

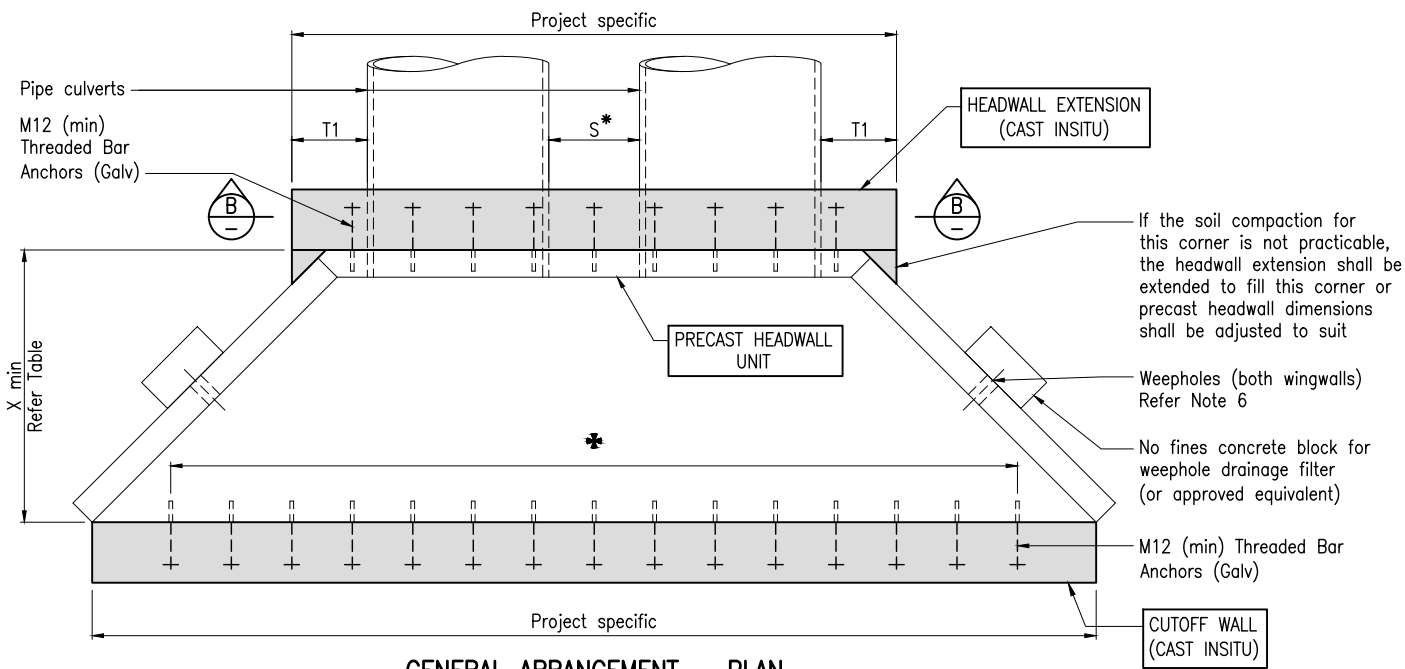
SCOPE OF PRECAST HEADWALL STANDARD DRAWING: 1243

The scope of this standard drawing is to provide indicative standard details for culvert headwalls. The dimensions shown are minimum requirements only. It is the precast headwall supplier's responsibility to provide project specific drawings with actual dimensions to suit the project situation and to RPEQ certify the project specific drawings. This standard drawing is applicable for the following situations:

1. Single cell and multi-cell headwalls
2. Single cell sloping face headwalls.

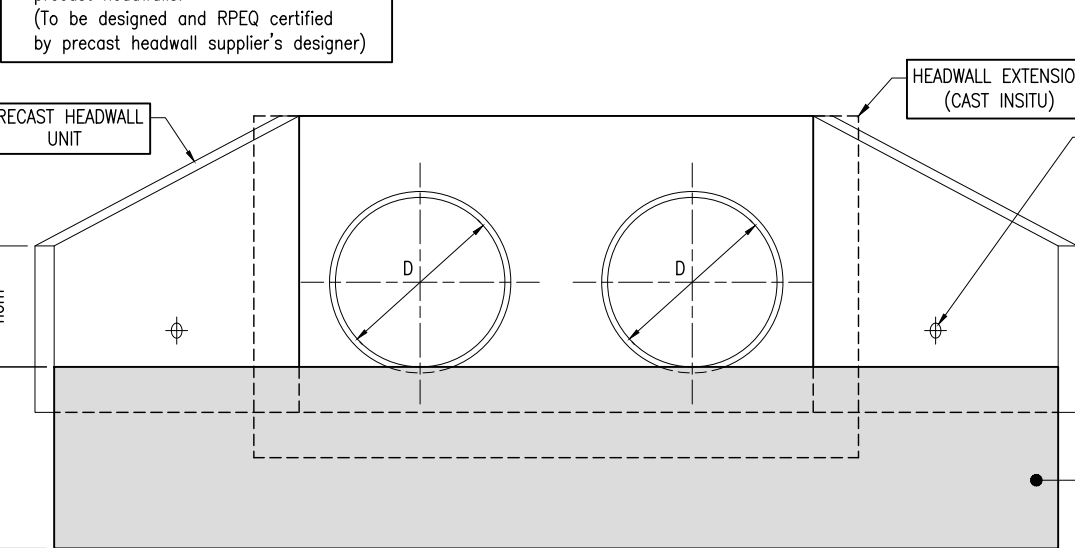
APRON DIMENSIONS	
INTERNAL PIPE DIAMETER (D)	X min.
375	650
450	650
525	650
600	780
675	1000
750	1000
825	1000
900	1000
1050	1620
1200	1620
1350	1620
1500	1620
1650	2400
1800	2400
1950	2400
2100	2400
2250	2400
2400	2400
2550	3000

- NOTES (Continue on to Drawing 2):**
1. FERRULES to be hot dipped galvanised and TMR Approved.
 2. ALL FIXINGS into ferrules to be galvanised.
 3. PRECAST CONCRETE to be in accordance with MRTS72.
 4. INSITU CONCRETE to be in accordance with MRTS70.
 5. CONCRETE (for pipe culvert only):
 - (a) For pipes less than or equal to 800mm diameter and soil cover is less than or equal to 2500mm
Design life 50 years
Minimum exposure classification B1 to AS3600 and cover to reinforcing to AS3600
Minimum concrete strength S32/20 to MRTS70
Cover to reinforcement for exposure classification B1 and S32/20 concrete;
 - Precast concrete (using intense compaction and rigid formwork) - 30mm
 - Insitu concrete - 40mm
 - (b) For pipes greater than 800mm diameter and all pipe sizes where soil cover is greater than 2500mm
Design life 100 years
Minimum exposure classification B2 to AS5100 and cover to reinforcing to AS5100
Minimum concrete strength S40/20 to MRTS70 and AS5100
Cover to reinforcement for exposure classification B2 and S40/20 concrete;
 - Precast concrete (using intense compaction and rigid formwork) - 45mm
 - Insitu concrete - 55mm
 - (c) Minimum concrete strength for higher exposure classification than (a) and (b) above to MRTS72 and Design Criteria for Bridges and Other Structures as appropriate.
 6. WEEPHOLES of 50 diameter shall be provided at maximum of 1200 centres (vertically and horizontally) in wingwalls of precast headwall unit. A 300 x 300 x 150 no fines concrete block or approved equivalent shall be provided at each weephole as a drainage filter. Location of weepholes to be decided ensuring cover requirements as specified in note 5.
 7. DESIGN of precast Headwall, cast in-situ Headwall extension and cast in-situ Cutoff wall shall be carried out in accordance with Technical Note 27 and RPEQ certified by the precast headwall supplier's designer according to the project specific requirements. Minimum details required to be shown in the precast supplier provided project specific drawings are:
 - All dimensions of precast Headwall unit including wingwall & apron lengths & reinforcement details.
 - Design loads and design standards including Technical Note 27.
 - Cast in-situ Headwall extension dimensions and reinforcement details.
 - Cast in-situ Cutoff wall dimensions and reinforcement details.
 - Details of ferrules and the threaded bar anchors for connection between precast Headwall unit and cast in-situ Headwall extension and Cutoff wall.
 - Design minimum exposure classification.
 - Concrete information including concrete class, aggregate size, cover to reinforcement.
 8. REINFORCING STEEL to be read in conjunction with Standard Drawings 1043 and 1044. Reinforcing steel to be in accordance with MRTS71 and AS/NZS 4671. Deformed bars Grade D500N and Round bars Grade R250N. All carbon reinforcing steel to be Australian Certification Authority for Reinforcing Steel (ACRS) certified.
 9. THREADED BARS to be Grade 4.6 and hot dip galvanised to AS1214, nuts class 5 to AS1112.1 and thin nuts class 5 to AS1112.4.
 10. TACK WELDING to reinforcement for location purposes to AS/NZS 1554.3 Clauses 3.3.1 and 3.3.2. and MRTS 71. Welding consumables to be G49X or T49X to AS/NZS ISO14341 or AS/NZS ISO 17632.
 11. LIFTING POINTS and lifting devices for precast headwall unit shall be designed and RPEQ certified in accordance with MRTS72.

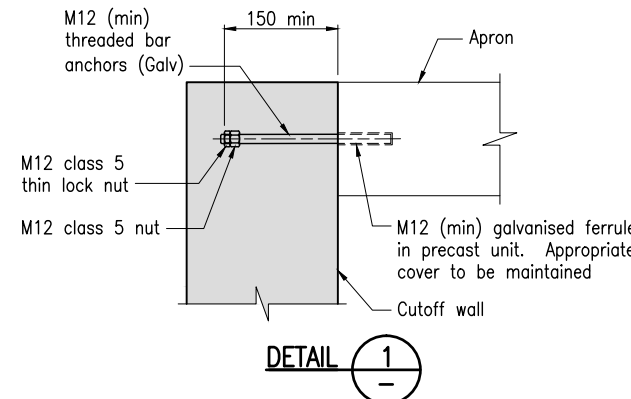


GENERAL ARRANGEMENT - PLAN
(DETAIL IS SIMILAR IN UPSTREAM AND DOWNSTREAM SIDES)

- * Minimum 12 dia. galvanised Ferrules at 200 nominal spacing (ferrule positions may be slightly adjusted to avoid precast mould stiffeners where applicable) in precast headwalls. (To be designed and RPEQ certified by precast headwall supplier's designer)
- This surface of precast concrete shall be prepared as a construction joint as per MRTS70
- S* For spacing between multiple culverts refer standard drawing 1359 - Culverts



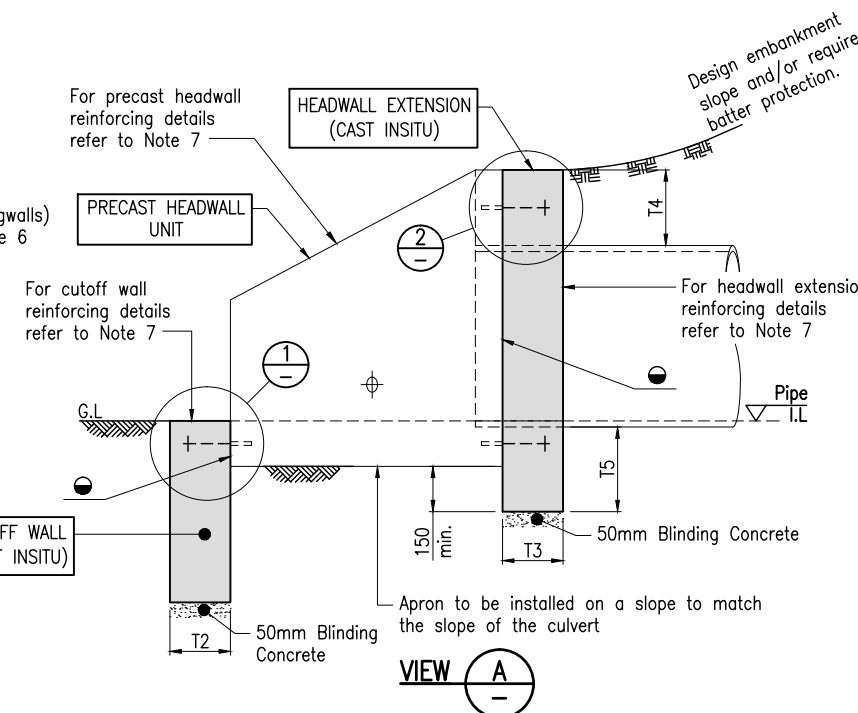
GENERAL ARRANGEMENT - ELEVATION



DETAIL 1
(DETAIL 2 IS SIMILAR)

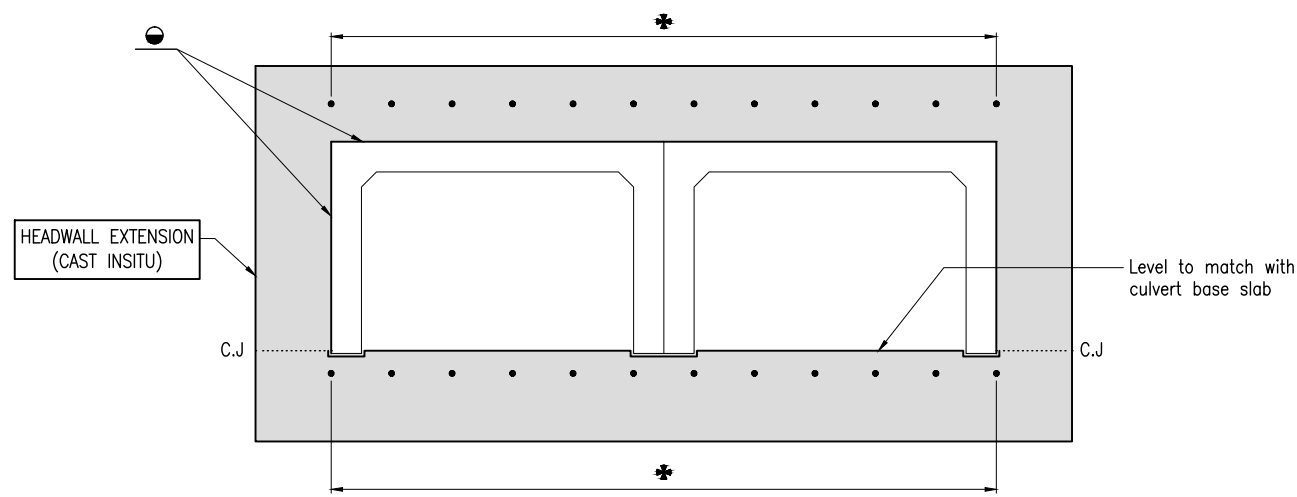
HEADWALL EXTENSION AND CUTOFF WALL DIMENSIONS		
DIMENSION	INTERNAL PIPE DIAMETER (D) (mm)	MINIMUM DIMENSION (mm) ◆
T1	≤ 600	150
	600 to 800	250
T2	> 800	250
	≤ 800	200
T3	> 750	300
	≤ 750	250
T4 †	< 600	150
	600 to 800	250
T5	> 800	250
	All diametres	250
T6	≤ 450	500
	> 450	600

- NOTE:**
- ◆ This minimum dimension shall be assessed and modified if required to suit project specific designs.
 - † Where precast headwall height is extended to retain road embankment the extension of the cast insitu headwall extension to match precast head wall is not necessary.

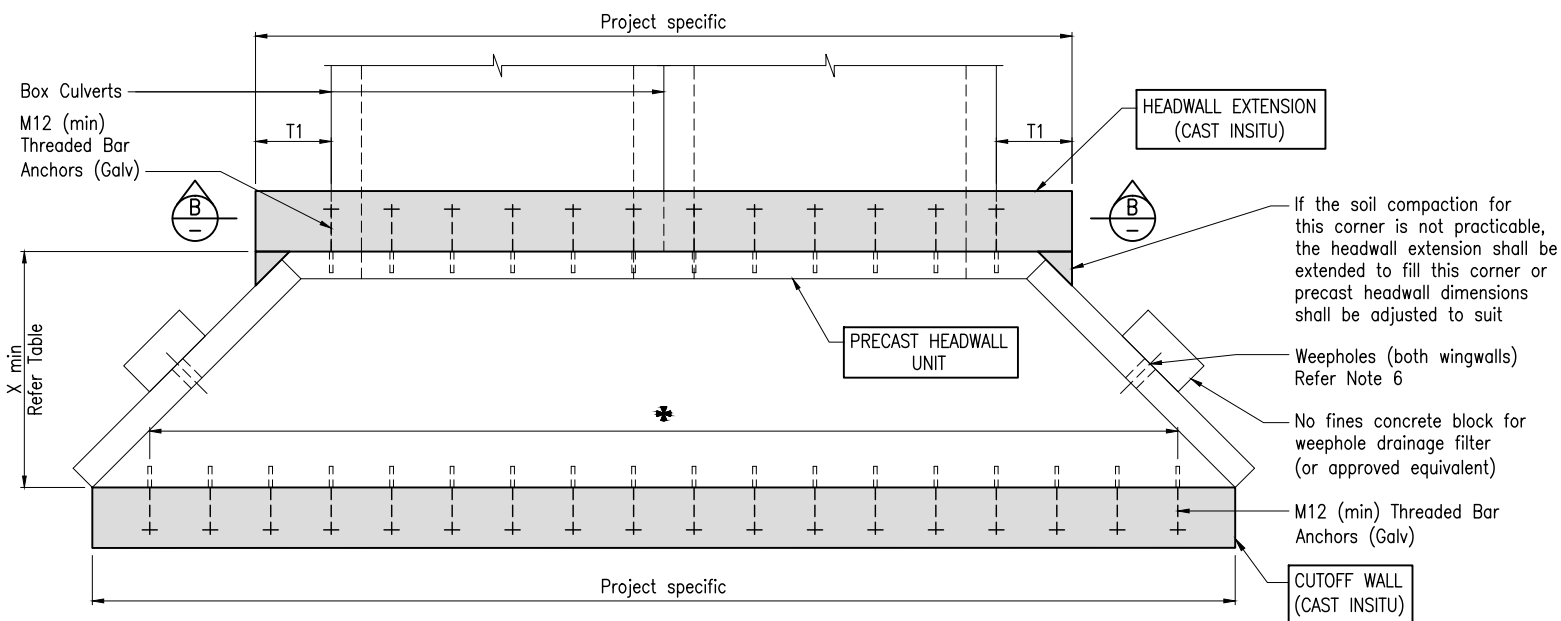


VIEW A

Department of Transport and Main Roads			
CULVERT HEADWALLS			
PRECAST HEADWALL		A3	Standard Drawing No
(REINFORCED CONCRETE PIPE CULVERTS)		Not to Scale	1243
DRAWING 1 of 2		A	Date 5/14



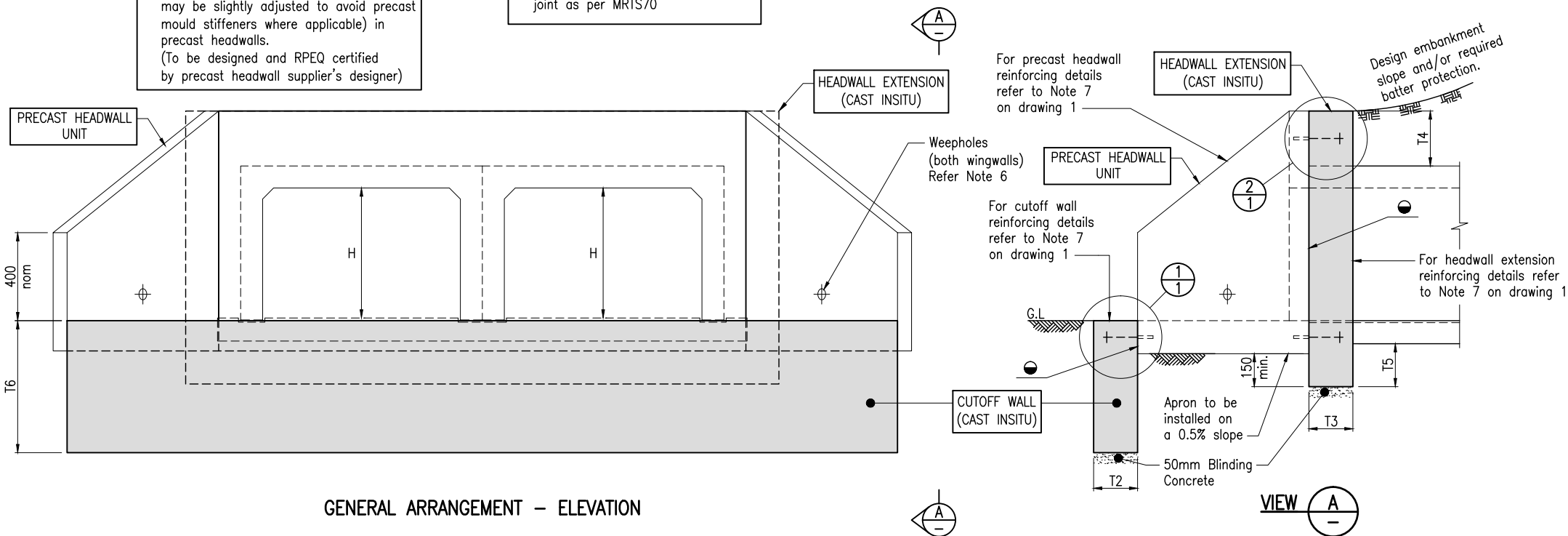
SECTION B



GENERAL ARRANGEMENT - PLAN
(DETAIL IS SIMILAR IN UPSTREAM AND DOWNSTREAM SIDES)

✱ Minimum 12 dia. galvanised Ferrules at 200 nominal spacing (ferrule positions may be slightly adjusted to avoid precast mould stiffeners where applicable) in precast headwalls.
(To be designed and RPEQ certified by precast headwall supplier's designer)

● This surface of precast concrete shall be prepared as a construction joint as per MRTS70



GENERAL ARRANGEMENT - ELEVATION

SCOPE OF PRECAST HEADWALL STANDARD DRAWING: 1243

The scope of this standard drawing is to provide indicative standard details for culvert headwalls. The dimensions shown are minimum requirements only. It is the precast headwall supplier's responsibility to provide project specific drawings with actual dimensions to suit the project situation and to RPEQ certify the project specific drawings.
This standard drawing is applicable for the following situations:
1. Single cell and multi-cell headwalls
2. Single cell sloping face headwalls.

APRON DIMENSIONS	
INTERNAL CULVERT HEIGHT (H)	X min.
375	650
450	650
600	780
750	1000
900	1000
1200	1620
1500	1620
1800	2400
2100	2400
2400	2400

NOTES (Continue from Drawing 1):

12. CONCRETE (for box culvert only):
- (a) For reinforced concrete box culverts less than or equal to 800mm height and soil cover is less than or equal to 2500mm
 - Design life 50 years
 - Minimum exposure classification B1 to AS3600 and cover to reinforcing to AS3600
 - Minimum concrete strength S32/20 to MRTS70
 - Cover to reinforcement for exposure classification B1 and S32/20 concrete;
 - Precast concrete (using intense compaction and rigid formwork) - 30mm
 - Insitu concrete - 40mm
 - (b) For reinforced concrete box culverts greater than 800mm height and all culvert heights where soil cover is greater than 2500mm
 - Design life 100 years
 - Minimum exposure classification B2 to AS5100 and cover to reinforcing to AS5100
 - Minimum concrete strength S40/20 to MRTS70 and AS5100
 - Cover to reinforcement for exposure classification B2 and S40/20 concrete;
 - Precast concrete (using intense compaction and rigid formwork) - 45mm
 - Insitu concrete - 55mm
 - (c) Minimum concrete strength for higher exposure classification than (a) and (b) above to MRTS72 and Design Criteria for Bridges and Other Structures as appropriate.

13. DIMENSIONS are in millimetres unless shown otherwise.
- ASSOCIATED DEPARTMENTAL DOCUMENTS:
- Technical Note 27 - Guidelines and Design for precast Culvert and pipe headwalls
 - Standard Drawings Roads
 - Specifications
 - Design Criteria for Bridges and Other Structures
 - Drafting and Design Presentation Standards Manual
 - Road Drainage Manual
- Standard Drawings:
- 1043 Reinforcing Steel - Standard Bar Shapes
 - 1044 Reinforcing Steel - Lap Lengths and Reinforcing Steel Information
 - 1359 Culverts - Installation, Bedding and Filling/Backfilling Against/Over Culverts
- REFERENCED DOCUMENTS:
- Specifications:
- MRTS03 Drainage, Retaining Structures and Protective Treatments
 - MRTS70 Concrete
 - MRTS71 Reinforcing Steel
 - MRTS72 Manufacture of Precast Concrete Elements
- Australian Standards:
- AS 1111.1 ISO metric hexagon bolts and screws - Product grade C - Bolts
 - AS 1112.1 ISO metric hexagon nuts - Style 1 - Product grades A and B
 - AS 1214 Hot-dip Galvanized Coatings on Threaded Fasteners (ISO Metric Coarse Thread Series)
 - AS/NZS 1554.3 Structural Steel Welding - Welding of Reinforcing Steel
 - AS 3600 Concrete Structures
 - AS/NZS 4671 Steel Reinforcing Materials
 - AS/NZS 4680 Hot-dip Galvanized (Zinc) Coatings on Fabricated Ferrous Articles
 - AS 5100.2 Bridge Design - Design Loads
 - AS 5100.5 Bridge Design - Concrete
 - AS/NZS ISO14341 Welding consumables - Wire electrodes and weld deposits for gas shielded metal arc welding of non alloy and fine grain steels
 - AS/NZS ISO 17632 Welding consumables - Tubular cored electrodes for gas shielded and non-gas shielded metal arc welding of non-alloy and fine grain steels - Classification

HEADWALL EXTENSION AND CUTOFF WALL DIMENSIONS

DIMENSION	INTERNAL CULVERT HEIGHT (H) (mm)	MINIMUM DIMENSION (mm) ◆
T1	≤ 600	150
	600 to 800	250
T2	≤ 800	200
	> 800	250
T3	≤ 750	250
	> 750	300
T4 †	< 600	150
	600 to 800	250
	> 800	250
T5	All heights	250
T6	≤ 450	500
	> 450	600

NOTE:
◆ This minimum dimension shall be assessed and modified if required to suit project specific designs.
† Where precast headwall height is extended to retain road embankment the extension of the cast insitu headwall extension to match precast head wall is not necessary.

Department of Transport and Main Roads			
CULVERT HEADWALLS			
PRECAST HEADWALL		A3	Standard Drawing No
(REINFORCED CONCRETE PIPE CULVERTS)		Not to Scale	1243
DRAWING 2 of 2		A	Date 5/14