

TYPICAL RURAL ROAD CROSS SECTIONS

**DRAINS**

Sized for design stormwater volume. Trapezoidal and swale drain shape. Rip Rap or equivalent to be used where velocity is greater than 0.5m/s. Min. 0.4m deep below road edge for 1.6m (slope 5:1) & 0.48m for 2m (to the top of Rip Rap if applicable). Where appropriate, a concrete channel may be used. min. 0.15m deep below road edge plus a subsoil drain (KDC S12).

**\* Note**

**FEATHERED SHOULDER** Sid. slope 5:1 Width shall be increased to 2.0m on roads with greater than 500vpd

**CUT BATTERS**

All cut batters require a factor of safety, Min. 1.1

**ACCESSWAY PAVEMENT**

- All roads & accessways require 665 mesh, a MIN. CBR of 15 and Council inspection, prior to pouring concrete.
- Concrete to be Min. 0.15m thick & 30MPa at 28 days.
- Subsoil drains shall be used on either side where there is no open drain (min. open drain depth 0.4m).

**RURAL, HAND OR SLOJFORMED MOUNTABLE KERB ACCESSWAY** (for up to 3 dwelling units)  
(kerb & carriageway formed as one component)

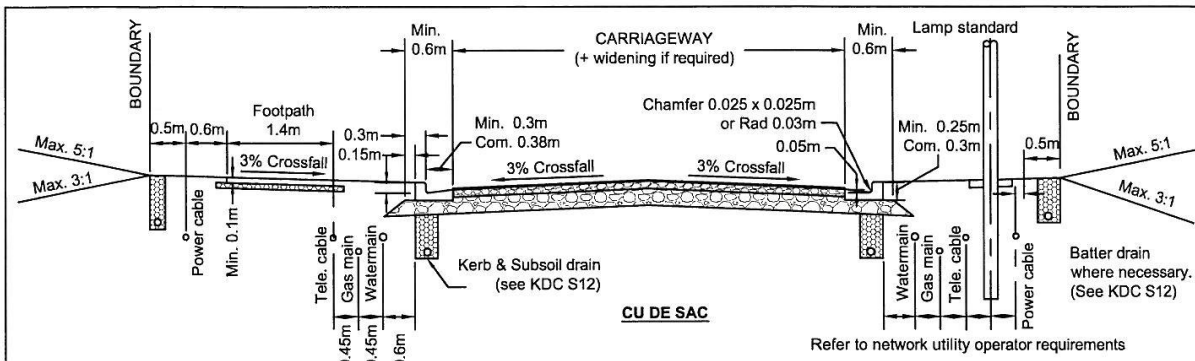
No.	Revisions	Date
1	Designed	08/08
2	Approved	09/09
Drawing Status IMPLEMENTATION		
Office Location CPG, WHANGAREI		



KAIPARA DISTRICT COUNCIL  
ENGINEERING STANDARDS 2009

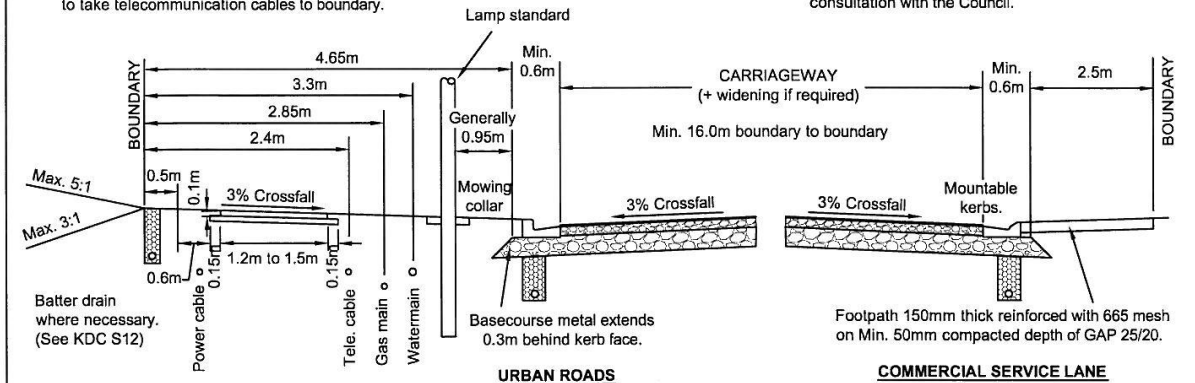
Drawing	S01
Revision	0
Scale	N.T.S.

T:\\_020000\020239 KDC\04 Resource Consents\KDC Eng Standards 2009\_Final Eng Std 2009\Drawings\S01.dwg, Plotted by Anniversita Pilapil at 28/09/2009 5:00:35 p.m. Scale 1:46.62

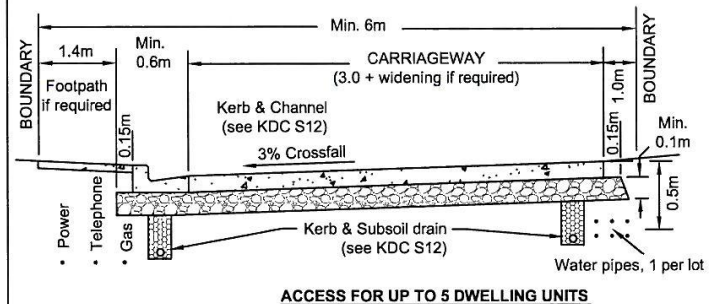


Developer to provide ducts under footpath to take telecommunication cables to boundary.

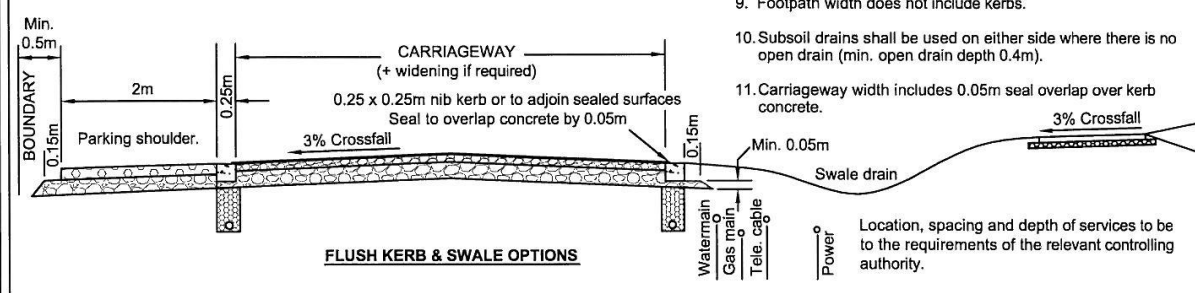
Cables and water mains in service lanes on consultation with the Council.



- NOTES (Urban)**
1. Ground to be compacted before pouring. Low or soft ground to be made good with compacted fill. Footpaths have a min. 0.05m basecourse of GAP 7 to GAP 15.
  2. Use min. 0.1m, of compacted GAP40 basecourse and 665 mesh prior to pouring concrete.
  3. All roads & accessways require Council inspection and a min. CBR of 15, prior to pouring concrete.
  4. Commercial, curves and tangent point intersection channel to be reinforced with 3-D12. See KDC drawing S12 for kerb details.
  5. Seal as specified.
  6. Concrete to be min. 0.15m thick & 30MPa at 28 days with centrally placed 665 reinforcing mesh.
  7. Footpath concrete to be not less than 0.1m thick, ordinary grade 20MPa at 28 days, with construction joints at 3.5m centres.
  8. Slope shall be varied from those shown to suit existing footpaths.
  9. Footpath width does not include kerbs.
  10. Subsoil drains shall be used on either side where there is no open drain (min. open drain depth 0.4m).
  11. Carriageway width includes 0.05m seal overlap over kerb concrete.



**ACCESS FOR UP TO 5 DWELLING UNITS**



**FLUSH KERB & SWALE OPTIONS**

**TYPICAL URBAN ROAD CROSS SECTIONS**

ORIGINAL SIZE mm A4	No. Revisions: _____ Date: _____ Designed: M WINCH 08/08 Approved: 09/09 Drawing Status: IMPLEMENTATION Office Location: CPG, WHANGAREI	<p>KAIPARA DISTRICT COUNCIL          ENGINEERING STANDARDS 2009</p>	Drawing: <b>S02</b> Revision: 0 Scale: N.T.S.
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**NOTES**

For roads and accessways serving up to 100 household equivalents, 25 year design loads shall be as specified in Table 5.6 and shown on the pavement design chart.

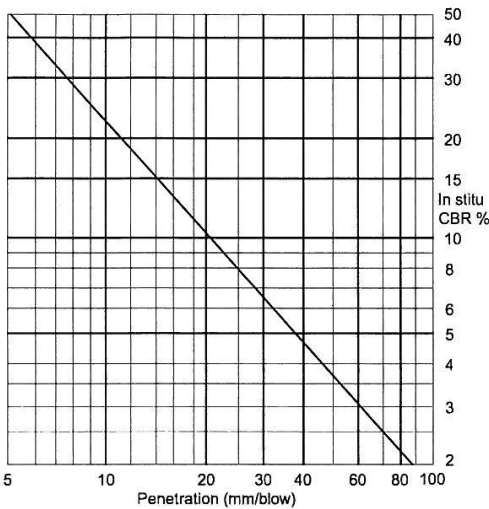
The minimum basecourse (top layer) depth on sealed pavements shall be:

- 150mm for lime stabilised pavements
- 250mm for TNZ M/4 basecourse.

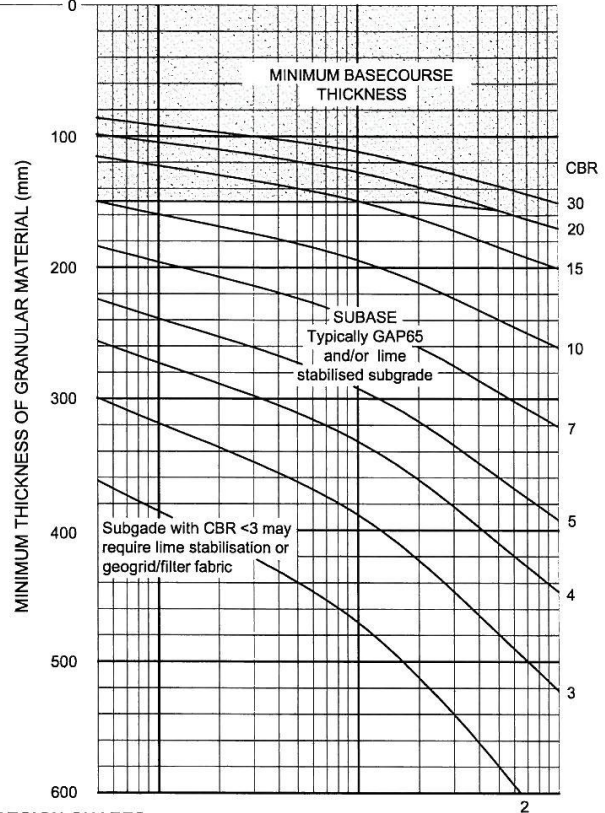
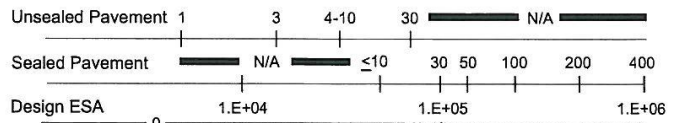
Unsealed road pavements shall include an upper layer of well graded running course aggregate of maximum particle size 20mm, minimum layer thickness 50mm and containing sufficient fine material to bind the layer and confine larger particles in the underlying structural pavement layer.

Refer Section 5.2.12 for further details.

**SUBGRADE PENETROMETER CHART**



**Household Equivalents**



**PAVEMENT DESIGN CHARTS**

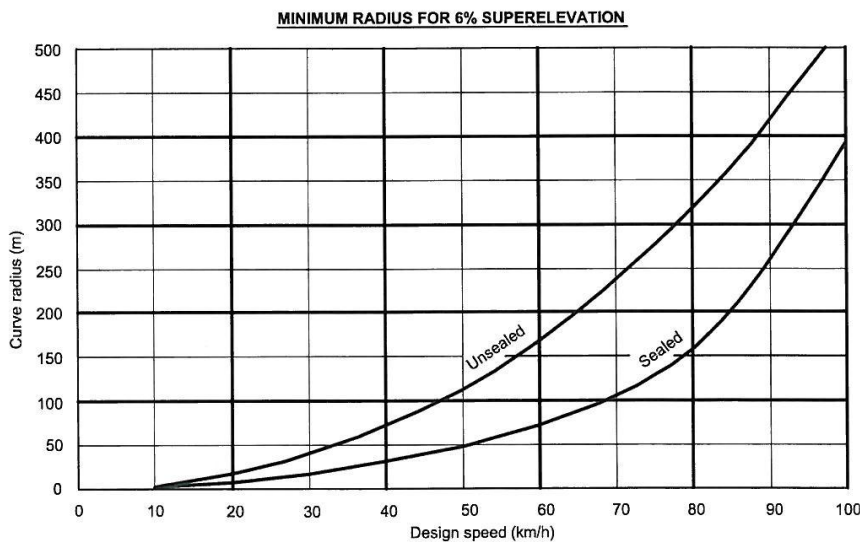
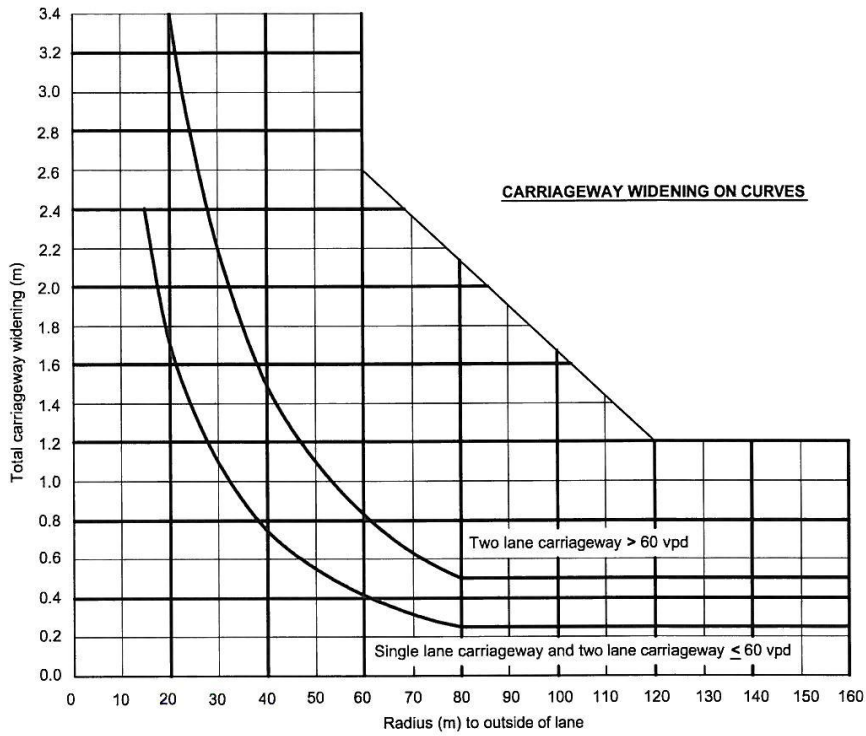
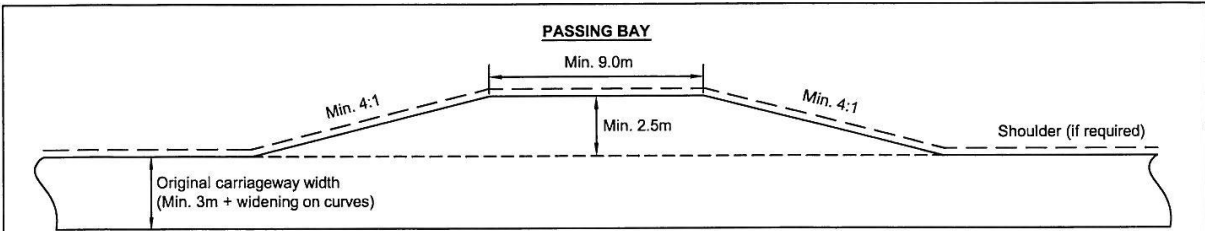
Test	Relevant Standard	Frequency	IANZ Lab Required
<b>Subgrade Strength Tests</b>			
Scala Penetrometer	NZS 4402	Minimum of 10 per uniform design length taken at the edge of carriageway on alternate sides of the road. For roads greater than 1km in length, the centerline spacing between tests shall not exceed 100m. The depth of subgrade tested shall be from 0 to 1.0m below design subgrade level. The lowest CBR recorded in this depth range shall be the CBR value recorded at that test location. The design CBR for each uniform pavement design shall be the 10%ile CBR value; that is the value exceeded by 90% of the test results.	No
Soaked CBR	NZS 4402: NZ Standard Compaction	Minimum of three representative samples per uniform design length or per kilometre for road lengths greater than 1km. Three tests to be undertaken for each sample.	Yes
<b>Sub Base Layer Test</b>			
Clegg Hammer	Clegg Impact value for fourth blow.	20m intervals on both sides of the road taken 300mm in from the edge of the carriageway. For 2 lane roads, centreline tests shall also be taken	No
<b>Top Basecourse Layer Tests</b>			
Clegg Hammer	Clegg Impact value for fourth blow.	20m intervals on both sides of the road taken 300mm in from the edge of the carriageway. For 2 lane roads, centreline tests shall also be taken	No
Total Voids	NZS 4407 : Test 4.2.2	5 random test locations per 200m length of road.	Yes
Benkleman Beam	TNZ T/1 Specification	20m intervals on both sides of the road taken 300mm in from the edge of the carriageway.	Yes
Falling Weight Deflectometer	Manufacturers Specification	25m intervals on alternate sides of the road taken 300mm in from the edge of the carriageway (40 tests/centreline km).	Yes

**SCHEDULE OF TESTING**

**PAVEMENT DESIGN CHART AND SCHEDULE OF TESTING**

ORIGINAL SIZE mm 44		KAIPARA DISTRICT COUNCIL ENGINEERING STANDARDS 2009	Drawing <b>S03</b>
	No. Revisions: _____ Date: _____ Designed: M WINCH 08/08 Approved: _____ 09/09 Drawing Status: IMPLEMENTATION Office Location: CPG, WHANGAREI		Revision: 0
			Scale: N.T.S.
	No. Revisions: _____ Date: _____ Designed: M WINCH 08/08 Approved: _____ 09/09 Drawing Status: IMPLEMENTATION Office Location: CPG, WHANGAREI		

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**PASSING BAY DETAILS, CARRIAGEWAY WIDENING AND CURVE RADIUS GUIDELINES**

ORIGINAL SIZE: 74

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



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ENGINEERING STANDARD 2009

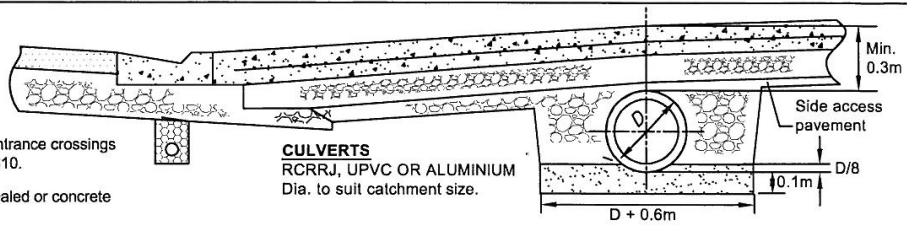
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Revision	0
Scale	N.T.S.

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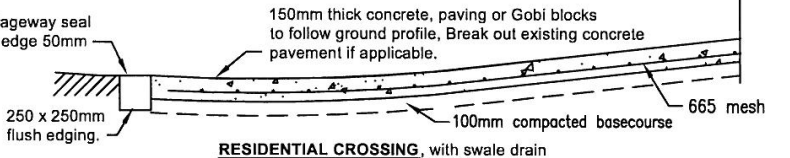
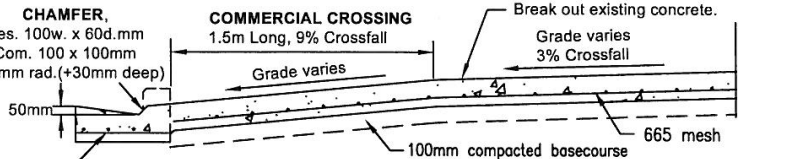
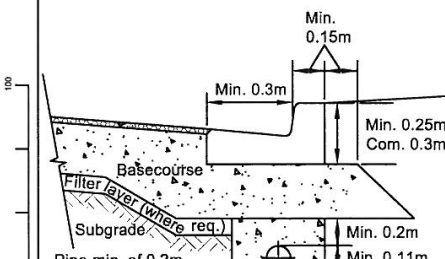
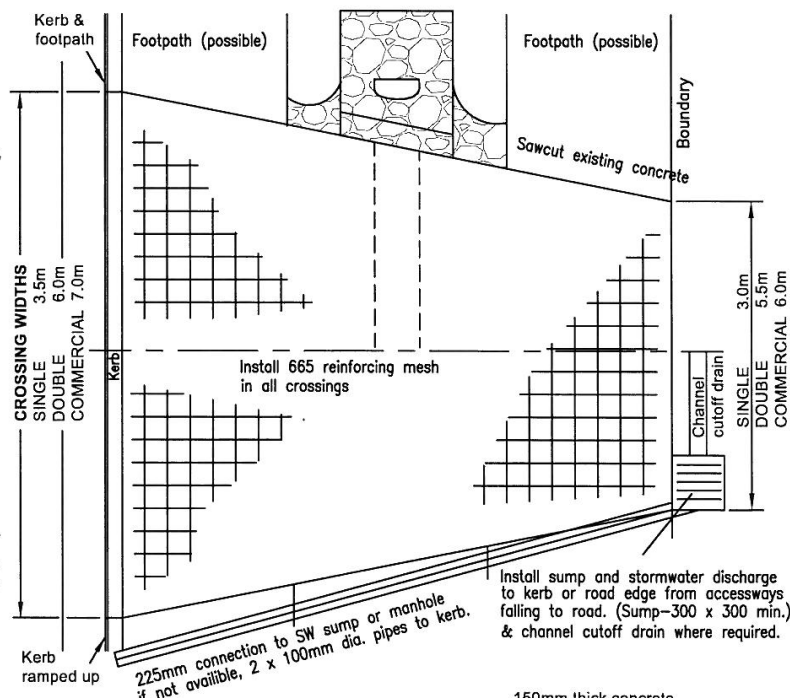


**NOTES (Urban)**

1. Sight distance requirements for entrance crossings are to comply with KDC drawing S10.
2. The crossing/driveway shall be sealed or concrete from the carriageway edge.
3. All crossings require Council inspection and a min. CBR of 15, prior to pouring concrete.
4. Ground to be compacted before pouring. Low or soft ground to be made good with compacted basecourse.
5. For single dwelling crossing only, min. 50mm of GAP25/40 and 665 mesh. All others use min. 100mm, of compacted GAP40 basecourse and 665 mesh prior to pouring concrete.
6. See KDC drawing S12 for kerb details.
7. Commercial, curves and tangent point intersection channel to be reinforced with 3-D12.
8. Crossing concrete to be 30MPa at 28 days.
9. Footpath concrete to be not less than 100mm thick, ordinary grade 17.5 MPa at 28 days, with construction joints at 3.5m centres.
10. Slope shall be varied from those shown to suit existing footpaths.
11. Footpath width does not include kerbs.
12. In all cases the kerb level is to be below the adjacent property, flood level by min. 100mm.
13. If no footpath, allowance shall be made for such with a 3% crossfall to the kerb as part of any property vehicle access.



**ENERGY DISSIPATOR**



**URBAN VEHICLE CROSSING ROADS WITH KERB AND CHANNEL TYPE**

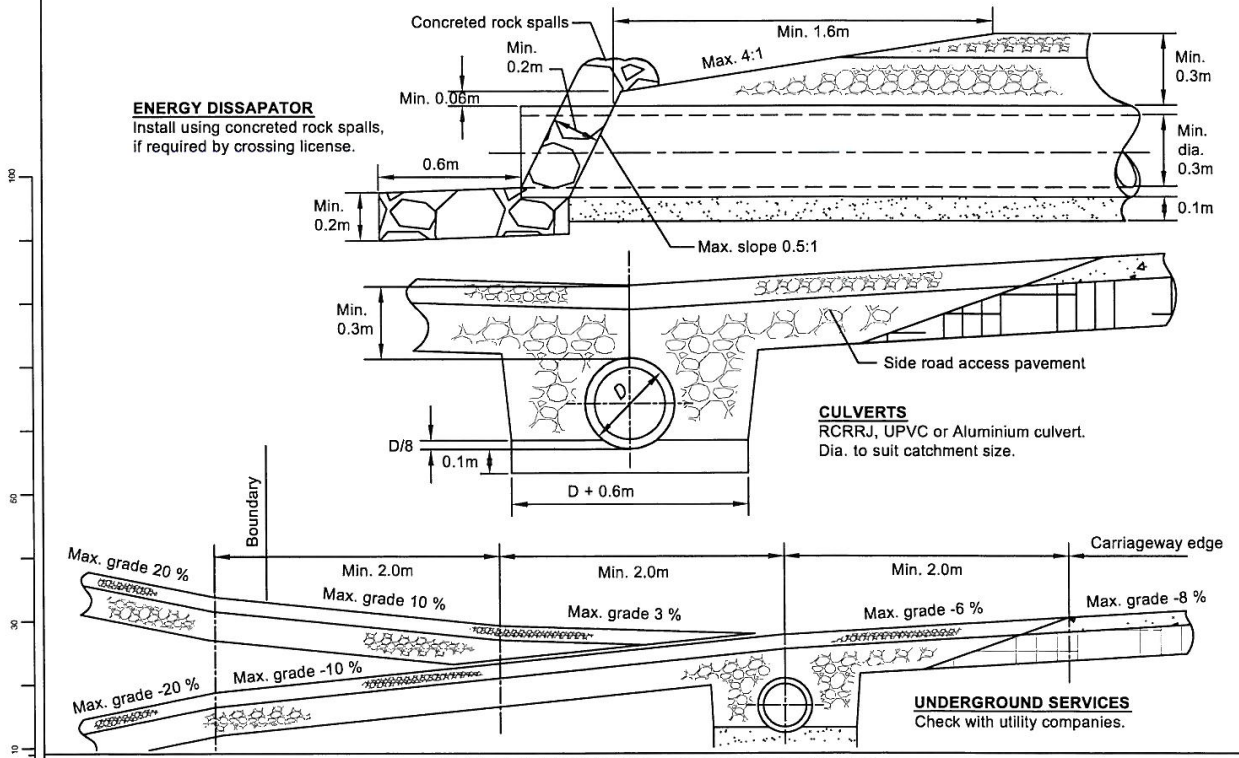
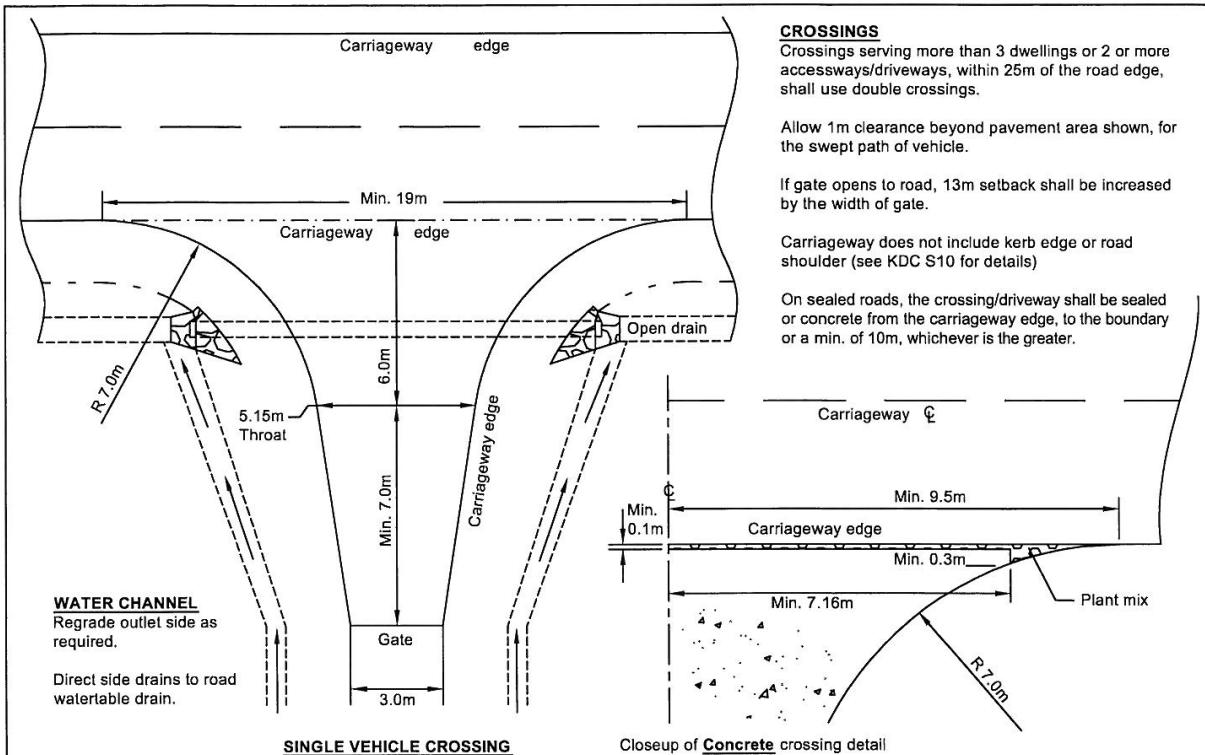
No. Revisions	Date
Designed M WINCH	08/08
Approved	09/09
Drawing Status	IMPLEMENTATION
Office Location	CPG, WHANGAREI



KAIPARA DISTRICT COUNCIL  
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Drawing	S05
Revision	0
Scale	N.T.S.

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ORIGINAL SIZE (mm)  
A4

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

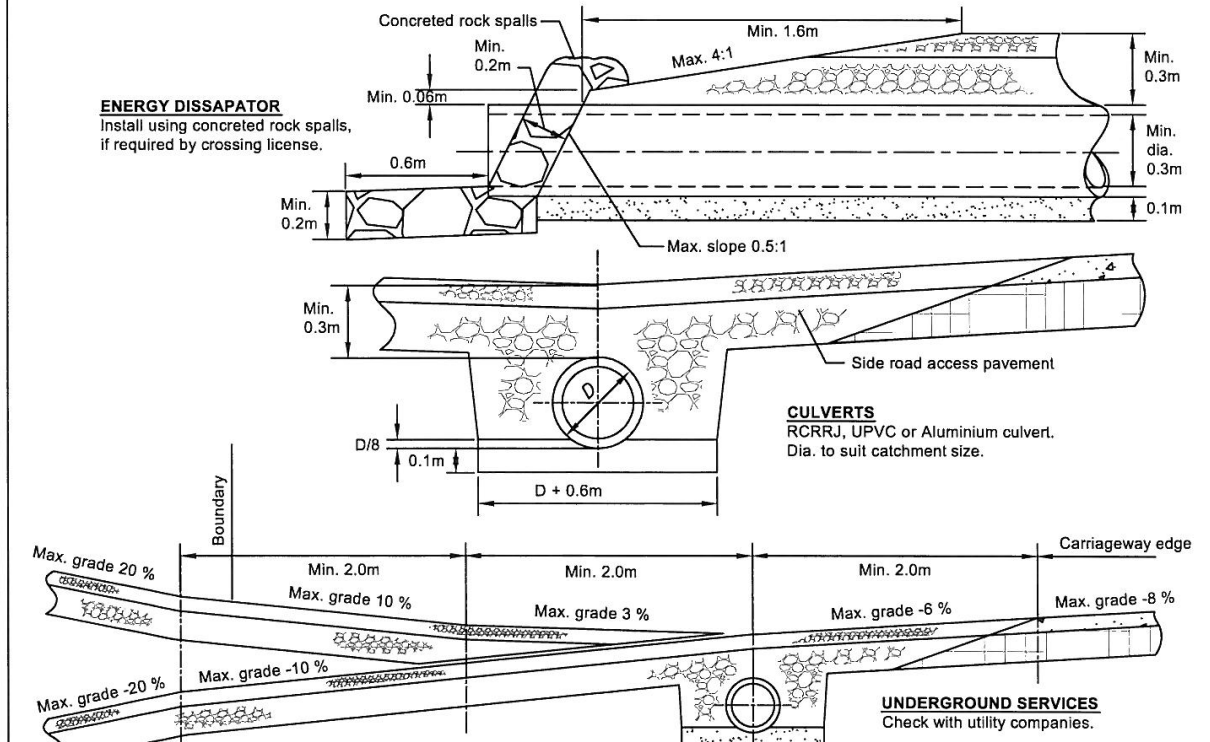
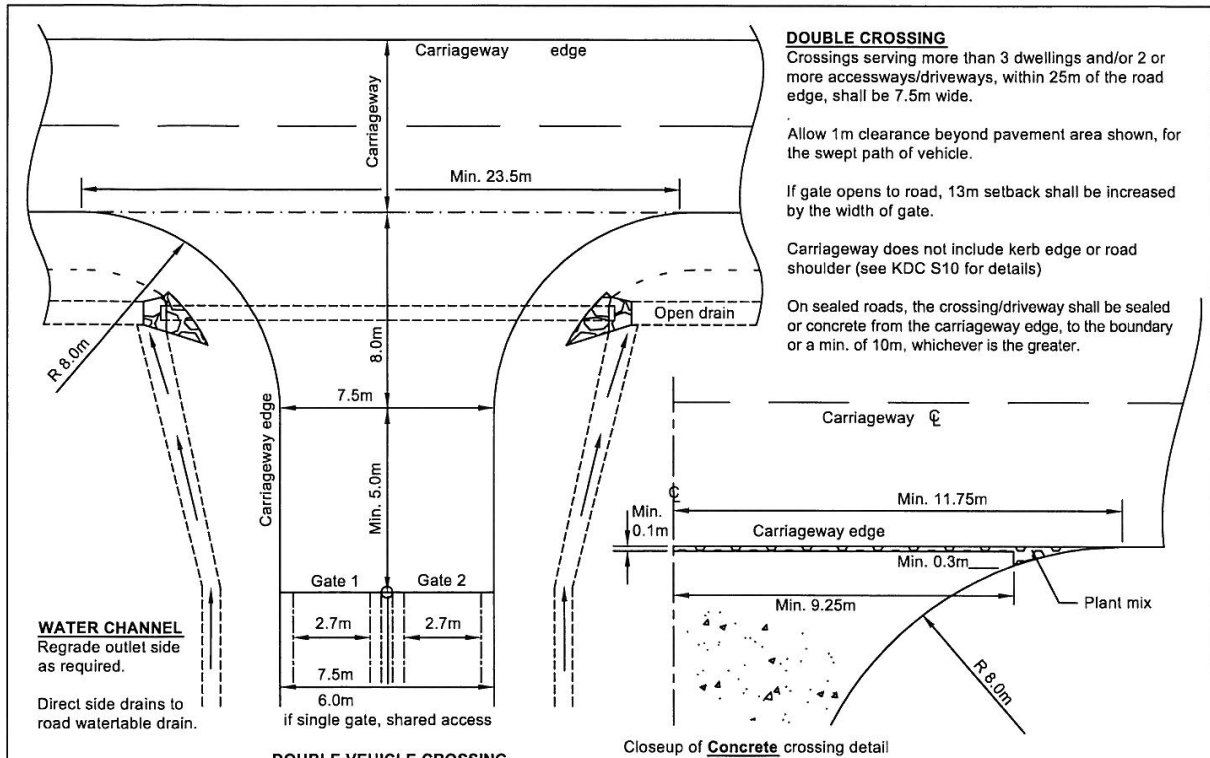


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ENGINEERING STANDARDS 2009

Drawing	S06
Revision	0
Scale	N.T.S.

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**VEHICLE CROSSING : UNKERBED ROADS**  
**DOUBLE DOMESTIC VEHICLE CROSSING - 4 TO 6 DWELLINGS (24 TO 36 VPD)**

ORIGINAL SIZE mm A4 0 10 30 50 100		KAIPARA DISTRICT COUNCIL ENGINEERING STANDARDS 2009	Drawing <b>S07</b>												
	<table border="1"> <tr><th>No.</th><th>Revisions</th><th>Date</th></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </table>	No.	Revisions	Date										Approved: <b>M WINCH</b> 08/08 09/09	Revision <b>0</b>
	No.	Revisions	Date												
Drawing Status: <b>IMPLEMENTATION</b>	Office Location: <b>CPG, WHANGAREI</b>	Scale: <b>N.T.S.</b>													

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**LAYOUT APPLIES TO**

Main road less than 500vpd and side road / accessway 42 to 180vpd (7 to 30du)  
Farm, commercial or industrial crossings less than 10 truck movements per day.

Allow 1m clearance beyond pavement area shown, for the swept path of vehicle.

If gate opens towards road, 25m setback shall be increased by the width of the gate.

Carriageway does not include kerb edge or road shoulder (see KDC S10 for details)

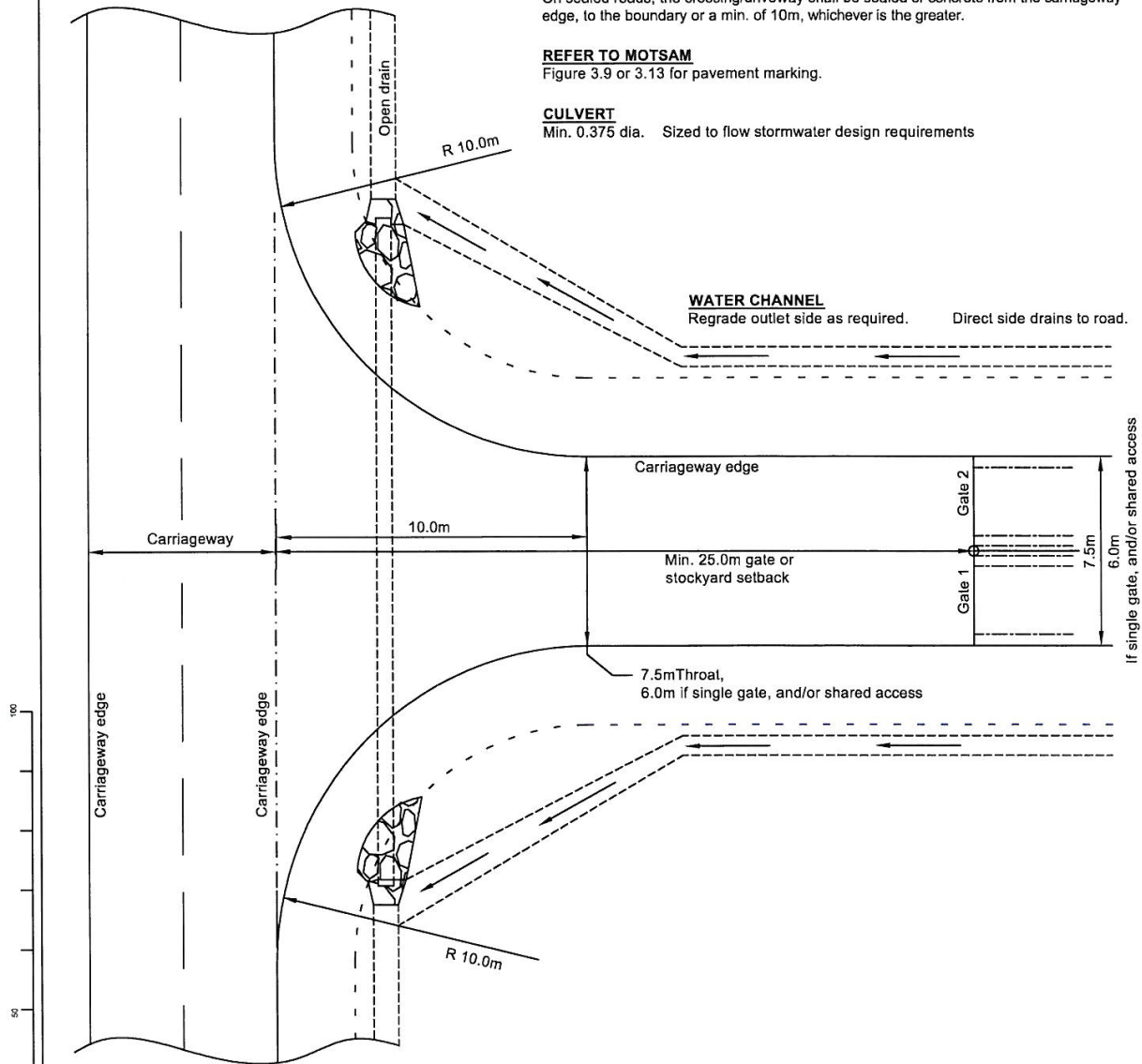
On sealed roads, the crossing/driveway shall be sealed or concrete from the carriageway edge, to the boundary or a min. of 10m, whichever is the greater.

**REFER TO MOTSAM**

Figure 3.9 or 3.13 for pavement marking.

**CULVERT**

Min. 0.375 dia. Sized to flow stormwater design requirements



**NOTE**

These design standards do not apply to State highways and Transit NZ should be consulted for the appropriate guidelines and standards.

**VEHICLE CROSSING AND INTERSECTION LAYOUT  
TYPE 1**

No.	Revisions	Date
1	Designed	08/08
2	Approved	09/09
Drawing Status IMPLEMENTATION		
Office Location CPC, WHANGAREI		

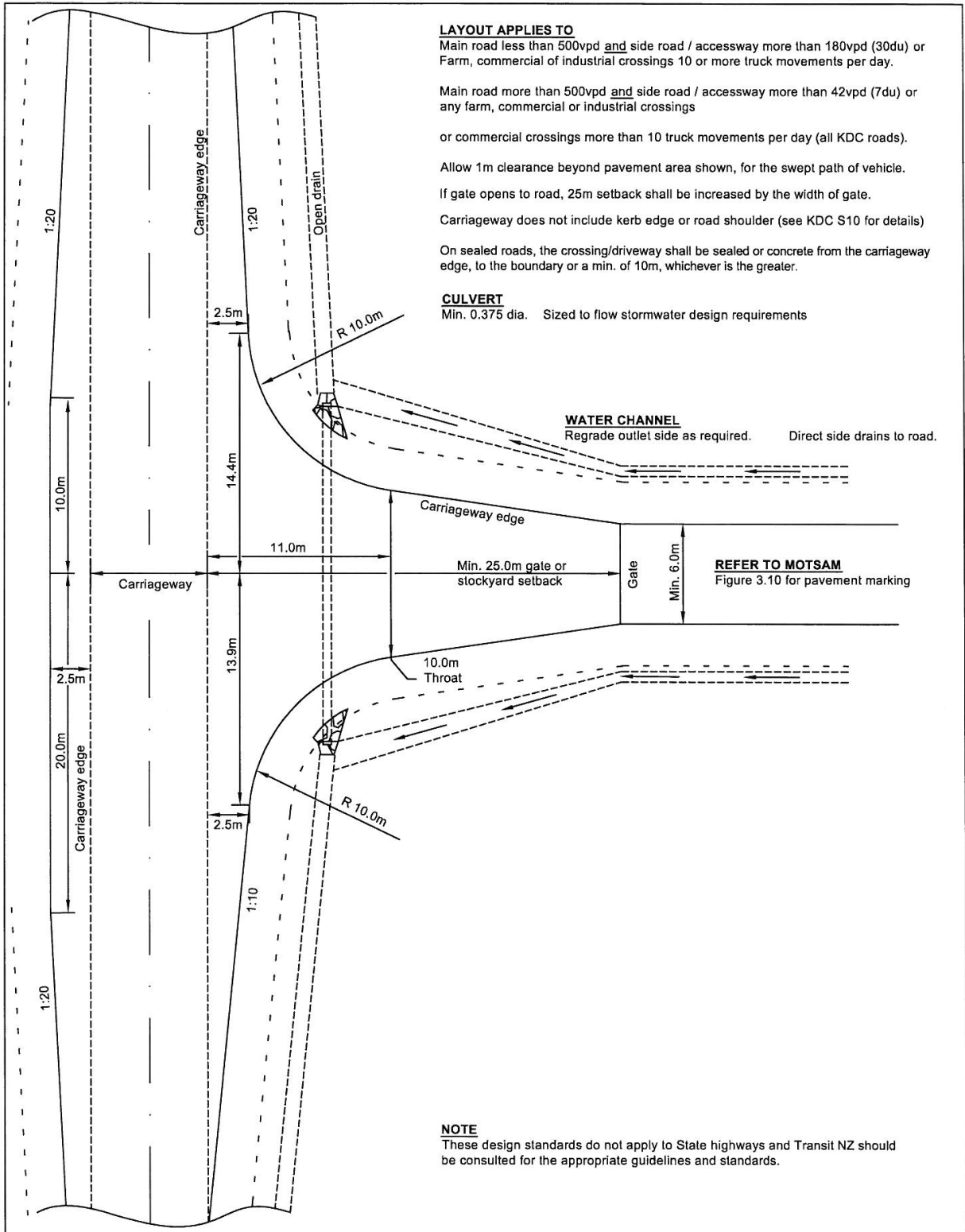


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ENGINEERING STANDARDS 2009

Drawing	<b>S08</b>
Revision	0
Scale	N.T.S.

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VEHICLE CROSSING AND INTERSECTION  
 TYPE 2

ORIGINAL SIZE mm  
 A4

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



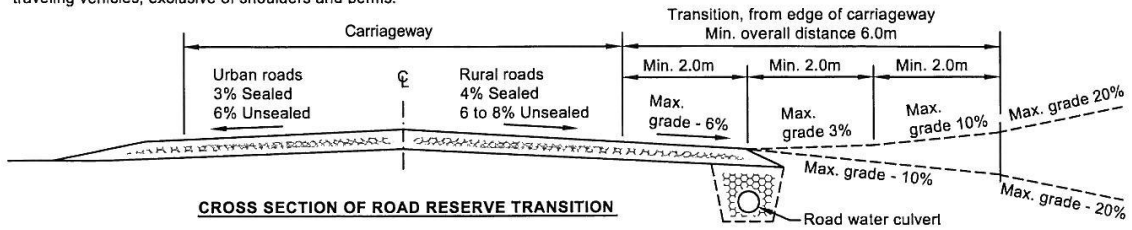
KAIPARA DISTRICT COUNCIL  
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Drawing	S09
Revision	0
Scale	N.T.S.

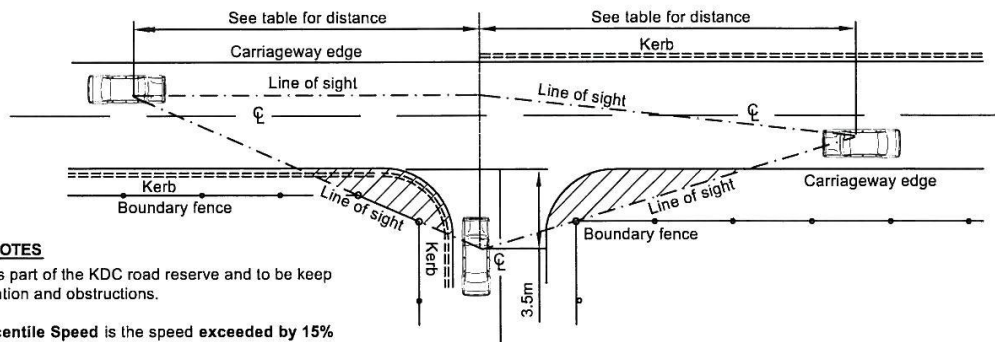
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**CARRIAGEWAY DEFINITION**

The portion of the road devoted particularly to the use of traveling vehicles, exclusive of shoulders and berms.



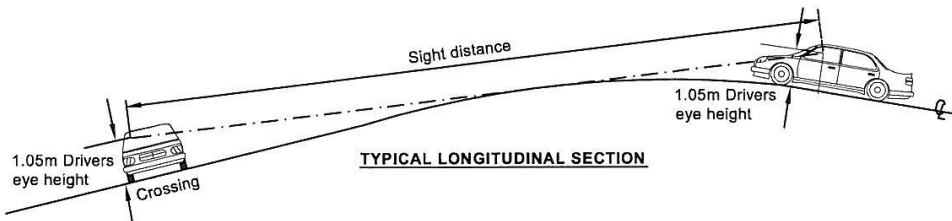
**CROSS SECTION OF ROAD RESERVE TRANSITION**



**LINE OF SIGHT NOTES**

1. Shaded area is part of the KDC road reserve and to be kept clear of vegetation and obstructions.
2. The 85th Percentile Speed is the speed exceeded by 15% of drivers

**PLAN OF TRAFFIC SIGHT LINES AT VEHICLE CROSSING**



**TYPICAL LONGITUDINAL SECTION**

Road operating speed (km/h)	85th Percentile speeds							
	≤ 40	50	60	70	80	90	100	110
Minimum sight distance sealed (m)	40	45	65	85	105	130	160	200
Minimum sight distance unsealed (m)	45	65	85	115	145	185	230	

**TABLE OF MINIMUM SIGHT DISTANCE**

**GENERAL NOTES**

1. Refer to KDC drawings S10, S11, S13 (for swale details), and S05 to S09 for crossing layouts.
2. Crossings shall have a positive drain system which intercepts stormwater and directs it away from the road or into the road drainage system.
3. The crossing and driveway shall be sealed or concrete in accordance with clause 5.2.6.
4. Any superfluous entrance crossings along the property road frontage shall be removed and the site reinstated similar to their immediate surroundings.
5. The transition to road crossfall goes past the boundary, over a minimum length of 6m and the grade shall be less than 10% (10 to 1). Driveway grade shall be less than 20% (5 to 1).
6. The road operating speed shall be measured at the approaching vehicle position on the road as shown in the drawings above.
7. Sight distances are to be increased for gradients in accordance with the current Austroads guide for "Intersections at Grade".
8. A turning area shall be provided within the property.

**VEHICLE CROSSING  
SIGHT DISTANCE AND VERTICAL GEOMETRY STANDARDS**

		KAIPARA DISTRICT COUNCIL ENGINEERING STANDARDS 2009		Drawing <b>S10</b>
No. Revisions Designed M WINCH 08/08 Approved 09/09 Drawing Status IMPLEMENTATION Office Location CPG, WHANGAREI				Revision <b>0</b> Scale <b>N.T.S</b>

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