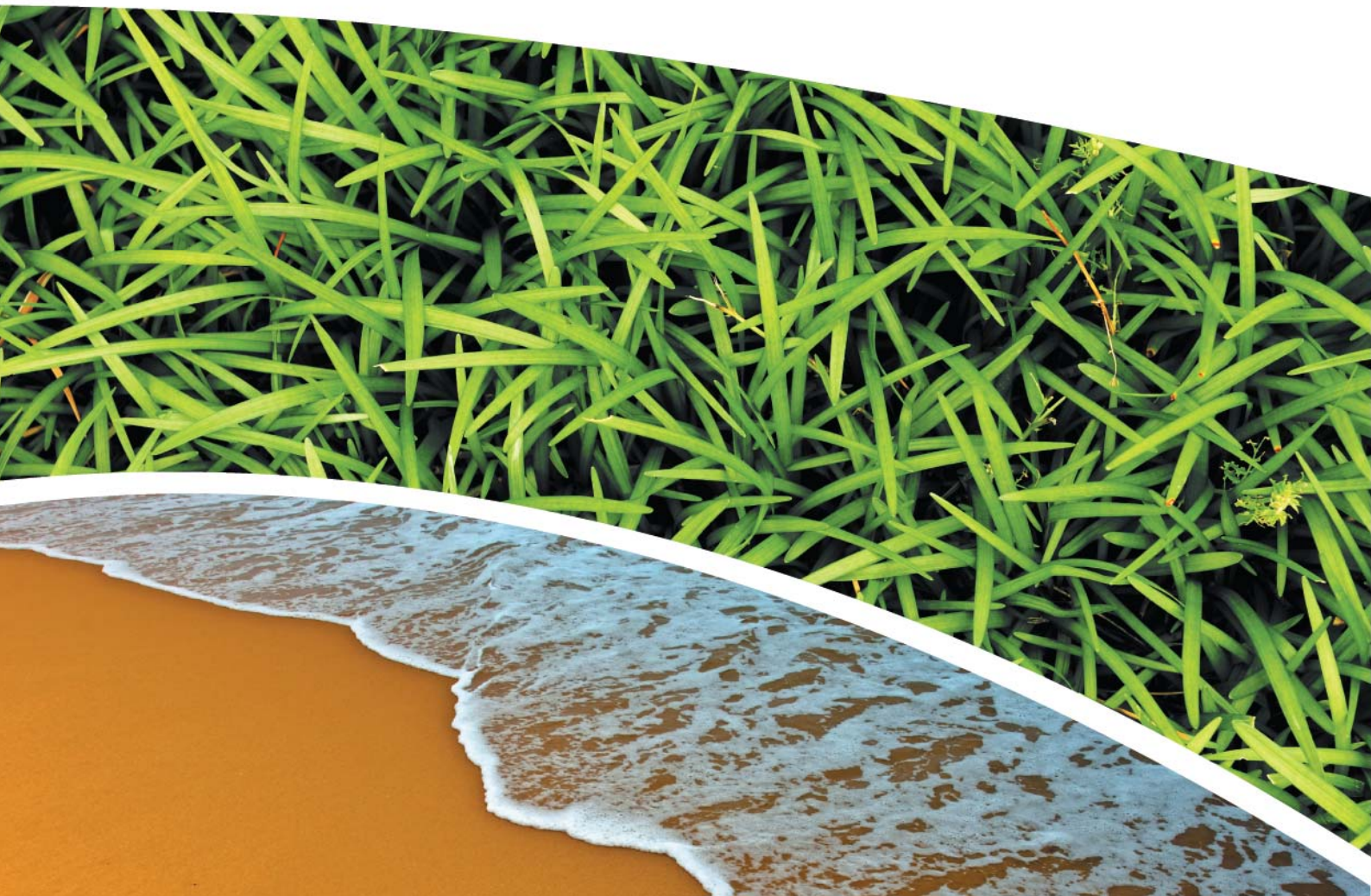
GROUND WATER, SURFACE WATER, DEPOSITIONAL DUST, HVAS AND METEOROLOGICAL MONITORING

Prepared for Pine Dale Mine Community Consultative Committee

Prepared by RCA Australia

RCA ref 6880-809/0
November 2012

RCA AUSTRALIA
GEOTECHNICAL • ENVIRONMENTAL



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DOCUMENT STATUS						
Rev No	Comment	Author	Reviewer	Approved for Issue (Project Manager)		
				Name	Signature	Date
/0	Final	K Shaw	K Tripp	K Tripp	KT	22.01.13

DOCUMENT DISTRIBUTION				
Rev No	Copies	Format	Issued to	Date
/0	1	Electronic (email)	Pine Dale Mine – Hilton Goldfinch hilton.a.goldfinch@bigpond.com	22.01.13
/0	1	Electronic (email)	Truenergy- Mark Frewin mark.frewin@truenergy.com.au	22.01.13
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/0	1	Bound report	Pine Dale Mine – Hilton Goldfinch PO Box 202, Wallerawang NSW 2845	22.01.13
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RCA LE ref 6880-809/0

22 January 2013

Pine Dale Mine
PO Box 202
WALLERAWANG NSW 2845

Attention: Mr Hilton Goldfinch

REPORT COMPILED FOR

PINE DALE MINE COMMUNITY CONSULTATIVE COMMITTEE

DETAILING GROUND WATER, DEPOSITIONAL DUST HVAS AND METEOROLOGICAL MONITORING

NOVEMBER 2012

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1 GENERAL COMMENTS

Job Number: 6880.

Date Samples Received: During the month of November 2012.

Samples received were sampled by RCA Laboratories – Environmental staff.

2 ANALYTICAL PROCEDURES

The analytical procedures used by RCA Laboratories – Environmental are based on established internationally recognised procedures such as APHA and Australian Standards. Analytical test methods are detailed in **Table 1**. When an external testing laboratory is used to obtain the analysis of samples which become a part of this report, then the details of that laboratory's official report will be attached in an Appendix.

Table 1 *Analytical Test Methods*

ANALYSIS	METHOD	UNITS	ANALYSING LABORATORY	NATA / NON-NATA ANALYSIS
Determination of Suspended Particulate Matter	ENV-LAB003	$\mu g/m^3$	RCA Laboratories - Environmental	NATA Analysis
Determination of Particulate Matter – Deposited Matter	ENV-LAB004	$g/m^2/month$	RCA Laboratories - Environmental	NATA Analysis
pH	ENV-LAB006	pH	RCA Laboratories - Environmental	NATA Analysis
Conductivity	ENV-LAB010	µS/cm	RCA Laboratories - Environmental	NATA Analysis
Total Dissolved Solids	ENV-LAB020	mg/L	RCA Laboratories - Environmental	NATA Analysis
Turbidity	ENV-LAB037	NTU	RCA Laboratories - Environmental	NATA Analysis
Oil and Grease	ENV-LAB022	mg/L	RCA Laboratories - Environmental	Non-NATA Analysis
Major Anions (Alkalinity, Cl, SO_4)	ED037, ED041, ED045	mg/L	ALS	NATA Analysis
Major Cations (Ca, Mg, Na, K)	ED093	mg/L	ALS	NATA Analysis
Dissolved Metals	EG020F	mg/L	ALS	NATA Analysis

3 WATER ANALYSIS RESULTS

3.1 GROUNDWATER

A total of 5 on-site groundwater samples were collected during the month of November 2012. No sample was collected from groundwater monitoring location P4 as the bore did not contain sufficient water to sample.

Water quality analysis results are shown in **Table 2**.

Table 2 *Groundwater Analysis Results*

ANALYSIS	UNITS	P2	P3	P6	P7	P7a
Sample Number		11126880019	11126880020	11126880010	11126880021	11126880022
Date Sampled	-	22/11/2012	22/11/2012	22/11/2012	22/11/2012	22/11/2012
Time Sampled	-	14:48	14:41	13:35	13:51	13:55
Standing Water Level	m	5.46	6.02	28.05	8.12	6.12
Standpipe Height	m	0.95	0.66	0.95	1.00	0.90
Relative Standing Water Level*	m	4.51	5.36	27.10	7.12	5.22
pH	pH unit	4.9	4.4	6.6	6.6	6.7
Conductivity	µS/cm	476	754	991	745	807

NOTES:
*****Depth relative to ground level (not standpipe height).

Groundwater monitoring locations are shown in **Appendix 1**.

3.2 EPA SURFACE WATER MONITORING

Routine quarterly surface water monitoring was undertaken during the month of November 2012 at three surface water sites. Water quality analysis results are shown in **Table 3**.

Table 3 *EPA Surface Water Analysis Results*

ANALYSIS	UNITS	EPA Point 2 Neubeck's Ck Upstream	EPA Point 3 Neubeck's Ck Downstream	EPA Point 14 Cox's River Downstream
Sample Number	-	11126880046	11126880014	11126880051
Date Sampled	-	22/11/2012	22/11/2012	22/11/2012
Time Sampled	-	11:11	15:53	17:04
Temperature	°C	16.0	23.0	21.5
Flow	-	Still	Slow	Moderate
pH	pH	7.3	8.0	8.2
Conductivity	µS/cm	1001	1251	965
Turbidity	NTU	3.2	3.4	2.5
Total Suspended Solids	mg/L	<5	<5	<5
Sulfate	mg/L	402	617	117
Dissolved Iron	mg/L	0.13	0.08	0.14

4 AIR QUALITY MONITORING RESULTS

4.1 HIGH VOLUME AIR SAMPLERS (HVAS)

HVAS at this facility conform to AS/NZS 3580.9.3:2003, AS/NZS 3580.9.6:2003 and AS/NZS 3580.1.1:2007.

HVAS Total Suspended Particulate analysis results are shown in **Table 3**; PM_{10} Suspended Particulate Matter results are shown in **Table 4**.

Table 3 *Total Suspended Particulates (µg/m³ 0°C 101.3 kPa)*

RUN DATE	TSP (µg/m^3)	SAMPLE NO	FILTER NO	DATE FILTER OFF	TIME FILTER OFF	FIELD TECH	HOURS RUN
04-Nov-12	31	11126880052	8580268	07-Nov-12	12:40	Client	24.00
10-Nov-12	14	11126880054	8580270	13-Nov-12	12:55	Client	24.00
16-Nov-12	7	11126880057	8580273	19-Nov-12	11:50	Client	24.00
22-Nov-12	18	11126880058	8580274	23-Nov-12	6:23	Client	24.06
28-Nov-12	30	11126880060	8580238	30-Nov-12	11:15	Client	24.00

Table 4 *Suspended Particulate Matter PM_{10} ($\mu g/m^3$ 0^oC 101.3 kPa)*

RUN DATE	PM_{10} ($\mu g/m^3$)	SAMPLE NO	FILTER NO	DATE FILTER OFF	TIME FILTER OFF	FIELD TECH	HOURS RUN
04-Nov-12	18	11126880053	8580269	07-Nov-12	12:40	Client	24.00
10-Nov-12	11	11126880055	8580271	13-Nov-12	12:55	Client	24.00
16-Nov-12	5	11126880056	8580272	19-Nov-12	11:50	Client	24.00
22-Nov-12	13	11126880059	8580275	23-Nov-12	6:30	Client	24.00
28-Nov-12	12	11126880061	8580239	30-Nov-12	11:15	Client	24.00

4.1.1 Allowable TSP Limits

The EPA Annual Mean TSP limit is 90µg/m^3. All TSP HVAS results during this monitoring period are in compliance with consent conditions, as the *current rolling annual mean* (from December 2011 to November 2012) for the TSP unit is 23.1µg/m^3, which is well below the allowable limit of 90µg/m^3.

4.1.2 Allowable PM_{10} Limits

The EPA 24h Maximum PM_{10} Limit is 50µg/m^3. The EPA Annual Mean PM_{10} limit is 30µg/m^3. All PM_{10} HVAS results during this monitoring period are in compliance with consent conditions, as the *current rolling annual mean* for the PM_{10} unit is 10.9µg/m^3, which is below the allowable limit of 30µg/m^3 and the 24 hour maximum was not exceeded on any run day during the month.

4.1.3 Comments

HVAS monitoring locations are shown in **Appendix 1**.

Graphical HVAS results presentations are shown in **Appendix 2**.

4.2 DEPOSITIONAL DUST

Depositional Dust Gauges at this facility conform to AS/NZS 3580.10.1:2003 and AS/NZS 3580.1.1:2007. Depositional Dust monitoring results are shown in **Table 5**.

Table 5 *Deposited Matter (g/m^2/month)*

SAMPLE NO	DEPOSIT GAUGE	DATE SAMPLE STARTED	DATE SAMPLE COMPLETED	NO OF DAYS	NOTES	INSOLUBLE SOLIDS (g/m^2/month)	ASH (g/m^2/month)	COMBUSTIBLE MATTER (g/m^2/month)
11126880033	D1	26/10/2012	23/11/2012	28	I	1.4	0.8	0.6
11126880034	D2	26/10/2012	23/11/2012	28	I	0.9	0.5	0.4
11126880035	D3	26/10/2012	23/11/2012	28	I	1.4	1.0	0.4
11126880036	D4	26/10/2012	23/11/2012	28	I	0.6	0.3	0.3
11126880037	D5	26/10/2012	23/11/2012	28	B	3.6	1.2	2.4
11126880038	D6	26/10/2012	23/11/2012	28	I	0.7	0.4	0.3

4.2.1 Glossary of Terms Used in Notes

I Insects (e.g. Ants, spiders)
B Bird Droppings

4.2.2 Allowable Depositional Dust Limits

The EPA Long Term (Annual Average) Dust Limit is $4g/m^2$ per month. All Depositional Dust results during this monitoring period are in compliance with consent conditions. The Annual Average for Dust Gauges D1, D2, D3, D4, D5 and D6 are all $1.0g/m^2$ per month or less, which is below the allowable Annual Average Long Term Limit of $4g/m^2$ per month.
Depositional Dust monitoring locations are shown in **Appendix 1**.
Graphical Depositional Dust results are shown in **Appendix 2**.

4.3 BLASTING

Blasting results for the month of November are shown in **Table 6**.

Table 6 *Blasting Results- Airblast Overpressure (dB) and Ground Vibration (mm/sec)*

Date	***Park***		***Noon St.***		***Summer St.***	
	Overpressure (dB)	Vibration (mm/sec)	Overpressure (dB)	Vibration (mm/sec)	Overpressure (dB)	Vibration (mm/sec)
7/11/2012	NT	NT	103.9	0.38	95.7	0.10
28/11/2012	NT	NT	110.1	1.61	113.7	1.61
2012 Year to Date Information						
Minimum	103.9	0.32	103.6	0.33	95.7	0.10
Average	109.1	2.14	110.0	1.33	109.8	1.74
Maximum	114.6	3.95	114.4	2.69	116.3	4.58
% > EPL 95% Compliance Criteria	0%	0%	0%	0%	3%	0%
% > EPL 100% Compliance Criteria	0%	0%	0%	0%	0%	0%

Notes: NT No Trigger

4.3.1 Allowable Blasting Limits

Conditions of EPL 4911 state that in relation to airblast overpressure levels a result of greater than 115dB must not be observed at any noise sensitive location for more than 5% of the total number of blasts over each annual reporting period. All blasts within the annual reporting period (100% of blasts) are not to exceed the compliance criteria of 120dB. Ground vibration peak velocity levels must not exceed 5mm/sec for 95% of blasts, whilst an intensity of 10mm/sec must not be exceeded by any blast during the reporting period. Pine Dale Mine's reporting period runs from 1 January 2012- 31 December 2012.

During November 2012, there were nil exceedances of the EPL conditions for both overpressure and vibration levels. Year- to- date, zero blasts have exceeded the 100% compliance conditions of 120dB and 10mm/sec for overpressure and vibration respectively. Overpressure and vibration criteria of 115dB and 5mm/sec, respectively, have not been exceeded for more than 5% of the blasts during the 2012 reporting period. Please note that data for the full reporting period has yet to be collected.
Graphical blasting results from overpressure and vibration are presented in **Appendix 2**.

5 SUMMARY

During the month of November 2012 all environmental monitoring constituents were found to be in compliance with EPL 4911.

Quarterly surface water sampling was conducted in November 2012. All required sites were sampled during this monitoring round. EPA Points 4, 5 and 13 were not sampled this month because the site was not discharging.

Rolling annual averages from both the TSP and PM_{10} High Volume Air Samplers are currently well below the EPA Annual Mean TSP and PM_{10} criterion of 90µg/m^3 and 30µg/m^3 respectively. There were zero exceedances of the PM_{10} short term impact assessment criteria of 50µg/m^3 over twenty-four hours during November 2012.

Currently there are no depositional dust gauge results which are greater than the EPA Long Term (annual average) criteria of 4g/m^2/month based upon a rolling average of the past 12 months.

During November there were nil exceedances of the blasting requirements as outlined in Pine Dale Mine's EPL. During the 2012 reporting period to date, there are no non-compliances based upon the 95% or 100% limits for either overpressure or vibration levels.

Please contact the undersigned if you have any queries.
Yours sincerely

Katy Shaw
Environmental Scientist
RCA Australia Pty Ltd trading as
RCA Laboratories – Environmental

Karen Tripp
Senior Environmental Scientist / Hygienist
RCA Australia Pty Ltd trading as
RCA Laboratories – Environmental

Appendix 1

Groundwater and Air Quality Monitoring Locations

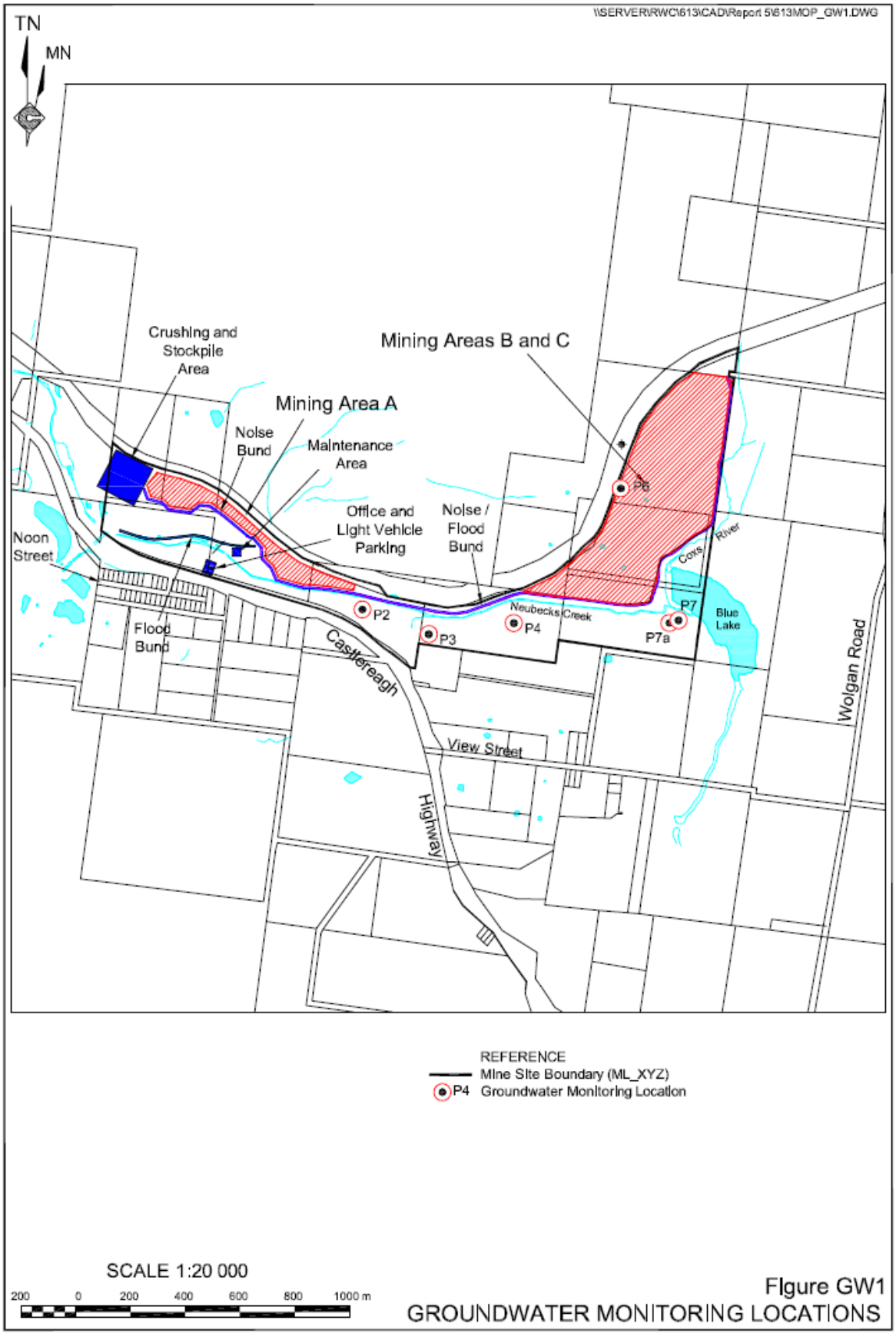


Figure GW1
GROUNDWATER MONITORING LOCATIONS

R.W. CORKERY & CO. PTY. LIMITED

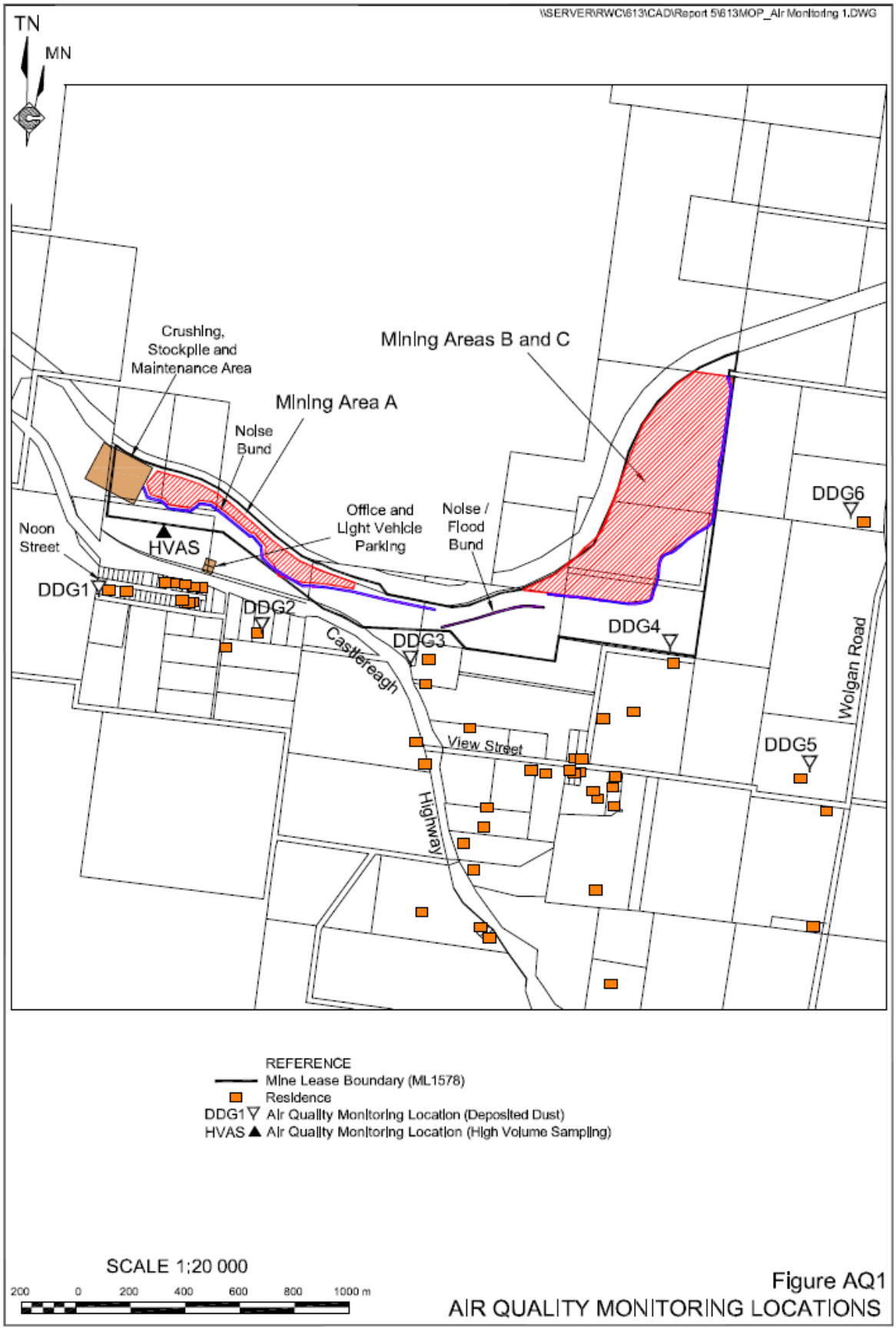
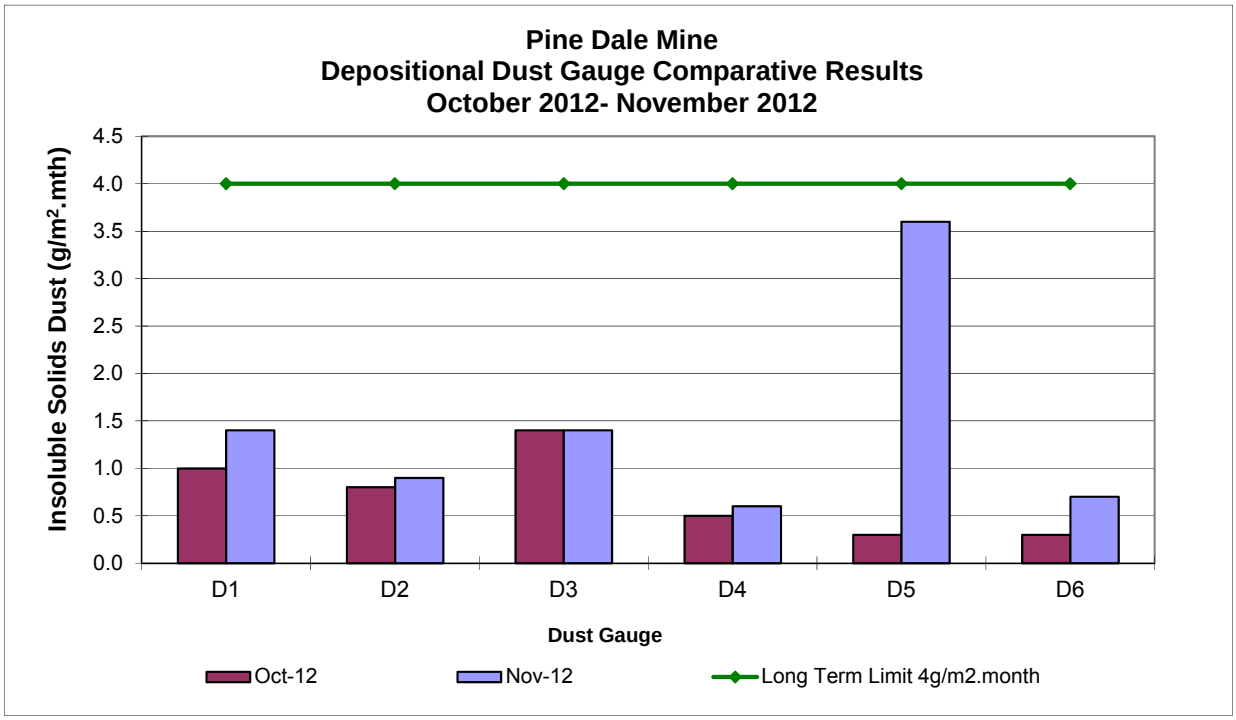


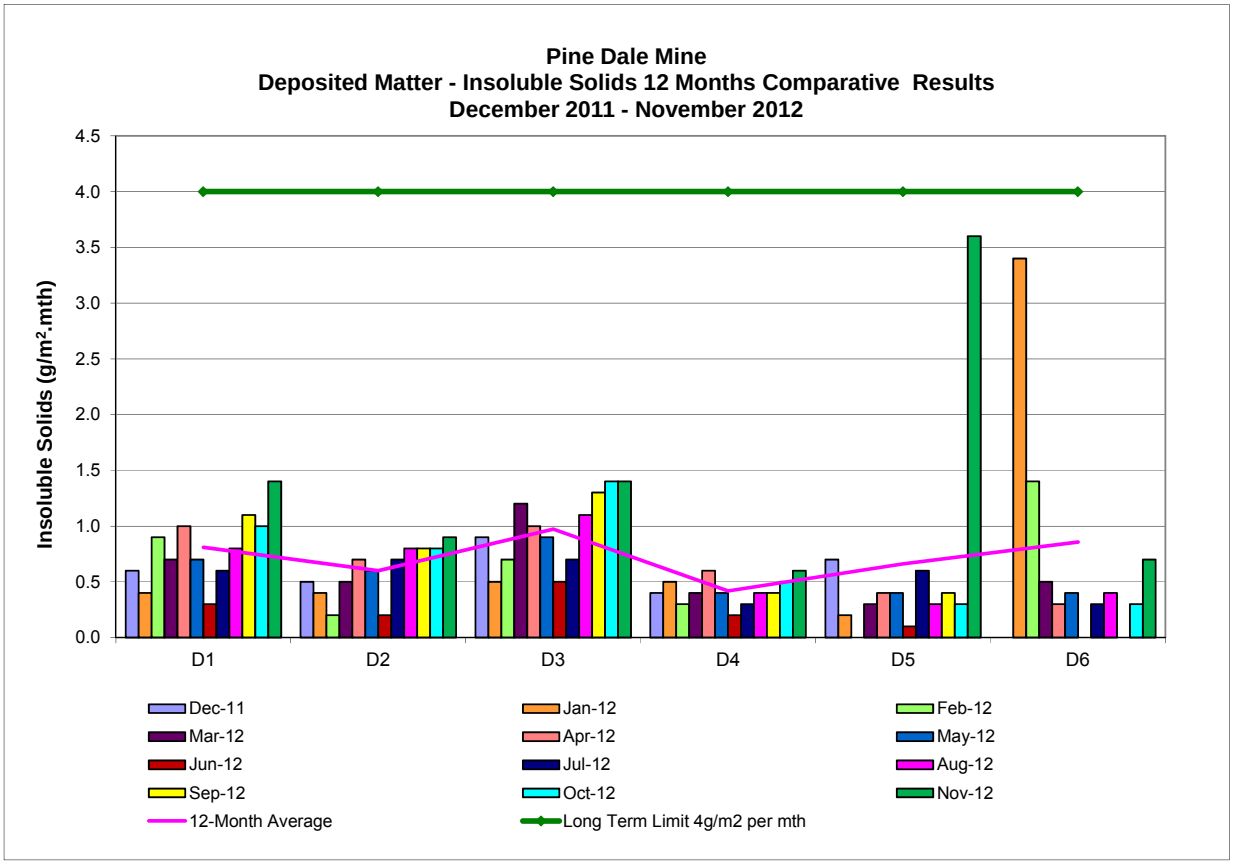
Figure AQ1
AIR QUALITY MONITORING LOCATIONS

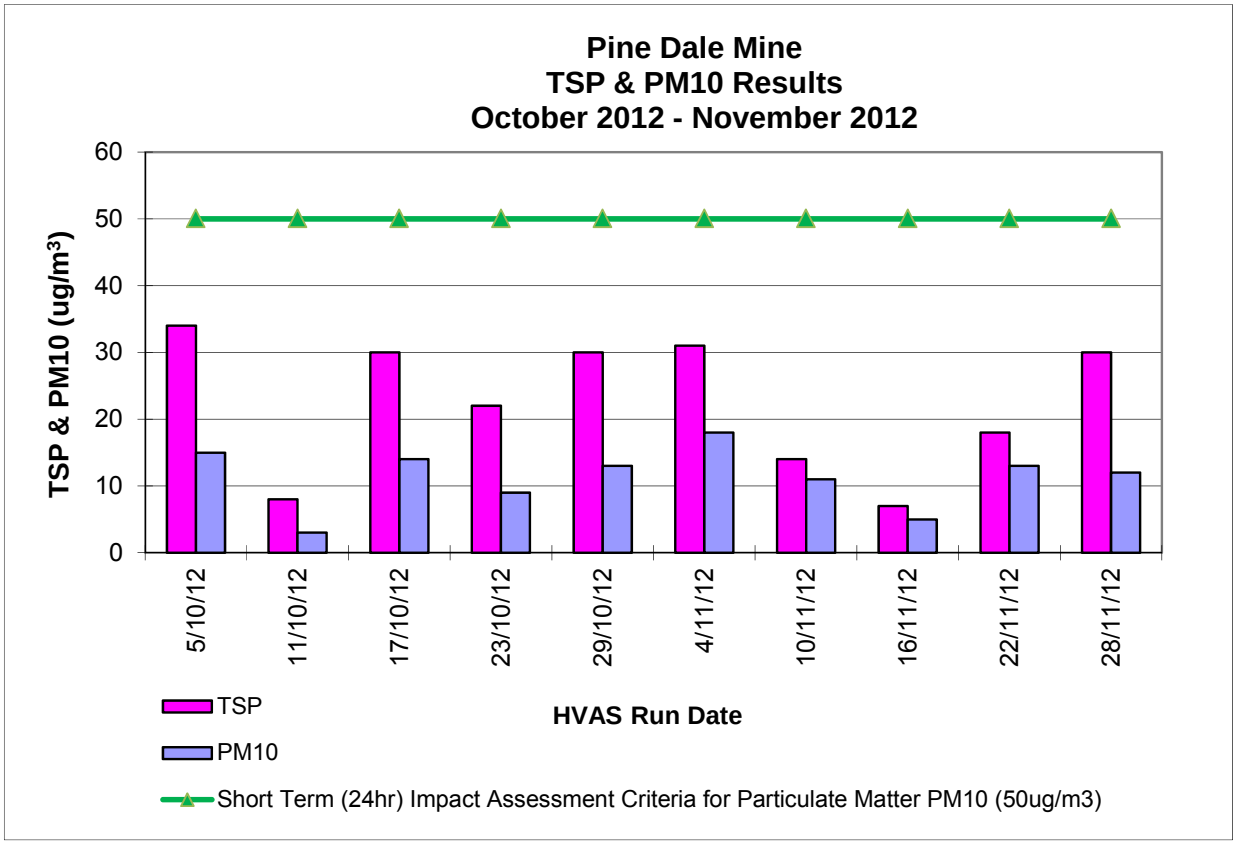
R.W. CORKERY & CO. PTY. LIMITED

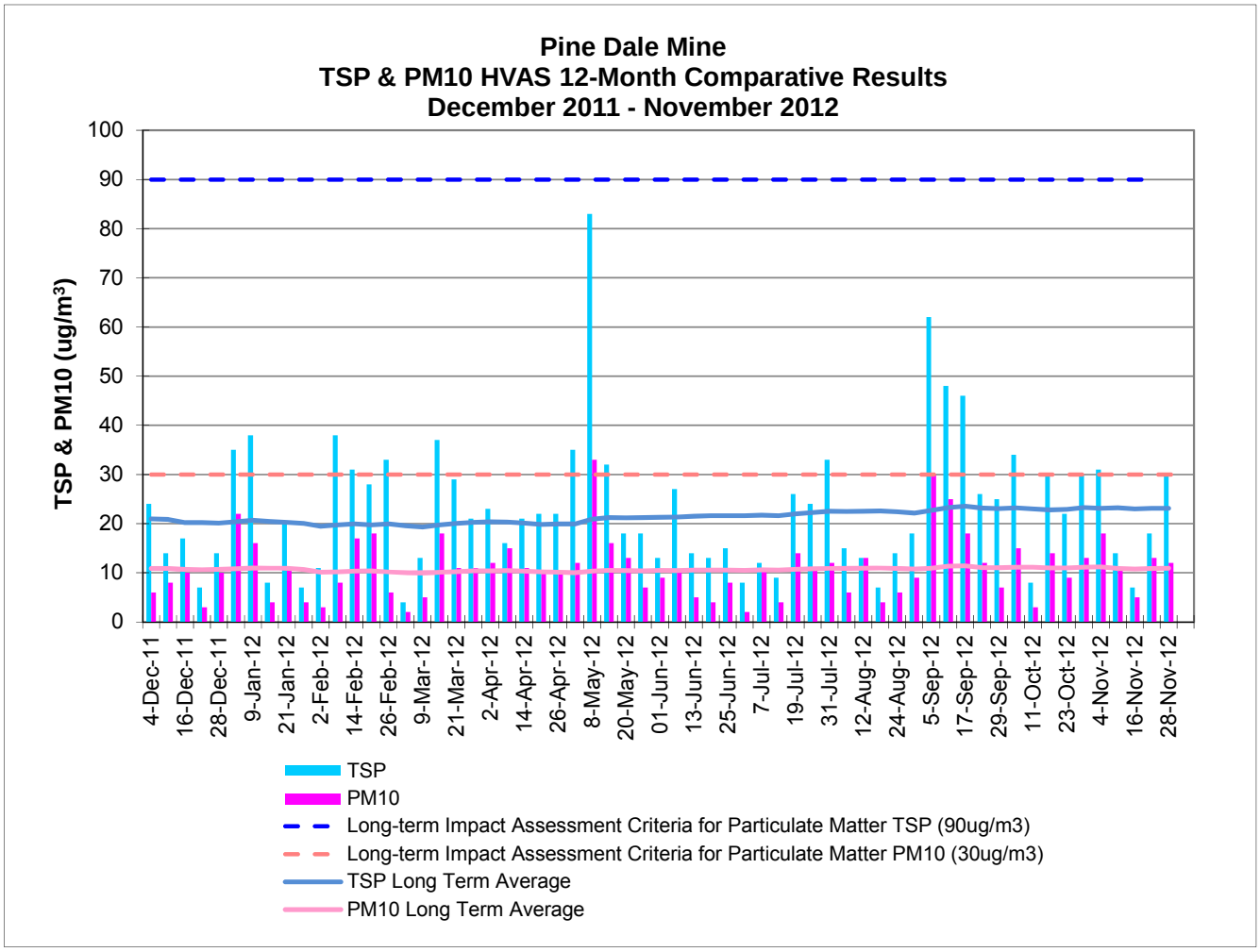
Appendix 2

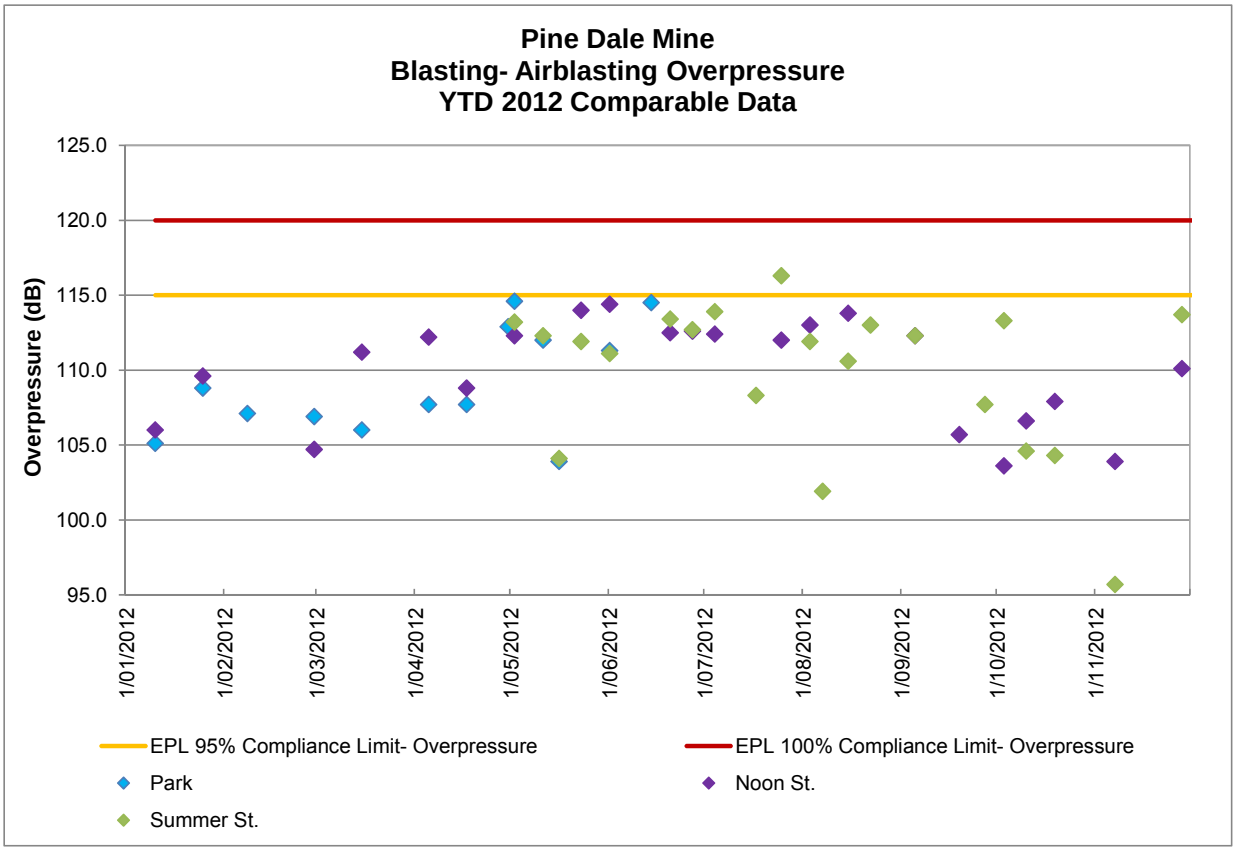
Depositional Dust, HVAS and Blast Result Graphs

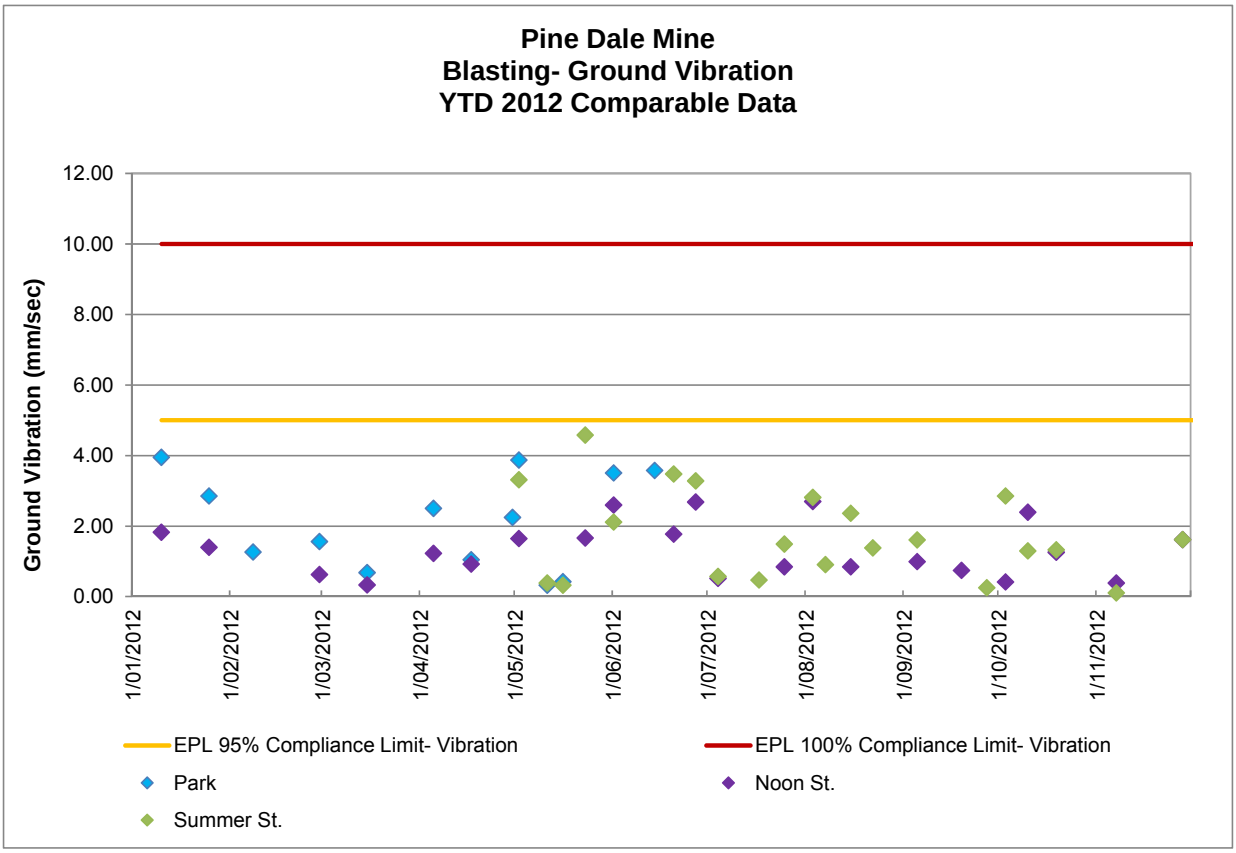

Pine Dale Mine
Depositional Dust Gauge Comparative Results
October 2012- November 2012
Insoluble Solids Dust (g/m².mth)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
D1
D2
D3
D4
D5
D6
Dust Gauge
Oct-12
Nov-12
Long Term Limit 4g/m2.month


Pine Dale Mine
Deposited Matter - Insoluble Solids 12 Months Comparative Results
December 2011 - November 2012
Insoluble Solids (g/m².mth)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
D1
D2
D3
D4
D5
D6
Dec-11
Jan-12
Feb-12
Mar-12
Apr-12
May-12
Jun-12
Jul-12
Aug-12
Sep-12
Oct-12
Nov-12
12-Month Average
Long Term Limit 4g/m2 per mth


Pine Dale Mine
TSP & PM10 Results
October 2012 - November 2012
TSP & PM10 (ug/m³)
60
50
40
30
20
10
0
5/10/12
11/10/12
17/10/12
23/10/12
29/10/12
4/11/12
10/11/12
16/11/12
22/11/12
28/11/12
HVAS Run Date
TSP
PM10
Short Term (24hr) Impact Assessment Criteria for Particulate Matter PM10 (50ug/m3)

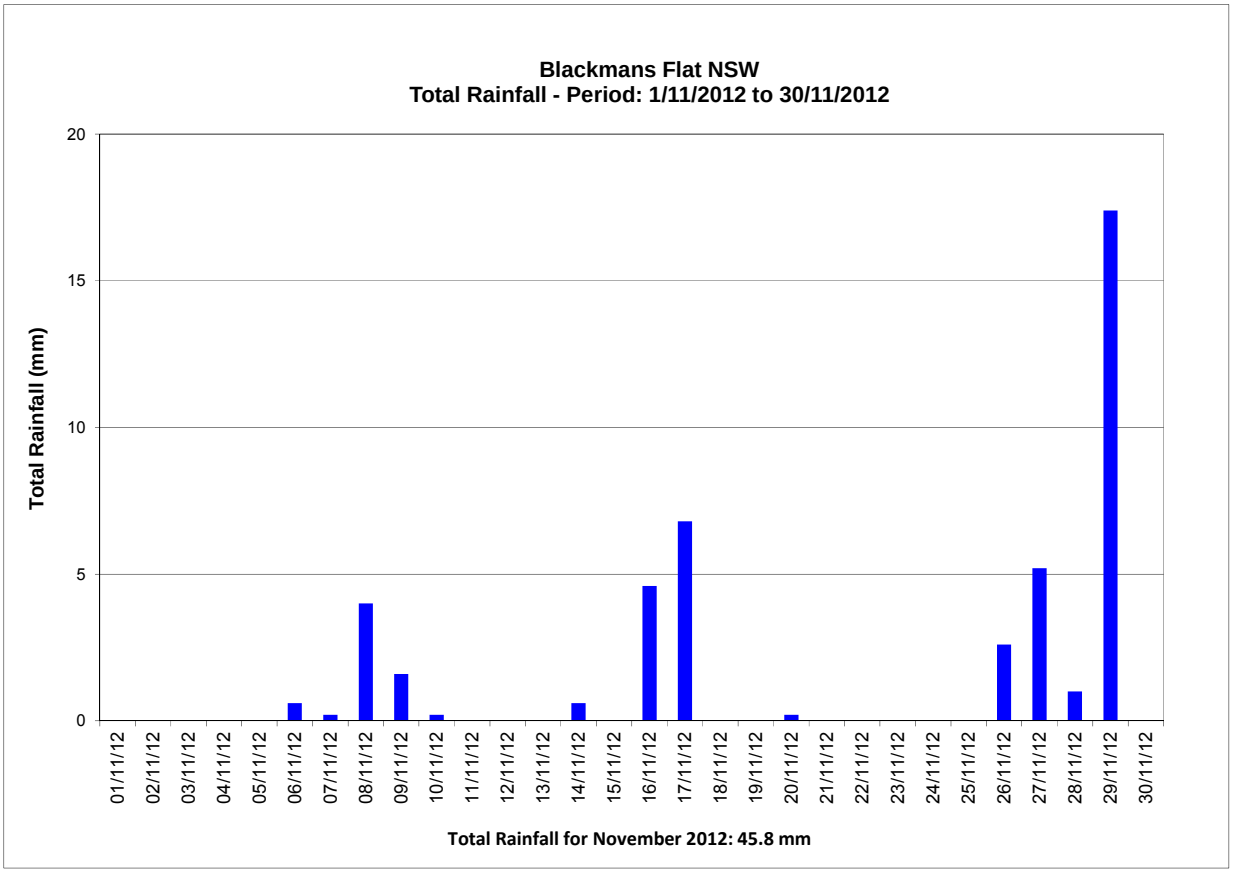

Pine Dale Mine
TSP & PM10 HVAS 12-Month Comparative Results
December 2011 - November 2012
TSP & PM10 (ug/m³)
100
90
80
70
60
50
40
30
20
10
0
4-Dec-11
16-Dec-11
28-Dec-11
9-Jan-12
21-Jan-12
2-Feb-12
14-Feb-12
26-Feb-12
9-Mar-12
21-Mar-12
2-Apr-12
14-Apr-12
26-Apr-12
8-May-12
20-May-12
01-Jun-12
13-Jun-12
25-Jun-12
7-Jul-12
19-Jul-12
31-Jul-12
12-Aug-12
24-Aug-12
5-Sep-12
17-Sep-12
29-Sep-12
11-Oct-12
23-Oct-12
4-Nov-12
16-Nov-12
28-Nov-12
TSP
PM10
Long-term Impact Assessment Criteria for Particulate Matter TSP (90ug/m3)
Long-term Impact Assessment Criteria for Particulate Matter PM10 (30ug/m3)
TSP Long Term Average
PM10 Long Term Average

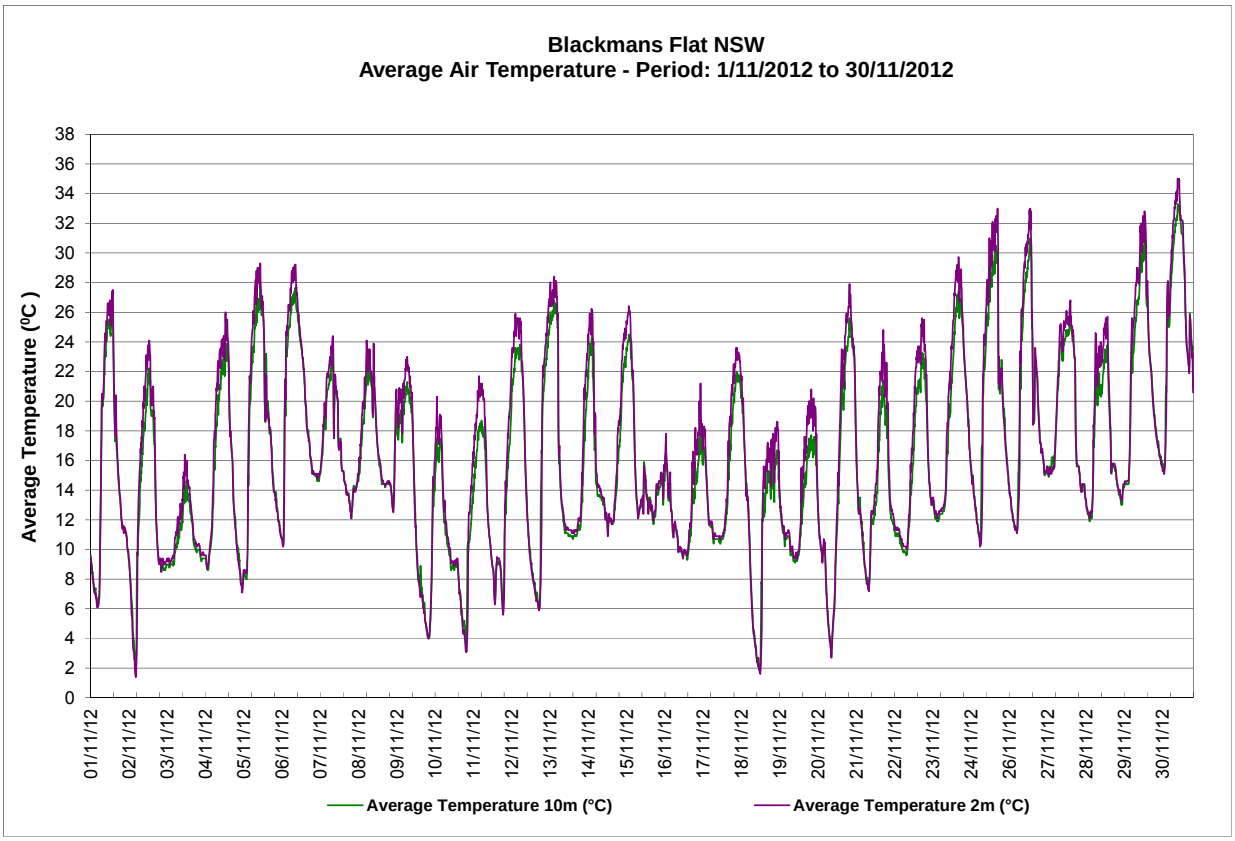

Pine Dale Mine
Blasting- Airblasting Overpressure
YTD 2012 Comparable Data
Overpressure (dB)
125.0
120.0
115.0
110.0
105.0
100.0
95.0
1/01/2012
1/02/2012
1/03/2012
1/04/2012
1/05/2012
1/06/2012
1/07/2012
1/08/2012
1/09/2012
1/10/2012
1/11/2012
EPL 95% Compliance Limit- Overpressure
EPL 100% Compliance Limit- Overpressure
Park
Noon St.
Summer St.

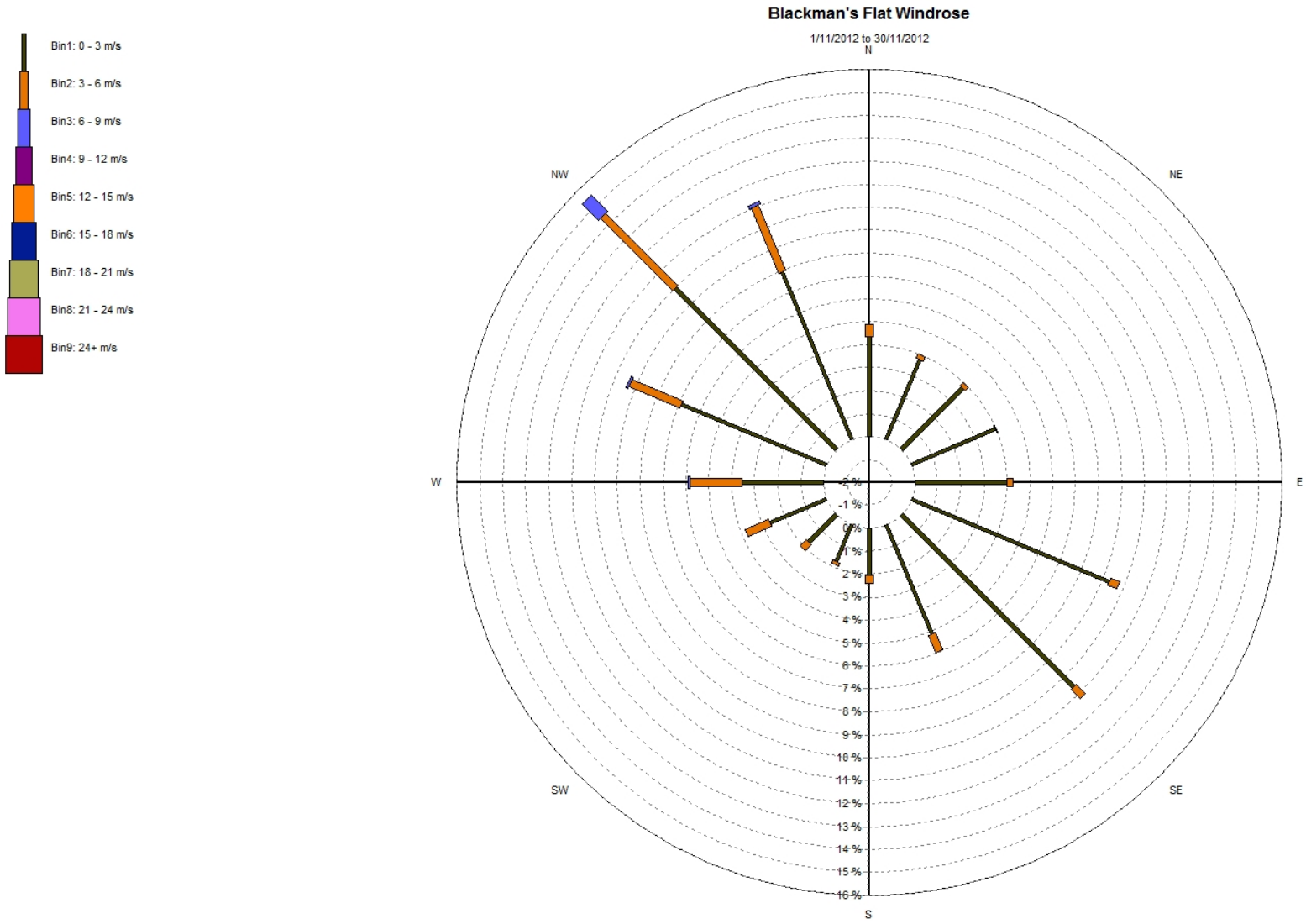

Pine Dale Mine
Blasting- Ground Vibration
YTD 2012 Comparable Data
Ground Vibration (mm/sec)
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2012
1/02/2012
1/03/2012
1/04/2012
1/05/2012
1/06/2012
1/07/2012
1/08/2012
1/09/2012
1/10/2012
1/11/2012
EPL 95% Compliance Limit- Vibration
EPL 100% Compliance Limit- Vibration
Park
Noon St.
Summer St.

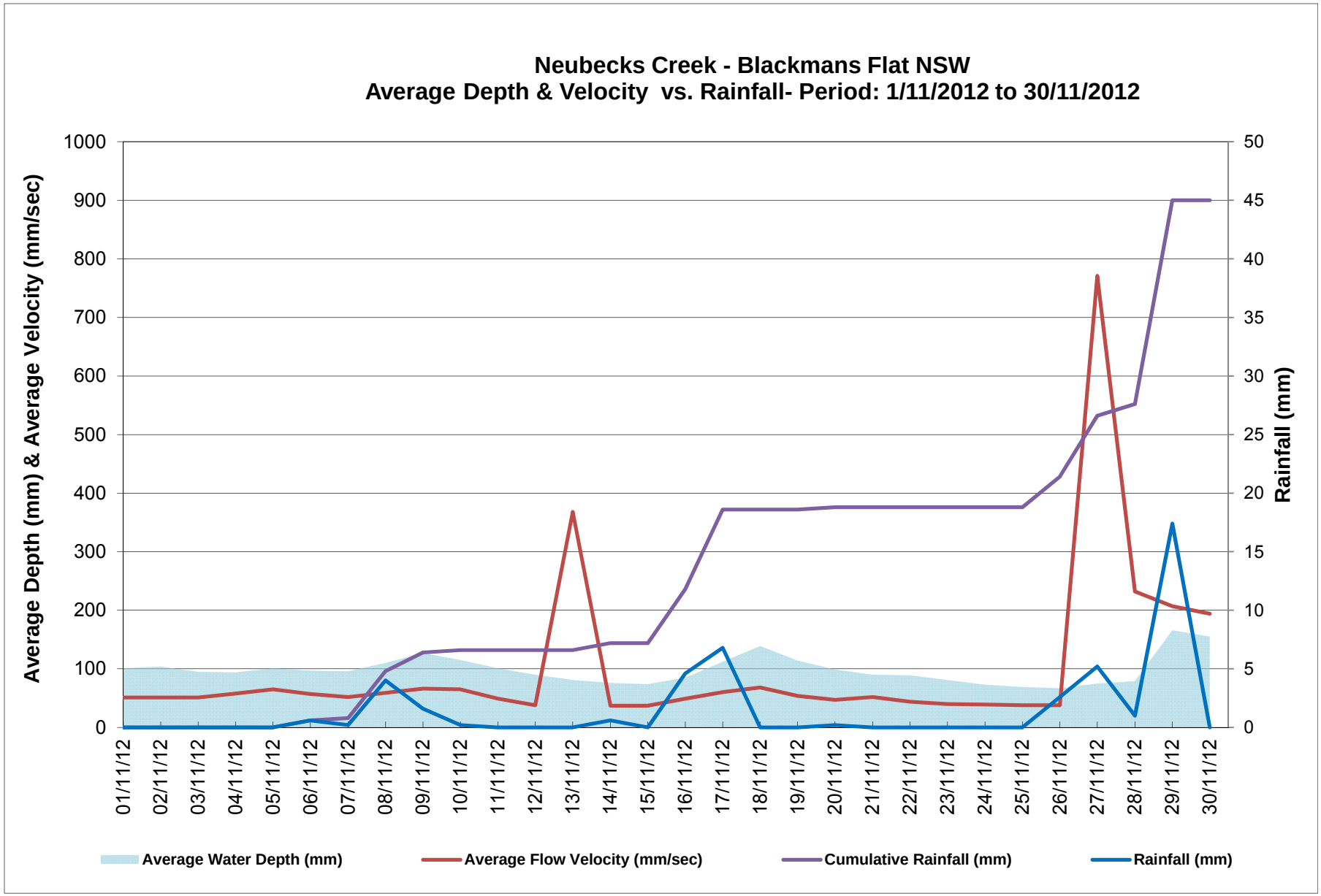
Appendix 3

Meteorological Data


Blackmans Flat NSW
Total Rainfall - Period: 1/11/2012 to 30/11/2012
Total Rainfall (mm)
0
5
10
15
20
01/11/12
02/11/12
03/11/12
04/11/12
05/11/12
06/11/12
07/11/12
08/11/12
09/11/12
10/11/12
11/11/12
12/11/12
13/11/12
14/11/12
15/11/12
16/11/12
17/11/12
18/11/12
19/11/12
20/11/12
21/11/12
22/11/12
23/11/12
24/11/12
25/11/12
26/11/12
27/11/12
28/11/12
29/11/12
30/11/12
Total Rainfall for November 2012: 45.8 mm


Blackmans Flat NSW
Average Air Temperature - Period: 1/11/2012 to 30/11/2012
Average Temperature (ºC)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
01/11/12
02/11/12
03/11/12
04/11/12
05/11/12
06/11/12
07/11/12
08/11/12
09/11/12
10/11/12
11/11/12
12/11/12
13/11/12
14/11/12
15/11/12
16/11/12
17/11/12
18/11/12
19/11/12
20/11/12
21/11/12
22/11/12
23/11/12
24/11/12
26/11/12
27/11/12
28/11/12
29/11/12
30/11/12
Average Temperature 10m (°C)
Average Temperature 2m (°C)


Blackman's Flat Windrose
1/11/2012 to 30/11/2012
Bin1: 0 - 3 m/s
Bin2: 3 - 6 m/s
Bin3: 6 - 9 m/s
Bin4: 9 - 12 m/s
Bin5: 12 - 15 m/s
Bin6: 15 - 18 m/s
Bin7: 18 - 21 m/s
Bin8: 21 - 24 m/s
Bin9: 24+ m/s
N
NE
E
SE
S
SW
W
NW
-2 %
-1 %
0 %
1 %
2 %
3 %
4 %
5 %
6 %
7 %
8 %
9 %
10 %
11 %
12 %
13 %
14 %
15 %
16 %


Neubecks Creek - Blackmans Flat NSW
Average Depth & Velocity vs. Rainfall- Period: 1/11/2012 to 30/11/2012
Average Depth (mm) & Average Velocity (mm/sec)
Rainfall (mm)
1000
900
800
700
600
500
400
300
200
100
0
50
45
40
35
30
25
20
15
10
5
0
01/11/12
02/11/12
03/11/12
04/11/12
05/11/12
06/11/12
07/11/12
08/11/12
09/11/12
10/11/12
11/11/12
12/11/12
13/11/12
14/11/12
15/11/12
16/11/12
17/11/12
18/11/12
19/11/12
20/11/12
21/11/12
22/11/12
23/11/12
24/11/12
25/11/12
26/11/12
27/11/12
28/11/12
29/11/12
30/11/12
Average Water Depth (mm)
Average Flow Velocity (mm/sec)
Cumulative Rainfall (mm)
Rainfall (mm)