

Capacities of Drainage Piping for Roof and Paved Areas

Maximum Load for Horizontal Storm Drains, Roof and/or Paved Areas

.5% - 1/16" per foot
 1% - 1/8" per foot
 2% - 1/4" per foot
 4% - 1/2" per foot

Table 3 Pipe Slopes															
Pipe Size	.08	.12	.15	.22	.3	.4	.5	.6	1%	1.33%	2%	4%			
75 (3")	FOR SINGLE RAINWATER LEADER ONLY										273.6	388	m ²		
											2,945	4,185	ft ²		
											2,736	3,888	L		
100 (4")									497	573.4	700.8	968	m ²		
									5,350	6,172	7,544	10,420	ft ²		
									4,969	5,734	7,008	9,681	L		
150 (6")							1,045	1,147	1,478	1,593	2,064	3,186	m ²		
							11,249	12,346	15,910	17,147	22,220	34,295	ft ²		
							10,448	11,468	14,781	15,928	20,642	31,856	L		
200 (8")						1,758	2,160	2,242	3,185	3,568	4,332	6,244	m ²		
						18,928	23,250	24,133	34,284	38,407	46,630	67,212	ft ²		
						17,584	21,611	22,426	31,856	35,679	43,324	62,438	L		
250 (10")					3,111	3,593	4,022	4,460	5,734	6,626	8,155	11,341	m ²		
					33,468	38,680	43,300	48,000	61,723	71,325	87,785	122,075	ft ²		
					31,091	35,933	40,226	44,598	57,341	66,261	81,552	113,408	L		
300 (12")				4,332	4,970	5,861	6,500	7,136	9,175	10,449	13,201	18,350	m ²		
				46,633	53,493	63,095	69,953	76,812	98,758	112,473	142,101	197,515	ft ²		
				43,322	49,695	58,615	64,986	71,358	91,746	104,488	132,012	183,492	L		
375 (15")			6,500	7,773	9,176	10,576	11,774	12,870	15,928	17,202	22,172	33,131	m ²		
			69,952	83,670	98,777	113,845	126,738	138,525	171,454	185,170	238,664	356,629	ft ²		
			64,986	77,729	91,746	105,762	117,740	128,699	159,281	172,023	221,719	331,308	L		
450 (18")			9,302	10,449	12,742	14,909	16,310	17,202	20,847	25,689	26,122	38,227	54,794	m ²	
			100,129	112,474	137,164	160,481	175,569	185,170	224,400	276,521	281,185	411,491	589,815	ft ²	
			93,020	104,488	127,425	149,087	163,104	172,023	208,467	256,888	261,221	382,275	547,938	L	
525 (21")			14,144	15,928	19,241	25,230	26,122	29,308	32,111	41,286	46,510	51,683	81,553	m ²	
			152,251	171,454	207,116	271,583	281,185	315,476	345,652	444,410	500,647	556,335	877,854	ft ²	
			141,441	159,281	192,411	252,301	261,221	293,077	321,111	412,857	465,101	516,835	815,526	L	
600 (24")			16,562	20,388	22,936	27,778	32,493	37,718	41,031	45,490	58,360	66,261	81,552	116,721	m ²
			178,283	219,462	246,894	299,016	349,763	406,004	441,666	489,674	628,209	713,251	877,847	1,256,418	ft ²
			165,625	203,880	229,365	277,786	324,933	377,178	410,308	454,907	583,606	662,610	815,520	1,167,213	L

Sanitary & Storm Sewers for Commercial & Industrial Developments



Inspection Line 604-276-4111

City of Richmond

6911 No. 3 Road, Richmond, BC V6Y 2C1
www.richmond.ca
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Building Approvals Division
www.richmond.ca

- Table 1 indicates the minimum type and class of pipes for Sanitary and Storm Sewers, Building Drains and Sanitary & Storm Sewers outside of a Building.

Table 1			
	All sanitary and storm pipe and fittings used under a building and clear of footing pressures	"All pipe and fittings for sanitary and storm sewers located outside the building, with a minimum of 450 mm (18") but, less than 900 mm (36") depth to the top of pipe under traffic areas may be:"	"All pipe and fittings for sanitary and storm sewers located outside of the building with minimum 450 mm (18") depth to the top of pipe in landscape areas or minimum 900 mm (36") depth to the top of pipe under traffic areas may be:"
Cast iron certified to CSA B70	P	P	P
Asbestos cement soil pipe certified to CSA B127.1	P	P	P
Asbestos cement sewer pipe certified to CSA B127.2	P	NP	P
ABS/PVC-DWV certified to CSA B181.1 and B181.2 respectively	P	P	P
ABS/PVC sewer pipe certified to CSA B182.1 and marked 320 KPa stiffness	P	NP	P
"PVC sewer pipe in sizes 200 mm (8") and over SDR 35 maximum certified to CSA 182.2"	P	NP	P
Ribbed PVC sewer pipe certified to CSA B182.4	P	NP	P
Reinforced concrete conforming to ASTM C76 - Class IV with gasket joints	P	P	P
Non-reinforced concrete conforming to ASTM C14 - Class III with gasket joints	P	NP	P
"P - PERMITTED NP - NOT PERMITTED"			

- Slopes for sanitary sewers shall be not less than the following: 1.0% for 100 mm (4") pipe, 0.65% for 150 mm (6"), 0.4% for 200 mm (8"), 0.3% for 250 mm (10") and over. (See Table 3 for gradients on storm sewers).
- Cleanouts for horizontal sanitary and storm piping shall be provided at intervals of not more than 15 m (50') apart for 100 mm (4") pipe, and not more than 26 m (85') apart for pipes 150 mm (6") and over. Pipes up to 150 mm (6") must have additional cleanouts where cumulative changes of direction exceed 45°.
- Where cleanout is required to serve a sanitary or storm sewer 200 mm (8") and over it shall be a minimum 1 m (42") diameter manhole. Larger diameters required for depth over 2.1 m (7').

- All sewers shall be installed in Class (1) bedding as defined in ASTM D2321 Standards. This is a mix of material from 6 mm (¼") to 40 mm (1½") which for inspection must be compacted from 150 mm (6") below the pipe and up to the spring line. After inspection approval an additional 150 mm (6") must be installed over the pipe.

Note: 20 mm (¾") clear crush is preferred as it provides the best pipe support with the least effort.

- All storm drainage piping shall be intercepted by a sump before it leaves the property. This sump shall be a minimum of 600 mm (24") round or square, with a minimum of 425 mm (17") of sediment trap construction of concrete at least

100 mm (4") thick or precast manhole sections. Larger sizes of sumps are required for depths over 1200 mm (4'), and where any pipe is 200 mm (8") in diameter or over. (See Richmond Drawing P-101).

- All storm water must be collected within the property and conveyed to the City drainage system in an approved manner. See Table 3 for schedule of pipe sizes for storm drainage of roof and paved areas.
- A flexible joint is required for inlet and outlet pipes within 1 m of sump or manhole and all catch basin outlets.
- Catch basins must be installed on Wye branch of main storm sewer. See Richmond Drawing P-101 for details of catch basins and sumps.

Table 2 Maximum Load of Rain Water Leaders m ² (ft. ²)					
Diameter of Leader		Circular			Allow 10% more roof area for square and rectangular leaders with the same least dimensions.
mm	(inches)	m ²	ft. ²	L	
50	(2)	170	1,829	1,700	
65	(2 ½)	307	3,305	3,070	
75	(3)	500	5,382	5,000	
100	(4)	1,080	11,625	10,800	
125	(5)	1,950	20,990	19,500	
150	(6)	3,180	34,230	31,800	
200	(8)	6,830	73,519	68,300	

Sizes of Gutter (Based on 10 mm (0.394") in 15 minutes) Maximum Load on Gutter m ² (ft. ²)													
Diameter of Gutter		0.5%			1%			2%			4%		
mm	(inches)	m ²	ft. ²	L	m ²	ft. ²	L	m ²	ft. ²	L	m ²	ft. ²	L
75	(3)	40	(430)	400	58	(620)	576	81	(869)	808	115	(1,240)	1,152
100	(4)	86	(930)	864	122	(1,317)	1,224	173	(1,860)	1,728	245	(2,635)	2,448
125	(5)	150	(1,610)	1,496	209	(2,247)	2,088	299	(3,220)	2,992	424	(4,572)	4,248
150	(6)	230	(2,480)	2,304	324	(3,488)	3,240	461	(4,960)	4,608	662	(7,130)	6,624
175	(7)	331	(3,565)	3,312	468	(5,038)	4,680	662	(7,130)	6,624	936	(10,075)	9,360
200	(8)	475	(5,115)	4,752	670	(7,208)	6,696	955	(10,284)	9,554	1,339	(14,415)	13,392
250	(10)	864	(9,300)	8,640	1,224	(13,175)	12,240	1,728	(18,601)	17,280	2,397	(25,808)	23,976

The hydraulic load that is drained to a gutter that is not semi-circular shall not exceed the maximum load that may be drained to a semi-circular gutter of the same cross-sectional area.