G-CAST®

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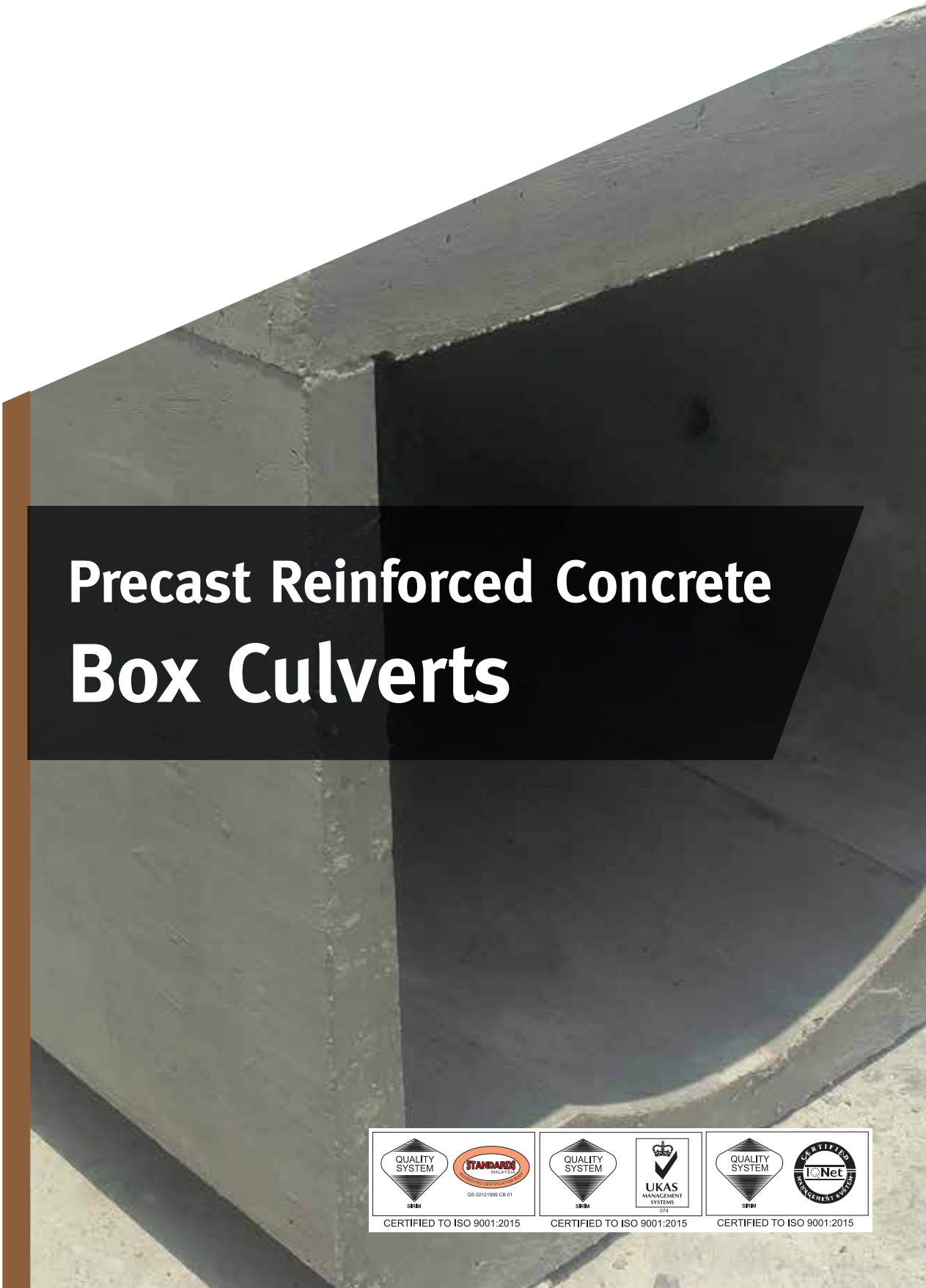
MS1293 : PART 1 : 1992

Precast Reinforced Concrete
Box Culverts



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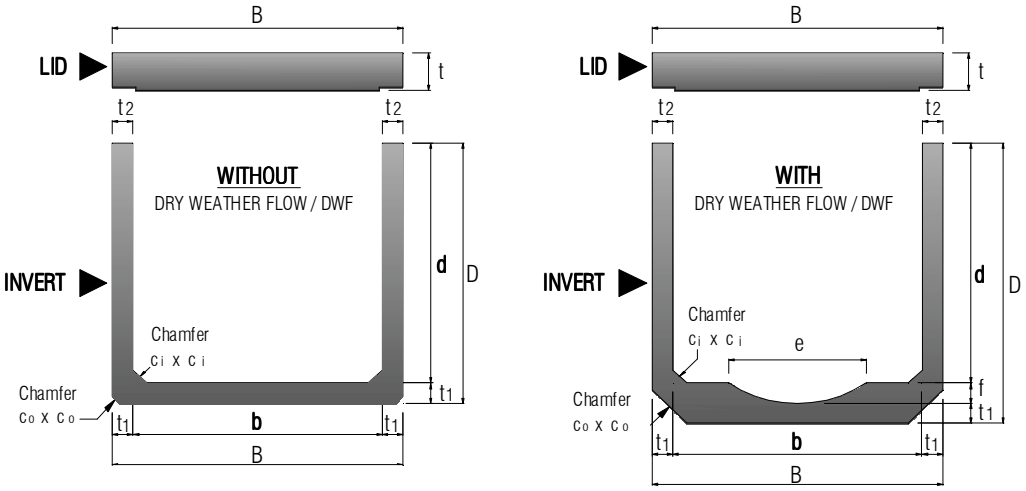
BOX CULVERT - STANDARD SIZES

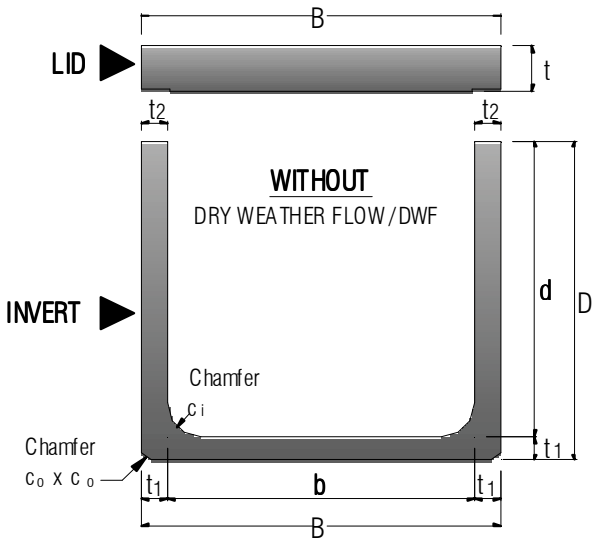
BOX CULVERTS OF STANDARD LENGTH 1.000 METRE

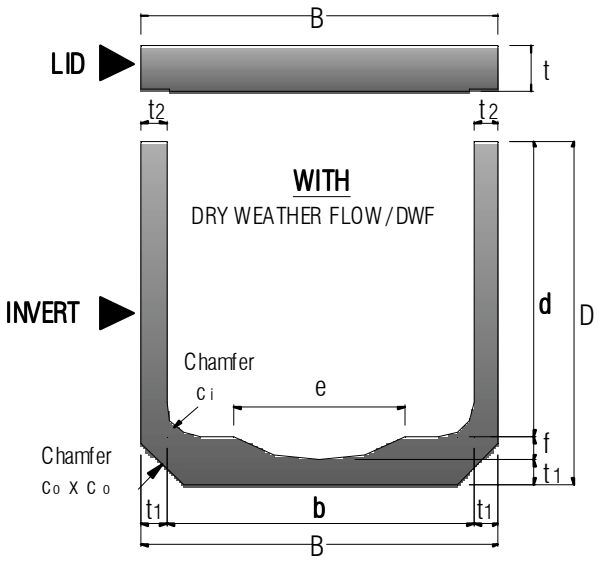


Nominal Size		Section Thickness			Overall Width	Without DWF					With DWF						
Internal Width	Internal Depth	Lid	Invert			Overall Depth	Chamfers		Approx. Weight		Overall Depth	Chamfers		DWF Size		Approx. Weight	
b	d	t	t_1	t_2	B	D	c_i	c_o	LID	INVERT	D	c_i	c_o	e	f	LID	INVERT
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(ton)	(ton)	(mm)	(mm)	(mm)	(mm)	(mm)	(ton)	(ton)
300	300	110	60	55	420	360	25	25	0.12	0.15	410	25	75	200	50	0.12	0.17
450	300	110	60	57	570	360	25	25	0.16	0.17	410	25	100	200	50	0.16	0.20
	450			55		510				0.21	560						0.24
600	300	125	65	63	730	365	50	25	0.23	0.21	430	50	125	405	65	0.23	0.25
	450			61		515				0.26	580						0.30
	600			60		665				0.30	730						0.34
750	450	140	65	62	880	515	50	25	0.31	0.28	580	50	125	405	65	0.31	0.34
	600			61		665				0.33	730						0.39
	750			60		815				0.37	880						0.43
900	450	140	75	68	1050	525	50	25	0.37	0.35	600	50	125	500	75	0.37	0.45
	600			65		675				0.40	750						0.50
	750			63		825				0.45	900						0.54
	900			60		975				0.50	1050						0.59
1200	600	140	80		1360	680	50	25	0.47	0.51	855	50	225	900	175	0.47	0.71
	750					830				0.57	1005						0.77
	900					980				0.63	1155						0.82
	1050					1130				0.69	1305						0.88
	1200					1280				0.75	1455						0.94
1500	750	160	100		1700	850	50	25	0.67	0.79	1075	50	250	1075	225	0.67	1.17
	900					1000				0.87	1225						1.24
	1050					1150				0.94	1375						1.32
	1200					1300				1.01	1525						1.39
	1350					1450				1.09	1675						1.46
	1500					1600				1.16	1825						1.54
1800	900	180	115		2030	1015	50	25	0.90	1.09	1240	50	250	1075	225	0.90	1.65
	1050					1165				1.17	1390						1.73
	1200					1315				1.26	1540						1.82
	1350					1465				1.34	1690						1.90
	1500					1615				1.43	1840						1.99
	1650					1765				1.51	1990						2.07
	1800					1915				1.60	2140						2.15

BOX CULVERT - SUPER SIZES (page 1 of 2)

BOX CULVERTS OF STANDARD LENGTH 1.000 METRE





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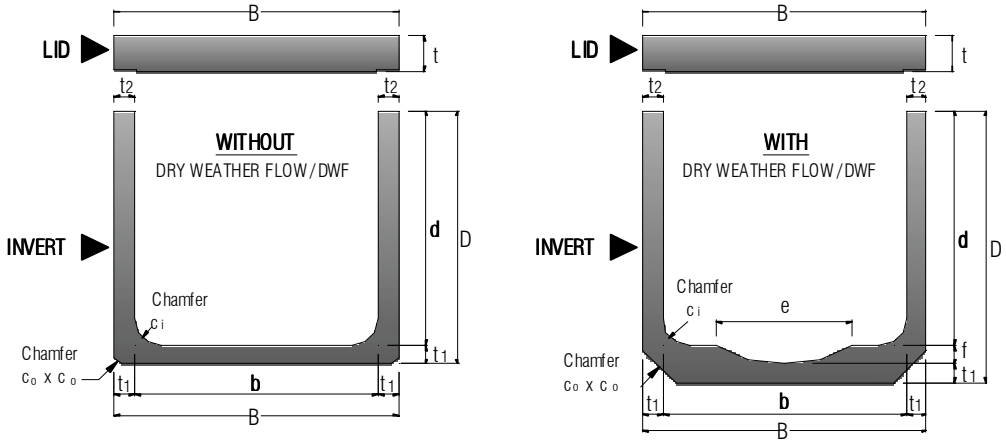
Internal Width	Internal Depth	Lid	Invert		Overall Depth	Chamfers		Approx. Weight		Overall Depth	Chamfers		DWF Size		Approx. Weight	
b	d	t	t_1	t_2	B	D	c_i	c_o	LID	INVERT	D	c_i	c_o	e	f	LID	INVERT
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(ton)	(ton)	(mm)	(mm)	(mm)	(mm)	(mm)	(ton)	(ton)
	1050					1200				1.69	1425						2.31
	1200					1350				1.80	1575						2.42
	1350					1500				1.91	1725						2.53
2100	1500	215	150	2400		1650	Radius 180	25	1.27	2.02	1875	Radius 180	350	1075	225	1.27	2.64
	1650					1800				2.13	2025						2.75
	1800					1950				2.24	2175						2.86
	1950					2100				2.35	2325						2.97
	2100					2250				2.46	2475						3.08
	1200					1350				1.91	1575						2.69
	1350					1500				2.02	1725						2.80
	1500					1650				2.13	1875						2.91
	1650					1800				2.24	2025						3.02
2400	1800	215	150	2700		1950	Radius 180	25	1.43	2.35	2175	Radius 180	350	1075	225	1.43	3.13
	1950					2100				2.46	2325						3.24
	2100					2250				2.57	2475						3.35
	2250					2400				2.68	2625						3.46
	2400					2550				2.79	2775						3.57
	1350					1530				2.58	1755						3.56
	1500					1680				2.71	1905						3.69
	1650					1830				2.84	2055						3.82
	1800					1980				2.97	2205						3.95
2700	1950	215	180	3060		2130	Radius 180	25	1.62	3.11	2355	Radius 180	350	1075	225	1.62	4.09
	2100					2280				3.24	2505						4.22
	2250					2430				3.37	2655						4.35
	2400					2580				3.50	2805						4.48
	2550					2730				3.64	2955						4.62
	2700					2880				3.77	3105						4.75

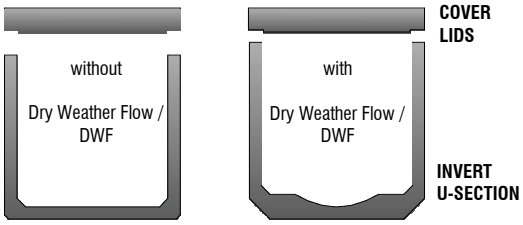
BOX CULVERT - SUPER SIZES (page 2 of 2)

BOX CULVERTS OF STANDARD LENGTH 1.000 METRE



Nominal Size		Section Thickness			Overall Width	Without DWF					With DWF						
Internal Width	Internal Depth	Lid	Invert			Overall Depth	Chamfers		Approx. Weight		Overall Depth	Chamfers		DWF Size		Approx. Weight	
b	d	t	t_1	t_2	B	D	c_i	c_o	LID	INVERT	D	c_i	c_o	e	f	LID	INVERT
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(ton)	(ton)	(mm)	(mm)	(mm)	(mm)	(mm)	(ton)	(ton)
	1500					1680				2.84	1905						3.99
	1650					1830				2.97	2055						4.12
	1800					1980				3.11	2205						4.25
	1950					2130				3.24	2355						4.38
	2100					2280				3.37	2505						4.52
3000	2250	215	180		3360	2430	Radius 180	25	1.77	3.50	2655	Radius 180	350	1075	225	1.77	4.65
	2400					2580				3.64	2805						4.78
	2550					2730				3.77	2955						4.91
	2700					2880				3.90	3105						5.05
	2850					3030				4.03	3255						5.18
	3000					3180				4.17	3405						5.31
	1650					1850				3.47	2075						4.80
	1800					2000				3.61	2225						4.95
	1950					2150				3.76	2375						5.09
	2100					2300				3.91	2525						5.24
	2250					2450				4.06	2675						5.39
3300	2400	255	200		3700	2600	Radius 180	25	2.32	4.20	2825	Radius 180	350	1075	225	2.32	5.53
	2550					2750				4.35	2975						5.68
	2700					2900				4.50	3125						5.83
	2850					3050				4.64	3275						5.98
	3000					3200				4.79	3425						6.12
	3150					3350				4.94	3575						6.27
	3300					3500				5.08	3725						6.42
	1800					2000				3.76	2225						5.26
	1950					2150				3.91	2375						5.41
	2100					2300				4.06	2525						5.55
	2250					2450				4.20	2675						5.70
	2400					2600				4.35	2825						5.85
	2550					2750				4.50	2975						5.99
3600	2700	255	200		4000	2900	Radius 180	25	2.50	4.64	3125	Radius 180	350	1075	225	2.50	6.14
	2850					3050				4.79	3275						6.29
	3000					3200				4.94	3425						6.44
	3150					3350				5.08	3575						6.58
	3300					3500				5.23	3725						6.73
	3450					3650				5.38	3875						6.88
	3600					3800				5.53	4025						7.02

PRECAST RC Box Culverts



STANDARD PRODUCT RANGE : 300 - 3600 MM

SPECIAL DESIGN: G-Cast is able to design and manufacture special design Box Culverts to suit individual project requirements

G-CAST manufactures a wide range of precast concrete box culverts from 300mm width to 3600mm width, and are available with or without dry weather flow (DWF) channel. All products are manufactured under a Quality Management System complying to ISO 9001:2008.

MATERIAL SPECIFICATIONS

Concrete characteristic strength at 28 days = 40 N/mm^2 ,

Nominal concrete cover :

Standard Size	(300-1800mm width)	25mm
Super size	(2100-3600mm width)	30mm

Cement of pulverized fuel ash cement which warrants lower permeability and higher long term durability and long term strength.

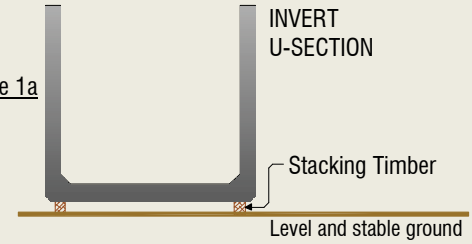


Figure 1a

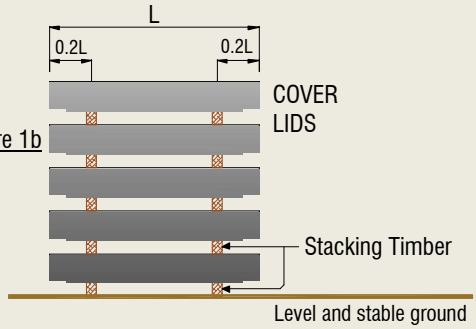


Figure 1b

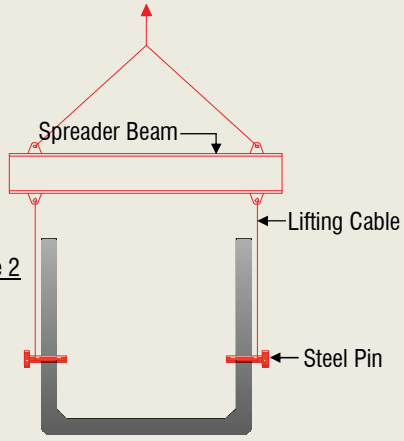


Figure 2

DESIGN SPECIFICATIONS

Backfill depth of box culverts not exceeding 2m depth, with highway live load of 45 Units HB loading (112.5 kN).

Bulk density of backfill soil = 19 kN/m^3, coefficient of lateral earth pressure at rest = 0.50.

Hydrostatic pressure is eliminated by provision of weep holes at side walls of box culverts.

Design loadings are made reference to BS 5400-2, BD 31/01 (Department of Transport, UK), BS 8110-1 and MS 1293-1 and for carrying highway vehicle axle loadings permitted by Jabatan Kerja Raya.

HANDLING

Spreader beam, steel pins and cables to be used to lift invert section (U-shape) as shown in Figure 2. Improper lifting will cause cracking of the side walls.

STORAGE AT SITE

Both Invert sections (U-shape) and cover lids are to be stacked at site on level and stable ground to undesirable forces that cause cracking. Stacking timbers must be used at all times as shown in Figure 1a, 1b.

LAYING

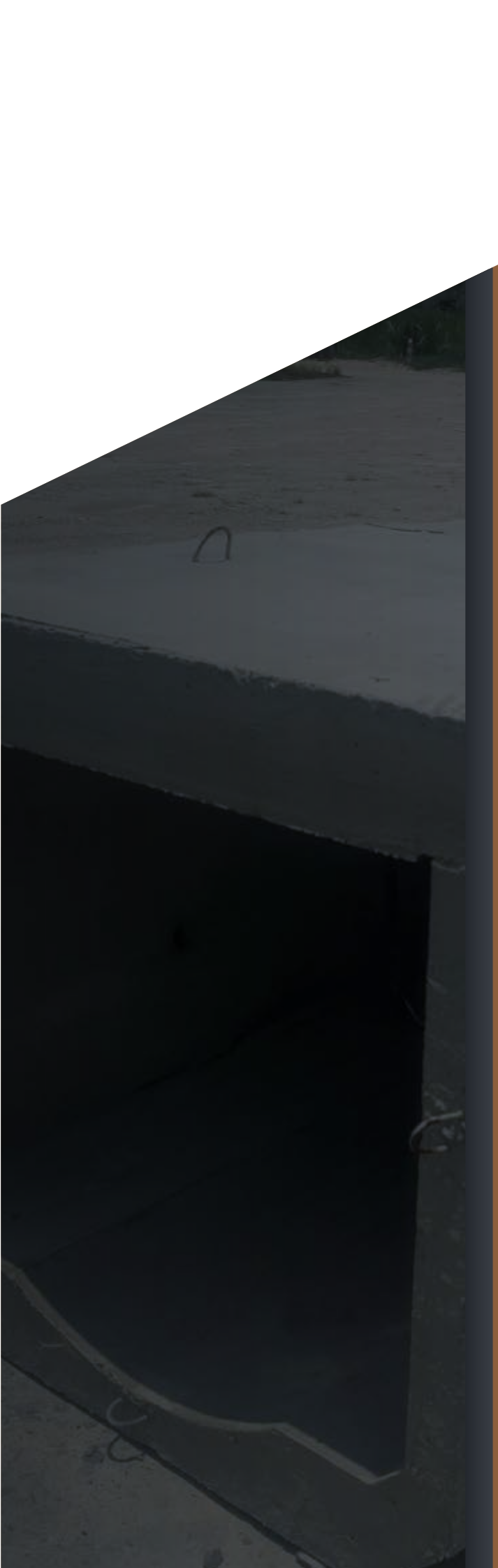
Box culverts must be laid on level and compacted bedding to ensure uniform support is provided that eliminates undesirable loads.

JOINTING

G-Cast box culverts of standard unit length 1.000 metre come with butt end joints and whenever necessary, cement-sand mortar is used to close up gaps.

BACKFILLING

Backfill material adjacent to box culverts should be granular soil and compacted in thin layers using light compactor.



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- Lot 12448-12473, Kawasan Perindustrian Bidor, Mukim Bidor, Daerah Batang Padang, 35500 Perak Darul Ridzuan, Malaysia.
- Lot 1561, Kampong Stesen, Sungai Choh, 48000 Rawang, Selangor Darul Ehsan, Malaysia.
- No. 1, Jalan Starken, Batu 5, Jalan Mawai, 81900 Kota Tinggi, Johor Darul Takzim, Malaysia.
- Lot 22993, Kawasan Industri Malaysia-China Kuantan, Jalan Gebeng By Pass, 26080 Kuantan, Pahang.

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