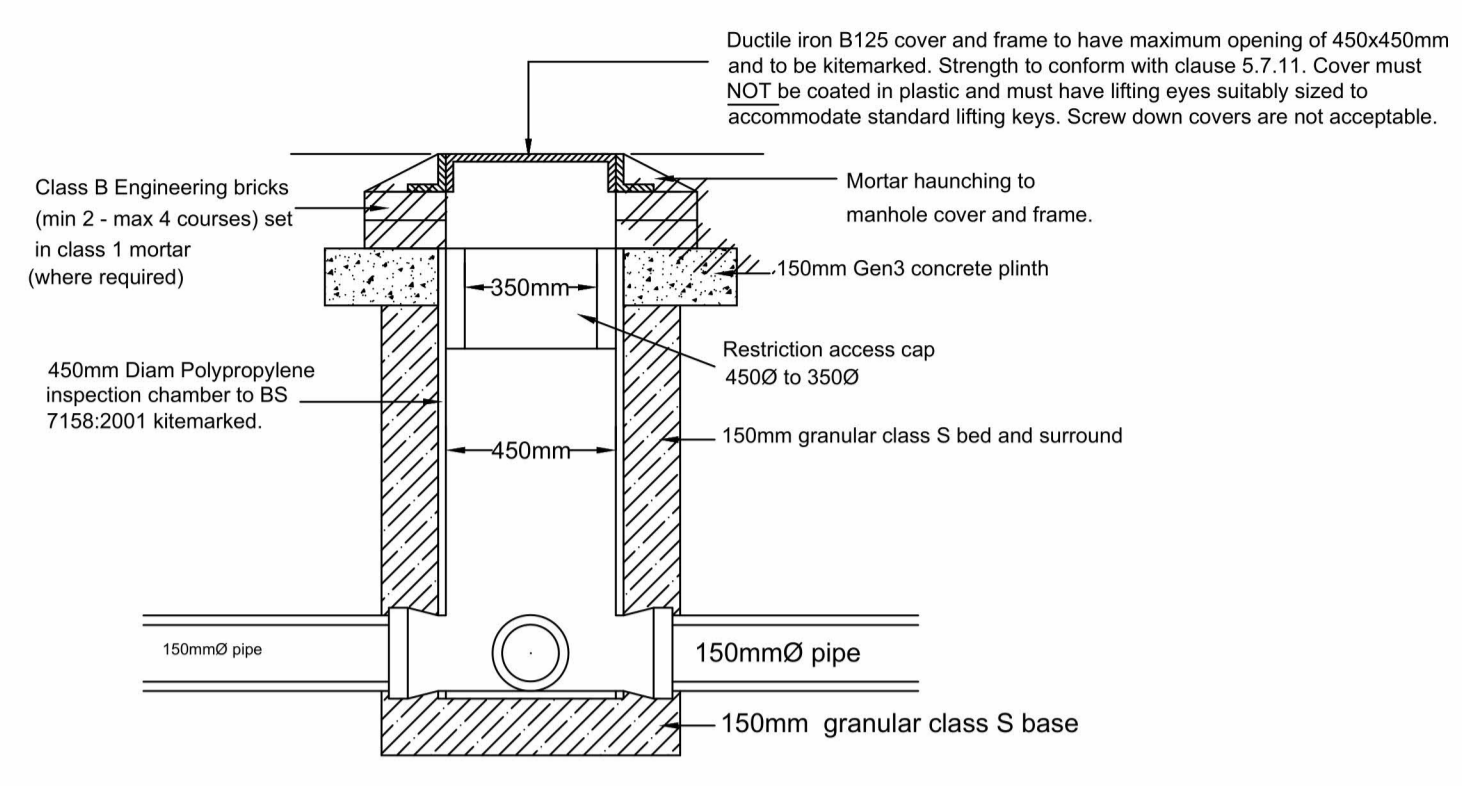
22. United Utilities IS NOT OBLIGED TO ACCEPT FILTER DRAIN / LAND DRAINAGE RUN-OFF INTO THE PUBLIC WATER SEWER NETWORK OR ADOPTABLE DRAINAGE SYSTEM DIRECTLY OR IN-DIRECTLY. FILTER DRAIN / LAND DRAINAGE RUN-OFF SHALL USE AN ALTERNATIVE METHOD OF DISPOSAL IN LIAISON WITH THE LAND DRAINAGE AUTHORITY.

23. ALL ADOPTABLE SEWER WORKS AND MATERIAL TO BE IN ACCORDANCE WITH 'DESIGN AND CONSTRUCTION GUIDANCE (DCG)/CODE FOR ADOPTION, THE RELEVANT BRITISH / EUROPEAN AND United Utilities'S STANDARDS / REQUIREMENTS / ADDENDUM TO THE MECHANICAL AND ELECTRICAL SPECIFICATION AND KITEMARKED.

24. WHERE A B125 COVER AND FRAME HAS BEEN APPROVED, THIS MUST NOT BE COATED IN PLASTIC AND MUST HAVE LIFTING EYES SUITABLY SIZED TO ACCOMMODATE STANDARD LIFTING KEYS. SCREW DOWN COVERS ARE NOT ACCEPTED.

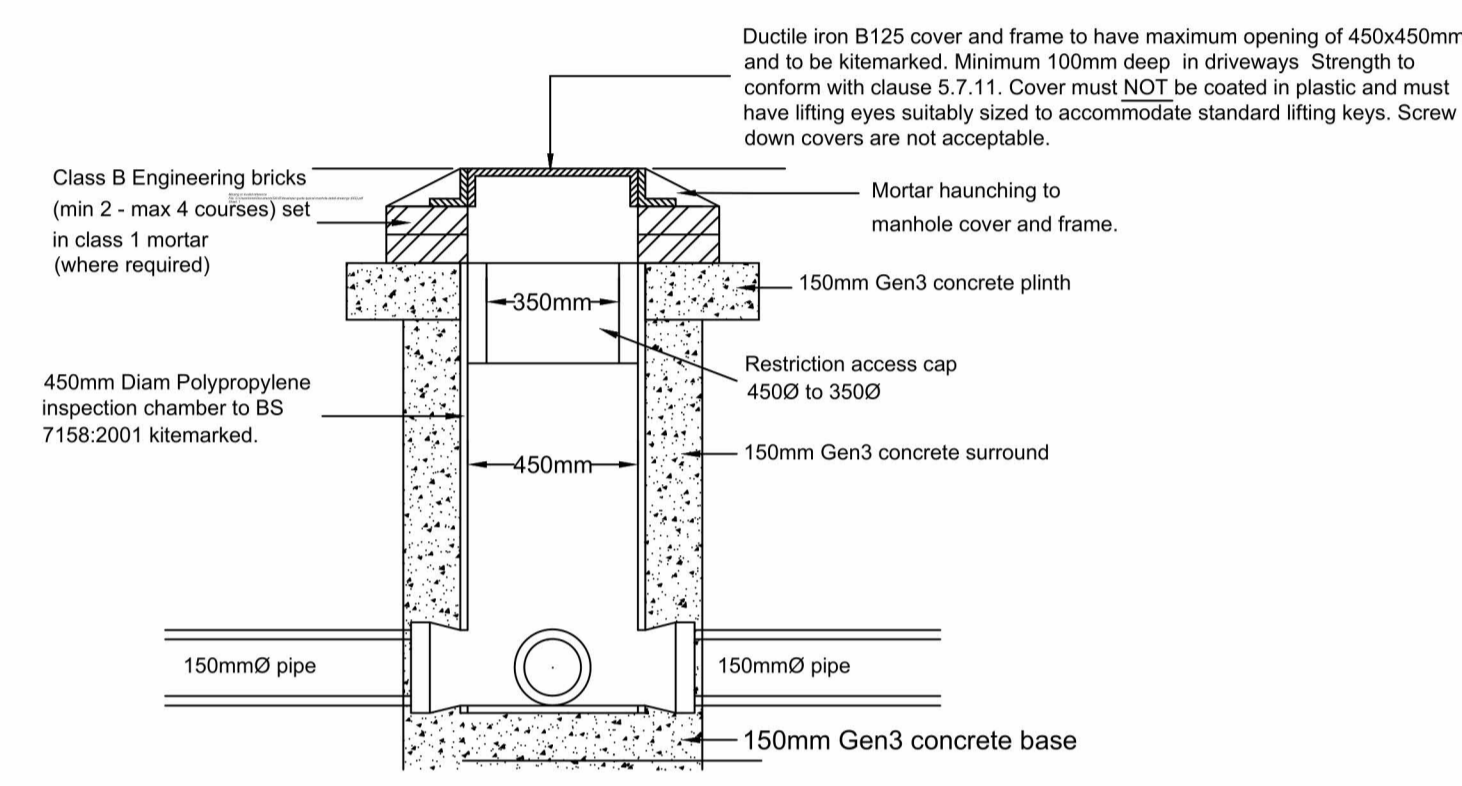
DEMARICATION CHAMBER LOCATED IN GARDENS

For depth of chamber greater than 1200mm maximum depth 3000mm



DEMARICATION CHAMBER LOCATED IN DRIVEWAY

For depth of chamber greater than 1200mm maximum depth 3000mm



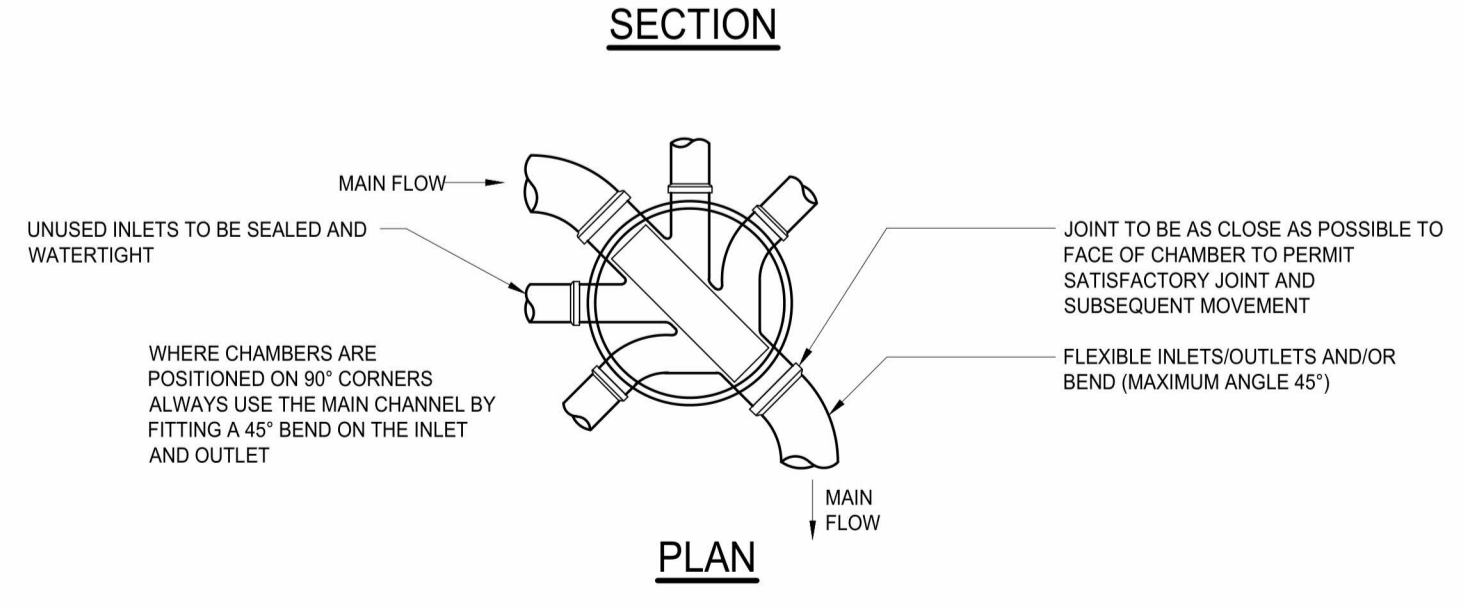
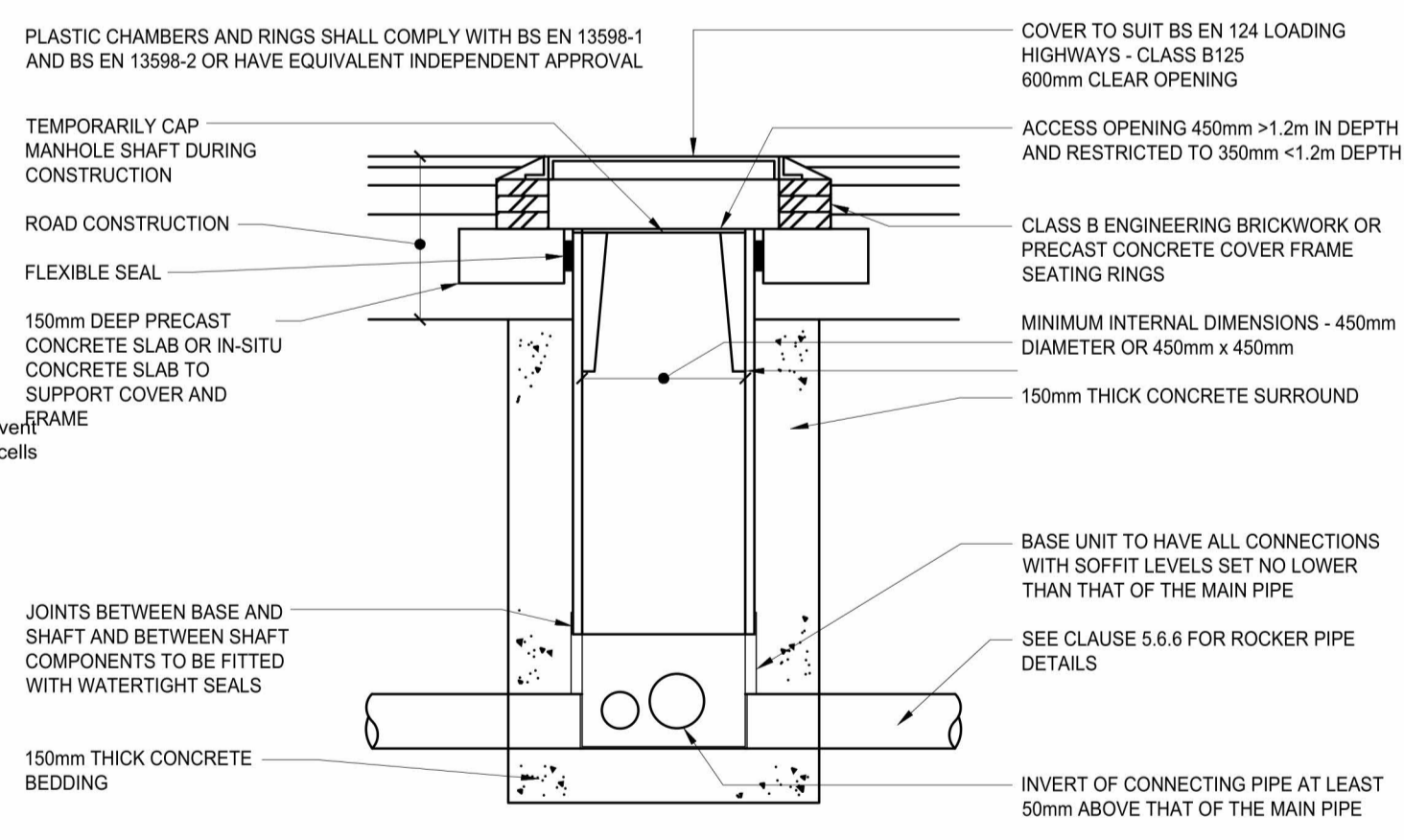
Pipes

Diameter (mm)	Gradient	F/Out	S/W
100	1:80	-	-
150	1:80	1:80	-

Vitrified clay pipes to BS EN 295 kitemarked. Unplasticised PVC pipes to BS 4660:200 & BS EN 1401-1 kitemarked. Structured Wall Unplasticised PVC pipes to WIS 4-35-01 kitemarked.

Demarcation Chamber Covers and Frames

Surface	Class (Loading in kN)	Loading
Road	D400	Vehicle Impact
Footway & Driveway	B125	Occasional vehicle loading
Gardens	B125	Pedestrian/cyclist

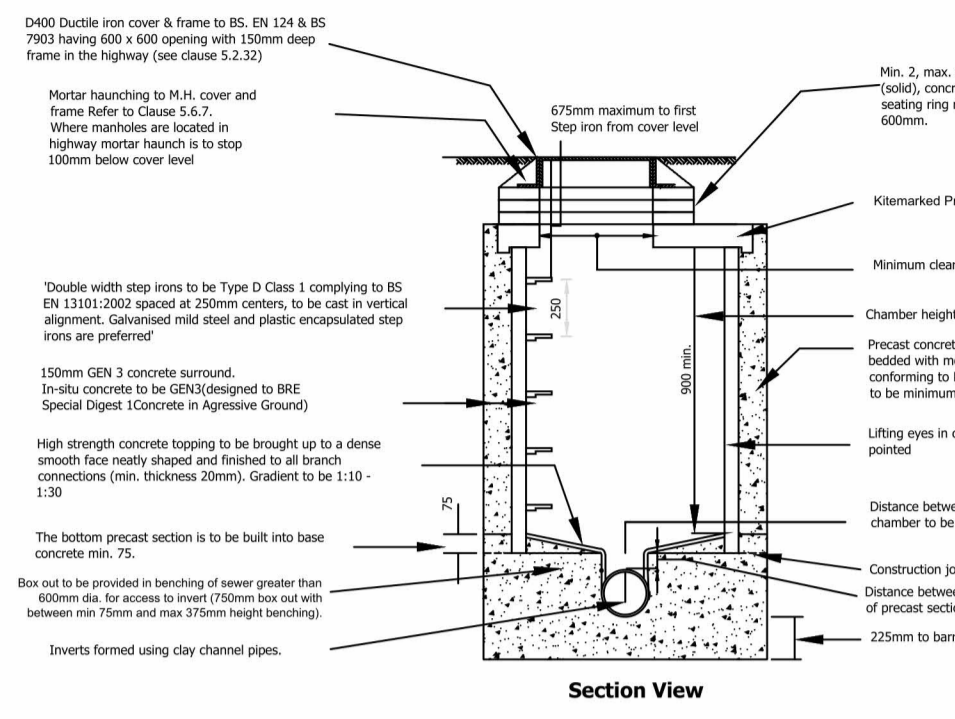


TYPE 3 DEMARICATION CHAMBER DETAIL (FLEXIBLE MATERIAL DETAIL)
 (MAX. DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE IN AREAS SUBJECT TO VEHICLE LOADING 2m, NON ENTRY)
 SCALE 1:20

Typical Manhole Construction

Type B (Design and Construction Guidance)

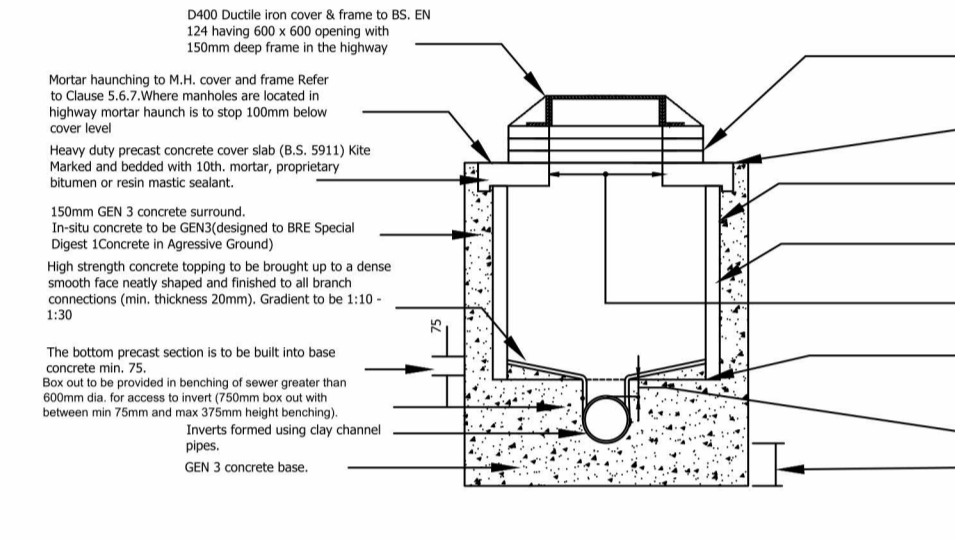
For use on manholes with maximum depth from cover level to soffit of pipe 3000mm



Shallow Manhole Construction

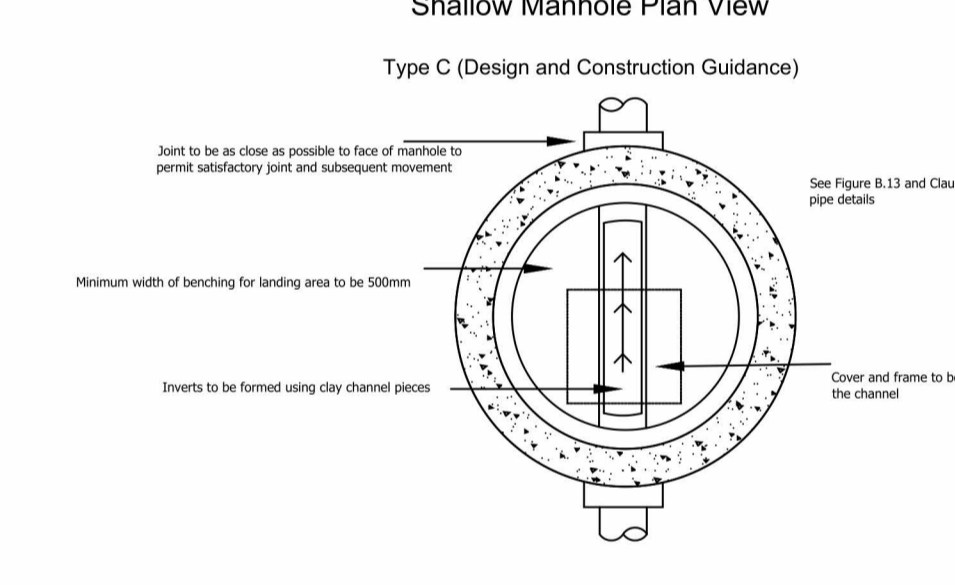
Type C (Design and Construction Guidance)

Construction of manhole where depth from soffit to cover level less than 1.5m



Shallow Manhole Plan View

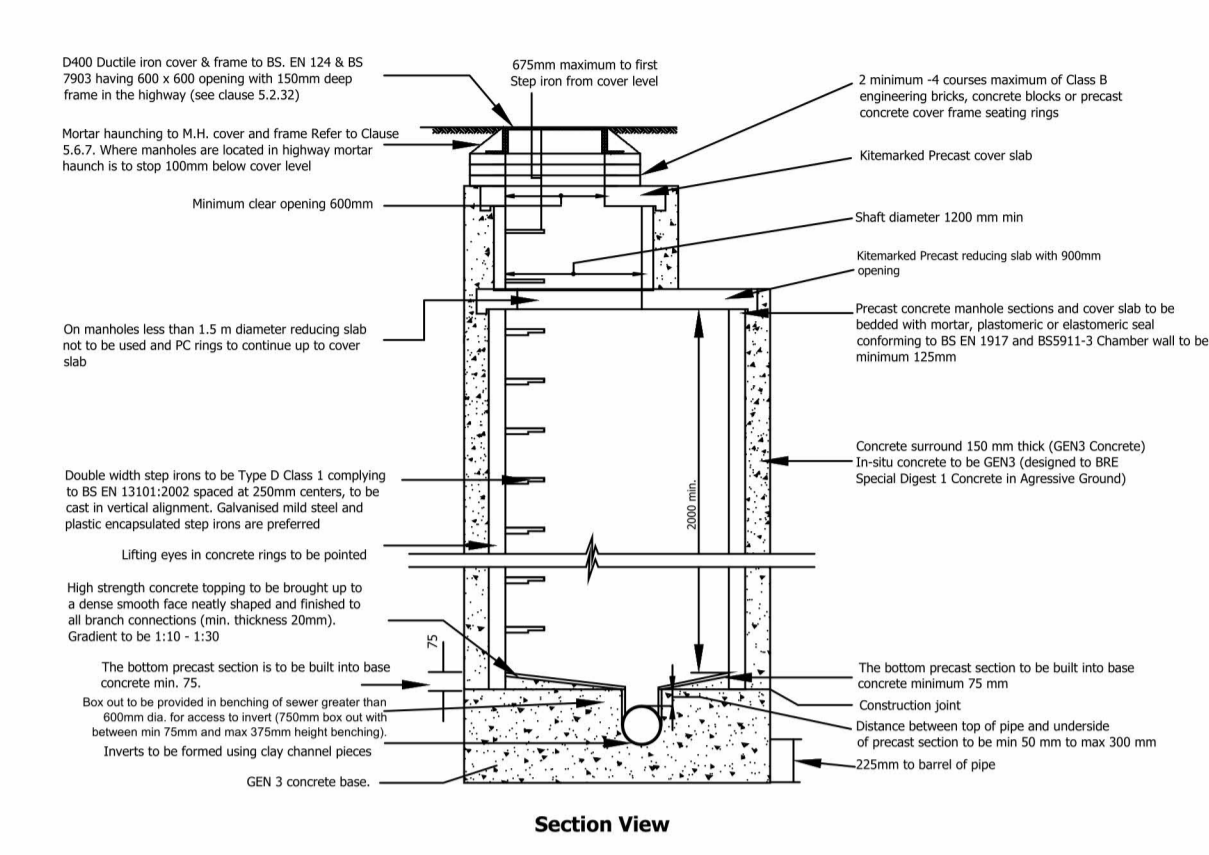
Type C (Design and Construction Guidance)



Typical Manhole Construction

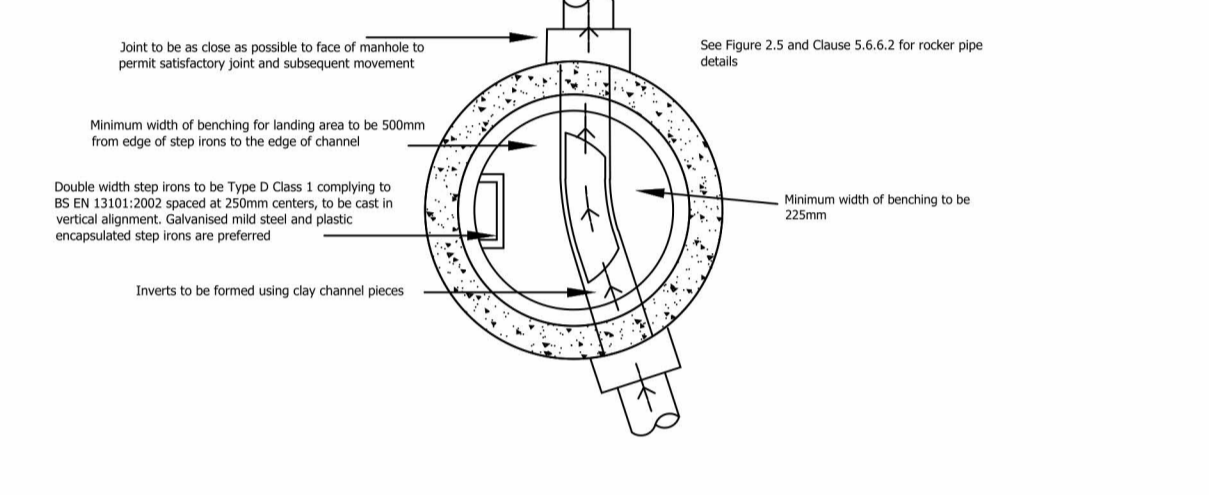
Type A1 (Design and Construction Guidance)

For use on manholes of depth from cover level to soffit of pipe between 3000mm and 6000mm



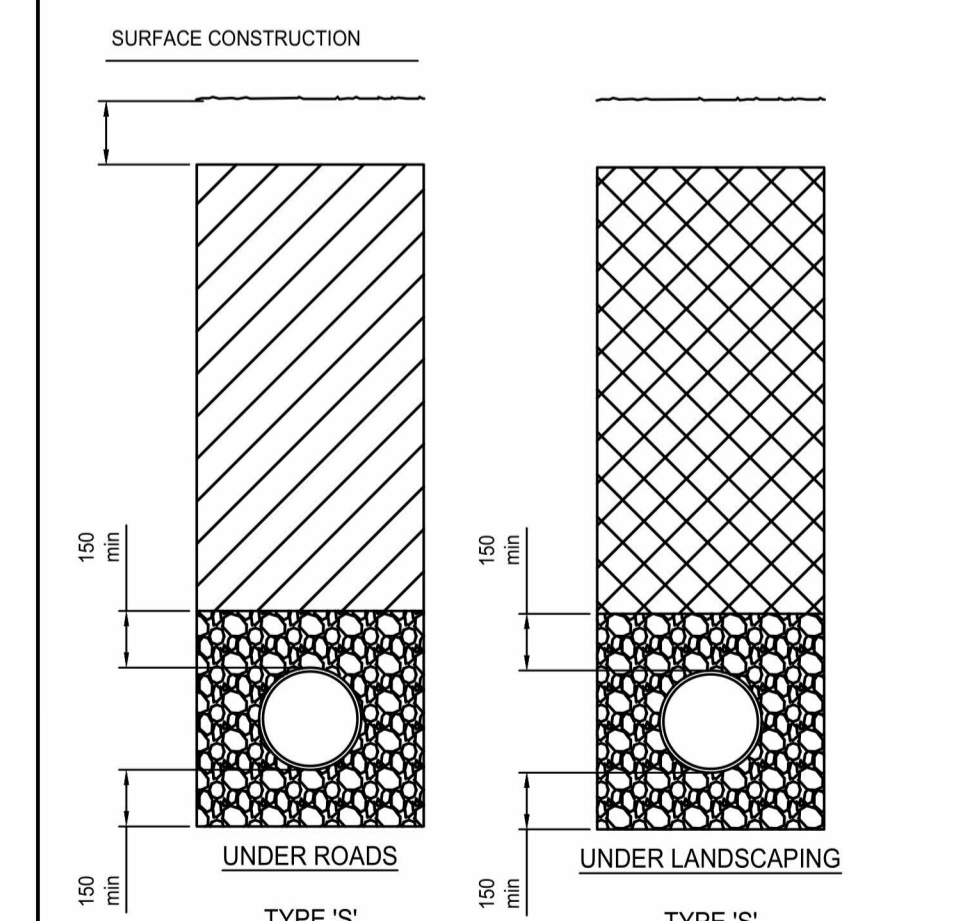
Typical Manhole Plan View

Type A and Type B (Design and Construction Guidance)



Manhole Diameters

Nominal internal diameter of largest pipe in manhole (mm)	Minimum nominal internal diameter of manhole (mm)
Up to 300	1000
375-450	1500
450-750	1900
750-900	1900
Greater than 900	Specific detailed drawing required

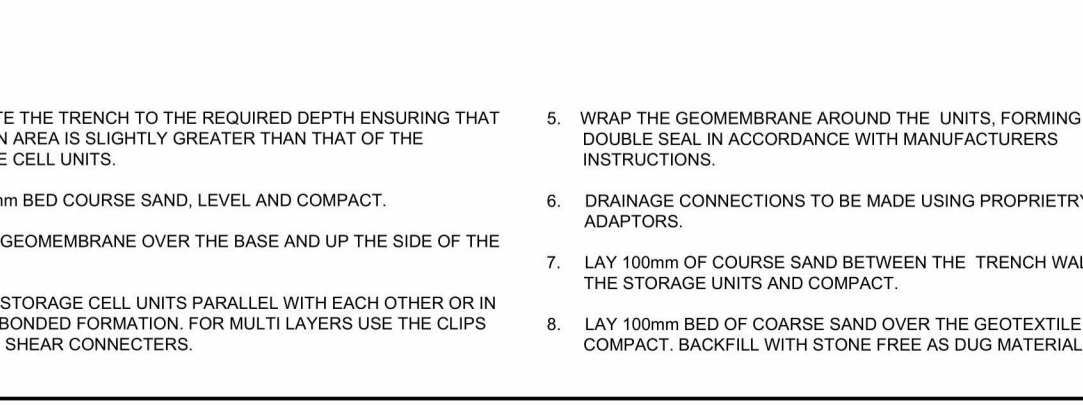


DRAINS WITH GRANULAR (TYPE S) BED AND SURROUND
 (SCALE 1:20)

APPLICABLE UNDER ROADS / SERVICE YARDS WHERE DRAINS HAVE MORE THAN 1200 COVER IF ADOPTED OR MORE THAN 900 COVER IF NOT ADOPTED

APPLICABLE UNDER FOOTPATHS, VERGES AND OTHER NON-TRAFFICKED AREAS WHERE DRAINS HAVE MORE THAN 900 COVER IF ADOPTED OR MORE THAN 600 COVER IF NOT ADOPTED

SECTION THROUGH ATTENUATION CELLS (1:25)



- EXCAVATE THE TRENCH TO THE REQUIRED DEPTH ENSURING THAT THE PLAN AREA IS SLIGHTLY GREATER THAN THAT OF THE STORAGE CELL UNITS.
- LAY 100mm BED COURSE SAND, LEVEL AND COMPACT.
- LAY THE GEOMEMBRANE OVER THE BASE AND UP THE SIDE OF THE TRENCH.
- LAY THE STORAGE CELL UNITS PARALLEL WITH EACH OTHER OR IN A BRICK BONDED FORMATION. FOR MULTI LAYERS USE THE CLIPS AND THE SHEAR CONNECTORS.
- WRAP THE GEOMEMBRANE AROUND THE UNITS, FORMING A DOUBLE SEAL IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS.
- DRAINAGE CONNECTIONS TO BE MADE USING PROPRIETARY ADAPTORS.
- LAY 100mm OF COURSE SAND OVER THE TRENCH WALLS AND THE STORAGE UNITS AND COMPACT.
- LAY 100mm BED OF COARSE SAND OVER THE GEOTEXTILE AND COMPACT. BACKFILL WITH STONE FREE AS DUG MATERIAL.

SIZING OF BEDDING MATERIAL TO IGN 4-08-01

PIPE DIAMETER	AGGREGATE	
	NOMINAL SINGLE-SIZED	GRADED
UP TO 100mm	10mm	
OVER 100mm TO 150mm	10mm 14mm	14mm TO 5mm
OVER 150mm TO 300mm	10mm 14mm 20mm	14mm TO 5mm 20mm TO 5mm
OVER 300mm TO 550mm	14mm 20mm	14mm TO 5mm 20mm TO 5mm
OVER 550mm	14mm 20mm 40mm	14mm TO 5mm 20mm TO 5mm 40mm TO 5mm

MINIMUM SUPPORTED TRENCH WIDTHS TO BS EN 1610

OUTSIDE DIAMETER	WIDTH OF TRENCH				
	TRENCH DEPTH				
	0m - 0.99m	1.00m - 1.74m	1.75m - 3.99m	4.00m+	
100mm	500mm	800mm	900mm	1000mm	
150mm	550mm	800mm	900mm	1000mm	
225mm	625mm	800mm	900mm	1000mm	
300mm	800mm	900mm	900mm	1000mm	
375mm		1075mm			
450mm		1150mm			
525mm		1225mm			
600mm		1300mm			
675mm		1375mm			
750mm		1600mm			
825mm		1675mm			
900mm		1750mm			
975mm		1825mm			
1050mm		1900mm			
1200mm		2050mm			
OVER 1200mm	PIPE DIAMETER + 1000mm				



CONTACT

CLIENT

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PROJECT

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DRAWING TITLE

DRAINAGE DETAILS

Drawn	AD	Chkd	RT	Date	Jan 2024	Scale	-
Sheet Size	A1	Drawing No.	23545-DR-C-0106	Revision			P1