Contaminant Load Model

Version MAY06

Auckland Regional Council
TE RAUHITANGA TAIAO

SOURCE	Site area (m^2)		2068175	Source contaminant management train				Contaminant yields, loads, and load reduction efficiencies															
								Sediment				Zinc				Copper				Total Petroleum Hydrocarbons			
	SOURCE TYPE		Source Area (m^2)	First management option	Second management option	Third management option	Fraction of area draining to train	Yield (g $m^{-2}a^{-1}$)	Initial load (g a^{-1})	Load reduction efficiency	Reduced load (g a^{-1})	Yield (g $m^{-2}a^{-1}$)	Initial load (g a^{-1})	Load reduction efficiency	Reduced load (g a^{-1})	Yield (g $m^{-2}a^{-1}$)	Initial load (g a^{-1})	Load reduction efficiency	Reduced load (g a^{-1})	Yield (g $m^{-2}a^{-1}$)	Initial load (g a^{-1})	Load reduction efficiency	Reduced load (g a^{-1})
Roofs	Galvanised unpainted		0					5	0	0.00	0	2.200	0.0	0.00	0.00	0.0008	0.0	0.00	0.0				
	Galvanised steel poor paint		4490					5	22449	0.00	22449	1.600	7183.8	0.00	7183.76	0.0008	3.6	0.00	3.6				
	Galvanised well painted		4490					5	22449	0.00	22449	0.150	673.5	0.00	673.48	0.0008	3.6	0.00	3.6				
	Zinc/aluminium unpainted		0					5	0	0.00	0	0.300	0.0	0.00	0.00	0.0008	0.0	0.00	0.0				
	Colorsteel/colorcote		35919					5	179594	0.00	179594	0.040	1436.8	0.00	1436.75	0.0008	28.7	0.00	28.7				
	Concrete							10	0	0.00	0	0.020	0.0	0.00	0.00	0.0013	0.0	0.00	0.0				
	Clay							5	0	0.00	0	0.020	0.0	0.00	0.00	0.0008	0.0	0.00	0.0				
	Slate							5	0	0.00	0	0.020	0.0	0.00	0.00	0.0008	0.0	0.00	0.0				
	Copper							5	0	0.00	0	0.000	0.0	0.00	0.00	3.0000	0.0	0.00	0.0				
	Decramastic		17959					5	89797	0.00	89797	0.200	3591.9	0.00	3591.88	0.0017	30.5	0.00	30.5				
	Other materials		116736					5	583681	0.00	583681	0.020	2334.7	0.00	2334.72	0.0008	93.4	0.00	93.4				
	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				
		Length (m)																					
Roads	<1000	5460	92820					4	371279	0.00	371279	0.021	1992.9	0.00	1992.90	0.0070	647.7	0.00	647.7	0.11	9964.5	0.00	9964.5
	1000-500	2185	37137					30	1116302	0.00	1116302	0.107	3986.8	0.00	3986.79	0.0349	1295.7	0.00	1295.7	0.54	19934.0	0.00	19934.0
	Vehicles/day 5000-20000	2005	34080					150	5122036	0.00	5122036	0.537	18293.0	0.00	18292.99	0.1744	5945.2	0.00	5945.2	2.68	91464.9	0.00	91464.9
	20000-50000		0					299	0	0.00	0	1.068	0.0	0.00	0.00	0.3472	0.0	0.00	0.0	5.34	0.0	0.00	0.0
	50000-100000		0					300	0	0.00	0	2.281	0.0	0.00	0.00	0.7414	0.0	0.00	0.0	11.41	0.0	0.00	0.0
	>100000		0					300	0	0.00	0	3.532	0.0	0.00	0.00	1.1480	0.0	0.00	0.0	17.66	0.0	0.00	0.0
Paved Surfaces other than roads	Residential		386859					20	7737185	0.00	7737185	0.070	27080.1	0.00	27080.15	0.0100	3868.6	0.00	3868.6				
	Industrial							50	0	0.00	0	0.100	0.0	0.00	0.00	0.1300	0.0	0.00	0.0				
	Commercial							100	0	0.00	0	0.050	0.0	0.00	0.00	0.0500	0.0	0.00	0.0				
Urban Grass lands		<10	686227					35	24017959	0.00	24017959				840.6				168.1				
	Slope	10-20						80	0	0.00	0				0.0				0.0				
		>20						160	0	0.00	0				0.0				0.0				
Urban Stream Channel	length x width							6000	0	0.00	0				0.0				0.0				
	Urban area without construction sites		1416717.797					Totals	39262731	0.00	39262731	Totals	66573.4	-0.01	67414.0	Totals	11917.1	-0.01	12085.2	Totals	121363.4	0.00	121363.4
Construction Site (1) open for 2 months/year	Slope	<10						400	0	0.00	0				0.0				0.0				
		10-20						2500	0	0.00	0				0.0				0.0				
		>20						7000	0	0.00	0				0.0				0.0				
Construction Site (2) open for 6 months/year	Slope	<10						1300	0	0.00	0				0.0				0.0				
		10-20						7500	0	0.00	0				0.0				0.0				
		>20						20000	0	0.00	0				0.0				0.0				
Construction Site (3) open for 12 months/year	Slope	<10						2500	0	0.00	0				0.0				0.0				
		10-20						15000	0	0.00	0				0.0				0.0				
		>20						40000	0	0.00	0				0.0				0.0				
	Urban area with construction sites		1416718					Totals	39262731	0.00	39262731	Totals	66573.4	-0.01	67414.0	Totals	11917.1	-0.01	12085.2	Totals	121363.4	0.00	121363.4
Exotic production forest		<10	11593					10	115933	0.00	115933				4.1				0.8				
		10-20	14876					60	892542	0.00	892542				31.2				6.2				
	Slope	20-30	3916					200	783117	0.00	783117				27.4				5.5				
		>30	743					500	371371	0.00	371371				13.0				2.6				
Stable bush		<10	95405					5	477024	0.00	477024				16.7				3.3				
		10-20	54081					30	1622422	0.00	1622422				56.8				11.4				
	Slope	20-30	20034					100	2003419	0.00	2003419				70.1				14.0				
		>30	1329					250	332366	0.00	332366				11.6				2.3				
Farmed pasture		<10	348207					50	17410330	0.00	17410330				609.4				121.9				
		10-20	72023					100	7202308	0.00	7202308				252.1				50.4				
	Slope	20-30	27258					500	13628758	0.00	13628758				477.0				95.4				
		>30	1994					1000	1993696	0.00	1993696				69.8				14.0				
Retired pasture		<10						20	0	0.00	0				0.0				0.0				
		10-20						100	0	0.00	0				0.0				0.0				
	Slope	20-30						200	0	0.00	0				0.0				0.0				
		>30						500	0	0.00	0				0.0				0.0				
Horticulture		Volcanic						50	0	0.00	0				0.0				0.0				
	Soil type	Sediment						100	0	0.00	0				0.0				0.0				
		Unknown						100	0	0.00	0				0.0				0.0				
	Total area of sources (m^2)		2068175					Site totals	86096016	0.00	86096016	Site totals	66573.4	-0.04	69053.2	Site totals	11917.1	-0.04	12413.0	Site totals	121363.4	0.00	121363.4

Site and source area's agree
Difference = 0

Bottom of Site contaminant management train				Bottom of Site out-fall Loads (kg a^{-1})				Average yields				Average concentrations (mg kg^{-1})			
First management option	Second management option	Third management option	Fraction of area draining to train	TSS	Zn	Cu	TPH	TSS kg ha^{-1} a^{-1}	Zn g ha^{-1} a^{-1}	Cu g ha^{-1} a^{-1}	TPH g ha^{-1} a^{-1}	TSS	Zn	Cu	TPH
				86096.0	69.1	12.4	121.4	416	334	60	587		802	144	1410

Waimeha Stream Sub-Catchment
- Existing

Contaminant Load Model

Version MAY06

Auckland Regional Council
TE RAUHITANGA TAIAO

SOURCE	Site area (m^2)		2068175	Source contaminant management train				Contaminant yields, loads, and load reduction efficiencies															
								Sediment				Zinc				Copper				Total Petroleum Hydrocarbons			
	SOURCE TYPE		Source Area (m^2)	First management option	Second management option	Third management option	Fraction of area draining to train	Yield (g m^{-2} a^{-1})	Initial load (g a^{-1})	Load reduction efficiency	Reduced load (g a^{-1})	Yield (g m^{-2} a^{-1})	Initial load (g a^{-1})	Load reduction efficiency	Reduced load (g a^{-1})	Yield (g m^{-2} a^{-1})	Initial load (g a^{-1})	Load reduction efficiency	Reduced load (g a^{-1})	Yield (g m^{-2} a^{-1})	Initial load (g a^{-1})	Load reduction efficiency	Reduced load (g a^{-1})
Roofs	Galvanised unpainted							5	0	0.00	0	2.200	0.0	0.00	0.0	0.0008	0.0	0.00	0.0				
	Galvanised steel poor paint		4490					5	22449	0.00	22449	1.600	7183.8	0.00	7183.76	0.0008	3.6	0.00	3.6				
	Galvanised well painted		4490					5	22449	0.00	22449	0.150	673.5	0.00	673.48	0.0008	3.6	0.00	3.6				
	Zinc/aluminium unpainted							5	0	0.00	0	0.300	0.0	0.00	0.00	0.0008	0.0	0.00	0.0				
	Colorsteel/colorcote		35919					5	179594	0.00	179594	0.040	1436.8	0.00	1436.75	0.0008	28.7	0.00	28.7				
	Concrete							10	0	0.00	0	0.020	0.0	0.00	0.00	0.0013	0.0	0.00	0.0				
	Clay							5	0	0.00	0	0.020	0.0	0.00	0.00	0.0008	0.0	0.00	0.0				
	Slate							5	0	0.00	0	0.020	0.0	0.00	0.00	0.0008	0.0	0.00	0.0				
	Copper							5	0	0.00	0	0.000	0.0	0.00	0.00	3.0000	0.0	0.00	0.0				
	Decramastic		17959					5	89797	0.00	89797	0.200	3591.9	0.00	3591.88	0.0017	30.5	0.00	30.5				
	Other materials		116736					5	583681	0.00	583681	0.020	2334.7	0.00	2334.72	0.0008	93.4	0.00	93.4				
	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				
		Length (m)																					
Roads	<1000	5460	92820					4	371279	0.00	371279	0.021	1992.9	0.00	1992.90	0.0070	647.7	0.00	647.7	0.11	9964.5	0.00	9964.5
	1000-500	742	12622					30	379404	0.00	379404	0.107	1355.0	0.00	1355.02	0.0349	440.4	0.00	440.4	0.54	6775.1	0.00	6775.1
Vehicles/day	5000-20000	4196	71333					150	10720895	0.00	10720895	0.537	38288.9	0.00	38288.91	0.1744	12443.9	0.00	12443.9	2.68	191444.6	0.00	191444.6
	20000-50000		0					299	0	0.00	0	1.068	0.0	0.00	0.00	0.3472	0.0	0.00	0.0	5.34	0.0	0.00	0.0
	50000-100000		0					300	0	0.00	0	2.281	0.0	0.00	0.00	0.7414	0.0	0.00	0.0	11.41	0.0	0.00	0.0
	>100000		0					300	0	0.00	0	3.532	0.0	0.00	0.00	1.1480	0.0	0.00	0.0	17.66	0.0	0.00	0.0
Paved Surfaces other than roads	Residential		386859					20	7737185	0.00	7737185	0.070	27080.1	0.00	27080.15	0.0100	3868.6	0.00	3868.6				
	Industrial							50	0	0.00	0	0.100	0.0	0.00	0.00	0.1300	0.0	0.00	0.0				
	Commercial							100	0	0.00	0	0.050	0.0	0.00	0.00	0.0500	0.0	0.00	0.0				
Urban Grass lands		<10	686227					35	24017959	0.00	24017959				840.6				168.1				
	Slope	10-20						80	0	0.00	0				0.0				0.0				
		>20						160	0	0.00	0				0.0				0.0				
Urban Stream Channel	*length x width*							6000	0	0.00	0				0.0				0.0				
	Urban area without construction sites		**1429455.298**					**Totals**	**44124693**	**0.00**	**44124693**	**Totals**	**83937.6**	**-0.01**	**84778.2**	**Totals**	**17560.4**	**-0.01**	**17728.5**	**Totals**	**208184.1**	**0.00**	**208184.1**
Construction Site (1) open for 2 months/year		<10						400	0	0.00	0				0.0				0.0				
	Slope	10-20						2500	0	0.00	0				0.0				0.0				
		>20						7000	0	0.00	0				0.0				0.0				
Construction Site (2) open for 6 months/year		<10						1300	0	0.00	0				0.0				0.0				
	Slope	10-20						7500	0	0.00	0				0.0				0.0				
		>20						20000	0	0.00	0				0.0				0.0				
Construction Site (3) open for 12 months/year		<10						2500	0	0.00	0				0.0				0.0				
	Slope	10-20						15000	0	0.00	0				0.0				0.0				
		>20						40000	0	0.00	0				0.0				0.0				
	Urban area with construction sites		**1429455**					**Totals**	**44124693**	**0.00**	**44124693**	**Totals**	**83937.6**	**-0.01**	**84778.2**	**Totals**	**17560.4**	**-0.01**	**17728.5**	**Totals**	**208184.1**	**0.00**	**208184.1**
Exotic production forest		<10	11593					10	115933	0.00	115933				4.1				0.8				
		10-20	14335					60	860115	0.00	860115				30.1				6.0				
	Slope	20-30	3916					200	783117	0.00	783117				27.4				5.5				
		>30	743					500	371371	0.00	371371				13.0				2.6				
Stable bush		<10	95405					5	477024	0.00	477024				16.7				3.3				
		10-20	51733					30	1551991	0.00	1551991				54.3				10.9				
	Slope	20-30	20034					100	2003419	0.00	2003419				70.1				14.0				
		>30	1329					250	332366	0.00	332366				11.6				2.3				
Farmed pasture		<10	348207					50	17410330	0.00	17410330				609.4				121.9				
		10-20	62174					100	6217371	0.00	6217371				217.6				43.5				
	Slope	20-30	27258					500	13628758	0.00	13628758				477.0				95.4				
		>30	1994					1000	1993696	0.00	1993696				69.8				14.0				
Retired pasture		<10						20	0	0.00	0				0.0				0.0				
		10-20						100	0	0.00	0				0.0				0.0				
	Slope	20-30						200	0	0.00	0				0.0				0.0				
		>30						500	0	0.00	0				0.0				0.0				
Horticulture		Volcanic						50	0	0.00	0				0.0				0.0				
	Soil type	Sediment						100	0	0.00	0				0.0				0.0				
		Unknown						100	0	0.00	0				0.0				0.0				
	Total area of sources (m^2)		**2068175**					**Site totals**	**89870183**	**0.00**	**89870183**	**Site totals**	**83937.6**	**-0.03**	**86379.3**	**Site totals**	**17560.4**	**-0.03**	**18048.7**	**Site totals**	**208184.1**	**0.00**	**208184.1**

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^{-1})				Average yields				Average concentrations (mg kg^{-1})			
First management option	Second management option	Third management option	Fraction of area draining to train	TSS	Zn	Cu	TPH	TSS kg ha^{-1} a^{-1}	Zn g ha^{-1} a^{-1}	Cu g ha^{-1} a^{-1}	TPH g ha^{-1} a^{-1}	TSS	Zn	Cu	TPH
				89870.2	86.4	18.0	208.2	435	418	87	1007		961	201	2316

Waimeha Stream Sub-Catchment
- Future (2031) with Expressway
- Unmitigated

Contaminant Load Model

Version MAY06

Auckland Regional Council
TE RAUHITANGA TAIAO

SOURCE	SOURCE TYPE			Source Area (m^2)	First management option	Second management option	Third management option	Fraction of area draining to train	Sediment Yield (g m^{-2} a^{-1})	Sediment Initial load (g a^{-1})	Sediment Load reduction efficiency	Sediment Reduced load (g a^{-1})	Zinc Yield (g m^{-2} a^{-1})	Zinc Initial load (g a^{-1})	Zinc Load reduction efficiency	Zinc Reduced load (g a^{-1})	Copper Yield (g m^{-2} a^{-1})	Copper Initial load (g a^{-1})	Copper Load reduction efficiency	Copper Reduced load (g a^{-1})	Total Petroleum Hydrocarbons Yield (g m^{-2} a^{-1})	Total Petroleum Hydrocarbons Initial load (g a^{-1})	Total Petroleum Hydrocarbons Load reduction efficiency	Total Petroleum Hydrocarbons Reduced load (g a^{-1})
	Site area (m^2)			**2068175**	**Source contaminant management train**				**Contaminant yields, loads, and load reduction efficiencies**															
Roofs	Galvanised unpainted								5	0	0.00	0	2.200	0.0	0.00	0.00	0.0008	0.0	0.00	0.0				
	Galvanised steel poor paint			4490					5	22449	0.00	22449	1.600	7183.8	0.00	7183.76	0.0008	3.6	0.00	3.6				
	Galvanised well painted			4490					5	22449	0.00	22449	0.150	673.5	0.00	673.48	0.0008	3.6	0.00	3.6				
	Zinc/aluminium unpainted								5	0	0.00	0	0.300	0.0	0.00	0.00	0.0008	0.0	0.00	0.0				
	Colorsteel/colorcote			35919					5	179594	0.00	179594	0.040	1436.8	0.00	1436.75	0.0008	28.7	0.00	28.7				
	Concrete								10	0	0.00	0	0.020	0.0	0.00	0.00	0.0013	0.0	0.00	0.0				
	Clay								5	0	0.00	0	0.020	0.0	0.00	0.00	0.0008	0.0	0.00	0.0				
	Slate								5	0	0.00	0	0.020	0.0	0.00	0.00	0.0008	0.0	0.00	0.0				
	Copper								5	0	0.00	0	0.000	0.0	0.00	0.00	3.0000	0.0	0.00	0.0				
	Decramastic			17959					5	89797	0.00	89797	0.200	3591.9	0.00	3591.88	0.0017	30.5	0.00	30.5				
	Other materials			116736					5	583681	0.00	583681	0.020	2334.7	0.00	2334.72	0.0008	93.4	0.00	93.4				
	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				
			Length (m)																					
Roads		<1000	5460	92820					4	371279	0.00	371279	0.021	1992.9	0.00	1992.90	0.0070	647.7	0.00	647.7	0.11	9964.5	0.00	9964.5
		1000-500	742	12622					30	379404	0.00	379404	0.107	1355.0	0.00	1355.02	0.0349	440.4	0.00	440.4	0.54	6775.1	0.00	6775.1
	Vehicles/day	5000-20000	4196	71333	Constructed wetland			0.18	150	10720895	0.77	9234979	0.537	38288.9	0.54	34567.23	0.1744	12443.9	0.69	10898.4	2.68	191444.6	0.10	187998.6
		20000-50000		0					299	0	0.00	0	1.068	0.0	0.00	0.00	0.3472	0.0	0.00	0.0	5.34	0.0	0.00	0.0
		50000-100000		0					300	0	0.00	0	2.281	0.0	0.00	0.00	0.7414	0.0	0.00	0.0	11.41	0.0	0.00	0.0
		>100000		0					300	0	0.00	0	3.532	0.0	0.00	0.00	1.1480	0.0	0.00	0.0	17.66	0.0	0.00	0.0
Paved Surfaces other than roads	Residential			386859					20	7737185	0.00	7737185	0.070	27080.1	0.00	27080.15	0.0100	3868.6	0.00	3868.6				
	Industrial								50	0	0.00	0	0.100	0.0	0.00	0.00	0.1300	0.0	0.00	0.0				
	Commercial								100	0	0.00	0	0.050	0.0	0.00	0.00	0.0500	0.0	0.00	0.0				
Urban Grass lands		<10		686227					35	24017959	0.00	24017959				840.6				168.1				
	Slope	10-20							80	0	0.00	0				0.0				0.0				
		>20							160	0	0.00	0				0.0				0.0				
Urban Stream Channel	*length x width*								6000	0	0.00	0				0.0				0.0				
	Urban area without construction sites			**1429455.298**					**Totals**	**44124693**	**0.03**	**42638777**	**Totals**	**83937.6**	**0.03**	**81056.5**	**Totals**	**17560.4**	**0.08**	**16183.0**	**Totals**	**208184.1**	**0.02**	**204738.1**
Construction Site (1) open for 2 months/year		<10							400	0	0.00	0				0.0				0.0				
	Slope	10-20							2500	0	0.00	0				0.0				0.0				
		>20							7000	0	0.00	0				0.0				0.0				
Construction Site (2) open for 6 months/year		<10							1300	0	0.00	0				0.0				0.0				
	Slope	10-20							7500	0	0.00	0				0.0				0.0				
		>20							20000	0	0.00	0				0.0				0.0				
Construction Site (3) open for 12 months/year		<10							2500	0	0.00	0				0.0				0.0				
	Slope	10-20							15000	0	0.00	0				0.0				0.0				
		>20							40000	0	0.00	0				0.0				0.0				
	Urban area with construction sites			**1429455**					**Totals**	**44124693**	**0.03**	**42638777**	**Totals**	**83937.6**	**0.03**	**81056.5**	**Totals**	**17560.4**	**0.08**	**16183.0**	**Totals**	**208184.1**	**0.02**	**204738.1**
Exotic production forest		<10		11593					10	115933	0.00	115933				4.1				0.8				
		10-20		14335					60	860115	0.00	860115				30.1				6.0				
	Slope	20-30		3916					200	783117	0.00	783117				27.4				5.5				
		>30		743					500	371371	0.00	371371				13.0				2.6				
Stable bush		<10		95405					5	477024	0.00	477024				16.7				3.3				
		10-20		51733					30	1551991	0.00	1551991				54.3				10.9				
	Slope	20-30		20034					100	2003419	0.00	2003419				70.1				14.0				
		>30		1329					250	332366	0.00	332366				11.6				2.3				
Farmed pasture		<10		348207					50	17410330	0.00	17410330				609.4				121.9				
		10-20		62174					100	6217371	0.00	6217371				217.6				43.5				
	Slope	20-30		27258					500	13628758	0.00	13628758				477.0				95.4				
		>30		1994					1000	1993696	0.00	1993696				69.8				14.0				
Retired pasture		<10							20	0	0.00	0				0.0				0.0				
		10-20							100	0	0.00	0				0.0				0.0				
	Slope	20-30							200	0	0.00	0				0.0				0.0				
		>30							500	0	0.00	0				0.0				0.0				
Horticulture		Volcanic							50	0	0.00	0				0.0				0.0				
	Soil type	Sediment							100	0	0.00	0				0.0				0.0				
		Unknown							100	0	0.00	0				0.0				0.0				
	Total area of sources (m^2)			**2068175**					**Site totals**	**89870183**	**0.02**	**88384267**	**Site totals**	**83937.6**	**0.02**	**82657.6**	**Site totals**	**17560.4**	**0.06**	**16503.2**	**Site totals**	**208184.1**	**0.02**	**204738.1**

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^{-1})				Average yields				Average concentrations (mg kg^{-1})			
First management option	Second management option	Third management option	Fraction of area draining to train	TSS	Zn	Cu	TPH	TSS kg ha^{-1} a^{-1}	Zn g ha^{-1} a^{-1}	Cu g ha^{-1} a^{-1}	TPH g ha^{-1} a^{-1}	TSS	Zn	Cu	TPH
				88384.3	82.7	16.5	204.7	427	400	80	990		935	187	2316

Waimeha Stream Sub-Catchment
- Future (2031) with Expressway
- Mitigated