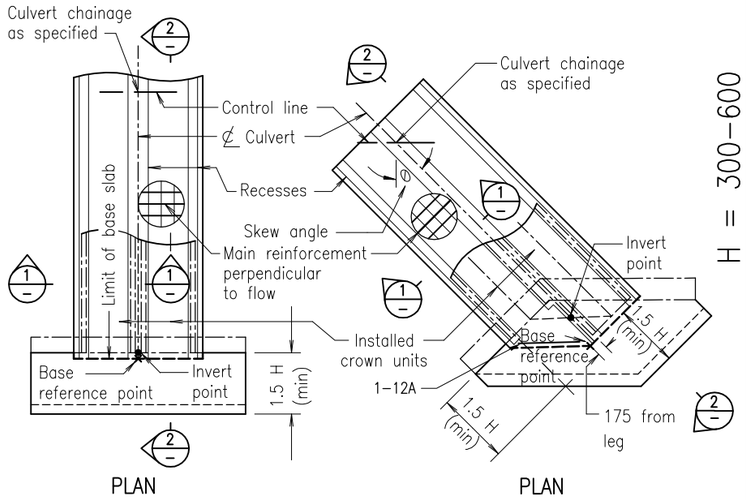
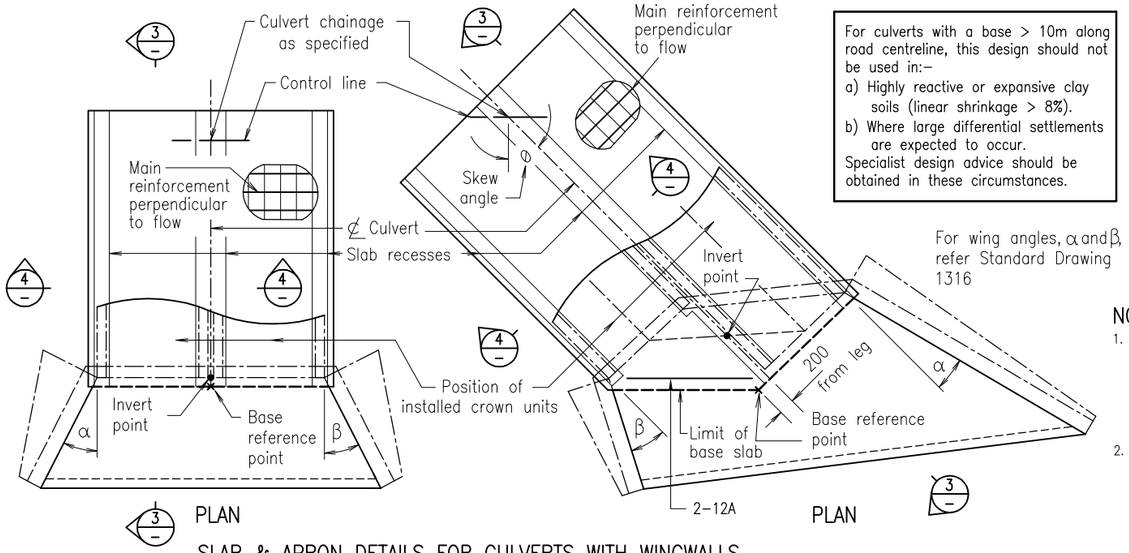


H = 300–600
H = 750–3600



For culverts with a base > 10m along road centreline, this design should not be used in:–
a) Highly reactive or expansive clay soils (linear shrinkage > 8%).
b) Where large differential settlements are expected to occur.
Specialist design advice should be obtained in these circumstances.

For wing angles, α and β, refer Standard Drawing 1316

Span	Thickness of slab, d	Main Reinforcement	Secondary Reinforcement	Position
600	180 (210)	RL1218	12 at 200	Single mat on centre line
750	180 (210)	RL1218	12 at 200	
900	180 (210)	RL1218	12 at 200	
1200	180 (210)	RL1218	12 at 200	
1500	190 (210)	RL1218	12 at 200	
1800	190 (210)	RL1218	12 at 200	
2100	210 (210)	RL1218	12 at 200	
2400	220 (220)	RL1218	12 at 200	
2700	240 (280)	RL1218	12 at 200	Top mat 55 (70) and bottom mat 75 (90) cover
3000	240 (280)	RL1218	12 at 200	
3300	250 (290)	RL1218	12 at 200	
3600	260 (300)	RL1218	12 at 200	

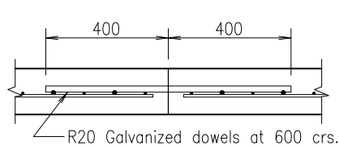
TABLE 1 – SLAB DETAILS
(Refer notes 8, 9 and 10)

SLAB & APRON DETAILS FOR CULVERTS WITHOUT WINGWALLS

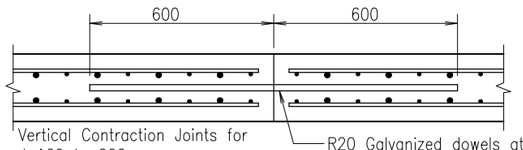
For construction detail refer Standard Drawing 1174

SLAB & APRON DETAILS FOR CULVERTS WITH WINGWALLS

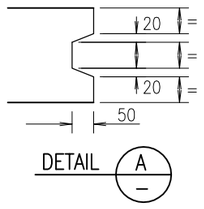
For construction detail refer Standard Drawing 1319

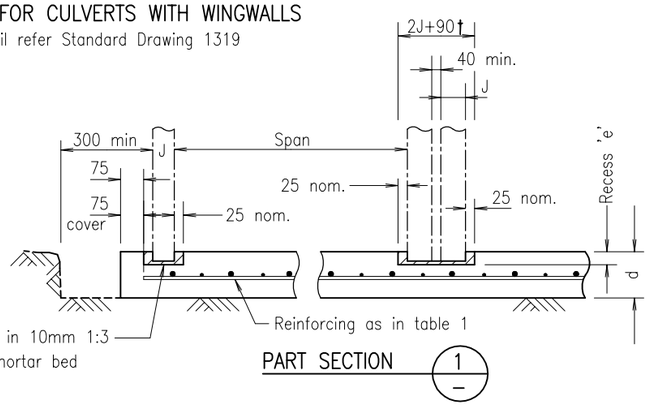


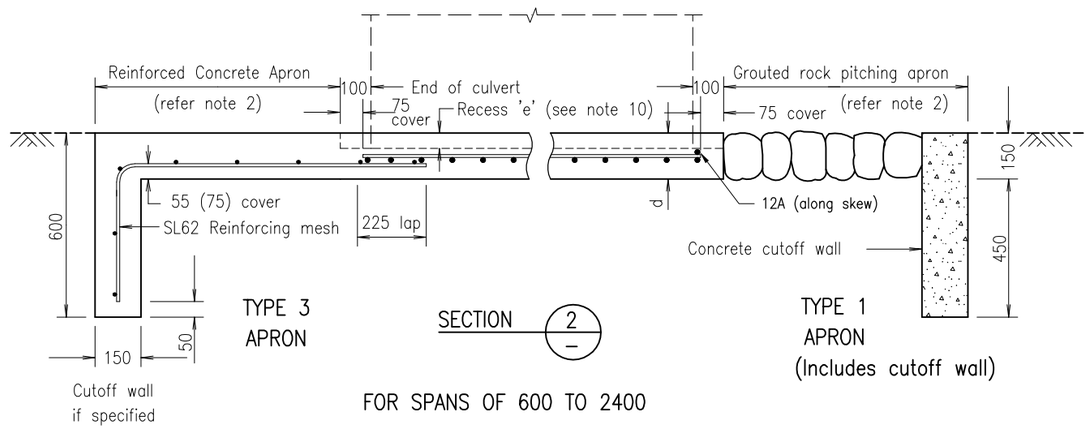
CONTRACTION JOINT
(Single Reinforcement Layer) Refer note 1

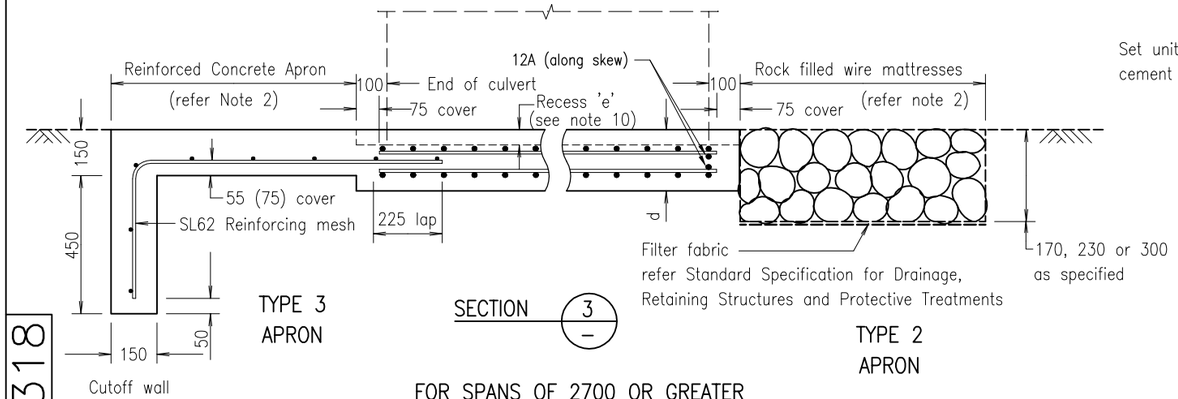


CONTRACTION JOINT
(Double Reinforcement Layer) Refer note 1



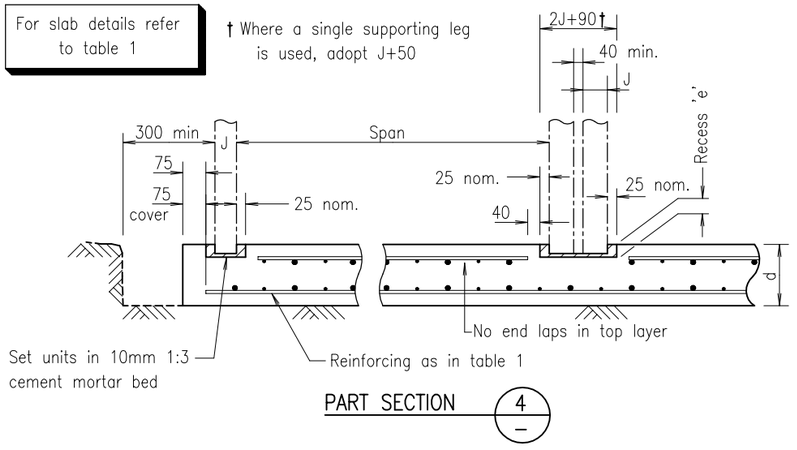


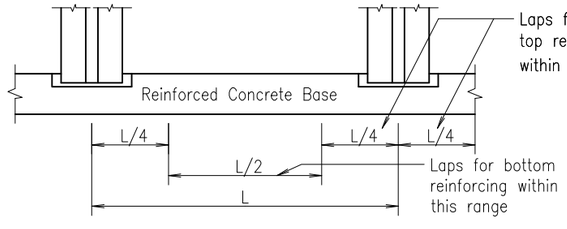




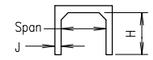
For slab details refer to table 1

† Where a single supporting leg is used, adopt J+50





NOTES :

1. CONTRACTION JOINTS are to be provided where (a) the length of the base slab and/or (b) the width of the base slab exceed 20 metres. When contraction joints are required across the width of the base slab, they are to be located at 1/4 span points of crown units. Contraction joints across the width of the base slab are to be continued across the aprons. For apron contraction joints refer to detail for single reinforcement layer. 24 hours minimum is to be allowed between pours.
2. APRONS, where unreinforced wingwalls are used, shall be grouted rock pitching (Type 1), rock filled wire mattresses (Type 2) or concrete reinforced with SL62 mesh (Type 3) refer Standard Drawing 1306. Where RC wingwalls are used, refer Standard Drawing 1303 for apron details. Protection works at outlets and inlets are typical and may be varied as shown in documents. If aprons are specified, apron lengths shall be nominally between ends of the wings as drawn. Any extended or reduced length will be shown on the drawings.
3. BASE DIMENSIONS given are applicable to a maximum fill height over the culvert crown of 2 metres. An on site check of the units dimensions should be made before setting out the base slab as there are variations between manufacturers.
4. UNIT DIMENSIONS : 

H = Height of opening
J = Thickness of leg
Span = Internal width
5. MESH LAPS shall be made so that the two outermost wires of one fabric overlap the two outermost wires of the sheet being lapped. 
6. REINFORCING BAR LAPS :
300 for 12 dia. secondary reinforcement
7. DETAIL TO BE SHOWN ELSEWHERE IN THE DOCUMENTS :
Apron type, depth of Type 2 apron (if required).
Apron cutoff wall, U/S and/or D/S (if required).
Exposure classification treatment (if required).
Culvert location (chainage) and base distance and height.
8. EXPOSURE CLASSIFICATIONS B2 : Dimensions indicating slab thickness, steel cover and concrete class are shown in brackets for salt–rich arid areas and tidal or splash zones (ie. exposure classification C). Specialist design advice should be obtained for aggressive soils (ie. exposure classification U).
9. DESIGN LOADING HLP400, M1600, A160 and W80.
EMBANKMENT – Maximum height of fill to be 2 metres.
CULVERT BASE – Maximum pressure to be 150 kPa.
10. RECESS DETAILS are as follows :
H = 600, no recesses
H > 600 to 750, 'e' = 20mm
H > 750 to 1200, 'e' = 30mm
H > 1200, 'e' = 40mm
11. CONCRETE :
S40/20 (S50/20)
12. STEEL :
Reinforcing bars to be grade D500N to AS/NZS 4671. 20 dia. dowels to be grade R250N to AS/NZS 4671 and galvanized to AS/NZS 4680. Reinforcing mesh to AS/NZS 4671. All reinforcing steel to be ACRS certified. Steel reinforcement to be read in conjunction with Standard Drawings 1043 and 1044.
13. **REINFORCEMENT BAR IN THE SECONDARY DIRECTION is to be offset from the secondary (cross) wires of the mesh by 100.**
14. DIMENSIONS are in millimetres unless shown otherwise.

ASSOCIATED DOCUMENTS :
Department of Main Roads Manual of Standard Drawings Roads
Department of Main Roads Manual of Standard Specifications Roads
REFERENCED DOCUMENTS :
Standard Drawings :
1043 Standard Bar Shapes Drawing 1 of 2 and 2 of 2
1044 Standard Hook, Lap and Bend Details and General Steel Reinforcement Information
1174 Construction of End Structures H = 150 – 600
1303 Construction of Reinforced Concrete Wingwalls and Headwalls
1306 Construction of Unreinforced Wingwalls, Headwalls and Aprons.
1316 General Arrangement and Installation of Precast Units
1319 Construction of Unreinforced Wingwalls and RC Headwalls H = 750 – 2400
Standard Specifications :
MRS11.03 Drainage, Retaining Structures and Protective Treatments
Australian Standards :
AS/NZS 4671 Steel Reinforcing Materials
AS/NZS 4680 Hot–dip Galvanized (Zinc) Coatings on Fabricated Ferrous Articles

1318

R C BOX CULVERTS & SLAB LINK BOX CULVERTS

Queensland Government Department of Main Roads

CONSTRUCTION OF BASES WITH RECESSES AND APRONS

Size A3 | Not to Scale

Drawing No 1318
Date 3/07
G