

Modified data	Area (ha)		Action Plan		R 11 Database		Action Plan		R 11 Database	
	AP	DB	kgN/ha	total	kgN/ha	total	kgP/ha	total	kgP/ha	total
Native forest and scrub	3062	2758	3	9186	3	8358	0.12	400	0.12	324
Forests	4281	3974	2.5	10703	2.5	9792	0.10	430	0.11	432
<i>Trees Total</i>	<i>7343</i>	<i>6732</i>		<i>19889</i>		<i>18150</i>	<i>0.00</i>	<i>830</i>		<i>756</i>
Crop and hort	5	46	60	300	18.1	843	2.00	10	0.28	13
Pastoral drystock	847	612	20	17400	6.2	3814	0.90	760	1.46	893
Dairy	126	124	50	6300	42	5255	0.71	90	4.77	592
Dairy support	0	502	0	0	20.5	10278	0.00	0	2.61	1312
Grasslands	32	0	12	400	0	0	0.94	30	0.00	0
<i>Pastoral Total</i>	<i>1010</i>	<i>1284</i>		<i>24400</i>	<i>0</i>	<i>20190</i>	<i>0.00</i>	<i>890</i>	<i>0.00</i>	<i>2810</i>
Other/non productive	196	78	12	2400	14	1035	0.92	180	1.87	146
Urban/Houses/bareground	173	10	3	500	48	477	0.69	120	3.10	31
Wetlands/riparians	51	15	2	100	2.7	40.5			0.09	1.4
Lifestyle/not benchmarked		700			6.2	4340			1.5	1050
<i>Other/Urban/Lifestyle Total</i>	<i>420</i>	<i>803</i>		<i>3000</i>		<i>5892.5</i>		<i>300</i>		<i>1228.4</i>
<b>Total</b>	<b>8773</b>	<b>8819</b>		<b>47289</b>		<b>44233</b>		<b>2020</b>		<b>4794.4</b>

Modified data is adjusted for:

catchment size - assume 285ha taken out of native forest (into Ōkātina catchment)

N discharge for 3kg/ha for native and 2.5kg/ha for forestry to match up with coefficients in the R11 database.

Discharge loss of 6.2 kgN/ha and 1.5kgP/ha for non-benchmarked area

Original data (Overseer V6)	Area		AP		DB		AP		DB	
	AP	DB	kgN/ha	total	kgN/ha	total	kgP/ha	total	kgP/ha	total
Native forest and scrub	3347	2758	4.0	13400	3	8358	0.12	400	0.12	324
Forests	4281	3974	3.0	12800	2.5	9792	0.10	430	0.11	432
<i>Trees Total</i>	<i>7628</i>	<i>6732</i>		<i>26200</i>		<i>18150</i>		<i>830</i>		<i>756</i>
Crop and hort	5	46	60	300	18.1	843	2.0	10	0.28	13
Pastoral drystock	847	612	20.5	17400	6.2	3814	0.90	760	1.46	893
Dairy	126	124	50	6300	42	5255	0.71	90	4.77	592
Dairy support	0	502	0	0	20.5	10278	0	0	2.61	1312
Grasslands	32	0	12.5	400	0	0	0.94	30	0	0
<i>Pastoral Total</i>	<i>1010</i>	<i>1284</i>		<i>24400</i>		<i>20190</i>		<i>890</i>		<i>2810</i>
Other/non productive	196	78	12.2	2400	14	1035	0.92	180	1.87	146
Urban/Houses/bareground	173	10	2.9	500	48	477	0.69	120	3.10	31
Wetlands/riparians	51	15	2.0	100	2.7	40.5	0.00	0	0.09	1.4
<i>Other/Urban Total</i>	<i>420</i>	<i>103</i>		<i>3000</i>		<i>1552.5</i>		<i>300</i>		<i>178.4</i>
Non-benchmarked area		700								
Adjusted catchment area	-285									
<i>Adjustment Total</i>	<i>-285</i>	<i>700</i>								
<b>Total</b>	<b>8773</b>	<b>8819</b>		<b>53600</b>		<b>39893</b>		<b>2020</b>		<b>3744.4</b>

Original data is adjusted to compare with benchmarking data - excludes N losses from:

imported nutrients	250000kg
rainfall	12500kg
geothermal	41600kg
and estimated inputs from septic tanks	5900kg

## Rotomā Action Plan

Action Plan target

Nkg/yr  
1320

Pkg/yr  
250

**Table 1.**

The following figures are derived from a Farm Nutrient Analysis Report prepared in 2010 by Perrin Ag. The N and P losses were modelled using Overseer 5.4.3

Property	Area Ha	Overseer 5.4.3		Nutrient loss coefficients	
		N loss	P loss	kgN/ha	kgP/ha
Glenmarie grazing	35	450	109	12.9	3.1
Glenmarie trees	43	168	17	3.9	0.4
Total	78	618	126		
Taumanu grazing	8.4	477	66.6	54.8	7.7
Taumanu trees	4.2	12.6	0.4	3	0.1
Total	12.6	489.6	67		
Taharoto grazing	345	4106	1208	12	4
Taharoto trees (IC)	91	861	221	9	2
Total	436	4967	1429		
Taharoto - IC	345	4106	1208	12	4

These figures include the 91.3ha in the Farm Nutrient Analysis document that falls in the separate internal catchment!

## Landuse Change Scenarios

**Table 2.**

The following four scenarios have been analysed separately. The only land use change scenario that reaches the N target is the fourth scenario of converting 150ha of pasture to trees.

Scenario	Area Ha	Total Loss (kg)		Reduction (kg)		% of Target	
		N	P	N	P	N	P
1. Glenmarie full conversion to trees	78	234	7.8	384	118.2	29%	47%
2. Taumanu full conversion to trees	12.6	37.8	1.26	451.8	65.74	34%	26%
3. Taharoto stock excluded from gums							
Taharoto grazing	345	4106	1208				
Taharoto trees	91	273	9				
Total	436	4379	1217.1	588	211.9	45%	85%
4. Taharoto 150ha of grazing to trees							
Taharoto grazing	195	2321	683				
Taharoto trees	150	450	15				
Total	345	2770.5	697.5	1335.5	511	101%	204%

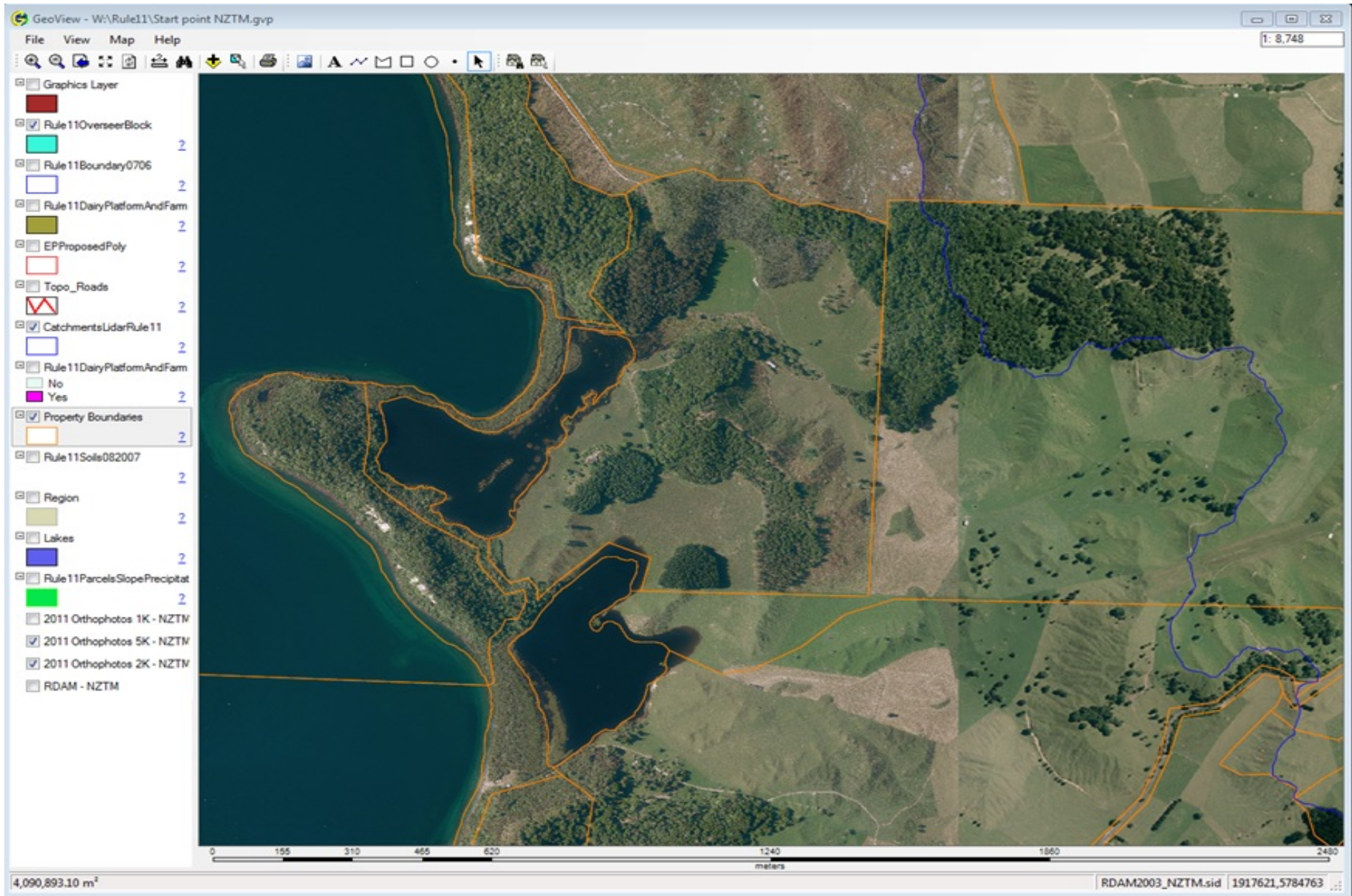
## Land Purchase Options

**Table 3.**

The land purchase options both result in a much higher expenditure however also result in land ownership of which some of the cost could be re-couped upon sale of the land. The nutrient purchase option is a similar type of agreement as an LPA which results in a decrease from the benchmark.

Nutrient purchase options	Lower limit	Higher limit	Likely	Area Ha	Total \$-000	N removed kg	N cost \$/kg	N target %
	\$	\$	\$-000					
Drystock land purchase	7500	10000	10	150	1500	1336	1123	101%
Dairy land purchase	28000	48000	40	13	520	452	1151	34%
Nutrient purchase					330	1320	250	100%

Estimate land values provided by Bayleys real estate and range dependent on many factors including contour



**Rotomā Action Plan**

<b>Action Plan target</b>	<b>Nkg/yr 1320</b>	<b>Pkg/yr 250</b>
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**Table 1.**  
P loss figures from Overseer and the Action Plan cannot easily be compared. The Overseer losses are calculated on a block basis and much of the P loss from the individual blocks may not make it to the lake. The following table compares the different P loss coefficients and total P loss calculated from both methods.

Property	Area Ha	Overseer 5.4.3 P losses		Action Plan P losses	
		kg P/ha	Total P loss	kg P/ha	Total P loss
Glenmarie grazing	35	3.1	109	0.4	14
Glenmarie trees	43	0.4	17	0.2	8.6
<b>Total</b>	<b>78</b>		<b>126</b>		<b>22.6</b>
Taumanu grazing	8.4	7.7	67	0.4	3.36
Taumanu trees	4.2	0.1	0.4	0.1	0.42
<b>Total</b>	<b>12.6</b>		<b>67.4</b>		<b>3.78</b>
Taharoto grazing	345	3.5	1208	0.4	138
Taharoto trees (IC)	91	2.4	221	0.2	18.2
<b>Total</b>	<b>436</b>		<b>1429</b>		<b>156.2</b>
Taharoto - IC	345	3.5	1208	0.4	138

**Table 2.**  
The following table compares the P loss calculated on a loss/block basis (Overseer 5.4.3) and the P losses calculated from the Action Plan P loss coefficients for the following landuse scenarios.

Landuse Change Scenario	Area Ha	Overseer Total P kg	AP Total P kg	Overseer P Reduction		Action Plan P reduction	
				kg	%	kg	%
1. Glenmarie full conversion to trees	78	7.8	7.8	118	47%	14.80	6%
2. Taumanu full conversion to trees	12.6	1.26	1.26	66	26%	2.52	1%
3. Taharoto stock excluded from gums	345	1208	138				
	91	9	9				
	436	1217	147	222	89%	9	4%
4. Taharoto 150ha of grazing to trees	195	683	78				
	150	15	15				
	345	698	93	511	204%	45	18%

**Table 3.**  
The following table compares the associated P loss from land purchase.

Associated P gains from Land purchase	Area Ha	Overseer P kg	Action Plan P kg
Dairy land purchase	13	66	3
Drystock land purchase	150	511	45
Nutrient purchase			

## Rotoiti Action Plan

**Sewage target**

**Nkg/yr  
8400**

**Pkg/yr  
840**

**Table 1.**

The following figures are derived from database reports based on the 2001-2004 landuse. The N-loss coefficient is very low for drystock and is partly attributed to grazing tree blocks, poor pasture management resulting in blackberry and other woody weed infestations and low stocking rates on unimproved properties.

Property	Area	Overseer v6 losses		Nutrient loss coefficients	
	Ha	N (kg)	P (kg)	kgN/ha	kgP/ha
Drystock	612	3814	893	6.2	1.5
Dairy	124	5255	592	42	4.8
Dairy support	502	10278	1312	20	2.6
Trees				3	0.1

**Table 2.**

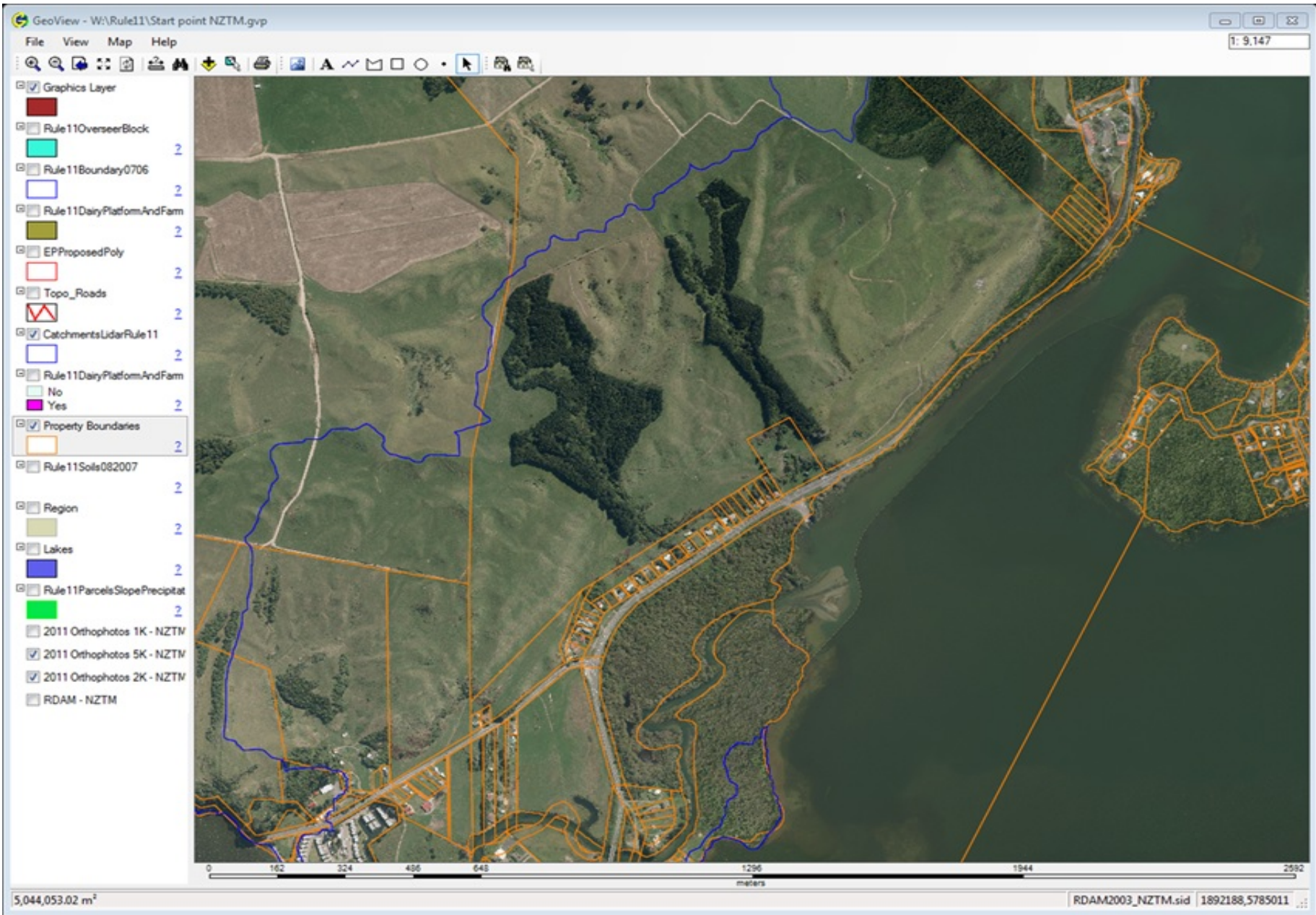
Scenario	Area	Total Loss (kg)		Reduction (kg)		% of Sewage Target	
	Ha	N	P	N	P	N	P
1. Drystock full conversion to trees	612	1836	61.2	1978	831.8	24%	99%
2. Dairy full conversion to trees	124	372	12.4	4883	579.6	58%	69%
3. Dairy support full conversion to trees	502	1506	50.2	8772	1261.8	104%	150%

**Table 3.**

The land purchase options result in a much higher expenditure however also result in land ownership of which some of the cost could be re-couped upon sale of the land. The nutrient purchase option is a similar type of agreement as an LPA which results in a decrease in nutrient discharge allocation from the benchmark.

Nutrient purchase options	Lower limit	Higher limit	Likely	Area	Total	N removed	N cost	N target
	\$	\$	\$-000	Ha	\$-000	kg	\$/kg	%
Drystock/dairy support land purchase	7500	10000	10	502	5020	8772	572	104%
Dairy land purchase	28000	48000	40	124	4960	4883	1016	58%
Nutrient purchase					2100	8400	250	100%

Estimate land values provided by Bayleys real estate and range dependent on many factors including contour



### Rotoiti Action Plan

Sewage target	Nkg/yr 8400	Pkg/yr 840
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**Table 1.**

P loss management in the catchment has been difficult considering the benchmarking process using Overseer measures P losses from individual blocks that do not necessarily make it to the lake and the Action Plan P loss targets have been modelled from in lake measurements. The Action Plan coefficients have been used to compare

Property	Area Ha	Overseer 6 losses		Action Plan	
		kgP/ha	Total P loss (kg)	kgP/ha	Total P loss (kg)
Drystock	612	1.5	893	0.9	551
Dairy	124	4.8	592	0.7	87
Dairy support	502	2.6	1312	0.9	452
Trees		0.1		0.1	

**Table 2.**

The following three scenarios have been analysed separately. The conversion of 502ha of dairy support to trees achieves the P target if the Overseer P coefficients are used but none of the scenarios outlined reach the Action Plan target if the action plan P coefficients are used.

Scenario	Total			Overseer P Reduction (kg)		Action Plan P reduction	
	Ha	N loss	P loss	kg	%	kg	%
1. Drystock full conversion to trees	612	1836	61.2	831.8	99%	489.6	58%
2. Dairy full conversion to trees	124	372	12.4	579.6	69%	74.4	9%
3. Dairy support full conversion to trees	502	1506	50.2	1261.8	150%	401.6	48%

**Table 3.**

The associated P gains from the land purchase options have been calculated using both the Overseer P loss and the Action Plan P loss coefficients

Associated P gains	Area Ha	Overseer P kg	AP P kg
Drystock/dairy support land purchase	502	1262	402
Dairy land purchase	124	580	74
Nutrient purchase			