

## **Appendix G: Soil and Leaf Sample Analysis Data**



**ANALYSIS REPORT** Page 1 of 10

<b>Client:</b> OPUS International Consultants	<b>Lab No:</b> 1007402 <span style="float: right;">shpv1</span>
<b>Address:</b> Private Bag 3057 HAMILTON 3240	<b>Date Registered:</b> 15-May-2012
	<b>Date Reported:</b> 23-May-2012
	<b>Quote No:</b> 39043
	<b>Order No:</b>
<b>Phone:</b> 07 838 9344	<b>Client Reference:</b>
	<b>Submitted By:</b> J Turner

**Sample Name:** Plot 1 **Lab Number:** 1007402.1  
**Sample Type:** SOIL General, Outdoor (S10)

Analysis	Level Found	Medium Range	Low	Medium	High
pH	pH Units 5.5	5.8 - 6.3			
Volume Weight	g/mL 0.63	0.60 - 1.00			
Soluble Salts (Field)	% 0.06	0.05 - 0.30			
EC (in 1:5 Extract)	mS/cm 0.18				
Available Nitrogen (15cm Depth)*	kg/ha 336	100 - 150			
Anaerobically Mineralisable N*	µg/g 354				
Organic Matter*	% 27.5	7.0 - 17.0			
Total Carbon	% 16.0				
Total Nitrogen	% 1.01	0.30 - 0.60			
C/N Ratio*	15.9				
Anaerobically Mineralisable N/Total N Ratio*	% 3.5	3.0 - 5.0			
Dry Matter*	% 19.6				
Moisture*	% 80.4				
'Total' Phosphorus	mg/kg 587				

The above nutrient graph compares the levels found with reference interpretation levels. NOTE: It is important that the correct sample type be assigned, and that the recommended sampling procedure has been followed. R J Hill Laboratories Limited does not accept any responsibility for the resulting use of this information. IANZ Accreditation does not apply to comments and interpretations, i.e. the 'Range Levels' and subsequent graphs.

**Analyst's Comments**  
The Available Nitrogen (kg/ha) test above assumes the sample is taken to a 15 cm depth. If the depth is 7.5 cm, then the level above should be divided by two.



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**ANALYSIS REPORT** Page 2 of 10

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	<b>Submitted By:</b> J Turner

<b>Sample Name:</b> Plot 2		<b>Lab Number:</b> 1007402.2				
<b>Sample Type:</b> SOIL General, Outdoor (S10)						
Analysis		Level Found	Medium Range	Low	Medium	High
pH	pH Units	5.5	5.8 - 6.3			
Volume Weight	g/mL	0.32	0.60 - 1.00			
Available Nitrogen (15cm Depth)*	kg/ha	308	100 - 150			
Anaerobically Mineralisable N*	µg/g	649				
Organic Matter*	%	50.4	7.0 - 17.0			
Total Carbon	%	29.2				
Total Nitrogen	%	1.81	0.30 - 0.60			
C/N Ratio*		16.1				
Anaerobically Mineralisable N/Total N Ratio*	%	3.6	3.0 - 5.0			
Dry Matter*	%	6.9				
Moisture*	%	93.1				
Total Phosphorus	mg/kg	973				

The above nutrient graph compares the levels found with reference interpretation levels. NOTE: It is important that the correct sample type be assigned, and that the recommended sampling procedure has been followed. R J Hill Laboratories Limited does not accept any responsibility for the resulting use of this information. IANZ Accreditation does not apply to comments and interpretations, i.e. the 'Range Levels' and subsequent graphs.

**Analyst's Comments**

The Available Nitrogen (kg/ha) test above assumes the sample is taken to a 15 cm depth. If the depth is 7.5 cm, then the level above should be divided by two.



**ANALYSIS REPORT** Page 3 of 10

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	<b>Submitted By:</b> J Turner

**Sample Name:** Plot 3 **Lab Number:** 1007402.3  
**Sample Type:** SOIL General, Outdoor (S10)

Analysis	Level Found	Medium Range	Low	Medium	High
pH	pH Units	5.6	5.8 - 6.3		
Volume Weight	g/mL	0.48	0.60 - 1.00		
Soluble Salts (Field)	%	0.06	0.05 - 0.30		
EC (in 1:5 Extract)	mS/cm	0.17			
Available Nitrogen (15cm Depth)*	kg/ha	270	100 - 150		
Anaerobically Mineralisable N*	µg/g	372			
Organic Matter*	%	41.6	7.0 - 17.0		
Total Carbon	%	24.2			
Total Nitrogen	%	1.68	0.30 - 0.60		
C/N Ratio*		14.4			
Anaerobically Mineralisable N/Total N Ratio*	%	2.2	3.0 - 5.0		
Dry Matter*	%	11.5			
Moisture*	%	88.5			
'Total' Phosphorus	mg/kg	734			

The above nutrient graph compares the levels found with reference interpretation levels. NOTE: It is important that the correct sample type be assigned, and that the recommended sampling procedure has been followed. R J Hill Laboratories Limited does not accept any responsibility for the resulting use of this information. IANZ Accreditation does not apply to comments and interpretations, i.e. the 'Range Levels' and subsequent graphs.

**Analyst's Comments**  
The Available Nitrogen (kg/ha) test above assumes the sample is taken to a 15 cm depth. If the depth is 7.5 cm, then the level above should be divided by two.



**ANALYSIS REPORT** Page 4 of 10

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	<b>Submitted By:</b> J Turner

**Sample Name:** Plot 4 **Lab Number:** 1007402.4  
**Sample Type:** SOIL General, Outdoor (S10)

Analysis	Level Found	Medium Range	Low	Medium	High	
pH	pH Units	5.6	5.8 - 6.3			
Volume Weight	g/mL	0.23	0.60 - 1.00			
Available Nitrogen (15cm Depth)*	kg/ha	263	100 - 150			
Anaerobically Mineralisable N*	µg/g	752				
Organic Matter*	%	65.3	7.0 - 17.0			
Total Carbon	%	37.9				
Total Nitrogen	%	2.38	0.30 - 0.60			
C/N Ratio*		15.9				
Anaerobically Mineralisable N/Total N Ratio*	%	3.2	3.0 - 5.0			
Dry Matter*	%	5.7				
Moisture*	%	94.3				
*Total* Phosphorus	mg/kg	868				

The above nutrient graph compares the levels found with reference interpretation levels. NOTE: It is important that the correct sample type be assigned, and that the recommended sampling procedure has been followed. R J Hill Laboratories Limited does not accept any responsibility for the resulting use of this information. IANZ Accreditation does not apply to comments and interpretations, i.e. the 'Range Levels' and subsequent graphs.

**Analyst's Comments**  
The Available Nitrogen (kg/ha) test above assumes the sample is taken to a 15 cm depth. If the depth is 7.5 cm, then the level above should be divided by two.



**ANALYSIS REPORT** Page 5 of 10

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<b>Phone:</b>	07 838 9344	<b>Client Reference:</b>		
		<b>Submitted By:</b>	J Turner	

**Sample Name:** Plot 1 **Lab Number:** 1007402.5  
**Sample Type:** General, Non-specified NZ (P10)

Analysis	Level Found	Medium Range	Low	Medium	High
Nitrogen*	% 2.1				
Phosphorus	% 0.19				

The above nutrient graph compares the levels found with reference interpretation levels. NOTE: It is important that the correct sample type be assigned, and that the recommended sampling procedure has been followed. R J Hill Laboratories Limited does not accept any responsibility for the resulting use of this information. IANZ Accreditation does not apply to comments and interpretations, i.e. the 'Range Levels' and subsequent graphs.

**Analyst's Comments**

Normal range levels for each nutrient have not been printed on this report. Either the plant species or the plant part submitted for analysis has not been clearly specified or identified, or the normal range data is not available.

Please contact the Laboratory for more information: Ph (07) 858 2000, mail@hill-labs.co.nz or check our website, www.Hill-Laboratories.com



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		<b>Submitted By:</b>	J Turner	

**Sample Name:** Plot 2 **Lab Number:** 1007402.6  
**Sample Type:** General, Non-specified NZ (P10)

Analysis	Level Found	Medium Range	Low	Medium	High
Nitrogen*	% 1.3				
Phosphorus	% 0.10				

The above nutrient graph compares the levels found with reference interpretation levels. NOTE: It is important that the correct sample type be assigned, and that the recommended sampling procedure has been followed. R J Hill Laboratories Limited does not accept any responsibility for the resulting use of this information. IANZ Accreditation does not apply to comments and interpretations, i.e. the 'Range Levels' and subsequent graphs.

**Analyst's Comments**

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**ANALYSIS REPORT** Page 7 of 10

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		<b>Submitted By:</b>	J Turner	

**Sample Name:** Plot 3 **Lab Number:** 1007402.7  
**Sample Type:** General, Non-specified NZ (P10)

Analysis		Level Found	Medium Range	Low	Medium	High
Nitrogen	%	1.3				
Phosphorus	%	0.13				

The above nutrient graph compares the levels found with reference interpretation levels. NOTE: It is important that the correct sample type be assigned, and that the recommended sampling procedure has been followed. R J Hill Laboratories Limited does not accept any responsibility for the resulting use of this information. IANZ Accreditation does not apply to comments and interpretations, i.e. the 'Range Levels' and subsequent graphs.

**Analyst's Comments**

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**ANALYSIS REPORT** Page 8 of 10

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	<b>Submitted By:</b> J Turner

**Sample Name:** Plot 4 **Lab Number:** 1007402.8  
**Sample Type:** General, Non-specified NZ (P10)

Analysis	Level Found	Medium Range	Low	Medium	High
Nitrogen* %	2.3				
Phosphorus %	0.18				

The above nutrient graph compares the levels found with reference interpretation levels. NOTE: It is important that the correct sample type be assigned, and that the recommended sampling procedure has been followed. R J Hill Laboratories Limited does not accept any responsibility for the resulting use of this information. IANZ Accreditation does not apply to comments and interpretations, i.e. the 'Range Levels' and subsequent graphs.

**Analyst's Comments**

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## Analyst's Comments

The soluble salts (EC in 1:5 extract) tests have been cancelled for samples 2 and 4 as insufficient extract could be obtained for this measurement due to the nature of the soil.

## SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

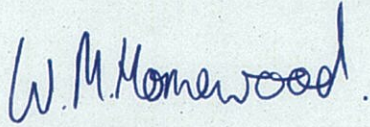
Sample Type: Soil			
Test	Method Description	Default Detection Limit	Samples
Sample Registration*	Samples were registered according to instructions received.	-	1-8
Soil Prep (Dry & Grind)*	Air dried at 35 - 40°C overnight (residual moisture typically 4%) and crushed to pass through a 2mm screen.	-	1-4
pH	1:2 (v/v) soil:water slurry followed by potentiometric determination of pH.	0.1 pH Units	1-4
Available Nitrogen	Anaerobic incubation followed by extraction using 2M KCl followed by Berthelot colorimetry. (Calculation based on 15cm depth sample).	1 mg/L	2-4
Available Nitrogen*	Determined by NIR, calibration based on Available N by Anaerobic incubation followed by extraction using 2M KCl followed by Berthelot colorimetry. (Calculation based on 15cm depth sample).	1 mg/L	1
Anaerobically Mineralisable N*	As for Available Nitrogen but reported as µg/g.	5 µg/g	1-4
Organic Matter*	Organic Matter is 1.72 x Total Carbon.	0.2 %	1-4
Total Carbon	Dumas combustion.	0.1 %	1-4
Total Nitrogen	Dumas combustion.	0.04 %	1-4
Soluble Salts (Field)	1:5 soil:water extraction followed by potentiometric determination of conductivity. Calculated by EC (mS/cm) x 0.35.	0.05 %	1, 3
Electrical Conductivity (EC)	Electrical Conductivity measured in 1:5 Soil:Water extract.	0.01 mS/cm	1, 3
'Total' Phosphorus	Nitric/hydrochloric digestion (based on US EPA 200.2) followed by ICP-OES. (Total recoverable nutrients reported on a dry weight basis) The levels from this method are referred to as 'Totals' in quotation marks, as they will be a slight under-estimation of the true Totals for some elements.	40 mg/kg	1-4
Dry Matter*	Weight loss on drying at 105°C for 24 hours.	0.5 %	1-4
Moisture*	Moisture is calculated from the Dry Matter.	0.5 %	1-4
Volume Weight	The weight/volume ratio of dried, ground soil.	0.01 g/mL	1-4

Sample Type: Plant			
Test	Method Description	Default Detection Limit	Samples
Plant Prep (Dry & Grind)*	Oven dried at 62°C overnight (residual moisture typically 5%) and ground to pass through a 1.0mm screen.	-	5-8
Water Wash*	Leaves were washed with water prior to drying and grinding.	-	5-8
Nitrogen	Dumas combustion.	0.1 %	7
Nitrogen*	Estimated by NIR, calibration based on N by Dumas combustion.	0.1 %	5-6, 8
Phosphorus	Nitric Acid/Hydrogen Peroxide digestion followed by ICP-OES.	0.02 %	5-8

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

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Wendy Homewood  
Quality Assurance Officer - Agriculture Division