

**ENERGY DISSIPATOR**  
Install using concrete rock spalls, if required by crossing license.

**NOTES**

1. On sealed roads, the crossing/driveway shall be sealed or concrete from the carriageway edge.
2. All crossings require Council inspection and a MIN. CBR of 15, prior to pouring concrete.
3. Crossing concrete to be 30MPa at 28 days.
4. Ground to be compacted before pouring. Low or soft ground to be made good with a compacted Sub base layer as required.
5. Use a Min. 100mm, of compacted GAP40 basecourse and 665 mesh prior to pouring concrete. For urban, single dwelling crossing only, Min. 50mm of GAP25/40 and 665 mesh.

**Urban**

1. Slope shall be varied from those shown to suit existing footpaths.
2. If no footpath, allowance shall be made for such with a 3% crossfall to the kerb as part of any property vehicle access.

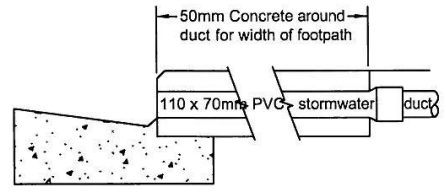
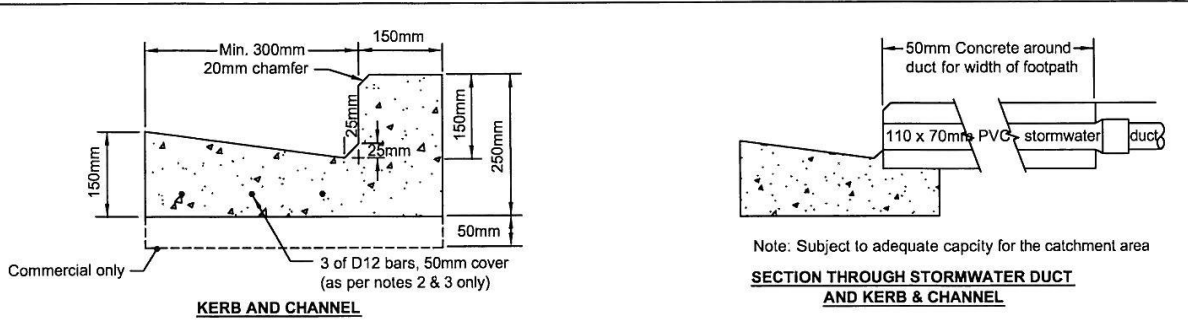
**CULVERTS**  
RCRRJ, UPVC or Aluminium culvert.  
Dia. to suit catchment size.

**UNDERGROUND SERVICES**  
Check with utility companies.

**VEHICLE CROSSING CROSS SECTIONS  
KERBED AND UNKERBED ROADS**

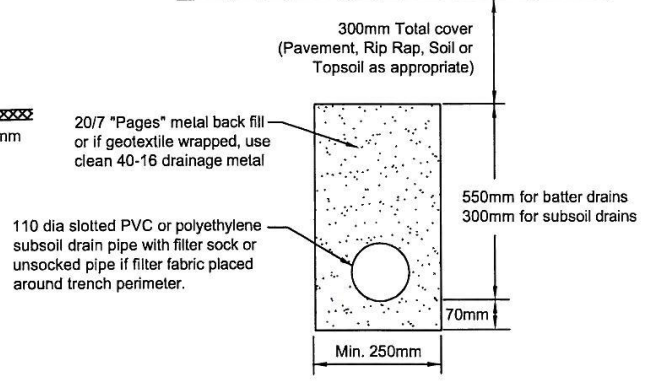
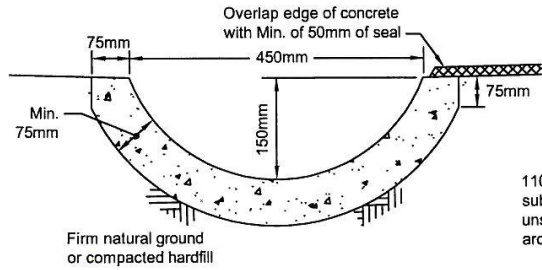
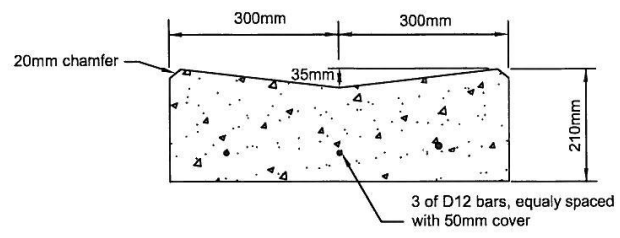
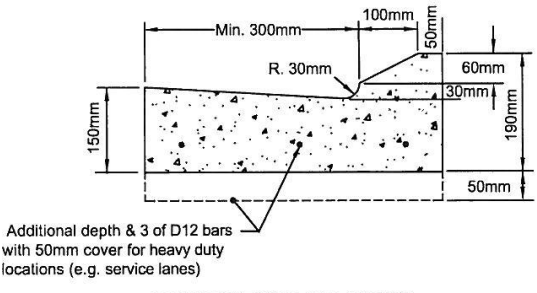
		KAIPARA DISTRICT COUNCIL ENGINEERING STANDARDS 2009		Drawing <b>S11</b>
No. Revisions Designed M WINCH Approved 08/08 Drawing Status IMPLEMENTATION Office Location CPG, WHANGAREI	Date 08/08 09/09			Revision 0 Scale N.T.S.

T:\\_020000\020239 KDC\04 Resource Consents\KDC Eng Standards 2009\Final Eng Std 2009\Drawings\S11.dwg , Plotted By Anniversita Pilapil at 29/09/2009 10:00:20 a.m. Scale 1:46.82

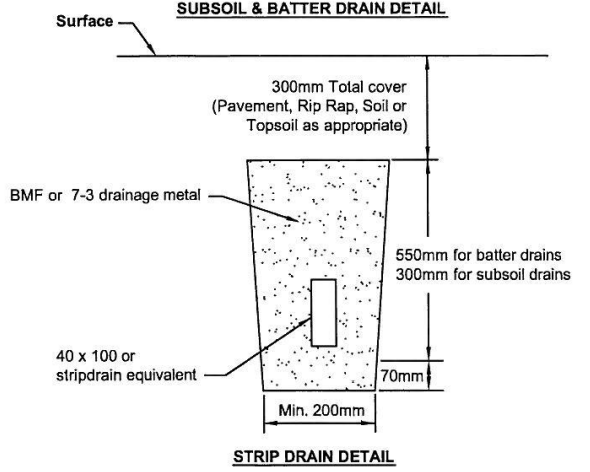


Note: Subject to adequate capacity for the catchment area


**SECTION THROUGH STORMWATER DUCT AND KERB & CHANNEL**



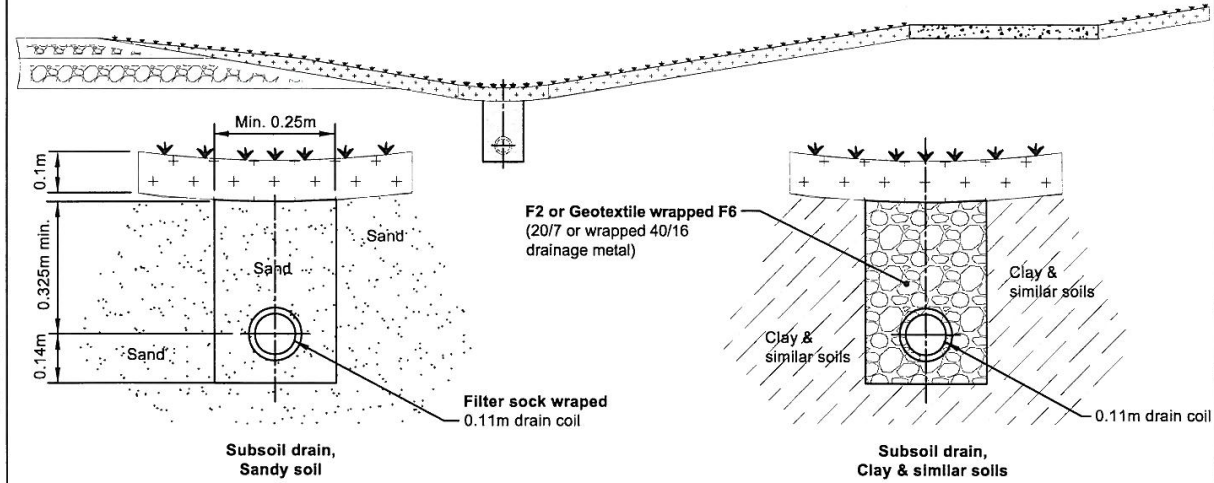
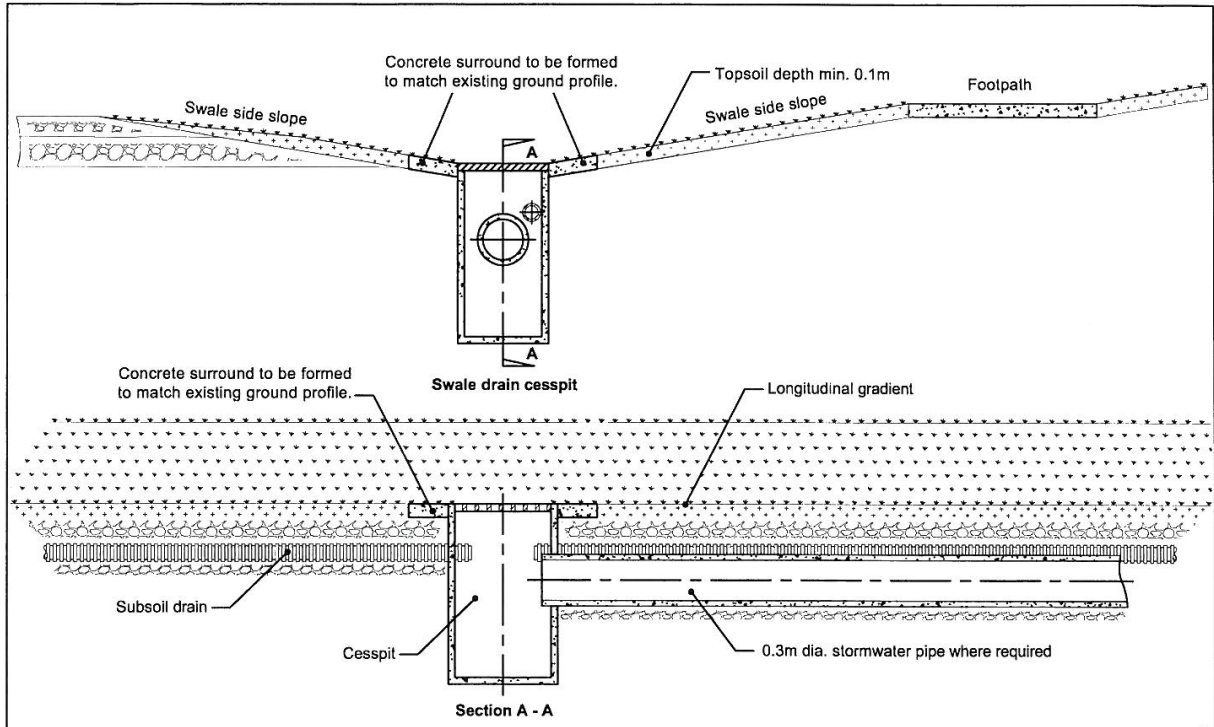
- NOTES**
1. Mountable kerbs are only to be used for service lanes, traffic islands and similar.
  2. 3/D12 reinforcing bars to be placed around all curves, and intersections between tangent points.
  3. Commercial crossings to be additional 50mm in depth as well as having 3-D12's equally spaced in the channel.
  4. Concrete for Dished Channel, Pram Crossing and Mountable Kerb and Channel shall comply with NZS3109 and be 30MPa at 28 days.
  5. Concrete for Concrete Lined Channel Rural and Kerb and Channel shall comply with NZS3109 and be 20MPa at 28 days.
  6. Crack control joints to be formed at maximum of 3.5 metre intervals.
  7. Profiles may be modified slightly to suit kerbing machine.
  8. 300mm wide channels may be used for privateways and carparks.



**KERB & CHANNEL, SUBSOIL & BATTER DRAIN DETAILS**

ORIGINAL SIZE mm A4	No. Revisions	Date	 <p>KAIPARA DISTRICT COUNCIL ENGINEERING STANDARDS 2009</p>	Drawing	<b>S12</b>	
	Designer	M WINGHT		08/08	Revision	0
	Approved			09/09	Scale	N.T.S.
	Drawing Status	IMPLEMENTATION				
	Office Location	CPG, WHANGAREI				

T:\\_020000\020239 KDC\04 Resource Consents\KDC Eng Standards 2009\_Final Eng Std 2009\Drawings\S12-R1.dwg , Plotted By Anniversta Pilapil at 29/09/2009 10:01:45 a.m. Scale 1:46.82



**NOTES**

- Swale drain side slopes can vary from 20:1 to 6:1. Swale drains with vehicle crossings shall comply with the departure angle shown on KDC S17
- Road reserve width may require increase to accommodate swale batters.
- Vehicle crossings may require reduced swale side slopes.
- Swale drain to be designed to limit max. velocities, refer to KDC Code of Practice clause 6.4.3.
- Disposal soakage areas or outfalls subject to specific design.
- Where cesspits are used they should be a max. of 100m apart.

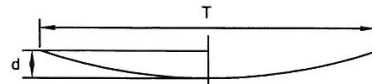
**SWALE SHAPE & DESIGN DETAILS:**

Cross section area (A)

Top Width (T) =  $1.5 \times A$

$$\text{Hydraulic Radius (Hyd.r)} = \frac{d}{1.5 \times T^2 + 4 \times d^2}$$

Where: T = 2.5m  
 d = 0.2m



ORIGINAL SIZE mm

**SWALE DRAIN DESIGN**

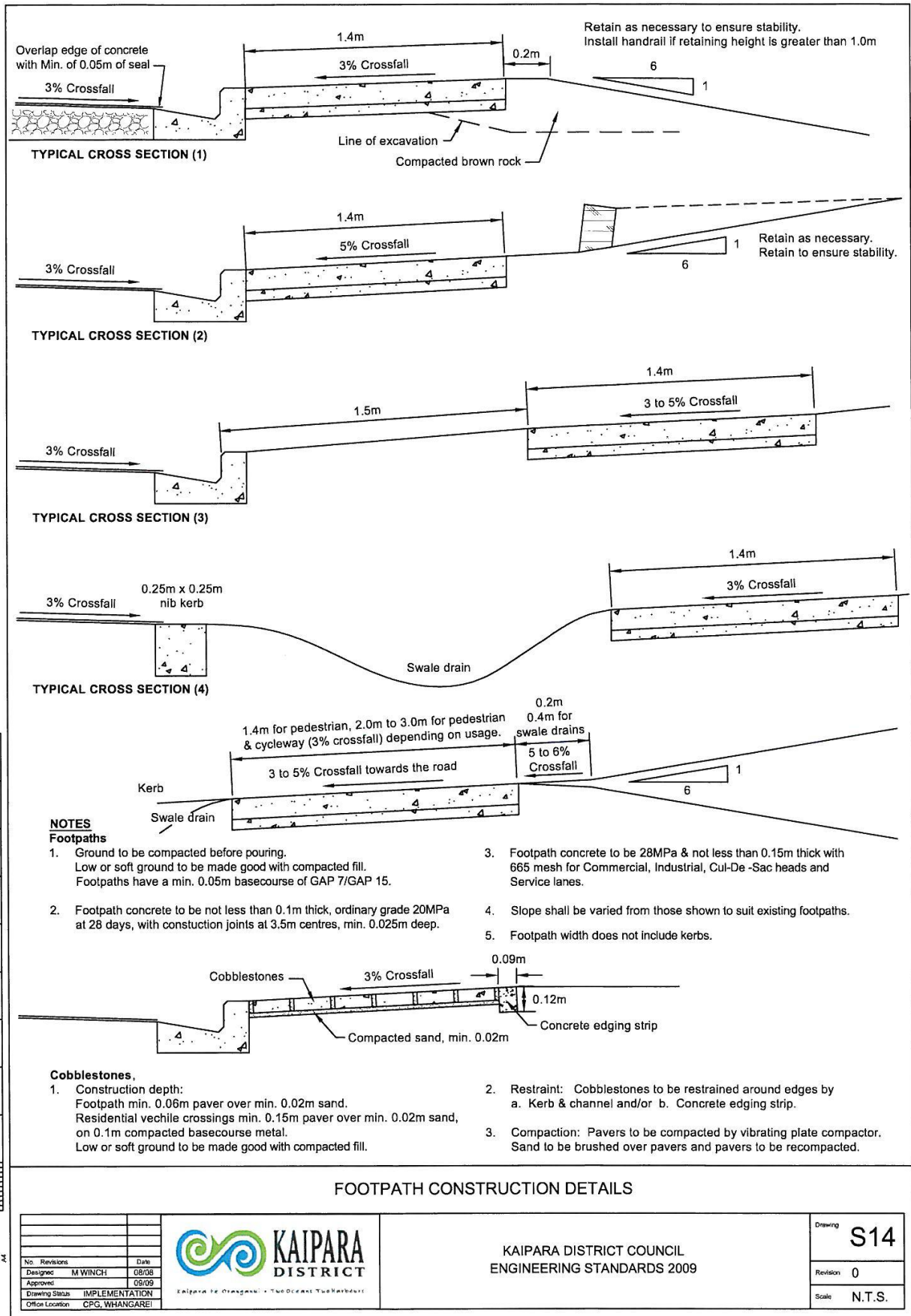
No.	Revisions	Date
Designs	M WINCH	08/08
Approves		09/09
Drawing Status	IMPLEMENTATION	
Office Location	CPG, WHANGAREI	



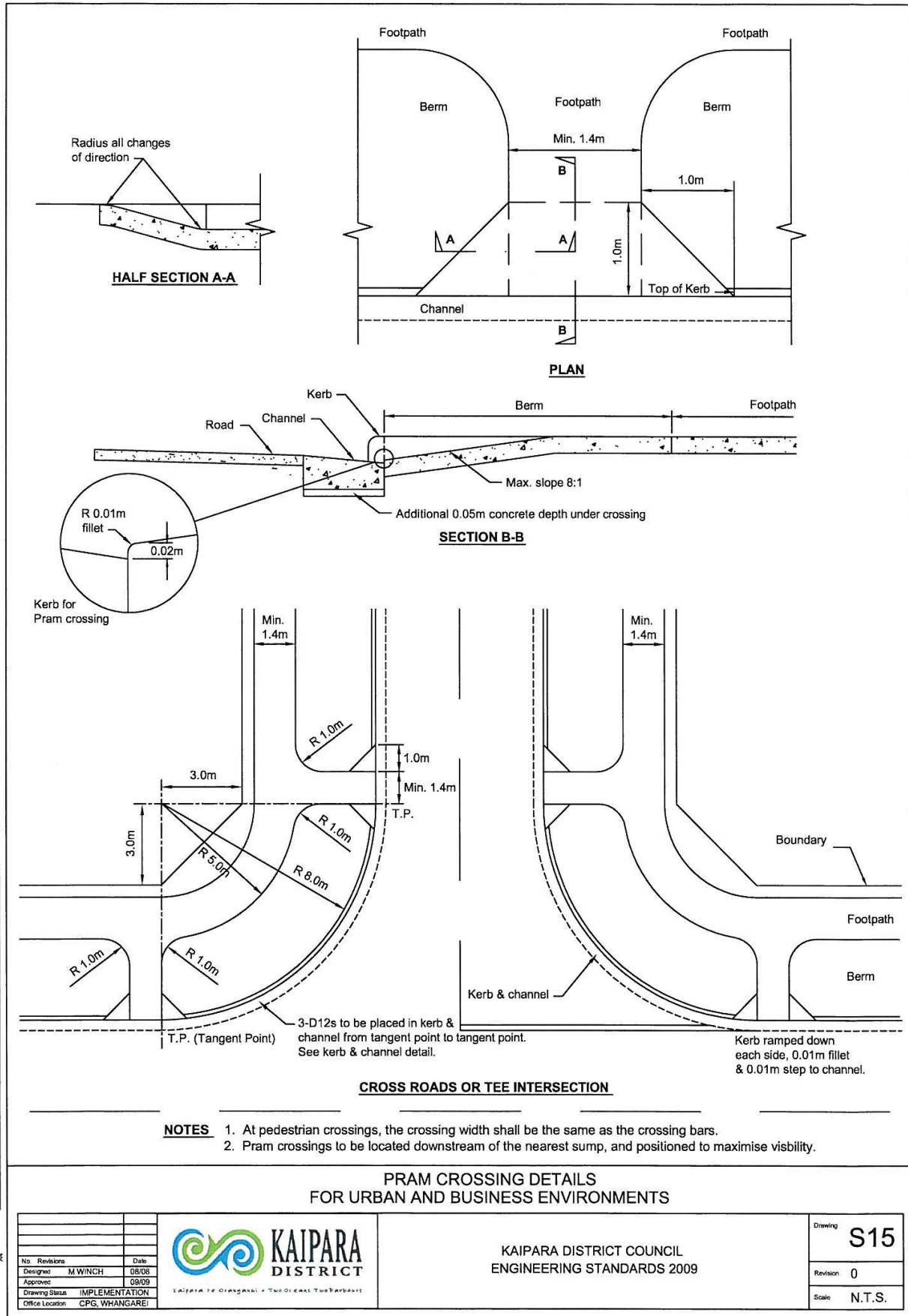
KAIPARA DISTRICT COUNCIL  
 ENGINEERING STANDARDS 2009

Drawing	<b>S13</b>
Revision	0
Scale	N.T.S.

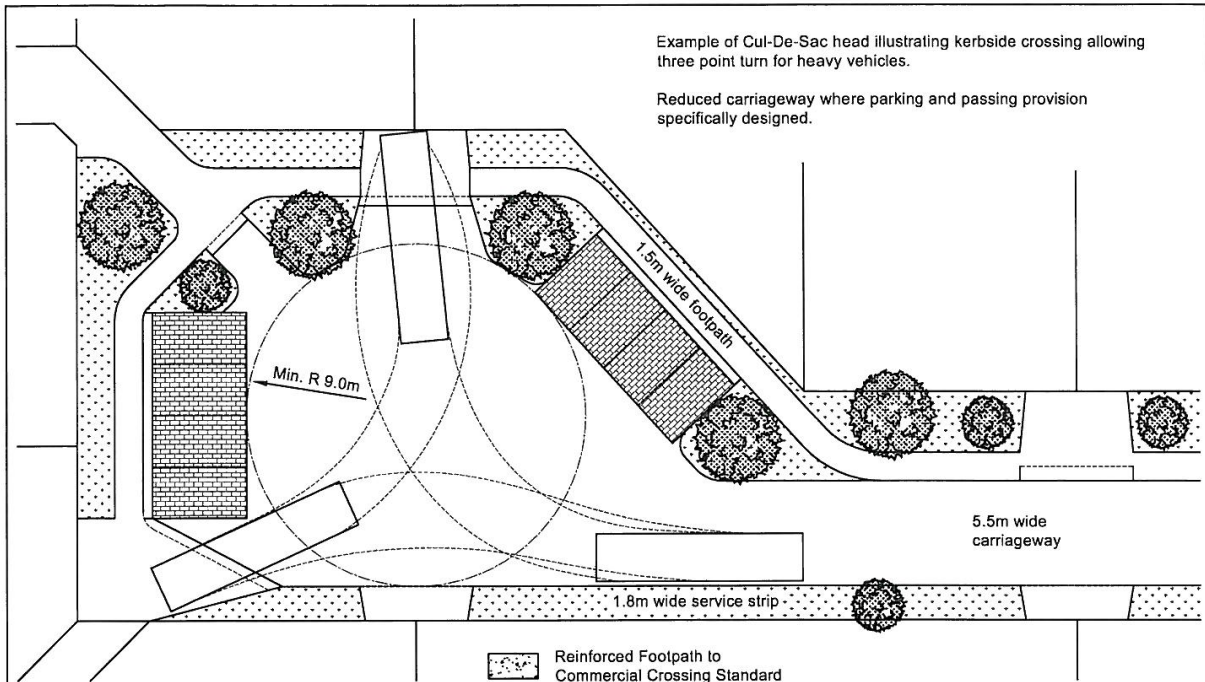
T:\\_020000\020239 KDC\04 Resource Consents\KDC Eng Standards 2009\_Final Eng Std 2009\Drawings\S13.dwg, Plotted by Annivista Pilapil at 29/09/2009 10:02:54 a.m. Scale 1:46.82







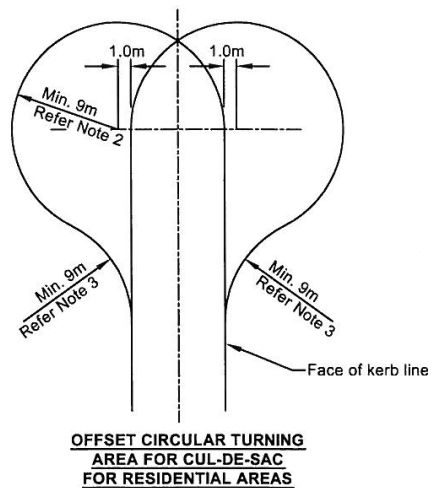
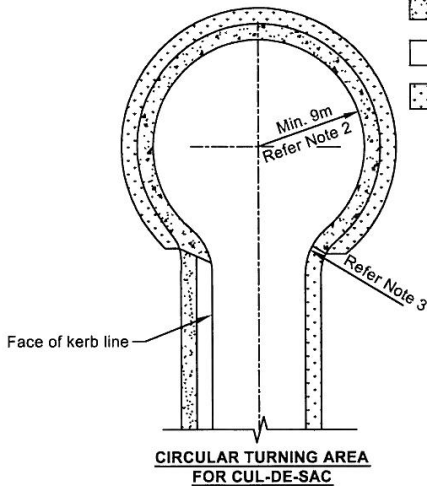
T:\\_020300\020239 KDC\04 Resource Consents\KDC Eng Standards 2009\_Final Eng Std 2009\Drawings\S14.dwg , Plotted By Anniversita Pilapil at 29/08/2009 10:11:00 a.m. Scale 1:46.82



T:\\_020000\020239 KDC\04 Resource Consents\KDC Eng Standards 2009\_Final Eng Std 2009\Drawings\S15.dwg, Plotted By Anniversita Piplai at 29/09/2009 10:14:38 a.m. Scale 1:46.82



-  Reinforced Footpath to Commercial Crossing Standard
-  Ordinary Footpath
-  Carriageway, Refer KDC S2
-  Service Berm



**NOTES**

1. For All Environments, These dimensions are absolute minima. Kerb and shoulder support is not included.
2. Turning Radius 9 metres for Urban, 10m for Roads or Privateways longer than 100m and Rural areas, 15 metres for Industrial & Commercial areas.
3. Shoulder radius 8.0 metres for non-offset heads, 9.0 metres for offset heads. The "offset" dimensions apply for offsets from the road centreline of 2 metres or more.
4. Footpaths and berm widths as required for Urban Cul de sac (refer KDC S2 & S6).
5. Reinforced footpath to be 0.15m thick concrete with 665 mesh. Concrete strength to be 30 MPa at 28 days.
6. A central area may be provided for parking or planting. Where this is proposed, the layout shall be checked for access by heavy vehicles using tracking curves.
7. Hammerhead or "T" cul-de-sacs may be approved where a standard circular head is unsuitable. The layout is subject to specific design. Compliance with Figure 3.5 in NZS 4404:2004 is an acceptable solution in residential areas.
8. Where a cul de sac is formed, and it is intended that the road will be extended as part of a future stage in a development, the provision for turning at the end of the cul de sac shall be specifically considered. The design shall be subject to specific approval by the Roading Manager.

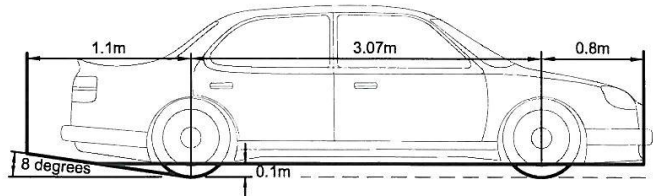
**CUL - DE - SAC DETAILS**

No. Revisions	Date
Designed M WINCH	08/08
Approved	09/09
Drawing Status	IMPLEMENTATION
Office Location	CPG, WHANGAREI



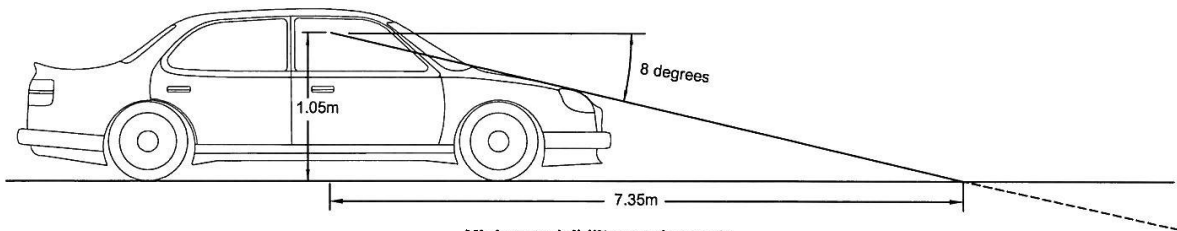
KAIPARA DISTRICT COUNCIL  
ENGINEERING STANDARDS 2009

Drawing	<b>S16</b>
Revision	0
Scale	N.T.S.



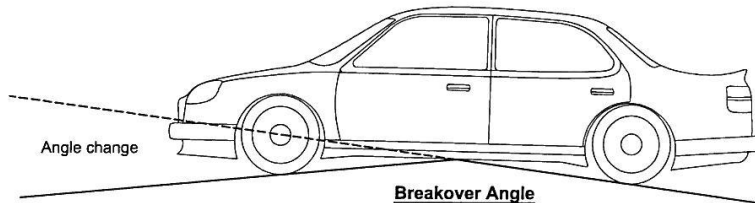
**Ground clearance template**

1. Prepare long section of driveway to natural scale and to the same scale as the template.
2. Move template back and forth along the plot, ensuring that the heavy line does not fall below the ground line.

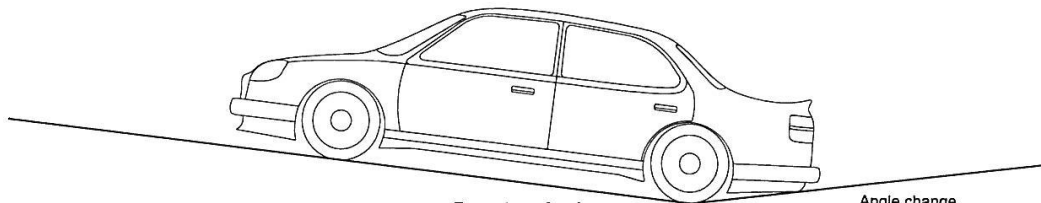


**Minimum visibility requirements  
Bonnet visibility line**

If angle change exceeds 10%, a vertical curve with minimum  $k > 1.0$  m/% shall be provided



**Breakover Angle**  
Maximum Change of Grade  
10% (5.7 degrees)



**Departure Angle**  
Maximum Change of Grade  
17% (9.65 degrees)

Refer NZS 4404 Fig 3.9

**ACCESS AND VEHICLE CROSSING  
MINIMUM SERVICEABILITY REQUIREMENTS**

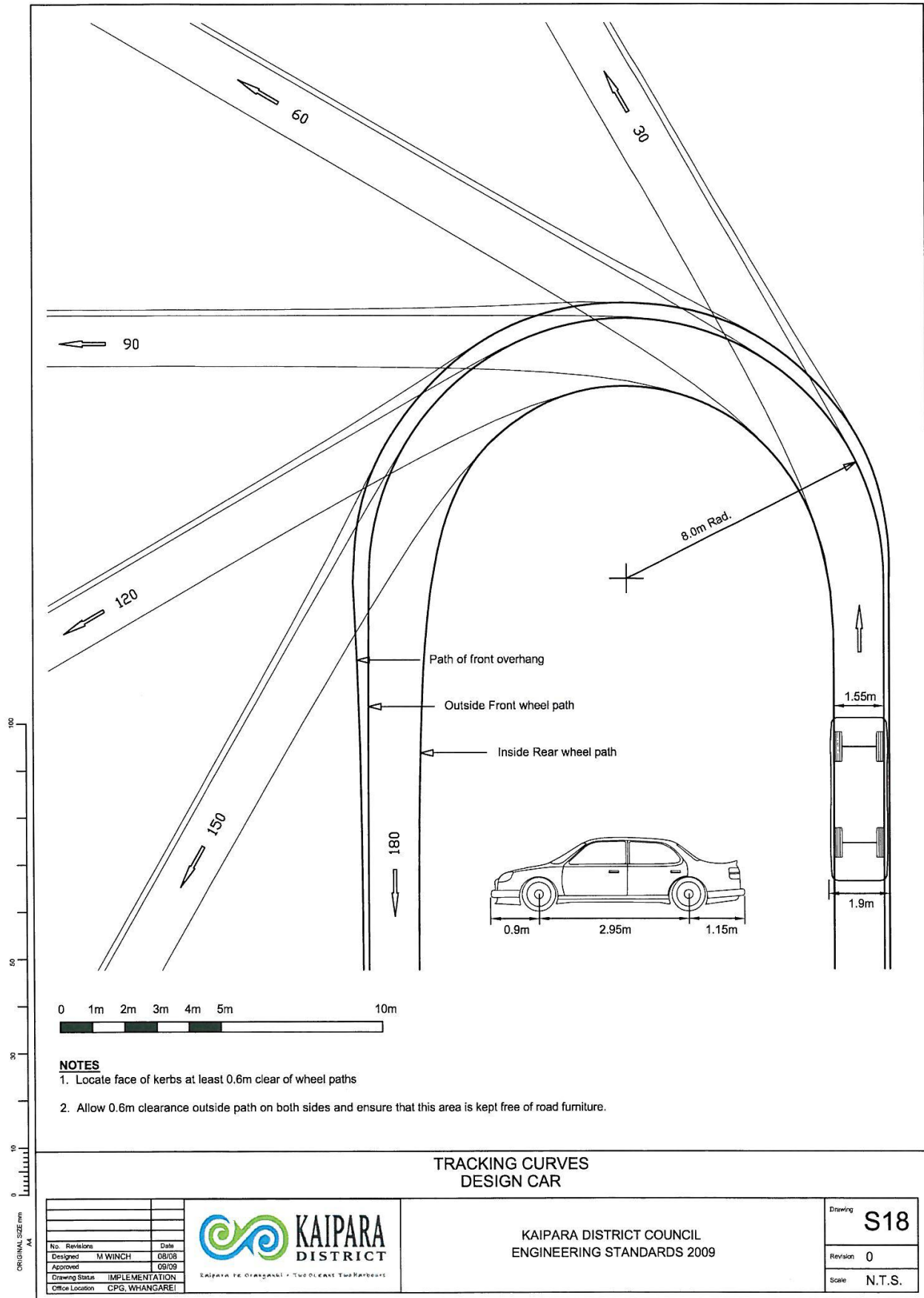
ORIGINAL SIZE mm A4

No. Revisions	Date
Designed M WINGH	08/08
Approved	09/09
Drawing Status	IMPLEMENTATION
Office Location	CPG, WHANGAREI



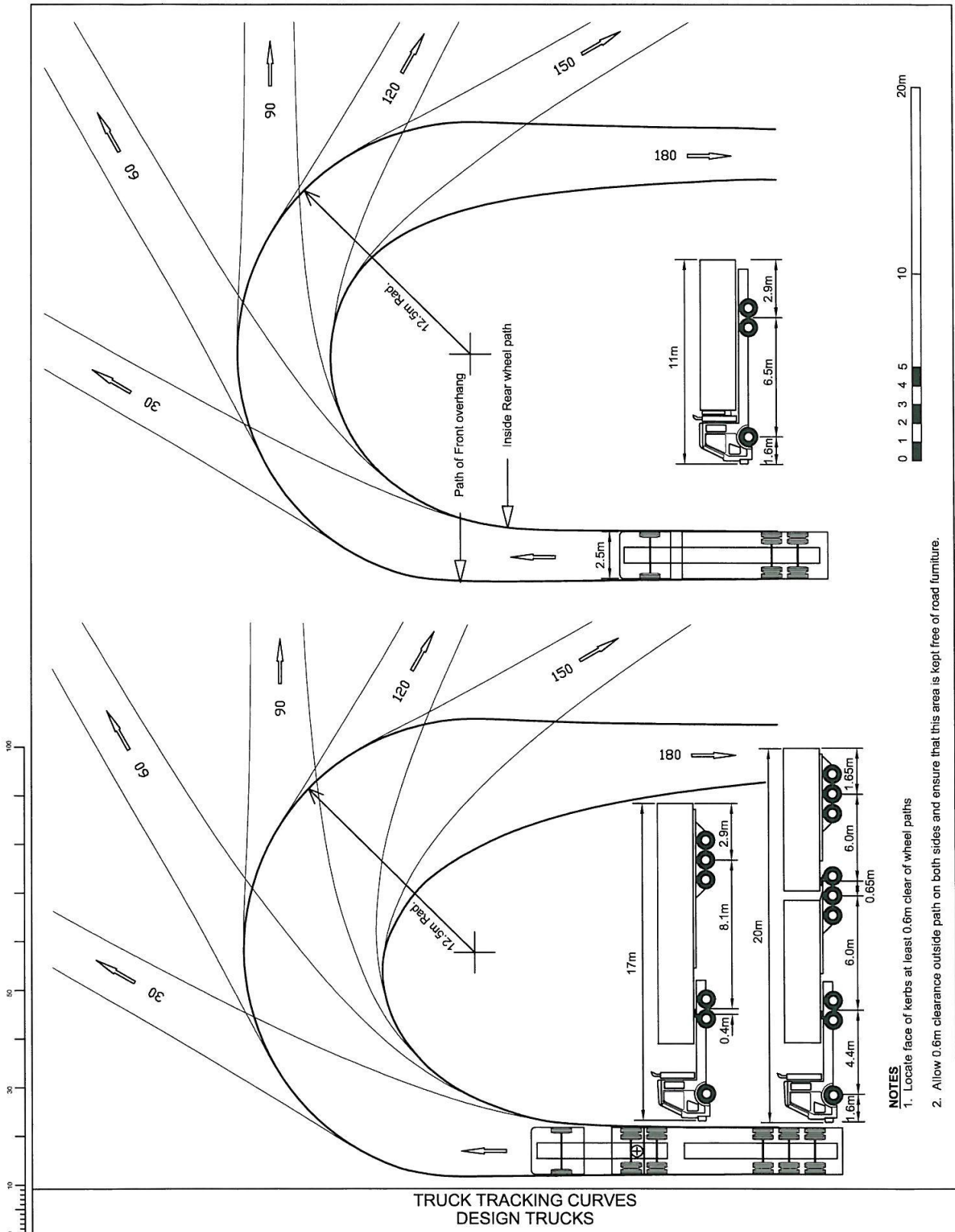
KAIPARA DISTRICT COUNCIL  
ENGINEERING STANDARDS 2009

Drawing	<b>S17</b>
Revision	0
Scale	N.T.S.




T:\\_020000\020238 KDC\04 Resource Consents\KDC Eng Standards 2009\_Final Eng Std 2009\Drawings\S18.dwg , Plotted By Anniversila Piplil at 29/09/2009 8:59:20 a.m. Scale 1:46.82





- NOTES**
1. Locate face of kerbs at least 0.6m clear of wheel paths
  2. Allow 0.6m clearance outside path on both sides and ensure that this area is kept free of road furniture.

ORIGINAL SIZE: mm A4	 <b>KAIPARA DISTRICT</b> Kaipara te Oraohangi - The Oceanic Paradise		<b>KAIPARA DISTRICT COUNCIL</b> <b>ENGINEERING STANDARDS 2009</b>		Drawing <b>S19</b>
	No. Revisions Designed M WINCH 08/08 Approved 19/09 Drawing Status IMPLEMENTATION Office Location CPG, WHANGAREI				Revision 0

T:\\_020000\020239 KDC\04 Resource Consent\KDC Eng Standards 2009\_Final Eng Std 2009\Drawings\S19.dwg, Plotted By Annversita Pitapil at 29/09/2009 8:59:02 a.m. Scale 1:46.82

