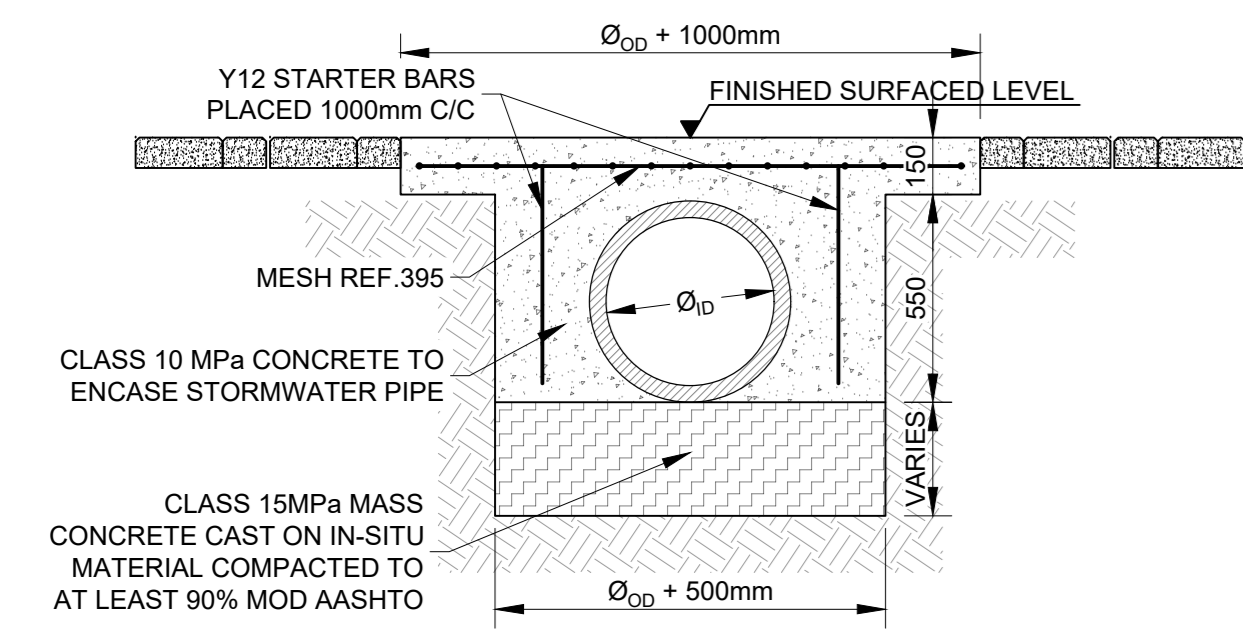


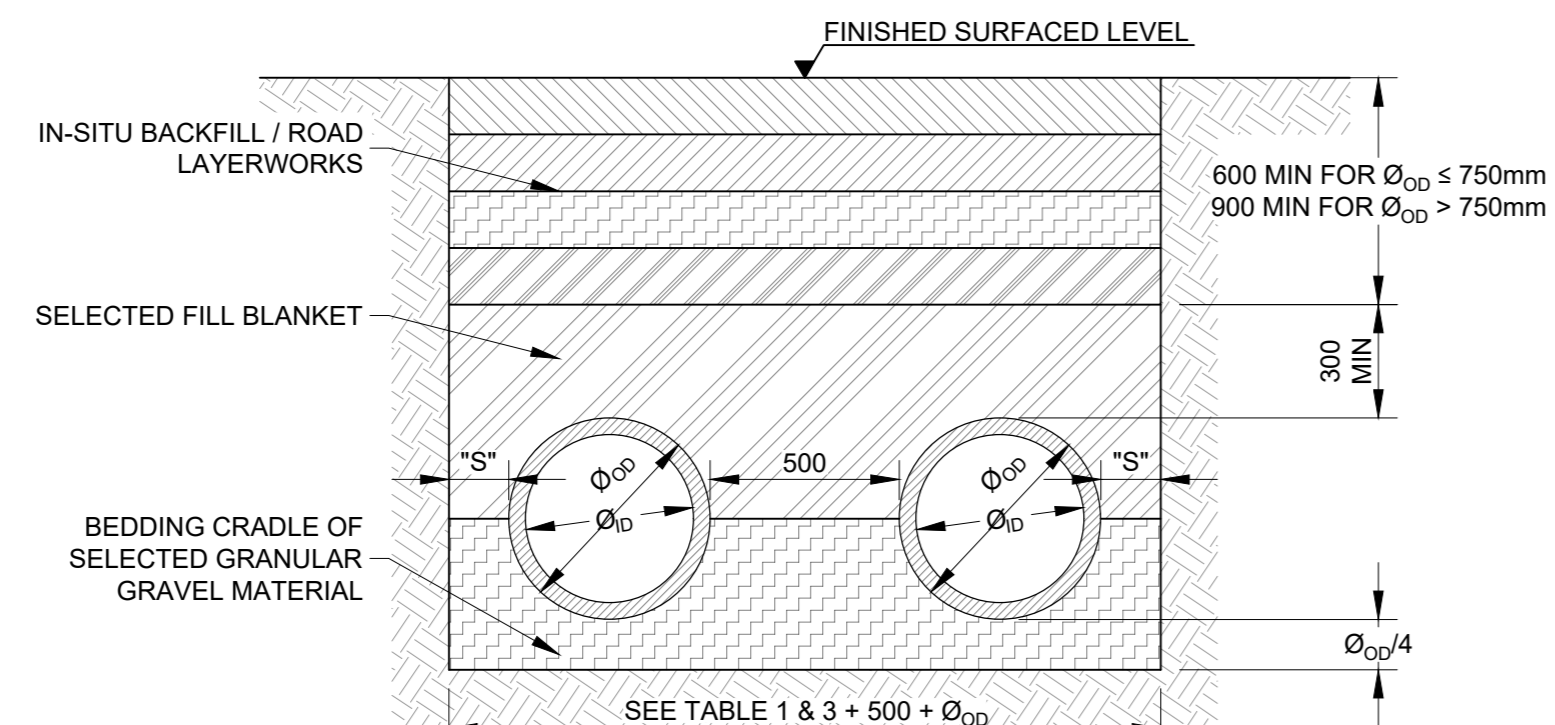
RIGID PIPE CLASS A CONCRETE BEDDING
SCALE 1:20

RIGID PIPE CLASS B GRANULAR GRAVEL BEDDING
SCALE 1:20

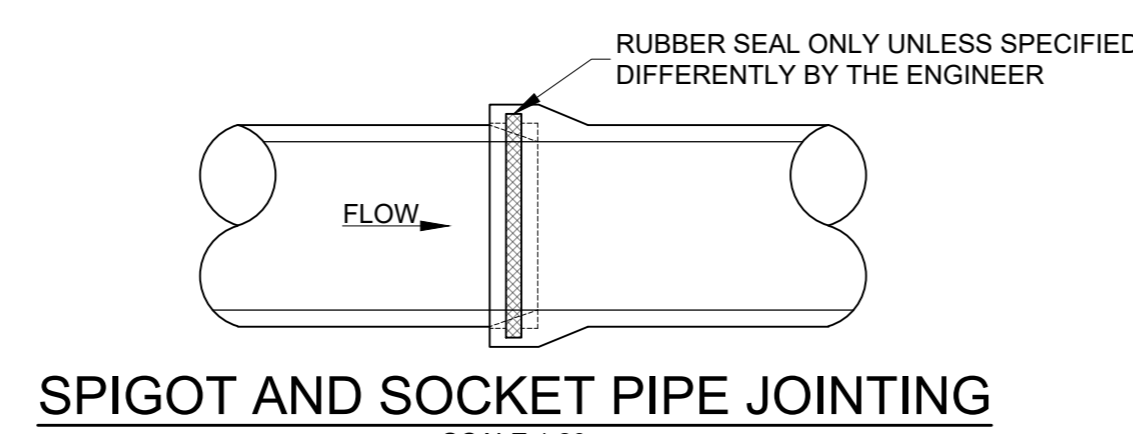
RIGID PIPE CLASS B BEDDING: 19mm STONE USED AS BEDDING
SCALE 1:20



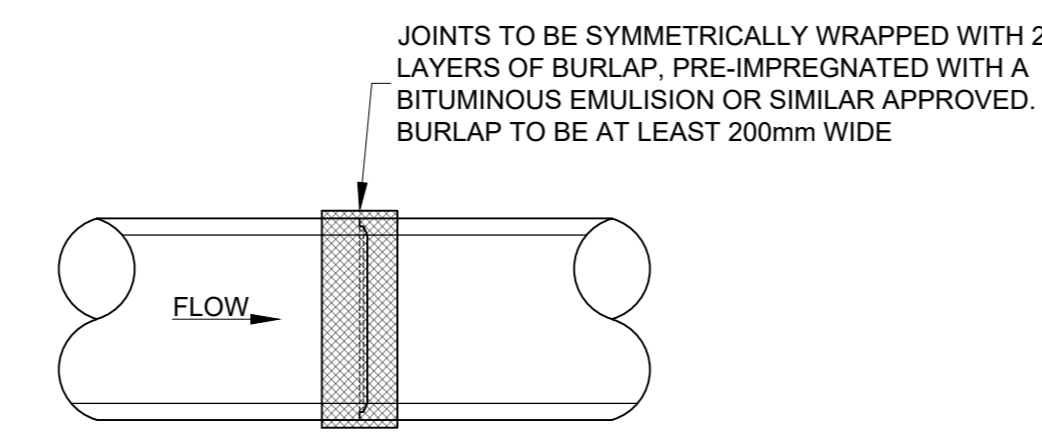
TYPICAL SECTION THROUGH STORMWATER PIPE ENCASEMENT
SCALE 1:20



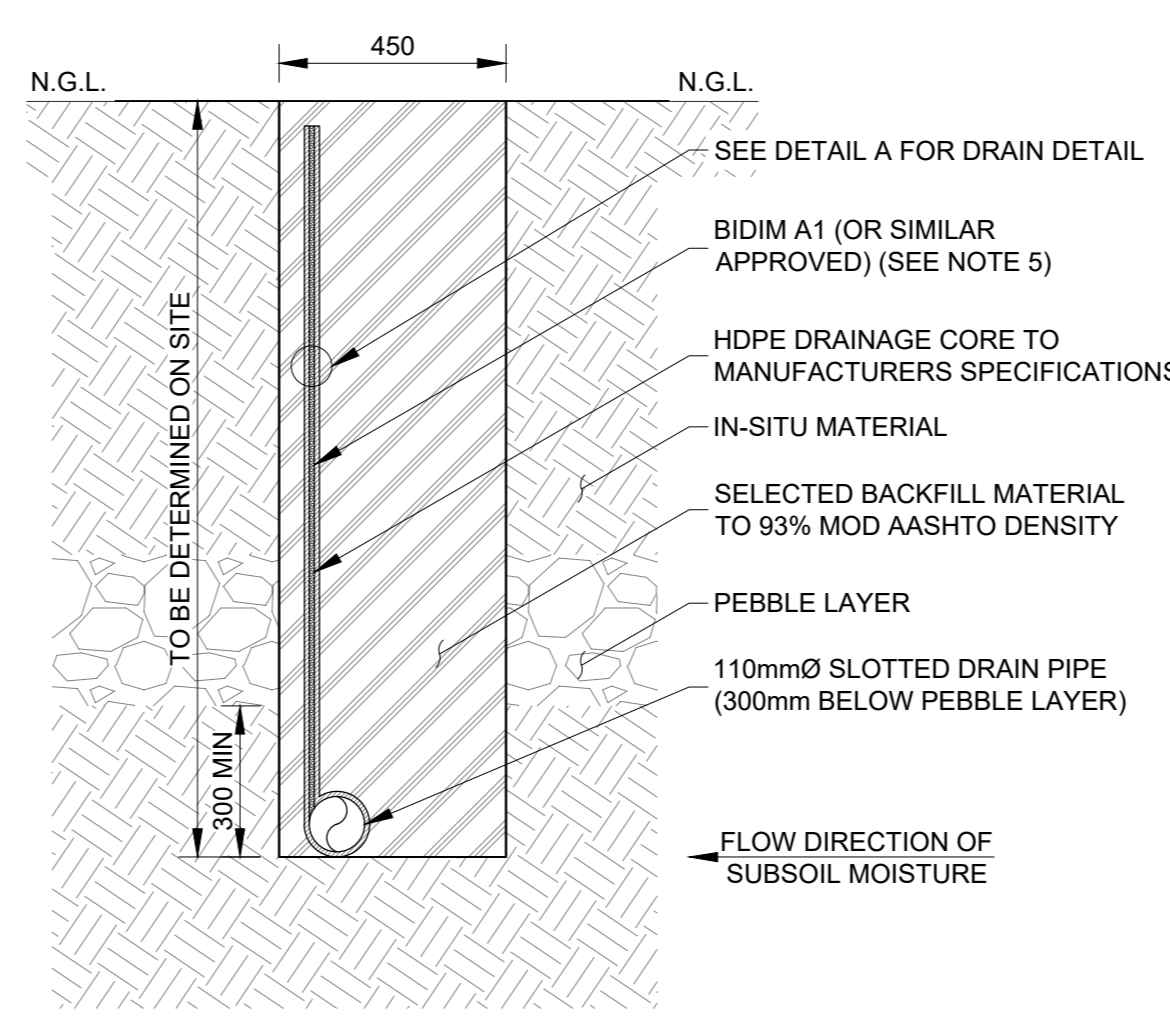
RIGID PIPE CLASS B GRANULAR GRAVEL BEDDING (DOUBLE PIPE)
SCALE 1:20



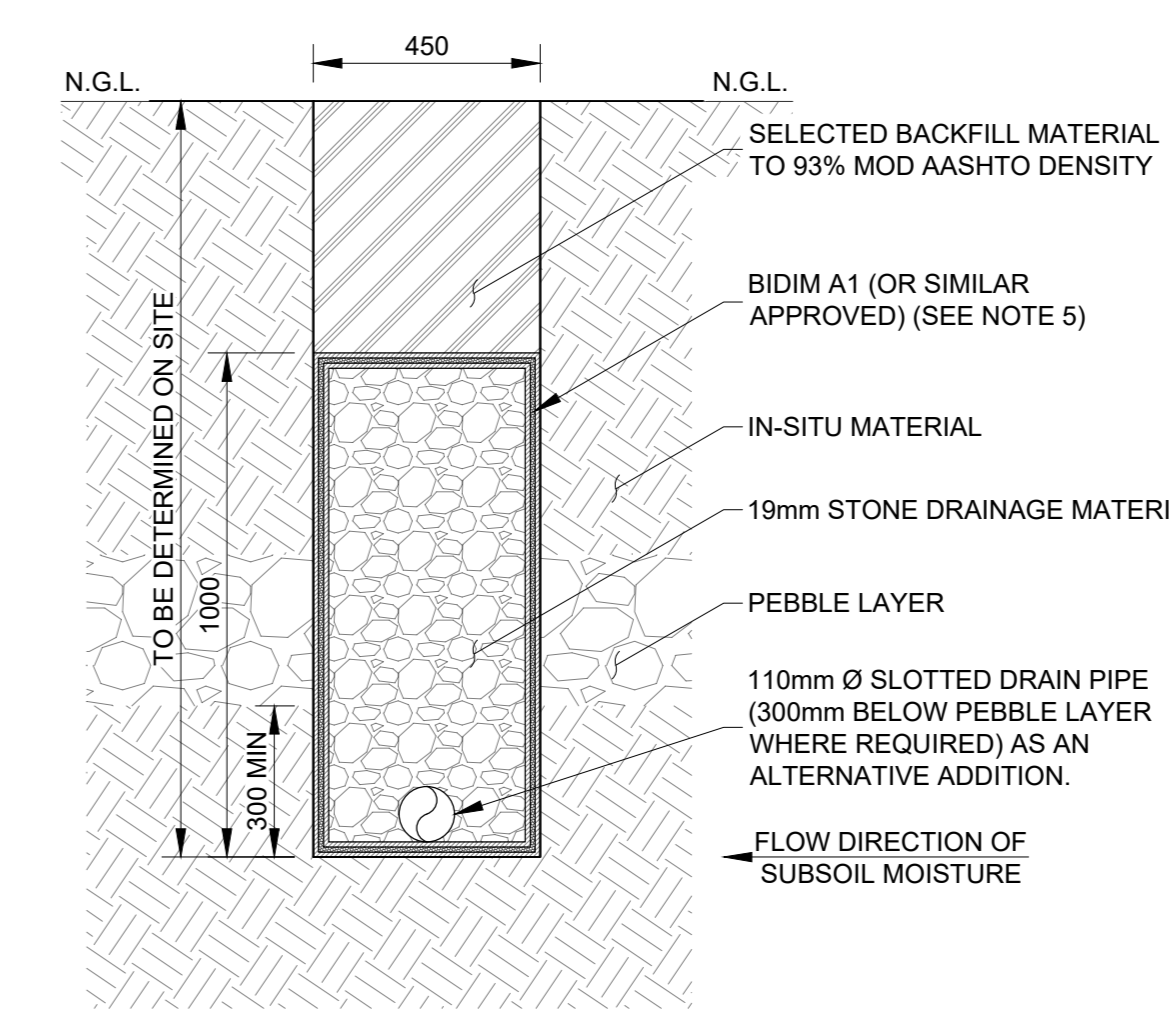
SPIGOT AND SOCKET PIPE JOINTING
SCALE 1:20



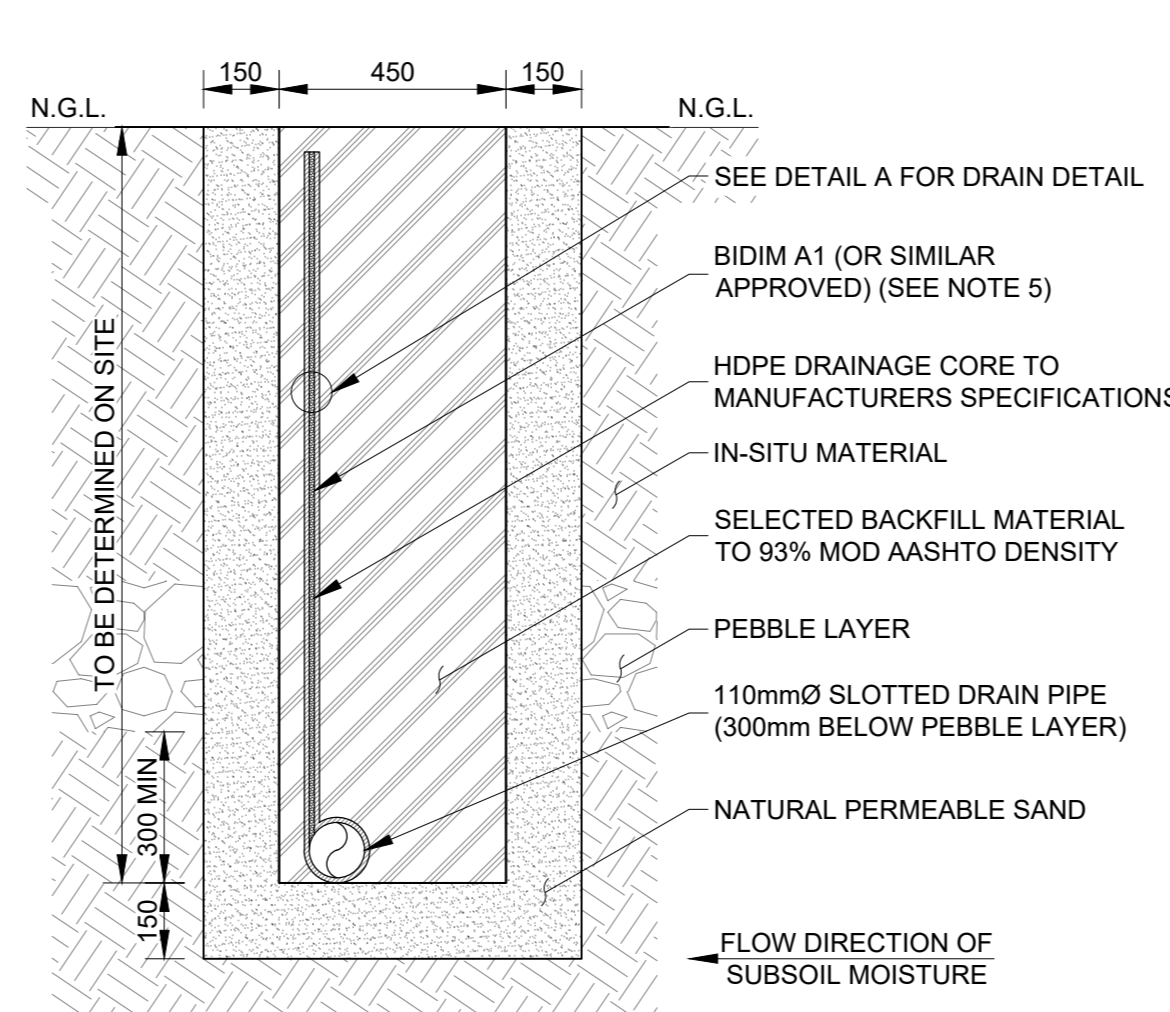
INTERLOCKING PIPE JOINTING
SCALE 1:20



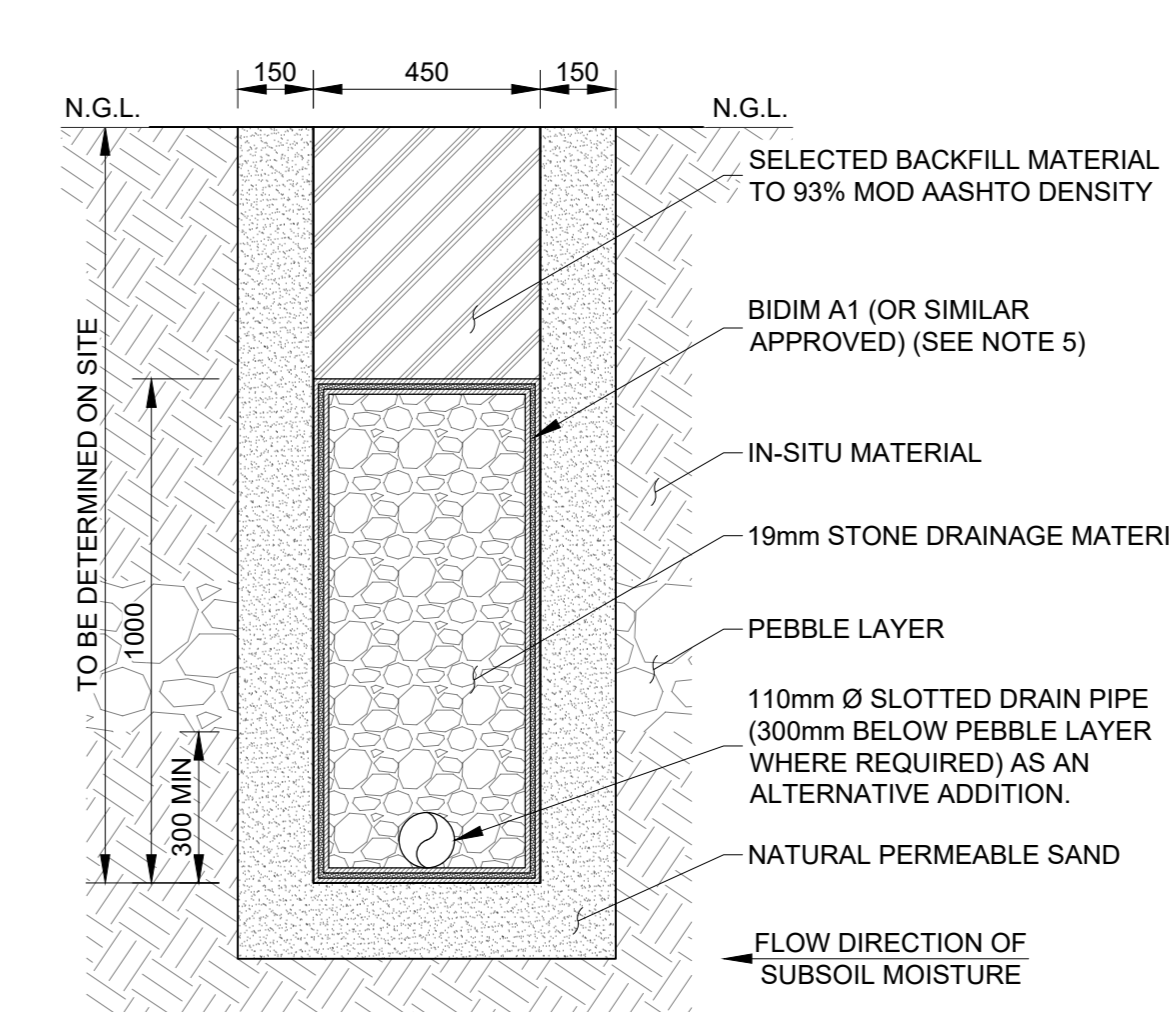
TYPE 1: TYPICAL FIN-DRAIN DETAIL
SCALE 1:15



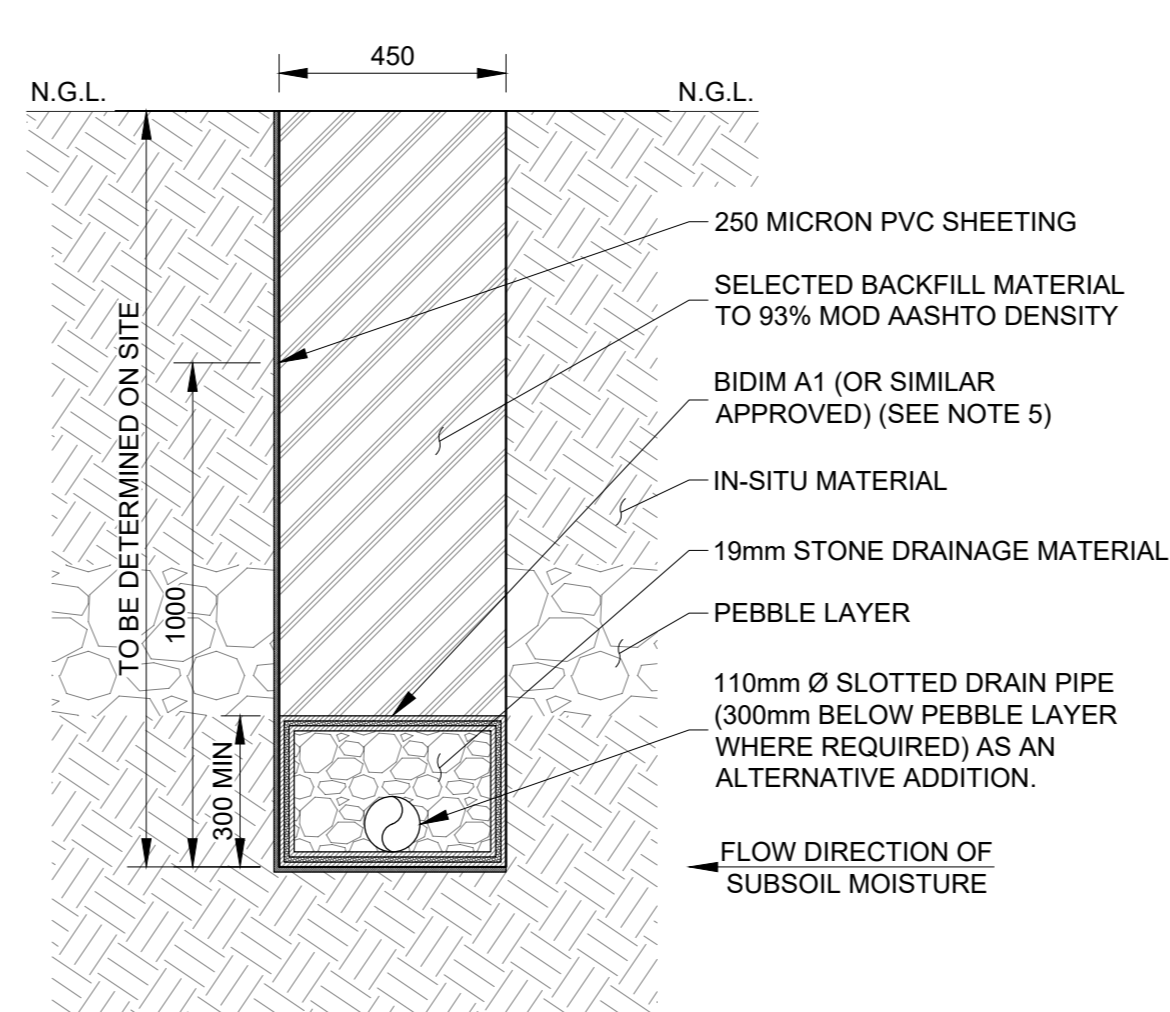
TYPE 2: TYPICAL SUBSOIL-DRAIN DETAIL
SCALE 1:15



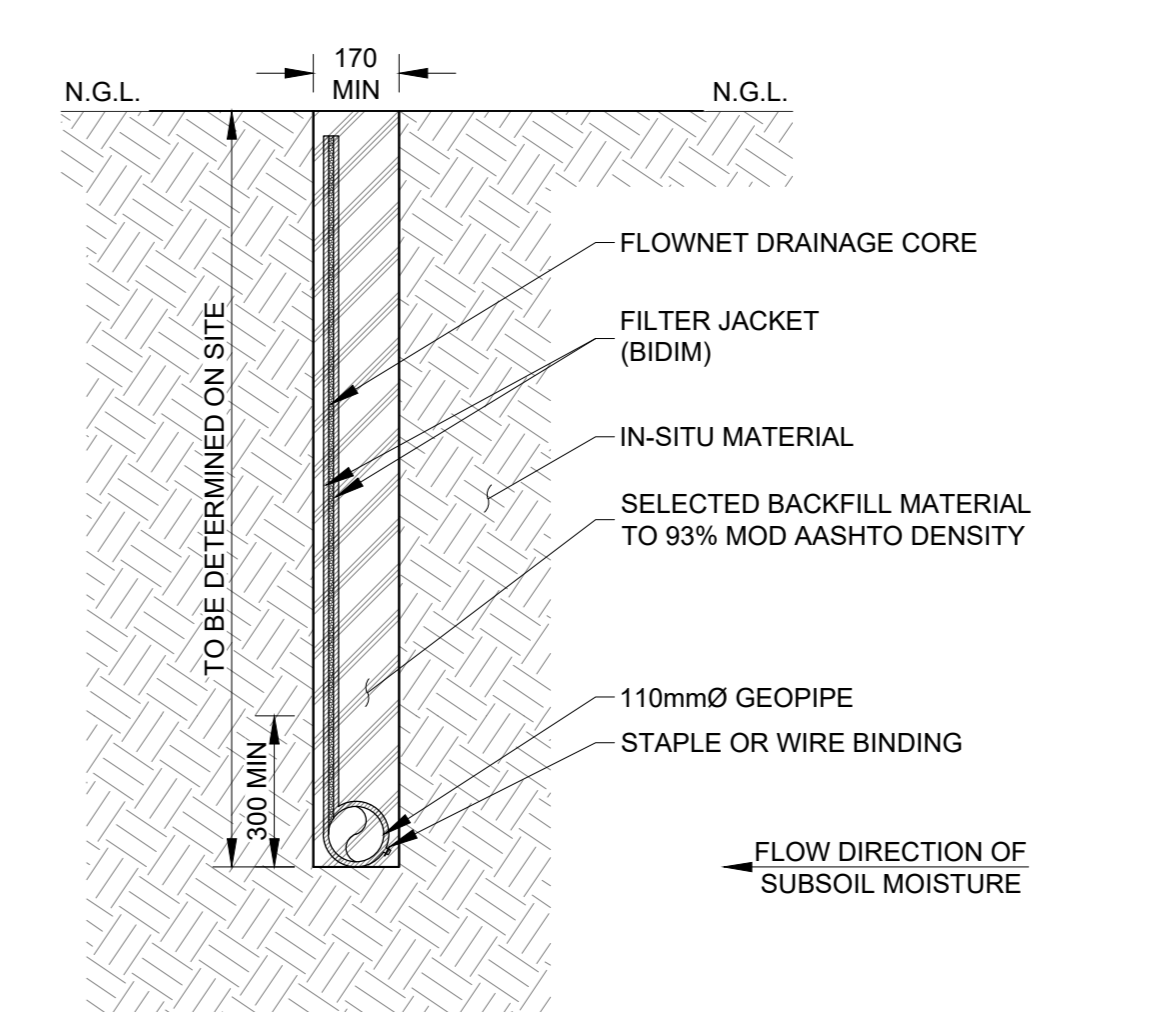
TYPE 3: TYPICAL FIN-DRAIN DETAIL
SCALE 1:15



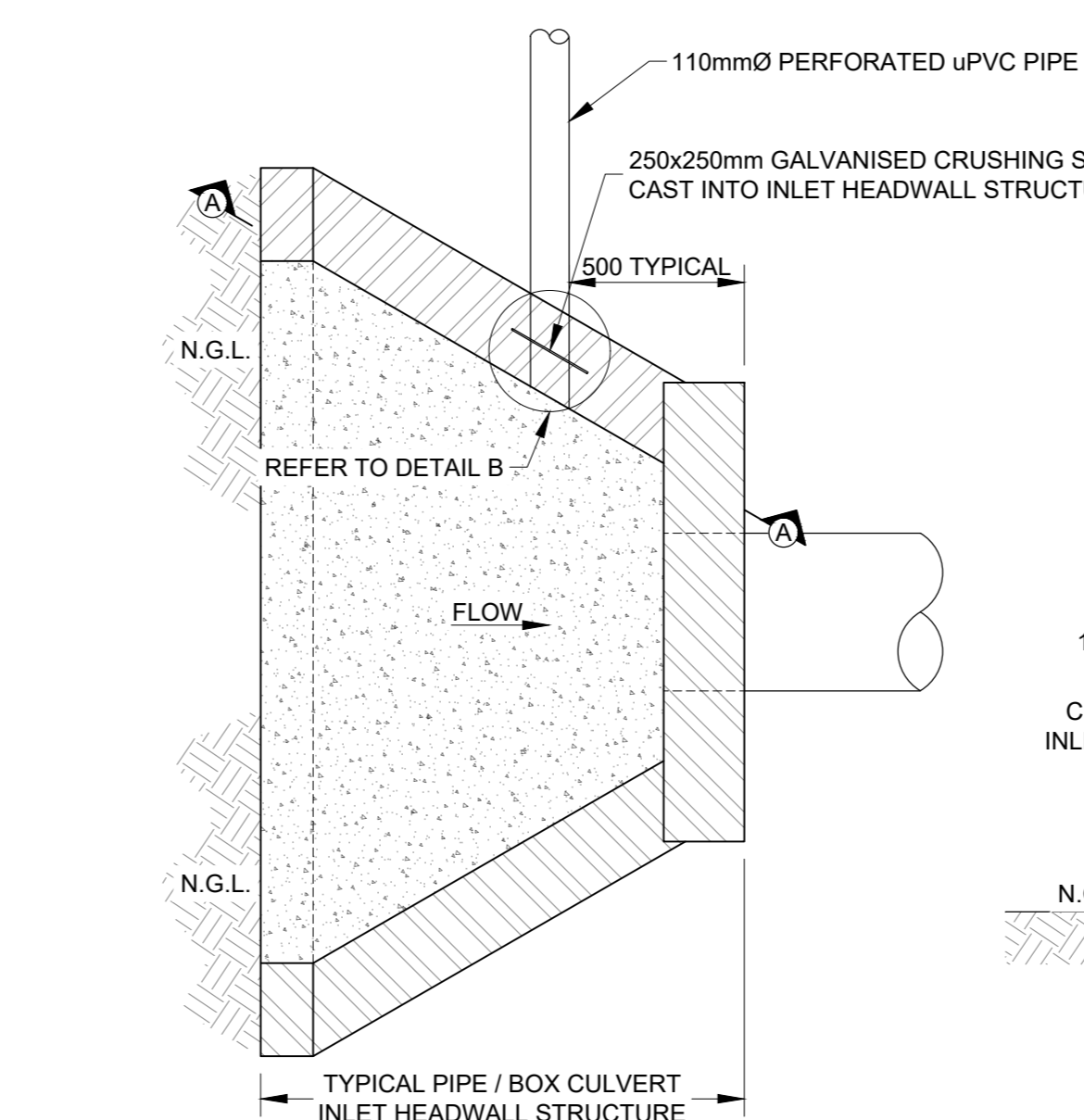
TYPE 4: TYPICAL SUBSOIL-DRAIN DETAIL
SCALE 1:15



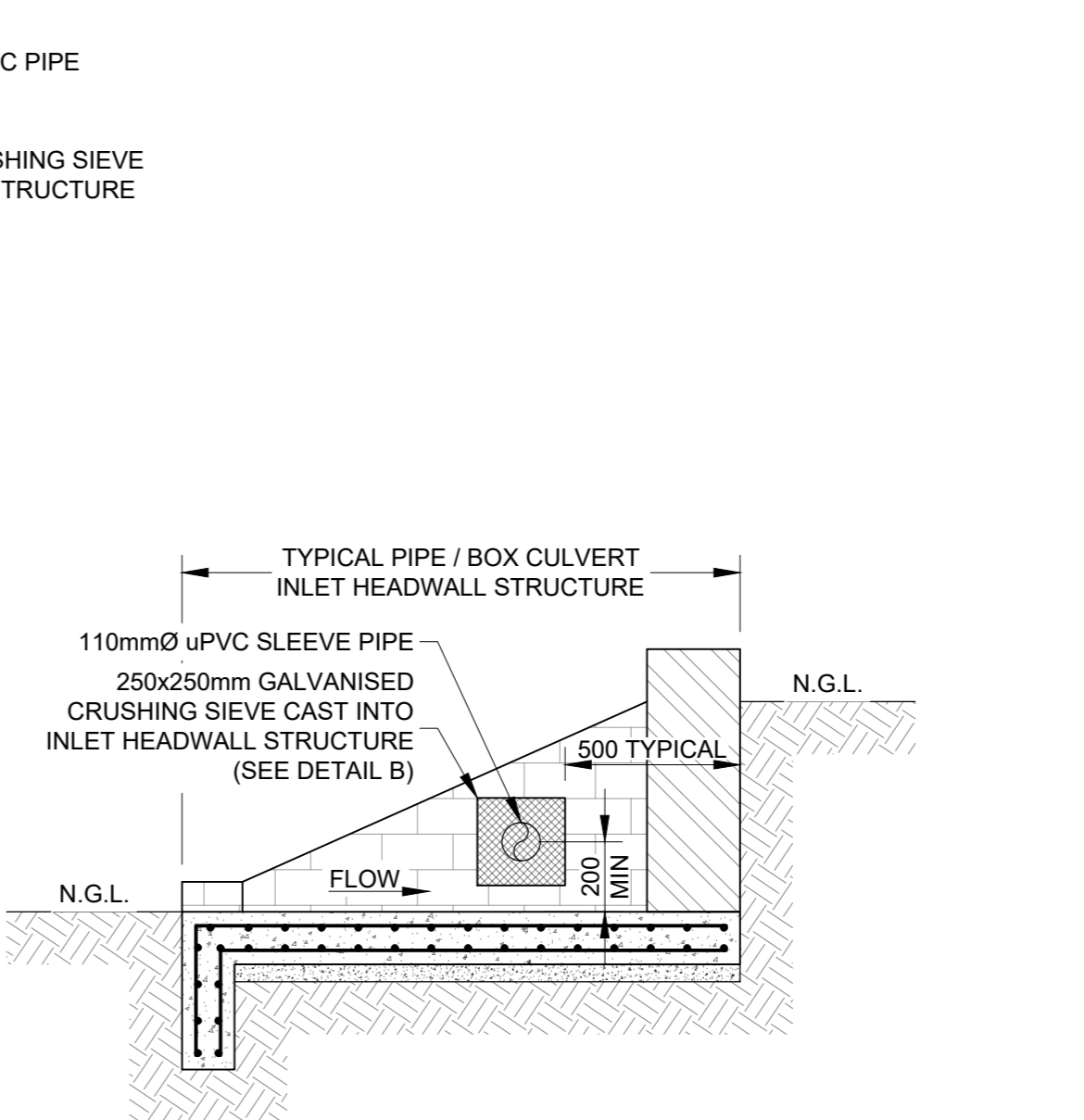
TYPE 5: CUT-OFF DRAIN
SCALE 1:15



TYPE 6: FLO-DRAIN
SCALE 1:15



PLAN VIEW: SUB SURFACE DRAINAGE IN HEADWALL STRUCTURE
SCALE 1:20



SECTION A-A: SUB SURFACE DRAINAGE IN HEADWALL STRUCTURE
SCALE 1:20

GRADING REQUIREMENTS OF CRUSHED STONE

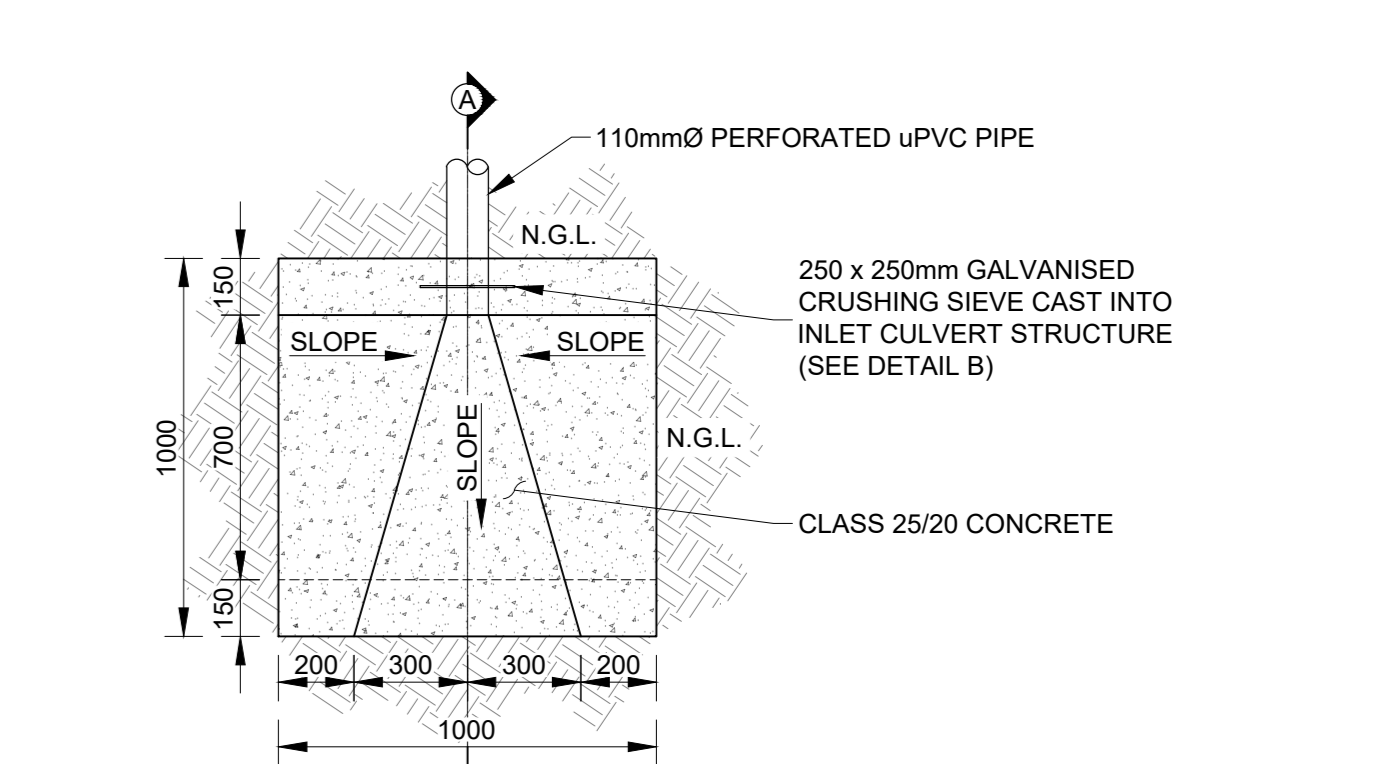
- CRUSHED STONE SHALL BE GRADED
- CRUSHED STONE, WHICH CONFORMS TO THE FOLLOWING REQUIREMENTS:
 - PERCENTAGE PASSING THROUGH:
 - 2.0mm SIEVE: 100
 - 1.2mm SIEVE: 60-85
 - FINE GRADE STONE:**
 - 3.1. A MINIMUM OF 15% PASSING THROUGH A 3.0mm SIEVE
 - 3.2. A MAXIMUM OF 15% PASSING THROUGH A 1.18mm SIEVE.
 - COURSE GRADE STONE:**
 - 4.1. A MINIMUM OF 15% PASSING THROUGH A 6.75mm SIEVE.
 - 4.2. A MAXIMUM OF 15% PASSING THROUGH A 2.38mm SIEVE.
- IN THE CASE OF CRUSHED STONE NOT MORE THAN 5% OF THE MATERIAL SHALL PASS THROUGH THE 0.075mm SIEVE.

LEGEND:

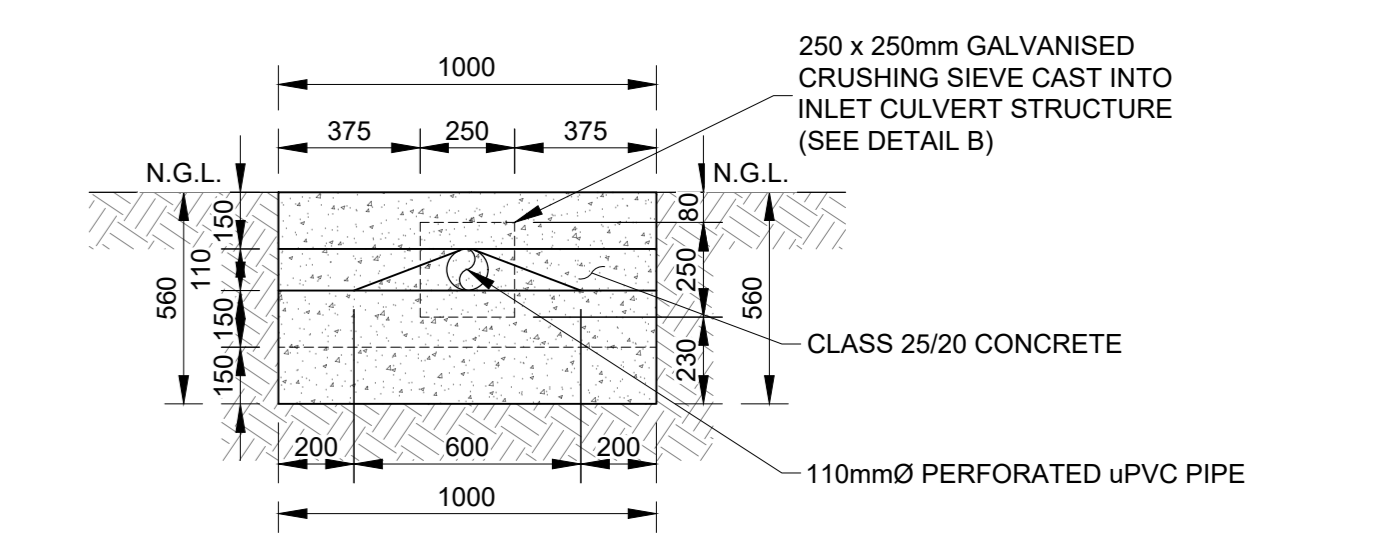
- SELECTED BACKFILL MATERIAL
- 19mm STONE DRAINAGE MATERIAL
- NATURAL PERMEABLE SAND
- IN-SITU MATERIAL
- PEBBLE LAYER

NOTES:

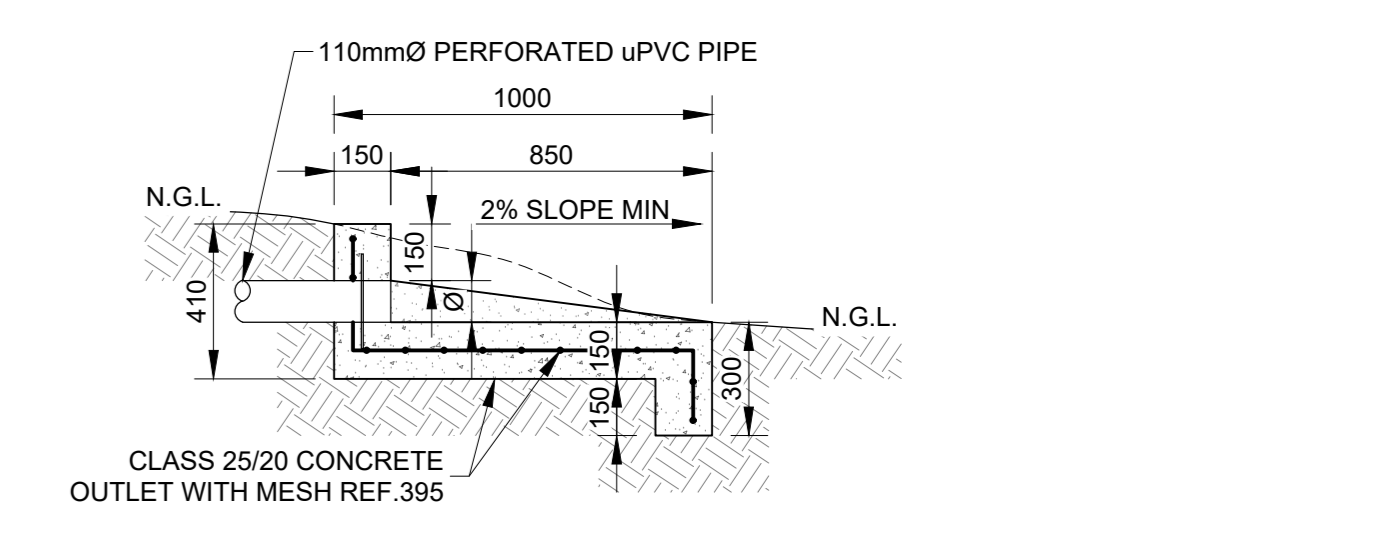
- UNLESS OTHERWISE SPECIFIED, TYPICAL SUBSOIL DRAINAGE MUST BE APPLIED THROUGHOUT.
- WHERE A SUBSURFACE DRAINAGE CONDUIT IS PLACED IN A STORMWATER BEARING SIDE DRAIN, IT MUST BE PROTECTED BY LINING THE SIDE DRAIN WITH A CONCRETE LINING / PAVING / CORBELS OR SLURRY PAVING.
- A MAXIMUM OF 15% PASSING THROUGH A 1.18mm SIEVE.
- THE MINIMUM DEPTH OF SUBSOILS SHOULD BE AS DIRECTED BY THE ENGINEER ON SITE.
- USE BIDM A1 OR SIMILAR APPROVED IF SUBSOIL DRAIN IS TO BE SUBMERGED BY GROUNDWATER.



PLAN VIEW: SUB SURFACE DRAINAGE OUTLET STRUCTURE
SCALE 1:20



ELEVATION: SUB SURFACE DRAINAGE OUTLET STRUCTURE
SCALE 1:20



SECTION A-A: SUB SURFACE DRAINAGE OUTLET STRUCTURE
SCALE 1:20

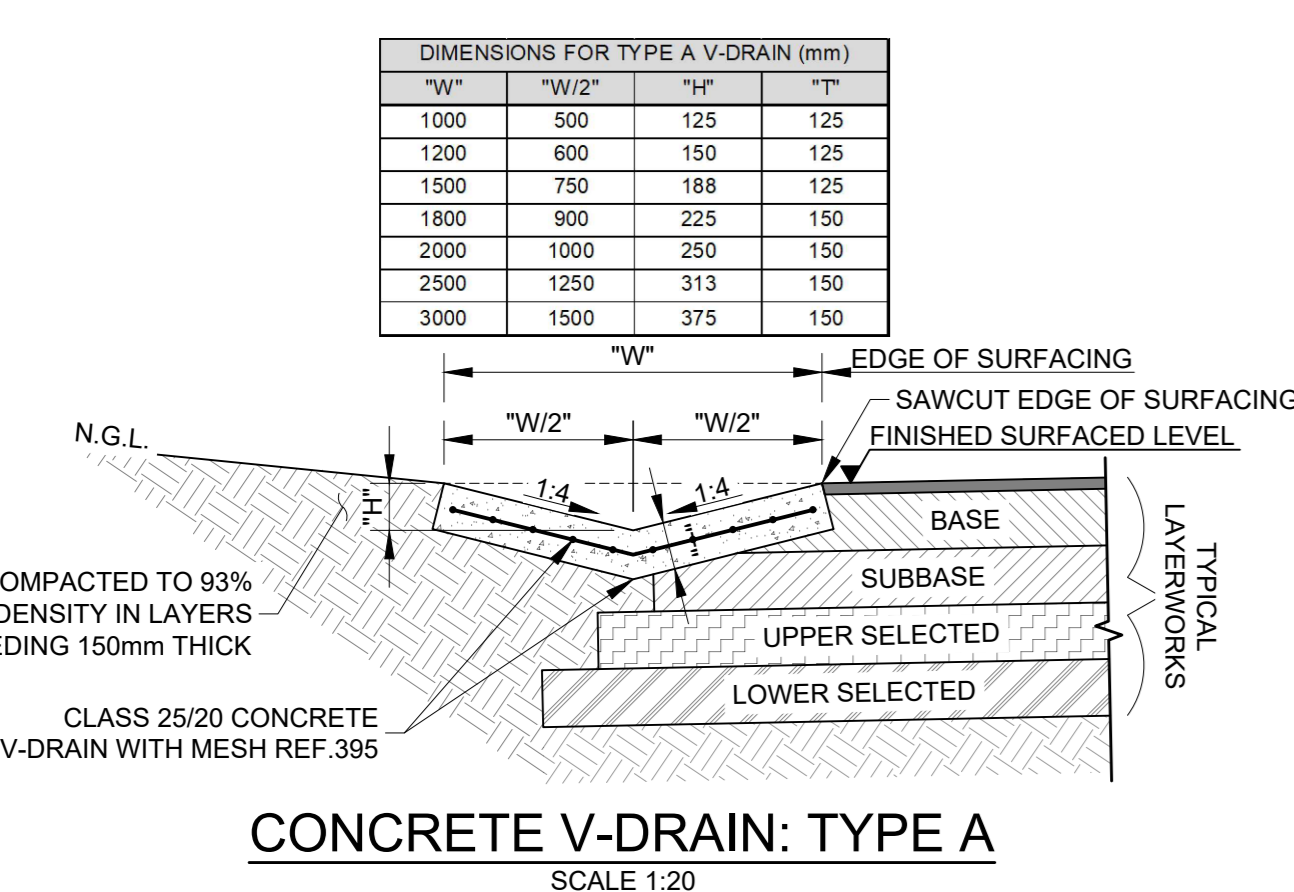
TABLE 1: SIDE ALLOWANCE FOR TRENCH EXCAVATIONS OF RIGID PIPES SANS 1200 DB - PIPE TRENCHES

EXTERNAL DIAMETER OF PIPE BERREL ("OD") mm	SIDE ALLOWANCE ON EACH SIDE ("S") mm	
	UP TO AND INCLUDING	OVER
125	125	300
700	1000	400
1000	2000	500
2000	-	600

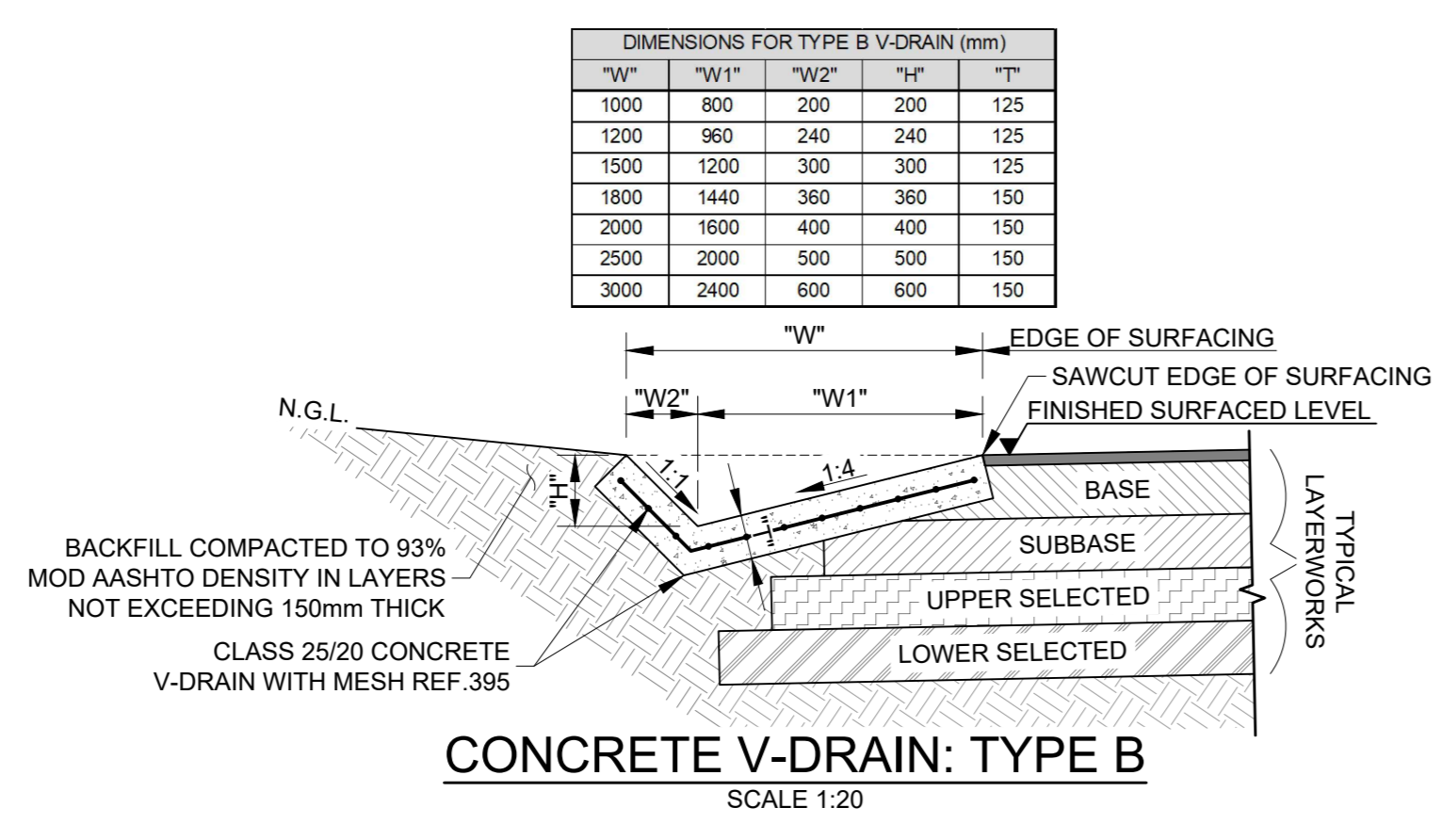
TABLE 2: CONCRETE INTERLOCKING JOINT PIPE DATA

Pipe Class	Nominal Diameter (NCD) mm	Inside Diameter (ID) mm	Outside Diameter (OOD) mm	Wall Thickness (T) mm	Nominal Length (L) m	Approximate Mass per metre kg/metre	Approximate Mass kg/pipe	Proof Load kNm
500	300	292	362	35	1.832.44	93	170226	15
	375	369	445	38	1.832.44	125	229306	18.8
	450	445	533	44	1.832.44	174	319428	22.5
	525	534	618	41	2.44	191	466	26.3
	600	611	699	44	2.44	234	570	30
	675	685	767	51	2.44	304	742	33.8
	750	762	870	54	2.44	397	971	37.5
	825	830	946	58	2.44	417	1019	41.3
	900	903	1029	63	2.44	493	1204	45
	1050	1034	1194	80	2.44	722	1763	52.5
1000	1200	1181	1359	89	2.44	916	2235	60
	1350	1328	1524	98	2.44	1133	2764	67.5
	1500	1461	1689	114	2.44	1455	3551	75
	1650	1638	1854	123	2.44	1726	4211	82.5
	1800	1755	2019	132	2.44	2019	4926	90
	1950	1898	2184	143	2.44	2398	5772	97.5
	150	153	197	22	1.83	31	57	15
	225	229	279	25	1.83	31	54	22.5
	300	292	362	35	1.832.44	93	170226	30
	375	369	445	38	1.832.44	125	229306	37.5
450	445	533	44	1.832.44	174	319428	45	
525	514	618	51	2.44	234	570	52.5	
600	584	699	57	2.44	299	729	60	
675	647	767	70	2.44	407	993	67.5	
750	718	870	76	2.44	489	1355	75	
825	788	946	79	2.44	555	1193	82.5	
900	853	1029	88	2.44	671	1638	90	
1050	986	1194	104	2.44	919	2242	105	
1200	1127	1359	116	2.44	1189	2652	120	
1350	1262	1524	131	2.44	1479	3609	135	
1500	1383	1689	153	2.44	1905	4648	150	
1650	1524	1854	165	2.44	2259	5512	165	
1800	1695	2094	177	2.44	2843	6448	180	
1950	1800	2184	192	2.44	3100	7564	195	

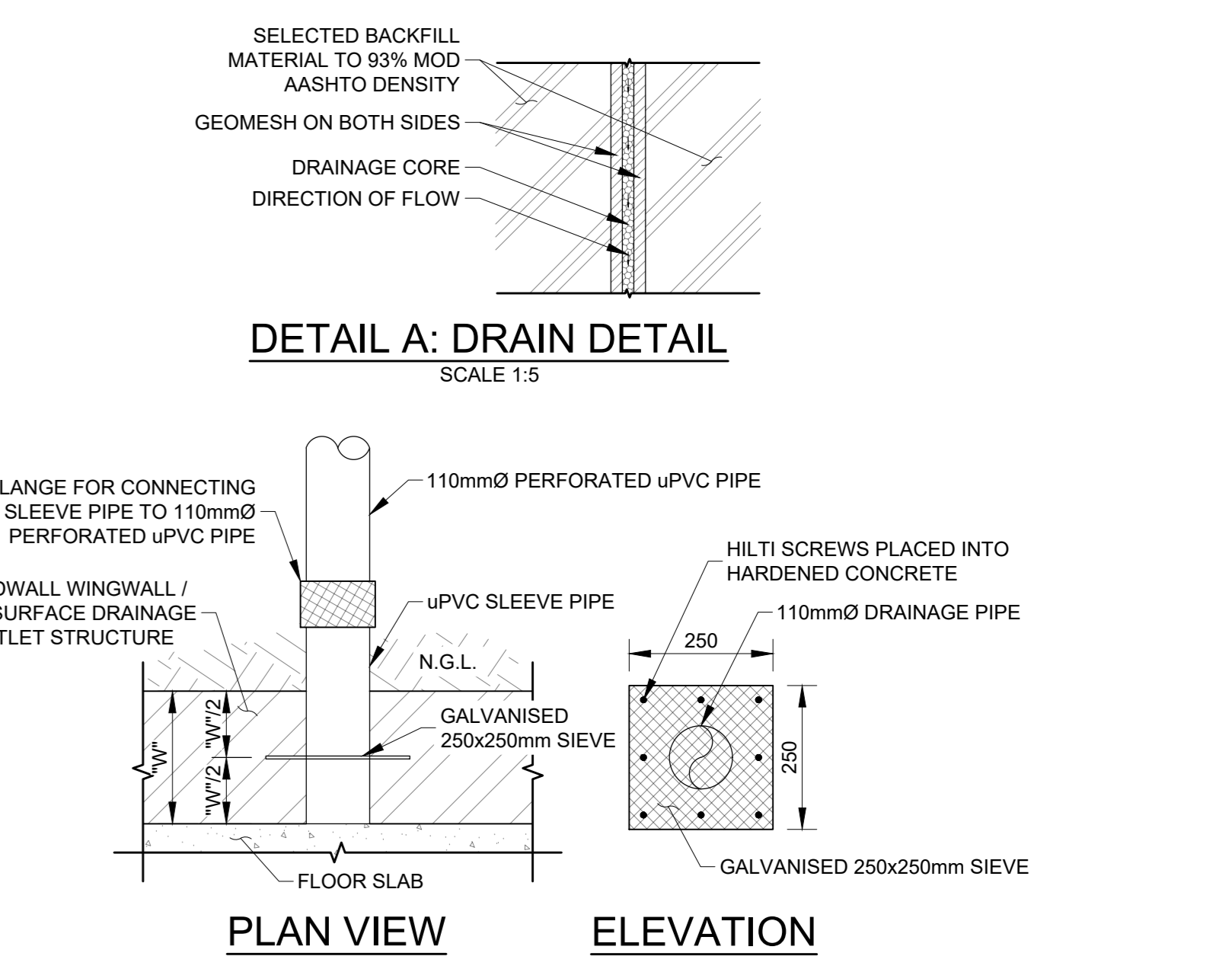
- NOTES:**
- PIPE BEDDING IN ACCORDANCE WITH SABS 1200LB.
 - PIPE JOINTING IN ACCORDANCE WITH SABS 1200LE.
 - FOR PRECAST CONCRETE PIPE DETAILS REFER TO ROCLA PRODUCT CATALOGUE OR SIMILAR APPROVED.
 - SELECTED FILL BLANKET AND BEDDING CRADLE TO BE COMPACTED TO 90% OF MOD AASHTO DENSITY.
 - BEDDING SHALL BE OF AN APPROVED SELECTED GRAVEL MATERIAL WITH A PI NOT EXCEEDING 6.
 - THE CLASS A IN SITU CONCRETE BEDDING SHALL BE IN ACCORDANCE WITH SABS 0102.
 - ϕ_{OD} = OUTSIDE DIAMETER OF PIPE
 ϕ_{ID} = INSIDE DIAMETER OF PIPE
 - PIPE TRENCH EXCAVATION IN ACCORDANCE WITH SANS 1200 DB



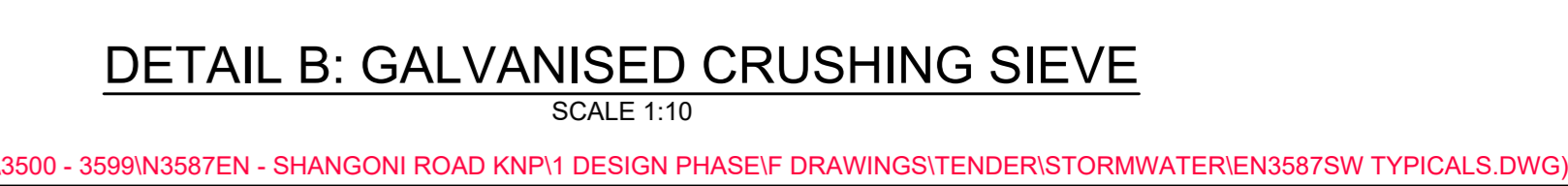
CONCRETE V-DRAIN: TYPE A
SCALE 1:20



CONCRETE V-DRAIN: TYPE B
SCALE 1:20



DETAIL A: DRAIN DETAIL
SCALE 1:15



DETAIL B: GALVANISED CRUSHING SIEVE
SCALE 1:10