

SOURCE	Site area (m <sup>2</sup> )		Source contaminant management train				Contaminant yields, loads, and load reduction efficiencies																	
	SOURCE TYPE	Source Area (m <sup>2</sup> )	First management option	Second management option	Third management option	Fraction of area draining to train	Sediment				Zinc				Copper				Total Petroleum Hydrocarbons					
							Yield (g m <sup>-2</sup> a <sup>-1</sup> )	Initial load (g a <sup>-1</sup> )	Load reduction efficiency	Reduced load (g a <sup>-1</sup> )	Yield (g m <sup>-2</sup> a <sup>-1</sup> )	Initial load (g a <sup>-1</sup> )	Load reduction efficiency	Reduced load (g a <sup>-1</sup> )	Yield (g m <sup>-2</sup> a <sup>-1</sup> )	Initial load (g a <sup>-1</sup> )	Load reduction efficiency	Reduced load (g a <sup>-1</sup> )	Yield (g m <sup>-2</sup> a <sup>-1</sup> )	Initial load (g a <sup>-1</sup> )	Load reduction efficiency	Reduced load (g a <sup>-1</sup> )		
							18243264																	
Roofs	Galvanised unpainted Galvanised steel poor paint Galvanised well painted Zinc/aluminium unpainted Colorsteel/colorcote Concrete Clay Slate Copper Decramastic Other materials Unknown (no galvanised steel/copper)	12633 14540 11013 394 88496        44051 288498					5 5 5 5 5 10 5 5 5 5 5 5 7	63163 72700 55064 1968 442482 0 0 0 0 220257 1442492 0	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	63163 72700 55064 1968 442482 0 0 0 0 220257 1442492 0	2.200 1.600 0.150 0.300 0.040 0.020 0.020 0.020 0.000 0.200 0.020 0.200	27791.9 23263.88 1651.9 118.1 3539.9 0.0 0.0 0.0 0.0 8810.3 5770.0 8810.3	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	27791.89 23263.88 1651.93 118.05 3539.85 0.0 0.0 0.0 0.0 8810.28 5769.97 8810.28	0.0008 0.0008 0.0008 0.0008 0.0008 0.0013 0.0008 0.0008 0.0008 0.0017 0.0008 0.0008	10.1 11.6 8.8 0.3 70.8 0.0 0.0 0.0 0.0 74.9 230.8 74.9	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	10.1 11.6 8.8 0.3 70.8 0.0 0.0 0.0 0.0 74.9 230.8 74.9						
Roads	Vehicles/day Length (m) <1000 1000-500 5000-20000 20000-50000 50000-100000 >100000	22641 5886 5105 4525 0 0 0	384895 100056 86792 92759 0 0 0				4 30 150 299 300 300	1539580 3007556 13044254 27746355 0 0 0	0.00 0.00 0.00 0.00 0.00 0.00 0.00	1539580 3007556 13044254 27746355 0 0 0	0.021 0.107 0.537 1.068 2.281 3.532	8263.9 10741.27 46586.62 99094.1 0.0 0.0	0.00 0.00 0.00 0.00 0.00 0.00	8263.92 10741.27 46586.62 99094.12 0.0 0.0	0.0070 0.0349 0.1744 0.3472 0.7414 1.1480	2685.8 3490.9 15140.7 32205.6 0.0 0.0	0.00 0.00 0.00 0.00 0.00 0.00	2685.8 3490.9 15140.7 32205.6 0.0 0.0	0.11 0.54 2.68 5.34 11.41 17.66	41319.6 53706.4 232933.1 495470.6 0.0 0.0	0.00 0.00 0.00 0.00 0.00 0.00	41319.6 53706.4 232933.1 495470.6 0.0 0.0		
Paved Surfaces other than roads	Residential Industrial Commercial	1058962 8569 6967				20 50 100	21179244 428463 696661	0.00 0.00 0.00	21179244 428463 696661	0.070 0.100 0.050	74127.4 856.9 348.3	0.00 0.00 0.00	74127.35 856.93 348.33	0.0100 0.1300 0.0500	10589.6 1114.0 348.3	0.00 0.00 0.00	10589.6 1114.0 348.3							
Urban Grass lands	Slope <10 10-20 >20	1722117				35 80 160	60274104 0 0	0.00 0.00 0.00	60274104 0 0															
Urban Stream Channel	length x width					6000	0	0.00	0															
Urban area without construction sites		3920741.916					Totals	130214342	0.00	130214342	Totals	310964.4	-0.01	313074.0	Totals	65982.2	-0.01	66404.2	Totals	823429.7	0.00	823429.7		
Construction Site (1) open for 2 months/year	Slope <10 10-20 >20					400 2500 7000	0 0 0	0.00 0.00 0.00	0 0 0															
Construction Site (2) open for 6 months/year	Slope <10 10-20 >20					1300 7500 20000	0 0 0	0.00 0.00 0.00	0 0 0															
Construction Site (3) open for 12 months/year	Slope <10 10-20 >20					2500 15000 40000	0 0 0	0.00 0.00 0.00	0 0 0															
Urban area with construction sites		3920742					Totals	130214342	0.00	130214342	Totals	310964.4	-0.01	313074.0	Totals	65982.2	-0.01	66404.2	Totals	823429.7	0.00	823429.7		
Exotic production forest	Slope <10 10-20 20-30 >30	569549 357969 217437 768607				10 60 200 500	5695495 21478168 43487313 384303524	0.00 0.00 0.00 0.00	5695495 21478168 43487313 384303524															
Stable bush	Slope <10 10-20 20-30 >30	1568983 620055 757610 1813055				5 30 100 250	7844917 18601664 75760995 453263853	0.00 0.00 0.00 0.00	7844917 18601664 75760995 453263853															
Farmed pasture	Slope <10 10-20 20-30 >30	6257457 1179923 156832 27810				50 100 500 1000	312872850 117992324 78415779 27809668	0.00 0.00 0.00 0.00	312872850 117992324 78415779 27809668															
Retired pasture	Slope <10 10-20 20-30 >30					20 100 200 500	0 0 0 0	0.00 0.00 0.00 0.00	0 0 0 0															
Horticulture	Soil type Volcanic Sediment Unknown					50 100 100	0 0 0	0.00 0.00 0.00	0 0 0															
Total area of sources (m <sup>2</sup> )		18243264					Site totals	1680464248	0.00	1680464248	Site totals	310964.4	-0.18	367332.7	Site totals	65982.2	-0.17	77255.9	Site totals	823429.7	0.00	823429.7		

ERROR!!! Site and source area's do not agree  
Difference = 0

Bottom of Site contaminant management train				Bottom of Site out-fall Loads (kg a <sup>-1</sup> )				Average yields				Average concentrations (mg kg <sup>-1</sup> )			
First management option	Second management option	Third management option	Fraction of area draining to train	TSS	Zn	Cu	TPH	TSS	Zn	Cu	TPH	TSS	Zn	Cu	TPH
option	option	option		kg a <sup>-1</sup>	kg a <sup>-1</sup>	kg a <sup>-1</sup>	kg a <sup>-1</sup>	kg ha <sup>-1</sup> a <sup>-1</sup>	g ha <sup>-1</sup> a <sup>-1</sup>	g ha <sup>-1</sup> a <sup>-1</sup>	g ha <sup>-1</sup> a <sup>-1</sup>	kg a <sup>-1</sup>	kg a <sup>-1</sup>	kg a <sup>-1</sup>	kg a <sup>-1</sup>
				1680464.2	367.3		77.3	823.4	921	201	42	451	219	46	490



# Contaminant Load Model

Version MAY06



SOURCE	Site area (m <sup>2</sup> )		Source contaminant management train				Contaminant yields, loads, and load reduction efficiencies																																						
	SOURCE TYPE	18243264	Source Area (m <sup>2</sup> )	First management option	Second management option	Third management option	Fraction of area draining to train	Sediment				Zinc				Copper				Total Petroleum Hydrocarbons																									
								Yield (g m <sup>-2</sup> a <sup>-1</sup> )	Initial load (g a <sup>-1</sup> )	Load reduction efficiency	Reduced load (g a <sup>-1</sup> )	Yield (g m <sup>-2</sup> a <sup>-1</sup> )	Initial load (g a <sup>-1</sup> )	Load reduction efficiency	Reduced load (g a <sup>-1</sup> )	Yield (g m <sup>-2</sup> a <sup>-1</sup> )	Initial load (g a <sup>-1</sup> )	Load reduction efficiency	Reduced load (g a <sup>-1</sup> )	Yield (g m <sup>-2</sup> a <sup>-1</sup> )	Initial load (g a <sup>-1</sup> )	Load reduction efficiency	Reduced load (g a <sup>-1</sup> )																						
Roofs	Galvanised unpainted	12633					5	63163	0.00	63163	2.200	27791.9	0.00	27791.89	0.0008	10.1	0.00	10.1																											
	Galvanised steel poor paint	14540					5	72700	0.00	72700	1.600	23263.9	0.00	23263.88	0.0008	11.6	0.00	11.6																											
	Galvanised well painted	11013					5	55064	0.00	55064	0.150	1651.9	0.00	1651.93	0.0008	8.8	0.00	8.8																											
	Zinc/aluminium unpainted	394					5	1968	0.00	1968	0.300	118.1	0.00	118.05	0.0008	0.3	0.00	0.3																											
	Colorsteel/colorcote	88496					5	442482	0.00	442482	0.040	3539.9	0.00	3539.85	0.0008	70.8	0.00	70.8																											
	Concrete	0					10	0	0.00	0	0.020	0.0	0.00	0.00	0.0013	0.0	0.00	0.0																											
	Clay	0					5	0	0.00	0	0.020	0.0	0.00	0.00	0.0008	0.0	0.00	0.0																											
	Slate	0					5	0	0.00	0	0.020	0.0	0.00	0.00	0.0008	0.0	0.00	0.0																											
	Copper	0					5	0	0.00	0	0.000	0.0	0.00	0.00	3.0000	0.0	0.00	0.0																											
	Decramastic	44051					5	220257	0.00	220257	0.200	8810.3	0.00	8810.28	0.0017	74.9	0.00	74.9																											
	Other materials	288498					5	1442492	0.00	1442492	0.020	5770.0	0.00	5769.97	0.0008	230.8	0.00	230.8																											
	Unknown (no galvanised steel/copper)						7	0	0.00	0	0.200	0.0	0.00	0.00	0.0008	0.0	0.00	0.0																											
Roads	<1000 1000-5000 5000-20000 20000-50000 50000-100000 >100000	22641 6798 14906	384895 115570 253405 0 0 0				0.35	4 30 150 299 300 300	0.00 0.00 0.75 0.00 0.00 0.00	1539580 3473902 28087934 0 0 0	0.021 0.107 0.537 1.068 2.281 3.532	8263.9 12406.8 136019.1 0.0 0.0 0.0	0.00 0.00 0.47 0.00 0.00 0.00	8263.92 12406.79 113643.92 0.00 0.00 0.00	0.0070 0.0349 0.1744 0.3472 0.7414 1.1480	2685.8 4032.2 44206.2 0.0 0.0 0.0	0.00 0.00 0.57 0.00 0.00 0.00	2685.8 4032.2 35387.1 5.34 11.41 17.66	0.11 0.54 2.68 5.34 11.41 17.66	41319.6 62034.0 680095.3 0.0 0.0 0.0	0.00 0.00 0.47 0.00 0.00 0.00	41319.6 62034.0 568219.6 0.0 0.0 0.0																							
Paved Surfaces other than roads	Residential Industrial Commercial	1405871 8569 6967						20 50 100	0.00 0.00 0.00	28117421 428463 696661	0.070 0.100 0.050	98411.0 856.9 348.3	0.00 0.00 0.00	98410.97 856.93 348.33	0.0100 0.1300 0.0500	14058.7 1114.0 348.3	0.00 0.00 0.00	14058.7 1114.0 348.3																											
Urban Grass lands	Slope <10 10-20 >20	1376065						35 80 160	0.00 0.00 0.00	48162270 0 0				1685.7				337.1																											
Urban Stream Channel	length x width							6000	0.00	0				0.0				0.0																											
Urban area without construction sites			4010967.368				Totals	400 2500 7000	0.00 0.00 0.00	122801758	0.08	112804358	Totals	327251.8	0.06	306562.4	Totals	66852.6	0.13	58370.6	Totals	783448.8	0.14	671573.2																					
Construction Site (1) open for 2 months/year	Slope <10 10-20 >20							1300 7500 20000	0.00 0.00 0.00	0 0 0				0.0 0.0 0.0				0.0 0.0 0.0																											
Construction Site (2) open for 6 months/year	Slope <10 10-20 >20							2500 15000 40000	0.00 0.00 0.00	0 0 0				0.0 0.0 0.0				0.0 0.0 0.0																											
Construction Site (3) open for 12 months/year	Slope <10 10-20 >20							40000	0.00	0				0.0				0.0																											
Urban area with construction sites			4010967				Totals	122801758	0.08	112804358	Totals	327251.8	0.06	306562.4	Totals	66852.6	0.13	58370.6	Totals	783448.8	0.14	671573.2																							
Exotic production forest	<10 10-20 20-30 >30	569549 341610 217437 768607						10 60 200 500	0.00 0.00 0.00 0.00	5695495 20496614 43487313 384303524				199.3 717.4 1522.1 13450.6				39.9 143.5 304.4 2690.1																											
Stable bush	<10 10-20 20-30 >30	1568983 615505 757610 1813055						5 30 100 250	0.00 0.00 0.00 0.00	7844917 18465156 75760995 453263853				274.6 646.3 2651.6 15864.2				54.9 129.3 530.3 3172.8																											
Farmed pasture	<10 10-20 20-30 >30	6257457 1110607 156832 27810						50 100 500 1000	0.00 0.00 0.00 0.00	312872850 111060727 78415779 27809668				10950.5 3887.1 2744.6 973.3				2190.1 777.4 548.9 194.7																											
Retired pasture	<10 10-20 20-30 >30							20 100 200 500	0.00 0.00 0.00 0.00	0 0 0 0				0.0 0.0 0.0 0.0				0.0 0.0 0.0 0.0																											
Horticulture	Soil type Volcanic Sediment Unknown							50 100 100	0.00 0.00 0.00	0 0 2723356				0.0 0.0 95.3				0.0 0.0 19.1																											
Total area of sources (m <sup>2</sup> )			18243264				Site totals	1665002006	0.01	1655004606	Site totals	327251.8	-0.10	360539.4	Site totals	66852.6	-0.03	69166.0	Site totals	783448.8	0.14	671573.2																							

ERROR!!! Site and source area's do not agree  
Difference = 0

Bottom of Site contaminant management train				Bottom of Site out-fall Loads (kg a <sup>-1</sup> )				Average yields				Average concentrations (mg kg <sup>-1</sup> )			
First management option	Second management option	Third management option	Fraction of area draining to train	TSS	Zn	Cu	TPH	TSS	Zn	Cu	TPH	TSS	Zn	Cu	TPH
				1655004.6	360.5	69.2	671.6	907	198	38	368	218	42	406	

Te Harakeke Wetland Sub-Catchment – Future (2031) with Expressway – Mitigated