

Appendix A

Community Flyer

Appendix A Community Flyer

Lower Hunter Dust Deposition Study

Fact sheet 1

What is a dust deposition study?

A dust deposition study examines:

- how much visible dust is deposited in the environment
- what is in the dust
- the likely sources of the dust.

Why is a dust deposition study being conducted in the Lower Hunter?

Lower Hunter residents have expressed concern about the amount of visible black dust in the area, and have requested more information on what is in the dust and where it comes from. As a result, the EPA has commissioned a study to examine deposited dust in key areas where complaints have been received.

Who is managing the study?

To ensure that the views of the community are fully considered, the EPA has established the Lower Hunter Dust Deposition Project Reference Group. The reference group comprises eight members: two community representatives, two industry representatives, two independent technical experts and two EPA staff members. The reference group acts as a conduit between the broader community and the EPA regarding the study, and advises and guides the EPA on project design and delivery including the selection of a consultant to conduct the study.

How will dust samples be collected?

AECOM Pty Ltd has been commissioned to conduct the Lower Hunter Dust Deposition Study and will use various techniques to collect dust samples from sample sites. Techniques will include dust deposition gauges, petri dishes and swabs. Samples will be analysed to assess the quantity and composition of the dust and identify likely sources of deposited dust.

Will the study tell me where the dust comes from?

The analysis of dust samples may point to likely or potential sources of the dust. However, it is beyond the scope of the study to identify specific facilities as the sources of the dust. The study is concerned with visible dust and will not examine fine particles, PM_{10} and $PM_{2.5}$, as this is the focus of the Lower Hunter Particle Characterisation Study.

How are sample sites being selected?

AECOM is looking for sites to locate dust deposition gauges for 12 months of monitoring. The sample sites will be selected based on the distribution and intensity of complaints received by the EPA regarding air quality over the last two or three years, as well as sites along the rail corridor.



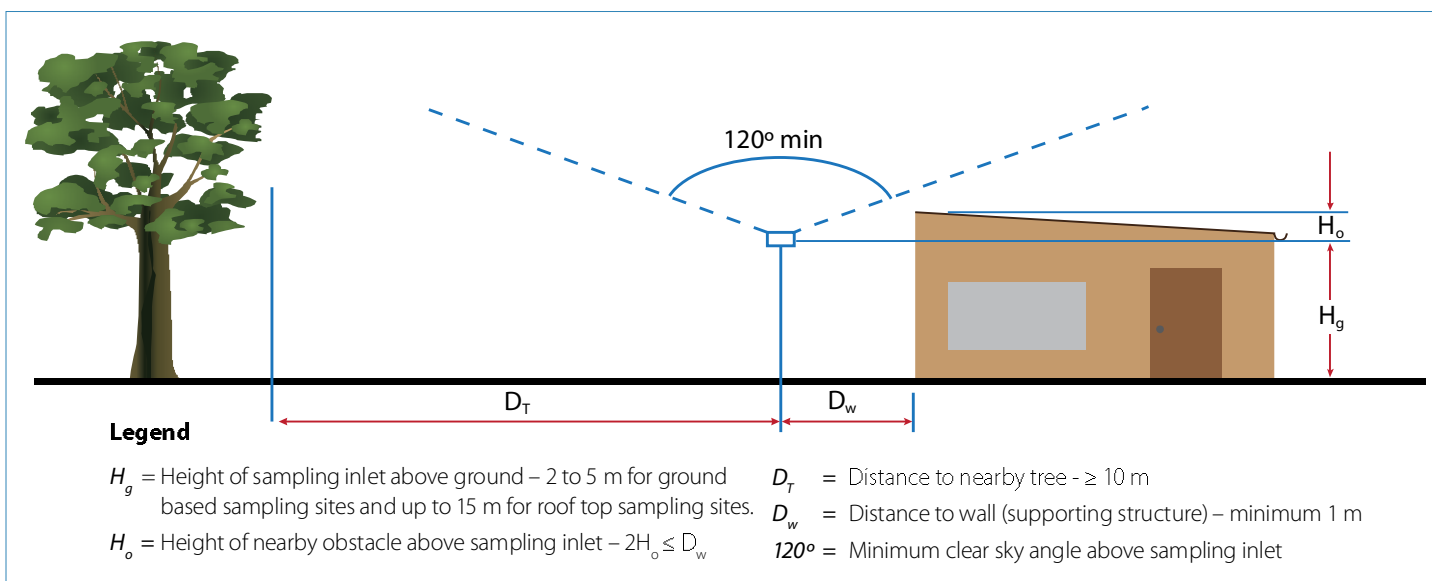
Dust deposition gauge

Using this data, sample sites will be selected in the following suburbs:

Stockton	Carrington	Wickham
Tighes Hill	Mayfield East	Mayfield
Mayfield West	Waratah	Hamilton North
Newcastle	Newcastle East	

The sample sites will be located in accordance with Australian Standards (AS/NZS 3580.1.1 2007, *Methods for sampling and analysis of ambient air – Guide to siting air monitoring equipment*).

Figure 1: Ground-level sampling site



Source: AS/NZS 3580.1.1:23007 Figure 1 – Reproduced with permission from SAI Global Ltd under Licence 1408-C007

How can I get involved?

If you think your residence is suitable as a sampling site, contact Catharina Boer, Senior Community Projects Officer, EPA:

- by phoning 9995 6197
- by emailing catharina.boer@epa.nsw.gov.au

The dust deposition gauge would need to be in place for 12 months with access for AECOM researchers to collect samples and check the equipment.

www.epa.nsw.gov.au

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Appendix B

Meteorological Data

Appendix B Meteorological Data

Monthly Wind Roses

Wind frequency distribution tables for OEH monitoring sites at Mayfield West, Stockton and Newcastle from 15 October 2014 to 15 October 2015 are presented in **Table 17** to **Table 19**. Annual and monthly wind roses for Mayfield West, Stockton and Newcastle are also presented in **Figure 26** to **Figure 28** respectively.

The annual wind distributions for the OEH Carrington monitoring site are described in **Section 2.4**. With the exception of dust gauge locations at Stockton North and Stockton South shown in **Figure 48** to **Figure 50**, Carrington meteorology data was used to create wind rose overlays presented in **Figure 29** to **Figure 53** in **Appendix C**. When compared to the other three stations the Carrington data was found to have a similar wind distribution pattern. Annually at Carrington 33% of winds were found to come from the west to northwest; similarly 33% at Mayfield West, 28% at Stockton and 33% and Newcastle came from the west northwest to north northwest. Annual average wind speed was found to be similar between Carrington (2.7 m/s), Mayfield West (2.9 m/s) and Newcastle (2.5 m/s). The annual average wind speed at Stockton was found to be slightly higher at 3.8 m/s. Stockton was also found to have the lowest occurrence of calms at 0.4 per cent of the year. The percentage of calms at both Carrington and Mayfield West were found to be similar occurring for 1.4 and 1.8% of the year respectively while the occurrence of calms at Stockton and Newcastle were found to occur for 0.4% and 5.0% of the year respectively.

Mayfield West

Table 17 Wind Speed Frequency Distribution of Mayfield West OEH Station Oct 2014 to Oct 2015 data (%)

Wind Direction	Wind Speed Class (m/s)						Total
	0.5-2.1	2.1-3.6	3.6-5.7	5.7-8.8	8.8-11.1	≥11.1	
N	1.7	0.1	<0.1	<0.1	<0.1	<0.1	1.9
NNE	1.8	0.4	<0.1	<0.1	<0.1	<0.1	2.2
NE	2.2	0.7	0.1	<0.1	<0.1	<0.1	3.1
ENE	2.7	2.8	0.8	<0.1	<0.1	<0.1	6.3
E	1.1	2.1	2.7	2.0	0.1	<0.1	7.9
ESE	1.1	2.2	3.3	0.5	<0.1	<0.1	7.1
SE	1.1	1.9	2.6	0.5	<0.1	<0.1	6.1
SSE	1.1	1.6	2.0	1.0	<0.1	0.1	5.8
S	1.7	1.5	1.8	1.3	0.1	0.1	6.4
SSW	1.2	1.2	0.9	0.1	<0.1	<0.1	3.4
SW	1.9	2.4	1.3	0.1	<0.1	<0.1	5.6
WSW	1.8	1.4	0.3	<0.1	<0.1	<0.1	3.6
W	2.1	1.9	0.7	0.2	<0.1	<0.1	4.9
WNW	5.4	4.5	4.1	2.3	0.3	<0.1	16.6
NW	6.5	4.0	1.5	0.6	0.1	<0.1	12.8
NNW	3.0	0.6	<0.1	<0.1	<0.1	<0.1	3.6
Sub-Total	36.3	29.5	22.3	8.6	0.6	0.2	97.5

Annual (15 Oct 2014 to 15 Oct, 2015). Total periods = 8,784; Valid periods = 8,715; Calm wind periods = 154; Calm winds: 1.8%

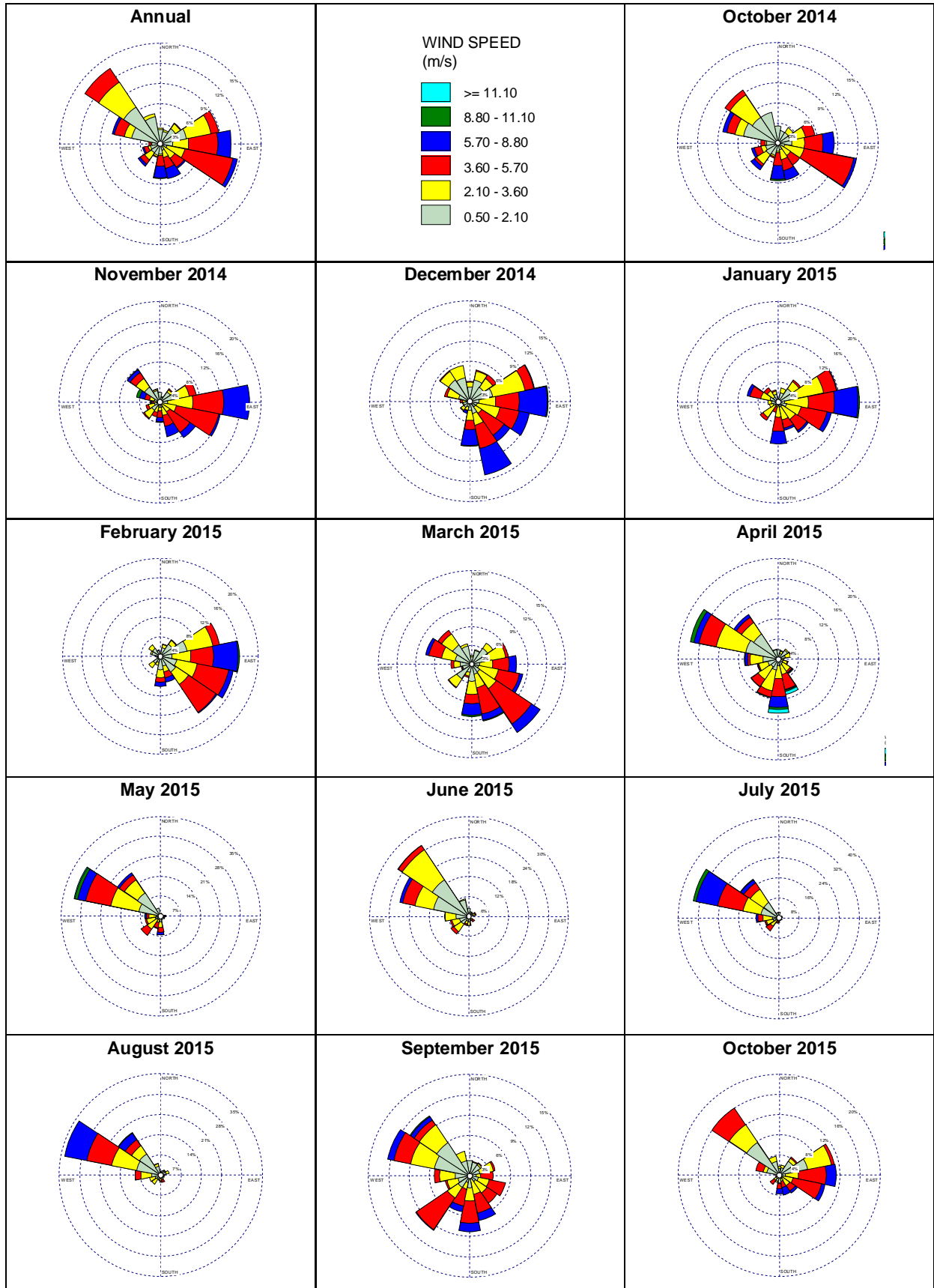


Figure 26 Monthly Wind Roses at OEH Monitoring Station at Mayfield West from October 2014 to October 2015

Stockton

Table 18 Wind Speed Frequency Distribution of Stockton OEH Station Oct 2014 to Oct 2015 data (%)

Wind Direction	Wind Speed Class (m/s)						Total
	0.5-2.1	2.1-3.6	3.6-5.7	5.7-8.8	8.8-11.1	≥11.1	
N	1.4	2.1	0.8	0.2	<0.1	<0.1	4.5
NNE	1.6	1.2	0.3	<0.1	<0.1	<0.1	3.1
NE	2.7	2.6	0.4	<0.1	<0.1	<0.1	5.6
ENE	2.3	2.5	1.1	0.2	<0.1	<0.1	6.2
E	1.1	1.9	3.8	0.8	<0.1	<0.1	7.6
ESE	0.8	2.0	1.9	0.2	<0.1	<0.1	5.0
SE	0.8	1.8	2.5	0.4	<0.1	<0.1	5.4
SSE	0.9	1.3	2.4	0.9	<0.1	0.1	5.6
S	0.7	1.2	1.8	1.7	0.1	0.1	5.6
SSW	0.7	1.4	1.8	1.0	0.1	<0.1	4.9
SW	0.8	1.3	2.2	0.8	<0.1	<0.1	5.1
WSW	0.9	1.1	1.5	0.8	<0.1	<0.1	4.3
W	0.8	1.1	1.0	0.5	0.1	0.1	3.7
WNW	1.0	2.4	4.6	4.0	0.9	0.2	13.1
NW	1.2	2.5	4.0	1.9	0.4	0.1	10.0
NNW	1.4	2.5	1.1	0.1	<0.1	<0.1	5.1
Sub-Total	18.9	28.9	31.3	13.4	1.6	0.6	94.7
Annual (15 Oct 2014 to 15 Oct, 2015). Total periods = 8,784; Valid periods = 8,361; Calm wind periods = 39; Calm winds: 0.4%							

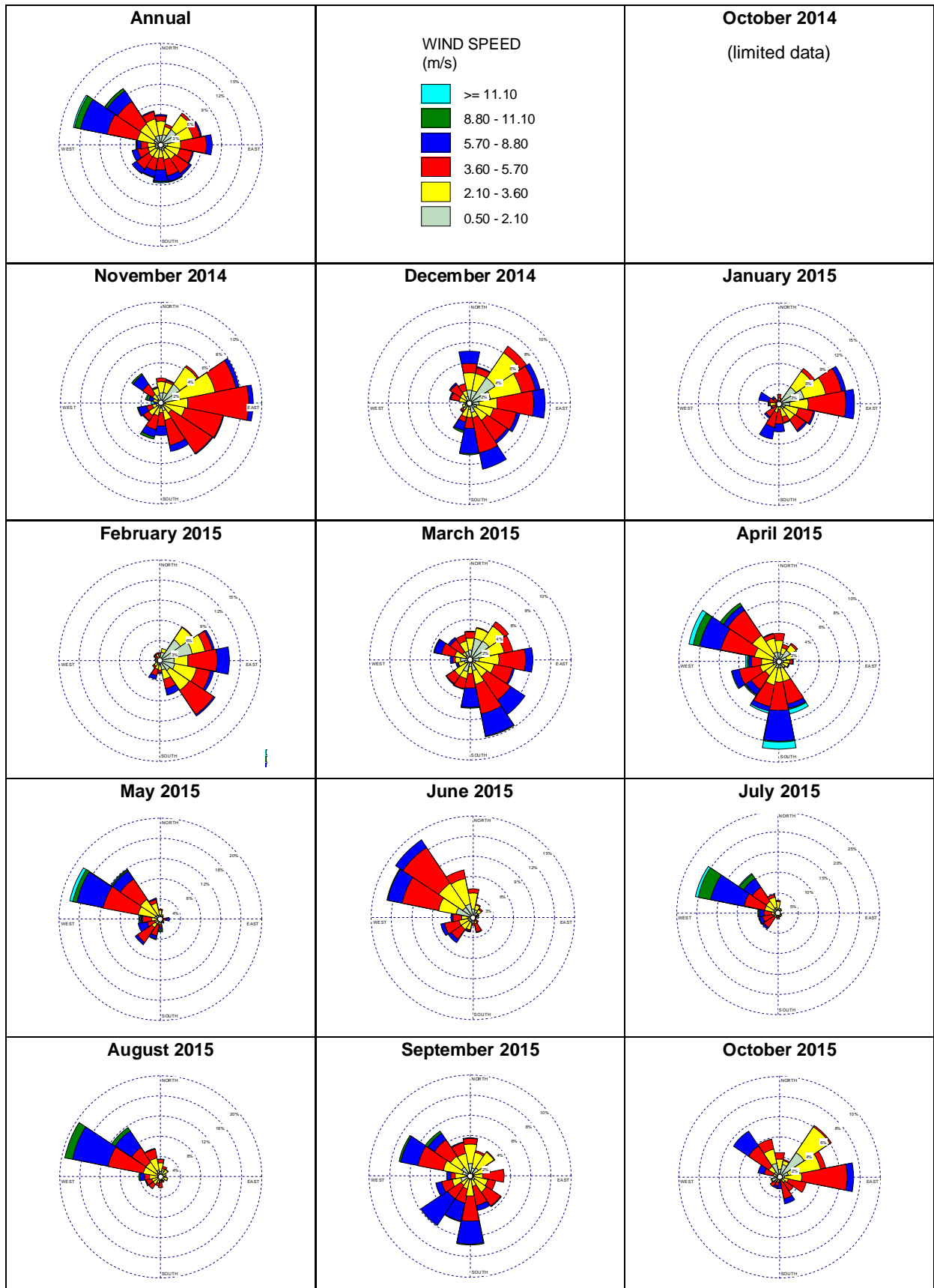


Figure 27 Monthly Wind Roses at OEH Monitoring Station at Stockton from October 2014 to October 2015

Newcastle

Table 19 Wind Speed Frequency Distribution of Newcastle OEH Station Oct 2014 to Oct 2015 data (%)

Wind Direction	Wind Speed Class (m/s)						Total
	0.5-2.1	2.1-3.6	3.6-5.7	5.7-8.8	8.8-11.1	≥11.1	
N	1.9	1.0	<0.1	<0.1	<0.1	<0.1	2.9
NNE	1.8	0.6	<0.1	<0.1	<0.1	<0.1	2.4
NE	2.3	3.1	0.4	<0.1	<0.1	<0.1	5.9
ENE	1.2	2.6	2.5	<0.1	<0.1	<0.1	6.2
E	0.9	1.6	1.3	0.1	<0.1	<0.1	3.9
ESE	1.1	2.0	1.9	<0.1	<0.1	<0.1	5.0
SE	1.0	2.1	2.0	0.2	<0.1	<0.1	5.3
SSE	1.4	2.9	2.9	0.4	<0.1	<0.1	7.5
S	1.6	2.9	2.6	0.5	0.1	<0.1	7.8
SSW	1.9	2.2	1.2	0.2	<0.1	<0.1	5.5
SW	2.8	2.4	0.2	<0.1	<0.1	<0.1	5.4
WSW	1.9	0.1	<0.1	<0.1	<0.1	<0.1	2.1
W	1.5	0.1	<0.1	<0.1	<0.1	<0.1	1.6
WNW	2.9	0.7	0.1	<0.1	<0.1	<0.1	3.7
NW	8.5	5.5	4.3	1.2	<0.1	<0.1	19.6
NNW	5.9	3.1	0.7	<0.1	<0.1	<0.1	9.7
Sub-Total	38.6	32.9	20.2	2.7	0.2	<0.1	94.5
Annual (15 Oct 2014 to 15 Oct, 2015). Total periods = 8,784; Valid periods = 8,743; Calm wind periods = 440; Calm winds: 5.0%							

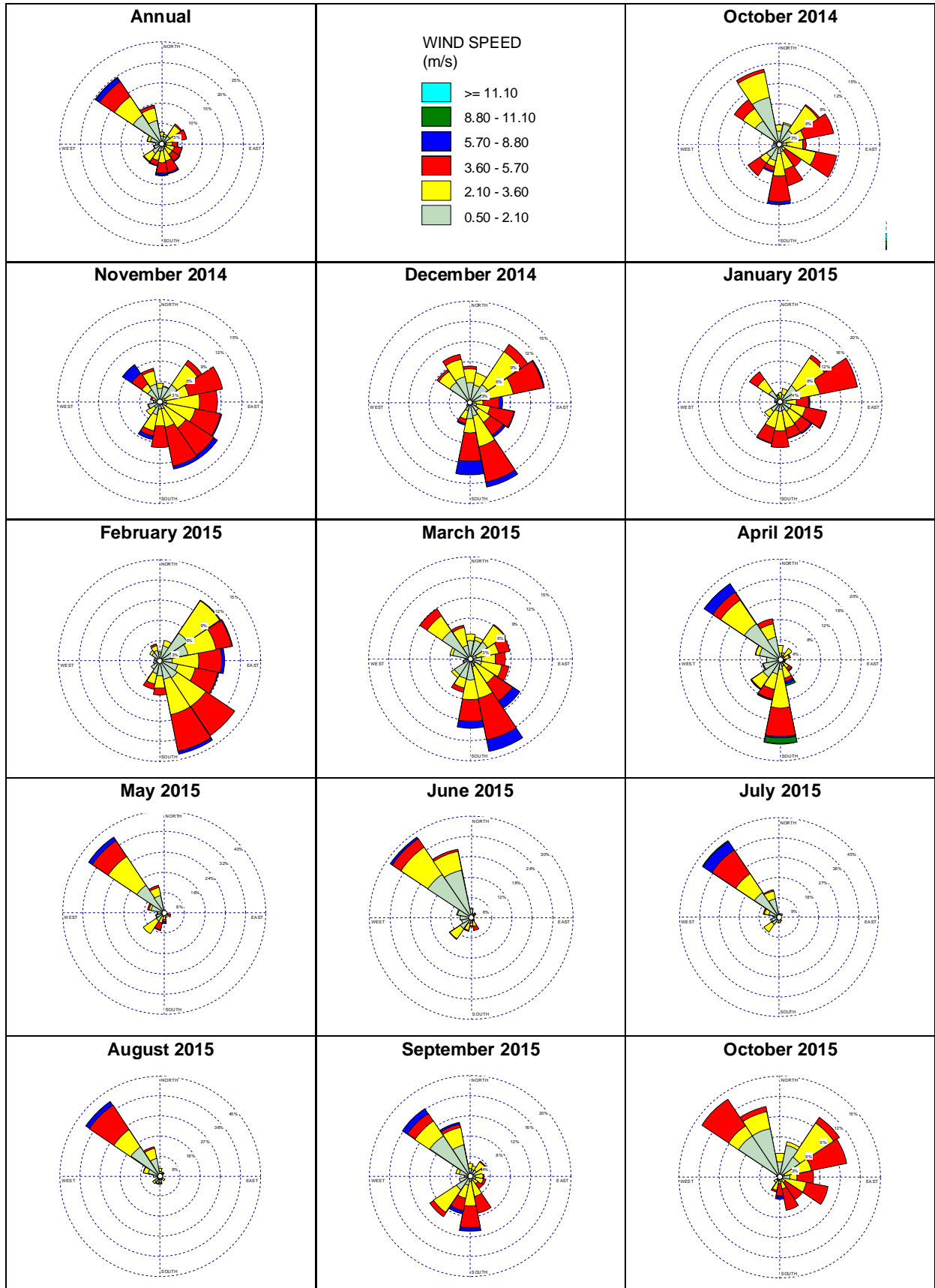


Figure 28 Monthly Wind Roses at OEH Monitoring Station at Newcastle from October 2014 to October 2015

Appendix C

Wind Conditions During Sampling Periods

Appendix C Wind Conditions During Sampling Periods



Figure 29: Wind Rose Overlay for Petri Dish Sample P1



Figure 30: Wind Rose Overlay for Petri Dish Samples P2 and P3

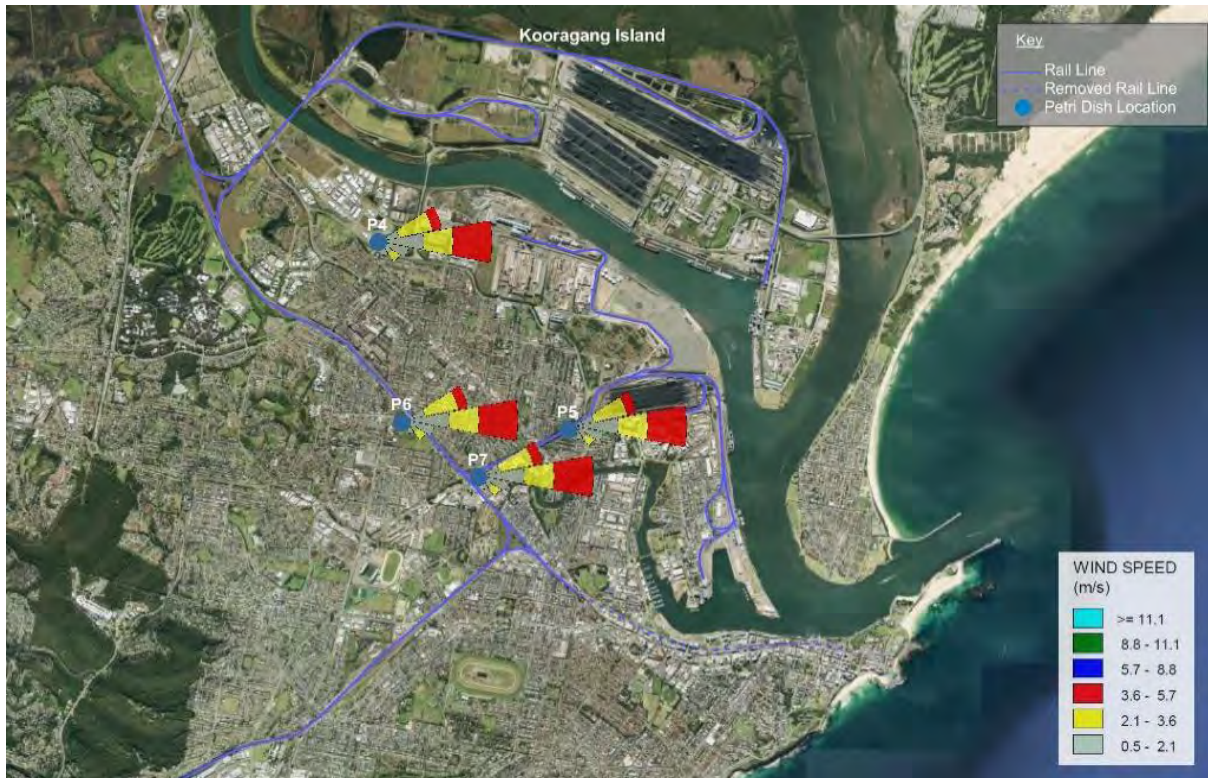


Figure 31: Wind Rose Overlay for Petri Dish Samples P4, P5, P6 and P7



Figure 32: Wind Rose Overlay for Petri Dish Samples P8 and P9



Figure 33: Wind Rose Overlay for Petri Dish Samples P10, P11 and P12

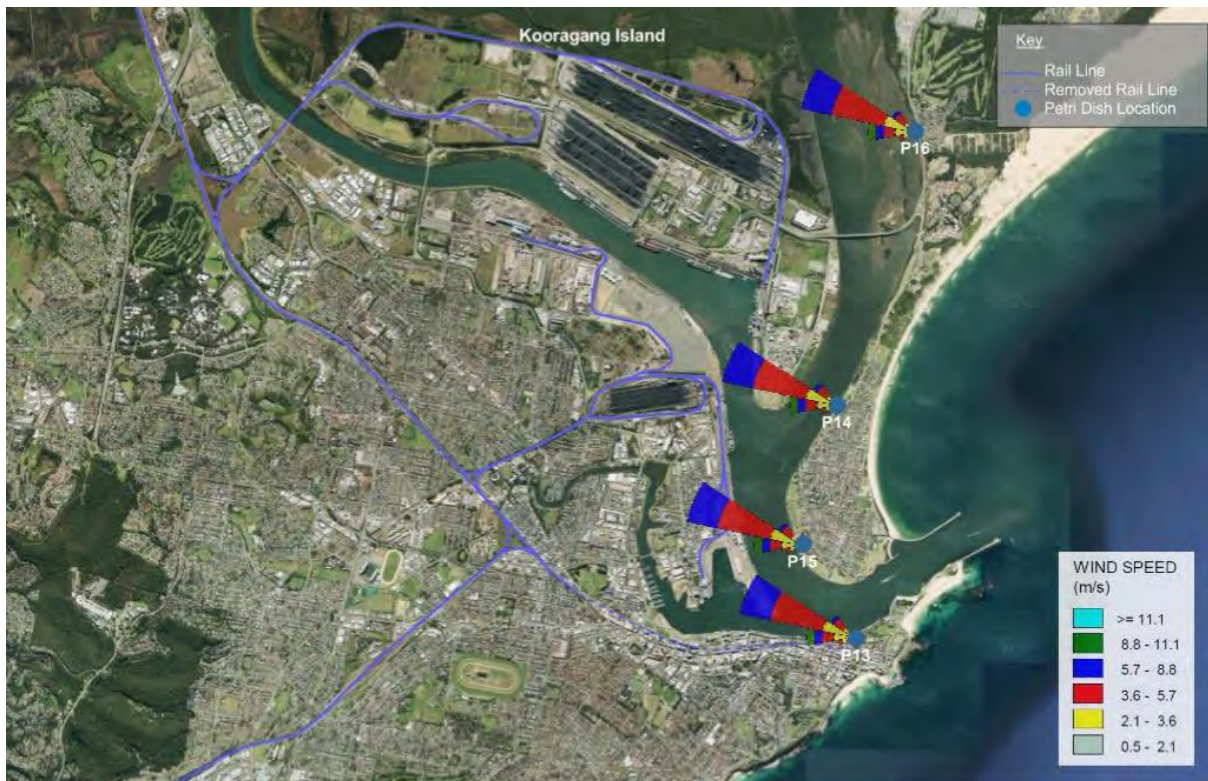


Figure 34: Wind Rose Overlay for Petri Dish Samples P13, P14, P15 and P16



Figure 35: Wind Rose Overlay for Petri Dish Samples P17, P18, P19, P20 and P21

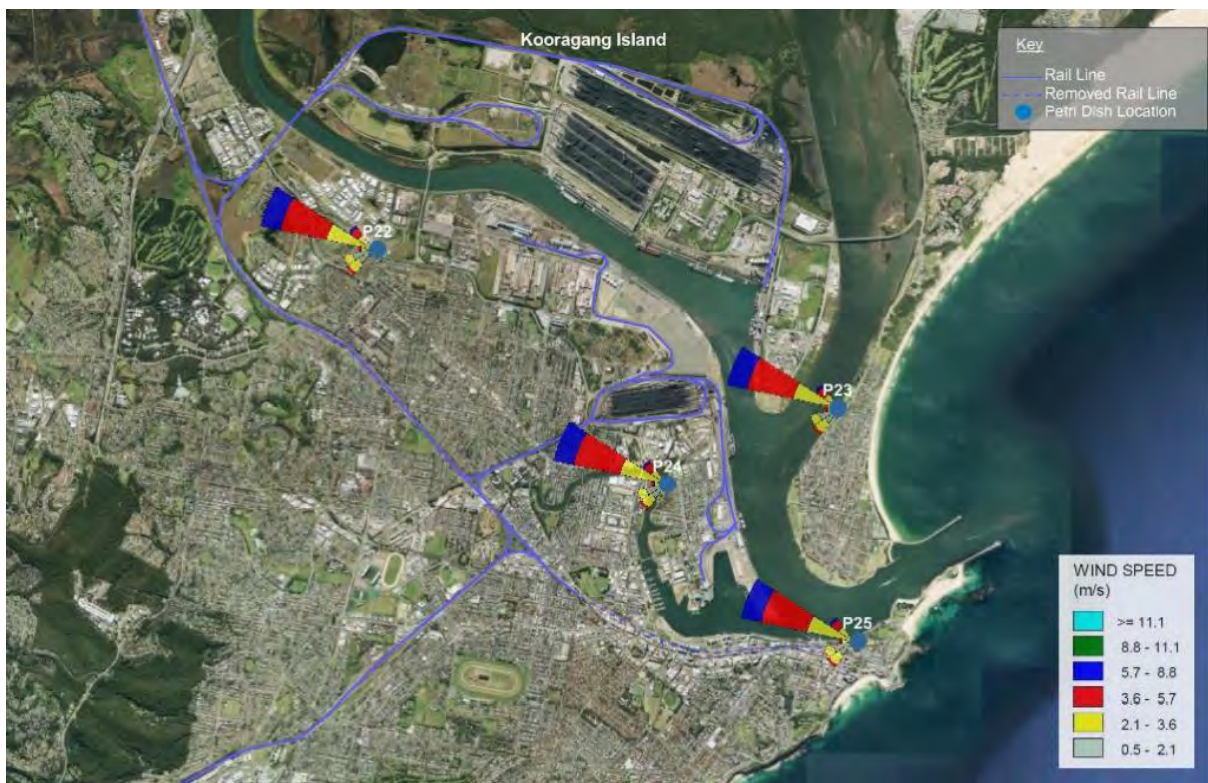


Figure 36: Wind Rose Overlay for Petri Dish Samples P22, P23, P24 and P25

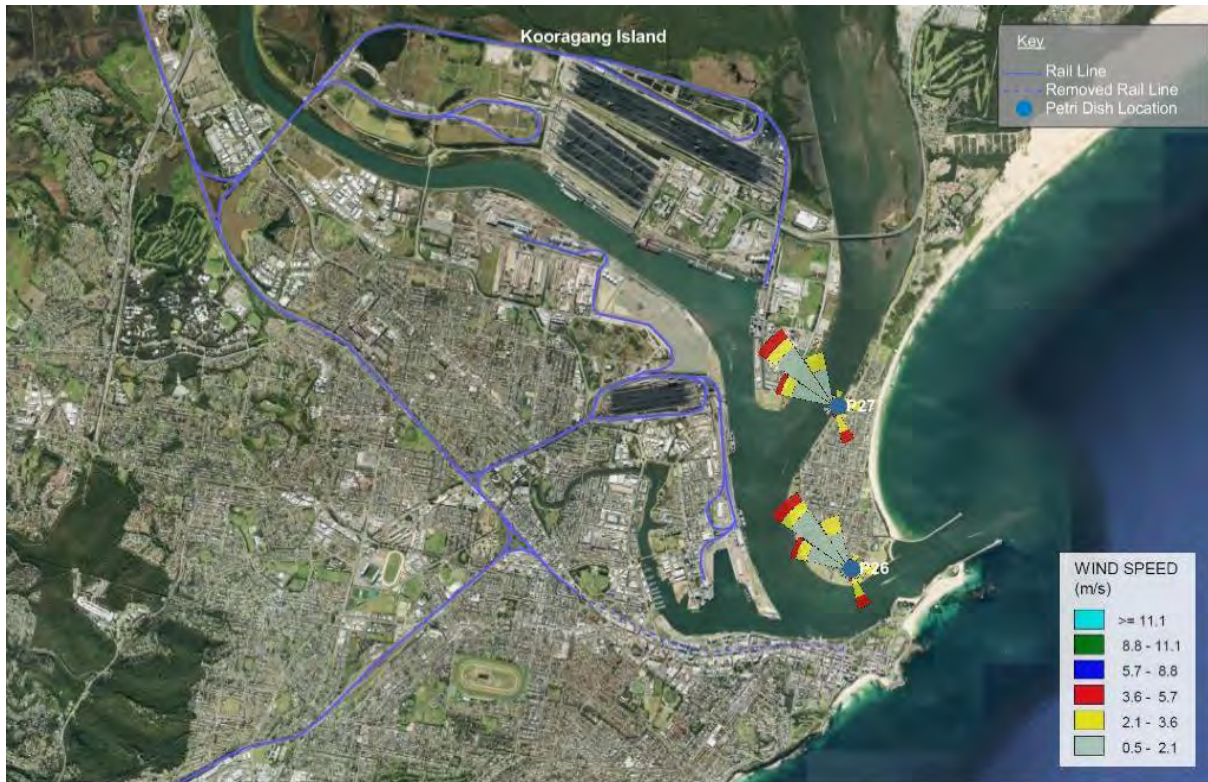


Figure 37: Wind Rose Overlay for Petri Dish Samples P26 and P27

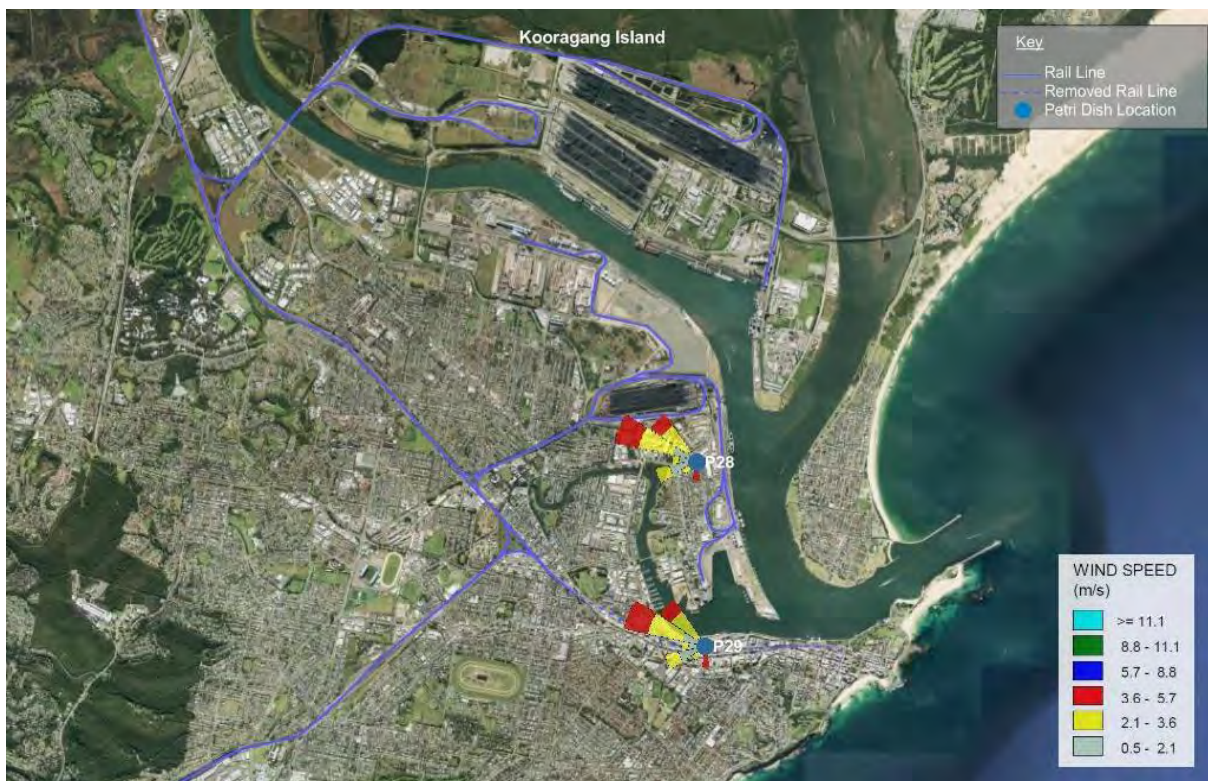


Figure 38: Wind Rose Overlay for Petri Dish Samples P28 and P29

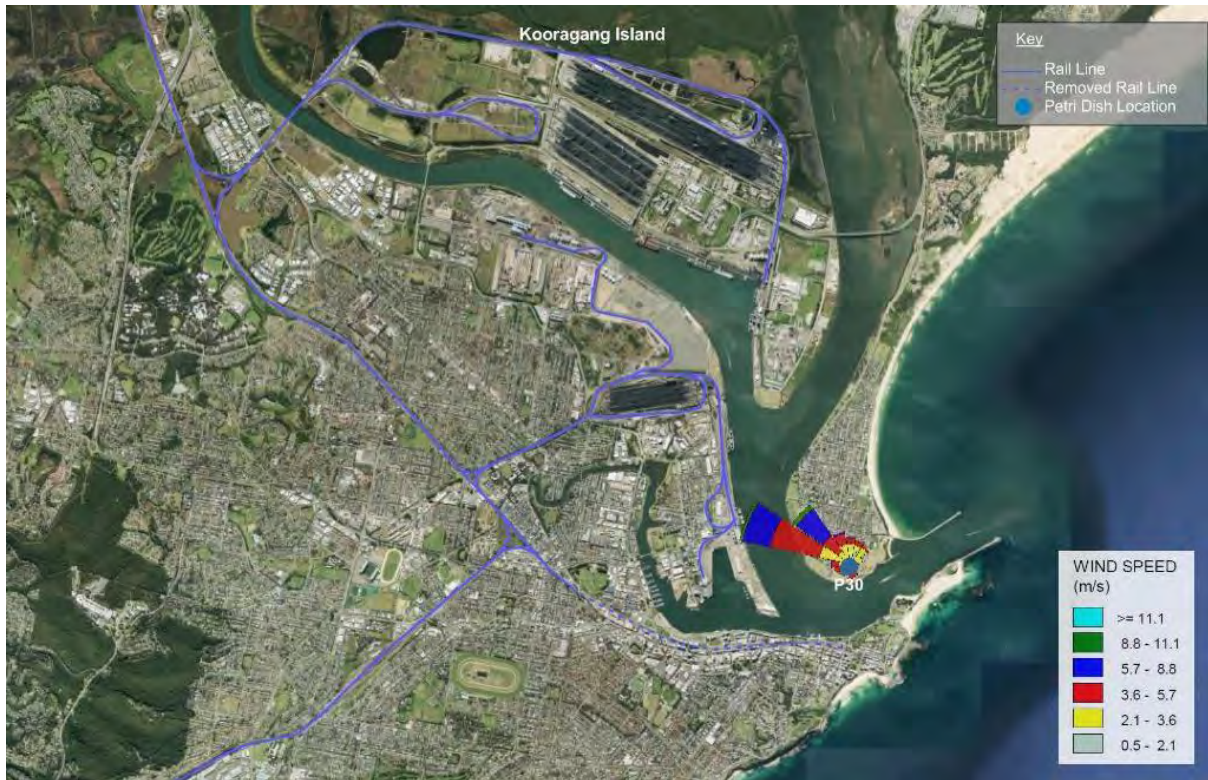


Figure 39: Wind Rose Overlay for Petri Dish Sample P30



Figure 40: Wind Rose Overlay for Petri Dish Samples P31 and P32



Figure 41: Wind Rose Overlay for Petri Dish Samples P33, P34, P35 and P36



Figure 42: Wind Rose Overlay for Dust Deposition Sample D1 (Carrington)



Figure 43: Wind Rose Overlay for Dust Deposition Sample D2 (Islington)



Figure 44: Wind Rose Overlay for Dust Deposition Sample D3 (Mayfield East)

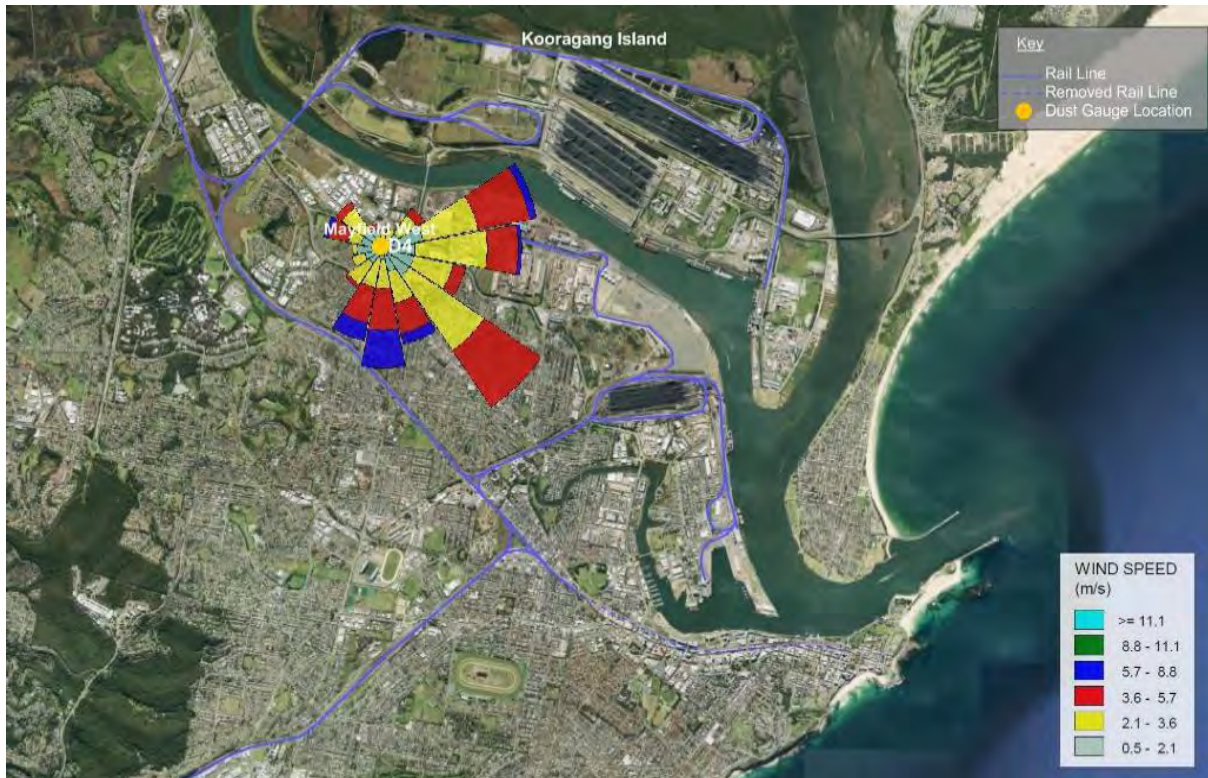


Figure 45: Wind Rose Overlay for Dust Deposition Sample D4 (Mayfield West)



Figure 46: Wind Rose Overlay for Dust Deposition Sample D5 (Tighes Hill)



Figure 47: Wind Rose Overlay for Dust Deposition Sample D6 (Waratah)

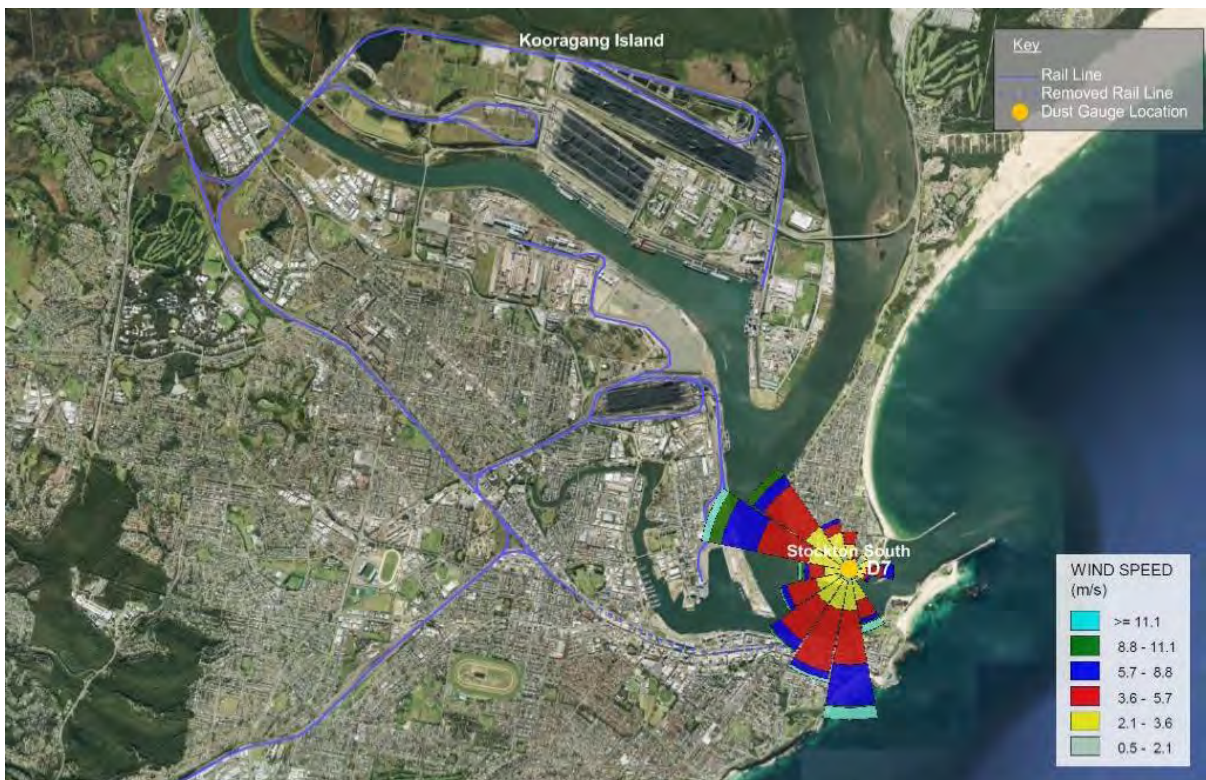


Figure 48: Wind Rose Overlay for Dust Deposition Sample D7 (Stockton)



Figure 49: Wind Rose Overlay for Dust Deposition Sample D8 (Stockton North)

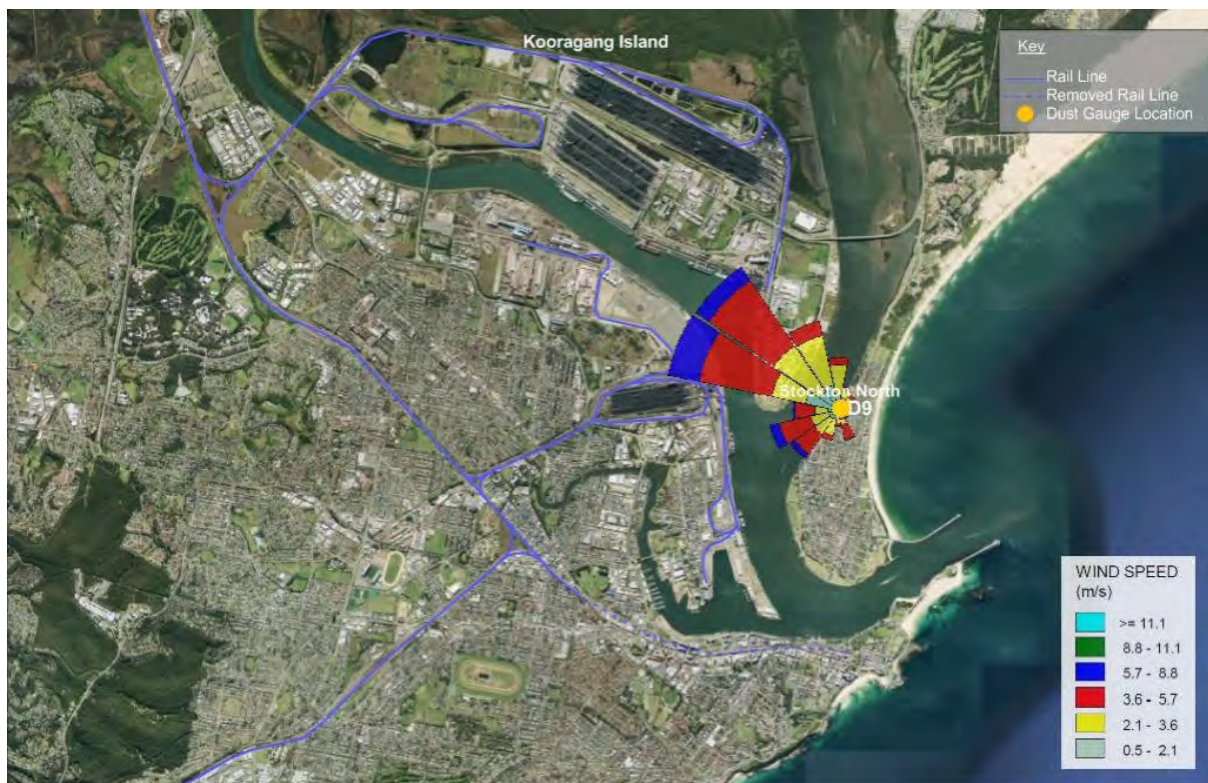


Figure 50: Wind Rose Overlay for Dust Deposition Sample D9 (Stockton North)

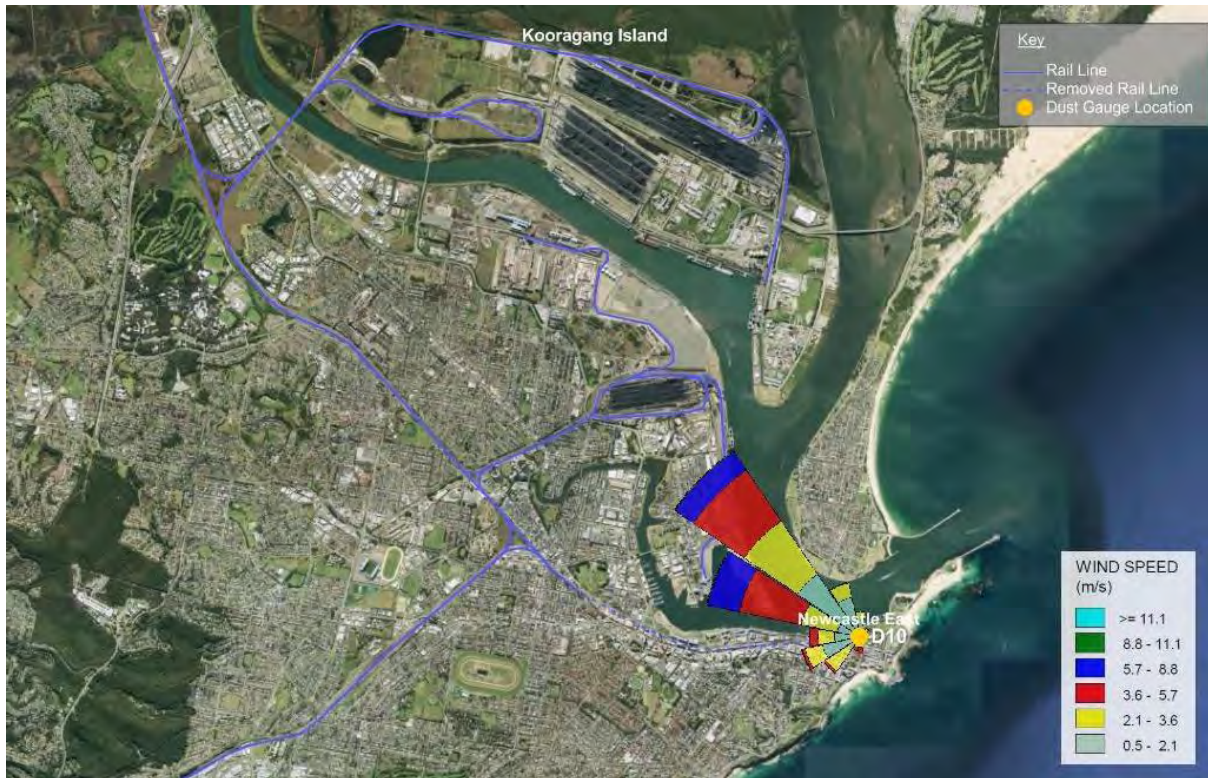


Figure 51: Wind Rose Overlay for Dust Deposition Sample D10 (Newcastle East)



Figure 52: Wind Rose Overlay for Dust Deposition Sample D11 (Wickham)



Figure 53: Wind Rose Overlay for Dust Deposition Sample D12 (Hamilton)

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Appendix D

DDG Field Sheets

Appendix D DDG Field Sheets

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Air Analysis - Dust Monitoring Field Sheet

Q4AN(EV)-332-FM45

Client: EPA Lower Hunter Dust Study Project No.: 60330323 Lab ID No.: EMH10640
 Date Collected: 14/11/14 Collection Start Time: 8:00 Collection Stop Time: 11:30

Site	Funnel Diameter	Installed Date	Collection Date	Water Level	Water Colour	Turbidity	Decomposing Matter	Comments
Mayfield West	150	16/10/14	14/11/14	500	C	C	vegetation	
Mayfield East	149	16/10/14	14/11/14	600	C	C	vegetation + beetles	small beetles
Waratah	148	16/10/14	14/11/14	500	C	C	insects + veg	
Islington	146	16/10/14	14/11/14	500	C	C	insects + veg	
Tighes Hill	144	16/10/14	14/11/14	500	C	C	minimal	
Carrington	148	17/10/14	14/11/14	500	C	C	vegetation	
Wickham	145	16/10/14	14/11/14	500	C	C	vegetation	
Hamilton	147	16/10/14	14/11/14	500	C	C	insects + veg	
Newcastle	147	17/10/14	14/11/14	500	C	C	vegetation	
Stockton North	149	16/10/14	14/11/14	500	C	C	minimal	
Stockton South	147	16/10/14	14/11/14	500	C	ST	insects + vegetation	bird droppings ^{on} funnel
Newcastle East	144	16/10/14	14/11/14	500	C	C	insects + vegetation	
Turbidity - Clear (C), Slightly Turbid (ST), Turbid (T), Very Turbid (VT).							Initials:	CB

NATA Signatory: CB

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Air Analysis - Dust Monitoring Field Sheet

Q4AN(EV)-332-FM45

Client: EPA Lower Hunter Dust Study Project No.: 60330323 Lab ID No.: EN1410999
 Date Collected: 12/12/14 Collection Start Time: 8:30 Collection Stop Time: 12:00

Site	Funnel Diameter	Installed Date	Collection Date	Water Level	Water Colour	Turbidity	Decomposing Matter	Comments
Mayfield West	150	14/11/14	12/12/14	1800	C	C	insects + veg	
Mayfield East	149	14/11/14	12/12/14	1800	cloudy	T	insects + veg	Many beetles #
Waratah	148	14/11/14	12/12/14	2100	C	ST	insects + veg	a few beetles
Islington	146	14/11/14	12/12/14	2000	C	C	insects + veg	
Tighes Hill	144	14/11/14	12/12/14	1900	C	C	insects + veg	
Carrington	148	14/11/14	12/12/14	1700	C	C	insects + veg	
Wickham	145	14/11/14	12/12/14	1700	C	C	minimal	
Hamilton	147	14/11/14	12/12/14	2000	C	C	minimal	
Newcastle	147	14/11/14	12/12/14	1700	C	C	insects + veg	
Stockton North	149	14/11/14	12/12/14	1800	C	C	minimal	
Stockton South	147	14/11/14	12/12/14	1800	C	C	insects + veg	
Newcastle East	144	14/11/14	12/12/14	1900	C	C	insects + veg	
Turbidity - Clear (C), Slightly Turbid (ST), Turbid (T), Very Turbid (VT).						Initials:	CB	

* likely contaminated.

NATA Signatory CB Swobland

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Air Analysis - Dust Monitoring Field Sheet

Q4AN(EV)-332-FM45

Client: EPA Lower Hunter Dust Study Project No.: 60330323 Lab ID No.: FM1510138
 Date Collected: 9/1/15 Collection Start Time: 11:39 Collection Stop Time: 15:00

Site	Funnel Diameter	Installed Date	Collection Date	Water Level	Water Colour	Turbidity	Decomposing Matter	Comments
Mayfield West	150	12/12/14	9/1/15	400	C	C	minimal	
Mayfield East	149	12/12/14	9/1/15	400	cloudy	T	insects + veg	couple of beetles
Waratah	148	12/12/14	9/1/15	400	C	C	minimal	
Islington	146	12/12/14	9/1/15	400	C	C	insects + veg	
Tighes Hill	144	12/12/14	9/1/15	400	C	C	insects + veg	
Carrington	148	12/12/14	9/1/15	400	C	C	insects + veg	
Wickham	145	12/12/14	9/1/15	400	C	C	insects + veg	
Hamilton	147	12/12/14	9/1/15	400	C	C	Minimal	
Newcastle	147	12/12/14	9/1/15	400	C	C	Minimal	
Stockton North	149	12/12/14	9/1/15	400	C	C	minimal	
Stockton South	147	12/12/14	9/1/15	400	C	C	minimal	
Newcastle East	144	12/12/14	9/1/15	400	C	C	insects + veg	
Turbidity - Clear (C), Slightly Turbid (ST), Turbid (T), Very Turbid (VT).						Initials:	CB	

NATA Signatory..... *CB*



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Air Analysis - Dust Monitoring Field Sheet

Q4AN(EV)-332-FM45

Client: EPA Lower Hunter Dust Study Project No.: 60330323 Lab ID No.: EN1510453
 Date Collected: 6/2/15 Collection Start Time: 13:00 Collection Stop Time: 16:30

Site	Funnel Diameter	Installed Date	Collection Date	Water Level	Water Colour	Turbidity	Decomposing Matter	Comments
Mayfield West	150	9/1/15	6/2/15	3300	C	C	insects + veg	high l. insects
Mayfield East	149	9/1/15	6/2/15	3000	C	C	insects + veg	
Waratah	148	9/1/15	6/2/15	2900	C	C	Minimal	
Islington	146	9/1/15	6/2/15	2800	C	C	insects + veg	
Tighes Hill	144	9/1/15	6/2/15	2800	C	C	Minimal	
Carrington	148	9/1/15	6/2/15	2800	C	C	Minimal	
Wickham	145	9/1/15	6/2/15	3000	C	C	insects + veg	
Hamilton	147	9/1/15	6/2/15	3000	C	C	insects + veg	
Newcastle	147	9/1/15	6/2/15	3200	C	C	insects + veg	
Stockton North	149	9/1/15	6/2/15	2700	C	C	Minimal	
Stockton South	147	9/1/15	6/2/15	3100	C	C	insects + veg	
Newcastle East	144	9/1/15	6/2/15	3000	C	C	insects + veg	
Turbidity - Clear (C), Slightly Turbid (ST), Turbid (T), Very Turbid (VT).							Initials:	CBuckland

NATA Signatory: *CBuckland*

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Air Analysis - Dust Monitoring Field Sheet

Q4AN(EV)-332-FM45

Client: EPA Lower Hunter Dust Study Project No.: 60330323 Lab ID No.: EN1510781
 Date Collected: 6/3/15 Collection Start Time: 9:05 Collection Stop Time: 14:25

Site	Funnel Diameter	Installed Date	Collection Date	Water Level	Water Colour	Turbidity	Decomposing Matter	Comments
Mayfield West	150	6/2/15	6/3/15	1300	C	C	insects + veg	algal growth?
Mayfield East	149	6/2/15	6/3/15	1100	C	C	Minimal	
Waratah	148	6/2/15	6/3/15	800	C	C	Minimal	
Islington	146	6/2/15	6/3/15	800	C	C	insects + veg	
Tighes Hill	144	6/2/15	6/3/15	700	C	C	insects + veg	some algal growth
Carrington	148	6/2/15	6/3/15	700	C	C	insects + veg	
Wickham	145	6/2/15	6/3/15	700	C	C	minimal	
Hamilton	147	6/2/15	6/3/15	800	C	C	insects + veg	flowers
Newcastle	147	6/2/15	6/3/15	800	C	C	vegetation	
Stockton North	149	6/2/15	6/3/15	700	C	C	Minimal	
Stockton South	147	6/2/15	6/3/15	700	C	C	insects + veg	litter + algae
Newcastle East	144	6/2/15	6/3/15	700	C	C	Minimal	
Turbidity - Clear (C), Slightly Turbid (ST), Turbid (T), Very Turbid (VT).						Initials: <u>CB</u>		

* ODE moved slightly due to trees growing up around original location
 NATA Signatory: [Signature]

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Air Analysis - Dust Monitoring Field Sheet

Q4AN(EV)-332-FM45

Client: EPA Lower Hunter Dust Study Project No.: 60330323 Lab ID No.: EN1511252
 Date Collected: 7/4/15 Collection Start Time: 8:45 Collection Stop Time: 12:00

Site	Funnel Diameter	Installed Date	Collection Date	Water Level	Water Colour	Turbidity	Decomposing Matter	Comments
Mayfield West	150	6/3/15	7/4/15	2700	C	C	insects + veg	
Mayfield East	149	6/3/15	7/4/15	2700	C	C	insects + veg	
Waratah	148	6/3/15	7/4/15	2600	C	C	minimal	
Islington	146	6/3/15	7/4/15	2700	C	C	insects + veg	
Tighes Hill	144	6/3/15	7/4/15	2700	C	C	vegetation	
Carrington	148	6/3/15	7/4/15	2800	C	C	insects + veg	
Wickham	145	6/3/15	7/4/15	2800	C	C	Minimal	
Hamilton	147	6/3/15	7/4/15	2700	C	C	insects + veg	
Newcastle	147	6/3/15	7/4/15	2800	C	C	insects + veg	
Stockton North	149	6/3/15	7/4/15	2800	C	C	Minimal	
Stockton South	147	6/3/15	7/4/15	2700	C	C	Insects + veg	
Newcastle East	144	6/3/15	7/4/15	2500	C	C	insects + veg	
Turbidity - Clear (C), Slightly Turbid (ST), Turbid (T), Very Turbid (VT).						Initials:	CB	

NATA Signatory: CB

16;#Australia New Zealand\ja541b326-6e42-45fc-a7d5-d797f3cb72ce

Air Analysis - Dust Monitoring Field Sheet

Q4AN(EV)-332-FM45

Client: EPA Lower Hunter Dust Study Project No.: 60330323 Lab ID No.: ENVIS11788
 Date Collected: 5/5/15 Collection Start Time: 9:00 Collection Stop Time: 12:30

Site	Funnel Diameter	Installed Date	Collection Date	Water Level	Water Colour	Turbidity	Decomposing Matter	Comments
Mayfield West	150	7/4/15	5/5/15	4000	C	C	Minimal	
Mayfield East	149	7/4/15	5/5/15	4000	C	C	insects + veg	
Waratah	148	7/4/15	5/5/15	4000	C	C	insects + veg	
Islington	146	7/4/15	5/5/15	4000	C	C	insects + veg	
Tighes Hill	144	7/4/15	5/5/15	4000	C	C	minimal	
Carrington	148	7/4/15	5/5/15	4000	C	C	Minimal	
Wickham	145	7/4/15	5/5/15	4000	C	C	insects + veg	
Hamilton	147	7/4/15	5/5/15	4000	C	C	insects + veg	above any organic
Newcastle	147	7/4/15	5/5/15	4000	C	C	insects + veg	
Stockton North	149	7/4/15	5/5/15	4000	C	C	Minimal	
Stockton South	147	7/4/15	5/5/15	4000	C	C	Minimal	
Newcastle East	144	7/4/15	5/5/15	4000	C	C	insects + veg	
Turbidity – Clear (C), Slightly Turbid (ST), Turbid (T), Very Turbid (VT).							Initials:	

CBuckland

NATA Signatory... *CBuckland*

16:#Australia New Zealandja541b326-6e42-45fc-a7d5-d797f3cb72ce

Q4AN(EV)-332-FM45

Air Analysis - Dust Monitoring Field Sheet

Client: EPA Lower Hunter Dust Study Project No.: 60330323 Lab ID No.: FN1512051
 Date Collected: 2/6/15 Collection Start Time: 9:30 Collection Stop Time: 13:00

Site	Funnel Diameter	Installed Date	Collection Date	Water Level	Water Colour	Turbidity	Decomposing Matter	Comments
Mayfield West	150	5/5/15	2/6/15	1200	C	C	Insects + veg	Earthworks/Construction*
Mayfield East	149	5/5/15	2/6/15	1100	C	C	Insects + veg	
Waratah	148	5/5/15	2/6/15	1200	C	C	minimal	
Islington	146	5/5/15	2/6/15	1309	C	C	Insects + veg	spiders + high T. veg
Tighes Hill	144	5/5/15	2/6/15	1200	C	C	Insects + veg	
Carrington	148	5/5/15	2/6/15	1100	C	C	minimal	
Wickham	145	5/5/15	2/6/15	1100	C	C	Insects + veg	
Hamilton	147	5/5/15	2/6/15	1300	C	C	minimal	
Newcastle	147	5/5/15	2/6/15	1200	C	C	minimal	
Stockton North	149	5/5/15	2/6/15	1200	C	C	minimal	
Stockton South	147	5/5/15	2/6/15	1300	C	C	Insects + veg	
Newcastle East	144	5/5/15	2/6/15	1200	C	C	Insects + veg	
Turbidity - Clear (C), Slightly Turbid (ST), Turbid (T), Very Turbid (VT).							Initials:	CB

* Surface stripping, wood cutting, stockpiles at sail.

NATA Signatory: C. B. Ruddland

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Air Analysis - Dust Monitoring Field Sheet

Q4AN(EV)-332-FM45

Client: EPA Lower Hunter Dust Study Project No.: 60330323 Lab ID No.: EV1512374
 Date Collected: 3/7/15 Collection Start Time: 9:30 Collection Stop Time: 13:00

Site	Funnel Diameter	Installed Date	Collection Date	Water Level	Water Colour	Turbidity	Decomposing Matter	Comments
Mayfield West	150	2/6/15	3/7/15	1400	C	C	Insects + vegetation	*
Mayfield East	149	2/6/15	3/7/15	1400	C	C	Minimal	
Waratah	148	2/6/15	3/7/15	1500	C	C	Insects + veg	
Islington	146	2/6/15	3/7/15	1400	C	C	Insects + veg	
Tighes Hill	144	2/6/15	3/7/15	1600	C	C	Insects + veg	
Carrington	148	2/6/15	3/7/15	1900	C	C	Insects + veg	
Wickham	145	2/6/15	3/7/15	1600	C	C	Insects + veg	
Hamilton	147	2/6/15	3/7/15	1500	C	C	Insects + veg	
Newcastle	147	2/6/15	3/7/15	2000	C	C	Minimal	
Stockton North	149	2/6/15	3/7/15	1900	C	C	Minimal	
Stockton South	147	2/6/15	3/7/15	1800	C	C	Minimal	
Newcastle East	144	2/6/15	3/7/15	1800	C	C	Insects + veg	
Turbidity - Clear (C), Slightly Turbid (ST), Turbid (T), Very Turbid (VT).						Initials: CB.		

* Funnel stem broken, same glass fragments in sample. Likely that workers knocked sample over and the NATA Signatory stood it back up. *CB*

16;#Australia New Zealand\16326-6e42-45fc-a7d5-d797f3cb72ce

Air Analysis - Dust Monitoring Field Sheet

Q4AN(EV)-332-FM45

Client: EPA Lower Hunter Dust Study Project No.: 60330323 Lab ID No.: EN1512637
 Date Collected: 3/8/15 Collection Start Time: 9:30 Collection Stop Time: 13:30

Site	Funnel Diameter	Installed Date	Collection Date	Water Level	Water Colour	Turbidity	Decomposing Matter	Comments
Mayfield West	150	3/7/15	3/8/15	300	C	C	minimal	
Mayfield East	149	3/7/15	3/8/15	300	C	C	minimal	
Waratah	148	3/7/15	3/8/15	300	C	C	insects + veg	
Islington	146	3/7/15	3/8/15	400	C	C	insects + veg	
Tighes Hill	144	3/7/15	3/8/15	300	C	C	insects + veg	
Carrington	148	3/7/15	3/8/15	300	C	C	insects + veg	
Wickham	145	3/7/15	3/8/15	400	C	C	insects + veg	
Hamilton	147	3/7/15	3/8/15	300	C	C	insects + veg	
Newcastle	147	3/7/15	3/8/15	400	C	C	insects + veg	
Stockton North	149	3/7/15	3/8/15	500	C	C	vegetation	
Stockton South	147	3/7/15	3/8/15	400	C	C	insects + veg	
Newcastle East	144	3/7/15	3/8/15	400	C	C	insects + veg	
Turbidity – Clear (C), Slightly Turbid (ST), Turbid (T), Very Turbid (VT).								Initials:
								CB

NATA Signatory: *CBuddland*



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Q4AN(EV)-332-FM45

Air Analysis - Dust Monitoring Field Sheet

Client: EPA Lower Hunter Dust Study Project No.: 60330323 Lab ID No.: EN1513044
 Date Collected: 3/9/15 Collection Start Time: 9:30 Collection Stop Time: 13:30

Site	Funnel Diameter	Installed Date	Collection Date	Water Level	Water Colour	Turbidity	Decomposing Matter	Comments
Mayfield West	150	3/8/15	3/9/15	500	C	C	insects + veg	
Mayfield East	149	3/8/15	3/9/15	500	C	C	insects + veg	
Waratah	148	3/8/15	3/9/15	500	C	C	insects + veg	
Islington	146	3/8/15	3/9/15	500	C	C	insects + veg	
Tighes Hill	144	3/8/15	3/9/15	500	C	C	minimal	
Carrington	148	3/8/15	3/9/15	500	C	C	insects + veg	
Wickham	145	3/8/15	3/9/15	500	C	C	insects + veg	
Hamilton	147	3/8/15	3/9/15	500	C	C	insects + veg	
Newcastle	147	3/8/15	3/9/15	600	C	C	insects + veg	
Stockton North	149	3/8/15	3/9/15	500	C	C	insects + veg	
Stockton South	147	3/8/15	3/9/15	500	C	C	insects + veg	
Newcastle East	144	3/8/15	3/9/15	500	C	C	insects + veg	
Turbidity – Clear (C), Slightly Turbid (ST), Turbid (T), Very Turbid (VT).							Initials:	C Brackland

NATA Signatory: *C Brackland*

16;#Australia New Zealand\ja541b326-6e42-45fc-a7d5-d797f3cb72ce

Air Analysis - Dust Monitoring Field Sheet

Q4AN(EV)-332-FM45

Client: EPA Lower Hunter Dust Study Project No.: 60330323 Lab ID No.: EN1513412
 Date Collected: 2/10/15 Collection Start Time: 12:00 Collection Stop Time: 16:00

Site	Funnel Diameter	Installed Date	Collection Date	Water Level	Water Colour	Turbidity	Decomposing Matter	Comments
Mayfield West	150	3/9/15	2/10/15	2500	C	C	insects + veg	
Mayfield East	149	3/9/15	2/10/15	2600	C	C	insects + veg	
Waratah	148	3/9/15	2/10/15	2500	C	C	insects + veg	
Islington	146	3/9/15	2/10/15	2400	C	C	insects + veg	
Tighes Hill	144	3/9/15	2/10/15	2700	C	C	insects + veg	
Carrington	148	3/9/15	2/10/15	2500	C	C	insects + veg	
Wickham	145	3/9/15	2/10/15	2600	C	C	insects + veg	
Hamilton	147	3/9/15	2/10/15	2200	C	C	insects + veg	
Newcastle	147	3/9/15	2/10/15	2300	C	C	insects + veg	
Stockton North	149	3/9/15	2/10/15	2600	C	C	insects + veg	
Stockton South	147	3/9/15	2/10/15	2400	C	C	insects + veg	
Newcastle East	144	3/9/15	2/10/15	2200	C	C	insects + veg	
Turbidity - Clear (C), Slightly Turbid (ST), Turbid (T), Very Turbid (VT).							Initials:	
							CB	

NATA Signatory: *CB*

Appendix E

ALS Environmental Laboratory Certificates of Analysis

Appendix E ALS Environmental Laboratory Certificates of Analysis



ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: EN1410640	Page	: 1 of 5
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Newcastle
Contact	: MR CYE BUCKLAND	Contact	: Peter Keyte
Address	: 17 WARABROOK BOULEVARDE WARABROOK NSW, AUSTRALIA 2304	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
E-mail	: cye.buckland@aecom.com	E-mail	: peter.keyte@alsglobal.com
Telephone	: +61 02 4911 4900	Telephone	: +61 2 4014 2500
Facsimile	: +61 02 4911 4999	Facsimile	: +61 2 4967 7382
Project	: 60330323 Task 1.1	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 60330323 Task 1.1	Date Samples Received	: 20-Nov-2014 16:00
C-O-C number	: ---	Date Analysis Commenced	: 27-Nov-2014
Sampler	: CYE BUCKLAND	Issue Date	: 04-Dec-2014 21:06
Site	: ---		
Quote number	: ---	No. of samples received	: 13
		No. of samples analysed	: 12

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



WORLD RECOGNISED
ACCREDITATION

NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics



Page : 2 of 5
Work Order : EN1410640
Client : AECOM Australia Pty Ltd
Project : 60330323 Task 1.1

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis.
- Sampling data was supplied by AECOM Newcastle. NATA Accreditation No. 2778. Corporate Site No. 14391.
- Subcontract results to follow when available.



Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST**
 (Matrix: **AIR**)

Compound	CAS Number	LOR	Unit	Client sample ID				
				Mayfield West 16/10/14 - 14/11/14 [14-Nov-2014]	Mayfield East 16/10/14 - 14/11/14 [14-Nov-2014]	Waratah 16/10/14 - 14/11/14 [14-Nov-2014]	Islington 16/10/14 - 14/11/14 [14-Nov-2014]	Tighes Hill 16/10/14 - 14/11/14 [14-Nov-2014]
				EN1410640-001	EN1410640-002	EN1410640-003	EN1410640-004	EN1410640-005
				Result	Result	Result	Result	Result
EA120: Ash Content								
Ash Content	---	0.1	g/m ² .month	0.4	1.3	0.7	1.2	0.9
Ash Content (mg)	---	1	mg	7	22	11	19	14
EA125: Combustible Matter								
Combustible Matter	---	0.1	g/m ² .month	0.2	1.3	0.4	0.7	0.7
Combustible Matter (mg)	---	1	mg	4	22	8	11	11
EA141: Total Insoluble Matter								
Total Insoluble Matter	---	0.1	g/m ² .month	0.6	2.6	1.1	1.9	1.6
Total Insoluble Matter (mg)	---	1	mg	11	44	19	30	25



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID				
				Carrington 17/10/14 - 14/11/14 [14-Nov-2014]	Wickham 16/10/14 - 14/11/14 [14-Nov-2014]	Hamilton 16/10/14 - 14/11/14 [14-Nov-2014]	Newcastle 17/10/14 - 14/11/14 [14-Nov-2014]	Stockton North 16/10/14 - 14/11/14 [14-Nov-2014]
EA120: Ash Content								
Ash Content	---	0.1	g/m ² .month	0.7	0.8	0.9	0.4	0.7
Ash Content (mg)	---	1	mg	12	13	15	7	11
EA125: Combustible Matter								
Combustible Matter	---	0.1	g/m ² .month	0.4	0.4	0.4	0.4	0.2
Combustible Matter (mg)	---	1	mg	6	6	6	5	5
EA141: Total Insoluble Matter								
Total Insoluble Matter	---	0.1	g/m ² .month	1.1	1.2	1.3	0.8	0.9
Total Insoluble Matter (mg)	---	1	mg	18	19	21	12	16



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID	
				Client sampling date / time	Result
EA120: Ash Content					
Ash Content	---	0.1	g/m ² .month	Stockton South 16/10/14 - 14/11/14 [14-Nov-2014]	Newcastle East 16/10/14 - 14/11/14 [14-Nov-2014]
Ash Content (mg)	---	1	mg	0.7	0.4
EA125: Combustible Matter					
Combustible Matter	---	0.1	g/m ² .month	12	7
Combustible Matter (mg)	---	1	mg	0.9	0.3
EA141: Total Insoluble Matter					
Total Insoluble Matter	---	0.1	g/m ² .month	14	4
Total Insoluble Matter (mg)	---	1	mg	1.6	0.7
				26	11

CERTIFICATE OF ANALYSIS

<p>Work Order : EN1410999</p> <p>Client : AECOM Australia Pty Ltd</p> <p>Contact : MR CYE BUCKLAND</p> <p>Address : 17 WARABROOK BOULEVARDE WARABROOK NSW, AUSTRALIA 2304</p> <p>E-mail : cye.buckland@aecom.com</p> <p>Telephone : ---</p> <p>Facsimile : ---</p> <p>Project : 60330323 Task 1.1</p> <p>Order number : 60330323 Task 1.1</p> <p>C-O-C number : ---</p> <p>Sampler : ---</p> <p>Site : ---</p> <p>Quote number : ---</p>	<p>Page : 1 of 5</p> <p>Laboratory : Environmental Division Newcastle</p> <p>Contact : Peter Keyte</p> <p>Address : 5/585 Maitland Road Mayfield West NSW Australia 2304</p> <p>E-mail : peter.keyte@alsglobal.com</p> <p>Telephone : +61 2 4014 2500</p> <p>Facsimile : +61 2 4967 7382</p> <p>QC Level : NEPM 2013 Schedule B(3) and ALS QCS3 requirement</p> <p>Date Samples Received : 18-Dec-2014 15:50</p> <p>Date Analysis Commenced : 23-Dec-2014</p> <p>Issue Date : 12-Jan-2015 20:26</p> <p>No. of samples received : 16</p> <p>No. of samples analysed : 12</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Accreditation Category</i>
Dianne Blane	Newcastle - Inorganics
Laboratory Coordinator (2IC)	





Page : 2 of 5
Work Order : EN1410999
Client : AECOM Australia Pty Ltd
Project : 60330323 Task 1.1

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis.
- Sampling data was supplied by AECOM Newcastle. NATA Accreditation No. 2778. Corporate Site No. 14391.
- Subcontract results to follow when available.



Analytical Results

Sub-Matrix: DUST (Matrix: AIR)	CAS Number	LOR	Client sampling date / time	Client sample ID				
				Mayfield West	Mayfield East	Waratah	Islington	Tighes Hill
Compound		Unit		EN1410999-001	EN1410999-002	EN1410999-003	EN1410999-004	EN1410999-005
EA120: Ash Content								
Ash Content	--	0.1	g/m ² .month	0.7	1.7	0.6	1.0	0.9
Ash Content (mg)	--	1	mg	11	28	9	15	14
EA125: Combustible Matter								
Combustible Matter	--	0.1	g/m ² .month	0.6	10.3	0.3	0.3	0.4
Combustible Matter (mg)	--	1	mg	10	167	6	6	6
EA141: Total Insoluble Matter								
Total Insoluble Matter	--	0.1	g/m ² .month	1.3	12.0	0.9	1.3	1.3
Total Insoluble Matter (mg)	--	1	mg	21	195	15	21	20



Analytical Results

Sub-Matrix: DUST (Matrix: AIR)	Client sample ID	Client sampling date / time		Carrington	Wickham	Hamilton	Newcastle	Stockton North
		CAS Number	LOR					
<i>Compound</i>				Result	Result	Result	Result	Result
EA120: Ash Content								
Ash Content	--	0.1	g/m ² .month	0.8	1.0	0.8	1.1	0.8
Ash Content (mg)	--	1	mg	13	16	12	17	13
EA125: Combustible Matter								
Combustible Matter	--	0.1	g/m ² .month	0.4	0.4	0.3	0.5	0.4
Combustible Matter (mg)	--	1	mg	6	6	5	9	6
EA141: Total Insoluble Matter								
Total Insoluble Matter	--	0.1	g/m ² .month	1.2	1.4	1.1	1.6	1.2
Total Insoluble Matter (mg)	--	1	mg	19	22	17	26	19



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID		Result
				Stockton South	Newcastle East	
				Client sampling date / time		
EA120: Ash Content						
Ash Content	--	0.1	g/m ² .month	0.8	0.6	
Ash Content (mg)	--	1	mg	12	9	
EA125: Combustible Matter						
Combustible Matter	--	0.1	g/m ² .month	0.6	0.5	
Combustible Matter (mg)	--	1	mg	10	7	
EA141: Total Insoluble Matter						
Total Insoluble Matter	--	0.1	g/m ² .month	1.4	1.1	
Total Insoluble Matter (mg)	--	1	mg	22	16	

AECOM Australia Pty Limited

Address: 17 Warabrook Blvd, Warabrook NSW 2304
 Phone Number : 4911 4900
 Email: eye.buckland@aecom.com; ntlair.labs@aecom.com

Laboratory Details

Lab. Name: ALS Newcastle
 Lab Address: 15/585 Maitland Rd, Mayfield West
 Contact Name: Hayley Worthington
 Lab. Ref: PC

ALS GROUP - Newcastle
EN1410999



Telephone : +61 2 4014 2500

AECOM Project No: 60330323 Task 1.1

Specifications:

1. Urgent TAT required? (please circle: 24hr 48hr _____ days)
2. Fast TAT Guarantee Required?
3. Is any sediment layer present in waters to be excluded from extractions?
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?
5. Special storage requirements? (details: _____)
6. Shell Quality Partnership:
7. Report Format: Fax Hardcopy Email : eye.buckland@aecom.com; ntlair.labs@aecom.com

Analysis Req

Sample ID	Sampling Period	Sampling Time	Matrix			Preservation			Container (No. & type)	Insoluble Solids	Ash Residue	Combustible Matter	SM, SEM/EDS	XRD	Image	Funnel Dia
			soil	water	other	filtered	acid	ice								
Mayfield West	14/11/14 to 12/12/14	28 Days		X					4L Jar CuSO4	X	X					150
Mayfield East	14/11/14 to 12/12/14	28 Days		X					4L Jar CuSO4	X	X					149
Waratah	14/11/14 to 12/12/14	28 Days		X					4L Jar CuSO4	X	X					148
Islington	14/11/14 to 12/12/14	28 Days		X					4L Jar CuSO4	X	X					146
Tighes Hill	14/11/14 to 12/12/14	28 Days		X					4L Jar CuSO4	X	X		X	X	CP	144
Carrington	14/11/14 to 12/12/14	28 Days		X					4L Jar CuSO4	X	X		X	X		148
Wickham	14/11/14 to 12/12/14	28 Days		X					4L Jar CuSO4	X	X					145
Hamilton	14/11/14 to 12/12/14	28 Days		X					4L Jar CuSO4	X	X					147
Newcastle	14/11/14 to 12/12/14	28 Days		X					4L Jar CuSO4	X	X					147
Stockton North	14/11/14 to 12/12/14	28 Days		X					4L Jar CuSO4	X	X					149
Stockton South	14/11/14 to 12/12/14	28 Days		X					4L Jar CuSO4	X	X					147
Newcastle East	14/11/14 to 12/12/14	28 Days		X					4L Jar CuSO4	X	X					144
Carrington Petri	17/12/14 8:40 to 18/12/14 8:30								150mm Petri			X				
Mayfield East Petri	17/12/14 8:30 to 18/12/14 8:15								150mm Petri			X				
Islington Brush	12/12/2014	NA							100mm Petri			X				
Stockton 5th Brush	12/12/2014	NA							100mm Petri			X				

Comments: SIM, SEM, EDS, XRD and Image to be undertaken by UQMP

Relinquished by: *C. Buckland* Signed: *[Signature]* Date: *18/12/14*
 Received by: *[Signature]* Signed: *[Signature]* Date: *18/12/14*
 Requested by: *[Signature]* Received by: *[Signature]* Date: *18/12/14*
 Client Drop off. '1550.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16



ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order : **EN1510138** Page : 1 of 5

Amendment : **1**

Client : **AECOM Australia Pty Ltd** Laboratory : **Environmental Division Newcastle**

Contact : **MR CYE BUCKLAND** Contact : **Peter Keyte**

Address : **17 WARABROOK BOULEVARDE** Address : **5/585 Maitland Road Mayfield West NSW Australia 2304**

E-mail : **cye.buckland@aecom.com** E-mail : **peter.keyte@alsglobal.com**

Telephone : **---** Telephone : **+61 2 4014 2500**

Facsimile : **---** Facsimile : **+61 2 4967 7382**

Project : **60330323 Task 1.1** QC Level : **NEPM 2013 Schedule B(3) and ALS QCS3 requirement**

Order number : **60330323 Task 1.1** Date Samples Received : **13-Jan-2015 15:30**

C-O-C number : **---** Date Analysis Commenced : **15-Jan-2015**

Sampler : **CYE BUCKLAND** Issue Date : **27-Jan-2015 19:27**

Site : **---**

Quote number : **---** No. of samples received : **12**

No. of samples analysed : **12**

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825
Accredited for compliance with
ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics





Page : 2 of 5
Work Order : EN1510138 Amendment 1
Client : AECOM Australia Pty Ltd
Project : 60330323 Task 1.1

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

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Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis.
- Sampling data was supplied by AECOM Newcastle. NATA Accreditation No. 2778. Corporate Site No. 14391.
- Subcontract results to follow when available.
- This report has been amended following changes to the analytical data reported. The quality system is being utilised to resolve this issue. The specific data affected includes the sample #010 insoluble results.



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID								
				Mayfield West 12/12/14 - 09/01/15 [09-Jan-2015]	Mayfield East 12/12/14 - 09/01/15 [09-Jan-2015]	Waratah 12/12/14 - 09/01/15 [09-Jan-2015]	Islington 12/12/14 - 09/01/15 [09-Jan-2015]	Tighes Hill 12/12/14 - 09/01/15 [09-Jan-2015]				
EA120: Ash Content							Result	Result	Result	Result	Result	Result
Ash Content	---	0.1	g/m ² .month	0.5	1.7	0.4	1.0	1.0				
Ash Content (mg)	---	1	mg	8	27	7	15	15				
EA125: Combustible Matter							Result	Result	Result	Result	Result	Result
Combustible Matter	---	0.1	g/m ² .month	0.2	1.6	0.1	0.4	0.4				
Combustible Matter (mg)	---	1	mg	3	26	1	7	6				
EA141: Total Insoluble Matter							Result	Result	Result	Result	Result	Result
Total Insoluble Matter	---	0.1	g/m ² .month	0.7	3.3	0.5	1.4	1.4				
Total Insoluble Matter (mg)	---	1	mg	11	53	8	22	21				



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID				
				Carrington 12/12/14 - 09/01/15 [09-Jan-2015] EN1510138-006	Wickham 12/12/14 - 09/01/15 [09-Jan-2015] EN1510138-007	Hamilton 12/12/14 - 09/01/15 [09-Jan-2015] EN1510138-008	Newcastle 12/12/14 - 09/01/15 [09-Jan-2015] EN1510138-009	Stockton North 12/12/14 - 09/01/15 [09-Jan-2015] EN1510138-010
EA120: Ash Content								
Ash Content	---	0.1	g/m ² .month	0.6	0.8	0.6	0.4	0.4
Ash Content (mg)	---	1	mg	9	13	9	6	6
EA125: Combustible Matter								
Combustible Matter	---	0.1	g/m ² .month	0.2	0.4	0.2	0.1	<0.1
Combustible Matter (mg)	---	1	mg	4	5	3	2	<1
EA141: Total Insoluble Matter								
Total Insoluble Matter	---	0.1	g/m ² .month	0.8	1.2	0.8	0.5	0.4
Total Insoluble Matter (mg)	---	1	mg	13	18	12	8	6



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID		
				Client sampling date / time	Stockton South 12/12/14 - 09/01/15 [09-Jan-2015]	Newcastle East 12/12/14 - 09/01/15 [09-Jan-2015]
EA120: Ash Content				Result	Result	Result
Ash Content	---	0.1	g/m ² .month	0.4	0.5	----
Ash Content (mg)	---	1	mg	6	8	----
EA125: Combustible Matter				Result	Result	Result
Combustible Matter	---	0.1	g/m ² .month	0.2	0.4	----
Combustible Matter (mg)	---	1	mg	4	5	----
EA141: Total Insoluble Matter				Result	Result	Result
Total Insoluble Matter	---	0.1	g/m ² .month	0.6	0.9	----
Total Insoluble Matter (mg)	---	1	mg	10	13	----

ALS Chain of Custody

AECOM Australia Pty Limited

Address: 17 Warabrook Blvd, Warabrook NSW 2304
 Phone Number : 4911 4900
 Email: cye.buckland@aecom.com; ntlair.labs@aecom.com

Laboratory Details

Lab. Name: ALS Newcastle
 Lab Address: 5/585 Maitland Rd, Mayfield West
 Contact Name: Hayley Worthington
 Lab. Ref:

Tel: 02 40142500
 Fax:
 Preliminary Report by:
 Final Report by:
 Lab Quote No:

AECOM Project No: 60330323 Task 1.1

PO No. NA

Specifications:

1. Urgent TAT required? (please circle: 24hr 48hr days)
2. Fast TAT Guarantee Required?
3. Is any sediment layer present in waters to be excluded from extractions?
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?
5. Special storage requirements? (details:)
6. Shell Quality Partnership:
7. Report Format: Fax Hardcopy Email : cye.buckland@aecom.com; ntlair.labs@aecom.com

Sample ID	Sampling Period	Sampling Time	Matrix			Preservation			Container (No. & type)	Yes (tick)	Insoluble Solids	Ash Residue	Combustible Matter	SIM, SEM/EDS	XRD	Image	Analysis Request		
			soil	water	other	filled	acid	ice									other	Funnel Diameter (mm)	
1	12/12/14 to 9/1/15	28 Days		x							x	x							150
2	12/12/14 to 9/1/15	28 Days		x							x	x							149
3	12/12/14 to 9/1/15	28 Days		x							x	x							148
4	12/12/14 to 9/1/15	28 Days		x							x	x							146
5	12/12/14 to 9/1/15	28 Days		x							x	x							144
6	12/12/14 to 9/1/15	28 Days		x							x	x							148
7	12/12/14 to 9/1/15	28 Days		x							x	x							145
8	12/12/14 to 9/1/15	28 Days		x							x	x							147
9	12/12/14 to 9/1/15	28 Days		x							x	x							147
10	12/12/14 to 9/1/15	28 Days		x							x	x							149
11	12/12/14 to 9/1/15	28 Days		x							x	x							147
12	12/12/14 to 9/1/15	28 Days		x							x	x							144

ALS GROUP - Newcastle
EN1510138



Telephone : +61 2 4014 2500

Comments: SIM, SEM, EDS, XRD and Image to be undertaken by UQMP

Relinquished by: *C. Buckland* Signed: *13/1/15*
 Received by: *K. C. Coleman* Signed: *15-30* Date: *13/1/15*
 Printed copies of this document are uncontrolled by: *13/1/15*
 Date: *13/1/15* Date: *13/1/15*
 Date: *13/1/15* Date: *13/1/15*

CERTIFICATE OF ANALYSIS

<p>Work Order : EN1510453</p> <p>Client : AECOM Australia Pty Ltd</p> <p>Contact : MR CYE BUCKLAND</p> <p>Address : 17 WARABROOK BOULEVARDE WARABROOK NSW, AUSTRALIA 2304</p> <p>E-mail : cye.buckland@aecom.com</p> <p>Telephone : ---</p> <p>Facsimile : ---</p> <p>Project : 60330323 Task 1.1</p> <p>Order number : 60330323 Task 1.1</p> <p>C-O-C number : ---</p> <p>Sampler : CYE BUCKLAND</p> <p>Site : ---</p> <p>Quote number : ---</p>	<p>Page : 1 of 5</p> <p>Laboratory : Environmental Division Newcastle</p> <p>Contact : Peter Keyte</p> <p>Address : 5/585 Maitland Road Mayfield West NSW Australia 2304</p> <p>E-mail : peter.keyte@alsglobal.com</p> <p>Telephone : +61 2 4014 2500</p> <p>Facsimile : +61 2 4967 7382</p> <p>QC Level : NEPM 2013 Schedule B(3) and ALS QCS3 requirement</p> <p>Date Samples Received : 11-Feb-2015 14:30</p> <p>Date Analysis Commenced : 16-Feb-2015</p> <p>Issue Date : 20-Feb-2015 19:13</p> <p>No. of samples received : 12</p> <p>No. of samples analysed : 12</p>
--	--

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Accreditation Category</i>
Dianne Blane	Newcastle - Inorganics
Laboratory Coordinator (2IC)	





Page : 2 of 5
Work Order : EN1510453
Client : AECOM Australia Pty Ltd
Project : 60330323 Task 1.1

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

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Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

- Subcontract results to follow when available.
- Subcontracted results to follow when available.
- Sampling data was supplied by AECOM Newcastle. NATA Accreditation No. 2778. Corporate Site No. 14391.
- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis.



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID				
				Mayfield West 09/01/15 - 06/02/15 [06-Feb-2015]	Mayfield East 09/01/15 - 06/02/15 [06-Feb-2015]	Waratah 09/01/15 - 06/02/15 [06-Feb-2015]	Islington 09/01/15 - 06/02/15 [06-Feb-2015]	Tighes Hill 09/01/15 - 06/02/15 [06-Feb-2015]
				EN1510453-001	EN1510453-002	EN1510453-003	EN1510453-004	EN1510453-005
				Result	Result	Result	Result	Result
EA120: Ash Content								
Ash Content	---	0.1	g/m ² .month	0.4	0.4	0.3	0.4	0.2
Ash Content (mg)	---	1	mg	7	6	5	7	3
EA125: Combustible Matter								
Combustible Matter	---	0.1	g/m ² .month	0.4	0.5	0.3	0.4	0.3
Combustible Matter (mg)	---	1	mg	6	8	4	5	4
EA141: Total Insoluble Matter								
Total Insoluble Matter	---	0.1	g/m ² .month	0.8	0.9	0.6	0.8	0.5
Total Insoluble Matter (mg)	---	1	mg	13	14	9	12	7



Analytical Results

Compound	CAS Number	LOR	Client sample ID		Carrington 09/01/15 - 06/02/15 [06-Feb-2015]	Wickham 09/01/15 - 06/02/15 [06-Feb-2015]	Hamilton 09/01/15 - 06/02/15 [06-Feb-2015]	Newcastle 09/01/15 - 06/02/15 [06-Feb-2015]	Stockton North 09/01/15 - 06/02/15 [06-Feb-2015]
			Client sampling date / time	Unit					
EA120: Ash Content									
Ash Content	---	0.1	g/m ² .month		0.3	0.4	0.3	0.2	0.3
Ash Content (mg)	---	1	mg		5	6	5	3	5
EA125: Combustible Matter									
Combustible Matter	---	0.1	g/m ² .month		0.3	0.1	<0.1	0.2	0.2
Combustible Matter (mg)	---	1	mg		4	2	<1	4	3
EA141: Total Insoluble Matter									
Total Insoluble Matter	---	0.1	g/m ² .month		0.6	0.5	0.3	0.4	0.5
Total Insoluble Matter (mg)	---	1	mg		9	8	5	7	8



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID	
				Client sampling date / time	Result
EA120: Ash Content					
Ash Content	---	0.1	g/m ² .month	Stockton South 09/01/15 - 06/02/15 [06-Feb-2015]	Newcastle East 09/01/15 - 06/02/15 [06-Feb-2015]
Ash Content (mg)	---	1	mg	EN1510453-011 Result	EN1510453-012 Result
EA125: Combustible Matter					
Combustible Matter	---	0.1	g/m ² .month	0.3	0.7
Combustible Matter (mg)	---	1	mg	4	10
EA141: Total Insoluble Matter					
Total Insoluble Matter	---	0.1	g/m ² .month	0.1	0.7
Total Insoluble Matter (mg)	---	1	mg	3	11
EA141: Total Insoluble Matter					
Total Insoluble Matter	---	0.1	g/m ² .month	0.4	1.4
Total Insoluble Matter (mg)	---	1	mg	7	21

ALS Chain of Custody

AECOM Australia Pty Limited

Address: 17 Warabrook Blvd, Warabrook NSW 2304
 Phone Number : 4911 4900
 Email: cye.buckland@aecom.com; ntlair.labs@aecom.com

Laboratory Details

Lab. Name: ALS Newcastle
 Lab Address: 5/585 Maitland Rd, Mayfield West
 Contact Name: Hayley Worthington
 Lab. Ref:

Tel: 02 40142500

Fax:
 Preliminary Report by:
 Final Report by:
 Lab Quote No:

AECOM Project No: 60330323 Task 1.1

PO No. NA

Specifications:

1. Urgent TAT required? (please circle: 24hr 48hr _____ days)
2. Fast TAT Guarantee Required?
3. Is any sediment layer present in waters to be excluded from extractions?
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?
5. Special storage requirements? (details: _____)
6. Shell Quality Partnership:
7. Report Format: Fax Hardcopy Email: cye.buckland@aecom.com; ntlair.labs@aecom.com

Analysis Request

Sample ID	Sampling Period	Sampling Time	Matrix			Preservation			Container (No. & type)	Insoluble Solids	Ash Residue	Combustible Matter	SM, SEM/EDS	XRD	Image	Other	Funnel Diameter (mm)
			soil	water	other	filled	acid	ice									
Mayfield West 1	9/1/15 to 6/2/15	28 Days		x					4L Jar CuSO4	X	X	X	X			150	
Mayfield East 2	9/1/15 to 6/2/15	28 Days		x					4L Jar CuSO4	X	X					149	
Waratah 3	9/1/15 to 6/2/15	28 Days		x					4L Jar CuSO4	X	X					148	
Islington 4	9/1/15 to 6/2/15	28 Days		x					4L Jar CuSO4	X	X					146	
Tighes Hill 5	9/1/15 to 6/2/15	28 Days		x					4L Jar CuSO4	X	X					144	
Carrington 6	9/1/15 to 6/2/15	28 Days		x					4L Jar CuSO4	X	X					148	
Wickham 7	9/1/15 to 6/2/15	28 Days		x					4L Jar CuSO4	X	X					145	
Hamilton 8	9/1/15 to 6/2/15	28 Days		x					4L Jar CuSO4	X	X					147	
Newcastle 9	9/1/15 to 6/2/15	28 Days		x					4L Jar CuSO4	X	X					147	
Stockton North 10	9/1/15 to 6/2/15	28 Days		x					4L Jar CuSO4	X	X					149	
Stockton South 11	9/1/15 to 6/2/15	28 Days		x					4L Jar CuSO4	X	X					147	
Newcastle East 12	9/1/15 to 6/2/15	28 Days		x					4L Jar CuSO4	X	X					144	

**Environmental Division
 Newcastle**
 Work Order Reference
EN1510453



Telephone : +61 2 4014 2500

Comments: SIM, SEM, EDS, XRD and Image to be undertaken by UQMP

Relinquished by: *C. Buckland* Signed: *C. Buckland* Date: *11/11/15*
 Reviewed by: *K. Gelder* Signed: *K. Gelder* Date: *11/11/15*
 Received by: *W. S. P. M. Pty Ltd* Date: *14/30*



ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: EN1510781	Page	: 1 of 5
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Newcastle
Contact	: MR CYE BUCKLAND	Contact	: Peter Keyte
Address	: 17 WARABROOK BOULEVARDE WARABROOK NSW, AUSTRALIA 2304	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
E-mail	: cye.buckland@aecom.com	E-mail	: peter.keyte@alsglobal.com
Telephone	: ---	Telephone	: +61 2 4014 2500
Facsimile	: ---	Facsimile	: +61 2 4967 7382
Project	: 60330323 Task 1.1	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 60330323 Task 1.1	Date Samples Received	: 10-Mar-2015 08:35
C-O-C number	: ---	Date Analysis Commenced	: 11-Mar-2015
Sampler	: CYE BUCKLAND	Issue Date	: 31-Mar-2015 20:57
Site	: ---	No. of samples received	: 27
Quote number	: ---	No. of samples analysed	: 12

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



WORLD RECOGNISED
ACCREDITATION

NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Barbara Coupland	Quality Officer	Newcastle - Inorganics



Page : 2 of 5
Work Order : EN1510781
Client : AECOM Australia Pty Ltd
Project : 60330323 Task 1.1

General Comments

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LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

- Subcontract results to follow when available.
- Sampling data was supplied by AECOM Newcastle. NATA Accreditation No. 2778. Corporate Site No. 14391.
- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis.



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID				
				Mayfield West 06/02/15 - 06/03/15 [06-Mar-2015]	Mayfield East 06/02/15 - 06/03/15 [06-Mar-2015]	Waratah 06/02/15 - 06/03/15 [06-Mar-2015]	Islington 06/02/15 - 06/03/15 [06-Mar-2015]	Tighes Hill 06/02/15 - 06/03/15 [06-Mar-2015]
EA120: Ash Content								
Ash Content	---	0.1	g/m ² .month	0.9	0.5	0.4	1.0	1.1
Ash Content (mg)	---	1	mg	15	8	6	15	17
EA125: Combustible Matter								
Combustible Matter	---	0.1	g/m ² .month	1.3	1.0	1.0	1.0	1.1
Combustible Matter (mg)	---	1	mg	22	17	17	16	17
EA141: Total Insoluble Matter								
Total Insoluble Matter	---	0.1	g/m ² .month	2.2	1.5	1.4	2.0	2.2
Total Insoluble Matter (mg)	---	1	mg	37	25	23	31	34



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID				
				Carrington 06/02/15 - 06/03/15 [06-Mar-2015]	Wickham 06/02/15 - 06/03/15 [06-Mar-2015]	Hamilton 06/02/15 - 06/03/15 [06-Mar-2015]	Newcastle 06/02/15 - 06/03/15 [06-Mar-2015]	Stockton North 06/02/15 - 06/03/15 [06-Mar-2015]
EA120: Ash Content								
Ash Content	---	0.1	g/m ² .month	0.4	0.5	0.3	0.4	0.2
Ash Content (mg)	---	1	mg	6	7	5	7	3
EA125: Combustible Matter								
Combustible Matter	---	0.1	g/m ² .month	0.7	0.8	0.8	0.6	0.3
Combustible Matter (mg)	---	1	mg	11	13	13	9	5
EA141: Total Insoluble Matter								
Total Insoluble Matter	---	0.1	g/m ² .month	1.1	1.3	1.1	1.0	0.5
Total Insoluble Matter (mg)	---	1	mg	17	20	18	16	8



Page : 5 of 5
 Work Order : EN1510781
 Client : AECOM Australia Pty Ltd
 Project : 60330323 Task 1.1

Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID	
				Client sampling date / time	Result
EA120: Ash Content					
Ash Content	---	0.1	g/m ² .month	Stockton South 06/02/15 - 06/03/15 [06-Mar-2015]	Newcastle East 06/02/15 - 06/03/15 [06-Mar-2015]
Ash Content (mg)	---	1	mg	EN1510781-011	EN1510781-012
EA125: Combustible Matter					
Combustible Matter	---	0.1	g/m ² .month	0.9	0.3
Combustible Matter (mg)	---	1	mg	15	5
EA141: Total Insoluble Matter					
Total Insoluble Matter	---	0.1	g/m ² .month	1.8	0.4
Total Insoluble Matter (mg)	---	1	mg	27	6
EA141: Total Insoluble Matter					
Total Insoluble Matter	---	0.1	g/m ² .month	2.7	0.7
Total Insoluble Matter (mg)	---	1	mg	42	11

AECOM Australia Pty Limited

Address: 17 Warabrook Blvd, Warabrook NSW 2304
 Phone Number : 4911 4900
 Email: cye.buckland@aecom.com; ntlair.labs@aecom.com Invoice to: ap_customerservice@aecom.com

Laboratory Details

Tel: 02 40142500
 Fax:
 Lab Name: ALS Newcastle
 Lab Address: 5/585 Maitland Rd, Mayfield West
 Preliminary Report by:
 Contact Name: Hayley Worthington
 Final Report by:
 Lab Quote No:

AECOM Project No: 60330323 Task 1.1

PO No. NA

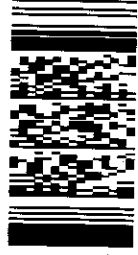
Specifications:

1. Urgent TAT required? (please circle: 24hr 48hr days)
2. Fast TAT Guarantee Required?
3. Is any sediment layer present in waters to be excluded from extractions?
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?
5. Special storage requirements? (details: _____)
6. Shell Quality Partnership:
7. Report Format: Fax Hardcopy Email: cye.buckland@aecom.com; ntlair.labs@aecom.com

Analysis Request

Sample ID	Sampling Period	Sampling Time	Matrix			Preservation			Container (No. & type)	Analysis Request								
			soil	water	other	filled	acid	ice		other	Insoluble Solids	Ash Residue	Combustible Matter	SM, SEM/EDS	XRD	Image	Other	Funnel Diameter (mm)
1	6/2/15 to 6/3/15	28 Days		X					4L Jar CuSO4	X	X							150
2	6/2/15 to 6/3/15	28 Days		X					4L Jar CuSO4	X	X							149
3	6/2/15 to 6/3/15	28 Days		X					4L Jar CuSO4	X	X							148
4	6/2/15 to 6/3/15	28 Days		X					4L Jar CuSO4	X	X							146
5	6/2/15 to 6/3/15	28 Days		X					4L Jar CuSO4	X	X		X	X				144
6	6/2/15 to 6/3/15	28 Days		X					4L Jar CuSO4	X	X							148
7	6/2/15 to 6/3/15	28 Days		X					4L Jar CuSO4	X	X							145
8	6/2/15 to 6/3/15	28 Days		X					4L Jar CuSO4	X	X							147
9	6/2/15 to 6/3/15	28 Days		X					4L Jar CuSO4	X	X							147
10	6/2/15 to 6/3/15	28 Days		X					4L Jar CuSO4	X	X							149
11	6/2/15 to 6/3/15	28 Days		X					4L Jar CuSO4	X	X							147
12	6/2/15 to 6/3/15	28 Days		X					4L Jar CuSO4	X	X							144

Environmental Division
Newcastle
 Work Order Reference
EN1510781



Telephone : +61 2 4014 2500

Comments: SIM, SEM, EDS, XRF and Image to be undertaken by UQMP

Relinquished by: *C. Buckland* Signed: *C. Buckland* Date: *6/3/15*
 Reviewed by: *C. Buckland* Signed: *C. Buckland* Date: *6/3/15*
 Received by: _____ Signed: _____ Date: _____

AECOM Australia Pty Limited

Address: 17 Warabrook Blvd, Warabrook NSW 2304
Phone Number : 4911 4900
Email: cye.buckland@aecom.com; ntlair.labs@aecom.com Invoice to: ap_customerservice@aecom.com

Laboratory Details

Lab Name: ALS Newcastle
Lab Address: 5/585 Maitland Rd, Mayfield West
Contact Name: Hayley Worthington
Lab Ref:
Tel: 02 40142500
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No: PO No. NA

AECOM Project No: 60330323 Task 1.1

Specifications:

- 1. Urgent TAT required? (please circle: 24hr 48hr ___ days)
2. Fast TAT Guarantee Required?
3. Is any sediment layer present in waters to be excluded from extractions?
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?
5. Special storage requirements? (details:)
6. Shell Quality Partnership:

7. Report Format: Fax Hardcopy Email: cye.buckland@aecom.com; ntlair.labs@aecom.com

Table with columns: Sample ID, Sampling Period, Sampling Time, Matrix (soil, water, other, filtered, acid, ice, other), Preservation, Container (No. & type), Ash Residue, Insoluble Solids, Combustible Matter, XRD, SM, SEM/EDS, Image, Funnel Diameter (mm), Other.

Comments: SIM, SEM, EDS, XRD and Image to be undertaken by UQMP

Relinquished by: C. Burchland Signed: 11/3/15 08:35
Received by: K. Collins Signed: 5/3/15 08:35
Date: 11/3/15 Date: 5/3/15

CERTIFICATE OF ANALYSIS

<p>Work Order : EN1511252</p> <p>Client : AECOM Australia Pty Ltd</p> <p>Contact : MR CYE BUCKLAND</p> <p>Address : 17 WARABROOK BOULEVARDE WARABROOK NSW 2304</p> <p>E-mail : cye.buckland@aecom.com</p> <p>Telephone : +61 02 4911 4900</p> <p>Facsimile : +61 02 4911 4999</p> <p>Project : 60330323 Task 1.1</p> <p>Order number : 60330323 Task 1.1</p> <p>C-O-C number : ---</p> <p>Sampler : CYE BUCKLAND</p> <p>Site : ---</p> <p>Quote number : ---</p>	<p>Page : 1 of 5</p> <p>Laboratory : Environmental Division Newcastle</p> <p>Contact : Rebecca Kleinschmidt</p> <p>Address : 5/585 Maitland Road Mayfield West NSW Australia 2304</p> <p>E-mail : rebecca.kleinschmidt@alsglobal.com</p> <p>Telephone : +61 3552 8668</p> <p>Facsimile : +61 2 4967 7382</p> <p>QC Level : NEPM 2013 Schedule B(3) and ALS QCS3 requirement</p> <p>Date Samples Received : 17-Apr-2015 15:00</p> <p>Date Analysis Commenced : 22-Apr-2015</p> <p>Issue Date : 13-May-2015 15:09</p> <p>No. of samples received : 15</p> <p>No. of samples analysed : 12</p>
---	--

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



**WORLD RECOGNISED
ACCREDITATION**

NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics



Page : 2 of 5
Work Order : EN1511252
Client : AECOM Australia Pty Ltd
Project : 60330323 Task 1.1

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

- Subcontract results to follow when available.
- Sampling data was supplied by AECOM Newcastle. NATA Accreditation No. 2778. Corporate Site No. 14391.
- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis.



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID					
				Mayfield West 06/03/15 - 07/04/15 [07-Apr-2015]	Mayfield East 06/03/15 - 07/04/15 [07-Apr-2015]	Waratah 06/03/15 - 07/04/15 [07-Apr-2015]	Islington 06/03/15 - 07/04/15 [07-Apr-2015]	Tighes Hill 06/03/15 - 07/04/15 [07-Apr-2015]	
Sub-Matrix: DUST (Matrix: AIR)									
EA120: Ash Content									
Ash Content	---	0.1	g/m ² .month	0.3	0.4	0.4	0.4	0.3	
Ash Content (mg)	---	1	mg	5	7	8	7	6	
EA125: Combustible Matter									
Combustible Matter	---	0.1	g/m ² .month	0.1	0.4	0.6	0.5	0.4	
Combustible Matter (mg)	---	1	mg	3	7	10	9	6	
EA141: Total Insoluble Matter									
Total Insoluble Matter	---	0.1	g/m ² .month	0.4	0.8	1.0	0.9	0.7	
Total Insoluble Matter (mg)	---	1	mg	8	14	18	16	12	



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID				
				Carrington 06/03/15 - 07/04/15 [07-Apr-2015] EN1511252-006	Wickham 06/03/15 - 07/04/15 [07-Apr-2015] EN1511252-007	Hamilton 06/03/15 - 07/04/15 [07-Apr-2015] EN1511252-008	Newcastle 06/03/15 - 07/04/15 [07-Apr-2015] EN1511252-009	Stockton North 06/03/15 - 07/04/15 [07-Apr-2015] EN1511252-010
EA120: Ash Content								
Ash Content	---	0.1	g/m ² .month	0.5	0.4	0.5	0.2	0.3
Ash Content (mg)	---	1	mg	9	7	9	3	6
EA125: Combustible Matter								
Combustible Matter	---	0.1	g/m ² .month	0.3	0.2	0.3	<0.1	0.3
Combustible Matter (mg)	---	1	mg	5	3	5	1	6
EA141: Total Insoluble Matter								
Total Insoluble Matter	---	0.1	g/m ² .month	0.8	0.6	0.8	0.2	0.6
Total Insoluble Matter (mg)	---	1	mg	14	10	14	4	12



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID	
				Client sampling date / time	Result
EA120: Ash Content					
Ash Content	---	0.1	g/m ² .month	0.4	0.6
Ash Content (mg)	---	1	mg	7	10
EA125: Combustible Matter					
Combustible Matter	---	0.1	g/m ² .month	0.3	0.3
Combustible Matter (mg)	---	1	mg	5	5
EA141: Total Insoluble Matter					
Total Insoluble Matter	---	0.1	g/m ² .month	0.7	0.9
Total Insoluble Matter (mg)	---	1	mg	12	15

AECOM Australia Pty Limited

Address: 17 Warabrook Blvd, Warabrook NSW 2304
 Phone Number : 4911 4900
 Email: cye.buckland@aecom.com; ntlair.labs@aecom.com Invoice to: ap_customerservice@aecom.com

Laboratory Details

Lab. Name: ALS Newcastle
 Lab Address: 5/585 Maitland Rd, Mayfield West
 Contact Name: Hayley Worthington
 Lab. Ref:

Tel: 02 40142500
 Fax:
 Preliminary Report by:
 Final Report by:
 Lab Quote No:

Sampled By: Cye Buckland AECOM Project No: 60330323 Task 1.1 PO No. NA

Specifications:

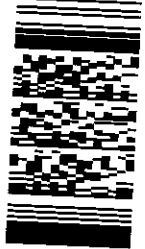
1. Urgent TAT required? (please circle: 24hr 48hr _____ days)
2. Fast TAT Guarantee Required?
3. Is any sediment layer present in waters to be excluded from extractions?
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?
5. Special storage requirements? (details: _____)
6. Shell Quality Partnerships:
7. Report Format: Fax Hardcopy Email: cye.buckland@aecom.com; ntlair.labs@aecom.com

Sample ID	Sampling Period	Sampling Time	Matrix			Preservation			Container (No. & type)	Yes (tick)
			soil	water	other	filled	acid	ice		
1	6/3/15 to 7/4/15	32 Days		X					4L Jar CuSO4	X
2	6/3/15 to 7/4/15	32 Days		X					4L Jar CuSO4	X
3	6/3/15 to 7/4/15	32 Days		X					4L Jar CuSO4	X
4	6/3/15 to 7/4/15	32 Days		X					4L Jar CuSO4	X
5	6/3/15 to 7/4/15	32 Days		X					4L Jar CuSO4	X
6	6/3/15 to 7/4/15	32 Days		X					4L Jar CuSO4	X
7	6/3/15 to 7/4/15	32 Days		X					4L Jar CuSO4	X
8	6/3/15 to 7/4/15	32 Days		X					4L Jar CuSO4	X
9	6/3/15 to 7/4/15	32 Days		X					4L Jar CuSO4	X
10	6/3/15 to 7/4/15	32 Days		X					4L Jar CuSO4	X
11	6/3/15 to 7/4/15	32 Days		X					4L Jar CuSO4	X
12	6/3/15 to 7/4/15	32 Days		X					4L Jar CuSO4	X
13	8/04/2015, 9:25am - 16:35pm	7hrs, 10mir							Petri Dish	X
14	8/04/2015, 9:00am - 16:15pm	7hrs, 15mir							Petri Dish	X
15	8/04/2015, 8:50am to 16:10pm	7hrs, 20mir							Petri Dish	X

Comments: SIM, SEM, EDS, XRD and Image to be undertaken by UQMP

Analysis Request									
Insoluble Solids	Ash Residue	Combustible Matter	SM, SEM/EDS	XRD	Image	Other	Tunnel Diameter (mm)		
							150		
							149		
			X	X	X		148		
							146		
							144		
							148		
							145		
							147		
							147		
							149		
							147		
							144		

**Environmental Division
 Newcastle
 Work Order Reference
 EN1511252**



Telephone : +61 2 4014 2500

Received by: *C. Buckland* Signed: *C. Buckland* Date: *13/4/15*
 Received by: *K. Cederman* Signed: *K. Cederman* Date: *13/4/15*
 Comments: SIM, SEM, EDS, XRD and Image to be undertaken by UQMP
 Lab Report No. _____
 Esky ID _____



ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: EN1511788	Page	: 1 of 5
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Newcastle
Contact	: MR CYE BUCKLAND	Contact	: Peter Keyte
Address	: 17 WARABROOK BOULEVARDE WARABROOK NSW 2304	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
E-mail	: cye.buckland@aecom.com	E-mail	: peter.keyte@alsglobal.com
Telephone	: +61 02 4911 4900	Telephone	: +61 2 4014 2500
Facsimile	: +61 02 4911 4999	Facsimile	: +61 2 4967 7382
Project	: 60330323 Task 1.1	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 60330323 Task 1.1	Date Samples Received	: 25-May-2015 14:00
C-O-C number	: ---	Date Analysis Commenced	: 28-May-2015
Sampler	: CYE BUCKLAND	Issue Date	: 09-Jun-2015 16:05
Site	: ---	No. of samples received	: 16
Quote number	: ---	No. of samples analysed	: 12

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



WORLD RECOGNISED ACCREDITATION

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Barbara Coupland	Quality Officer	Newcastle - Inorganics



Page : 2 of 5
Work Order : EN1511788
Client : AECOM Australia Pty Ltd
Project : 60330323 Task 1.1

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

- Subcontract results to follow when available.
- Sampling data was supplied by AECOM Newcastle. NATA Accreditation No. 2778. Corporate Site No. 14391.
- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis.



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID					
				Mayfield West 07/04/15 - 05/05/15 [05-May-2015]	Mayfield East 07/04/15 - 05/05/15 [05-May-2015]	Waratah 07/04/15 - 05/05/15 [05-May-2015]	Islington 07/04/15 - 05/05/15 [05-May-2015]	Tighes Hill 07/04/15 - 05/05/15 [05-May-2015]	
Sub-Matrix: DEPOSITIONAL DUST (Matrix: AIR)									
EA120: Ash Content									
Ash Content	---	0.1	g/m ² .month	0.1	0.2	0.2	0.3	0.1	
Ash Content (mg)	---	1	mg	2	4	3	5	2	
EA125: Combustible Matter									
Combustible Matter	---	0.1	g/m ² .month	0.1	0.5	0.3	0.3	0.2	
Combustible Matter (mg)	---	1	mg	1	8	5	5	3	
EA141: Total Insoluble Matter									
Total Insoluble Matter	---	0.1	g/m ² .month	0.2	0.7	0.5	0.6	0.3	
Total Insoluble Matter (mg)	---	1	mg	3	12	8	10	5	



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID				
				Carrington 07/04/15 - 05/05/15 [05-May-2015] EN1511788-006	Wickham 07/04/15 - 05/05/15 [05-May-2015] EN1511788-007	Hamilton 07/04/15 - 05/05/15 [05-May-2015] EN1511788-008	Newcastle 07/04/15 - 05/05/15 [05-May-2015] EN1511788-009	Stockton North 07/04/15 - 05/05/15 [05-May-2015] EN1511788-010
EA120: Ash Content								
Ash Content	---	0.1	g/m ² .month	0.2	0.3	0.4	0.1	0.1
Ash Content (mg)	---	1	mg	3	4	6	1	2
EA125: Combustible Matter								
Combustible Matter	---	0.1	g/m ² .month	<0.1	<0.1	0.9	0.2	0.2
Combustible Matter (mg)	---	1	mg	<1	<1	15	3	3
EA141: Total Insoluble Matter								
Total Insoluble Matter	---	0.1	g/m ² .month	0.2	0.3	1.3	0.3	0.3
Total Insoluble Matter (mg)	---	1	mg	3	4	21	4	5



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID	
				Client sampling date / time	Result
EA120: Ash Content					
Ash Content	---	0.1	g/m ² .month	Stockton South 07/04/15 - 05/05/15 [05-May-2015]	Newcastle East 07/04/15 - 05/05/15 [05-May-2015]
Ash Content (mg)	---	1	mg	EN1511788-011 Result	EN1511788-012 Result
EA125: Combustible Matter					
Combustible Matter	---	0.1	g/m ² .month	0.3	0.3
Combustible Matter (mg)	---	1	mg	4	5
EA141: Total Insoluble Matter					
Total Insoluble Matter	---	0.1	g/m ² .month	0.1	0.5
Total Insoluble Matter (mg)	---	1	mg	3	7
EA141: Total Insoluble Matter					
Total Insoluble Matter	---	0.1	g/m ² .month	0.4	0.8
Total Insoluble Matter (mg)	---	1	mg	7	12

Laboratory Details

Address: 17 Warabrook Blvd, Warabrook NSW 2304
 Phone Number : 4911 4900
 Email: eye.buckland@aecom.com; ntlair.labs@aecom.com Invoice to: ap_customerservice@aecom.com

Tel: 02 40142500
 Fax:
 Lab Name: ALS Newcastle
 Lab Address: 5/585 Maitland Rd, Mayfield West
 Contact Name: Hayley Worthington
 Lab Ref:

AECOM Project No: 60330323 Task 1.1 PO No. NA

Specifications:

1. Urgent TAT required? (please circle: 24hr 48hr _____ days)
2. Fast TAT Guarantee Required?
3. Is any sediment layer present in waters to be excluded from extractions?
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?
5. Special storage requirements? (details: _____)
6. Shell Quality Partnership:
7. Report Format: Fax Hardcopy Email : eye.buckland@aecom.com; ntlair.labs@aecom.com

Sample ID	Sampling Period	Sampling Time	Matrix			Preservation			Container (No. & type)	Yes (tick)
			soil	water	other	filled	acid	ice		
Mayfield West 1	7/4/15 to 5/5/15	28 Days		X					4L Jar CuSO4	X
Mayfield East 2	7/4/15 to 5/5/15	28 Days		X					4L Jar CuSO4	X
Waratah 3	7/4/15 to 5/5/15	28 Days		X					4L Jar CuSO4	X
Islington 4	7/4/15 to 5/5/15	28 Days		X					4L Jar CuSO4	X
Tighes Hill 5	7/4/15 to 5/5/15	28 Days		X					4L Jar CuSO4	X
Carrington 6	7/4/15 to 5/5/15	28 Days		X					4L Jar CuSO4	X
Wickham 7	7/4/15 to 5/5/15	28 Days		X					4L Jar CuSO4	X
Hamilton 8	7/4/15 to 5/5/15	28 Days		X					4L Jar CuSO4	X
Newcastle 9	7/4/15 to 5/5/15	28 Days		X					4L Jar CuSO4	X
Stockton North 10	7/4/15 to 5/5/15	28 Days		X					4L Jar CuSO4	X
Stockton South 11	7/4/15 to 5/5/15	28 Days		X					4L Jar CuSO4	X
Newcastle East 12	7/4/15 to 5/5/15	28 Days		X					4L Jar CuSO4	X
Newcastle East 13	11/05/2015 11:30am to 13/05/2015 3:00pm	51hrs 30mins							Petri Dish	X
Stockton North 14	11/05/2015 10:40am to 13/05/2015 2:40pm	52hrs							Petri Dish	X
Stockton South, Punt rd 15	11/05/2015 10:45am to 13/05/2015 2:35pm	51hrs 50mins							Petri Dish	X
Fern Bay, Taylor Rd 16	11/05/2015 10:30am to 13/05/2015 2:25pm	51hrs 55mins							Petri Dish	X

Comments: StM, SEM, EDS, XRD and image to be undertaken by UQMP

Analysis Request									
Image	XRD	SM, SEM/EDS	Ash Residue	Insoluble Solids	Combustible Matter	Other	Tunnel Diameter (mm)	Other	Other
			X	X	X		150		
			X	X	X		149		
			X	X	X		148		
			X	X	X		146		
			X	X	X		144		
			X	X	X		148		
			X	X	X		145		
			X	X	X		147		
			X	X	X		147		
			X	X	X		144		
			X	X	X		149		
			X	X	X		147		
			X	X	X		144		

Environmental Division
Newcastle
 Work Order Reference
EN1511788



Telephone : +61 2 4014 2500

Relinquished by: *C. Buckland* Signed: *C. Buckland* Date: *23/5/15*
 Received by: *K. G. Brennan* Signed: *K. G. Brennan* Date: *23/5/15*
 Printed copies of this document are *35/3/15* certified by: *1401* Date: *23/5/15*
 Comments: StM, SEM, EDS, XRD and image to be undertaken by UQMP



ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: EN1512051	Page	: 1 of 5
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Newcastle
Contact	: MR CYE BUCKLAND	Contact	: Peter Keyte
Address	: 17 WARABROOK BOULEVARDE WARABROOK NSW 2304	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
E-mail	: cye.buckland@aecom.com	E-mail	: peter.keyte@alsglobal.com
Telephone	: +61 02 4911 4900	Telephone	: +61 2 4014 2500
Facsimile	: +61 02 4911 4999	Facsimile	: +61 2 4967 7382
Project	: 60330323 Task 1.1	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 60330323 Tank 1.1	Date Samples Received	: 17-Jun-2015 11:57
C-O-C number	: ---	Date Analysis Commenced	: 18-Jun-2015
Sampler	: CYE BUCKLAND	Issue Date	: 30-Jun-2015 09:11
Site	: ---	No. of samples received	: 14
Quote number	: ---	No. of samples analysed	: 12

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Barbara Coupland	Quality Officer	Newcastle - Inorganics





Page : 2 of 5
Work Order : EN1512051
Client : AECOM Australia Pty Ltd
Project : 60330323 Task 1.1

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

- Subcontract results to follow when available.
- Sampling data was supplied by AECOM Newcastle. NATA Accreditation No. 2778. Corporate Site No. 14391.
- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis.



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID				
				Mayfield West 05/05/15 - 02/06/15 [02-Jun-2015]	Mayfield East 05/05/15 - 02/06/15 [02-Jun-2015]	Waratah 05/05/15 - 02/06/15 [02-Jun-2015]	Islington 05/05/15 - 02/06/15 [02-Jun-2015]	Tighes Hill 05/05/15 - 02/06/15 [02-Jun-2015]
				EN1512051-001	EN1512051-002	EN1512051-003	EN1512051-004	EN1512051-005
				Result	Result	Result	Result	Result
EA120: Ash Content								
Ash Content	---	0.1	g/m ² .month	0.2	0.3	0.2	0.6	0.4
Ash Content (mg)	---	1	mg	4	5	3	9	6
EA125: Combustible Matter								
Combustible Matter	---	0.1	g/m ² .month	0.1	<0.1	<0.1	<0.1	0.1
Combustible Matter (mg)	---	1	mg	1	<1	<1	1	2
EA141: Total Insoluble Matter								
Total Insoluble Matter	---	0.1	g/m ² .month	0.3	0.3	0.2	0.6	0.5
Total Insoluble Matter (mg)	---	1	mg	5	5	3	10	8



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID				
				Carrington 05/05/15 - 02/06/15 [02-Jun-2015] EN1512051-006	Wickham 05/05/15 - 02/06/15 [02-Jun-2015] EN1512051-007	Hamilton 05/05/15 - 02/06/15 [02-Jun-2015] EN1512051-008	Newcastle 05/05/15 - 02/06/15 [02-Jun-2015] EN1512051-009	Stockton North 05/05/15 - 02/06/15 [02-Jun-2015] EN1512051-010
EA120: Ash Content								
Ash Content	---	0.1	g/m ² .month	0.2	0.3	0.4	0.2	0.5
Ash Content (mg)	---	1	mg	4	5	6	3	8
EA125: Combustible Matter								
Combustible Matter	---	0.1	g/m ² .month	0.1	0.3	0.2	<0.1	0.2
Combustible Matter (mg)	---	1	mg	1	5	3	<1	4
EA141: Total Insoluble Matter								
Total Insoluble Matter	---	0.1	g/m ² .month	0.3	0.6	0.6	0.2	0.7
Total Insoluble Matter (mg)	---	1	mg	5	10	9	3	12



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID	
				Client sampling date / time	Result
EA120: Ash Content					
Ash Content	---	0.1	g/m ² .month	0.3	0.3
Ash Content (mg)	---	1	mg	4	5
EA125: Combustible Matter					
Combustible Matter	---	0.1	g/m ² .month	<0.1	0.2
Combustible Matter (mg)	---	1	mg	<1	2
EA141: Total Insoluble Matter					
Total Insoluble Matter	---	0.1	g/m ² .month	0.3	0.5
Total Insoluble Matter (mg)	---	1	mg	4	7

Stockton South 05/05/15 - 02/06/15 [02-Jun-2015]	Newcastle East 05/05/15 - 02/06/15 [02-Jun-2015]	Result	Result
EN1512051-011	EN1512051-012	Result	Result

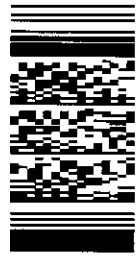
Laboratory Details
 Lab Name: ALS Newcastle
 Lab Address: 5/585 Maitland Rd, Mayfield West
 Contact Name: Hayley Worthington
 Lab. Ref: PO No. NA
 Tel: 02 40142500
 Fax: Preliminary Report by:
 Final Report by:
 Lab Quote No:

Address: 17 Warabrook Blvd, Warabrook NSW 2304
 Phone Number : 4911 4900
 Email: eye.buckland@aecom.com; nfair.labs@aecom.com Invoice to: ap_customerservice@aecom.com
 AECOM Project No: 60330323 Task 1.1

- Specifications:**
1. Urgent TAT required? (please circle: 24hr 48hr _____ days)
 2. Fast TAT Guarantee Required?
 3. Is any sediment layer present in waters to be excluded from extractions?
 4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?
 5. Special storage requirements? (details: _____)
 6. Shell Quality Partnership:
 7. Report Format: _____ Fax _____ Hardcopy _____ Email: eye.buckland@aecom.com; nfair.labs@aecom.com

Sample ID	Sampling Period	Sampling Time	Matrix			Preservation			Container (No. & type)	Yes (tick)	Insoluble Solids	Ash Residue	Combusible Matter	SM, SEM/EDS	XRD	Image	Analysis Request																	
			soil	water	other	fitted	acid	ice									other	150	149	148	146	144	148	145	147	147								
1 Mayfield West	5/5/15 to 2/6/15	28 Days		X						X	X	X																						
2 Mayfield East	5/5/15 to 2/6/15	28 Days		X						X	X	X																						
3 Waratah	5/5/15 to 2/6/15	28 Days		X						X	X	X																						
4 Islington	5/5/15 to 2/6/15	28 Days		X						X	X	X																						
5 Tighes Hill	5/5/15 to 2/6/15	28 Days		X						X	X	X																						
6 Carrington	5/5/15 to 2/6/15	28 Days		X						X	X	X																						
7 Wickham	5/5/15 to 2/6/15	28 Days		X						X	X	X																						
8 Hamilton	5/5/15 to 2/6/15	28 Days		X						X	X	X																						
9 Newcastle	5/5/15 to 2/6/15	28 Days		X						X	X	X																						
10 Stockton North	5/5/15 to 2/6/15	28 Days		X						X	X	X																						
11 Stockton South	5/5/15 to 2/6/15	28 Days		X						X	X	X																						
12 Newcastle East	5/5/15 to 2/6/15	28 Days		X						X	X	X																						
13 Hamilton brush	2/06/2015													X																				
14 Stockton South Brush	2/06/2015													X																				

Environmental Division
Newcastle
 Work Order Reference
EN1512051



Telephone : +61 2 4014 2500

Comments: SIM, SEM, EDS, XRD and Image to be undertaken by UQMP
 Signed: _____
 Received by: *Mark Spener* Date: *17/06/15*
 Signed: _____ Date: _____
 Printed copies of this document are _____
 Signed: _____ Date: _____

1157



Environmental

CERTIFICATE OF ANALYSIS

Work Order	: EN1512374	Page	: 1 of 5
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Newcastle
Contact	: MIR CYE BUCKLAND	Contact	: Peter Keyte
Address	: 17 WARABROOK BOULEVARDE WARABROOK NSW 2304	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
E-mail	: cye.buckland@aecom.com	E-mail	: peter.keyte@alsglobal.com
Telephone	: +61 02 4911 4900	Telephone	: +61 2 4014 2500
Facsimile	: +61 02 4911 4999	Facsimile	: +61 2 4967 7382
Project	: 60330323 Task 1.1	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 60330323 Task 1.1	Date Samples Received	: 16-Jul-2015 11:20
C-O-C number	: --	Date Analysis Commenced	: 17-Jul-2015
Sampler	: CYE BUCKLAND	Issue Date	: 28-Jul-2015 18:44
Site	: --	No. of samples received	: 17
Quote number	: --	No. of samples analysed	: 12

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

WORLD RECOGNISED ACCREDITATION

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
--------------------	-----------------	-------------------------------

Barbara Coupland	Quality Officer	Newcastle - Inorganics
------------------	-----------------	------------------------



Page : 2 of 5
Work Order : EN1512374
Client : AECOM Australia Pty Ltd
Project : 60330323 Task 1.1

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

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Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

- Subcontract results to follow when available.
- Subcontracted SEM/XRD Results to follow when available
- Sampling data was supplied by AECOM Newcastle. NATA Accreditation No. 2778. Corporate Site No. 14391.
- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis.



Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST**
 (Matrix: **AIR**)

Compound	CAS Number	LOR	Unit	Client sample ID				
				Mayfield West 02/06/15 - 03/07/15 [03-Jul-2015]	Mayfield East 02/06/15 - 03/07/15 [03-Jul-2015]	Waratah 02/06/15 - 03/07/15 [03-Jul-2015]	Islington 02/06/15 - 03/07/15 [03-Jul-2015]	Tighes Hill 02/06/15 - 03/07/15 [03-Jul-2015]
				EN1512374-001	EN1512374-002	EN1512374-003	EN1512374-004	EN1512374-005
				Result	Result	Result	Result	Result
EA120: Ash Content								
Ash Content	---	0.1	g/m ² .month	0.8	0.4	0.7	0.5	0.4
Ash Content (mg)	---	1	mg	14	7	12	9	6
EA125: Combustible Matter								
Combustible Matter	---	0.1	g/m ² .month	0.6	0.4	0.5	0.4	0.4
Combustible Matter (mg)	---	1	mg	11	7	10	6	7
EA141: Total Insoluble Matter								
Total Insoluble Matter	---	0.1	g/m ² .month	1.4	0.8	1.2	0.9	0.8
Total Insoluble Matter (mg)	---	1	mg	25	14	22	15	13



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID				
				Carrington 02/06/15 - 03/07/15 [03-Jul-2015]	Wickham 02/06/15 - 03/07/15 [03-Jul-2015]	Hamilton 02/06/15 - 03/07/15 [03-Jul-2015]	Newcastle 02/06/15 - 03/07/15 [03-Jul-2015]	Stockton North 02/06/15 - 03/07/15 [03-Jul-2015]
				EN1512374-006	EN1512374-007	EN1512374-008	EN1512374-009	EN1512374-010
				Result	Result	Result	Result	Result
EA120: Ash Content								
Ash Content	---	0.1	g/m ² .month	0.5	0.5	0.3	0.1	0.4
Ash Content (mg)	---	1	mg	8	9	5	2	7
EA125: Combustible Matter								
Combustible Matter	---	0.1	g/m ² .month	0.4	0.4	0.3	0.2	0.4
Combustible Matter (mg)	---	1	mg	8	7	5	3	7
EA141: Total Insoluble Matter								
Total Insoluble Matter	---	0.1	g/m ² .month	0.9	0.9	0.6	0.3	0.8
Total Insoluble Matter (mg)	---	1	mg	16	16	10	5	14



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID	
				Client sampling date / time	Result
EA120: Ash Content					
Ash Content	---	0.1	g/m ² .month	Stockton South 02/06/15 - 03/07/15 [03-Jul-2015]	Newcastle East 02/06/15 - 03/07/15 [03-Jul-2015]
Ash Content (mg)	---	1	mg	EN1512374-011 Result	EN1512374-012 Result
EA125: Combustible Matter					
Combustible Matter	---	0.1	g/m ² .month	0.2	0.4
Combustible Matter (mg)	---	1	mg	4	6
EA141: Total Insoluble Matter					
Total Insoluble Matter	---	0.1	g/m ² .month	0.3	0.1
Total Insoluble Matter (mg)	---	1	mg	4	3
EA141: Total Insoluble Matter					
Total Insoluble Matter	---	0.1	g/m ² .month	0.5	0.5
Total Insoluble Matter (mg)	---	1	mg	8	9

AECOM Australia Pty Limited

Address: 17 Warabrook Blvd, Warabrook NSW 2304
 Phone Number : 4911 4900
 Email: cye.buckland@aecom.com; ntlair.labs@aecom.com Invoice to: ap_customerservice@aecom.com

Laboratory Details

Lab. Name: ALS Newcastle
 Lab Address: 5/585 Maitland Rd, Mayfield West
 Contact Name: Hayley Worthington
 Lab. Ref:

Tel: 02 40142500
 Fax:

Preliminary Report by:
 Final Report by:
 Lab Quote No:

PO No. NA

AECOM Project No: 60330323 Task 1.1

Specifications:

1. Urgent TAT required? (please circle: 24hr 48hr days)
2. Fast TAT Guarantee Required?
3. Is any sediment layer present in waters to be excluded from extractions?
4. % extraneous material removed from samples to be reported as per NIEPM 5.1.1?
5. Special storage requirements? (details: _____)
6. Shell Quality Partnership:

7. Report Format: Fax Hardcopy Email: cye.buckland@aecom.com; ntlair.labs@aecom.com

Sample ID	Sampling Period	Sampling Time	Matrix			Preservation			Container (No. & type)	Yes (tick)	Insoluble Solids	Ash Residue	Combustible Matter	SM, SEM/EDS	XRD	Image	Analysis Request		Tunnel Diameter (mm)
			soil	water	other	filled	acid	ice									other		
Mayfield West	2/6/15 to 3/7/15	31 days		X							X	X							150
Mayfield East	2/6/15 to 3/7/15	31 days		X							X	X							149
Waratah	2/6/15 to 3/7/15	31 days		X							X	X							148
Islington	2/6/15 to 3/7/15	31 days		X							X	X							146
Tighes Hill	2/6/15 to 3/7/15	31 days		X							X	X							144
Carrington	2/6/15 to 3/7/15	31 days		X							X	X							148
Wickham	2/6/15 to 3/7/15	31 days		X							X	X							145
Hamilton	2/6/15 to 3/7/15	31 days		X							X	X							147
Newcastle	2/6/15 to 3/7/15	31 days		X							X	X							147
Stockton North	2/6/15 to 3/7/15	31 days		X							X	X							149
Stockton South	2/6/15 to 3/7/15	31 days		X							X	X							147
Newcastle East	2/6/15 to 3/7/15	31 days		X							X	X							144
Stockton South DDG site	3/7/2015 12:15pm to 7/7/15 1:30pm	97 hrs 15 mins																	
Stockton North DDG site	3/07/2015 12:00pm to 7/07/2015 1:25pm	97 hrs 25 mins																	
Carrington DDG site	3/07/2015 1:50pm to 7/07/2015 1:45pm	95 hrs 55 mins																	
Tighes Hill DDG Site	3/07/2015 1:45pm to 7/07/2015 1:50pm	96 hrs 5 mins																	
Hamilton DDG site	3/07/2015 2:50pm to 7/07/2015 2:00pm	95 hrs 10 mins																	

Environmental Division
Newcastle
 Work Order Reference
EN1512374



Telephone : +61 2 4014 2500

Comments: SM, SEM, EDS, XRD and Image to be undertaken by UQMP

Relinquished by: *CBuckland* Signed: *CBuckland* Date: *16/7/15*
 Received by: *CBuckland* Signed: *CBuckland* Date: *16/7/15*
 Revisited by: *CBuckland* Signed: *CBuckland* Date: *16/7/15*



Environmental

CERTIFICATE OF ANALYSIS

Work Order	: EN1512637	Page	: 1 of 5
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Newcastle
Contact	: MIR CYE BUCKLAND	Contact	: Peter Keyte
Address	: 17 WARABROOK BOULEVARDE WARABROOK NSW 2304	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
E-mail	: cye.buckland@aecom.com	E-mail	: peter.keyte@alsglobal.com
Telephone	: +61 02 4911 4900	Telephone	: +61 2 4014 2500
Facsimile	: +61 02 4911 4999	Facsimile	: +61 2 4967 7382
Project	: 60330323 Task 1.1	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 60330323 Task 1.1	Date Samples Received	: 10-Aug-2015 09:40
C-O-C number	: --	Date Analysis Commenced	: 11-Aug-2015
Sampler	: CYE BUCKLAND	Issue Date	: 19-Aug-2015 19:46
Site	: --	No. of samples received	: 16
Quote number	: --	No. of samples analysed	: 12

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

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- General Comments
- Analytical Results



NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

WORLD RECOGNISED ACCREDITATION

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
--------------------	-----------------	-------------------------------

Barbara Coupland	Quality Officer	Newcastle - Inorganics
------------------	-----------------	------------------------



Page : 2 of 5
Work Order : EN1512637
Client : AECOM Australia Pty Ltd
Project : 60330323 Task 1.1

General Comments

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Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

- Subcontract results to follow when available.
- Subco results to follow at a later date once ready for reporting
- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m².mth as sampling data was provided by the client.



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID				
				Mayfield West 03/07/15 - 03/08/15 [03-Aug-2015]	Mayfield East 03/07/15 - 03/08/15 [03-Aug-2015]	Waratah 03/07/15 - 03/08/15 [03-Aug-2015]	Islington 03/07/15 - 03/08/15 [03-Aug-2015]	Tighes Hill 03/07/15 - 03/08/15 [03-Aug-2015]
EA120: Ash Content								
Ash Content	---	0.1	g/m ² .month	0.2	0.5	1.0	0.8	0.4
Ash Content (mg)	---	1	mg	4	9	17	14	7
EA125: Combustible Matter								
Combustible Matter	---	0.1	g/m ² .month	0.2	0.3	0.4	0.5	0.3
Combustible Matter (mg)	---	1	mg	4	6	7	9	5
EA141: Total Insoluble Matter								
Total Insoluble Matter	---	0.1	g/m ² .month	0.4	0.8	1.4	1.3	0.7
Total Insoluble Matter (mg)	---	1	mg	8	15	24	23	12



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID				
				Carrington 03/07/15 - 03/08/15 [03-Aug-2015] EN1512637-006	Wickham 03/07/15 - 03/08/15 [03-Aug-2015] EN1512637-007	Hamilton 03/07/15 - 03/08/15 [03-Aug-2015] EN1512637-008	Newcastle 03/07/15 - 03/08/15 [03-Aug-2015] EN1512637-009	Stockton North 03/07/15 - 03/08/15 [03-Aug-2015] EN1512637-010
EA120: Ash Content								
Ash Content	---	0.1	g/m ² .month	0.6	0.5	0.4	0.2	0.4
Ash Content (mg)	---	1	mg	11	8	7	4	8
EA125: Combustible Matter								
Combustible Matter	---	0.1	g/m ² .month	0.4	0.3	0.1	0.1	0.4
Combustible Matter (mg)	---	1	mg	6	5	1	2	7
EA141: Total Insoluble Matter								
Total Insoluble Matter	---	0.1	g/m ² .month	1.0	0.8	0.5	0.3	0.8
Total Insoluble Matter (mg)	---	1	mg	17	13	8	6	15



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID	
				Stockton South 03/07/15 - 03/08/15 [03-Aug-2015]	Newcastle East 03/07/15 - 03/08/15 [03-Aug-2015]
				Result	Result
EA120: Ash Content					
Ash Content	---	0.1	g/m ² .month	0.3	0.4
Ash Content (mg)	---	1	mg	6	6
EA125: Combustible Matter					
Combustible Matter	---	0.1	g/m ² .month	0.3	0.4
Combustible Matter (mg)	---	1	mg	5	8
EA141: Total Insoluble Matter					
Total Insoluble Matter	---	0.1	g/m ² .month	0.6	0.8
Total Insoluble Matter (mg)	---	1	mg	11	14

AECOM Australia Pty Limited

Address: 17 Warabrook Blvd, Warabrook NSW 2304

Phone Number : 4911 4900

Email: eye.buckland@aecom.com; ntlair.labs@aecom.com

Invoice to: ap_customerservice@aecom.com

Laboratory Details

Lab Name: ALS Newcastle

Lab Address: 5/585 Maitland Rd, Mayfield West

Contact Name: Hayley Worthington

Tel: 02 40142500

Fax:

Preliminary Report by:

Final Report by:

Lab Quote No:

PO No. NA

AECOM Project No: 60330323 Task 1.1

Specifications:

1. Urgent TAT required? (please circle: 24hr 48hr _____ days)
2. Fast TAT Guarantee Required?
3. Is any sediment layer present in waters to be excluded from extractions?
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?
5. Special storage requirements? (details: _____)
6. Shell Quality Partnership:
7. Report Format: Fax Hardcopy Email : eye.buckland@aecom.com; ntlair.labs@aecom.com

Sample ID	Sampling Period	Sampling Time	Matrix			Preservation			Container (No. & type)	Insoluble Solids	Ash Residue	Combustible Matter	SM, SEM/EDS	XRD	Image	Analysis Request		Funnel Diameter (mm)
			soil	water	other	filled	acid	ice								Other	Other	
1	Mayfield West	37/15 to 3/8/15		X					4L Jar CuSO4	X	X						150	
2	Mayfield East	37/15 to 3/8/15		X					4L Jar CuSO4	X	X						149	
3	Waratah	37/15 to 3/8/15		X					4L Jar CuSO4	X	X						148	
4	Islington	37/15 to 3/8/15		X					4L Jar CuSO4	X	X						146	
5	Tighes Hill	37/15 to 3/8/15		X					4L Jar CuSO4	X	X						144	
6	Carrington	37/15 to 3/8/15		X					4L Jar CuSO4	X	X						148	
7	Wickham	37/15 to 3/8/15		X					4L Jar CuSO4	X	X						145	
8	Hamilton	37/15 to 3/8/15		X					4L Jar CuSO4	X	X						147	
9	Newcastle	37/15 to 3/8/15		X					4L Jar CuSO4	X	X						147	
10	Stockton North	37/15 to 3/8/15		X					4L Jar CuSO4	X	X						149	
11	Stockton South	37/15 to 3/8/15		X					4L Jar CuSO4	X	X						147	
12	Newcastle East	37/15 to 3/8/15		X					4L Jar CuSO4	X	X						144	
13	Mayfield West DDG Site	10/8/2015 10:00am to 6/08/2015 12:45pm							Petri Dish				X	X				
14	Stockton North DDG Site	10/8/2015 10:20am to 6/08/2015 11:20am							Petri Dish				X	X				
15	Carrington DDG Site	10/8/2015 11:30am to 6/08/2015 13:00pm							Petri Dish				X	X				
16	Newcastle East DDG Site	10/8/2015 12:20pm to 6/08/2015 13:15pm							Petri Dish				X	X				

Environmental Division
Newcastle
Work Order Reference
EN1512637



Telephone : +61 2 4014 2500

Comments: SIM, SEM, EDS, XRD and image to be undertaken by UQMP

Relinquished by: *C. Buckland* Signed: *C. Buckland* Date: *10/8/15*

Received by: *K. Carter* Signed: *K. Carter* Date: *10/8/15 0940*

Page 1 of 1



Environmental

CERTIFICATE OF ANALYSIS

Work Order	: EN1513044	Page	: 1 of 5
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Newcastle
Contact	: MIR CYE BUCKLAND	Contact	: Peter Keyte
Address	: 17 WARABROOK BOULEVARDE WARABROOK NSW 2304	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
E-mail	: cye.buckland@aecom.com	E-mail	: peter.keyte@alsglobal.com
Telephone	: +61 02 4911 4900	Telephone	: +61 2 4014 2500
Facsimile	: +61 02 4911 4999	Facsimile	: +61 2 4967 7382
Project	: 60330323 Task 1.1	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 60330323 Task 1.1	Date Samples Received	: 15-Sep-2015 09:00
C-O-C number	: --	Date Analysis Commenced	: 16-Sep-2015
Sampler	: CYE BUCKLAND	Issue Date	: 18-Sep-2015 20:20
Site	: --	No. of samples received	: 28
Quote number	: --	No. of samples analysed	: 12

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

WORLD RECOGNISED
ACCREDITATION

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Barbara Coupland	Quality Officer	Newcastle - Inorganics



Page : 2 of 5
Work Order : EN1513044
Client : AECOM Australia Pty Ltd
Project : 60330323 Task 1.1

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

- Subcontract results to follow when available.
- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m².mth as sampling data was provided by the client.



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID				
				Mayfield West DDG 03/08/15 - 03/09/15 [03-Sep-2015]	Mayfield East DDG 03/08/15 - 03/09/15 [03-Sep-2015]	Waratah DDG 03/08/15 - 03/09/15 [03-Sep-2015]	Islington DDG 03/08/15 - 03/09/15 [03-Sep-2015]	Tighes Hill DDG 03/08/15 - 03/09/15 [03-Sep-2015]
				EN1513044-001	EN1513044-002	EN1513044-003	EN1513044-004	EN1513044-005
				Result	Result	Result	Result	Result
EA120: Ash Content								
Ash Content	---	0.1	g/m ² .month	0.4	0.8	0.5	0.9	0.5
Ash Content (mg)	---	1	mg	8	15	8	15	9
EA125: Combustible Matter								
Combustible Matter	---	0.1	g/m ² .month	0.4	0.4	0.1	0.4	0.5
Combustible Matter (mg)	---	1	mg	7	6	3	7	7
EA141: Total Insoluble Matter								
Total Insoluble Matter	---	0.1	g/m ² .month	0.8	1.2	0.6	1.3	1.0
Total Insoluble Matter (mg)	---	1	mg	15	21	11	22	16



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID				
				Carrington DDG 03/08/15 - 03/09/15 [03-Sep-2015] EN1513044-006	Wickham DDG 03/08/15 - 03/09/15 [03-Sep-2015] EN1513044-007	Hamilton DDG 03/08/15 - 03/09/15 [03-Sep-2015] EN1513044-008	Newcastle DDG 03/08/15 - 03/09/15 [03-Sep-2015] EN1513044-009	Stockton North DDG 03/08/15 - 03/09/15 [03-Sep-2015] EN1513044-010
EA120: Ash Content								
Ash Content	---	0.1	g/m ² .month	0.5	0.6	0.6	0.2	0.5
Ash Content (mg)	---	1	mg	9	10	10	4	9
EA125: Combustible Matter								
Combustible Matter	---	0.1	g/m ² .month	0.4	0.3	0.4	0.3	0.4
Combustible Matter (mg)	---	1	mg	7	5	7	5	8
EA141: Total Insoluble Matter								
Total Insoluble Matter	---	0.1	g/m ² .month	0.9	0.9	1.0	0.5	0.9
Total Insoluble Matter (mg)	---	1	mg	16	15	17	9	17



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID	
				Stockton South DDG 03/08/15 - 03/09/15 [03-Sep-2015]	Newcastle East DDG 03/08/15 - 03/09/15 [03-Sep-2015]
				Result	Result
EA120: Ash Content					
Ash Content	---	0.1	g/m ² .month	0.5	0.3
Ash Content (mg)	---	1	mg	8	5
				Result	Result
EA125: Combustible Matter					
Combustible Matter	---	0.1	g/m ² .month	0.1	<0.1
Combustible Matter (mg)	---	1	mg	3	<1
				Result	Result
EA141: Total Insoluble Matter					
Total Insoluble Matter	---	0.1	g/m ² .month	0.6	0.3
Total Insoluble Matter (mg)	---	1	mg	11	5
				Result	Result



Telephone : +61 2 4014 2500

ALS Chain of Custody Page 1 of 2

Laboratory Details
 Lab. Name: ALS Newcastle
 Lab Address: 5/585 Maitland Rd, Mayfield West
 Contact Name: Hayley Worthington
 Lab. Ref:

Address: 17 Warabrook Blvd, Warabrook NSW 2304
 Phone Number : 4911 4900
 Email: eye.buckland@aecom.com; ntlair.labs@aecom.com Invoice to: ap_customerservice@aecom.com
 AECOM Project No: 60330323 Task 1.1

Sampled By: Cye Buckland

- Specifications:**
1. Urgent TAT required? (please circle: 24hr 48hr days)
 2. Fast TAT Guarantee Required?
 3. Is any sediment layer present in waters to be excluded from extractions?
 4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?
 5. Special storage requirements? (details: _____)
 6. Shell Quality Partnership:
 7. Report Format: Fax Hardcopy Email: eye.buckland@aecom.com; ntlair.labs@aecom.com

Sample ID	Sampling Period	Sampling Time	Matrix			Preservation			Container (No. & type)	Yes (tick)	Insoluble Solids	Ash Residue	Combustible Matter	STM, SEM/EDS	XRD	Image	Funnel Diameter (mm)
			soil	water	other	filled	acid	ice									
1 Mayfield West DDG	3/08/2015 to 3/9/15	31 days		X							X	X					150
2 Mayfield East DDG	3/08/2015 to 3/9/15	31 days		X							X	X					149
3 Waratah DDG	3/08/2015 to 3/9/15	31 days		X							X	X					148
4 Islington DDG	3/08/2015 to 3/9/15	31 days		X							X	X					146
5 Tighes Hill DDG	3/08/2015 to 3/9/15	31 days		X							X	X					144
6 Carrington DDG	3/08/2015 to 3/9/15	31 days		X							X	X					148
7 Wickham DDG	3/08/2015 to 3/9/15	31 days		X							X	X					145
8 Hamilton DDG	3/08/2015 to 3/9/15	31 days		X							X	X					147
9 Newcastle DDG	3/08/2015 to 3/9/15	31 days		X							X	X					147
10 Stockton North DDG	3/08/2015 to 3/9/15	31 days		X							X	X					149
11 Stockton South DDG	3/08/2015 to 3/9/15	31 days		X							X	X					147
12 Newcastle East DDG	3/08/2015 to 3/9/15	31 days		X							X	X					144
13 Stockton South Petri	17/8/15 15:00 to 20/8/15 14:00	71 hours				X											
14 Stockton North Petri	17/8/15 15:10 to 20/8/15 13:50	70 hrs 40 mins				X											
15 Carrington Petri	28/8/15 12:20 to 31/8/15 14:20	74 hours				X											
16 Honeysuckle Petri	28/8/15 12:42 to 31/8/15 14:30	73hrs 48mins				X											
17 Stockton South Petri	17/8/15 14:50 to 3/9/15 10:15	17 days				X											

Comments: SIM, SEM, EDS, XRD and image to be undertaken by UQMP

Relinquished by: *C. Buckland* Signed: *Shawn* Date: *15/9/15*
 Received by: *K.M* Signed: *Shawn* Date: *15/9/15*

AECOM Australia Pty Limited

Address: 17 Warabrook Blvd, Warabrook NSW 2304
 Phone Number : 4911 4900
 Email: cye.buckland@aecom.com; ntlair.labs@aecom.com Invoice to: ap_customer_service@aecom.com

Laboratory Details

Lab. Name: ALS Newcastle
 Lab Address: 5/585 Maitland Rd, Mayfield West
 Contact Name: Hayley Worthington
 Lab. Ref:

Tel: 02 40142500
 Fax:
 Preliminary Report by:
 Final Report by:
 Lab Quote No:

AECOM Project No: 60330323 Task 1.1

PO No. NA

Specifications:

1. Urgent TAT required? (please circle: 24hr 48hr _____ days)
2. Fast TAT Guarantee Required?
3. Is any sediment layer present in waters to be excluded from extractions?
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?
5. Special storage requirements? (details: _____)
6. Shell Quality Partnership:

7. Report Format: Fax Hardcopy Email: cye.buckland@aecom.com; ntlair.labs@aecom.com

Sample ID	Sampling Period	Sampling Time	Matrix			Preservation			Container (No. & type)	Yes (tick)	Analysis Request						Other	
			soil	water	other	filled	acid	ice			other	Insoluble Solids	Ash Residue	Combustible Matter	SM, SEM/EDS	XRD		Image
18 Wickham Brush 1	3/09/2015		X						Petri dish			X	X	X				
19 Wickham Brush 2	3/09/2015		X						Petri dish			X	X	X				
20 Lott St Carrington Brush	8/09/2015		X						Petri dish			X	X	X				
21 Bull St Mayfield Brush	8/09/2015		X						Petri dish			X	X	X				
22 Elcho St Hamilton Brush	8/09/2015		X						Petri dish			X	X	X				
23 Kings Rd Tighes Hill Brush	8/09/2015		X						Petri dish			X	X	X				
24 Neville St Mayfield Brush	8/09/2015		X						Petri dish			X	X	X				
25 Hargrave St Carrington Brush	8/09/2015		X						Petri dish			X	X	X				
26 Bourke St Mayfield Brush	8/09/2015		X						Petri dish			X	X	X				
27 Stevenson St Newcastle East Brush	9/09/2015		X						Petri dish			X	X	X				
28 Gregson St Mayfield West Brush	9/09/2015		X						Petri dish			X	X	X				

Comments: SIM, SEM, EDS, XRD and Image to be undertaken by UQMP

Relinquished by: *C. Buckland* Signed: *AP* Date: *15/9/15*
 Received by: *RM* Signed: *AP* Date: *15/9/15*



Environmental

CERTIFICATE OF ANALYSIS

Work Order	: EN1513412	Page	: 1 of 5
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Newcastle
Contact	: MIR CYE BUCKLAND	Contact	: Peter Keyte
Address	: 17 WARABROOK BOULEVARDE WARABROOK NSW 2304	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
E-mail	: cye.buckland@aecom.com	E-mail	: peter.keyte@alsglobal.com
Telephone	: +61 02 4911 4900	Telephone	: +61 2 4014 2500
Facsimile	: +61 02 4911 4999	Facsimile	: +61 2 4967 7382
Project	: 60330323 Task 1.1	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 60330323 Task 1.1	Date Samples Received	: 09-Oct-2015 08:40
C-O-C number	: --	Date Analysis Commenced	: 13-Oct-2015
Sampler	: CYE BUCKLAND	Issue Date	: 22-Oct-2015 17:21
Site	: --	No. of samples received	: 18
Quote number	: --	No. of samples analysed	: 12

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



WORLD RECOGNISED
ACCREDITATION

NATA Accredited Laboratory 825
Accredited for compliance with
ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Barbara Coupland	Quality Officer	Newcastle - Inorganics



Page : 2 of 5
Work Order : EN1513412
Client : AECOM Australia Pty Ltd
Project : 60330323 Task 1.1

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

- Subcontract results to follow when available.
- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m².mth as sampling data was provided by the client.



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID				
				Mayfield West DDG 03/09/15 - 02/10/15 [02-Oct-2015]	Mayfield East DDG 03/09/15 - 02/10/15 [02-Oct-2015]	Waratah DDG 03/09/15 - 02/10/15 [02-Oct-2015]	Islington DDG 03/09/15 - 02/10/15 [02-Oct-2015]	Tighes Hill DDG 03/09/15 - 02/10/15 [02-Oct-2015]
EA120: Ash Content								
Ash Content	---	0.1	g/m ² .month	0.5	0.3	0.4	0.4	0.3
Ash Content (mg)	---	1	mg	8	5	7	7	4
EA125: Combustible Matter								
Combustible Matter	---	0.1	g/m ² .month	<0.1	0.2	0.1	<0.1	<0.1
Combustible Matter (mg)	---	1	mg	<1	3	2	<1	1
EA141: Total Insoluble Matter								
Total Insoluble Matter	---	0.1	g/m ² .month	0.5	0.5	0.5	0.4	0.3
Total Insoluble Matter (mg)	---	1	mg	8	8	9	7	5



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID				
				Carrington DDG 03/09/15 - 02/10/15 [02-Oct-2015]	Wickham DDG 03/09/15 - 02/10/15 [02-Oct-2015]	Hamilton DDG 03/09/15 - 02/10/15 [02-Oct-2015]	Newcastle DDG 03/09/15 - 02/10/15 [02-Oct-2015]	Stockton North DDG 03/09/15 - 02/10/15 [02-Oct-2015]
EA120: Ash Content								
Ash Content	---	0.1	g/m ² .month	0.2	0.2	0.2	0.2	0.2
Ash Content (mg)	---	1	mg	4	3	4	3	3
EA125: Combustible Matter								
Combustible Matter	---	0.1	g/m ² .month	0.8	0.2	0.3	0.2	0.3
Combustible Matter (mg)	---	1	mg	12	4	5	4	6
EA141: Total Insoluble Matter								
Total Insoluble Matter	---	0.1	g/m ² .month	1.0	0.4	0.5	0.4	0.5
Total Insoluble Matter (mg)	---	1	mg	16	7	9	7	9



Analytical Results

Compound	CAS Number	LOR	Unit	Client sample ID	
				Client sampling date / time	Result
EA120: Ash Content					
Ash Content	---	0.1	g/m ² .month	Stockton South DDG 03/09/15 - 02/10/15 [02-Oct-2015]	Newcastle East DDG 03/09/15 - 02/10/15 [02-Oct-2015]
Ash Content (mg)	---	1	mg	EN1513412-011 Result	EN1513412-012 Result
EA125: Combustible Matter					
Combustible Matter	---	0.1	g/m ² .month	0.2	0.3
Combustible Matter (mg)	---	1	mg	4	4
EA141: Total Insoluble Matter					
Total Insoluble Matter	---	0.1	g/m ² .month	0.2	0.3
Total Insoluble Matter (mg)	---	1	mg	3	5
EA141: Total Insoluble Matter					
Total Insoluble Matter	---	0.1	g/m ² .month	0.4	0.6
Total Insoluble Matter (mg)	---	1	mg	7	9

AECOM Australia Pty Limited

Address: 17 Warabrook Blvd, Warabrook NSW 2304
 Phone Number : 4911 4900
 Email: cye.buckland@aecom.com; ntlair.labs@aecom.com Invoice to: ap_customerservice@aecom.com

Laboratory Details
 Lab. Name: ALS Newcastle
 Lab Address: 5/585 Maitland Rd, Mayfield West
 Contact Name: Hayley Worthington
 Lab. Ref:

Tel: 02 40142500
 Fax:
 Preliminary Report by:
 Final Report by:
 Lab Quote No:

Sampled By: Cye Buckland AECOM Project No. 60330323 Task 1.1 PO No. NA

Specifications:

1. Urgent TAT required? (please circle: 24hr 48hr _____ days)
2. Fast TAT Guarantee Required?
3. Is any sediment layer present in waters to be excluded from extractions?
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?
5. Special storage requirements? (details: _____)
6. Shell Quality Partnership:

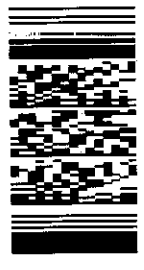
7. Report Format: Fax Hardcopy Email: cye.buckland@aecom.com; ntlair.labs@aecom.com

Sample ID	Sampling Period	Sampling Time	Matrix			Preservation			Container (No. & type)	Insoluble Solids	Ash Residue	Combustible Matter	SIM, SEM/EDS	XRD	Image	Analysis Request	
			soil	water	other	filtered	acid	ice								other	Other
Mayfield West DDG	3/09/2015 to 2/10/15	29 days		X					4L Jar CuSO4	X	X						150
Mayfield East DDG	3/09/2015 to 2/10/15	29 days		X					4L Jar CuSO4	X	X						149
Waratah DDG	3/09/2015 to 2/10/15	29 days		X					4L Jar CuSO4	X	X						148
Islington DDG	3/09/2015 to 2/10/15	29 days		X					4L Jar CuSO4	X	X						146
Tighes Hill DDG	3/09/2015 to 2/10/15	29 days		X					4L Jar CuSO4	X	X						144
Carrington DDG	3/09/2015 to 2/10/15	29 days		X					4L Jar CuSO4	X	X						148
Wickham DDG	3/09/2015 to 2/10/15	29 days		X					4L Jar CuSO4	X	X						145
Hamilton DDG	3/09/2015 to 2/10/15	29 days		X					4L Jar CuSO4	X	X			X			147
Newcastle DDG	3/09/2015 to 2/10/15	29 days		X					4L Jar CuSO4	X	X						147
Stockton North DDG	3/09/2015 to 2/10/15	29 days		X					4L Jar CuSO4	X	X						149
Stockton South DDG	3/09/2015 to 2/10/15	29 days		X					4L Jar CuSO4	X	X						147
Newcastle East DDG	3/09/2015 to 2/10/15	29 days		X					4L Jar CuSO4	X	X						144
Mayfield East Petri	9/9/15 11:45 to 11/9/15 16:20	62 hrs 35 mins			X				Petri Dish				X	X			
Waratah Petri	9/9/15 10:45 to 11/9/15 16:00	53 hrs 15 mins			X				Petri Dish				X	X			
Carrington Petri	2/10/2015 1:50:00 PM to 6/10/15 15:40	97hours 50 min			X				Petri Dish				X	X			
Newcastle Petri	2/10/2015 2:45:00 PM to 6/10/15 15:50	97hrs 5 mins			X				Petri Dish				X	X			
Broadmeadow Petri	015 3:10:00 PM to 6/10/15 16:10	97hrs			X				Petri Dish				X	X			
Warabrook Petri	015 4:05:00 PM to 6/10/15 16:30	96hrs 25mins			X				Petri Dish				X	X			

Comments: SIM, SEM, EDS, XRD and images to be undertaken by UQMP

Relinquished by: *[Signature]* Signed: *[Signature]*
 Date: 13/10/15 Date: 13/10/15
 Page 4 of 4 Page 4 of 4
 Reviewed by: *[Signature]* Reviewed by: *[Signature]*

Environmental Division
Newcastle
 Work Order Reference
EN1513412



Telephone : +61 2 4014 2500

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18