

Table LBW5.4 : Cost functions (Year 2011 Rand value)

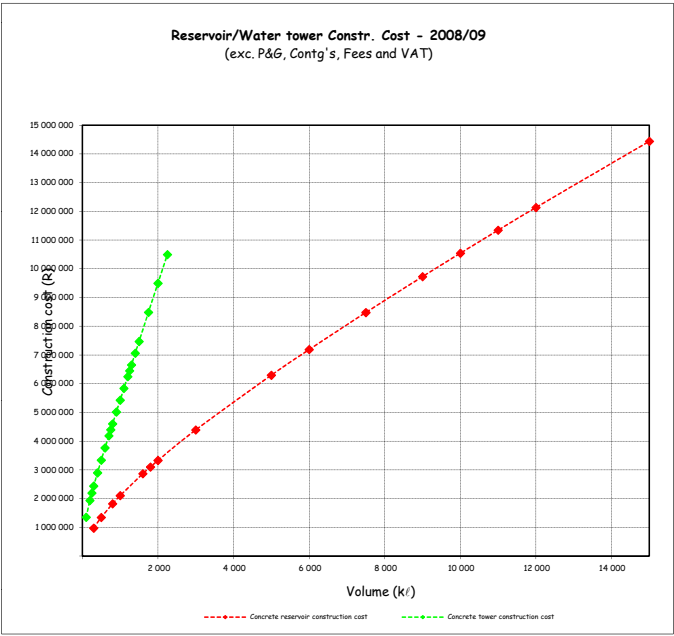
Note: Costs exclude P&G's, Contingencies, Fees, EIA studies, registration of servitudes and/or land acquisition, protection, monitoring and VAT.

Pressure pipeline construction cost									Valves, Meters construction cost					
Pipe Diameter			Class (PVC)	Material	P.O.S.	Reserve	Road	Connection*	Valve size Recomm.	Valve & Chamber	Check Valve & Chamber	Control Valve & Chamber	Water Meter & Chamber	Comments (where applicable)
Nom (mm)	OD (mm)	ID (mm)												
50	50	44	12	uPVC	173	186	390	5 100	50	40 900	50 100	72 600	38 900	Including 1 x 50Ø main valve/meter, 50Ø by-pass, 50Ø relief valve & Chamber
63	63	56	12	uPVC	187	202	410	5 100	50	41 900	51 100	76 700	40 900	Including 1 x 50Ø main valve/meter, 50Ø by-pass, 50Ø relief valve & Chamber
75	75	66	12	uPVC	201	219	431	5 100	80	41 900	53 200	80 800	41 900	Including 1 x 80Ø main valve/meter, 50Ø by-pass, 50Ø relief valve & Chamber
90	90	80	12	uPVC	222	242	458	6 100	80	43 000	54 200	84 900	44 000	Including 1 x 80Ø main valve/meter, 50Ø by-pass, 50Ø relief valve & Chamber
110	110	100	12	uPVC	240	264	486	6 100	100	44 000	56 200	92 000	47 000	Including 1 x 100Ø main valve/meter, 50Ø by-pass, 50Ø relief valve & Chamber
125	125	113	12	uPVC	268	295	522	7 200	100	45 000	58 300	97 200	49 100	Including 1 x 100Ø main valve/meter, 50Ø by-pass, 50Ø relief valve & Chamber
140	140	127	12	uPVC	296	325	557	7 200	150	46 000	60 300	102 300	51 100	Including 1 x 150Ø main valve/meter, 50Ø by-pass, 50Ø relief valve & Chamber
160	160	145	12	uPVC	330	365	603	7 200	150	47 000	62 400	109 400	53 200	Including 1 x 150Ø main valve/meter, 50Ø by-pass, 50Ø relief valve & Chamber
200	200	182	12	uPVC	423	468	719	9 200	200	50 100	67 500	122 700	59 300	Including 1 x 200Ø main valve/meter, 50Ø by-pass, 50Ø relief valve & Chamber
250	250	227	12	uPVC	561	623	890	10 200	250	52 200	74 700	139 100	65 500	Including 1 x 250Ø main valve/meter, 50Ø by-pass, 50Ø relief valve & Chamber
315	315	286	12	uPVC	809	897	1 183	13 300	250	56 200	84 900	161 600	74 700	Including 1 x 250Ø main valve/meter, 50Ø by-pass, 50Ø relief valve & Chamber
355	355	322	12	uPVC	977	1 082	1 382	14 300	300	58 300	92 000	175 900	80 800	Including 1 x 300Ø main valve/meter, 50Ø by-pass, 50Ø relief valve & Chamber
400	400	363	12	uPVC	1 196	1 324	1 637	16 400	300	61 400	100 200	191 200	86 900	Including 1 x 300Ø main valve/meter, 50Ø by-pass, 50Ø relief valve & Chamber
450	457	445	6.0	Steel(X42)	2 196	2 406	2 737	21 500	350	66 500	118 600	224 000	100 200	Including 1 x 350Ø main valve/meter, 50Ø by-pass, 50Ø relief valve & Chamber
500	508	496	6.0	Steel(X42)	2 444	2 683	3 029	24 500	350	70 600	130 900	244 400	108 400	Including 1 x 350Ø main valve/meter, 50Ø by-pass, 50Ø relief valve & Chamber
550	559	547	6.0	Steel(X42)	2 781	3 053	3 415	198 400	400	164 700	569 700	443 900	76 700	Including 1 x 400Ø main valve/meter, 100Ø by-pass, 100Ø relief valve & Chamber
600	610	598	6.0	Steel(X42)	2 951	3 245	3 623	227 000	400	187 200	650 400	533 900	89 000	Including 1 x 400Ø main valve/meter, 100Ø by-pass, 100Ø relief valve & Chamber
650	660	648	6.0	Steel(X42)	3 138	3 456	3 851	256 700	450	210 700	734 300	631 000	102 300	Including 1 x 450Ø main valve/meter, 100Ø by-pass, 100Ø relief valve & Chamber
700	711	699	6.0	Steel(X42)	3 406	3 770	4 242	288 400	450	236 200	824 300	738 400	116 600	Including 1 x 450Ø main valve/meter, 100Ø by-pass, 100Ø relief valve & Chamber
750	762	746	8.0	Steel(X42)	4 204	4 640	5 129	320 100	500	261 800	910 200	845 800	130 900	Including 1 x 500Ø main valve/meter, 100Ø by-pass, 100Ø relief valve & Chamber
800	813	797	8.0	Steel(X42)	4 415	4 880	5 386	355 900	500	290 500	1 008 400	969 500	148 300	Including 1 x 500Ø main valve/meter, 100Ø by-pass, 100Ø relief valve & Chamber
850	864	848	8.0	Steel(X42)	4 735	5 238	5 760	393 700	600	321 100	1 111 700	1 102 500	165 700	Including 1 x 600Ø main valve/meter, 150Ø by-pass, 150Ø relief valve & Chamber
900	914	898	8.0	Steel(X42)	5 018	5 557	6 094	433 600	600	352 800	1 216 000	1 241 600	184 100	Including 1 x 600Ø main valve/meter, 150Ø by-pass, 150Ø relief valve & Chamber
950	965	949	8.0	Steel(X42)	5 270	5 844	6 396	475 600	700	386 600	1 327 500	1 392 900	204 500	Including 1 x 700Ø main valve/meter, 150Ø by-pass, 150Ø relief valve & Chamber
1 000	1 016	996	10.0	Steel(X42)	6 349	7 040	7 670	516 500	700	419 300	1 433 800	1 539 200	224 000	Including 1 x 700Ø main valve/meter, 150Ø by-pass, 150Ø relief valve & Chamber
1 100	1 118	1 098	10.0	Steel(X42)	6 976	7 751	8 414	611 600	800	495 000	1 678 300	1 881 800	270 000	Including 1 x 800Ø main valve/meter, 150Ø by-pass, 150Ø relief valve & Chamber
1 200	1 219	1 199	10.0	Steel(X42)	7 556	8 415	9 109	713 900	800	576 800	1 937 000	2 257 100	319 100	Including 1 x 800Ø main valve/meter, 150Ø by-pass, 150Ø relief valve & Chamber
1 300	1 324	1 300	12.0	Steel(X42)	9 032	10 046	10 773	824 300	600 x2	664 800	2 214 200	2 665 200	373 300	Including 2 x 600Ø main valve/meter, 150Ø by-pass, 150Ø relief valve & Chamber
1 400	1 422	1 398	12.0	Steel(X42)	9 711	10 822	11 580	938 800	600 x2	756 800	2 498 500	3 094 700	429 500	Including 2 x 600Ø main valve/meter, 150Ø by-pass, 150Ø relief valve & Chamber
1 500	1 524	1 492	16.0	Steel(X42)	13 282	14 724	15 514	1 056 500	700 x2	850 900	2 787 900	3 536 500	487 800	Including 2 x 700Ø main valve/meter, 150Ø by-pass, 150Ø relief valve & Chamber
1 600	1 626	1 594	16.0	Steel(X42)	14 455	16 043	16 866	1 191 500	700 x2	959 300	3 118 200	4 051 000	555 300	Including 2 x 700Ø main valve/meter, 150Ø by-pass, 150Ø relief valve & Chamber
1 800	1 829	1 797	16.0	Steel(X42)	15 775	17 593	18 477	1 486 000	800 x2	1 194 500	3 828 000	5 177 000	703 600	Including 2 x 800Ø main valve/meter, 150Ø by-pass, 150Ø relief valve & Chamber

Connection * Construction cost for connection to an existing pipeline
House connect. = R 1 040 (excl. meter) or = R 1 800 (incl. meter)

Concrete reservoir construction cost			Concrete tower construction cost		
Volume (m ³)	Constr. Cost (R)	Unit Cost (R/m ³)	Volume (m ³)	Constr. Cost (R)	Unit Cost (R/m ³)
300	972 600	3 240	100	1 351 000	13 510
500	1 343 800	2 690	200	1 936 000	9 680
800	1 818 400	2 270	250	2 192 700	8 770
1 000	2 102 700	2 100	300	2 436 100	8 120
1 600	2 866 700	1 790	400	2 897 300	7 240
1 800	3 100 900	1 720	500	3 338 100	6 680
2 000	3 328 900	1 660	600	3 766 600	6 280
3 000	4 390 500	1 460	700	4 187 000	5 980
5 000	6 295 800	1 260	750	4 395 600	5 860
6 000	7 187 600	1 200	800	4 603 200	5 750
7 500	8 478 300	1 130	900	5 016 400	5 570
9 000	9 727 000	1 080	1 000	5 426 500	5 430
10 000	10 542 100	1 050	1 100	5 836 600	5 310
11 000	11 343 900	1 030	1 200	6 245 700	5 200
12 000	12 133 400	1 010	1 250	6 449 200	5 160
15 000	14 436 600	960	1 300	6 653 800	5 120
16 000	15 182 100	950	1 400	7 061 800	5 040
20 000	18 041 700	900	1 500	7 468 900	4 980
22 750	19 877 400	870	1 750	8 484 400	4 850
25 000	21 288 800	850	2 000	9 494 900	4 750
30 000	24 066 400	800	2 250	10 494 000	4 660

P&G / Contg's and Fees =	40%	of construction cost
Base year =	2010/11	
Bulk connection =	R 613 600	/connection (excl. Connection*)
Major crossing (< 250mmØ) =	2	x road pipe construction cost
Major crossing (> 250mmØ) =	4	x road pipe construction cost
Flow meter =	R 14 300	data logger & accessories
	R 18 400	including pressure transducer
Water Treatment Plant =	R 6 136 000	/MI/day
WTP formula: Cost = R 6136000 / 1 MI/d X Req. Capacity ^ 0.75		



Pump station construction cost					
Capacity* (kW)	Flow* (l/s)	Civils (R)	Pipeworks (R)	Mech.&Elec. (R)	Total (R)
2	3	297 600	34 800	62 400	394 800
3	4	298 600	37 800	67 500	403 900
4	6	300 700	41 900	75 700	418 300
5	8	302 700	48 100	85 900	436 700
7	12	306 800	58 300	104 300	469 400
10	16	311 900	69 500	125 800	507 200
12	20	316 000	80 800	144 200	541 000
14	24	320 100	91 000	162 600	573 700
19	33	329 300	114 500	204 500	648 300
24	40	337 500	136 000	241 400	714 900
29	49	347 700	160 600	284 300	792 600
35	60	359 000	191 200	337 500	887 700
48	82	383 500	253 600	443 900	1 081 000
58	98	400 900	300 700	524 700	1 226 300
70	120	424 400	365 100	632 000	1 421 500
84	144	451 000	437 700	750 700	1 639 400
102	174	484 800	531 800	903 100	1 919 700
118	201	514 400	617 700	1 039 100	2 171 200
128	217	531 800	669 900	1 121 900	2 323 600
169	287	608 500	697 500	1 142 400	2 448 400
205	348	675 000	857 000	1 377 600	2 909 600
237	402	734 300	1 005 300	1 590 300	3 329 900
256	435	770 100	1 096 300	1 719 200	3 585 600
307	522	866 200	1 222 100	1 869 500	3 957 800
355	603	955 200	1 445 100	2 163 000	4 563 300
384	652	1 009 400	1 584 200	2 341 000	4 934 600
410	696	1 056 500	1 626 100	2 375 800	5 058 400
474	805	1 176 100	1 938 000	2 756 200	5 870 300
512	870	1 247 700	2 133 400	2 987 300	6 368 400
592	1006	1 397 000	2 483 100	3 369 800	7 249 900
640	1087	1 486 000	2 743 900	3 658 200	7 888 100
710	1207	1 616 900	3 080 400	4 006 000	8 703 300
768	1305	1 724 300	3 414 800	4 353 700	9 492 800
829	1408	1 837 800	3 730 900	4 661 500	10 230 200
896	1522	1 962 600	4 148 100	5 073 700	11 184 400

Capacity * Pump capacity @ 100% efficiency existing pump upgraded
Flow * Pump capacity @ 65% efficiency @ 60m head existing pump downsized

