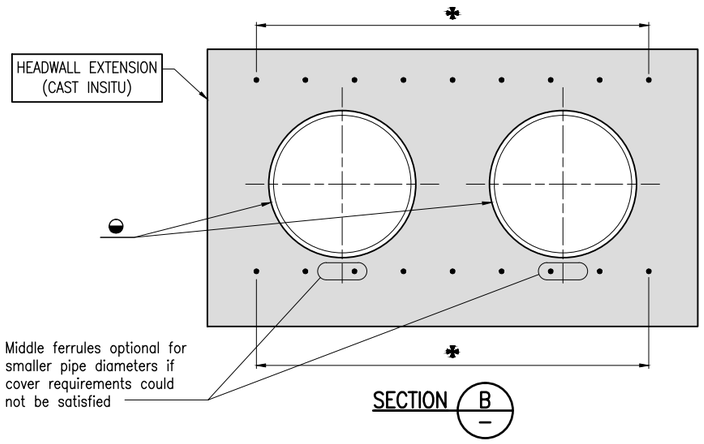


SCOPE OF PRECAST HEADWALL STANDARD DRAWING: 1243

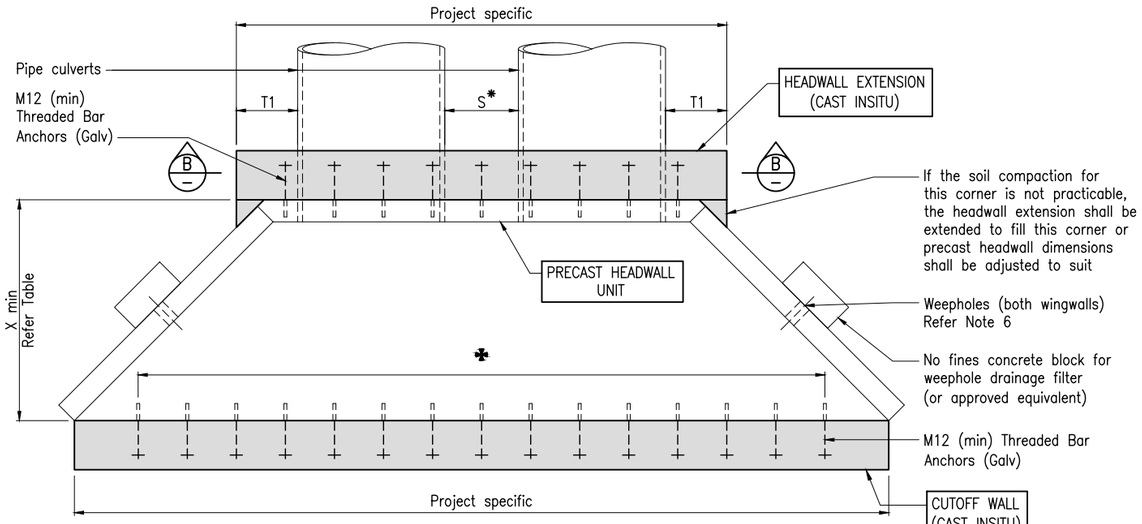
The scope of this standard drawing is to provide indicative standard details for culvert headwalls. The dimensions shown are minimum requirements only. It is the precast headwall supplier's responsibility to provide project specific drawings with actual dimensions to suit the project situation and to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

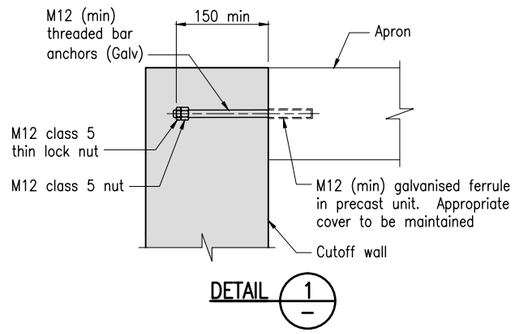
NOTES (Continue on to Drawing 2):

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)



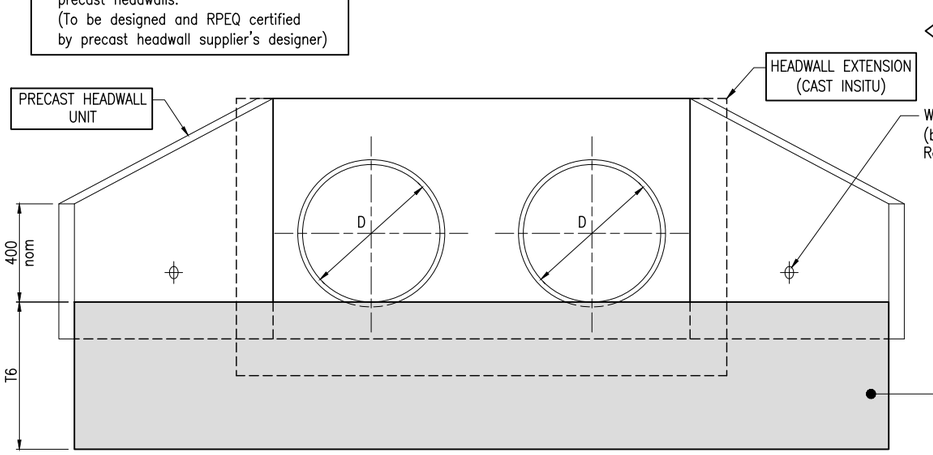
DETAIL 1

(DETAIL 2 IS SIMILAR)

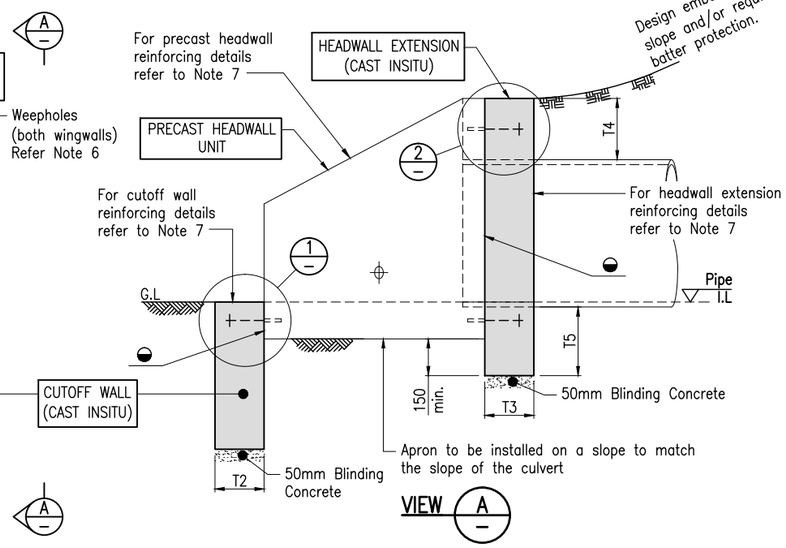
✠ Minimum 12 dia. galvanised Ferrules at 200 nominal spacing (ferrule positions may be slightly adjusted to avoid precast mould stiffeners where applicable) in precast headwalls.
(To be designed and RPEQ certified by precast headwall supplier's designer)

◒ 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



VIEW A

HEADWALL EXTENSION AND CUTOFF WALL DIMENSIONS

DIMENSION	INTERNAL PIPE DIAMETER (D) (mm)	MINIMUM DIMENSION (mm) ◆
T1	⩽ 600	150
	600 to 800	250
	> 800	250
T2	⩽ 800	200
	> 800	250
T3	⩽ 750	250
	> 750	300
T4✝	< 600	150
	600 to 800	250
	> 800	250
T5	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.

Department of Transport and Main Roads

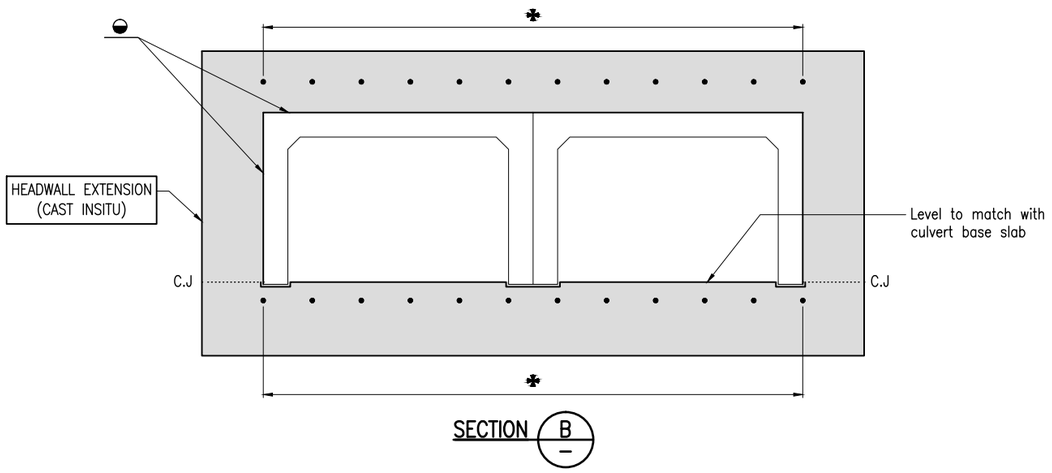
CULVERT HEADWALLS

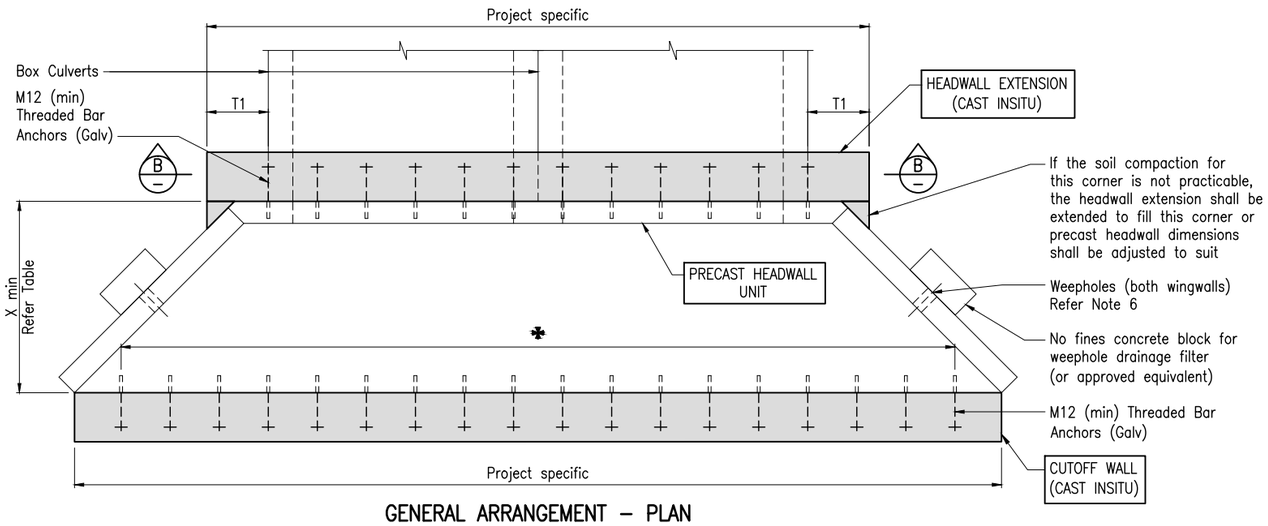
PRECAST HEADWALL

(REINFORCED CONCRETE PIPE CULVERTS)
DRAWING 1 of 2

A3 | Not to Scale | A

Standard Drawing No 1243
Date 5/14



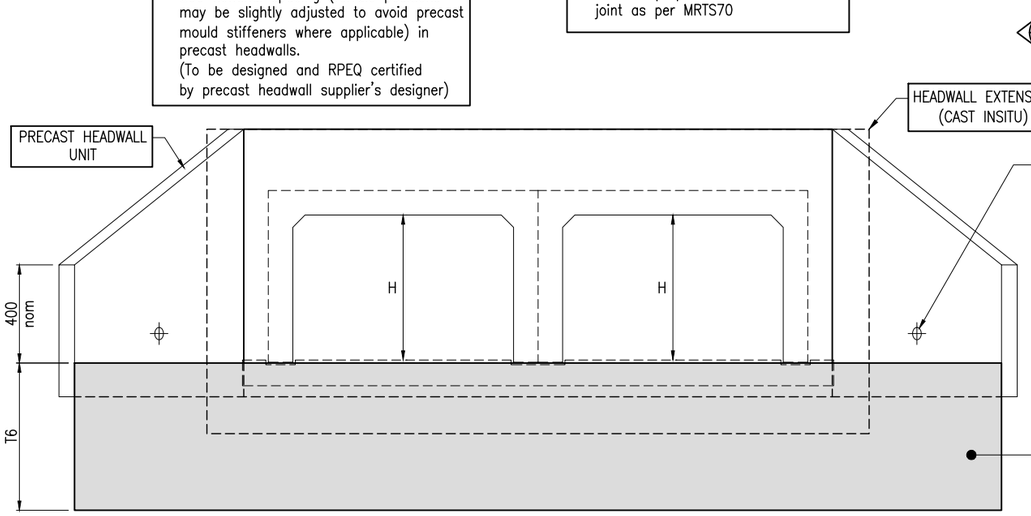


GENERAL ARRANGEMENT – PLAN

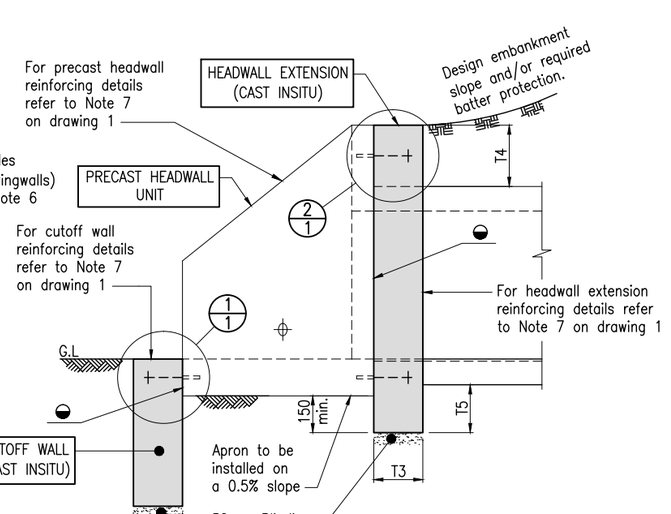
(DETAIL IS SIMILAR IN UPSTREAM AND DOWNSTREAM SIDES)

✠ 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 consumerables– Wire electrodes and weld deposits for gas shielded metal arce 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
	> 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

(REINFORCED CONCRETE PIPE CULVERTS)
DRAWING 2 of 2

Queensland Government

A3

Not to Scale

Standard Drawing No
1243
Date 5/14

A