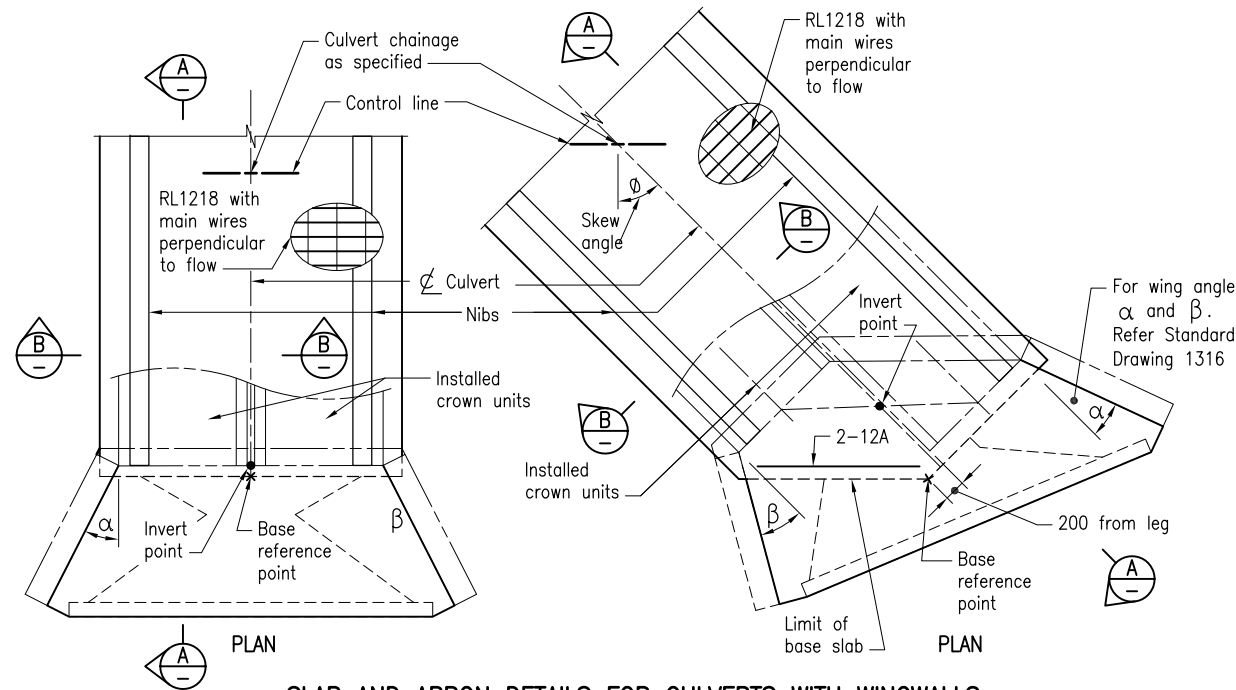


SLAB AND APRON DETAILS FOR CULVERTS WITHOUT WINGWALLS

For Headwall details where H = 300 to 600 refer Standard Drawing 1174

H = 375 TO 600
H = 750 TO 3600



SLAB AND APRON DETAILS FOR CULVERTS WITH WINGWALLS

For Headwall and Wingwall details refer Standard Drawing 1303

DESIGN EXCLUSIONS:
For culverts with a base > 10 metres 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 shall be obtained in these circumstances

NOTES:

- BASE SLAB for RC Box Culvert shall be in accordance with MRTS03.
- Reinforced concrete base, aprons and footings shall be cast monolithically.
- BASE DIMENSIONS given are applicable to a maximum fill height over the culvert crown of 2000. An on site check of the units dimensions should be made before setting out the base slab as there are variations between manufacturers.
- UNIT DIMENSIONS :

5. CONCRETE shall be in accordance with MRTS70. Requirements for reinforced concrete are shown in table below.

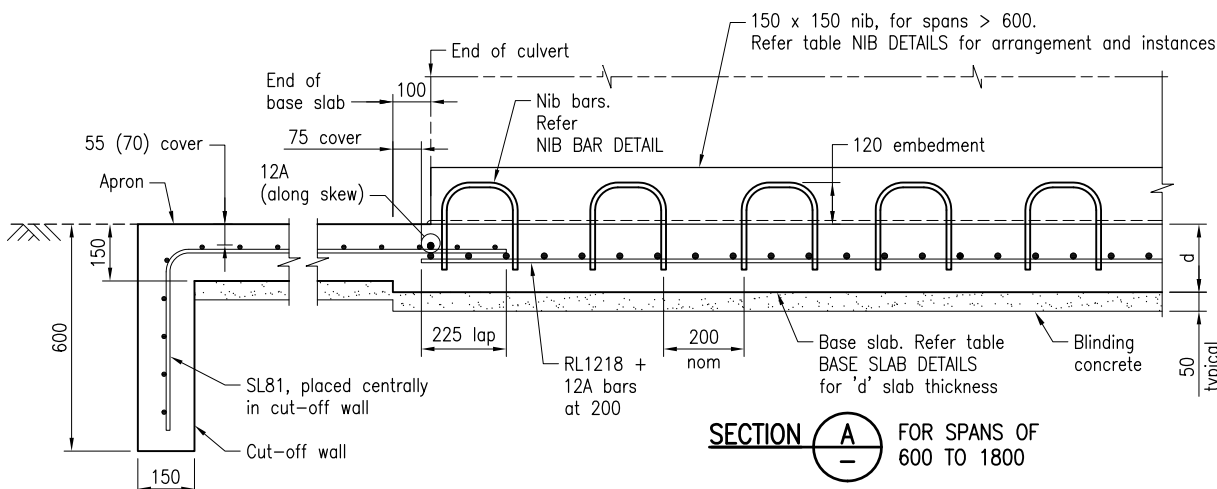
Design life	100 years
Minimum exposure classification	B2 to AS 5100
Minimum concrete class	S40/20
Minimum cover to reinforcement UNO	55 cover to AS 5100
Minimum concrete class and cover for exposure classification C	S50/20 with 70 cover to AS 5100

† Slab thickness 'd' in brackets () shall be used for exposure classification C. All exposed edges shall have 19 x 19 chamfers. Blinding concrete N20/20.

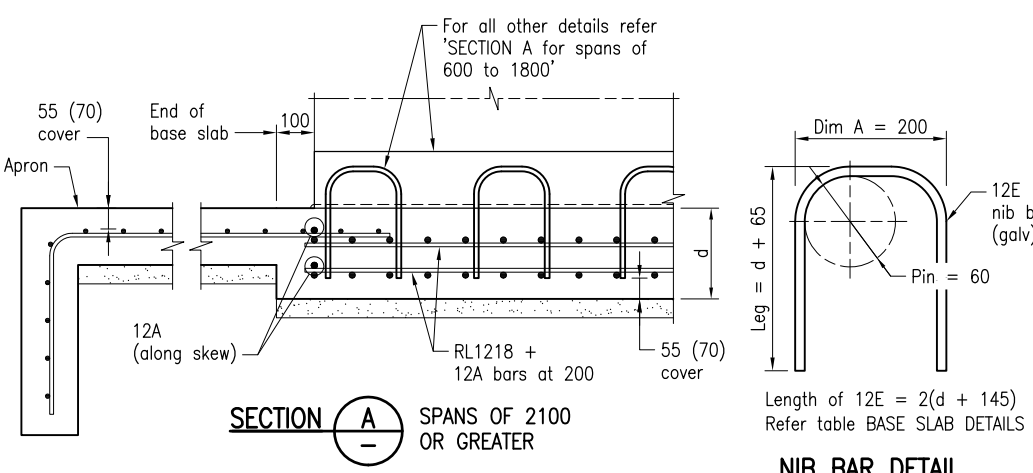
- REINFORCING STEEL shall be read in conjunction with Standard Drawings 1043 and 1044 and in accordance with MRTS71 and AS/NZS 4671. Reinforcement bar in the secondary direction shall be offset from the secondary (cross) wires of the mesh by 100. Deformed bars Grade D500N, round bars grade R250N and reinforcing mesh Grade D500L. Reinforcement shall be hot dip galvanised to AS/NZS 4680 where shown.
- TACK WELDING to reinforcement for location purposes to AS/NZS 1554.3. Welding consumables shall be G49X to AS/NZS ISO 14341-B or T49X to AS/NZS ISO 17632-B.
- DOWELLED CONTRACTION JOINTS shall be provided where (a) the length and/or (b) the width of the base slab exceed 20 metres. When contraction joints are required across the width, they shall be located at 1/4 span points of crown units and are to be continued across the aprons. 24 hours minimum shall be allowed between pours.
- DESIGN LOADING: HLP400, M1600, A160 and W80 in accordance with AS 5100.2. EMBANKMENT - Maximum height of fill shall be 2000. BASE SLAB - Maximum pressure shall be 150 kPa.
- Refer Standard Drawing 1359 for details of earthworks for culverts.
- PROJECT-SPECIFIC INFORMATION to be shown on the drawings: Exposure classification; Culvert chainage; Skew angle; Base and apron setout and extents; Headwall and/or wingwall extents; Steel schedule.
- DIMENSIONS are in millimetres unless shown otherwise.

ASSOCIATED DEPARTMENTAL DOCUMENTS:
Design Criteria for Bridges and Other Structures
NDRRA Guidelines
Road Drainage Manual (RDM)

REFERENCED DOCUMENTS:
Departmental Standard Drawings:
1043 Reinforcing Steel - Standard Bar Shapes
1044 Reinforcing Steel - Lap Lengths
1174 RC Box Culverts - Installation of Precast Units and Construction of Headwalls Height = 375 to 600
1303 RC Box Culverts and Slab Link Culverts - Construction of Headwalls and Wingwalls Height > 600
1316 RC Box Culverts and Slab Link Culverts - General Arrangement and Installation of Precast Units Height > 600
1359 Culverts - Installation, Bedding and Filling/Backfilling Against/Over Culverts
Departmental Specifications:
MRTS03 Drainage, Retaining Structures and Protective Treatments
MRTS70 Concrete
MRTS71 Reinforcing Steel

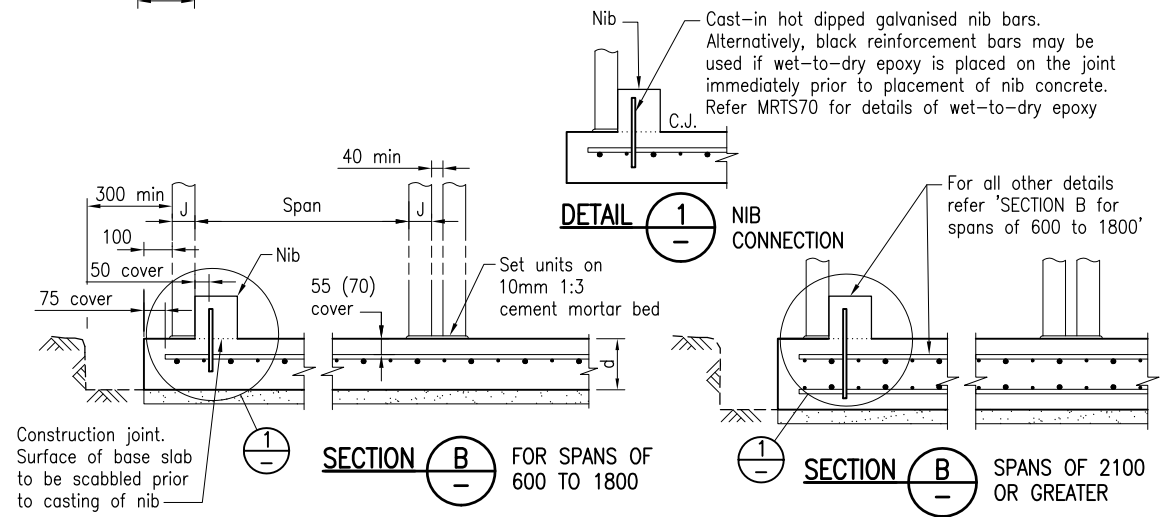


SECTION A FOR SPANS OF 600 TO 1800



SECTION A SPANS OF 2100 OR GREATER

NIB BAR DETAIL



DETAIL 1 NIB CONNECTION

Arrangements:

for H = 600	- no nibs	
for RCBC H > 600	- nibs supporting external legs of external cells	
for SLBC H > 600 to 900	- nibs supporting external legs of external cells	
for SLBC H > 900	- nibs supporting both legs of external cells	

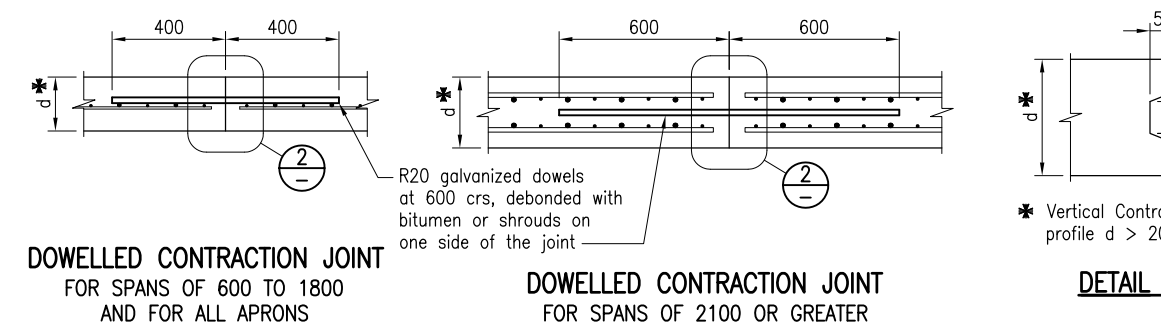
Installation:

for H < 1500	- nibs cast before placement of units	
for H ≥ 1500	- nibs cast after placement of units	

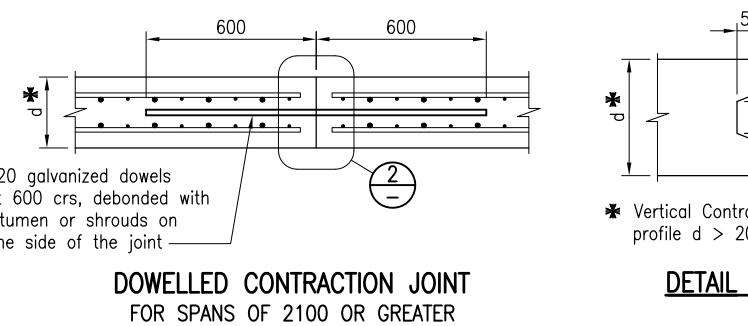
NIB DETAILS

BASE SLAB DETAILS

Span, refer Note 4	Slab thickness 'd'	Length of 12E nib bar
600	180 (210)	N/A
750	180 (210)	630
900	180 (210)	630
1200	180 (210)	630
1500	190 (210)	650
1800	190 (210)	650
2100	210 (240)	690
2400	220 (240)	710
2700	240 (280)	750
3000	240 (280)	750
3300	250 (290)	770
3600	260 (300)	790



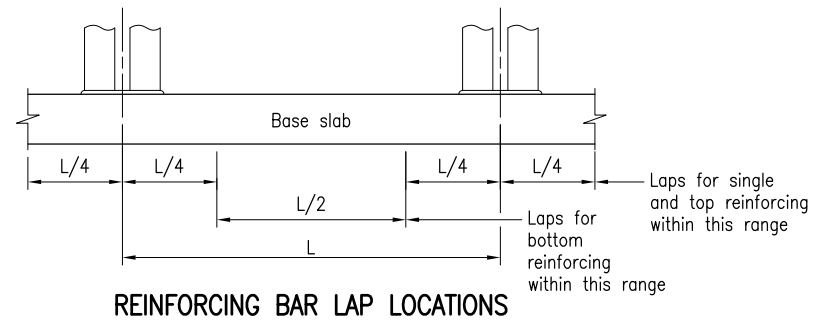
DOWELLED CONTRACTION JOINT FOR SPANS OF 600 TO 1800 AND FOR ALL APRONS



DOWELLED CONTRACTION JOINT FOR SPANS OF 2100 OR GREATER

* Vertical Contraction Joints with profile d > 200 shall be keyed

DETAIL 2



REINFORCING BAR LAP LOCATIONS

Department of Transport and Main Roads

R C BOX CULVERTS AND SLAB LINK BOX CULVERTS

CONSTRUCTION OF BASES WITH NIBS AND APRONS (ALL SIZES)

A3 Standard Drawing No 1317 Date 11/16

Not to Scale

Queensland Government

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