

APPENDIX S –

PROPOSED MATIMBA B POWER STATION - ATMOSPHERIC DISPERSION SIMULATION RESULTS – MAXIMUM HOURLY, DAILY AND ANNUAL CONCENTRATIONS DUE TO VARIOUS POWER STATION CONFIGURATION SCENARIOS

NOTE: PM10 Concentrations given in tables is due exclusively to stack emissions – including primary particulate releases and secondary particulate formation following atmospheric conversion of SO_x and NO_x emissions. Total PM10 concentrations due to all sources, stacks and fugitive dust sources, are depicted in Appendix U.

SCENARIO A.1 - Predicted SO₂, NO, NO₂ and PM10 concentrations occurring – given at the point of maximum ground level concentration (glc) and at nearby sensitive receptor locations. (Exceedance of air quality limit values indicated in bold.)

Location	Sulphur Dioxide Concentrations			Nitric Oxide Concentrations			Nitrogen Dioxide Concentrations			PM10 Concentrations	
	Highest Hourly (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)	Highest Hourly (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)	Highest Hourly (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)
GLC Maximum	1993.7	176.7	26.8	392.6	33.9	4.0	128.2	23.8	1.9	8.4	0.6
Marapong	1231.9	110.7	5.1	248.5	21.2	0.7	46.6	6.3	0.4	8.2	0.3
Onverwacht (maximum)	891.6	61.7	5.4	178.3	7.2	0.6	96.3	8.8	0.6	4.2	0.3
Onverwacht (central)	610.9	41.0	3.9	99.7	6.2	0.4	56.5	5.2	0.4	4.9	0.2
Air Quality Limit Value	350	125	50	750	375	188	200	188	40	75	40

	Predicted Sulphur Dioxide Concentrations as a Fraction of the Selected Limit			Predicted Nitric Oxide Concentrations as a Fraction of the Selected Limit			Predicted Nitrogen Dioxide Concentrations as a Fraction of the Selected Limit			Predicted PM10 Levels as a Fraction of Selected Limit	
	Highest Hourly	Highest Daily	Annual Average	Highest Hourly	Highest Daily	Annual Average	Highest Hourly	Highest Daily	Annual Average	Highest Daily	Annual Average
GLC Maximum	5.70	1.41	0.54	0.52	0.09	0.02	0.64	0.12	0.05	0.11	0.02
Marapong	3.52	0.89	0.10	0.33	0.06	0.00	0.23	0.03	0.01	0.11	0.01
Onverwacht (maximum)	2.55	0.49	0.11	0.24	0.02	0.00	0.48	0.05	0.01	0.06	0.01
Onverwacht (central)	1.75	0.33	0.08	0.13	0.02	0.00	0.28	0.03	0.01	0.07	0.01

SCENARIO B.1 - Predicted SO₂, NO, NO₂ and PM10 concentrations occurring – given at the point of maximum ground level concentration (glc) and at nearby sensitive receptor locations. (Exceedance of air quality limit values indicated in bold.)

Location	Sulphur Dioxide Concentrations			Nitric Oxide Concentrations			Nitrogen Dioxide Concentrations			PM10 Concentrations	
	Highest Hourly (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)	Highest Hourly (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)	Highest Hourly (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)
GLC Maximum	1993.7	171.6	23.2	392.6	33.9	4.0	124.5	23.8	1.8	8.3	0.6
Marapong	1231.9	115.5	4.7	248.5	21.2	0.6	47.8	6.8	0.3	8.1	0.2
Onverwacht (maximum)	891.6	47.4	5.0	178.3	7.2	0.6	78.8	7.7	0.5	4.8	0.3
Onverwacht (central)	610.9	35.8	3.6	99.7	6.2	0.4	56.5	5.0	0.4	5.1	0.2

Air Quality Limit Value	350	125	50	750	375	188	200	188	40	75	40
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	Predicted Sulphur Dioxide Concentrations as a Fraction of the Selected Limit			Predicted Nitric Oxide Concentrations as a Fraction of the Selected Limit			Predicted Nitrogen Dioxide Concentrations as a Fraction of the Selected Limit			Predicted PM10 Levels as a Fraction of Selected Limit	
	Highest Hourly	Highest Daily	Annual Average	Highest Hourly	Highest Daily	Annual Average	Highest Hourly	Highest Daily	Annual Average	Highest Daily	Annual Average
GLC Maximum	5.70	1.37	0.46	0.52	0.09	0.02	0.62	0.12	0.05	0.11	0.02
Marapong	3.52	0.92	0.09	0.33	0.06	0.00	0.24	0.04	0.01	0.11	0.01
Onverwacht (maximum)	2.55	0.38	0.10	0.24	0.02	0.00	0.39	0.04	0.01	0.06	0.01
Onverwacht (central)	1.75	0.29	0.07	0.13	0.02	0.00	0.28	0.03	0.01	0.07	0.01

SCENARIO C.1 - Predicted SO₂, NO, NO₂ and PM10 concentrations occurring – given at the point of maximum ground level concentration (glc) and at nearby sensitive receptor locations. (Exceedance of air quality limit values indicated in bold.)

Location	Sulphur Dioxide Concentrations			Nitric Oxide Concentrations			Nitrogen Dioxide Concentrations			PM10 Concentrations	
	Highest Hourly (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)	Highest Hourly (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)	Highest Hourly (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)
GLC Maximum	3585.4	303.5	42.7	392.6	27.5	4.7	131.6	33.9	2.5	11.5	0.9
Marapong	1481.5	153.4	6.8	256.0	9.6	0.8	60.2	22.9	0.5	11.5	0.3
Onverwacht (maximum)	1080.8	75.6	6.9	183.0	9.1	0.7	99.8	7.3	0.7	6.6	0.4
Onverwacht (central)	944.7	54.2	5.2	100.6	6.4	0.5	65.0	6.5	0.5	7.4	0.3

Air Quality Limit Value	350	125	50	750	375	188	200	188	40	75	40
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	Predicted Sulphur Dioxide Concentrations as a Fraction of the Selected Limit			Predicted Nitric Oxide Concentrations as a Fraction of the Selected Limit			Predicted Nitrogen Dioxide Concentrations as a Fraction of the Selected Limit			Predicted PM10 Levels as a Fraction of Selected Limit	
	Highest Hourly	Highest Daily	Annual Average	Highest Hourly	Highest Daily	Annual Average	Highest Hourly	Highest Daily	Annual Average	Highest Daily	Annual Average
GLC Maximum	10.24	2.43	0.85	0.52	0.07	0.03	0.66	0.18	0.06	0.15	0.02
Marapong	4.23	1.23	0.14	0.34	0.03	0.00	0.30	0.12	0.01	0.15	0.01
Onverwacht (maximum)	3.09	0.61	0.14	0.24	0.02	0.00	0.50	0.04	0.02	0.09	0.01
Onverwacht (central)	2.70	0.43	0.10	0.13	0.02	0.00	0.32	0.03	0.01	0.10	0.01

SCENARIO D.1 - Predicted SO₂, NO, NO₂ and PM10 concentrations occurring – given at the point of maximum ground level concentration (glc) and at nearby sensitive receptor locations. (Exceedance of air quality limit values indicated in bold.)

Location	Sulphur Dioxide Concentrations			Nitric Oxide Concentrations			Nitrogen Dioxide Concentrations			PM10 Concentrations	
	Highest Hourly (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)	Highest Hourly (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)	Highest Hourly (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)
GLC Maximum	2818.6	294.4	37.7	392.6	33.9	4.2	128.2	28.1	2.4	11.2	0.8
Marapong	1361.5	163.1	6.3	256.2	22.7	0.7	60.8	10.6	0.5	11.2	0.3
Onverwacht (maximum)	959.5	67.1	6.5	183.4	7.3	0.7	96.3	8.9	0.6	7.7	0.3
Onverwacht (central)	667.0	40.1	4.8	100.8	6.3	0.5	57.6	5.2	0.5	7.8	0.3

Air Quality Limit Value	350	125	50	750	375	188	200	188	40	75	40
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	Predicted Sulphur Dioxide Concentrations as a Fraction of the Selected Limit			Predicted Nitric Oxide Concentrations as a Fraction of the Selected Limit			Predicted Nitrogen Dioxide Concentrations as a Fraction of the Selected Limit			Predicted PM10 Levels as a Fraction of Selected Limit	
	Highest Hourly	Highest Daily	Annual Average	Highest Hourly	Highest Daily	Annual Average	Highest Hourly	Highest Daily	Annual Average	Highest Daily	Annual Average
GLC Maximum	8.05	2.36	0.75	0.52	0.09	0.02	0.64	0.15	0.06	0.15	0.02
Marapong	3.89	1.31	0.13	0.34	0.06	0.00	0.30	0.06	0.01	0.15	0.01
Onverwacht (maximum)	2.74	0.54	0.13	0.24	0.02	0.00	0.48	0.05	0.02	0.10	0.01
Onverwacht (central)	1.91	0.32	0.10	0.13	0.02	0.00	0.29	0.03	0.01	0.10	0.01

SCENARIO E.1 - Predicted SO₂, NO, NO₂ and PM10 concentrations occurring – given at the point of maximum ground level concentration (glc) and at nearby sensitive receptor locations. (Exceedance of air quality limit values indicated in bold.)

Location	Sulphur Dioxide Concentrations			Nitric Oxide Concentrations			Nitrogen Dioxide Concentrations			PM10 Concentrations	
	Highest Hourly (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)	Highest Hourly (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)	Highest Hourly (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)
GLC Maximum	3441.5	293.3	41.2	392.6	33.9	4.7	135.7	27.6	2.5	11.5	1.1
Marapong	1471.5	150.0	6.6	256.0	22.9	0.8	60.4	9.6	0.5	11.5	0.4
Onverwacht (maximum)	1037.4	80.4	6.8	183.0	7.3	0.7	101.3	9.2	0.7	6.8	0.4
Onverwacht (central)	907.7	53.4	5.1	100.6	6.5	0.5	65.2	6.4	0.5	7.5	0.3

Air Quality Limit Value	350	125	50	750	375	188	200	188	40	75	40
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	Predicted Sulphur Dioxide Concentrations as a Fraction of the Selected Limit			Predicted Nitric Oxide Concentrations as a Fraction of the Selected Limit			Predicted Nitrogen Dioxide Concentrations as a Fraction of the Selected Limit			Predicted PM10 Levels as a Fraction of Selected Limit	
	Highest Hourly	Highest Daily	Annual Average	Highest Hourly	Highest Daily	Annual Average	Highest Hourly	Highest Daily	Annual Average	Highest Daily	Annual Average
GLC Maximum	9.83	2.35	0.82	0.52	0.09	0.03	0.68	0.14	0.06	0.15	0.03
Marapong	4.20	1.20	0.13	0.34	0.06	0.00	0.30	0.05	0.01	0.15	0.01
Onverwacht (maximum)	2.96	0.64	0.14	0.24	0.02	0.00	0.51	0.05	0.02	0.09	0.01
Onverwacht (central)	2.59	0.43	0.10	0.13	0.02	0.00	0.33	0.03	0.01	0.10	0.01

SCENARIO F.1 - Predicted SO₂, NO, NO₂ and PM10 concentrations occurring – given at the point of maximum ground level concentration (glc) and at nearby sensitive receptor locations. (Exceedance of air quality limit values indicated in bold.)

Location	Sulphur Dioxide Concentrations			Nitric Oxide Concentrations			Nitrogen Dioxide Concentrations			PM10 Concentrations	
	Highest Hourly (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)	Highest Hourly (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)	Highest Hourly (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)	Highest Daily (µg/m ³)	Annual Average (µg/m ³)
GLC Maximum	2708.3	276.4	36.5	392.6	33.9	4.3	128.2	28.1	2.4	11.3	1.0
Marapong	1363.0	154.8	6.1	256.4	22.8	0.7	60.6	10.1	0.5	11.3	0.3
Onverwacht (maximum)	964.7	65.6	6.3	183.8	7.2	0.7	96.3	8.9	0.6	7.3	0.4
Onverwacht (central)	628.6	39.9	4.6	100.9	6.3	0.5	57.7	5.2	0.5	7.7	0.3

Air Quality Limit Value	350	125	50	750	375	188	200	188	40	75	40
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	Predicted Sulphur Dioxide Concentrations as a Fraction of the Selected Limit			Predicted Nitric Oxide Concentrations as a Fraction of the Selected Limit			Predicted Nitrogen Dioxide Concentrations as a Fraction of the Selected Limit			Predicted PM10 Levels as a Fraction of Selected Limit	
	Highest Hourly	Highest Daily	Annual Average	Highest Hourly	Highest Daily	Annual Average	Highest Hourly	Highest Daily	Annual Average	Highest Daily	Annual Average
GLC Maximum	7.74	2.21	0.73	0.52	0.09	0.02	0.64	0.15	0.06	0.15	0.03
Marapong	3.89	1.24	0.12	0.34	0.06	0.00	0.30	0.05	0.01	0.15	0.01
Onverwacht (maximum)	2.76	0.52	0.13	0.25	0.02	0.00	0.48	0.05	0.02	0.10	0.01
Onverwacht (central)	1.80	0.32	0.09	0.13	0.02	0.00	0.29	0.03	0.01	0.10	0.01