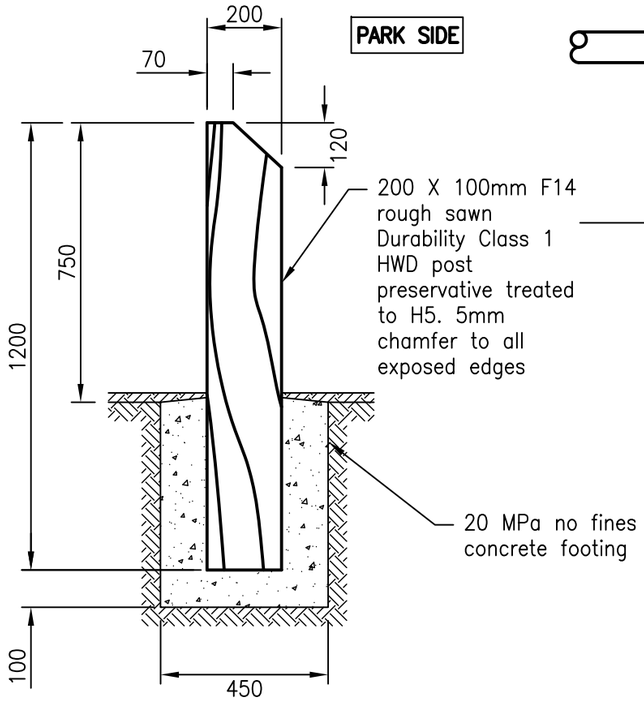
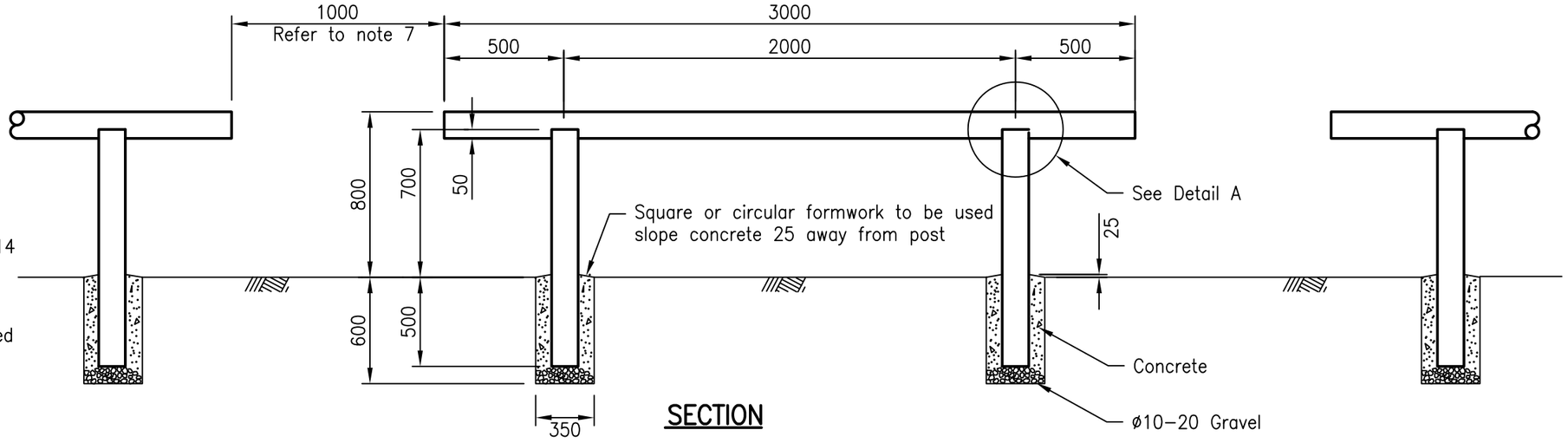
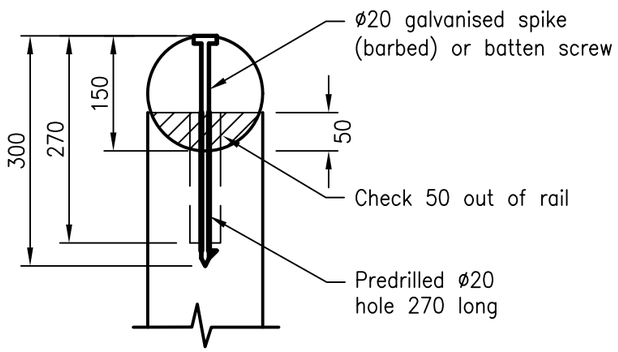


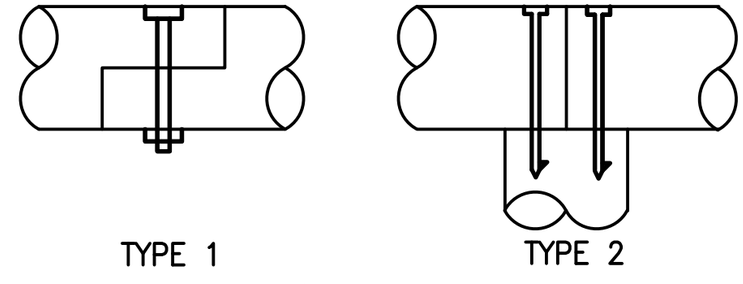
SIDE SECTION



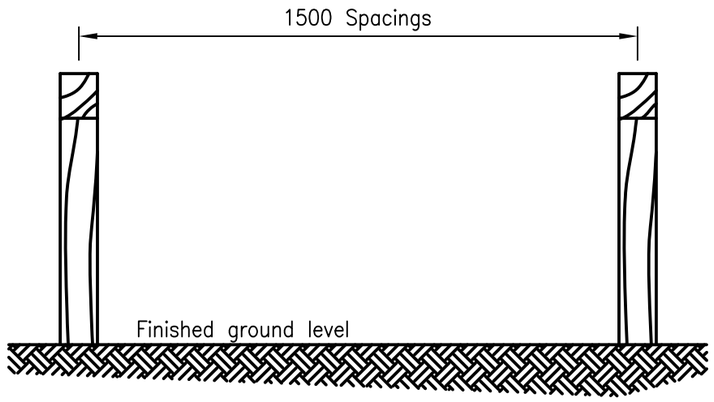
SECTION



DETAIL A

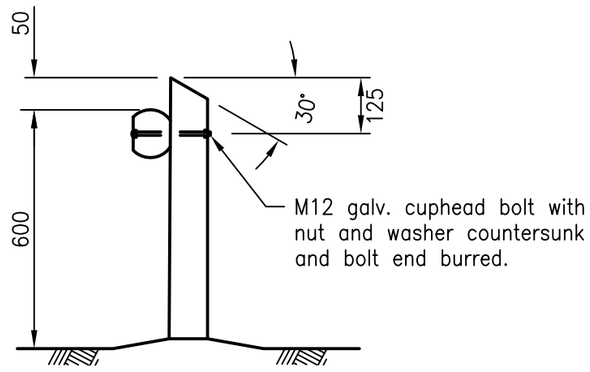


TYPICAL RAIL JOINTS
FOR CONTINUOUS FENCING



FRONT ELEVATION
HARDWOOD
TIMBER BOLLARD

Refer to relevant Council for Bollard Type



ALTERNATIVE RAIL

NOTES:

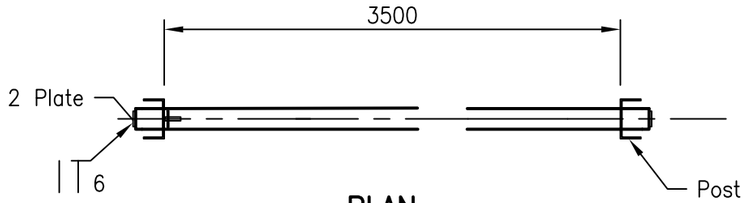
1. Concrete N25 in accordance with AS 1379 and AS 3600. Durability class H5 min to AS 1604.
2. All hardwood timber to be Durability class 1, F14 preservative treated to H5.
3. Log Barriers to be 150 diameter, Grade A treated to AS 1604. Use of CCA treated timber to be approved by relevant Council prior to installation.
4. Paint all cut surfaces with industrial clear water repellant to lock in chemicals used on CCA, in accordance with AS 1607.
5. Material
   Hexagonal head bolts to AS 1111.
   Nuts to AS 1112.
   Washers to AS 1237.
   Galvanising to AS 1214.
6. Check for service locations prior to boring for posts
7. The speed environment of the road should be considered when determining the lateral placement of log barrier fencing adjacent to the road way. Refer Austroad "Guide to Road Design – Part 6".
8. All dimensions are in millimetres unless shown otherwise.

Rv.	DATE	REVISIONS
E	06/14	Review
D	03/13	Amended Drawing Number
C	02/11	Review
B	06/10	Review
A	06/09	ORIGINAL ISSUE

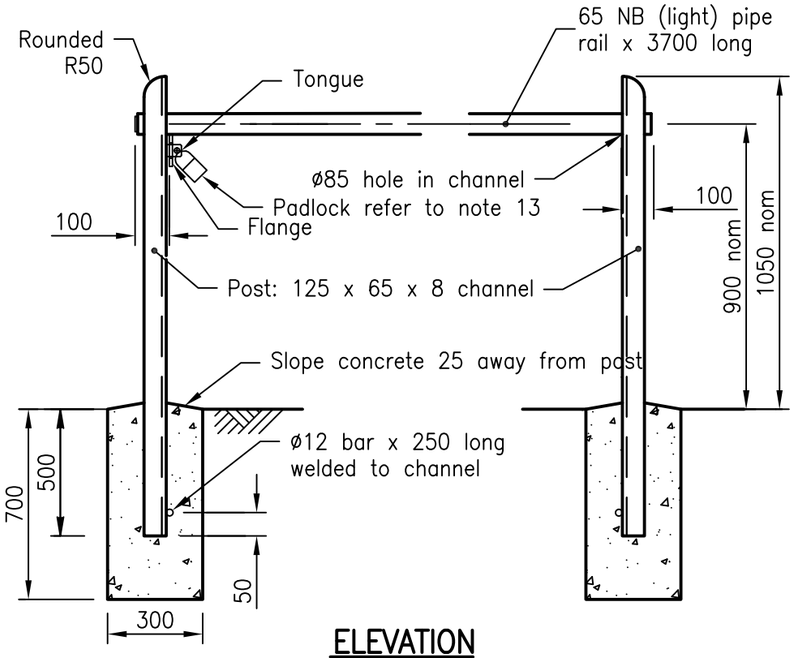
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

FENCING
LOG BARRIER AND ALTERNATIVE
HARDWOOD TIMBER BOLLARD

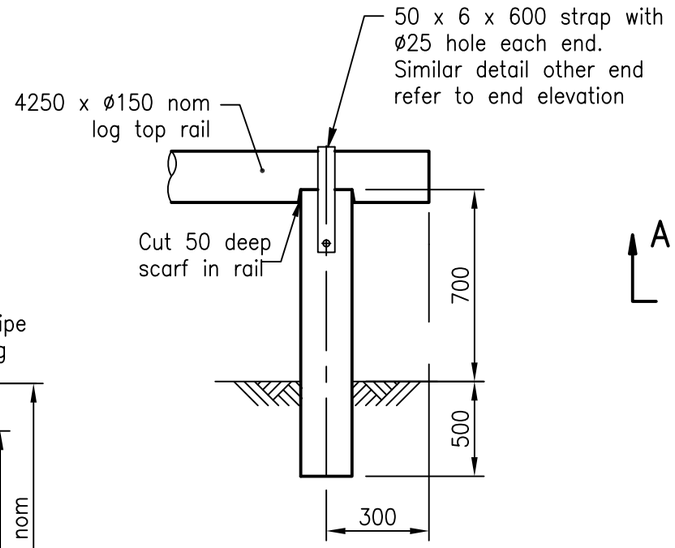
GS–042



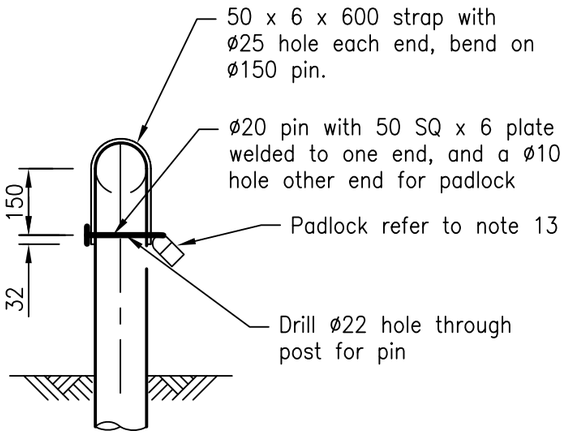
PLAN



ELEVATION

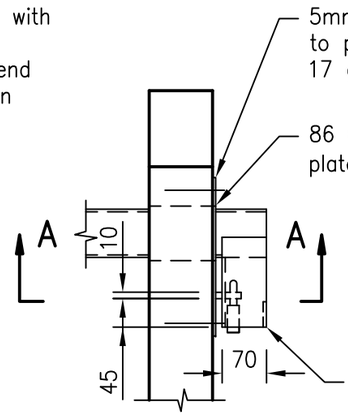


ELEVATION

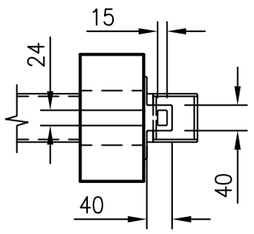


END ELEVATION

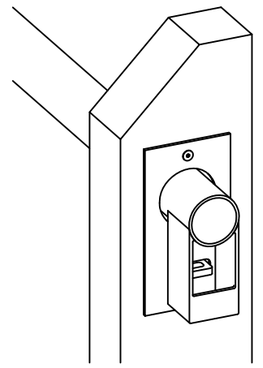
LOCKING RAIL TYPE 2



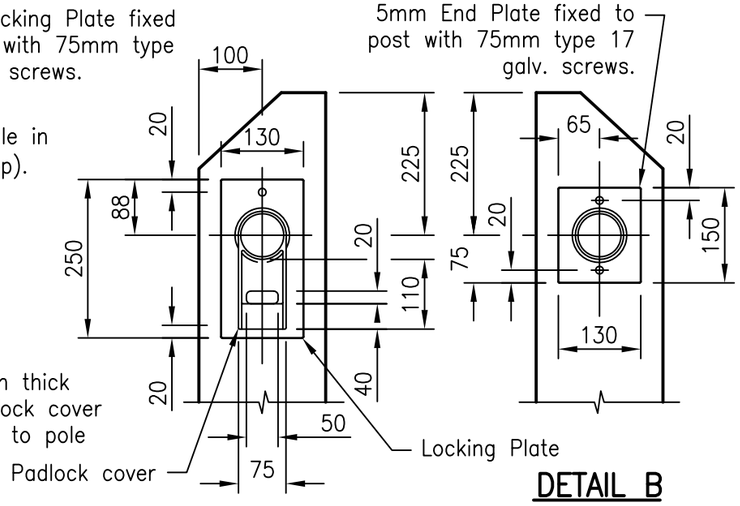
DETAIL A



SECTION A–A

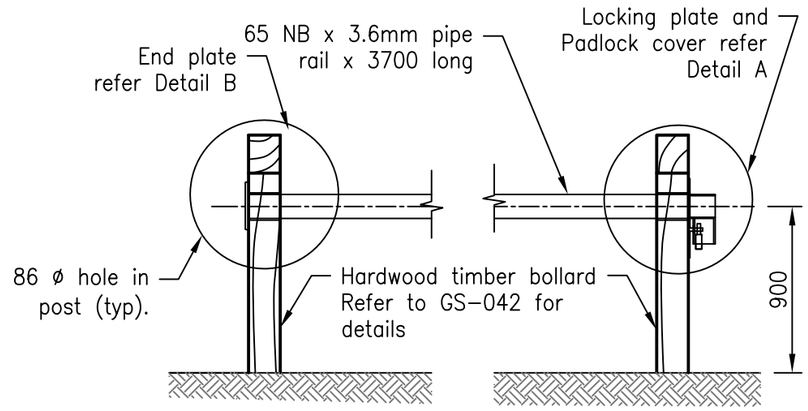


ISOMETRIC VIEW



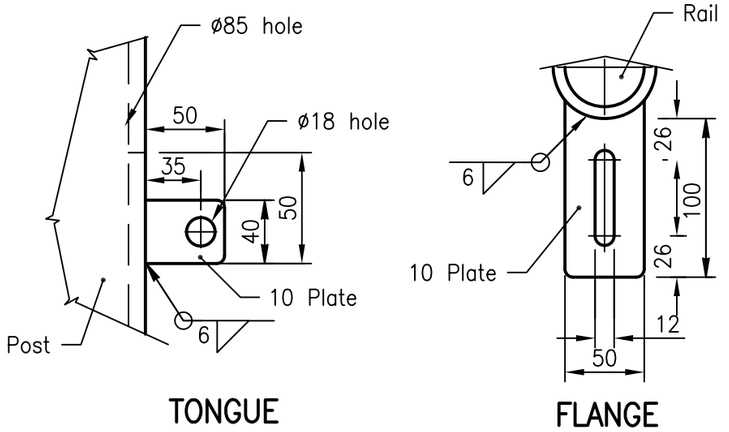
DETAIL B

END ELEVATION



ELEVATION

LOCKING RAIL TYPE 3



TONGUE

FLANGE

LOCKING RAIL TYPE 1

NOTES:

1. All pipes medium black tube to AS 1074.
2. All welds to AS 1554.
3. All welding symbols to AS 1101.3.
4. Steel plates to be Grade 250 to AS 3678.
5. Bar and channels to be Grade 250 to AS 3679.
6. All fabricated work, including plate key, shall have smooth ground edges.
7. All steelwork to be hot dipped galvanised after fabrication to AS 4680.
8. Concrete N25 in accordance with AS 1379 and AS 3600.
9. Log Barriers to be 150 dia. Grade A treated to AS 1604.
10. Use of CCA treated timber to be approved by relevant Council prior to installation.
11. Paint all cut CCA surfaces with industrial clear water repellant to lock chemicals used on CCA, in accordance with AS 1607.
12. All hardwood timber to be Durability Class 1 F14, preservative treated to H5.
13. Refer to relevant Council for supply of approved locking system.
14. Locking rail to be painted yellow (Safety) or as specified.
15. All dimensions are in millimetres unless shown otherwise.

Rv.	DATE	REVISIONS
E	06/14	Review
D	03/13	Amended Drawing Number
D	03/13	Drawing number changed & Type 2 Rail height amended
C	06/11	Review
B	06/10	Review
F	11/15	Isometric View added

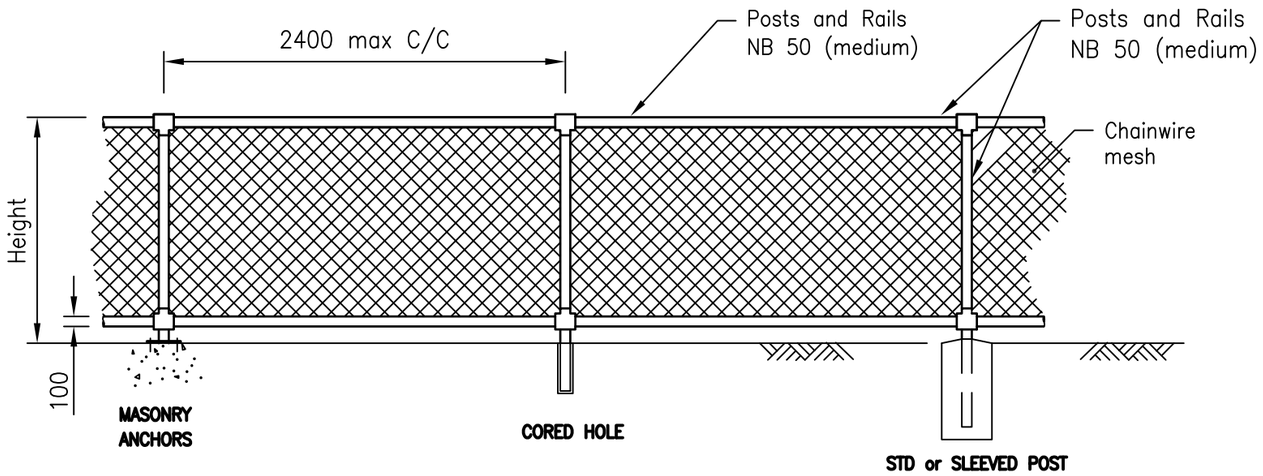
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA

STANDARD DRAWINGS

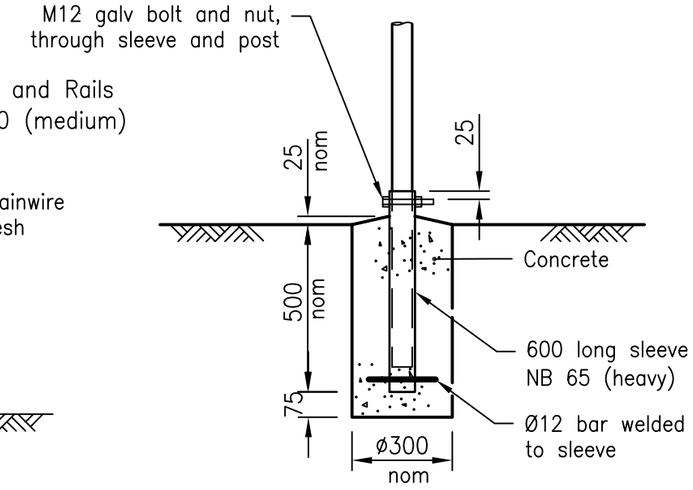
FENCING
LOCKING RAIL
TYPES 1, 2 & 3

GS–043

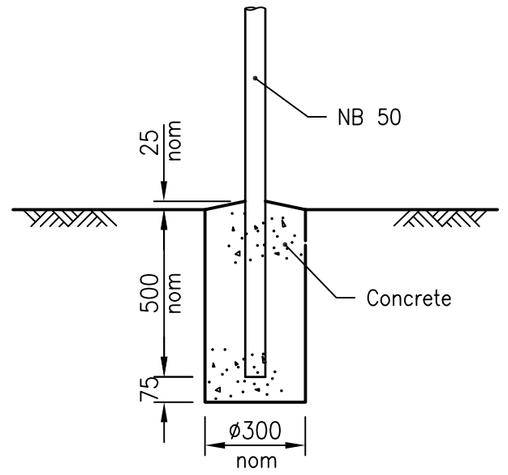
Rv. E D C B A F



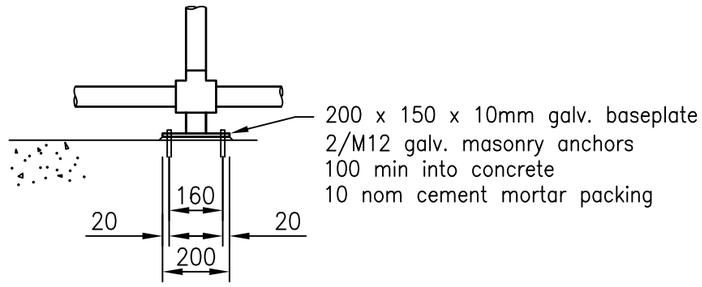
TYPE 1 – A (Height – 1100)
TYPE 1 – B (Height – 1350)



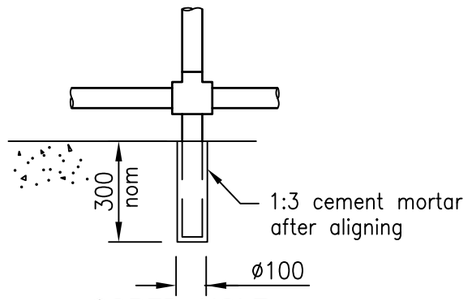
SLEEVED POST



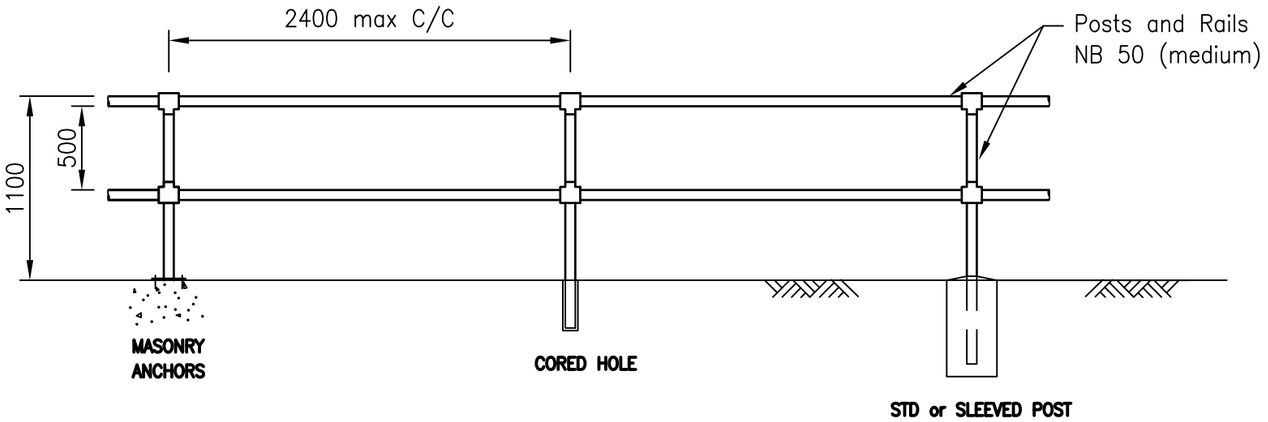
STD. POST



MASONRY ANCHORS



CORED HOLE



TYPE 2

FOOTING DETAILS

NOTES

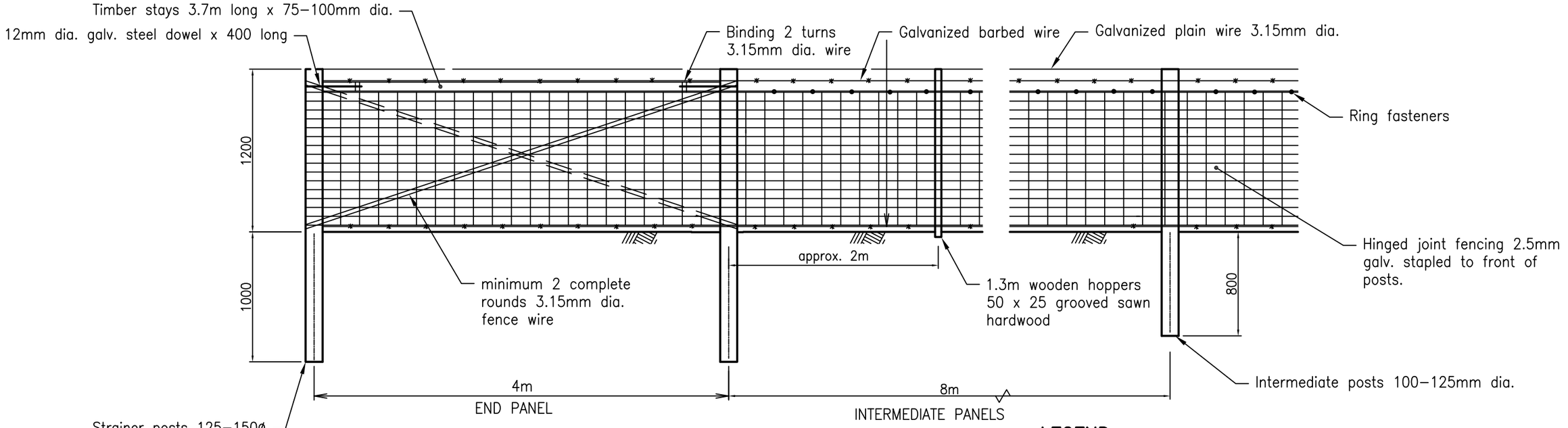
1. Refer project drawings for type of fence to be installed and type of footing to be adopted.
2. Construction of posts & rails shall be done using standard coupling connections only. (no welds).
3. Chainwire to be 50 x 2.5mm galv. to AS 2423 or plastic coated. Chainwire to be fixed using 1.6mm wire ties.
4. ø12 bars, Grade 250 steel to AS 1302
5. Hexagonal head bolts to AS 1111 Nuts to AS 1112 Washers to AS 1237 Galvanizing to AS 4680
6. All rails and posts galvanised steel tube to AS 1074.
7. Concrete N25 in accordance with AS 1379 and AS 3600.
8. All dimensions are in millimetres unless shown otherwise

Rv.	DATE	REVISIONS
D	06/14	Review
C	03/13	Amended Drawing Number
B	12/11	Revised Issue
A	03/08	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

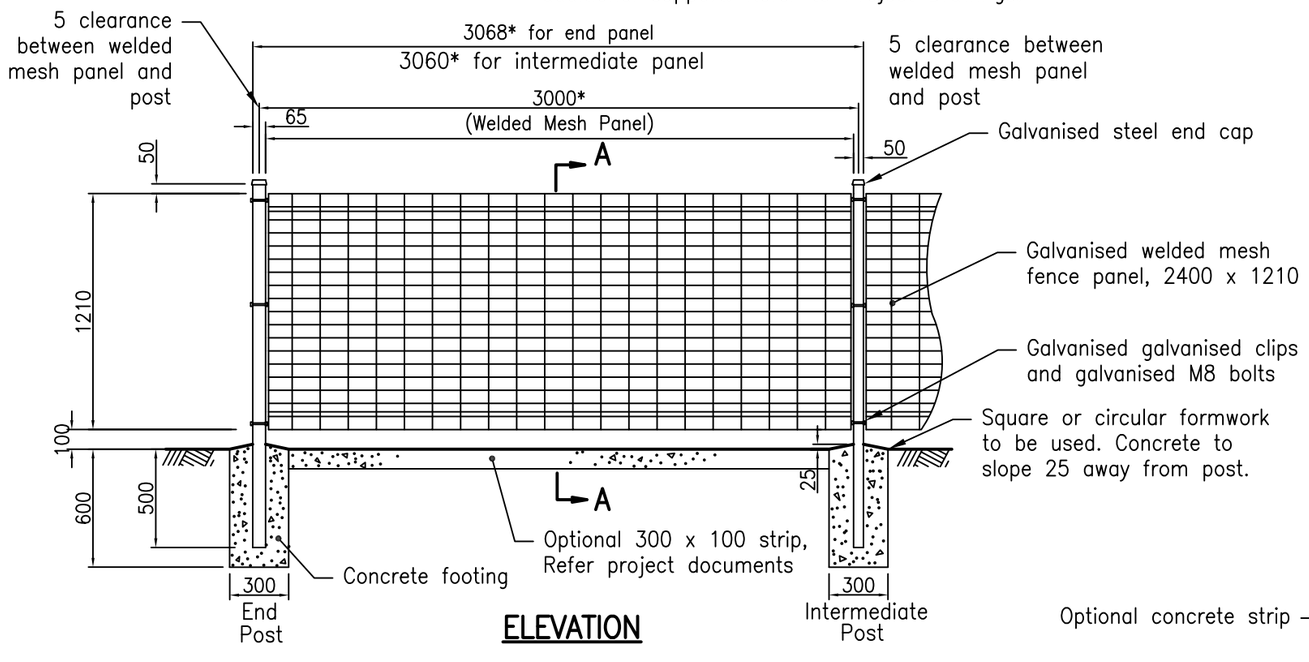
FENCING
TUBULAR STEEL FENCE
WITH & WITHOUT CHAIN WIRE

GS–044



* Welded Mesh panels can be cut to suit reduced post centres in locations requiring additional support. Refer to Project Drawings.

CONTROL FENCE



ELEVATION

WELDED MESH FENCE

SECTION A–A

LEGEND

- Wire fixed to back of posts

NOTES

A – Welded Mesh Fence

1. Gate and end posts to be 65x65x2 galvanized steel section to AS 1163.
2. Intermediate posts to be 50x50x2 galvanized steel section to AS 1163.
3. Panels to be fixed to posts using standard galvanized clips and galvanized M8 bolts.
4. Galvanizing to AS 1214 and AS 1650.
5. Concrete N25 in accordance with AS 1379 and AS 3600.
6. Posts are to be vertical. Raked panels are available for slopes up to 1 in 5.
7. Nuts to be spot welded to bolts as an anti–theft deterent.

B – Control Fence

1. All barbed wire, plain wire, hinged joint fencing, staples and ring fasteners to be galvanized to AS 2423.
2. Provide strainer panels at 100 to 140m spacing. Panels to be as for 'End Panels' with an extra 2/3.15mm wire brace as indicated by broken lines.
3. Posts may be tea–tree, split hardwood or sawn timber.
4. Where fences turn 90° adopt an end panel going away in each direction.
5. Dowels, Grade 250 to AS 3679.

C – General

1. All dimensions are in millimetres unless shown otherwise.

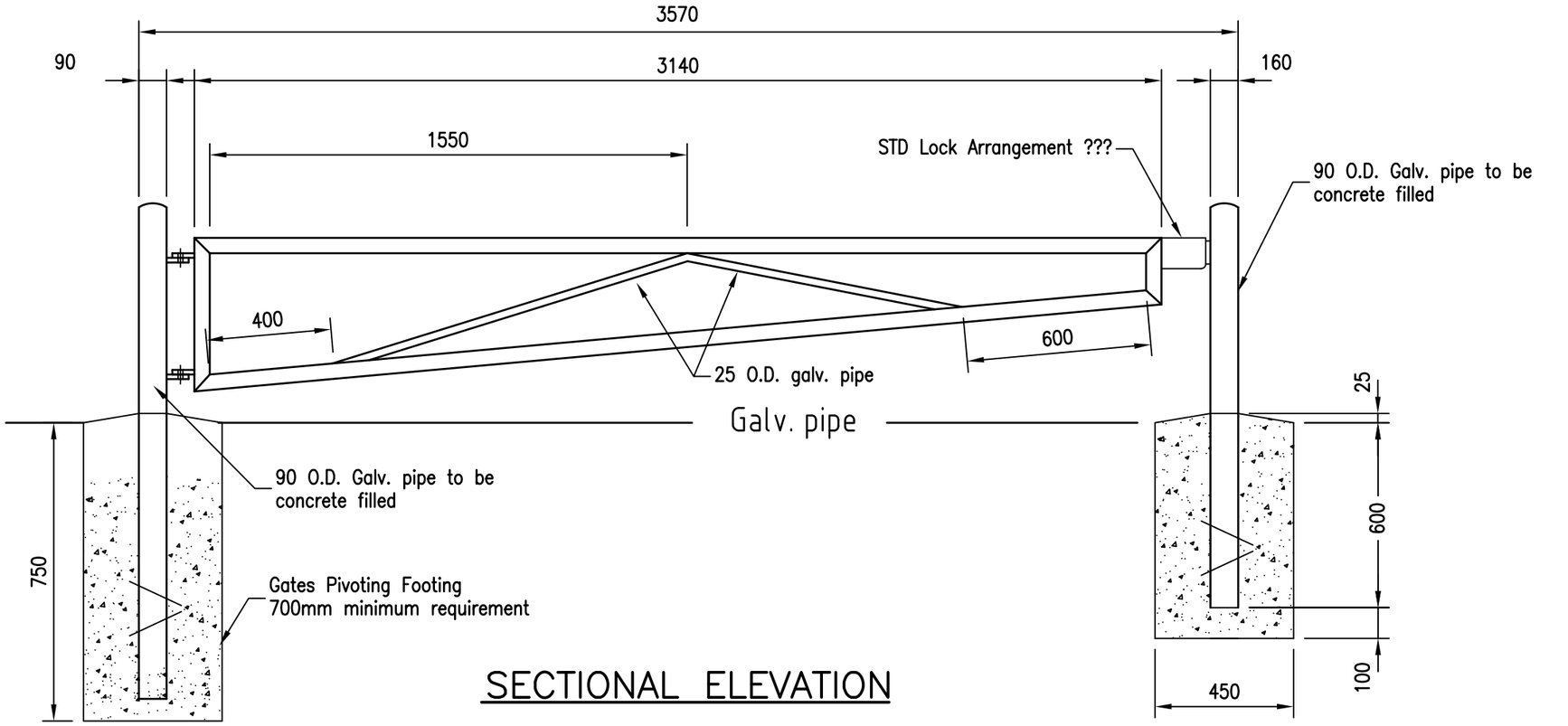
Rv.	DATE	REVISIONS
B	03/14	Amended Drawing Number
A	12/95	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

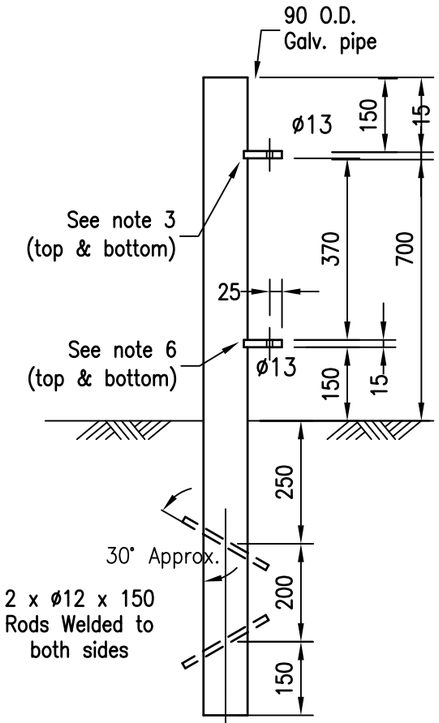
FENCING
WELDED MESH FENCING
AND CONTROL FENCE

GS–045

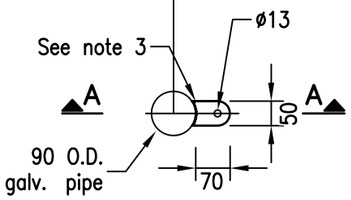
Rv. B A



SECTIONAL ELEVATION



SECTION A–A

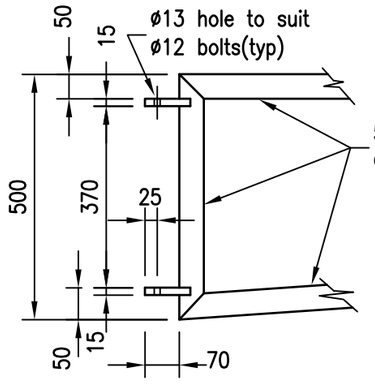


PLAN

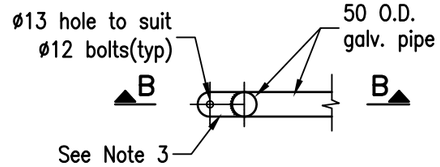
POST HINGE DETAILS

NOTES

1. All concrete to be grade N25
2. Gate to be mounted to post with two M12 galvanised steel bolts 40 long suitably burred after erection.
3. Hinge lugs to be 6 fillet welded to post and gate prior to erection
4. All end and mitre joints to be butt welded all around.
5. All pipes to be medium gauge heavy galvanised finished with two coats of two pack 125 micron minimum total thickness (e.g. Wattly Paracryl or equivalent process). Colour to match colorbond "Caulfield Green".
6. All welds and bare metal to be thoroughly cleaned and painted with cold galvanising primer prior to finish coat.
7. All dimensions are in millimetres unless shown otherwise.



SECTION B–B

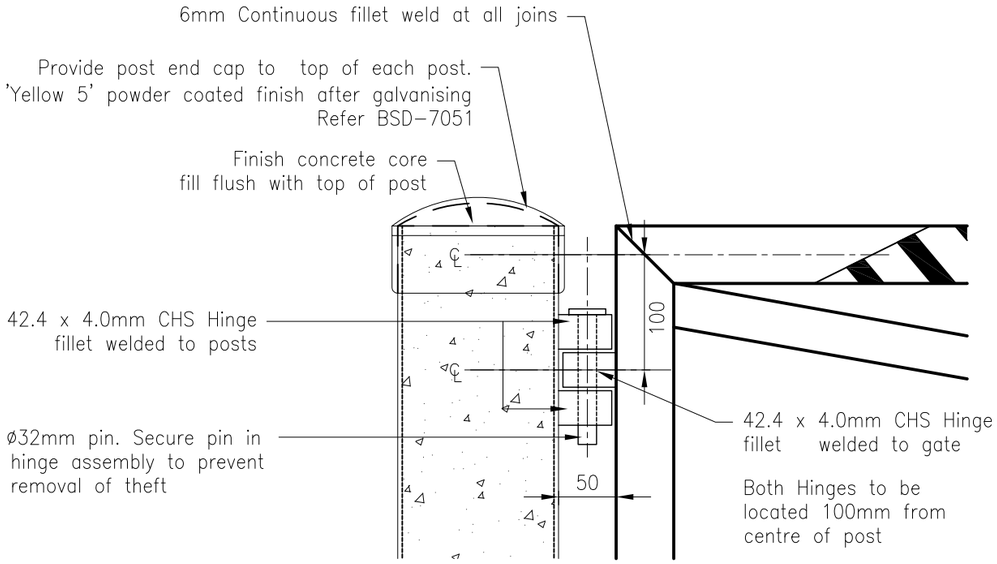


PLAN

GATE HINGE DETAILS

These drawings have been developed in consultation between the participating Councils.
BEFORE USE, the user shall confirm that the drawing has been adopted by the appropriate Council.

Rv.	DATE	REVISIONS	INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA STANDARD DRAWINGS	FENCING ENTRANCE BARRIER SINGLE SWING GATE	GS–047
	February	Original Issue			

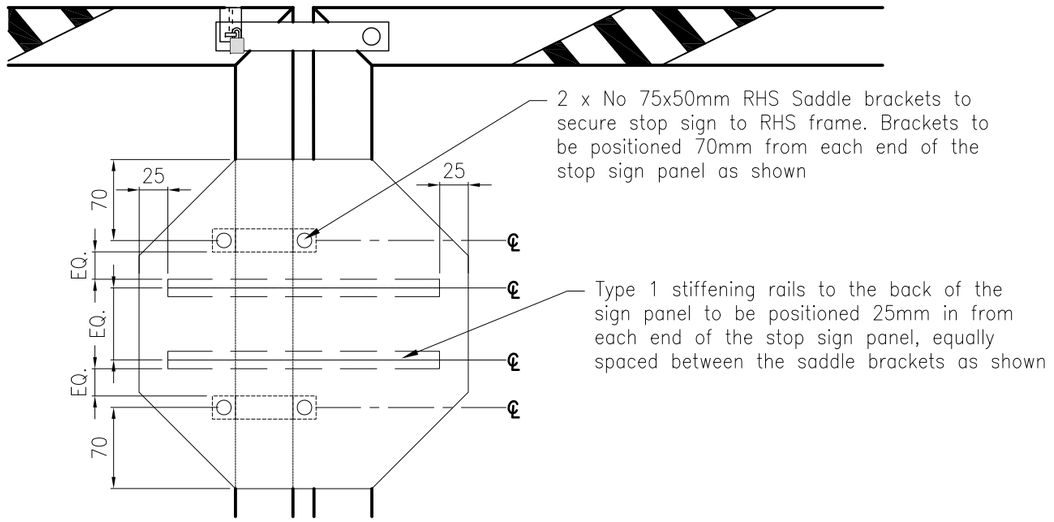


STEEL LOCK GATE HINGE DETAIL

SCALE: 1:5

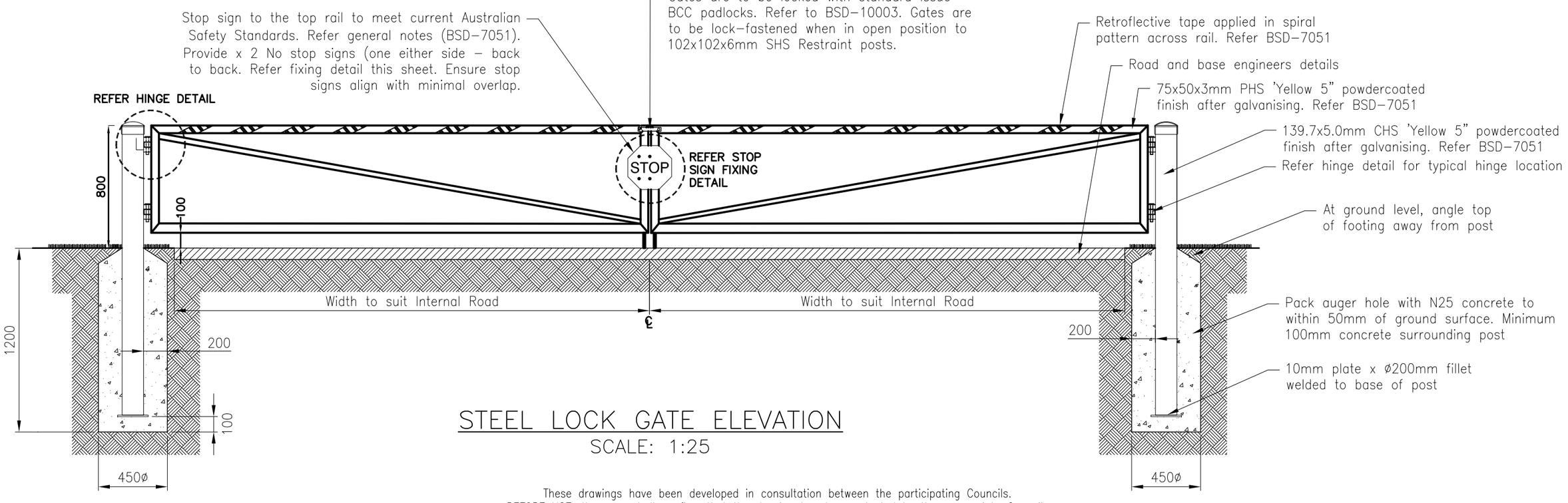
REFER TO BSD-7051 FOR ASSOCIATED SPECIFICATIONS.

NOTE: Provide fixings of a type and material suitable, sufficient and matching in finish and appearance to the components fastened. Provide insulation between dissimilar materials, unless specified otherwise. Where possible all fixings to be tamper/vandal proof to minimise theft or damage. As an example: Only one sign is shown attached to gate frame.



STOP SIGN FIXING DETAIL

SCALE: 1:5



STEEL LOCK GATE ELEVATION

SCALE: 1:25

These drawings have been developed in consultation between the participating Councils.
BEFORE USE, the user shall confirm that the drawing has been adopted by the appropriate Council.

Rv.	DATE	REVISIONS
	February, 2016	Original Issue

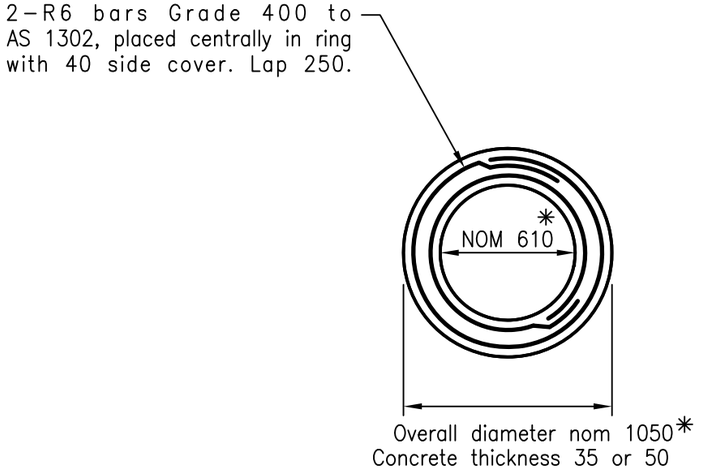
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA

STANDARD DRAWINGS

FENCING
ENTRANCE BARRIER
DOUBLE SWING GATE

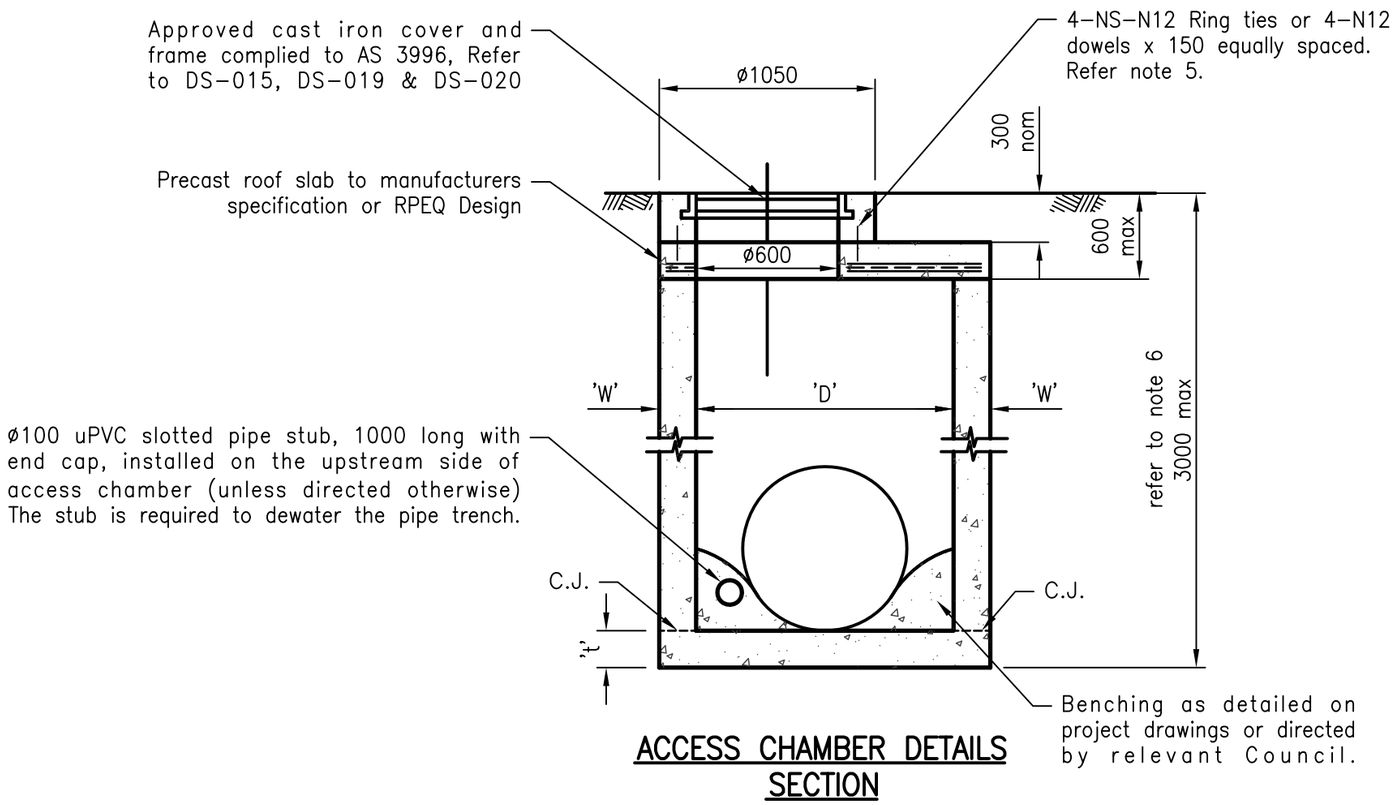
GS-048

Rv.



ROOF RING PLAN

For use in raising covers and frames of existing access chambers
* Size to suit existing access chamber



ACCESS CHAMBER DETAILS SECTION

DIMENSION

Access chamber DIA 'D'	FLOOR THICKNESS 't'		Wall thickness 'W'	Roof/Floor slab DIA
	INLET	OUTLET		
1050	175	150	150	1350
1200	250	225	225	1650
1350	250	225	225	1800
1500	250	225	225	1950
1800	250	225	250	2300
2100	275	250	275	2650

NOTES:

1. Concrete: Benching N25, Structural N40 (precast), N32 (Cast insitu) in accordance with AS1379 and AS 3600.
2. Access chambers which are proprietary items are required to be designed and certified to AS 3996–1992. Access covers subject to road traffic shall be of Class D design, where Minimum Ultimate Limit State Design Load = 210kN. Access covers subject to pedestrian traffic and occasional vehicle load shall be of Class C design, where Minimum Ultimate Limit State Design Load =150kN. (Ref: AS 3996–1992 and Austroads Bridge Design Code 1992).
3. Cover and frame, gray cast iron, Grade > T220 to AS 1830.
4. Refer Project Drawings for size and level of culverts, chamber cover level and setout point details.
5. Precast manhole top slabs are to be supplied with four (4) factory installed ring ties or alternately dowel bars may be accepted, subject to approval from the relevant Council.
6. Manholes deeper than 3000 require individual design and certification.
7. All dimensions are in millimetres unless shown otherwise.

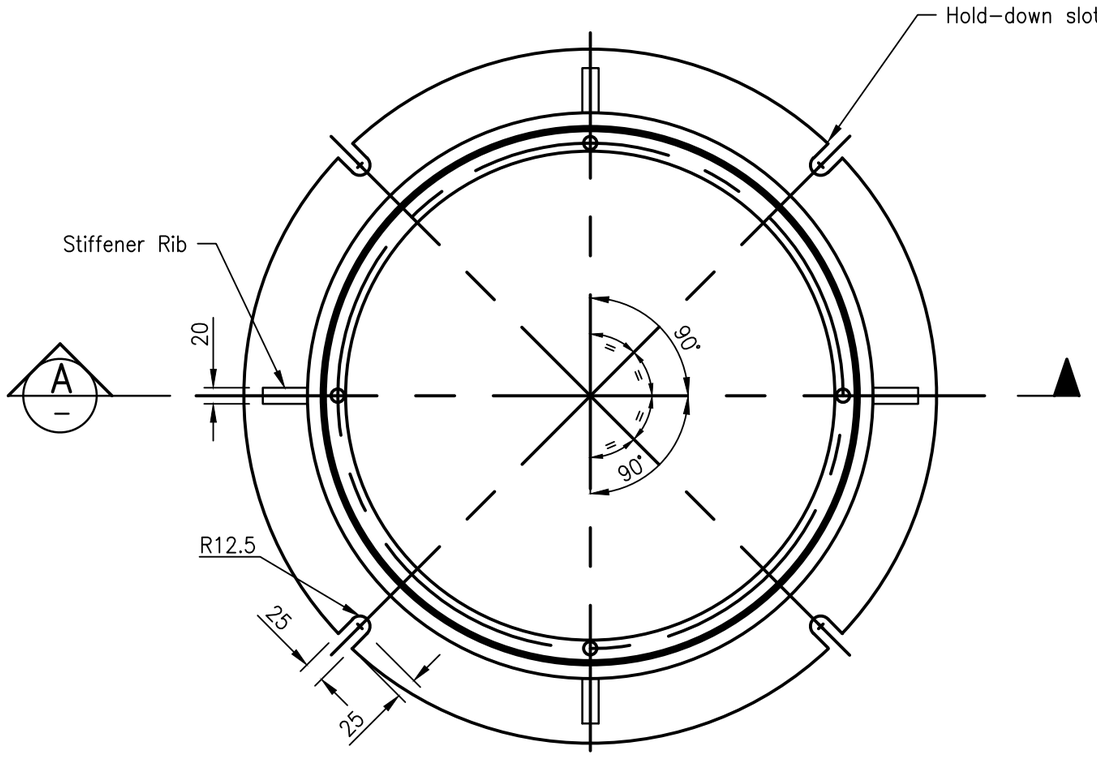
Rv.	DATE	REVISIONS
D	06/14	Review
C	03/14	Amended Drawing Number
B	11/12	Concrete Strength Amended
A	10/12	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

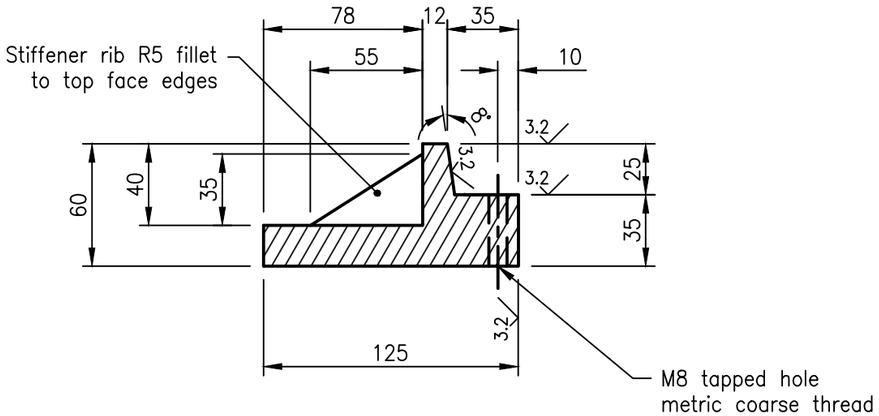
STORMWATER ACCESS CHAMBER DETAIL
1050 TO 2100 DIAMETER

DS–010

D C B A Rv.

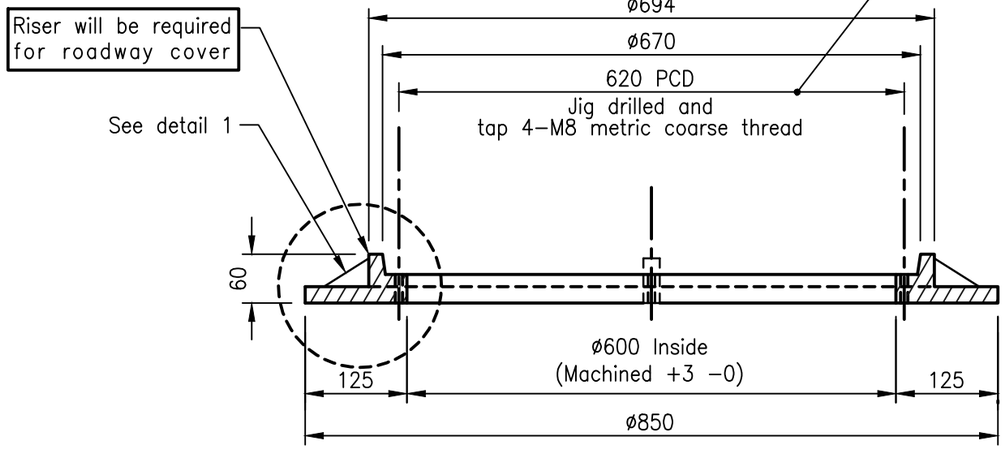


PLAN



DETAIL 1

NOTE:
Gauge shall be used to check PCD and tapped hole position



SECTION A – A

NOTES:

1. All edges to be square.
2. Casting to be free of burrs and pits.
3. Material
   Grey Cast iron (AS 1830)
   Tensile strength : >T220
   Hardness : 145–185 (HB)
   Design Load = 210kN (AS 3996)
   Mass = 59.5Kg
4. Tolerances
   Cast size ± 1.00mm
   Angle Profile ± 0.25°
   Machined size ± 0.125mm
   Overall diameter of cover + 0mm–0.25mm
   DFT of coating 50 µm
5. Machine surface symbol: 3.2
6. All machined surfaces shall have a coating approved as fit for the purpose of providing a rust proof, non–stick and gas/water proof joint.
7. Refer Std Dwg No DS–018 for manhole riser details.
8. Refer Std Dwg No DS–019, DS–020 and DS–021 for manhole cover details.
9. All dimensions are in millimetres unless shown otherwise.

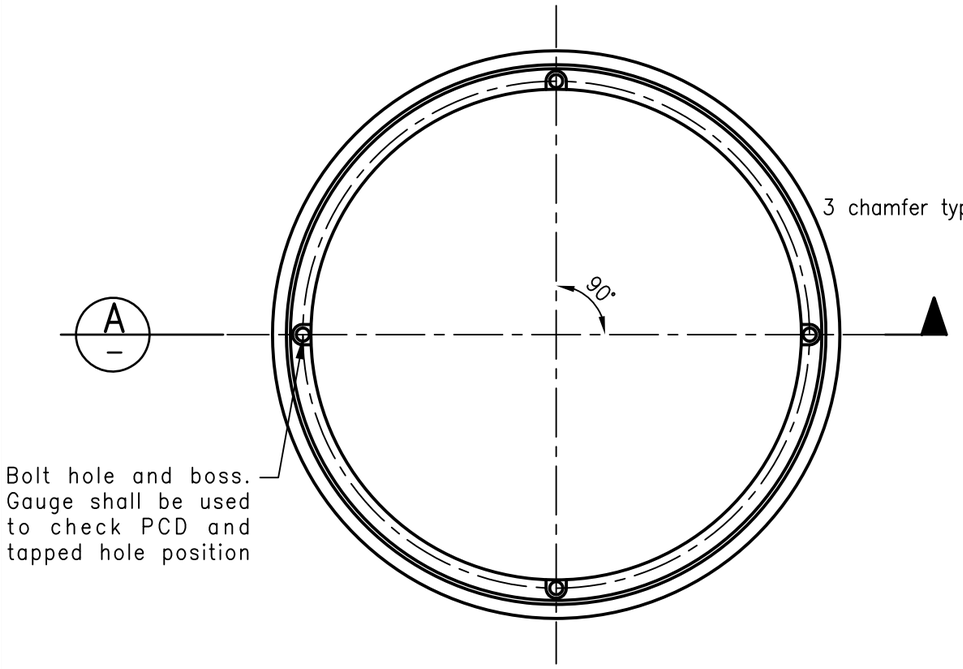
Rv.	DATE	REVISIONS
C	06/14	Review
B	03/14	Amended Drawing Number
A	10/12	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

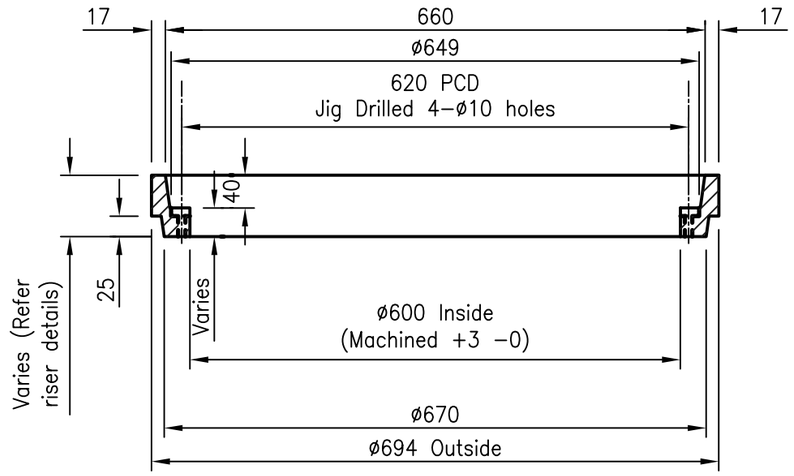
MANHOLE FRAME
(ROADWAY AND NON–ROADWAY)
1050 TO 2100 DIAMETER

DS–015

Rv. C B A



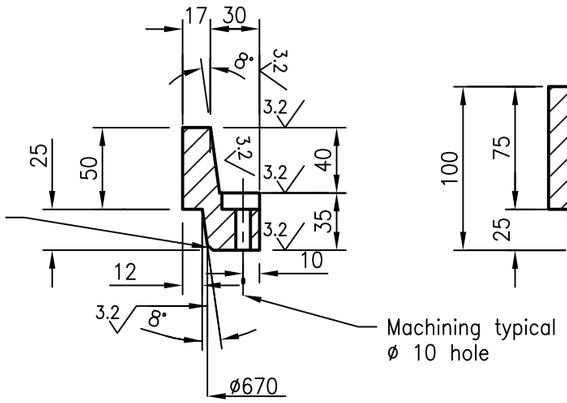
PLAN



SECTION A

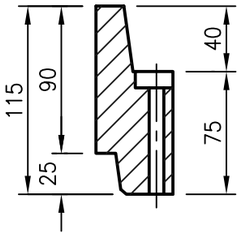
TABLE 1

RISER HEIGHT	BOLT LENGTH	
	FOR RISER ONLY	FOR RISER WITH COVER
35	60	100
60	90	130
75	110	150
90	115	160

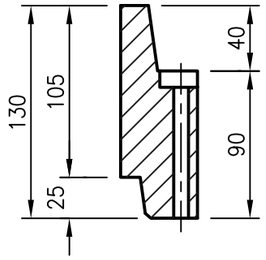


35 RISER
MASS: 27.5kg

60 RISER
MASS: 32kg



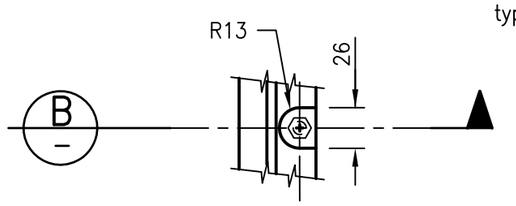
75 RISER
MASS: 38kg



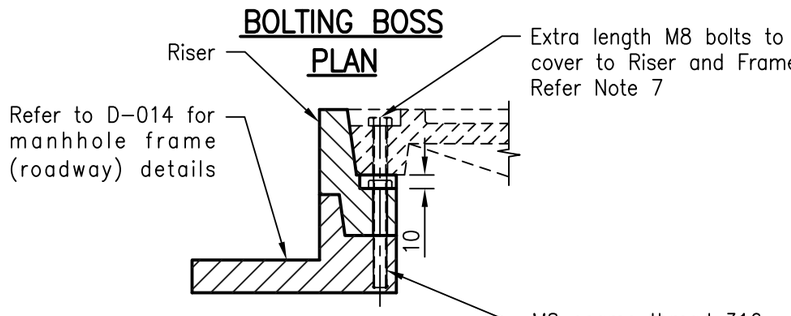
90 RISER
MASS: 44kg

RISER DETAILS

(Refer to 35 riser for typical dimensions for all risers)



BOLTING BOSS PLAN



SECTION B

TYPICAL ASSEMBLY

Bolts: 60 long for 35 riser
90 long for 60 riser
110 long for 75 riser
115 long for 90 riser

NOTES:

1. All edges to be square.
2. Casting to be free of burrs and pits.
3. Material
   Ductile cast iron
   Tensile strength : 600–3 (AS 1831)
   Hardness : 145–185 (HB)
   Design load = 210kN (AS 3996)
   Mass = varies
4. Tolerances
   Cast size ± 1.00mm
   Angle profile ± 0.25°
   Machined size ± 0.125mm
   Overall diameter of cover +0mm–0.25mm
   DFT of coating 50 µm
5. Machine surface symbol: 3.2
6. All machined surfaces shall have a coating approved as fit for the purpose of providing a rust proof, non stick and gas/water proof joint.
7. Four (4) M8 Course Thread Stainless Steel Bolts must be supplied and used to fix riser to frame, where cover is required to be bolted down, min two extra length bolts must be used to secure cover and raiser to frame, with two remaining bolts securing riser to frame. Refer TABLE 1 for bolt Lengths
8. Refer Std Dwg DS–015 for manhole frame details.
9. Refer Std Dwg DS–019, DS–020 and DS–021 for manhole cover details.
10. All dimensions are in millimetres unless shown otherwise.

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BEFORE USE, the user shall confirm that the drawing has been adopted by the appropriate Council.

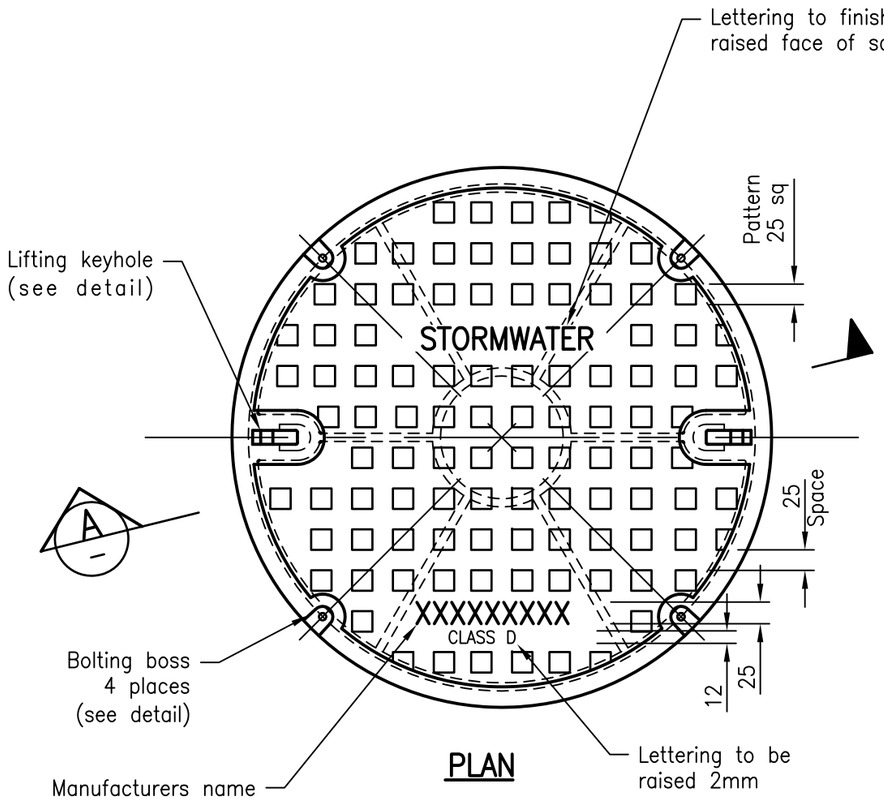
Rv.	DATE	REVISIONS
C	06/14	Review
B	03/14	Amended Drawing Number
A	10/12	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

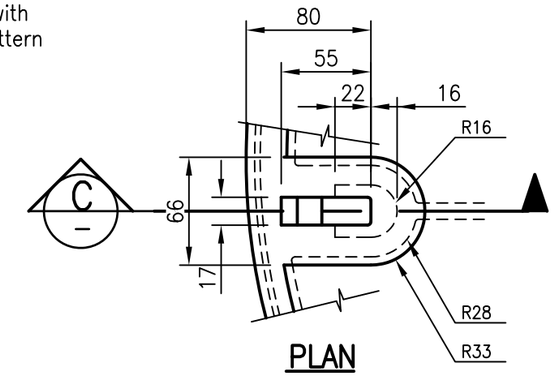
MANHOLE RISER DETAILS
(ROADWAY)

DS–018

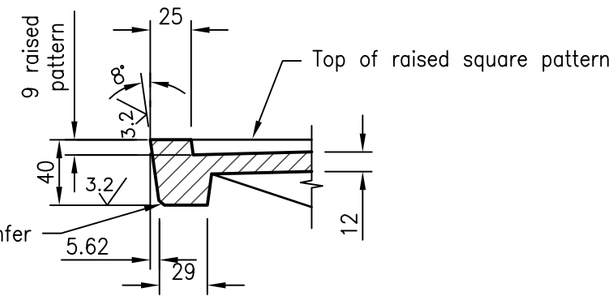
Rv. C B A



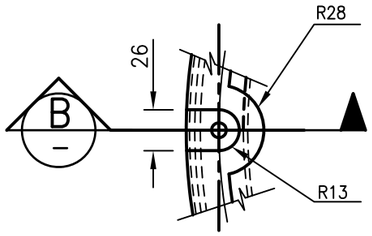
PLAN



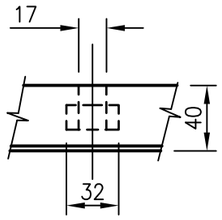
PLAN



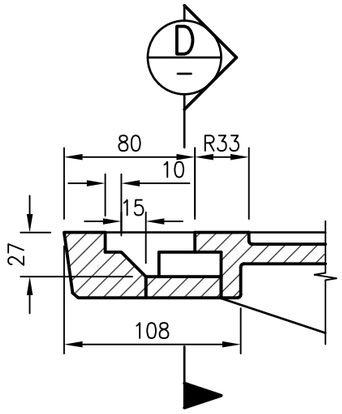
TYPICAL EDGE DETAIL



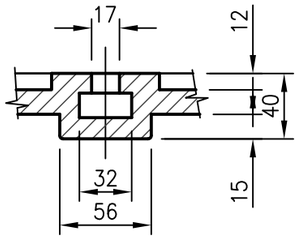
PLAN



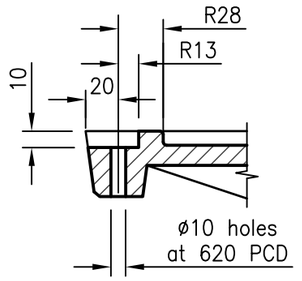
END ELEVATION



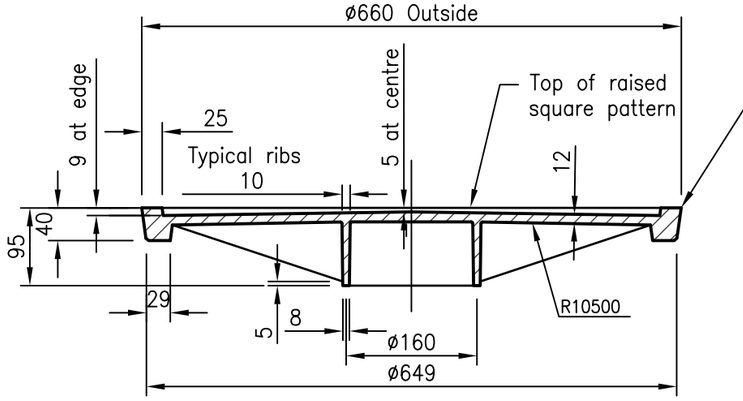
SECTION D



SECTION D



SECTION B



SECTION A

LIFTING KEYHOLE DETAIL

BOLTING BOSS DETAIL

Riser will be required for roadway cover

NOTES:

1. All edges to be square.
2. Casting to be free of burrs and pits.
3. Material
   Ductile cast iron
   Tensile Strength: 600–3 (AS 1831)
   Hardness: 145–185 (HB)
   Design Load = 210kN (AS 3996)
   Mass = 49kg
4. Tolerances
   Cast Size ± 1.00mm
   Angle profile ± 0.25°
   Machined Size ± 0.125mm
   Overall diameter of cover +0mm–0.25mm
   DFT of coating 50 μm
5. Machine surface symbol: 3.2
6. All machine surfaces shall have a coating approved as fit for purpose of providing a rust proof, non–stick and gas/water proof joint.
7. Lids to be bolted down if directed by Designer. min two extra length bolts must be used to secure Cover and Riser to frame. Refer to D–018 for Riser detail and Bolt lengths.
8. Refer Std Dwg DS–015 for manhole frame details.
9. Refer Std Dwg DS–018 for manhole riser details.
10. Refer Std Dwg DS–020 and DS–021 for alternate cover details.
11. All dimensions are in millimetres unless shown otherwise.

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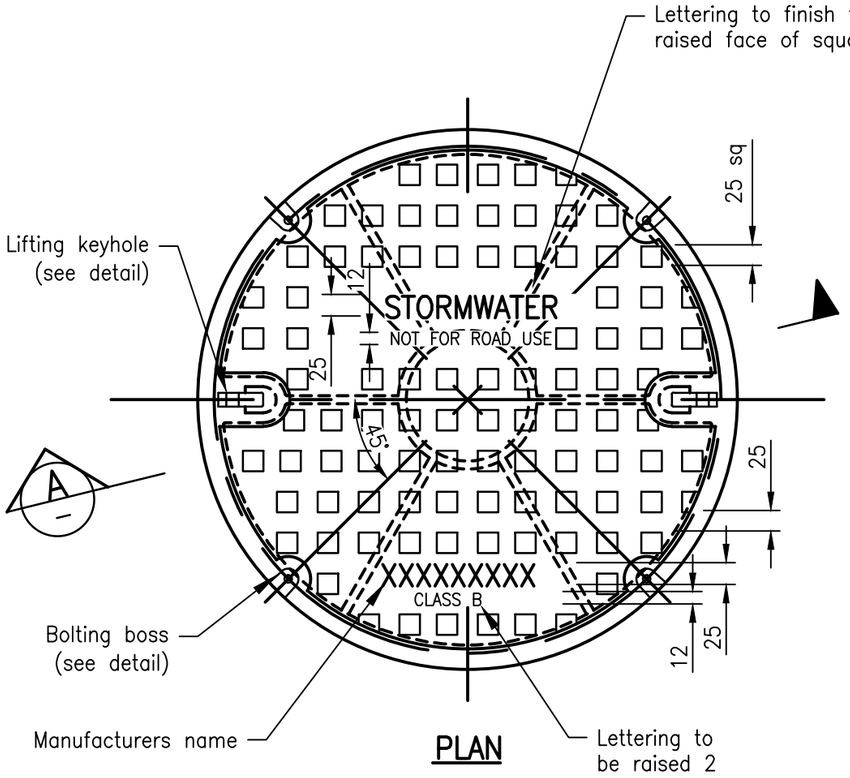
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

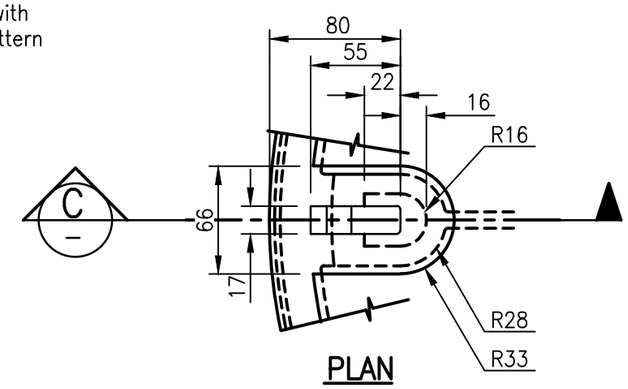
MANHOLE COVER
(ROADWAY)
1050 TO 2100 DIAMETER

DS–019

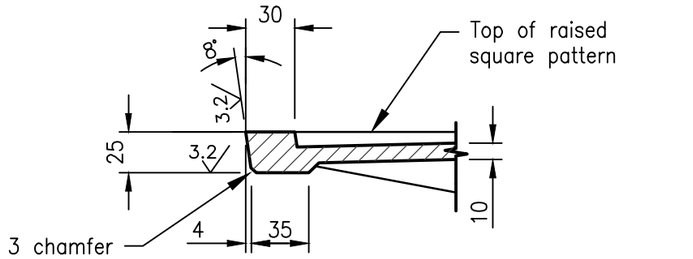
Rv. C B A



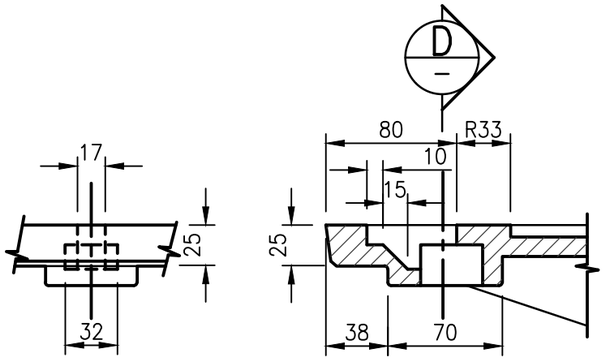
PLAN

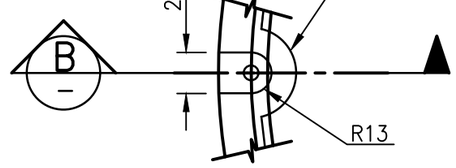


PLAN

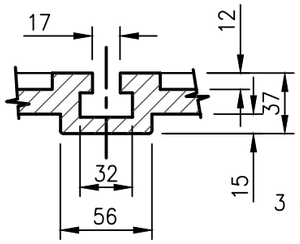


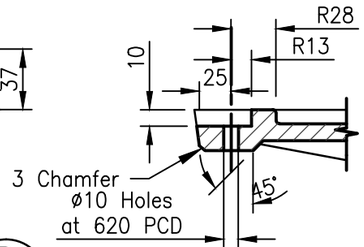
TYPICAL EDGE DETAIL





PLAN



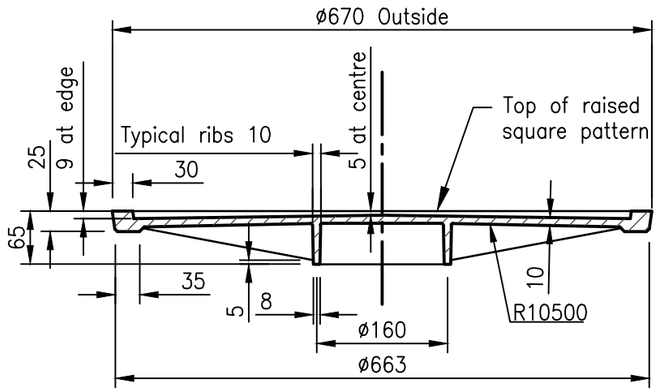


SECTION D

SECTION B

END ELEVATION

SECTION C



SECTION A

LIFTING KEYHOLE DETAIL

BOLTING BOSS DETAIL

NOTES:

1. This drawing is for use in non commercial loading applications where vehicle loads are less than 3.5t.
2. All edges to be square.
3. Casting to be free of burrs and pits.
4. Material
   Ductile cast iron
   Tensile strength : 600–3 (AS 1831)
   Hardness : 145–185 (HB)
   Design load = 80kN (AS 3996)
   Mass = 39kg
5. Tolerances
   Cast size ± 1.00mm
   Angle profile ± 0.25°
   Machined size ± 0.125mm
   Overall diameter of cover +0mm–0.25mm
   DFT of coating 50 µm
6. Machine surface symbol: 3.2
7. All machine surfaces shall have a coating approved as fit for purpose of providing a rust proof, non–stick and gas/water proof joint.
8. Lids to be bolted down if required by Design, using M8 coarse thread 316 stainless steel bolts in four (4) places.
9. Refer Std Dwg DS–015 for manhole frame details.
10. Refer Std Dwg DS–018 for manhole riser details.
11. Refer Std Dwg DS–019 and DS–021 for alternate cover details.
12. All dimensions are in millimetres unless shown otherwise.

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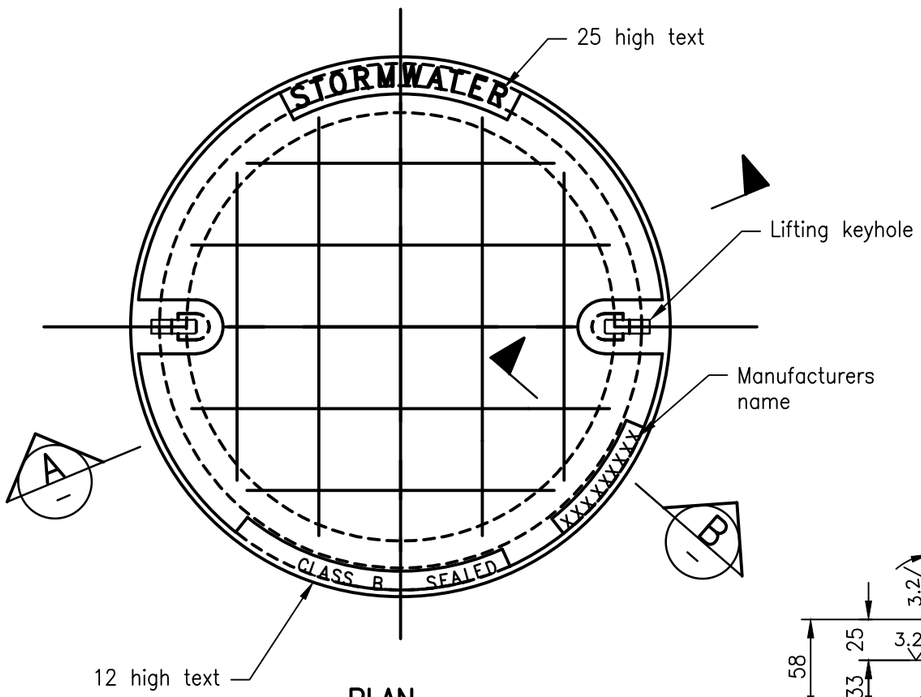
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

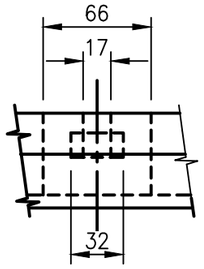
MANHOLE COVER
(NON ROADWAY)
1050 TO 2100 DIAMETER

DS–020

Rv. C B A



PLAN



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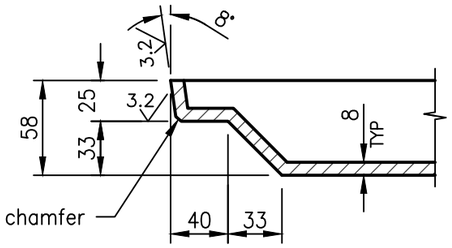
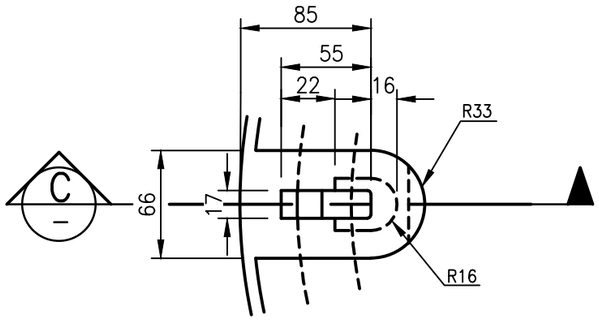


DETAIL 1



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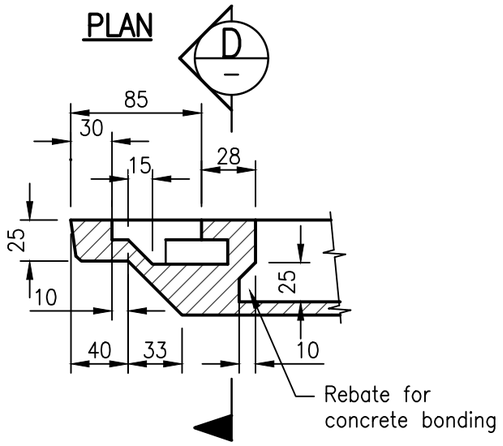
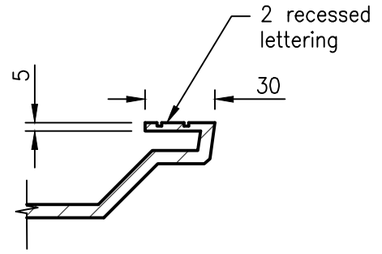
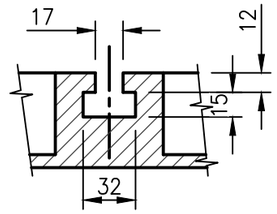


SECTION C

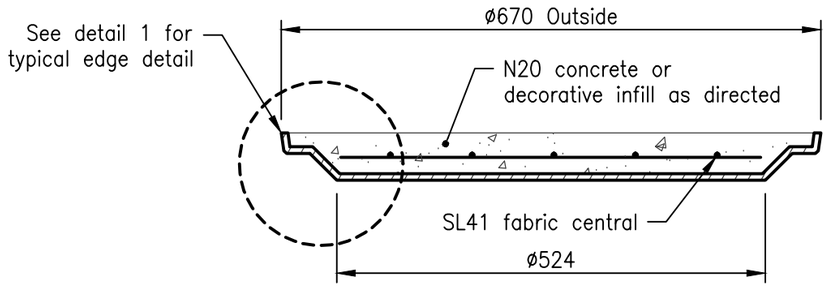


SECTION B



SECTION D

LIFTING KEYHOLE DETAILS



SECTION A

NOTES:

1. This drawing is for use in non roadway application subject to pedestrian loadings only.
2. All edges to be square
3. Casting to be free of burrs and pits.
4. Material
   Ductile cast iron
   Tensile strength : 600–3 (AS 1831)
   Hardness : 145–185 (HB)
   Design Load : 80kN (AS 3996)
   Mass = 59.5kg
5. Tolerances
   Cast size ± 1.00mm
   Angle profile ± 0.25°
   Machined size ± 0.125mm
   Overall diameter of cover +0mm–0.25mm
   DFT of coating 50µm
6. Machine surface symbol: 3.2
7. All machined surfaces shall have a coating approved as fit for the purpose of providing a rust proof non–stick and gas/water proof joint.
8. Refer Std Dwg DS–015 for manhole frame details.
9. Refer Std Dwg DS–018 for manhole riser details.
10. Refer Std Dwg DS–019 and DS–020 for alternate cover details.
11. All dimensions are in millimetres unless shown otherwise.

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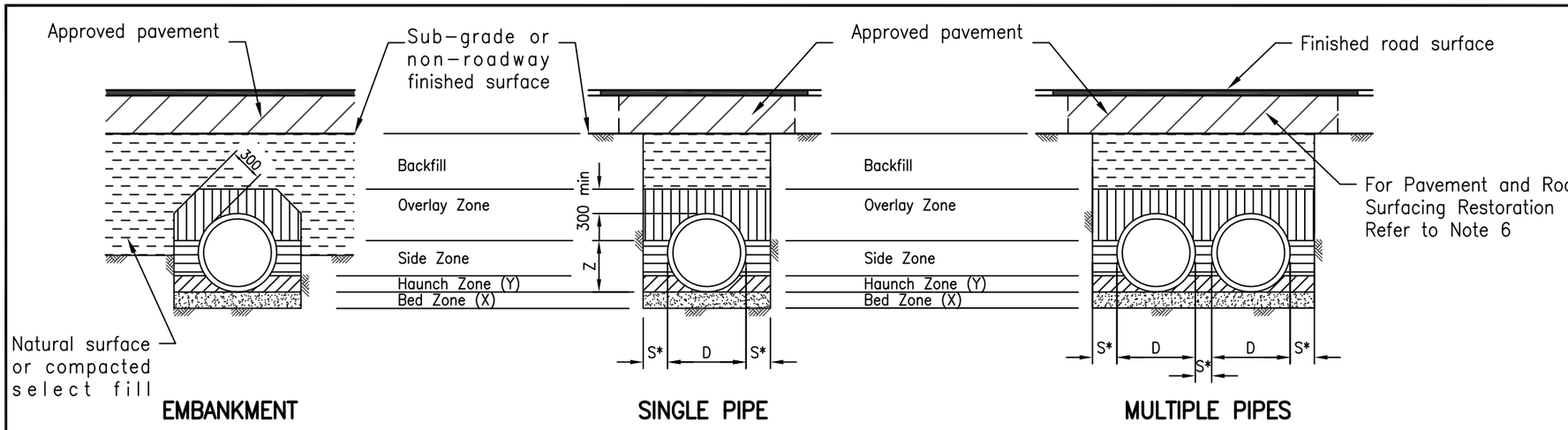
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

MANHOLE COVER CONCRETE
INFILL (PEDESTRIAN TRAFFIC)
1050 TO 2100 DIAMETER

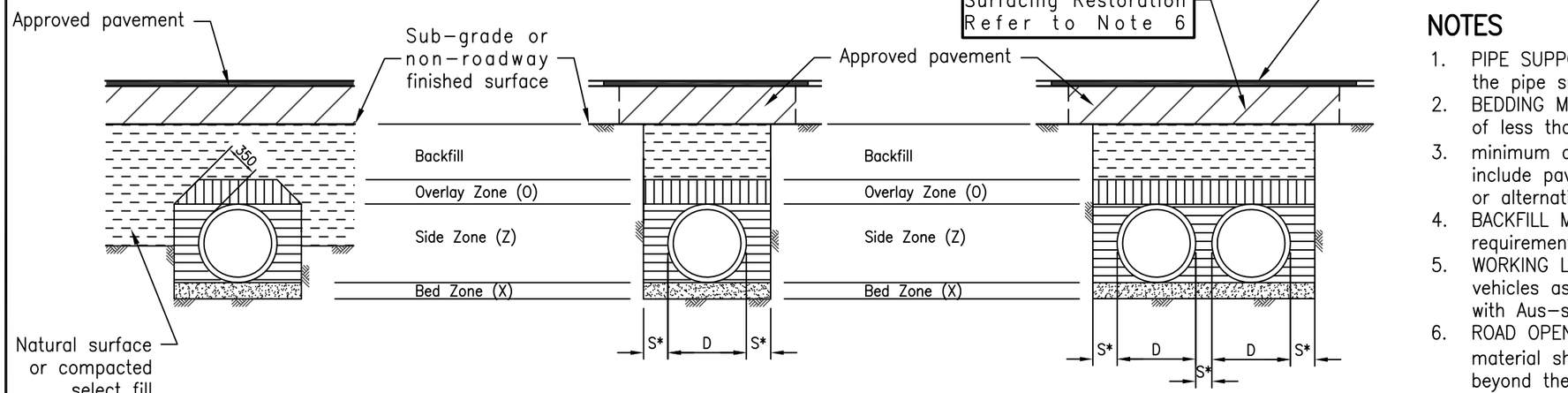
DS–021

C B A Rv.



EMBANKMENT | SINGLE PIPE | MULTIPLE PIPES

RIGID PIPE



EMBANKMENT | SINGLE PIPE | MULTIPLE PIPES

FLEXIBLE PIPE

TABLE 1

BEDDING MATERIAL GRADING (% weight passing)		
Sieve size	**Bed & Haunch zones**	**Side zones**
75.0		100
19.0	100	
9.5		50 – 100
2.36	50 – 100	30 – 100
0.60	20 – 90	15 – 50
0.30	10 – 60	
0.15	0 – 25	
0.075	0 – 10	0 – 25

The use of Controlled Low Strength Material (CLSM) in lieu of the material in Table 1 is to be approved by the relevant Council.

PIPE INSTALLATION DIMENSIONS

	RIGID PIPE				FLEXIBLE PIPE			
D (Dia.)	X	Y	Z	S*	X	Z	O	S*
>300 <450	100	0.3 D	–	300	100	Pipe Dia.	150	300
>450 <600	100	0.3 D	–	300	150	Pipe Dia.	150	300
>600 <900	100	0.3 D	–	600	150	Pipe Dia.	200	600
>900 <1200	100	0.3 D	–	600	150	Pipe Dia.	200	600
>1200 <1500	100	0.3 D	–	600	150	Pipe Dia.	200	600
>1500	150	0.3 D	> 0.7 D	900	150	Pipe Dia.	0.25 D	900

S* – Where the use of Controlled Low Strength Material (CLSM) has been approved, the space between multiple pipes and the side of the trench can be reduced in accordance with the requirements of the relevant Australian Standard.

NOTES

1. PIPE SUPPORT TYPE – unless shown otherwise on the project drawings, the pipe support shall be HS3 within road reserve and H2 elsewhere.
2. BEDDING MATERIAL shall comply with Table 1 and have a Plasticity Index of less than 6.
3. minimum depth of OVERLAY ZONE above pipes / culverts as shown may include pavement. Pavement within this area to be compacted by hand or alternatively a lean mix concrete pavement layer may be used.
4. BACKFILL MATERIAL shall be Select Backfill complying with the requirements of Aus–Spec 1352 Pipe drainage.
5. WORKING LOADS are those due to fill material and standard highway vehicles as per AS 3725. Allowance for construction loads shall comply with Aus–spec 1352 Pipe Drainage.
6. ROAD OPENINGS AND RESTORATION – Approved replacement pavement material shall extend a min 300mm (subject to depth of pavement) beyond the perimeter of any trench excavation. The road surfacing shall extend min 100mm beyond the perimeter of any pavement replacement.
7. WINGWALLS fill/backfill material shall be placed 300mm thick behind wingwalls for the length and height of the wings.
8. Increase excavation locally at spigot and socket joints (Rigid pipes) to ensure minimum cover as shown.
9. Unless directed otherwise, provide pipe stub to de–water drainage trench. Stub to be 3m long x 100mm dia. corrugated polyethylene pipe class 400 to AS 2439 (with end cap) installed on the upstream face of manholes.
10. All dimensions are in millimetres unless shown otherwise.

REFERENCED DOCUMENTS
Australian Standards:
AS 3725 Loads on Buried Concrete Pipes
AS 4139 Fibre reinforced concrete pipes and fittings
AS/NZS 2566.1 Buried Flexible Pipelines –Structural Design
AS/NZS 2566.2 Buried Flexible Pipelines – Installation

Specifications:
Nat–Spec 1352 Pipe drainage
Nat–spec 1152 Road Openings and Restorations
Nat–Spec 1112 Earthworks (Roadways)

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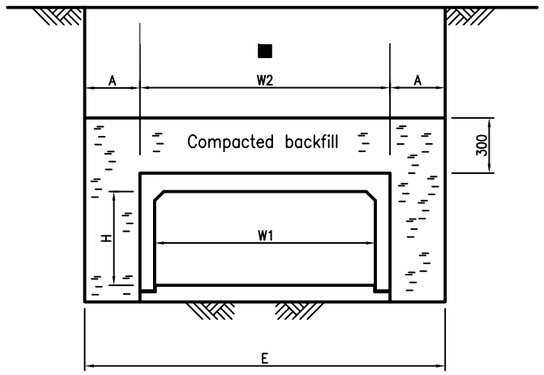
STANDARD DRAWINGS

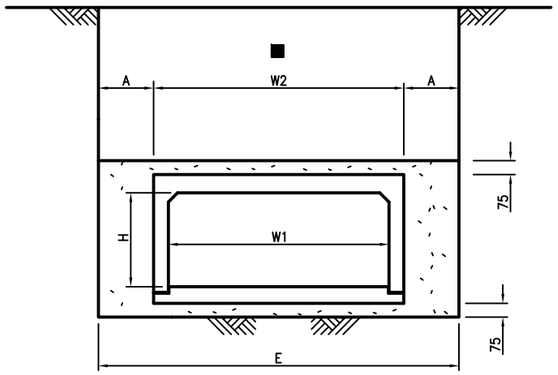
EXCAVATION, BEDDING AND BACKFILLING
RIGID & FLEXIBLE DRAINAGE PIPES

DS–030

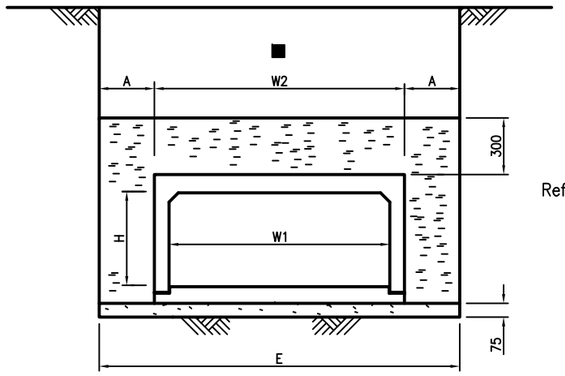
C B A Rv.



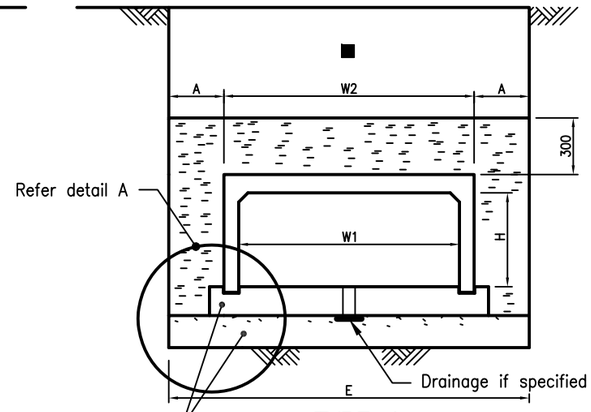
TYPE 1
NATURAL BEDDING



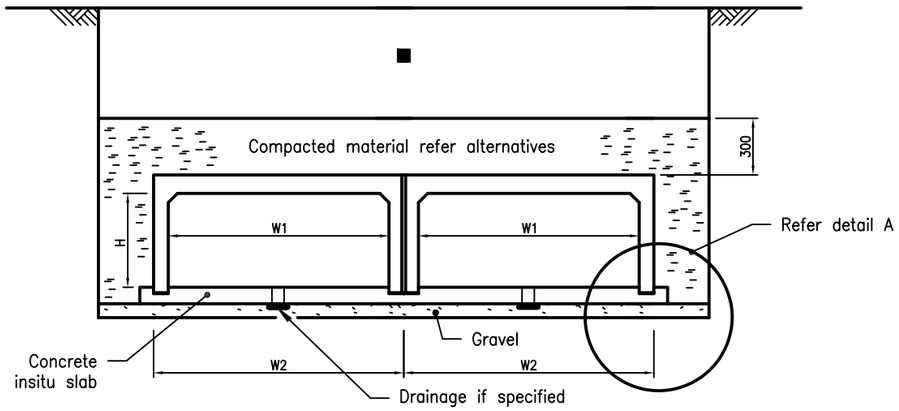
TYPE 2
SAND SURROUND



TYPE 3
SAND BEDDING



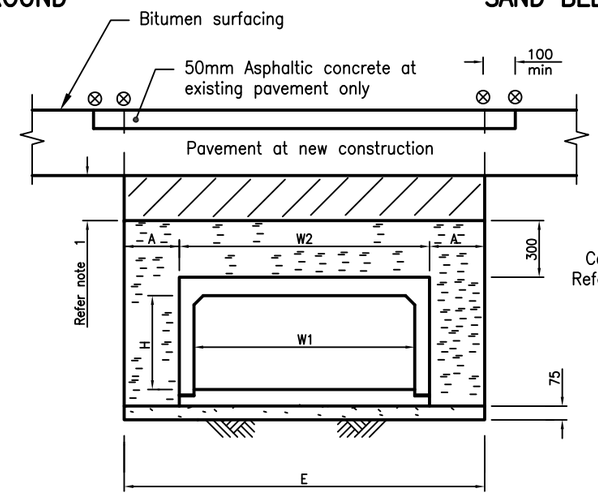
TYPE 4
INSITU BASE SLAB



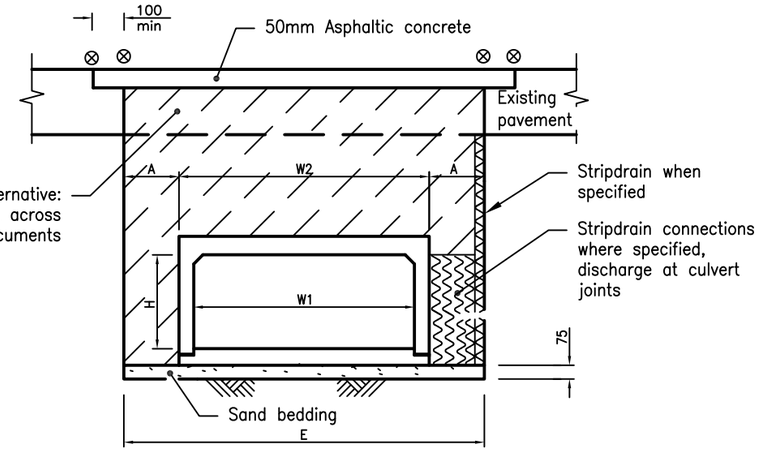
MULTIPLE CULVERTS

W1	W2	E nom
300	420	1000
375	500	1100
450	570	1200
600	730	1300
750	890	1500
900	1050	1700
1200	1360	2000
1520	1700	2300
1820	2010	2600
2130	2340	3000
2440	2670	3300

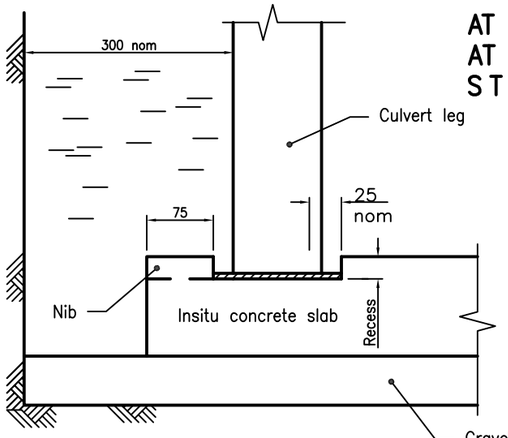
EXCAVATION WIDTH



ALTERNATIVE A
AT EXISTING SURFACED PAVEMENTS OR AT NEW PAVEMENTS ON RESIDENTIAL STREETS & RURAL ROADS



ALTERNATIVE B
AT EXISTING SURFACED PAVEMENTS OR ON INDUSTRIAL, TRUNK COLLECTOR, SUB-ARTERIAL STREETS/ROADS



TYPICAL DETAIL A

LEGEND

A	300mm nom.
■	Refer Alternative A for backfill requirements at new pavement
⊗	Saw cut at existing pavement
	Gravel (min CBR15) or 75mm crusher run backfill
	Lean mix concrete backfill (1:15 mix)
	10mm Cement mortar bed, 1:3 mix

NOTES:

1. Backfill compaction: Approved fill/approved bedding/compacted backfill/CBR15 Gravel 90% Compacted gravel (300 layer) under road pavement 95% Compacted fill – at footpaths/private property 90% max densities determined by Standard Compaction tests to AS 1289.E5.1
2. Refer to DTMR Std. Dwg. 1316 for installation of of precast culverts.
3. Tape all joints with 75 wide Denso (600) Tape or equivalent,
4. All dimensions are in millimetres unless shown otherwise

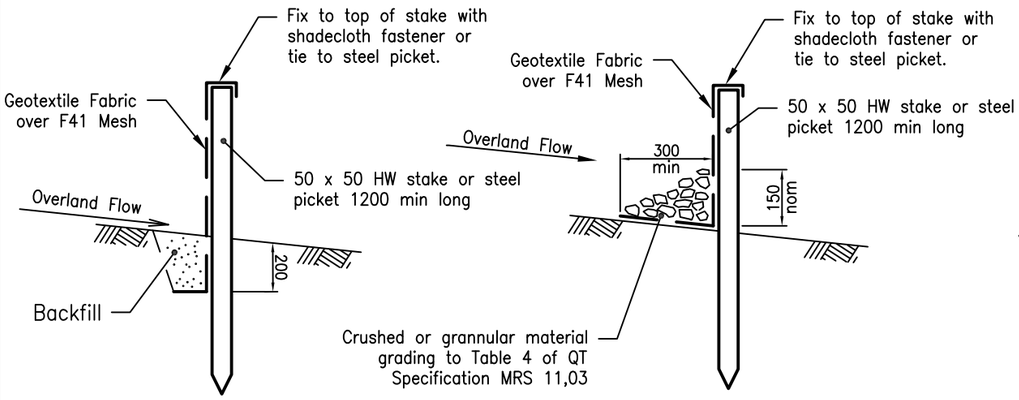
Rv.	DATE	REVISIONS
C	06/14	Review
B	03/14	Amended Drawing Number
A	10/12	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

EXCAVATION, BEDDING AND BACKFILLING PRECAST BOX CULVERTS

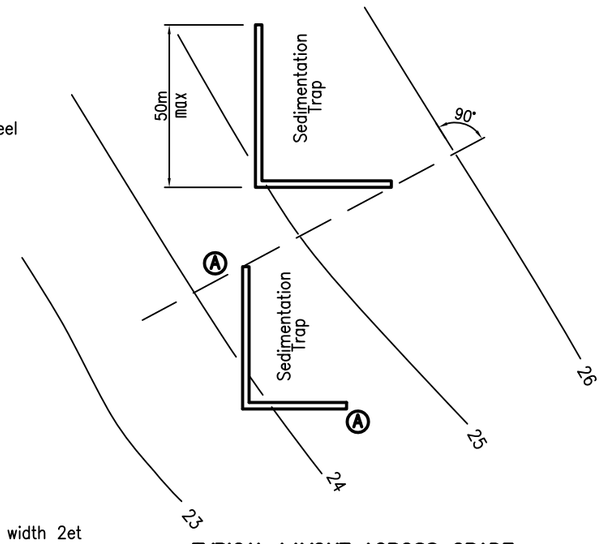
DS-031

C B A Rv.

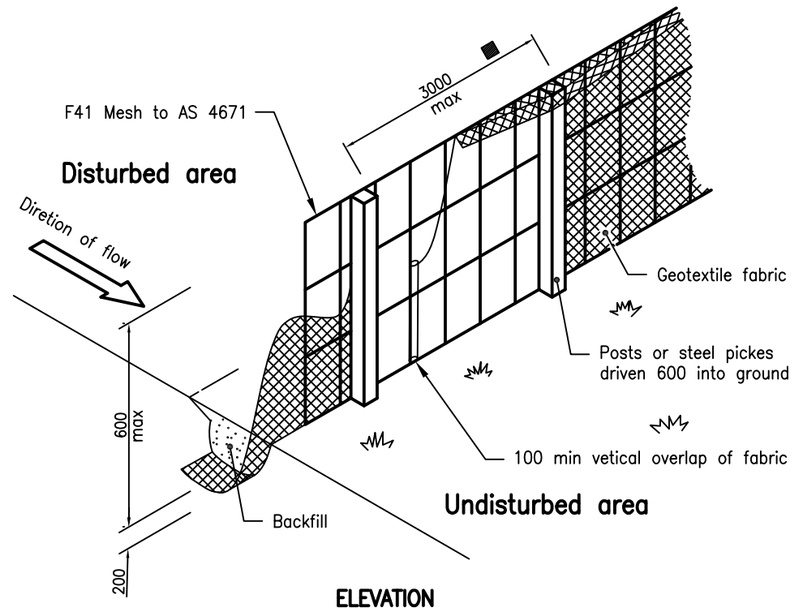


ALTERNATIVE 1

ALTERNATIVE 2

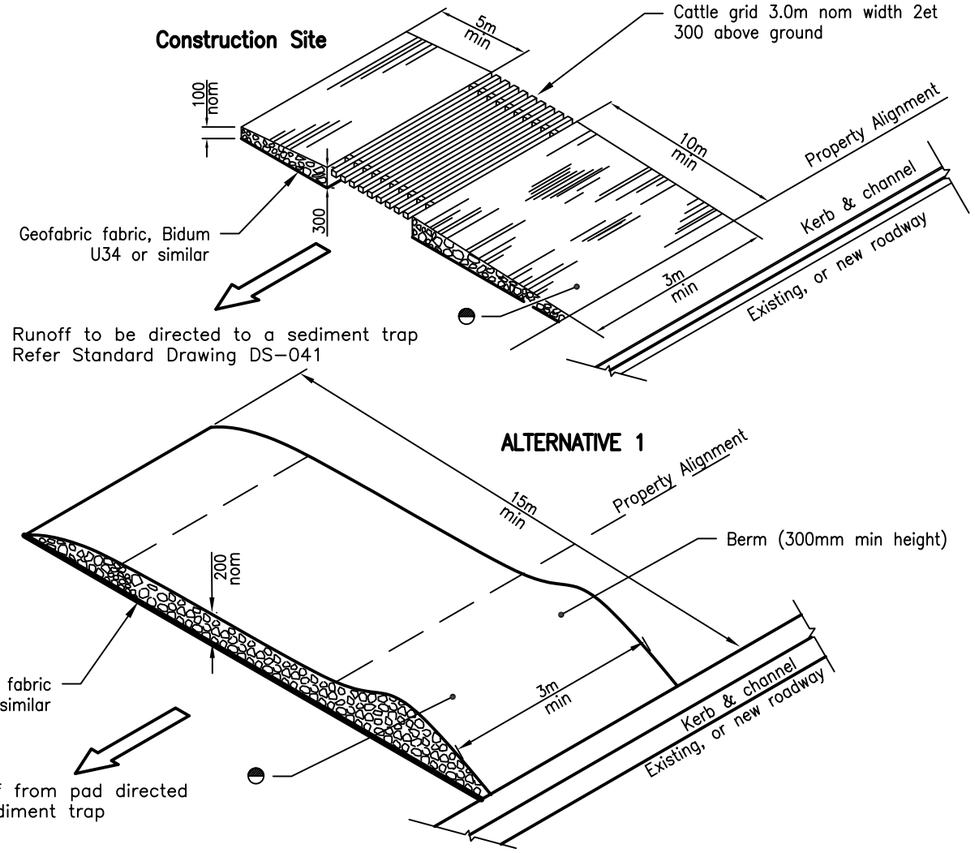


TYPICAL LAYOUT ACROSS GRADE
points A at same elevation



ELEVATION

SEDIMENT FENCE



ALTERNATIVE 1

ALTERNATIVE 2

TEMPORARY CONSTRUCTION ENTRY/EXIT SEDIMENT TRAP

LEGEND

- Unbound pavement material (gravel) to Grading B Table 9 of QT Specification MRS11.05 exclude material finer than AS sieve 2.36
- Without F41 mesh 2000 max C/C

NOTES:

GENERAL

1. All erosion and sediment controls to be in accordance with "Best Practice Erosion and Sediment Control", International Erosion and Sediment Control Association (IECA), Australasia Chapter, 2008 and to the satisfaction of the superintendent,
2. Temporary drainage control. Flow should be diverted around the work site where possible.
3. All drainage, erosion and sediment controls to be installed and be operational before commencing up-slope earthworks.
4. All control measures to be inspected at least weekly and after significant runoff producing storms.
5. Control measures may be removed when on-site erosion is controlled and 70% permanent soil coverage is obtained over all upstream disturbed land.
6. In areas where runoff turbidity is to be controlled, exposed surfaces to be either mulched, covered with erosion control blankets or turfed if earthworks are expected to be delayed for more than 14 days.
7. Straw bale sediment traps are a secondary option which generally should not be used if other options are available.

SEDIMENT FENCE

8. Not to be located in areas of concentrated flow.
9. Normally located along the contour with a maximum catchment area 0.6 ha per 100m length of fence.
10. Woven fabrics are preferred, non-woven fabrics may be used on small work sites, i.e. operational period less than 6 months or on sites where significant sediment runoff is not expected.
11. Where fences need to be located across the contour the layout shall conform to 'Typical Layout Across Grade'.
12. Fences are required 2m min from toe of cut or fill batters, where not practical one fence can be at the toe with a second fence 1m min away. Fence should not be located parallel with toe if concentration of flow will occur behind the fence.
13. Temp Construction Entry/Exit Sediment Trap.
14. Adjacent stormwater runoff to be diverted away from entry/exit.
15. Wheel – wash or spray unit may be required during wet weather.
16. Safety issues must be considered at all times, incorporate traffic control devices to the satisfaction of the superintendent.
17. All dimensions are in millimetres unless indicated otherwise.

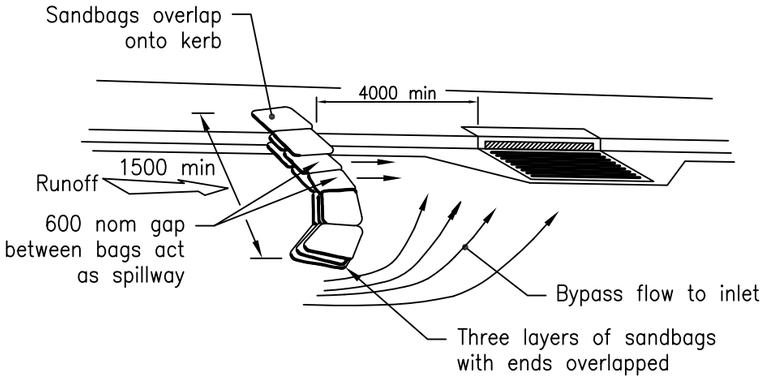
Rv.	DATE	REVISIONS
D	06/14	Review
C	03/14	Amended Drawing Number
B	11/12	Note 1a Added
A	10/12	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

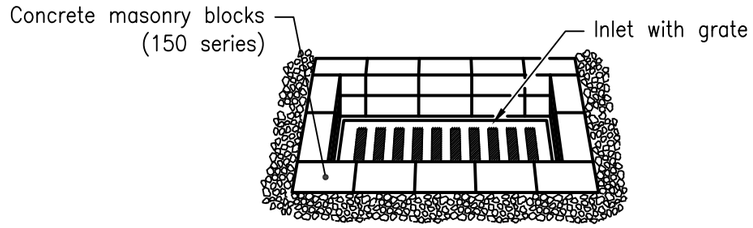
SEDIMENT CONTROL DEVICES
SEDIMENT FENCE, ENTRY/EXIT SEDIMENT TRAP

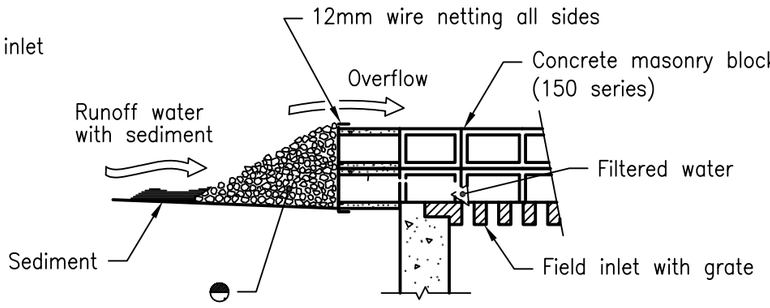
DS-040

Rv. D C B A

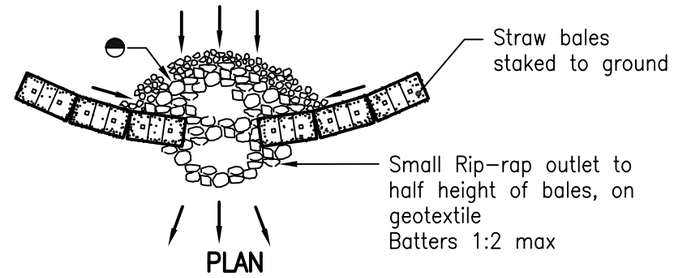


ON GRADE KERB INLET SEDIMENT TRAP

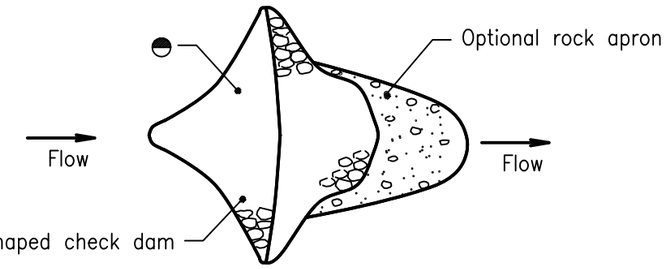


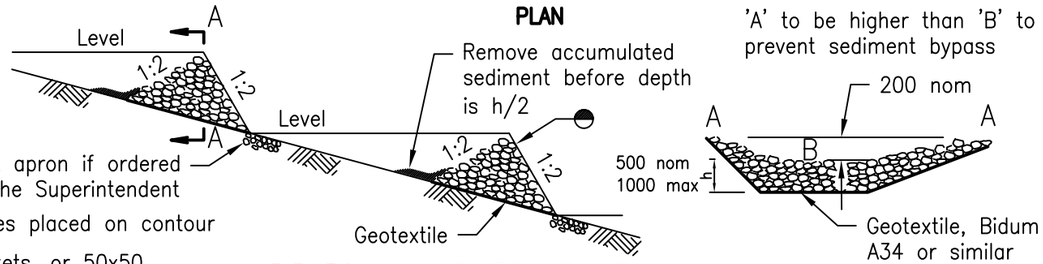


FIELD INLET SEDIMENT TRAP

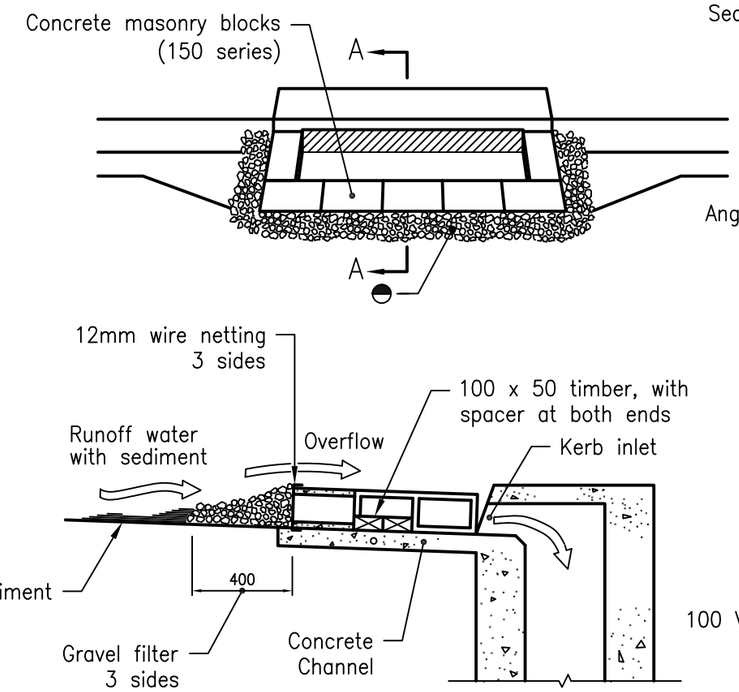


STRAW BALE AND STONE TRAP SEDIMENT CONTROL – CONCENTRATED FLOW





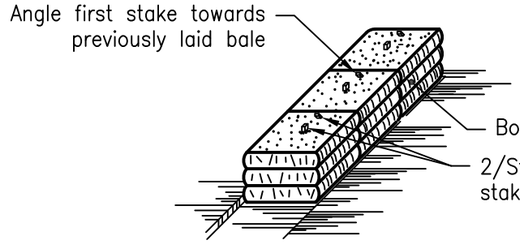
CHECK DAMS FLOW CONTROL



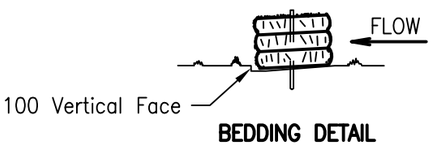
SECTION A–A

SAG INLET SEDIMENT TRAP

A stabilised bypass 'overland flow path' should exist adjacent to inlet in genuine sags.



ANCHORING DETAIL



BEDDING DETAIL

STRAW BALE BANK SEDIMENT CONTROL

LEGEND

Gravel filter, refer Grading B
Table 9 of QT Specitifation MRS 11.05 excluded
material finer then AS sieve 2.36

NOTES

1. All erosion and sediment controls to be in accordance with "Best Practice Erosion and Sediment Control", International Erosion and Sediment Control Association (IECA), Australasia Chapter, 2008 and to the satisfaction of the superintendent.
2. Field Inlet
   a. A stabilised bypass overland flow path should exist adjacent to the field inlet.
   b. Water level control perimeter banks may be required.
   c. Blocks to be restrained by a horizontal timber rail at block joint height fixed to timber stakes at corners.
3. Check Dams
   a. Catchment area limited to 4 ha.
   b. Use in minor open drains only, (velocity control), sediment collection is a secondary purpose.
4. Straw Bale Banks
   a. Bales shall be placed at the toe of a slope or on the contour, in a row with ends tightly abutting the adjacent bales
   b. Each bale shall be embedded in the soil a minimum of 100mm on the downstream side and placed so the bindings are horizontal.
   c. Bales shall be securely anchored in place with either two stakes or steel pickets driven through the bale. The first stake in each bale shall be driven toward the previously laid bale at an angle to force the bales together.
   d. Inspections shall be frequent and repair or replacement shall be made promptly as needed. Replace at least 3 monthly.
5. Safety issues must be considered at all times, incorporate traffic control devices to the satisfaction of the Superintendent.

These drawings have been developed in consultation between the participating Councils.
BEFORE USE, the user shall confirm that the drawing has been adopted by the appropriate Council.

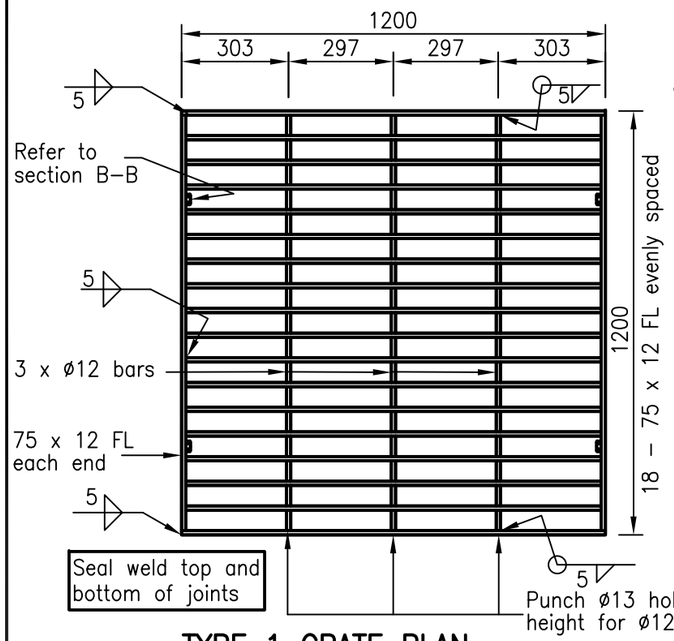
Rv.	DATE	REVISIONS
D	06/14	Review
C	03/14	Amended Drawing Number
B	11/12	Note 1 Added
A	10/12	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

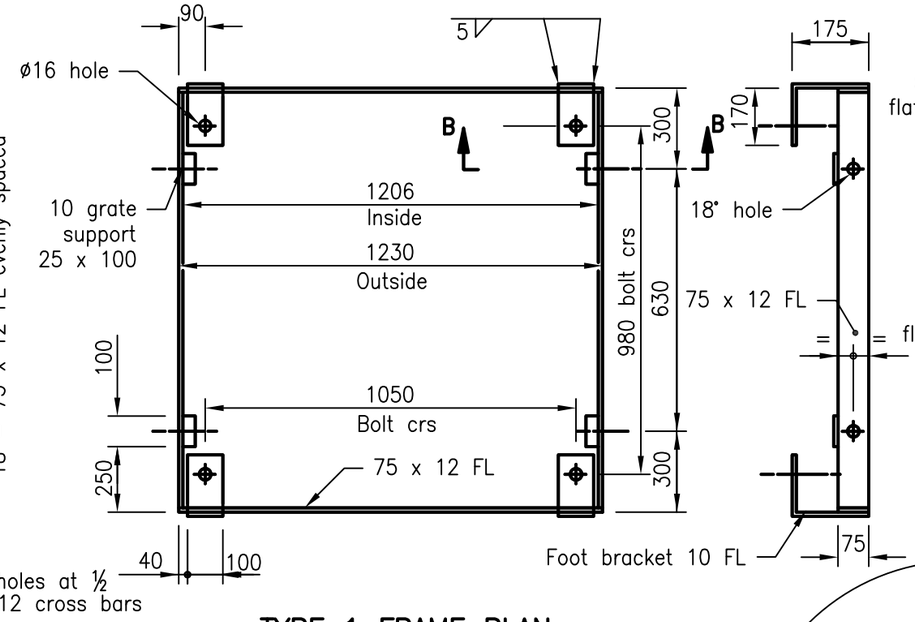
SEDIMENT CONTROL DEVICES
KERB AND FIELD INLET –
CHECK DAMS & STRAW BALES

DS–041

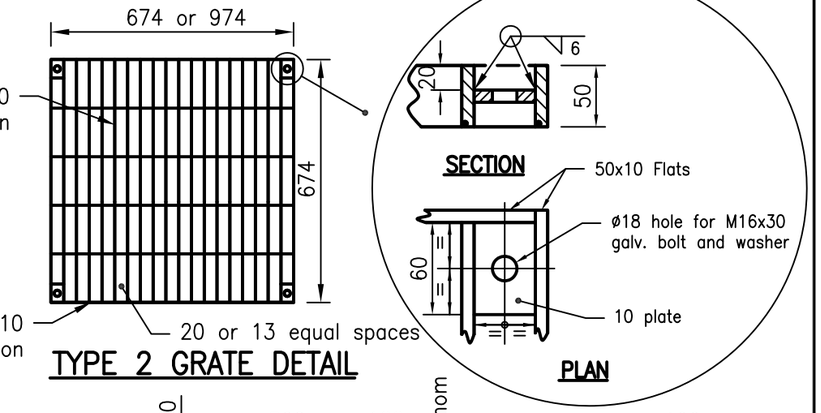
D C B A Rv.



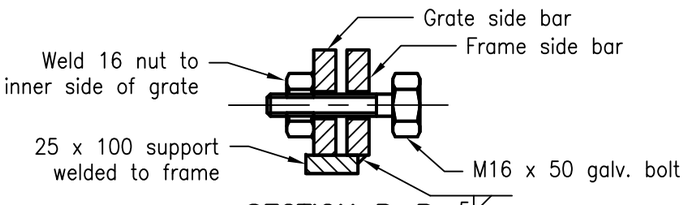
TYPE 1 GRATE PLAN



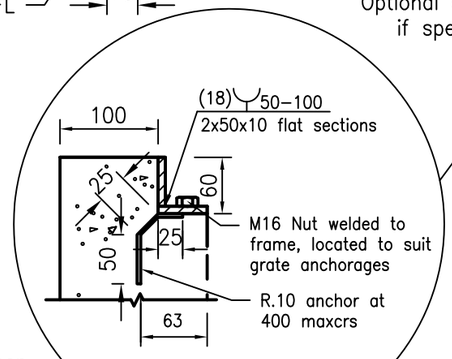
TYPE 1 FRAME PLAN

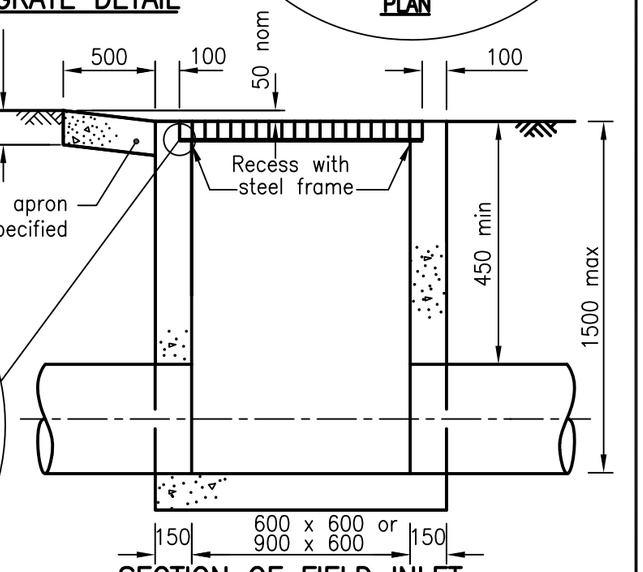


TYPE 2 GRATE DETAIL



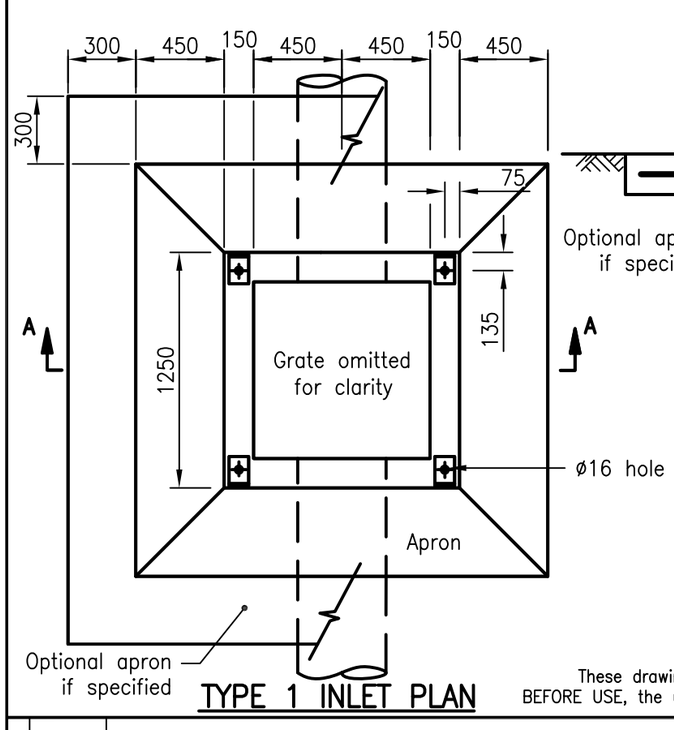
SECTION B–B



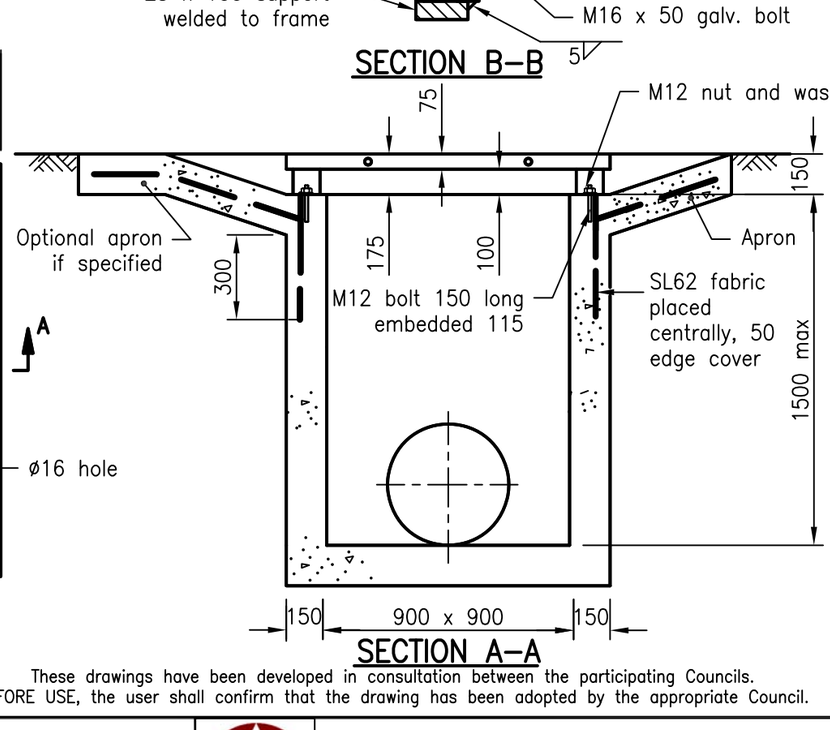


SECTION OF FIELD INLET

TYPE 2A – 600x600 TYPE 2B – 900x600



TYPE 1 INLET PLAN



SECTION A–A

These drawings have been developed in consultation between the participating Councils.
BEFORE USE, the user shall confirm that the drawing has been adopted by the appropriate Council.

NOTES:

1. Concrete N32 precast or N25 cast insitu in accordance with AS 1379 and AS 3600.
2. Live Load Surcharge, earth and ultimate load factors are in accordance with Australian Bridge Design Code.
3. All welds to AS 1554. All welding symbols to AS 1101.3.
4. Grate and frame to be hot dip galvanised after fabrication to AS 1650.
5. Steel reinforcing bars to be Grade 250 to AS 4671.
6. All flats Grade 250 to AS 3678.
7. All angles Grade 250 to AS 3679.1
8. All bolt hexagonal heads to AS 1111, nuts to AS 1112, washers to AS 1237, galv. to AS 1214.
9. Class B grate to AS 3996 – grate in direction nominated, refer Project Drawings.
10. Pits up to a depth of 2.2 metre do not require steel reinforcement. One layer of SL81 mesh is to be placed centrally in the wall for pit depths 2.2 to 3.0 metres.
11. Bicycle safe grates are to be provided in all areas unless approved otherwise.
12. Pit size and depth requirements are:
    - 0–1m depth = 600 x 600 inlet
    - 1–1.5m depth = 900 x 600 inlet
    - 0–2m depth = 900 x 900 inlet
    - 2m or greater = std. manhole with 600 x 600 nom grate set into an approved roof slab.
    - Council may accept 300 x 300 pit for property drainage.
13. All dimensions are in millimetres unless shown otherwise.

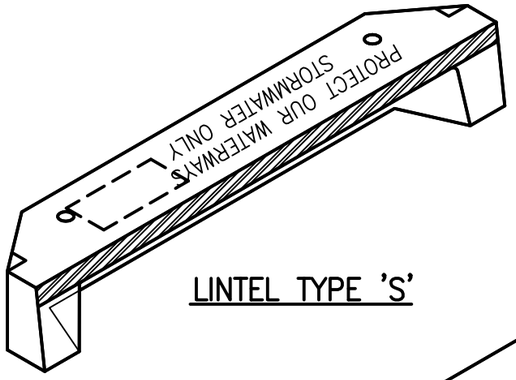
Rv.	DATE	REVISIONS
D	06/14	Review
C	03/14	Amended Drawing Number
B	11/12	Pit max Depth Added
A	10/12	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

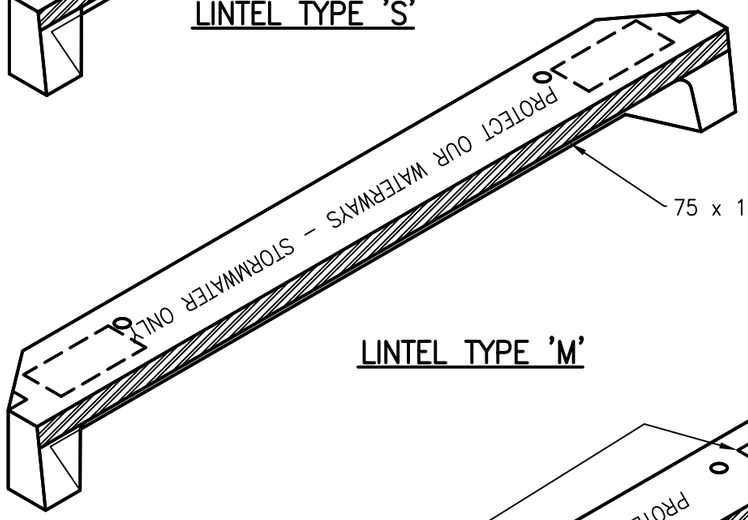
DRAINAGE PITS
FIELD INLET
TYPE 1 AND TYPE 2

DS–050

D C B A Rv.

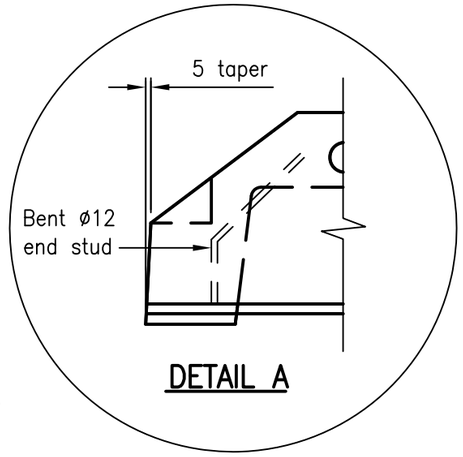


LINTEL TYPE 'S'

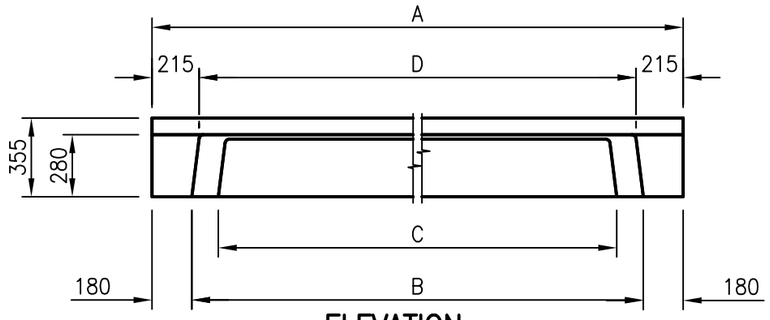


LINTEL TYPE 'M'

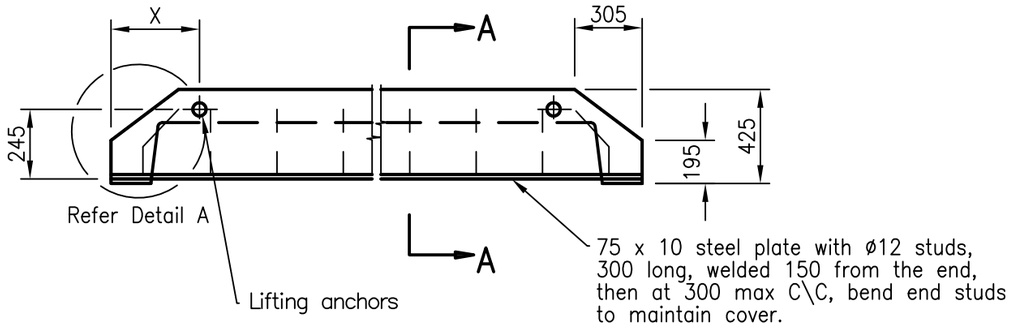
LINTEL TYPE 'L'



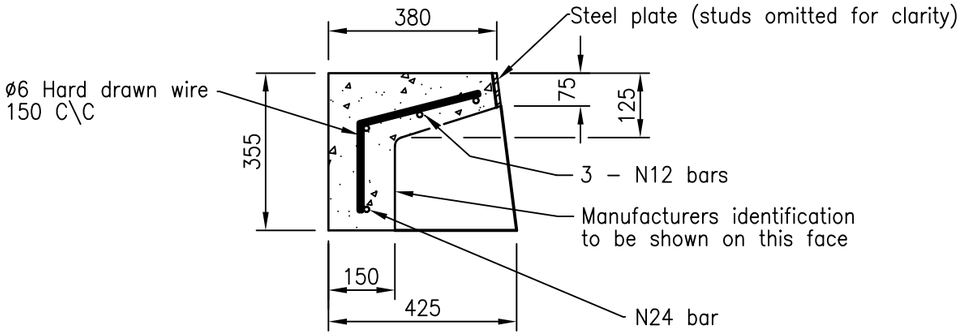
DETAIL A



ELEVATION



PLAN



SECTION A–A

NOTES:

1. Concrete N32 in accordance with AS 1379 and AS 3600.
2. Each lifting anchor to be 1.3 tonne, galvanised to AS 4680 and fitted to manufacturers specification.
3. Reinforcing steel Grade 400 to AS 4671. Place centrally, 40 min end cover.
4. All steel flats Grade 250 to AS 3678.
5. All welds to AS 1554.
6. Hard drawn wire to AS 1303.
7. Steel plate hot dip galvanised after fabrication to AS 4680.
8. Lintel text 40mm high letters imprinted 5mm into concrete. Words face footpath.
9. All dimensions are in millimetres unless shown otherwise.

LINTEL	A	B	C	D	X	MASS (kg)
S	2400	2040	1800	1970	400	445
M	3600	3240	3000	3170	690	550
L	4800	4440	4200	4370	1000	725

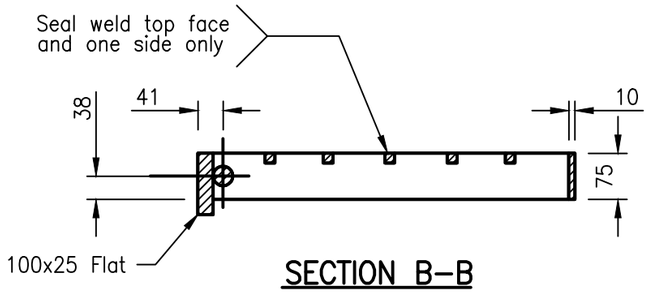
Rv.	DATE	REVISIONS
B	03/14	Amended Drawing Number
A	10/12	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALIA
QUEENSLAND DIVISION INC.
STANDARD DRAWINGS

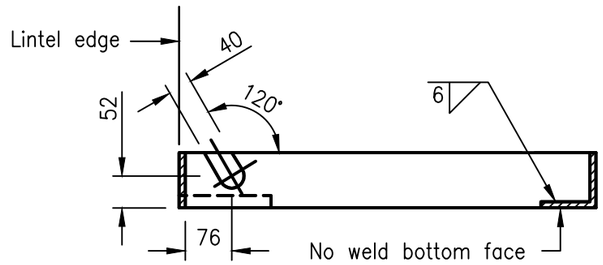
DRAINAGE PITS
KERB INLET
PRECAST LINTEL DETAILS

DS–061

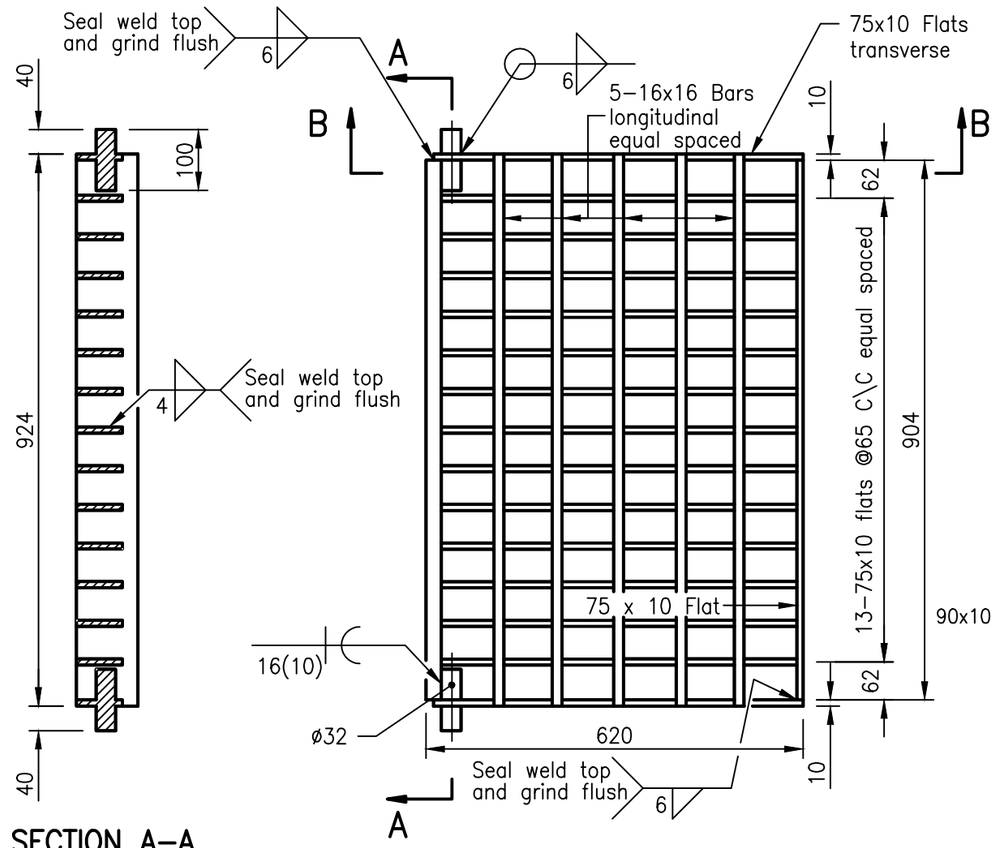
Rv. B A



SECTION B–B

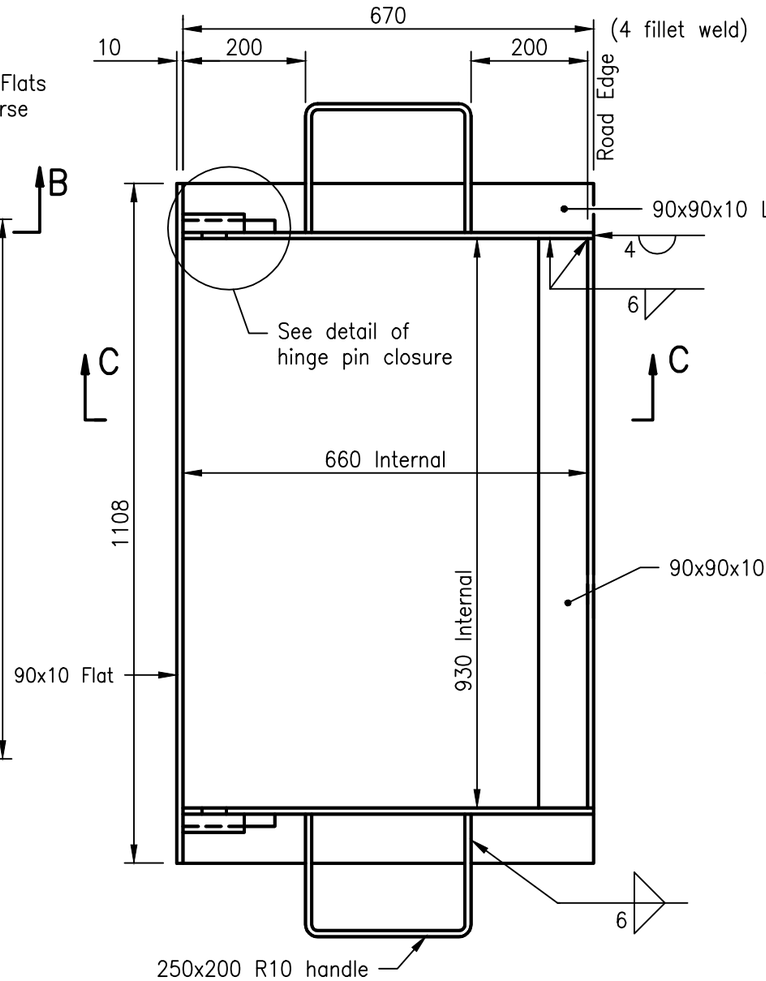


SECTION C–C

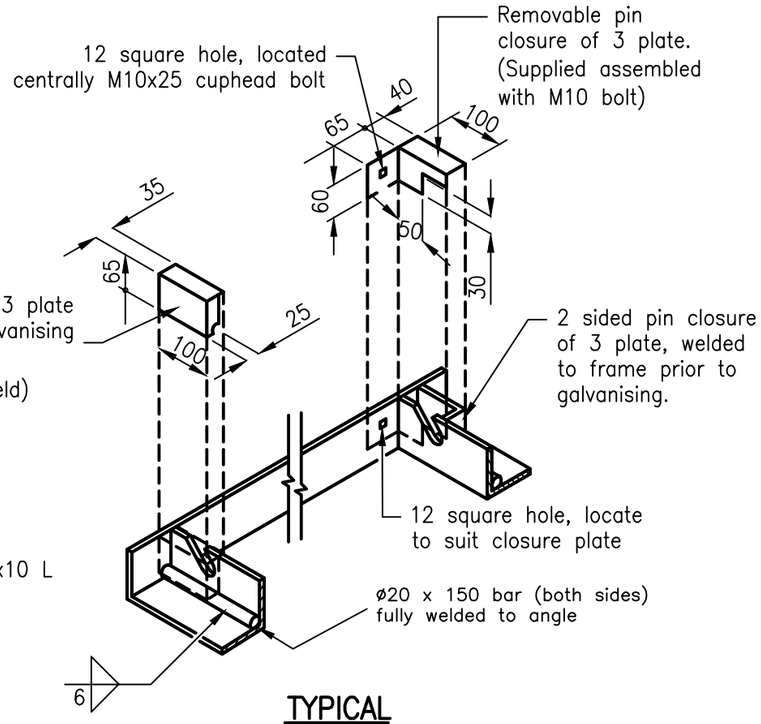


SECTION A–A

PLAN OF GRATE



PLAN OF FRAME



TYPICAL DETAIL OF HINGE PIN CLOSURES

A locking device shall be provided in accordance with clause 3.2.1.4 of AS 3996.

NOTES:

1. Mass of grate = 85 kg.
2. Mass of frame = 39 kg.
3. All steel flats Grade 250 to AS 3678.
4. All steel bars and angles Grade 250 to AS 3679.
5. Grate, Frame and Hinge to be hot dip galvanised after fabrication to AS 1650.
6. All bolt hexagonal heads to AS 1111, Nuts to AS 1112, Washers to AS 1237 and Galv. to AS 1214.
7. All welds to AS 1554. Welding symbols to AS 1101.3.
8. Refer Std Dwg DS–060 and DS–063 for kerb inlet details Refer Std Dwg DS–061 for precast lintel details.
9. Grate and Frame to be Class D bicycle safe to AS 3996.
10. Alternative fabricated steel grate and frame may be used when approved by relevant Council
11. All dimensions are in millimetres unless shown otherwise

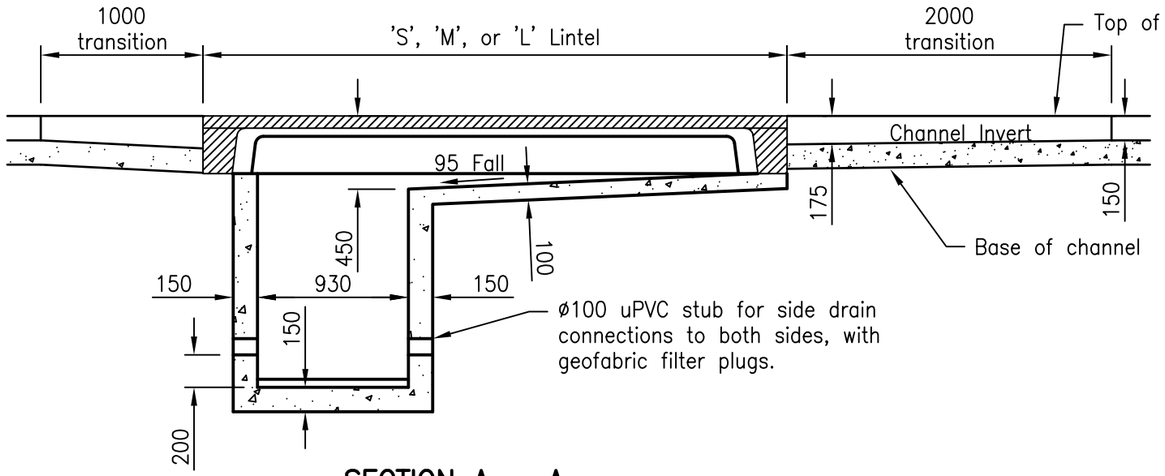
Rv.	DATE	REVISIONS
C	06/14	Review
B	03/14	Amended Drawing Number
A	10/12	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

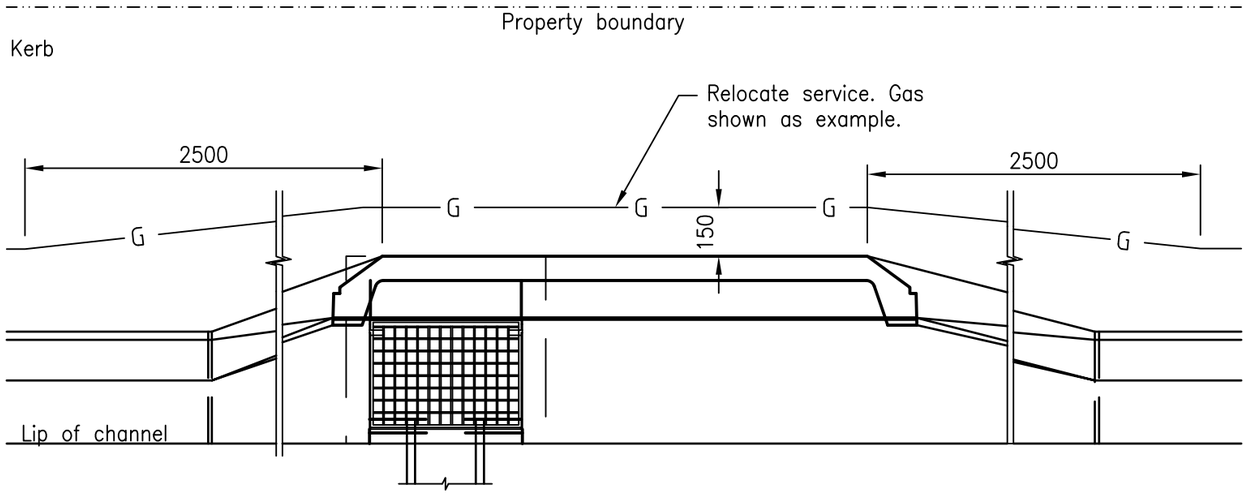
DRAINAGE PITS
KERB INLET
GRATE AND FRAME

DS–062

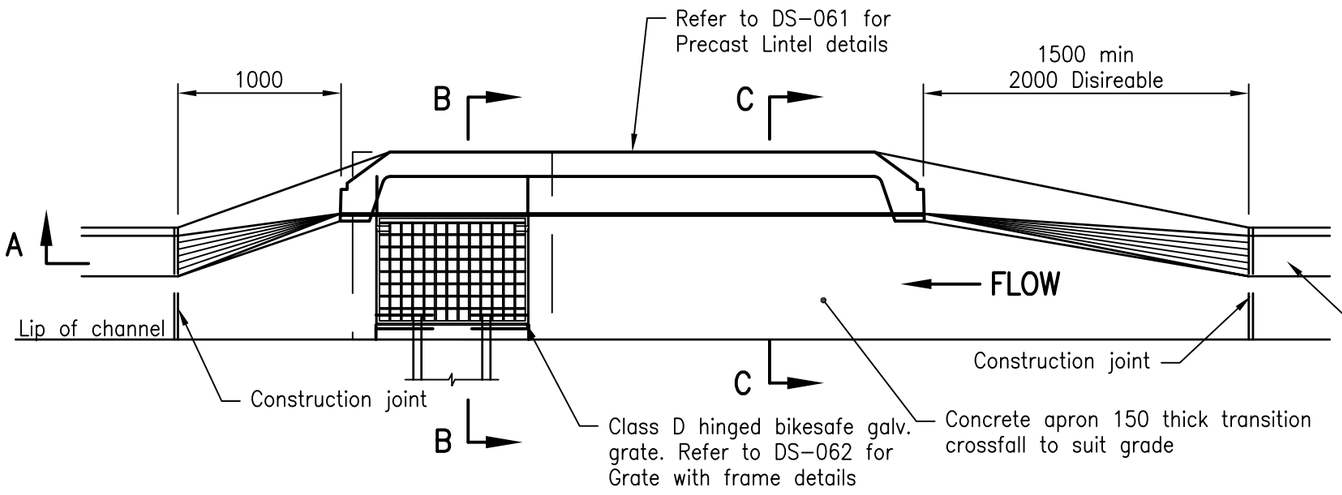
Rv. C B A



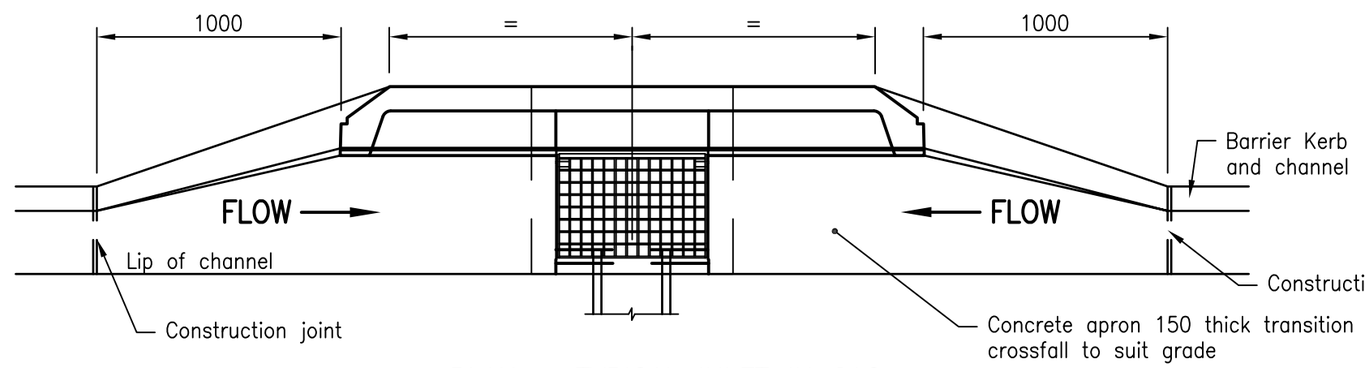
SECTION A – A



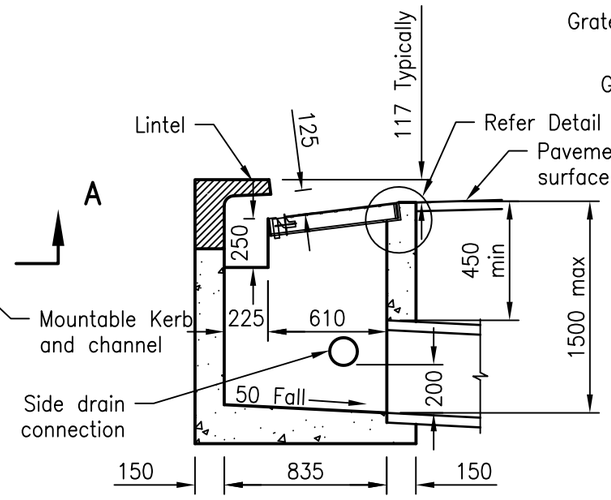
SERVICE RE–ALIGNMENT DETAILS



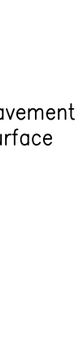
PLAN – TYPICAL INLET ON GRADE



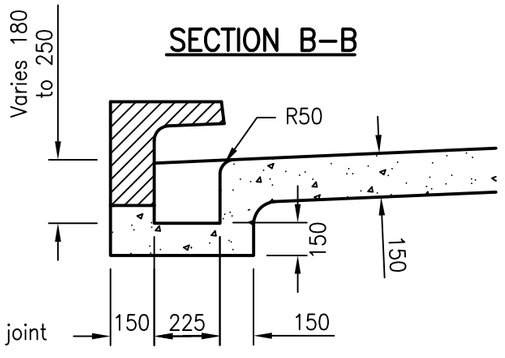
PLAN – TYPICAL INLET IN SAG



SECTION B–B



DETAIL A



SECTION C–C

NOTES

1. The kerb inlet may be cast–in–situ or precast. This drawing indicates a cast–in–situ catchpit with a precast lintel.
2. Precast concrete N32 in accordance with AS 1379 and AS 3600.
3. Cast in–situ concrete N32 in accordance with AS 1379 and AS 3600.
4. Refer to project drawings for set out point detail.
5. All dimensions are in millimetres unless shown otherwise.

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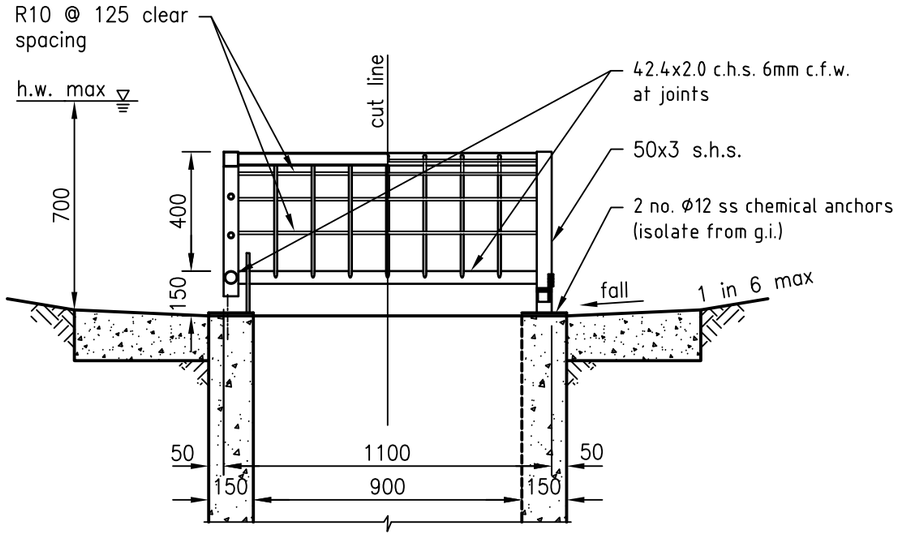
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

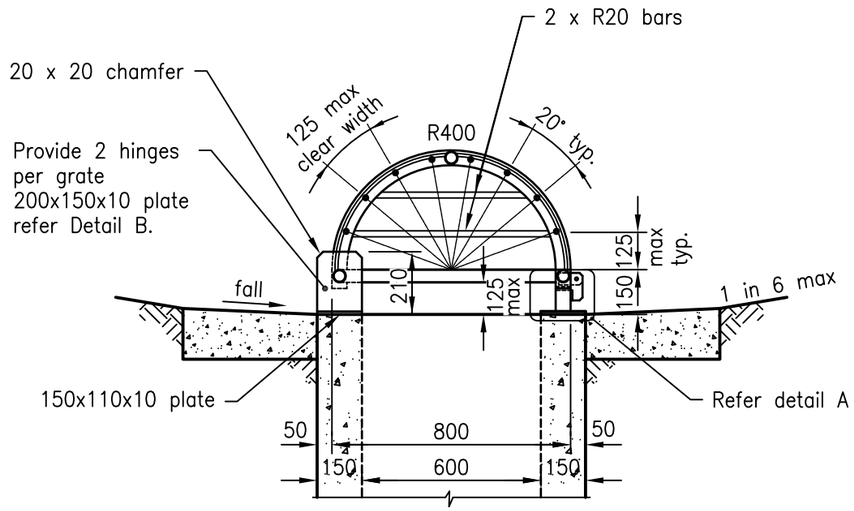
DRAINAGE PITS
KERB INLET – LIP IN LINE
GENERAL ARRANGEMENT

DS–063

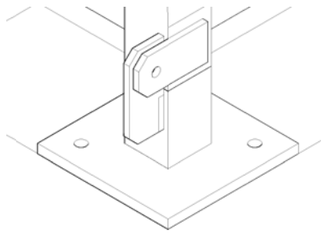
Rv. C B A



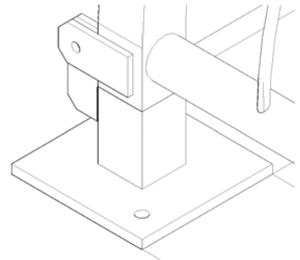
SECTION B–B
TYPE 1 GENERAL USE



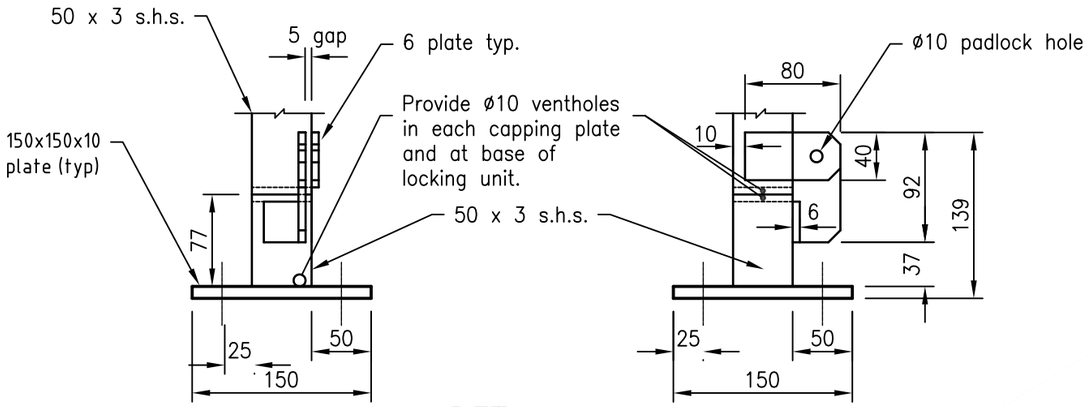
SECTION A–A



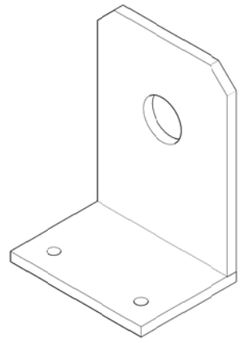
LOCKING UNIT A



LOCKING UNIT B



DETAIL A



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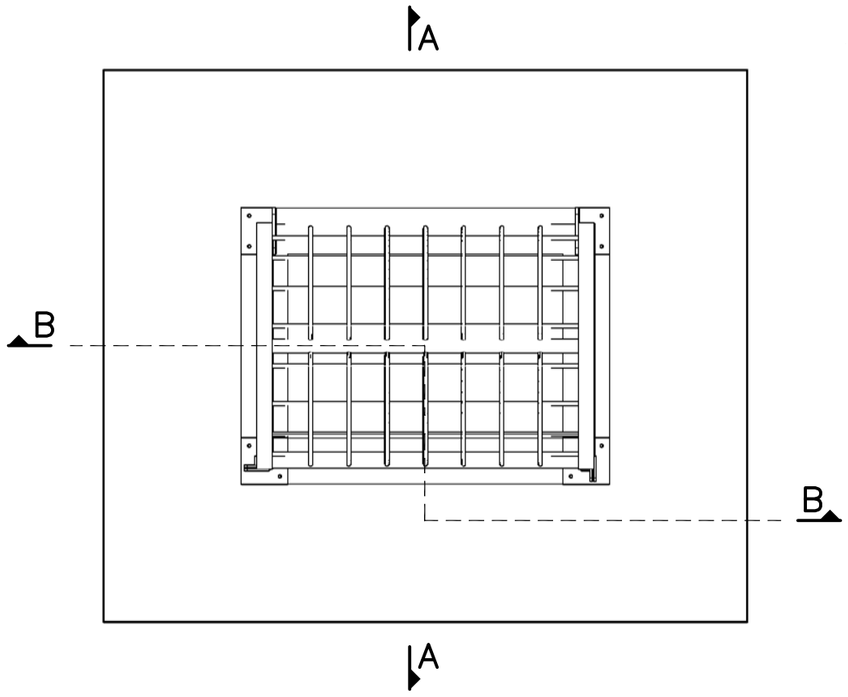
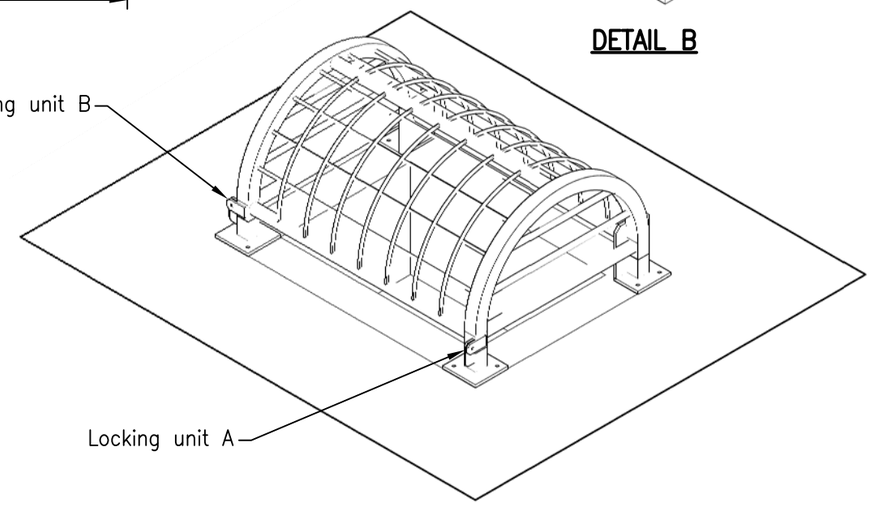


PLAN

NOTES:

1. Concrete to be grade N32.
2. All components to be hot–dipped galvanised to AS/NZS 4680 after fabrication.
3. All welds 6mm c.f.w. all round.
4. All edge distances to chemical anchors to be not less than 25mm.
5. Locking units to be secured with hot dipped galvanised m8 bolts with snug tightened nut upon installation.
6. Ensure clear opening widths of 125 max in fabrication and installation for child proof safety.
7. Dimensions are in millimetres unless shown otherwise.

THIS IS NOT A FRANGIBLE ITEM



ISOMETRIC VIEW

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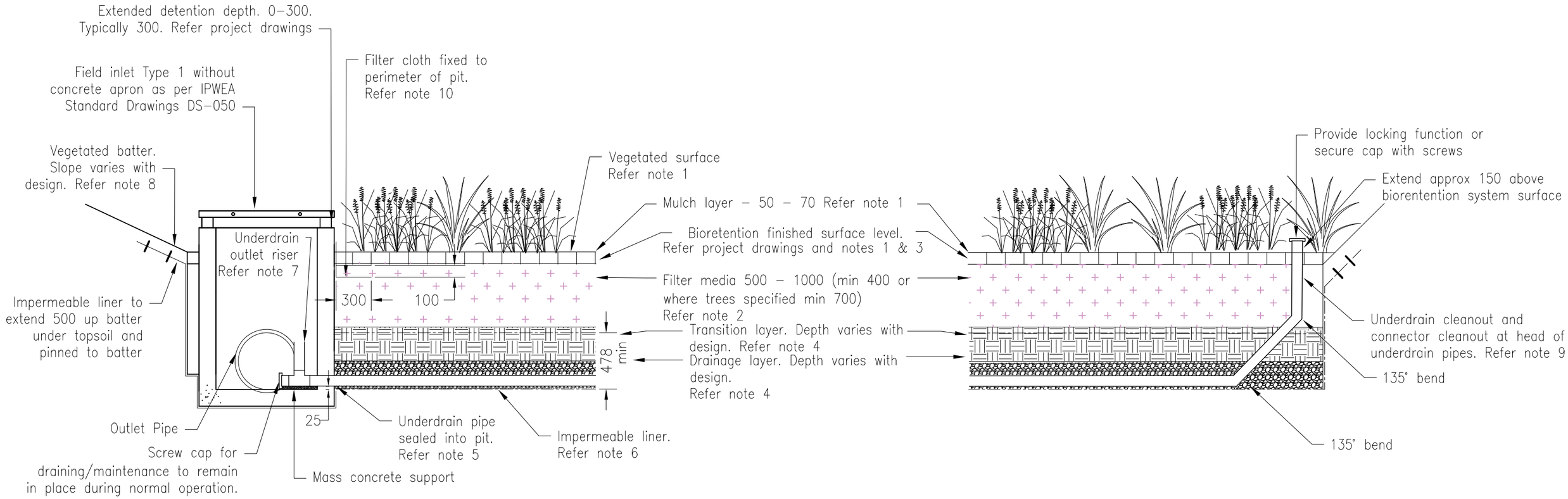
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

DRAINAGE PITS
FIELD INLET PIT
DOME TOP COVER (900x600)

DS–069

Rv. B A



NOTES:

1. Bioretention system surface. Surface level is top of filter media. Surface to be mulched and planted as per project drawings and the 'Bioretention Technical Design Guidelines' (Water by Design).
2. Filter media specification shall be in accordance with the 'Adoption guidelines for Stormwater Biofiltration Systems (CRC for water sensitive cities) and the Bioretention Technical Design Guidelines (Water by Design). Bioretention hydraulic conductivity shall be in accordance with Practice Note 1: in situ Measurement of Hydraulic Conductivity' (FAWB). The number of samples to be tested shall be in accordance with the 'Construction and Establishment Guidelines – Swales, Bioretention Systems and Wetlands' (Water by Design).
3. Construction tolerances shall be in accordance with the 'Construction and Establishment Guidelines –Swales, Bioretention Systems and Wetlands' (Water by Design)
4. Transition layer and drainage layer depths vary with design. Depths and specification to be in accordance with project drawings and the 'Bioretention Technical Design Guidelines' (Water by Design)
5. Underdrain. Slotted rigid pipe laid flat. Refer to project drawings for diameter and pipe invert. Pipe should not be installed with a filter sock surrounding pipe. Underdrain pipes shall be sealed into pits using grout or other approved watertight seal.
6. Impermeable liner. Compacted clay or synthetic liner with permeability of no greater than 1×10^{-9}m/s. Impermeable liner to be sealed around all protrusions. Synthetic liners to be installed and sealed in accordance with manufacturers requirements. Impermeable liner as per project drawings and 'Bioretention Technical Design Guidelines' (Water by Design)
7. Underdrain outlet riser establishes max saturated zone water level. Underdrain outlet riser as per project drawings and 'Bioretention Technical Design Guidelines' (Water by Design)
8. Vegetated batter. Slope and planting to be in accordance with project drawings and 'Bioretention Technical Design Guidelines' (Water by Design).
9. Inspection/cleanout point. Vertical solid pipe section attached to the end of each underdrain in accordance with project drawings and the 'Bioretention Technical Design Guidelines'(Water by Design)
10. Filter cloth to be fixed to perimeter of pit to avoid runnelling of water between pit and soil interface. Begin filter cloth 100 above surface. Extend to 100 below surface. Continue 300 horizontally into filter media.
11. For general design and construction notes refer to DS–078
12. All dimensions in millimetres unless otherwise noted.

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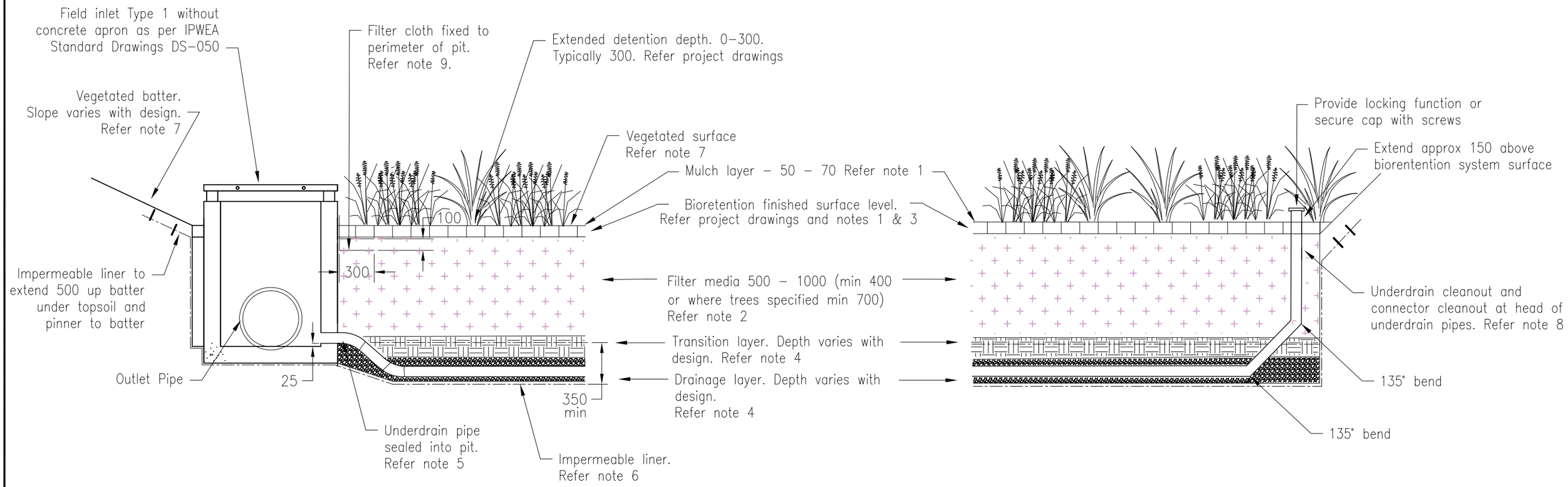
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA

STANDARD DRAWINGS

BIORETENTION DRAINAGE PROFILE – TYPE 1 SATURATED ZONE – UNCONSTRAINED

DS–070

Rv.



NOTES:

1. Bioretention system surface refer note 1 DS-070
2. Filter media specification refer note 2 DS-070
3. Construction tolerances refer note 3 DS-070
4. Transition layer and drainage layer refer note 4 DS-070
5. Underdrain refer note 5 DS-070
6. Impermeable liner refer note 6 DS-070
7. Vegetated batter refer note 8 DS-070
8. Inspection/cleanout point refer note 9 DS-070
9. Filter cloth refer note 10 DS-070
10. For general design and construction notes refer to DS-078
11. All dimensions in millimetres unless otherwise noted.

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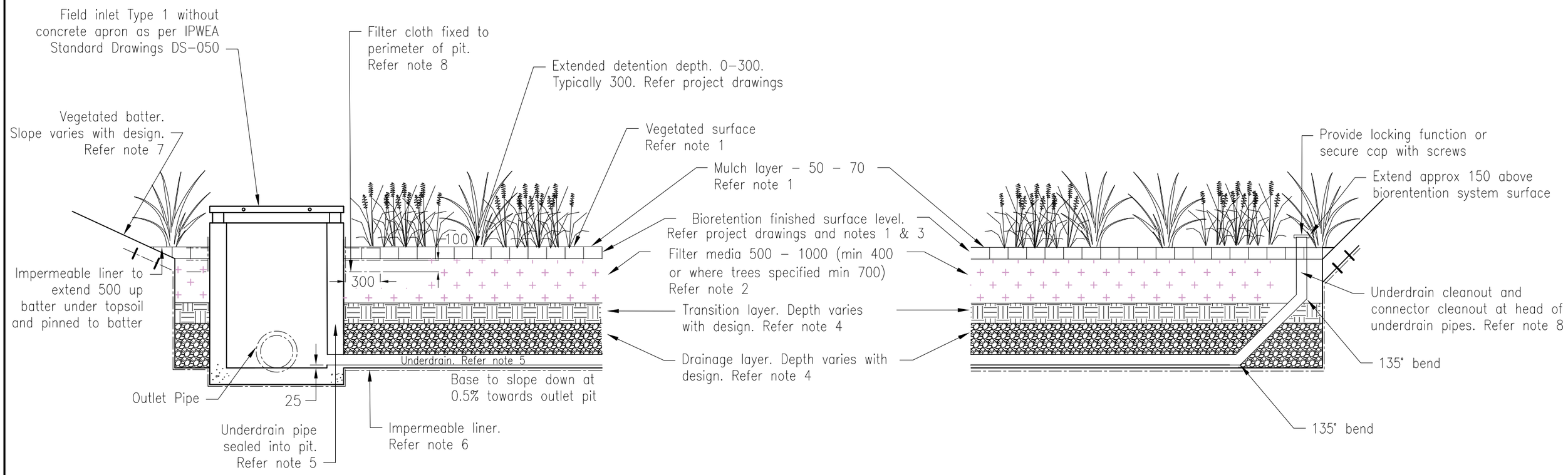
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA

STANDARD DRAWINGS

BIORETENTION DRAINAGE PROFILE - TYPE 1
SATURATED ZONE - CONSTRAINED

DS-071

Rv.



NOTES:

1. Bioretention system surface. Refer note 1 DS-070
2. Filter media specification. Refer not 2 DS-070
3. Construction tolerances. Refer note 3 DS-070
4. Transition layer and drainage layer. Refer note 4 DS-070
5. Underdrain. Refer note 5 DS-070
6. Impermeable liner. Refer note 6 DS-070
7. Vegetated batter. Refer note 8 DS-070
8. Inspection/cleanout point. Refer note 9 DS-070
9. Filter Cloth refer note 10 DS-070
10. For general design and construction notes refer to DS-078
11. All dimensions in millimetres unless otherwise noted.

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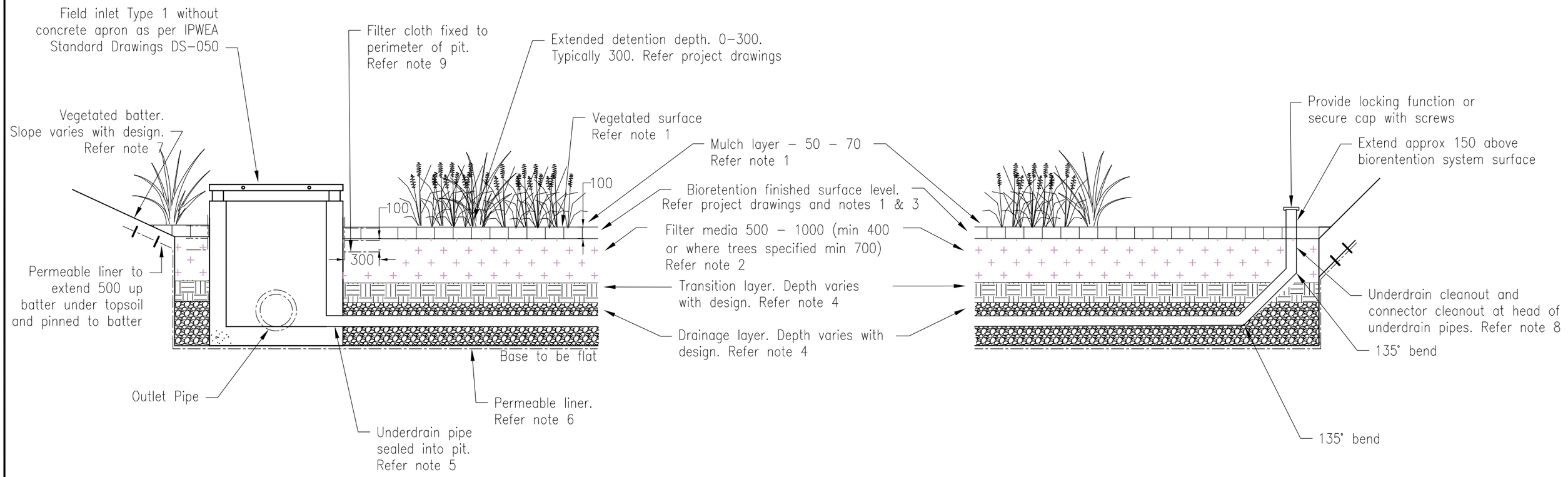
STANDARD DRAWINGS

BIORETENTION DRAINAGE PROFILE - TYPE 2 SEALED

DS-072

Rv.



NOTES:

1. Bioretention system surface. Refer note 1 DS-070
2. Filter media specification. Refer note 2 DS-070
3. Construction tolerances. Refer note 3 DS-070
4. Transition layer and drainage layer. Refer note 4 DS-070
5. Underdrain. Refer note 5 DS-070
6. Permeable liner. Non-woven geotextile filter cloth to base and sides of bioretention system. Filter cloth not to be placed between any filter layers. Permeable liner as per project drawings and "Bioretention Technical Design Guidelines' (Water by Design).
7. Vegetated batter. Refer note 8 DS-070
8. Inspection/cleanout point. Refer note 9 DS-070
9. Filter cloth refer note 10 DS-070
10. For general design and construction notes refer to DS-078
11. All dimensions in millimetres unless otherwise noted.

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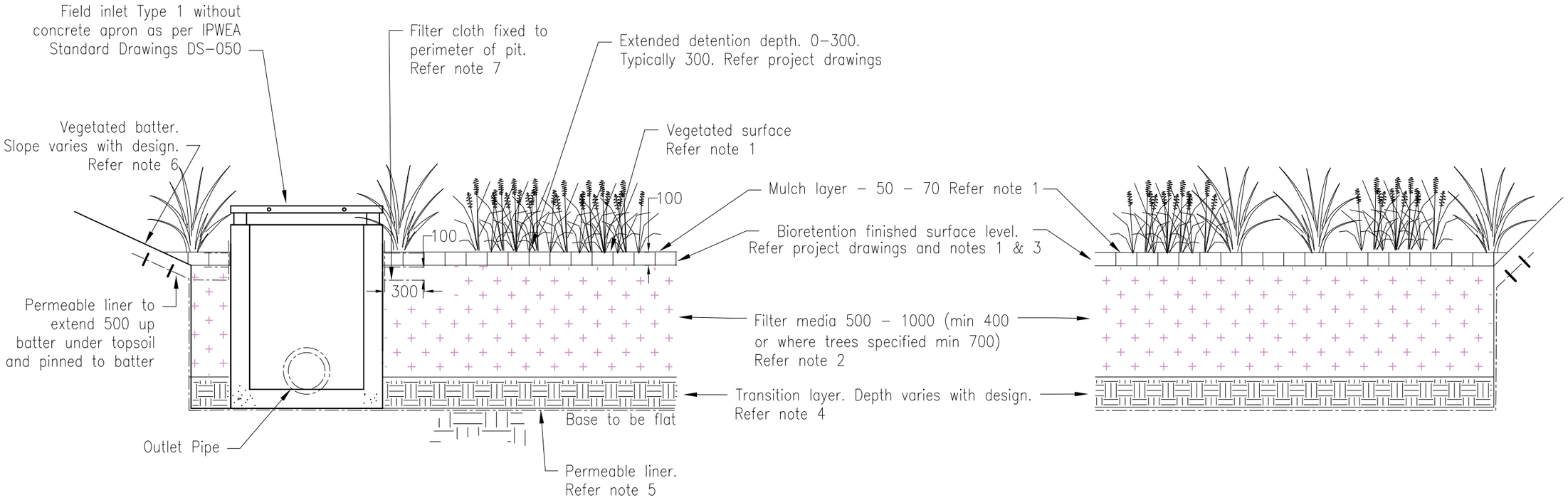
STANDARD DRAWINGS

BIORETENTION DRAINAGE PROFILE - TYPE 3 CONVENTIONAL

DS-073

Rv.



NOTES:

1. Bioretention system surface. Refer note 1 BIO–01
2. Filter media specification. Refer note 2 BIO–01
3. Construction tolerances. Refer note 3 BIO–01
4. Transition layer depth varies with design. Depth and specification to be in accordance with project drawings and the 'Bioretention Technical Design Guidelines' (Water by Design).
5. Permeable liner. Refer Note 6 DS–073
6. Vegetated batter. Refer not 8 DS–078
7. Filter cloth refer note 10 DS–070
8. For general design and construction notes refer to DS–078
9. All dimensions in millimetres unless otherwise noted.

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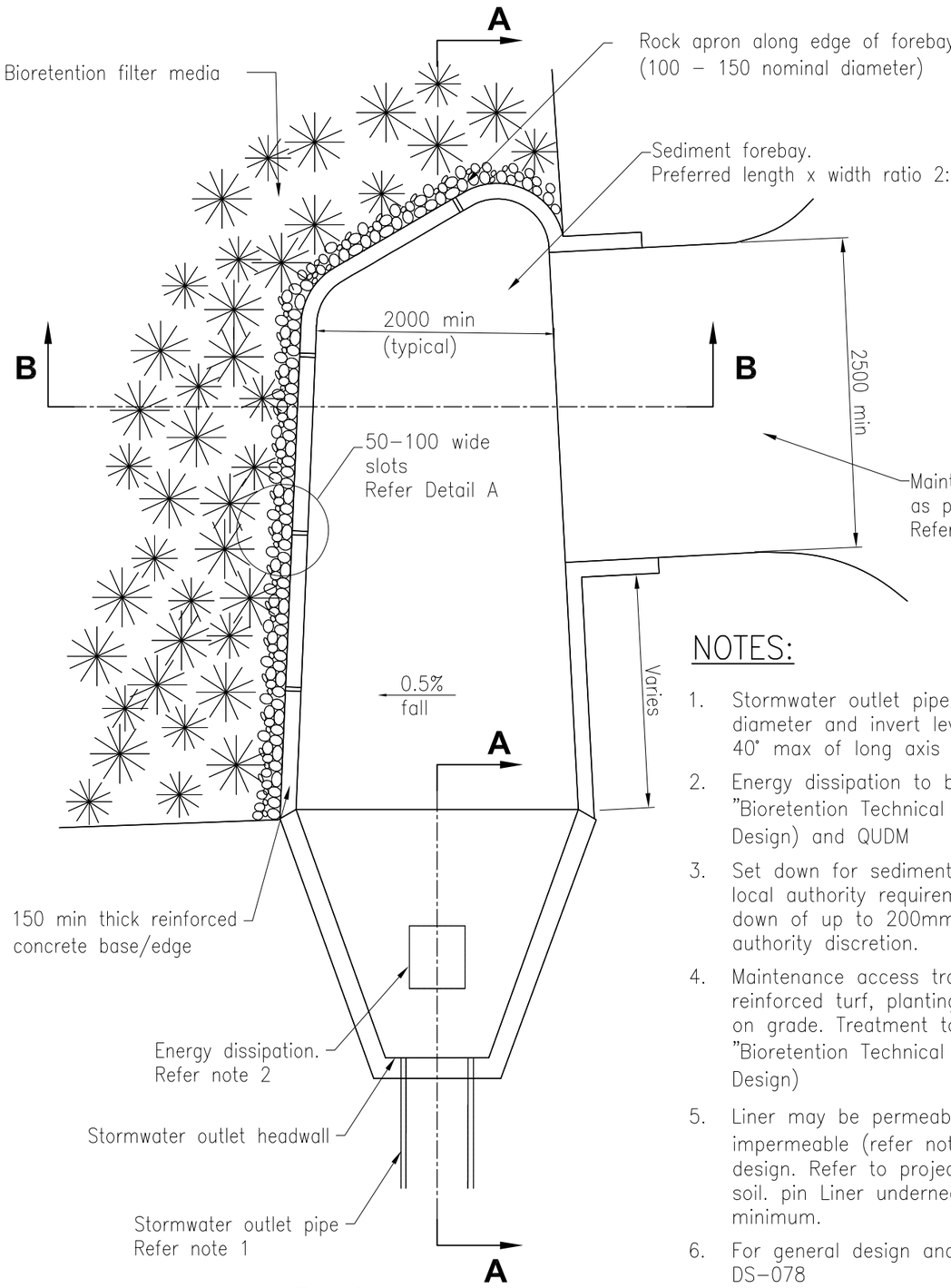
STANDARD DRAWINGS

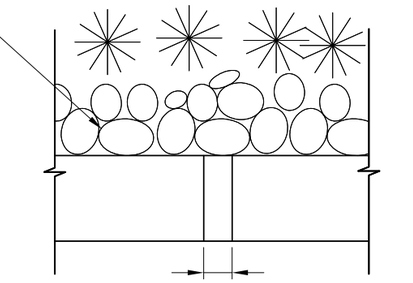
BIORETENTION DRAINAGE PROFILE – TYPE 4 PIPELESS

DS–074

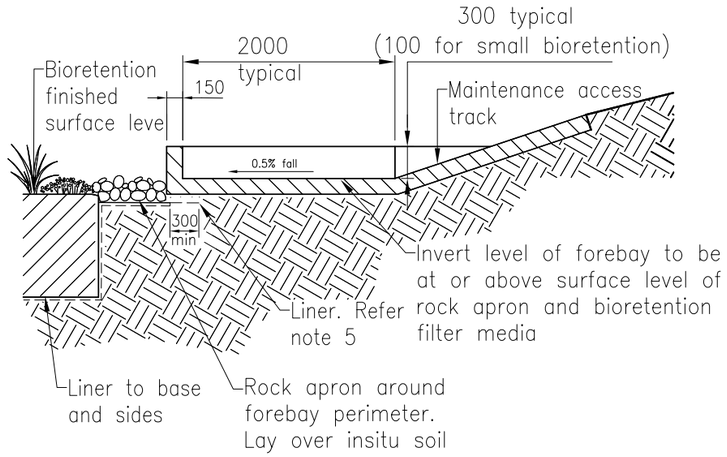
Rv.



PLAN



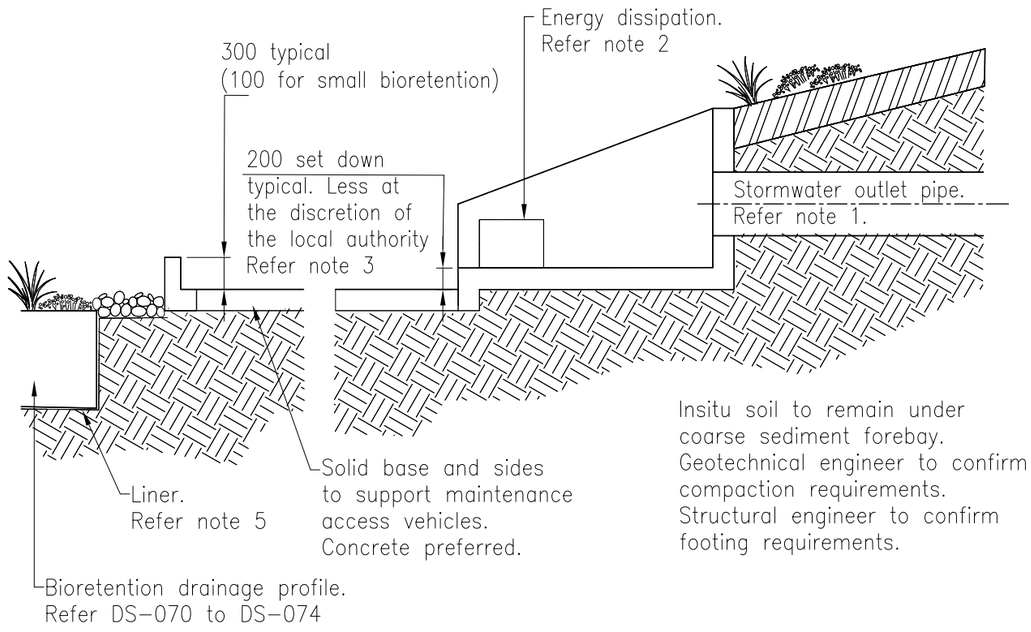
DETAIL A



SECTION B-B

NOTES:

1. Stormwater outlet pipe. Refer project drawings for diameter and invert level. Pipe to be aligned to within 40° max of long axis of the coarse sediment forebay.
2. Energy dissipation to be in accordance with the "Bioretention Technical Design Guidelines" (Water by Design) and QUDM
3. Set down for sediment accumulation required subject to local authority requirements and site constraints. Set down of up to 200mm is typical. Can be flush at local authority discretion.
4. Maintenance access track. Treatment may include reinforced turf, planting, gravel or concrete and depend on grade. Treatment to be in accordance with the "Bioretention Technical Design Guidelines" (Water by Design)
5. Liner may be permeable (refer note 12 on DS–078) or impermeable (refer note 13 on DS–078) depending on design. Refer to project drawings. Lay Liner over insitu soil. pin Liner underneath sediment forebay 300mm minimum.
6. For general design and construction notes refer to DS–078
7. All dimensions in millimetres unless specified otherwise.



SECTION A-A

These drawings have been developed in consultation between the participating Councils.
BEFORE USE, the user shall confirm that the drawing has been adopted by the appropriate Council.

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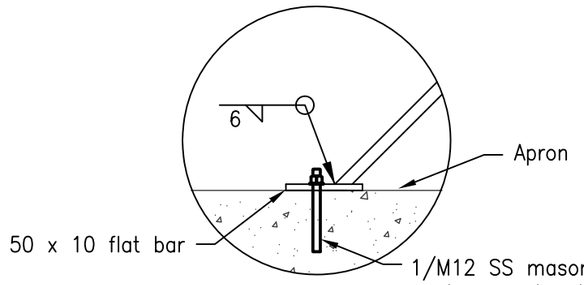
STANDARD DRAWINGS

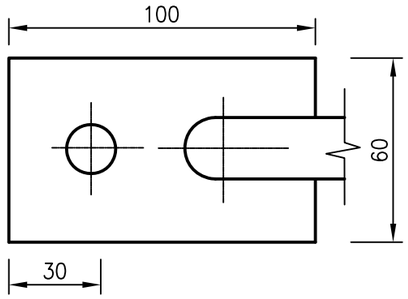
LARGE BIORETENTION SEDIMENT FOREBAY

DS–075

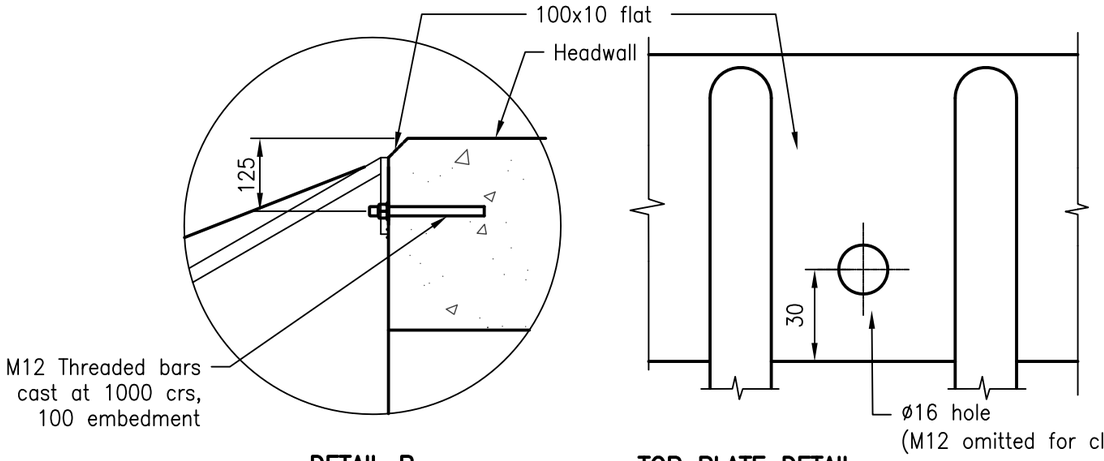
Rv.



DETAIL A

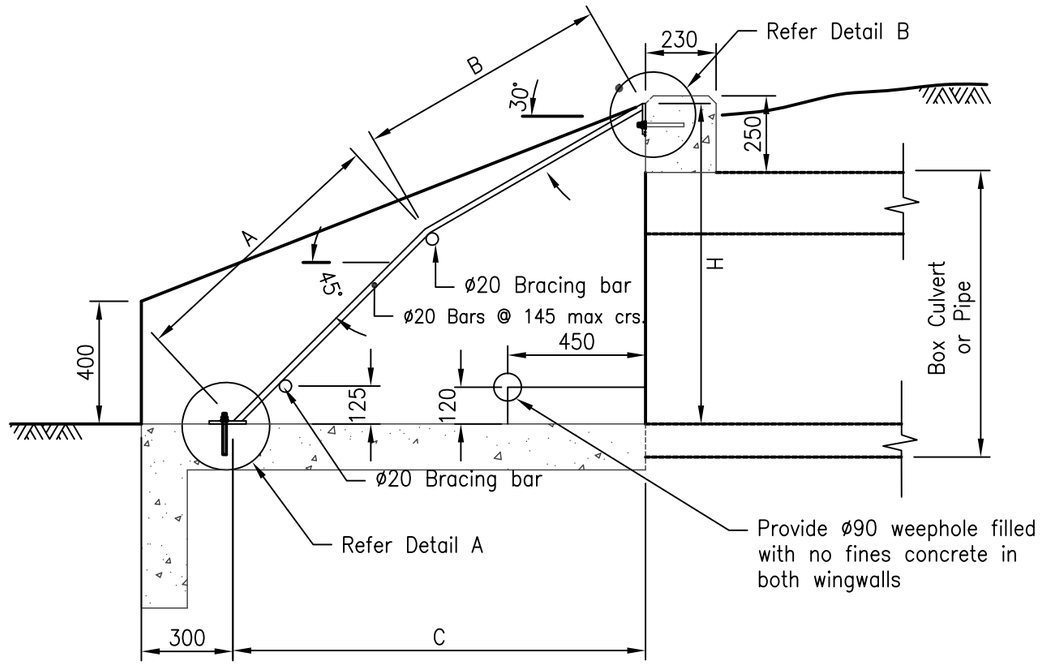


BOTTOM PLATE DETAIL



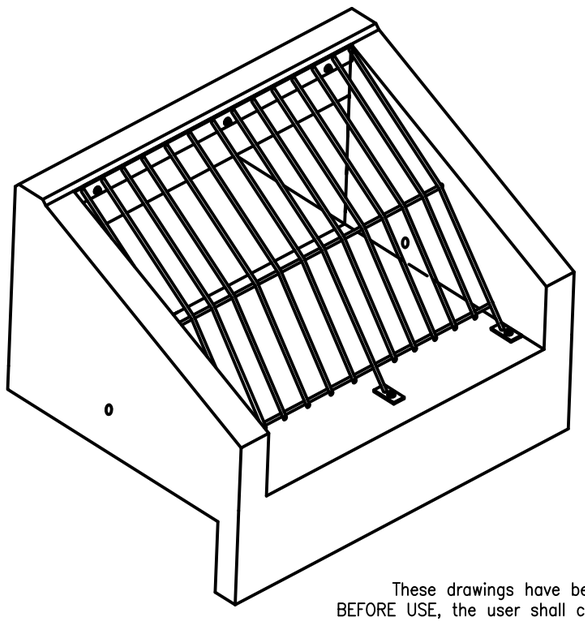
DETAIL B

TOP PLATE DETAIL



SECTION A–A

Reinforcement omitted for clarity

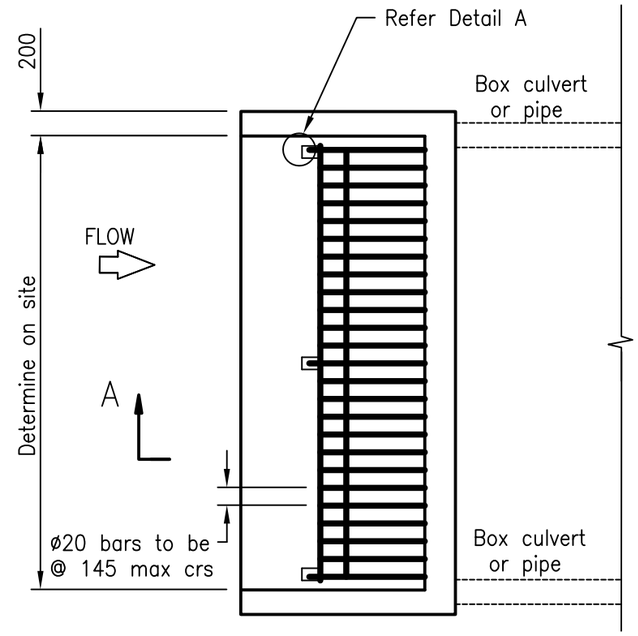


NOTES:

1. For Wingwall and Headwall details and reinforcement, refer TMR Std Dwg 1303
2. For Apron details and reinforcement, refer TMR Std Dwg 1318 (Type 3 Apron)
3. Concrete to be Class N32/20 AS1379–3600.
4. All cover to reinforcement to be 50mm minimum.
5. Cover in aggressive environments refer TMR Std Dwg 1303.
6. All sections to be grade 300 and all bar to be grade 400.
7. All welds to conform to AS1554 and be 6mm continuous fillet welds unless otherwise noted.
8. All steelwork to be hot dip galvanised after fabrication to AS4680.
9. All nuts, bolts and washers to be stainless steel grade 316. with isolation washers.
10. Refer to TMR Standards for safe distances to carriageways.
11. All dimensions are in millimetres unless shown otherwise.

TABLE 1

CULVERT HEIGHT	A	B	C	SCREEN HEIGHT
375	500	613	884	660
450	575	671	988	742
600	675	841	1206	898
750	800	977	1411	1054
900	900	1181	1659	1227
1200	1150	1478	2093	1552



PLAN

These drawings have been developed in consultation between the participating Councils.
BEFORE USE, the user shall confirm that the drawing has been adopted by the appropriate Council.

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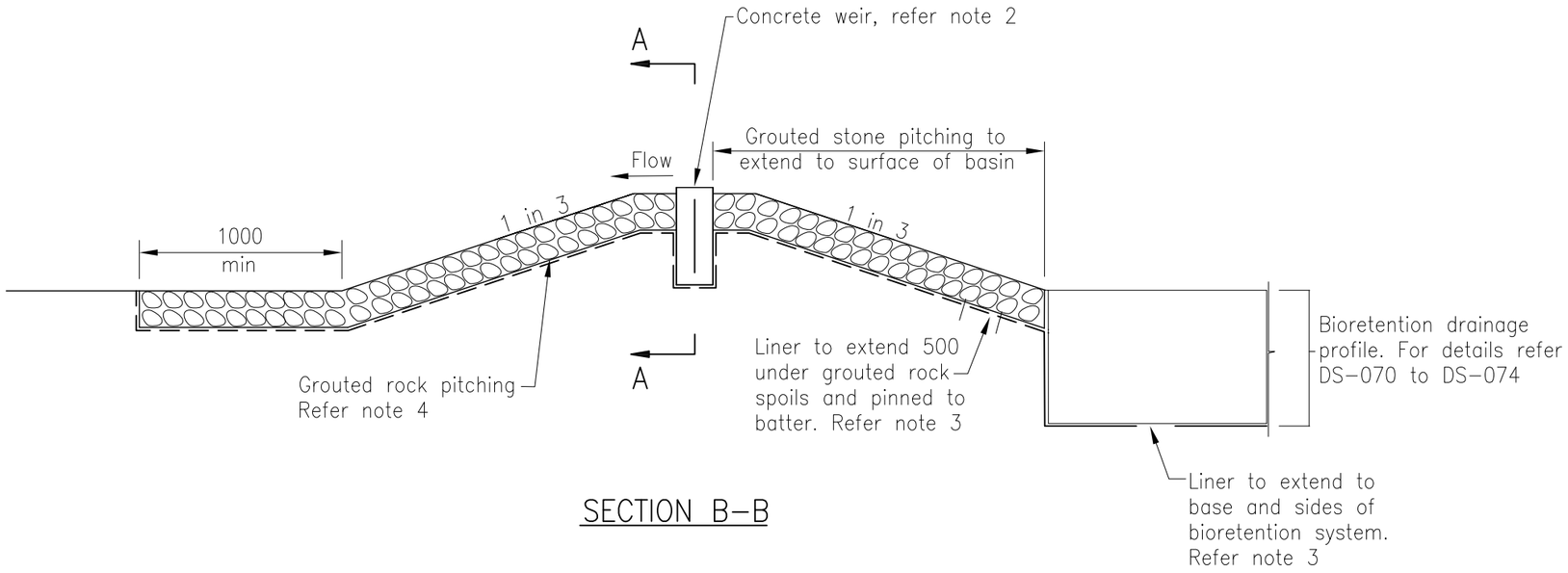
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

DRAINAGE DETAILS
CULVERT INLET SCREEN

DS–082

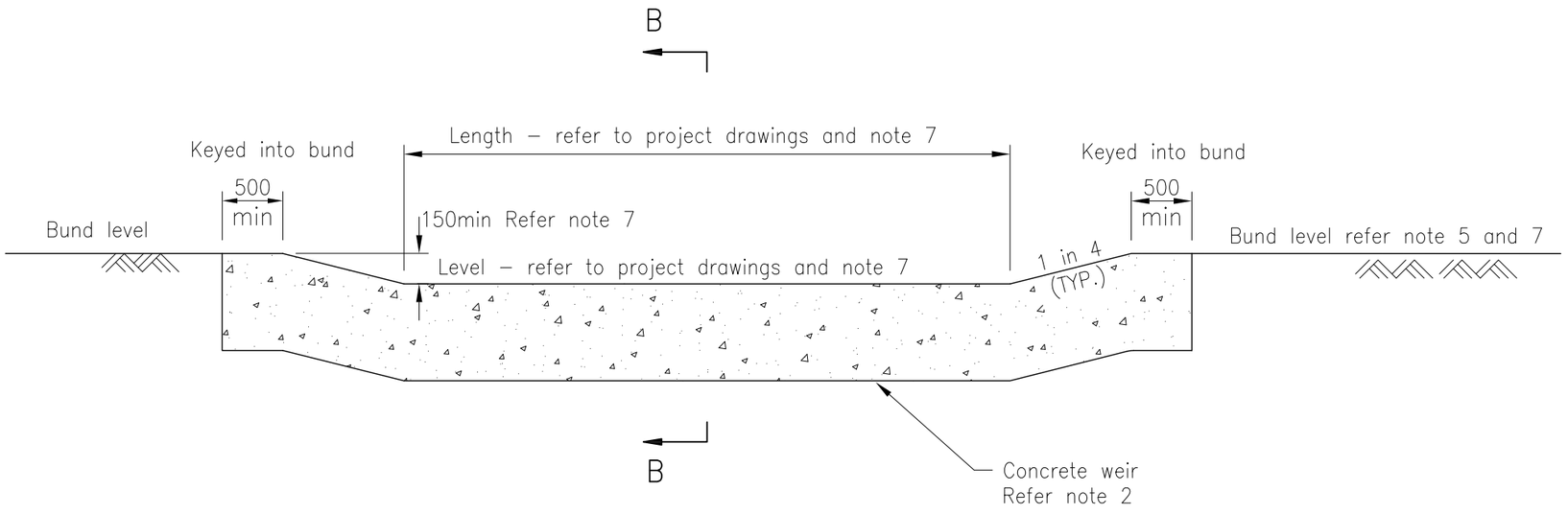
Rv. C B A



SECTION B–B

NOTES:

1. Insitu material to be tested and approved by geotechnical engineer prior to weir construction.
2. Concrete weir – 300 wide x 600 deep concrete (N32) with SL82 mesh placed centrally.
3. Liner. permeable or impermeable depending on design. Refer to DS–070 to DS–074
4. Grouted stone pitching – stones 75–100, 300 thick on filter cloth, refer note 3. Refer landscape drawings and project drawings for plant specification and details. Geotechnical engineer to confirm compaction requirements for bund subsoil.
5. Construction tolerances as documented in the 'Water Sensitive Urban Design Construction and Establishment Guidelines – Swales, Bioretention Systems and Wetlands' (Water by Design) must be achieved. Construction tolerances and bund levels must be noted on project plans.
6. For extent and details of scour protection refer to project drawings.
7. Bund level, refer to project drawings for minimum freeboard requirements. Bund levels must be noted on project drawings.
8. All dimensions are in millimetres unless otherwise noted.



SECTION A–A

These drawings have been developed in consultation between the participating Councils.
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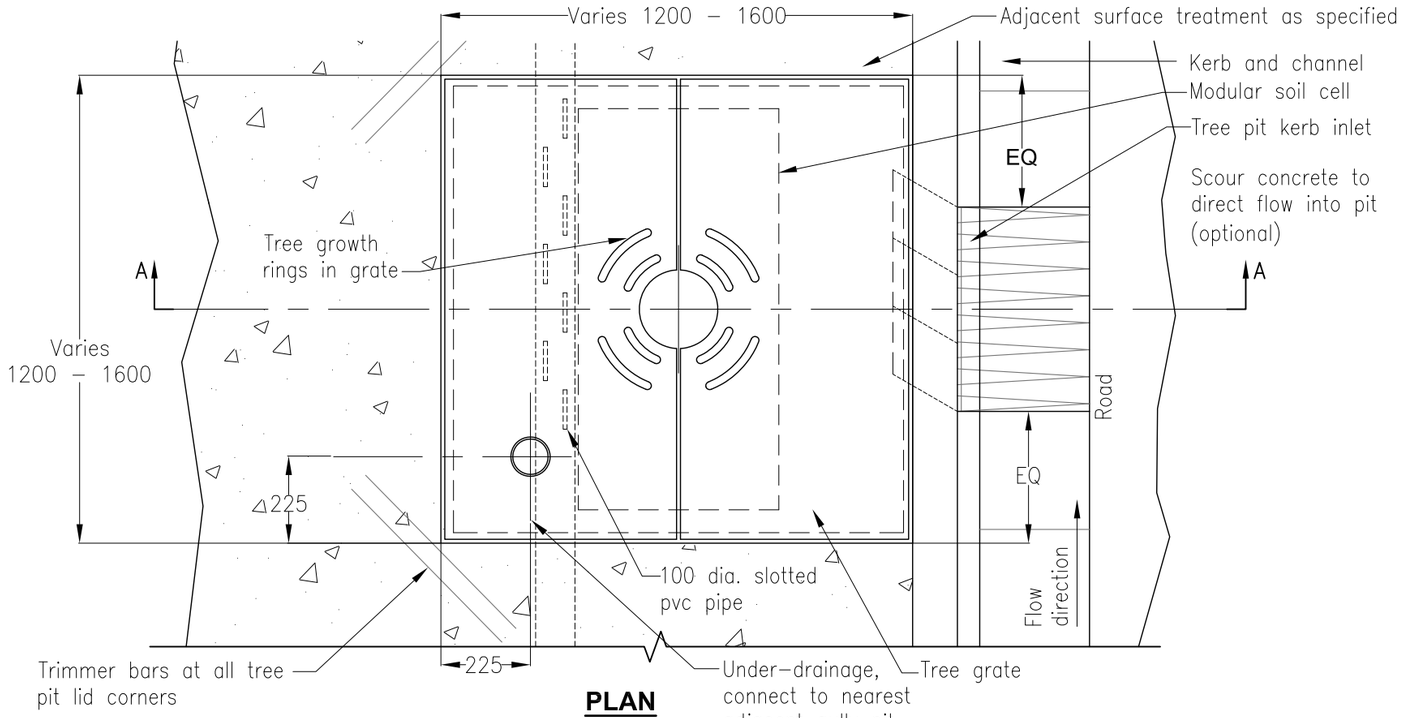
STANDARD DRAWINGS

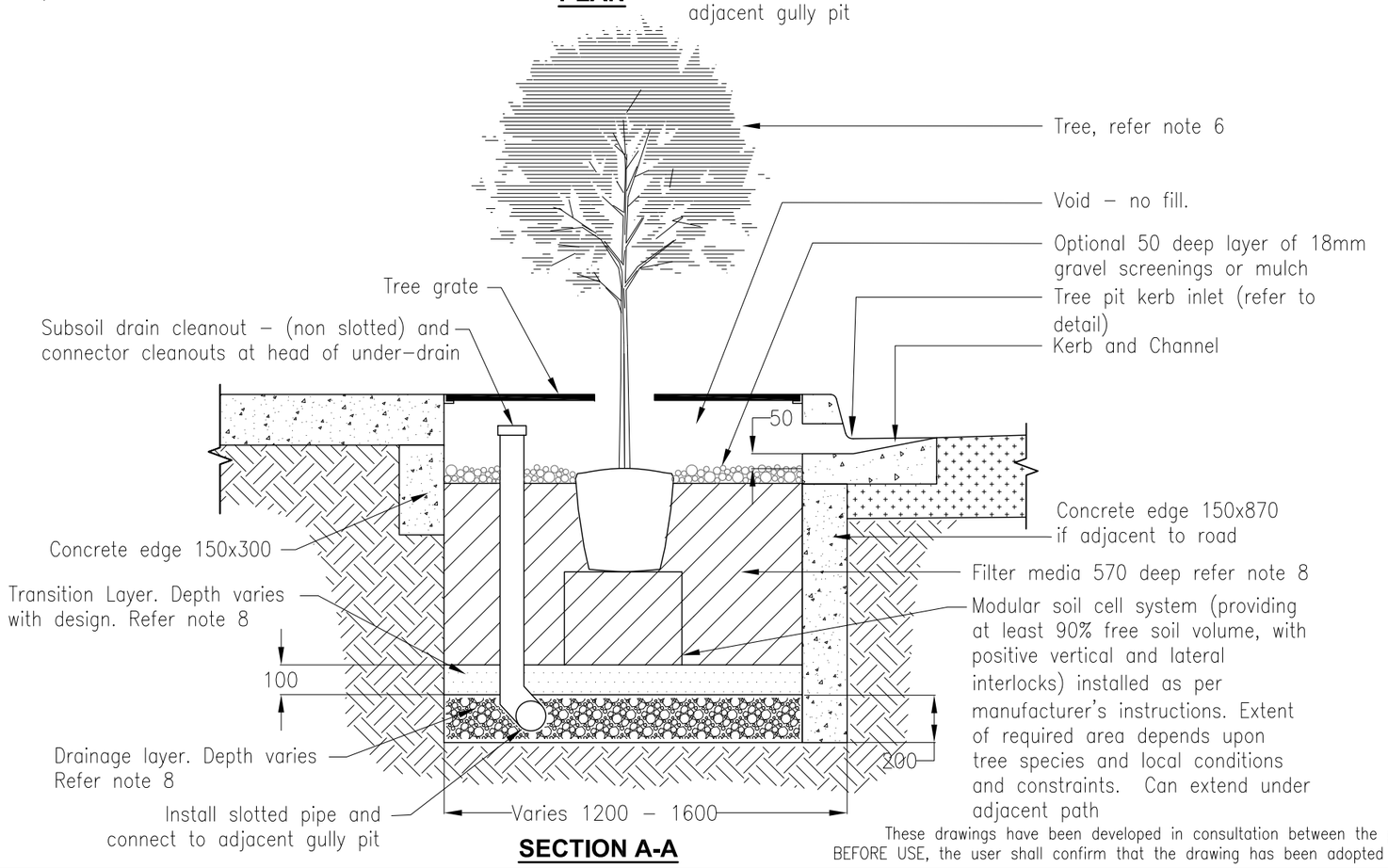
BIORETENTION WEIR

DS–076

Rv.



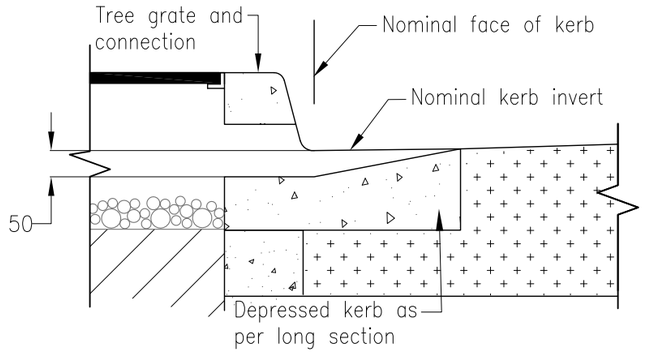
PLAN



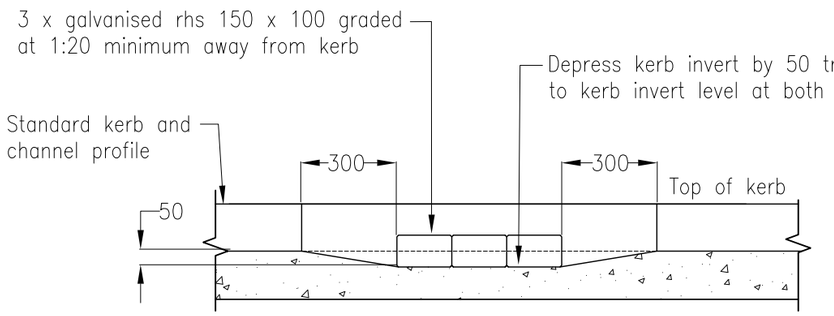
SECTION A-A

NOTES:

1. For general design and construction notes refer to DS–078.
2. WSUD kerb shown is only suitable for street tree pits and small raingardens. Larger systems may need specific inlet design or multiple inlets.
3. Where no parking lane exists, RHS kerb inlet may be replaced by an open kerb cut.
4. Ensure tree pit drainage is connected to stormwater system to avoid flooding the tree.
5. Tree pits are to be located upstream of gully pits.
6. Street tree to be appropriate for traffic sight lines.
7. Filter media specification shall be in accordance with the 'Guidelines for Soil filter Media in Bioretention systems' (FAWB) and the Bioretention Technical Design Guidelines (Water by Design). Bioretention hydraulic conductivity shall be in accordance with 'Practice Note 1: InSitu Measurement of Hydraulic Conductivity' (FAWB). The number of samples to be tested shall be in accordance with the 'Construction and Establishment Guidelines –Swales, Bioretention Systems and Wetlands' (Water by Design).
8. Transition layer and drainage layer specifications to be in accordance with Bioretention Technical Design Guidelines (Water by Design.
9. All dimensions in millimetres unless specified otherwise.



TREE PIT KERB INLET TYPICAL SECTION



TREE PIT KERB INLET ELEVATION

These drawings have been developed in consultation between the participating Councils.
BEFORE USE, the user shall confirm that the drawing has been adopted by the appropriate Council.

Rv.	DATE	REVISIONS	
	February, 2016	Original Issue	

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA

STANDARD DRAWINGS

BIORETENTION STREET TREE

DS–077

Rv.

Bioretention System Specification

1. Referenced documents.
   The following documents are incorporated into this specification by reference:
   1.1. Standards
      1.1.1. AS 1289 - Methods of Testing Soils for Engineering Purposes
      1.1.2. AS 1289.5.4.1-2007- Soil Compaction and Density Tests--Compaction Control Test--Dry Density Ratio, Moisture Variation and Moisture Ratio
      1.1.3. AS 1289.5.7.1-2006 - Soil Compaction and Density Tests--Compaction Control Test--Hilf Density Ratio and Hilf Moisture Variation (rapid method)
      1.1.4. AS 2758 - Aggregates and Rock for Engineering Purposes
      1.1.5. AS 4419 - Soils for Landscaping and Garden Use
      1.1.6. 1.1.6 AS 4454 - Composts, Soil Conditioners and Mulches
   1.2. Other publications
      1.2.1. Guidelines for Soil Filter Media in Bioretention Systems (FAWB) - the current version of the guideline can be found at http://www.monash.edu.au/FAWB/
      1.2.2. Construction and Establishment Guidelines - Swales, Bioretention systems and Wetlands (Water by Design) http://waterbydesign.com.au/ceguide/
      1.2.3. Transferring Ownership of Vegetated Stormwater Assets (Water by Design) http://waterbydesign.com.au/transferguide/
      1.2.4. Transferring Ownership of Vegetated Stormwater Assets (Water by Design) http://waterbydesign.com.au/transferguide/
      1.2.5. Bioretention Technical Design Guidelines (Water by Design) http://waterbydesign.com.au/techguide/
      1.2.6. Water Sensitive Urban Design Field Guide (Water by Design)
2. Abbreviations and definitions
   2.1. The bioretention system specification consists of the following abbreviations and definitions:
   2.2. Filter: soil layer which acts as a pollutant filter and supports plant growth.
   2.3. Impermeable liners: the liner that prevents water movement between the filter and the surrounding soils and defines the edge of the system.
   2.4. Transition layer: layer to separate filter layer from the drainage layer to avoid migration of soils from the filter to the drainage layer
   2.5. Drainage layer: relatively free draining layer to convey infiltrated water to the underdrainage.
   2.6. Under-drains: slotted drains collect treated stormwater from the drainage layer at the base of the bioretention system.
3. Test methods and standards
   3.1. The following test methods and standards are to be used as specified in the above guidelines when conducting tests associated with this specification:
   3.2. The hydraulic conductivity of potential filter media shall be measured using the ASTM F1815-11 method
   3.3. Particle size distribution: AS1289.3.6.1 - 1995
   3.4. Soils for landscaping and garden use: AS4419 - 2003.
4. Materials
   4.1. Materials shall meet the required specifications detailed in *Section 8 Filter media, Section 9 Transition layer, Section 10 Drainage layer, Section 11 Under drainage, Section 12 Permeable liner, Section 13 Impermeable liner and Section 14 Landscaping* of this document.
   4.2. All materials must be certified by the supplier with certification and delivery supply dockets shall be provided on request to certify the material delivered is the material tested.
5. Timing and erosion and sediment control
   5.1. The timing of civil and landscape works for bioretention systems must be carefully planned to ensure that both the bioretention system and the downstream waterways, are not impacted by stormwater and sediment (e.g. through best practice erosion and sediment control). In particular, the drainage layer, transition layer and filter media must not be placed until the risk of high sediment loading from upstream construction activities has been mitigated. The construction sequence must be approved by the superintendent.
   5.2. Erosion and sediment control during construction must be delivered in accordance with all legislative requirements including, where required, the preparation of site-specific ESC plan/s in accordance with current Best Practice Erosion and Sediment Control (e.g. IECA 2008, or later version).
6. Earthworks and hydraulic structures
   6.1. The construction of hydraulic structures must ensure the design levels are achieved. Bunds/ embankments surrounding the system shall be at correct levels. The below table summarises the construction tolerances for each element of a typical bioretention system.
   6.2. Bioretention systems tolerances

Bioretention element	Tolerance (unless specified otherwise)
Hydraulic structures	+ /- 25 mm (+/- 15 mm for streetscape systems)
Earthworks	+ /-50 mm
Under-drainage	+/- 25 mm
Drainage and transition layers	+ 25 mm
Surface level	+/- 25 mm +/- 40 mm for filter media >300 m² provided the average extended detention requirement is within 25 mm of the design requirement.
Embankments and bunds	-25 mm, + 50 mm

7. Maintenance access.
   Maintenance access is provided in accordance with the design drawings.

8. Filter media
   8.1. Materials
   A fundamental part of bioretention systems is the filter media. The main role of the filter media is to support vegetation and remove pollutants. Filter media should be loamy sand that has high permeability when compacted. It should not contain any rubbish or deleterious material. The loamy sand should contain some organic matter to improve water-holding capacity and plant health, but it should be low in nutrient content. The filter media must be compliant with AS4419 - Soils for Landscaping and Garden Use, and meet the following requirements:

Parameter	Test method in accordance with	Requirement
Saturated hydraulic conductivity	ASTM f1815-11	50 - 500 mm/hr (200 preferred)
pH	AS 4419	5.5 - 7.5
Electrical conductivity	AS 4419	<1.2 dS/m
Nitrogen content	AS 4419	<800 mg/kg
Phosphorus content	AS 4419	<40 mg/kg
Organic content	AS 4419	3% - 10%. Where organic content is below this threshold, the filter media may be ameliorated by adding 50 mm of compost and tining it into the top 150 mm of filter media.
Particle size distribution	AS 1289.3.6.1 - 1995	Clay & silt 3 - 6% (<0.05 mm) Very fine sand 5 - 30% (0.05 - 0.15 mm) Fine sand 10- 30% (0.15 - 0.25 mm) Medium to coarse sand 40- 60% (0.25 - 1.0 mm) Coarse sand 7 - 10% (1.0 - 2.0 mm) Fine gravel <3% (2.0 - 3.4%)

Source: Guidelines for Soil Filter Media in Bioretention Systems (FAWB) and Bioretention Technical Design Guidelines (Water by Design)

Filter media must be free of weeds and propagates. Other characteristics of the filter media required for plant growth should be confirmed with a soil analysis or confirmed with a horticulturist/landscape architect.

   8.2. Testing frequency
   Suitable filter media can be delivered to site or imported sand can be ameliorated to meet the above specification. In either case, the media shall be tested against the above parameters at one sample per 500 m3 of filter media. For soil supplied to site, testing must be undertaken on the actual material to be delivered to the bioretention system. The supplier and contractor will be responsible for ensuring the filter media meets the specification and the correct material is delivered to site prior to installation.
   8.3. Installation and compaction
   When installing, the following specifications shall be applied:
      8.3.1. Filter media shall be installed and compacted in two lifts for depths of over 500 mm. Compaction shall be light and even across the surface.
      8.3.2. The top surface of the drainage layer, transition layer and the filter media layer shall be level and free from localised depressions to ensure even distribution of stormwater flows across the surface and prevent localised ponding.
      8.3.3. Filter fabric must not be used between drainage layer, transition layer and the filter media layers or wrapped around the under-drainage

9. Transition layer
   9.1. Transition layers prevent filter media migrating into the drainage layer.
      9.1.1. Materials
         9.1.1.1. Transition layer shall be minimum thickness of 100 mm coarse sand unless otherwise specified (typically 1mm particle size diameter) with <2% fines.
         9.1.1.2. A particle size distribution for the sand shall be obtained to ensure that it meets the following criteria (VicRoads).
         9.1.1.3. D15 (transition layer) ≤ 5 x D85 (filter media)
      9.2. Testing
      A sample of the proposed transition layer is to be provided to the superintendent for approval prior to installation. The superintendent may require the transition layer to be tested to ensure its particle size.

10. Drainage layer
Drainage layers convey infiltrated water into the slotted under-drainage pipes.
   10.1. Materials
      10.1.1. Drainage layer shall be comprised of fine gravel (nominal 2-5 mm) with <2% fines and a minimum saturated hydraulic conductivity of 400 mm/hr. The depth of the drainage layer shall ensure at least 50 mm of aggregate cover over all perforated under-drainage pipes.
      10.1.2. A particle size distribution for the gravel shall be obtained to ensure that it meets the following bridging criteria (VicRoads): D15 (drainage layer) ≤ 5 x D85 (transition layer)
   10.2. Testing
      A sample of the proposed drainage layer is to be provided to the superintendent for approval prior to installation. The superintendent may require the drainage layer to be tested to ensure its particle size.

11. Under-drainage
   11.1. Materials
      Either slotted rigid pipe (HDPE or similar) or ag-pipe can be used for under-drainage as specified in the construction drawings. When installing, the following specifications shall be considered:
      11.1.1. Typically 100 mm-slotted HDPE pipe is the preferred type of rigid pipe.
      11.1.2. The slots in the pipe shall not allow the drainage layer aggregate to freely enter the pipe (under-drainage with slot width of 2 mm or smaller is preferred).
   11.1.3 Under-drainage pipes must not be surrounded by any geofabric or sock.
   11.2. Installation
      11.2.1. The maximum spacing of under-drains for bio-retention systems <100 m2 is 1.5 m from centre to centre. For bioretention systems >100 m2 the maximum spacing can be increased to 2.0 - 2.5 m if specified in the construction drawings.
      11.2.2. The under-drains shall be sloped towards the outlet pit (min. 0.5% longitudinal grade) and the base of filtration trench shall be free from localised depressions. For bioretention systems with a saturated zone a 0% pipe grade is acceptable.
      11.2.3. All junctions and connections shall be appropriately sealed.
      11.2.4. Under-drainage pipes shall be sealed into the overflow pit.
      11.2.5. All under drainage pipes to have raised clean out points constructed from non-slotted pipes which extend to 150 mm above filter media surface

12. Permeable liner (where specified)
   12.1. A permeable geotextile liner fabric must be used to line the outside of the bioretention system.
   12.2. The liner must extend at least 500 mm beyond the top of the sides and must be keyed into batter and covered by at least 200 mm of topsoil.
   12.3. The liner must be resistant to all soil acids and alkalis, resistant to microorganisms and comply with the requirements of AS3706.12 and AS3706.13.

13. Impermeable liner (where specified)
   13.1. Materials
      Liner options include clay, geosynthetic bentonite clay liners or high-density poly ethylene (HDPE) liners. Refer to the project drawings for liner details.
   13.2. Installation
      Installation must be in accordance with manufacturers specifications and design drawings and achieve the following:
      13.2.1. The liners shall be keyed into the batters and to the embankments.
      13.2.2. Liners must be sealed around protrusions such as outlet pipes.
   13.2.3 Must achieve a maximum permeability of $1x10^{-9}$m/s

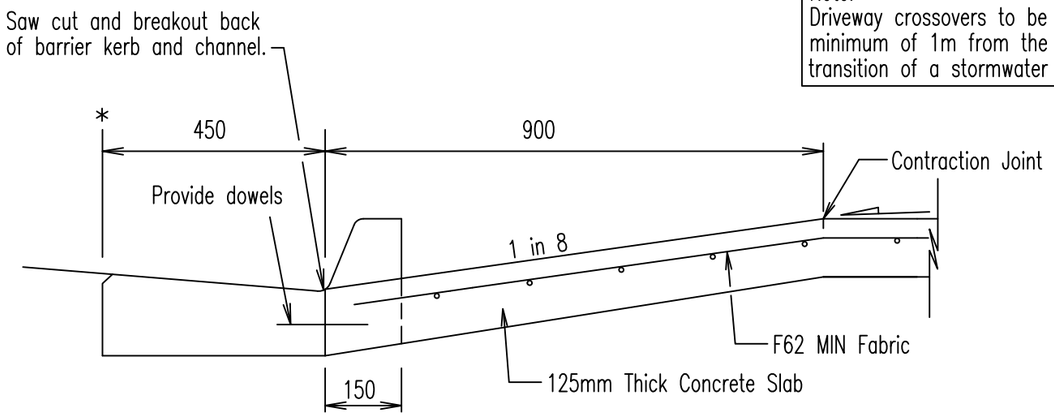
14. Landscaping
   14.0. Refer to landscape design drawings.
   14.1. Batter slopes must have min 200 mm topsoil which must be tested by a NATA-accredited laboratory in accordance with AS 4419.
   14.2. Subsoils to be cultivated to 150 mm prior to placing topsoil on batter slopes.
   14.3. Planting densities and species must be consistent with the landscape design drawings. No substitutions should be made unless approved by the superintendent.
   14.4. Plants supplied to site must:
      14.4.1. be grown in clean, weed- and pest-free conditions;
      14.4.2. be well developed, sun-hardened and contain a fully established root ball that does not crumble when removed from its container.
      14.4.3. be at least 200 mm high.
      14.4.4. show no sign of pest and disease
      14.4.5. show no signs of nutrient deficiency
      14.4.6. be free from weeds
      14.4.7. be clearly labelled
      14.4.8. be supplied in a container that is at least: 90 mm high x 50 mm wide
   14.5. Preparing Filter media: Unless specified otherwise, each plant must receive at least 10 g of slow-release native fertilizer in granular or tablet form. Pre-hydrated water crystals may be applied at 1-2% by weight.
   14.6. Mulch must be applied in accordance with the design drawings, be applied prior to planting, provide coverage of the soil and not exceed 75 mm thickness, and be kept 50 mm clear of plant stems. Unless otherwise specified, mulch should be fine sugar cane mulch secured in place by a loose weave jute net pinned at 500 mm centres.
   14.7. Filter media surface and plant stock are to be watered immediately prior to planting. Unless otherwise specified, plants should be planted in clumps of the same species, and large monocultures avoided.
   14.8. Plant method must minimise soil compaction and ensure that all roots are covered by at least 10 - 20 mm of soil, avoid covering plant crowns.
   14.9. Unless specified otherwise, the following irrigation schedule applies during plant establishment (at 2.5 - 5 L per plant per week)
      - Week 1-5 Five waterings per week
      - Week 6-10 Three waterings per week
      - Week 11-15 Two waterings per week
      - Thereafter As required to sustain plants until successful establishment
   14.10. Replanting must occur during the establishment period if less than 90% of plants survive.
   14.11. Successful plant establishment in bioretention systems is considered when the plants are robust and self-sustaining, and meet the following criteria.
      - Vegetation must cover at least 90% of the bioretention surface with mulch covering the remainder (< 10% mulch visible from above)
      - Average groundcover plant height must be greater than 500 mm.
      - Plants must be healthy and free from disease.
      - No weeds or litter to be present.

15. Certification and chain of custody
   15.1. The following certification and the chain of custody applies to bioretention media:
      15.1.1. The supplier and contractor are responsible for ensuring the bioretention media meets the specifications outlined in these guidelines and that the correct material is delivered to site. The supplier must arrange for testing of the filter media by a soil laboratory certified for the methods in accordance with the requirements listed above. On the basis of the testing, the soil laboratory and supplier must certify the material meets these specifications. The supplier must provide the certification and laboratory test results to the contractor with the supply docket.
      15.1.2. The contractor provides a copy of the supplier's certification, test results and supply docket to the site superintendent or bioretention designer for review.
      15.1.3. Following review of the certification, test results and the supply docket, the site superintendent or bioretention designer approves installation of the bioretention media.
      15.1.4. The relevant sections of the bioretention media sign-off form as per the Construction and Establishment Guidelines (Water by Design) should be completed and signed. This sign-off form is provided as part of the construction certification by the site superintendent or bioretention designer.

16. Hold points
   16.1. The following hold points must be observed in accordance with the most recent Water by Design construction checklists and superintendent approval is required for works to proceed:
      16.1.1. Prestart meeting
      16.1.2. Completion of hydraulic structures and under-drainage
   16.1.3 Prior to placing filter media
      16.1.4. After placement of filter media (prior to applying mulch and planting).

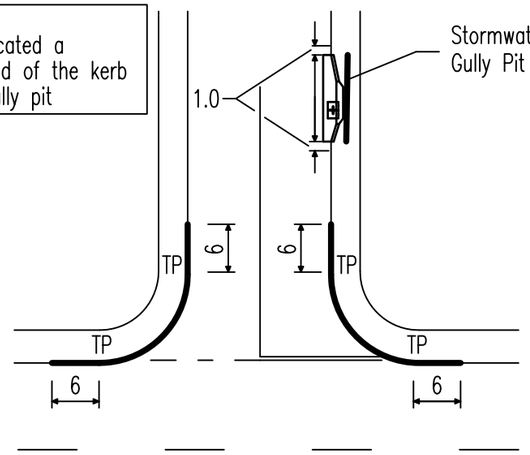
17. Compliance testing (for on-maintenance or off-maintenance)
   17.1. Compliance testing must be in accordance with chapter 5 of Transferring Ownership of Vegetated Stormwater Assets (Water by Design). Checklists must be completed and signed by the superintendent.

Disclaimer: it is the responsibility of the certifying registered professional engineer to ensure these standard notes are adapted to the specific needs of the project. It is expected that additional drawing notes would be required to cover other important project issues (e.g. Workplace Health and Safety, Environmental Protection, Erosion and Sediment Control, etc). Healthy Waterways, IPWEA and all contributors to this document accept no liability for the use, misuse or any omission or inaccuracy in this document.



BARRIER KERB & CHANNEL – TYPE B1

Note:
Driveway crossovers to be located a minimum of 1m from the end of the kerb transition of a stormwater gully pit



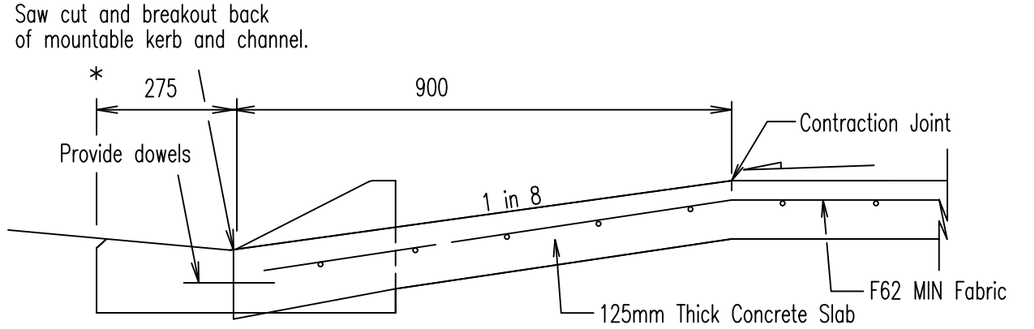
Prohibited Locations shown in a heavy line.
All Dimensions are in Metres.

TABLE 1 – DRIVEWAY CROSSOVER WIDTHS

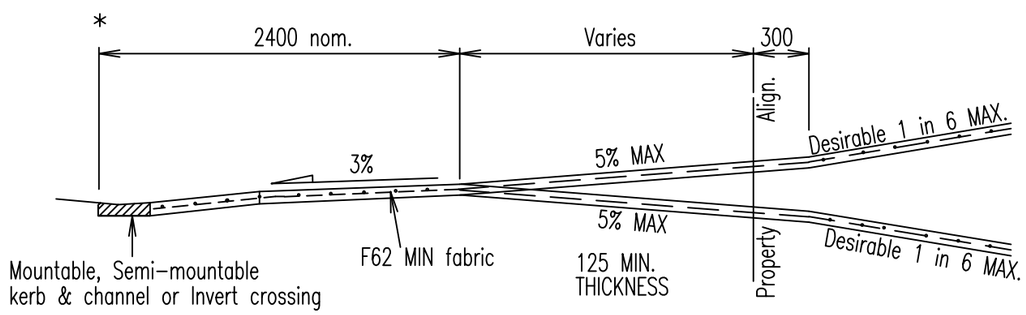
	Description	No. of Crossings Permitted	W1	W2	Special Conditions
Single Dwelling House	Single Garage	1	4.5m	3.5m	1. W1 must not be more than 50% of the total lot frontage width
	Double Garage	1	6.0m	5.0m	
	Double Garage	2	6.0m	5.0m	1. Min. 20m frontage 2. Min 6m between crossovers 3. Max. combined total width 9m
	Double garage or carport on property boundary	1	7.0m	6.0m	
Duplex	Duplex with frontage of less than 20m	1	7.0m	6.0m	
		2	4.0m	3.0m	1. Min. 6m between crossovers
	Duplex with frontage of 20m or more	2	4.0m	5.0m	1. Min. 6m between crossovers
W1 – Maximum allowable width at kerb invert (including splays)					
W2 – Maximum allowable width at property boundary					

LEGEND

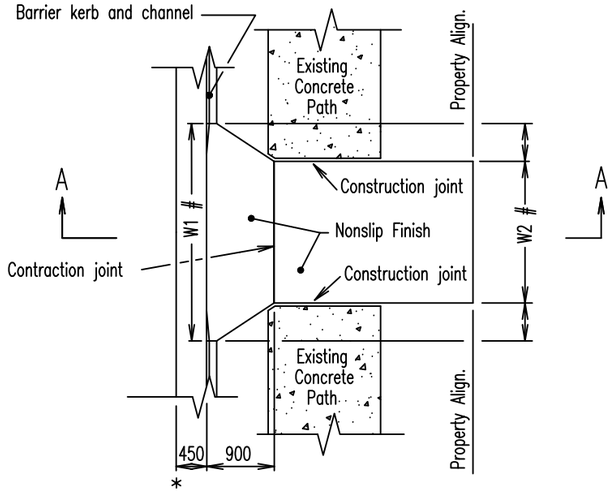
* Lip Line for Setting Out
\# Refer to Table 1



MOUNTABLE KERB & CHANNEL – TYPE M1



SECTION A–A



SLAB ABUTTING CHANNEL INVERT BARRIER KERB AND CHANNEL

LEGEND

* Lip Line for Setting Out
\# Refer to Table 1

NOTES:

1. Crossings are not designed for commercial vehicles.
2. Reprofile and turf adjacent footpath to finish flush with driveway. Footpath earthworks adjoining concrete must be well compacted.
3. Where concrete paths exist, sawcut and grade smoothly to driveway crossover and join with expansion joint
4. Concrete surface tolerance to be $^{+5mm}_{-0mm}$, over 3 metre sections.
5. Concrete N25 in accordance with AS 1379 and AS 3600.
6. Reinforcement fabric to AS 4671, 50 top and edge cover, lap fabric 250.
7. Expansion joints to be 10 thick, full depth closed cell cross linked polyethylene foam (85 – 150 kg/m)
8. Other kerb and channel types shall have the same construction treatment as shown on this drawing.
9. All reinforcing mesh shall be supported on bar chairs.
10. Driveways are not to be constructed within 1m of a stormwater gully pit.
11. Galvanised steel dowels, 12mm dia, 250mm long and spaced at 500mm centres are used when joining to concrete paths and where the kerb is removed to ensure a flush joint is maintained.
12. Reinforcing mesh to be cut at construction joint
13. All dimensions in millimetres.
14. Removal of mountable kerb is optional on collector street, access streets and access places.
15. All driveway crossovers are to be constructed perpendicular to the road.

F G H

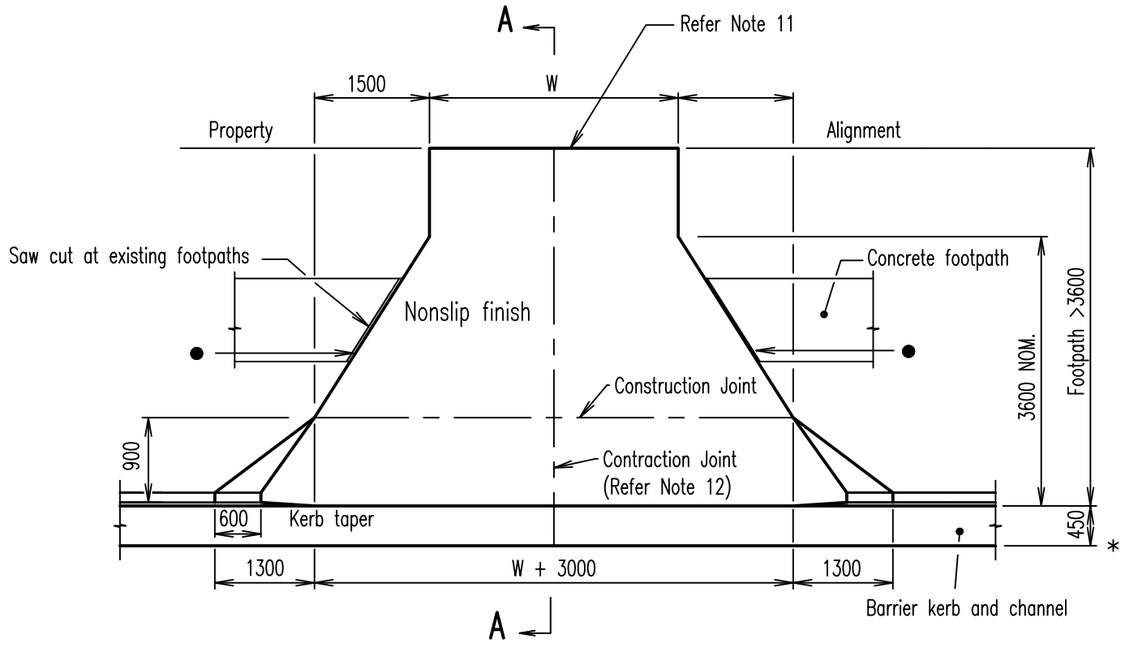
H	UPDATED	3/17	
G	UPDATED	3/10	
F	AMENDED	12/07	
E	AMENDED	7/05	
D	AMENDED	2/03	
C	AMENDED	1/02	
B	AMENDED	1/99	
A	ORIGINAL ISSUE	1/98	
REVISIONS		DATE	APPROVED

Redland CITY COUNCIL

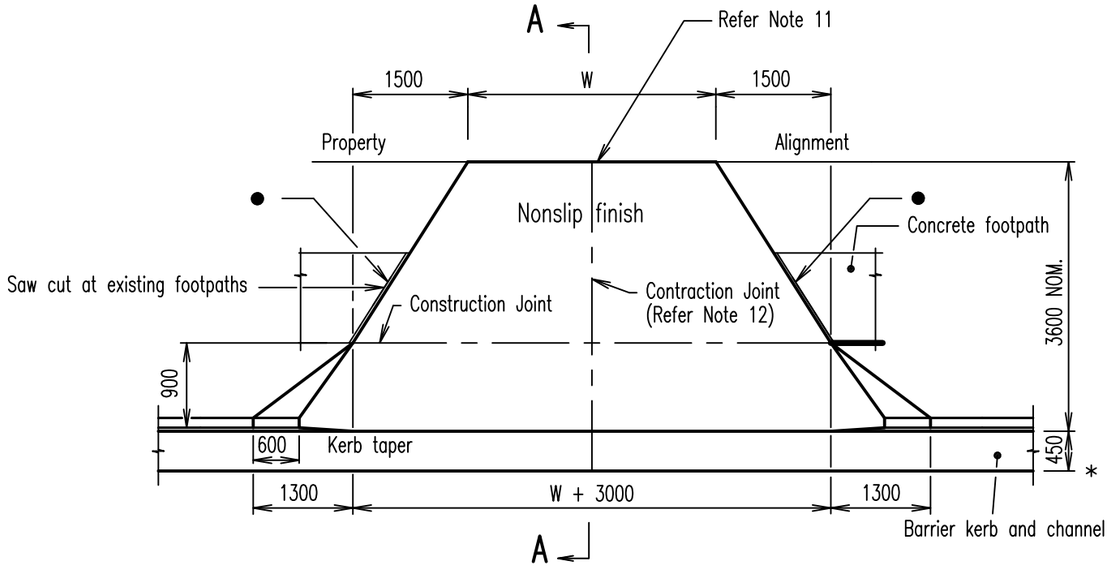
DOMESTIC DRIVEWAY CROSSOVER FOR KERB AND CHANNEL

ROAD/STREET
Standard Drawing
R–RCC–1

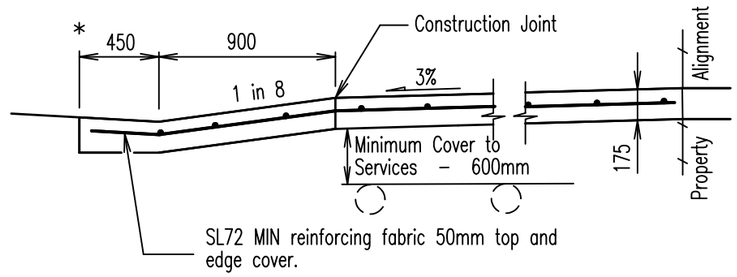
A B C D E



PLAN – WIDE FOOTPATHS



PLAN – 3.6m FOOTPATH



SECTION A – A

LEGEND

* Lip Line

● Expansion joints to be 10 thick, full depth closed cell cross linked polyethylene foam (85 – 150 kg/m³). Also refer Note 12.

NOTES:

1. Concrete N25 in accordance with AS 1379 and AS 3600.
2. Reinforcing fabric to AS 4671. Lap fabric 250mm.
3. Depths of concrete and reinforcing steel shown are the minimum requirements for good foundation conditions, and average traffic loading. Where this does not apply, depths of concrete and reinforcing shall be increased to suit specific conditions.
4. Design of crossings may vary, refer project drawings.
5. Dimension W, 3.0m One way, 5.5m Two way, refer specification or project drawings.
6. Reprofile adjacent footpath to match driveway,as directed by Redland City Council. Footpath earthworks adjoining concrete must be well compacted.
7. Existing footpath profile to be maintained where possible.
8. Compaction for subgrade 95% Standard to AS 1289.5.1.1.
9. Where subgrade is less than CBR 5 excavate and provide imported material to satisfaction of the Superintendent.
10. The driveway shall be concrete unless otherwise approved.
11. Gully pits may be provided on each side inside the property boundary when discharging to street underground drainage. Alternatively, a grated drain may be provided on the side of the property boundary. Refer project Drawings.
12. Galvanised steel slip dowels, 12mm dia, 250mm long and spaced at 500mm are used when joining to concrete paths to ensure a flush joint is maintained.
13. Contraction joints are required at 3 to 4.5m centres.
14. All reinforcing mesh shall be supported on bar chairs.
15. This drawing indicates the minimum standard required unless otherwise specified in the development approval.
16. All dimensions in millimetres.

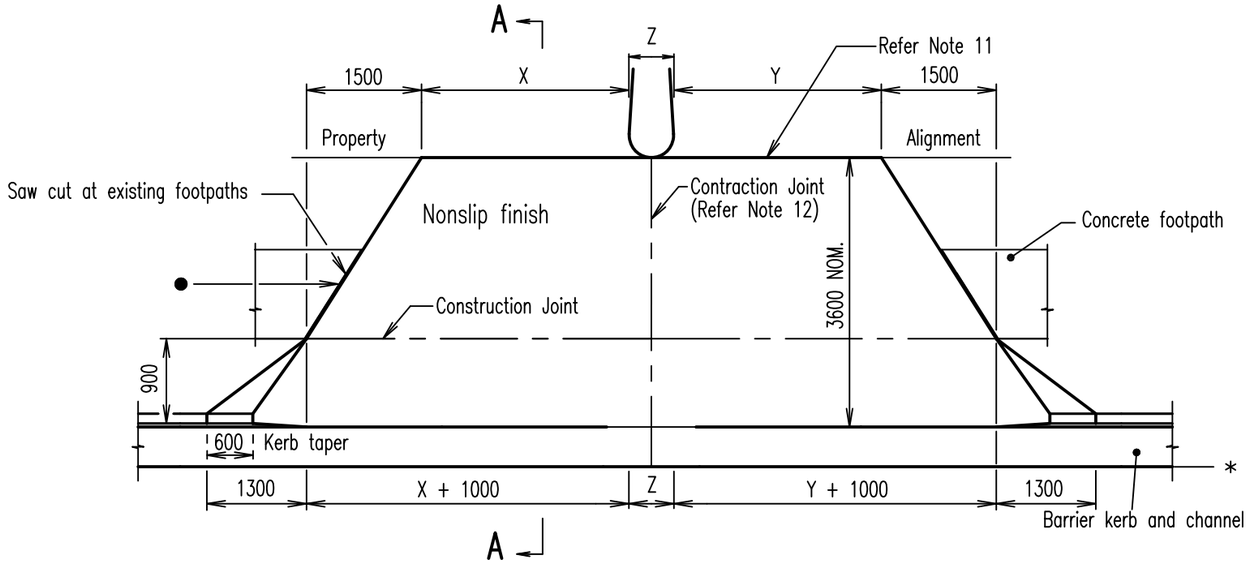
E	UPDATED	3/10	
D	AMENDED	7/05	
C	AMENDED	1/02	
B	AMENDED	1/99	
A	ORIGINAL ISSUE	1/98	
REVISIONS		DATE	APPROVED

Redland CITY COUNCIL

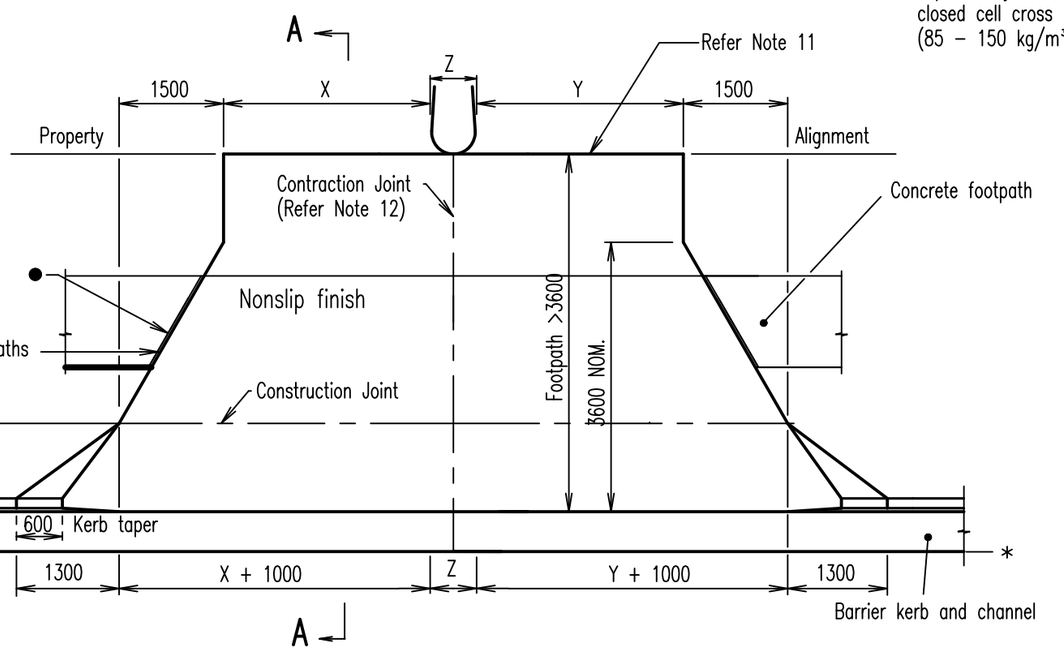
COMMERCIAL / INDUSTRIAL/ MULTIPLE DWELLING / DRIVEWAY CROSSOVER

ROAD/STREET
Standard Drawing
R-RCC-2

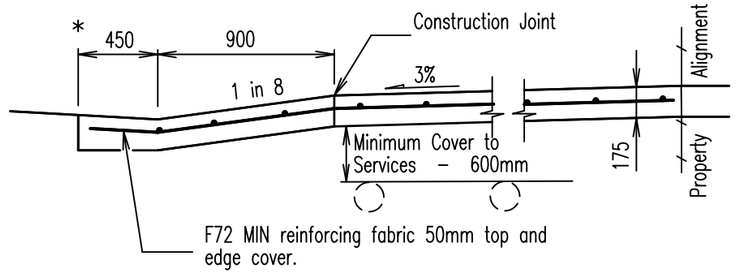
A B C D E



PLAN – 3.6m FOOTPATH



PLAN – WIDE FOOTPATHS



SECTION A – A

LEGEND

* Lip Line

● Expansion joints to be 10 thick, full depth closed cell cross linked polyethylene foam (85 – 150 kg/m³).

NOTES:

1. Concrete N25 in accordance with AS 1379 amd AS 3600.
2. Reinforcing fabric to AS 4671. Lap fabric 250mm.
3. Depths of concrete and reinforcing steel shown are the minimum requirements for good foundation conditions, and average traffic loading. Where this does not apply, depths of concrete and reinforcing shall be increased to suit specific conditions.
4. Design of crossings may vary, refer project drawings.
5. Dimensions X, Y, & Z , refer specification or project drawings. Unless otherwise specified X = 5500, Y = 4500 and Z = 1200
6. Reprofile adjacent footpath to match driveway, as directed by Redland City Council. Footpath earthworks adjoining concrete must be well compacted.
7. Existing footpath profile to be maintained where possible.
8. Compaction for subgrade 95% Standard to AS 1289.5.1.1.
9. Where subgrade is less than CBR 5 excavate and provide imported material to satisfaction of the Superintendent.
10. The driveway shall be concrete unless otherwise approved.
11. Gully pits may be provided on each side inside the property boundary when discharging to street underground drainage. Alternatively, a grated drain may be provided on the side of the property boundary. Refer project Drawings.
12. Contraction Joints are required in driveway at 3 to 4.5m centres.
13. All reinforcing mesh shall be supported on bar chairs.
14. This drawing indicates the minimum standard required unless otherwise specified in the development approval.
15. All dimensions in millimetres.

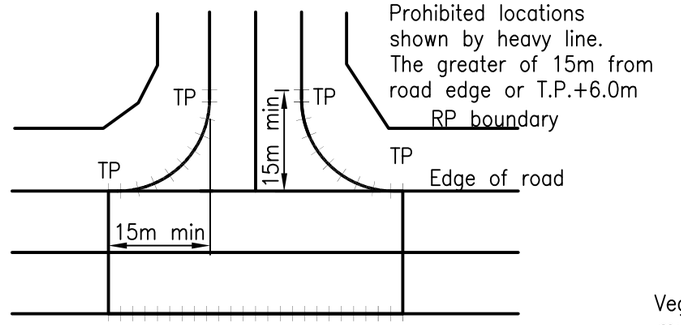
E	UPDATED	3/10	
D	AMENDED	6/04	
C	AMENDED	1/02	
B	AMENDED	1/99	
A	ORIGNIAL ISSUE	1/98	
REVISIONS		DATE	APPROVED

Redland CITY COUNCIL

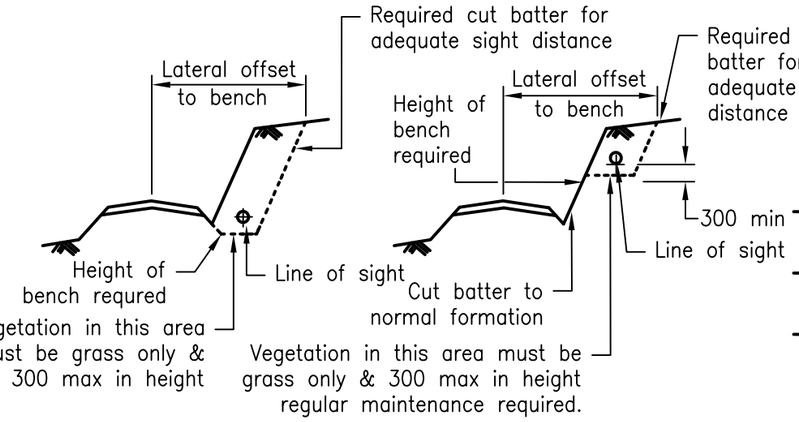
COMMERCIAL/INDUSTRIAL DRIVEWAY CROSSOVER

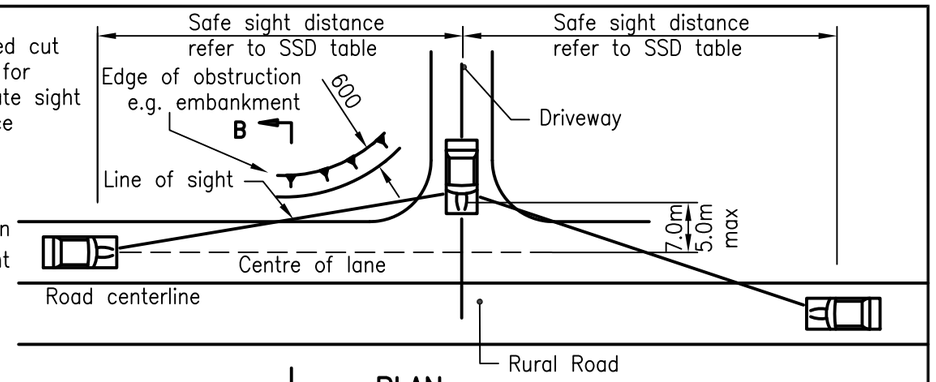
Standard Drawing
R-RCC-3

A B C D E



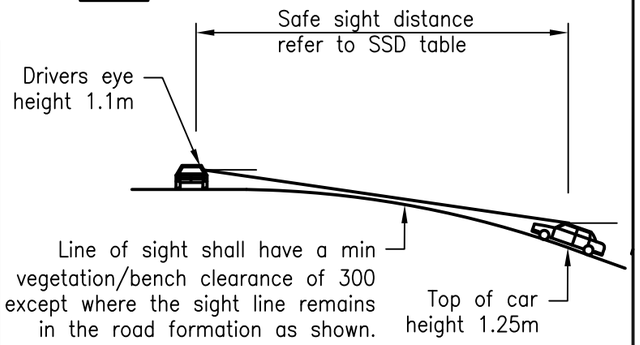
PROHIBITED LOCATIONS AT INTERSECTIONS FOR RURAL DRIVEWAYS





B

PLAN



BENCHING DETAIL

SECTION B–B

PIPE SIZE		
Catchment Area	ARI 2	ARI 10
<0.5Ha	375	450
<1.0Ha	450	525
<1.5Ha	525	600
<2.5Ha	600	2/450
<3.0Ha	2/450	2/525
<4.0Ha	2/525	2/600
<5.0Ha	2/600	(2)

For average daily traffic <= 2000, ARI 2
For average daily traffic > 2000, ARI 10

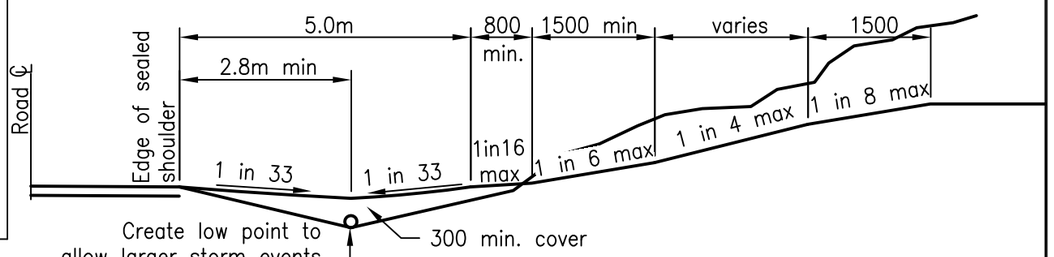
(1) Alternatives may be approved if supported with calculations in accordance with the provisions of the Queensland Urban Drainage Manual or under the provisions of Council's Planning Scheme.

(2) Seek consulting engineer advice.

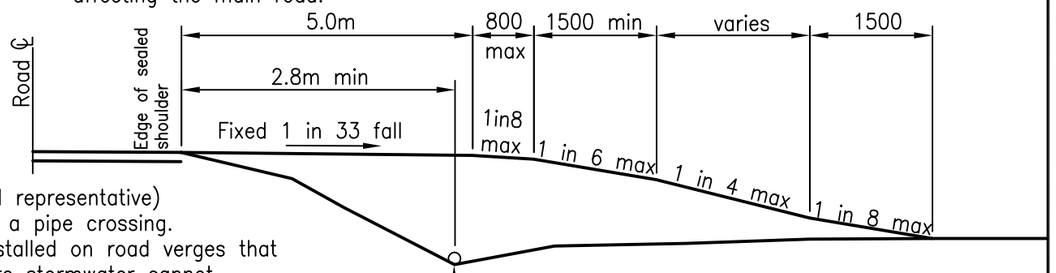
Safe Sight Distance	
Speed Limit (km/h)	Safe Sight Distance (m)
40	73
50	97
60	123
70	151
80	181
90	214
100	248

Based on Austroads Part 4A – 2009, Table 3.2

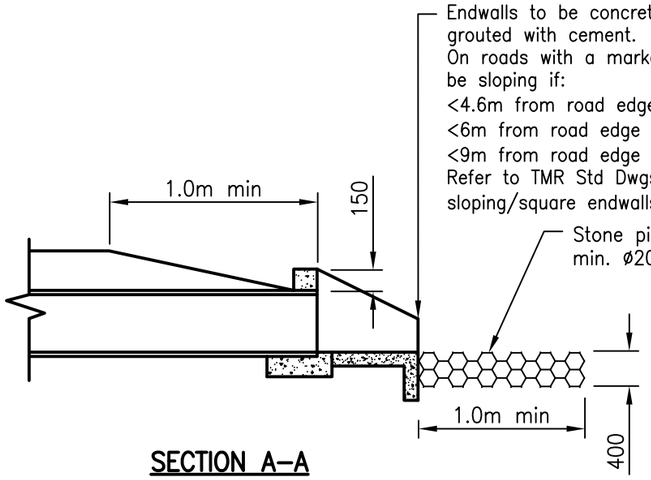
LONGITUDINAL SECTION SSD – EXITING FROM DRIVEWAY



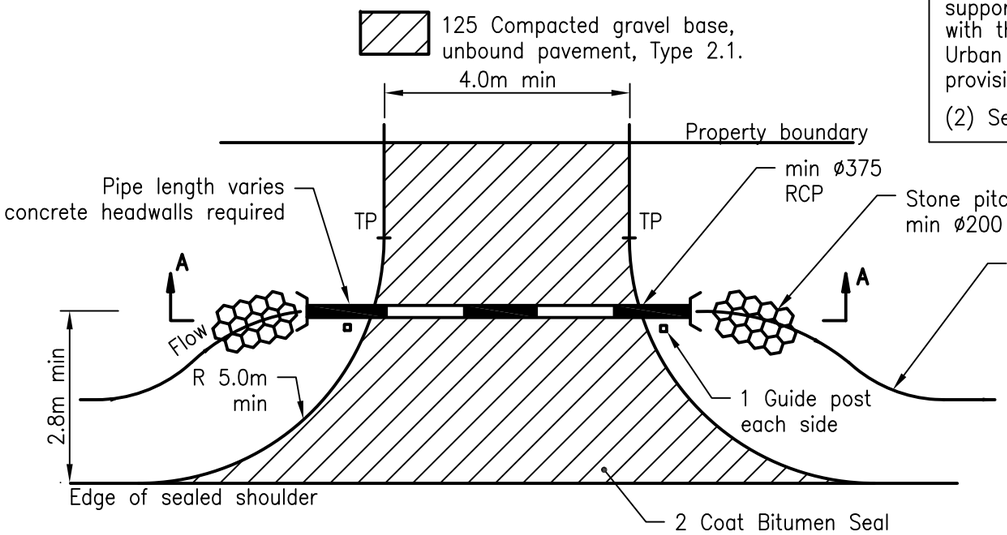
TYPICAL DRIVEWAY SECTION – ROAD IN CUT



TYPICAL DRIVEWAY SECTION – ROAD IN FILL



SECTION A–A



DRIVEWAY PLAN

NOTES:

1. A site assessment (By a Council representative) is to occur upon application for a pipe crossing. Pipe crossings are not to be installed on road verges that fall to the subject property where stormwater cannot be directed to a natural water course or drainage easement or when there is no upstream stormwater catchment or V–Drain.
2. All dimensions are in millimetres unless shown otherwise.

These drawings have been developed in consultation between the participating Councils.
BEFORE USE, the user shall confirm that the drawing has been adopted by the appropriate Council.

Rv.	DATE	REVISIONS
F	06/14	Review
E	03/14	Amended Drawing Number
D	12/11	Drawing number changed from SEQ R–056 to RS–056
C	06/10	Review
B	06/09	Review
A	03/08	ORIGINAL ISSUE

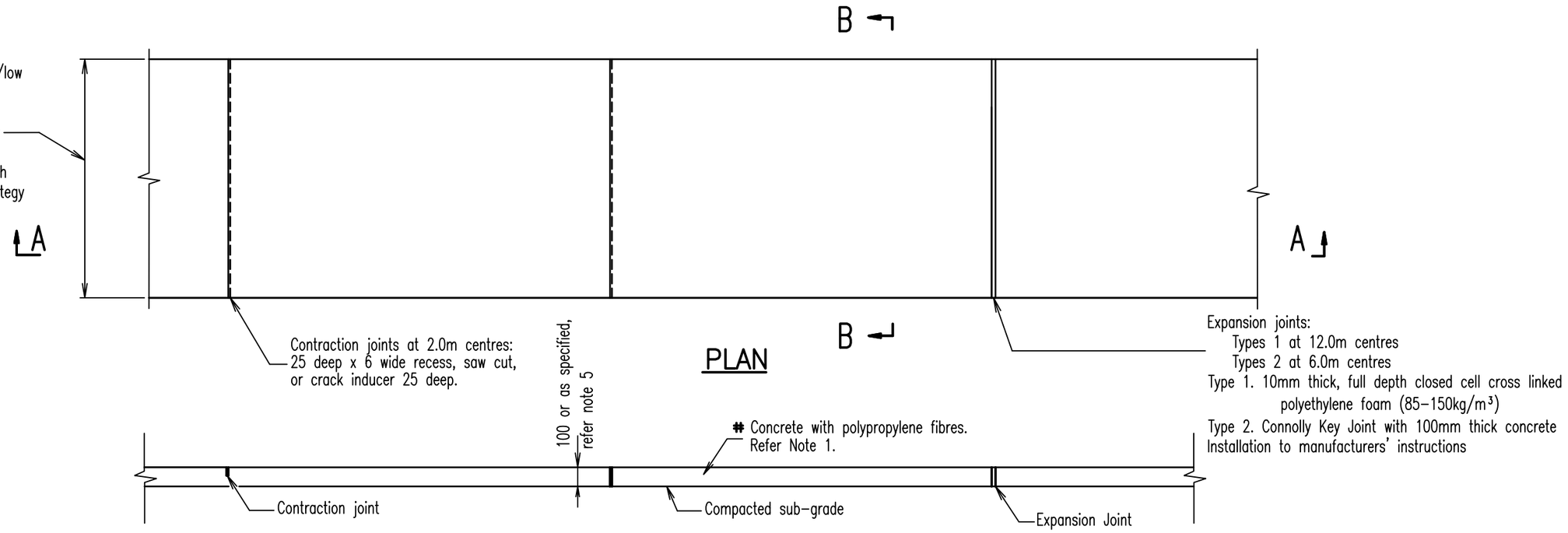
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

DRIVEWAYS
RURAL DRIVEWAY

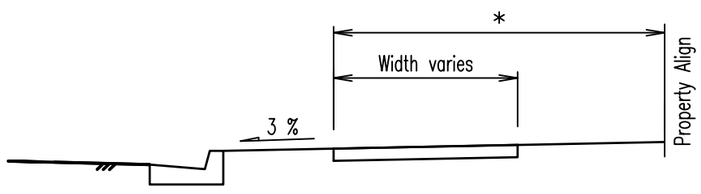
RS–056

Rv. F E D C B A

Width varies:
- Footpaths 1500 minimum width
- Shared use paths 2500 minimum, 2000 absolute minimum in restrcted/low use situations
- Commuter and recreational paths 2500 minimum width for lower order paths or 3000 maximum width for higher order paths in accordance with Redlands Cycling and Pedestrian Strategy Technical Report.



SECTION A – A



SECTION B–B

(Where kerb & channel exists)

FIBRE REINFORCED CONCRETE SPECIFICATION

The concrete shall be reinforced with a mixed dose of high performance polymer fibres and discreet graded fibrillated filament fibres. These fibres shall be provided as a coarse filament in an engineered contoured sinusoildal profile, of not less than 600 denier and discreet graded fibrillated filament fibres, of not greater than 6 denier. These fibres are to be manufactured from virgin polypropylene and added to the concrete, at the rate of 4.6kg per cubic metre. The 4.6kg shall consist of 3.8kg of HPP and 0.8kg of discrete graded fibrillated filament fibres.

LEGEND

*** 2700 width for 4000 verge**
Distance varies to provide adequate clearance to street light poles, trees and fixed objects on wider verges.

 # Alternative treatment without fibres, where specified by Council is SL62 reinforcing fabric, 50mm top edge cover, supported on bar chairs. Also refer Note 5.

NOTES

1. **Concrete N25 in accordance with AS 1379 and AS 3600. with polypropylene fibres incorporated into the concrete mix Refer Fibre Reinforced Concrete Specification**
2. **All concrete to be broom finished.**
3. **Contraction/expansion joints, 2m MAX spacing.**
4. **Finished surface tolerance to be maximum +6mm relative to kerb level and crossfall specified. –0mm**
5. **Thickness to be increased to 125mm at residential vehicular crossovers and through parks and reserves. Provide a contraction joint at both ends of crossover**
6. **Concrete footpaths, adjoining existing driveways are to be transitioned over a minimum 5.0m length.**
7. **Galvanised steel slip dowels, 12mm dia, 250mm long and spaced at 500mm are used wehn joining to existing concrete paths to ensure a flush joint is maintained.**
8. **A street opening permit must be obtained from Council, seek approval of location and levels prior to excavation.**
9. **All dimensions in millimetres.**

E	UPDATED	3/10	
D	AMENDED	8/05	
C	AMENDED	1/02	
B	AMENDED	1/99	
A	ORIGINAL ISSUE	1/98	
REVISIONS		DATE	APPROVED

Redland CITY COUNCIL

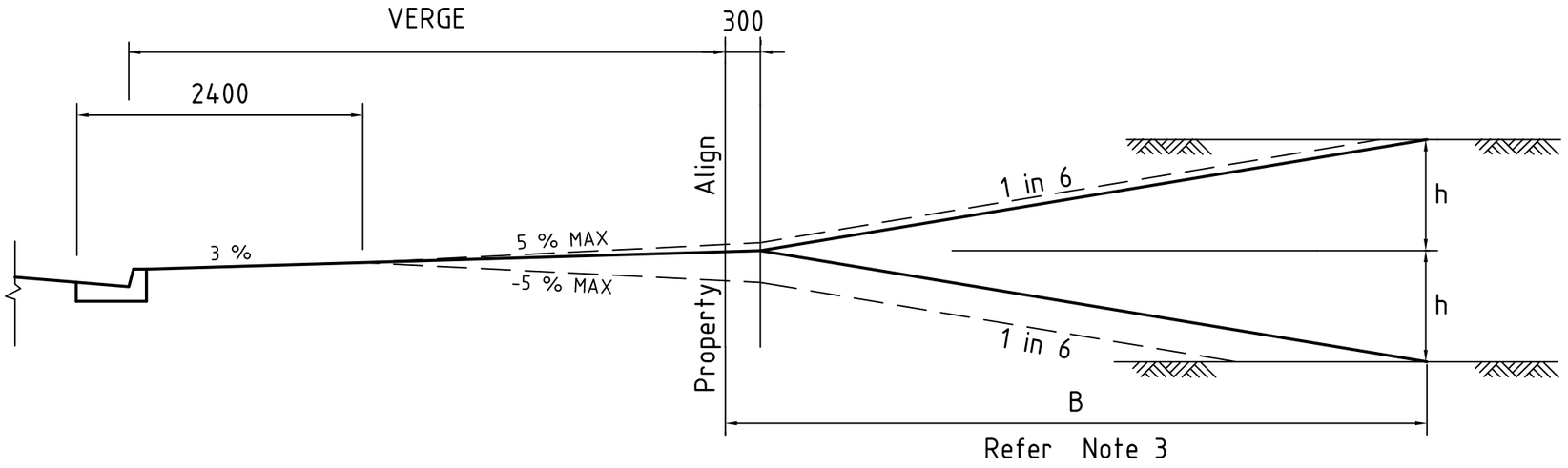
CONCRETE FOOTPATHS AND SHARED USE PATHS

ROAD/STREET

Standard Drawing

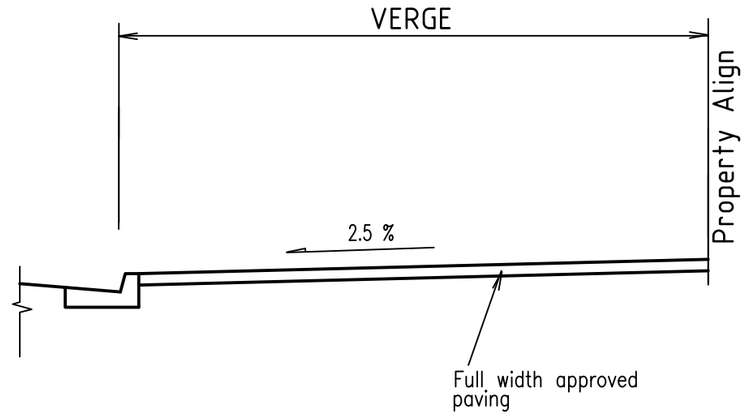
R–RCC–4

A | B | C | D | E



RESIDENTIAL FOOTPATH PROFILE & ADJOINING BATTER

Scale 1:50



COMMERCIAL FOOTPATH PROFILE

NTS

NOTES

1. Where h < 750, a standard 3% footpath with 1 in 6 batter shall be adopted.
2. Where h > 750, a combination of 3% and + 5% Max. may be adopted for the footpath profile with 1 in 6 slopes in private property.
3. Where B > 6000 when adopting 1 in 6 batters they may be increased to 1 in 4 Max. with B constant at 6000.
4. Where h > 1500, 1 in 2 batters may be provided with access points to each property graded at 1 in 4. (Not to be adopted unless approved by the Manager Infrastructure Development.
5. Provide Topsoil and Turfing as specicfied.
6. All grades are to conform with regard to accessability to all members of the community.
7. Variations may be approved at the descretion of the Manager Infrastructure Develpment.
8. Paving type and pattern to be approved by Redland Shire Council.

C	UPDATED	3/10	
B	AMENDED	1/99	
A	ORIGINAL ISSUE	1/98	
REVISIONS		DATE	APPROVED

Redland CITY COUNCIL

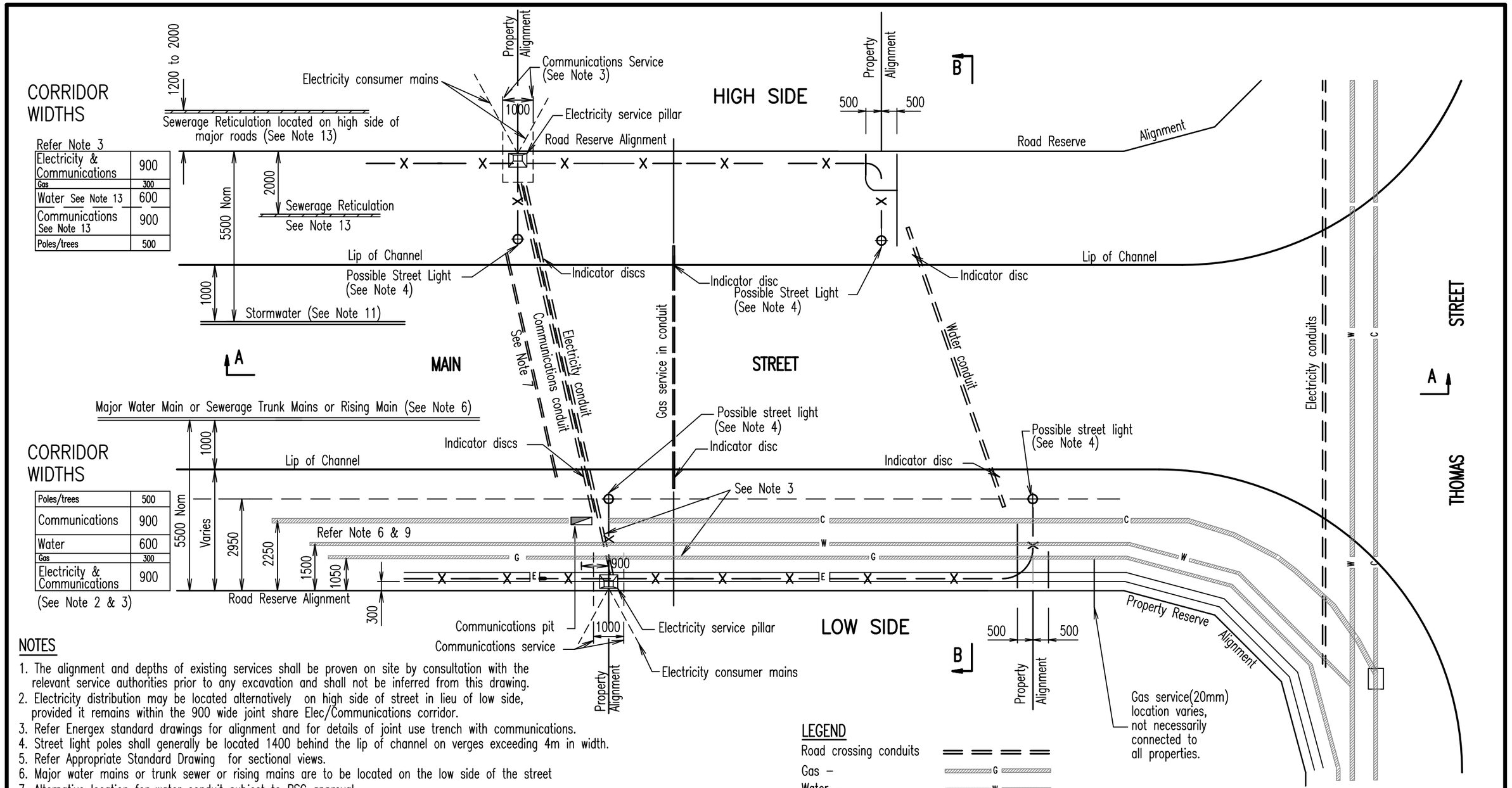
FOOTPATH PROFILE POLICY

ROAD/STREET

Standard Drawing

R-RCC-5

A | B | C



NOTES

1. The alignment and depths of existing services shall be proven on site by consultation with the relevant service authorities prior to any excavation and shall not be inferred from this drawing.
2. Electricity distribution may be located alternatively on high side of street in lieu of low side, provided it remains within the 900 wide joint share Elec/Communications corridor.
3. Refer Energex standard drawings for alignment and for details of joint use trench with communications.
4. Street light poles shall generally be located 1400 behind the lip of channel on verges exceeding 4m in width.
5. Refer Appropriate Standard Drawing for sectional views.
6. Major water mains or trunk sewer or rising mains are to be located on the low side of the street
7. Alternative location for water conduit subject to RSC approval.
8. Conduits to extend 600 beyond back of kerb or 300 beyond Concrete path where applicable.
9. Water mains are located on the low side of the street unless otherwise approved.
10. Trees not to be planted closer than 7000 from street lights.
11. Stormwater mains are located on the high side of the street under the kerb & channel where side inlet chambers are used.
12. Conduits to have a minimum 1000 separation.
13. Sewerage reticulation instead of Communications and Water is located on the verge on the high side of type A and B streets. (Road reserve widths of 18 metres or less). The location is 1200 to 2000 in private property on all higher order roads.
14. All dimensions in millimetres.

LEGEND

Road crossing conduits
Gas – G
Water – W
Sewerage – S
Communications – C
Electricity – E
Street light – X

F	UPDATED	3/10	
E	AMENDED	7/05	
D	AMENDED	11/03	
C	AMENDED	1/02	
B	AMENDED	1/99	
A	ORIGINAL ISSUE	1/98	
REVISIONS		DATE	APPROVED

Redland CITY COUNCIL

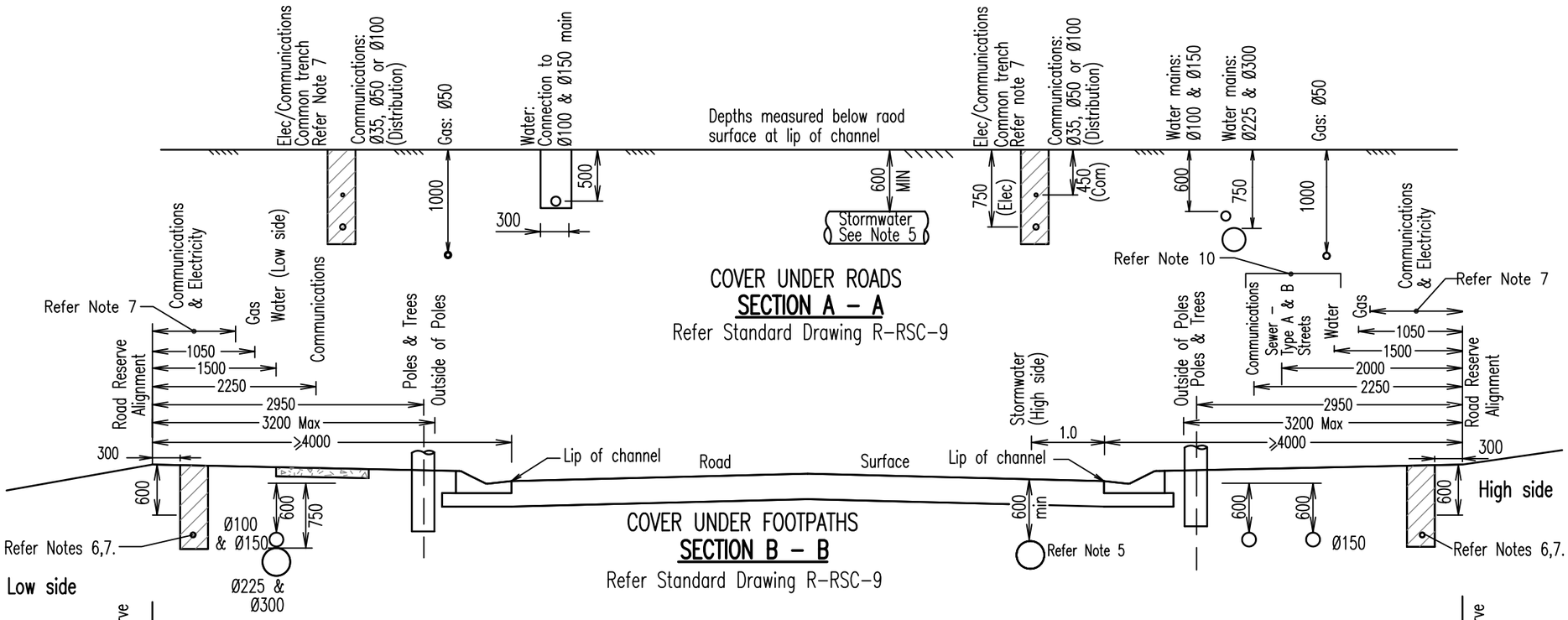
PUBLIC UTILITIES IN ROAD RESERVES

TYPICAL SERVICE CORRIDORS AND ALIGNMENTS

F

ROAD/STREET
Standard Drawing
R–RCC–6

A | B | C | D | E



NOTES

1. Electricity conduits adopted are Typically:
   Ø40 for street lighting
   Ø80 for LV, Ø100, 11kV
   Ø100/125 for HV, 33kV
2. Water conduit to be encased in lean mix concrete if less than 150mm cover below the bottom of box.
3. Non–corrosive metal indicator discs to be placed in kerb over all conduits.
4. All depths are from Lip of Channel
5. Stormwater main to be at sufficient depth to have a min. 150 clearance from other services. Stormwater main may also be located under Kerb & Channel when Catch Pits are used as Access Chambers.
6. Electricity distribution may be located alternatively on high side of street in lieu of low side,provided it remains within the 900 wide joint share Elec/Communications corridor.
7. Refer Energex standard drawings for alignment and for details of joint use trench with communications.
8. Alignment is subject to design. Street Lights, Poles shall generally be located 1400 behind lip of channel on verges exceeding 4m in width.
9. For Communication conduits,the following depths apply: Distribution Lines
   – 450mm on verge
   – 600mm under roads
   Main Lines
   – 600mm for verges & under roads
10. Sewer reticulation instead of Communications and Water is located on the verge on the high side of Type A and B streets (Road Reserve width 18 metres or less). The location is 1200 to 2000 in private property on all higher order roads.
11. All dimensions are in millimetres

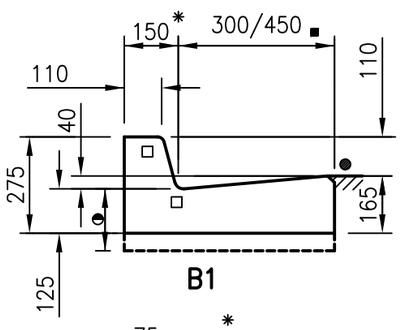
F	UPDATED	3/10	
E	AMENDED	7/05	
D	AMENDED	11/03	
C	AMENDED	1/02	
B	AMENDED	1/99	
A	ORIGINAL ISSUE	1/98	
REVISIONS		DATE	APPROVED

Redland CITY COUNCIL

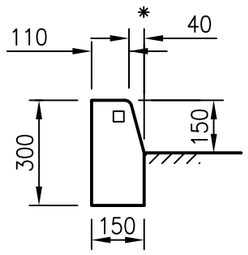
PUBLIC UTILITIES IN ROAD RESERVES
TYPICAL SERVICE CONDUIT SECTIONS

ROAD/STREET
Standard Drawing
R–RCC–7

F | A | B | C | D | E

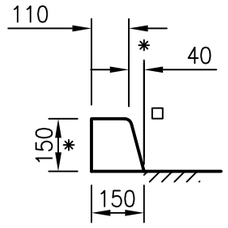


B1

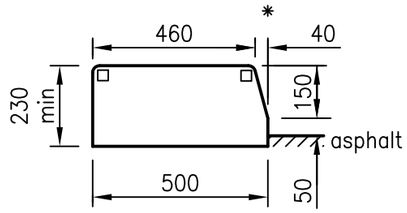


B2

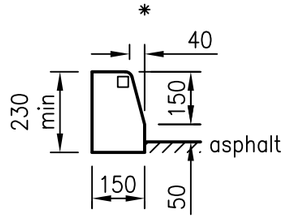
*For Carparks where overhang is required can reduce to 100.



B4

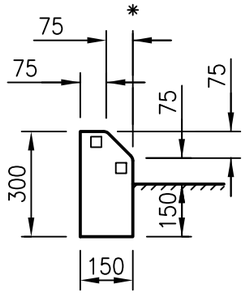


B6

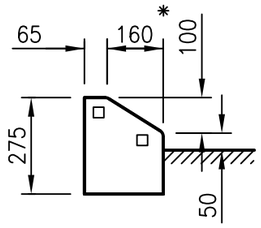


B7

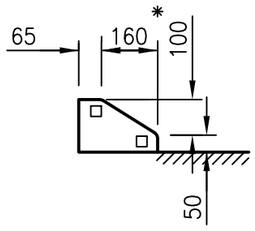
BARRIER TYPE



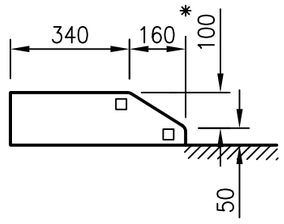
SM2



SM3



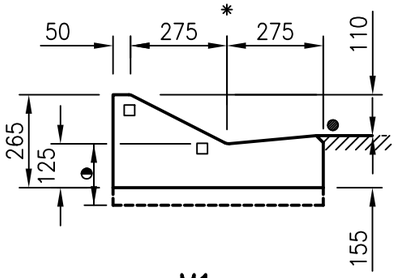
SM4



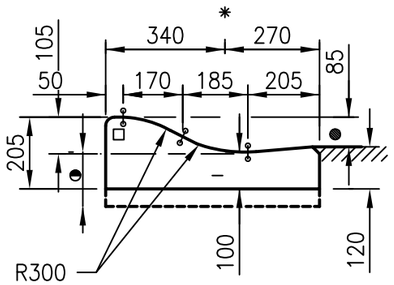
SM5

REFER TO PROJECT DRAWINGS FOR KERB SETOUT

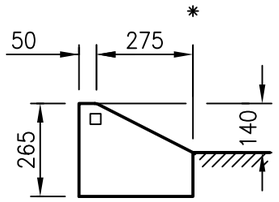
SEMI – MOUNTABLE TYPE



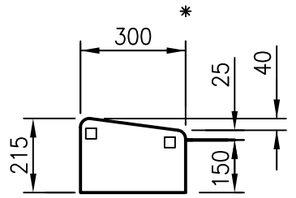
M1



M3



M4

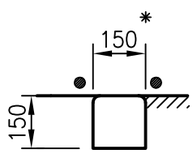


M6

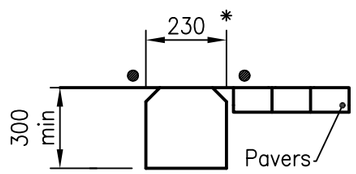
NOTES:

1. All materials and construction shall comply with AS 2876 except for dimensions on this drawing.
2. All concrete N32 min (refer project documentation) in accordance with AS 1379 and AS 3600 unless approved otherwise by relevant Council.
3. Control joints shall be 3 metre centres unless otherwise directed by relevant Council.
4. Expansion joints at 12 metre centres unless otherwise directed by relevant Council. Expansion joints, preformed jointing material of bituminous fibreboard or equivalent approved by relevant Council.
5. All dimensions are in millimetres unless shown otherwise.

MOUNTABLE TYPE

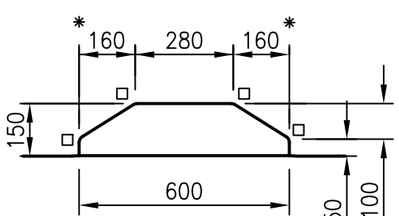


ER1

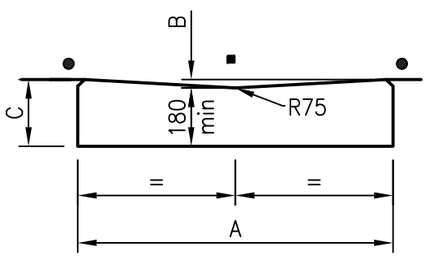


ER2

EDGE RESTRAINT



MEDIAN



DIMENSION		
A	B	C
600	25	200 min
900	40	220 min

For wider channel's refer to project drawings

CHANNEL

LEGEND

- ✱ nominal kerb line.
- ■ Channel invert width, refer project drawings.
- ● R10 Radius.
- □ R20 Radius.
- ◓ 175 where specified for commercial and industrial applications, refer project drawings.

These drawings have been developed in consultation between the participating Councils.
BEFORE USE, the user shall confirm that the drawing has been adopted by the appropriate Council.

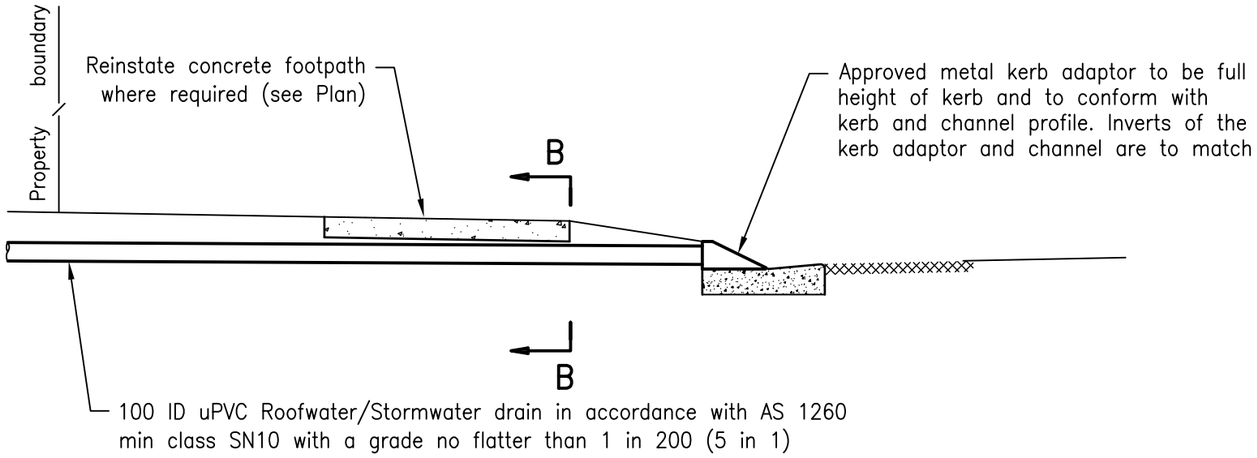
Rv.	DATE	REVISIONS
E	06/14	Review
D	06/11	Review
C	06/10	Review
B	06/09	Review
A	03/08	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

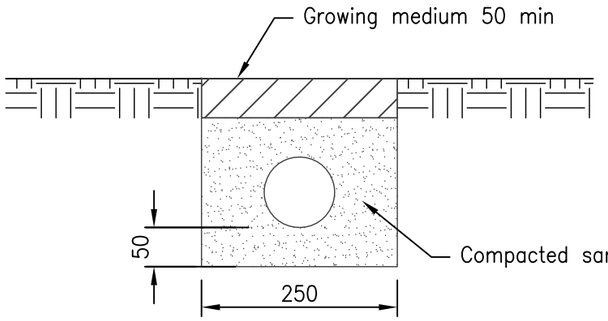
KERB AND CHANNEL
PROFILES AND DIMENSIONS
INCLUDING EDGE RESTRAINTS, MEDIAN & CHANNEL

RS–080

Rv. E D C B A

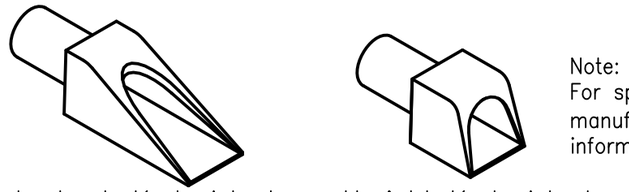


SECTION A–A



SECTION B–B

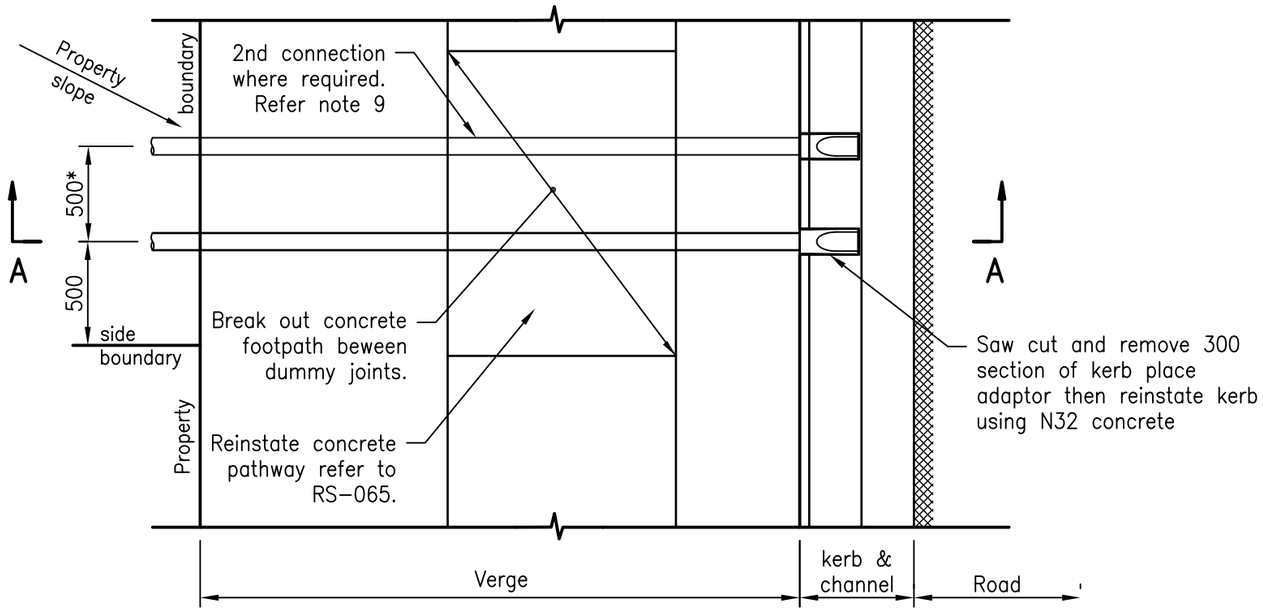
CAUTION
Verify location of services prior to commencement of work



Layback Kerb Adaptor Upright Kerb Adaptor

Note:
For specifications refer to manufacturer's product information.

TYPICAL FULL HEIGHT KERB ADAPTORS



*** Spacing may be reduced if approved by relevant Council**

PLAN

NOTES:

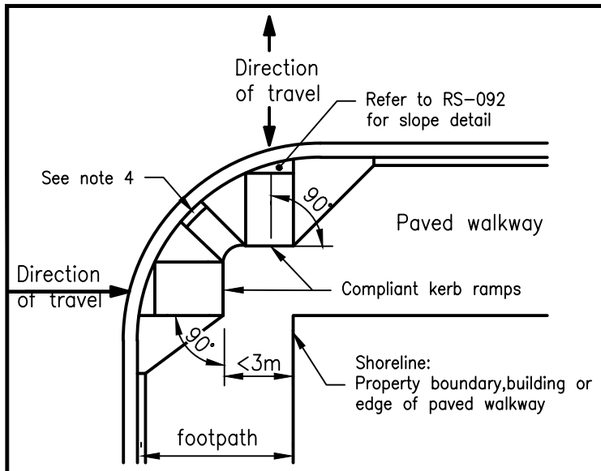
1. Kerb adaptors and other ancillary components within the verge are to be designed to cater for residential vehicle loadings and be approved by the relevant Council.
2. Roofwater/Stormwater drains are to transport only clean stormwater runoff from roofed or otherwise uncontaminated areas.
3. The requirements of AS 3500.3.1 Stormwater drainage – Performance requirements and the Queensland Building Code Regulations are to be met.
4. Roofwater/Stormwater drain outlets are not to be positioned within 5 metres of the upstream side of a catchpit (measured from the nearest catchpit component). Thus providing uncompromised capture efficiency of the catchpit. Outlets in this area are to discharge into the catchpit. The maximum discharge of stormwater drainage allowable to Council's kerb & channel street drainage system at any one location is 25 litres/second.
5. Council approval is required to connect to stormwater infrastructure such as manholes, catchpits and the like.
6. An alternative Roofwataer/Stormwater drain within the verge is two continual lengths of 125x75x3 hot dipped galvanised RHS at a grade no flatter than 1 in 200 and cut to finish flush with the kerb profile. All cut ends are to be cold galvanised and the kerb reinstated. Concrete cover to relevant Council approval.
7. Council's policy is that provision and maintenance of private Roofwater/Stormwater drains are the responsibility of the property owner. The property owner is also responsible for verge restoration to original conditions after construction.
8. Appropriate measures are to be taken to ensure work site safety during construction.
9. The minimum requirement for new allotments is the provision of two kerb adaptors plus piped drainage to the far edge of the concrete footpath where applicable.
10. All dimensions are in millimetres unless shown otherwise.

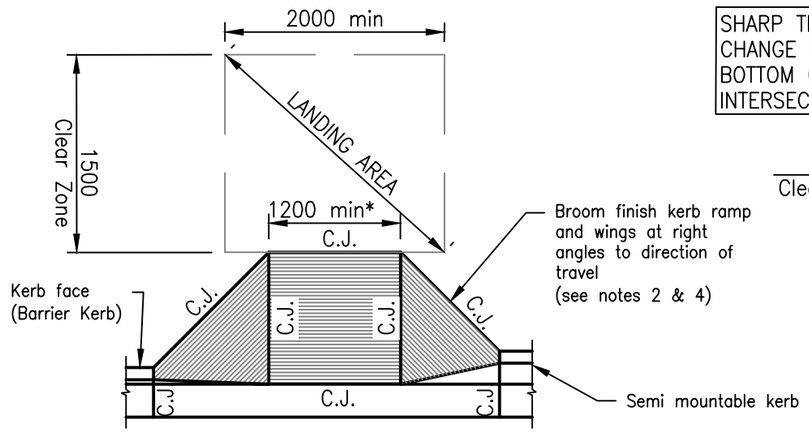
Rv.	DATE	REVISIONS
F	03/14	Amended Standard Drawings
E	12/11	Drawing number changed from SEQ R–081 to R–081
D	06/11	Review
C	06/10	Review
B	06/09	Review
G	06/14	Review
	03/08	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

KERB AND CHANNEL
RESIDENTIAL DRAINAGE CONNECTIONS

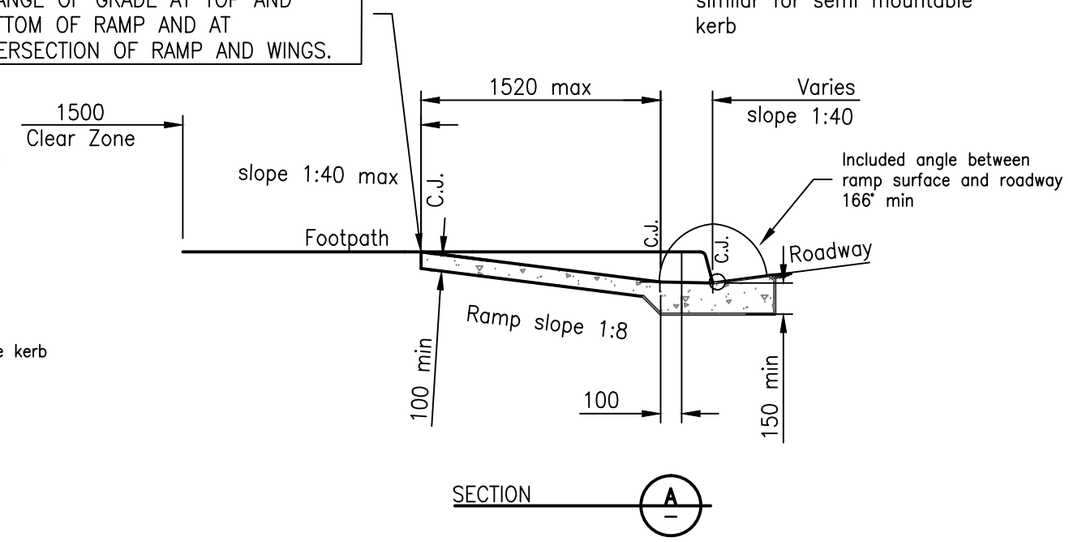
RS–081





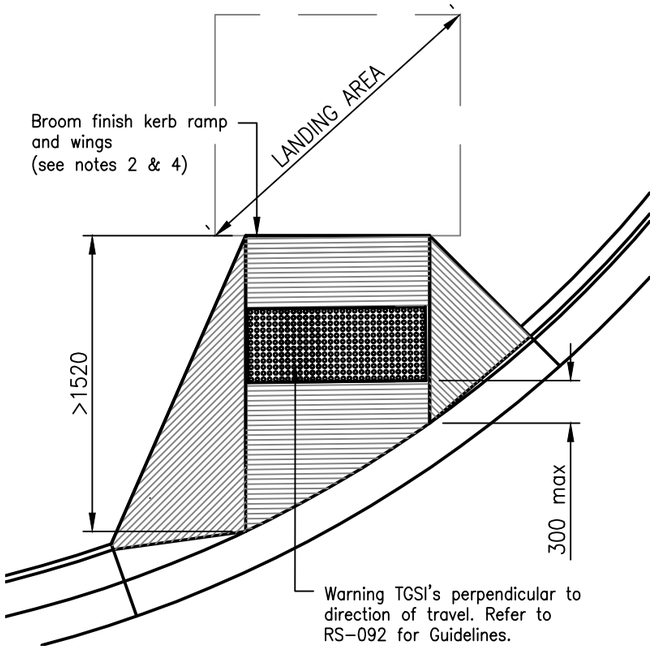
SHARP TRANSITION (NO ROUNDING) AT CHANGE OF GRADE AT TOP AND BOTTOM OF RAMP AND AT INTERSECTION OF RAMP AND WINGS.

Barrier kerb shown. Details similar for semi mountable kerb

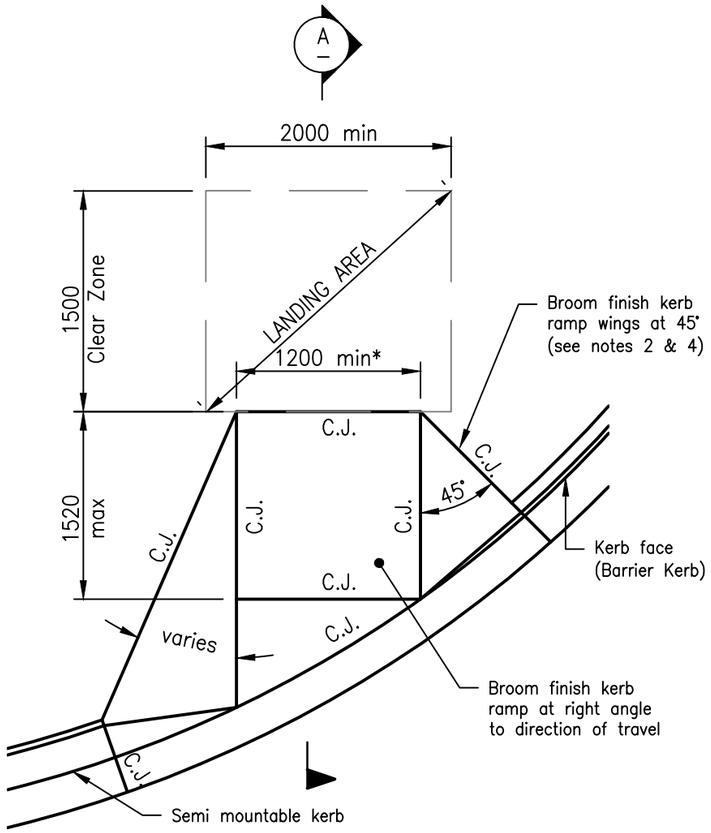


COMPLIANT KERB RAMP ALIGNMENT

Refer drawing RS-092 for criteria where TGSI's are required.



NON-COMPLIANT KERB RAMP PLAN VIEW



COMPLIANT KERB RAMP PLAN VIEW

*Kerb ramp to be 1200 min wide or as specified on construction drawings.

COMPLIANT KERB RAMP ALIGNMENT

NOTES:

A compliant kerb ramp exists where all the following are satisfied:

1. TOP OF RAMP: There shall be a minimum obstruction free wheelchair turnaround distance of 1500 beyond the top of the ramp. The sharp transition at the top and bottom of the ramp shall be perpendicular to the direction of travel. The top of ramp landing area shall have a minimum of 2000 long by 1500 wide clear zone.
2. RAMP: maximum ramp slope for wheelchair access shall be 1:8. A sharp transition (no rounding) is to be maintained at the intersection of graded plane surfaces (top & bottom of ramp and intersection of ramp and wings). The intersection of the ramp and wings should be a tooled joint.
3. RAMP ALIGNMENT: Ramps shall be aligned parallel to the pedestrian direction of travel. Ramps on both sides of a carriageway shall be aligned with one another and the direction of travel.
4. KERB RAMP WINGS: The required wing angle is 45°. Subject to the approval of the superintendent, wings may be angled at less than 45° if the wing is required to be clear of traffic signals hardware, other wings or utility pits/manholes. Wing angle may also be reduced at obtuse angled intersections. Wing widths shall be between 600 and 1500. A maximum slope of 1 on 4 is to be maintained on the wings at the kerb face (ie min 600 wide wing for a 150 kerb). At least a 1 metre kerb upstand is desirable between adjacent kerb ramps wings on an intersection corner.
5. SURFACE OF RAMP and sloping sides shall be slip resistant as specified in AS/NZS 1428.1.

General:

6. CONCRETE to be Class N32/10. All concrete to be broom finished. Ramp to be cast monolithically with the channel or tray.
7. All dimensions are in millimetres unless shown otherwise.

Australian Standards:

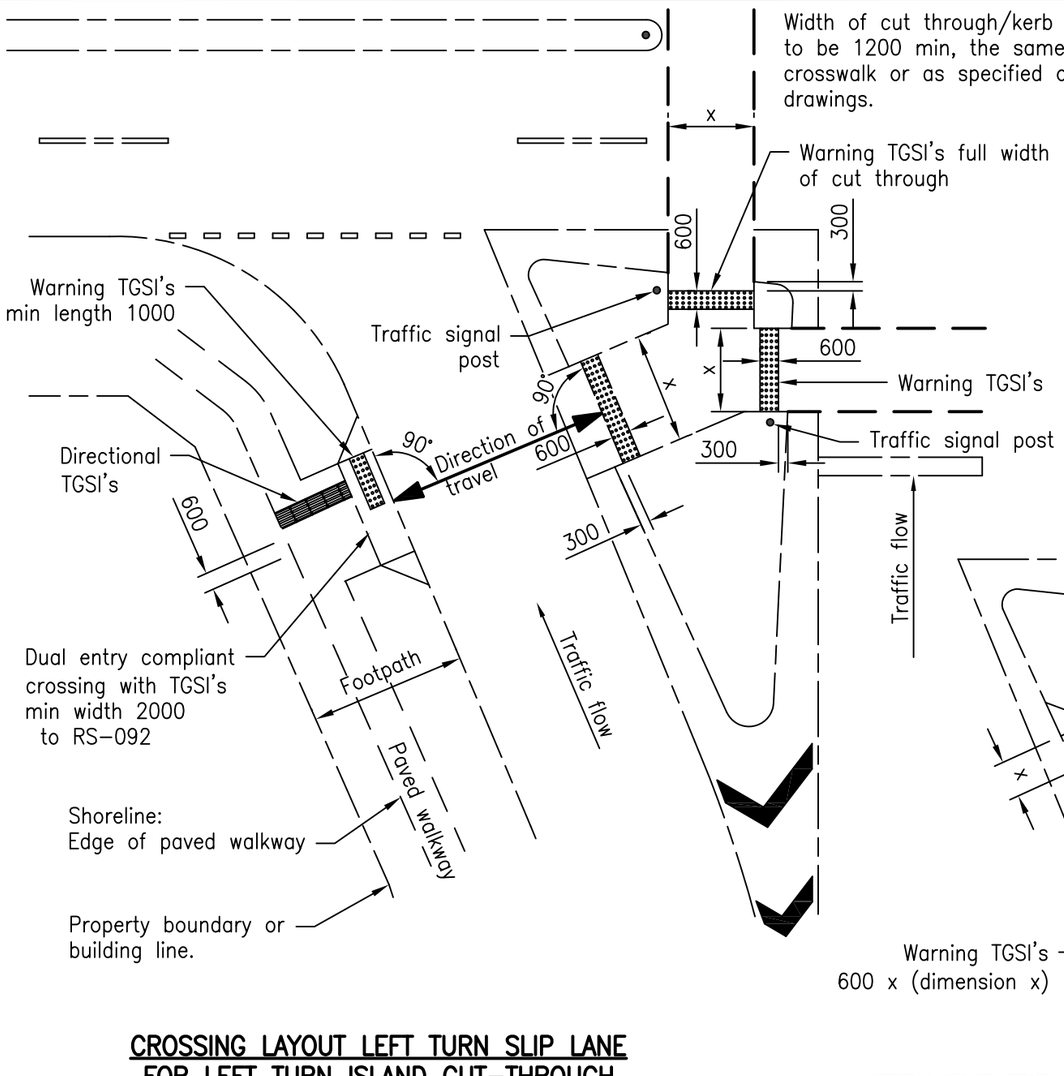
AS 2876 Concrete kerbs and channels (gutters) – Manually or Machine Placed
AS 1428.1 Design for access and mobility – Part 1 General requirements for access – New building work
AS/NZS 1428.4.1 Design for access and mobility – Part 4.1 Means to assist the orientation of people with vision impairment – Tactile Ground Surface Indicators

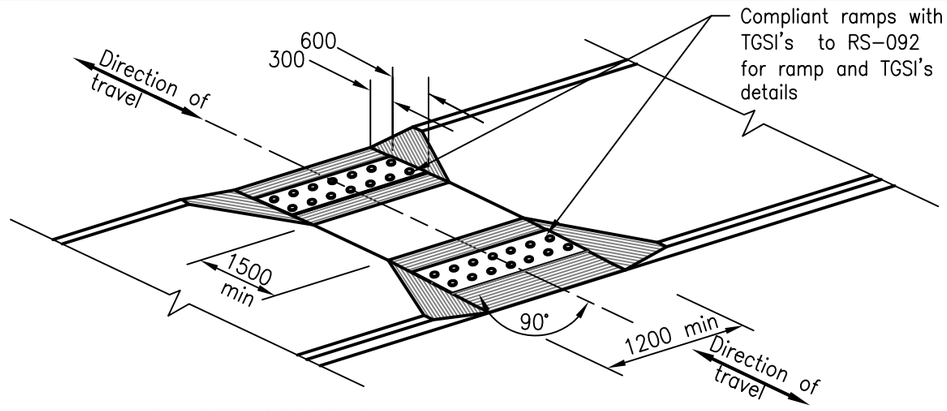
Rv.	DATE	REVISIONS
F	03/14	Amended Standard Drawings
E	12/11	Drawing number changed from SEQ R-090 to RS-090
D	06/11	Review
C	06/10	Review
B	06/09	Review
G	06/14	Review
	03/08	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

KERB RAMPS
RAMPED PEDESTRIAN CROSSINGS

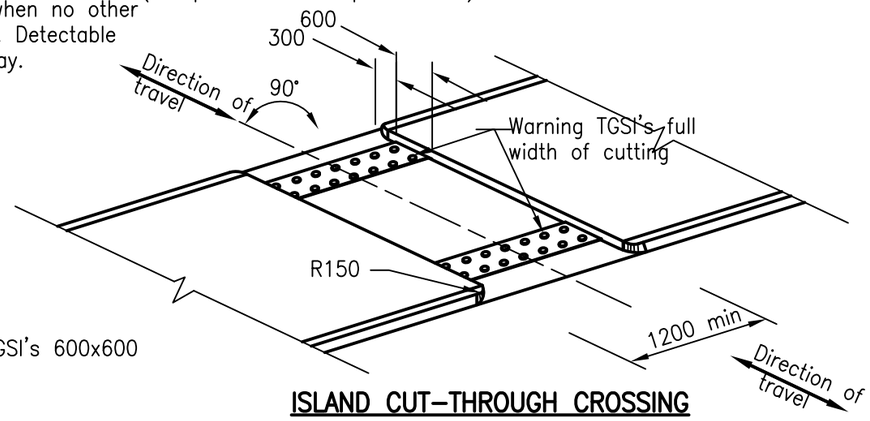
RS-090



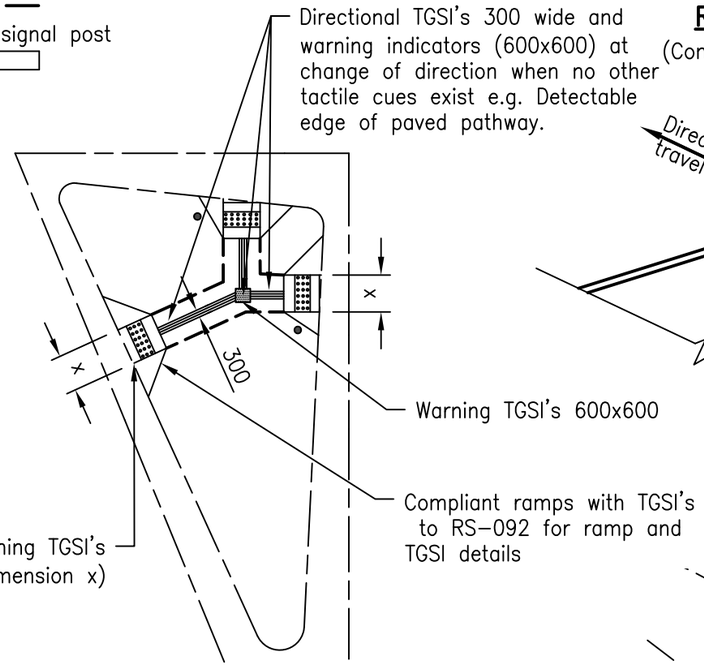


RAMPED CROSSING

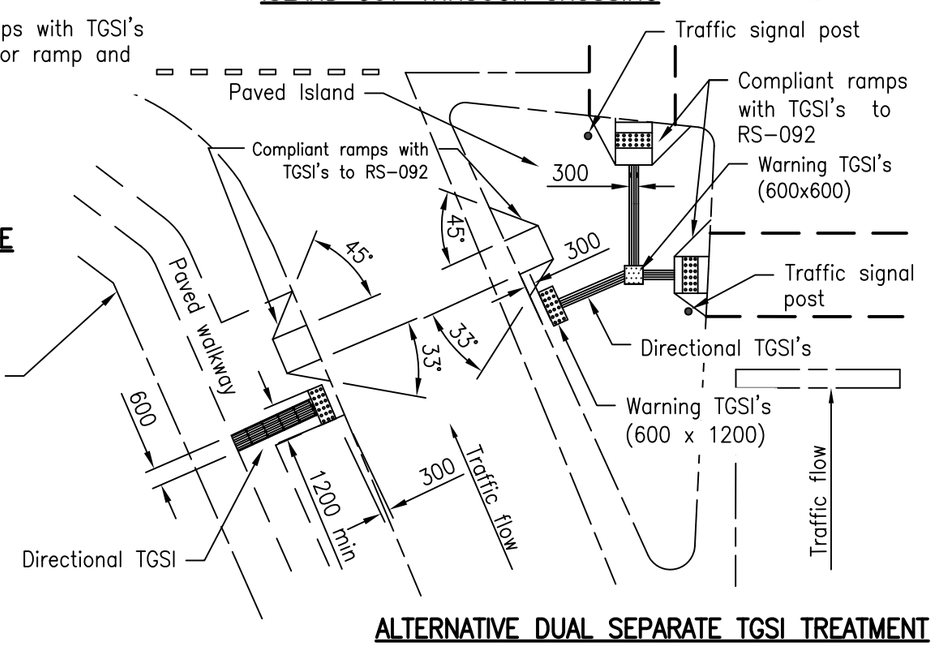
(Compliant kerb ramps installed)



ISLAND CUT-THROUGH CROSSING



ALTERNATIVE TREATMENT ACROSS LEFT TURN ISLAND KERB RAMPS WITH DIRECTIONAL TGSI OR WALKWAY EDGE



ALTERNATIVE DUAL SEPARATE TGSI TREATMENT ACROSS LEFT TURN SLIP LANE

CROSSING LAYOUT LEFT TURN SLIP LANE FOR LEFT TURN ISLAND CUT-THROUGH

NOTES:

1. Ramp details and notes as for Kerb Ramps to RS-090.
2. Tactile ground surface indicators (TGSI's) shall be in accordance with AS 1428.4.1.
3. Directional TGSI's to continue to the top of kerb ramp, unless edge of paved walkway provides consistent detectable cue for pedestrians with vision impairment.
4. Cut-through islands are to be constructed parallel to the direction of travel.
5. Installation of TGSI's on ramped kerb crossings to RS-092 & RS-093.
6. TGSI's to be provided at designated crossing points when new designs or modifications are being carried out to island or median cut throughs.
7. All dimensions are in millimetres unless shown otherwise.

REFERENCED DOCUMENTS:

Australian Standards:

AS 2876 Concrete kerbs and channels (gutters) – Manually or Machine Placed
AS 1428.1 Design for access and mobility – Part 1 General requirements for access – New building work
AS/NZS 1428.4.1 Design for access and mobility – Part 4.1 Means to assist the orientation of people with vision impairment – Tactile Ground Surface Indicators

These drawings have been developed in consultation between the participating Councils.
BEFORE USE, the user shall confirm that the drawing has been adopted by the appropriate Council.

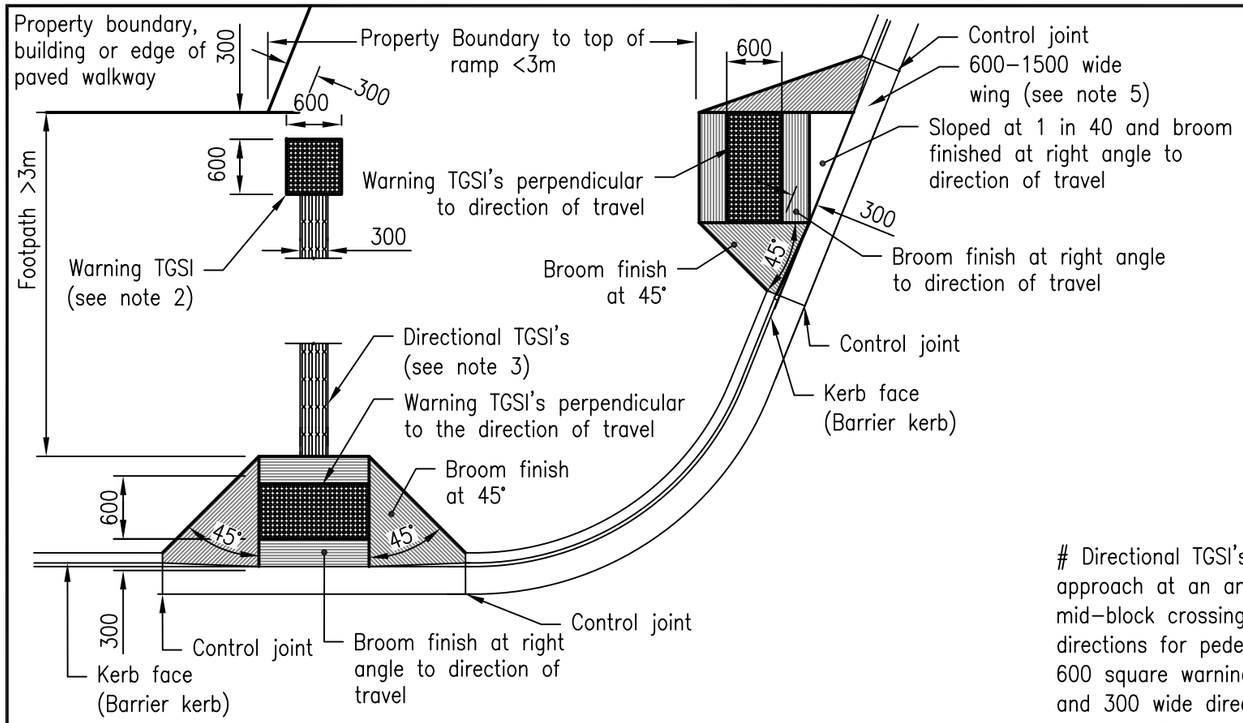
Rv.	DATE	REVISIONS
F	06/14	Review
E	12/11	Drawing number changed from SEQ R-091 to RS-091
D	06/11	Review
C	06/10	Review
B	06/09	Review
A	03/08	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

KERB RAMPS
RAMPED AND CUT THROUGH TREATMENTS
FOR PEDESTRIAN CROSSINGS
SLIP LANES AND MEDIANS

RS-091

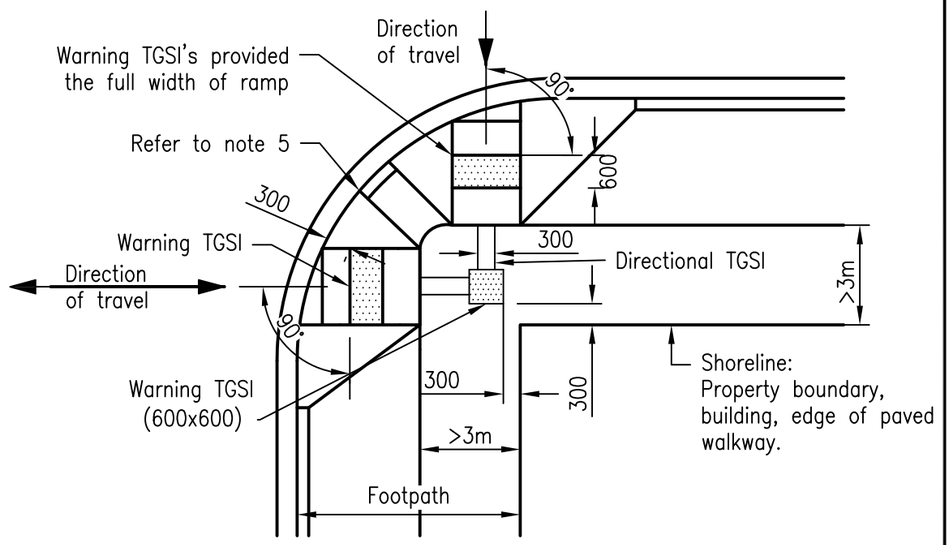
Rv. F E D C B A



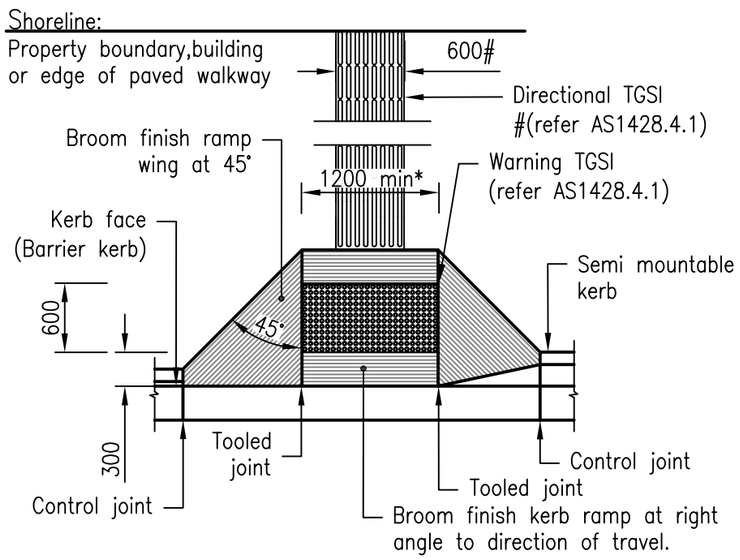
COMPLIANT KERB RAMPS AND TGSI's APPLICATION EXAMPLE PLAN VIEW

Directional TGSI's are 600 wide where pedestrians approach at an angle to the path of travel (eg at a mid–block crossing point). If there is a choice of directions for pedestrians (eg on intersection corner) install 600 square warning TGSI's pad 300 from the shore line/s and 300 wide directional TGSI's between top of kerb ramp and the 600 square warning TGSI's pad.

*Kerb ramp to be 1200 min wide or as specified on construction drawings.



COMPLIANT KERB RAMP ALIGNMENT – incl. TGSI's



COMPLIANT MID BLOCK KERB RAMP incl. TGSI's

GUIDELINES

For the installation of Tactile Ground Surface Indicators (TGSI) for pedestrians with a vision impairment at ramped kerb crossings (kerb ramps):

A. Warning and directional TGSI's shall conform with AS/NZS 1428.4.1 Design for Access and Mobility – Part 4: Tactile Indicators.
B. Tactile indicators shall have luminance contrast in all conditions (eg wet/dry, day/night). Tactile indicators and their base shall be slip resistant. Refer AS/NZS 1428.4.1 for luminance contrast and slip resistance requirements.
C. Warning TGSI's shall be installed (dimensions in brackets are warning TGSI dimensions):
   a) to warn pedestrians with a vision impairment of hazards.
   b) 300 from any hazard e.g. roadway (600 deep x full width of kerb ramp, path of travel or cut through median/island)
   c) perpendicular to the direction of travel.
   d) at the intersection of 2 (or more) directional indicator strips to indicate a change of direction (600 x 600).
   e) When kerb ramp gradient is shallower than 1:8.5.
D. Directional TGSI's shall be installed (dimensions in brackets are directional TGSI dimensions):
   a) to give directional guidance to pedestrians with a vision impairment in the absence of normally available cues.
   b) along the centreline of the direction of travel.
   d) at mid–block kerb ramps or street crossings to direct pedestrians with a vision impairment to the crossing point (600 x property boundary to top of kerb ramp).
   e) between a warning indicator pad indicating a choice of directions and the top of kerb ramps where 2 pedestrian crossings exist on a corner of an intersection.
E. The installation of TGSI should be prioritised as follows:
   a) NO TGSI's REQUIRED when all criteria at Note G are satisfied;
   b) Multiple entry kerb ramp treatment installed (Dual entry or Dual separate). Multiple entry kerb ramps must only be installed when there is sufficient space on both sides of the crossing (see AS/NZS 1428.4.1 for details of multiple entry treatments);
   c) Warning TGSI on the face of a compliant kerb ramp.
F. If a warning TGSI treatment is installed, a warning TGSI treatment must be installed on the other side of the crossing.
G. TGSI's are not required at a crossing point if:
   a) a compliant kerb ramp is installed refer to RS–090.
   b) the top of ramp is within 3 metres of the end of the shore line (property boundary, building line or edge of paved walkway), and
   c) the ramp is in direct continuous accessible path of travel from the shore line (property line, building line or paved walkway) orientated in terms of normally available cues.
   In these situations, a colour treatment of the full width and length of the face of the ramp may assist pedestrians with a vision impairment.
H. Examples of normally available cues that aid people with a vision impairment are:
   a) sharp transitions in grade between surfaces eg top and bottom of a 1 on 8 kerb ramp; change in grade between ramp and ramp wings.
   b) audio tactile push buttons, refer MUTCD Parts 10 and 14 for location and orientation of pedestrian push buttons. Note, an audio tactile push button alone is an insufficient cue for a pedestrian with a vision impairment to find the crossing point.
   c) a detectable edge of a paved walkway or cut through island.

NOTES:

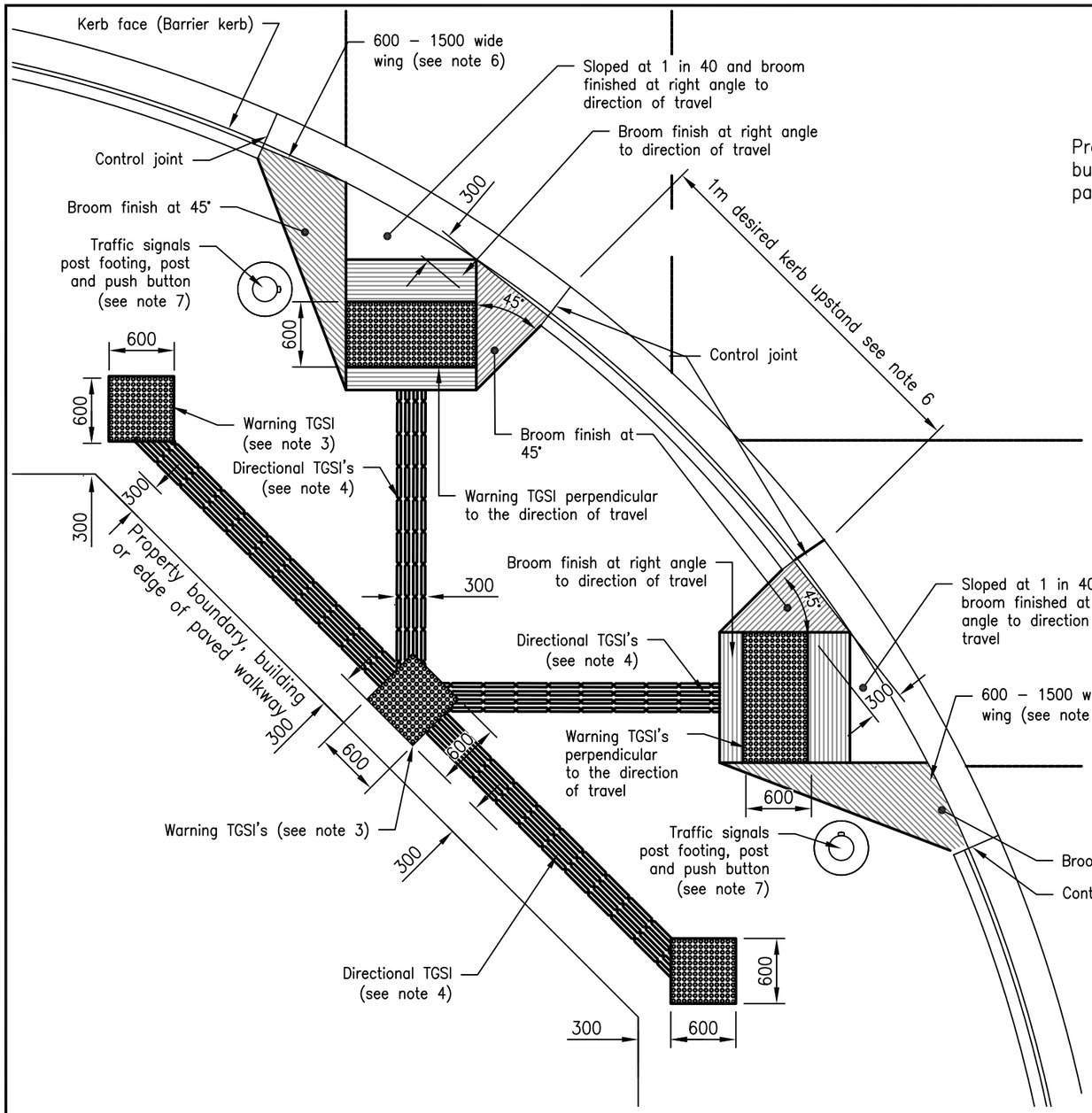
1. For details of compliant kerb ramps refer to RS–090 and RS–091.
2. Warning indicators required adjacent to shoreline (property boundary) to indicate change/choice of direction.
3. Directional indicators are required from the warning indicator pad to the top of the kerb ramps.
4. Warning indicators are required on the kerb ramp to warn of the hazard (the road/traffic). Can be omitted if kerb ramp is in accordance with AS 1428.1 & < 3 metres from the building line.
5. Kerb ramp wings may be angled at less than 45° if required to be clear of signals hardware, other kerb ramps or utility pits/manholes. Kerb ramp wings may also be reduced at obtuse angled intersections, wings shall have a width between 600mm and 1500mm. A maximum of 1:4 slope on kerb ramp wings should be maintained (600mm wide wing for a 150mm kerb). A 1m kerb upstand is desirable between adjacent ramp wings (which may necessitate reduced wing angles).
6. All Dimensions are in millimetres unless shown otherwise

Rv.	DATE	REVISIONS
F	06/14	Review
E	03/14	Amended Drawing Number
D	12/11	Drawing number changed from SEQ R–092 to RS–092.
C	06/11	Review
B	06/10	Review
G	02/16	Amendment to Guideline B

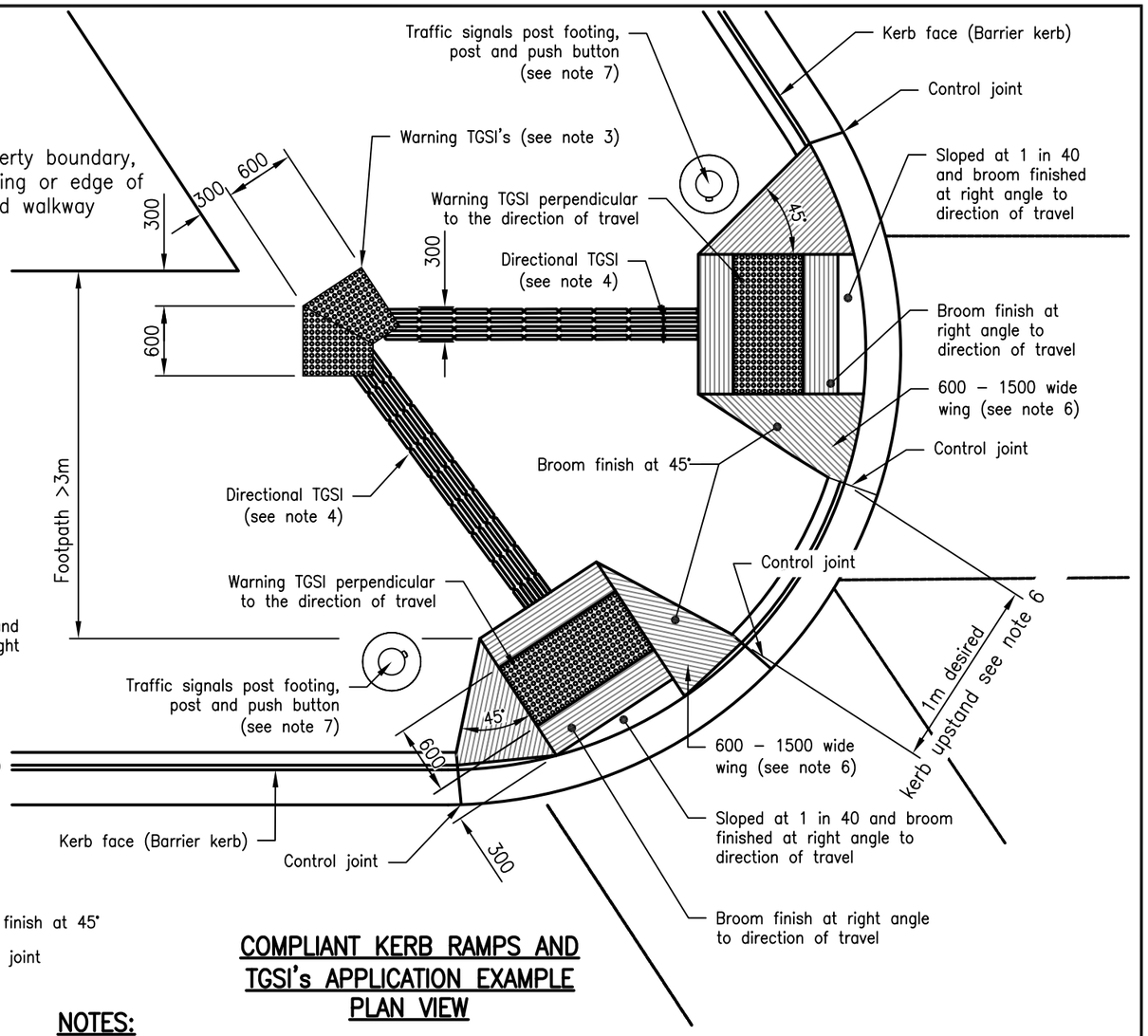
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

KERB RAMPS
INSTALLATION OF TGSI's
ON RAMPED KERB CROSSINGS

RS–092



COMPLIANT KERB RAMPS AND TGSI's APPLICATION EXAMPLE PLAN VIEW



COMPLIANT KERB RAMPS AND TGSI's APPLICATION EXAMPLE PLAN VIEW

NOTES:

1. For details of compliant kerb ramps refer to RS–090.
2. For details of warning and directional TGSI's, refer to AS 1428.4.1
3. Warning indicators required adjacent to property boundary to indicate change of direction.
4. Directional indicators are required from the warning indicator pad to the top of the kerb ramps.
5. Warning indicators are required on the kerb ramp to warn of the hazard (the road/traffic)
6. Kerb ramp wings may be angled at less than 45° if required to be clear of signals hardware, other kerb ramps or utility pits/manholes. Kerb ramp wings may also be reduced at obtuse angled intersections, wings shall have a width between 600mm and 1500mm. A maximum of 1:4 slope on kerb ramp wings should be maintained (600mm wide wing for a 150mm kerb). A 1m kerb upstand is desirable between adjacent ramp wings (which may necessitate reduced wing angles).
7. For location of traffic signal posts and location and orientation of pedestrian push button assemblies refer to MUTCD Part 14. The push button post should be located on a level surface and the push button assembly located within the zone of common reach. Refer to AS 1428.2 i.e. button to be no more than 400mm outside the edge of a pathway or kerb ramp.
8. All dimensions are in millimetres unless shown otherwise.

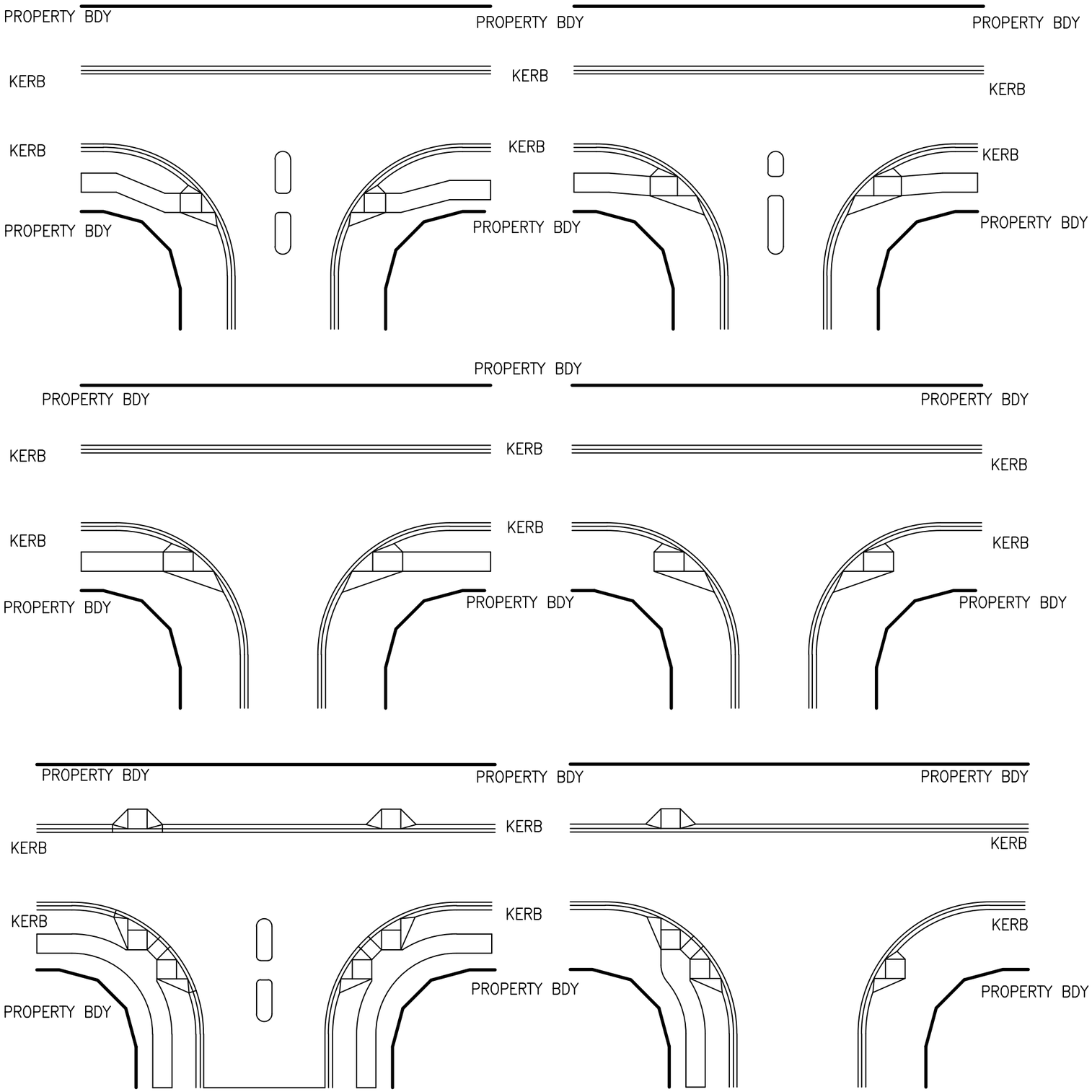
Rv.	DATE	REVISIONS
E	06/14	Review
D	03/14	Amended Drawing Number
C	12/11	Drawing number changed from SEQ R–093 to R–093.
B	06/10	Review
A	06/09	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

KERB RAMPS
INSTALLATION OF TGSI's ON RAMPED KERB CROSSINGS
APPLICATION EXAMPLES

RS–093

Rv. E D C B A



KERB RAMPS MUST ALWAYS ALIGN WITH THE OPPOSITE KERB RAMP & MEDIAN/ISLAND CUT THROUGHS

NOTES:

1. For details of compliant kerb ramps refer to RS–090.
2. For details of warning and directional TGSI's, refer to AS1428.4.1.
3. All dimensions are in millimetres unless shown otherwise.

These drawings have been developed in consultation between the participating Councils.
BEFORE USE, the user shall confirm that the drawing has been adopted by the appropriate Council.

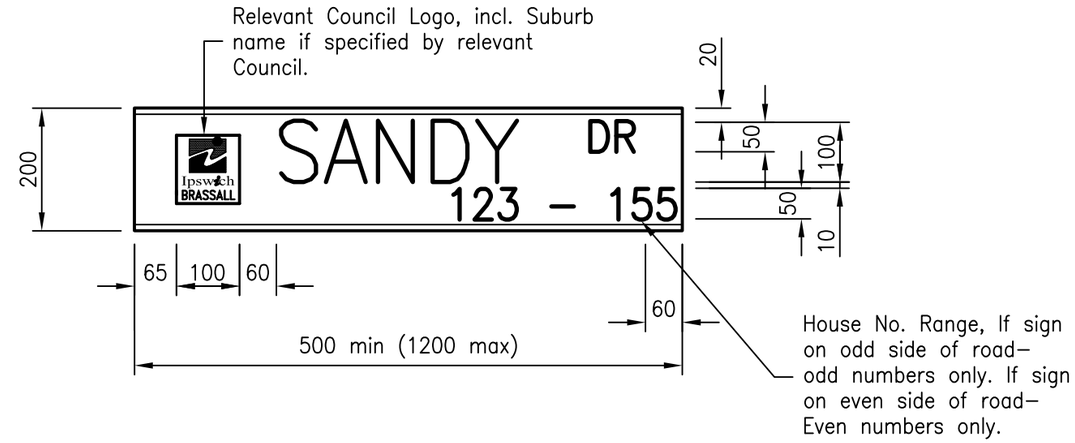
Rv.	DATE	REVISIONS
F	06/14	Review
E	05/14	Amended Drawing Layers & Text Style
D	03/14	Amended Drawing Number
C	12/11	Drawing number changed from SEQ R–094 to R–094
B	06/10	Review
A	06/09	ORIGINAL ISSUE

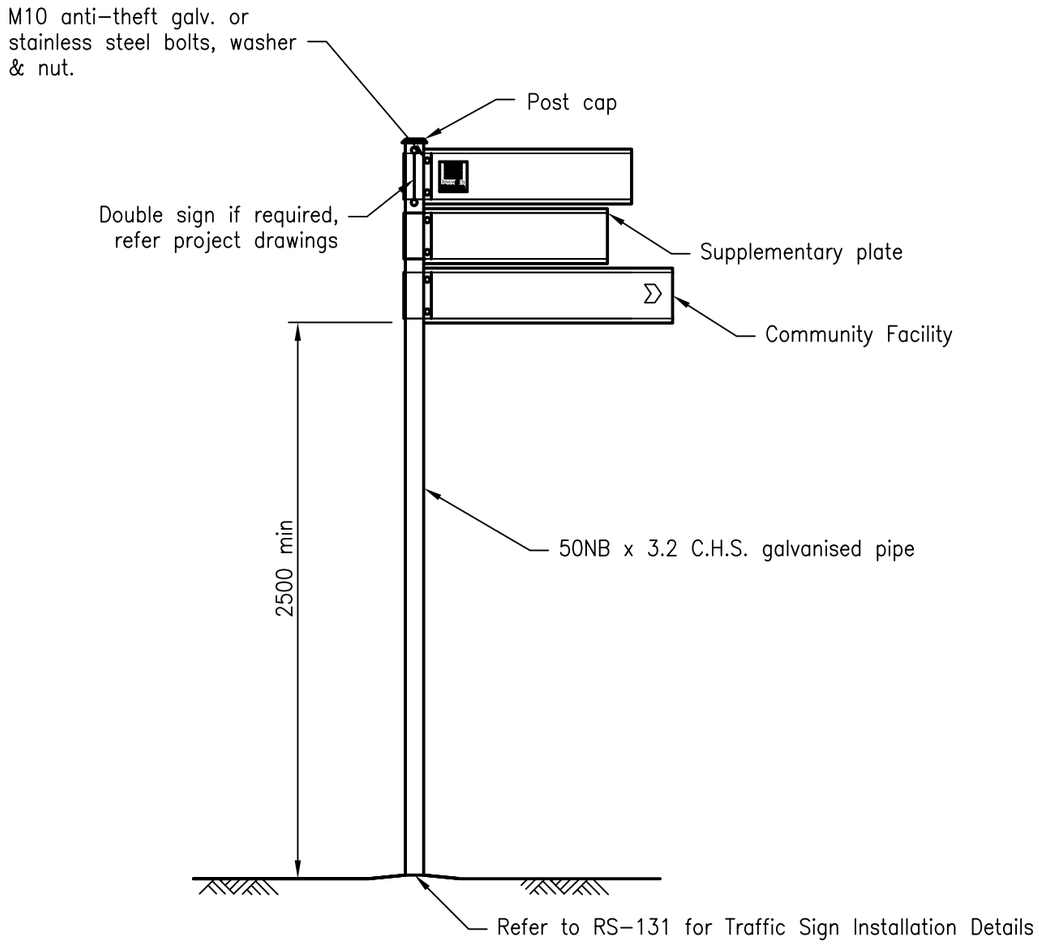
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

KERB RAMPS
LOCATIONS AND CONFIGURATIONS

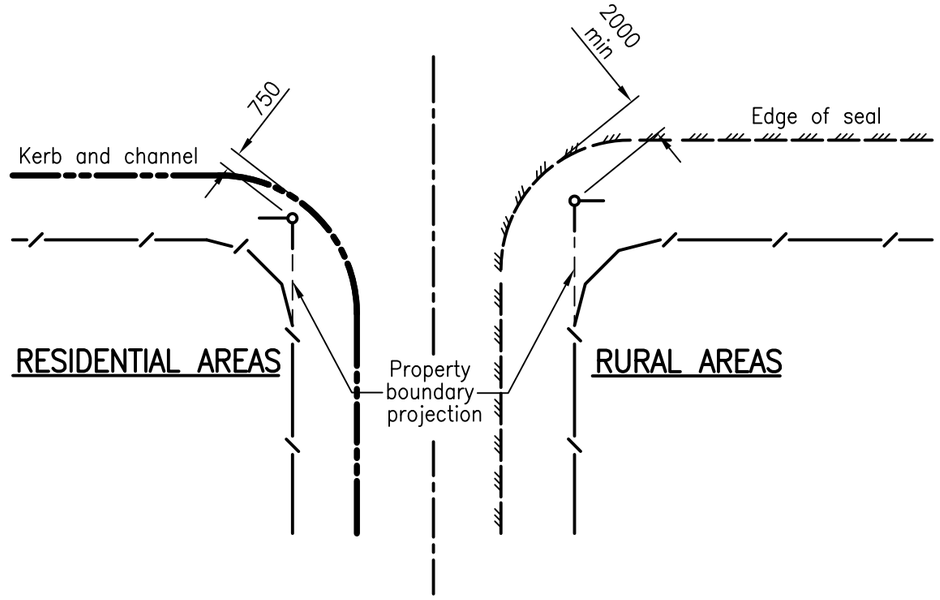
RS–094

Rv. F E D C B A





ELEVATION



STREET NAME SIGN LOCATIONS

NOTES:

1. Street names must be approved by relevant Council.
2. Name plates: 200 mm wide x 3 mm thick extruded aluminium or polypropylene section with top and bottom edge thickening.
3. Colour: The recommended colour for street name signs is a black legend on a Class 1 retro–reflective white background in accordance with AS 1742.5.
4. Bracket: Proprietary bracket to suit standard name plate (including 2 x M10 x 25mm anti–theft cadmium or stainless steel bolts nuts and washers). Locking nut to be utilised if specified by relevant Council.
5. Lettering & Numerals : Letters: 100 mm high, Series D, (narrower lettering is permissible in accordance with the MUTCD). Numerals: 50 mm high, Series D. All text to AS 1744.
6. Supplementary Plates to be in accordance with the MUTCD.
7. Community Facility Plates: A desirable maximum of two and an absolute maximum of three facilities to be signposted at any one location in accordance with the MUTCD.
8. All signs are to be approved by relevant Council prior to erection.
9. Refer to RS–131 for Traffic Sign Installation Detail.
10. All dimensions are in millimetres unless shown otherwise.

Rv.	DATE	REVISIONS
E	06/14	Review
D	03/14	Amended Drawing Number
C	12/11	Amended to MUTCD and number changed SEQ R–130 to RS–130
B	06/11	Review
A	11/09	ORIGINAL ISSUE

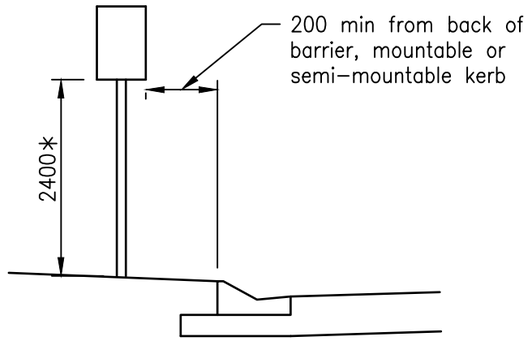
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

ROAD FURNITURE
STREET NAME SIGN AND LOCATION (FINGER BOARD)

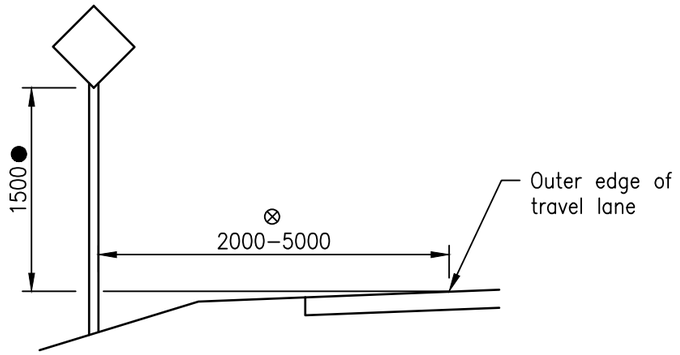
RS–130

E D C B A Rv.

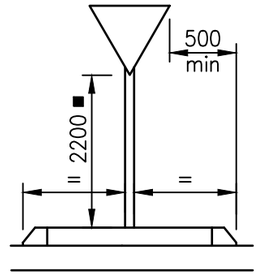
CAUTION
Confirm existence of services prior to installation of sign



RESIDENTIAL AREAS

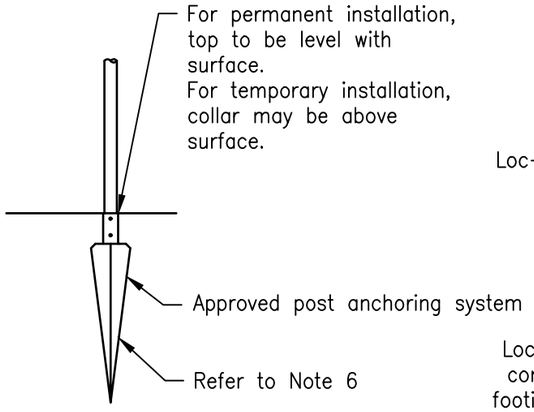


RURAL ROADS

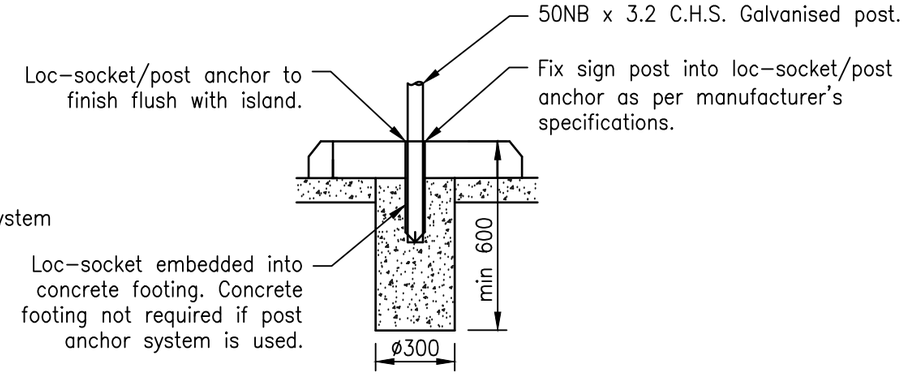


MEDIANS

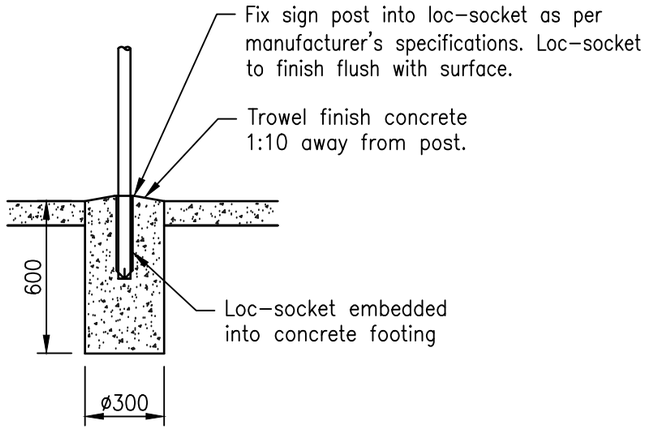
LOCATION OF SIGNS



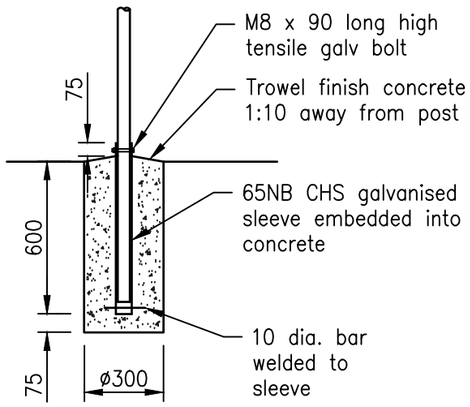
TYPICAL POST ANCHOR



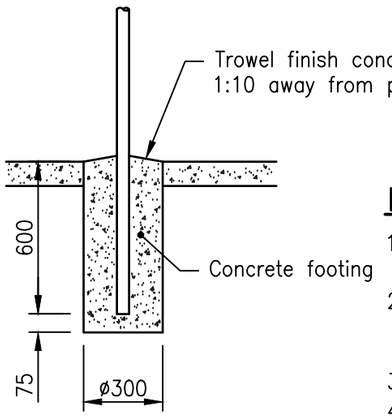
MEDIANS



LOC–SOCKET (OR SIMILAR)



TYPICAL SLEEVE



CONCRETE FOOTING

These drawings have been developed in consultation between the participating Councils.
BEFORE USE, the user shall confirm that the drawing has been adopted by the appropriate Council.

LEGEND

✳ When sign overhangs a pathway, dimension to be 2500.

● Parking and Guide signs to be 2200 above road surface.

■ Some signs (Keep Left, No–U Turn, D4 Hazard series) to be mounted at 525. Height can be adjusted if there is a visibility problem.

⊗ At least 600 clearance to be provided to outer edge of shoulder, line of guide posts or guardrail.

NOTES:

1. All signs are to be approved by relevant Council prior to erection.
2. Signs to be positioned on the side of street/road that provides best visibility. Underground services are to be located prior to installation.
3. Concrete N20 in accordance with AS 1379 and AS 3600.
4. Bars ø10, Grade 250 to AS 1302.
5. Refer to MUTCD for sign locations.
6. Relevant Council approved post anchoring system to be installed to comply with manufacturer's specifications. Other post mounting systems may be used if approved by relevant Council.
7. All dimensions are in millimetres unless shown otherwise.

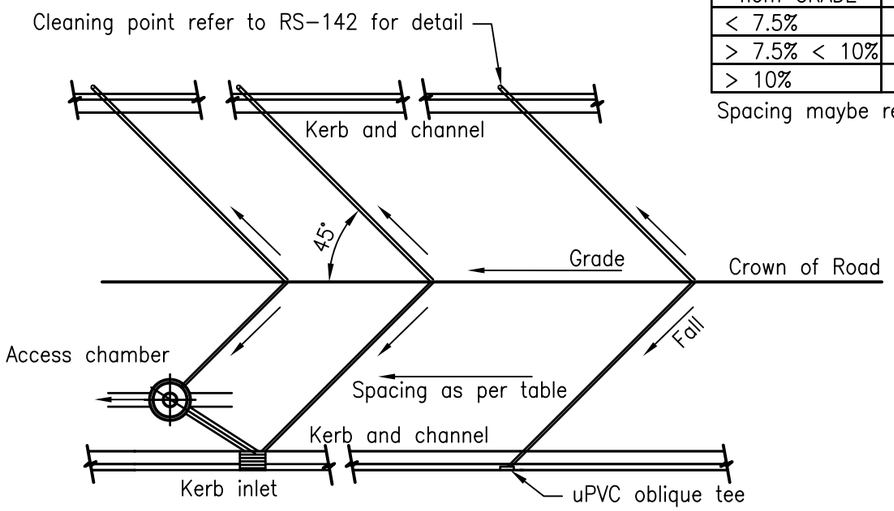
Rv.	DATE	REVISIONS
E	06/16	Review
D	06/14	Review
D	03/14	Amended Drawing Number
C	12/11	Drawing number changed from SEQ R–131 to RS–131
B	06/11	Review Issue
A	11/09	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

ROAD FURNITURE
TRAFFIC SIGN INSTALLATION DETAILS

RS–131

E D C B A Rv.

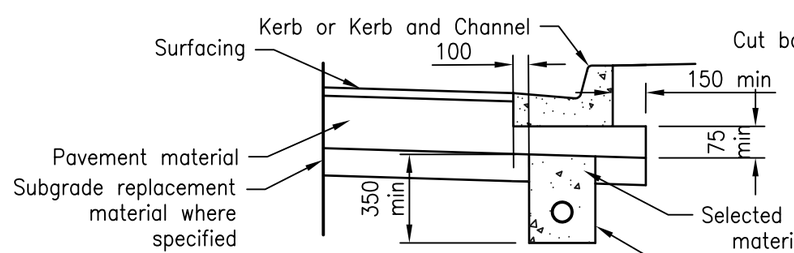


MITRE DRAIN SPACING

nom GRADE	SPACING
< 7.5%	40m centres
> 7.5% < 10%	30m centres
> 10%	20m centres

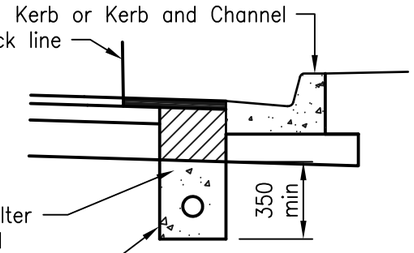
Spacing maybe reduced if required

TYPICAL MITRE DRAIN LOCATIONS

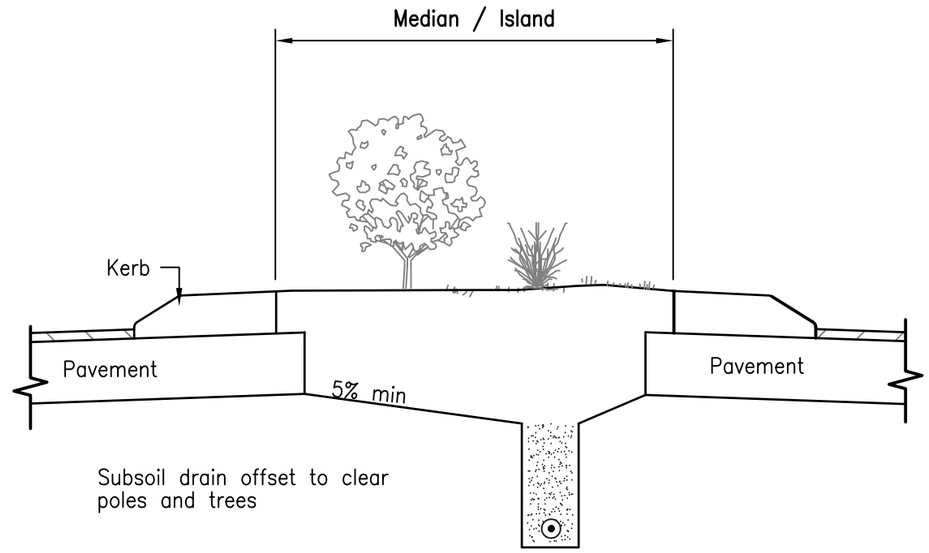


TYPICAL LOCATION NEW CONSTRUCTION

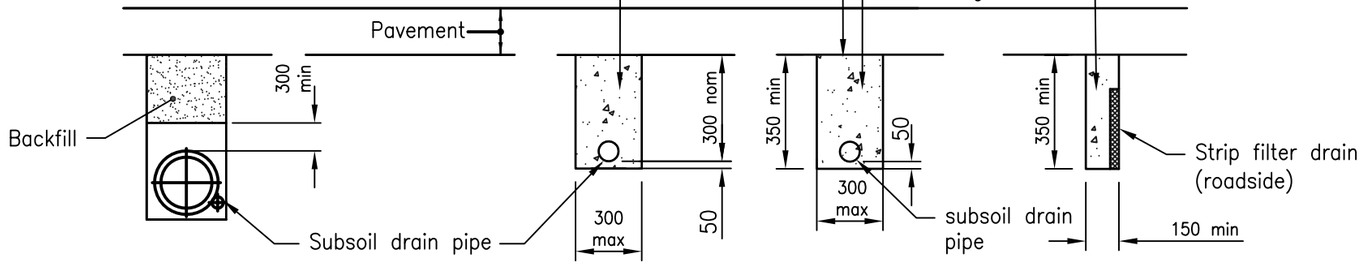
ALTERNATIVE LOCATION TO BE APPROVED BY RELEVANT COUNCIL



TYPICAL LOCATION WITH EXISTING K&C



ALTERNATIVE LOCATION LANDSCAPE MEDIAN



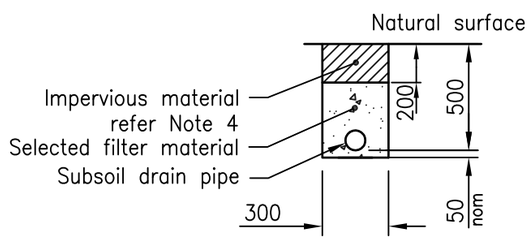
STORMWATER DRAINAGE TRENCHES WITH SUBSOIL DRAINAGE

TYPE A/B TYPE B/C TYPE B/D

A.S. SIEVE SIZE	5mm nom size % BY WT. PASSING	10mm nom size % BY WT. PASSING
13.20 mm	–	100
9.50 mm	–	85 – 100
6.70 mm	100	–
4.75 mm	85 – 100	0 – 20
2.36 mm	0 – 40	0 – 5
75 μm	0 – 2	0 – 2

FILTER MATERIAL GRADING

Unless otherwise specified



TYPE E

STANDARD SUBSOIL DRAIN

NOTES:

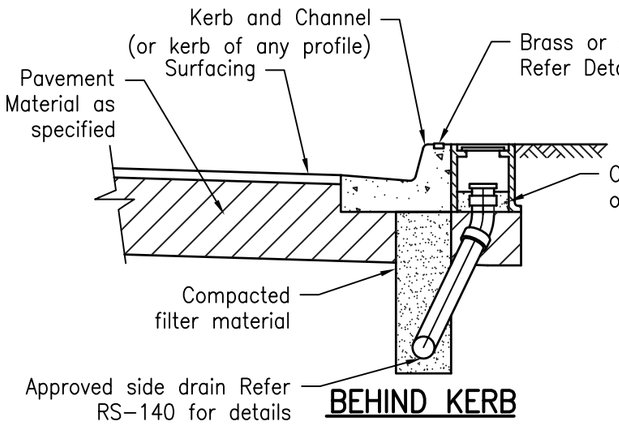
1. All subsoil drains to be Class 1000 polyethylene corrugated slotted pipe to AS 2439.1. Drains shall outlet at drainage pit, preferably or stormwater pipe 200 above invert min grade 0.5%, unless approved otherwise. Other pipes and fittings to be uPVC to AS 1254.
2. Filter materials not complying with the specified grading requirements may be used when approved by the relevant Council. A geofabric may be used to line trenches where approved by the relevant Council.
3. Refer to RS–142 for subsoil drainage access point details.
4. Impervious material to be provided where subsoil drainage is not under a pavement. When impervious material is omitted the backfill/selected filter material shall extend to underside of pavement.
5. All dimensions are in millimetres unless shown otherwise.

Rv.	DATE	REVISIONS
F	03/14	Amended Drawing Number
E	12/11	Drawing number changed from SEQ R–140 to RS–140
D	06/11	Review
C	06/10	Review
B	06/09	Review
G	06/14	Review

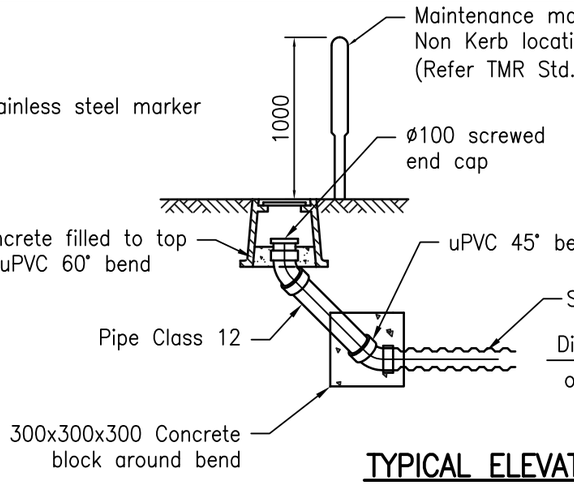
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

SUBSOIL DRAINS DETAILS AND LOCATIONS

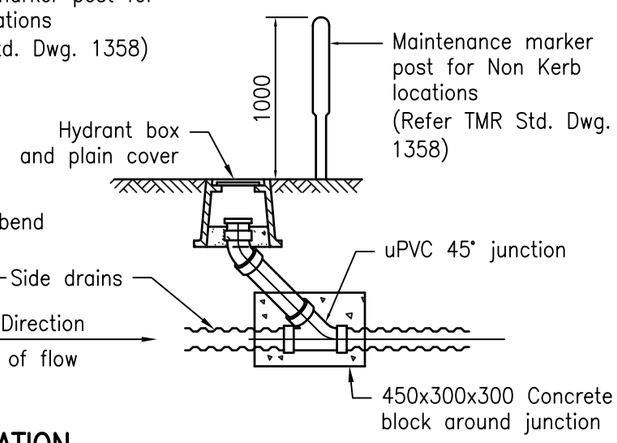
RS–140

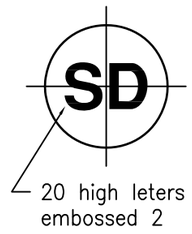


BEHIND KERB

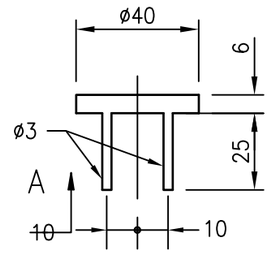


TYPICAL ELEVATION





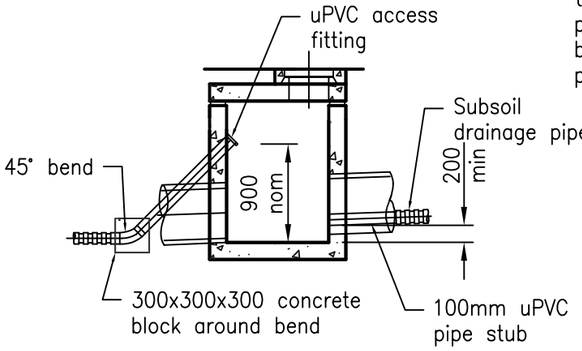
PLAN



SECTION

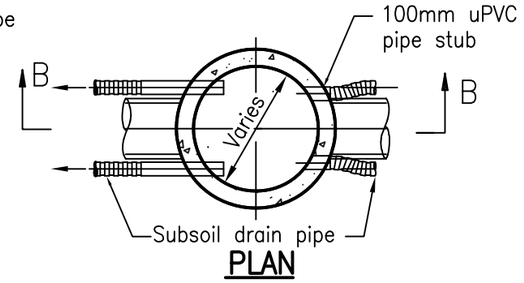
Approved propriety stainless steel markers also permitted

BRASS MARKER DETAIL



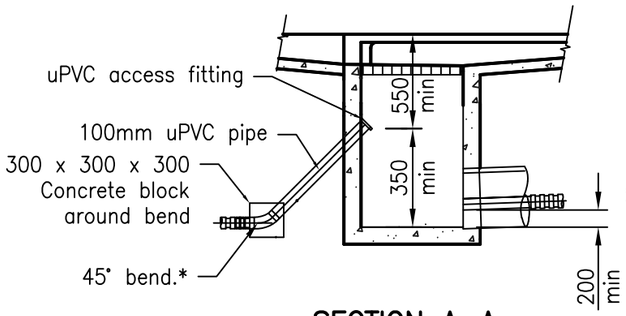
SECTION B–B

* Bend may be omitted where there is insufficient depth to the side drain trench. A min fall of 100mm is to be provided in the connection pipe between the cap and the side drain pipe

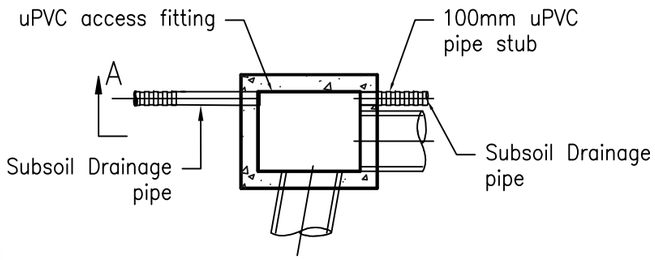


PLAN

CONNECTION DETAIL – ACCESS CHAMBER

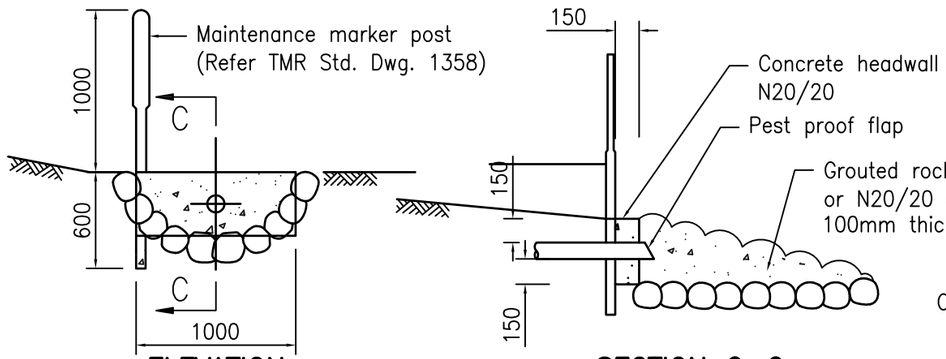


SECTION A–A



PLAN

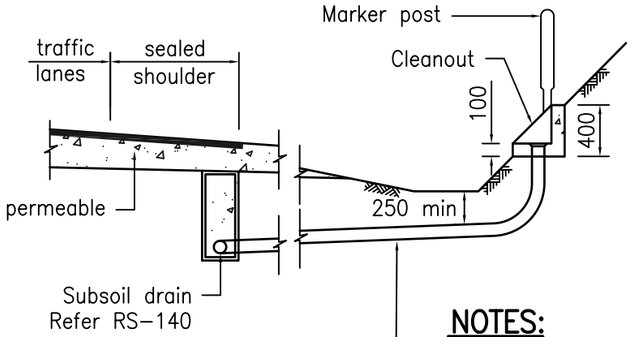
CONNECTION DETAIL – KERB INLET



ELEVATION

SECTION C–C

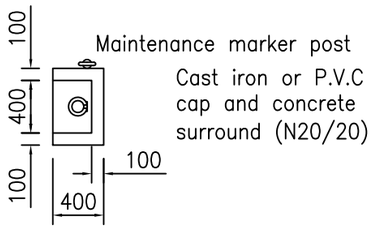
OUTLET TO NATURAL SURFACE



Subsoil drain cleanout – 100 dia upvc SH pipe
Cleanouts at head of pipe and at 60m maximum spacings(50m spacing for strip filter drains)

CUTTING CROSS SECTION

SUBSOIL DRAIN AND CLEANOUT



CLEANOUT

NOTES:

1. Refer to RS–140 for subsoil drain details and locations.
2. All pipes and fittings other than subsoil drains to be 100 dia Class 12 pipe.
3. All subsoil drains shall be in accordance with TMR specification MRTS03.
4. Concrete anchors to be N20 in accordance with AS 1379 and AS 3600.
5. All dimensions are in millimetres unless shown otherwise.

These drawings have been developed in consultation between the participating Councils. BEFORE USE the user shall confirm that the drawing has been adopted by the appropriate Council.

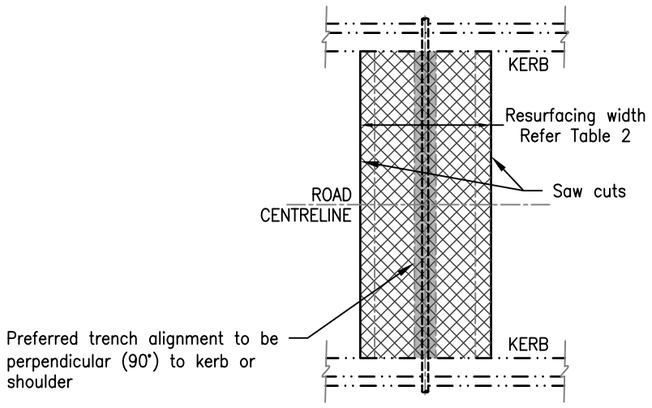
Rv.	DATE	REVISIONS
E	06/14	Review
E	03/14	Amended Drawing number
D	12/11	Drawing number changed from SEQ R–142 to RS–142
C	06/11	Review
B	06/09	Review
A	03/08	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

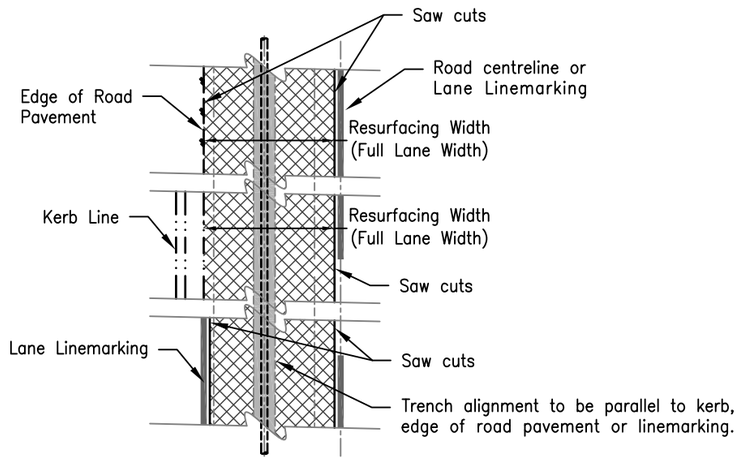
SUBSOIL DRAINS
ACCESS POINTS

RS–142

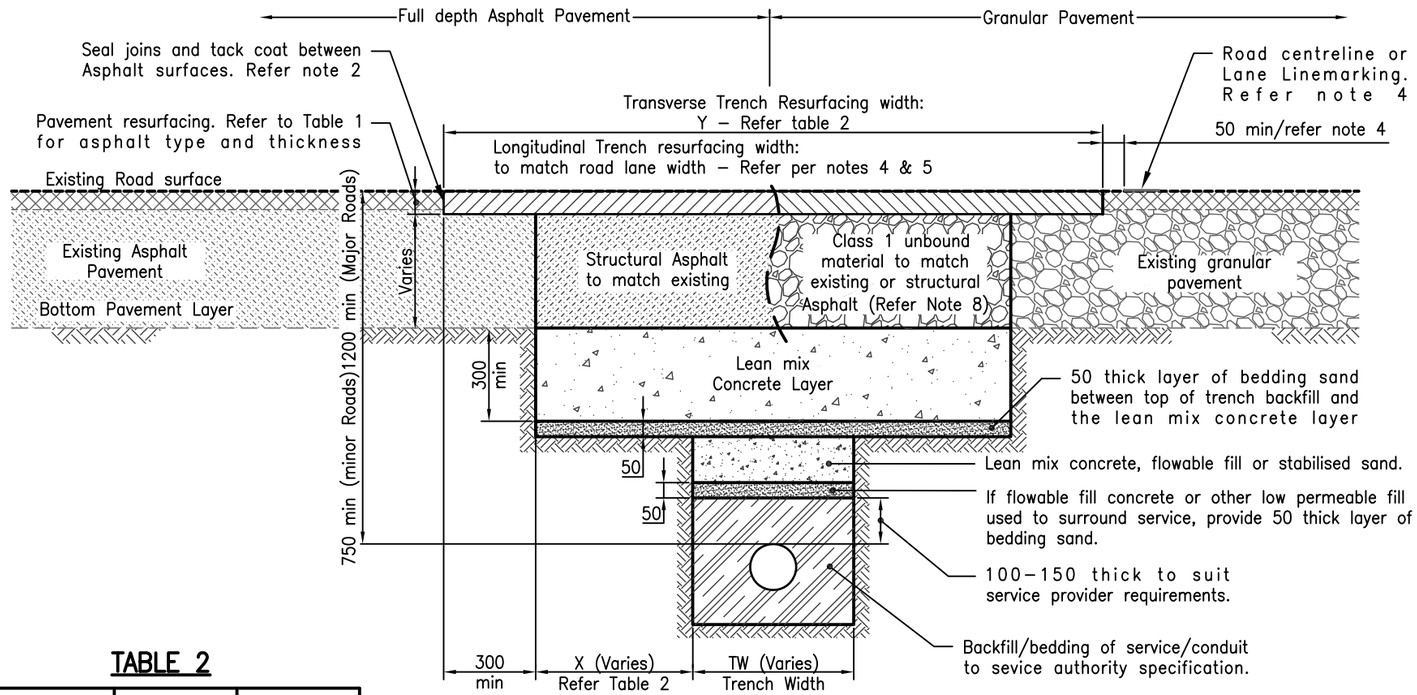
Rv. E D C B A



TYPICAL PLAN VIEW – TRANSVERSE TRENCH



TYPICAL PLAN VIEW – LONGITUDINAL TRENCH
(REFER NOTE 4)



TYPICAL TRENCH REINSTATEMENT CROSS–SECTION

TABLE 2

TRENCH WIDTH (TW)	X	Y
<600	TW/2 (150 min)	1500 min
>600	300 min	2200 min

TABLE 1 – SURFACE LAYER

	ASPHALT MIX		SURFACE THICKNESS (EXCLUDING PAVEMENT)	
LOCATION	BCC	TMR	EACH LAYER	TOTAL SURFACE THICKNESS
minor Road	Type 2	DG10	25–40	min 50mm or adjacent Asphalt thickness, whichever is greater
Major Road	Type 3	DG14	50–60	min 100mm or adjacent Asphalt thickness, whichever is greater

NOTES:

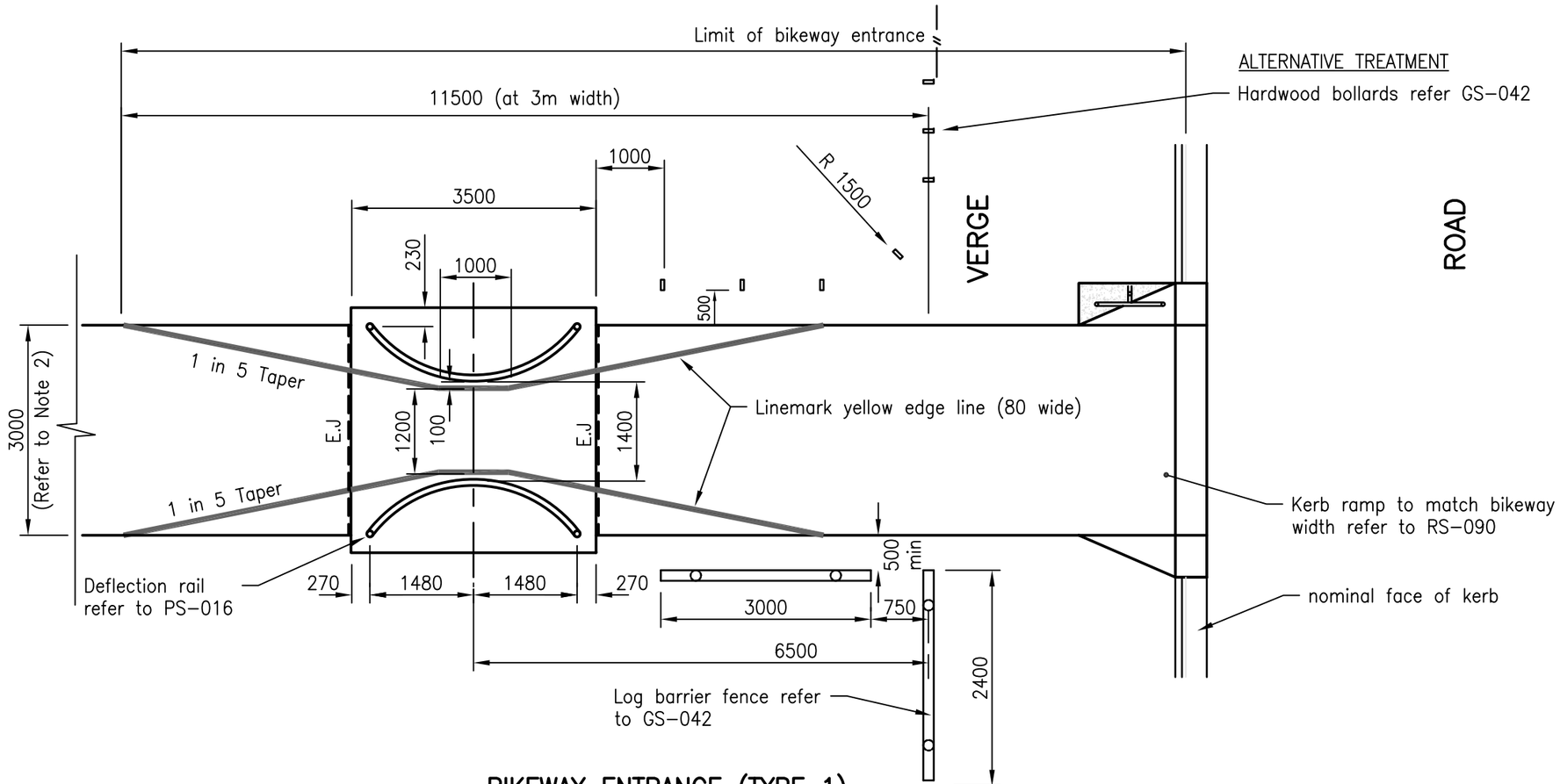
1. Trenchless Technology Techniques are the preferred method for road crossing services conduits in existing Roadways.
2. Asphalt to Asphalt joint – saw cut existing AC where shown or as agreed with Council Representative on site to provide clean cut and seal with bitumen emulsion crack sealant. Apply bitumen emulsion tack coat to all other newly exposed asphalt surfaces prior to placement of reinstated asphalt pavement or surface.
3. All exposed faces of gravel pavement to be primed during sealing operations.
4. Where the trench has been constructed longitudinally in the road, then the final surface repair width is to match the existing lane width and terminate 50mm clear of the road centreline or lane line linemarking to allow for the bitumen emulsion joint seal. Reinstatement of surface adjacent to the kerb or road pavement edge to extend fully to the kerb line or edge of pavement.
5. A part lane resurfacing may be approved where the full reinstatement is able to be completed between the inner and/or outer edge and centre of the lane.
6. The vertical deviation from a 3m straight edge parallel to the centre line of the existing road is not to exceed 5mm.
7. Asphalt surface repairs are to be undertaken within 24 hours unless approved otherwise by council. Final asphalt layers to be placed by paving machine.
8. Where structural asphalt is used to reinstate existing granular pavement, subsoil drainage is to be installed on the uphill side of the trench unless approved otherwise by council.
9. Standard drawings to be read in conjunction with the following reference specifications for civil engineering works:
   - S140 : Earthworks
   - S145 : Installation and maintenance of utility services
   - S300 : Quarry products
   - S310 : Supply of dense graded asphalt
   - S320 : Laying of asphalt
10. For backfill requirements for stormwater drainage pipes refer to DS–030.
11. All dimensions are in millimetres unless shown otherwise

Rv.	DATE	REVISIONS
F	06/14	Review
E	03/14	Amended Drawing number
D	12/11	Drawing number changed and reviewed
C	06/11	Review
B	06/09	Review
A	05/08	ORIGINAL ISSUE

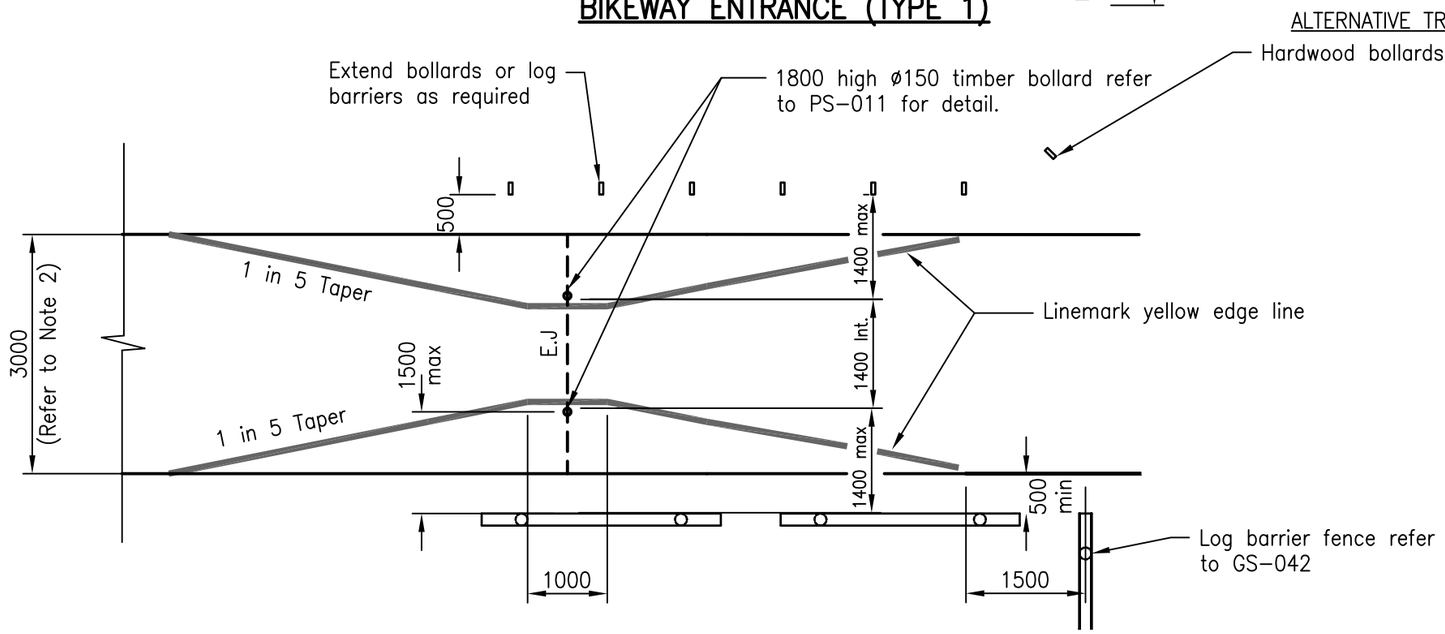
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

PAVEMENT EXTENSION
TRENCHING AND WIDENING

RS–170



BIKEWAY ENTRANCE (TYPE 1)



BIKEWAY ENTRANCE (TYPE 1– ALTERNATIVE TREATMENT)

LEGEND

Expansion joint (E.J) – – – – – – –

NOTES:

1. Concrete N25 in accordance with AS 1379 & AS 3600.
2. Bikeway to have preferred width of 3000, width may vary.
3. Deflection rails not to be installed on curves.
4. Pavement markings to be installed in waterborne paint or other suitable material. Material to have Anti–Slip/Skid material applied to surface. Thermoplastic materials are not to be used.
5. Refer to RS–065 for concrete construction details.
6. Refer to PS–011 for Type 2 high volume.
7. Refer to PS–013 for bikeway slowdown control reverse curve
8. Refer PS–016 for bikeway furniture details.
9. Refer to MUTCD and Austroads Guide to Road Design Part 6A for Bikeway design and signage.
10. All dimensions are in millimetres unless shown otherwise.

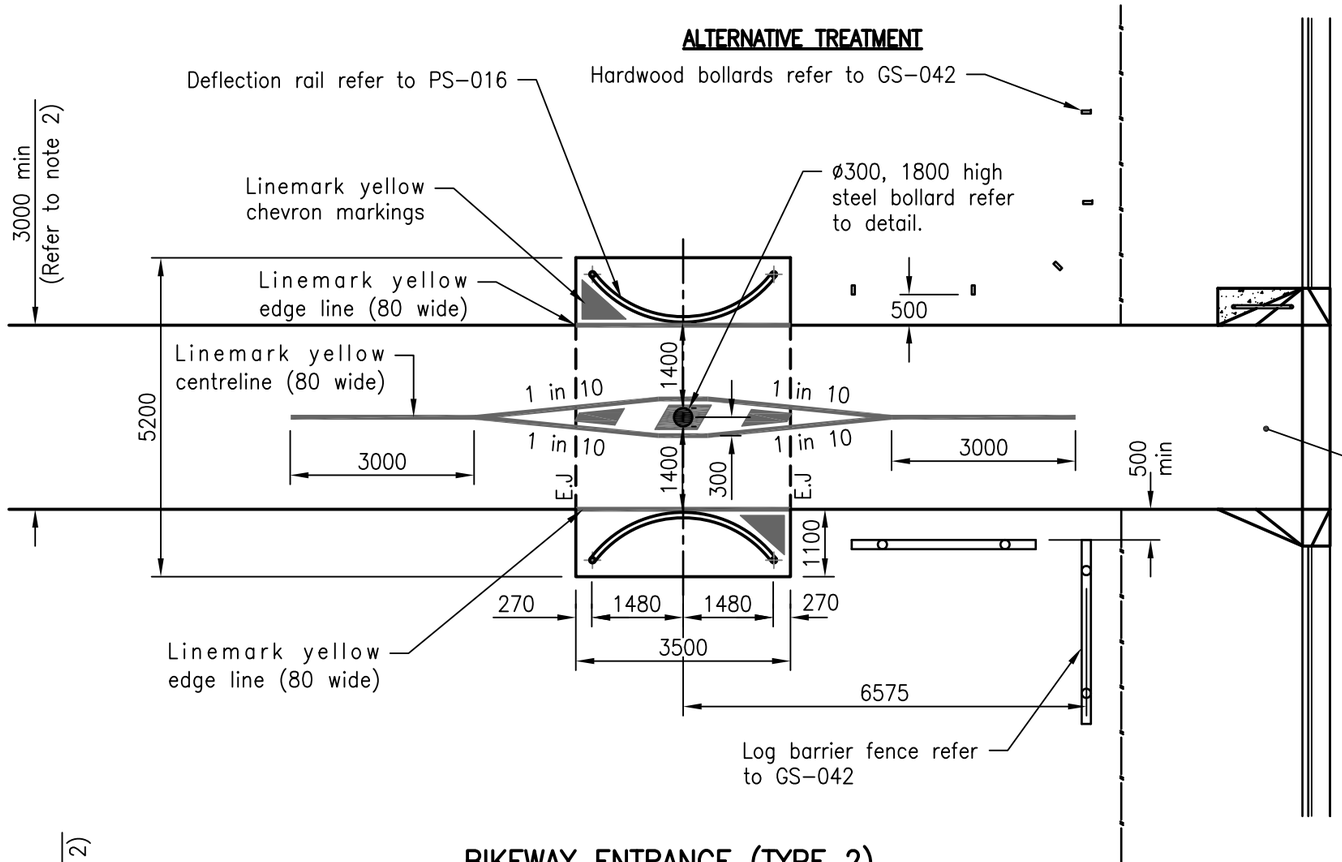
Rv.	DATE	REVISIONS
F	06/14	Review
E	03/14	Amended Drawing Number
D	12/11	Drawing number changed from SEQ P–010 to PS–010
C	06/11	Review
B	06/10	Review
A	11/09	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

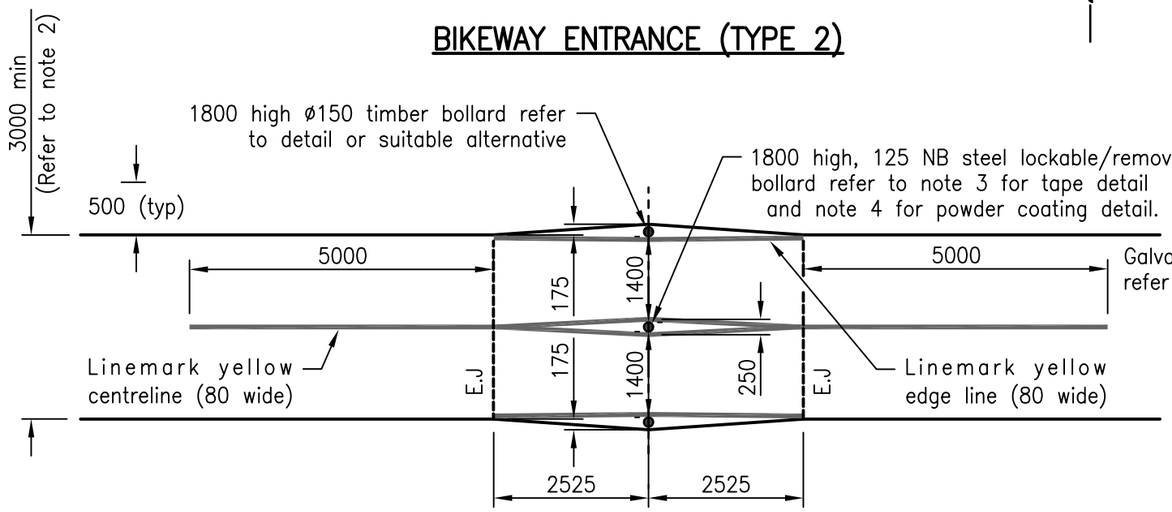
BIKEWAY ENTRANCE CONTROL
TYPE 1 – LOW VOLUME

PS–010

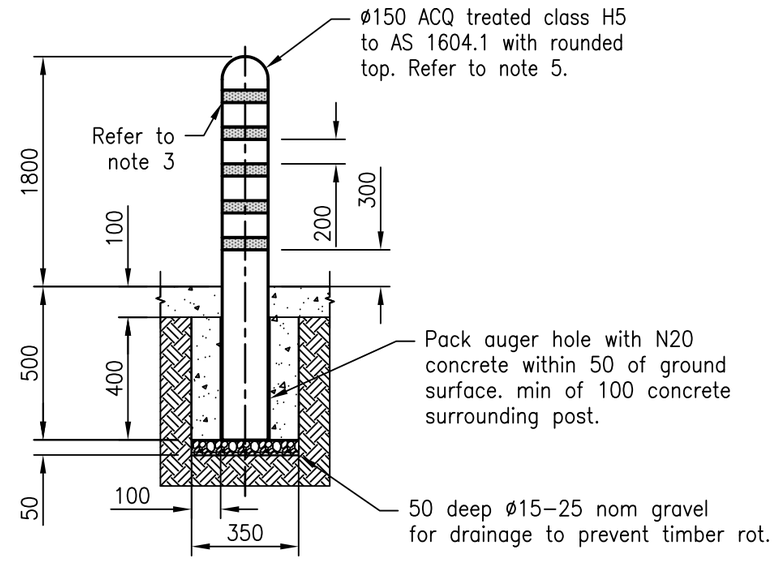
Rv. F E D C B A



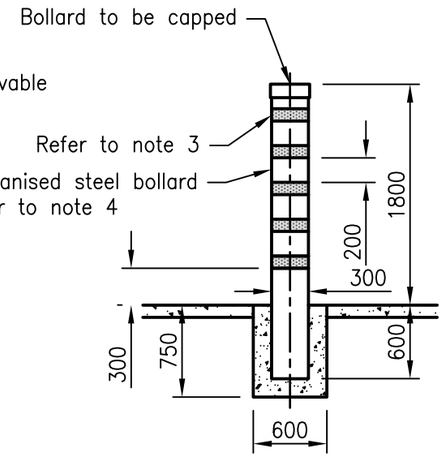
BIKEWAY ENTRANCE (TYPE 2)



BIKEWAY ENTRANCE (TYPE 2 – ALTERNATIVE)



TIMBER BOLLARD DETAIL



STEEL BOLLARD DETAIL

NOTES:

1. Concrete N25 in accordance with AS 1379 & AS 3600.
2. Bikeway to have minimum width of 3000. Width may be increased.
3. Reflective tape to be 100mm wide red class 1A retro–reflective sheeting.
4. Galvanised steel bollard to be powder coated Y11 canary yellow in accordance with AS 2700.
5. Paint timber bollard with two coats of lacquer acrylic Y11 canary yellow in accordance with AS 2700.
6. Refer to RS–065 for concrete construction details.
7. Prior to installation of timber bollards all edges, joints, cuts to receive coating with an approved timber preservative.
8. Pavement markings to be installed in waterborne paint or other suitable material. Material to have anti–slip/skid material applied to surface. Thermoplastic materials are not to be used.
9. Refer to MUTCD and Austroads Guide to Road Design Part 6A for Bikeway design and signage.
10. All dimensions are in millimetres unless shown otherwise.

LEGEND

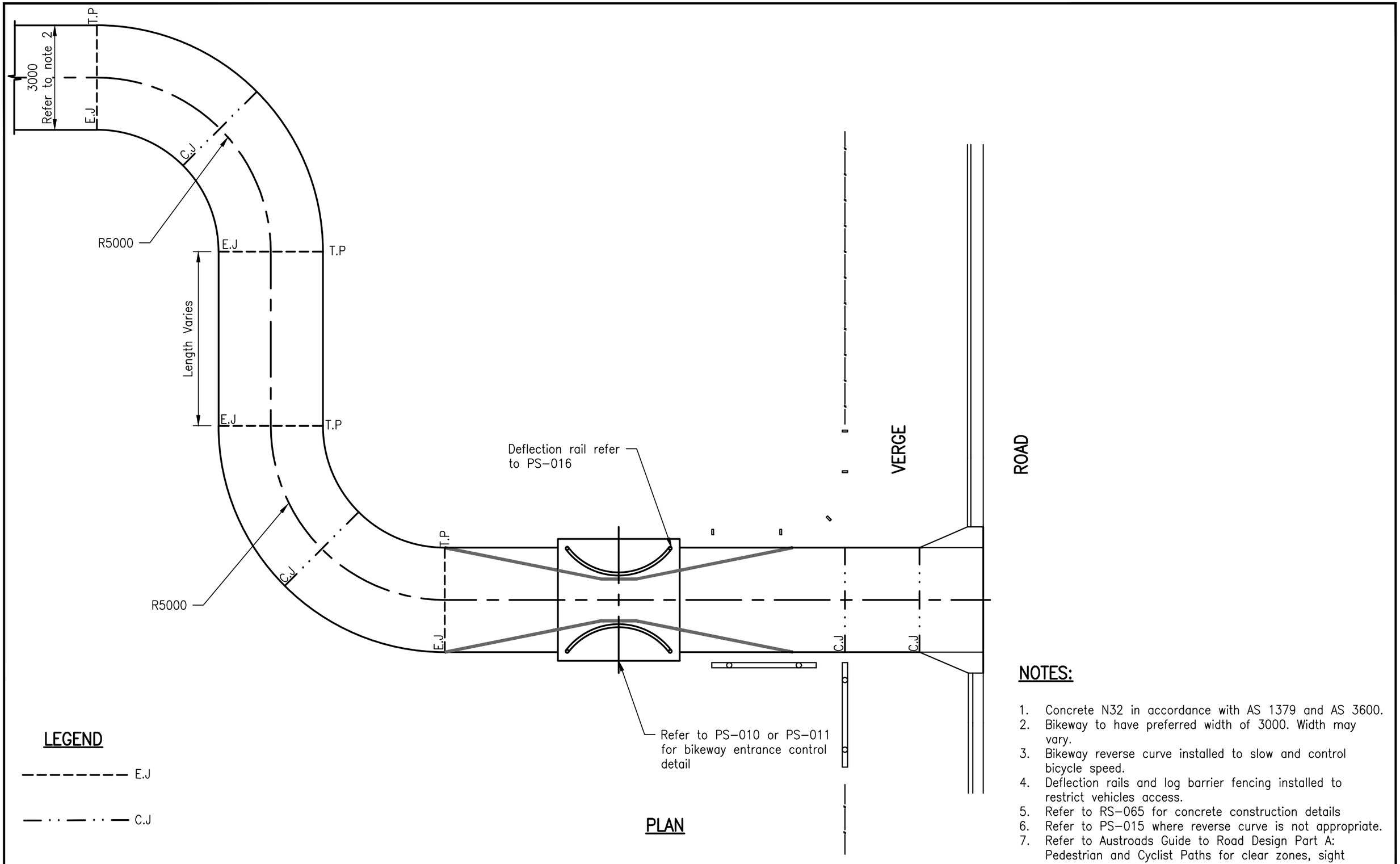
Expansion joint (E.J) – – – – – – – –

Rv.	DATE	REVISIONS
F	06/14	Review
E	03/14	Amended Drawing Number
D	12/11	Drawing number changed from SEQ P–011 to PS–011
C	06/11	Review
B	06/10	Review
A	01/10	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

BIKEWAY ENTRANCE CONTROL
TYPE 2 – HIGH VOLUME

PS–011



PLAN

LEGEND

E.J

C.J

NOTES:

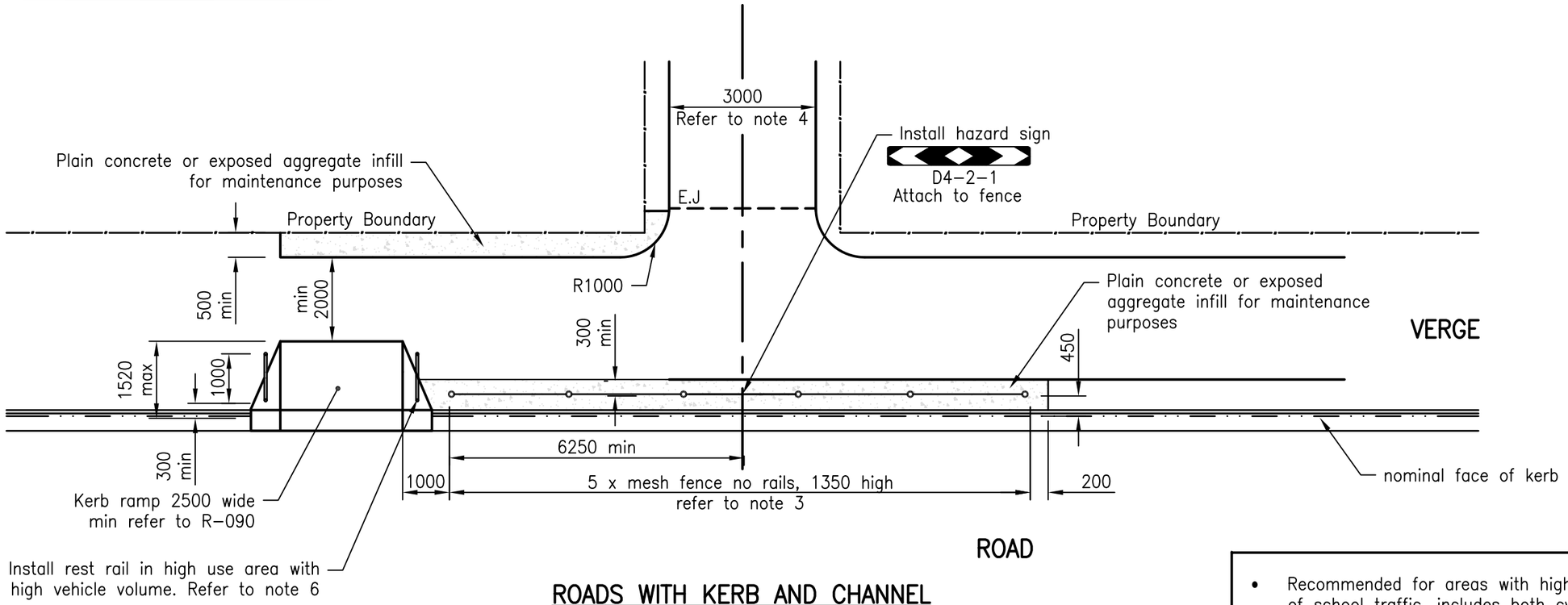
1. Concrete N32 in accordance with AS 1379 and AS 3600.
2. Bikeway to have preferred width of 3000. Width may vary.
3. Bikeway reverse curve installed to slow and control bicycle speed.
4. Deflection rails and log barrier fencing installed to restrict vehicles access.
5. Refer to RS-065 for concrete construction details
6. Refer to PS-015 where reverse curve is not appropriate.
7. Refer to Austroads Guide to Road Design Part A: Pedestrian and Cyclist Paths for clear zones, sight distance requirements and crossfalls.
8. All dimensions are in millimetres unless shown otherwise.

Rv.	DATE	REVISIONS
F	06/14	Review
E	03/14	Amended Drawing Number
D	12/11	Drawing number changed from SEQ P-013 to PS-013.
C	06/11	Review
B	06/10	Review
A	11/09	ORIGINAL ISSUE

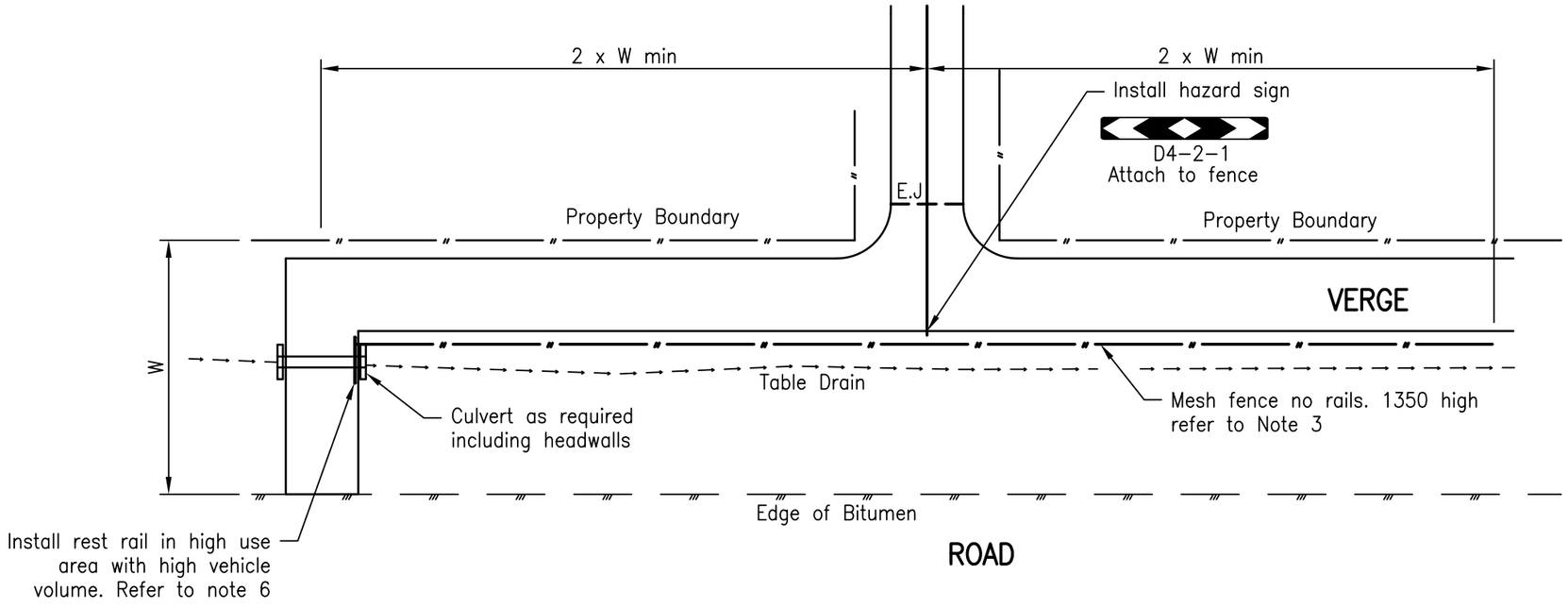
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

BIKEWAY SLOWDOWN CONTROL
REVERSE CURVE

PS-013



ROADS WITH KERB AND CHANNEL



ROADS WITHOUT KERB AND CHANNEL

- Recommended for areas with high volumes of school traffic, includes both cyclists and pedestrians.
- Ramp position to face oncoming traffic where possible.

NOTES:

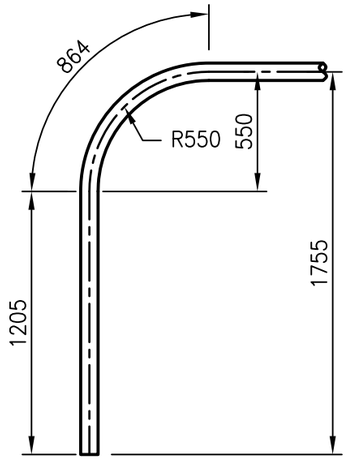
1. Concrete N32 in accordance with AS 1379 and AS 3600.
2. Refer to RS–065 for concrete construction details.
3. Mesh fence no rails details refer to GS–045.
4. Bikeway to have preferred width of 3000. Width may vary.
5. Kerb ramp details refer to RS–090.
6. Rest rail details refer to PS–016 and PS–010.
7. Installation of TGSI's refer to RS–092 and RS–093. TGSI's are required on a bikeway where a need for vision impaired pedestrian has been identified. TGSI's shall comply with AS 1428.4.1.
9. All dimensions are in millimetres unless shown otherwise.

Rv.	DATE	REVISIONS
F	06/14	Review
E	03/14	Amended Drawing Number
D	12/11	Drawing number changed from SEQ P–015 to PS–015
C	06/11	Review
B	06/10	Review
A	08/09	ORIGINAL ISSUE

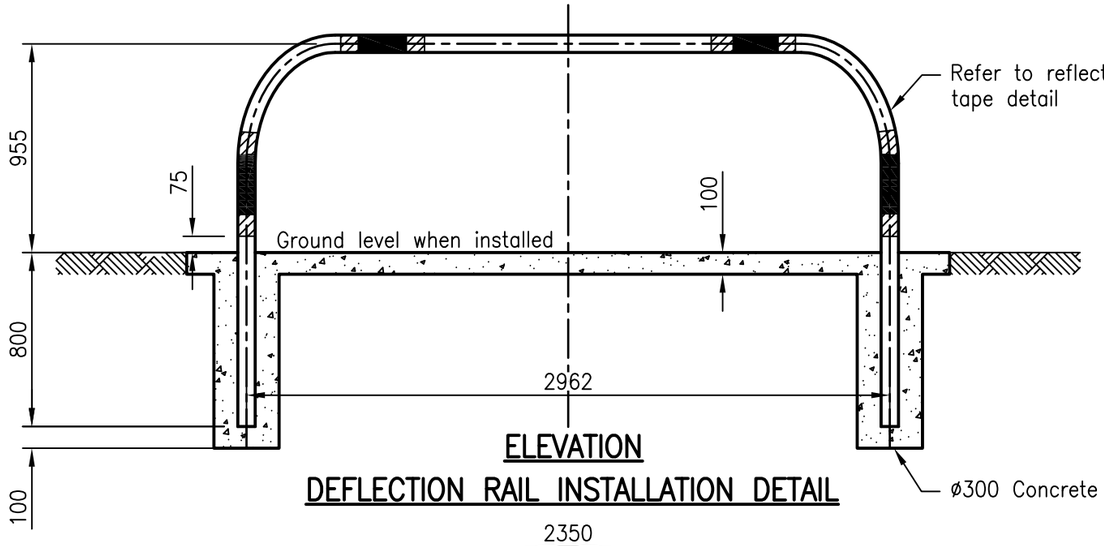
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

BIKEWAY ENTRANCE CONTROL
OFFSET CHICANE

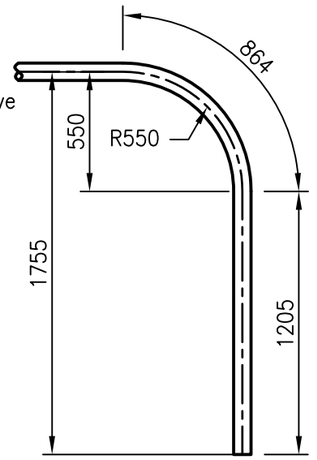
PS–015



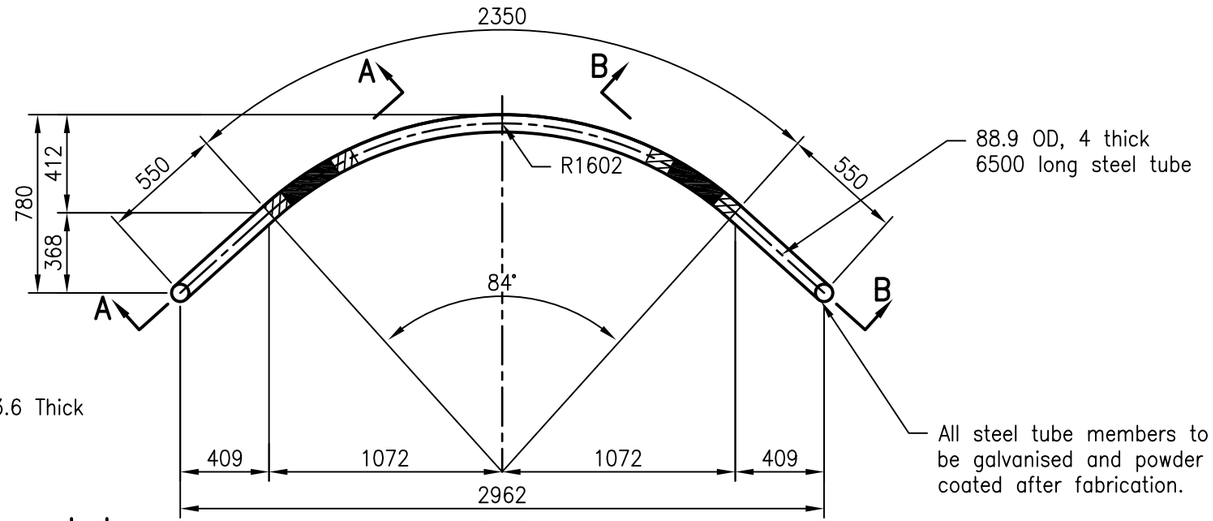
SECTION A–A



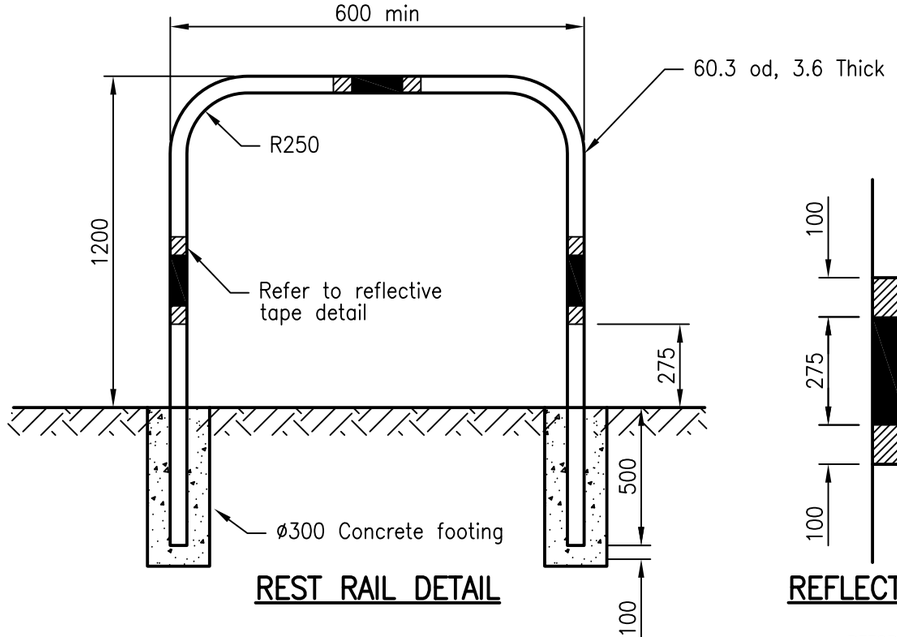
ELEVATION
DEFLECTION RAIL INSTALLATION DETAIL



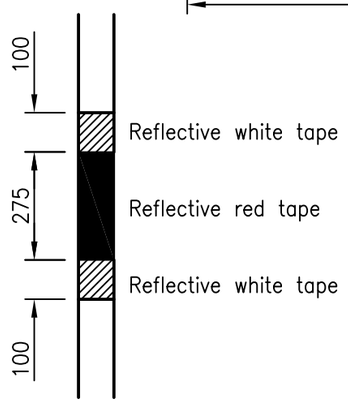
SECTION B–B



PLAN
DEFLECTION RAIL



REST RAIL DETAIL



REFLECTIVE TAPE DETAIL

NOTES:

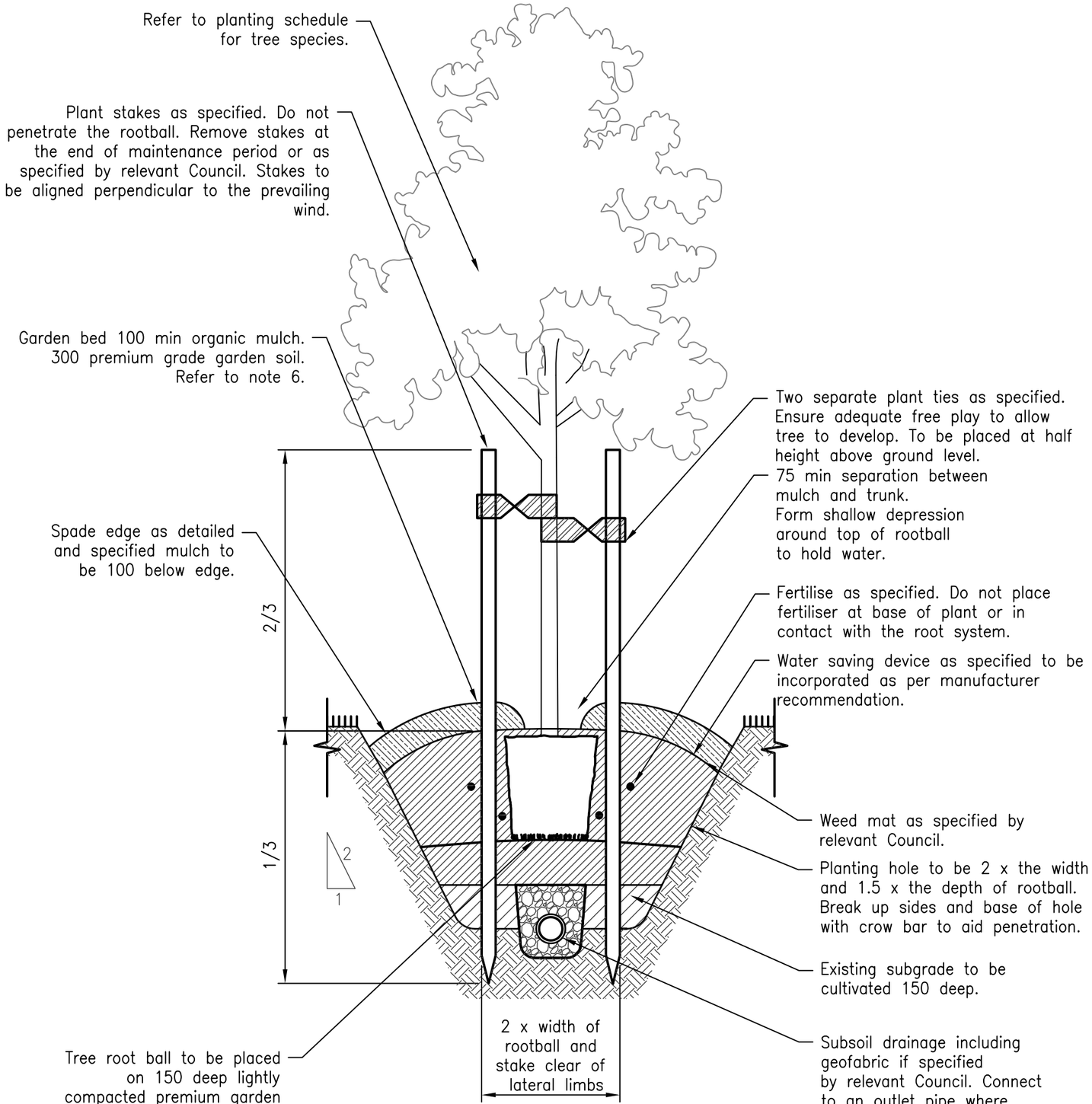
1. Concrete footing to be grade N25 in accordance with AS 3600.
2. Refer to RS–065 for concrete construction details.
3. Galvanised steel tube in accordance with AS 1163.
4. Rollform deflection rail from a single piece 6500 long tube.
5. Reflective tape to be white and red class 1 in accordance with AS 1906.1
6. Galvanised steel to be powder coated in Y11 Canary Yellow to AS 2700–1996.
7. Refer to PS–010 & PS–011 for deflection & rest rail installation details on bikeways.
8. All dimensions are in millimetres unless shown otherwise.

Rv.	DATE	REVISIONS
F	06/14	Review
E	03/14	Amended Drawing Number
D	12/11	Drawing number changed from SEQ P–016 to PS–016
C	06/11	Review
B	06/10	Review
A	08/09	ORIGINAL ISSUE

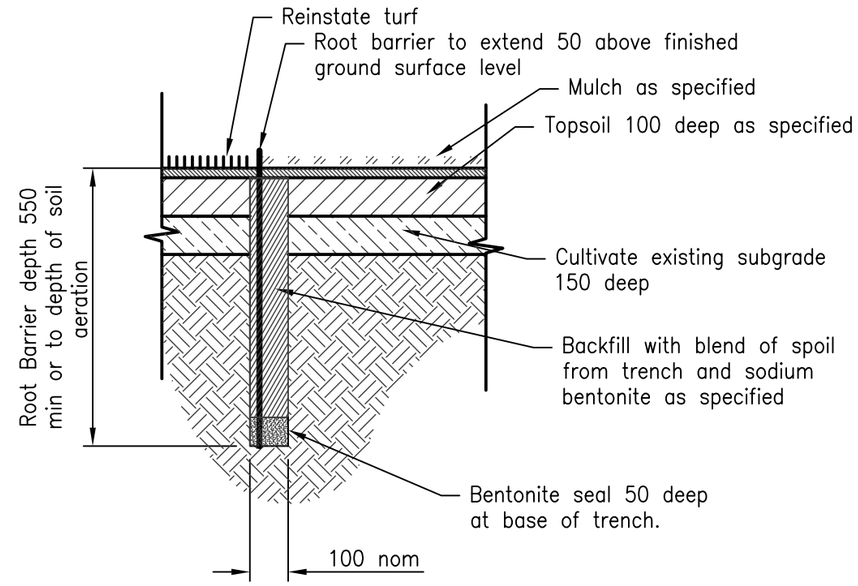
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

BIKEWAY FURNITURE DETAILS
DEFLECTION AND REST RAIL DETAIL

PS–016



ELEVATION
PLANTING AND STAKING



ROOT BARRIER

Refer to manufacturers specification, location of Root barrier as directed.

CAUTION
Verify location of services prior to commencement of work

NOTES:

1. Plant types as specified, refer project documentation. Prior to planting pre water hole and allow to soak away.
2. Form a saucer shaped depression around base of tree and water immediately.
3. Planting shall be a minimum of 650 from the back of kerb.
4. Provide gravel filter and connect to an outlet pipe where directed. Refer to grading requirements on RS–140.
5. For planting in medians refer to GS–011 and GS–012.
6. Garden bed organic mulch to conform to AS 4419 unless otherwise specified.
7. All dimensions are in millimetres unless shown otherwise.

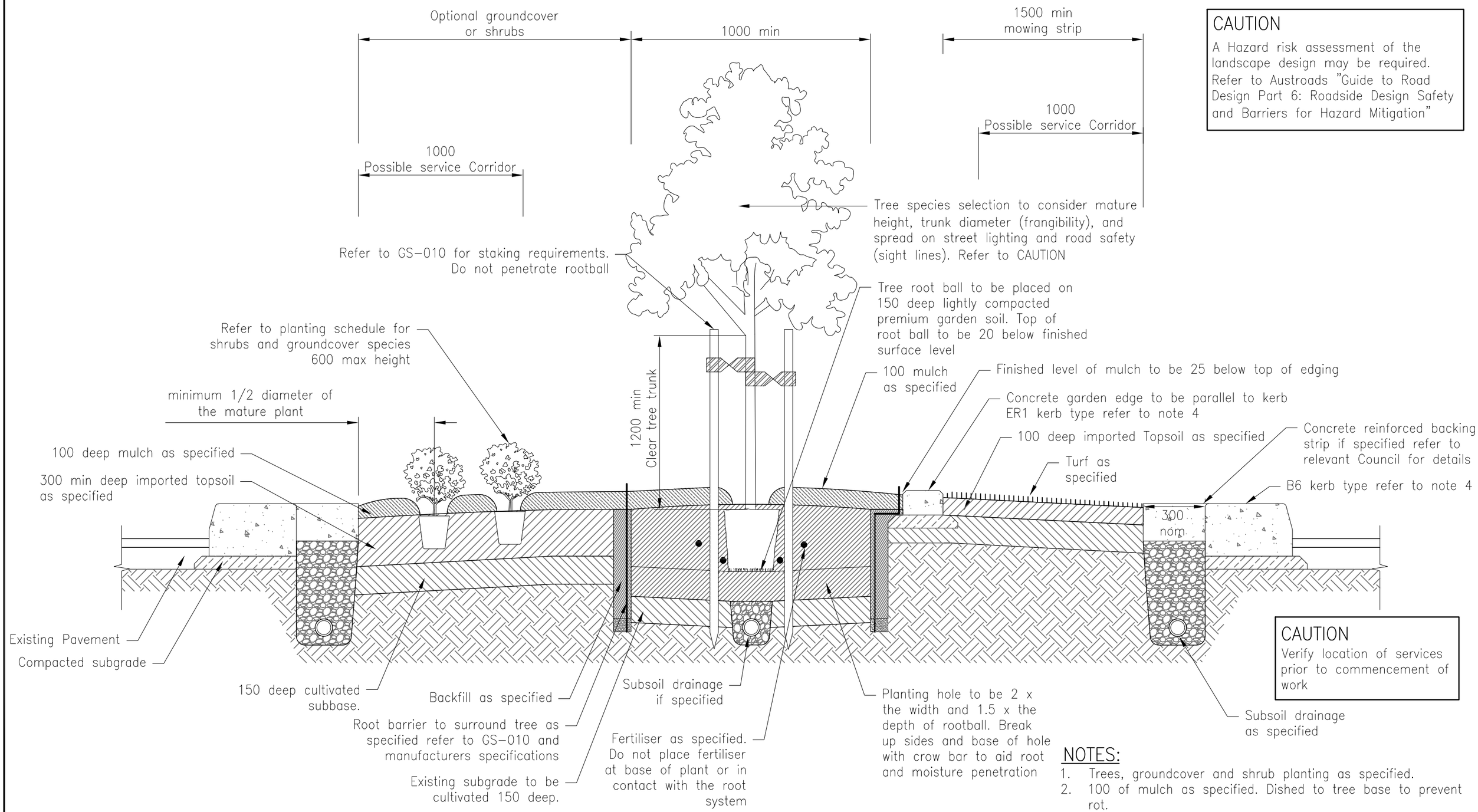
Rv.	DATE	REVISIONS
D	06/14	Review
C	03/14	Amended Drawing Number
B	03/13	Drawing number changed from SEQ G–010 to GS–010
A	01/10	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

LANDSCAPING
STREET TREE PLANTING DETAILS
INCLUDING ROOT BARRIERS

GS–010

D C B A Rv.



CAUTION
A Hazard risk assessment of the landscape design may be required. Refer to Austroads "Guide to Road Design Part 6: Roadside Design Safety and Barriers for Hazard Mitigation"

CAUTION
Verify location of services prior to commencement of work

TYPICAL MEDIAN PLANTING SECTION TREES, SHRUBS AND GROUNDCOVERS

These drawings have been developed in consultation between the participating Councils.
BEFORE USE, the user shall confirm that the drawing has been adopted by the appropriate Council

NOTES:

1. Trees, groundcover and shrub planting as specified.
2. 100 of mulch as specified. Dished to tree base to prevent rot.
3. Height of clear tree trunk is dependant upon road safety sight distance requirements. Refer to Austroads "Guide to Road Design Part 3 – Geometric Design"
4. Refer to RS–080 for kerb type unless otherwise specified by relevant Council.
5. All dimensions are in millimetres unless shown otherwise.

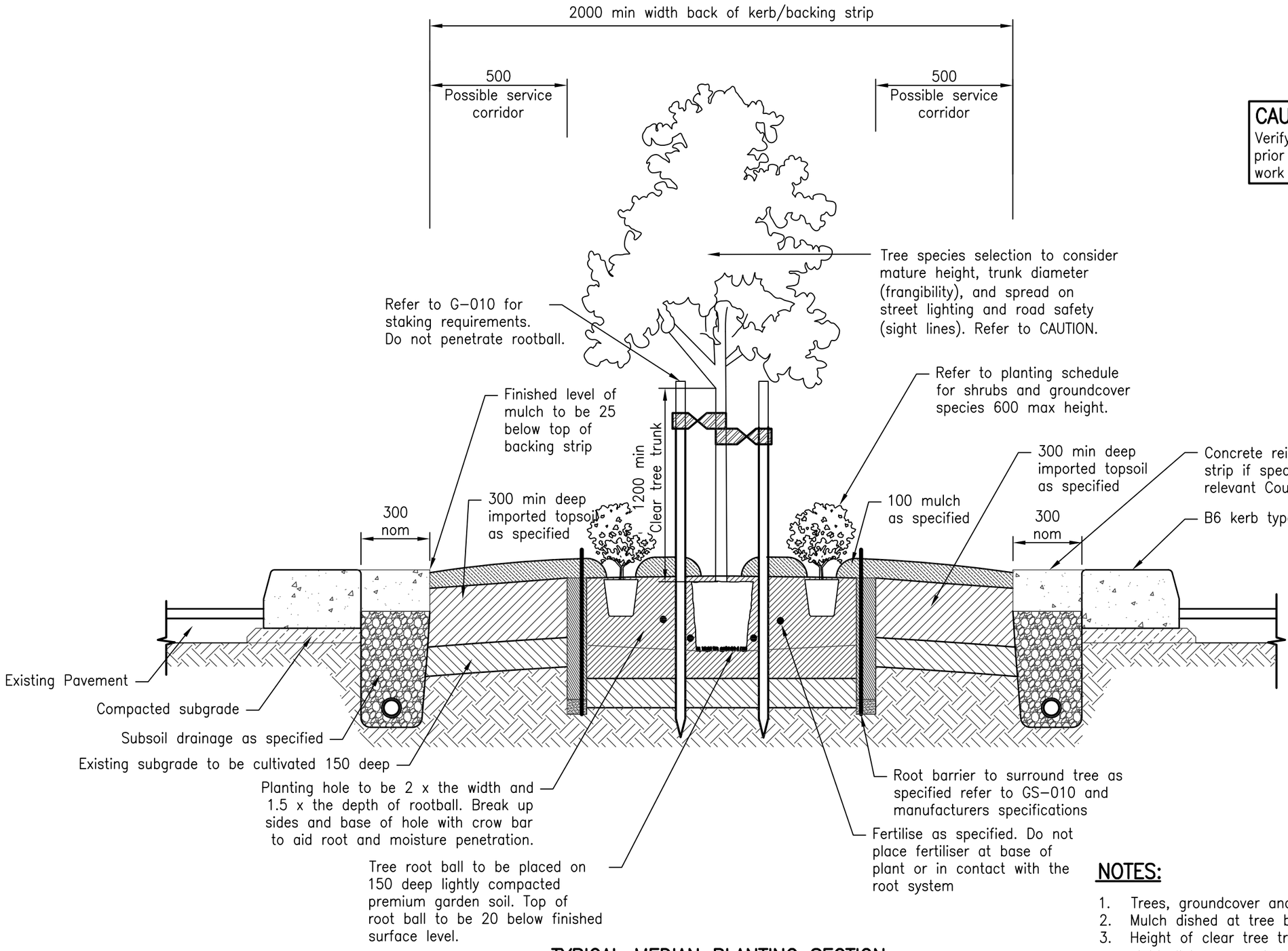
Rv.	DATE	REVISIONS
E	06/14	Review
D	03/14	Amended Drawing Number
C	03/13	Drawing number changed from SEQ G–011 to G–011.
B	06/11	Review
A	01/10	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

STREET TREE PLANTING DETAILS
WIDE MEDIAN

GS–011

Rv. E D C B A



CAUTION
Verify location of services prior to commencement of work

TYPICAL MEDIAN PLANTING SECTION TREES, SHRUBS AND GROUNDCOVERS

NOTES:

1. Trees, groundcover and shrub planting as specified.
2. Mulch dished at tree base to prevent rot.
3. Height of clear tree trunk is dependant upon road safety sight distance requirements. Refer to Austroads "Guide to Road Design Part 3 – Geometric Design"
4. Refer to RS–080 for kerb type
5. All dimensions are in millimetres unless shown otherwise

Rv.	DATE	REVISIONS
E	06/14	Review
D	03/14	Amended Drawing Number
C	03/13	Drawing number changed form SEQ G–012 to GS–012
B	02/11	Review
A	01/10	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA
STANDARD DRAWINGS

STREET TREE PLANTING DETAILS
NARROW MEDIAN

GS–012

E D C B A Rv.