

**CLASS S BEDDING DETAIL**  
SCALE 1:20

**CLASS Z CONCRETE BEDDING DETAIL**  
SCALE 1:20

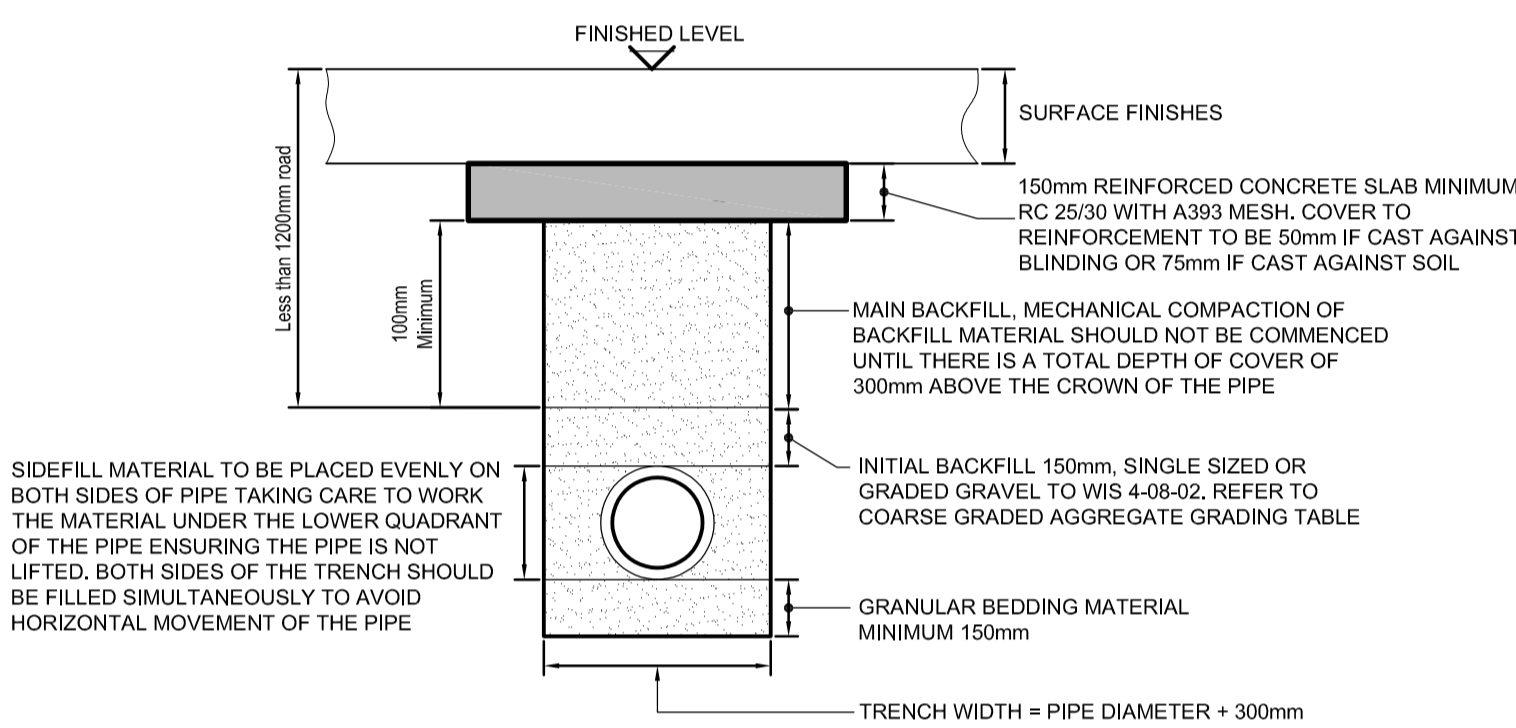
4/20 COARSE GRADED AGGREGATE GRADING TABLE	
SIIEVE SIZE (mm)	PERCENTAGE PASSING (%)
40	100
31.5	98 - 100
20	90 - 99
10	25 - 70
4	0 - 15
2	0 - 5

TABLE 2: 4/20 COARSE GRADED AGGREGATE GRADING TABLE

NOMINAL PIPE DIA (mm)	SINGLE SIZED (mm)	GRADED (mm)
100	10	N/A
OVER 100 TO 150	10 OR 14	14 TO 5
OVER 150 TO 300	10, 14 OR 20	14 TO 5 OR 20 TO 5
OVER 300 TO 525	14 OR 20	14 TO 5 OR 20 TO 5
GREATER THAN 525	14, 20 OR 40	14 TO 5, 20 TO 5 OR 40 TO 5

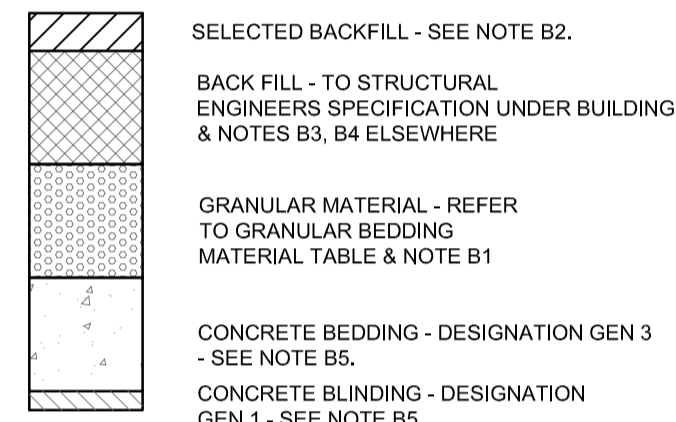
**GRANULAR BEDDING MATERIAL TABLE**  
(ALL AGGREGATES TO BS EN 12342, PD 6682-6:2003 & BS EN 13055-2)

**NOTES**  
A) Bc = OUTSIDE DIAMETER OF PIPE BARREL.  
B) Y = FOR UNIFORM SOILS.  
SLEEVE JOINTED PIPES, MIN. 50mm OR 1/8Bc, WHICHEVER IS THE GREATER, SOCKETED PIPE, MIN. 100mm OR 1/8Bc, WHICHEVER IS THE GREATER UNDER BARRELS, NOT LESS THAN 50mm UNDER SOCKETS, FOR ROCK OR MIXED SOILS CONTAINING ROCK BANDS, BOULDERS, STONES OR OTHER IRREGULAR HARD SPOTS; SLEEVE JOINTED PIPES, MIN. 150mm OR 1/4Bc, WHICHEVER IS THE GREATER, SOCKETED PIPE, MIN. 200mm OR 1/4Bc, WHICHEVER IS THE GREATER UNDER BARRELS, NOT LESS THAN 150mm UNDER SOCKETS.  
CONCRETE BED AND SURROUND TO BE DISCONTINUED AT EVERY PIPE JOINT (NOT TO EXCEED 5m) USING COMPRESSIBLE FILLER, COMPRESSIBLE FILLER TO BE 18mm THICK FOR PIPEWORK UP TO 450mm DIAMETER, FOR PIPES OVER 450mm FLEXCELL JOINTS TO BE 36mm THICK



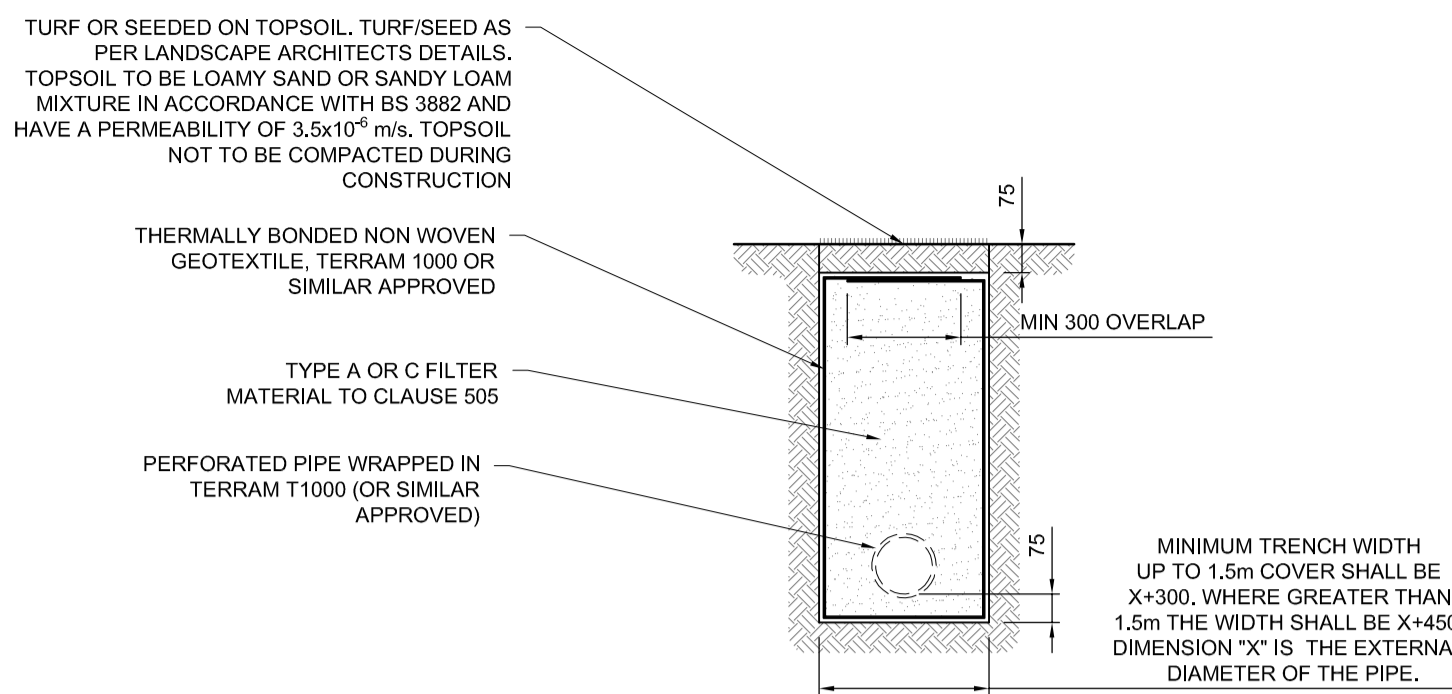
**CONCRETE PROTECTION DETAIL**  
SCALE 1:20

**PIPE BEDDING DETAIL KEY**

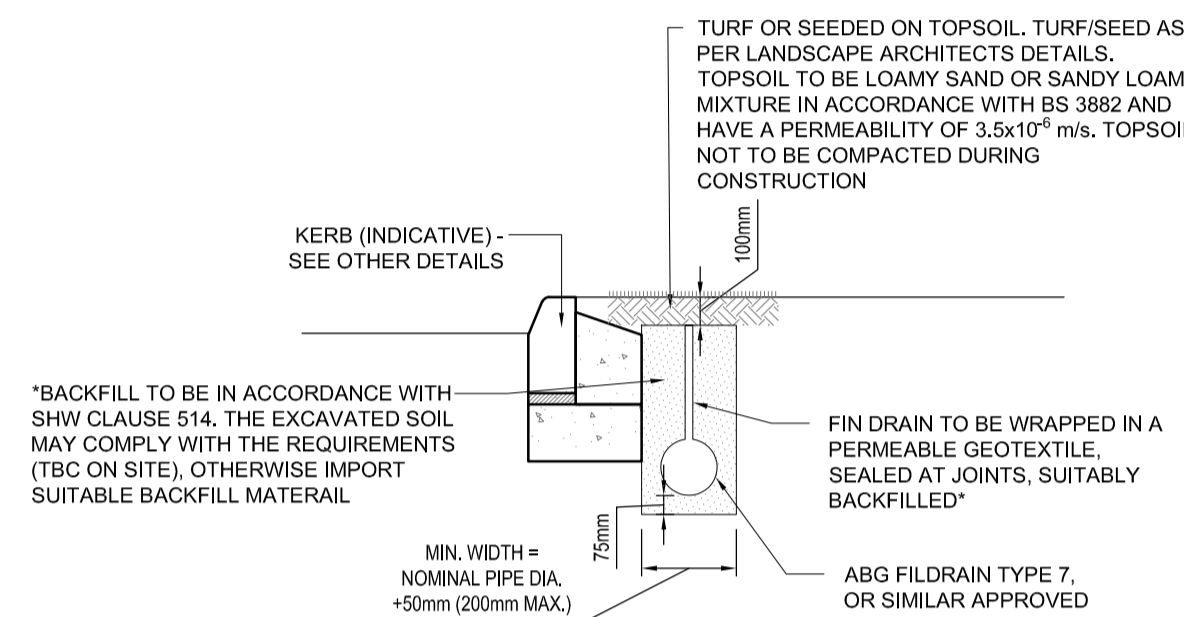


**BEDDING NOTES:**

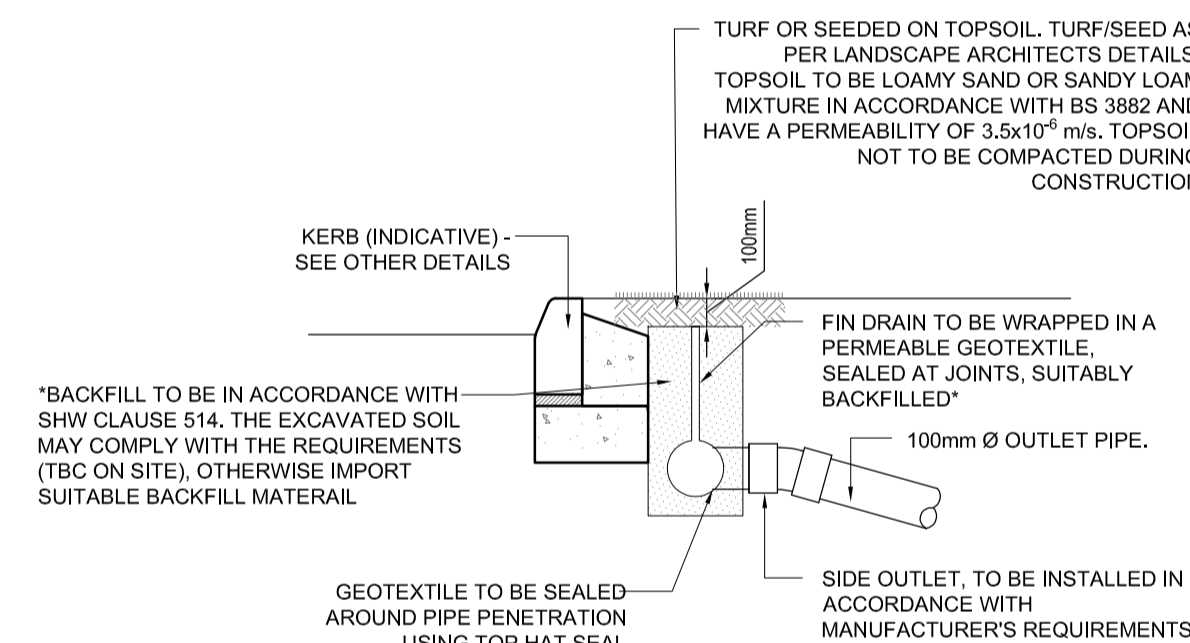
- B1. PIPE BEDDING MATERIALS TO COMPLY GENERALLY WITH SHW - SERIES 500 - CLAUSE 503. GRANULAR BEDDING MATERIALS TO ALSO COMPLY WITH BS EN 12342 & THE GRANULAR BEDDING MATERIAL TABLE ON THIS DRAWING.
- B2. SELECTED BACKFILL MATERIAL TO BE PROVIDED ABOVE THE PIPE SURROUND TO A HEIGHT OF 300mm MINIMUM ABOVE THE TOP OF THE PIPE. SELECTED BACKFILL MATERIAL TO BE CLASS 8 - LOWER TRENCH FILL MATERIAL IN ACCORDANCE WITH SHW - SERIES 600 TABLE 61 & TO COMPRISE OF UNIFORM SOIL, FREE FROM STONES LARGER THAN 40mm, LUMPS OF CLAY OVER 100mm, TIMBER, FROZEN MATERIAL & VEGETABLE MATTER. SELECTED BACKFILL MATERIAL TO BE PLACED & COMPACTED IN LAYERS NOT EXCEEDING 150mm IN THICKNESS. SHOULD THE MATERIAL BE UNSUITABLE OR WEATHER CONDITIONS AFFECT THE MATERIALS STABILITY, THEN A SUITABLE HARD GRANULAR MATERIAL SHALL BE USED.
- B3. GENERAL BACKFILL TO DRAINAGE TRENCHES [OTHER THAN FILTER DRAINS] IN VEHICULAR TRAFFICKED AREAS ABOVE THE PIPE BEDDING & SELECTED BACKFILL SHALL BE CLASS 1, 2 OR 3 GENERAL FILL MATERIAL IN ACCORDANCE WITH SHW - SERIES 600.
- B4. GENERAL BACKFILL UNDER NON-VEHICULAR TRAFFICKED AREAS TO BE SUITABLE AS-DUG MATERIAL COMPACTED IN ACCORDANCE WITH SHW - SERIES 600 IN LAYERS NOT EXCEEDING 225mm, EACH LAYER COMPACTED TO FORM A STABLE TRENCH BACKFILL. SHOULD THE MATERIAL BE UNSUITABLE OR WEATHER CONDITIONS AFFECT THE MATERIALS STABILITY, THEN A HARD GRANULAR MATERIAL SHALL BE USED UP TO FORMATION LEVEL.
- B5. ALL CONCRETE TO BE DESIGNATED CONCRETE TO CONFORM TO BS 8500-2.



**FILTER DRAIN DETAIL**  
SCALE - 1:20



**TYPICAL TYPE 7 FIN DRAIN DETAIL**  
(IN ACCORDANCE WITH MCHW VOL. 3 SECTION 1, DRAWING F18)  
SCALE - 1:20



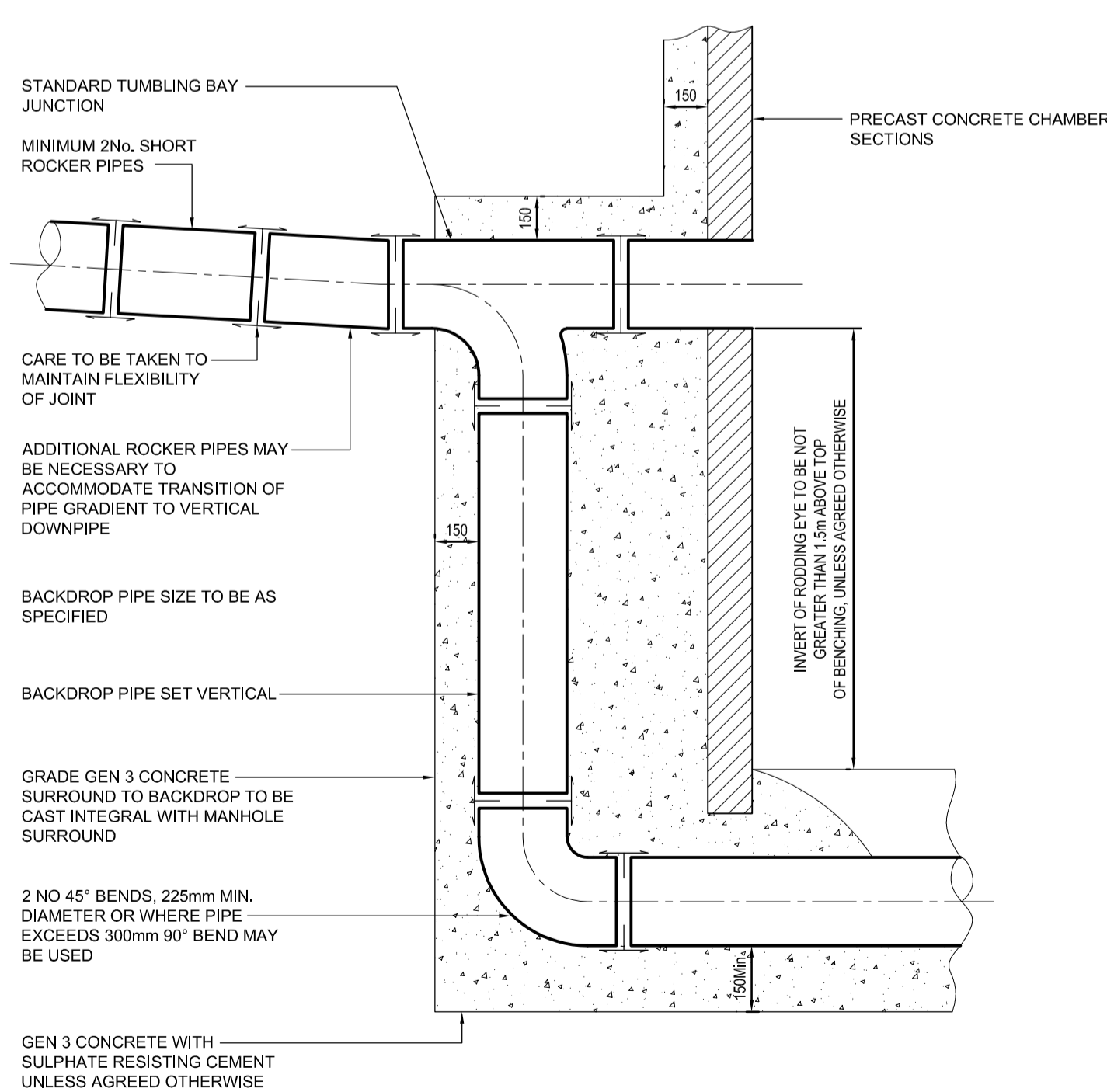
**TYPICAL FIN DRAIN OUTLET DETAIL**  
SCALE - 1:20

**CONCRETE NOTES:**

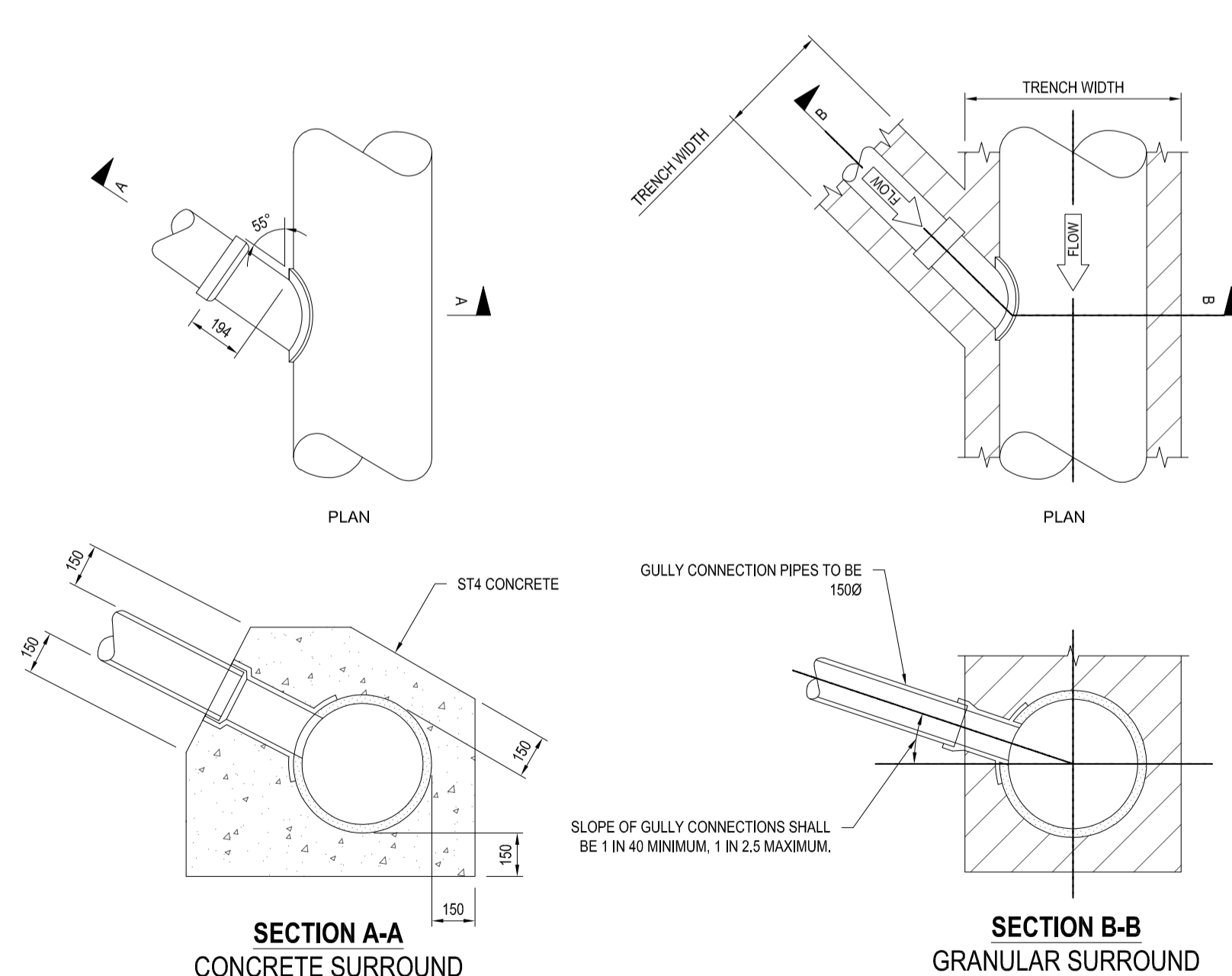
- DESIGNATED CONCRETE:**
- ALL DESIGNATED CONCRETE TO CONFORM TO BS 8500-2
  - STRUCTURAL CONCRETE:
    - COMPRESSIVE STRENGTH CLASS - C45/55
    - MAXIMUM WATER CEMENT RATIO - 0.35
    - MINIMUM CEMENT CONTENT - 380 kg/m³
    - CEMENT COMBINATION TYPE - SRPC
    - MAXIMUM AGGREGATE SIZE - 20mm
    - CONSISTENCY CLASS - TO BE AGREED ON SITE
    - COVER TO CONCRETE - 55mm (MINIMUM)
- DESIGNATED CONCRETE:**
- ALL DESIGNATED CONCRETE TO CONFORM TO BS 8500-2
  - BLINDING CONCRETE:
    - DESIGNATION - GEN 3
    - CEMENT TYPE - SRPC
    - MAXIMUM AGGREGATE SIZE - 20mm
    - CONSISTENCY CLASS - TO BE AGREED ON SITE
- PRECAST CONCRETE**
- PRECAST CONCRETE MANHOLES TO BE IN ACCORDANCE WITH BS 5911 PART 200. PRECAST CONCRETE RISERS AND COVER SLABS TO BE JOINTED WITH CEMENT MORTAR.
  - ALL CONCRETE PIPES TO BE CLASS 120 TO BS EN 1916/BS 5911-1:2002.
  - ALL CONCRETE MANHOLES TO BE IN ACCORDANCE WITH BS 1917/BS EN 5911-3:2010.
  - INSITU AND PRECAST CONCRETE UNITS SHALL HAVE SULPHATE RESISTING PORTLAND CEMENT TO BS 4027, UNLESS AGREED OTHERWISE WITH THE ADOPTING AUTHORITY.
  - NOMINAL COVER TO ALL REINFORCEMENT TO BE 50mm (UNLESS NOTED OTHERWISE).
  - ALL HIGH YIELD REINFORCEMENT (H BARS) TO BE GRADE 500.
  - BOTTOM STEEL REINFORCEMENT TO BE SUPPORTED ON 50x50x50mm DEEP CONCRETE BLOCKS OR SIMILAR, WIRED TO THE REINFORCEMENT.
  - TYING WIRE TO BE STAINLESS STEEL.
  - SPACING OF REINFORCEMENT TO BE ADJUSTED LOGICALLY AS REQUIRED IN PARTICULAR TO AVOID HOLES, POCKETS, SOCKETS RECESSES AND HOLDING DOWN BOLTS.
  - ALL EXPOSED EDGES TO HAVE 20x20mm CHAMFER.
  - IMMEDIATELY AFTER LAYING, CONCRETE SHALL BE PROTECTED FROM RAIN, RAPID TEMPERATURE CHANGE, FROST AND FROM DRYING OUT. ALSO MAINTAIN THE CONCRETE ABOVE 2' IN COLD WEATHER. THE METHODS USED SHALL BE IN ACCORDANCE WITH BS 5400, OR APPROVED BY THE ENGINEER.

**DRAINAGE NOTES:**

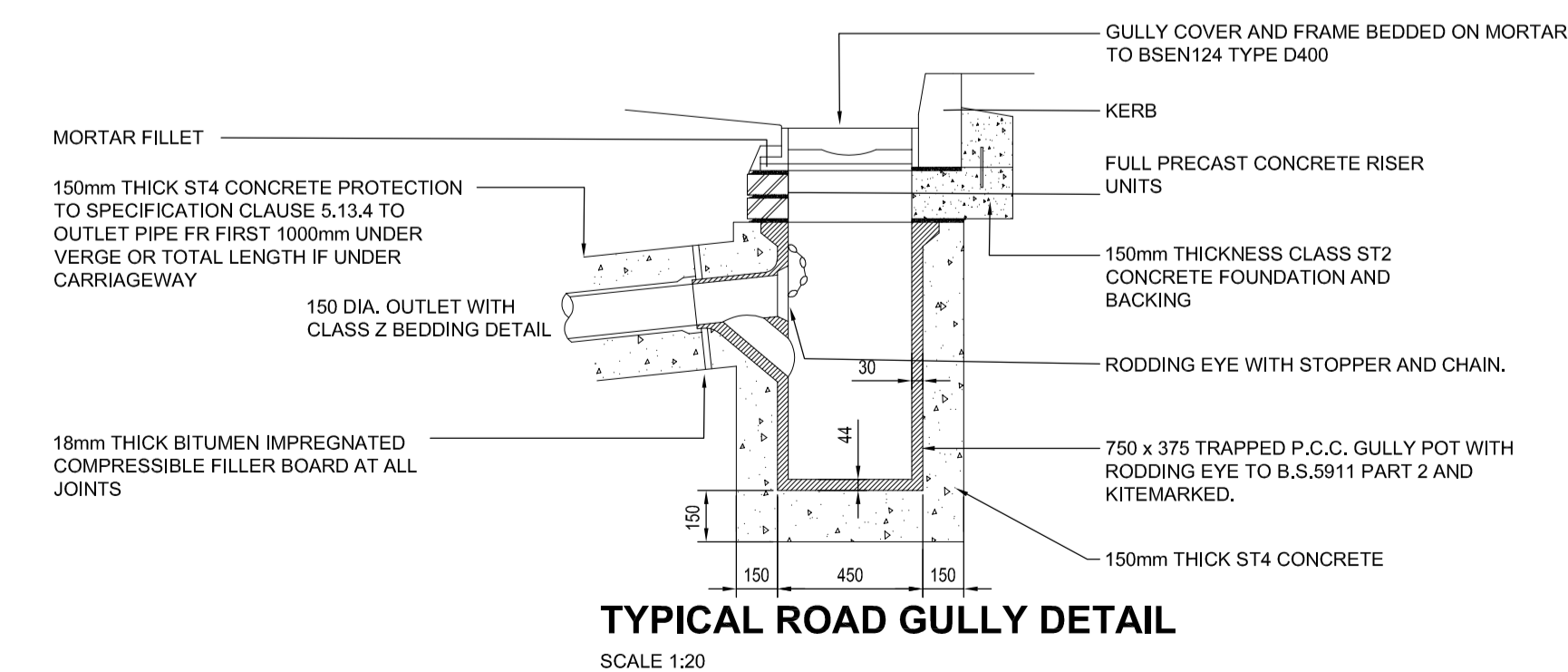
- D01. ALL SEWER WORKS AND MATERIAL TO BE IN ACCORDANCE WITH MCHW VOLUME 1 SPECIFICATION FOR HIGHWAY WORKS, AND THE RELEVANT BRITISH/EUROPEAN STANDARDS/REQUIREMENTS/ADDENDUMS AND KITEMARKED. THIS INCLUDES THE MCHW VOLUME 1 SERIES 500 APPENDIX 5/1, AND HCD DRAWING NUMBERS F1 TO F28 WHERE APPLICABLE. WHERE A CONFLICT OCCURS BETWEEN ANY SPECIFICATION AND THE CONSTRUCTION DRAWINGS, THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE.
- D02. DRAINAGE SYSTEMS TO COMPLY WITH BS EN 476 AND BS EN 752.
- D03. ALL COMPONENTS USED IN DRAINAGE SYSTEMS TO COMPLY WITH THE FOLLOWING: BS EN 476:2011.
- D04. ALL DRAINAGE SYSTEMS AND COMPONENTS TO BE CONSTRUCTED AND TESTED TO THE FULL SATISFACTION OF THE RELEVANT ADOPTING AUTHORITY, AND IN ACCORDANCE WITH BS EN 1610.
- D05. 'VC' DENOTES VITRIFIED CLAY, VITRIFIED CLAY PIPES AND FITTINGS TO COMPLY WITH THE RELEVANT PROVISIONS OF BS EN 295-1:2013, -2:2012, -3:2012 AND BS 65 RESPECTIVELY AND BE KITEMARKED. ALL PIPES SHALL BE EXTRA STRENGTH TO BS 65 OR EQUIVALENT TO BS EN 205 PIPE CRUSHING STRENGTH.
- D06. WHERE COVER TO PIPE IS LESS THAN 1.2m TO GROUND LEVEL, PIPE PROTECTION IS REQUIRED IN THE FORM OF A REINFORCED CONCRETE PROTECTION SLAB.
- D07. MANHOLE COVERS AND FRAMES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN 124-2 & 6:2015 AND BS 7903. MANHOLE COVERS AND FRAMES TO BE OF A NON-ROCKING DESIGN WITH CUSHION INSERTS AND KITEMARKED. LOAD CLASS D400 TO BE USED IN VEHICULAR TRAFFICKED AREAS. ALL COVERS TO BE BADGED 'FW' OR 'SW' AS APPROPRIATE. MANHOLE COVER SLABS AND ACCESS TO BE IN ACCORDANCE WITH CONCRETE PIPE ASSOCIATION TECHNICAL BULLETIN ISSUED SEPTEMBER 2001.
- D08. ROAD GULLY GRATES AND FRAMES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN 124-1 TO 5:2015, BS EN 5911-6:2004 AND BS 7903. TO BE OF A NON-ROCKING DESIGN WITH LEFT HANDED CAPTIVE HINGE ACCESS AND BE KITEMARKED. LOAD CLASS D400 GRATES TO BE USED IN VEHICULAR TRAFFICKED AREAS. WITH A 450mm GRATE AND FRAME, MINIMUM AREA OF WATERWAY TO BE 900cm².
- D09. NO MECHANICAL COMPACTION OF FILL MATERIAL WITHIN 300mm OF THE CROWN OF ANY PIPE.
- D10. MORTAR TO COMPLY WITH THE RELEVANT PROVISIONS OF BS EN 998-2:2016 AND PD 6878:2005
- D11. COVER AND FRAME BEDDING MORTAR TO COMPLY WITH THE DESIGN MANUAL FOR ROADS AND BRIDGES VOLUME 4, SECTION 2, PART 5 HA 104/09 CHAPTER 6 AND THE RELEVANT PROVISIONS OF THE MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAYS WORKS VOLUMES 1 AND 2.



**TYPICAL VERTICAL BACKDROP DETAIL**  
SCALE 1:20



**TYPICAL SADDLE CONNECTION DETAIL**  
SCALE 1:20

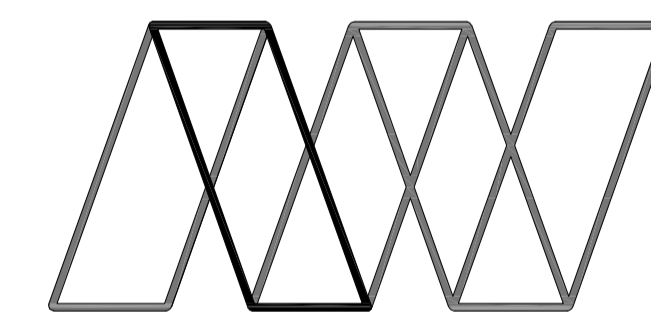


**TYPICAL ROAD GULLY DETAIL**  
SCALE 1:20

**GENERAL NOTES:**

- THE NOTES ARE INTENDED TO AUGMENT DRAWINGS AND SPECIFICATIONS. WHERE CONFLICT OF REQUIREMENTS EXIST THE ORDER OF PRECEDENCE SHALL BE AS SHOWN IN THE SPECIFICATION, OTHERWISE THE STRICTEST PROVISION SHALL GOVERN.
- THE DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEERS AND ARCHITECTS DRAWINGS.
- DRAWINGS NOT TO BE SCALED. ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR. ANY DISCREPANCIES TO BE NOTIFIED TO THE ENGINEER AND FURTHER INSTRUCTIONS OBTAINED BEFORE WORK IS COMMENCED.
- ALL LEVELS ARE IN METRES AOD (ABOVE ORDNANCE DATUM) UNLESS NOTED OTHERWISE.
- ALL WORKS TO BE UNDERTAKEN IN COMPLIANCE WITH BS 8000 FOR WORKMANSHIP ON BUILDING SITES.
- ABBREVIATIONS: MH = MANHOLE  
CL = COVER LEVEL  
IL = INVERT LEVEL  
SW = SURFACE WATER  
N1-10S = SWALE  
N1-10MH = SURFACE WATER CHAMBERS.  
DS = SURFACE WATER DEMARCATION CHAMBER  
CONC = CONCRETE  
DWG = DRAWING
- ALL EARTHWORKS SHALL BE UNDERTAKEN IN FULL COMPLIANCE WITH THE SPECIFICATION FOR HIGHWAYS WORKS MCW SERIES 600.
- THE CONTRACTOR MUST ENSURE THAT THE WHOLE WORKS COMPLY BOTH WITH THE SPECIFICATION AND THE DRAWINGS WHICH ARE SUBJECT TO APPROVAL BY THE RELEVANT AUTHORITIES.
- IF ANY DISCREPANCIES EXIST BETWEEN THE SPECIFICATION AND THE DRAWINGS, THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY.
- THE CONTRACTOR SHALL NOTIFY THE APPROPRIATE AUTHORITY PRIOR TO COMMENCEMENT OF EACH STAGE OF THE WORK FOR THEIR REPRESENTATIVE TO CARRY OUT INSPECTION TO ENSURE COMPLIANCE WITH THEIR SPECIFICATION AND APPROVED DETAILS. IF ANY SUCH REQUESTS OR INSTRUCTIONS CAUSE CONFLICT WITH THE SPECIFICATION THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER.

Rev	Description	Date	By	Chk	App
C01	FOR CONSTRUCTION	20.05.24	GDV	BH	BH
P02	FIN DRAIN DETAILS ADDED	11.11.22	JP	JAG	JAG
P01	FIRST ISSUE	30.09.22	JP	JAG	JAG



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Project:	LINCOLNSHIRE LAKES, SCUNTHORPE M181/B1450 HIGHWAY WORKS				
Client:	NORTH LINCOLNSHIRE COUNCIL				
Drawing:	M181-JUNCTION-DRAINAGE STANDARD DETAILS SHEET 1				
Role:	CIVIL ENGINEER				
Drawing Status:	FOR CONSTRUCTION				
Job. no.	47603				
Scale@ A1:	AS SHOWN				
Rev.	C01				
Project Originator	Volume	Level	Type	Role	Number
M181 - AWP - 01 - 05 - DR - D - 0060					