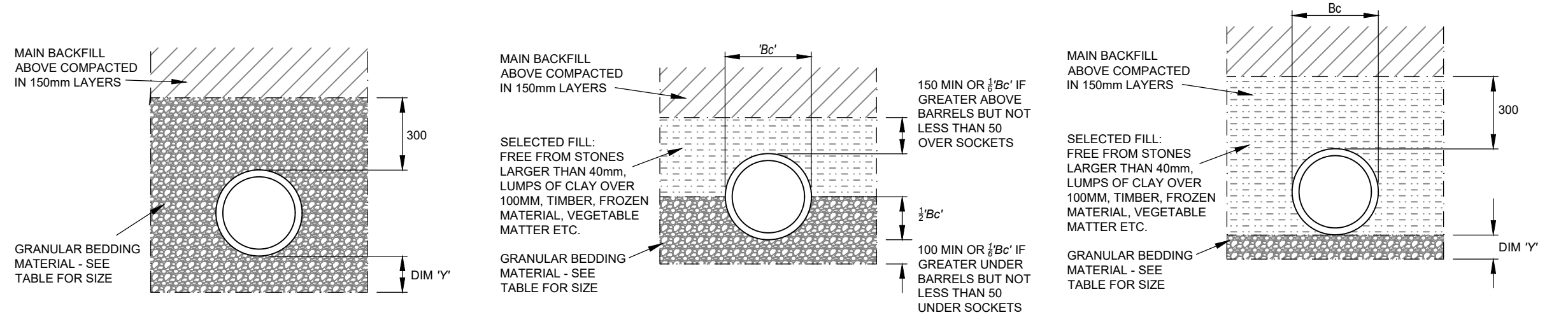
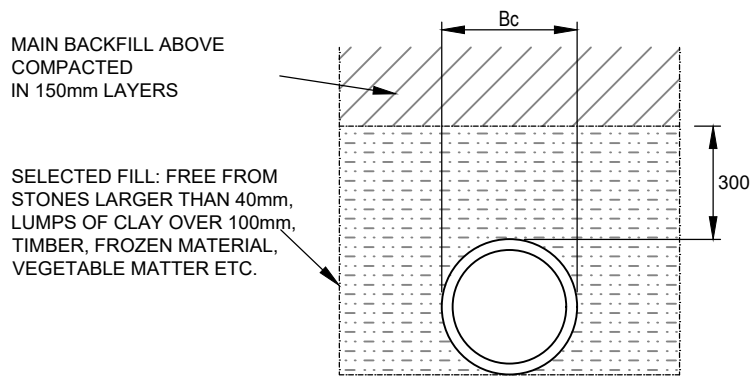




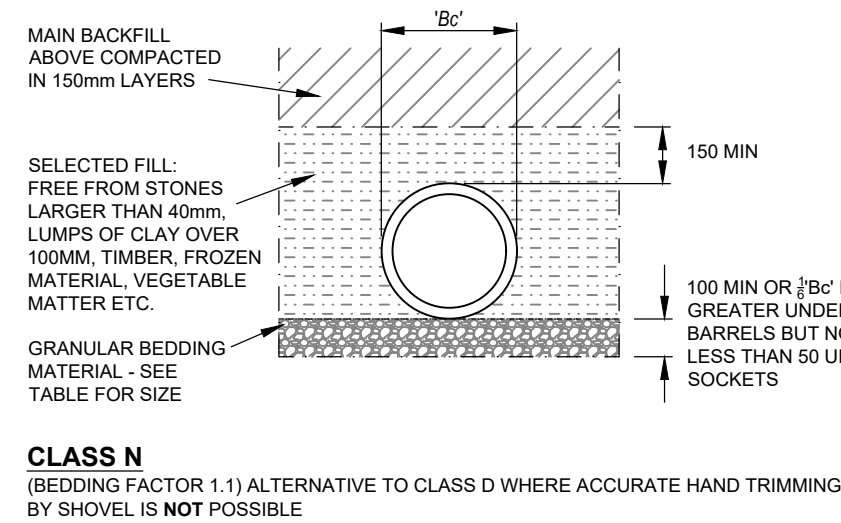
CLASS S
(BEDDING FACTOR 2.5) GENERALLY SUITABLE FOR ALL SOIL CONDITIONS

CLASS B
(BEDDING FACTOR 2.5) GENERALLY SUITABLE FOR ALL SOIL CONDITIONS

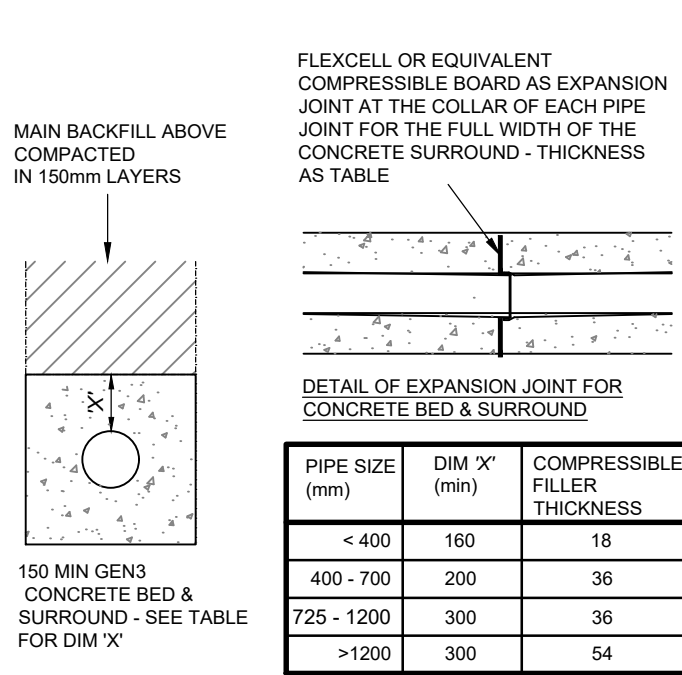
CLASS F
(BEDDING FACTOR 1.9) GENERALLY SUITABLE FOR ALL SOIL CONDITIONS



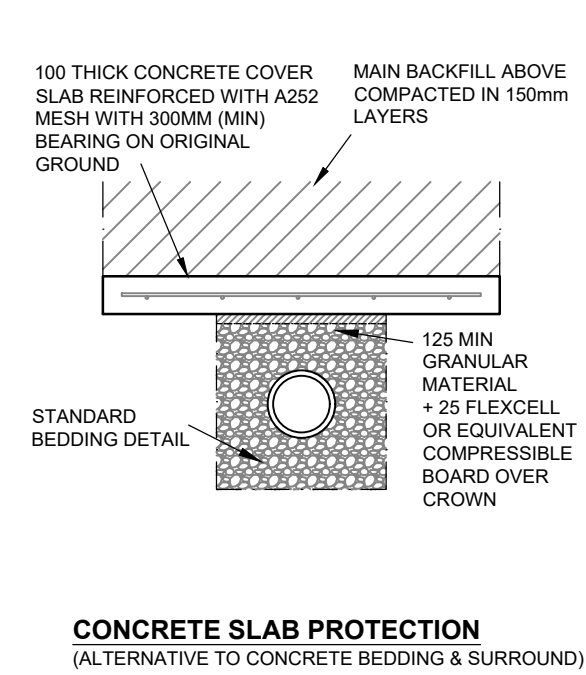
CLASS D
EMBEDMENT TYPE 4
HIGH STANDARD OF WORKMANSHIP REQUIRED
NOT TO BE USED UNLESS ACCURATE HAND TRIMMING BY SHOVEL IS POSSIBLE



CLASS N
(BEDDING FACTOR 1.1) ALTERNATIVE TO CLASS D WHERE ACCURATE HAND TRIMMING BY SHOVEL IS NOT POSSIBLE



CLASS Z
CONCRETE BEDDING & SURROUND
REQUIRED WHERE COVER TO PIPEWORK IS LESS THAN 1.2m
GENERALLY SUITABLE FOR ALL SOIL CONDITIONS



CONCRETE SLAB PROTECTION
(ALTERNATIVE TO CONCRETE BEDDING & SURROUND)

Drawn 1:20

PIPE BEDDING MATERIAL DETAILS

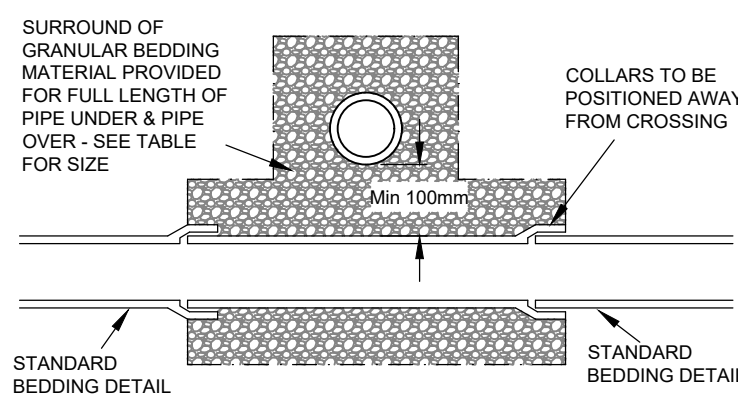
MATERIAL DESIGNATED TYPE A SHALL CONSIST OF ANGULAR GRAVEL OR CRUSHED ROCK GRADED IN ACCORDANCE WITH BS 882 OR AIR COOLED BLAST FURNACE SLAG TO BS 1047 OR SINTERED PULVERISED FUEL ASH TO BS 3797 SELECTED ACCORDING TO PIPE SIZE AS FOLLOWS:

NOMINAL SIZE OF PIPES (mm)	MAXIMUM PARTICULAR SIZE (mm)	IMPORTED GRANULAR MATERIALS
100-125	10	10mm NOMINAL SINGLE SIZE
150-200	15	10 OR 14mm SINGLE SIZE 14mm TO 5mm GRADED
225-300	20	10, 14 OR 20mm SINGLE SIZE 14mm TO 5mm GRADED 20mm TO 5mm GRADED
375-500	20	14 OR 20mm SINGLE SIZE 14mm TO 5mm GRADED 20mm TO 5mm GRADED
OVER 500	40	14, 20 OR 40mm SINGLE SIZE 14mm TO 5mm GRADED 20mm TO 5mm GRADED 40mm TO 5mm GRADED

MATERIAL DESIGNATED TYPE B, USED UNDER GARDENS AND VERGES SHALL CONSIST OF UNIFORM READILY COMPACTABLE MATERIAL FREE FROM TREE ROOTS, VEGETABLE MATTER, RUBBISH AND FROZEN SOIL, AND EXCLUDING CLAY LUMPS RETAINED ON A 75mm SIEVE AND STONES LARGER THAN 37mm. BEDDING TO BE COMPACTED IN 225mm LAYERS.

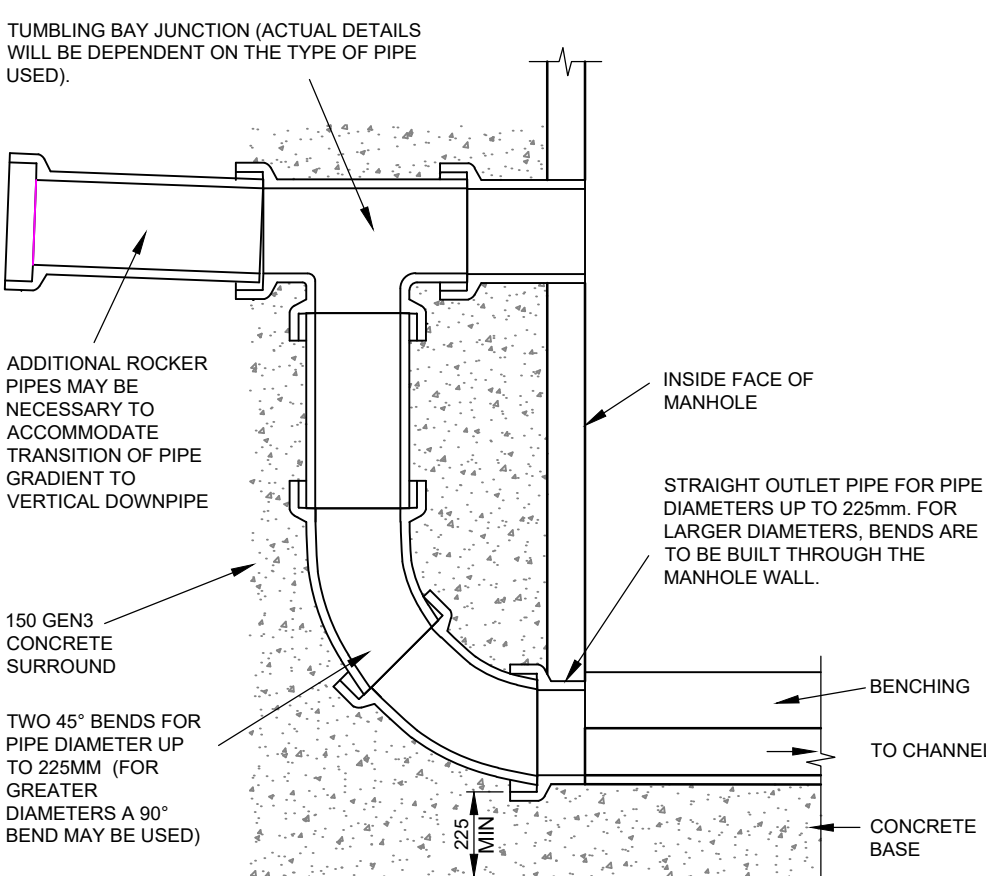
MATERIAL DESIGNATED TYPE B, USED UNDER ROADS AND FOOTPATHS SHALL CONSIST OF GRANULAR MATERIAL AS USED FOR CARRIAGEWAY SUB-BASE CONSTRUCTION.

STRAIGHT BAR END HINGED
GULLY GRATE C250/D400
GRADE AS APPROPRIATE



PIPE CROSSINGS
(SCALE 1:20)

NOMINAL DIAMETER OF PIPE (mm)	THICKNESS OF COMPRESSIBLE FILLER (mm)
LESS THAN 450	18
450 - 1200	36
GREATER THAN 1200	54



ADOPTABLE MANHOLE
TYPICAL EXTERNAL VERTICAL BACKDROP DETAIL
(WHERE TUMBLING BAY IS NOT MORE THAN 1.5m ABOVE BENCHING)
(SCALE 1:20)

NOMINAL PIPE DIAMETER (mm)	DROPSHAFT DIAMETER (mm)
225 to 300	225
375	300
450	375
525 to 600	450
675	525
750 to 900	600

HYDRO-BRAKE OPTIMUM SHE-0100-5600-1750-5600 LIMITING DISCHARGE TO 5.6 l/s BASED ON A DESIGN HEAD OF 1.75m.

NOTE: IF AN ALTERNATIVE PRODUCT IS USED THIS WILL AFFECT THE STORAGE REQUIREMENTS & SUMP CONFIGURATION

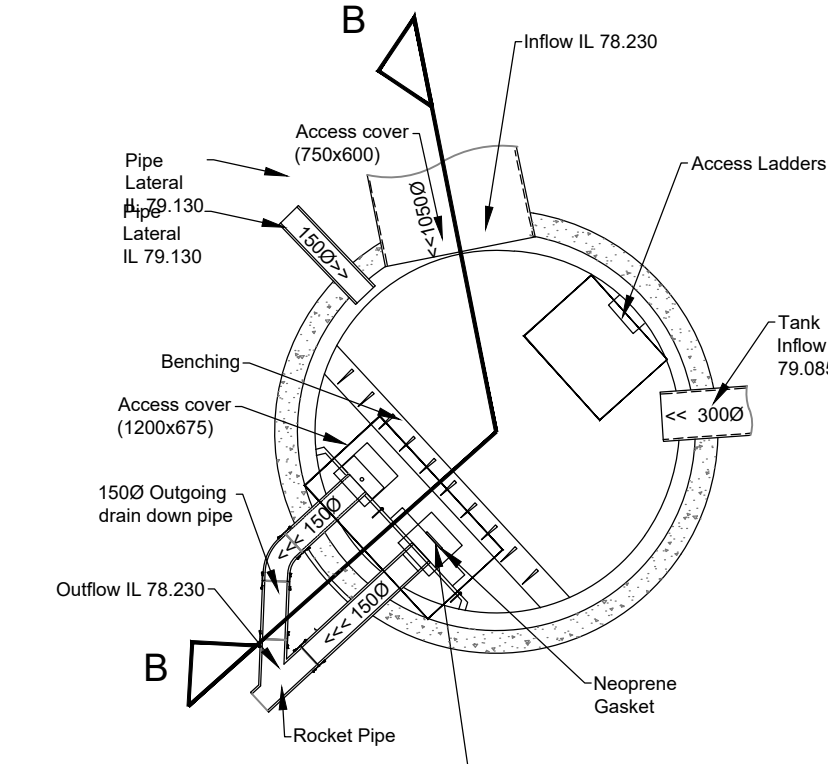
MH S3 HYDRO-BRAKE OPTIMUM
SHE-0100-5600-1750-5600 FLOW CONTROL CHAMBER
(SCALE 1:50)

MANHOLE DETAILS	DETAIL
MANHOLE REF	SS
MH DIAMETER (m)	2.000
COVER LEVEL (AOSDm)	81.970
INVERT LEVEL (AOSDm)	77.232
MH TYPE (UU TYPE/SSG TYPE)	UU HYDRO-BRAKE
DEPTH TO SOFFIT (m)	3.688
CONNECTIONS (SIZE mm)	150x2, 1050
COVER SIZE(s) (mm)	1200x675
COVER DEPTH (mm)	150
COVER SPEC	D400
ACCESS LADDER OR DOUBLE STEPS	ACCESS LADDERR
SAFETY CHAIN	NO
SAFETY RAIL	NO
INVERT ACCESS STEPS	YES (FROM TOP)
SOLE SIZE IN COVER SLAB (mm)	1200x675

HYDRO-BRAKE OPTIMUM SHE-0100-5900-2000-5900 LIMITING DISCHARGE TO 5.9 l/s BASED ON A DESIGN HEAD OF 2.0m.

NOTE: IF AN ALTERNATIVE PRODUCT IS USED THIS WILL AFFECT THE STORAGE REQUIREMENTS & SUMP CONFIGURATION

MH S8 HYDRO-BRAKE OPTIMUM
SHE-0100-5900-2000-5900 FLOW CONTROL CHAMBER
(SCALE 1:50)

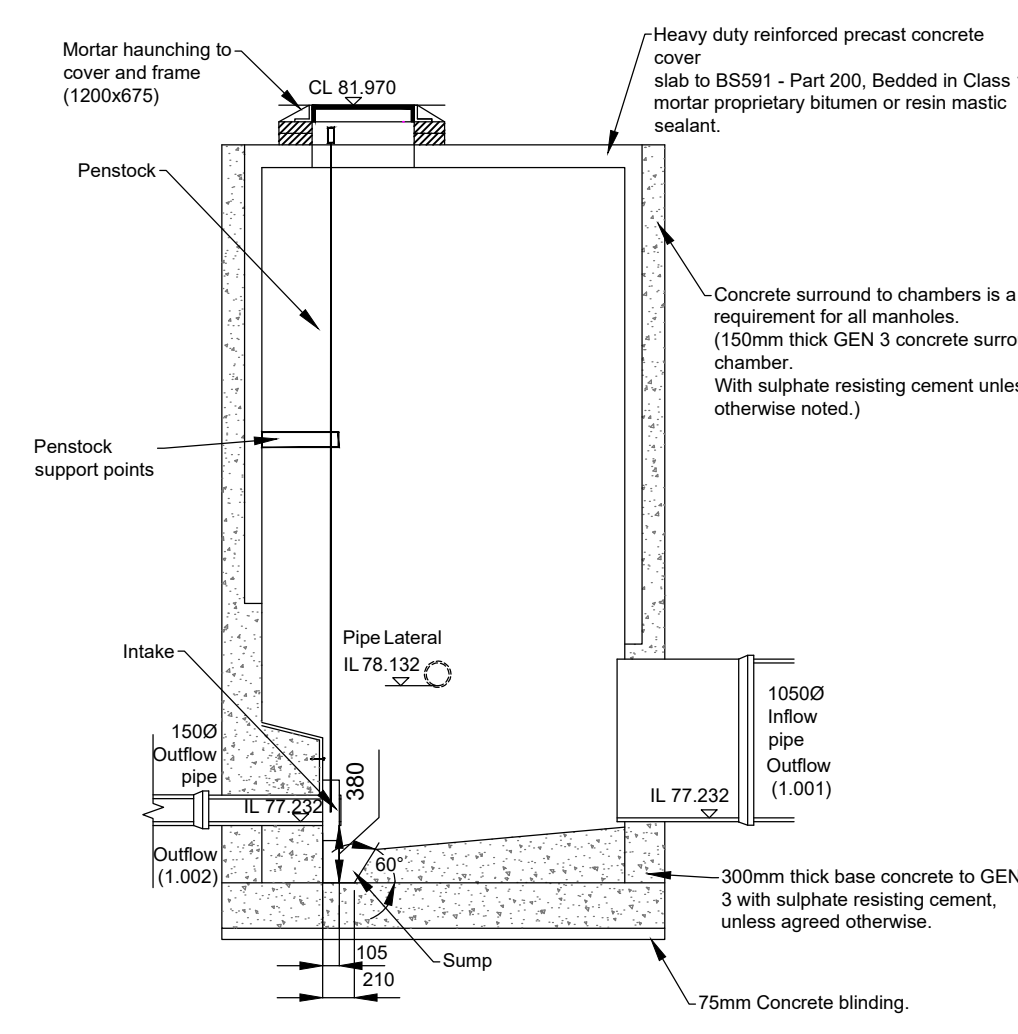


MANHOLE DETAILS	DETAIL
MANHOLE REF	SS
MH DIAMETER (m)	2.400
COVER LEVEL (AOSDm)	82.265
INVERT LEVEL (AOSDm)	78.230
MH TYPE (UU TYPE/SSG TYPE)	UU HYDRO-BRAKE
DEPTH TO SOFFIT (m)	2.985
CONNECTIONS (SIZE mm)	150x2, 300 & 1050
COVER SIZE(s) (mm)	1200x675
COVER DEPTH (mm)	150
COVER SPEC	D400
ACCESS LADDER OR DOUBLE STEPS	ACCESS LADDERR
SAFETY CHAIN	NO
SAFETY RAIL	NO
INVERT ACCESS STEPS	YES (FROM TOP)
SOLE SIZE IN COVER SLAB (mm)	1200x675

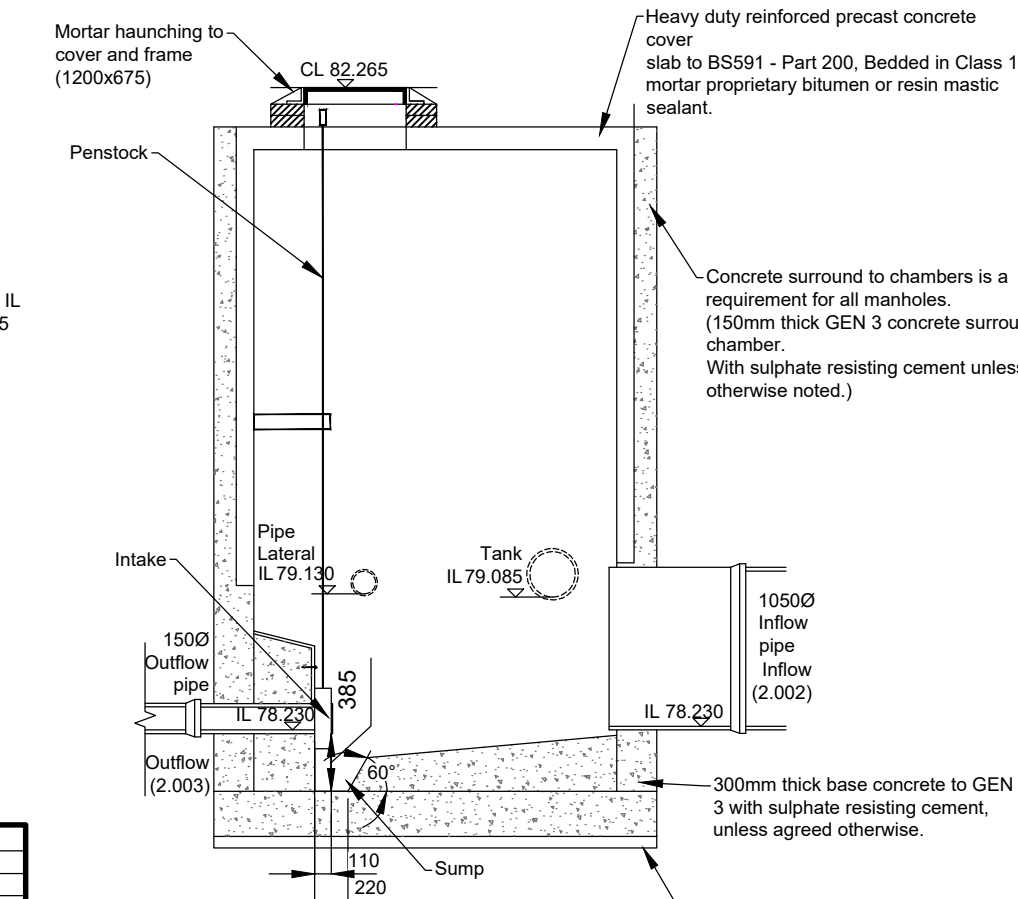
HYDRO-BRAKE OPTIMUM SHE-0100-5600-1750-5600 LIMITING DISCHARGE TO 5.6 l/s BASED ON A DESIGN HEAD OF 1.75m.

NOTE: IF AN ALTERNATIVE PRODUCT IS USED THIS WILL AFFECT THE STORAGE REQUIREMENTS & SUMP CONFIGURATION

MH S3 HYDRO-BRAKE OPTIMUM
SHE-0100-5600-1750-5600 FLOW CONTROL CHAMBER
(SCALE 1:50)



SECTION A-A



SECTION B-B

DRAINAGE

- ALL DRAINAGE WORKS TO BE CONSTRUCTED FROM THE OUTFALL TOWARDS THE HEAD OF RUN TO ENSURE THE OUTFALL CAN BE ACHIEVED.
- ALL EXISTING DRAINS & SERVICES (LINE & LEVELS) TO BE CHECKED & CONFIRMED BY THE CONTRACTOR PRIOR COMMENCEMENT OF ANY ON SITE DRAINAGE WORKS. ANY DISCREPANCY IN LEVELS IS TO BE REPORTED IMMEDIATELY TO APP.
- ALL DRAINAGE WORK TO BE IN ACCORDANCE WITH THE BUILDING REGULATIONS, BS EN 752 & TO THE SATISFACTION OF THE BUILDING INSPECTOR.
- ALL PROPRIETARY ITEMS TO BE INSTALLED STRICTLY IN ACCORDANCE WITH MANUFACTURER'S DETAILS, INSTRUCTIONS & SPECIFICATIONS.
- ALL COVER LEVELS ARE APPROXIMATE. EXACT LEVELS TO BE DETERMINED FROM THE EXTERNAL WORKS LAYOUT.
- INVERT LEVELS QUOTED AT MANHOLES & INSPECTION CHAMBERS ARE THOSE OF THE LARGEST CONNECTED PIPE DIAMETER. PIPES AT CHAMBERS TO BE LID WITH SOFFITS LEVEL UNLESS NOTED OTHERWISE.
- PIPE GRADIENTS WHERE STATED ARE APPROXIMATE - LEVELS AT THE CHAMBERS TAKE PRECEDENT.
- REFER TO ARCHITECT'S DRAWINGS FOR PRECISE LOCATION OF ALL RAINWATER PIPES, INTERNAL CONNECTIONS ETC.
- ALL INTERNAL CONNECTIONS TO HAVE AN ABOVE-FLOOR ACCESS POINT TO ENABLE FUTURE ACCESS FOR MAINTENANCE.
- PIPES & FITTINGS TO BE:
 - CONCRETE PIPES & ANCILLARY PRODUCTS TO BS 5911:2022 & BS EN 1916:2002.
 - VITRIFIED CLAY PIPES & FITTINGS TO BS EN 295:2013
 - DUCTILE IRON TO BS EN 598:2007 & BS ISO 4179:2005.
 - PERFORATED VITRIFIED CLAY PIPES FOR LAND DRAINAGE TO BS 1196.
 - PLASTIC PIPES FOR LAND DRAINAGE TO BS 4962:1982.
 - PLASTIC PIPES SYSTEMS FOR NON-PRESSURE, UNDERGROUND DRAINAGE & SEWAGE TO BS EN 1401 & BS 4680 - SOLID WALL, STRUCTURED WALL PIPES TO BS EN 13476.
 - PRECAST CONCRETE MANHOLE UNITS TO BS EN 1917:2002.
 - PLASTIC INSPECTION CHAMBERS FOR DRAINS & SEWERS TO BS EN 13598:1:2010.
 - GULLY & MANHOLE TOPS FOR VEHICULAR & PEDESTRIAN AREAS TO BS EN 124:1994.
 - DRAINAGE CHANNELS FOR VEHICULAR & PEDESTRIAN AREAS TO BS EN 1433:2002.
- ALL MANHOLE COVERS, ROAD GULLY COVERS & FRAMES TO COMPLY WITH BS EN124 NON ROCKING TYPE.
- UNLESS NOTED OTHERWISE USE CLASS:
 - A15 FOR USE IN PEDESTRIAN AREAS WHERE VEHICLES HAVE NO ACCESS
 - B125 FOR USE IN CAR PARKS & PEDESTRIAN AREAS WHERE INFREQUENT LIGHT VEHICLE ACCESS IS LIKELY (INCLUDING DRIVEWAYS).
 - C250 FOR ACCESS COVERS & GULLY GRATINGS IN AREAS OF SLOW MOVING, HEAVY TRAFFIC, ALSO FOR GULLY GRATINGS IN CARRIAGEWAY WITHIN 500mm OF KERB & UP TO 200mm INTO THE FOOTWAY.
 - D400 FOR USE IN CARRIAGEWAYS OF ROADS & PARKING AREAS ACCESSIBLE BY ALL TYPES OF VEHICLES.
 - E800 FOR USE IN AREAS WHERE HIGH WHEEL LOADS ARE PRESENT.
 - F900 FOR USE IN AREAS WHERE EXTREMELY HIGH WHEEL LOADS ARE PRESENT SUCH AS AIRCRAFT PAVEMENTS, DOCKS, HEAVY INDUSTRIAL SITES.
- MANHOLES IN INTERNAL AREAS REQUIRE DOUBLE SEALED COVERS WITH LOCKING SCREWS. RECESSED WHERE REQUIRED TO ACCOMMODATE FLOOR FINISHES TO ARCHITECT'S SPECIFICATION.
- PIPE BEDDING
 - USE CLASS S BEDDING UNLESS NOTED OTHERWISE. NB PROTECT AGAINST CONSTRUCTION TRAFFIC AS NECESSARY
 - USE CLASS Z CONCRETE BED & SURROUND OR CONCRETE SLAB PROTECTION AS FOLLOWS:
 - CLASS 120 CLAYWARE OR CLASS M CONCRETE (100 - 6000 PIPES)
 - LANDSCAPING - LESS THAN 600mm COVER TO CROWN.
 - HARDSTANDING - LESS THAN 1200mm COVER TO CROWN.
 - PLASTIC (100 - 3000 PIPES)
 - LANDSCAPING - LESS THAN 600mm COVER TO CROWN.
 - HARDSTANDING - LESS THAN 900mm COVER TO CROWN.
 - PIPES BELOW CONCRETE GROUND FLOOR SLABS:
 - WHERE THE CROWN OF THE PIPE IS WITHIN 300mm OF THE UNDERSIDE OF SLAB, SPECIAL PROTECTION TO BE PROVIDED IN ACCORDANCE WITH BUILDING REGULATIONS H1 2.44 OR 150mm GEN3 CONCRETE BED & SURROUND CAST INTEGRALLY WITH SLAB.
 - OTHERWISE USE CLASS S BEDDING.
- MAIN BACKFILL TO BE WELL COMPACTED IN 150mm LAYERS OF:
 - SELECTED BACKFILL MATERIAL IN ALL SOFT LANDSCAPED AREAS
 - TYPE 1 GRANULAR MATERIAL IN ALL HARDSTANDING AREAS & PUBLIC HIGHWAYS
- BACKFILL TO DRAINS NEAR FOUNDATIONS TO BE IN ACCORDANCE WITH BUILDING REGULATIONS H1 DIAGRAMS 8 & 12.
- CCTV TO BE CARRIED OUT TO VERIFY CONDITION OF ANY DRAINAGE TO BE RE-USED.

Notes

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GENERAL NOTES

- THE STRUCTURAL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT CLIENT, ARCHITECT, SERVICES ENGINEER, AND SPECIALIST CONTRACTOR DRAWINGS, REPORTS AND SPECIFICATIONS.
 - FOR SETTING OUT AND LEVELS REFER TO ARCHITECTS DRAWINGS.
 - FOR THE PURPOSE OF CONSTRUCTION ALL DRAWINGS MUST NOT BE SCALED AND ONLY WRITTEN OR CALCULATED DIMENSIONS USED. LEVEL DATUMS TO BE CONFIRMED BY THE ARCHITECT.
 - ANY REVISIONS TO THE LAYOUT DETAILS REQUIRED BY THE CONTRACTOR TO BE AGREED AND APPROVED BY THE ALIGN PROPERTY PARTNERS ENGINEER.
 - FINISHED FLOOR LEVELS TO BE DETERMINED.
 - ALL PROPRIETARY PRODUCTS ARE TO BE USED STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S DETAILS AND REQUIREMENTS.
 - GENERALLY, ONLY KNOWN PENETRATIONS, HOLES, POCKETS AND RECESSES ETC. WITH ANY DIMENSIONS GREATER THAN 150 ARE SHOWN ON THE DRAWINGS. FOR CONFIRMATION OF THESE AND FOR DETAILS OF SMALLER HOLES PLUS INSERTS, FIXINGS ETC. REFERENCE SHALL BE MADE TO THE ARCHITECT'S SERVICES ENGINEER'S OR THE RELEVANT SUBCONTRACTOR'S BUILDERS WORK DRAWINGS.
 - THE CONTRACTOR SHALL ENSURE THAT TEMPORARY LOADS ONTO THE NEW STRUCTURES/DRAINAGE SHALL BE LESS THAN THOSE FOR WHICH IT HAS BEEN DESIGNED.
 - THE CONTRACTOR IS RESPONSIBLE FOR ESTABLISHING AND CHECKING THE SETTING OUT OF GRIDLINES, LEVELS AND DATUMS.
 - ANY DISCREPANCIES BETWEEN THE STRUCTURAL AND ARCHITECTURAL DRAWINGS SHOULD IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE CONTRACT ADMINISTRATOR.
 - THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO ENSURE THAT NOISE, VIBRATION AND RESULTING FROM THE WORKS ARE KEPT WITHIN REASONABLE LIMITS.
 - THE CONTRACTOR IS TO ALLOW A MINIMUM OF 10 WORKING DAYS IN THEIR PROGRAMME FOR THE REVIEW OF ANY CONTRACTOR'S DESIGN PORTIONS OF WORK FOR REVIEW BY THE ALIGN PROPERTY PARTNERS ENGINEER.
 - IRRESPECTIVE OF ANY NAMED MANUFACTURERS OF ANY PRODUCT/MATERIAL NOTED ON DRAWINGS, THE CONTRACTOR IS FREE TO PROPOSE AN EQUAL OR APPROVED PRODUCT/MATERIAL PROVIDED THAT ANY SUCH CHANGE TO THE SPECIFICATION MEETS A SIMILAR LEVEL OF PERFORMANCE AND IS NOTED ON ALL TENDER RETURNS AND DOCUMENTATION FOR ALIGN PROPERTY PARTNERS.
- IMPORTANT:**
- DRAWING PROVIDED FOR INFORMATION ONLY AND IS SUBJECT TO THE FOLLOWING STATUTORY APPROVALS:
- PLANNING APPROVAL
 - BUILDING CONTROL
 - UNITED UTILITIES APPROVAL
 - HIGHWAYS APPROVAL
- ALL CONSTRUCTION WORKS PRIOR TO APPROVALS ABOVE WILL BE UNDERTAKEN AT CLIENTS/CONTRACTORS RISK

P04	UPDATED HYDRO-BRAKE DETAILS TO SUIT LATEST SURFACE WATER DRAINAGE DESIGN.	ZS 19/09/23	BO 19/09/23	BD 19/09/23
P03	UPATED HYDRO-BRAKE DETAIL BACKDROP DETAIL ADDED	JSM 19/09/23	ZS 19/09/23	BD 19/09/23
P02	UPDATED HYDRO-BRAKE DETAIL TO REFLECT THE LATEST DRAINAGE LAYOUT PLAN	JSM 20/09/23	ZS 20/09/23	ZS 20/09/23
P01	INITIAL ISSUE	ZS 19/09/23	LF 19/09/23	LF 19/09/23
Rev	Details	Author & Date	Checked & Date	Approved & Date

Westmorland & Furness Office, Riverside Business Park, Natland Road, Kendal LA9 7SX			
Client MOSSCAE ST VINCENTS			
Project Name PARKMOUNT ROAD, MANCHESTER			
Drawing Title S104 DRAINAGE CONSTRUCTION DETAILS SHEET 2 OF 2			
Purpose PLANNING			
Scale	Drawn	Checked	Approved
AS SHOWN	ZS	LF	LF
Original Size	Date	Date	Date
A1	19/09/23	19/09/23	19/09/23
Drawing Number	Rev.		
PV2310-APP-92-XX-DR-C-3201	P04		