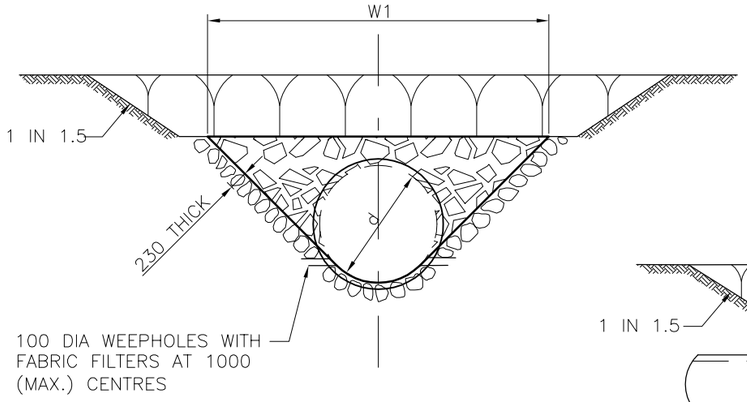
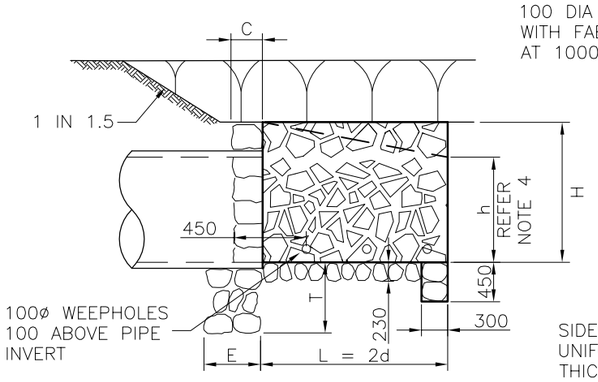
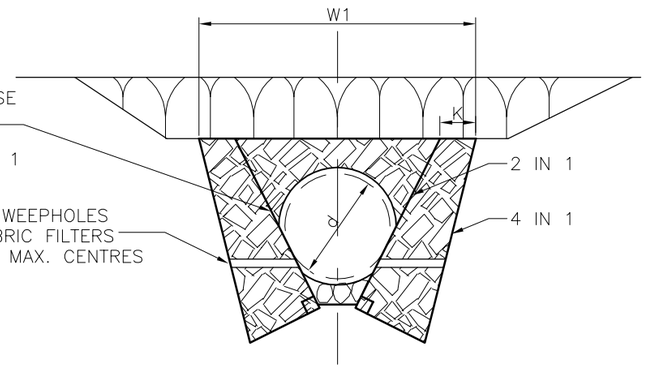


SECTION B–B



SECTION A–A



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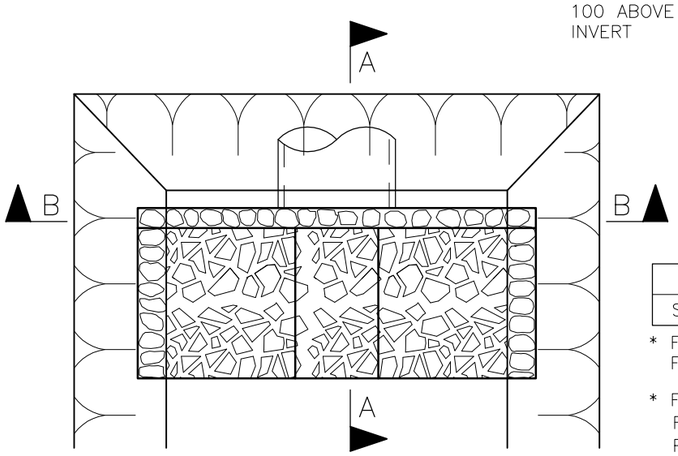
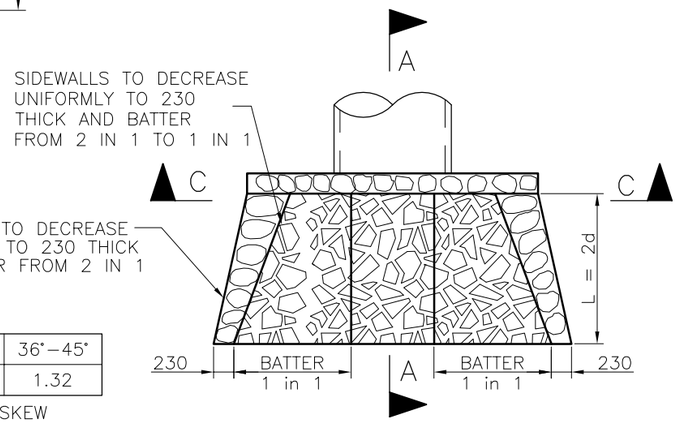


TYPE A PLAN



TYPE B PLAN

PIPE SKEW	5°–15°	16°–25°	26°–35°	36°–45°
SKEW FACTOR	1.02	1.07	1.16	1.32

* FOR SKEWED PIPES – MULTIPLY W1 BY THE SKEW FACTOR.

* FOR MULTIPLE PIPES – INCREASE W1 BY DIMENSION 'X' FOR EACH ADDITIONAL PIPE ('X' BEING THE DISTANCE FROM PIPE ℄ TO PIPE ℄).

MULTIPLE\SKEW PIPES

DIMENSION	PIPE DIAMETER 'd'													
	300	375	450	525	600	675	750	900	1050	1200	1350	1500	1650	1800
W1*	1095	1285	1485	1820	2015	2200	2550	2720	3300	3685	4065	4450	4810	5175
C	150	150	150	230	230	230	300	300	300	300	300	300	300	300
E	450	450	450	450	450	450	600	600	600	600	600	600	600	600
H	485	565	650	800	885	960	1120	1275	1435	1595	1755	1905	2065	2215
T	450	450	450	450	450	600	600	600	600	600	600	600	600	600
'X'	510	595	685	765	850	935	1015	1180	1345	1510	1675	1835	2000	2165

DIMENSIONS

TYPE A INLET FOR d = 300 TO 1200

TYPE A OUTLET FOR d = 300 TO 1800

DIMENSION	PIPE DIMENSION 'd'			
	1350	1500	1650	1800
W1*	2960	3200	3755	4000
B	760	840	915	990
C	300	300	300	300
E	600	600	600	600
H	1755	1905	2065	2220
T	450	450	450	450
K	300	300	450	450
X	1675	1835	2000	2165

DIMENSIONS

TYPE B INLET AND OUTLET

FOR d = 1350 TO 1800

NOTES:

1. DESIGN ALLOWABLE BEARING PRESSURE 75 KPa. WHERE THIS BEARING PRESSURE CANNOT BE OBTAINED, THE SUPERINTENDENT MAY DIRECT THAT A WIDER FOOTING BE USED.
2. UNREINFORCED CONCRETE CLASS 20 MPa/20. REINFORCED CONCRETE CLASS 32 MPa/20. CONCRETE COVER TO 50 UNLESS SHOWN OTHERWISE.
3. IN TIDAL AREAS WHERE MESH REINFORCEMENT IS SPECIFIED, CONCRETE IS TO BE SULPHATE RESISTANT GRADE S40.
4. IN EMBANKMENT SITUATIONS, THE HEIGHT OF THE WING WALL AT THE TOE SHOULD BE REDUCED TO "h" SO THAT THE SLOPE OF THE TOP OF THE WING WALL EQUALS THE ADJACENT EMBANKMENT BATTER. (REFER TO PROJECT DRAWINGS FOR VALUE OF "h").
5. SEE PROJECT DRAWINGS FOR THE FOLLOWING: NUMBER AND DIAMETER OF PIPES; SKEW ANGLES OF PIPES, IF APPLICABLE; INVERT LEVELS OF PIPES; HEIGHT OF WING WALL "h" AT TOE IF APPLICABLE.
6. FOR QUANTITIES REFER BSD–8104.
7. SCOUR PROTECTION IS GENERALLY REQUIRED DOWNSTREAM OF THE APRON UNDER ANY ONE OF THE FOLLOWING CONDITIONS:
   - AVERAGE OUTLET VELOCITY EXCEEDS THE NON–EROSIVE VELOCITY.
   - AVERAGE OUTLET VELOCITY EXCEEDS 2m/s.
   - OUTLET JET IS EXPECTED TO STRIKE AN UNPROTECTED CHANNEL BANK WITHIN A DISTANCE OF 10 TIMES THE PIPE DIAMETER.
8. BED SCOUR MAY BE CONTROLLED BY THE FOLLOWING METHODS:
   - REDUCING THE OUTLET VELOCITY BY INSTALLING AN EXPANSION CHAMBER.
   - INSTALLING AN ENERGY DISSIPATOR.
   - ARMOURING THE BED WITH ROCK, USUALLY OVER A MAXIMUM DISTANCE OF 8 TIMES THE PIPE DIAMETER.
9. PREFERRED POSITIONING OF STORMWATER PIPE OUTLET:
   - SETBACK FOR MORE THAN A DISTANCE OF 3 TIMES THE BANK HEIGHT MEASURED FROM THE TOE OF THE WATERCOURSE BANK.
   - FOR 'NARROW' RECEIVING WATERCOURSE, ANGLE THE OUTLET PIPE IN THE DIRECTION OF THE MAIN FLOW. AN APPROACH ANGLE IN THE RANGE OF 45° TO 60° MEASURED FROM THE BANK IS RECOMMENDED.
   - LIMIT THE MAXIMUM HEIGHT BETWEEN THE OUTLET INVERT AND THE RECIEVING CHANNEL INVERT OR EXPECTED WATER LEVEL TO $0.247/d^{0.5}$ WHERE d IS THE OUTLET PIPE DIAMETER IN METRES.
10. WHERE DIRECTED, INSTALL 1200 HIGH FENCE ALONG HEADWALL AND WINGWALLS:
    - FOR 1000–1500 DROP HEIGHT, PROVIDE GALVANISED TUBULAR HANDRAIL IN ACCORDANCE WITH BSD–7001, GALVANISED WELD MESH FENCING IN ACCORDANCE WITH BSD–7002 OR PEDESTRIAN SAFETY FENCING IN ACCORDANCE WITH BSD–7003.
    - FOR >1500 DROP HEIGHT, PROVIDE POWDER COATED STEEL FENCING (HUNTER ROD TOP OR APPROVED EQUIVALENT) INSTALLED USING VANDAL PROOF FIXINGS. DESIGN TO RESIST A MINIMUM STATIC LOAD OF 1.5 kN/m AS PER CLAUSE 3.6 OF AS 1170–2002.
11. USE OF EQUIVALENT PRECAST PRODUCTS IS PERMITTED.
12. DIMENSIONS IN MILLIMETRES (U.N.O.).

ISSUE	AMENDMENT	DRAWN DATE	CHK'D DATE	APPR'D DATE
A	ORIGINAL ISSUE	OCT '13	OCT '13	OCT '13

DRAWING AUTHORISED FOR PUBLICATION
Publish
ASSET ENGINEERING MANAGER
STRATEGIC ASSET MANAGEMENT
DESIGN APPROVED
Publish
PRINCIPAL ASSET OFFICER
ROADS & DRAINAGE

DESIGN	Std Dwgs WG	DATE	OCT '13
DRAWN	CPO - P&D	DATE	OCT '13
CHECKED		DATE	OCT '13
DRAWING FILENAME	BSD-8102.dwg		
ASSOCIATED PLANS	SUPERSEDES UMS-342		

BRISBANE CITY

BRISBANE CITY COUNCIL STANDARD DRAWING

INLETS AND OUTLETS (STONEPITCHED) STORMWATER DRAINS

SCALE NOT TO SCALE

DWG No. BSD–8102

ORIGINAL SIZE A3

REVISION A