DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Paul Cotter
REGISTERED CIVIL ENGINEER

July 1, 2002
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Paul Cotter
No. C34509
EXP. 9-30-03
CIVIL
STATE OF CALIFORNIA

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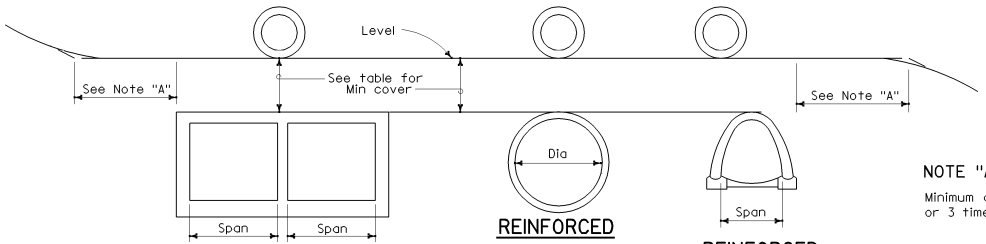
TABLE OF MINIMUM COVER AND STRUTTING REQUIREMENTS FOR CONSTRUCTION LOADS

	TYPE				80-222 kN (18-50 k) AXLE		222-334 kN (50-75 k) AXLE		334-489 kN (75-110 k) AXLE		489-667 kN (110-150 k) AXLE	
	MAXIMUM DESIGN FILL	SPAN	CELLS	MIN COVER	STRUTS REQUIRED	STRUT SIZE AND SPACING	STRUTS REQUIRED	STRUT SIZE AND SPACING	STRUTS REQUIRED	STRUT SIZE AND SPACING	STRUTS REQUIRED	STRUT SIZE AND SPACING
BOX CULVERTS	3.0 m (10') and 6.0 m (20')	1.2 m (4') to 2.4 m (8')	Single and Multiple	1.5 m (5')	—	—	—	—	—	—	—	—
	3.0 m (10')	3.0 m (10') to 4.3 m (14')	Single and Multiple	1.5 m (5')	—	—	1/3 Points	Struts 140 mm x 140 mm (6" x 6") @ 1.0 m (3'-6") Sills 140 mm x 184 mm (6" x 8")	1/3 Points	Struts 140 mm x 184 mm (6" x 8") @1.0 m (3'-6") Sills 140 mm x 184 mm (6" x 8")	1/3 Points	Struts 140 mm x 184 mm (6" x 8") @1.0 m (3'-6") Sills 140 mm x 184 mm (6" x 8')
	6.0 m (20')	3.0 m (10') to 4.3 m (14')	Single and Multiple	1.5 m (5')	—	—	—	—	—	—	—	—

TABLE OF MINIMUM COVER FOR CONSTRUCTION LOADS

TYPE		DIA OR SPAN	80-222 kN (18-50k) AXLE	222-334 kN (50-75k) AXLE	334-489 kN (75-110k) AXLE	489-667 kN (110-150k) AXLE
REINFORCED CONCRETE CULVERTS	Pipes	Dia 300 mm to 1000 mm (12" to 39")	600 mm (2')	900 mm (3')	900 mm (3')	900 mm (3')
		Dia 1050 mm to 2700 mm (42" to 108")	$\frac{Dia}{1.75}$ or 900 mm (3')	$\frac{Dia}{1.75}$ or 900 mm (3')	$\frac{Dia}{1.75}$ or 900 mm (3')	$\frac{Dia}{1.75}$ or 900 mm (3')
	Arches	Spans to 4.3 m (14')	$\frac{Span}{2.5}$ or 1.2 m (4')	$\frac{Span}{2.5}$ or 1.2 m (4')	$\frac{Span}{2.5}$ or 1.2 m (4')	$\frac{Span}{2.5}$ or 1.2 m (4')
		Spans 4.6 m to 6.7 m (15 to 22')	$\frac{Span}{3.5}$ or 1.8 m (6')	$\frac{Span}{3.5}$ or 1.8 m (6')	$\frac{Span}{3.5}$ or 1.8 m (6')	$\frac{Span}{3.5}$ or 1.8 m (6')
METAL CULVERTS	Pipes	Dia to 3000 mm (120")	$\frac{Dia}{1.75}$ or 1.2 m (4')	$\frac{Dia}{1.75}$ or 1.2 m (4')	$\frac{Dia}{1.75}$ or 1.2 m (4')	$\frac{Dia}{1.75}$ or 1.2 m (4')
		Dia over 3000 mm (120")	$\frac{Dia}{3}$ or 1.8 m (6')	$\frac{Dia}{3}$ or 1.8 m (6')	$\frac{Dia}{3}$ or 1.8 m (6')	$\frac{Dia}{3}$ or 1.8 m (6')
	Pipe Arches	All Spans	$\frac{Span}{3}$ or 1.2 m (4')	$\frac{Span}{3}$ or 1.2 m (4')	$\frac{Span}{3}$ or 1.2 m (4')	$\frac{Span}{3}$ or 1.2 m (4')
	Structural Plate Pipe, Arches and Vehicular Undercrossings	All Spans	$\frac{Span}{3}$ or 1.5 m (5')	$\frac{Span}{3}$ or 1.5 m (5')	$\frac{Span}{3}$ or 1.5 m (5')	$\frac{Span}{3}$ or 1.5 m (5')
Plastic Pipe		Dia 300 mm to 1200 mm (12" to 48")	$\frac{Dia}{1.75}$ or 1.2 m (4')	$\frac{Dia}{1.75}$ or 1.2 m (4')	$\frac{Dia}{1.75}$ or 1.2 m (4')	$\frac{Dia}{1.75}$ or 1.2 m (4')

NOTE: Minimum cover shall be the greater value of alternatives shown. The diameter and spans shown in the table to calculate the minimum cover (Example: $\frac{Dia}{1.75}$) are the diameter or span of the facility expressed in number of meters (feet).



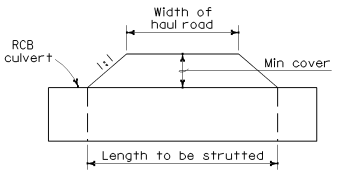
BOX CULVERTS

REINFORCED CONCRETE PIPES, PLASTIC PIPES AND METAL CULVERTS

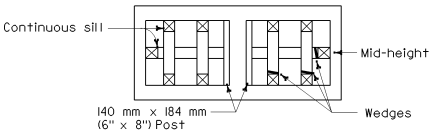
REINFORCED CONCRETE ARCH CULVERTS

NOTE "A":

Minimum distance equals 3 times the span or 3 times the diameter.



MINIMUM LENGTH OF STRUTTING



RCB STRUTTING DETAILS

NOTES:

Length of strutting to be determined by the Engineer, but shall not be less than as shown in the sketch above.

Assumed tire patterns:

222 kN (50 k) axle	610x460 mm (2.0' x 1.5')
334 kN (75 k) axle	910x610 mm (3.0' x 2.0')
489 kN (110 k) axle	910x760 mm (3.0' x 2.5')
667 kN (150 k) axle	910x910 mm (3.0' x 3.0')

Impact = 10%

Sills to be glue-laminated or solid timber.

For strutting requirements of Structural Steel Plate Vehicular Undercrossing, Structural Steel Plate Arches and Structural Steel Plate Pipes during construction, see Standard Plans D88A.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

CONSTRUCTION LOADS ON CULVERTS

These "Standard Plans for Construction of Local Streets and Roads" contain units in two systems of measurement: International System of Units (SI or "metric") and United States Standard Measures shown in the parentheses ( ). The measurements expressed in the two systems are not necessarily equal or interchangeable. See the "Foreword" at the beginning of this publication.

NO SCALE

D88

2002 DUAL UNITS STD PLAN D88