QUANTITIES IN 2 HEADWALLS

- **E1 BAR**
  - L1: 685, 960, 1,055, 1,155, 1,215, 1,275, 1,335
  - L2: 725, 1,000, 1,080, 1,160, 1,240, 1,320, 1,400

- **M1 MESH**
  - L1: 1,060, 1,150, 1,230, 1,320, 1,410
  - L2: 1,010, 1,100, 1,190, 1,280, 1,370

- **STEEL REINFORCEMENT**
  - CONCRETE N25 (SEE NOTE 1)
  - Ø12 mm

NOTES:
1. CONCRETE STRENGTH GRADES SHOWN ARE FOR EXPOSURE CLASSIFICATION A2. REFER TO RMS SPECIFICATION B80 AND AS3600-2009, FOR CONCRETE STRENGTH GRADE, COVER TO CONCRETE STRENGTH GRADES SHOWN ARE FOR EXPOSURE CLASSIFICATION A2. REFER TO RMS SPECIFICATION B80 AND AS3600-2009, FOR CONCRETE STRENGTH GRADE, COVER TO CONCRETE STRENGTH GRADE. CONCRETE WORK FOR BRIDGES

2. WEEPHOLES ARE TO BE PROVIDED AT 1800 CENTRES (MAXIMUM AT OUTLET ONLY).
3. ALL STEEL BARS TO BE GRADE 400Y TO AS4671-2001.
4. MESH: LAPS SHALL BE MADE SO THAT THE TWO OUTERMOST WIRES OF ONE FABRIC OVERLAP THE TWO OUTERMOST WIRES OF THE SHEET BEING LAPPED.

REFERENCED DOCUMENTS:
- AS4671-2001 STEEL REINFORCING MATERIALS
- AS3600-2009 CONCRETE STRUCTURES
- SPECIFICATION R11 - STORMWATER DRAINAGE SPECIFICATION B80 - CONCRETE WORK FOR BRIDGES
- SPECIFICATION R11 - STORMWATER DRAINAGE SPECIFICATION B80 - CONCRETE WORK FOR BRIDGES

CONCRETE HEADWALLS SINGLE CELL Ø300mm TO Ø900mm WITH CONCRETE APRON (2 TO 1 BATTER OR STEEPER)
NOTES

1. CONCRETE STRENGTH GRADES SHOWN ARE FOR EXPOSURE CLASSIFICATIONS. REFER TO AS3600-2009, SECTION 4 FOR CONCRETE STRENGTH GRADES SHOWN ARE FOR EXPOSURE CLASSIFICATIONS.

2. WEEPHOLES ARE TO BE PROVIDED AT 1800 CENTRES (MAXIMUM) AT OUTLET ONLY.

3. ALL STEEL BARS TO BE GRADE 400Y TO AS4671-2001.

REFERENCED DOCUMENTS:

- AS4671-2001 STEEL REINFORCING MATERIALS
- AS3600-2009 CONCRETE STRUCTURES
- SPECIFICATION B80 - CONCRETE WORK FOR BRIDGES
- SPECIFICATION R11 - STORMWATER DRAINAGE

CONCRETE HEADWALLS SINGLE CELL Ø300mm TO Ø900mm
WITH ROCK MATTRESS PROTECTION 230 mm THICK ROCK MATTRESS
INLET PROTECTION 170 mm THICK ROCK MATTRESS
OUTLET PROTECTION 200 mm THICK ROCK MATTRESS
UNDERSIDE AND ENDS LINED WITH GEOTEXTILE
OUTLET PROTECTION 230 mm THICK ROCK MATTRESS
INLET PROTECTION 170 mm THICK ROCK MATTRESS
WITH ROCK MATTRESS PROTECTION

CONCRETE NO2 (SEE NOTE 1),
NOMINAL PIPE DIAMETER (mm)
Ø12 mm
STEEL REINFORCEMENT
CONCRETE N25 (SEE NOTE 1)
NOM COVER (SEE NOTE 1)
EXPOSURE CLASSIFICATIONS B2 & C

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN

SEND FEEDBACK ON THIS STANDARD DRAWING TO technologystandards@rms.nsw.gov.au

MANAGER ROAD POLICY, SPECIFICATIONS & TECHNOLOGY

STANDARD DRAWING
ROAD DESIGN ENGINEERING
R0210 STORMWATER DRAINAGE SERIES - HEADWALLS
CONCRETE HEADWALLS SINGLE CELL, Ø300mm TO Ø900mm
WITH ROCK MATTRESS PROTECTION 230 mm THICK ROCK MATTRESS

EDMS No. 20.01.17/DS2014_005789
R0210-02
PROJECTWISERQRCODELAYER
1. Concrete strength grades shown are for exposure classification all refer to AS3600-2009 section 4 for concrete strength grade, cover to reinforcement and for other exposure classifications.

2. Weepholes are to be provided at 1800 centres (maximum at outlet only).

3. All steel bars to be Grade 400Y to AS4671-2001.

4. Mesh laps shall be made so that the two outermost wires of one fabric overlap the two outermost wires of the sheet being lapped.

5. Spacing for multiple pipes as specified in R0240-01.

REFERENCES:
- AS4671-2001 Steel Reinforcing Materials
- AS3600-2009 Concrete Structures
- Specification R11 - Stormwater Drainage
- Specification B80 - Concrete Work for Bridges

NOTES:
- Concrete strength grades shown are for exposure classification all refer to AS3600-2009 section 4 for concrete strength grade, cover to reinforcement and for other exposure classifications.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN
Manufacture and construction of headwalls must be consistent with R0240-01.

**Section 1**

- Inlet protection 175 mm thick rock mattress
- Outlet protection 250 mm thick rock mattress
- Underside and ends lined with geotextile
- Outlet protection 230 mm thick rock mattress
- Inlet protection 170 mm thick rock mattress

**Elevation**

- Ø100 weepholes

**Table: Dimensions**

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<th>Diameter (mm)</th>
<th>Length (mm)</th>
<th>Weight (kg)</th>
<th>Volume (m³)</th>
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**Exposure Classifications**

- B2 & C

**Specifications**

- Referenced to AS3600-2009, Section 4 for concrete strength grades shown.
- Steel bars to be grade 400Y to AS4671-2001.
- Wepholes are to be provided at 1800 centres (maximum) at outlet only.
- All steel bars to be grade 400Y to AS4671-2001.
- Spacing for multiple pipes as specified in R0240-01.
REINFORCEMENT FOR 2 HEADWALLS

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NOTES
1. CONCRETE STRENGTH GRADES SHOWN ARE FOR EXPOSURE CLASSIFICATION AS REFER TO AS/NZS 4671-2007. FOR CONCRETE STRENGTH GRADE, COVER TO REINFORCEMENT AND FOR OTHER EXPOSURE CLASSIFICATIONS.
2. CLEAN OUTLET TO OUTER FACE OF REINFORCEMENT 50 mm UNLESS OTHERWISE SHOWN.
3. CONCRETE GRADES N25.
4. ALL RIBS TO BE 26 mm X 26 mm X 200 mm.
5. SPACING FOR MULTIPLE PIPES AS SPECIFIED IN R0240-01.
 Manufacture and construction must be consistent with R0240-01.
Concrete Headwalls Triple Cell Ø300 mm to Ø900 mm

**NOTES**
1. Concrete strength grades shown are for exposure classification A2. Refer to AS3600-2009, Section 4 for concrete strength grades. Cover to reinforcement and for other exposure classifications.
2. Weepholes are to be provided at 1800 centres (maximum) at outlet only.
3. All steel bars to be Grade 400Y to AS4671-2001.
4. Spacing for multiple pipes as specified in R0240-01.

**REFERENCE DOCUMENTS:**
- AS4671-2001 Steel Reinforcing Materials
- AS3600-2009 Concrete Structures

**ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN**

**EXECUTIVE SUMMARY**
- **ENTE**
- **SHEET**
- **R0210 STORMWATER DRAINAGE SERIES - HEADWALLS**
- **CONCRETE HEADWALLS TRIPLE CELL Ø300 mm TO Ø900 mm**

**DIMENSIONS**
- **NOMINAL PIPE DIAMETER (mm)**
- **LENGTH (mm)**
- **WEIGHT (kg)**
- **VOLUME (m³)**

**PLAN**
- **SECTION**
- **Elevation**

**EXPOSURE CLASSIFICATIONS**
- **B2 & C**

**OUTLET PROTECTION**
- 230 mm Thick Rock Mattress

**INLET PROTECTION**
- 170 mm Thick Rock Mattress

**APRON DEPTHS**
- Outlet: 2000 mm
- Inlet: 2000 mm

**HEADWALL LENGTH**
- 2110 mm
- 2350 mm
- 2620 mm
- 2860 mm
- 3100 mm
- 3610 mm
- 4150 mm

**APRON WIDTH**
- 2950 mm
- 3350 mm
- 3850 mm
- 4250 mm
- 4700 mm
- 5550 mm
- 6450 mm

**WINGWALL LENGTH**
- 1040 mm
- 1400 mm
- 1780 mm
- 2150 mm
- 2520 mm
- 2975 mm
- 3430 mm
- 3905 mm
- 4370 mm

**CONCRETE N25**
- Refer to AS3600-2009, Section 4 for concrete strength grades. Cover to reinforcement and for other exposure classifications.

**STEEL REINFORCEMENT**
- All steel bars to be Grade 400Y to AS4671-2001.

**SPACING FOR MULTIPLE PIPES**
- As specified in R0240-01.
REINFORCEMENT FOR 2 HEADWALLS

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**NOTES**

1. CONCRETE STRENGTH GRADES SHOWN ARE FOR EXPOSURE CLASSIFICATION A2. REFER TO R0210-09 FOR CONCRETE STRENGTH CLASSIFICATION.A2. REFER TO R0240-01 FOR OTHER EXPOSURE CLASSIFICATIONS.
2. CLEAN COVER TO OUTER FACE OF REINFORCEMENT 50 mm UNLESS OTHERWISE SHOWN.
3. CONCRETE GRADE N25.
4. ALL BARS TO BE GRADE 400Y TO AS4671-2001.
5. SPACING FOR MULTIPLE PLIES AS SPECIFIED IN R0240-01.
Manufacture and construction of headwalls must be consistent with R0240-01.

**STANDARD DRAWING**

**R0210 STORMWATER DRAINAGE SERIES - HEADWALLS**

**CONCRETE HEADWALLS FOUR CELL Ø300 mm TO Ø900 mm WITH CONCRETE APRON (2 TO 1 BATTER OR STEEPER)**

**NOTES**

1. CONCRETE STRENGTH GRADES SHOWN ARE FOR EXPOSURE CLASSIFICATION A2. REFER TO AS3600-2009, SECTION 4 FOR CONCRETE STRENGTH GRADES SHOWN ARE FOR EXPOSURE CLASSIFICATION A2.

2. MESH LAP SHEETS TO BE MADE SUCH THAT THE TWO OUTERMOST WIRES OF ONE FABRIC OVERLAP THE TWO OUTERMOST WIRES OF THE SHEET BEING LAPED.

3. ALL STEEL BARS TO BE GRADE 400Y TO AS4671-2001.

4. MESH LAP SHEETS TO BE MADE SUCH THAT THE TWO OUTERMOST WIRES OF ONE FABRIC OVERLAP THE TWO OUTERMOST WIRES OF THE SHEET BEING LAPED.

5. SPACING FOR MULTIPLE PIPES AS SPECIFIED IN R0240-01.

**REFERENCED DOCUMENTS:**

- AS4671-2001 STEEL REINFORCING MATERIALS
- AS3600-2009 CONCRETE STRUCTURES
- SPECIFICATIONS - CONCRETE HEADWALLS
- SPECIFICATIONS - STORMWATER DRAINAGE

**REFERENCES**

- SPECIFICATION B80 - CONCRETE WORK FOR BRIDGES
- SPECIFICATION R11 - STORMWATER DRAINAGE
- AS4671-2001 STEEL REINFORCING MATERIALS
- AS3600-2009 CONCRETE STRUCTURES

**QUALITY CONTROL**

- All dimensions are in millimetres unless otherwise shown.

**DRAWN BY:**

- [Name]

**CHECKED BY:**

- [Name]

**APPROVED BY:**

- [Name]

**PREPARED BY:**

- [Name]

**ISSUED:**

- [Date]

**REV.:**

- [Number]

**CONCRETE N25 (SEE NOTE 1)**
Manufacture and construction of headwalls must be consistent with R0240-01.
Concrete Headwalls Five Cell Ø300 mm to Ø900 mm

1. Concrete strength grades shown are for exposure classification A2. Refer to AS3600-2009, Section 4 for concrete strength grades shown are for exposure classification and for other exposure classifications.

2. Wewholes are to be provided at 1800 centres (maximum) at outlet only.

3. All steel bars to be grade 400Y to AS4671-2001.

4. Mesh laps shall be made so that the two outermost wires of one fabric overlap the two outermost wires of the sheet being lapped.

5. Spacing for multiple pipes as specified in R0240-01.

Referenced Documents:
- AS4671-2001 Steel Reinforcing Materials
- AS3600-2009 Concrete Structures
- Specification R01 - Stormwater Drainage
- AS80 - Concrete Work for Bridges
1. CONCRETE STRENGTH GRADES SHOWN ARE FOR EXPOSURE CLASSIFICATION A2. REFER TO AS3600-2009, SECTION 4 FOR CONCRETE STRENGTH GRADES SHOWN ARE FOR EXPOSURE CLASSIFICATIONS.

2. WEEPHOLES ARE TO BE PROVIDED AT 1800 CENTRES (MAXIMUM) AT OUTLET ONLY.

3. ALL STEEL BARS TO BE GRADE 400Y TO AS4671-2001.

4. SPACING FOR MULTIPLE PIPES AS SPECIFIED IN R0240-01.

REFERENCE DOCUMENTS:
AS3600-2009 CONCRETE STRUCTURES
AS4671-2001 STEEL REINFORCING MATERIALS
ADDE-2038 CONCRETE STRUCTURES SPECIFICATION R11 - STORMWATER DRAINAGE
### Scales on A3 Size Drawing

- ON THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
- DIMENSIONS

### CONCRETE HEADWALLS SINGLE CELL Ø300 mm TO Ø900 mm

<table>
<thead>
<tr>
<th>NOMINAL PIPE DIAMETER (mm)</th>
<th>Length (mm)</th>
<th>Apron Width (mm)</th>
<th>Wingwall Length (mm)</th>
<th>E1 Bar (Ø12 mm)</th>
<th>M1 Mesh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø300</td>
<td>470</td>
<td>1450</td>
<td>1830</td>
<td>1.45</td>
<td>M1 MESH</td>
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<tr>
<td>Ø375</td>
<td>150</td>
<td>200</td>
<td>2320</td>
<td>1.50</td>
<td>M1 MESH</td>
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<tr>
<td>Ø450</td>
<td>150</td>
<td>200</td>
<td>2320</td>
<td>1.50</td>
<td>M1 MESH</td>
</tr>
<tr>
<td>Ø525</td>
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<td>200</td>
<td>2320</td>
<td>1.50</td>
<td>M1 MESH</td>
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<tr>
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<td>M1 MESH</td>
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<tr>
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<tr>
<td>Ø900</td>
<td>150</td>
<td>200</td>
<td>2320</td>
<td>1.50</td>
<td>M1 MESH</td>
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</table>

### Notes

1. CONCRETE STRENGTH GRADES SHOWN ARE FOR EXPOSURE CLASSIFICATIONS AS SPECIFIED IN SECTION 4 FOR CONCRETE STRENGTH GRADE, COVER TO REINFORCEMENT AND FOR OTHER EXPOSURE CLASSIFICATIONS.
2. WEEPHOLES ARE TO BE PROVIDED AT 1800 CENTRES (MAXIMUM AT OUTLET ONLY).
3. ALL STEEL BARS TO BE GRADE 400Y TO AS4671-2001.
4. SHEET MESH LAPS SHALL BE MADE SO THAT THE TWO OUTERMOST WIRES OF ONE FABRIC OVERLAP THE TWO OUTERMOST WIRES OF THE SHEET BEING LAPPED.
5. SPACING FOR MULTIPLE PIPES AS SPECIFIED IN R0240-01.

### Referenced Documents

- AS4671-2001 STEEL REINFORCING MATERIALS
- AS3600-2009 CONCRETE STRUCTURES
- AS4671-2001 STEEL REINFORCING MATERIALS
- R0210 STORMWATER DRAINAGE SERIES - HEADWALLS

### Quality Check

- Date: 01/01/2017
- ProjectWiseQRCodeLayer
### Dimensions

**A1 BAR Ø100 mm**

<table>
<thead>
<tr>
<th>Ø100 mm Ø300 mm</th>
<th>Ø100 mm Ø375 mm</th>
<th>Ø100 mm Ø450 mm</th>
<th>Ø100 mm Ø525 mm</th>
<th>Ø100 mm Ø600 mm</th>
<th>Ø100 mm Ø750 mm</th>
<th>Ø100 mm Ø900 mm</th>
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<tbody>
<tr>
<td>L1 (mm)</td>
<td>860</td>
<td>950</td>
<td>1030</td>
<td>1110</td>
<td>1190</td>
<td>1270</td>
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<tr>
<td>L2 (mm)</td>
<td>200</td>
<td>230</td>
<td>260</td>
<td>290</td>
<td>320</td>
<td>350</td>
</tr>
<tr>
<td>N. REQ.</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
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<td>4</td>
</tr>
<tr>
<td>LENGTH (mm)</td>
<td>5 140</td>
<td>5 460</td>
<td>5 820</td>
<td>6 140</td>
<td>9 660</td>
<td>10 340</td>
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**CONCRETE NO.2 (SEE NOTE 1)**

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<th>E1 BARS Ø100 mm</th>
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<th>E1 BARS Ø100 mm</th>
<th>E1 BARS Ø100 mm</th>
<th>E1 BARS Ø100 mm</th>
<th>E1 BARS Ø100 mm</th>
<th>E1 BARS Ø100 mm</th>
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</thead>
<tbody>
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<td>5 460</td>
<td>5 820</td>
<td>6 140</td>
<td>9 660</td>
<td>10 340</td>
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<tr>
<td>M3</td>
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<td>0.68</td>
<td>0.70</td>
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<td>2.43</td>
<td>2.58</td>
<td>3.65</td>
<td>4.31</td>
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### Notes

1. **CONCRETE STRENGTH GRADES SHOWN ARE FOR EXPOSURE CLASSIFICATION A2. REFER TO AS4671-2001. SECTION 4 FOR CONCRETE STRENGTH GRADE, COVER TO REINFORCEMENT AND FOR OTHER EXPOSURE CLASSIFICATIONS.**

2. **WEEPHOLES ARE TO BE PROVIDED AT 1800 CENTRES (MAXIMUM) AT OUTLET ONLY.**

3. **ALL STEEL BARS TO BE GRADE 400Y TO AS4671-2001.**

**REFERRED DOCUMENTS:**

- AS4671-2001 STEEL REINFORCING MATERIALS
- AS3600-2009 CONCRETE STRUCTURES
- AS1193 - STORMWATER DRAINAGE
- SPECIFICATION B83 - CONCRETE WORK FOR BRIDGES

**CONCRETE HEADWALLS SINGLE CELL Ø300 mm TO Ø900 mm**

**STRENGTH GRADE, COVER TO REINFORCEMENT AND FOR OTHER EXPOSURE CLASSIFICATIONS A2. REFER TO AS4671-2001. SECTION 4 FOR CONCRETE STRENGTH GRADE, COVER TO REINFORCEMENT AND FOR OTHER EXPOSURE CLASSIFICATIONS.**

**SEND FEEDBACK ON THIS STANDARD DRAWING TO:**

transportstandards@nrs.nsw.gov.au

**Send feedback on this standard drawing to transportstandards@nrs.nsw.gov.au**

**Transport Engineering Services**

**Send feedback on this standard drawing to transportstandards@nrs.nsw.gov.au**

**Transport Engineering Services**

**Send feedback on this standard drawing to transportstandards@nrs.nsw.gov.au**

**Transport Engineering Services**

**Send feedback on this standard drawing to transportstandards@nrs.nsw.gov.au**
CONCRETE HEADWALLS DOUBLE CELL Ø300 mm TO Ø900 mm

WITH CONCRETE APRON (3 TO 1 BATTER OR FLATTER)

### Dimensions

#### Nominal Pipe Diameter (mm)

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Length 1 (mm)</th>
<th>Length 2 (mm)</th>
<th>Length 3 (mm)</th>
<th>Weight (kg)</th>
<th>Volume (m³)</th>
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<tbody>
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<td>470</td>
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<td>29.0</td>
<td>0.90</td>
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#### Steel Reinforcement

- **E1 Bars**: Ø12 mm M1 Mesh
- **M1 Mesh**: Ø100 WEEPHOLES
- **Steel Cover**: Nominal cover (see note 1)

#### Notes

1. Concrete strength grades shown are for exposure classification B3 & C.
2. WEEPHOLES are to be provided at 1800 centres (maximum at outlet only).
3. All steel bars to be grade 400Y to AS4671-2001.
4. Mesh laps shall be made so that the two outermost wires of one fabric overlap the two outermost wires of the sheet being lapped.
5. Spacing for multiple pipes as specified in R0240-01.

#### Referenced Documents

- AS4671-2001 Steel Reinforcing Materials
- AS3600-2009 Concrete Structures
- Specification R11 - Stormwater Drainage
- Specification B80 - Concrete Work for Bridges

**PROVIDE DAMP PROOF MEMBRANE FOR EXPOSURE CLASSIFICATIONS B2 & C**
**CONCRETE HEADWALLS TRIPLE CELL Ø300 mm TO Ø900 mm**

WITH CONCRETE APRON (3 TO 1 BATTER OR FLATTER)

<table>
<thead>
<tr>
<th>Nominal Pipe Diameter (mm)</th>
<th>L1 (mm)</th>
<th>L2 (mm)</th>
<th>No. REQ</th>
<th>Length (mm)</th>
<th>Area (m²)</th>
<th>Weight (kg)</th>
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</thead>
<tbody>
<tr>
<td>300</td>
<td>375</td>
<td>450</td>
<td>525</td>
<td>600</td>
<td>750</td>
<td>900</td>
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<td>200</td>
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<td>600</td>
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</tbody>
</table>

**Q U A N T I T I E S  I N  2  H E A D W A L L S**

<table>
<thead>
<tr>
<th>Headwall Length (mm)</th>
<th>Apron Width (mm)</th>
<th>Wingwall Length (mm)</th>
<th>W/Wingwall Length (mm)</th>
<th>Wingwall Depth (mm)</th>
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<tbody>
<tr>
<td>1830</td>
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<tr>
<td>2350</td>
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<td>3610</td>
<td>3900</td>
<td>4150</td>
<td>4400</td>
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</table>

**STEEL REINFORCEMENT**

- **CONCRETE N25 (SEE NOTE 1)**

**REFERENCES AND TECHNOLOGY**

- AS3600-2009 CONCRETE STRUCTURES
- AS4671-2001 STEEL REINFORCING MATERIALS

**NOTES**

1. Concrete strength grades shown are for exposure classification A2 (refer to AS3600, Section 4 for concrete strength grades). Cover to reinforcement and for other exposure classifications.

2. Widespread overlaps shall be provided at 1500 centres (maximum) at outlet only.

3. All steel bars to be Grade 400Y to AS4671-2001.

4. Mesh laps shall be made so that the two outermost wires of one fabric overlap the two outermost wires of the sheet below. Steel mesh laps shall be made so that the two outermost wires of one fabric overlap the two outermost wires of the sheet below.

5. Spacing for multiple pipes as specified in R0240-01.

**REFERRED DOCUMENTS:**

- AS4671-2001 Steel Reinforcing Materials
- AS3600-2009 Concrete Structures
- Specification 911 - Stormwater Drainage
Manufacture and construct with R0240-01

**CONCRETE HEADWALLS TRIPLE CELL Ø300 mm TO Ø900 mm**

**DIMENSIONS**

| NOMINAL PIPE DIAMETER (mm) | L1 (mm) | L2 (mm) | No. REQ | LENGTH (mm) | a (mm) | b (mm) | c (mm) | S (mm) | W (mm) | W1 (mm) | W2 (mm) | E1 BARS | ø12 mm |
|---------------------------|---------|---------|---------|------------|--------|--------|--------|-------|-------|---------|---------|---------|---------|---------|
| 300                       | 200     | 200     | 4       | 1030       | 200    | 200    | 200    | 200   | 500   | 600     | 600     | 200     | 200     |
| 375                       | 225     | 225     | 4       | 1280       | 225    | 225    | 225    | 225   | 750   | 900     | 900     | 300     | 300     |
| 450                       | 270     | 270     | 4       | 1500       | 270    | 270    | 270    | 270   | 1000  | 1200    | 1200    | 400     | 400     |
| 525                       | 315     | 315     | 4       | 1730       | 315    | 315    | 315    | 315   | 1300  | 1500    | 1500    | 500     | 500     |
| 600                       | 360     | 360     | 4       | 2000       | 360    | 360    | 360    | 360   | 1600  | 1800    | 1800    | 600     | 600     |
| 750                       | 470     | 470     | 4       | 2500       | 470    | 470    | 470    | 470   | 2100  | 2300    | 2300    | 800     | 800     |
| 900                       | 730     | 730     | 4       | 3000       | 730    | 730    | 730    | 730   | 2600  | 2800    | 2800    | 1000    | 1000    |

**STEEL REINFORCEMENT**

Concrete N25 (SEE NOTE 1)

**NOTES**

1. CONCRETE STRENGTH GRADES SHOWN ARE FOR EXPOSURE CLASSIFICATION A REFER TO AS3600-2009, SECTION 4 FOR CONCRETE STRENGTH GRADE, COVER TO REINFORCEMENT AND FOR OTHER EXPOSURE CLASSIFICATIONS.

2. WEEPHOLES ARE TO BE PROVIDED AT 1800 CENTRES (MAXIMUM) AT OUTLET ONLY.

3. ALL STEEL BARS TO BE GRADE 400Y TO AS4671-2001.

4. SPACING FOR MULTIPLE PIPES AS SPECIFIED IN R0240-01.

**REFERENCED DOCUMENTS:**

- AS4671-2001 STEEL REINFORCING MATERIALS
- AS3600-2009 CONCRETE STRUCTURES
- SFR-2017-01 STORMWATER DRAINAGE

**SPACING FOR MULTIPLE PIPES AS SPECIFIED IN R0240-01.**

- REFERENCED DOCUMENTS:
  - AS4671-2001 STEEL REINFORCING MATERIALS
  - R0240-01 STORMWATER DRAINAGE SERIES - HEADWALLS

**NOT TO SCALE**

1. PROVIDE DAM PROOF MEMBRANE FOR EXPOSURE CLASSIFICATIONS B & C

2. OUTLET PROTECTION 230 mm THICK ROCK MATTRESS WITH ROCK MATTRESS PROTECTION (3 TO 1 BATTER OR FLATTER)

3. EXPOSED TO B2 & C CLASSIFICATION. REFER TO AS3600-2009, SECTION 4 FOR CONCRETE STRENGTH GRADES SHOWN ARE FOR EXPOSURE CLASSIFICATION A REFER TO AS3600-2009, SECTION 4 FOR CONCRETE STRENGTH GRADE, COVER TO REINFORCEMENT AND FOR OTHER EXPOSURE CLASSIFICATIONS.

4. SPACING FOR MULTIPLE PIPES AS SPECIFIED IN R0240-01.
### Dimensions

<table>
<thead>
<tr>
<th>Nominal Pipe Diameter (mm)</th>
<th>Aspect ratio</th>
<th>Length (mm)</th>
<th>Apron Depth (mm)</th>
<th>Headwall Length (mm)</th>
<th>Wingwall Length (mm)</th>
<th>Concrete APRON (3 to 1 BATTER OR FLATTER) or FLATTER</th>
<th>Steel Reinforcement</th>
<th>Concrete Headwalls Four Cell Ø300 mm to Ø900 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>300</td>
<td>470</td>
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<td>200</td>
<td>300</td>
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<td></td>
</tr>
</tbody>
</table>

### Details

1. **Concrete Strength Grades Shown** are for exposure classification and are to be provided at 1800 centres (maximum at outlet only).
2. **Steel Bars to be Grade** to AS4671-2001.
3. **Outlet Only.**
4. **WEEPHOLES** are to be provided at 1800 centres (maximum at outlet only).
5. **Spacing for Multiple Pipes** as specified in R0240-01.

**Referenced Documents:**
- AS4671-2001 Steel Reinforcing Materials
- AS3600-2009 Concrete Structures
- Specification R011 - Stormwater Drainage
- Specification R003 - Concrete Work for Bridges

**Notes:**
- Concrete strength grades shown are for exposure classifications B2 & C.
- Weepholes are to be provided at 1800 centres (maximum at outlet only).
- All steel bars to be Grade 400Y to AS4671-2001.
- Outlet only.
- Exposure classifications.
- Concrete strength grades shown are for exposure classification and are to be provided at 1800 centres (maximum at outlet only).
- Steel bars to be Grade 400Y to AS4671-2001.
- Outlet only.
- Weepholes are to be provided at 1800 centres (maximum at outlet only).
- Exposed classification.
- Concrete strength grades shown are for exposure classification and are to be provided at 1800 centres (maximum at outlet only).
# Concrete Headwalls

## Dimensions

<table>
<thead>
<tr>
<th>Nominal Pipe Diameter (mm)</th>
<th>L1 (mm)</th>
<th>L2 (mm)</th>
<th>No. Req</th>
<th>E1 Bars</th>
<th>Ø12 mm Weepholes</th>
<th>Apron Depth at Inlet (mm)</th>
<th>Apron Depth at Outlet (mm)</th>
<th>Wingwall Length (mm)</th>
<th>Headwall Length (mm)</th>
<th>Apron Width (mm)</th>
<th>Section A1</th>
<th>Section A2</th>
<th>Section B</th>
<th>Section C</th>
<th>Wingwall Width (mm)</th>
<th>Weight (kg)</th>
<th>Volume (m³)</th>
</tr>
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<tbody>
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<td>300</td>
<td>470</td>
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<td>4</td>
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## Notes

1. Concrete strength grades shown are for exposure classification A2. Refer to AS3600-2009, Section 4 for concrete strength grades, cover to reinforcement and for other exposure classifications.

2. Weepholes are to be provided at 1800 centres (maximum) at outlet only.

3. All steel bars to be grade 400Y to AS4671-2001.

4. Spacing for multiple pipes as specified in R0240-01.

## Referenced Documents

- AS4671-2001 Steel Reinforcing Materials
- AS3600-2009 Concrete Structures
- R0210 Stormwater Drainage Series - Headwalls
- R11 - Stormwater Drainage

## Additional Instructions

- Outlet protection 230 mm thick rock mattress
- Inlet protection 170 mm thick rock mattress
- Underside and ends lined with geotextile
- Outlet protection 3 to 1 batter or flatter
- Inlet protection 1 to 3 or flat

Manufacture and construction must be consistent with R0240-01.
### Concrete Headwalls Five Cell Ø300 mm to Ø900 mm

#### Dimensions

<table>
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<tr>
<th>Nominal Pipe Diameter (mm)</th>
<th>L1 (mm)</th>
<th>L2 (mm)</th>
<th>No. REQ</th>
<th>Length (mm)</th>
<th>W (mm)</th>
<th>a (mm)</th>
<th>b (mm)</th>
<th>c (mm)</th>
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### Steel Reinforcement

**Concrete #25 (See Note 1)**

<table>
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<tr>
<th>Section</th>
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</thead>
</table>

**Notes:**

1. Concrete strength grades shown are for exposure classification. Refer to AS3600 for concrete strength grade, cover to reinforcement and for other exposure classifications.

2. Weepholes are to be provided at 1800 centres (maximum at outlet only).

3. All steel bars to be grade 400Y to AS4671-2001.

4. Mesh laps shall be made so that the two outermost wires of one fabric overlap the two outermost wires of the sheet being lapped.

5. Spacing for multiple pipes as specified in R0240-01.

### Referenced Documents

- Specification B80 - Concrete Work for Bridges
- Specification R11 - Stormwater Drainage
- AS3600-2009 Concrete Structures
- AS4671-2001 Steel Reinforcing Materials
- Specification R01 - Stormwater Drainage
- Specification B83 - Concrete Work for Bridges

### Contact Details

Send feedback on this standard drawing to technologystandards@rms.nsw.gov.au

**Manager Road Policy, Specifications & Technology**

Send feedback on this standard drawing to technologystandards@rms.nsw.gov.au

**DATE:** 02/17

**PROJECT NO.:** R0210-23

**ISSUE:** 1

**ISSUED BY:** Roads and Maritime Services

**ORIGINAL ISSUE DATE:** January 2017

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Manufacture and construction must be consistent with R0240-01.
The drawing indicates the following details:

- **Concrete Headwalls Four Cell Ø300 mm to Ø900 mm**
- **Dimensions**:
  - **Nominal Pipe Diameter (mm)**: 300, 375, 450, 525, 600, 750, 900
  - **Length (mm)**: 470, 730, 150, 300, 300, 300, 400, 400, 400
  - **Weight (kg)**: 14.1, 15.5, 17.1, 18.5, 22.8, 25.8, 29.0
  - **Volume (m³)**: 1.26, 1.56, 1.88, 2.20, 2.58, 3.33, 4.18

- **Inlet Protection**: 170 mm thick rock mattress
- **Outlet Protection**: 230 mm thick rock mattress
- **Wingwall Length**: 150 mm
- **Headwall Length**: 3350, 3850, 4300, 4700, 5100, 5950, 6850 mm
- **Apron Width**: 4350, 5100, 5850, 6500, 7200, 8600, 10500 mm
- **Wingwall Length**: 1560, 2110, 2680 mm
- **Capacity Classification**: 3 to 1 or flatter

- **Steel Reinforcement**:
  - **E1 Bar Ø12 mm**
  - **E1 Bars Ø100**
  - **WEEPHOLES**

- **Geotextile Lining**: Underside and ends lined with geotextile
- **Protection**: Outlet protection 230 mm thick rock mattress
- **Protection**: Inlet protection 170 mm thick rock mattress

- **Referenced Documents**:
  - AS3600-2009 Concrete Structures
  - AS4671-2001 Steel Reinforcing Materials
  - RS11 - STORMWATER DRAINAGE

- **Notes**:
  1. Concrete strength grades shown are for Exposure Classification A2. Refer to AS3600-2009, Section 4 for concrete strength grades, cover to reinforcement and for other exposure classifications.
  2. Weepholes are to be provided at 1800 centres (maximum) at outlet only.
  3. All steel bars to be grade 40Y to AS4671-2001.
  4. Spacing for multiple pipes as specified in R0240-01.

- **QR Code**

This drawing is intended for the manufacture and construction of headwalls with concrete pipes, ensuring consistency with R0240-01.
### Plan - Ø450 Single Cell Headwall

- **Bar Mark Updateds / QR Code Removed**
- **2 REQD PER HEADWALL**
- **W12**
- **Ø450**
- **Cement Grouted in Place**
- **Hot Dip Galvanised**
- **R20 at 300°C/C**

### Notes
1. Concrete strength grades shown are for exposure classification A2. Refer to AS3600-2009 for concrete strength classification. Grade, cover to reinforcement and for other exposure classifications.
2. All exposed surfaces to be 25mm chamfer.
3. Concrete grade N25.

### Specifications
- **CONCRETE GRADE N25.**
- **ALL EXPOSED SURFACES TO BE 25 MM CHAMFER.**
- **CLASSIFICATIONS.**
  - **GRADE, COVER TO REINFORCEMENT** AND FOR OTHER EXPOSURE CLASSIFICATIONS.

### Table

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<th>TOTAL LENGTH</th>
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**Concrete in one headwall - 8.94 m³**
**NOTES**

1. CONCRETE STRENGTH GRADES SHOWN ARE FOR EXPOSURE CLASSIFICATION A2. REFER TO AS3600-2009 FOR CONCRETE STRENGTH GRADES.

2. ALL EXPOSED SURFACES TO BE 25 mm CHAMFER.

3. CONCRETE GRADE N25.
**NOTES**

1. CONCRETE STRENGTH GRADES SHOWN ARE FOR EXPOSURE CLASSIFICATION A2. REFER TO AS3600-2009, SECTION 4 FOR CONCRETE STRENGTH GRADES SHOWN ARE FOR EXPOSURE CLASSIFICATIONS.

2. CONCRETE STRENGTH GRADES N25.

3. EXPOSED SURFACES TO BE 25 mm CHAMFER.
FLAT CONCRETE HEADWALL FOR Ø300 mm TO Ø450 mm SINGLE PIPE CULVERTS

<table>
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</table>

NOTES
1. CONCRETE STRENGTH GRADES SHOWN ARE FOR EXPOSURE CLASSIFICATION A. REFER TO AS3600-2009, SECTION 4 FOR CONCRETE STRENGTH GRADES SHOWN FOR EXPOSURE CLASSIFICATION A2. REFER TO AS3600-2009, SECTION 4 FOR CONCRETE STRENGTH GRADES SHOWN FOR EXPOSURE CLASSIFICATION A2.
2. EXPOSED SURFACES TO BE 25 mm CHAMFER

ELEVATION

SECTION

NOT TO SCALE

PLAN

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN

SEND FEEDBACK ON THIS STANDARD DRAWING TO technologystandards@rms.nsw.gov.au
NOTES

1. CONCRETE AS PER QA SPECIFICATION R53.
2. COVER INCLUDING EDGE COVER MUST BE 50 mm UNLESS OTHERWISE SHOWN.
3. REINFORCING STEEL TO BE IN ACCORDANCE WITH AZ/NZS 4671.
4. PRECAST UNIT MUST BE SECURED TO CURTAIN WALL IN ACCORDANCE WITH MANUFACTURER'S DESIGN DOCUMENTATION.
5. CAST IN-SITU SLAB MUST PROVIDE UNIFORM BEARING FOR PRECAST UNIT IN ACCORDANCE WITH THE PRECAST HEADWALL MANUFACTURER'S INSTRUCTIONS.

SECTION
NOT TO SCALE

PLAN

FRONT ELEVATION

CAST IN-SITU CURTAIN WALL

TO SUIT WIDTH OF PRECAST HEADWALL

TO SUIT LENGTH OF PRECAST HEADWALL

MESH CENTRED REINFORCEMENT
SL82

CAST IN-SITU SLAB MUST PROVIDE UNIFORM BEARING FOR PRECAST UNIT IN ACCORDANCE WITH THE PRECAST HEADWALL MANUFACTURER'S INSTRUCTIONS.