INTEGRA COAL

APPENDIX A



Noise and Blasting Assessment

URS

HEGGIES

REPORT 10-5202-R1

Revision 4

Integra Open Cut Project

Operational Noise and Blasting Assessment

PREPARED FOR

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24 SEPTEMBER 2009

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Integra Open Cut Project

Operational Noise and Blasting Assessment

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EXECUTIVE SUMMARY

INTRODUCTION

Heggies Pty Ltd has been commissioned by URS Australia Pty Ltd, on behalf of Integra Coal Operations Pty Ltd, to undertake a Noise and Blasting Assessment for the Integra Open Cut Project.

The assessment has been guided by the Director-General's Requirements issued by the Department of Planning (dated 24 July 2008) which include the requirements of various government agencies for the preparation of the Environmental Assessment regarding noise and blasting.

For the purposes of this noise assessment, all residences identified within approximately 5 km of the Integra Open Cut Project were sorted into Noise Assessment Groups, where each group of residences experience comparable ambient/background noise levels.

This assessment focuses on noise emissions from the proposed northerly extension of the existing open cut. Two development alternatives are considered. The Full Pit Extent which includes mining through the "Dulwich" property, and the Part Pit Extent which does not include mining through the "Dulwich" property.

NOISE EMISSIONS TO NON-MINE OWNED RESIDENCES

Based on both the predicted $L_{Aeq(15minute)}$ intrusive noise emissions and the predicted $L_{Aeq(period)}$ noise amenity emissions for Full Pit Extent Years 1, 4, 6 and 8, together with Part Pit Extent Year 3 and 6, the following table presents a summary of all known non-mine owned residences where the project specific criteria are predicted to be exceeded. There are seven non-mine owned residences (Residences 87, 106, 108, 109, 110, 111 and 153 "Dulwich") in the Noise Affectation Zone and 12 non-mine owned residences located in the Marginal Noise Management Zone (as defined by the DECCW).

Residence 153 "Dulwich" lies in the existing Integra Open Cut Zone of Affectation. Therefore, a total of six additional non-mine owned residences surrounding the Integra Open Cut Project would fall into the Zone of Affection due to the increased noise emission levels from the Open Cut Extension.

Sleep Disturbance

Compliance with the sleep disturbance criteria would be achieved at all non-mine owned residences which have not been identified as being in either the Noise Management Zone or Noise Affectation Zone. However, residences within the Noise Management Zone or Noise Affectation Zone would experience exceedances of the sleep disturbance criteria. Residences within the Noise Affectation Zone would be particularly impacted by sleep disturbance events from the Open Cut Project with peak noise level events predicted to exceed the background noise levels by more than 20 dBA.

Noise Management Plan

The potential noise impacts at all residences will be managed through the implementation of a mine Noise Management Plan.

Non-Mine Owned Residences within Noise Management and Affectation Zones

Noise Assessment Group	Minor Noise Management Zone[1]	Marginal Noise Management Zone[1]	Noise Affectation Zone
1	-	80 G Donnellan	-
2	-	-	-
3	-	-	87 B & R Richards 106 B & R Richards
4	88 M & T De Jong 91 T & D Olofsson 94 L & S Foord 95 J & T Clarke	96 S J Roberton 105 J & G McInerney 161 V Lopes	-
5	154 M & M Beasley 156 R Ninness	112 S & C Ernst	111 T Burgess
6	-	-	-
7	-	-	108 I M Tisdell 109 I M Tisdell 110 G J Hall 153 “Dulwich” R & D Hall
8	-	-	-
9	-	-	-
10	5 Darren Philip Cox	6 W G Cox 8 D K Geelan 9 W & N Pendered 10 E & B Kleinman 11 F Ferraro 13 P & K Russell	-
11	14 M Hoggan 16 A Lambkin	-	-
12	54 G Holmes 62 D Moran	-	
A	34 T & G Breen 35 R & W Gardner	-	
C	63 J & M Moore	64 W & A Gardner	-
D	-	-	-
F	71 A C Noble 72 A Noble 73 A Noble 76 A Noble	-	-

Note 1: Noise Management Zones are as defined by the DECCW.

NOISE EMISSIONS TO MINE OWNED RESIDENCES

Based on the predicted $L_{Aeq(15minute)}$ intrusive noise emissions for the Full Pit Extent Years 1, 4, 6 and 8, together with the Part Pit Extent Year 3 and 6, there are eight mine owned residences (Residences 45, 77, 78, 81, 83, 84, 107 and 170) located in the Noise Affectation Zone and 16 mine owned residences located in the Noise Management Zone.

Based on the predicted $L_{Aeq(period)}$ noise amenity emissions for Full Pit Extent and Part Pit Extent operations, there are up to three mine owned residences (Residences 77, 78, and 107) in the Noise Affectation Zone due to exceedances of the maximum amenity project specific noise criteria and up to 16 mine owned residences located in the Noise Management Zone.

EXECUTIVE SUMMARY

The potential noise impacts at all residences will be managed through the implementation of a mine Noise Management Plan.

NOISE EMISSIONS TO NON-MINE OWNED FREEHOLD VACANT LAND

The DoP considers vacant land to be noise affected in the absence of a dwelling even though there would not be a resident present to be noise affected at the time of the study. Accordingly, an assessment of non-mine owned vacant land has been conducted for information purposes.

The table below presents all known non-mine owned freehold vacant land where the intrusive project specific noise assessment criteria are predicted to be exceeded during the life of the Open Cut Project.

Non-Mine Owned Freehold Vacant Land within Noise Management and Affectation Zones

Noise Assessment Group	Noise Management Zone		Noise Affectation Zone
	1 dBA to 2 dBA above Project Specific Criteria	3 dBA to 5 dBA above Project Specific Criteria	>5 dBA above Project Specific Criteria
1	-	-	-
2	-	-	-
3	-	-	-
4	-	-	-
5	-	-	351 Scott Hamilton Andrews 352 Scott Hamilton Andrews
6	-	-	-
7	-	-	-
8	-	-	-
9	-	-	-
10	-	-	-
11	-	-	-
12	-	-	-
A	334 Graham Jame Nightingale & Carol Ann Nightingale	332 Michael Colin Langdon	-
C	-	-	-
D	-	-	-
F	328 Alan Charles Noble	-	-

CUMULATIVE NOISE AMENITY ASSESSMENT

The potential for the simultaneous operation of the adjoining industrial and mining developments to exceed the acceptable and maximum noise amenity criteria can be assessed on a worst case scenario by adding the anticipated intrusive noise levels from the Open Cut Project to the approved noise limits from Integra Underground, Rixs Creek, Mt Owen, Ashton, Ravensworth East, Glendell Coal Mines and the Mine Gas Power Plant. The intrusive noise levels are then adjusted to the equivalent amenity level for comparison against the acceptable and maximum amenity assessment criteria.

The cumulative noise amenity levels at all non-mine owned residences are below the maximum amenity criteria, except during the night-time period at Residences 87, 108, 109, 110 and 153 “Dulwich”.

ROAD TRANSPORTATION NOISE ASSESSMENT

Traffic noise impacts on Bridgman Road are considered acceptable at distances greater than 8 m and 20 m from the roadway during the daytime and night-time periods respectively.

Also, the increase in the existing traffic noise levels at all offset distances would be less than the acceptable 2 dBA.

RAIL TRANSPORTATION NOISE ASSESSMENT

The cumulative rail noise impacts on the Main Northern Railway are considered acceptable at distances greater than 89 m and 116 m from the rail line during the daytime and night-time periods respectively.

BLAST EMISSION ASSESSMENT

In accordance with the existing blasting practices at the Open Cut Project, all blasts within the Project Area would be monitored and the results used to further develop and refine the existing site laws for both ground vibration and airblast emissions. Where any future preliminary blast design assessment indicates that the ANZEC guidelines may be exceeded, the blast would be redesigned to ensure compliance with the ANZEC guidelines.

Flyrock Assessment

Flyrock will be managed through appropriate blast design to ensure there is no flyrock risk to the public using either the New England Highway or Middle Falbrook Road, or at any of the surrounding residences.

TABLE OF CONTENTS

1 INTRODUCTION 13
1.1 Assessment Requirements 13

2 NOISE AND BLASTING ASSESSMENT PROCEDURES 16
2.1 On-Site Construction Noise 16
2.2 On-site Operational Noise 16
2.3 Off-Site Road Traffic Noise 17
2.4 Off-Site Rail Traffic Noise 17
2.5 Cumulative Industrial Noise 17
2.6 On-site Blast Emissions 17

3 PROJECT SETTING AND OVERVIEW 18
3.1 Mining Activities 18
3.2 Hours of Operation 21
3.3 Topographic Setting 22
3.4 Land Ownership 22

4 EXISTING NOISE AND METEOROLOGICAL ENVIRONMENT 28
4.1 Unattended Noise Monitoring Results 29
4.2 Operator-Attended Noise Monitoring Results 30
4.3 Approved and Currently Proposed Industrial Noise Environment 32
4.4 Noise Environment for Project Assessment Purposes 36
4.5 Meteorological Environment 39
4.6 Noise Modelling Meteorology 40

5 NOISE ASSESSMENT METHODOLOGY 40
5.1 Construction and Operating Assessment Criteria 40
5.2 Mine Noise Modelling Procedure 45

6 INTRUSIVE NOISE ASSESSMENT - NON-MINE OWNED RESIDENCES 46
6.1 Operation Full Pit Extent Year 1 46
6.2 Operation Full Pit Extent Year 4 48
6.3 Operation Full Pit Extent Year 6 51
6.4 Operation Full Pit Extent Year 8 53
6.5 Operation Part Pit Extent Year 3 55
6.6 Operation Part Pit Extent Year 6 58
6.7 Noise Emission Summary of Non-Mine Owned Residences 60

7 INTRUSIVE NOISE ASSESSMENT - MINE OWNED RESIDENCES 62
7.1 Operation Full Pit Extent Year 1 62
7.2 Operation Full Pit Extent Year 4 64
7.3 Operation Full Pit Extent Year 6 66
7.4 Operation Full Pit Extent Year 8 68
7.5 Operation Part Pit Extent Year 3 70
7.6 Operation Part Pit Extent Year 6 72
7.7 Noise Emission Summary of Mine Owned Residences 74

8 INTRUSIVE NOISE ASSESSMENT - NON-MINE OWNED FREEHOLD VACANT LAND 76
8.1 Operation Full Pit Extent Year 1 76
8.2 Operation Full Pit Extent Year 4 76
8.3 Operation Full Pit Extent Year 6 77
8.4 Operation Full Pit Extent Year 8 78
8.5 Operation Part Pit Extent Year 3 79
8.6 Operation Part Pit Extent Year 6 80
8.7 Noise Emission Summary on Vacant Land 81

9 OPERATING NOISE AMENITY ASSESSMENT 82
9.1 Non-Mine Owned Residences 83
9.2 Mine Owned Residences 84

TABLE OF CONTENTS

10 CUMULATIVE NOISE AMENITY ASSESSMENT 85

11 ROAD TRANSPORTATION NOISE ASSESSMENT 87
- 11.1 Road Noise Assessment Criteria 87
- 11.2 Existing and Project Operating Road Traffic 87
- 11.3 Road Noise Predictions 88
- 11.4 Road Noise Impact Assessment 88
- 11.5 Summary 88

12 RAIL TRANSPORTATION NOISE 89
- 12.1 Rail Traffic Noise Assessment Criteria 89
- 12.2 Existing, Consented and Project Rail Traffic 89
- 12.3 Rail Traffic Noise Predictions 90
- 12.4 Rail Noise Impact Assessment 91

13 BLASTING ASSESSMENT 91
- 13.1 Ground Vibration - Structural Damage Criteria 91
- 13.2 Airblast - Structural Damage Criteria 93
- 13.3 Human Comfort and Disturbance Considerations 94
- 13.4 Open Cut Overburden Blasting Practices 94
- 13.5 Blast Emissions Assessment 95
- 13.6 Project Blast Emission Site Laws Development 96
- 13.7 Flyrock Assessment 97

TABLES

Table 1 Coverage of Director-General's Requirements within the Noise and Blasting Assessment (Department of Planning - 24 July 2008) 14
Table 2 Proposed Open Cut Extension Mobile Equipment Fleet and Existing Operational Plant SWLs 20
Table 3 Indicative Overburden Blast Design Parameters 21
Table 4 Expected Duration and Proposed Hours of Operations 22
Table 5 Surrounding Potentially Affected Non-Mine Owned Residences 23
Table 6 Surrounding Potentially Affected Mine Owned Residences 26
Table 7 Surrounding Potentially Affected Non-Mine Owned Freehold Vacant Land 27
Table 8 Unattended Ambient Noise Environment 30
Table 9 Operator-Attended Ambient Noise Environment 31
Table 10 Approved Mining Operations in the Project's Surrounds 32
Table 11 Calculated $L_{Aeq(Daytime)}$ Noise Amenity Levels - Non-Mine Owned Residences 33
Table 12 Calculated $L_{Aeq(Evening)}$ Noise Amenity Levels - Non-Mine Owned Residences 33
Table 13 Calculated $L_{Aeq(Night\text{-}time)}$ Noise Amenity Levels - Non-Mine Owned Residences 34
Table 14 Calculated $L_{Aeq(Daytime)}$ Noise Amenity Levels - Mine Owned Residences 34
Table 15 Calculated $L_{Aeq(Evening)}$ Noise Amenity Levels - Mine Owned Residences 35
Table 16 Calculated $L_{Aeq(Night\text{-}time)}$ Noise Amenity Levels - Mine Owned Residences 35
Table 17 Noise Environment for Project Assessment Purposes 36
Table 18 Median Ambient RBL Hunter Valley Noise Environment 38
Table 19 Noise Modelling Meteorological Parameters 40
Table 20 INP Noise amenity Assessment Criteria 42
Table 21 INP Project Specific Noise Assessment Criteria 42
Table 22 Project Noise Assessment Methodology 44
Table 23 Operation Full Pit Extent Year 1 $L_{Aeq(15minute)}$ Intrusive Noise Emissions 46
Table 24 Full Pit Extent Year 1 Non-Mine Owned Residences within Noise Management and Affectation Zones 47
Table 25 Full Pit Extent Year 4 Operation $L_{Aeq(15minute)}$ Intrusive Noise Emissions 49

TABLE OF CONTENTS

Table 26	Full Pit Extent Year 4 Non-Mine Owned Residences within Noise Management and Affectation Zones	49
Table 27	Full Pit Extent Year 6 Operation $L_{Aeq(15minute)}$ Intrusive Noise Emissions	51
Table 28	Full Pit Extent Year 6 Non-Mine Owned Residences within Noise Management and Affectation Zones	51
Table 29	Full Pit Extent Year 8 Operation $L_{Aeq(15minute)}$ Intrusive Noise Emissions	53
Table 30	Full Pit Extent Year 8 Non-Mine Owned Residences within Noise Management and Affectation Zones	54
Table 31	Part Pit Extent Year 3 Operation $L_{Aeq(15minute)}$ Intrusive Noise Emissions	56
Table 32	Part Pit Extent Year 3 Non-Mine Owned Residences within Noise Management and Affectation Zones	56
Table 33	Part Pit Extent Year 6 Operation $L_{Aeq(15minute)}$ Intrusive Noise Emissions	58
Table 34	Part Pit Extent Year 6 Non-Mine Owned Residences within Noise Management and Affectation Zones	58
Table 35	Summary of Potentially Impacted Non-Mine Owned Residences	60
Table 36	Operation Full Pit Extent Year 1 $L_{Aeq(15minute)}$ Intrusive Noise Emissions	62
Table 37	Full Pit Extent Year 1 Mine Owned Residences within Noise Management and Affectation Zones	63
Table 38	Full Pit Extent Year 4 Operation $L_{Aeq(15minute)}$ Intrusive Noise Emissions	64
Table 39	Full Pit Extent Year 4 Mine Owned Residences within Noise Management and Affectation Zones	65
Table 40	Full Pit Extent Year 6 Operation $L_{Aeq(15minute)}$ Intrusive Noise Emissions	66
Table 41	Full Pit Extent Year 6 Mine Owned Residences within Noise Management and Affectation Zones	67
Table 42	Full Pit Extent Year 8 Operation $L_{Aeq(15minute)}$ Intrusive Noise Emissions	68
Table 43	Full Pit Extent Year 8 Mine Owned Residences within Noise Management and Affectation Zones	69
Table 44	Part Pit Extent Year 3 Operation $L_{Aeq(15minute)}$ Intrusive Noise Emissions	70
Table 45	Part Pit Extent Year 3 Mine Owned Residences within Noise Management and Affectation Zones	71
Table 46	Part Pit Extent Year 6 Operation $L_{Aeq(15minute)}$ Intrusive Noise Emissions	72
Table 47	Part Pit Extent Year 6 Mine Owned Residences within Noise Management and Affectation Zones	73
Table 48	Summary of Potentially Impacted Mine Owned Residences	74
Table 49	Operation Full Pit Extent Year 1 - Non-Mine Owned Freehold Vacant Land with Intrusive PSNL Exceedances (>25% Land Area)	76
Table 50	Operation Full Pit Extent Year 4 - Non-Mine Owned Freehold Vacant Land with Intrusive PSNL Exceedances (>25% Land Area)	77
Table 51	Operation Full Pit Extent Year 6 - Non-Mine Owned Freehold Vacant Land with Intrusive PSNL Exceedances (>25% Land Area)	78
Table 52	Operation Full Pit Extent Year 8 - Non-Mine Owned Freehold Vacant Land with Intrusive PSNL Exceedances (>25% Land Area)	79
Table 53	Operation Part Pit Extent Year 3 - Non-Mine Owned Freehold Vacant Land with Intrusive PSNL Exceedances (>25% Land Area)	80
Table 54	Operation Part Pit Extent Year 6 - Non-Mine Owned Freehold Vacant Land with Intrusive PSNL Exceedances (>25% Land Area)	80
Table 55	Summary of Non-Mine Owned Freehold Vacant Land with Intrusive PSNL Exceedances (>25% Land Area)	81
Table 56	Operation Full Pit Extent Noise Amenity Emissions - $L_{Aeq(period)}$	82
Table 57	Operation Part Pit Extent Noise Amenity Emissions - $L_{Aeq(period)}$	83
Table 58	Non-Mine Owned Residences within Noise Management and Affectation Zones	83
Table 59	Mine Owned Residences within Noise Management and Affectation Zones	85
Table 60	Cumulative Noise Amenity Emissions - $L_{Aeq(period)}$ - Full Pit Extent	86
Table 61	Cumulative Noise Amenity Emissions - $L_{Aeq(period)}$ - Part Pit Extent	86
Table 62	DECC Guideline Noise Assessment Criteria for Traffic on Collector Road	87

Table 63	Estimated Peak Hourly Vehicle Movements - Bridgman Road	88
Table 64	Calculated Peak $L_{Aeq(1hour)}$ Noise Levels	88
Table 65	ATRC's Guideline Noise Assessment Criteria	89
Table 66	Existing Daily Train Movements	90
Table 67	Predicted Train Noise Emissions	91
Table 68	Transient Vibration Guide Values for Cosmetic Damage	92
Table 69	Probability of Window Damage from Airblast	94
Table 70	Predicted Overburden Blast Emissions	96

FIGURES

Figure 1	Graph of Transient Vibration Guide Values for Cosmetic Damage	93

APPENDICES

Appendix A1 Project Location
Appendix A2 Open Cut Project and Open Cut Extension Area
Appendix A3 Open Cut Project Area and Components
Appendix B1 Proposed Project Development Schedule
Appendix B2 Conceptual Mine Plan
Appendix B3 Project Site Surrounds - Topograhical Setting
Appendix C1 Land Ownership Plan
Appendix C2 Receptor Location Plan
Appendix C3 Vacant Land Listing
Appendix C4 Vacant Land Plan
Appendix D1 Background Noise Monitoring Methodology
Appendix D2 Background Noise Monitoring Locations
Appendix D3 Noise Assessment Groups
Appendix D4 Statistical Ambient Noise Levels - Noise Assessment Group 1
Appendix D5 Statistical Ambient Noise Levels - Noise Assessment Group 2
Appendix D6 Statistical Ambient Noise Levels - Noise Assessment Group 3
Appendix D7 Statistical Ambient Noise Levels - Noise Assessment Group 4
Appendix D8 Statistical Ambient Noise Levels - Noise Assessment Group 5
Appendix D9 Statistical Ambient Noise Levels - Noise Assessment Group 6
Appendix D10 Statistical Ambient Noise Levels - Noise Assessment Group 7
Appendix D11 Statistical Ambient Noise Levels - Noise Assessment Group 8
Appendix D12 Statistical Ambient Noise Levels - Noise Assessment Group 9
Appendix D13 Statistical Ambient Noise Levels - Noise Assessment Group 10
Appendix D14 Statistical Ambient Noise Levels - Noise Assessment Group 11
Appendix D15 Statistical Ambient Noise Levels - Noise Assessment Group 12
Appendix D16 Statistical Ambient Noise Levels - Noise Assessment Group A
Appendix D17 Statistical Ambient Noise Levels - Noise Assessment Group B
Appendix D18 Statistical Ambient Noise Levels - Noise Assessment Group C
Appendix D19 Statistical Ambient Noise Levels - Noise Assessment Group D
Appendix D20 Statistical Ambient Noise Levels - Noise Assessment Group F
Appendix D21 Statistical Ambient Noise Levels - Noise Assessment Group G
Appendix D22 Integra Coal Operations Project Area - Prevailing Wind Conditions
Appendix D23 Integra Coal Operations Project - Temperature Inversion Frequency of Occurrence
Appendix E Operational Scenarios
Appendix F1 Year 1 - Full Pit Operation Intrusive Noise Emissions - Non-Mine Owned Residences
Appendix F2 Year 4 - Full Pit Operation Intrusive Noise Emissions - Non-Mine Owned Residences
Appendix F3 Year 6 - Full Pit Operation Intrusive Noise Emissions - Non-Mine Owned Residences
Appendix F4 Year 8 - Full Pit Operation Intrusive Noise Emissions - Non-Mine Owned Residences
Appendix F5 Year 3 - Part Pit Operation Intrusive Noise Emissions - Non-Mine Owned Residences

TABLE OF CONTENTS

Appendix F6 Year 6 -Part Pit Operation Intrusive Noise Emissions - Non-Mine Owned Residences
Appendix G Intrusive Noise Emission Contours - Residences
Appendix H1 Year 1 - Full Pit Operation Intrusive Noise Emissions - Mine Owned Residences
Appendix H2 Year 4 - Full Pit Operation Intrusive Noise Emissions - Mine Owned Residences
Appendix H3 Year 6 - Full Pit Operation Intrusive Noise Emissions - Mine Owned Residences
Appendix H4 Year 8 - Full Pit Operation Intrusive Noise Emissions - Mine Owned Residences
Appendix H5 Year 3 - Part Pit Operation Intrusive Noise Emissions - Mine Owned Residences
Appendix H1 Year 6 - Part Pit Operation Intrusive Noise Emissions - Mine Owned Residences
Appendix I Intrusive Noise Emission Contours - Vacant Land
Appendix J1 Project Blast Emission Site Laws
Appendix J2 Project Blast Emission Predictions
Appendix J3 Allowable MIC versus Distance

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1 INTRODUCTION

Heggies Pty Ltd (Heggies) has been commissioned by URS Australia Pty Ltd on behalf of Integra Coal Operations Pty Ltd (Integra) to undertake a Noise and Blasting Assessment (NBA) for the Integra Open Cut Project.

Integra is the management company responsible for operations at the existing approved Integra Open Cut (formerly known as the Camberwell Coal Mine) and the Integra Underground (formerly known as the Glennies Creek Colliery) located approximately 10 km north-west of Singleton, NSW. Integra is proposing to extend the existing open cut, which has operated continuously since 11 March 1991, in a north-westerly direction. The objective of the proposed development is to maximise resource utilisation within and above CL357, thereby extending the life of the open cut by approximately nine years.

In addition to the Open Cut Extension, and as part of the Integra Open Cut Project, the application also seeks approval for the long-term use of the Coal Handling and Preparation Plant (CHPP), train loader, infrastructure and facilities required for or to support mining and processing and despatch of coal from the Integra Open Cut Project, and to replace DA 86/2889 (the existing Integra Open Cut Development Approval) and PA 06_0073 (the Glennies Creek Open Cut Approval (pending)) through the provision of a consolidated project approval.

For the purposes of this report, the "Open Cut Project", also referred to as "the Project", comprises:

- All areas of disturbance and activities associated with the Extension (the Open Cut Extension Area - see **Appendix A2**), including clearance of land, open cut mining and related activities such as overburden and soil removal and placement, coal haulage to and processing within the existing approved Coal Handling and Preparation Plant (CHPP).
- The North Open Cut Project Site (formerly known as Glennies Creek Open Cut) identified in PA 06_0073 (the Glennies Creek Open Cut Approval (pending)).
- Areas relating to the existing Integra Open Cut Development Approval (DA86/2899).
- The access corridor to the DA 86/2889 area and the area north of the PA 06_0073 boundary south of the Middle Falbrook and Stony Creek Roads.

The Open Cut Project Area and each of its components are shown in **Appendix A3**.

The potential noise and blasting impacts associated with the operation of the NOC have been comprehensively addressed in the *"Noise and Blasting Assessment of the Glennies Creek Open Cut Coal Mine"* (the NOC NBA) dated October 2007, prepared by Heggies as part of NOC EA. Accordingly, whilst the Open Cut Project will be assessed as a whole, this NBA will focus on the details associated with the Open Cut Extension.

1.1 Assessment Requirements

The assessment has been guided by the Director-General's Requirements issued by the Department of Planning (dated 24 July 2008) which include the requirements of various Government agencies regarding noise and blasting to be addressed in the Environmental Assessment (EA).

This assessment and its coverage are presented in **Table 1**.

Table 1 Coverage of Director-General's Requirements within the Noise and Blasting Assessment (Department of Planning - 24 July 2008)

Government Department	Requirement	Relevant Noise and Vibration Sections
Department of Planning	**General Requirements** The Environmental Assessment of the project must include:	
	• An executive summary.	**Page 3**
	• A detailed description of the following within the Integra mining complex and any associated reject disposal areas: ◦ Historical mining operations; ◦ Existing and approved mining operations/facilities; and ◦ The existing environmental management and monitoring regime.	**Section 3.1**
	• A detailed description of the project, including the: ◦ Need for the project; ◦ Alternatives considered, including a justification for the proposed mine plan and coal rejects disposal strategy; ◦ Likely staging of the project; ◦ Likely interactions between the proposed open cut and underground mining operations on site; and ◦ Plans of any proposed building works.	**Section 3.1**
	• A risk assessment of the potential environmental impacts of the project, identifying the key issues for further assessment.	**Sections 6, 7, 8, 9, 10, 11, 12, and 13**
	• A detailed assessment of the key issues specified below, and any other significant issues identified in the risk assessment (see above), which includes: ◦ A description of the existing environment, using sufficient baseline data; ◦ An assessment of the potential impacts of all stages of the project, including any cumulative impacts that may arise from the combined operation of the project with any other existing, approved or proposed mining operations in the region, taking into consideration any relevant statutory provisions, and technical or policy guidelines (see below); and ◦ A description of the measures that would be implemented to avoid, minimise, mitigate, rehabilitate/remediate, monitor and/or offset the potential impacts of the project, including detailed contingency plans for managing any potentially significant risks to the environment.	**Section 4** **Sections 6, 7, 8, 9, 10, 11, 12, and 13** **Sections 3.1, 5.1 and 13**
	• A statement of commitments, outlining all the proposed environmental management and monitoring measures.	**Sections 3.1**
	Noise **-** including the potential construction, operational and on-site and off-site road and rail noise and vibration impacts.	**Sections 6, 7, 8, 9, 10, 11, 12, and 13**
	Blasting and Vibration	**Sections 13**
Department of Environment and Climate Change (June 2008)	**Noise and Blasting** The west-ward and north-west-ward expansion of open cut mining activities proposed may result in increased noise and blasting impacts for individual landholders and possible residents in Camberwell Village. The EA must assess the potential noise and blasting impacts of the proposed open cut operation and give consideration to cumulative impacts of noise and blasting from other Integra operations and neighbouring activities.	**Sections 6, 7, 8, 9, 10, 11, 12, and 13**

Government Department	Requirement	Relevant Noise and Vibration Sections
Department of Environment and Climate Change (June 2008)	**Noise and Blasting**	
	The EA must include a comprehensive noise assessment of the existing environment, potential impacts and proposed noise amelioration measures. The New South Wales Industrial Noise Policy (EPA, 2000) provides a guide to the methodology and assessment criteria preferred by DECC to determine noise planning levels. The EA must determine the existing background (L_{A90}) and ambient (L_{Aeq}) noise levels in accordance with the NSW Industry Noise Policy.	**Sections 2, 3.1, 4 and 5**
	The evaluation should take into account the construction and operational phases of the development over the "operating" hours proposed and take into account adverse weather conditions including temperature inversions. The assessment must identify any noise sensitive locations likely to be affected by activities at the site, such as residential properties, schools, churches, and hospitals.	**Sections 6, 7, 8, 9, 10, 11, 12, and 13**
	The project specific noise levels for the site must be determined. For each identified potentially affected receiver, this should include:	
	• Determination of the intrusive criteria for each identified potentially affected receiver.	**Section 5.1**
	• Selection and justification of the appropriate amenity category for each identified potentially affected receiver.	**Section 5.1**
	• Determination of the appropriate sleep disturbance criterion.	**Section 5.1**
	Potential impacts should be determined for any identified significant adverse meteorological conditions. Predicted noise levels under calm conditions may also aid in quantifying the extent of impact where this is not the most adverse condition.	**Sections 6, 7 and 8**
	Sound power levels measured or estimated for all plant and equipment should be clearly stated and justified. The expected noise level and noise character (eg tonality, impulsiveness, vibration, etc) likely to be generated from noise sources during the following phases should be determined: • Site establishment • Construction • Operational phases • Transport including traffic noise generated by the proposal • Other services	**Section 3.1**
	The EA should include an assessment of cumulative noise and blasting impacts, having regard to existing developments and developments which received development consent in the area but which have not commenced.	**Sections 10 and 13**
	Monitoring Programs	
	The EA should include a detailed assessment of any noise, air quality, water quality or waste monitoring required during any construction and on-going operation of the facility to ensure that the development achieves a satisfactory level of environmental performance. The evaluation should include a detailed description of the monitoring locations, sample analysis methods and the level of reporting proposed.	**Section 5.1**

2 NOISE AND BLASTING ASSESSMENT PROCEDURES

The NSW Department of Environment and Climate Change (DECC - formerly the Department of Environment and Conservation and previously the Environment Protection Authority) has regulatory responsibility for the control of noise from "scheduled premises" under the Protection of the Environment Operations Act 1997.

Accordingly, the DECC has produced the NSW Industrial Noise Policy, 2000 (INP) to provide a framework and process for deriving project approvals and development consents issued under the Environmental Planning and Assessment Act 1979 and for deriving project noise limit conditions for scheduled premises specified in Environment Protection Licences issued under the Protection of the Environment Operations Act 1997 and to promote uniform methods for predicting and assessing noise impacts.

The Integra Open Cut Project, which involves mining for coal, is a scheduled activity under Schedule 1 of Protection of the Environment Operations Act 1997.

In implementing the INP, the DECC has two broad objectives.

- Controlling intrusive noise impacts in the short-term.
- Maintaining noise level amenity for particular land uses over the medium to long-term.

The objectives of the INP are to:

- Establish noise criteria that would protect the community from excessive intrusive noise, and preserve amenity for specific land uses.
- Use these criteria as the basis for deriving Project-specific noise criteria.
- Promote uniform methods to estimate and measure noise impacts, including a procedure for evaluating meteorological effects.
- Outline a range of mitigation measures that could be used to minimise noise impacts.
- Provide a formal process to guide the determination of feasible and reasonable noise limits for consents or licences that reconcile noise impacts with the economic, social and environmental considerations of industrial development.
- Carry out functions relating to the prevention, minimisation and control of noise from premises scheduled under the Protection of the Environment Operations Act 1997.

The assessment of noise and blasting emissions have been guided by the following procedures, guidelines and standards advocated by the DECC.

2.1 On-Site Construction Noise

The assessment of noise emissions from on-site construction works follows the procedures set out in the DECC's Environmental Noise Control Manual, 1994 (ENCM), Chapter 171 Noise Control Guideline - Construction Site Noise.

2.2 On-site Operational Noise

The INP provides non-mandatory procedures for setting acceptable $L_{Aeq(15minute)}$ intrusive and $L_{Aeq(period)}$ amenity noise levels for various localities as well as guidelines for assessing noise emissions from on-site noise sources.

The DECC's most recent policy considers sleep disturbance as the emergence of the $L_{A1(1minute)}$ level above the $L_{A90(15minute)}$ level at the time.

Other factors that may be important in assessing the extent of impacts on sleep include:

- How often high noise events will occur.
- Time of day (normally between 10.00 pm and 7.00 am).
- Whether there are times of the day when there is a clear change in the noise environment (such as during early morning shoulder periods).

2.3 Off-Site Road Traffic Noise

The DECC Environmental Criteria for Road Traffic Noise 1999 (ECRTN) provides non-mandatory procedures for setting acceptable L_{Aeq} noise levels on arterial, collector and local roads, as well as guidelines for assessing noise impacts from off-site road traffic.

2.4 Off-Site Rail Traffic Noise

The Australian Rail Track Corporation Ltd (ARTC) manages the Main Northern Railway line and provides access to operations such as RailCorp and Pacific National for the transport of passengers and freight by rail. The Main Northern Railway line bisects the Integra Open Cut operations.

Noise emissions from the railway are regulated via ARTC's Environmental Protection Licence (EPL No 3142, review date 1 July 2005).

Noise emissions from train movements occurring on the Open Cut Project Area (i.e. on the spur line and rail loop) are considered on-site noise sources and are accordingly assessed as part of the on-site operational noise.

2.5 Cumulative Industrial Noise

The INP provides non-mandatory cumulative noise assessment guidelines in order to address existing and successive industrial development by setting acceptable (and maximum) cumulative $L_{Aeq(period)}$ amenity levels for all industrial (ie non-transport related) noise in an area.

The INP does not set acceptable cumulative $L_{Aeq(15minute)}$ intrusive criteria for all industrial noise sources in an area but, rather, seeks to control cumulative noise via the amenity criteria.

2.6 On-site Blast Emissions

The DECC currently adopts the Australian and New Zealand Environment Council (ANZEC) "*Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration*", dated September 1990, for assessing the potential annoyance at residential receivers from blast emissions during daytime hours.

The assessment of blast emission impacts outside the hours advocated by ANZEC remains according to the DECC's ENCM Chapter 154 Noise Control Guideline - Blasting.

British Standard BS 7385-2:1993 "*Evaluation and measurement for Vibration in Buildings - Part 2: Guide to Damage Levels from Ground borne Vibration*" (BS 7385) provides guideline criteria for evaluating the effects of vibration on structures. This is the Standard recommended in Australian Standard AS 2187-2:2006 "*Explosives - Storage and Use - Part 2: Use of Explosives*" as the guideline values and assessment methods "are applicable to Australian conditions".

3 PROJECT SETTING AND OVERVIEW

3.1 Mining Activities

Site Location

The Open Cut Project Area is located approximately 10 km north-west of Singleton, New South Wales. The Project Area location is shown in **Appendix A1**.

The Open Cut Project Area is bounded by the New England Highway and Rix's Creek Coal Mine to the south and south-west; Glennies Creek to the west, Middle Falbrook Road and Stony Creek Road to the north and Bridgman Road to the east, as shown in **Appendix A2**.

The Open Cut Extension Area is generally bounded by the New England Highway and Rix's Creek Coal Mine to the south and south-west, Glennies Creek to the west, generally the Main Northern Rail Line to the north and the eastern extent of the existing South Pit (Existing DA) to the east, as shown in **Appendix A2**. The Open Cut Extension Area also includes the haulage corridor and CHPP components.

Operations

The Open Cut Project encompasses all Integra's open cut mining and related activities (ie those existing, approved, pending and proposed) including the NOC identified in PA 06_0073, the Development Application Area identified in DA 86/2889 (Existing DA) including the Existing South Pit.

The potential noise and blasting impacts associated with the operation of the NOC have been comprehensively addressed in the *"Noise and Blasting Assessment of the Glennies Creek Open Cut Coal Mine"* (the NOC NBA) dated October 2007, prepared by Heggies as part of NOC EA. Accordingly, whilst the Open Cut Project will be assessed as a whole, this NBA will focus on the details associated with the Extension and assumes that the NOC mining operations would proceed as proposed in the NOC EA.

It is anticipated that mining operations within the Open Cut Extension Area would be undertaken using the existing (or similar) equipment (and personnel) currently deployed in the existing South Pit. Open cut mining methods will be employed to extract up to a maximum of 4.5 Mtpa of ROM coal, while waste (overburden and interburden) volumes are estimated to range between 12 Mbcm and 26 Mbcm per annum. The mined coal would be transported via internal haul roads and the coal haulage corridor directly to the existing CHPP.

Fracturing of overburden/interburden would primarily be via drill and blast methods. The blasted material would be hauled to active dumping areas within the existing South Pit or in the mined-out areas of the active extended Pit. The final landform of the waste dumps would be to a maximum elevation of 150 mAHD.

All activities being conducted within the Open Cut Project Area and as part of the Project, including the Open Cut Extension, CHPP, Rail Loadout Facility, existing South Pit and NOC operations, have been included in this NBA. **Appendix A3** shows the various components of the Open Cut Project.

The dominant sources of noise and vibration emissions from the Open Cut Project may be grouped in the operational years described below for the purposes of the Environmental Assessment. The estimated timing of the Project activities for each of the operational years is based on the proposed development schedule summarised in **Appendix B1**. The actual timing of each activity and the associated noise emissions will be dependent upon the actual mine production and progression.

Appendix B1 also shows the scheduling of the Project in relation to Integra's current operations and proposed Underground developments.

There are two development alternatives for the Open Cut Extension. These are:

Full Pit Extent - This NBA is based on the Mine Area shown in **Appendix B2** and is referred to as the Full Pit or Full Pit Extent. The Full Pit Extent generally represents the "worst case" scenario for the purpose of assessing potential noise and blasting emissions from the Project. The Full Pit Extent includes mining through the "Dulwich" property and will involve coal extraction activities over an area of approximately 160 ha.

Part Pit Extent - In the event that the "Dulwich" property is not acquired or a suitable alternative arrangement cannot be reached with the landowner which permits mining the Full Pit, and subject to the receipt of planning approval, coal extraction within the Open Cut Extension will be undertaken to the limits permissible under the Mining Act 1992, as shown in **Appendix B2**. The Part Pit Extent is approximately 113 ha in size.

Four operational scenarios have been nominated for the Full Pit Extent in order to represent the potential noise and blasting emissions over the life of the Open Cut Project. In turn, two operational scenarios have been nominated for the Part Pit Extent, primarily to assess the potential noise and blasting emissions on the "Dulwich" property.

The nominated scenarios are as follows:

- Operation Full Pit Extent Year 1
- Operation Full Pit Extent Year 4
- Operation Full Pit Extent Year 6
- Operation Full Pit Extent Year 8
- Operation Part Pit Extent Year 3
- Operation Part Pit Extent Year 6

Operation Full Pit Extent Year 1 would be similar to the Part Pit Extent Year 1 operations. Accordingly, the Operation Full Pit Extent Year 1 scenario has been used to assess the potential noise emissions to the "Dulwich" property during the initial Part Pit Extent operations.

The conceptual mine plans for the Open Cut Extension operations during Full Pit Extent Years 1, 4, 6 and 8 and Part Pit Extent Year 3 and 6 are shown in **Appendix B2**.

The acoustically significant plant and equipment proposed to be used for the Open Cut Extension mining operations, indicative numbers of items and the maximum Sound Power Levels (SWLs) adopted in the modelling for each item are presented in **Table 2**.

Table 2 Proposed Open Cut Extension Mobile Equipment Fleet and Existing Operational Plant SWLs[1]

Site	Mobile Equipment	Make and Model (or equivalent)	Number of Items	Maximum L_{Aeq} SWL/item[2,3]
Open Cut Extension	Loading tool	P&H 2800 XPA face shovel	1	122 dBA
	Loading tool	Hitachi EX5500 Excavator	1	117 dBA
	Loading tool	Hitachi EX3600 Excavator	1	117 dBA
	Loading tool	CAT 994 FEL	4	117 dBA
	Haul Truck	CAT 789	26[4]	115 dBA
	Dozer	CAT D11	5	120 dBA
	Dozer	CAT D10	2	118 dBA
	RTD	CAT 895	1	115 dBA
	Water Cart	CAT 777B	2	115 dBA
	Grader	CAT 16G	2	106 dBA
	Drill	Drilltech D75K	3	112 dBA
	Drill	Drilltech C40K	1	105 dBA
	Service Tanker	CAT 773	1	113 dBA
CHPP and Train Loading Facility	ROM FEL	CAT 994 FEL	1	117 dBA
	CHPP	1200 tph	1	112 dBA
	Dozer	CAT D11	1	120 dBA
	Train Loadout Bin	200 t	1	114 dBA
	Locomotive Set	4 of 82 Class	1	114 dBA[5]

Note 1: The NOC mobile equipment fleet are detailed in the NOC NBA.

Note 2: Sound Power Levels (SWLs) have been determined from the August 2007 onsite SWL survey of the existing plant and equipment, supplemented with SWLs from Heggies' database and adjustments applied to represent the current lowest demonstrated and maintainable SWLs.

Note 3: Adopted SWLs are consistent with those used in recent EAs.

Note 4: Up to 23 haul trucks are generally in operation at any one time.

Note 5: Locomotive noise regulated by ARTC Environmental Protection Licence EPL 3142.

Blasting

In the order of 12 to 26 Mbcm of overburden/interburden would be extracted annually requiring an average of seven to eight blasts per week, that is, at an anticipated blasting frequency the same as that currently occurring as part of routine South Pit mining operations.

However, due to blasting restrictions imposed by ARTC when blasting in the vicinity of the Main Northern Railway line (typically permitted on one day per fortnight only), a maximum of five blasts per day may be required during the scheduled track possessions or as a consequence of extended periods of adverse weather conditions.

In general, all overburden and interburden requires blasting (including interburden plies to a thickness of 0.7m) due to the hard nature of the rock and the OH&S issues associated with ripping by bulldozers. These thin partings blasts are generally small in area, occur in several locations within the pit and require multiple daily shots to produce sufficient blasted material to maintain ROM coal production at the required levels. The need for multiple blasts of thin partings is consistent with mining a deposit comprising in excess of 25 coal plies separated by a corresponding number of interburden bands.

Based on the existing South Pit operations, the indicative blast design parameters for the overburden blasts are presented in **Table 3**. However, each blast would be designed to ensure that the relevant project-specific blast assessment criteria are met at surrounding residences. Consequently, the blast design parameters presented in **Table 3** are indicative only.

Table 3 Indicative Overburden Blast Design Parameters

Parameter	Quantity or Range
Blasthole Diameter	127 mm to 229 mm
Blasthole Depth	2 m to 20 m
Blasthole Burden x Spacing	4 m x 4 m to 6 m x 8 m
Depth of Stemming	1.5 m to 4 m
Bulk Explosive Type	ANFO and/or HANFO and/or slurry
Powder Factor	0.47 kg/bcm to 0.88 kg/bcm
Maximum Instantaneous Charge (MIC)	30 kg to 850 kg
Maximum Charge per Hole	15 kg to 850 kg
Initiation System	Nonel or Electronic

Blasting would typically be restricted to between the hours of 9.00 am and 5.00 pm Monday to Saturday.

Offsite Rail Transportation

Product coal would be loaded onto nominal 8,500 tonne trains 24 hours a day, 7 days per week. An average of 2 trains and a maximum of 7 trains would be loaded each day (based on 2007 and 2008 data). This is unchanged from the existing Integra Open Cut Project operations.

The product coal would then be transported to the Port of Newcastle.

Offsite Road Transportation

Development of the Open Cut Extension would provide continuity of employment for the existing South Pit workforce. Accordingly, there would be a negligible change in the total existing Project workforce (of approximately 250 personnel) and the number of personnel working on the proposed Open Cut Project.

As for the existing Integra Open Cut operations, nominal shift start and finish times during mining operations would be as follows:

- Administration Personnel - 7.00 am to 5.00 pm weekdays.
- Open Cut Personnel - up to 3 shifts per 24 hours, 7 days per week.

The primary access to the Open Cut Project Area would continue to be via the existing Access Road off Bridgman Road.

3.2 Hours of Operation

The expected duration and proposed hours of operations for the Open Cut Extension for which approval are sought are presented in **Table 4**. **Table 4** also identifies the expected duration and hours of operation nominated in the NOC EA.

Table 4 Expected Duration and Proposed Hours of Operations

Phase	Activity	Duration	Period
Open Cut Extension	Open Cut Mining	6 to 8 years	24 hours, 7 days per week
	Vegetation clearing and topsoil stripping	Campaign	7.00 am to 6.00 pm, Monday to Friday, 7 days per week
	Blasting	6 to 8 years	9.00 am to 5.00 pm, Monday to Saturday (Maximum: 5/day, 10/week; Average: 7-8/week)
	Coal Transport	6 to 8 years	24 hours, 7 days per week
CHPP and Railroading Facility	CHPP	Life of Integra operations	24 hours, 7 days per week
	Rail Loading	Life of Integra operations	24 hours (periodically), 7 days per week
NOC	Open Cut Mining	6 years	7.00 am to 10.00 pm, 7 days per week
	Highwall or Auger Mining	Campaign	24 hours, 7 days per week
	Vegetation clearing and topsoil stripping	Campaign	7.00 am to 6.00 pm, Monday to Friday, 7 days per week
	Blasting	6 years	9.00 am to 5.00 pm, Monday to Saturday
	Coal Transport	6 years	7.00 am to 10.00 pm, 7 days per week

3.3 Topographic Setting

The Open Cut Project Area is situated amongst the foothills of the ranges to the north of the Project Area. Glennies Creek (also known as Falbrook) runs to the north-west of the Project Area through an open valley. The resulting effect of the local topography on the ambient weather is a low occurrence of prevailing winds (as defined in the INP) in any one, or more, directions, although, it is noted that north-west and south-east winds are common in the Hunter Valley region.

The topography rises west and north-west of Glennies Creek, with noticeable increases further to the north. The northerly, southerly and westerly slopes facing the Open Cut Project Area contain numerous residences which are elevated and potentially exposed to the existing and planned mining operations. However, the distance from the mining operations and local topographic undulations result in a moderate degree of noise attenuation, particularly to the north. Significant topography to the east of the Open Cut Project Area offer substantial acoustic attenuation to residences in this area.

The topography surrounding the Project Area is illustrated in **Appendix B3**.

3.4 Land Ownership

The Land Ownership Plan of the area surrounding the Open Cut Project is attached as **Appendix C1**.

The surrounding potentially affected non-mine owned residences are identified in **Table 5** and in the Receptor Plan attached as **Appendix C2**.

The surrounding potentially affected mine owned residences (including those owned by the Proponent or its associated companies) are identified in **Table 6** and in the Receptor Plan attached in **Appendix C2**.

The surrounding non-mined owned freehold vacant land beyond the Open Cut Project Area is summarised in **Table 7**. A comprehensive list of all vacant land is presented in **Appendix C3**. In some cases, the "vacant land" parcels are part of a larger landholding on which a residence is located on another land title. All vacant land parcels surrounding the Project Area are identified in **Appendix C4**.

Each residence with a similar background noise environment has been grouped for noise assessment purposes into Noise Assessment Groups (see **Section 4**).

Table 5 Surrounding Potentially Affected Non-Mine Owned Residences

Noise Assessment Group[1] (NAG)	Residence Reference (Refer Appendix C2)	Landowner's Name	Residence Coordinates[2]		
			East (m)	North (m)	Elevation (mAHD)
1	80	G Donnellan	323284	6407998	80
3	87	B & R Richards	322109	6405876	86
	106	B & R Richards	321520	6405033	82
4	88	M & T De Jong	320675	6406074	63
	91	T & D Olofsson	320667	6405878	72
	94	L & S Foord	320434	6405827	69
	95	J & T Clarke	320526	6405794	75
	96	S J Roberton	320588	6405663	78
	99	A J Bennett	320372	6405788	68
	100	C L Stapleton	320278	6405790	65
	105	J & G McInerney	320988	6405748	72
	161	V Lopes	320629	6405744	77
5	103	S Turner	320337	6405531	70
	104	Church Property - Diocese of Newcastle	319975	6405633	66
	111	T Burgess	321417	6404001	120
	112	S & C Ernst	321120	6404550	74
	118	B & R Richards	320470	6405312	90
	120	M & J Chisholm	320519	6405283	90
	121	A Nowland; E Moore; J Dunn	320417	6405003	75
	123	C Standing	320196	6405074	65
	125	R M Lethbridge	320414	6404954	75
	126	R & C Bailey	320187	6404989	65
	129	N & M Smiles	320623	6404174	83
	139	M Eveleigh, K Penfold & R Eveleigh	325618	6399743	97
	154	M & M Beasley	320793	6404865	79
	156	R Ninness	320631	6405121	90
	157	K & D Miller	320568	6405131	87
	159	M Peachey	320458	6405213	86
6	132	W H Bowman; M Bowman; W G Bowman; G R Elder	319601	6403396	60
	133	A Bowman	319002	6403141	86
	137	A Bowman	319077	6401754	65
7	108	I M Tisdell	322119	6404278	76
	109	I M Tisdell	322132	6403985	88
	110	G J Hall	321897	6404243	98
	153 "Dulwich"	R & D Hall	323690	6405346	95
8	142	Singleton Heights (township)	327830	6398488	60

Noise Assessment Group[1] (NAG)	Residence Reference (Refer Appendix C2)	Landowner's Name	Residence Coordinates[2]		
			East (m)	North (m)	Elevation (mAHD)
9	2	Singleton Council	327631	6401713	147
	3	Christopher Ross Whiting	327957	6401847	142
	4	Leonard Cox	327966	6401985	142
	143	G Pitt	327770	6400312	95
	144	W & H Huls	327493	6400507	110
	145	A & S Murray	327366	6400677	110
	146	R & A Howard	327567	6400780	105
	147	S Farrugia	327578	6400874	112
	148	D & L Mellows	327612	6400980	116
	149	R & L Gulliver	327753	6400971	116
	150	R Bourke	327619	6401058	120
	151	C & T Wallace	327743	6401096	120
	152	K & J Badior	327878	6401384	135
10	5	Darren Philip Cox	328299	6402602	142
	6	W G Cox	328232	6402937	137
	8	D K Geelan	328089	6403312	130
	9	W & N Pendered	327918	6403585	115
	10	E & B Kleinman	327916	6403748	109
	11	F Ferraro	327976	6403920	110
	13	P & K Russell	328015	6404087	113
11	7	N J Smith	328802	6403222	150
	12	W Garland	328657	6403853	125
	14	M Hoggan	328294	6404226	121
	15	G & J Barnett	328672	6404208	132
	16	A Lambkin	328098	6404705	118
	17	W Cooper	328508	6404938	127
	18	W & G Cooper	328404	6405153	119
	19	S Andrews	328477	6405926	100
	20	A Garvie	328323	6406161	97
	21	S Andrews	328521	6406158	99
12	50	D & M Bridge	326289	6409093	99
	51	M & S Boyce	326338	6409236	98
	52	B & J Moran	326270	6409346	95
	53	K & J Badior	325976	6409608	110
	54	G Holmes	325761	6409620	108
	55	TBC[3]	325887	6410028	115
	56	B & D Wilson	325666	6409875	128
	57	TBC[3]	325672	6410068	128
	62	D Moran	325601	6409048	94

Noise Assessment Group[1] (NAG)	Residence Reference (Refer Appendix C2)	Landowner's Name	Residence Coordinates[2]		
			East (m)	North (m)	Elevation (mAHD)
A	22	S Andrews	328701	6406549	115
	23	R & K Bell	328273	6406899	110
	24	G Lambkin	328949	6407262	97
	25	J & C Whitney	329190	6407934	100
	26	B & R Frazer	329392	6408269	100
	27	D Hamilton	329678	6408425	110
	28	D Hamilton	329819	6408832	100
	29	D Cope	329155	6408739	130
	30	A Cox	329066	6408499	115
	31	D Kacunic & C Jensen	328580	6408315	110
	32	TBC[3]	328378	6407875	95
	34	T & G Breen	327852	6408123	101
	35	R & W Gardner	327234	6408320	83
	36	D Baker	327959	6409108	110
	37	Helen Leila May Castledine	327559	6409125	90
	38	M & R Porter	327589	6409582	107
	39	E & J Upward	327731	6409613	89
	40	E & J Upward	327715	6409738	91
	41	H M Upward & Sons	327632	6410253	100
	42	J A Welsh	326977	6409946	92
	43	Deidre Margaret Kay	327025	6409078	93
C	47	B & R Cherry	325946	6407965	90
	63	J & M Moore	325370	6408508	78
	64	W & A Gardner	325055	6408133	78
D	44	G & K Cheetham	326501	6408277	81
	48	G & K Cheetham	326121	6408190	80
	49	G & K Cheetham	326016	6408284	80
F	65	P Hedges	324814	6409365	109
	66	P Hedges	324841	6409154	96
	67	G M Watson	324678	6408969	110
	68	S J McInerney	324703	6408777	105
	71	A C Noble	324391	6408416	117
	72	A Noble	324416	6408394	117
	73	A Noble	324204	6408194	101
	76	A Noble	323837	6407878	89

Note 1: Refer to **Section 4** for an explanation of Noise Assessment Groups.

Note 2: Coordinates are presented in Universal Transverse Mercator (UTM) grid coordinates using reference Map Grid of Australia 1994 (MGA94).

Table 6 Surrounding Potentially Affected Mine Owned Residences

Noise Assessment Group[1] (NAG)	Residence Reference (Refer Appendix C2)	Landowner's Name	Residence Coordinates[2]		
			East (m)	North (m)	Elevation (mAHD)
1	77	VALE P/L and others	324031	6407105	75
	78	VALE P/L and others	323492	6406828	85
	79	Xstrata Mt Owen Pty Ltd	323405	6407862	77
	81	Glendell Tenements Pty Ltd	323212	6407709	75
	83	Glendell Tenements Pty Ltd	322862	6407719	74
2	84	Glendell Tenements Pty Ltd	322003	6406792	80
	85	Glendell Tenements Pty Ltd	321533	6406528	91
	86	Glendell Tenements Pty Ltd	321390	6406444	96
	170	Glendell Tenements Pty Ltd	321981	6406668	81
4	90	Ashton Coal Mines Ltd	320537	6406012	63
	92	Ashton Coal Mines Ltd	320297	6406023	62
	93	Ashton Coal Mines Ltd	320423	6405924	65
	97	Ashton Coal Mines Ltd	320581	6405642	80
	98	Ashton Coal Mines Ltd	319975	6405633	73
	101	Ashton Coal Mines Ltd	320187	6405962	63
	102	Ashton Coal Mines Ltd	320277	6405691	65
	155	Ashton Coal Mines Ltd	320717	6405289	90
	162	Ashton Coal Mines Ltd	320458	6405694	74
	163	Ashton Coal Mines Ltd	320353	6405694	70
	164	Ashton Coal Mines Ltd	320717	6405891	68
	165	Ashton Coal Mines Ltd	320515	6405870	68
	166	Ashton Coal Mines Ltd	320470	6405903	67
	167	Ashton Coal Mines Ltd	320428	6405985	63
	168	Ashton Coal Mines Ltd	320288	6405965	63
	169	Ashton Coal Mines Ltd	320320	6405921	64
5	89	Ashton Coal Mines Ltd	319956	6406300	120
	113	Ashton Coal Mines Ltd	320770	6404965	85
	114	Ashton Coal Mines Ltd	320637	6405043	88
	115	Ashton Coal Mines Ltd	320607	6405136	90
	116	Ashton Coal Mines Ltd	320597	6405198	90
	117	Ashton Coal Mines Ltd	320569	6405284	90
	119	Ashton Coal Mines Ltd	320357	6405316	78
	122	Ashton Coal Mines Ltd	320279	6405117	70
	124	Ashton Coal Mines Ltd	320284	6404998	69
	127	Ashton Coal Mines Ltd	320132	6404735	70
	128	Ashton Coal Mines Ltd	320643	6404423	85
	138	Rix's Creek Pty Ltd	323977	6400291	95
	140	Rix's Creek Pty Limited	325571	6399502	92
	141	Rix's Creek Pty Limited	325665	6398723	110
	158	Ashton Coal Mines Ltd	320545	6405136	86
	160	Ashton Coal Mines Ltd	320399	6405450	78

Noise Assessment Group[1] (NAG)	Residence Reference (Refer Appendix C2)	Landowner's Name	Residence Coordinates[2]		
			East (m)	North (m)	Elevation (mAHD)
6	130	Ashton Coal Mines Ltd	319945	6404294	65
	131	Ashton Coal Mines Ltd	319716	6404118	60
	134	Ashton Coal Mines Ltd	318359	6405948	70
	135	Ashton Coal Mines Ltd	317847	6405252	70
	136	Coal & Allied Operations Pty Ltd	317720	6402213	95
7	107	Integra Coal Operations Pty Ltd	321825	6404486	75
9	1	Hunter Valley Open Cut Examiners Pty Ltd	327905	6401608	135
12	58	Hunter Valley Coal Corp. Pty Ltd	325596	6410046	128
	59	Hunter Valley Coal Corp. Pty Ltd	325188	6409968	126
	60	Hunter Valley Coal Corporation PTY Ltd	324551	6410338	105
	61	Xstrata Mt Owen Pty Ltd	325389	6409820	114
A	33	Integra Coal Operations Pty Ltd	324031	6407105	98
B	45	Integra Coal Operations Pty Ltd	326371	6407486	110
	46	Integra Coal Operations Pty Ltd	326080	6407791	105
F	69	Integra Coal Operations Pty Ltd	324549	6408691	116
	70	RHA Pastoral Co Pty Ltd	323492	6406828	112
	74	Enex Ravensworth PTY Limited	323405	6407862	104
	75	Hunter Valley Coal Corporation PTY Limited	323212	6407709	100
G	82	Glendell Tenements Pty Ltd	322862	6407719	76

Note 1: Refer to **Section 4** for an explanation of Noise Assessment Groups.

Note 2: Coordinates are presented in Universal Transverse Mercator (UTM) grid coordinates using reference Map Grid of Australia 1994 (MGA94).

Note 3: The landowner could not be established.

Table 7 Surrounding Potentially Affected Non-Mine Owned Freehold Vacant Land

Noise Assessment Group[1]	Land Reference (Refer Appendix C4)	Landowner's Name[2]
5	343	Mark Andrew Beasley & Michele Kathleen Beasley
	351	Scott Hamilton Andrews
	352	Scott Hamilton Andrews
	395	Robert John Bailey & Cindy Narelle Bailey
	396	Ian John Poulton & Julie-Anee Poulton
6	397	Alistair Stuart Bowman
	401	WH Bowman , MH Bowman, WG Bowman & GR Elder
9	356	Alistair Stuart Bowman & Elizabeth Stuart Bowman
10	355	Alistair Stuart Bowman & Elizabeth Stuart Bowman
11	348	Scott Hamilton Andrews
	354	Freehold[3]
12	360	Leonard Cox & Wilma Dorren Cox
	361	Errol Thomas Foster & Dianne Gayle Foster
	362	Freehold[3]
	363	Alan Charles Noble
	364	William Edwin Gardner & Anne Mary Gardner

Noise Assessment Group[1]	Land Reference (Refer Appendix C4)	Landowner's Name[2]
A	332	Michael Colin Langdon
	333	Kennet Patrick Roots & Mary Louise Roots
	334	Graham Jame Nightingale & Carol Ann Nightingale
	335	Freehold[3]
	336	Gary David Hamilton & Marion Lee Gersbach
	337	Desmond Charles Paul & Denise Catherine Paul
	338	Richard Ian Robinson & Lyndal Maree Robinson
	339	Scott Hamilton Andrews
	340	Scott Hamilton Andrews
	341	Scott Hamilton Andrews
	342	Richard Ian Robinson & Lyndal Maree Robinson
	344	Andrew Garvie
	345	Clarence John Hastings & Leslie Jill Hastings
	346	Clarence John Hastings & Leslie Jill Hastings
	402	Errol David Upward & Jennifer Upward
C	331	Garnham, Cheethem, Upward, Donehue
D	358	Leonard Cox
F	328	Alan Charles Noble
	329	Alan Charles Noble
	330	Alan Charles Noble
	357	Leonard Cox
	359	Leonard Cox

Note 1: Refer to **Section 4** for an explanation of Noise Assessment Groups.

Note 2: The nominated landholdings are "vacant land" but may form part of a larger landholding on which a residence is located on another land title.

Note 3: The landowner could not be established and is therefore assumed to be freehold.

4 EXISTING NOISE AND METEOROLOGICAL ENVIRONMENT

Noise levels in the area surrounding the Open Cut Project are influenced by a range of sources including various mining operations and related activities, rail traffic, traffic on local roads and the New England Highway, agriculture equipment, stock, wind in trees, insects, frogs and birds. In order to characterise the local variation in noise levels, and thereby truly establish the ambient noise levels which would subsequently be used to set noise goals and in the assessment of noise impact from the Open Cut Project, an extensive program involving both unattended and operator-attended monitoring was undertaken.

Operator-Attended and unattended noise surveys were initially conducted in March 2005 to characterise and quantify the acoustical environment in the area surrounding the North Open Cut, with similar surveys undertaken in the area surrounding the entire Open Cut Project Area in August 2007.

Prior to undertaking each of the 2005 and 2007 noise surveys, Heggies undertook a desktop investigation and ground truthing surveys in order to identify areas and/or groupings of residences within approximately 5 km of the Open Cut Project Area with a similar noise environment based on their proximity to mines, road and rail traffic, fauna, waterways, vegetation and topography.

A total of eighteen such areas, referred to as Noise Assessment Groups (NAGs), were identified for the 2005 and/or 2007 surveys and a representative location selected in each NAG for the subsequent noise monitoring programmes.

The measurement methodology and analysis procedures are described in **Appendix D1**.

Noise Monitoring Programme

Ambient noise surveys were conducted in March 2005 to characterise and quantify the existing acoustical environment in the area surrounding the NOC. Eight unattended noise loggers were positioned at selected representative residences for a period of 20 days commencing Wednesday 9 March 2005.

Ambient noise surveys to characterise and quantify the existing acoustical environment in the area surrounding the entire Open Cut Project Area were conducted in August 2007 in order to supplement the March 2005 surveys. Twelve unattended noise loggers were positioned at selected representative residences for a period of 10 days commencing Monday 6 August 2007.

The March 2005 survey data from two locations, representative of Noise Assessment Group (NAG) E and NAG H, have been superseded and replaced by the August 2007 survey data representative of NAG 12 and NAG 1 respectively.

The location of each ambient noise monitoring site is presented in **Appendix D2**. The objective of the monitoring programmes was to establish the various background noise levels in the area typically within 5 km of the Open Cut Project Area.

Noise Assessment Groups

Each residence with a similar noise environment, based on their proximity to, or exposure to mines, road and rail traffic, fauna, waterways, vegetation and topography, has been grouped for noise assessment purposes into one of eighteen Noise Assessment Groups. Each noise monitoring location was chosen to be representative of the ambient noise levels in the vicinity of each Noise Assessment Group.

The selection methodology included an initial desktop investigation, referencing topographic maps and surrounding mining development EAs, consents and/or licences, followed by a number of ground truthing surveys to confirm residences and noise environments.

The locality plan attached as **Appendix D3** identifies the residences and vacant land in each Noise Assessment Group (also as noted in **Table 5** for non-mine owned residences).

4.1 Unattended Noise Monitoring Results

The unattended ambient noise monitoring data from each monitoring location, together with the ambient weather conditions, are presented graphically on a daily basis in **Appendices D4** to **D21**. The ambient noise data were processed in accordance with the requirements of the INP in order to derive the Monday to Sunday ambient noise levels presented in **Table 8**. Note, the estimated industrial $L_{Aeq(period)}$ amenity noise levels presented in **Table 8** indicate the industrial amenity noise levels present at the time at which the ambient noise monitoring programme was conducted only and do not necessarily correspond to the industrial amenity noise levels used in assessing the potential cumulative noise emissions from all approved industrial operations.

The ambient weather conditions at the time of the background noise monitoring surveys were typical of the moderate conditions experienced throughout the year.

Insect activity at the time of the background noise monitoring surveys were moderately low and typical of that experienced in the vicinity of the Open Cut Project (and Hunter Valley) during periods of reduced insect activity.

Table 8 Unattended Ambient Noise Environment (dBA re 20 µPa)

Noise Assessment Group (NAG)	Background Noise Monitoring Location (See Appendix D2)	Rating Background Level All Noise Sources			$L_{Aeq(Period)}$ All Noise Sources		
		Day	Evening	Night	Day	Evening	Night
1	80	30	33	34	50	45	45
2	84	31	34	34	63	62	62
3	87	33	35	35	56	45	48
4	95	34	43	32	49	49	47
5	114	45	41	37	60	56	56
6	131	34	36	33	51	44	43
7	110	40	37	34	64	44	44
8	142	37	37	30	49	44	50
9	143	32	36	34	54	54	51
10	8	31	36	32	46	44	44
11	16	33	38	35	51	49	48
12	54	30	34	30	44	46	46
A	31	31	34	31	53	52	46
B	45	30	32	30	48	47	42
C	64	38	40	41	53	53	46
D	48	32	36	33	54	57	43
F	73	34	35	35	55	49	43
G	82	33	39	35	47	64	48

Note 1: Measured noise levels less than 31 dBA may have a signal to noise ratio less than 5 dBA.

Note 2: Daytime 7.00 am to 6.00 pm, Evening 6.00 pm to 10.00 pm and Night-time 10.00 pm to 7.00 am.

4.2 Operator-Attended Noise Monitoring Results

In order to supplement the unattended logger measurements and to assist in identifying the character and duration of ambient noise sources, operator-attended daytime, evening and night-time surveys were conducted in March 2005 and August 2007. The measurement methodology and analysis procedures are described in **Appendix D1**. The operator-attended measurement results are summarised in **Table 9**.

Where industrial activities were discernible, the industrial $L_{Aeq(15minute)}$ intrusive noise levels were determined and subsequently used to estimate the industrial $L_{Aeq(period)}$ amenity noise levels for the corresponding unattended noise logger data. Note, this only gives a snapshot indication of the existing (cumulative) industrial noise levels for each Noise Assessment Group and, due to the variability in mining operations, mining development and noise enhancing weather conditions, the use of the measured industrial noise levels for determining the potential cumulative industrial noise levels over the life of the Open Cut Project is not appropriate. Consequently, a review of the approved noise emissions from all surrounding industrial operations is presented in the **Section 8.1** in order to determine the maximum potential cumulative noise levels from all currently approved industrial operations.

Table 9 Operator-Attended Ambient Noise Environment (dBA re 20 µPa)

Noise Assessment Group (NAG)	Noise Monitoring Location (See Appendix D2)	$L_{A90(15minute)}$ Ambient Level			$L_{Aeq(15minute)}$ Ambient Level			$L_{Aeq(15minute)}$ Industrial Noise		
		Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
1	80	35	33 35	32 36	43	51 38	35 43	37	36 37	34 40
2	84	38	37	36	60	40	43	ND	ND	40
3	87	32 38	36	37 44	51 44	51	45 48	30 41	33	38 47
4	95	44	40 36	42 38	48	48 40	46 41	44	47 39	45 40
5	114	47	40	39 39	56	57	51 53	30	40	41 43
6	131	33	40	35	40	43	39	22	<20	38
7	110	46	35	36	50	40	39	37	<25	37
8	142	38	37	36	42	41	41	<28	ND	ND
9	143	38	41	45 39 33	55	66	66 42 62	<30	41	22 42 ND
10	8	37 32	39 32	41 38 32	52 49	44 37	46 40 37	ND <22	41 28	37 39 22
11	16	36	42	40 38 36	53	47	53 42 46	20	46	38 39 25
12	54	28 29	33 29	36 33	38 52	37 37	38 37	20 <19	35 26	38 17
A	31	41 36	32 39	29 35	47 63	36 61	40 52	ND ND	ND ND	<30 35
B	45	37 36	29 46	27 37	68 61	58 56	32 53	ND ND	ND ND	<30 <30
C	64	36	34 38	35 38	64	54 45	43 63	<30	<30 ND	42 33
D	48	35 47	44 40	35 43	56 59	51 63	39 45	ND ND	ND ND	ND ND
F	73	37 42	42	38 30	57 48	64	39 37	ND ND	ND	35 33
G	82	42 33 37	46	30 42	46 40 43	53	47 51	ND ND ND	ND	ND ND

Note 1: ND not discernible.

Note 2: The number of operator-attended surveys conducted during each period at each location ranged between 1 and 3 surveys. The results of each survey are presented.

Existing DA Operation Influence on Ambient Noise Environment

The existing Integra Open Cut operation was discernible at a number of NAGs (NAGs 7, 9, 10 and 11) during the operator-attended ambient noise surveys. The $L_{Aeq(15minute)}$ and $L_{A90(15minute)}$ noise level contributions from the existing operations had a negligible to significant contribution to the ambient $L_{Aeq(15minute)}$ and $L_{A90(15minute)}$ noise levels at NAGs 7, 9, 10 and 11. However, the fluctuations of the $L_{A90(15minute)}$ noise emission levels from the existing operation were insufficient to influence the Rating Background Levels determined from the unattended noise ambient noise survey results presented in **Section 4.1**.

Based on the observations made during the operator-attended noise monitoring, it is concluded that the Rating Background Levels (RBLs) presented in **Table 8** are representative of the noise environment for all receivers within each NAG. Further, the background noise levels established during the March 2005 and August 2007 background noise monitoring programmes are considered to remain representative of the current background noise environments for each respective NAG.

4.3 Approved and Currently Proposed Industrial Noise Environment

Due to the variability in the noise emissions from the surrounding industrial (mining) operations over any one assessment period (day, evening or night) and over the life of the mine, measuring the existing industrial $L_{Aeq(period)}$ noise amenity levels for the Open Cut Project assessment purposes was assessed to be impractical. Therefore, in order to provide a conservative estimate for limiting noise emissions from the Project, the amenity and cumulative noise assessment are based on a review of noise emissions from currently approved and proposed industrial operations surrounding the Open Cut Project Area.

Adjoining Approved Mining Operations

A review of the approved and proposed mining operations in the vicinity of the Open Cut Project Area is presented in **Table 10**.

Table 10 Approved Mining Operations in the Project's Surrounds

Mine	Operated by	Approval Date	Development	Status
Integra Underground[1]	Integra Coal Operations Pty Ltd	1/11/1991	Approved[1]	Operating[1]
Mt Owen	Xtrata Mt Owen Pty Ltd	8/12/2004	Approved	Operating
Ashton	Ashton Coal Operations Pty Ltd	11/10/2002	Approved	Operating
Ravensworth East	Xtrata Mt Owen Pty Ltd	2/3/2000	Approved	Operating
Glendell[2]	Glendell Coal Ltd	2/5/1983	Approved	Operating
Glennies Creek Power Station	Envirogen (Oaky) Pty Ltd	14/8/2006	Approved	Operating[3]

Note 1: Integra's current proposal to expand the Integra Underground project has been included in the cumulative assessment.

Note 2: Xstrata Mt Owen Pty Ltd development application for the modification to the Glendell Coal Mine consent, approved 25 February 2008 has been included in the cumulative assessment.

Note 3: Singleton Council approved industrial development. Plant not yet operating at full capacity.

Estimated Approved Industrial $L_{Aeq(period)}$ Noise Amenity Levels

The potential for the simultaneous operation of adjoining mine developments to emit noise can be assessed on a worst case scenario basis by adding the approved noise limits of the surrounding industrial operations. The noise amenity level from each operation can be conservatively estimated by subtracting 3 dBA from the approved intrusive noise levels for each operation. This is clearly a worst case assessment as it assumes that all mines simultaneously emit their maximum (approved) noise emission to a common receiver locality.

The range of calculated industrial noise amenity levels for daytime, evening and night-time periods are presented in **Table 11**, **Table 12** and **Table 13** for non-mine owned residences and in **Table 14**, **Table 15** and **Table 16** for mine owned residences. Note, where there is a single non-mine owned residence or single mine owned residence per NAG the noise amenity level for the single residence in shown.

Table 11 Calculated $L_{Aeq(Daytime)}$ Noise Amenity Levels - Non-Mine Owned Residences

Noise Assessment Group (NAG)	Integra Underground[1]	Rixs Creek[2]	Mt Owen[2]	Ashton[2]	Ravensworth East[2]	Glendell[3]	Mine Gas Power Plant[4]	Calculated Noise Amenity Level
1	33	30	46	23	28	33	19	47
3	29-35	32-33	43-44	26-27	26-27	32-33	12-16	44-45
4	21-25	31-32	44-44	31-35	27-28	34-36	11-12	45-46
5	15-29	31-41	39-44	13-30	22-27	24-35	5-11	43-45
6	18-21	32-33	41-42	18-21	24-25	28-30	5-7	42-43
7	29-36	34-36	42-43	22-23	25-26	30-31	11-18	44-45
8	6	34	38	11	21	22	4	40
9	12-20	35-36	39-40	12-13	22-22	23-24	5-7	41-41
10	21-30	33-33	40-41	13-14	22-23	24-25	7-9	41-42
11	14-24	30-32	40-42	13-14	23-24	24-25	7-10	41-43
12	23-27	27-28	46-47	16-17	27-28	28-29	13-15	46-47
A	11-22	27-29	42-46	13-16	24-27	24-27	9-13	43-46
C	27-29	29-30	45-46	17-19	26-27	28-30	18-21	45-46
D	22-25	29-29	45-45	17-17	26-27	28-28	15-17	45-45
F	27-36	28-30	46-47	18-22	28-28	30-32	13-21	47-47

Note 1: The noise amenity level contributions are calculated from the intrusive noise levels presented in ERM Pty Limited report *"Integra Underground Coal Project Noise Impact Assessment"* dated December 2008.

Note 2: The noise amenity level contributions from the Rixs Creek, Mt Owen, Ashton and Ravensworth East operations are calculated from the intrusive noise limits specified in each operation's respective consent.

Note 3: The noise amenity level contributions are calculated from the intrusive noise levels presented in Advitech Pty Limited report *"Noise Impact Assessment Glendell Mine Modifications to Development Consent"* dated July 2007.

Note 4: The noise amenity level contributions are calculated from the intrusive noise levels presented in Heggies Australia Pty Ltd report *"Glennies Creek Power Plant Noise Impact Assessment, Glennies Creek Coal Mine"* dated 7 April 2006.

Table 12 Calculated $L_{Aeq(Evening)}$ Noise Amenity Levels - Non-Mine Owned Residences

Noise Assessment Group (NAG)	Integra Underground[1]	Rixs Creek[2]	Mt Owen[2]	Ashton[2]	Ravensworth East[2]	Glendell[3]	Mine Gas Power Plant[4]	Calculated Noise Amenity Level
1	33	30	41	23	28	33	19	43
3	29-35	32-33	38-39	26-27	26-27	32-33	13-16	41-42
4	21-25	31-32	39-39	31-35	27-28	34-36	11-12	42-42
5	15-29	31-41	34-39	13-30	22-27	24-35	5-11	40-42
6	18-21	32-33	36-37	18-21	24-25	28-30	6-8	38-39
7	29-36	34-36	37-38	22-23	25-26	30-31	12-18	41-42
8	6	34	33	11	21	22	4	37
9	12-20	35-36	34-35	12-13	22-22	23-24	6-7	38-39
10	21-30	33-33	35-36	13-14	22-23	24-25	8-9	38-39
11	14-24	30-32	35-37	13-14	23-24	24-25	8-11	38-39
12	23-27	27-28	41-42	16-17	27-28	28-29	13-16	41-43
A	11-22	27-29	37-41	13-16	24-27	24-27	9-14	38-41
C	27-29	29-30	40-41	17-19	26-27	28-30	18-21	41-42
D	22-25	29-29	40-40	17-17	26-27	28-28	16-17	41-41
F	27-36	28-30	41-42	18-22	28-28	30-32	13-22	42-43

Note 1: The noise amenity level contributions are calculated from the intrusive noise levels presented in ERM Pty Limited report *"Integra Underground Coal Project Noise Impact Assessment"* dated December 2008.

Note 2: The noise amenity level contributions from the Rixs Creek, Mt Owen, Ashton and Ravensworth East operations are calculated from the intrusive noise limits specified in each operation's respective consent.

Note 3: The noise amenity level contributions are calculated from the intrusive noise levels presented in Advitech Pty Limited report *"Noise Impact Assessment Glendell Mine Modifications to Development Consent"* dated July 2007.

Note 4: The noise amenity level contributions are calculated from the intrusive noise levels presented in Heggies Australia Pty Ltd report *"Glennies Creek Poer Plant Noise Impact Assessment, Glennies Creek Coal Mine"* dated 7 April 2006.

Table 13 Calculated $L_{Aeq(Night\text{-}time)}$ Noise Amenity Levels - Non-Mine Owned Residences

Noise Assessment Group (NAG)	Integra Underground[1]	Rixs Creek[2]	Mt Owen[2]	Ashton[2]	Ravensworth East[2]	Glendell[3]	Mine Gas Power Plant[4]	Calculated Noise Amenity Level
1	39	28	39	21	28	33	20	43
3	36-39	30-31	36-37	24-25	26-27	32-33	13-16	41-42
4	30-32	29-30	37-37	29-33	27-28	34-36	11-13	41-41
5	23-34	29-39	32-37	11-28	22-27	24-35	5-11	39-40
6	26-28	30-31	34-35	16-19	24-25	28-30	6-8	37-38
7	35-43	32-34	35-36	20-21	25-26	30-31	12-18	40-45
8	20	32	31	9	21	22	4	35
9	24-29	33-34	32-33	10-11	22-22	23-24	6-7	37-37
10	30-36	31-31	33-34	11-12	22-23	24-25	8-10	37-39
11	23-32	28-30	33-35	11-12	23-24	24-25	8-11	36-38
12	29-34	25-26	39-40	14-15	27-28	28-29	13-16	40-41
A	16-29	25-27	35-39	11-14	24-27	24-27	9-14	37-40
C	33-35	27-28	38-39	15-17	26-27	28-30	18-21	40-41
D	29-33	27-27	38-38	15-15	26-27	28-28	16-17	39-40
F	34-40	26-28	39-40	16-20	28-28	30-32	14-22	41-43

Note 1: The noise amenity level contributions are calculated from the intrusive noise levels presented in ERM Pty Limited report *"Integra Underground Coal Project Noise Impact Assessment"* dated December 2008.

Note 2: The noise amenity level contributions from the Rixs Creek, Mt Owen, Ashton and Ravensworth East operations are calculated from the intrusive noise limits specified in each operation's respective consent.

Note 3: The noise amenity level contributions are calculated from the intrusive noise levels presented in Advitech Pty Limited report *"Noise Impact Assessment Glendell Mine Modifications to Development Consent"* dated July 2007.

Note 4: The noise amenity level contributions are calculated from the intrusive noise levels presented in Heggies Australia Pty Ltd report *"Glennies Creek Poer Plant Noise Impact Assessment, Glennies Creek Coal Mine"* dated 7 April 2006.

Table 14 Calculated $L_{Aeq(Daytime)}$ Noise Amenity Levels - Mine Owned Residences

Noise Assessment Group (NAG)	Integra Underground[1]	Rixs Creek[2]	Mt Owen[2]	Ashton[2]	Ravensworth East[2]	Glendell[3]	Mine Gas Power Plant[4]	Calculated Noise Amenity Level
1	33-39	30-31	45-46	22-25	27-28	31-34	18-40	46-47
2	30-53	31-31	45-45	29-34	28-28	34-35	14-16	46-54
4	20-26	31-32	44-44	29-34	27-28	34-36	10-12	45-45
5	12-27	30-54	39-44	13-34	21-28	23-37	4-11	42-54
6	17-22	29-32	41-44	17-25	24-28	28-35	5-9	42-45
7	28	34	43	24	26	31	12	44
9	20	35	40	13	22	24	7	41
12	23-27	27-28	47-48	17-18	28-29	29-30	13-14	47-48
A	18	31	45	22	27	31	43	47
B	28-30	30-30	44-45	17-17	26-26	28-28	17-17	45-45
F	34-49	29-31	45-46	19-23	27-28	30-33	16-26	46-51
G	34	30	46	25	28	34	18	47

Note 1: The noise amenity level contributions are calculated from the intrusive noise levels presented in ERM Pty Limited report *"Integra Underground Coal Project Noise Impact Assessment"* dated December 2008.

Note 2: The noise amenity level contributions from the Rixs Creek, Mt Owen, Ashton and Ravensworth East operations are calculated from the intrusive noise limits specified in each operation's respective consent.

Note 3: The noise amenity level contributions are calculated from the intrusive noise levels presented in Advitech Pty Limited report *"Noise Impact Assessment Glendell Mine Modifications to Development Consent"* dated July 2007.

Note 4: The noise amenity level contributions are calculated from the intrusive noise levels presented in Heggies Australia Pty Ltd report *"Glennies Creek Power Plant Noise Impact Assessment, Glennies Creek Coal Mine"* dated 7 April 2006.

Table 15 Calculated $L_{Aeq(Evening)}$ Noise Amenity Levels - Mine Owned Residences

Noise Assessment Group (NAG)	Integra Underground[1]	Rixs Creek[2]	Mt Owen[2]	Ashton[2]	Ravensworth East[2]	Glendell[3]	Mine Gas Power Plant[4]	Calculated Noise Amenity Level
1	33-39	30-31	40-41	22-25	27-28	31-34	18-40	43-45
2	30-53	31-31	40-40	29-34	28-28	34-35	14-16	42-53
4	20-26	31-32	39-39	29-34	27-28	34-36	10-12	41-42
5	12-27	30-54	34-39	13-34	21-28	23-37	4-11	40-54
6	17-22	29-32	36-39	17-25	24-28	28-35	5-9	38-41
7	28	34	38	24	26	31	12	41
9	20	35	35	13	22	24	7	38
12	23-27	27-28	42-43	17-18	28-29	29-30	13-14	43-44
A	18	31	40	22	27	31	44	45
B	28-30	30-30	39-40	17-17	26-26	28-28	17-18	40-41
F	34-49	29-31	40-41	19-23	27-28	30-33	16-26	42-50
G	34	30	41	25	28	34	18	43

Note 1: The noise amenity level contributions are calculated from the intrusive noise levels presented in ERM Pty Limited report *"Integra Underground Coal Project Noise Impact Assessment"* dated December 2008.

Note 2: The noise amenity level contributions from the Rixs Creek, Mt Owen, Ashton and Ravensworth East operations are calculated from the intrusive noise limits specified in each operation's respective consent.

Note 3: The noise amenity level contributions are calculated from the intrusive noise levels presented in Advitech Pty Limited report *"Noise Impact Assessment Glendell Mine Modifications to Development Consent"* dated July 2007.

Note 4: The noise amenity level contributions are calculated from the intrusive noise levels presented in Heggies Australia Pty Ltd report *"Glennies Creek Power Plant Noise Impact Assessment, Glennies Creek Coal Mine"* dated 7 April 2006.

Table 16 Calculated $L_{Aeq(Night-time)}$ Noise Amenity Levels - Mine Owned Residences

Noise Assessment Group (NAG)	Integra Underground[1]	Rixs Creek[2]	Mt Owen[2]	Ashton[2]	Ravensworth East[2]	Glendell[3]	Mine Gas Power Plant[4]	Calculated Noise Amenity Level
1	40-44	28-29	38-39	20-23	27-28	31-34	19-41	43-47
2	36-54	29-29	38-38	27-32	28-28	34-35	14-17	42-54
4	29-33	29-30	37-37	27-32	27-28	34-36	10-12	40-41
5	22-33	28-52	32-37	11-32	21-28	23-37	4-11	38-52
6	23-29	27-30	34-37	15-23	24-28	28-35	5-9	36-40
7	35	32	36	22	26	31	12	40
9	28	33	33	11	22	24	7	37
12	28-32	25-26	40-41	15-16	28-29	29-30	13-14	41-42
A	27	29	38	20	27	31	44	45
B	35-36	28-28	37-38	15-15	26-26	28-28	17-18	40-41
F	37-50	27-29	38-39	17-21	27-28	30-33	17-26	42-50
G	40	28	39	23	28	34	19	43

Note 1: The noise amenity level contributions are calculated from the intrusive noise levels presented in ERM Pty Limited report *"Integra Underground Coal Project Noise Impact Assessment"* dated December 2008.

Note 2: The noise amenity level contributions from the Rixs Creek, Mt Owen, Ashton and Ravensworth East operations are calculated from the intrusive noise limits specified in each operation's respective consent.

Note 3: The noise amenity level contributions are calculated from the intrusive noise levels presented in Advitech Pty Limited report *"Noise Impact Assessment Glendell Mine Modifications to Development Consent"* dated July 2007.

Note 4: The noise amenity level contributions are calculated from the intrusive noise levels presented in Heggies Australia Pty Ltd report *"Glennies Creek Power Plant Noise Impact Assessment, Glennies Creek Coal Mine"* dated 7 April 2006.

4.4 Noise Environment for Project Assessment Purposes

The RBLs adopted for assessment purposes are representative of the background noise environment, with RBLs ranging from 30 dBA to 45 dBA during the daytime, 32 dBA to 43 dBA during the evening and 30 dBA to 41 dBA during the night-time. Based on a review of the ambient noise results presented in **Section 4.1** and **Section 4.2**, **Table 17** presents the RBLs and Calculated $L_{Aeq(period)}$ Noise Amenity Levels for noise assessment purposes.

Table 17 Noise Environment for Project Assessment Purposes (dBA re 20 µPa)[1]

Noise Assessment Group (NAG)	Background Noise Monitoring Location	Rating Background Level All Noise Sources[2, 3]			LAeq(period) All Noise Sources			Calculated LAeq(period) Noise Amenity Levels[4]		
		Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
1	80	30	33	34	50	45	45	46-47	43-45	43-47
2	84	31	34	34	63	62	62	46-54	42-53	42-54
3	87	33	35	35	56	45	48	44-45	41-42	41-42
4	95	34	43	32	49	49	47	45-46	41-42	40-41
5	114	45	41	37	60	56	56	42-54	40-54	38-52
6	131	34	36	33	51	44	43	42-45	38-41	36-40
7	110	40	37	34	64	44	44	44-45	41-42	40-45
8	142	37	37	30	49	44	50	40-40	37-37	35-35
9	143	32	36	34	54	54	51	41-41	38-39	37-37
10	8	31	36	32	46	44	44	41-42	38-39	37-39
11	16	33	38	35	51	49	48	41-43	38-39	36-38
12	54	30	34	30	44	46	46	46-48	41-44	40-42
A	31	31	34	31	53	52	46	43-47	38-45	37-45
B	45	30	32	30	48	47	42	45-45	40-41	40-41
C	64	38	40	41	53	53	46	45-46	41-42	40-41
D	48	32	36	33	54	57	43	45-45	41-41	39-40
F	73	34	35	35	55	49	43	46-51	42-50	41-50
G	82	33	39	35	47	64	48	47	43	43

Note 1: Daytime 7.00 am to 6.00 pm, Evening 6.00 pm to 10.00 pm and Night-time 10.00 pm to 7.00 am.

Note 2: Measured noise levels less than 31 dBA may have a signal to noise ratio less than 5 dBA.

Note 3: The RBLs have been determined from measurements of the existing noise environment (ie not calculated) and therefore, conservatively, do include the likely increase in background noise levels associated with the increasing mining activity in the area.

Note 4: Presents the range of Calculated Approved $L_{Aeq(period)}$ Noise Amenity Levels for both non-mine owned and mine owned residences.

Justification of the Background Noise Environment

The DECC's INP Applications Notes (dated 21 February 2008) state:

> *The results of long term unattended background noise monitoring can sometimes determine that the calculated Rating Background Level (RBL) for the evening or night period is higher than the RBL for the daytime period. These situations can often arise due to increased noise from for example insects or frogs during the evening and night in the warmer months or due to temperature inversion conditions during winter. The objective of carrying out long-term background noise monitoring is to determine existing background noise levels at a location that are indicative of the entire year.*

In determining project-specific noise levels from the RBLs, the community's expectations also need to be considered. The community generally expects greater control of noise during the more sensitive evening and night-time periods than the less sensitive daytime period. Therefore, in determining project-specific noise levels for a particular development, it is generally recommended that the intrusive noise level for evening be set at no greater than the intrusive noise level for daytime. The intrusive noise level for night-time should be no greater than the intrusive noise level for day or evening. Alternative approaches to these recommendations may be adopted if appropriately justified.

Heggies' experience in conducting environmental noise monitoring in the Hunter Region, together with a review of published data of noise monitoring conducted in the vicinity of the Open Cut Project, reveals that daytime $L_{A90(15minute)}$ noise levels are regularly lower than the evening and night-time levels. Typically, insect activity and unstable atmospheric conditions prevail during the spring, summer and autumn season evening periods, thereby increasing the background noise levels. During the night-time period however, particularly during the winter season, prevailing stable atmospheric conditions tend to increase the noise level contribution from distant traffic and mining operations. The background noise monitoring for the Open Cut Project was conducted during the autumn and winter seasons and the monitoring results are consistent with these observations.

These findings are further supported by the background noise monitoring results presented in the following local noise impacts assessments:

- Glendell Mine - Umwelt (Australia) Pty Limited *"Environmental Noise Monitoring Winter 2008"* dated November 2008 - monitoring conducted during June 2008 confirmed that the night-time background noise levels in the area between Camberwell Village and Falbrook Road are comparable to those presented in this assessment.
- Mt Owen Mine - Umwelt (Australia) Pty Limited *"Environmental Noise Monitoring Winter 2008"* dated October 2008 - monitoring conducted during June 2008 confirmed that the night-time background noise levels in the area between Camberwell Village and Falbrook Road are comparable to those presented in this assessment.
- Glendell Mine - Advitech Pty Limited *"Noise Impact Assessment Glendell Mine Modification Development Consent"* dated July 2007 - monitoring conducted between April 2006 and February 2007 confirmed that the evening and/or night-time background levels are higher than the daytime background levels in the area between Camberwell Village and Falbrook Road.
- Mt Owen Mine - Advitech Pty Limited *"Noise Impact Assessment Mt Owen Operations Project"* dated July 2007 - monitoring conducted between February 2003 and March 2003 confirmed that the evening and/or night-time background noise levels are higher than the daytime background levels in the area between Camberwell Village and Falbrook Road.
- Camberwell Mine - HLA Envirosciences Pty Limited *"Camberwell Coal Pty Limited Annual Environmental Management Report for the period 31 August 1998 to 31 August 1999"* dated 28 October 1999 - monitoring conducted during April 1999 confirmed that the evening/night-time background noise levels are higher than the daytime background levels in the area surrounding the project site. Also, observed cicada activity during November/December increased the background noise levels during all periods (ie daytime, evening and night-time).
- Mt Owen Mine - Advitech Pty Limited *"Environmental Noise Assessment March 1999"* dated March 1999 - monitoring conducted during March 1999 confirmed that the evening/night-time background levels are higher than the daytime background levels in the area surrounding the project site.
- Ravensworth East - ERM Mitchell McCotter Pty Ltd *"Ravensworth East Mine Noise and Blasting Impact Assessment"* dated February 1999 - monitoring conducted between May 1998 and June 1998 confirmed that the evening and night-time background noise levels are higher than the daytime background noise levels in the area surrounding the project site.

- Ashton Mine - HLA Envirosciences Pty Limited *"Noise and Vibration Assessment Ashton Coal Project"* dated 29 October 2001 - monitoring conducted during March 2000, August 2001 and September to October 2001 confirmed that the evening and/or night-time background noise levels are higher than the daytime background noise levels in Camberwell Village and in the area to the south of New England Highway.
- Liddell Colliery - Richard Heggie Associates Pty Ltd *"Noise and Blasting Impact Assessment Liddell Colliery"* dated 28 August 2001 - monitoring conducted during December 2000, January 2001 and July 2001 confirmed that the evening and night-time background noise levels are higher than the daytime background noise levels in the area surrounding the project site.
- Hunter Valley Operations - Environmental Resources Management Australia *"Hunter Valley Operations West Pit Extension and Minor Modifications Noise Assessment"* dated October 2003 - monitoring conducted between January 2003 and February 2003 confirmed that the evening and/or night-time background noise levels are higher than the daytime background noise levels in the area surrounding the project site.
- Bulga Mine - Global Acoustics *"Bulga Coal Continued Underground Operations"* dated July 2003 - monitoring conducted during March 2000, March 2001, October 2001 and May 2002 confirmed that the evening and night-time background noise levels are higher than the daytime background noise levels in the area surrounding the project site.
- Wambo Mine - Richard Heggie Associates Pty Ltd *"Wambo Development Project - Construction, Operating and Transportation - Noise and Blasting Impact Assessment"* dated 23 June 2003 - monitoring conducted during April 2001 and December 2002 confirms that the evening background levels are higher than the daytime background levels in the area surrounding the project.
- Bengalla Mine - Commissioners of Inquiry for Environment and Planning *"Establishment and Operation Bengalla Open Cut Coal Mine Muswellbrook"* dated August 1994 - confirmed that the evening/night-time background noise levels are higher than the daytime background noise levels in the area surrounding the project site.

Table 18 presents the median of a sample of the RBLs established in Hunter Valley mine developments' Environmental Impact Statements (EISs) or Environmental Assessments (EAs).

Table 18 Median Ambient RBL Hunter Valley Noise Environment

Project EIS/EA	Season	Number of Monitoring Sets	Day (median)[1]	Evening (median)[1]	Night (median)[1]
Camberwell Mine - October 1999	Spring/ Summer	1	40	40	44
Liddell Colliery - 28 August 2001	Summer	4	31	34	37
Bengalla Mine - August 1994	-	3	35	35	39
Mt Owen Mine - March 1999	Autumn	2	33	33	36
Ravensworth East - February 1999	Autumn/Winter	4	32	36	35
Mt Owen Mine - July 2007	Summer	2	33	34	34
Ashton Mine - 29 October 2001	Autumn/Winter	2	33	35	33
Bulga Mine - July 2003	Autumn/Spring	4	31	34	33
Glendell Mine - July 2007	Summer/Autumn	3	32	35	32
Hunter Valley Operations - October 2003	Summer	4	33	34	32
Wambo Mine - 23 June 2003	Summer/Autumn	8	34	35	31
	Overall Median of all Data Sets[3]		**32**	**35**	**33**

Note 1: Median of samples from project EIS/EA.
Note 2: Median of all sample data.

The above references confirm that the daytime background noise levels are generally lower than the evening and night-time background noise levels and are therefore a feature of the environment in the area surrounding the Open Cut Project and in the broader Hunter Valley mining region. Further, this background noise relationship is found to exist during all seasons of the year. During late spring and early summer significantly higher (up to 20 dBA) background noise levels are observed during all periods of the day due to increased insect activity, accordingly, background noise monitoring is usually avoided during this time (as it was avoided during the Open Cut Project background noise monitoring programme).

NAG C (Group C), although representing only three residences (Residences 47, 63 and 64), was identified as an acoustically different group of residences. Group C is located in a relatively large open area which receives relatively little topographic acoustic screening from the surrounding mining operations and is therefore exposed to higher ambient noise levels (compared to the adjacent Group B).

4.5 Meteorological Environment

The INP Section 5.3, Wind Effects, states:

> *"Wind effects need to be assessed where wind is a feature of the area. Wind is considered to be a feature where source to receiver wind speeds (at 10 m height) of 3 m/s or below occur for 30 percent of the time or more in any assessment period in any season."*

An assessment of existing wind conditions has been prepared from the ICO meteorological data recorded on Project Open Cut Area for the period 2001 to 2004. Note, the ICO weather station was not functioning properly after 2004 and consequently, no reliable more recent weather data is available. The dominant seasonal wind speeds and directions are presented in **Appendix D22** for daytime (7.00 am to 6.00 pm), evening (6.00 pm to 10.00 pm) and night-time (10.00 pm to 7.00 am).

The assessment shows that there are no winds within the daytime, evening or night-time periods in any season of velocity less than (or equal to) 3 m/s with a frequency of occurrence greater than (or equal to) 30%. Therefore, wind is not considered to be a feature of the site in accordance with the inp. Further, this also indicates that the occurrence of (or presence of the Hunter Valley) drainage-flow winds is less than 30% and therefore they need not be considered when temperature inversions are present. Furthermore, the residences surrounding the Open Cut Project are either at a higher elevation than the Project or are separated by intervening higher topography, thereby preventing source to receiver drainage flows to form.

Temperature Inversion

Temperature inversions, when they occur, have the ability to increase noise levels by focusing sound waves. Temperature inversions occur predominantly at night during the winter months. Consequently, the NSW INP states that temperature inversions need only be considered for the night-time noise assessment period ie 10.00 pm to 7.00 am. Further, for a temperature inversion to be a significant characteristic of the area, it needs to occur for 30% or more of the total nights during winter, or about two (2) nights per week.

An assessment of existing atmospheric stability conditions has been prepared from the Camberwell Mine meteorological data recorded on site for the period 2001 to 2004. The frequency of occurrence of each stability class is presented in **Appendix D23** for evening (6.00 pm to 10.00 pm) and night-time (10.00 pm to 7.00 am), where stability classes F and G are the indicators of the occurrence of noise enhancing temperature inversions.

The assessment shows that the cumulative frequency of occurrence of F and G stability classes is greater than 30%. Therefore, in accordance with the INP, temperature inversions are considered to be a feature of the Open Cut Project Area. Further, as the dominant stability class was F, it is appropriate to use moderate (F class, 3˚C/100 m - refer to the INP Section 5.2 and INP Appendix F) temperature inversions in the assessment of night-time noise emissions from the Open Cut Project in accordance with the INP.

4.6 Noise Modelling Meteorology

The noise modelling meteorological parameters determined in accordance with the INP are presented in **Table 19**.

Table 19 Noise Modelling Meteorological Parameters

Period	Meteorological Condition	Air Temp	Relative Humidity	Wind Velocity	Temperature Gradient
Daytime	Calm	18°C	60%	0m/s	0°C/100m
Evening	Calm	12°C	75%	0m/s	0°C/100m
Night-time	Calm	6°C	90%	0m/s	0°C/100m
Night-time	Adverse	6°C	90%	0m/s	3°C/100m

5 NOISE ASSESSMENT METHODOLOGY

5.1 Construction and Operating Assessment Criteria

Construction

The assessment of potential noise impacts from on-site construction works remains according to the DECC's ENCM (1994), Chapter 171 Noise Control Guideline - Construction Site Noise. Accordingly, the applicable $L_{A10(15minute)}$ construction noise criteria for the Open Cut Project is the RBL plus 20 dBA.

Construction activities will be limited in extent but may include amenity bunding, dams and other water management structures, haul road construction and demolition works associated with existing buildings within the Mine Area.

Operation

The INP prescribes detailed calculation routines for establishing "project specific" $L_{Aeq(15minute)}$ intrusive noise criteria and $L_{Aeq(period)}$ noise amenity criteria (ie Project Specific Noise Levels - PSNLs) for a development at noise sensitive receivers. In order to assess the noise emissions, it is important to appreciate and distinguish between the INP's first and second environmental noise control objectives.

Intrusive Noise Criteria $L_{Aeq(15minute)}$

The INP's first objective, that the intrusive noise emission from any single development does not exceed the background level by more than 5 dBA, relates to individual industrial sites where the intrusive noise limit is generally specified in the Planning Approval and/or Environment Protection Licence.

There is no established procedure (or regulatory requirement) to derive intrusive $L_{Aeq(15minute)}$ noise criteria for the cumulative operation of existing and/or approved industrial developments in a locality.

DECC Modified Project Specific Intrusive Criteria $L_{Aeq(15minute)}$

Notwithstanding the prevailing trend of evening RBLs being typically 3 dBA higher than daytime RBLs and night-time RBLs being typically 1 dBA higher than daytime RBLs (refer to **Table 18**), the DECC have nominated the following modified intrusive PSNLs for the Open Cut Project:

- $L_{Aeq(15minute, daytime)}$ PSNL = $RBL_{(daytime)}$ + 5 dBA
- $L_{Aeq(15minute, evening)}$ PSNL = lower of: RBL(evening) + 5 dBA
  $L_{Aeq(15minute, daytime)}$ PSNL + 3 dBA
- $L_{Aeq(15minute, night)}$ PSNL = lower of: RBL(night) + 5 dBA
  $L_{Aeq(15minute, daytime)}$ PSNL + 1 dBA

Noise Amenity Criteria $L_{Aeq(period)}$

The INP's second objective, that the $L_{Aeq(period)}$ amenity level (ie non-transport related) does not exceed the specified "acceptable" or "maximum" noise level appropriate for the particular locality and land use, is aimed at restricting the potential cumulative increase in the noise amenity levels, otherwise known as "background creep".

In addition, "vacant land" is considered to comprise a lot which is not excluded from obtaining permission for a residential development but does not at the time of this study have either an application lodged or consent obtained for a dwelling. However, current Department of Planning (DoP) policy considers vacant land to be noise affected in the absence of a residence even though there would not be a resident present to be noise affected at the time of the study. In the event that the landowner establishes a residence, only then should it be considered as a noise sensitive receiver. Accordingly, the vacant land noise assessment is conducted for information purposes only.

Sleep Disturbance

The most recent criteria for sleep disturbance are those contained in the DECC's *"Application notes - NSW industrial noise policy"* dated 21 February 2008. The Application notes consider sleep disturbance as the emergence of the $L_{A1(1minute)}$ level above the $L_{A90(15minute)}$ level at the time. The appropriate screening criterion for sleep disturbance is determined to be an $L_{A1(1minute)}$ level 15 dBA above the RBL for the night-time period (10.00 am to 7.00 am).

When the criterion is not met, a more detailed analysis may be required which should cover the maximum noise level or $L_{A1(1minute)}$ the extent that the maximum noise level exceeds the background level and the number of times this happens during the night-time period. Some guidance on possible impacts is contained in the review of research results in the appendices to the NSW Environmental Criteria for Road Traffic Noise (ECRTN).

A review of noise events from comparable coal mining operations shows that the $L_{A1(1minute)}$ levels from mobile equipment (ie dozers, haul trucks, trains etc) are typically no greater than 10 dBA above the $L_{Aeq(15minute)}$ intrusive level.

Accordingly, if the $L_{Aeq(15minute)}$ intrusive criteria (ie RBL plus 5 dBA) are achieved then the DECC's sleep disturbance guideline screening criterion (ie RBL plus 15 dBA) will also be met. This relationship enables the noise assessment process to focus on the setting of the appropriate $L_{Aeq(15minute)}$ intrusive criteria.

Assessment Criteria

Ideally, the intrusive noise emission should generally not exceed the background level by more than 5 dBA. Similarly, the noise amenity level should generally not exceed the specified INP "acceptable" or "maximum" noise level appropriate for the particular locality and land use as shown in **Table 20** for the 18 noise assessment groups.

Table 20 INP Noise amenity Assessment Criteria (dBA re 20μPa)

Noise Assessment Group (NAG)	Land Use	Amenity Assessment Criteria					
		Amenity LAeq(period)[1] Acceptable			Amenity LAeq(period)[1] Maximum		
		Daytime	Evening	Night-time	Daytime	Evening	Night-time
1	Rural	50	45	40	55	50	45
2	Rural	50	45	40	55	50	45
3	Rural	50	45	40	55	50	45
4	Suburban	55	45	40	60	50	45
5	Suburban	55	45	40	60	50	45
6	Rural	50	45	40	55	50	45
7	Rural	50	45	40	55	50	45
8	Suburban	55	45	40	60	50	45
9	Suburban	55	45	40	60	50	45
10	Rural	50	45	40	55	50	45
11	Rural	50	45	40	55	50	45
12	Rural	50	45	40	55	50	45
A	Rural	50	45	40	55	50	45
B	Rural	50	45	40	55	50	45
C	Rural	50	45	40	55	50	45
D	Rural	50	45	40	55	50	45
F	Rural	50	45	40	55	50	45
G	Rural	50	45	40	55	50	45

Note 1: Daytime 7.00 am to 6.00 pm, Evening 6.00 pm to 10.00 pm and Night-time 10.00 pm to 7.00 am.

The intrusive and amenity noise assessment criteria (ie Project Specific Noise Levels - PSNLs) for each of the 18 NAGs are presented in **Table 21**. The $L_{Aeq(period)}$ noise amenity levels resulting from the operation of all approved mining operations in the vicinity of the Open Cut Project, as presented in **Table 17**, have been used to determine the resulting project specific amenity noise criteria in accordance with the procedures prescribed in the INP. These criteria are nominated for the purposes of assessing the potential noise emissions from the Open Cut Project. Note, typically the $L_{Aeq(15minute)}$ intrusive criteria are the controlling noise criteria at residences during day and evening assessment periods, whereas the $L_{Aeq(night)}$ amenity criteria are likely to be the controlling noise criteria during night-time assessment period.

Table 21 INP Project Specific Noise Assessment Criteria (dBA re 20 μPa)[1,2]

Noise Assessment Group (NAG)	Representative Noise Monitoring Location	Project Specific Assessment Criteria (PSNLs)								
		Intrusive $L_{Aeq(15minute)}$[3]			Amenity $L_{Aeq(period)}$[4]					
					Acceptable			Maximum		
		Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
1	80	35	38	36	47-48	37-41	33-37	55-55	48-50	37-41
2	84	36	39	37	44-48	41-43	32-44	49-55	43-50	42-44
3	87	38	40	39	48-49	42-43	32-32	55-55	50-50	42-43
4	95	39	42	37	55-55	42-43	32-32	55-55	50-50	43-43
5	114	50	46	42	49-55	41-44	32-42	49-55	44-50	42-45
6	131	39	41	38	48-50	43-45	32-38	55-55	50-50	43-45
7	110	45	42	39	49-49	43-43	32-32	55-55	50-50	43-43

Noise Assessment Group (NAG)	Representative Noise Monitoring Location	Project Specific Assessment Criteria (PSNLs)								
		Intrusive $L_{Aeq(15minute)}$[3]			Amenity $L_{Aeq(period)}$[4]					
					Acceptable			Maximum		
		Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
8	142	42	42	35	55-55	45-45	38-38	55-55	50-50	45-45
9	143	37	40	38	55-55	44-45	37-37	55-55	50-50	45-45
10	8	36	39	37	50-50	44-45	34-37	55-55	50-50	44-45
11	16	38	41	39	50-50	44-45	36-38	55-55	50-50	45-45
12	54	35	38	35	46-48	39-43	32-32	55-55	49-50	42-43
A	31	36	39	36	47-50	37-45	32-37	55-55	48-50	37-45
B	45	35	37	35	48-48	43-43	32-32	55-55	50-50	43-43
C	64	35[5]	37[5]	35[5]	48-48	42-43	32-32	55-55	50-50	43-43
D	48	37	40	38	48-48	43-43	32-34	55-55	50-50	43-44
F	73	39	40	40	42-48	37-42	32-40	53-55	42-50	38-43
G	82	38	41	39	47-47	41-41	33-33	55-55	50-50	41-41

Note 1: Determined from existing noise environment presented in **Table 17**.

Note 2: Daytime 7.00 am to 6.00 pm, Evening 6.00 pm to 10.00 pm and Night-time 10.00 pm to 7.00 am.

Note 3: Determined in accordance with the procedures specified in INP Section 2.1.

Note 4: Determined in accordance with the procedures specified in INP Section 2.2.

Note 5: Following discussions with DoP and DECC, the intrusive PSNLs for NAG B have been applied to NAG C in order to maintain a degree of parity between the adjacent NAG intrusive PSNLs.

Justification of the Project Specific Noise Assessment Criteria

An extensive review of the background noise environment documented in previous assessments for the areas surrounding the Open Cut Project is presented in **Section 4.4**. Subsequently, the intrusive PSNLs presented in **Table 21** were compared to this data and Heggies confirm that they are appropriate for the Open Cut Project as higher evening and night-time noise levels are a feature of the subject area. Therefore, the RBL plus 5 dBA intrusive PSNL is considered appropriate for assessing the $L_{Aeq(15minute)}$ intrusive noise emissions from the Project.

In order to cater for the increase in the evening and night-time background noise levels due to enhanced noise propagation from surrounding mining activities, it is appropriate to limit the Project's noise emission contributions via the amenity criterion.

Project Noise Assessment Methodology

The INP states that the project specific assessment criteria have been selected to protect at least 90% of the population living in the vicinity of industrial noise sources from the adverse effects of noise for at least 90% of the time. Provided the criteria in the INP are achieved, it is unlikely that most people would consider the resultant noise levels excessive.

In those cases where the INP project specific assessment criteria are not achieved, it does not automatically follow that all people exposed to the noise would find the noise unacceptable. In subjective terms, exceedances of the INP project specific assessment criteria can be generally described as follows:

- Negligible noise level exceedance <1 dBA
  (Not noticeable by all people).

- Marginal noise level exceedance 1 dBA to 2 dBA
  (Not noticeable by most people).
- Moderate noise level exceedance 3 dBA to 5 dBA
  (Not noticeable by some people but may be noticeable by others).
- Appreciable noise level exceedance >5 dBA
  (Noticeable by most people).

In view of the foregoing, **Table 22** presents the methodology for assessing noise levels which may exceed the INP project specific noise assessment criteria.

Table 22 Project Noise Assessment Methodology

Assessment Criteria	Project Specific Criteria	Noise Management Zone[1]		Noise Affectation Zone
		Marginal	Moderate	
Intrusive $L_{Aeq(15minute)}$	DECCW Modified Intrusive PSNL	1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
Amenity $L_{Aeq(period)}$	INP based on existing industrial level	3 dBA to 4 dBA below Maximum Amenity PSNL	0 dBA to 2 dBA below Maximum Amenity PSNL	Above Maximum Amenity PSNL

Note 1: Heggies acknowledge that the DECCW has, in previous correspondence, defined the Marginal Noise Management Zone as being a 'Minor Exceedance' and Moderate Noise Management Zone as being a 'Marginal Exceedance'.

For the purposes of assessing the potential noise impacts, the management and affectation criteria are further defined as follows.

Noise Management Zone

Depending on the degree of exceedance of the intrusive PSNLs (1 dBA to 5 dBA) or the encroachment towards the maximum amenity PSNL (to within 4 dBA), noise impacts could range from negligible to marginal (as defined by the DECCW). Within this zone, it is recommended that management procedures be implemented including the following:

- Noise monitoring on-site and within the community.
- Prompt response to any community issues of concern.
- Refinement of on-site noise mitigation measures and operating procedures where practicable.
- Discussions with relevant landowners to assess concerns.
- Consideration of acoustical mitigation at residences, where substantiated by monitoring results.
- Consideration of negotiated agreements with landowners.

Noise Affectation Zone

Exposure to noise levels within this zone may be considered unacceptable by some landowners. Here, it is recommended that the following be considered:

- Discussions with relevant landowners to assess concerns and define responses.
- Implementation of acoustical mitigation at residences.
- Negotiated agreements with landowners, where required.

Noise Emissions to Non-Mine Owned Vacant Land

The DoP considers vacant land to be noise affected in the absence of a dwelling even though there would not be a resident present to be noise affected at the time of the study. Accordingly, an assessment of non-mine owned vacant land, where the intrusive PSNLs are estimated to be exceeded on over 25% of the vacant land area, has been conducted for information purposes.

Noise Mitigation Measures

The Noise Management Zone and Noise Affectation Zone procedures described in **Section 5.1** are in addition to ensuring that the following feasible and reasonable noise controls, as included in the predictive modelling, have been implemented on the Open Cut Project.

Noise Mitigation Investigations

During the initial assessment phase, a number of iterative steps were undertaken in order to ascertain potential unmitigated noise emissions and to assess the feasibility and practicability of implementing noise mitigation and management measures to reduce the Open Cut Project noise emissions at residences, including:

- Preliminary noise modelling of critical years in order to identify potential areas of affectation as well as investigating various noise mitigation and management measures to assess their relative effectiveness.
- Consideration of various combinations of noise mitigation and management measures to minimise the potential noise affectation zone, and adoption of mitigation measures (including a fully mitigated mobile fleet) that significantly reduce the Open Cut Project's operational noise emissions.

Noise Mitigation Investigations

All noise mitigation and management controls that would be adopted are provided below.

Operations - Mobile Equipment Noise Controls

The Open Cut Project's mobile equipment would be commissioned to achieve the predicted noise emission levels present in **Section 6**. The nominal overall L_{Aeq} sound power levels (SWLs) presented in **Table 2** are indicative only, however, the total mine SWL would be used by ICO to manage the onsite noise emissions.

Nevertheless, the overall SWLs for the mobile equipment are based on current demonstrated "achievable" noise emission standards. Further reductions may be possible in the future. Initial cost estimates to install, maintain and service the "achievable" noise controls have been undertaken and are included in the Open Cut Project's operating budgets.

Subsequent detailed design studies may be required to refine individual SWLs and to prepare procurement specifications in order to ensure that the approved off-site environmental noise limits are achieved.

5.2 Mine Noise Modelling Procedure

An Open Cut Project specific computer noise model was developed to incorporate the significant noise sources associated with the proposed development, together with the surrounding terrain and nearby residences and properties.

The noise model was prepared using RTA Software's Environmental Noise Model (ENM for Windows, Version 3.06), a commercial software system developed in conjunction with the NSW EPA (now DECC). The acoustical algorithms utilised by this software have been endorsed by the ANZEC and all State Environmental Authorities throughout Australia as representing one of the most appropriate predictive methodologies currently available.

The following scenarios were assessed (based on the planned production/mine progression):

- Operation Full Pit Extent Year 1 - including NOC Year 1, CHPP and Rail Loadout Facility.
- Operation Full Pit Extent Year 4 - including NOC Year 3, CHPP and Rail Loadout Facility.

- Operation Full Pit Extent Year 6 - including NOC Year 6, CHPP and Rail Loadout Facility.
- Operation Full Pit Extent Year 8 - including CHPP and Rail Loadout Facility.
- Operation Part Pit Extent Year 3 - including NOC Year 3, CHPP and Rail Loadout Facility.
- Operation Part Pit Extent Year 6 - including NOC Year 6, CHPP and Rail Loadout Facility.

Modelling of mining operations include all proposed plant items operating concurrently in order to simulate the overall maximum energy equivalent (ie $L_{Aeq(15minute)}$) intrusive noise level. For each of the six modelled operating scenarios, the location of each plant item is indicated on the conceptual mine plans presented in **Appendix E**, together with the mine fleet haul routes indicating where the mobile plant are operating for each scenario. That is, as a large proportion of the mobile equipment is operated in repeatable routines, representative waste rock and coal truck transportation cycles have been included in the modelling.

The L_{Aeq} sound power levels presented in **Table 2** do not include noise emissions which emanate from reversing alarms. Alarms will be subject to procurement specifications detailing the tone frequency, noise emission level, directionality and coverage. They will be installed to optimise safety and to minimise off-site noise breakout. In the unlikely event that alarm noise remains a source of disturbance, the feasibility of further on-site optimisation and fine adjustments will be examined in order to achieve further noise reductions without compromising safety standards.

6 INTRUSIVE NOISE ASSESSMENT - NON-MINE OWNED RESIDENCES

6.1 Operation Full Pit Extent Year 1

The predicted (point to point) $L_{Aeq(15minute)}$ intrusive noise emissions at the surrounding non-mine owned residences during Full Pit Extent Year 1 operations are presented in **Appendix F1** together with the intrusive PSNLs, while in **Table 23** this information is summarised by NAG. The $L_{Aeq(15minute)}$ intrusive noise contour diagrams for evening (calm) and (night-time) adverse winter operations are presented in **Appendix G**. Note, the calculation of the noise contours involves numerical interpolation of a noise level array with a graphical accuracy of up to approximately ±2.5 dBA.

Table 24 includes all known non-mine owned residences where the intrusive PSNLs are predicted to be exceeded during Full Pit Extent Year 1 operations and assigns the residences in either the Noise Management Zone or Noise Affectation Zone.

Table 23 Operation Full Pit Extent Year 1 $L_{Aeq(15minute)}$ Intrusive Noise Emissions

Noise Assessment Group (NAG)	Daytime		Evening		Night-time	Adverse Winter	
	Total	Intrusive PSNLs	Total	Intrusive PSNLs	Total	Total	Intrusive PSNLs
1	32	35	33	38	33	41	36
3	39-41	38	40-42	40	41-42	46	39
4	26-29	39	26-29	42	27-30	36-40	37
5	21-38	50	21-39	46	22-40	35-46	42
6	20-24	39	20-24	41	21-24	34-37	38
7	43-51	45	43-51	42	44-51	48-53	39
8	16	42	16	42	16	27	35
9	18-29	37	19-30	40	19-30	32-38	38
10	29-30	36	29-31	39	30-32	39-42	37
11	27-36	38	28-37	41	22-32	32-41	39

Noise Assessment Group (NAG)	Daytime		Evening		Night-time	Adverse Winter	
	Total	Intrusive PSNLs	Total	Intrusive PSNLs	Total	Total	Intrusive PSNLs
12	28-31	35	29-32	38	23-26	27-37	35
A	18-38	36	18-39	39	15-24	18-36	36
C	29-31	35	30-32	37	26-28	31-34	35
D	29-32	37	29-33	40	22-24	29-34	38
F	29-34	39	30-35	40	27-34	33-41	40

Table 24 Full Pit Extent Year 1 Non-Mine Owned Residences within Noise Management and Affectation Zones

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
1	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	80	-
3	Daytime	106	87	-
	Evening	87	-	-
	Night	106	87,	-
	Night (3degC/100m)	-	-	87, 106
4	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	88, 91, 95, 96, 161	105	-
5	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	112	111	-
6	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
7	Daytime	-	-	153 “Dulwich”
	Evening	108, 109, 110	-	153 “Dulwich”
	Night	-	108, 110	109, 153 “Dulwich”
	Night (3degC/100m)	-	-	108, 109, 110, 153 “Dulwich”
8	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
9	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
10	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	5	6, 8 9, 10, 11, 13	-
11	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	14, 16	-	-
12	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	62	-	-
A	Daytime	34, 35	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
C	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
D	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
F	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	76	-	-

6.2 Operation Full Pit Extent Year 4

The predicted (point to point) $L_{Aeq(15minute)}$ intrusive noise emissions at the surrounding non-mine owned residences during Full Pit Extent Year 4 operations are presented in **Appendix F2** together with the intrusive PSNLs, while in **Table 25** this information is summarised by NAG The $L_{Aeq(15minute)}$ intrusive noise contour diagrams for evening (calm) and (night-time) adverse winter operations are presented in **Appendix G**. Note, the calculation of the noise contours involves numerical interpolation of a noise level array with a graphical accuracy of up to approximately ±2.5 dBA.

Table 26 includes all known non-mine owned residences where the intrusive PSNLs are predicted to be exceeded during Full Pit Extent Year 4 operations and assigns the residences in either the Noise Management Zone or Noise Affectation Zone.

Table 25 Full Pit Extent Year 4 Operation $L_{Aeq(15minute)}$ Intrusive Noise Emissions

Noise Assessment Group (NAG)	Daytime		Evening		Night-time	Adverse Winter	
	Total	Intrusive PSNLs	Total	Intrusive PSNLs	Total	Total	Intrusive PSNLs
1	34	35	35	38	34	41	36
3	37-40	38	38-41	40	38-41	43-45	39
4	25-27	39	25-28	42	24-28	35-38	37
5	20-35	50	21-35	46	21-36	32-41	42
6	18-23	39	18-24	41	19-24	30-33	38
7	39	45	40	42	40-41	44-45	39
8	14	42	15	42	15	27	35
9	17-28	37	17-29	40	17-29	32-38	38
10	30-31	36	30-32	39	29-32	38-42	37
11	24-31	38	24-32	41	21-32	32-41	39
12	27-33	35	28-34	38	24-28	28-36	35
A	16-27	36	17-28	39	15-24	21-33	36
C	32-34	35	33-35	37	27-29	35-38	35
D	27-31	37	28-32	40	23-25	31-35	38
F	33-39	39	28-40	40	26-35	33-40	40

Table 26 Full Pit Extent Year 4 Non-Mine Owned Residences within Noise Management and Affectation Zones

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
1	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	80	-
3	Daytime	87	-	-
	Evening	87	-	-
	Night	87	-	-
	Night (3degC/100m)	-	106	87
4	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	96, 105, 161	-	-
5	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
6	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
7	Daytime	-	-	-
	Evening	-	-	-
	Night	108, 109, 110	-	-
	Night (3degC/100m)	-	109	108 110
8	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
9	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
10	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	5	6, 8, 9, 10, 11, 13	-
11	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	14, 16	-	-
12	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	62	-	-
A	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
C	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	63	64	-
D	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
F	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	76	-	-

6.3 Operation Full Pit Extent Year 6

The predicted (point to point) $L_{Aeq(15minute)}$ intrusive noise emissions at the surrounding non-mine owned residences during Full Pit Extent Year 6 operations are presented in **Appendix F3** together with the intrusive PSNLs, while in **Table 27** this information is summarised by NAG. The $L_{Aeq(15minute)}$ intrusive noise contour diagrams for evening (calm) and (night-time) adverse winter operations are presented in **Appendix G**. Note, the calculation of the noise contours involves numerical interpolation of a noise level array with a graphical accuracy of up to approximately ±2.5 dBA.

Table 28 includes all known non-mine owned residences where the intrusive PSNLs are predicted to be exceeded during Full Pit Extent Year 6 operations and assigns the residences in either the Noise Management Zone or Noise Affectation Zone.

Table 27 Full Pit Extent Year 6 Operation $L_{Aeq(15minute)}$ Intrusive Noise Emissions

Noise Assessment Group (NAG)	Daytime		Evening		Night-time	Adverse Winter	
	Total	Intrusive PSNLs	Total	Intrusive PSNLs	Total	Total	Intrusive PSNLs
1	34	35	35	38	34	39	36
3	39	38	40	40	41	44	39
4	26-31	39	26-30	42	27-33	36-44	37
5	24-38	50	23-39	46	23-40	33-46	42
6	19-23	39	19-24	41	20-24	31-35	38
7	46-48	45	46-48	42	47-49	51-52	39
8	15	42	15	42	16	27	35
9	18-28	37	18-28	40	18-29	32-38	38
10	29-31	36	29-31	39	29-31	39-41	37
11	23-31	38	22-31	41	21-32	32-41	39
12	24-33	35	26-31	38	24-28	30-36	35
A	17-28	36	16-28	39	15-25	24-35	36
C	32-34	35	31-34	37	27-29	34-36	35
D	27-31	37	27-30	40	23-25	32-34	38
F	33-38	39	32-39	40	27-35	32-39	40

Table 28 Full Pit Extent Year 6 Non-Mine Owned Residences within Noise Management and Affectation Zones

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
1	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	80	-
3	Daytime	87, 106	-	-
	Evening	-	-	-
	Night	87, 106	-	-
	Night (3degC/100m)	-	87, 106	-

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
4	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	88, 91, 94, 95 96, 161	105	-
5	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	112	111	-
6	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
7	Daytime	108, 110	109	-
	Evening	-	108, 110	109
	Night	-	-	108, 109, 110
	Night (3degC/100m)	-	-	108, 109, 110
8	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
9	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
10	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	5	6,8,9,10, 11, 13	-
11	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	14, 16	-	-
12	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	62	-	-
A	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
C	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	63, 64	-	-

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
D	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
F	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-

6.4 Operation Full Pit Extent Year 8

The predicted (point to point) $L_{Aeq(15minute)}$ intrusive noise emissions at the surrounding non-mine owned residences during Full Pit Extent Year 8 operations are presented in **Appendix F4** together with the intrusive PSNLs, while in **Table 29** this information is summarised by NAG. The $L_{Aeq(15minute)}$ intrusive noise contour diagrams for evening (calm) and (night-time) adverse winter operations are presented in **Appendix G**. Note, the calculation of the noise contours involves numerical interpolation of a noise level array with a graphical accuracy of up to approximately ±2.5 dBA.

Table 30 includes all known non-mine owned residences where the intrusive PSNLs are predicted to be exceeded during Full Pit Extent Year 8 operations and assigns the residences in either the Noise Management Zone of Noise Affectation Zone.

Table 29 Full Pit Extent Year 8 Operation $L_{Aeq(15minute)}$ Intrusive Noise Emissions

Noise Assessment Group (NAG)	Daytime		Evening		Night-time	Adverse Winter	
	Total	Intrusive PSNLs	Total	Intrusive PSNLs	Total	Total	Intrusive PSNLs
1	26	35	27	38	28	35	36
3	33	38	34	40	35	40-41	39
4	23-25	39	23-26	42	24-27	31-34	37
5	20-38	50	21-38	46	21-38	30-42	42
6	20-25	39	20-25	41	21-26	30-33	38
7	38-40	45	39-40	42	39-40	44-45	39
8	13	42	13	42	14	27	35
9	16-28	37	16-28	40	17-29	32-37	38
10	28-30	36	28-30	39	29-31	38-41	37
11	18-30	38	19-31	41	19-31	31-40	39
12	18-22	35	18-23	38	19-24	25-32	35
A	11-23	36	12-23	39	12-24	20-34	36
C	21-22	35	22-23	37	23-24	29-32	35
D	17-20	37	18-20	40	19-21	27-31	38
F	19-26	39	20-27	40	21-28	31-35	40

Table 30 Full Pit Extent Year 8 Non-Mine Owned Residences within Noise Management and Affectation Zones

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
1	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
3	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	87, 106	-	-
4	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
5	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
6	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
7	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	109	108, 110	109
8	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
9	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
10	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	5, 6, 10	8, 9, 11, 13	-
11	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	14, 16	-	-

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
12	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
A	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
C	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
D	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
F	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
G	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-

6.5 Operation Part Pit Extent Year 3

The predicted (point to point) $L_{Aeq(15minute)}$ intrusive noise emissions at the surrounding non-mine owned residences during Part Pit Extent Year 3 operations are presented in **Appendix F5** together with the intrusive PSNLs ,while in **Table 31** this information is summarised by NAG. The $L_{Aeq(15minute)}$ intrusive noise contour diagrams for evening (calm) and (night-time) adverse winter operations are presented in **Appendix G**. Note, the calculation of the noise contours involves numerical interpolation of a noise level array with a graphical accuracy of up to approximately ±2.5 dBA.

Table 32 includes all known non-mine owned residences where the intrusive PSNLs are predicted to be exceeded during Part Pit Extent Year 3 operations and assigns the residences in either the Noise Management Zone or Noise Affectation Zone.

Table 31 Part Pit Extent Year 3 Operation $L_{Aeq(15minute)}$ Intrusive Noise Emissions

Noise Assessment Group (NAG)	Daytime		Evening		Night-time	Adverse Winter	
	Total	Intrusive PSNLs	Total	Intrusive PSNLs	Total	Total	Intrusive PSNLs
1	33	35	34	38	31	38	36
3	40	38	40-41	40	40-41	46	39
4	26-31	39	26-31	42	33-25	37-40	37
5	21-40	50	22-41	46	21-40	36-47	42
6	19-24	39	19-24	41	18-23	33-36	38
7	47-49	45	48-50	42	47-49	52-54	39
8	15	42	15	42	15	27	35
9	18-29	37	18-29	40	17-30	32-38	38
10	29-31	36	30-32	39	30-32	39-41	37
11	23-31	38	24-32	41	21-32	32-41	39
12	27-32	35	28-33	38	23-25	26-35	35
A	16-27	36	17-28	39	14-25	19-35	36
C	32-34	35	33-35	37	25-27	31-34	35
D	27-31	37	28-32	40	22-23	29-33	38
F	33-38	39	34-39	40	26-32	32-39	40

Table 32 Part Pit Extent Year 3 Non-Mine Owned Residences within Noise Management and Affectation Zones

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
1	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	80	-	-
3	Daytime	87, 106	-	-
	Evening	106	-	-
	Night	87, 106	-	-
	Night (3degC/100m)	-	-	87, 106
4	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	88, 91, 94, 95	96, 105, 161	-
5	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	112	111	-
6	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
7	Daytime	110	108, 109, 153 “Dulwich”	-
	Evening	-	-	108, 109, 110, 153 “Dulwich”
	Night	-	-	108, 109, 110, 153 “Dulwich”
	Night (3degC/100m)	-	-	108, 109, 110, 153 “Dulwich”
8	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
9	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
10	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	5	6, 8, 9, 10, 11, 13	-
11	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	14, 16	-	-
12	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
A	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
C	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
D	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
F	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-

6.6 Operation Part Pit Extent Year 6

The predicted (point to point) $L_{Aeq(15minute)}$ intrusive noise emissions at the surrounding non-mine owned residences during Part Pit Extent Year 6 operations are presented in **Appendix F6** together with the intrusive PSNLs, while in **Table 33** this information is summarised by NAG. The $L_{Aeq(15minute)}$ intrusive noise contour diagrams for evening (calm) and (night-time) adverse winter operations are presented in **Appendix G**. Note, the calculation of the noise contours involves numerical interpolation of a noise level array with a graphical accuracy of up to approximately ±2.5 dBA.

Table 34 includes all known non-mine owned residences where the intrusive PSNLs are predicted to be exceeded during Part Pit Extent Year 6 operations and assigns the residences in either the Noise Management Zone or Noise Affectation Zone.

Table 33 Part Pit Extent Year 6 Operation $L_{Aeq(15minute)}$ Intrusive Noise Emissions

Noise Assessment Group (NAG)	Daytime		Evening		Night-time	Adverse Winter	
	Total	Intrusive PSNLs	Total	Intrusive PSNLs	Total	Total	Intrusive PSNLs
1	31	35	31	38	24	36	36
3	34	38	34-35	40	34-35	41-42	39
4	24-27	39	24-27	42	24-28	32-35	37
5	22-30	50	23-31	46	23-31	31-38	42
6	17-23	39	18-23	41	18-24	31-33	38
7	39-41	45	39-41	42	40-41	44-45	39
8	14	42	14	42	15	27	35
9	17-29	37	17-29	40	18-30	32-37	38
10	29-31	36	29-31	39	29-31	38-41	37
11	23-31	38	22-31	41	20-32	31-40	39
12	26-32	35	25-29	38	19-21	24-33	35
A	16-27	36	15-28	39	13-24	18-34	36
C	31-34	35	29-33	37	21-23	27-31	35
D	27-31	37	26-30	40	19-21	25-30	38
F	32-37	39	31-38	40	21-25	30-36	40

Table 34 Part Pit Extent Year 6 Non-Mine Owned Residences within Noise Management and Affectation Zones

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
1	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
3	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	87	106	-

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
4	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
5	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
6	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
7	Daytime	-	-	-
	Evening	-	-	-
	Night	108, 109, 110	-	-
	Night (3degC/100m)	-	110	108, 109
8	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
9	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
10	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	5, 6	8, 9, 11, 10, 13	-
11	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
12	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
A	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
C	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
D	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
F	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-

6.7 Noise Emission Summary of Non-Mine Owned Residences

Table 35 presents a summary of all known non-mine owned residences where the intrusive PSNLs are predicted to be exceeded during life of the Project, based on the predicted $L_{Aeq(15minute)}$ intrusive noise emissions for Full Pit Extent Years 1, 4, 6 and 8, together with Part Pit Extent Year 3 and 6, placing the residences into either the noise management zone and/or noise affectation zone.

Table 35 Summary of Potentially Impacted Non-Mine Owned Residences

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
1	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	80	-
3	Daytime	106	87	-
	Evening	87	-	-
	Night	106	87	-
	Night (3degC/100m)	-	-	87, 106
4	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	88, 91, 94, 95, 96, 161	105,	-
5	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	112	111	-
6	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
7	Daytime	108, 110	109, 153 “Dulwich”	-
	Evening	-	108, 110	109, 153 “Dulwich”
	Night	-	-	108, 109, 110, 153 “Dulwich”
	Night (3degC/100m)	-	-	108, 109, 110, 153 “Dulwich”

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
8	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
9	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
10	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	5	6, 8, 9, 10, 11, 13	-
11	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	14, 16	-	-
12	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	54, 62	-	-
A	Daytime	34, 35	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	34, 35	-	-
C	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	63	64	-
D	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
F	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	76	-	-

There are six non-mine owned residences (Residences 87, 106, 108, 109, 110 and 153 “Dulwich”) in the Noise Affectation Zone and an additional 26 non-mine owned residences located in the Noise Management Zone.

Note, Dulwich lies in the existing Integra Open Cut Zone of Affectation. Therefore, seven additional non-mine owned residences surrounding the Integra Open Cut Project would fall into the Zone of Affection due to the increased noise emission levels from the Open Cut Extension.

Sleep Disturbance

Compliance with the sleep disturbance criteria would be achieved at all non-mine owned residences which have not been identified as being in either the Noise Management Zone or Noise Affectation Zone. However, residences within the Noise Management Zone or Noise Affectation Zone would experience exceedances of the sleep disturbance criteria. Residences within the Noise Affectation Zone would be particularly impacted by sleep disturbance events from the Open Cut Project with peak noise level events predicted to exceed the background noise levels by more than 20 dBA.

Noise Management Plan

The potential noise impacts at all residences will be managed through the implementation of a mine Noise Management Plan.

7 INTRUSIVE NOISE ASSESSMENT - MINE OWNED RESIDENCES

7.1 Operation Full Pit Extent Year 1

The predicted (point to point) $L_{Aeq(15minute)}$ intrusive noise emissions at the surrounding mine owned residences during Full Pit Extent Year 1 operations are presented in **Appendix H1** together with the intrusive PSNLs ,while in **Table 36** this information is summarised by NAG. The $L_{Aeq(15minute)}$ intrusive noise contour diagrams for evening (calm) and (night-time) adverse winter operations are presented in **Appendix G**. Note, the calculation of the noise contours involves numerical interpolation of a noise level array with a graphical accuracy of up to approximately ±2.5 dBA.

Table 37 includes all known mine owned residences where the intrusive PSNLs are predicted to be exceeded during Full Pit Extent Year 1 operations and assigns the residences in either the Noise Management Zone or Noise Affectation Zone.

Table 36 Operation Full Pit Extent Year 1 $L_{Aeq(15minute)}$ Intrusive Noise Emissions

Noise Assessment Group (NAG)	Daytime		Evening		Night-time	Adverse Winter	
	Total	Intrusive PSNLs	Total	Intrusive PSNLs	Total	Total	Intrusive PSNLs
1	32-38	35	33-39	38	33-40	41-46	36
2	32-35	36	33-35	39	33-36	41-43	37
4	25-35	39	26-35	42	26-36	33-42	37
5	20-35	50	20-36	46	21-37	34-42	42
6	20-26	39	21-26	41	21-27	31-37	38
7	40	45	41	42	42	47	39
9	25	37	26	40	25	31	38
12	22-27	35	23-28	38	22-26	29-35	35
A	37	36	38	39	21	33	36
B	34-49	35	34-50	37	25-26	37-38	35
F	27-34	39	27-35	40	28-32	35-39	40
G	35	38	35	41	36	43	39

Table 37 Full Pit Extent Year 1 Mine Owned Residences within Noise Management and Affectation Zones

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
1	Daytime	-	78	-
	Evening	78	-	-
	Night	-	78	-
	Night (3degC/100m)	-	77, 79	78, 81, 83
2	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	85, 86	84, 170	-
4	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	90, 92, 97, 164, 165, 168	155	-
5	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
6	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
7	Daytime	-	-	-
	Evening	-	-	-
	Night	-	107	-
	Night (3degC/100m)	-	-	107
9	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
12	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
A	Daytime	33	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
B	Daytime	-	-	45
	Evening	-	-	45
	Night	-	-	-
	Night (3degC/100m)	45	46	-

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
F	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
G	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	82	-

7.2 Operation Full Pit Extent Year 4

The predicted (point to point) $L_{Aeq(15minute)}$ intrusive noise emissions at the surrounding mine owned residences during Full Pit Extent Year 4 operations are presented in **Appendix G2** together with the intrusive PSNLs, while in **Table 38** this information is summarised by NAG. The $L_{Aeq(15minute)}$ intrusive noise contour diagrams for evening (calm) and (night-time) adverse winter operations are presented in **Appendix G**. Note, the calculation of the noise contours involves numerical interpolation of a noise level array with a graphical accuracy of up to approximately ±2.5 dBA.

Table 39 includes all known mine owned residences where the intrusive PSNLs are predicted to be exceeded during Full Pit Extent Year 4 operations and assigns the residences in either the Noise Management Zone or Noise Affectation Zone.

Table 38 Full Pit Extent Year 4 Operation $L_{Aeq(15minute)}$ Intrusive Noise Emissions

Noise Assessment Group (NAG)	Daytime		Evening		Night-time	Adverse Winter	
	Total	Intrusive PSNLs	Total	Intrusive PSNLs	Total	Total	Intrusive PSNLs
1	34-37	35	35-42	38	34-42	41-47	36
2	32-35	36	33-36	39	33-36	40-42	37
4	24-32	39	24-33	42	24-34	33-38	37
5	19-35	50	20-35	46	20-36	31-42	42
6	19-24	39	20-25	41	20-25	28-35	38
7	38	45	39	42	39	44	39
9	24	37	24	40	24	32	38
12	22-30	35	23-31	38	21-26	31-34	35
A	24	36	25	39	21	32	36
B	38-41	35	39-42	37	28-29	37	35
F	27-37	39	28-38	40	29-32	33-38	40
G	37	38	38	41	38	43	39

Table 39 Full Pit Extent Year 4 Mine Owned Residences within Noise Management and Affectation Zones

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
1	Daytime	77	-	78
	Evening	-	78	-
	Night	-	78	-
	Night (3degC/100m)	-	79, 83	77, 78, 81
2	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	85, 86	84, 170	-
4	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	155	-	-
5	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
6	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
7	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	107	-
9	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
12	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
A	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
B	Daytime	-	46	45
	Evening	46	45	-
	Night	-	-	-
	Night (3degC/100m)	45, 46	-	-

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
F	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
G	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	82	-

7.3 Operation Full Pit Extent Year 6

The predicted (point to point) $L_{Aeq(15minute)}$ intrusive noise emissions at the surrounding mine owned residences during Full Pit Extent Year 6 operations are presented in **Appendix F3** together with the intrusive PSNLs, while in **Table 40** this information is summarised by NAG. The $L_{Aeq(15minute)}$ intrusive noise contour diagrams for evening (calm) and (night-time) adverse winter operations are presented in **Appendix G**. Note, the calculation of the noise contours involves numerical interpolation of a noise level array with a graphical accuracy of up to approximately ±2.5 dBA.

Table 41 includes all known mine owned residences where the intrusive PSNLs are predicted to be exceeded during Full Pit Extent Year 6 operations and assigns the residences in either the Noise Management Zone or Noise Affectation Zone.

Table 40 Full Pit Extent Year 6 Operation $L_{Aeq(15minute)}$ Intrusive Noise Emissions

Noise Assessment Group (NAG)	Daytime		Evening		Night-time	Adverse Winter	
	Total	Intrusive PSNLs	Total	Intrusive PSNLs	Total	Total	Intrusive PSNLs
1	34-39	35	34-40	38	34-40	39-45	36
2	32-35	36	33-36	39	33-36	40-41	37
4	25-32	39	25-33	42	25-34	34-42	37
5	21-33	50	21-33	46	22-34	33-41	42
6	19-24	39	20-25	41	20-25	28-35	38
7	38	45	38	42	39	44	39
9	24	37	24	40	24	32	38
12	26-30	35	23-29	38	22-27	31-34	35
A	24	36	26	39	22	32	36
B	39-41	35	38-39	37	27-29	37	35
F	28-37	39	28-38	40	29-32	33-38	40
G	30	38	37	41	36	42	39

Table 41 Full Pit Extent Year 6 Mine Owned Residences within Noise Management and Affectation Zones

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
1	Daytime	77	78	-
	Evening	-	78	-
	Night	-	78	-
	Night (3degC/100m)	-	79, 81	78, 77
2	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	84, 85, 86, 170	-	-
4	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	90, 93, 97, 164, 165, 166, 167, 169	155	-
5	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
6	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
7	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	107	-
9	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
12	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	62	-	-
A	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
B	Daytime	-	46	45
	Evening	45, 46	-	-
	Night	-	-	-
	Night (3degC/100m)	45, 46	-	-

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
F	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
G	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	82	-

7.4 Operation Full Pit Extent Year 8

The predicted (point to point) $L_{Aeq(15minute)}$ intrusive noise emissions at the surrounding mine owned residences during Full Pit Extent Year 8 operations are presented in **Appendix G4** together with the intrusive PSNLs, while in **Table 42** this information is summarised by NAG. The $L_{Aeq(15minute)}$ intrusive noise contour diagrams for evening (calm) and (night-time) adverse winter operations are presented in **Appendix G**. Note, the calculation of the noise contours involves numerical interpolation of a noise level array with a graphical accuracy of up to approximately ±2.5 dBA.

Table 43 includes all known mine owned residences where the intrusive PSNLs are predicted to be exceeded during Full Pit Extent Year 8 operations and assigns the residences in either the Noise Management Zone of Noise Affectation Zone.

Table 42 Full Pit Extent Year 8 Operation $L_{Aeq(15minute)}$ Intrusive Noise Emissions

Noise Assessment Group (NAG)	Daytime		Evening		Night-time	Adverse Winter	
	Total	Intrusive PSNLs	Total	Intrusive PSNLs	Total	Total	Intrusive PSNLs
1	26-32	35	27-33	38	28-34	36-39	36
2	27-28	36	28-29	39	29-30	35-36	37
4	22-26	39	22-27	42	23-28	30-35	37
5	19-30	50	20-31	46	21-32	31-38	42
6	17-25	39	18-26	41	18-26	26-32	38
7	35	45	36	42	37	41	39
9	23	37	23	40	24	31	38
12	16-20	35	16-20	38	17-21	24-31	35
A	19	36	19	39	20	31	36
B	22-24	35	23-25	37	24-26	32-34	35
F	20-24	39	21-25	40	22-26	31-34	40
G	29	38	30	41	30	36	39

Table 43 Full Pit Extent Year 8 Mine Owned Residences within Noise Management and Affectation Zones

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
1	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	77	78	-
2	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
4	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
5	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
6	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
7	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	107	-	-
9	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
12	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
A	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
B	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
F	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
G	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-

7.5 Operation Part Pit Extent Year 3

The predicted (point to point) $L_{Aeq(15minute)}$ intrusive noise emissions at the surrounding mine owned residences during Part Pit Extent Year 3 operations are presented in **Appendix G5** together with the intrusive PSNLs, while in **Table 44** this information is summarised by NAG. The $L_{Aeq(15minute)}$ intrusive noise contour diagrams for evening (calm) and (night-time) adverse winter operations are presented in **Appendix G**. Note, the calculation of the noise contours involves numerical interpolation of a noise level array with a graphical accuracy of up to approximately ±2.5 dBA.

Table 45 includes all known mine owned residences where the intrusive PSNLs are predicted to be exceeded during Part Pit Extent Year 3 operations and assigns the residences in either the Noise Management Zone or Noise Affectation Zone.

Table 44 Part Pit Extent Year 3 Operation $L_{Aeq(15minute)}$ Intrusive Noise Emissions

Noise Assessment Group (NAG)	Daytime		Evening		Night-time	Adverse Winter	
	Total	Intrusive PSNLs	Total	Intrusive PSNLs	Total	Total	Intrusive PSNLs
1	32-36	35	33-37	38	31-36	38-43	36
2	32-33	36	32-33	39	33	39-41	37
4	25-34	39	26-35	42	25-34	35-42	37
5	20-36	50	21-36	46	20-36	33-42	42
6	20-25	39	21-26	41	20-25	29-37	38
7	42	45	43	42	42	47	39
9	24	37	25	40	25	32	38
12	22-30	35	23-31	38	21-25	29-33	35
A	24	36	25	39	22	32	36
B	38-41	35	39-42	37	27	36	35
F	26-37	39	27-38	40	26-31	33-36	40
G	33	38	35	41	33	39	39

Table 45 Part Pit Extent Year 3 Mine Owned Residences within Noise Management and Affectation Zones

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
1	Daytime	78	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	79, 81, 83	77	78
2	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	84, 85, 170	-	-
4	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	90, 93, 164, 165, 166, 167, 169	97, 155	-
5	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)		-	-
6	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
7	Daytime	-	-	-
	Evening	107	-	-
	Night	-	107	-
	Night (3degC/100m)	-	-	107
9	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
12	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
A	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
B	Daytime	-	46	45
	Evening	46	45	-
	Night	-	-	-
	Night (3degC/100m)	45, 46	-	-
F	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
G	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-

7.6 Operation Part Pit Extent Year 6

The predicted (point to point) $L_{Aeq(15minute)}$ intrusive noise emissions at the surrounding mine owned residences during Part Pit Extent Year 6 operations are presented in **Appendix G6** together with the intrusive PSNLs, while in **Table 46** this information is summarised by NAG. The $L_{Aeq(15minute)}$ intrusive noise contour diagrams for evening (calm) and (night-time) adverse winter operations are presented in **Appendix G**. Note, the calculation of the noise contours involves numerical interpolation of a noise level array with a graphical accuracy of up to approximately ±2.5 dBA.

Table 47 includes all known mine owned residences where the intrusive PSNLs are predicted to be exceeded during Part Pit Extent Year 6 operations and assigns the residences in either the Noise Management Zone or Noise Affectation Zone.

Table 46 Part Pit Extent Year 6 Operation $L_{Aeq(15minute)}$ Intrusive Noise Emissions

Noise Assessment Group (NAG)	Daytime		Evening		Night-time	Adverse Winter	
	Total	Intrusive PSNLs	Total	Intrusive PSNLs	Total	Total	Intrusive PSNLs
1	29-33	35	30-36	38	25-28	36-39	36
2	29	36	29-30	39	28-29	35-36	37
4	22-28	39	23-29	42	23-29	31-35	37
5	21-34	50	21-35	46	22-35	31-40	42
6	19-23	39	19-23	41	19-23	26-32	38
7	36	45	37	42	37	41	39
9	24	37	24	40	25	31	38
12	21-29	35	21-27	38	18-21	23-32	35
A	24	36	26	39	20	31	36
B	38-41	35	38	37	24	32-33	35
F	23-36	39	23-37	40	21-24	32-34	40
G	31	38	32	41	26	35	39

Table 47 Part Pit Extent Year 6 Mine Owned Residences within Noise Management and Affectation Zones

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
1	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
2	Daytime	-	78	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
4	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
5	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
6	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
7	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	107	-	-
9	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
12	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
A	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
B	Daytime	-	46	45
	Evening	45, 46	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
F	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
G	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-

7.7 Noise Emission Summary of Mine Owned Residences

Table 48 presents a summary of all known mine owned residences where the intrusive PSNLs are predicted to be exceeded during life of the Project, based on the predicted $L_{Aeq(15minute)}$ intrusive noise emissions for Full Pit Extent Years 1, 4, 6 and 8, together with Part Pit Extent Year 3 and 6, placing the residences into either the noise management zone and/or noise affectation zone.

There are eight mine owned residences (Residences 45, 77, 78, 81, 83, 84, 107 and 170) in the noise affectation zone. Furthermore, there are 16 mine owned residences located in the noise management zone.

The potential noise impacts at all residences will be managed through the implementation of a Mine Noise Management Plan.

Table 48 Summary of Potentially Impacted Mine Owned Residences

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
1	Daytime	77	-	78
	Evening	-	78	-
	Night	-	-	78
	Night (3degC/100m)	-	79	77, 78, 81, 83
2	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)		85, 86	84, 170
4	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	90, 92, 93, 97, 164, 165, 166, 167, 168, 169	155	-

Noise Assessment Group (NAG)	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
5	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
6	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
7	Daytime	-	-	-
	Evening	107	-	-
	Night	-	107	
	Night (3degC/100m)	-	-	107
9	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
12	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
A	Daytime	33	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
B	Daytime	-	46	45
	Evening	46	-	45
	Night	-	-	-
	Night (3degC/100m)	45	46	-
F	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	-	-
G	Daytime	-	-	-
	Evening	-	-	-
	Night	-	-	-
	Night (3degC/100m)	-	82	-

8 INTRUSIVE NOISE ASSESSMENT - NON-MINE OWNED FREEHOLD VACANT LAND

The vacant land intrusive noise assessment has been conducted under calm evening and night-time inversion weather conditions.

8.1 Operation Full Pit Extent Year 1

The $L_{Aeq(15minute)}$ intrusive noise contour diagrams for Operation Full Pit Extent Year 1 are presented in **Appendix I**. Note, the calculation of the noise contours involves numerical interpolation of a noise level array with a graphical accuracy of up to approximately ±2.5 dBA.

Table 49 identifies the vacant land where, based on the noise contours presented in **Appendix I**, exceedances of the intrusive PSNL are estimated to occur on at least 25% of the land area.

Table 49 Operation Full Pit Extent Year 1 - Non-Mine Owned Freehold Vacant Land with Intrusive PSNL Exceedances (>25% Land Area)

Noise Assessment Group (NAG)	Period	1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
5	Evening	-	-	-
	Night (Inversion)	-	351	352
6	Evening	-	-	-
	Night (Inversion)	-	-	-
9	Evening	-	-	-
	Night (Inversion)	-	-	-
10	Evening	-	-	-
	Night (Inversion)	-	-	-
11	Evening	-	-	-
	Night (Inversion)	-	-	-
12	Evening	-	-	-
	Night (Inversion)	-	-	-
A	Evening	334	332	-
	Night (Inversion)	-	-	-
C	Evening	-	-	-
	Night (Inversion)	-	-	-
D	Evening	-	-	-
	Night (Inversion)	-	-	-
F	Evening	-	-	-
	Night (Inversion)	-	-	-

8.2 Operation Full Pit Extent Year 4

The $L_{Aeq(15minute)}$ intrusive noise contour diagrams for Operation Full Pit Extent Year 4 are presented in **Appendix I**. Note, the calculation of the noise contours involves numerical interpolation of a noise level array with a graphical accuracy of up to approximately ±2.5 dBA.

Table 50 identifies the vacant land where, based on the noise contours presented in **Appendix I**, exceedances of the intrusive PSNL are estimated to occur on at least 25% of the land area.

Table 50 Operation Full Pit Extent Year 4 - Non-Mine Owned Freehold Vacant Land with Intrusive PSNL Exceedances (>25% Land Area)

Noise Assessment Group (NAG)	Period	1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
5	Evening	-	-	-
	Night (Inversion)	-	-	-
6	Evening	-	-	-
	Night (Inversion)	-	-	-
9	Evening	-	-	-
	Night (Inversion)	-	-	-
10	Evening	-	-	-
	Night (Inversion)	-	-	-
11	Evening	-	-	-
	Night (Inversion)	-	-	-
12	Evening	-	-	-
	Night (Inversion)	-	-	-
A	Evening	-	-	-
	Night (Inversion)	-	-	-
C	Evening	-	-	-
	Night (Inversion)	-	-	-
D	Evening	-	-	-
	Night (Inversion)	-	-	-
F	Evening	-	-	-
	Night (Inversion)	-	-	-

8.3 Operation Full Pit Extent Year 6

The $L_{Aeq(15minute)}$ intrusive noise contour diagrams for Operation Full Pit Extent Year 6 are presented in **Appendix I**. Note, the calculation of the noise contours involves numerical interpolation of a noise level array with a graphical accuracy of up to approximately ±2.5 dBA.

Table 51 identifies the vacant land where, based on the noise contours presented in **Appendix I**, exceedances of the intrusive PSNL are estimated to occur on at least 25% of the land area.

Table 51 Operation Full Pit Extent Year 6 - Non-Mine Owned Freehold Vacant Land with Intrusive PSNL Exceedances (>25% Land Area)

Noise Assessment Group (NAG)	Period	1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
5	Evening	-	352	-
	Night (Inversion)	-	351	352
6	Evening	-	-	-
	Night (Inversion)	-	-	-
9	Evening	-	-	-
	Night (Inversion)	-	-	-
10	Evening	-	-	-
	Night (Inversion)	-	-	-
11	Daytime	-	-	-
	Evening	-	-	-
	Night (Inversion)	-	-	-
12	Evening	-	-	-
	Night (Inversion)	-	-	-
A	Evening	-	-	-
	Night (Inversion)	-	-	-
C	Evening	-	-	-
	Night (Inversion)	-	-	-
D	Evening	-	-	-
	Night (Inversion)	-	-	-
F	Evening	-	-	-
	Night (Inversion)	328	-	-
G	Evening	-	-	-
	Night (Inversion)	-	-	-

8.4 Operation Full Pit Extent Year 8

The $L_{Aeq(15minute)}$ intrusive noise contour diagrams for Operation Full Pit Extent Year 8 are presented in **Appendix I**. Note, the calculation of the noise contours involves numerical interpolation of a noise level array with a graphical accuracy of up to approximately ±2.5 dBA.

Table 52 identifies the vacant land where, based on the noise contours presented in **Appendix I**, exceedances of the intrusive PSNL are estimated to occur on at least 25% of the land area.

Table 52 Operation Full Pit Extent Year 8 - Non-Mine Owned Freehold Vacant Land with Intrusive PSNL Exceedances (>25% Land Area)

Noise Assessment Group (NAG)	Period	1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
5	Evening	-	-	-
	Night (Inversion)	-	-	351, 352
6	Evening	-	-	-
	Night (Inversion)	-	-	-
9	Evening	-	-	-
	Night (Inversion)	-	-	-
10	Evening	-	-	-
	Night (Inversion)	-	-	-
11	Evening	-	-	-
	Night (Inversion)	-	-	-
12	Evening	-	-	-
	Night (Inversion)	-	-	-
A	Evening	-	-	-
	Night (Inversion)	-	-	-
C	Evening	-	-	-
	Night (Inversion)	-	-	-
D	Evening	-	-	-
	Night (Inversion)	-	-	-
F	Evening	-	-	-
	Night (Inversion)	-	-	

8.5 Operation Part Pit Extent Year 3

The $L_{Aeq(15minute)}$ intrusive noise contour diagrams for Operation Part Pit Extent Year 3 are presented in **Appendix I**. Note, the calculation of the noise contours involves numerical interpolation of a noise level array with a graphical accuracy of up to approximately ±2.5 dBA.

Table 53 identifies the vacant land where, based on the noise contours presented in **Appendix I**, exceedances of the intrusive PSNL are estimated to occur on at least 25% of the land area.

Table 53 Operation Part Pit Extent Year 3 - Non-Mine Owned Freehold Vacant Land with Intrusive PSNL Exceedances (>25% Land Area)

Noise Assessment Group (NAG)	Period	1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
5	Evening	-	352	-
	Night (Inversion)	-	-	351, 352
6	Evening	-	-	-
	Night (Inversion)	-	-	-
9	Evening	-	-	-
	Night (Inversion)	-	-	-
10	Evening	-	-	-
	Night (Inversion)	-	-	-
11	Evening	-	-	-
	Night (Inversion)	-	267	-
12	Evening	-	-	-
	Night (Inversion)		-	-
A	Evening	-	-	-
	Night (Inversion)	-	-	-
C	Evening	-	-	-
	Night (Inversion)	-	-	-
D	Evening	-	-	-
	Night (Inversion)	-	-	-
F	Evening	-	-	-
	Night (Inversion)	-	-	-

8.6 Operation Part Pit Extent Year 6

The $L_{Aeq(15minute)}$ intrusive noise contour diagrams for Operation Part Pit Extent Year 6 are presented in **Appendix I**. Note, the calculation of the noise contours involves numerical interpolation of a noise level array with a graphical accuracy of up to approximately ±2.5 dBA.

Table 54 identifies the vacant land where, based on the noise contours presented in **Appendix I**, exceedances of the intrusive PSNL are estimated to occur on at least 25% of the land area.

Table 54 Operation Part Pit Extent Year 6 - Non-Mine Owned Freehold Vacant Land with Intrusive PSNL Exceedances (>25% Land Area)

Noise Assessment Group (NAG)	Period	1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
5	Evening	-	-	-
	Night (Inversion)	-	351	352
6	Evening	-	-	-
	Night (Inversion)	-	-	-
9	Evening	-	-	-
	Night (Inversion)	-	-	-
10	Evening	-	-	-
	Night (Inversion)	-	-	-

Noise Assessment Group (NAG)	Period	1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
11	Evening	-	-	-
	Night (Inversion)	-	-	-
12	Evening	-	-	-
	Night (Inversion)	-	-	-
A	Evening	-	-	-
	Night (Inversion)	-	-	-
C	Evening	-	-	-
	Night (Inversion)	-	-	-
D	Evening	-	-	-
	Night (Inversion)	-	-	-
F	Evening	-	-	-
	Night (Inversion)	-	-	-

8.7 Noise Emission Summary on Vacant Land

Table 55 presents a summary of all known non-mine owned freehold vacant land where the intrusive PSNLs are predicted to be exceeded during the life of the Open Cut Project.

Table 55 Summary of Non-Mine Owned Freehold Vacant Land with Intrusive PSNL Exceedances (>25% Land Area)

Noise Assessment Group (NAG)	Period	1 dBA to 2 dBA above Intrusive PSNL	3 dBA to 5 dBA above Intrusive PSNL	>5 dBA above Intrusive PSNL
5	Evening	-	352	-
	Night (Inversion)	-	-	351, 352
6	Evening	-	-	-
	Night (Inversion)	-	-	-
9	Evening	-	-	-
	Night (Inversion)	-	-	-
10	Evening	-	-	-
	Night (Inversion)	-	-	-
11	Evening	-	-	-
	Night (Inversion)	-	-	-
12	Evening	-	-	-
	Night (Inversion)	-	-	-
A	Evening	334	332	-
	Night (Inversion)	-	-	-
C	Evening	-	-	-
	Night (Inversion)	-	-	-
D	Evening	-	-	-
	Night (Inversion)	-	-	-
F	Evening	-	-	-
	Night (Inversion)	328	-	-

9 OPERATING NOISE AMENITY ASSESSMENT

In order to determine the noise amenity emissions from the Open Cut Project, the highest intrusive noise emission predicted at each residence over the life of the mine (refer to **Section 6** and **Section 7**) can be conservatively adjusted (by minus 3 dBA, in order to cater for the lower average noise levels associated with varying operating conditions and weather effects) to the equivalent noise amenity level for assessment against the maximum amenity PSNLs presented in **Table 21**.

Note, this is clearly a worst case noise amenity assessment as it assumes that all operations identified in **Table 10**, as well as the Open Cut Project, simultaneously emit their maximum noise emission to a common receiver locality.

The Open Cut Project's daytime, evening and night-time noise amenity level range for both the Full Pit Extent and Part Pit Extent are summarised in **Table 56** and **Table 57**, respectively, for the 18 NAGs.

Table 56 Operation Full Pit Extent Noise Amenity Emissions - $L_{Aeq(period)}$ (dBA re 20µPa)

Noise Assessment Group	$L_{Aeq(period)}$ Noise Amenity Emissions[1]			Maximum Amenity PSNLs[2]		
	Daytime	Evening	Night-time	Daytime	Evening	Night-time
1	31-38	32-39	38-44	55-55	48-50	37-41
2	30-32	30-33	38-40	49-55	43-50	42-44
3	36-38	37-39	43-43	55-55	50-50	42-43
4	23-32	23-33	31-39	55-55	50-50	43-43
5	18-35	18-36	31-43	49-55	44-50	42-45
6	17-23	17-23	28-34	55-55	50-50	43-45
7	37-45	38-45	44-49	55-55	50-50	43-43
8	13-13	13-13	24-24	55-55	50-50	45-45
9	15-26	16-27	29-35	55-55	50-50	45-45
10	26-28	27-29	36-39	55-55	50-50	44-45
11	24-33	25-34	29-38	55-55	50-50	45-45
12	20-30	20-31	27-34	55-55	49-50	42-43
A	15-55	15-48	21-37	55-55	48-50	37-45
B	36-46	36-47	34-35	55-55	50-50	43-43
C	29-31	30-32	32-35	55-55	50-50	43-43
D	27-29	27-30	29-32	55-55	50-50	43-44
F	25-36	25-37	31-38	53-55	42-50	38-43
G	34-34	35-35	40-40	55-55	50-50	41-41

Note 1: Calculated from the highest intrusive noise emission predicted in each noise assessment group presented in **Section 6** and **Section 7**. The night-time noise levels are calculated under adverse weather conditions.

Note 2: The maximum amenity PSNLs were determined in **Section 5** and presented in **Table 21**.

Table 57 Operation Part Pit Extent Noise Amenity Emissions - $L_{Aeq(period)}$ (dBA re 20μPa)

Noise Assessment Group	$L_{Aeq(period)}$ Noise Amenity Emissions[1]			Maximum Amenity PSNLs[2]		
	Daytime	Evening	Night-time	Daytime	Evening	Night-time
1	29-33	30-34	35-40	55-55	48-50	37-41
2	29-30	29-30	36-38	49-55	43-50	42-44
3	37-37	37-38	43-43	55-55	50-50	42-43
4	22-31	23-32	32-39	55-55	50-50	43-43
5	18-37	18-38	30-44	49-55	44-50	42-45
6	16-22	16-23	26-34	55-55	50-50	43-45
7	39-46	40-47	44-51	55-55	50-50	43-43
8	12-12	12-12	24-24	55-55	50-50	45-45
9	15-26	15-26	29-35	55-55	50-50	45-45
10	26-28	27-29	36-38	55-55	50-50	44-45
11	20-28	21-29	29-38	55-55	50-50	45-45
12	19-29	20-30	23-32	55-55	49-50	42-43
A	13-55	14-48	16-37	55-55	48-50	37-45
B	35-38	36-39	33-33	55-55	50-50	43-43
C	29-31	30-32	28-31	55-55	50-50	43-43
D	24-28	25-29	26-30	55-55	50-50	43-44
F	23-35	24-36	29-36	53-55	42-50	38-43
G	31-31	32-32	36-36	55-55	50-50	41-41

Note 1: Calculated from the highest intrusive noise emission predicted in each noise assessment group presented in **Section 6** and **Section 7**. The night-time noise levels are calculated under adverse weather conditions.

Note 2: The maximum amenity PSNLs were determined in **Section 5** and presented in **Table 21**.

9.1 Non-Mine Owned Residences

Table 58 includes all known non-mine owned residences where the maximum amenity PSNLs are predicted to be exceeded during Full Pit Extent and Part Pit Extent operations and assigns the residences to either the Noise Management Zone or Noise Affectation Zone.

Table 58 Non-Mine Owned Residences within Noise Management and Affectation Zones

Noise Assessment Group (NAG)	Operation	Noise Management Zone		Noise Affectation Zone
		3 dBA to 4 dBA below Maximum Amenity PSNL	0 dBA to 2 dBA below Maximum Amenity PSNL	Above Maximum Amenity PSNL
1	Full Pit Extent	80	-	-
	Part Pit Extent	-	-	-
3	Full Pit Extent	-	106	87
	Part Pit Extent	-	106	87
4	Full Pit Extent	-	-	-
	Part Pit Extent	-	-	-
5	Full Pit Extent	154, 156	111, 112	-
	Part Pit Extent	112, 154, 156	-	111
6	Full Pit Extent	-	-	-
	Part Pit Extent	-	-	-

Noise Assessment Group (NAG)	Operation	Noise Management Zone		Noise Affectation Zone
		3 dBA to 4 dBA below Maximum Amenity PSNL	0 dBA to 2 dBA below Maximum Amenity PSNL	Above Maximum Amenity PSNL
7	Full Pit Extent	-	-	108, 109, 110, 153 “Dulwich”
	Part Pit Extent	-	-	108, 109, 110, 153 “Dulwich”
8	Full Pit Extent	-	-	-
	Part Pit Extent	-	-	-
“9	Full Pit Extent	-	-	-
	Part Pit Extent	-	-	-
10	Full Pit Extent	-	-	-
	Part Pit Extent	-	-	-
11	Full Pit Extent	-	-	-
	Part Pit Extent	-	-	-
12	Full Pit Extent	-	-	-
	Part Pit Extent	-	-	-
A	Full Pit Extent	-	-	-
	Part Pit Extent	-	-	-
C	Full Pit Extent	-	-	-
	Part Pit Extent	-	-	-
D	Full Pit Extent	-	-	-
	Part Pit Extent	-	-	-
F	Full Pit Extent	71, 72, 73, 76	-	-
	Part Pit Extent	-	-	-

Noise Emission Summary of Non-Mine Owned Residences

There are six non-mine owned residences in the Noise Affectation Zone which exceed the maximum amenity PSNLs. Also, there are up to nine non-mine owned residences in the Noise Management Zone.

Note, 153 “Dulwich” lies in the existing Integra Open Cut Zone of Affectation. Therefore, five additional non-mine owned residences surrounding the Integra Open Cut Project would fall into the Zone of Affection due to the increased noise emission levels from the Open Cut Extension.

9.2 Mine Owned Residences

Table 59 includes all known mine owned residences where the Amenity PSNLs are predicted to be exceeded during Full Pit Extent and Part Pit Extent operations and assigns the residences in either the Noise Management Zone or Noise Affectation Zone.

Table 59 Mine Owned Residences within Noise Management and Affectation Zones

Noise Assessment Group (NAG)	Operation	Noise Management Zone		Noise Affectation Zone
		3 dBA to 4 dBA below Maximum Amenity PSNL	0 dBA to 2 dBA below Maximum Amenity PSNL	3 dBA to 4 dBA below Maximum Amenity PSNL
1	Full Pit Extent	79	81, 83	77, 78
	Part Pit Extent	-	77	78
2	Full Pit Extent	84, 85, 86, 170	-	-
	Part Pit Extent	-	-	-
4	Full Pit Extent	155	-	-
	Part Pit Extent	155	-	-
5	Full Pit Extent	113, 114, 115, 116, 117	-	-
	Part Pit Extent	113, 115, 116	-	-
6	Full Pit Extent	-	-	-
	Part Pit Extent	-	-	-
7	Full Pit Extent	-	-	107
	Part Pit Extent	-	-	107
9	Full Pit Extent	-	-	-
	Part Pit Extent	-	-	-
12	Full Pit Extent	-	-	-
	Part Pit Extent	-	-	-
A	Full Pit Extent	-	-	-
	Part Pit Extent	-	-	-
B	Full Pit Extent	45	-	-
	Part Pit Extent	-	-	-
F	Full Pit Extent	-	-	-
	Part Pit Extent	-	-	-
G	Full Pit Extent	-	82	-
	Part Pit Extent	-	-	-

Noise Emission Summary of Mine Owned Residences

There are up to three mine owned residences in the Noise Affectation Zone which exceed the Maximum Amenity PSNL. Also, there are up to 16 mine owned residences located in the Noise Management Zone.

10 CUMULATIVE NOISE AMENITY ASSESSMENT

In order to determine the cumulative industrial noise amenity levels at the residences surrounding the Project, the $L_{Aeq(period)}$ noise amenity emissions from the Open Cut Project (presented in **Table 56** and **Table 57**) can be added to the Approved Industrial Noise Amenity Levels (presented in **Table 17**). An assessment of the cumulative industrial noise amenity levels can then be made against the acceptable and maximum amenity assessment criteria presented in **Table 20**.

Note, this is clearly a worst case cumulative noise amenity assessment as it assumes that all operations identified in **Table 10**, as well as the Open Cut Project, simultaneously emit their maximum noise emission to a common receiver locality.

The daytime, evening and night-time cumulative noise amenity level range for both the Full Pit Extent and Part Pit Extent are summarised in **Table 60** and **Table 61**, respectively, for the 18 NAGs.

Table 60 Cumulative Noise Amenity Emissions - $L_{Aeq(period)}$ - Full Pit Extent (dBA re 20μPa)

Noise Assessment Group	Cumulative $L_{Aeq(period)}$ Noise Amenity Levels[1]			Cumulative Noise Assessment Criteria[2]					
				Acceptable Amenity			Maximum Amenity		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
1	47-47	43-45	44-48	50	45	40	55	50	45
2	46-54	43-53	43-54	50	45	40	55	50	45
3	45-46	42-44	45-46	50	45	40	55	50	45
4	45-46	41-42	41-43	55	45	40	60	50	45
5	42-54	40-54	39-52	55	45	40	60	50	45
6	42-45	38-41	37-40	50	45	40	55	50	45
7	45-47	42-47	45-50	50	45	40	55	50	45
8	40-40	37-37	36-36	55	45	40	60	50	45
9	41-42	38-39	37-39	55	45	40	60	50	45
10	41-42	38-39	40-41	50	45	40	55	50	45
11	41-43	38-40	38-41	50	45	40	55	50	45
12	46-48	42-44	40-42	50	45	40	55	50	45
A	43-48	39-46	37-45	50	45	40	55	50	45
B	46-49	42-48	41-42	50	45	40	55	50	45
C	45-46	41-42	41-42	50	45	40	55	50	45
D	45-45	41-41	40-41	50	45	40	55	50	45
F	46-51	43-50	42-51	50	45	40	55	50	45
G	47	43	45	50	45	40	55	50	45

Note 1: Calculated from the addition of the $L_{Aeq(period)}$ noise amenity emissions from the Open Cut Project (presented in **Table 56**) to the Approved Industrial Noise Amenity Levels (presented in **Table 17**).

Note 2: Cumulative noise amenity assessment criteria determined in **Table 20**.

Table 61 Cumulative Noise Amenity Emissions - $L_{Aeq(period)}$ - Part Pit Extent (dBA re 20μPa)

Noise Assessment Group	Cumulative $L_{Aeq(period)}$ Noise Amenity Levels[1]			Cumulative Noise Assessment Criteria[2]					
				Acceptable Amenity			Maximum Amenity		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
1	46-47	43-45	44-47	50	45	40	55	50	45
2	46-54	43-53	43-54	50	45	40	55	50	45
3	45-46	43-43	45-46	50	45	40	55	50	45
4	45-46	41-42	41-43	55	45	40	60	50	45
5	42-54	40-54	39-52	55	45	40	60	50	45
6	42-45	38-41	37-40	50	45	40	55	50	45
7	45-48	42-48	45-51	50	45	40	55	50	45
8	40-40	37-37	36-36	55	45	40	60	50	45
9	41-42	38-39	38-39	55	45	40	60	50	45
10	41-42	38-39	39-41	50	45	40	55	50	45
11	41-43	38-39	38-41	50	45	40	55	50	45
12	46-48	42-44	40-42	50	45	40	55	50	45
A	43-47	39-46	37-45	50	45	40	55	50	45
B	45-46	42-43	41-41	50	45	40	55	50	45
C	45-46	41-42	40-41	50	45	40	55	50	45

Noise Assessment Group	Cumulative $L_{Aeq(period)}$ Noise Amenity Levels[1]			Cumulative Noise Assessment Criteria[2]					
				Acceptable Amenity			Maximum Amenity		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
D	45-45	41-41	40-40	50	45	40	55	50	45
F	46-51	43-50	42-50	50	45	40	55	50	45
G	47	43	44	50	45	40	55	50	45

Note 1: Calculated from the addition of the $L_{Aeq(period)}$ noise amenity emissions from the Open Cut Project (presented in **Table 57**) with the Approved Industrial Noise Amenity Levels (presented in **Table 17**).

Note 2: Cumulative noise amenity assessment criteria determined in **Table 20**.

The cumulative noise amenity levels at all non-mine owned residences are below the INP's maximum amenity criteria, except during the night-time period at Residences 87, 108, 109, 110 and 153 "Dulwich".

The cumulative noise amenity levels at all mine owned residences are below the INP's maximum amenity criteria, except during the night-time period at residences in close proximity to adjoining mine operations, namely, Residences 77, 78, 84, 170, 138, 107, 74 and 75.

11 ROAD TRANSPORTATION NOISE ASSESSMENT

11.1 Road Noise Assessment Criteria

The primary access to the Open Cut Project Area would be via the existing Access Road which extends from Bridgman Road to the CHPP Area.

Based on the DECC's "*Environmental Criteria for Road Traffic Noise*" policy dated May 1999 (ECRTN), Bridgman Road is classified as a collector road. The associated guideline noise assessment criteria are presented in **Table 62**.

Table 62 DECC Guideline Noise Assessment Criteria for Traffic on Collector Road

Road	Policy	Descriptor	Noise Criteria
Bridgman Road	Land use developments with the potential to create additional traffic on collector road	Daytime $L_{Aeq(1hour)}$	60 dBA
		Night-time $L_{Aeq(1hour)}$	55 dBA

Note, in cases where the nominated criteria are already exceeded, traffic associated with the development should not lead to an increase in the existing noise traffic levels of more than 2 dBA.

11.2 Existing and Project Operating Road Traffic

As the Integra Open Cut Project would represent an extension of existing activities using the existing equipment, workforce and support infrastructure, the total number of trips for employees and other operational vehicles would remain unchanged, with the majority of (if not all) project vehicles continuing to enter and leave the site via the existing Access Road off Bridgman Road. Therefore there would be no change in the existing number of vehicle movements except for the additional vehicle movements associated with the proposed NOC operation. Note, both the construction and use of a separate access off Middle Falbrook Road, including the additional traffic flow on Bridgman Road, has been assessed in the NOC EA.

Existing traffic flows have been determined for Bridgman Road (see Chapter 10 Traffic and Transportation of the EA).

In order to determine the cumulative noise levels from the Project on Bridgman Road, the daytime and night-time peak hourly vehicle movements along the Mine Access Road as presented in **Table 63** were used.

Table 63 Estimated Peak Hourly Vehicle Movements - Bridgman Road

Peak Period	Existing Vehicles[1]		NOC Vehicles		Cumulative Vehicles	
	Light	Heavy	Light	Heavy	Light	Heavy
Night-time 6.00 am - 7.00 am	138	7	20	2	158	9
Daytime 2.00 pm - 3.00 pm	76	8	20	2	96	10

Note 1: Includes both project related and non-project related traffic.

11.3 Road Noise Predictions

The peak hour $L_{Aeq(1hour)}$ road traffic noise levels were predicted with reference to the US Environmental Protection Agency Report 550/9-74-004 dated March 1974, but including modifications based on equations in Appendix A-13 and certain amendments recommended in the UK Calculation of Road Traffic Noise (CORTN). This method takes into account vehicle volume, vehicle speed, vehicle type, passby duration, intervening topography, height and location of any intervening barriers and receiver location and facade reflection.

The calculated peak hourly daytime and night-time traffic noise levels at various offset distances are presented in **Table 64**.

Table 64 Calculated Peak $L_{Aeq(1hour)}$ Noise Levels

Distance from Road	Existing Vehicles		Project Vehicles		Cumulative Vehicles	
	Night-time 6.00 am-7.00 am	Daytime 2.00 pm - 3.00 pm	Night-time 6.00 am-7.00 am	Daytime 2.00 pm - 3.00 pm	Night-time 6.00 am-7.00 am	Daytime 2.00 pm - 3.00 pm
25 m	53 dBA	52 dBA	46 dBA	46 dBA	54 dBA	53 dBA
50 m	48 dBA	47 dBA	41 dBA	41 dBA	49 dBA	48 dBA
75 m	46 dBA	45 dBA	39 dBA	39 dBA	46 dBA	46 dBA

11.4 Road Noise Impact Assessment

The following assessment is derived from the predicted traffic noise levels and the DECC's guideline noise assessment criteria of daytime 60 $L_{Aeq(1hour)}$ and night-time 55 $L_{Aeq(1hour)}$.

It should be noted that the night-time peak hourly vehicle movements would occur between 6.00 am and 7.00 am in the morning.

- Peak hour daytime cumulative noise levels are likely to increase by up to 1 dBA due to the NOC operations but remain below the criterion at offset distances of 8 m and greater.
- Peak hour night-time cumulative noise levels are likely to increase by up to 1 dBA due to the NOC operations but remain below the criterion at offset distances of 20 m and greater.

11.5 Summary

Traffic noise impacts on Bridgman Road are considered acceptable at distances of 8 m and greater from the roadway as the peak cumulative daytime levels at these distances are below the 60 dBA $L_{Aeq(1hour)}$ criterion.

The night-time peak cumulative noise impacts are considered acceptable at distances greater than 20 m from the roadway as the peak cumulative levels at these distances are below the 55 dBA $L_{Aeq(1hour)}$ criterion.

Further, the increase in the existing traffic noise levels, at all offset distances (including less than 20 m) would be less than 2 dBA.

12 RAIL TRANSPORTATION NOISE

12.1 Rail Traffic Noise Assessment Criteria

As stated in **Section 1**, the ARTC operates the Main Northern Railway and noise emissions from the railway are regulated via ATRC's Environment Protection Licence EPL 3142. The EPL, Section L6, does not nominate specific environmental noise limits but notes that:

> *"It is an objective of this licence to progressively reduce noise levels of railway operations to appropriate goals through the implementation of Pollution Reduction Programs (RPRs)."*

At present the Main Northern Railway is not subject to a PRP. EPL 3142 Section U1.1, however, does provide further guidance in relation to pollution studies and reduction programmes for other parts of its rail network as follows.

> ***"U1.1 Objectives of PRPs***
>
> *In developing the PRPs, the licensee must work towards the goals of 65 dBA Leq, (day time - 7am-10pm), 60 dBA Leq, (night time - 10pm-7am) and 85 dBA (24hr) max pass-by noise, at one metre from the facade of affected residential properties. If it is not possible for these goals to be reached by feasible and reasonable mitigation measures, the PRP must aim, through feasible and reasonable measures to:*
>
> - *reduce operational rail noise emissions and the associated noise impact on the community where traffic levels are anticipated to remain constant; or*
> - *stabilise operational rail noise emissions and the associated noise impact on the community where traffic levels are anticipated to increase."*

Based on the foregoing, the guideline noise assessment criteria for the Main Northern Railway are presented in **Table 65**.

Table 65 ATRC's Guideline Noise Assessment Criteria

Railway	Licence Holder	Descriptor	Rail Traffic Goal
Main Northern	ATRC EPL 3142	Daytime $L_{Aeq(15hour)}$	65 dBA
		Night-time $L_{Aeq(9hour)}$	60 dBA
		Maximum L_{Amax}	85 dBA

12.2 Existing, Consented and Project Rail Traffic

For noise assessment proposes it has been conservatively assumed that the number of train movements equals the number of allocated train paths as presented in **Table 66**.

The Main Northern Line is joined by the North Coast Line downline of Maitland, so that by Maitland, the North Coast passenger, coal and freight trains adds to the Main Northern Line traffic. Given that the only existing rail spur that joins the Main Northern Line upline of Maitland is the low volume Bloomfield spur line at Thornton, the practical maximum cumulative noise rail impacts would occur near Maitland, hence, this section of the Main Northern Railway has been assessed as it is representative of the potentially most noise impacted section of the line.

Table 66 Existing Daily Train Movements[1,2]

Period	Existing/ Proposed	Train Type	Average Passbys	Peak Passbys	Train Length[3] (m)	Train Speed (kph)	Throttle Setting (Notch)
Daytime	Existing	Passenger	67	77	50/100	80	4
		Freight	21	22	755/760/1200/1500	60	4
		Coal[4]	111	112	1543	60	4
		Cumulative	199	211			
Night-time	Existing	Passenger	23	28	50/100	80	4
		Freight	16	17	755/760/1200/1500	60	4
		Coal[4]	66	67	1543	60	4
		Cumulative	105	112			

Note 1: Sourced from ARTC's *"Standard Working Timetable - Freight and Country Passenger services from 5th August 2007 - Book 5 North and North West"* effective 8 January 2008.

Note 2: In order to determine the maximum number of allowable train movements on the Main Northern Railway all timetabled slots have been included in the above count.

Note 3: Approximate train length.

Note 4: The Open Cut Project will not increase the existing number of trains departing from the Project CHPP.

It should be noted that current actual train movements on the Main Northern Railway (passing through Belford Station) were documented in GHD's *"Australian Rail Track Corporation Report on ARTC Minimbah Third Track Environmental Assessment - Noise and Vibration Impact Assessment"* (Minimbah Assessment) dated July 2008, prepared for the Minimbah Bank Third Track Environmental Assessment. Following a review of the coal train passby log presented in the Minimbah Assessment for the period between 13 March and 2 April 2008, the actual maximum daily passbys were 63 coal trains during the daytime period and 35 coal trains during the night-time period.

The coal paths listed in **Table 66** include paths for coal from Duralie and Stratford, which is hauled along the North Coast Line to Telarah Junction and also coal paths from mines in the Cessnock Coalfields that rail haul along the Cessnock Line to Telarah Junction. These mines generate many fewer trains than the mines from the Upper Hunter Coalfields, so the overwhelming majority of paths listed in **Table 66** are for these mines. Therefore the actual coal train passbys are much lower than the allocated train paths (98 actual compared to 177 allocated). Consequently, the daytime $L_{Aeq(15hour)}$ and night-time $L_{Aeq(9hour)}$ passby noise levels for the cumulative train movements presented in **Table 67** may over estimate the actual noise levels by approximately 3 dBA, for sections of the Main Northern Line both upline and downline of its junction with the North Coast Line.

It should be noted that the Project will not increase the current number of coal trains departing from Integra.

12.3 Rail Traffic Noise Predictions

Calculation of the daytime and night-time equivalent continuous noise levels and the maximum passby levels have been conducted using a computer based prediction model developed by Heggies.

The prediction model uses characteristic noise levels for the various sources (locomotive engine and exhaust noise as a function of throttle notch; wheel/rail noise as a function of train speed, and wagon type, etc) at a fixed reference distance. The model then makes adjustments for the train length and distance from the track (assuming no barriers) and facade reflection. Parameters including the daytime $L_{Aeq(15hour)}$, night-time $L_{Aeq(9hour)}$ and maximum passby level (L_{Amax}) can then be determined by summing the effects of the individual noise sources and by incorporating the number of train events.

The calculated daytime $L_{Aeq(15hour)}$, night-time $L_{Aeq(9hour)}$ and maximum (L_{Amax}) passby noise levels for the cumulative train movements at various offset distances are presented in **Table 67**.

Table 67 Predicted Train Noise Emissions (dBA re 20 µPa)

Distance to Receiver	Daytime Cumulative Trains		
	Average $L_{Aeq(15hour)}$	**Peak $L_{Aeq(15hour)}$**	**Passby L_{Amax}**
30 m	70	70	86
60 m	67	67	83
90 m	65	65	81
Distance to Receiver	**Night-time Cumulative Trains**		
	Average $L_{Aeq(9hour)}$	**Peak $L_{Aeq(9hour)}$**	**Passby L_{Amax}**
30 m	70	70	86
60 m	67	67	83
90 m	65	66	81

12.4 Rail Noise Impact Assessment

The following assessment is derived from the predicted train noise levels and the ARTC's guideline noise assessment criteria of daytime 65 dBA $L_{Aeq(15hour)}$, night-time 60 dBA $L_{Aeq(9hour)}$ and maximum passby L_{Amax} 85 dBA. Further, the assessment has conservatively been undertaken on the section of the Main Northern Railway which receives the greatest number of train movements and also assumes the operation of trains during all timetabled slots.

Daytime Noise

An assessment of the cumulative peak $L_{Aeq(15hour)}$ noise levels indicates that noise levels would continue to meet the daytime 65 dBA criterion at distances of 89 m (and greater).

Night-time Noise

An assessment of the cumulative peak $L_{Aeq(9hour)}$ noise levels indicates that noise levels would continue to meet the night-time 60 dBA criterion at distances of 116 m (and greater).

Passby Noise

As is currently the case, the maximum (L_{Amax}) noise criterion of 85 dBA would be achieved by train movements at distances of 31 m (and greater).

13 BLASTING ASSESSMENT

13.1 Ground Vibration - Structural Damage Criteria

In terms of the most recent relevant blast vibration damage criteria, British Standard 7385:Part 2-1993 "*Evaluation and Measurement for Vibration in Buildings Part 2"* is a definitive standard against which the likelihood of building damage from ground vibration can be assessed. This is the Standard recommended in Australian Standard AS 2187: Part 2-2006 "*Explosives - Storage and Use - Part 2: Use of Explosives*" as the guideline values and assessment methods "are applicable to Australian conditions".

Although there is a lack of reliable data on the threshold of vibration-induced damage in buildings both in countries where national standards already exist and in the UK, BS 7385:Part 2 has been developed from an extensive review of UK data, relevant national and international documents and other published data. The standard sets guide values for building vibration based on the lowest vibration levels above which damage has been credibly demonstrated. These levels are judged to give a minimum risk of vibration-induced damage, where minimal risk for a named effect is usually taken as a 95% probability of no effect.

Sources of vibration which are considered in the standard include blasting (carried out during mineral extraction or construction excavation), demolition, piling, ground treatments (eg compaction), construction equipment, tunnelling, road and rail traffic and industrial machinery.

As the strain imposed on a building at the foundation level is proportional to the peak particle velocity, but is inversely proportional to the propagation velocity of the shear or compressional waves in the ground, this quantity (ie peak particle velocity) has been found to be the best single descriptor for correlating with case history data on the recurrence of vibration-induced damage.

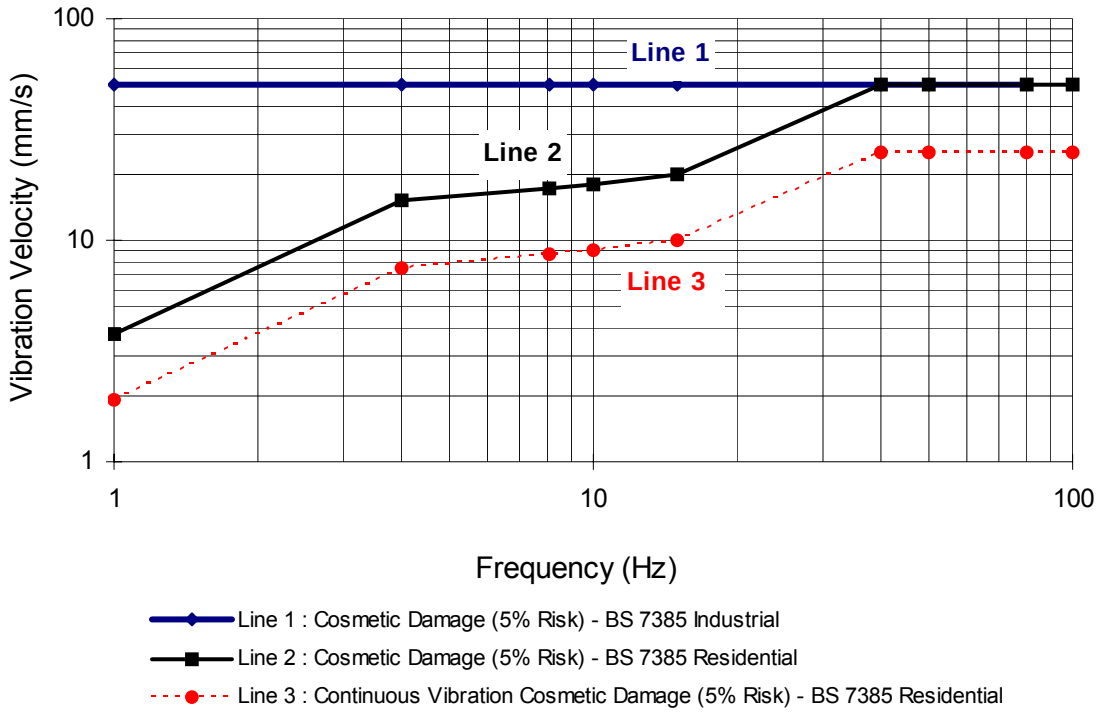
The guide values from this standard for transient vibration judged to result in a minimal risk of cosmetic damage to residential buildings and industrial buildings are presented numerically in **Table 68** and graphically in **Figure 1**.

Table 68 Transient Vibration Guide Values for Cosmetic Damage

Line	Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
		4 Hz to 15 Hz	15 Hz and above
1	Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
2	Unreinforced or light framed structures Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

In the lower frequency region where strains associated with a given vibration velocity magnitude are higher, the guide values for the building types corresponding to Line 2 are reduced. Below a frequency of 4 Hz where a high displacement is associated with the relatively low peak component particle velocity value, a maximum displacement of 0.6 mm (zero to peak) is recommended. This displacement is equivalent to a vibration velocity of 3.7 mm/s at 1 Hz.

Figure 1 Graph of Transient Vibration Guide Values for Cosmetic Damage



The standard goes on to state that minor damage is possible at vibration magnitudes which are greater than twice those given in **Table 68** and major damage to a building structure may occur at values greater than four times the tabulated values.

Fatigue considerations are also addressed in the standard and it is concluded that unless calculation indicates that the magnitude and number of load reversals is significant (in respect of the fatigue life of building materials) then the guide values in **Table 68** should not be reduced for fatigue considerations.

It is noteworthy that extra to the guide values nominated in **Table 68**, the standard states that:

> *"Some data suggests that the probability of damage tends towards zero at 12.5 mm/s peak component particle velocity. This is not inconsistent with an extensive review of the case history information available in the UK."*

Also that:

> *"A building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive."*

13.2 Airblast - Structural Damage Criteria

Based largely on work carried out by the US Bureau of Mines, the US Office of Surface Mining has presented the following regulatory limits for airblast from blasting (depending on the low frequency limit of the measuring system):

Low Frequency Limit	Peak Airblast Level Limit
2 Hz or lower	132 dB Linear
6 Hz or lower	130 dB Linear

These levels are generally consistent with the level of 133 dB Linear nominated in AS 2187.2-2006.

The US criteria are structural damage limits based on relationship between the level of airblast and the probability of window breakage, and include a significant safety margin. It has been well documented that windows are the elements of residential buildings most at risk to damage from airblast from blasting.

While cracked plaster is the type of damage most frequently monitored in airblast complaints, research has shown that window panes fail before any other structural damage occurs (USBM, RI 8485-1980). The probabilities of damage to windows exposed to a single airblast event are as shown in **Table 69**.

Table 69 Probability of Window Damage from Airblast

Airblast dB Linear	Level kPa	Probability of Damage	Effects and Comments
140	0.2	0.01%	"No damage" - windows rattle
150	0.6	0.5%	Very occasional failure
160	2.0	20%	Substantial failures
180	20.0	95%	Almost all fail

13.3 Human Comfort and Disturbance Considerations

The ground vibration and airblast levels which cause concern or discomfort to residents are significantly lower than the damage limits. Humans are far more sensitive to some types of vibration than is commonly realised. They can detect and possibly even be annoyed at vibration levels which are well below those causing any risk of damage to a building or its contents.

The criteria normally recommended for blasting in NSW, based on human discomfort, are contained in the DECC's Environmental Noise Control Manual (Chapter 154). However, for recent projects the DECC has advocated the use of the Australian and New Zealand Environment Council (ANZEC) guidelines "*Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration*" (ANZEC guidelines) for assessing potential residential disturbance arising from blast emissions.

The ANZEC criteria for the control of blasting impact at residences are as follows.

- The recommended maximum level for airblast is 115 dB Linear.
- The level of 115 dB Linear may be exceeded on up to 5% of the total number of blasts over a period of 12 months. The level should not exceed 120 dB Linear at any time.
- The recommended maximum level for ground vibration is 5 mm/s (peak particle velocity (ppv)).
- The ppv level of 5 mm/s may be exceeded on up to 5% of the total number of blasts over a period of 12 months. The level should not exceed 10 mm/s at any time.
- Blasting should generally only be permitted during the hours of 0900 hours to 1700 hours Monday to Saturday. Blasting should not take place on Sundays and public holidays.

The five percent exceedance of the general criteria for airblast and ground vibration up to a (never to be exceeded) maximum, as advocated by the DECC and the ANZEC, cater for the inherent variation in emission levels from a given blast design.

13.4 Open Cut Overburden Blasting Practices

Assessment of the potential ground-borne vibration and airblast emissions arising from the overburden blasting has been based on the indicative blast design parameters presented in **Table 3** and represent a continuation of the existing South Pit blasting practices for the Open Cut Project.

Blast Emission Site Laws

The blasting site laws developed from the blast emission data obtained from the existing project operations have been used to assess the blasting impacts from the Full Pit Extent. The blast emissions results monitored between January 2004 and April 2006 were used in the analysis.

The resulting site laws for ground vibration and airblast are:

Ground Vibration

$PVS\ (mm/s)\ (5\%) = 2{,}091\ (R/Q^{1/2})^{-1.47}$

Airblast

$SPL\ (dBL)\ (5\%) = 160 - 22.3 \log\ (R/Q^{1/3})$

where PVS (5%) and SPL (5%) are the levels of ground vibration (Peak Vector Sum - mm/s) and airblast (dB Linear) respectively, above which 5% of the total population (of data points) will lie, assuming that the population has the same statistical distribution as the underlying measured sample.

PVS = Peak Vector Sum ground vibration level (mm/s)
dB = Peak airblast level (dB Linear)
R = Distance between charge and receiver (m)
Q = Charge mass per delay (kg)

The Open Cut Project blast emission site laws are presented graphically in **Appendix J1**, together with the corresponding blast emissions data. Also, superimposed on the graphs are the generic ground vibration and airblast formulae presented in AS 2187 (also known as the ICI formulae) for blasting in average rock.

13.5 Blast Emissions Assessment

The blasting assessment was conducted with reference to the nearest residences within each NAG to the blasting operations, as the ground vibration and airblast emissions decrease with distance from the blast site. Accordingly, the predicted blast emissions indicate the maximum likely blast emissions levels at any residence within each NAG.

The Project blast emission site laws have been used to predict ground vibration and airblast emissions at the nearest potentially affected residences, the results are presented in **Table 70**. The blast emissions levels versus distance graphs are presented in **Appendix J2** for the indicative Maximum Instantaneous Charge (MIC) range of 30 kg to 850 kg.

Table 70 Predicted Overburden Blast Emissions

Noise Assessment Group	Reference Residence	Distance to Blast (m)	PVS Vibration (mm/s)		Peak Linear Airblast (dB re 20µPa)	
			MIC 30 kg	MIC 850 kg	MIC 30 kg	MIC 850 kg
1	78	1,013	1.0	11.4	104	113
2	84	2,002	0.4	4.2	97	106
3	106	1,298	0.7	7.9	101	110
4	105	2,176	0.3	3.7	96	105
5	111	972	1.0	12.1	104	113
6	130	2445	0.3	3.1	95	104
7	109	264	7.0	82.0	117	126
8	142	6,547	0.1	0.7	86	95
9	2	4,567	0.1	1.2	89	98
10	13	3,774	0.1	1.6	91	100
11	16	3,750	0.1	1.7	91	100
12	62	3,670	0.1	1.7	91	100
A	35	4,102	0.1	1.5	90	99
B	45	2,900	0.2	2.4	94	102
C	64	2,604	0.2	2.8	95	103
D	48	3,247	0.2	2.0	93	101
F	73	2,347	0.3	3.3	96	104
G	82	1,650	0.5	5.5	99	108

Note 1: This assessment assumes the indicative blast parameters presented in **Table 3** would be used. Actual blast parameters would be designed to ensure the ANZEC guidelines are met at all residences.

A review of the blast emissions levels presented in **Table 70** indicates that, for an MIC of 30 kg, the blast emissions at all residences are predicted to comply with the ANZEC guidelines, except at the nearest residence in NAG 7 (ie Dulwich property).

The following information is also derived from the predicted levels of blast emissions:

- The predicted levels of ground vibration at all nearby residences comply with the ANZEC general human comfort criterion (of 5 mm/s) and consequently with the ANZEC maximum human comfort criterion, as well as the BS 7385 structural damage criterion of 15 mm/s (at 4 Hz) under the indicative MIC range, except at the nearest residence in NAG 7, which would require the MIC to be limited to 19 kg in order to comply with the 5 mm/s criterion.
- The predicted levels of peak airblast at all residences comply with the ANZEC general human comfort criterion of 115 dB Linear and consequently with the ANZEC maximum human comfort criterion for the indicative MIC range, except at the nearest residence in NAG 7 which requires the MIC to be limited to 19 kg in order to comply with the 115 dB linear criterion.
- The predicted levels of peak airblast are clearly well below the US Bureau of Mines damage limit of 132 dB Linear (2 Hz cut off) at all residences.

13.6 Project Blast Emission Site Laws Development

In accordance with the existing blasting practices at the Open Cut Project, all blasts within the Project Area would be monitored and the results used to further develop and refine the existing site laws for both ground vibration and airblast emissions. Where any future preliminary blast design assessment indicates that the ANZEC guidelines may be exceeded, the blast would be designed to ensure satisfaction with the ANZEC guidelines. **Appendix J3** presents a graph of allowable MIC versus distance to comply with the ANZEC guidelines, based on the existing 5% exceedance Project blast emission site laws.

13.7 Flyrock Assessment

Flyrock is any material ejected from the blast site by the force of the blast.

There are generally two main areas within the blast from which flyrock has the potential to be produced. These are:

- At the blasthole collar (where the stemming length has not been optimised and the explosive column is too close to the upper surface of the rock mass creating crater effects - rifling).
- At the face of the blast (where less than optimum burden on one or more blastholes could result in a face blowout.

In order to minimise the potential for flyrock generation, ICO would check the burden on the front-row blastholes and modify the hole loading accordingly.

In terms of collar ejection, the proposed stemming lengths in **Table 3** are considered optimum for the proposed blasthole lengths and has been selected in order to totally contain the explosives and separate them from the collar of the blasthole. Further, aggregate will be used as the stemming material (not drill dust) again in order to fully contain the explosives within the blasthole. Where sub optimal burden is identified, the holes either would not be charged or the adjacent face would be buttressed.

Based on an extrapolation of the extensive research work conducted by the Swedish Research Foundation (SVEDEFO), the maximum potential travelling distance for flyrock for the proposed blast design (Power Factor of 0.6 kg/bcm and 229 mm diameter blastholes), is approximately 575 m. This distance is consistent with the operations of other open cut coal mines where road closures are conducted only when blasting is conducted within 300 m to 600 m of a road. However, Drilling Services Pty Ltd has advised Heggies that, based on their blasting experience and subject to the implementation of the mitigation measures detailed above, they are able to confidently state that blasted rock would fall within a blast envelope with dimensions: 50 m in front of the face, 20 m on either side of the face and 10 m behind the face; and, furthermore, such dimensions are consistent with industry best practice and are readily achievable.

Additionally, Terrock Consulting Engineers (Terrock) have produced a calibrated flyrock model for the subject site to predict and assist in controlling flyrock from the existing Integra Open Cut operations. The flyrock model has also been used to produce a flyrock risk assessment, the findings of which are presented in Terrock report *"Integra Coal, Camberwell - Addressing ARTC Concerns About Blasting Adjacent to The Main northern Railway"* dated 19 June 2008 and in the subsequent letter entitled *"Camberwell Mine - Blasting and ARTC Property - Additional Information"* dated 17 September 2008. The risk assessment found that flyrock can be *"controlled by adequate explosives confinement"* to within 50 m of the blast.

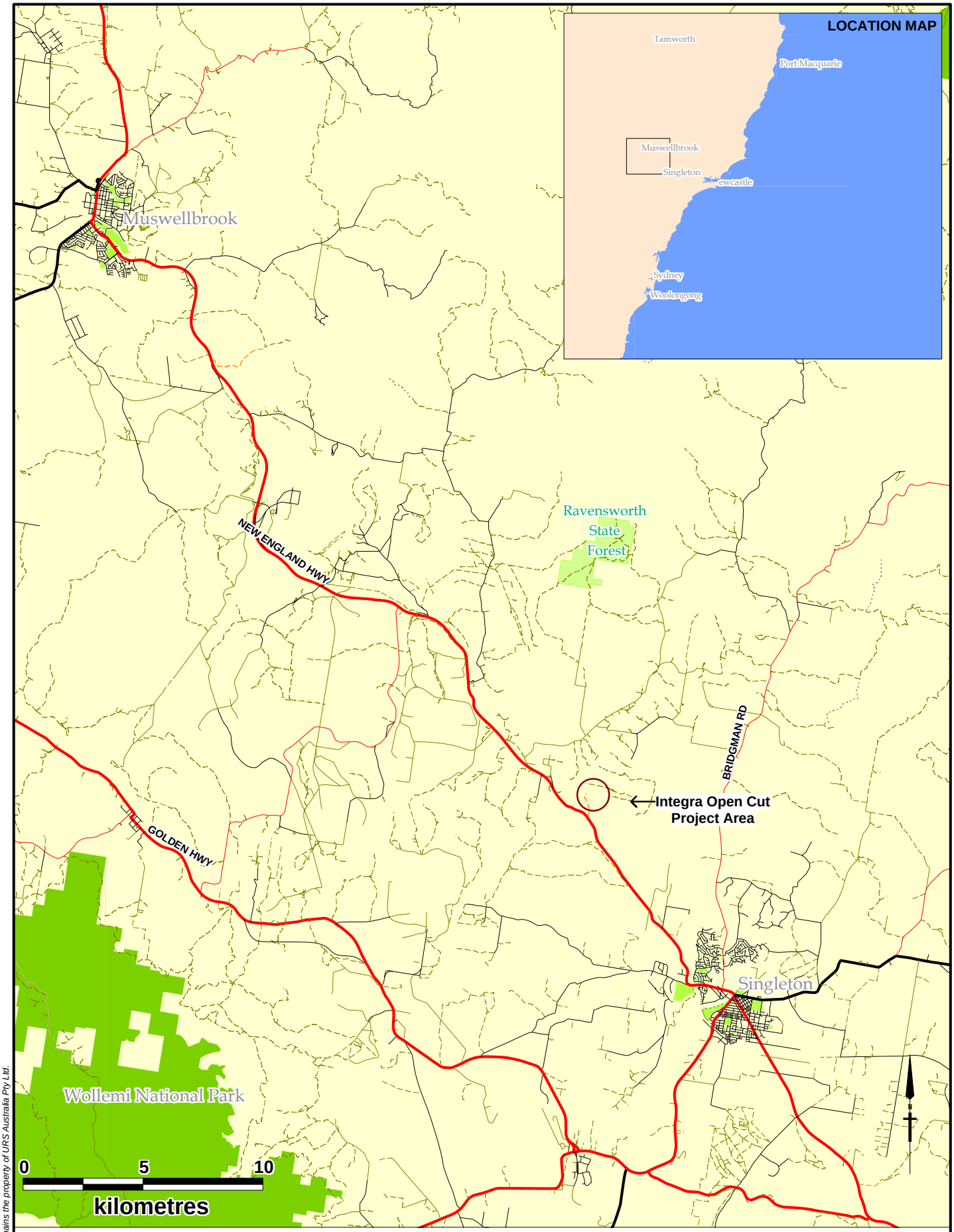
Accordingly, flyrock will be managed through appropriate blast design to ensure there is no flyrock risk to the public using either the New England Highway or Middle Falbrook Road, or any of the surrounding residences.

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Project Area Location

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Datum: GDA94, Projection: UTM, Grid: MGA Zone 55

Client	Project	Title
INTEGRA COAL OPERATIONS PTY LTD	INTEGRA OPEN CUT PROJECT ENVIRONMENTAL ASSESSMENT	**PROJECT AREA LOCATION**
URS	Drawn: TE | Approved: WB | Date: 18/09/2008	Figure: **A1**
	Job No: **43177507** | File No: 43177507.017.wor	

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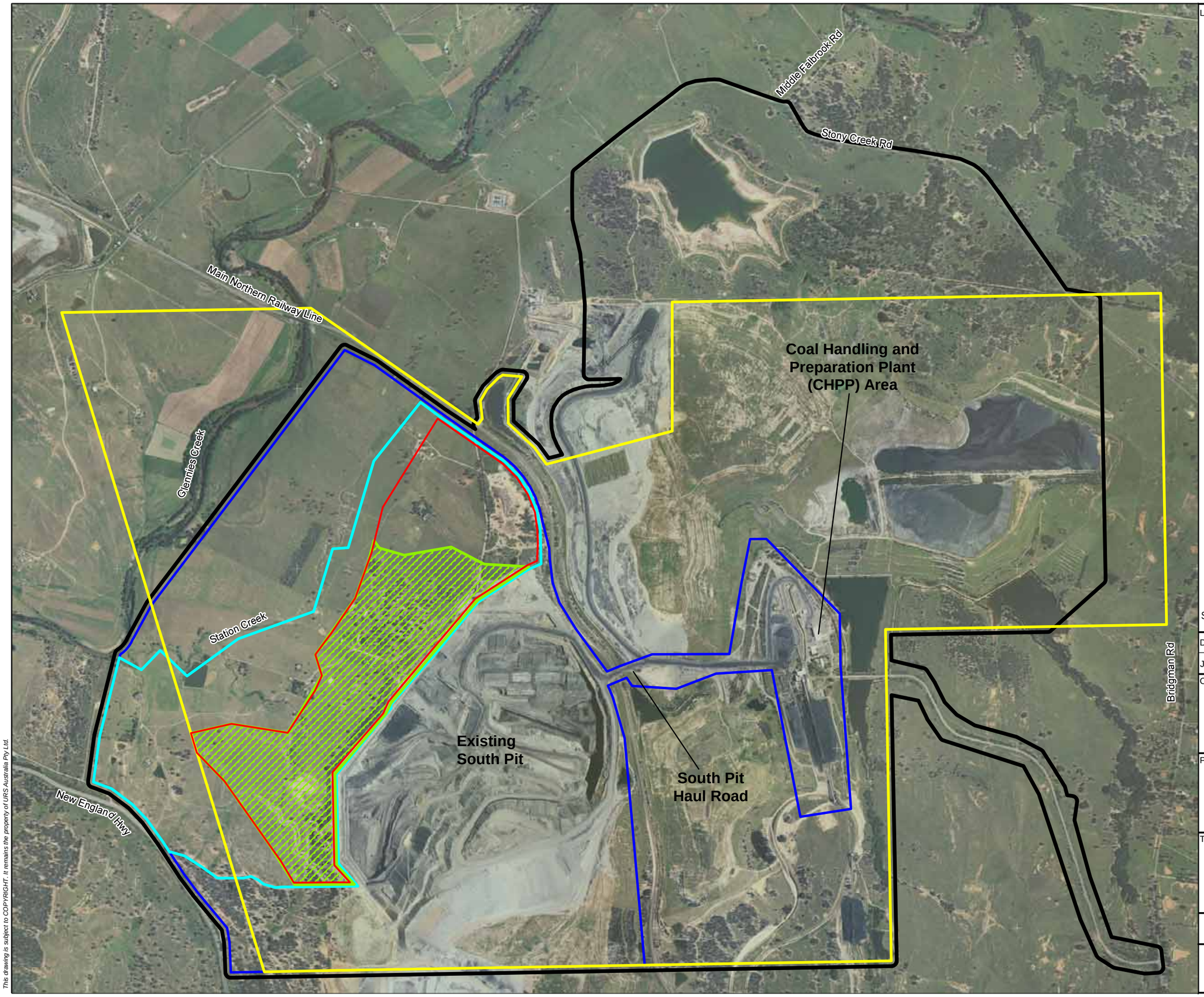
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Open Cut Project and Open Cut Extension Area

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Legend:

- Open Cut Project Area
- Open Cut Extension Area
- Mine Area : Full Pit Extent
- Open Cut Area
- Mine Area: Part Pit Extent
- CL357

Note: Project Area and Mine Area offset for clarity

N

0 250 500
metres

Source: Integra Coal

Drawn: AO	Approved: WB	Date: 16/02/2009
Job No: **43177507**	File: 43177507-039.wor	

Client

INTEGRA COAL OPERATIONS PTY LTD

Project

INTEGRA OPEN CUT PROJECT

Title

OPEN CUT PROJECT AND OPEN CUT EXTENSION AREA

Figure: 1.3

URS

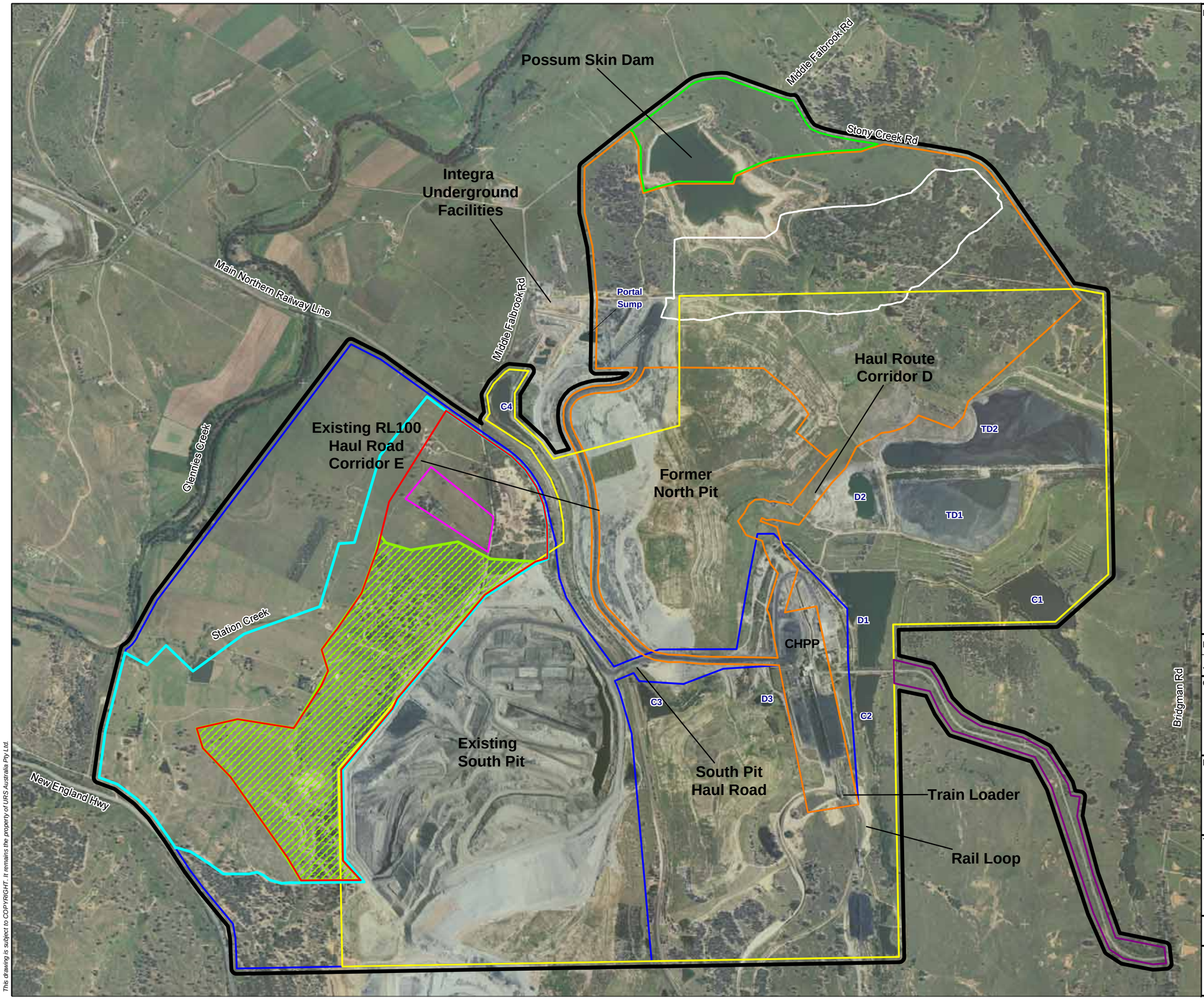
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Open Cut Project Area and Components

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Legend:

- Open Cut Project Area
- Additional Area to North
- DA 86/2889 Area
- Existing Access Road Corridor
- North Open Cut Project Site
- Open Cut Extension Area
- North Open Cut Mine Area
- Mine Area : Full Pit Extent
- Mine Area : Part Pit Extent
- Open Cut Area
- Dulwich Property

Note: Project Area
Boundary Offset for Clarity

N

0 250 500
metres

Source: Integra Coal

Drawn: AO	Approved: WB	Date: 16/02/2009
Job No: **43177507**	File: 43177507-050.wor	

Client

INTEGRA COAL OPERATIONS PTY LTD

Project

INTEGRA OPEN CUT PROJECT

Title

OPEN CUT PROJECT AREA AND COMPONENTS

Figure: 1.2

URS

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Proposed Project Development Schedule

Project Component	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Extension (Full Pit)[1]								
Extension (Part Pit)[1]								
NOC								
Existing IOC (South Pit)								
CHPP								
Rail Loadout Facility								

Note 1: Part Pit is the contingency scenario should the Dulwich property not be acquired.

Year[1]	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32+
Middle Liddell LW[2] 8 - 17																									
Hebden UG[3]																									
Barrett UG																									
South Pit Open Cut																									
North Pit Open Cut																									
Open Cut Extension to South Pit																									
CHPP/Product Despatch and Reject Management - UG Coal																									
CHPP/Product Despatch and Reject Management - Open cut Coal																									
Integrated Water Management																									

1 - Years 2008 - 2031

2 - Middle Liddell Longwall

3 - Underground

Legend:

- Longwall mining only
- Drift construction
- Longwall mining and intermittent first workings
- Open cut mining
- Open cut mine closure including final rehabilitation
- Underground mine closure including final rehabilitation
- CHPP/Product Despatch and Reject Management
- Integrated Water Management

Drawn: AO	Approved: WB	Date: 17/06/2009
Job No: **43177507**	File: 43177507.106.wor	

Client

INTEGRA COAL OPERATIONS PTY LTD

Project

INTEGRA OPEN CUT PROJECT

Title

INTEGRA OPEN CUT AND UNDERGROUND ACTIVITIES AND INTEGRATION SCHEDULE

Figure: **2.1**

URS

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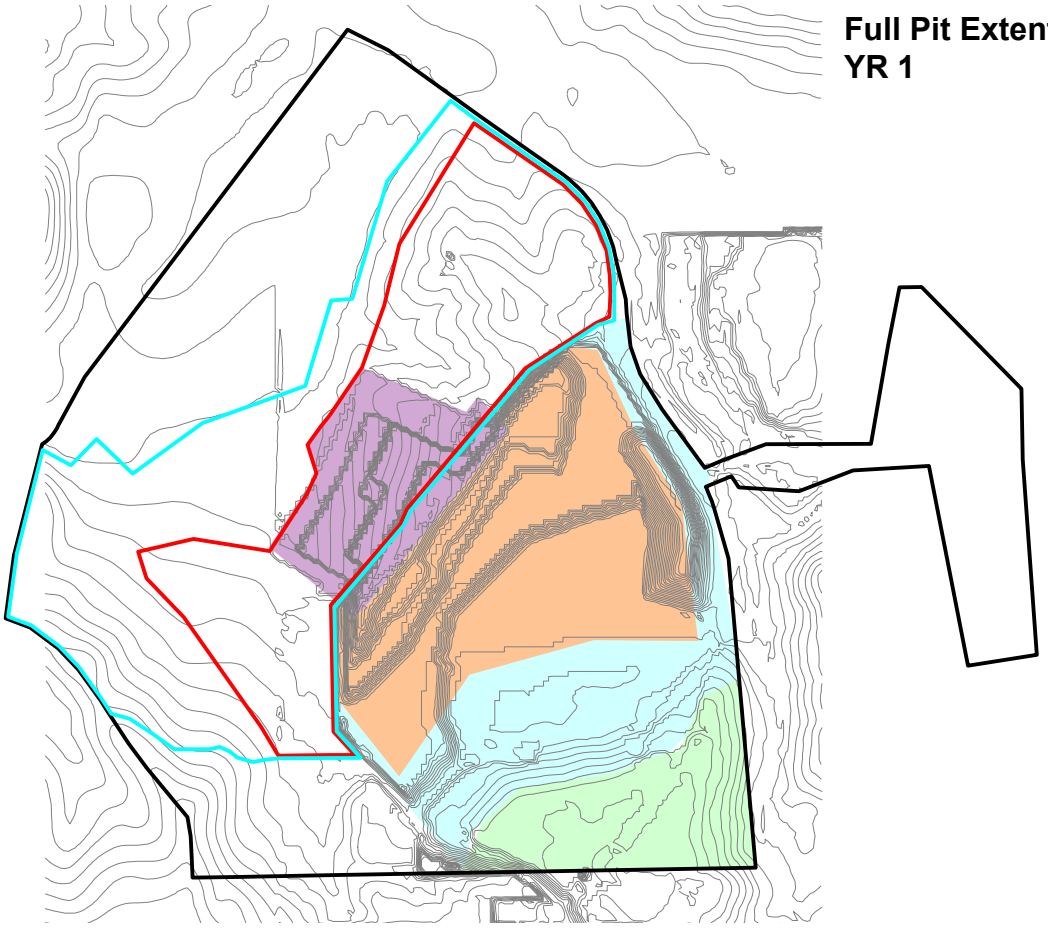
Conceptual Mine Plans

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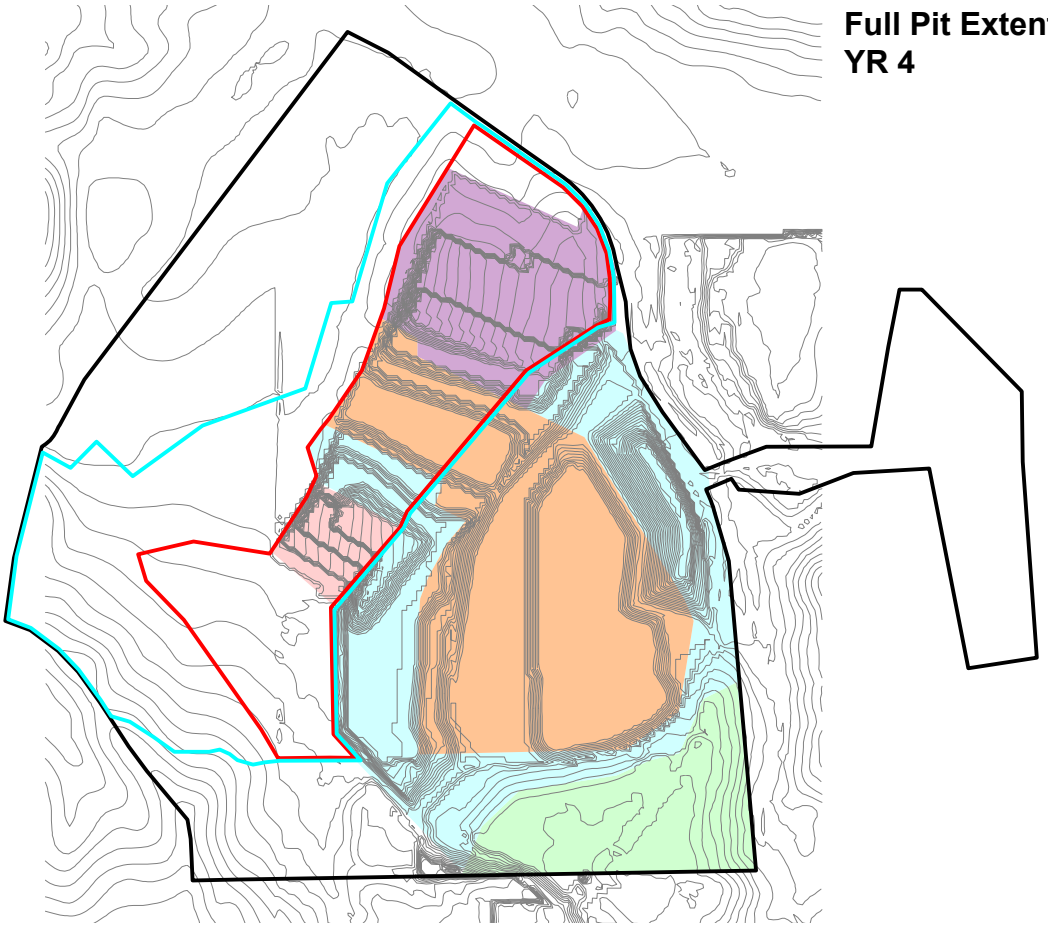
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LEGEND

- Extension Area Boundary
- Pit
- Open Cut Area
- Active Mining Area
- Active Overburden Placement Area
- Exposed Overburden
- Exposed Mining Area
- Rehabilitation Area
- Contour Spacing (5m)



Full Pit Extent YR 1



Full Pit Extent YR 4

N

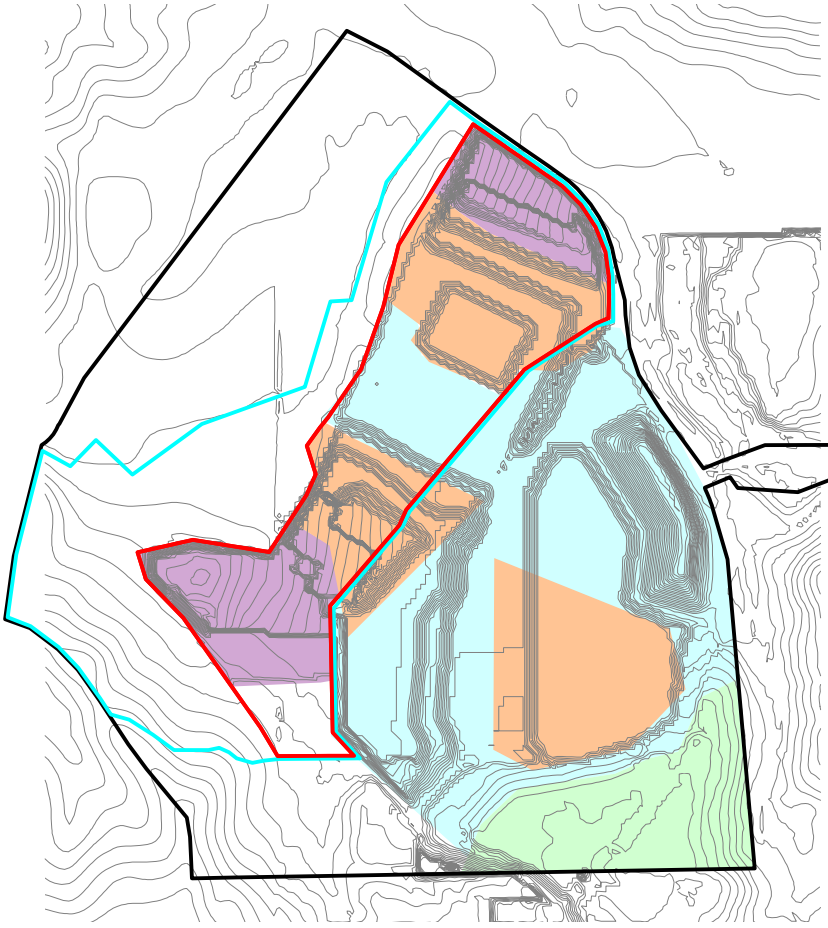
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Client: INTEGRA COAL OPERATIONS PTY LTD	Project: INTEGRA OPEN CUT PROJECT	Title: **CONCEPTUAL MINE PLAN FULL PIT EXTENT**
URS	Drawn: BH | Approved: WB | Date: 06/11/2008 Job No: **43177507** | File No: 43177507.048.WOR	Figure: 1

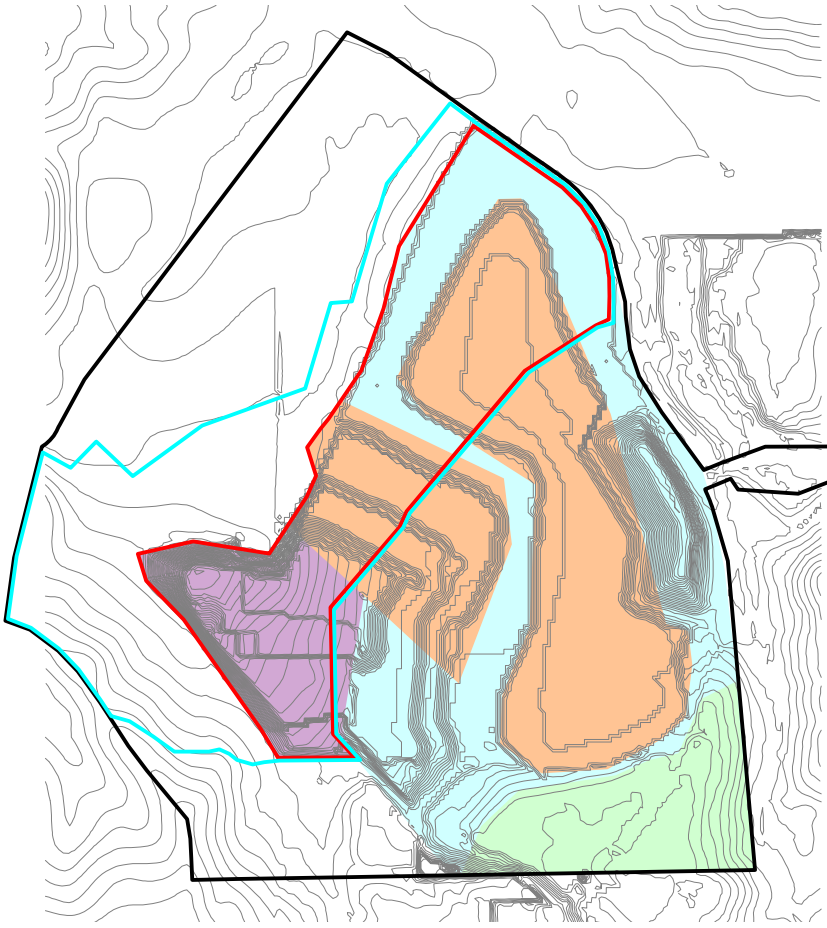
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LEGEND

- Extension Area Boundary
- Pit
- Open Cut Area
- Active Mining Area
- Active Overburden Placement Area
- Exposed Overburden
- Rehabilitation Area
- Contour Spacing (5m)



Full Pit Extent YR 6



Full Pit Extent YR 8

N

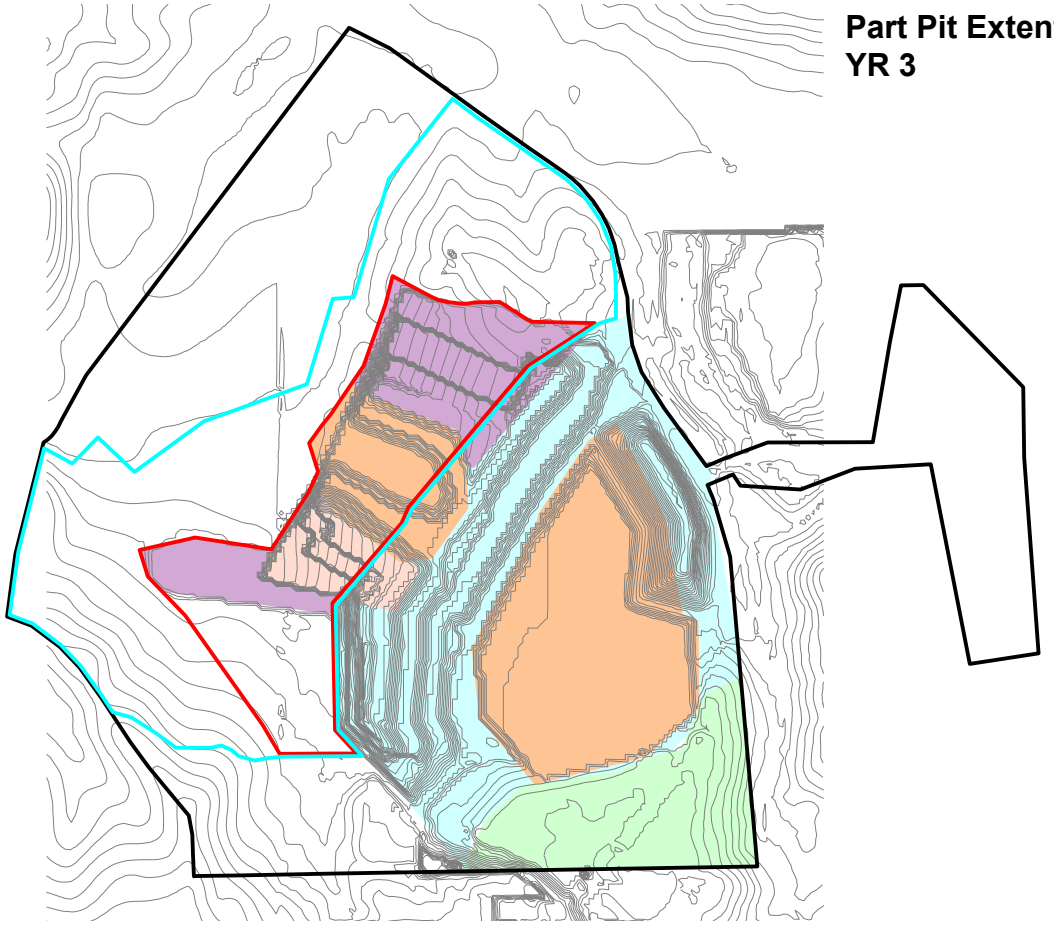
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Client	Project	Title
INTEGRA COAL OPERATIONS PTY LTD	INTEGRA OPEN CUT PROJECT	**CONCEPTUAL MINE PLAN FULL PIT EXTENT**
URS	Drawn: BH · Approved: WB · Date: 06/11/2008 · Job No: **43177507** · File No: 43177507.048.WOR	Figure: 2

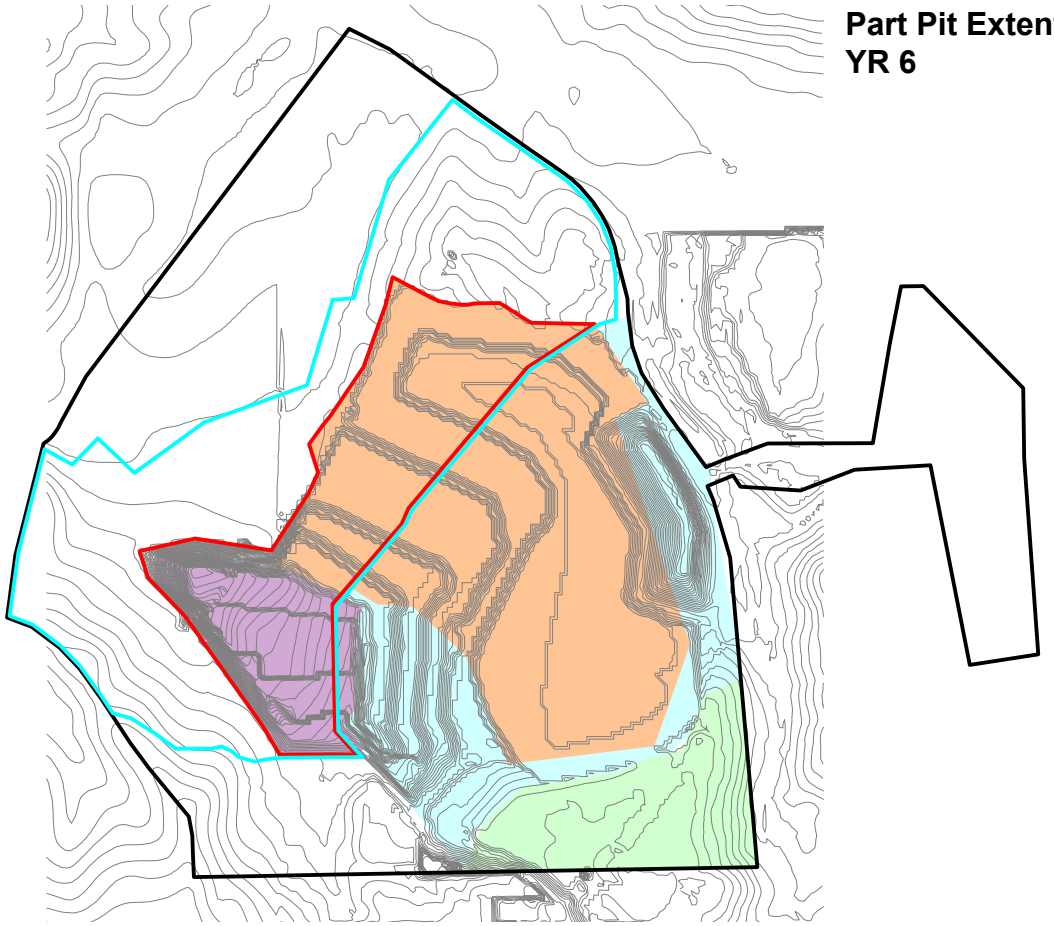
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LEGEND

- Extension Area Boundary
- Pit
- Open Cut Area
- Active Mining Area
- Active Overburden Placement Area
- Exposed Overburden
- Exposed Mining Area
- Rehabilitation Area
- Contour Spacing (5m)



Part Pit Extent YR 3



Part Pit Extent YR 6

N

0 400 800

meters

Client: INTEGRA COAL OPERATIONS PTY LTD	Project: INTEGRA OPEN CUT PROJECT	Title: **CONCEPTUAL MINE PLAN PART PIT EXTENT**
URS	Drawn: BH | Approved: WB | Date: 06/11/2008 Job No: **43177507** | File No: 43177507.048.WOR	Figure: 3

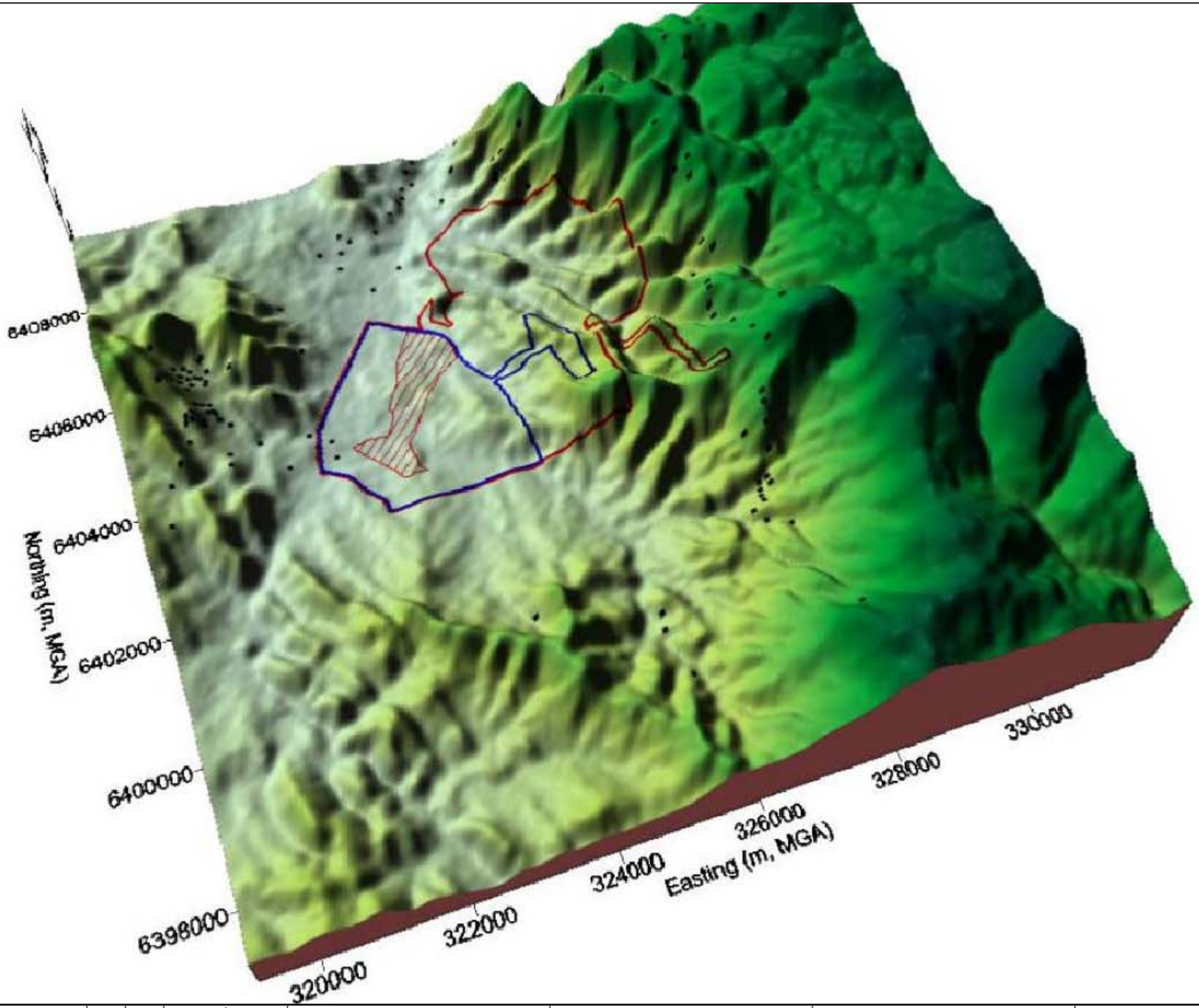
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Project Site Surrounds - Topographic Setting

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75 mm ON ORIGINAL

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	12/12/08		YL	MB

0 1042 2084

Scale = 1:104198

Heggies Pty Ltd
2 Lincoln Street
Lane Cove NSW 2066 Australia
PO Box 176 Lane Cove NSW 1595
Email address sydney@heggies.com.au
Telephone 02 9427 8100 Facsimile 02 9427 8200

10-5202 Integra Open Cut Project
Topographic Setting

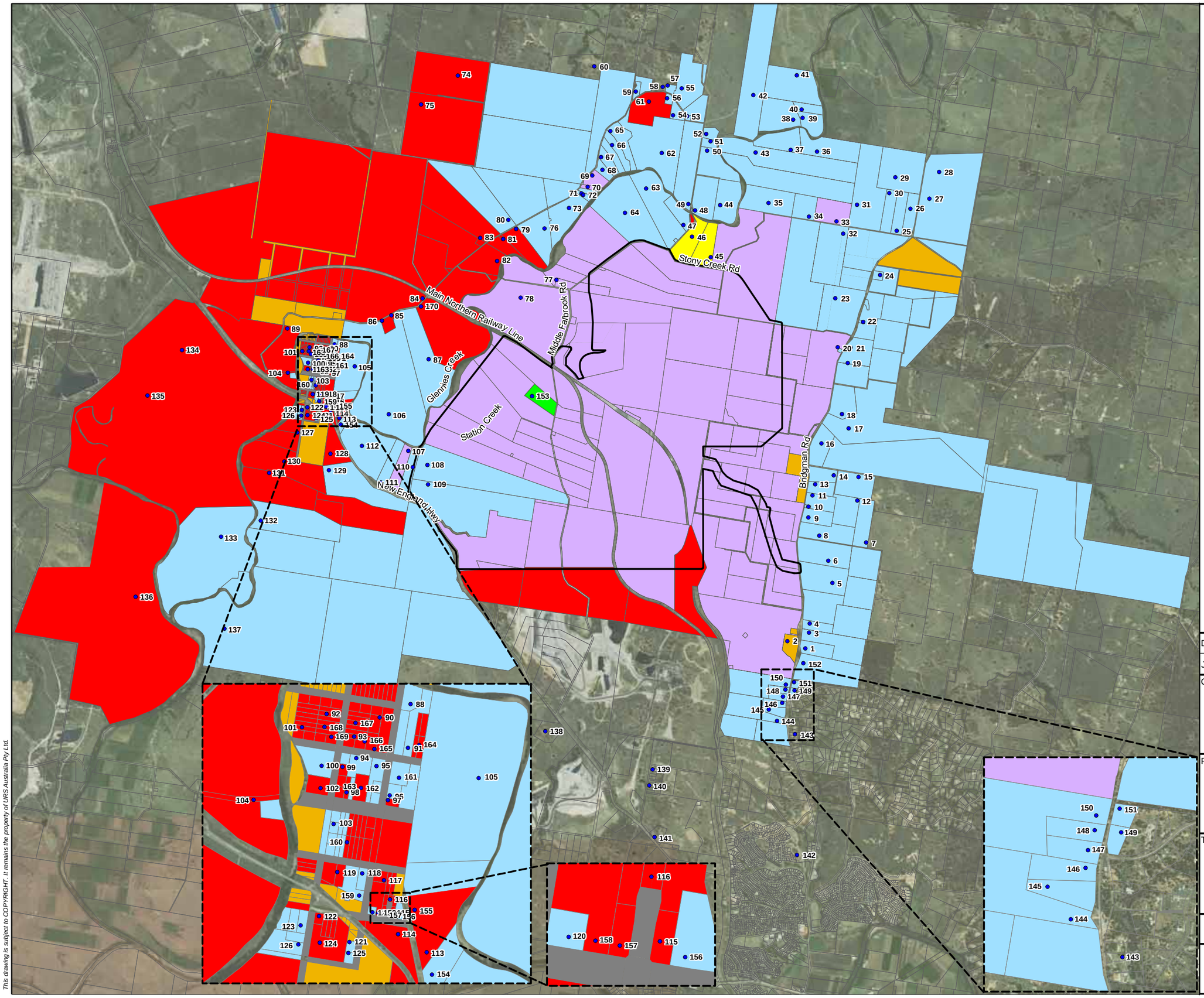
FILE NAME	DRAWING No.	REVISION
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Land Ownership Plan

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Legend:

- Receptor Location

Land Ownership:

- Crown Land and Singleton Council
- Dulwich
- Freehold Land
- Mine Owned Land
- Project Related Land
- Under Purchase by Integra

- Open Cut Project Area

N

0 1 2
kilometres

Source: URS/Heggies Pty Ltd

Drawn: AO	Approved: RO	Date: 24/02/2009
Job No: **43177507**	File: 43177507.094.wor	

Client

INTEGRA COAL OPERATIONS PTY LTD

Project

INTEGRA OPEN CUT PROJECT

Title

LAND OWNERSHIP PLAN

URS

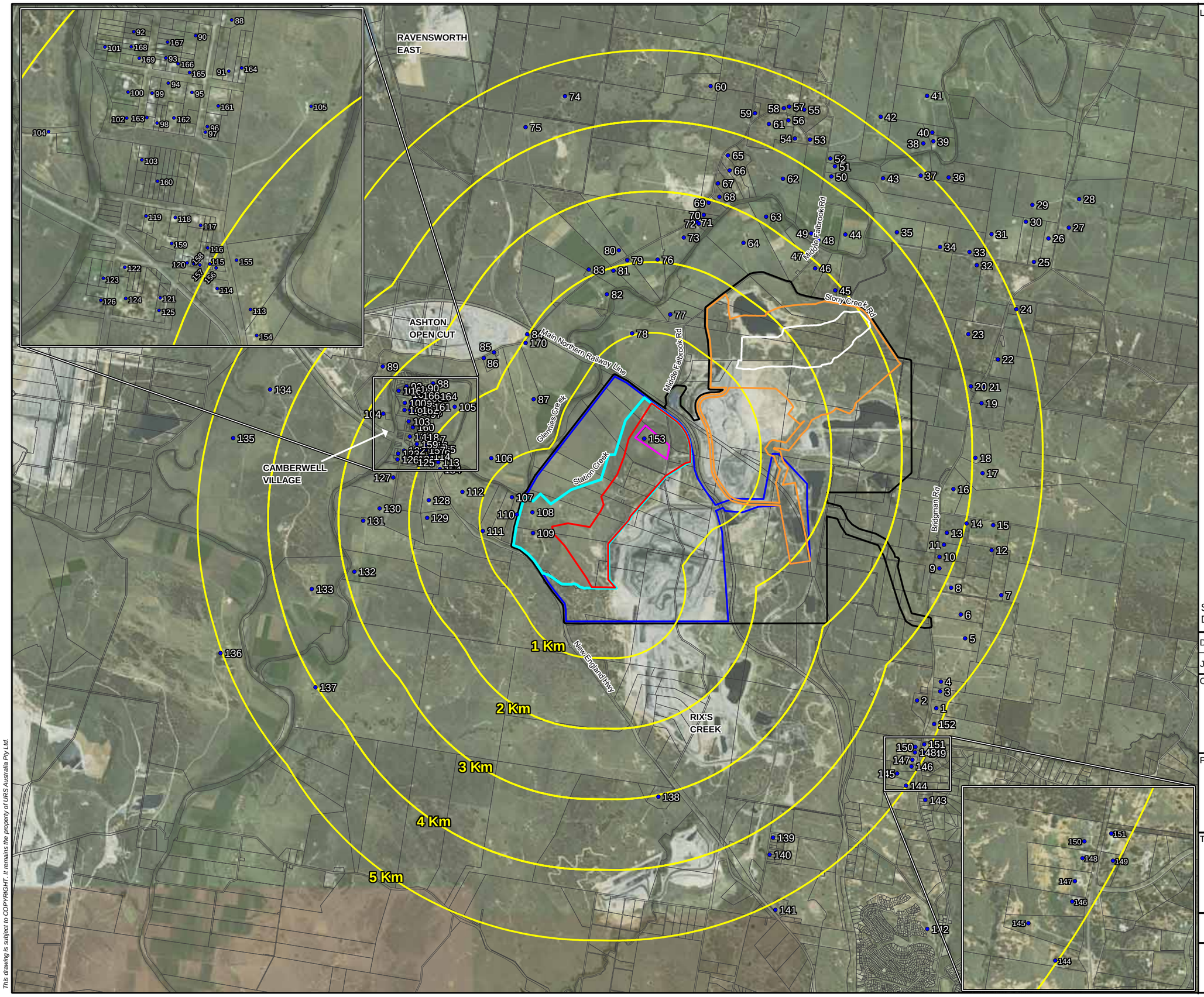
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Receptor Location Plan

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Legend:

- Receptor Location
- Open Cut Project Area
- Open Cut Extension Area
- Mine Area : Full Pit Extent
- Open Cut Area
- Dulwich Property
- North Open Cut Project Site Boundary
- North Open Cut Mine Area

N

0 1 2
kilometres

Source: URS, Integra Coal, Google Earth Pro 2008
Datum: GDA94, Projection: UTM, Grid: MGA Zone 56

Drawn: AO	Approved: WB	Date: 24/02/2009
Job No: **43177507**	File: 43177507.036.wor	

Client

INTEGRA COAL OPERATIONS PTY LTD

Project

INTEGRA OPEN CUT PROJECT

Title

RECEPTOR LOCATION PLAN

URS

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Vacant Land Listing

Noise Assessment Group[1]	Land Reference (Refer Appendix C4)	Landowner's Name[2]
1	403	Glendell Tenements Pty Limited
	404	Glendell Tenements Pty Limited
	405	Glendell Tenements Pty Limited
	406	Glendell Tenements Pty Limited
	407	Glendell Tenements Pty Limited
2	408	Glendell Tenements Pty Limited
	411	Glendell Tenements Pty Limited
	412	Glendell Tenements Pty Limited
4	204	Ashton Coal Mines Limited
	208	Ashton Coal Mines Limited
	244	Ashton Coal Mines Limited
	245	Ashton Coal Mines Limited
	289	Crown
	372	Freehold
5	201	Ashton Coal Mines Limited
	202	Ashton Coal Mines Limited
	203	Ashton Coal Mines Limited
	252	Ashton Coal Mines Limited
	257	Ashton Coal Mines Limited
	259	Ashton Coal Mines Limited
	262	Ashton Coal Mines Limited
	287	Crown
	288	Crown
	343	Mark Andrew Beasley & Michele Kathleen Beasley
	351	Scott Hamilton Andrews
	352	Scott Hamilton Andrews
	395	Robert John Bailey & Cindy Narelle Bailey
	396	Ian John Poulton & Julie-Anee Poulton
6	397	Alistair Stuart Bowman
	401	WH Bowman , MH Bowman, WG Bowman & GR Elder
9	268	Crown
	356	Alistair Stuart Bowman & Elizabeth Stuart Bowman
	432	Telstra Corporation Limited
10	355	Alistair Stuart Bowman & Elizabeth Stuart Bowman
11	267	Crown
	348	Scott Hamilton Andrews
	354	Freehold
12	360	Leonard Cox & Wilma Dorren Cox
	361	Errol Thomas Foster & Dianne Gayle Foster
	362	Freehold
	363	Alan Charles Noble

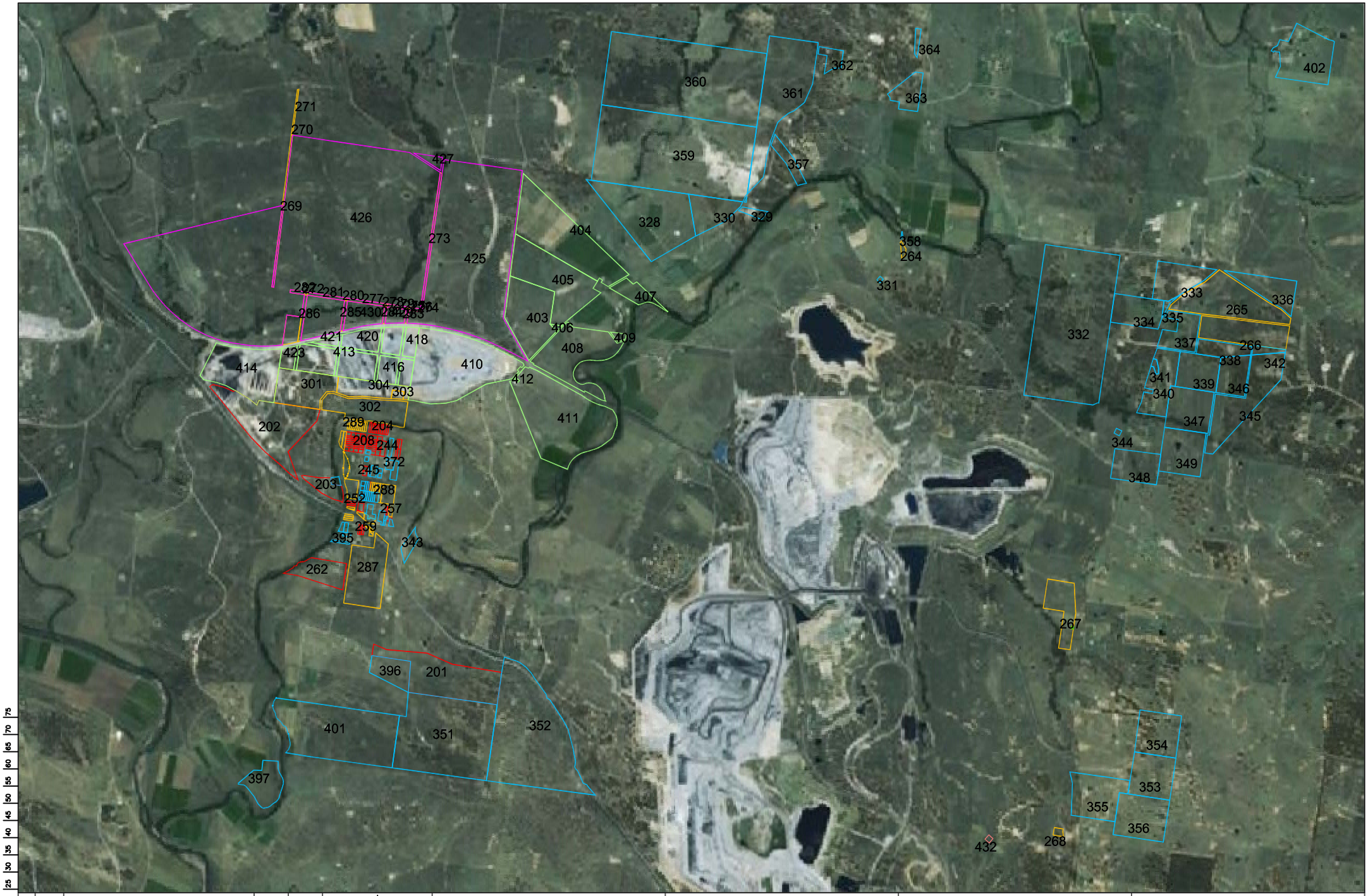
Vacant Land Listing

Noise Assessment Group[1]	Land Reference (Refer Appendix C4)	Landowner's Name[2]
12	364	Willian Edwin Gardner & Anne Mary Gardner
A	265	Crown
	266	Crown
	332	Michael Colin Langdon
	333	Kennet Patrick Roots & Mary Louise Roots
	334	Graham Jame Nightingale & Carol Ann Nightingale
	335	Freehold
	336	Gary David Hamilton & Marion Lee Gersbach
	337	Desmond Charles Paul & Denise Catherine Paul
	338	Richard Ian Robinson & Lyndal Maree Robinson
	339	Scott Hamilton Andrews
	340	Scott Hamilton Andrews
	341	Scott Hamilton Andrews
	342	Richard Ian Robinson & Lyndal Maree Robinson
	344	Andrew Garvie
	345	Clarence John Hastings & Leslie Jill Hastings
	346	Clarence John Hastings & Leslie Jill Hastings
	402	Errol David Upward & Jennifer Upward
C	264	Crown
	331	Garnham, Cheethem, Upward, Donehue
D	358	Leonard Cox
F	328	Alan Charles Noble
	329	Alan Charles Noble
	330	Alan Charles Noble
	357	Leonard Cox
	359	Leonard Cox
G	409	Glendell Tenements PTY Limited

Vacant Land Plan

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REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	24/09/09		YL	PB

0 366 732
Scale = 1:36591

Heggies Pty Ltd
2 Lincoln Street
Lane Cove NSW 2066 Australia
PO Box 176 Lane Cove NSW 1595
Email address sydney@heggies.com.au
Telephone 02 9427 8100 Facsimile 02 9427 8200

10-5202 Integra Open Cut Project
Vacant Land Plan

FILE NAME	DRAWING No.	REVISION
Vacant Land.dwg	10-5202 Vacant Land Plan	0

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1 Existing Acoustical Environment Measurement Methodology

1.1 Overview of Methodology

Ambient noise surveys to characterise and quantify the existing acoustical environment in the area surrounding the NOC were conducted in March 2005. Eight unattended noise loggers were positioned at selected representative residences for a period of 20 days commencing Wednesday 9 March 2005.

Ambient noise surveys to characterise and quantify the existing acoustical environment in the area surrounding the entire Open Cut Project Area were conducted in August 2007 to supplement the March 2007 surveys. Twelve unattended noise loggers were positioned at selected representative residences for a period of 10 days commencing Monday 6 August 2007.

The March 2005 survey data from two locations, representative of Noise Assessment Group (NAG) E and NAG H, have been superseded and replaced by the August 2007 survey data representative of NAG 12 and NAG 1, respectively.

In order to supplement the unattended noise logger measurements and to assist in identifying the character and duration of ambient noise sources, operator-attended daytime, evening and night time surveys were also conducted at all twelve logging locations.

The location of each ambient noise monitoring site is presented in **Appendix D2**. The objective of the monitoring programmes was to establish the various background noise levels in the area typically within 5 km of the Project Area.

The ambient noise monitoring programme was implemented in accordance with AS 1055-1989, "*Acoustics-Description and Measurement of Environmental Noise*" and the NSW Industrial Noise Policy (INP) 2000.

Noise Assessment Groups

Each residence with a similar noise environment, based on their proximity or exposure to mines, road and rail traffic, fauna, waterways, vegetation and topography, has been grouped for noise assessment purposes into one of eighteen Noise Assessment Groups. Each noise monitoring location was chosen to be representative of the ambient noise levels in the vicinity of each Noise Assessment Group.

The locality plan attached as **Appendix D3** identifies the non-mine owned residences and vacant land in each Noise Assessment Group (also as noted in **Table 5** for non-mine owned residences).

1.2 Instrumentation and Measurement Parameters

Unattended Monitoring and Operator-Attended Surveys

All acoustic instrumentation employed throughout the noise monitoring programme has been designed to comply with the requirements of AS 1259.2-1990, "*Sound Level Meters*" and carries current NATA or manufacturer calibration certificates.

A description of instrumentation, designated type and serial numbers is shown in **Table 1**, **Table 2** and **Table 3**.

All instrumentation was programmed to record continuously the noise exceedance levels in 15 minute intervals including the L_{Amax}, L_{A1}, L_{A5}, L_{A10}, L_{A50}, L_{A90}, L_{A95}, L_{A99}, L_{Amin} and the L_{Aeq}.

Instrument calibration was conducted before and after each measurement survey, with the variation in calibrated levels not exceeding ±0.5dBA.

Table 1 Unattended Monitoring Instrumentation and Location - March 2005

Noise Assessment Group	Residence Reference	Land Owner	Instrumentation	Class
A	31	D Kacunic & C Jensen	ARL EL215 194643	Type 2
B	45	B&L Evans	ARL EL316 16-203-526	Type 1
C	64	W&A Gardner	ARL EL215 194625	Type 2
D	48	G&K Cheetham	ARL EL316 16-203-509	Type 1
F	73	A Noble	ARL EL215 194528	Type 2
G	82	Glendell Tenements Pty Ltd	ARL EL215 194662	Type 2

Table 2 Unattended Monitoring Instrumentation and Location - August 2007

Noise Assessment Group	Residence Reference	Land Owner	Instrumentation	Class
1	80	Greg Donullan	ARL EL215 194627	Type 2
2	84	Glendell Tenements Pty Ltd	ARL EL215 194630	Type 2
3	87	B & R Richards	ARL EL316 16-203-529	Type 1
4	95	Tracey Clarke	ARL EL316 16-203-508	Type 1
5	114	Ashton Mine	ARL EL215 194592	Type 2
6	131	Ashton Mine	ARL EL215 193410	Type 2
7	110	Greg Hall	ARL EL316 16-004-033	Type 1
8	142	Singleton Heights	ARL EL316 16-306-038	Type 1
9	143	Glen Pitt	ARL EL316 16-301-472	Type 1
10	8	Dwight Geelan	ARL EL316 16-306-044	Type 1
11	16	Alan Lambkin	ARL EL215 194591	Type 2
12	54	Gillian Holmes	ARL EL316 16-301-471	Type 1

Table 3 Attended Monitoring Instrumentation

Instrumentation	Class
B&K 2260i Observer SLM 2414505	Type 1
B&K 2260 Sound Intensity SLM 2335702	Type 1

Weather Monitoring Station

Meteorological data was obtained from the permanent automatic weather station located at the Project site.

1.3 Unattended Ambient Noise Monitoring Results

The unattended ambient noise data from each location, together with the weather conditions are presented graphically on a daily basis in **Appendices D4** to **D20**.

The statistical noise exceedance levels (L_{AN}) are the levels exceeded for N% of the interval period. The L_{A90} represents the level exceeded for 90% of the interval period and is referred to as the average minimum or background noise level. The L_{A10} is the level exceeded for 10% of the time and is usually referred to as the average maximum noise level. The L_{Aeq} is the equivalent continuous sound pressure level and represents the steady sound level which is equal in energy to the fluctuating level over the interval period.

Prior to further analysis, the ambient noise data from each location which correlated with periods of unstable weather (eg rainfall greater than 0.5 mm or wind speed greater than 5m/s) were discarded. The acceptable ambient noise data was then processed in accordance with the NSW INP (2000) "*Appendix B - Applying the Background Noise Policy*" to derive the Monday to Sunday ambient noise levels presented in **Table 4** and **Table 5**.

Table 4 Unattended Ambient Noise Environment March 2005 (dBA re 20 µPa)[3]

Noise Assessment Group	Rating Background Level All Noise Sources[1,2]			LAeq(period) All Noise Sources			Estimated LAeq(period) Industrial Noise Amenity[4]		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
A	31	34	31	53	52	46	<44	<39	<34
B	30	32	30	48	47	42	<44	<39	<34
C	38	40	41	53	53	46	<44	<39	40
D	32	36	32	54	57	43	<44	<39	<34
F	34	35	35	55	49	43	<44	<39	34
G	33	39	35	47	64	48	<44	<39	<34

Note 1: Measured noise levels less than 31 dBA may have a signal to noise ratio less than 5 dB(A).
Note 2: In accordance with the NSW INP (2000), if the RBL is below 30 dBA, then 30 dBA shall be the assumed RBL.
Note 3: Daytime 7:00 am to 6:00 pm, Evening 6:00 pm to 10:00 pm and Night-time 10:00 pm to 7:00 am.
Note 4: LAeq(period) Industrial Noise levels estimated from attended noise survey results presented in **Table 3** to **Table 5**.

Table 5 Unattended Ambient Noise Environment August 2007 (dBA re 20 µPa)[3]

Noise Assessment Group	Rating Background Level All Noise Sources[1,2]			LAeq(period) All Noise Sources			Estimated LAeq(period) Industrial Noise Amenity[4]		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
1	30	33	34	50	45	45	<44	<39	37
2	31	34	34	63	62	62	<44	<39	37
3	33	35	35	56	45	48	<44	<39	43
4	34	43	32	49	49	47	<44	44	42
5	45	41	37	60	56	56	<44	<40	42
6	34	36	33	51	44	43	<44	<39	38
7	40	37	34	64	44	44	<44	<39	37
8	37	37	30	49	44	50	<44	<39	<34
9	32	36	34	54	54	51	<44	<39	38
10	31	36	32	46	44	44	<44	<39	36
11	33	38	35	51	49	48	<44	<39	36
12	30	34	30	44	46	46	<44	<39	35

Note 1: Measured noise levels less than 31 dBA may have a signal to noise ratio less than 5dBA.
Note 2: In accordance with the NSW INP (2000), if the RBL is below 30 dBA, then 30 dBA shall be the assumed RBL.
Note 3: Daytime 7:00 am to 6:00 pm, Evening 6:00 pm to 10:00 pm and Night-time 10:00 pm to 7:00 am.
Note 4: LAeq(period) Industrial Noise levels estimated from attended noise survey results presented in **Table 3** to **Table 5**.

1.4 Operator-Attended Ambient Noise Survey Results

Operator-attended noise surveys of 15 minutes duration were conducted with a precision integrating sound level meter in order to qualify the results obtained with the unattended noise loggers. During attended noise surveys, the operator identified the character and duration of acoustically significant ambient noise sources. Wherever possible the operator quantified local traffic flow and made a qualitative assessment of the prevailing weather conditions.

The results of the Daytime, Evening and Night operator attended surveys are presented in **Table 6** to **Table 11** respectively, together with a description of the noise levels and weather conditions.

Table 6 Daytime Operator-Attended Noise Survey Results - March 2005

Noise Assessment Group (NAG) Start Time Conditions	Measurement Description	Primary Noise Descriptor (dB(A) re 20µPa)					Description of Noise Emission and Typical Maximum Levels (L_{Amax})
		L_{Aeq}	L_{A1}	L_{A10}	L_{A50}	L_{A90}	
NAG A 10/3/05, 1228hrs 4Octa 2-3m/s E 26˚C, 48% RH	Ambient	47	58	50	41	34	Birds 40-58 Wind in trees 45-49 Flies 48-55 Aeroplane 55-60
	Mines	Not Discernible					
NAG A 29/3/05, 1403hrs 8Octa 1-3m/s E 23˚C, 42% RH	Ambient	63	69	49	39	36	Local traffic 74-91 Distant traffic 20-25 Aeroplane 45-58 Insects 25-35 Birds 30-45 Wind in trees 35-38
	Mines	Not Discernible					
NAG B 29/3/05, 1431hrs 8Octa 1-4m/s E 20˚C, 55% RH	Ambient	68	81	60	43	37	Local traffic 72-91 Distant traffic 40-57 Birds 30-58 Wind in trees 36-42
	Mines	Not Discernible					
NAG B 10/3/05, 1252hrs 2Octa 3-4m/s E 24˚C, 51% RH	Ambient	61	76	57	43	36	Local traffic 55-80 Birds 48-46 Flagpole 41
	Mines	Not Discernible					
NAG C 29/3/05, 1453hrs 8Octa 2-4m/s SE 20˚C, 57% RH	Ambient	64	76	51	40	36	Local traffic 73-92 Birds 40-58 Reversing alarm 20-25
	Mines	LAeq <30dB(A)					
NAG D 29/3/05, 1521hrs 8Octa Calm-2m/s SE 22˚C, 57% RH	Ambient	56	71	48	39	35	Local traffic 74-79 Tractor 23-28 Insects 15-30 Birds 25-43 Cows 47-54
	Mines	Not Discernible					
NAG D 10/3/05, 1337hrs 2Octa 3-4m/s E 26˚C, 46% RH	Ambient	59	72	60	52	47	Council workers 50-75 Insect 46-49
	Mines	Not Discernible					
NAG F 29/3/05, 1608hrs 8Octa 1-3m/s SE 20˚C, 61% RH	Ambient	57	63	45	39	37	Local traffic 86 Aeroplane 35-39 Birds 37-45
	Mines	Not Discernible					

Noise Assessment Group (NAG) Start Time Conditions	Measurement Description	Primary Noise Descriptor (dB(A) re 20µPa)					Description of Noise Emission and Typical Maximum Levels (L_{Amax})
		L_{Aeq}	L_{A1}	L_{A10}	L_{A50}	L_{A90}	
NAG F 10/3/05, 1424hrs 2Octa >5m/s NE 52˚C, 25% RH	Ambient	48	55	50	46	42	Birds 42-46 Wind in trees 65
	Mines	Not Discernible					
NAG G 29/3/05, 1628hrs 8Octa 1-2m/s SE 19˚C, 63% RH	Ambient	46	54	49	45	42	Tractor 30-43 Aeroplane 39-46 Insects 39-47
	Mines	Not Discernible					
NAG G 10/3/05, 1318hrs 4Octa 4m/s NE 27˚C, 45% RH	Ambient	40	48	43	37	33	Distant traffic 47-50 Cows 40-45 Insect 40-45
	Mines	Not Discernible					
NAG G 10/3/05, 1442hrs 4Octa 4-5m/s NE 25˚C, 48% RH	Ambient	43	50	47	41	37	Insects 36-38 Wind in trees 55
	Mines	Not Discernible					

Table 7 Daytime Operator-Attended Noise Survey Results - August 2007

Noise Assessment Group (NAG) Start Time Conditions	Measurement Description	Primary Noise Descriptor (dBA re 20Pa)					Description of Noise Emission and Typical Maximum Levels (LAmax)
		LAeq	LA1	LA10	LA50	LA90	
NAG 1 7/8/07 0906 hrs 0 Okta Calm 15˚C, 61% RH Stability Class E	Ambient	43	53	45	38	35	Birds 30-41 Train 44-46 horn 64-58 Cows 33-39 Mine hum 35-39 ((blast 7 dBA 85dBL peak @ 0916) + dozer + haul truck whine) Domestic activity 53-61 Plane 30-51 Traffic 44-49
	Mine	LAeq 37					
NAG 2 7/8/07 1107 hrs 0 Okta 19˚C, 36.8% RH Stability Class D	Ambient	60	74	53	40	38	Traffic (cars) 74-79 Traffic (trucks) 82-83 Pump 38 Highrail 62
	Mines	Not discernable					
NAG 3 7/8/07 1135 hrs 0 Okta Calm - 3m/s E 15˚C, 40% RH Stability Class E	Ambient	51	63	43	37	32	Ashton Dozer 22-28 Trucks 28-34 Plane 40-48 Birds 36-56 Traffic (Trucks) 35-43 (compression brake) Dogs 71-77
	Mines	LAeq 30					

BACKGROUND NOISE MONITORING METHODOLOGY

Noise Assessment Group (NAG) Start Time Conditions	Measurement Description	Primary Noise Descriptor (dBA re 20Pa)					Description of Noise Emission and Typical Maximum Levels (LAmax)
		LAeq	LA1	LA10	LA50	LA90	
NAG 3 15/8/07 1529 hrs 2 Okta 2m/s SW 18˚C, 47% RH Stability Class D	Ambient	44	54	47	40	38	Mine 32-36 Birds 43-52 Train 37-42 Distant Traffic 33-40 Distant Traffic (truck) 45-47 Haul truck 33-42 Plane 33-35 Dozer 25-34
	Mines	LAeq 41					
NAG 4 7/8/07 1220 hrs 0 Okta Calm - 3m/s W to N 16.6˚C, 39% RH Stability Class D-E	Ambient	48	54	50	46	44	Forkfift (neighbour) 43-52 Train horn 36 dozer 42-57 Haul truck (dumping) 40-50 Highway 30-48 Birds 30-55 Vehicles 50
	Mines	LAeq 44					
NAG 5 7/8/07 1258 hrs 0 Okta Calm 18.3˚C, 31.7% RH Stability Class E	Ambient	56	64	60	53	47	Highway 55-64 @120m Hauk truck 36-39 Birds 37-53 Passing traffic 61
	Mines	LAeq 30					
NAG 6 7/8/07 1323 hrs 0 Okta 1-3 m/s NW 17.4˚C, 38.1% RH Stability Class E-F	Ambient	40	50	41	37	33	Resident 45-55 Highway 31-37 Birds 35-62 Truck whine 25-30
	Mines	LAeq 22					
NAG 7 7/8/07 1401 hrs 0 Okta Calm - 3 m/s NW 18.6˚C, 34% RH Stability Class D	Ambient	45	53	47	43	39	Highway 40-50 Train horn 27 Birds 30-60 Plane 36-40
	Mines	LAeq <29					
NAG 7 15/8/07 1631 hrs 1 Okta 3m/s W 17˚C, 55% RH Stability Class D	Ambient	50	56	52	48	46	Traffic(HWY) 32-58 Wind 28-44 Birds 54 Train 45 Hammering neighbour 48-52 Haul Truck 30-50 Dozer 35-38 Reverse alarm 45-47
	Mines	LAeq 37					
NAG 8 15/8/07 1321 hrs 3 Okta Calm - 1m/s SE 20˚C, 44% RH Stability Class F	Ambient	42	53	43	40	38	Birds 25-30 Domestic Activity 38-44 Local Traffic 41-50 Radio 25-30 Construction Activity 25-45 Hammering 50-53
	Mine	LAeq <28					

Noise Assessment Group (NAG) Start Time Conditions	Measurement Description	Primary Noise Descriptor (dBA re 20Pa)					Description of Noise Emission and Typical Maximum Levels (LAmax)
		LAeq	LA1	LA10	LA50	LA90	
NAG 9 6/8/07 1448 hrs 0 Okta 1 m/s W-NW 20°C, 28% RH Stability Class D	Ambient	55	65	59	47	38	Birds 45-72 Train horn 37 Train <30 Traffic (North + South) (cars) 56-65 Traffic (North + South) (trucks) 68
	Mine	LAeq <30					
NAG 10 6/8/07 1521 hrs 0 Okta 1-3 m/s W 18.2°C, 29.8% RH Stability Class D	Ambient	52	63	55	44	37	Traffic 44-53 Aeroplane 39 Dog (@ 20m) 59-64
	Mines	Not Discernible					
NAG 10 15/8/07 1407 hrs 3 Okta 1 m/s - 2 m/s E 19°C, 42% RH Stability Class D	Ambient	49	61	50	37	32	Plane 28-36 Ute 62 Drilling 31-54 Birds 25-52 Dog 41-58 Distant Traffic 21 Cement Truck 48 Local Traffic (cars) 32-34 Local traffic (truck) 37
	Mines	LAeq <22					
NAG 11 6/8/07 1600 hrs 0 Okta 1-2 m/s W and changed to 1-2m/s N 18°C, 31.1% RH Stability Class D	Ambient	53	61	57	47	36	Traffic (cars) 56-62 Traffic (trucks) 62 Birds 69 Resident vehicles 59 Mine hum (west) 25 Horn 26 Truck exhaust 30-39
	Mines	LAeq 20					
NAG 12 7/8/07 1015 hrs 0 Okta 2 m/s SE 14.6°C, 49% RH Stability Class F	Ambient	38	48	40	32	28	Traffic 38-49 Birds 30-45 Dog 37-45 Train 25 Pump - Tank 32 Trucks 25-33
	Mines	LAeq 20					
NAG 12 15/8/07 1444 hrs 2 Okta 1-2 m/s 19°C, 43% RH ENE Stability Class F	Ambient	52	64	48	34	29	Birds 34-62 Traffic 36 Nearby traffic 68-73 Distant traffic 22-30 Distant radio 24 Wind in trees 22 Plane 48-51 Cow 32 Train horn 31-36
	Mines	LAeq <19					

Table 8 Evening Operator-Attended Noise Survey Results -March 2005

Noise Assessment Group (NAG) Start Time Conditions	Measurement Description	Primary Noise Descriptor (dB(A) re 20µPa)					Description of Noise Emission and Typical Maximum Levels (L_{Amax})
		L_{Aeq}	L_{A1}	L_{A10}	L_{A50}	L_{A90}	
NAG A 29/3/05, 2011hrs 8Octa Calm-1m/s E 17˚C, 76% RH	Ambient	36	42	39	35	32	Distant traffic 27-32 Insects 33-42
	Mines	Not Discernible					
NAG A 10/3/05, 1825hrs 2Octa 3m/s SW 24˚C, 60% RH	Ambient	61	71	51	42	39	Local traffic 70 Wind in trees 38-42
	Mines	Not Discernible					
NAG B 29/3/05, 2036hrs 8Octa Calm 17˚C, 74% RH	Ambient	58	69	45	31	29	Local traffic 79-86 Distant traffic 35-40 Birds 30-41 Insects 25-30
	Mines	LAeq <30dB(A)					Haul truck 25-29
NAG B 10/3/05, 1840hrs 4Octa 4-5m/s NE 20˚C, 64% RH	Ambient	56	67	59	50	46	Birds 36-40 Wind in trees 40-50 Dogs 60-70 Local traffic 56-60
	Mines	Not Discernible					
NAG C 29/3/05, 2057hrs 8Octa Calm 16˚C, 81% RH	Ambient	54	67	48	39	34	Aeroplane 36 Insects 36-47
	Mines	LAeq <30 dBA					Haul trucks 20-28
NAG C 10/3/05, 1856hrs 4Octa >5m/s NE 20˚C, 63% RH	Ambient	45	53	48	43	38	Cows 38 Wind in tress 40-50
	Mines	Not Discernible					
NAG D 29/3/05, 2127hrs 8Octa Calm 14˚C, 82% RH	Ambient	51	60	51	48	44	Local traffic 73 Insects 44-54
	Mines	Not Discernible					
NAG D 10/3/05, 1905hrs 4Octa >5m/s NE 20˚C, 66% RH	Ambient	63	77	64	44	40	Tractor 84
	Mines	Not Discernible					
NAG F 10/3/05, 1935hrs 5Octa >5m/s NE 19˚C, 70% RH	Ambient	64	79	56	48	42	Wind in trees 48-55 Traffic 78
	Mines	Not Discernible					
NAG G 10/3/05, 1946hrs 5Octa 4-5m/s NE 19˚C, 73% RH	Ambient	53	60	59	48	46	Trains 50-56 Insects 42-46
	Mines	Not Discernible					

Table 9 Evening Time Operator-Attended Noise Survey Results - August 2007

Noise Assessment Group (NAG) Start Time Conditions	Measurement Description	Primary Noise Descriptor (dBA re 20Pa)					Description of Noise Emission and Typical Maximum Levels (LAmax)
		LAeq	LA1	LA10	LA50	LA90	
NAG 1 7/8/07 1942 hrs 0 Okta Calm 12.8°C, 48% RH Stability Class D	Ambient	51	61	50	36	33	Insect 18 Trucks 28-33 Traffic 78 Train 50-54 Train horn 61-63 Humming 33-35 Damping 38-41 Mine trucks 35-46
	Mine	LAeq mines 36					
NAG 1 15/8/07 2117 hrs 0 Okta Calm 9°C, 86% RH Stability Class D	Ambient	38	43	39	37	35	Domestic Activity 29 Distant traffic 28-32 Mine hum 25-39 Car starting 28 Alarm 29-31 Blast 46
	Mines	LAeq 37					
NAG 2 7/8/07 2047 hrs 0 Okta Calm Stability Class D	Ambient	40	45	42	38	37	Insects 27-31 Traffic 41-44 Pump 37
	Mines	Not discernable					
NAG 3 7/8/07 2102 hrs 0 Okta Calm 9°C, 67.6% RH Stability Class D	Ambient	51	62	56	39	36	Dog 30-40 Trucks 30-45 (continuous for ½ survey) Cow 25 Traffic 30-40 Horn 35 Horn train 45-65 Distant train south 35-40 Trucks 45 Train 55-62
	Mines	LAeq 33					
NAG 4 7/8/07 2141 hrs 0 Okta Calm 8°C, 70% RH Stability Class D	Ambient	48	56	51	46	40	Trucks 55-60 (5min) Traffic 49-54 Dog 43-52 Plane 48-58 Humming 41
	Mines	LAeq 47					
NAG 4 15/8/07 2143 hrs 3 Okta Calm 11°C, 77% RH Stability Class D	Ambient	40	46	42	39	36	Mine hum 32-36 Dog 39-41 Distant Traffic 35-37 Haul Truck whine 34-40 Insects 22 Dozer tracking 39-42 Reverse alarm 21-23 Loading haul truck 43-47
	Mines	LAeq 39					
NAG 5 8/8/07 2101 hrs 0 Okta Calm 9.4°C, 61.1% RH Stability Class F	Ambient	57	67	62	48	40	Traffic (cars) 54-61 Traffic (trucks) 67-68 Mine 40-45 (continuous 39-41) Dozer 33 Dog 33-40
	Mines	LAeq 40					
NAG 6 8/8/07 2043 hrs 0 Okta Calm 9.4°C, 61.1% RH Stability Class E	Ambient	43	48	45	42	40	Traffic 45-56 Insect 15 Sheep 25
	Mines	LAeq <20					

Noise Assessment Group (NAG) Start Time Conditions	Measurement Description	Primary Noise Descriptor (dBA re 20Pa)					Description of Noise Emission and Typical Maximum Levels (LAmax)
		LAeq	LA1	LA10	LA50	LA90	
NAG 7 8/8/07 2121 hrs 0 Okta Calm 14.6°C, 41% RH Stability Class F-D	Ambient	40	45	42	39	35	Traffic 41-42 Insect 20 Cows 13 Dog barking 15-30
	Mines	LAeq <25					
NAG 8 15/8/07 1935 hrs 0 Okta Calm 13°C, 68% RH Stability Class E	Ambient	41	46	43	40	37	Dog 42-44 Insects 29-33 Distant Traffic 32-44 Domestic activity 28-38 Train 35-38
	Mine	Not discernable					
NAG 9 8/8/07 1907 hrs 0 Okta <1m/s NW 16.4°C, 37% RH Stability Class D	Ambient	66	79	66	48	41	Trucks 40-47 Traffic (cars) 77-88 Traffic (trucks) 83 Insect <20-22
	Mine	Not discernable					
NAG 10 8/8/07 1929 hrs 0 Okta Calm 13.7°C, 45% RH Stability Class D	Ambient	44	51	47	42	39	Trucks 40-44 Insect 32-40 Traffic 49-52 Dozer 34 Dog 47
	Mines	LAeq 41					
NAG 10 15/8/07 2019 hrs 0 Okta 1-2 m/s SE 12°C, 75% RH Stability Class E	Ambient	37	45	40	36	32	Insects 28-38 Distant Traffic 25-35 Mine Hum 19-32 Nearby Traffic 34-43 Pump humming on property 25 Dogs 26
	Mines	LAeq 28					
NAG 11 8/8/07 1948 hrs 0 Okta Calm 13.2°C, 47% RH Stability Class D	Ambient	47	56	48	45	42	Trucks 46-52 Mine 44-45 Traffic 54-59 Insect/frog 35-43
	Mines	LAeq 46					
NAG 12 8/8/07 2012 hrs 0 Okta Calm 16°C, 37.6% RH Stability Class F	Ambient	37	42	39	36	33	Horses 44-48 Insects 25-35 Mine 35-39 (100 Hz) Dog 33-40
	Mines	LAeq 35					
NAG 12 15/8/07 2051 hrs 0 Okta Calm - 1 m/s SE 11°C, 75% RH Stability Class E-D	Ambient	37	46	40	34	29	Insects 25-40 Plane 24-33 Horses 19-36 Distant traffic 14-16 Mine truck 23-26 Dozer 25 Cow 28
	Mines	LAeq 26					

Table 10 Night-time Operator-Attended Noise Survey Results - March 2005

Noise Assessment Group (NAG) Start Time Conditions	Measurement Description	Primary Noise Descriptor (dB(A) re 20µPa)					Description of Noise Emission and Typical Maximum Levels (L_{Amax})
		L_{Aeq}	L_{A1}	L_{A10}	L_{A50}	L_{A90}	
NAG A 30/3/05, 0023hrs 8Octa Calm 16˚C, 77% RH	Ambient	40	47	37	37	29	Insects 30-35 Haul trucks <20 Dozer 28-37 Reversing alarm 26
	Mines	LAeq <30					
NAG A 9/3/05, 2236hrs 2Octa 1m/s W 21˚C, 83% RH	Ambient	52	64	43	37	35	Local traffic 68-75 Insects 38-40 Mine rumble 35
	Mines	LAeq 35					
NAG B 30/3/05, 0051hrs 8Octa Calm 16˚C, 81% RH	Ambient	32	41	34	29	27	Aeroplane 36 Birds 30-36 Insects <30 Dozer 28
	Mines	LAeq <30 dB					
NAG B 9/3/05, 2309hrs 2Octa 1m/s W 21˚C, 80% RH	Ambient	53	64	43	39	37	Local traffic 72-78 Insects 35-38 Flagpole 36 Mine rumble 31-38
	Mines	LAeq <30					
NAG C 30/3/05, 0112hrs 8Octa Calm 16˚C, 75% RH	Ambient	43	50	45	40	35	Train 47-52 Insects <25 Dozer 32 Haul truck 40-47 Dump 47
	Mines	LAeq 42					
NAG C 9/3/05, 2330hrs 2Octa 1m/s W 21˚C, 83% RH	Ambient	63	77	63	41	38	Local Traffic 80 Insects 27 Wind 45 Mine 35-38
	Mines	LAeq 33					
NAG D 30/3/05, 0138hrs 8Octa Calm 16˚C, 77% RH	Ambient	39	43	41	38	35	Train 27-33 Train horn 39 Insects 35-39
	Mines	Not Discernible					
NAG D 9/3/05, 2350hrs 2Octa 2-3m/s W 21˚C, 82% RH	Ambient	45	48	46	44	43	Cows 50 Sprinklers 44-46
	Mines	Not Discernible					
NAG F 10/3/05, 0043hrs 2Octa 1m/s SE 20˚C, 80% RH	Ambient	39	43	41	49	38	Train 38-40 Mine rumble 38
	Mines	LAeq 35					
NAG F 29/3/05, 2215hrs 8Octa 1-3m/s E 16˚C, 78% RH	Ambient	37	47	37	33	30	Birds 34-39 Insects 20-25 Haul trucks 30-36
	Mines	LAeq 33					

Noise Assessment Group (NAG) Start Time Conditions	Measurement Description	Primary Noise Descriptor (dB(A) re 20µPa)					Description of Noise Emission and Typical Maximum Levels (L_{Amax})
		L_{Aeq}	L_{A1}	L_{A10}	L_{A50}	L_{A90}	
NAG G 29/3/05, 2244hrs 7Octa Calm 14˚C, 83% RH	Ambient	47	58	52	36	30	Distant traffic 46-48 Train 52-60 Train horn 60 Insects 25-47
	Mines	Not Discernible					
NAG G 10/3/05, 0103hrs 2Octa 3m/s NW 18˚C, 84% RH	Ambient	51	59	56	46	42	Insects 43-45 Train 36
	Mines	Not Discernible					

Table 11 Night Operator-Attended Noise Survey Results - August 2007

Noise Assessment Group (NAG) Start Time Conditions	Measurement Description	Primary Noise Descriptor (dBA re 20Pa)					Description of Noise Emission and Typical Maximum Levels (LAmax)
		LAeq	LA1	LA10	LA50	LA90	
NAG 1 8/8/07 054 hrs 0 Okta calm 6˚C, 72% RH Stability Class D	Ambient	35	40	36	34	32	Hum 35 Mine trucks 32-37 Mine continuous 32-34 Insect 20-23 Mine truck dumping 35
	Mines	LAeq 34					
NAG 1 15/8/07 2357 hrs 0 Okta Calm - 1 m/s 10˚C, 71% RH Stability Class F	Ambient	43	49	47	39	36	Mine hum 38 Dozer 38-42 Insects 19-22 Train 50-53
	Mines	LAeq 40					
NAG 3 8/8/07 0119 hrs 0 Okta 1-3 m/s NW 9.5˚C, 63% RH Stability Class D	Ambient	45	56	49	39	37	Train 54-56 (LAeq for pass by 2 minutes 53) Mine trucks 40-44 Mine Hum 38-39 Mine Truck dumping 40 Mine trucks 40 Train (far) 37-43
	Mines	LAeq 38					
NAG 3 16/8/07 0021 hrs 1 okta Calm 11˚C, 79% RH Stability Class F	Ambient	48	54	51	46	44	Mine noise 47-51 Shovel bucket closing 52 Dozer 50-55 Dozer 35-47 Train 55
	Mines	LAeq 47					
NAG 4 8/8/07 0150 hrs 0 Okta 1-2 m/s E 10˚C, 60% RH Stability Class D	Ambient	46	54	49	44	42	Traffic 48-59 Truck 44-49 Processing plant 45-46 Dozer 47
	Mines	LAeq 45					

Noise Assessment Group (NAG) Start Time Conditions	Measurement Description	Primary Noise Descriptor (dBA re 20Pa)					Description of Noise Emission and Typical Maximum Levels (LAmax)
		LAeq	LA1	LA10	LA50	LA90	
NAG 4 16/8/07 0105 hrs 4 okta Calm 10˚C, 78% RH Stability Class D	Ambient	41	46	43	40	38	Horn 41 Activity 37-48 Distant traffic 39-47 Insects 22 Reversing alarm 38-40
	Mines	LAeq 40					
NAG 5 8/8/07 0210 hrs 0 Okta 1-2 m/s WWS 10˚C, 60% RH Stability Class F	Ambient	51	63	55	42	39	Traffic (cars) 58-62 Traffic (trucks) 58-66 Processing plant 38-43 Hum 39-40 Dozer (pushing) 48-50 Dozer (reverse) 30
	Mines	LAeq 41					
NAG 5 16/8/07 0051 hrs 4 okta Calm 12˚C, 69% RH Stability Class D	Ambient	53	65	56	45	39	Mine activity 45-47 Nearby truck 61-67 Dozer 45 Nearby traffic 61
	Mines	LAeq 43					
NAG 6 8/8/07 0234 hrs 0 Okta 2-3 m/s W 10˚C, 58% RH Stability Class D	Ambient	39	46	41	37	35	Mine 36-43? Traffic 33-46 Dozer (reverse) 33 Dozer (pushing) 33
	Mines	LAeq 38					
NAG 7 8/8/07 0259 hrs 0 Okta 3-4 m/s W 9˚C, 60% RH Stability Class F	Ambient	39	46	41	37	36	Traffic 38-46 Dozer (reverse) 33-39 Mine 36-38
	Mines	LAeq 37					
NAG 8 2223 hrs 8/8/07 1 Okta calm 12˚C, 71% RH Stability Class D	Ambient	41	46	44	39	36	Train 48 Distant Traffic 38-41 Insects 22 Dog 35 Train horn 42
	Mines	Not discernable					
NAG 9 7/8/07 0539 hrs 0 Okta calm 8˚C, 65.1% RH Stability Class D	Ambient	66	79	68	54	45	Traffic (cars) 76-83 Traffic (trucks) 86 Birds 30-46 Train 31 Haul truck - whine 25
	Mines	LAeq 22					
NAG 9 8/8/07 0433 hrs 0 Okta 1-2 m/s NE 9.2˚C, 63% RH Stability Class D	Ambient	42	46	44	42	39	Mine Hum 44-46 Rooster 43-45 Mine 43
	Mines	LAeq 42					

Noise Assessment Group (NAG) Start Time Conditions	Measurement Description	Primary Noise Descriptor (dBA re 20Pa)					Description of Noise Emission and Typical Maximum Levels (LAmax)
		LAeq	LA1	LA10	LA50	LA90	
NAG 9 15/8/07 2239 hrs 1 Okta Calm 9°C, 83% RH Stability Class F	Ambient	62	77	61	44	33	Distant traffic 22-26 Insects 28-30 Nearby traffic 70-80
	Mines	Not discernable					
NAG 10 7/8/07 0604 hrs 0 Okta Calm 5°C, 83% RH Stability Class G	Ambient	46	54	49	45	41	Traffic (cars) 49-51 Traffic (trucks) 55 Haul truck - whine 33-40 Whine + fan 35-43 Horn 31 Bird 44-49 Dumping into empty truck 33 Truck - mine access 40-42 Dozer 28-33
	Mines	LAeq 37					
Location 10 8/8/07 0419 hrs 0 Okta 1 m/s 7.2°C, 71% RH Stability Class D	Ambient	40	47	42	39	38	Truck 33-34 Mine 39-41 Traffic 41 Train 39
	Mines	LAeq 39					
NAG 10 15/8/07 2302 hrs 2 Okta Calm 10°C, 85% RH Stability Class E	Ambient	37	45	40	35	32	Insects 25-40 Mine hum 19-27 Traffic 35-48 Pump on property 19-27
	Mines	LAeq 22					
NAG 11 7/8/07 0631 hrs 0 Okta Calm 5°C, 77% RH Stability Class E	Ambient	53	61	57	46	40	Traffic 55-64 Birds 30-56 CHPP 36-39 Haul truck (whine) 30-35
	Mines	LAeq 38					
NAG 11 8/8/07 0406 hrs 0 Okta calm 9°C, 63% RH Stability Class D	Ambient	42	47	44	41	38	Frog 30-45 Trucks 35-42 Wheel mill 35-40 Birds 59 Mine hum 39
	Mines	LAeq 39					
NAG 11 15/8/07 2319 hrs 0 – 2 Okta Calm - 1m/s E 10°C, 82% RH Stability Class E	Ambient	46	56	49	40	36	Nearby Traffic 58-59 Insects/frogs 40-44 Distant traffic 19-30 Water pump 20-23 Dog 32-35 Mine Access Road 35-37
	Mines	LAeq 25					
NAG 12 8/8/07 0346 hrs 0 Okta 1 m/s N 8.2°C, 67% RH Stability Class D	Ambient	38	46	39	37	36	Mines (both) 37-39 Insects 25-30 Trucks 33-35 Damping 30 Trucks 35-37
	Mines	LAeq 38					

BACKGROUND NOISE MONITORING METHODOLOGY

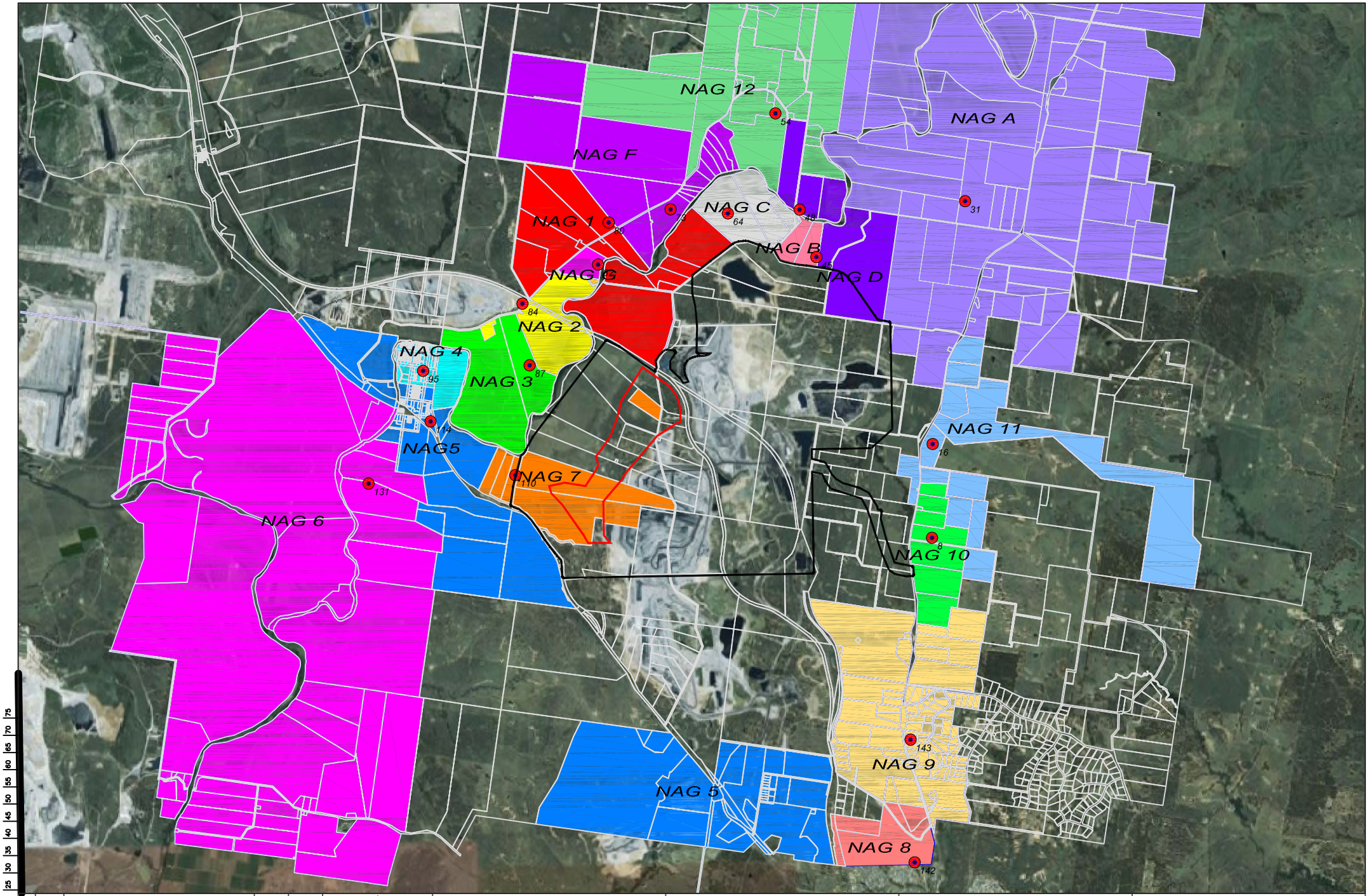
Noise Assessment Group (NAG) Start Time Conditions	**Measurement Description**	**Primary Noise Descriptor (dBA re 20Pa)**					**Description of Noise Emission and Typical Maximum Levels (LAmax)**
		LAeq	**LA1**	**LA10**	**LA50**	**LA90**	
NAG 12 15/8/07 2340 hrs 0 Okta Calm 11˚C, 77% RH Stability Class E	Ambient	37	42	39	36	33	Insects/frogs 28-32 Distant traffic 20-31 Trucks 28-30 Dog 29-31 Horse 38 Train 28-30 Train horn 35
	Mines	LAeq 17					

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Background Noise Monitoring Locations

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REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	24/09/08		YL	MB

0 464 928

Scale = 1:46420

Background Noise Monitoring Location

Heggies Pty Ltd
2 Lincoln Street
Lane Cove NSW 2066 Australia
PO Box 176 Lane Cove NSW 1595
Email address sydney@heggies.com.au
Telephone 02 9427 8100 Facsimile 02 9427 8200

10-5202 Integra Open Cut Project
Backgroumd Noise Monitoring Locations

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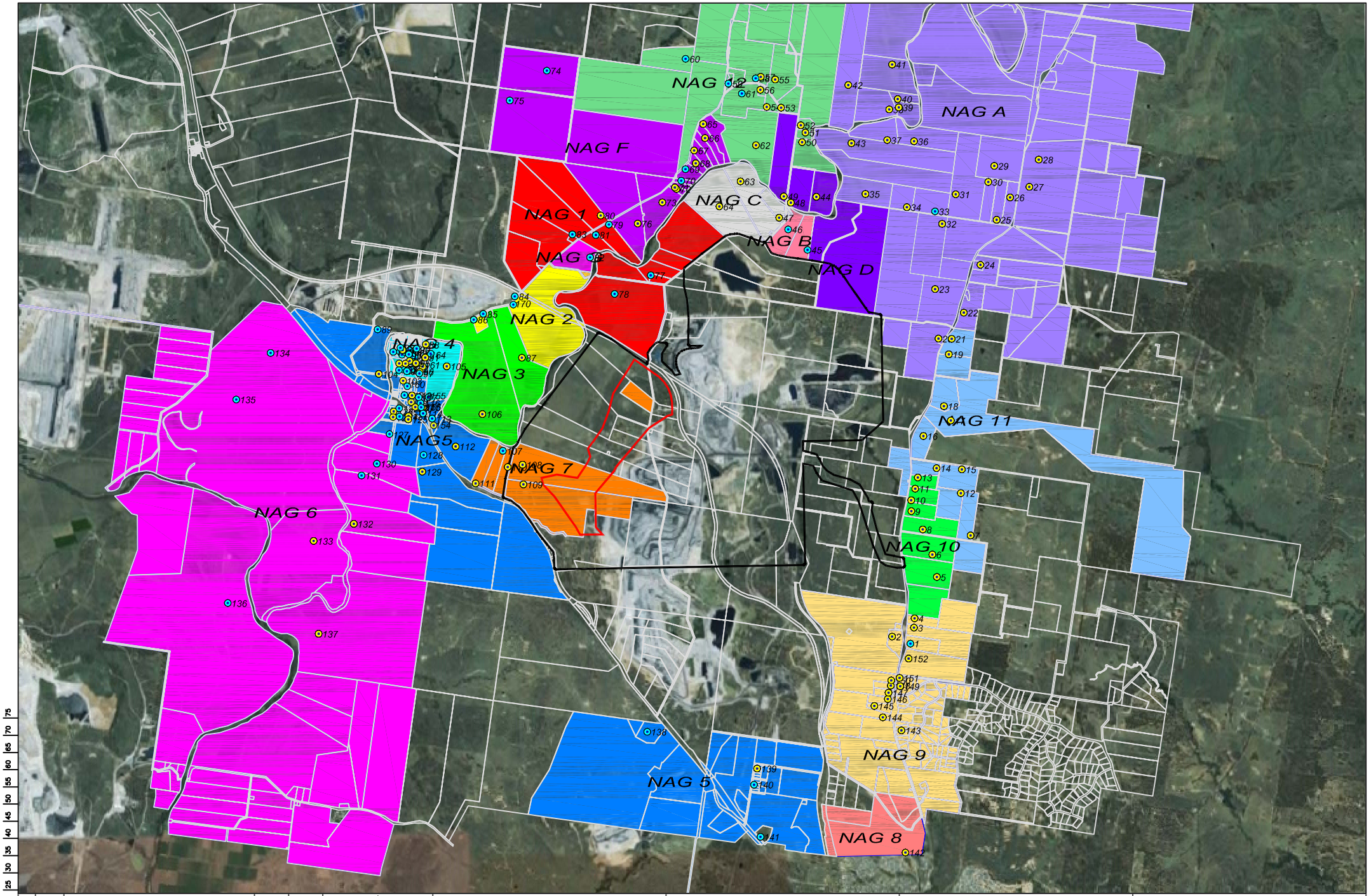
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Noise Assessment Groups

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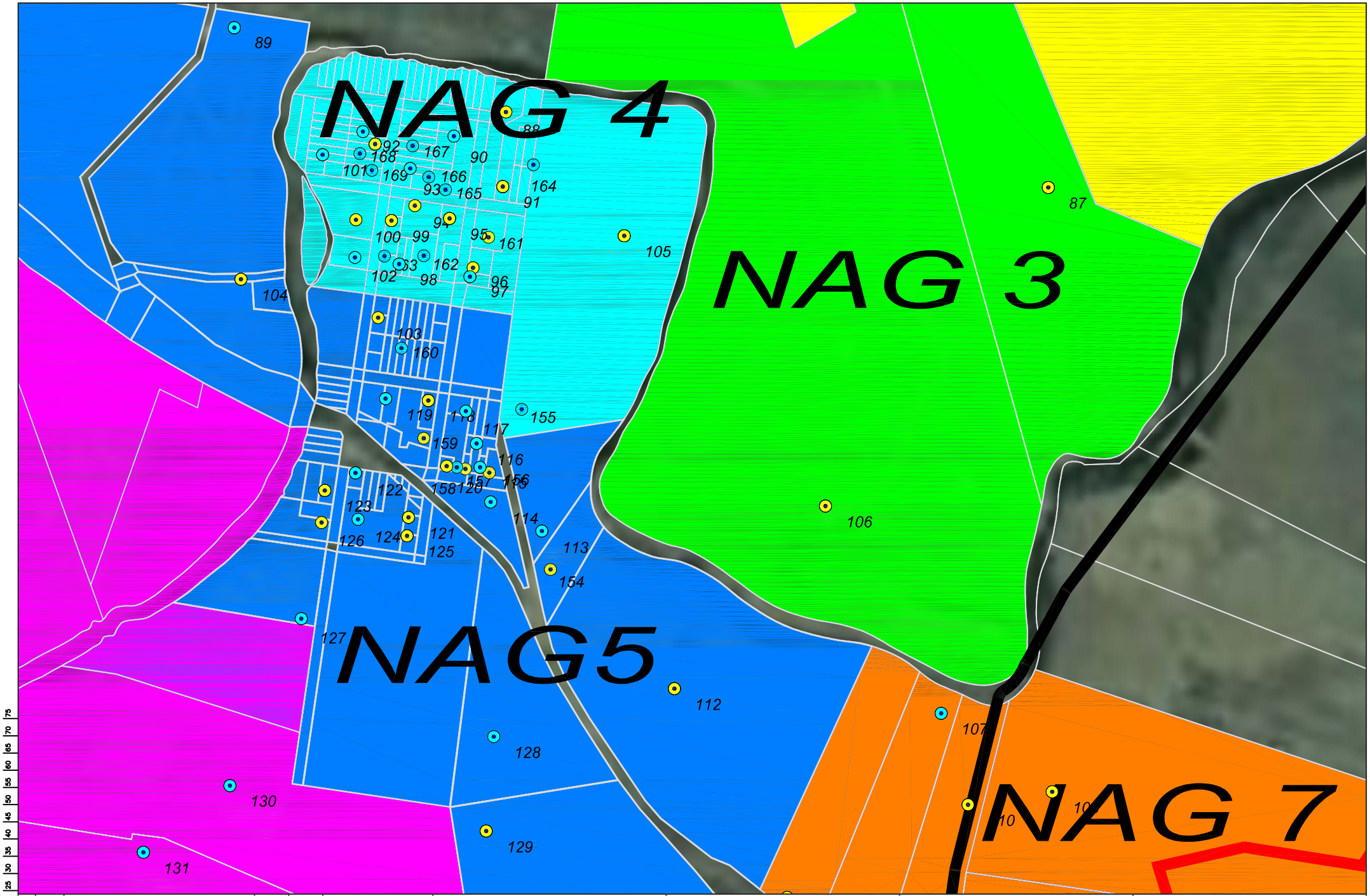
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- Receptors (Mine Owned)
- Receptors (None-Mine Owned)

Heggies Pty Ltd
2 Lincoln Street
Lane Cove NSW 2066 Australia
PO Box 176 Lane Cove NSW 1595
Email address sydney@heggies.com.au
Telephone 02 9427 8100 Facsimile 02 9427 8200

10-5202 Integra Open Cut Project
Assessment Groups

FILE NAME	DRAWING No.	REVISION
10-5202R1 Appendix D3 - Noise Assessment Groups.dwg	10-5202 Assessment Groups	0



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Receptors (Mine Owned)
Receptors (None-Mine Owned)

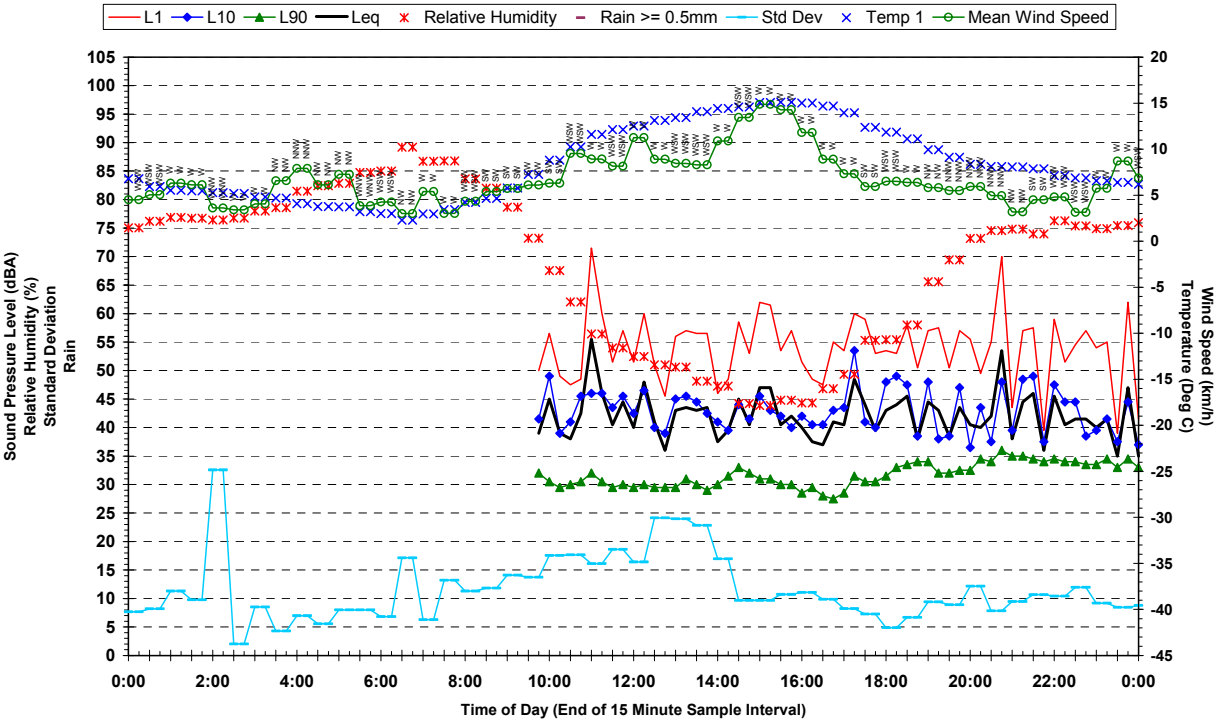
Heggies Pty Ltd
2 Lincoln Street
Lane Cove NSW 2066 Australia
PO Box 176 Lane Cove NSW 1595
Email address sydney@heggies.com.au
Telephone 02 9427 8100 Facsimile 02 9427 8200

10-5202 Integra Open Cut Project
Assessment Groups

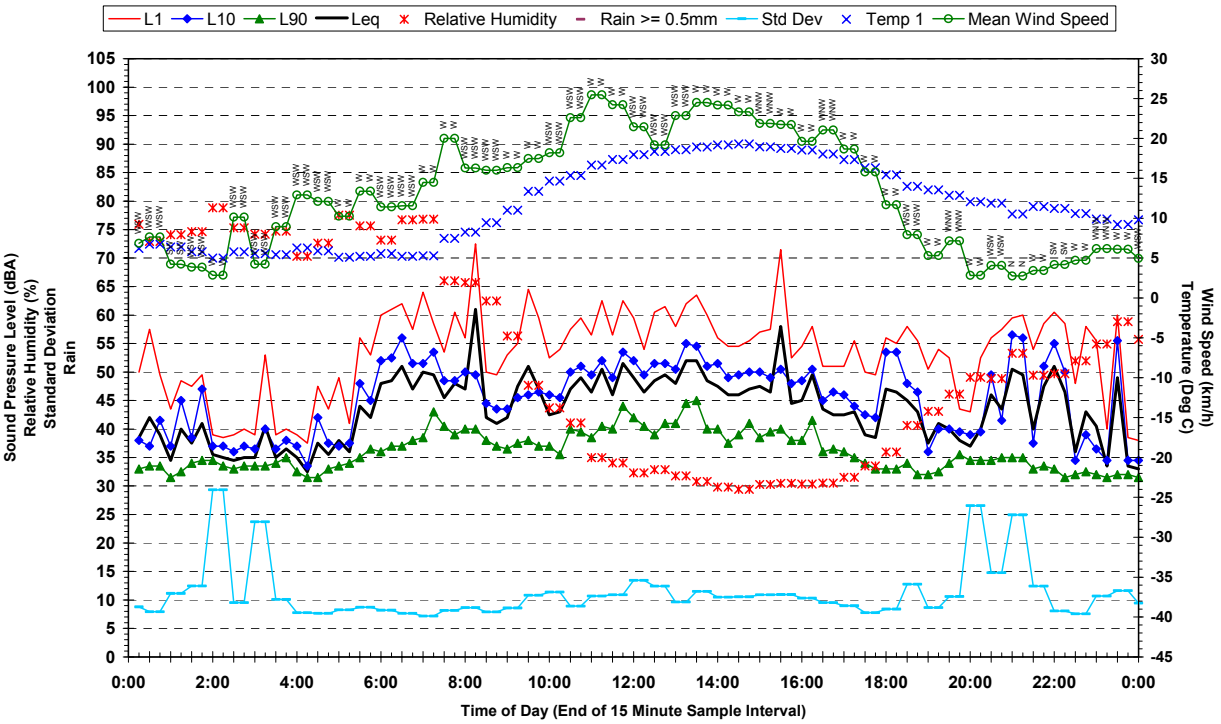
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Unattended Ambient Noise and Weather Data - Noise Assessment Group 1 - Residence Reference 80

Statistical Ambient Noise Levels
NAG 1 - Residence Reference 80 - Tuesday 7 August 2007

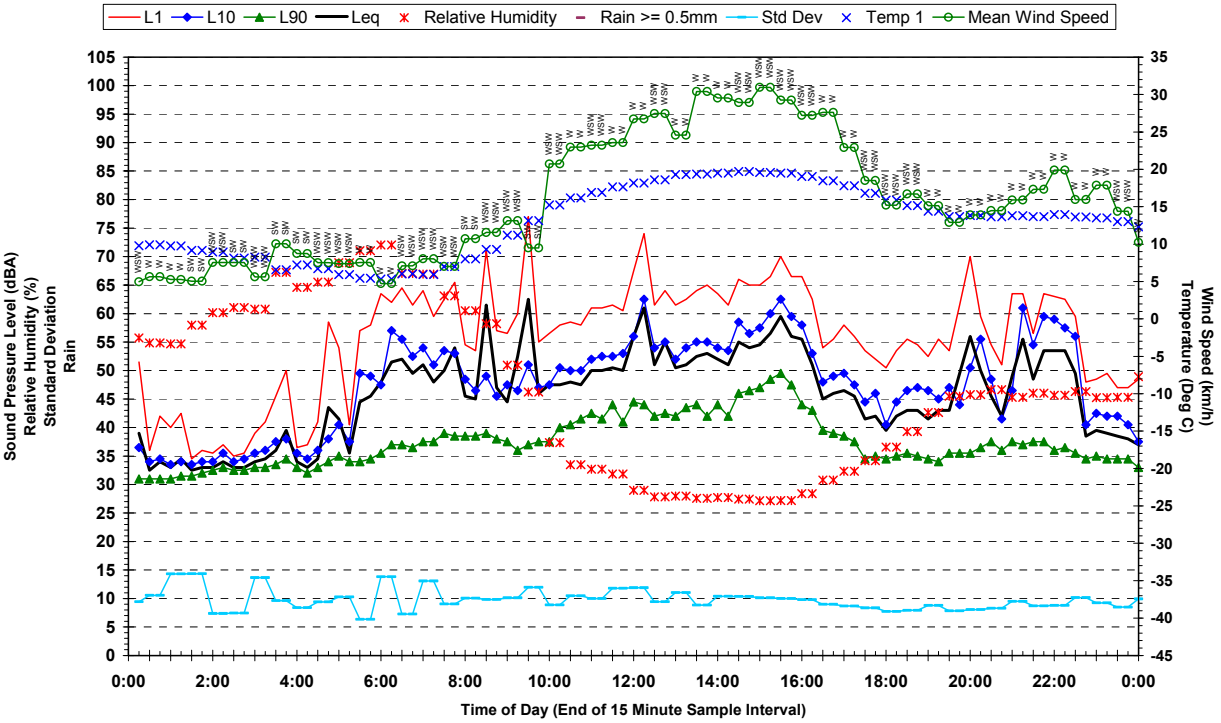


Statistical Ambient Noise Levels
NAG 1 - Residence Reference 80 - Wednesday 8 August 2007

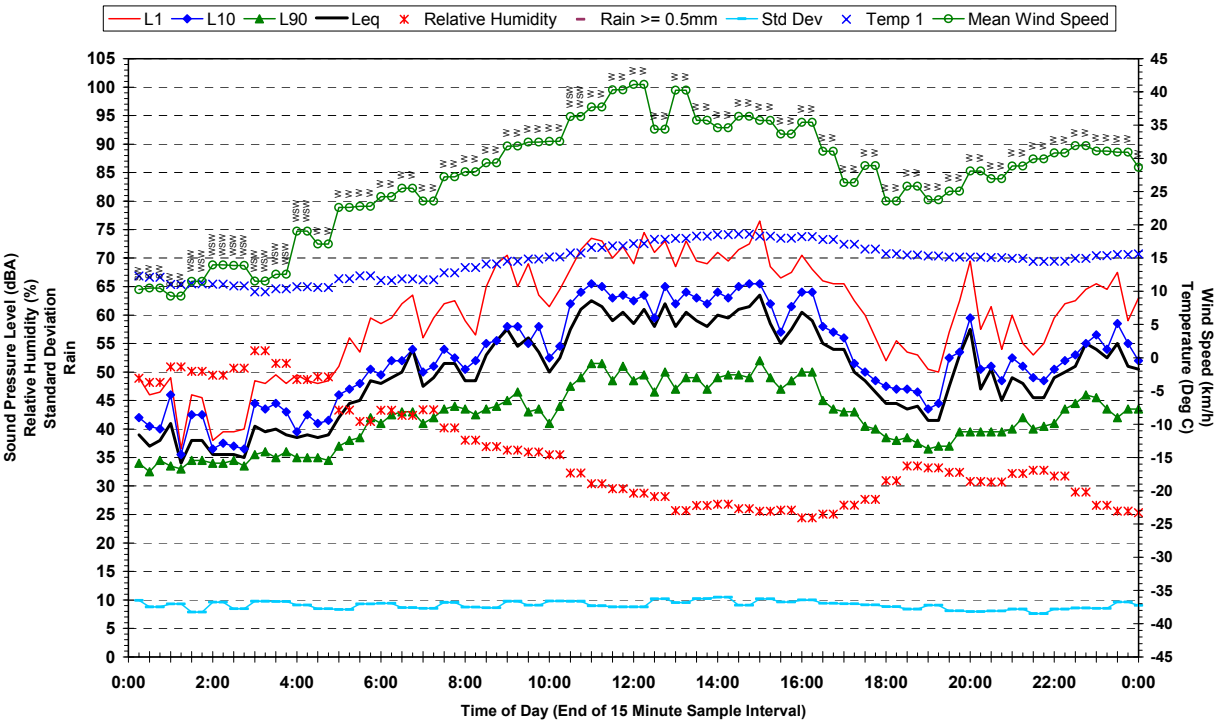


Unattended Ambient Noise and Weather Data - Noise Assessment Group 1 - Residence Reference 80

Statistical Ambient Noise Levels
NAG 1 - Residence Reference 80 - Thursday 9 August 2007

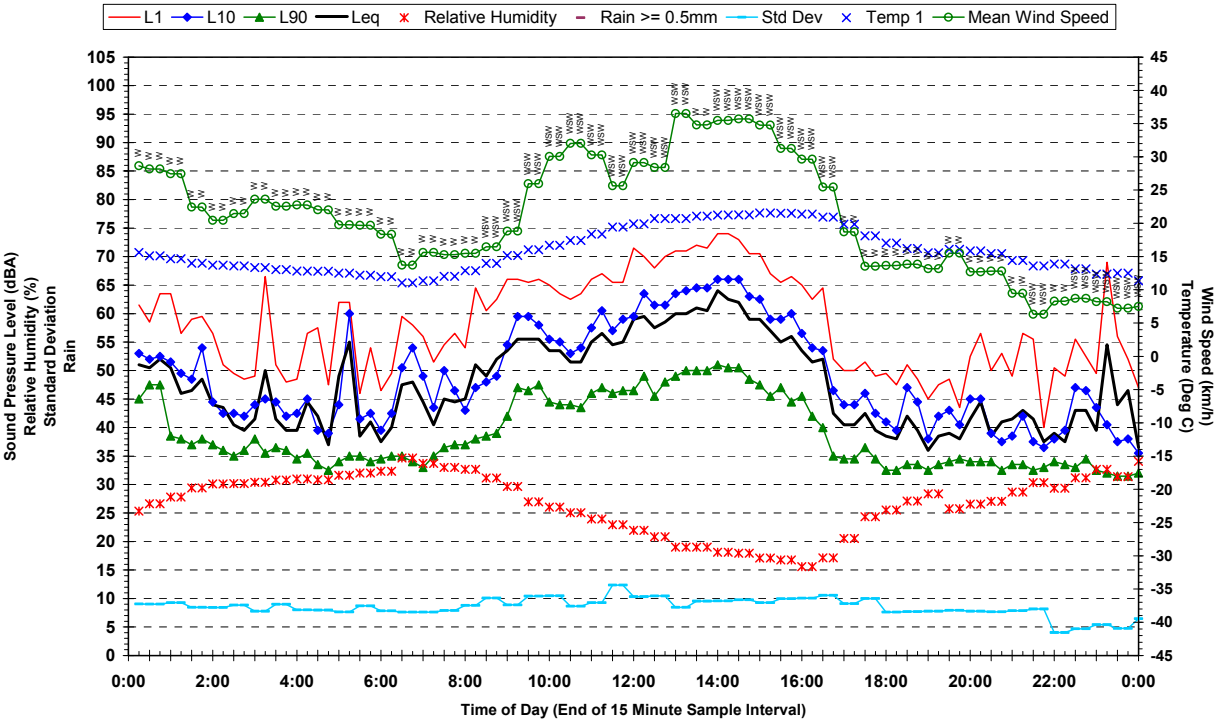


Statistical Ambient Noise Levels
NAG 1 - Residence Reference 80 - Friday 10 August 2007

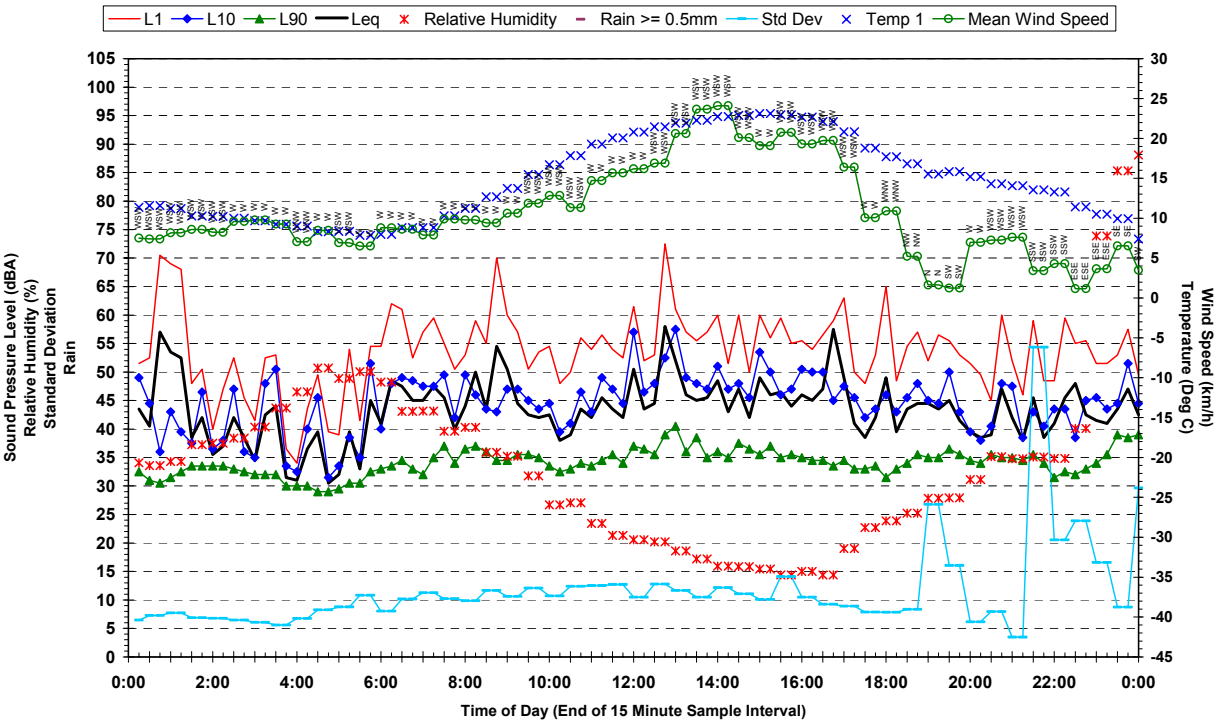


Unattended Ambient Noise and Weather Data - Noise Assessment Group 1 - Residence Reference 80

Statistical Ambient Noise Levels
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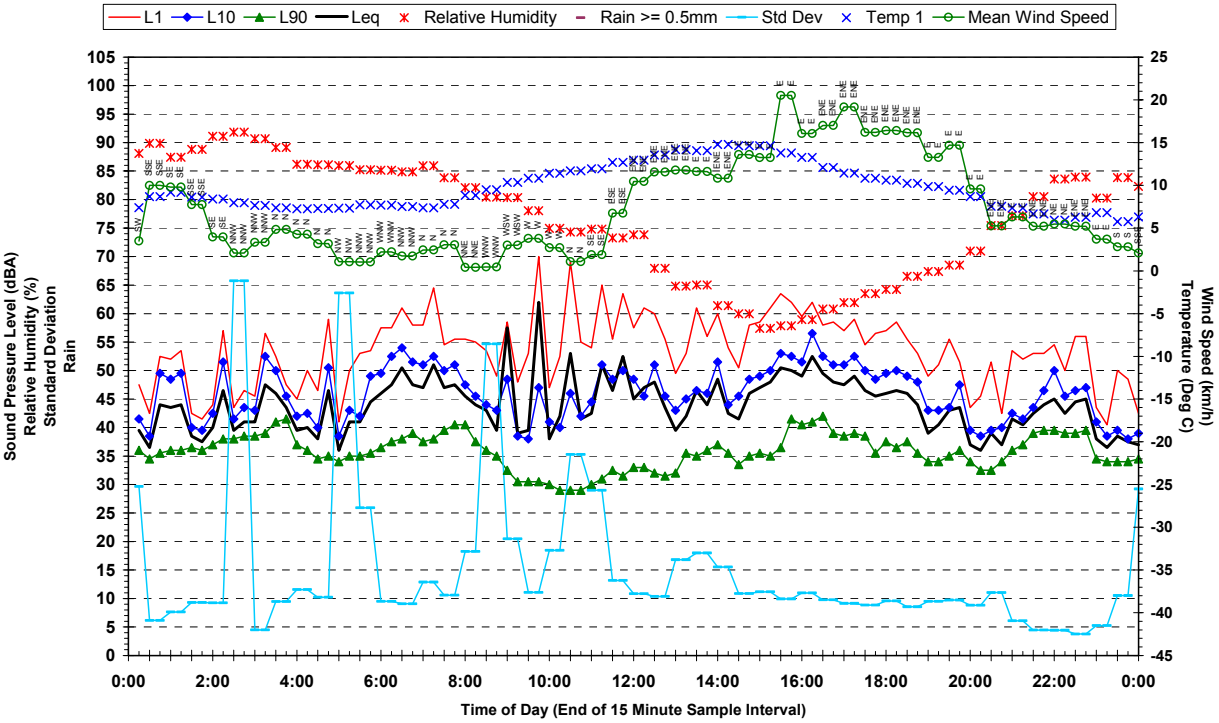


Statistical Ambient Noise Levels
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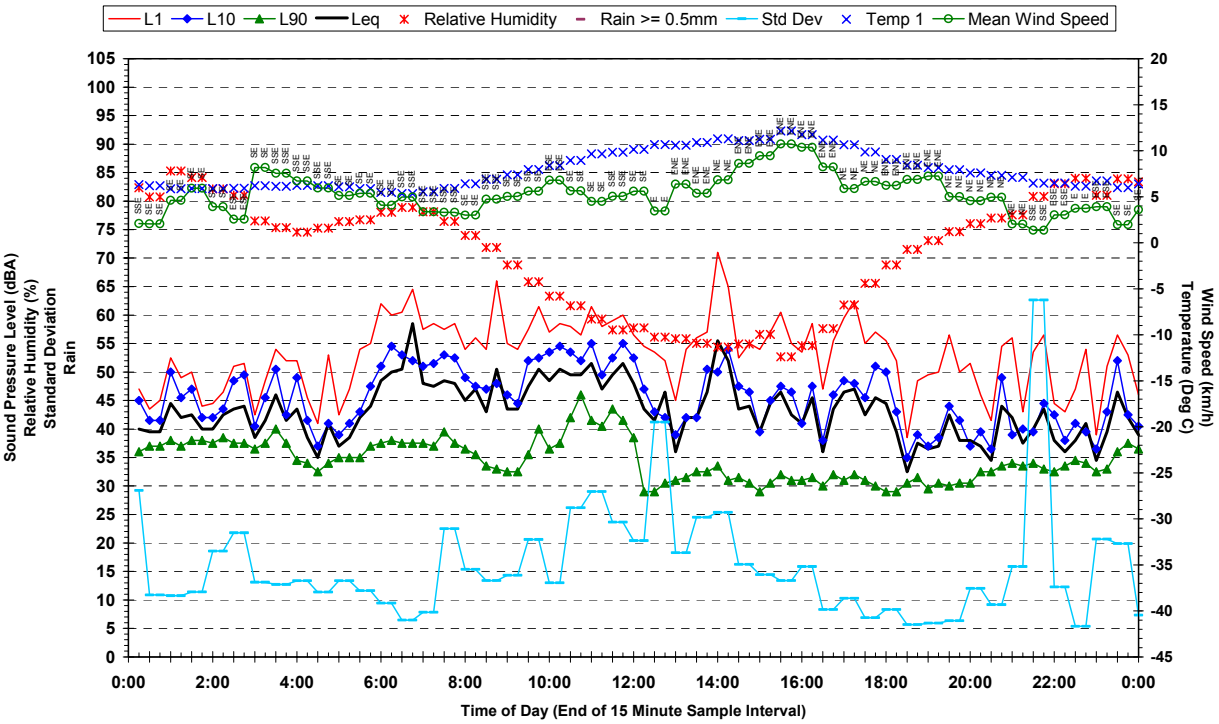


Unattended Ambient Noise and Weather Data - Noise Assessment Group 1 - Residence Reference 80

Statistical Ambient Noise Levels
NAG 1 - Residence Reference 80 - Monday 13 August 2007

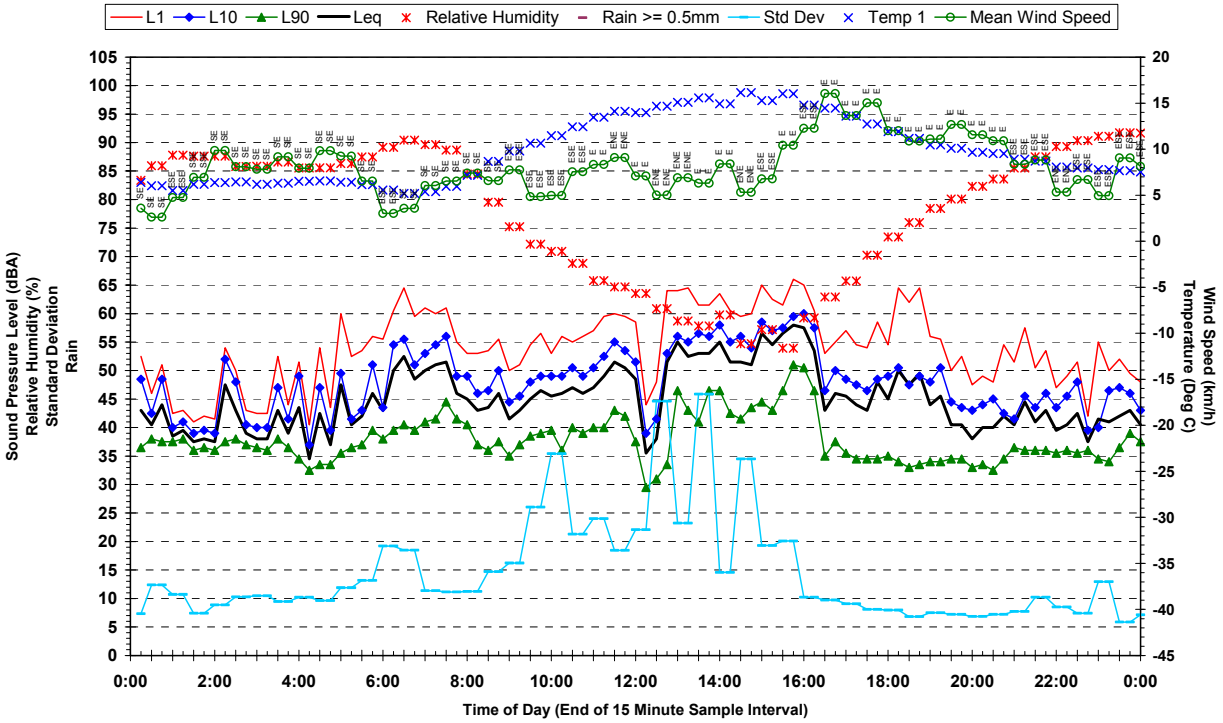


Statistical Ambient Noise Levels
NAG 1 - Residence Reference 80 - Tuesday 14 August 2007

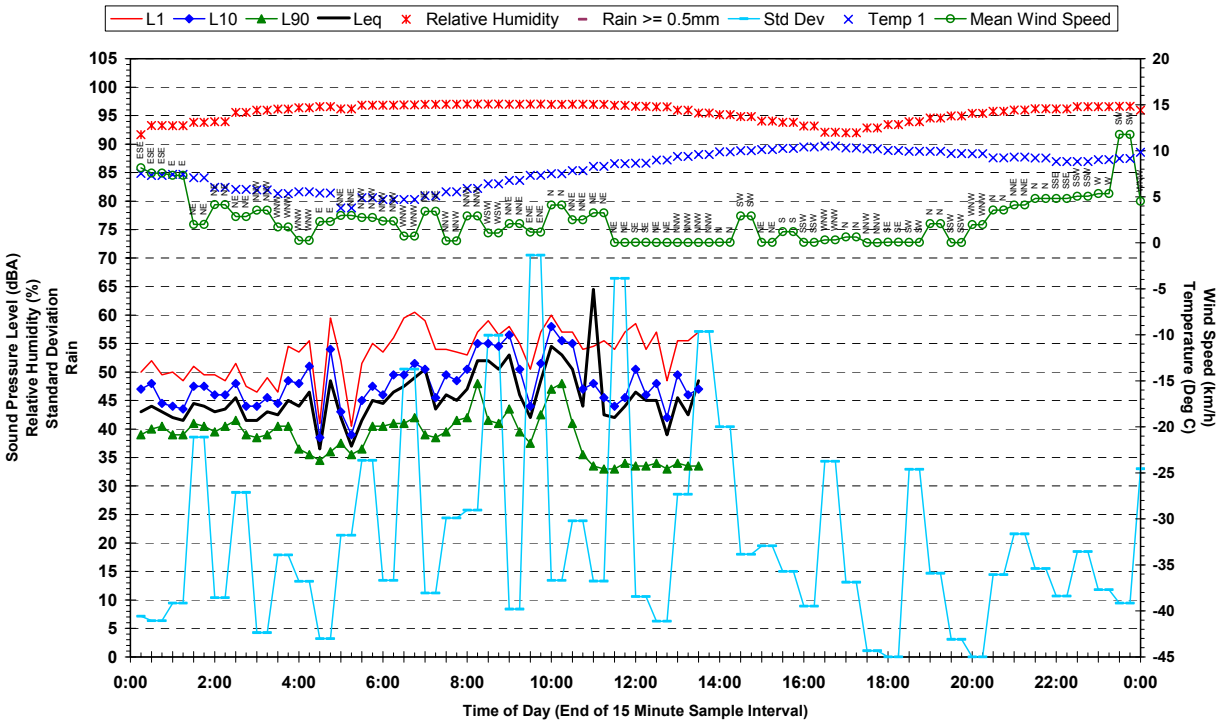


Unattended Ambient Noise and Weather Data - Noise Assessment Group 1 - Residence Reference 80

Statistical Ambient Noise Levels
NAG 1 - Residence Reference 80 - Wednesday 15 August 2007



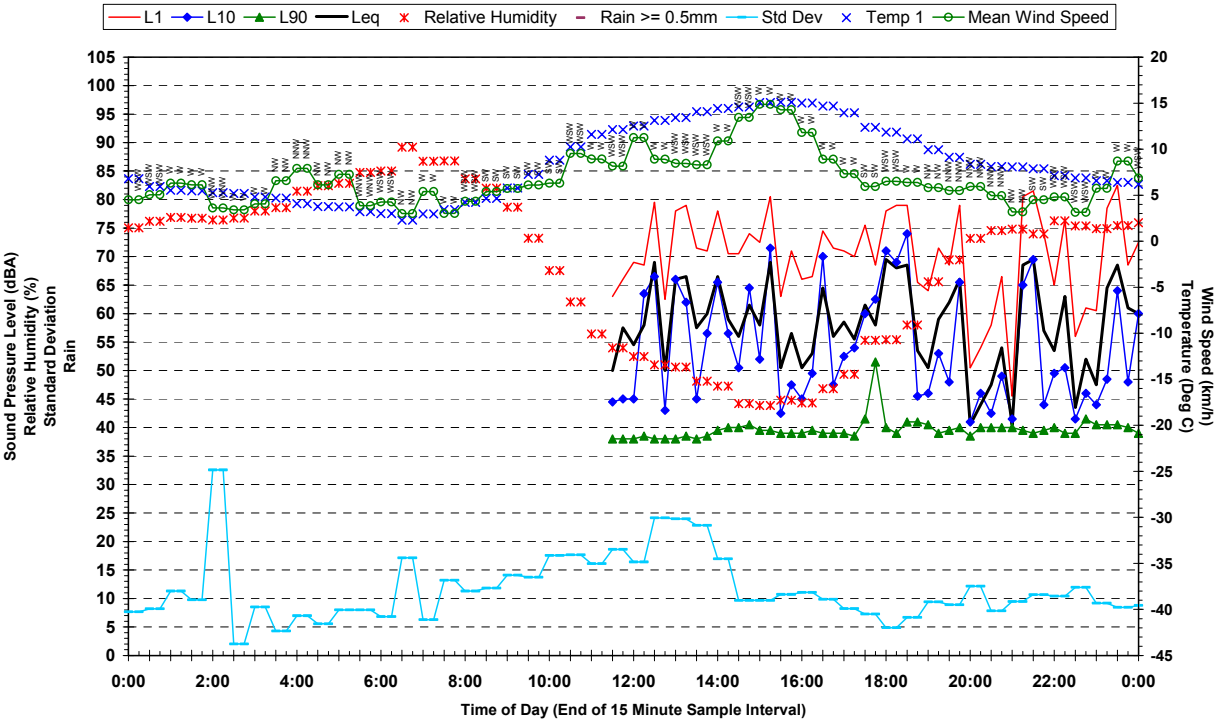
Statistical Ambient Noise Levels
NAG 1 - Residence Reference 80 - Thursday 16 August 2007



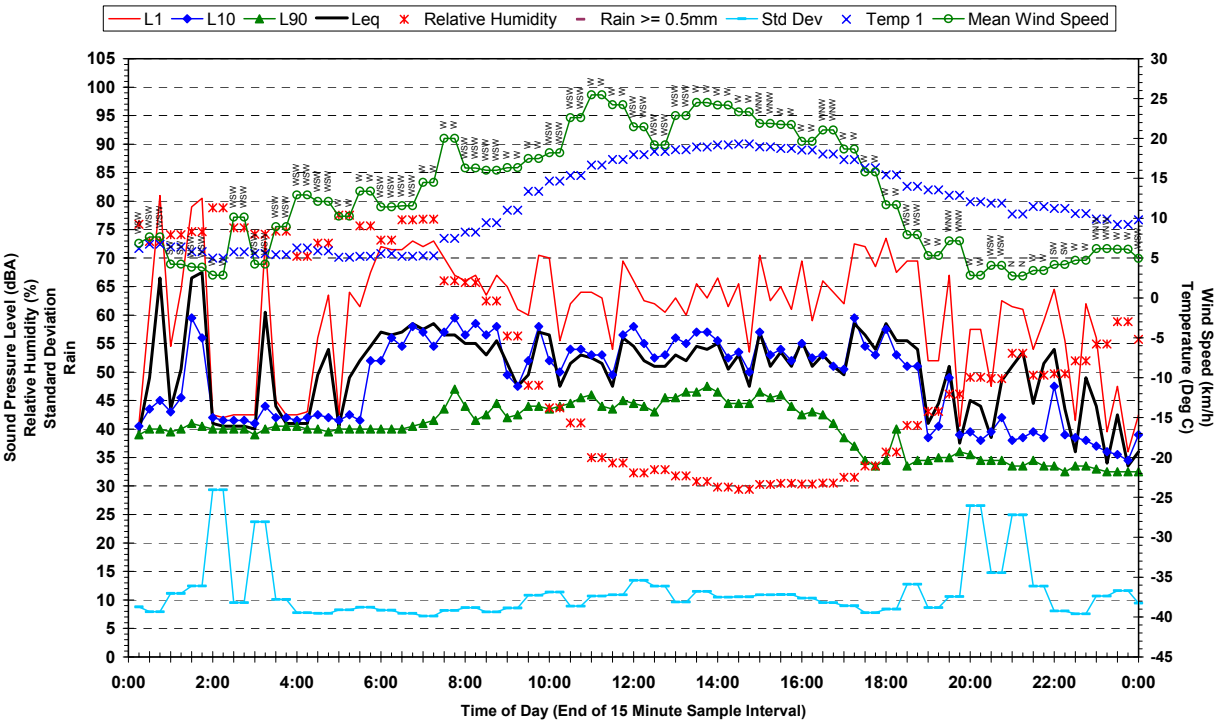
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Unattended Ambient Noise and Weather Data - Noise Assessment Group 2 - Residence Reference 84

Statistical Ambient Noise Levels
NAG 2 - Residence Reference 84 - Tuesday 7 August 2007

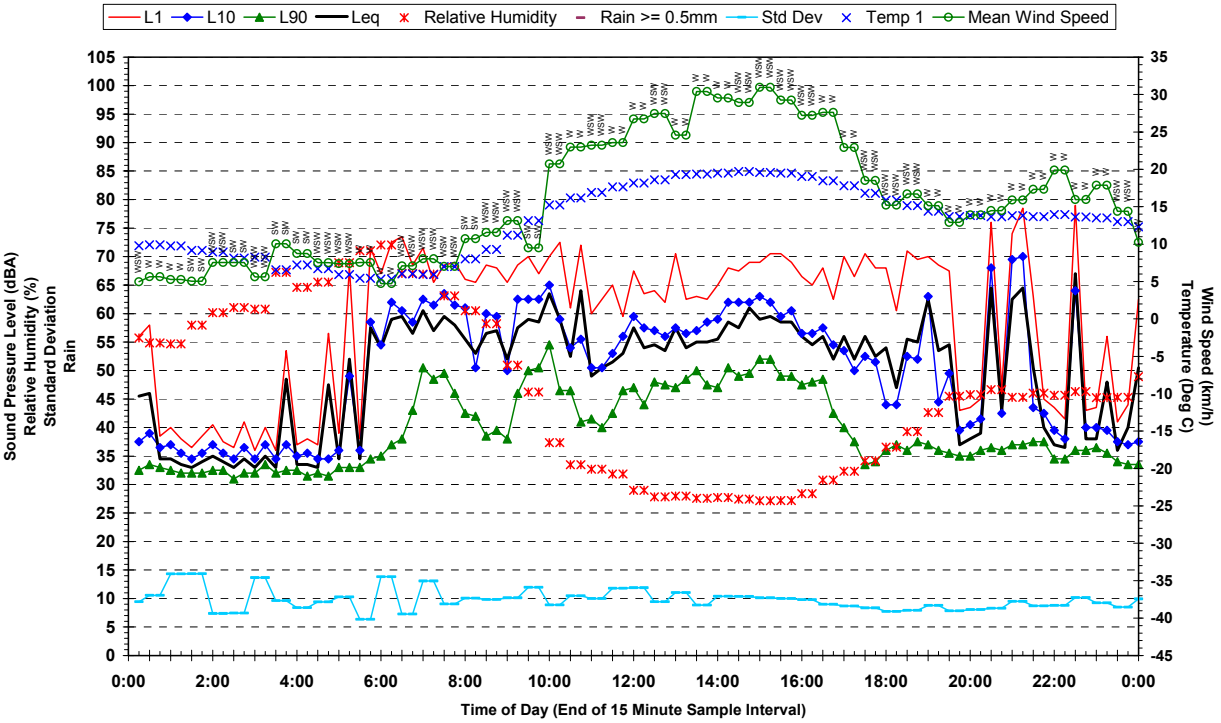


Statistical Ambient Noise Levels
NAG 2 - Residence Reference 84 - Wednesday 8 August 2007

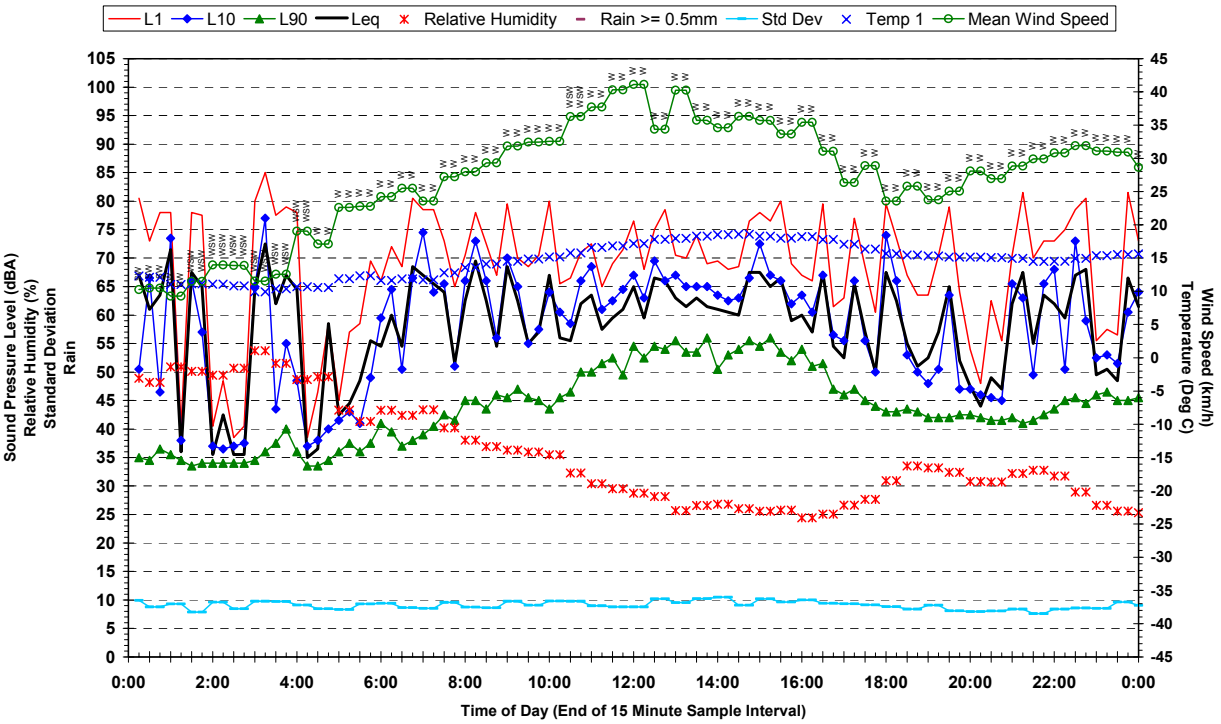


Unattended Ambient Noise and Weather Data - Noise Assessment Group 2 - Residence Reference 84

Statistical Ambient Noise Levels
NAG 2 - Residence Reference 84 - Thursday 9 August 2007

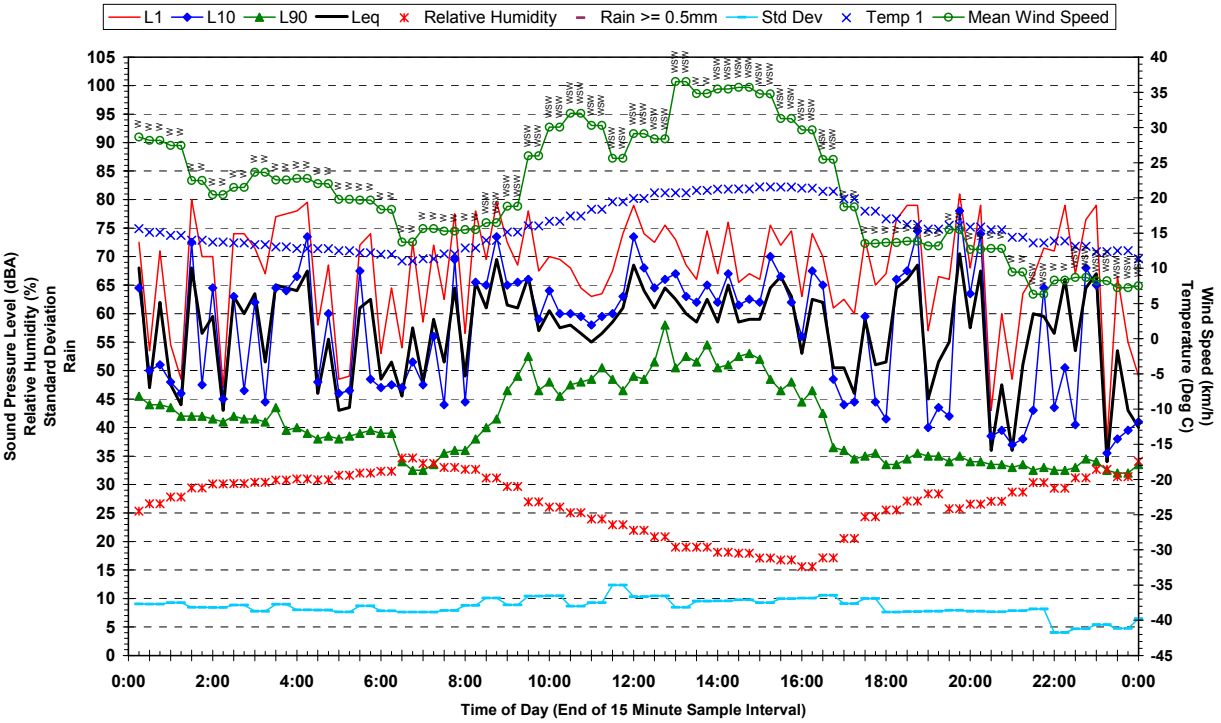


Statistical Ambient Noise Levels
NAG 2 - Residence Reference 84 - Friday 10 August 2007

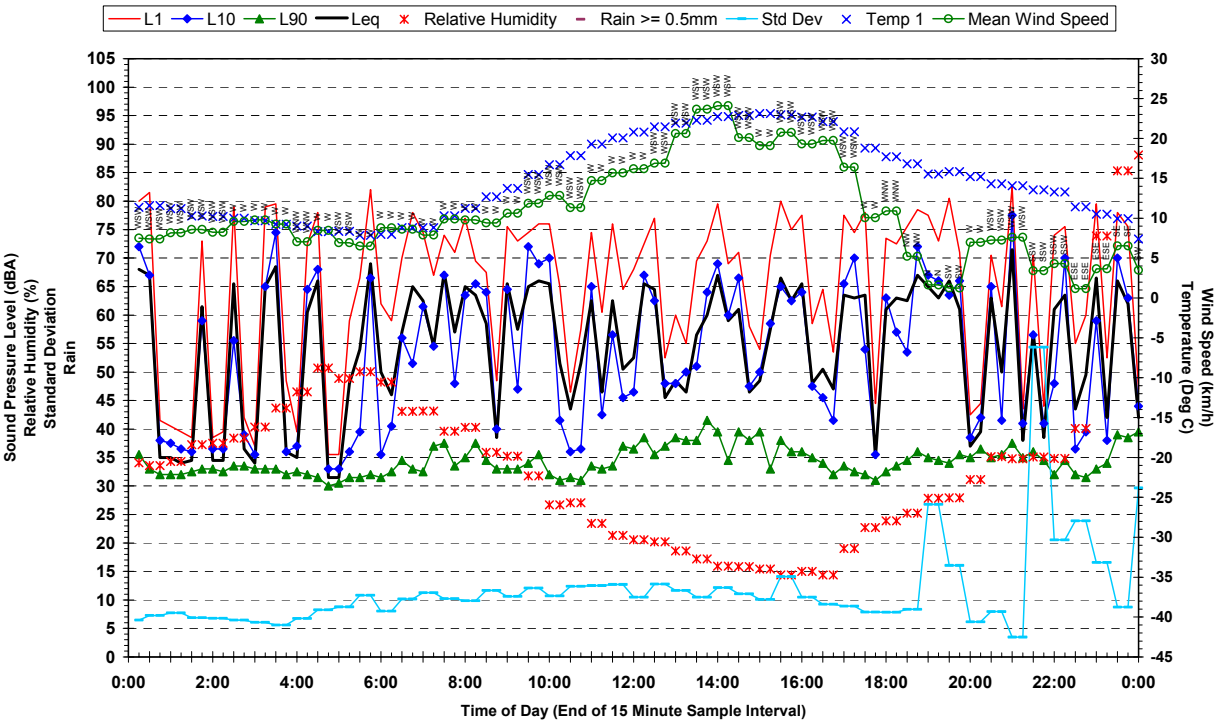


Unattended Ambient Noise and Weather Data - Noise Assessment Group 2 - Residence Reference 84

Statistical Ambient Noise Levels
NAG 2 - Residence Reference 84 - Saturday 11 August 2007

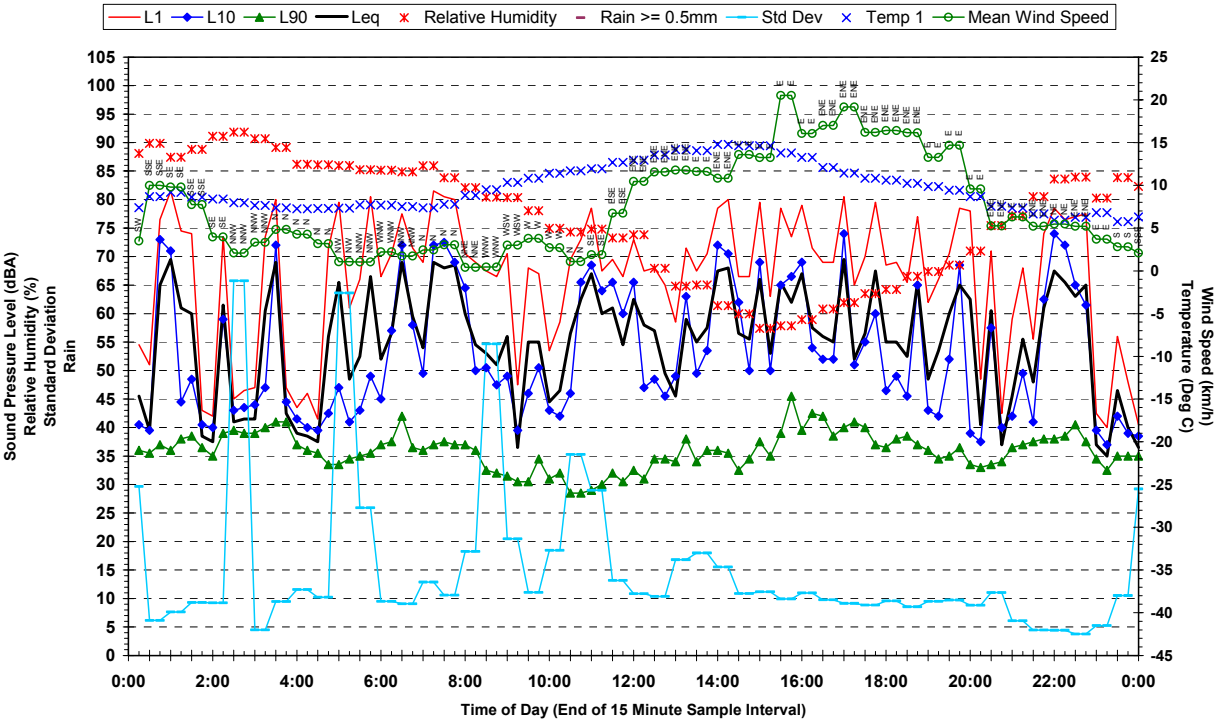


Statistical Ambient Noise Levels
NAG 2 - Residence Reference 84 - Sunday 12 August 2007

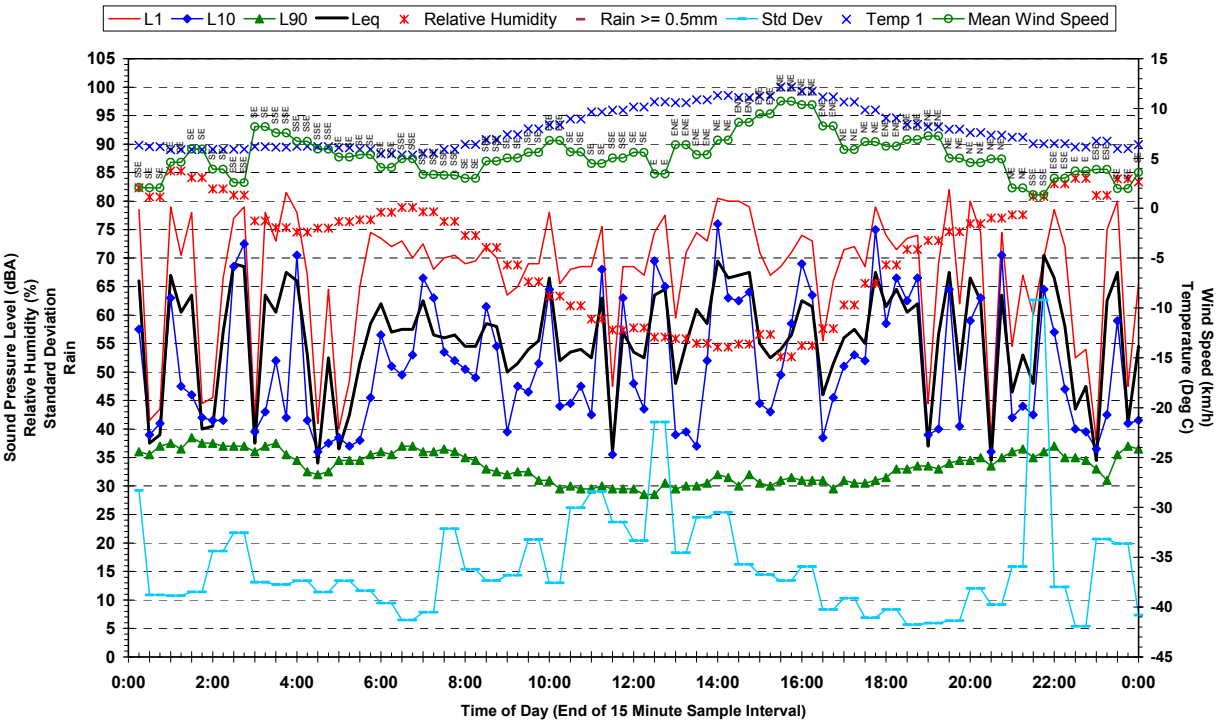


Unattended Ambient Noise and Weather Data - Noise Assessment Group 2 - Residence Reference 84

Statistical Ambient Noise Levels
NAG 2 - Residence Reference 84 - Monday 13 August 2007

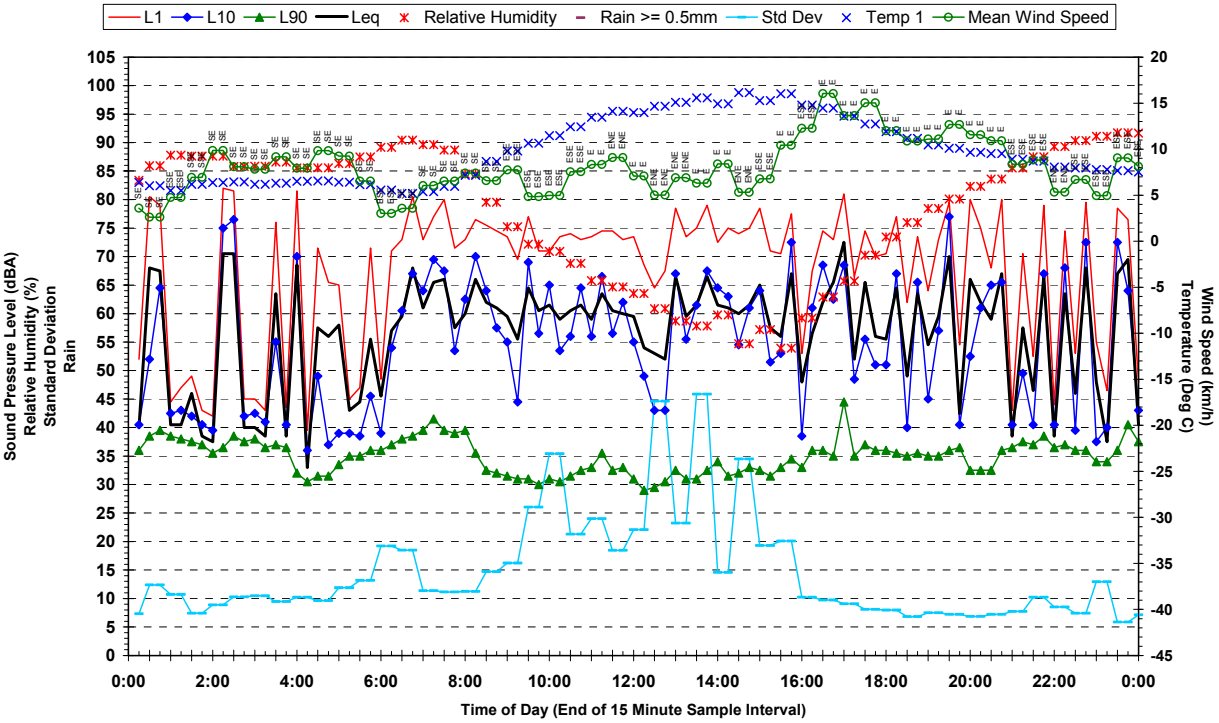


Statistical Ambient Noise Levels
NAG 2 - Residence Reference 84 - Tuesday 14 August 2007

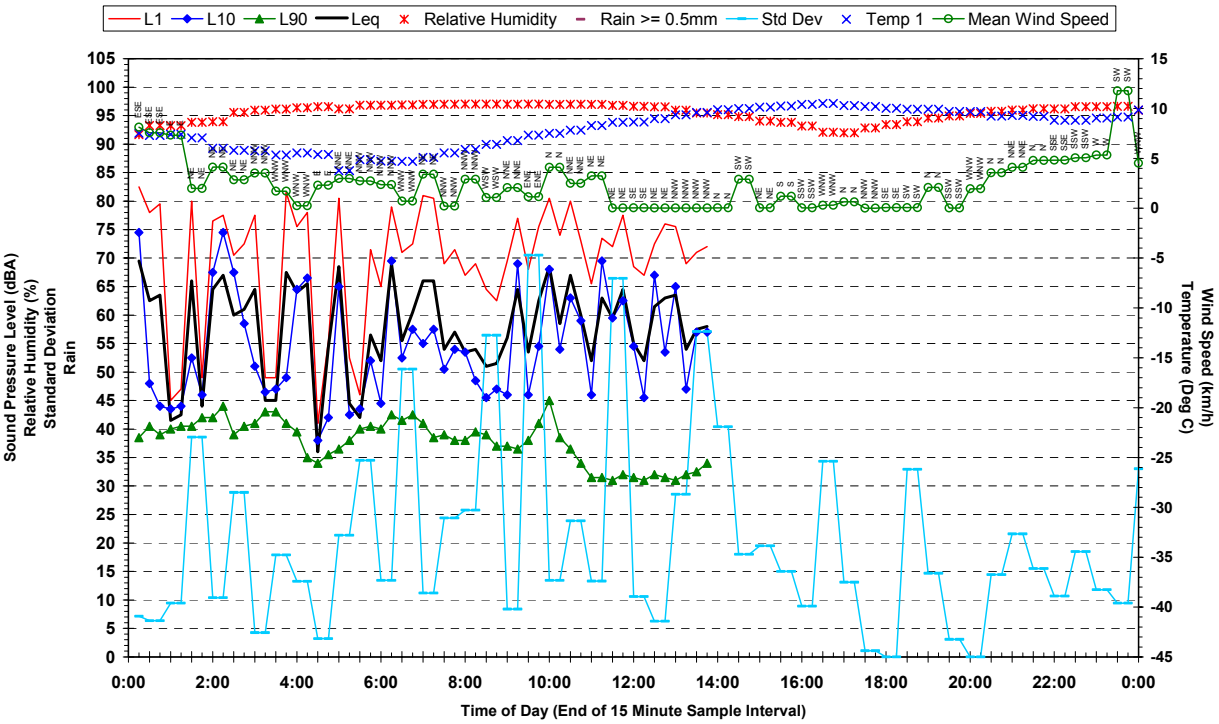


Unattended Ambient Noise and Weather Data - Noise Assessment Group 2 - Residence Reference 84

Statistical Ambient Noise Levels
NAG 2 - Residence Reference 84 - Wednesday 15 August 2007



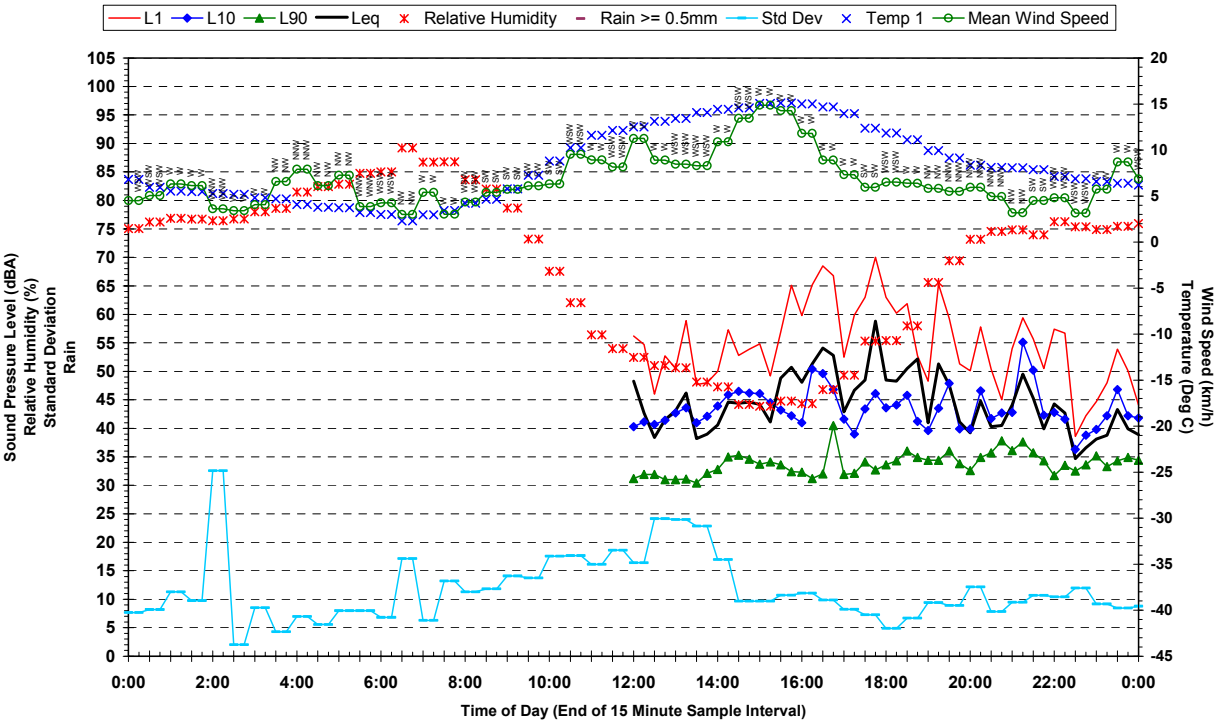
Statistical Ambient Noise Levels
NAG 2 - Residence Reference 84 - Thursday 16 August 2007



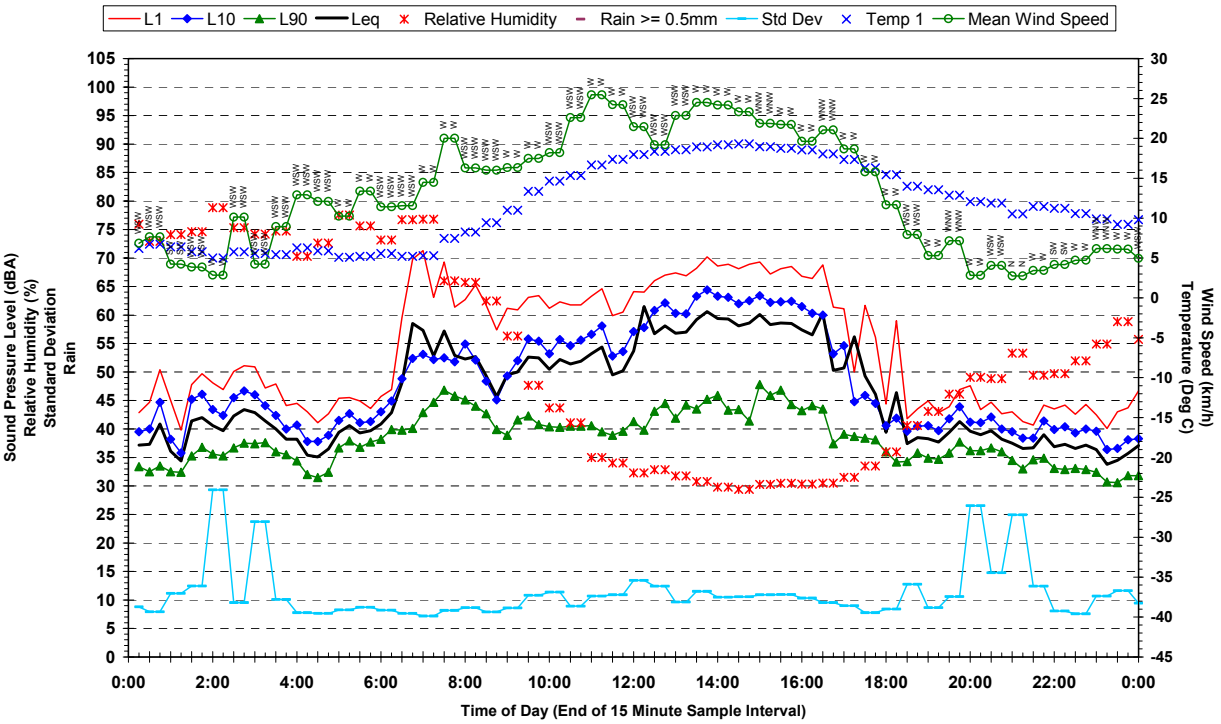
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Unattended Ambient Noise and Weather Data - Noise Assessment Group 3 - Residence Reference 87

Statistical Ambient Noise Levels
NAG 3 - Residence Reference 87 - Tuesday 7 August 2007

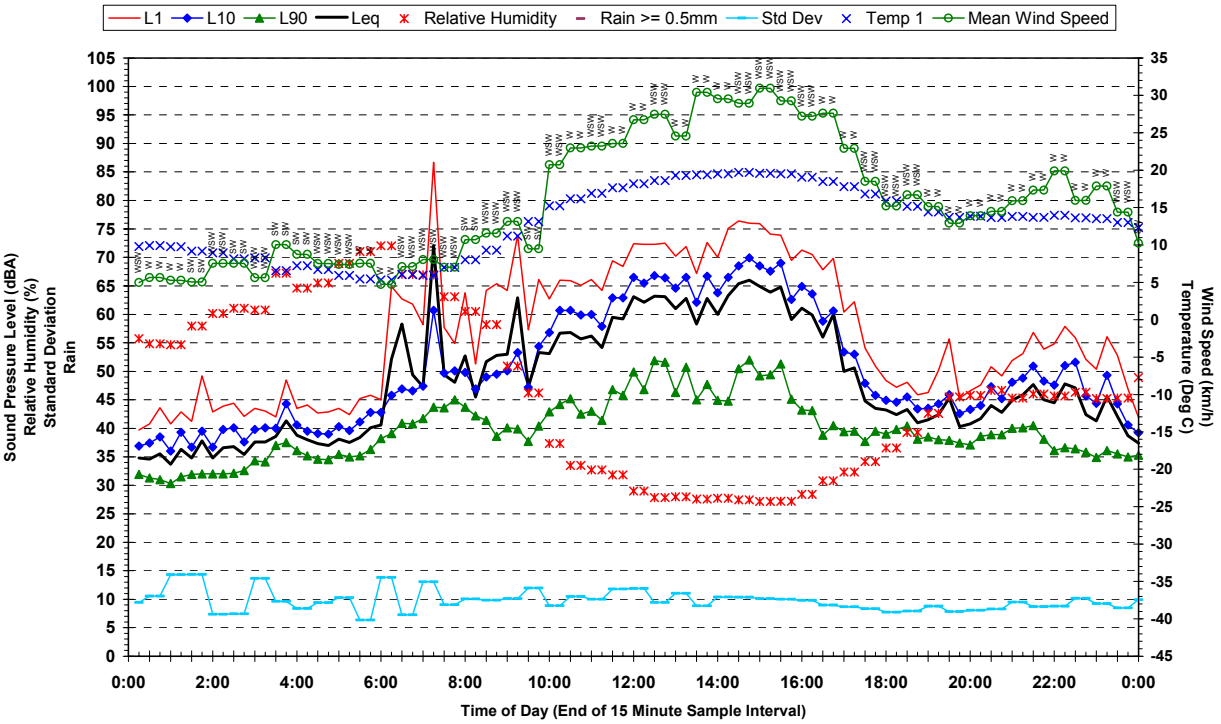


Statistical Ambient Noise Levels
NAG 3 - Residence Reference 87 - Wednesday 8 August 2007

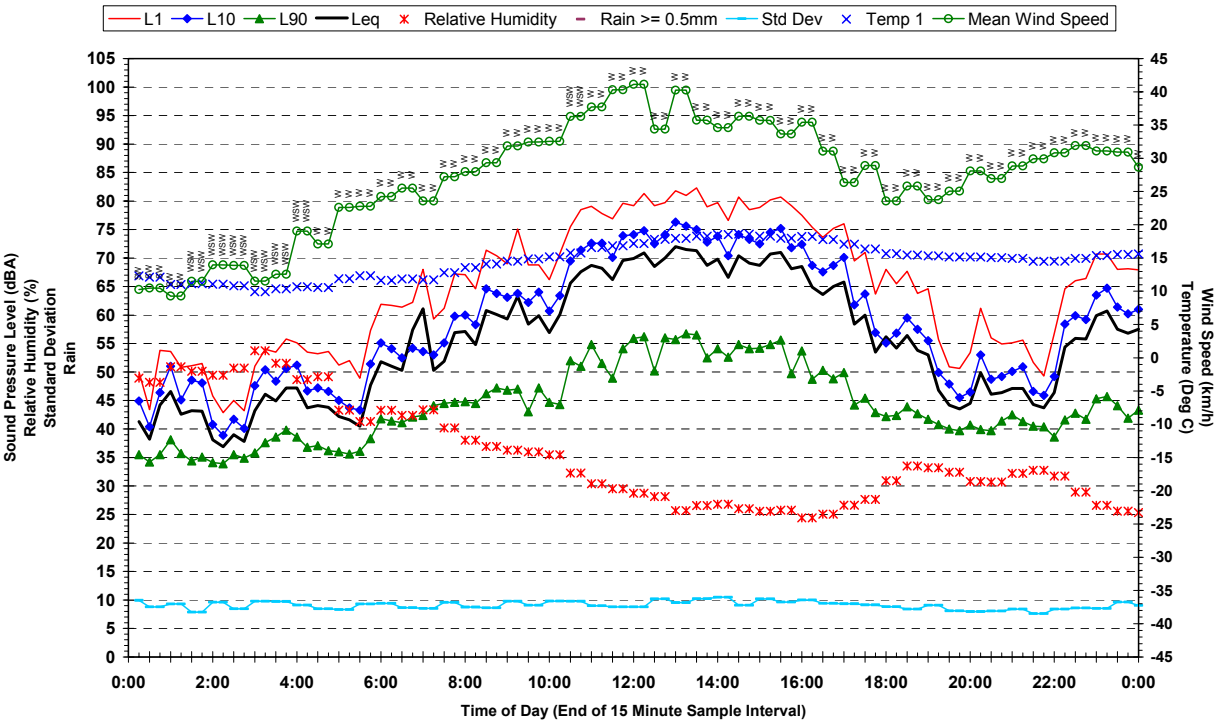


Unattended Ambient Noise and Weather Data - Noise Assessment Group 3 - Residence Reference 87

Statistical Ambient Noise Levels
NAG 3 - Residence Reference 87 - Thursday 9 August 2007

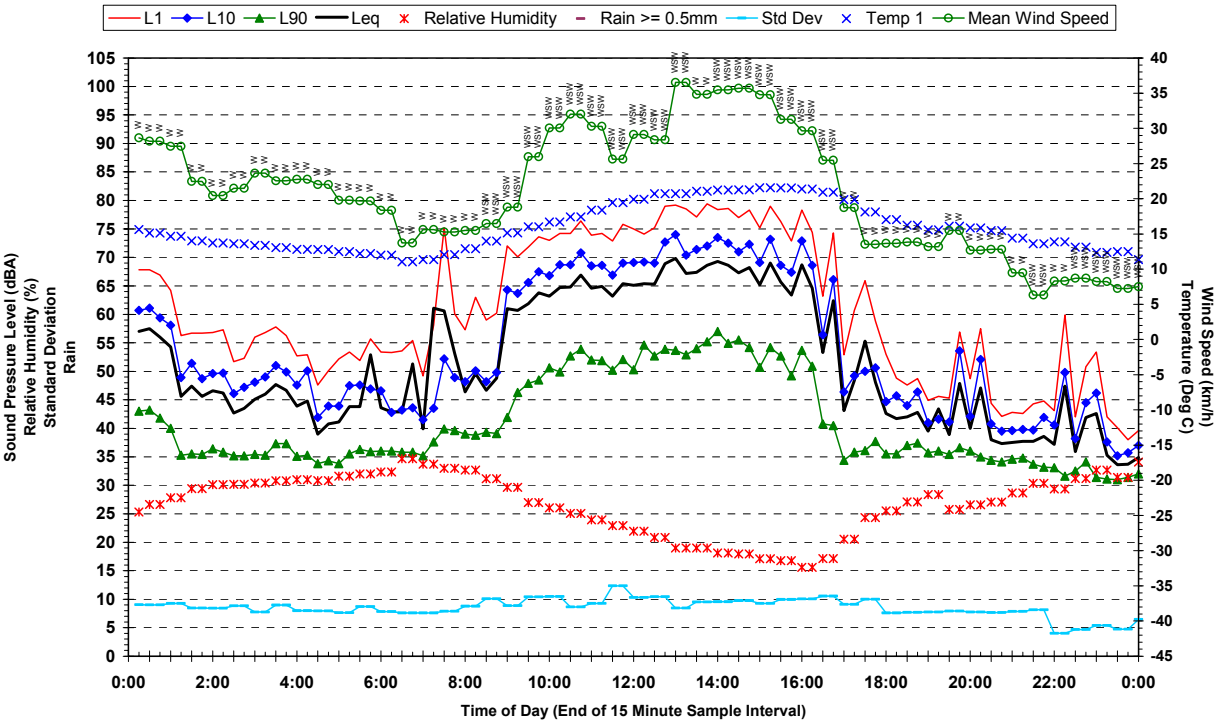


Statistical Ambient Noise Levels
NAG 3 - Residence Reference 87 - Friday 10 August 2007

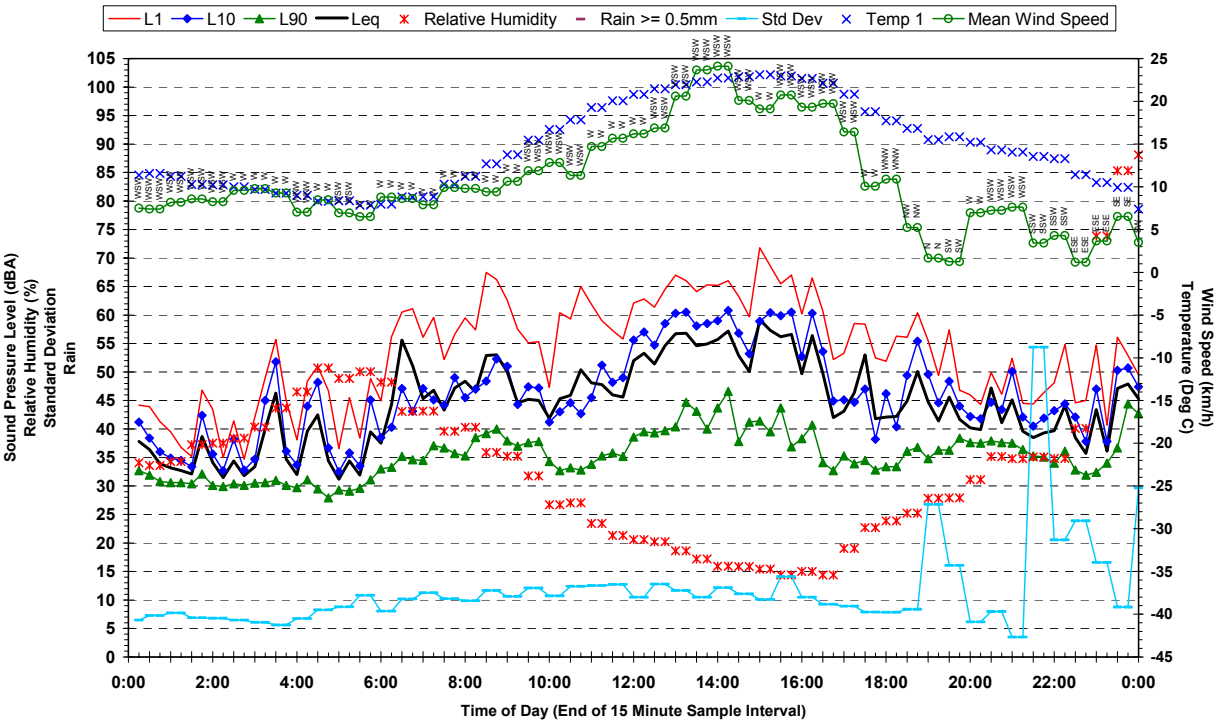


Unattended Ambient Noise and Weather Data - Noise Assessment Group 3 - Residence Reference 87

Statistical Ambient Noise Levels
NAG 3 - Residence Reference 87 - Saturday 11 August 2007

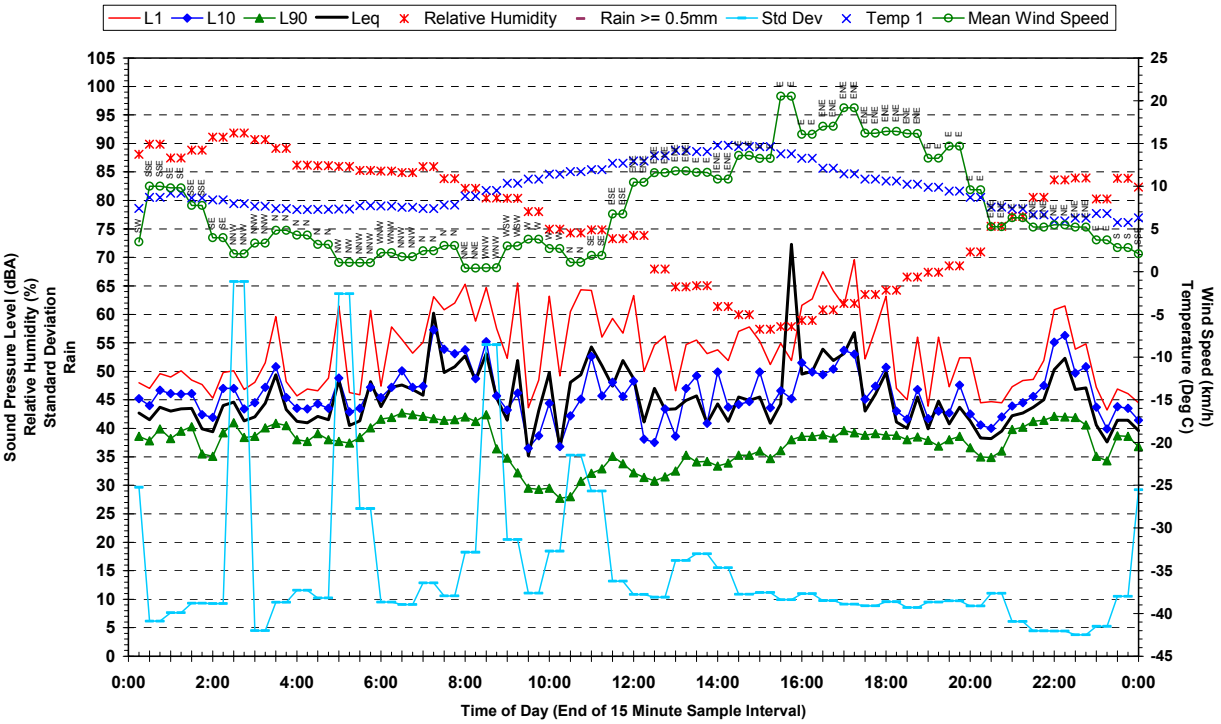


Statistical Ambient Noise Levels
NAG 3 - Residence Reference 87 - Sunday 12 August 2007

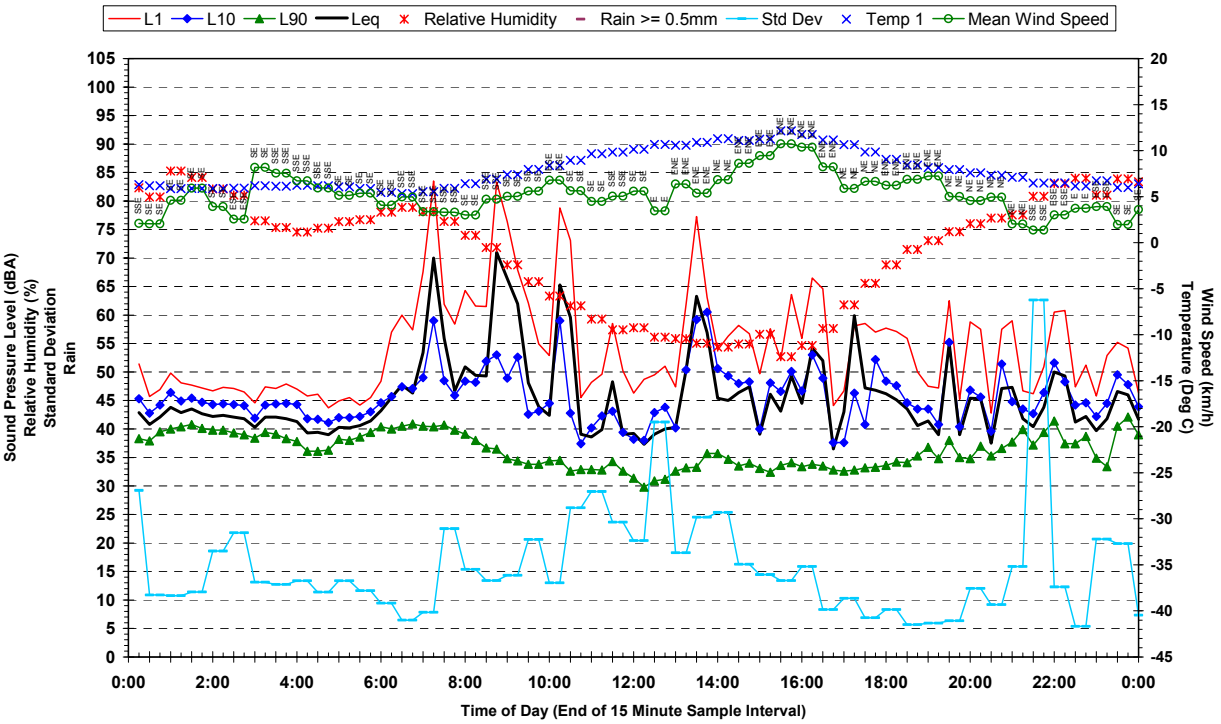


Unattended Ambient Noise and Weather Data - Noise Assessment Group 3 - Residence Reference 87

Statistical Ambient Noise Levels
NAG 3 - Residence Reference 87 - Monday 13 August 2007

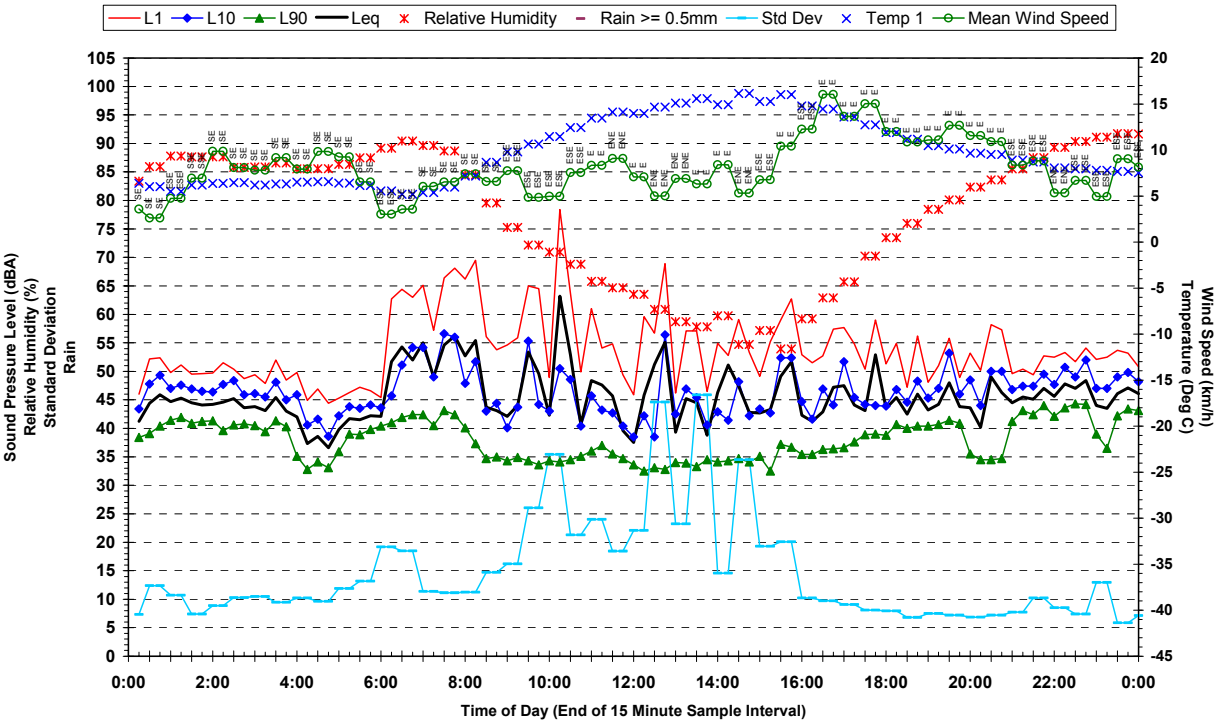


Statistical Ambient Noise Levels
NAG 3 - Residence Reference 87 - Tuesday 14 August 2007

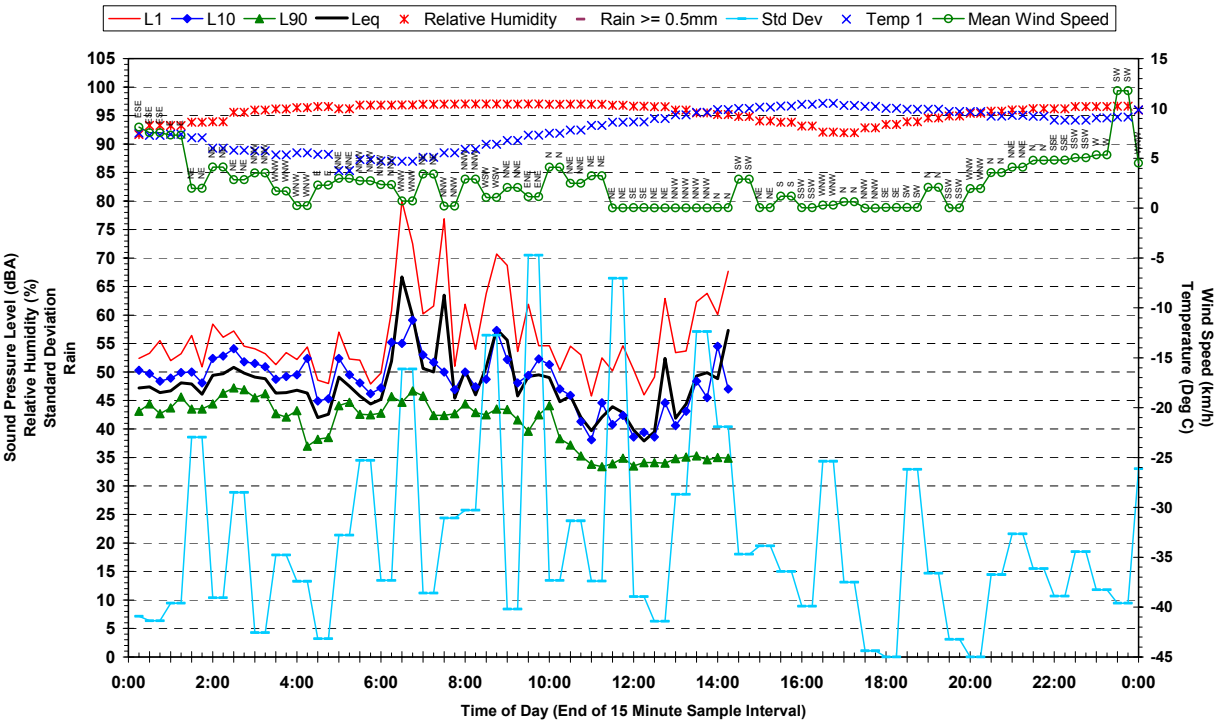


Unattended Ambient Noise and Weather Data - Noise Assessment Group 3 - Residence Reference 87

Statistical Ambient Noise Levels
NAG 3 - Residence Reference 87 - Wednesday 15 August 2007



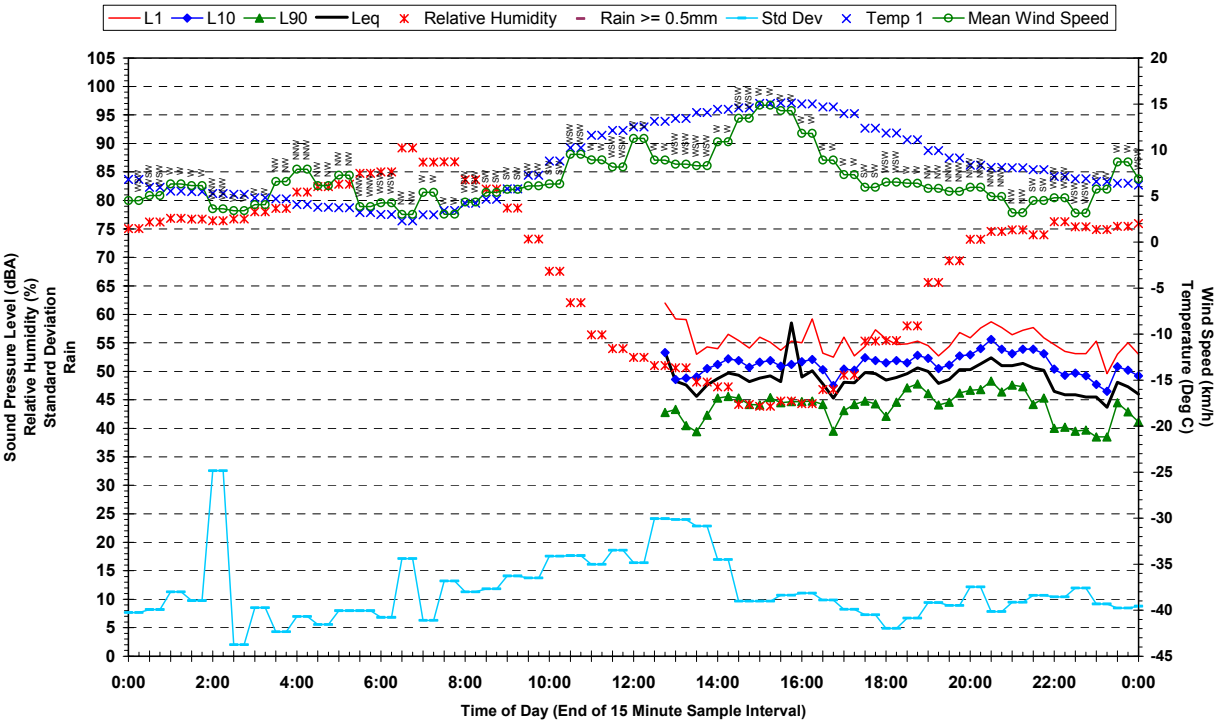
Statistical Ambient Noise Levels
NAG 3 - Residence Reference 87 - Thursday 16 August 2007



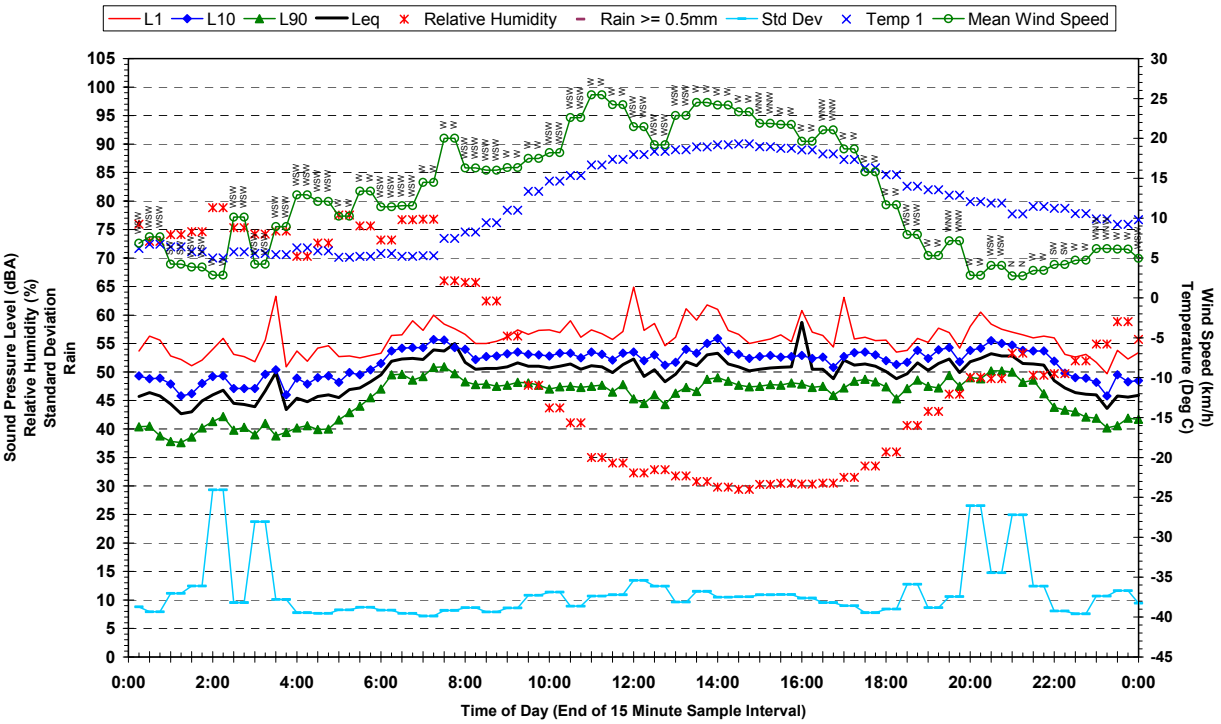
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Unattended Ambient Noise and Weather Data - Noise Assessment Group 4 - Residence Reference 95

Statistical Ambient Noise Levels
NAG 4 - Residence Reference 95 - Tuesday 7 August 2007

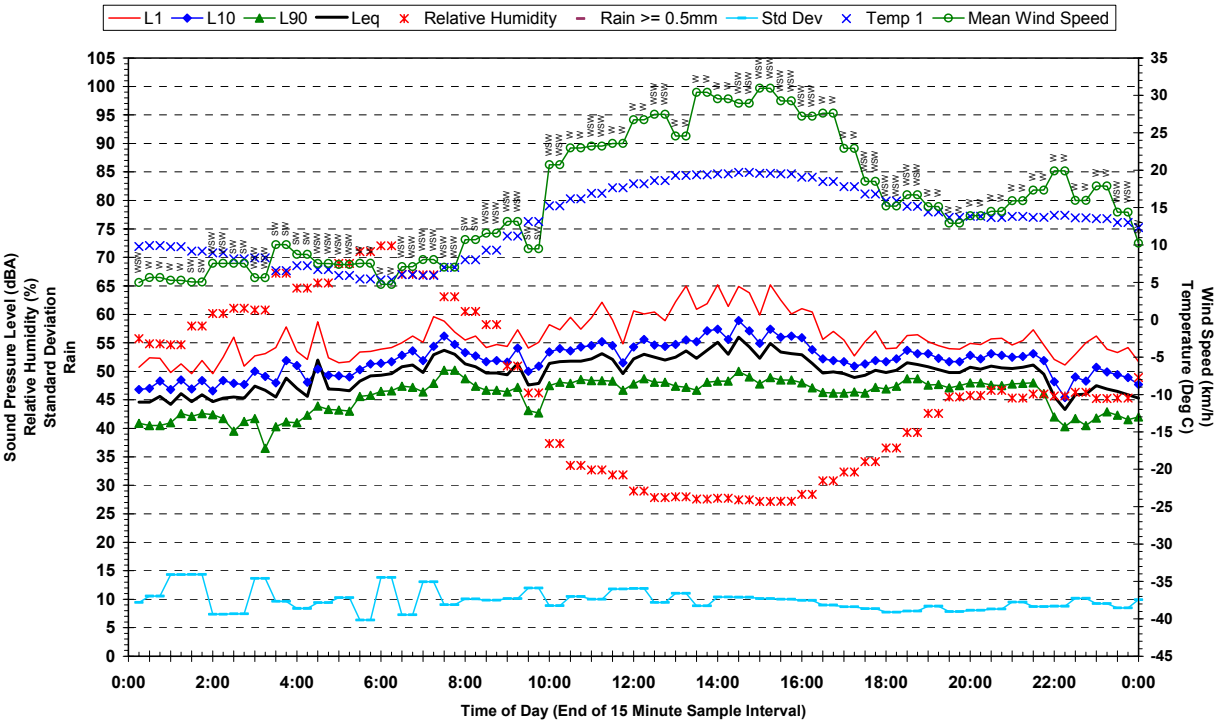


Statistical Ambient Noise Levels
NAG 4 - Residence Reference 95 - Wednesday 8 August 2007

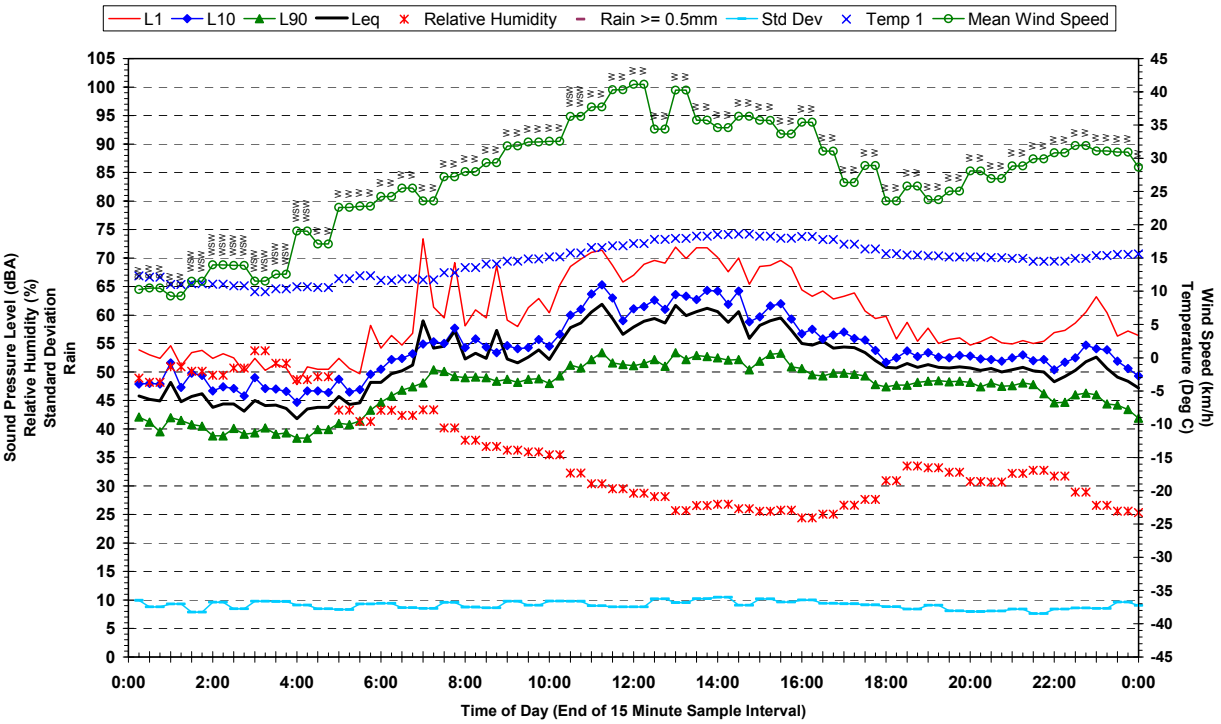


Unattended Ambient Noise and Weather Data - Noise Assessment Group 4 - Residence Reference 95

Statistical Ambient Noise Levels
NAG 4 - Residence Reference 95 - Thursday 9 August 2007

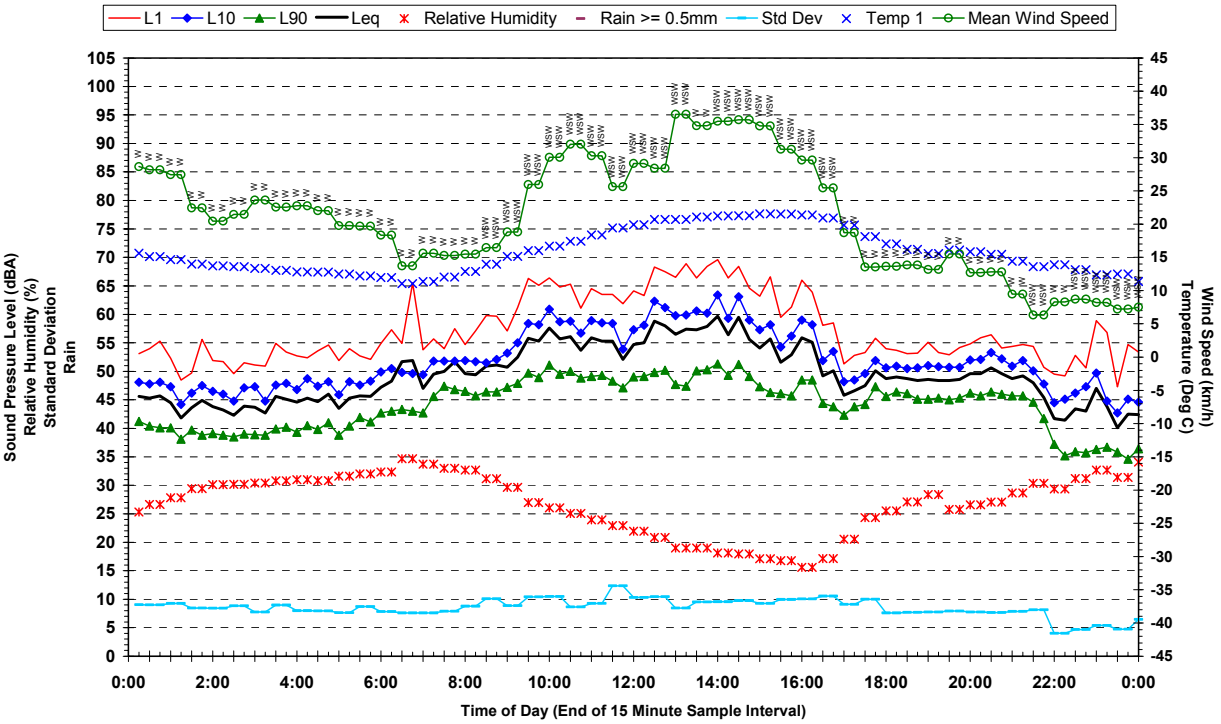


Statistical Ambient Noise Levels
NAG 4 - Residence Reference 95 - Friday 10 August 2007

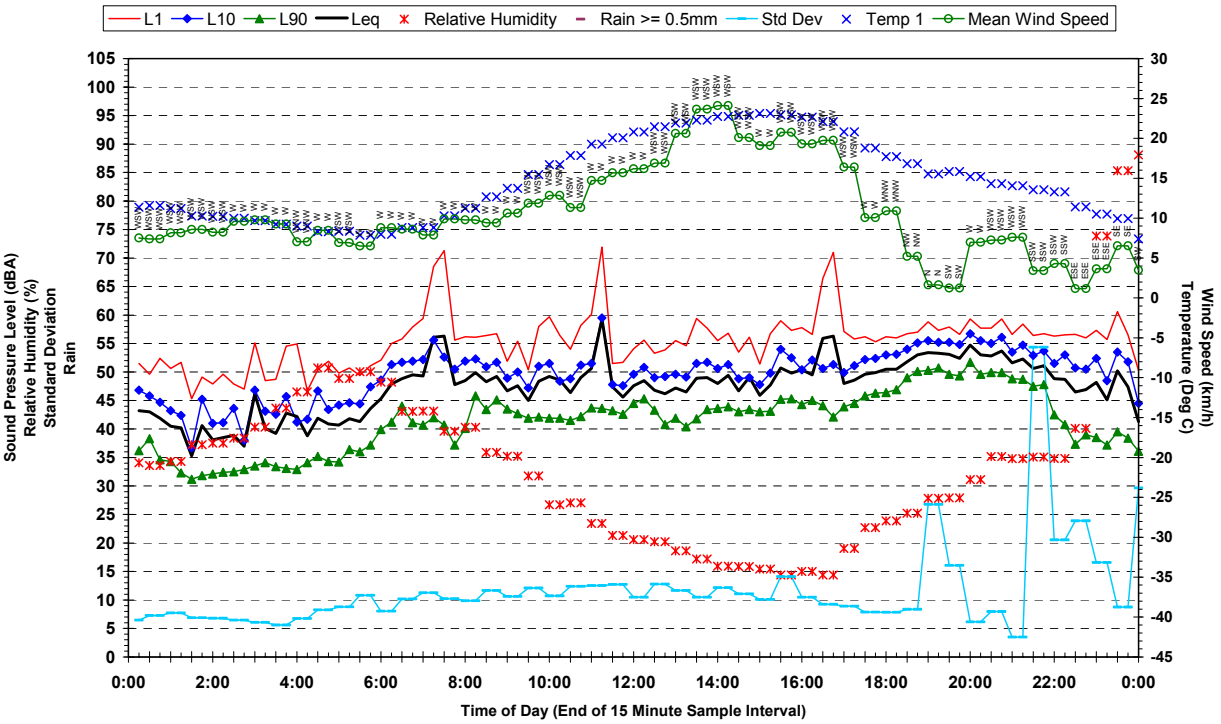


Unattended Ambient Noise and Weather Data - Noise Assessment Group 4 - Residence Reference 95

Statistical Ambient Noise Levels
NAG 4 - Residence Reference 95 - Saturday 11 August 2007

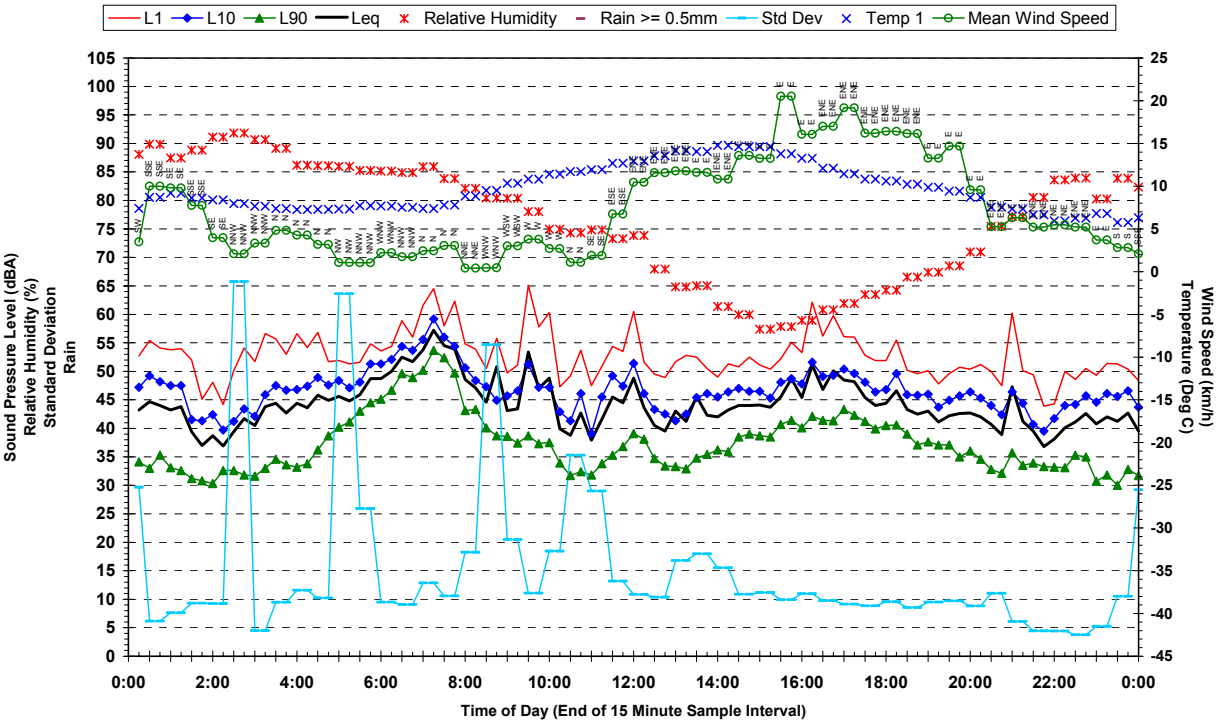


Statistical Ambient Noise Levels
NAG 4 - Residence Reference 95 - Sunday 12 August 2007

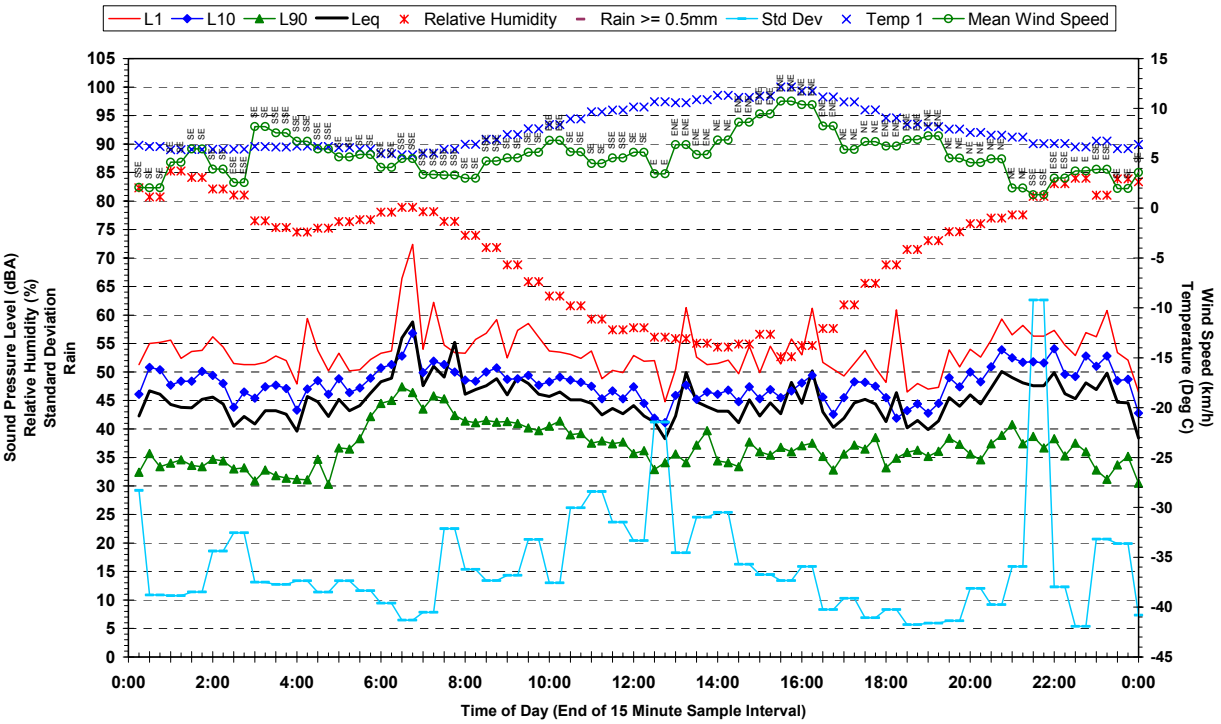


Unattended Ambient Noise and Weather Data - Noise Assessment Group 4 - Residence Reference 95

Statistical Ambient Noise Levels
NAG 4 - Residence Reference 95 - Monday 13 August 2007

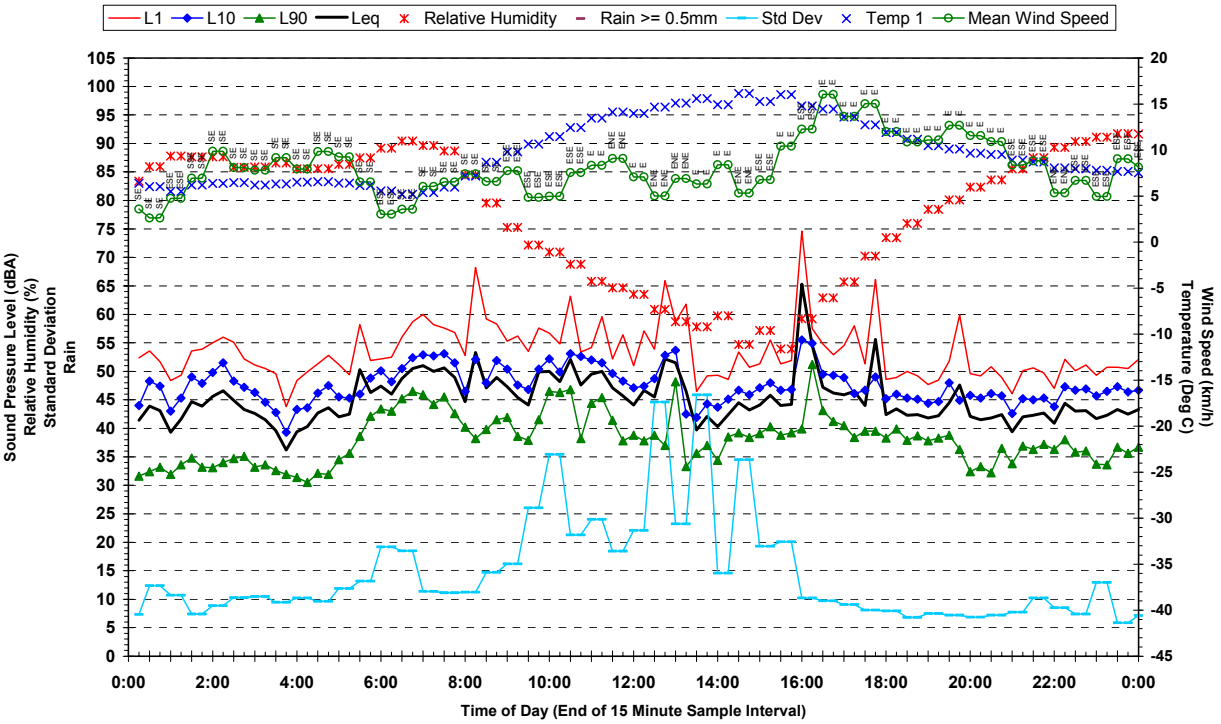


Statistical Ambient Noise Levels
NAG 4 - Residence Reference 95 - Tuesday 14 August 2007

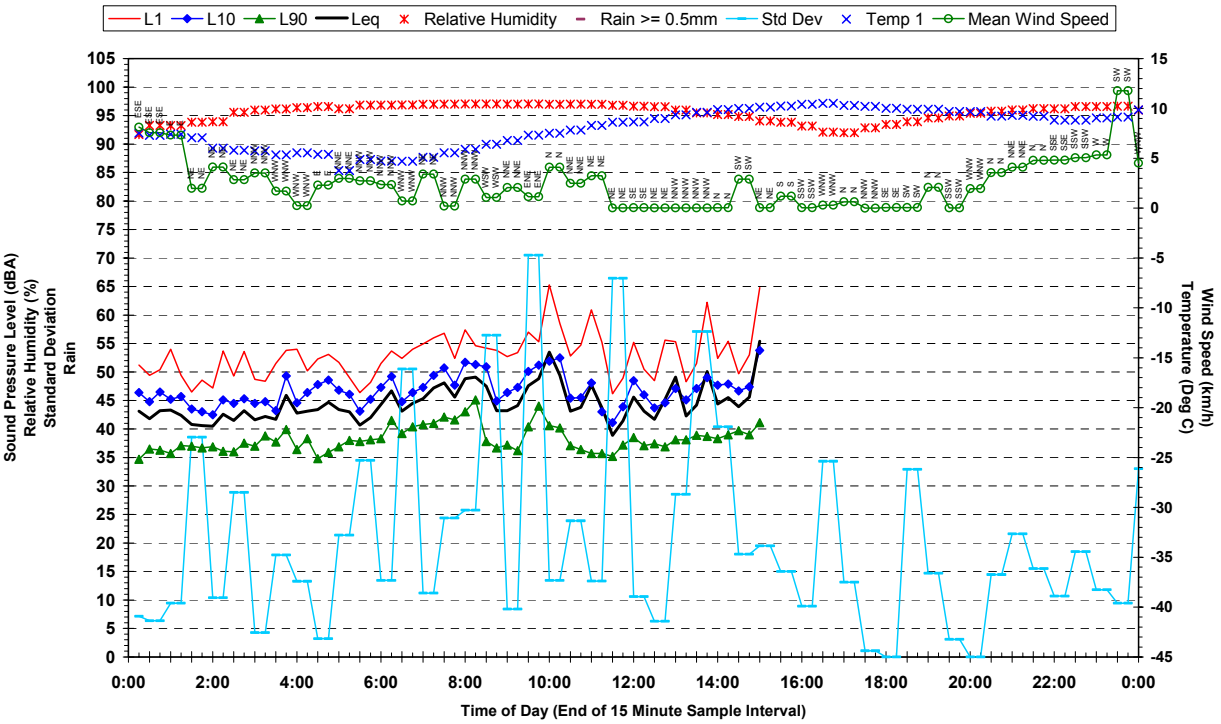


Unattended Ambient Noise and Weather Data - Noise Assessment Group 4 - Residence Reference 95

Statistical Ambient Noise Levels
NAG 4 - Residence Reference 95 - Wednesday 15 August 2007



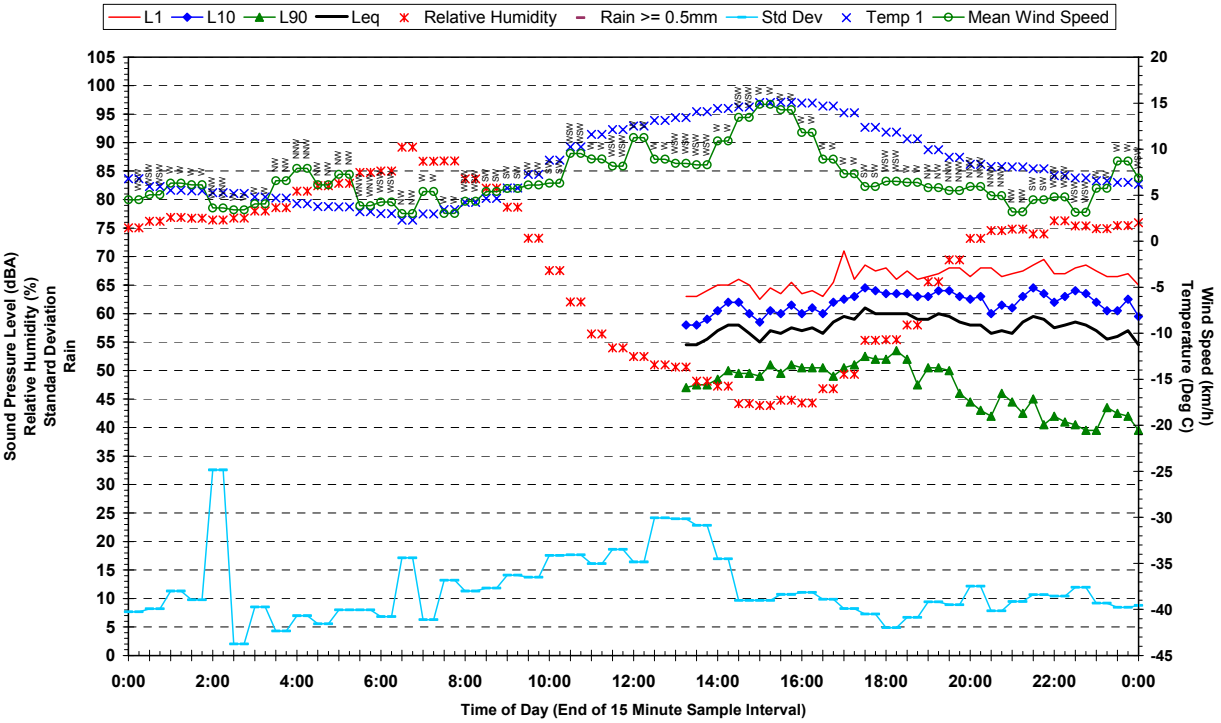
Statistical Ambient Noise Levels
NAG 4 - Residence Reference 95 - Thursday 16 August 2007



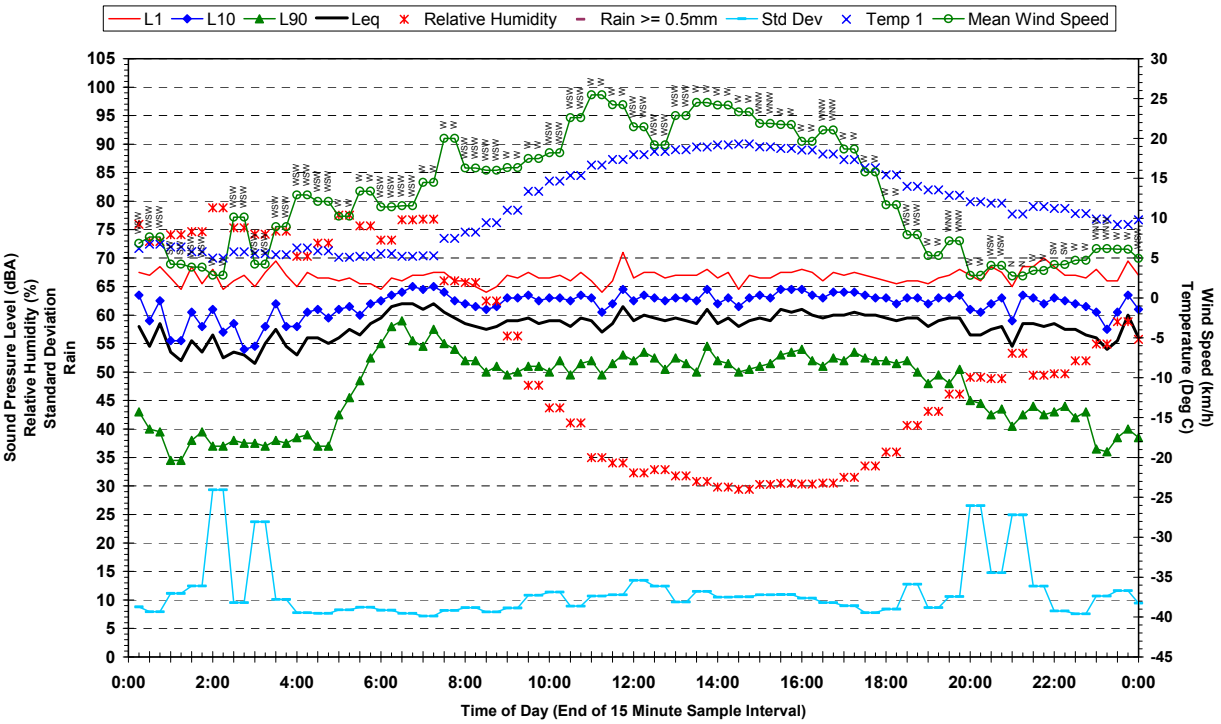
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Unattended Ambient Noise and Weather Data - Noise Assessment Group 5 - Residence Reference 90

Statistical Ambient Noise Levels
NAG 5 - Residence Reference 90 - Tuesday 7 August 2007

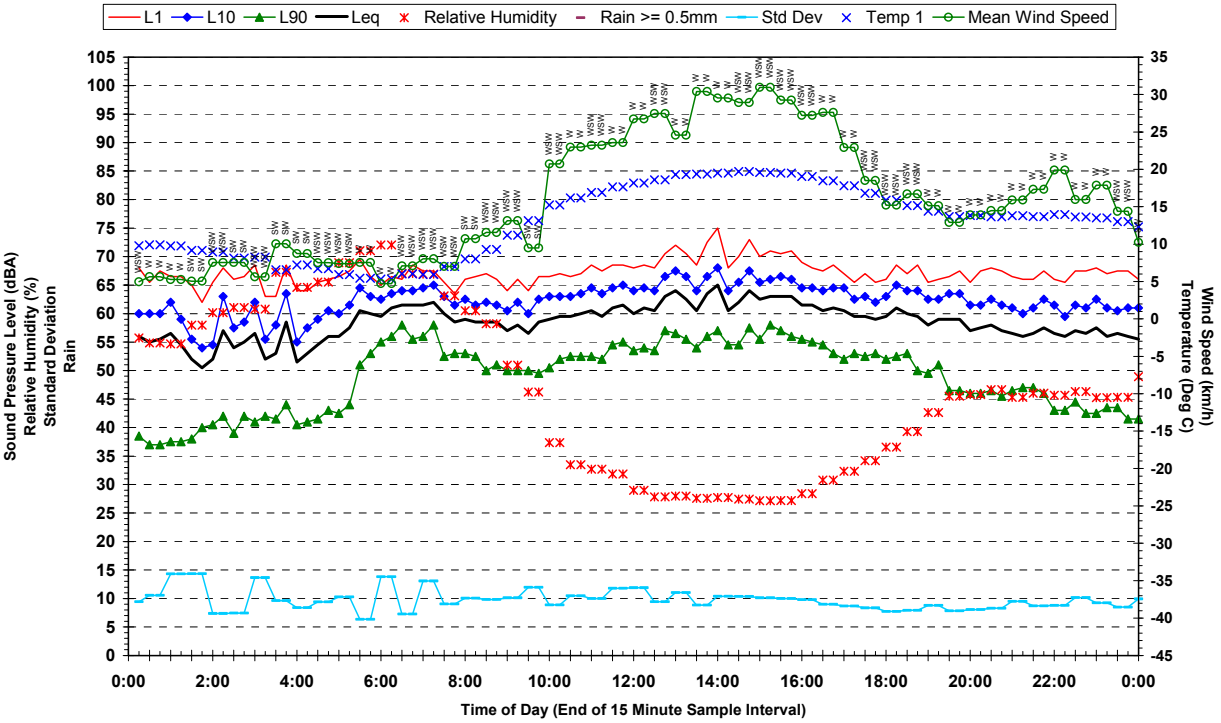


Statistical Ambient Noise Levels
NAG 5 - Residence Reference 90 - Wednesday 8 August 2007

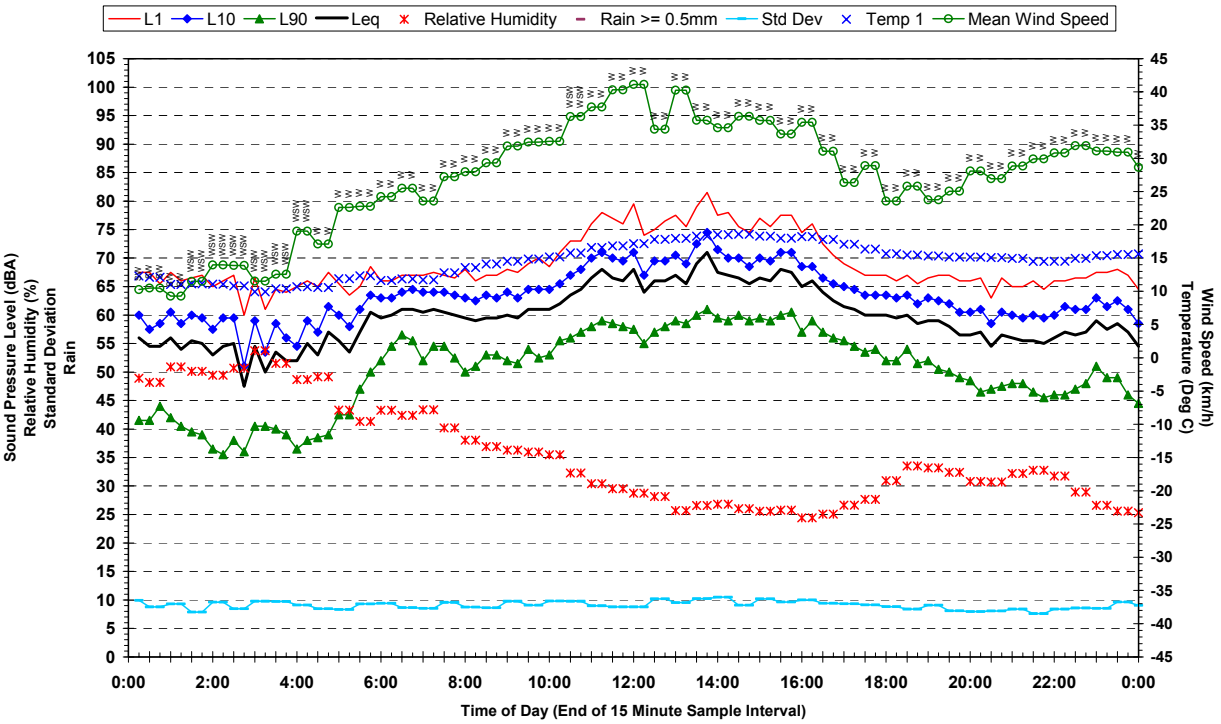


Unattended Ambient Noise and Weather Data - Noise Assessment Group 5 - Residence Reference 90

Statistical Ambient Noise Levels
NAG 5 - Residence Reference 90 - Thursday 9 August 2007

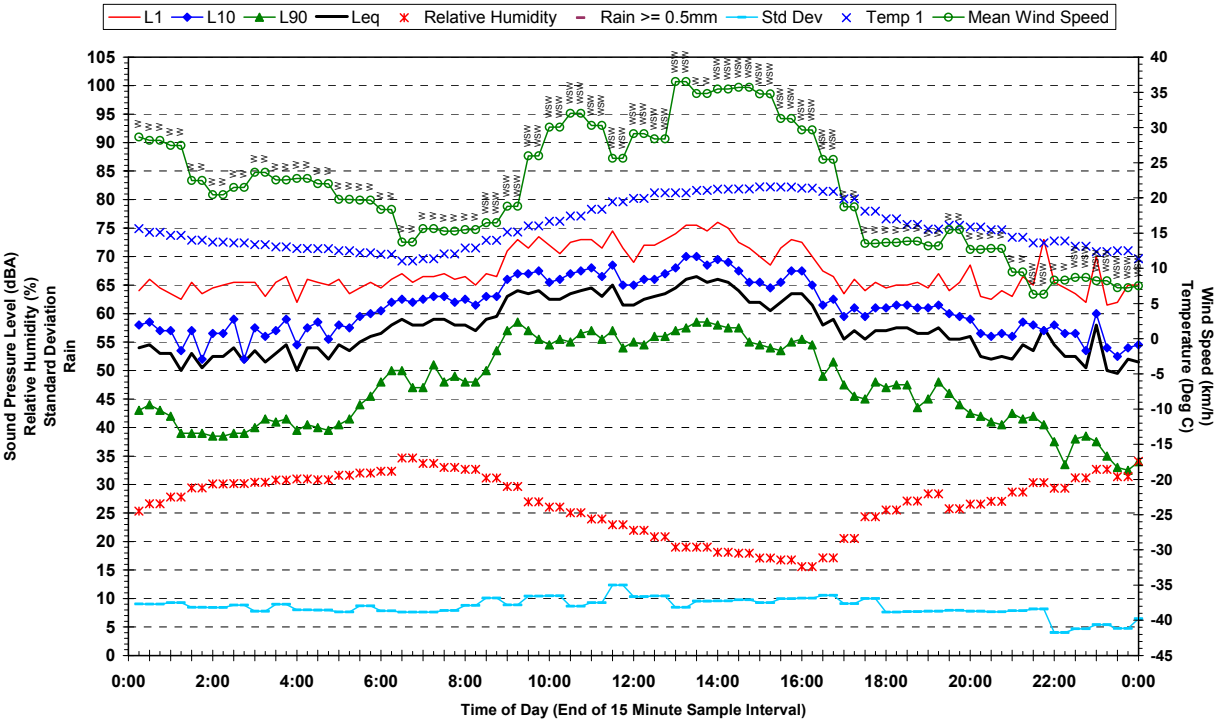


Statistical Ambient Noise Levels
NAG 5 - Residence Reference 90 - Friday 10 August 2007

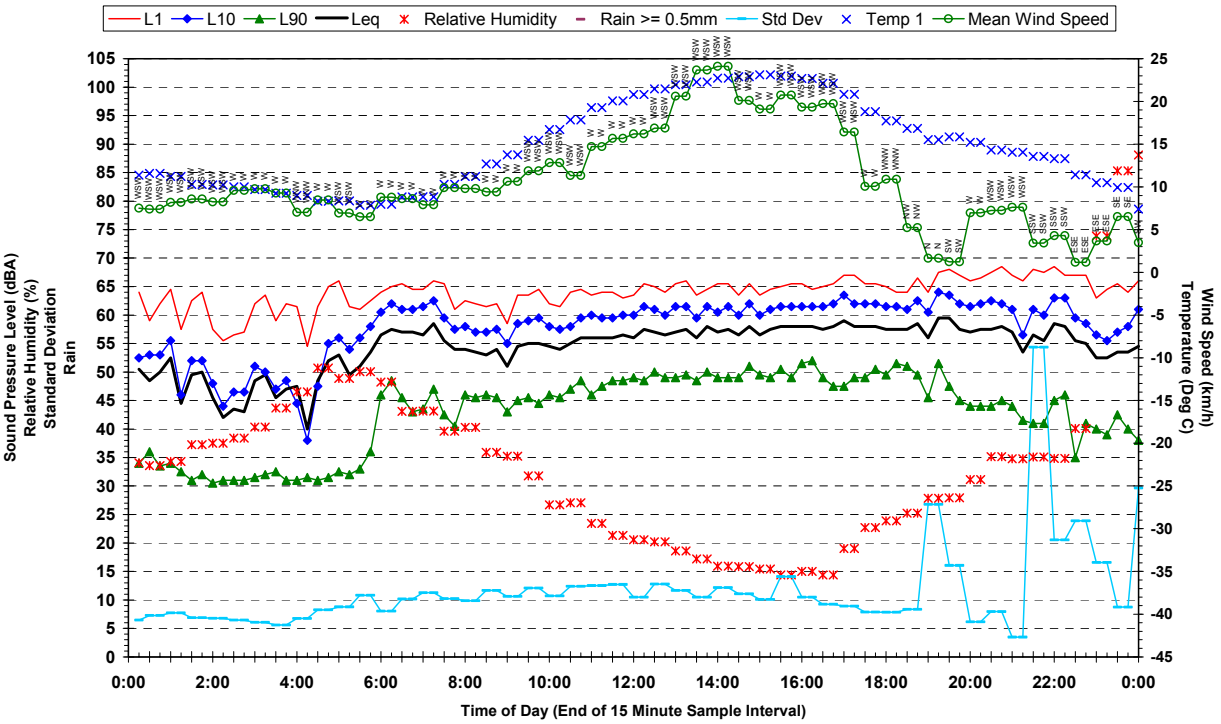


Unattended Ambient Noise and Weather Data - Noise Assessment Group 5 - Residence Reference 90

Statistical Ambient Noise Levels
NAG 5 - Residence Reference 90 - Saturday 11 August 2007

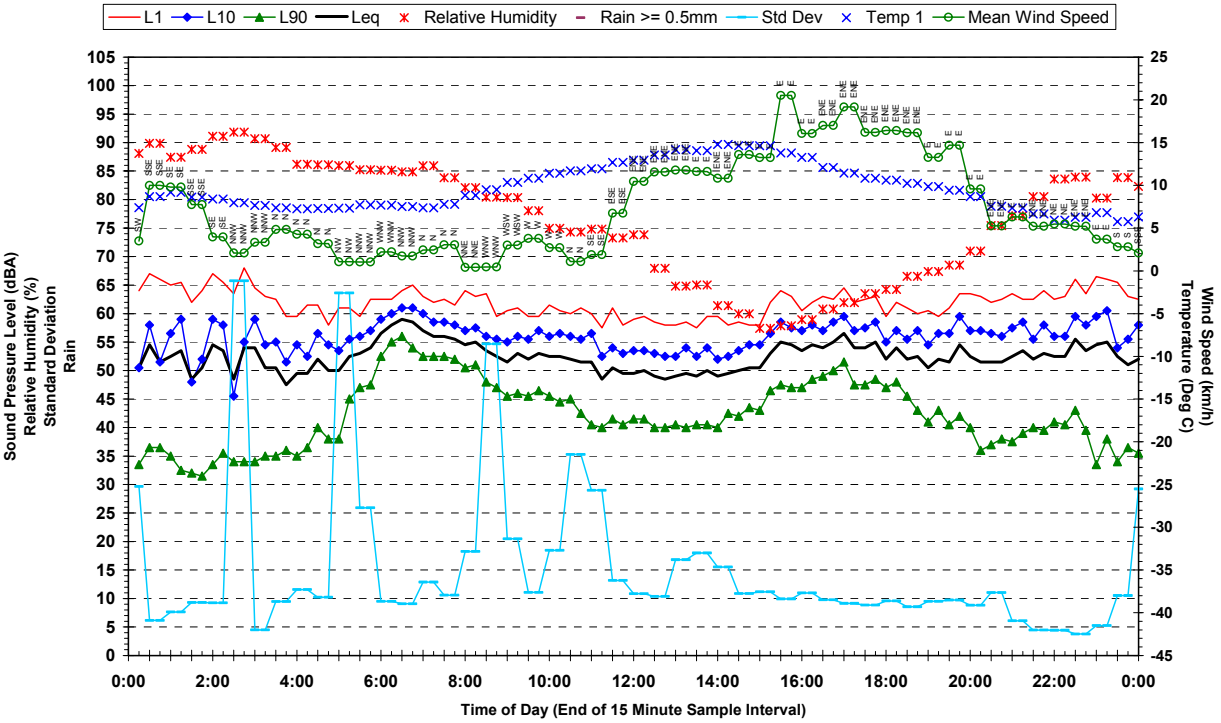


Statistical Ambient Noise Levels
NAG 5 - Residence Reference 90 - Sunday 12 August 2007

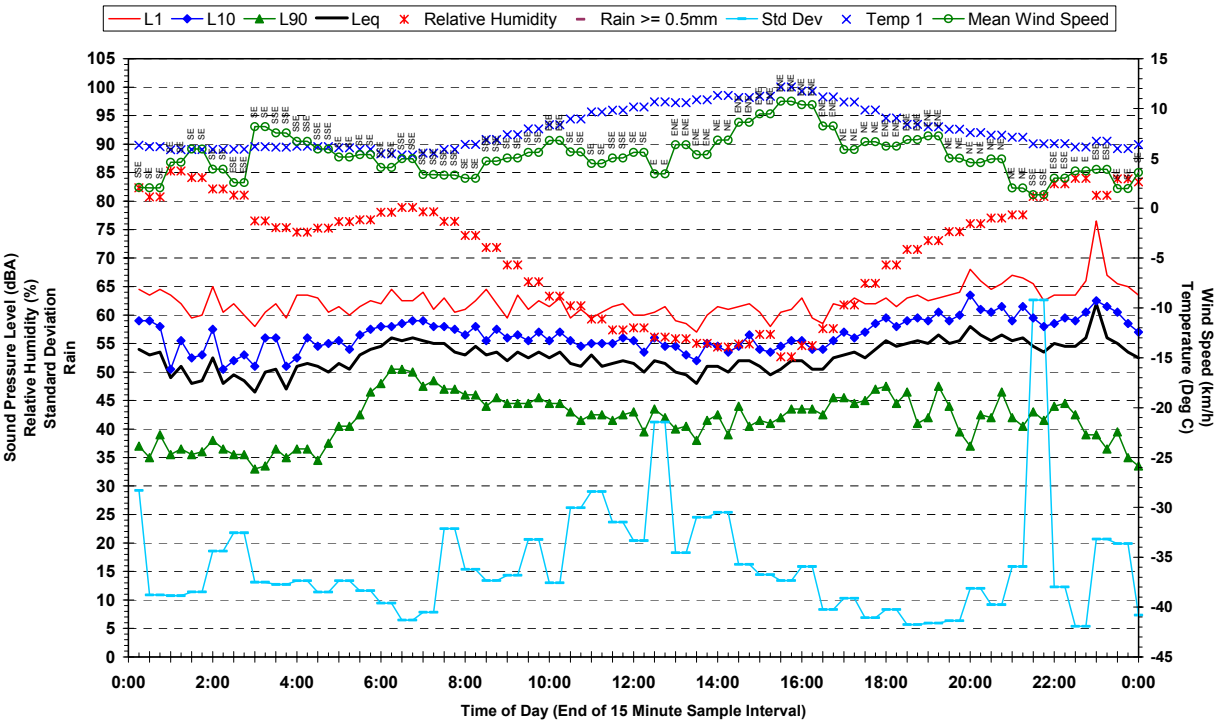


Unattended Ambient Noise and Weather Data - Noise Assessment Group 5 - Residence Reference 90

Statistical Ambient Noise Levels
NAG 5 - Residence Reference 90 - Monday 13 August 2007

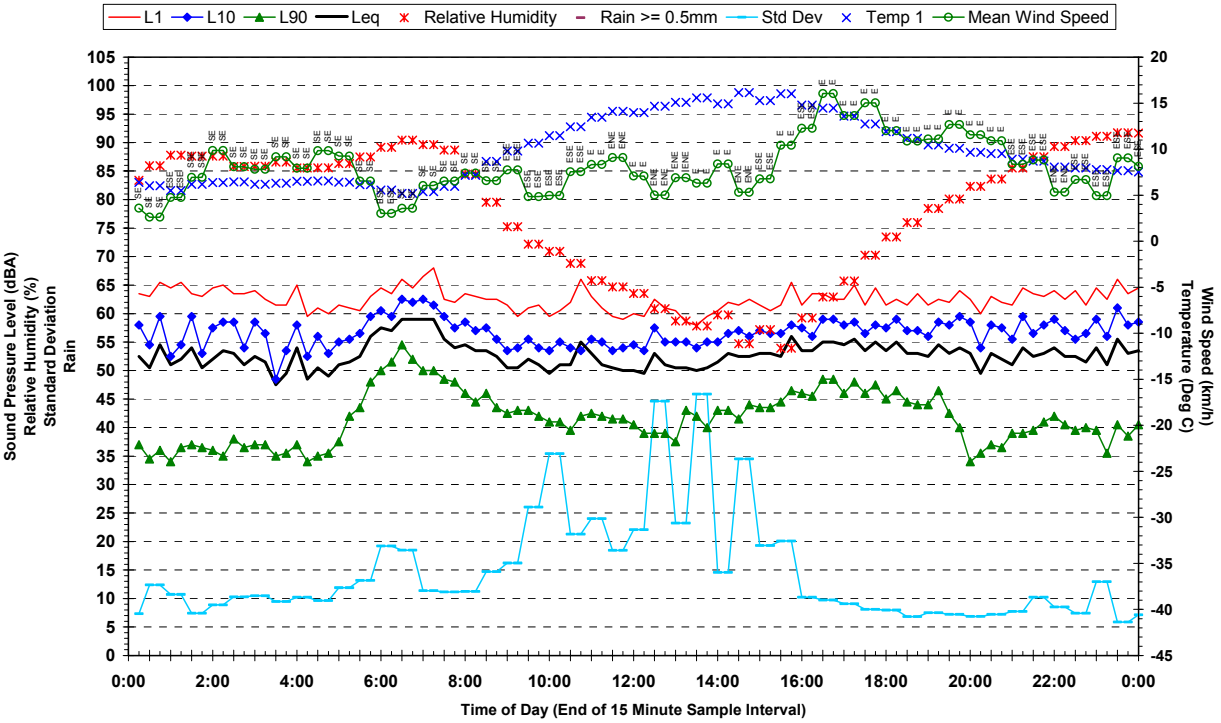


Statistical Ambient Noise Levels
NAG 5 - Residence Reference 90 - Tuesday 14 August 2007

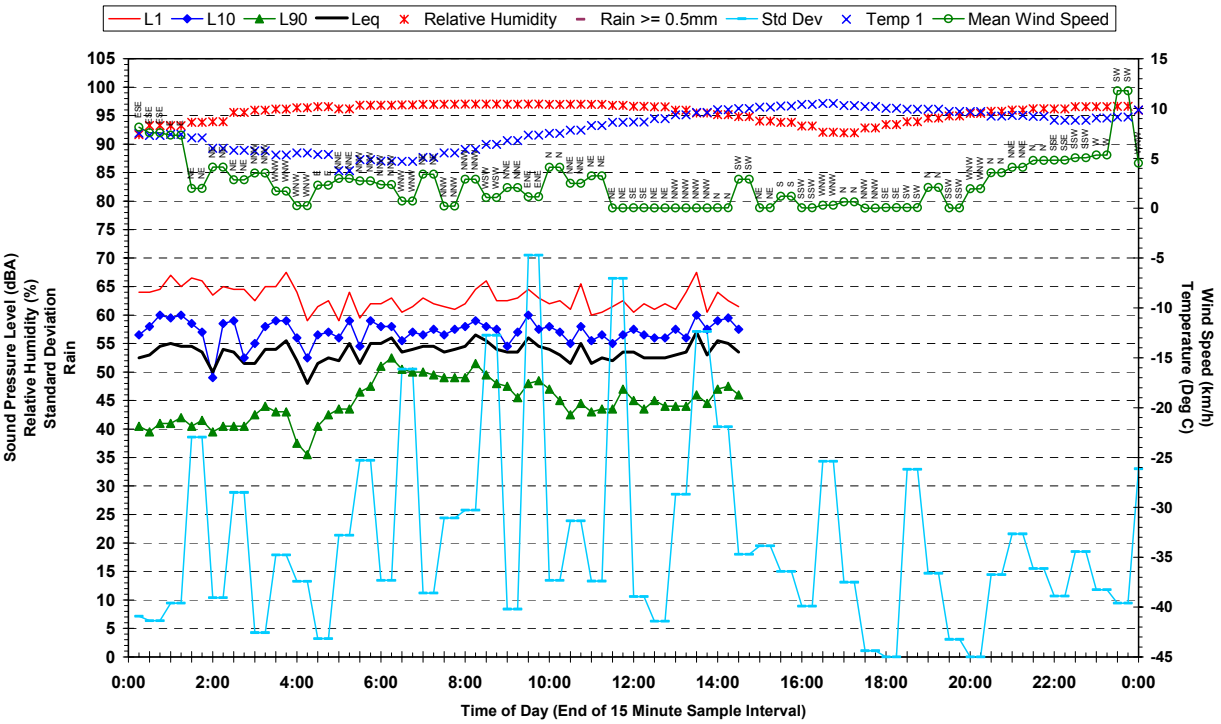


Unattended Ambient Noise and Weather Data - Noise Assessment Group 5 - Residence Reference 90

Statistical Ambient Noise Levels
NAG 5 - Residence Reference 90 - Wednesday 15 August 2007



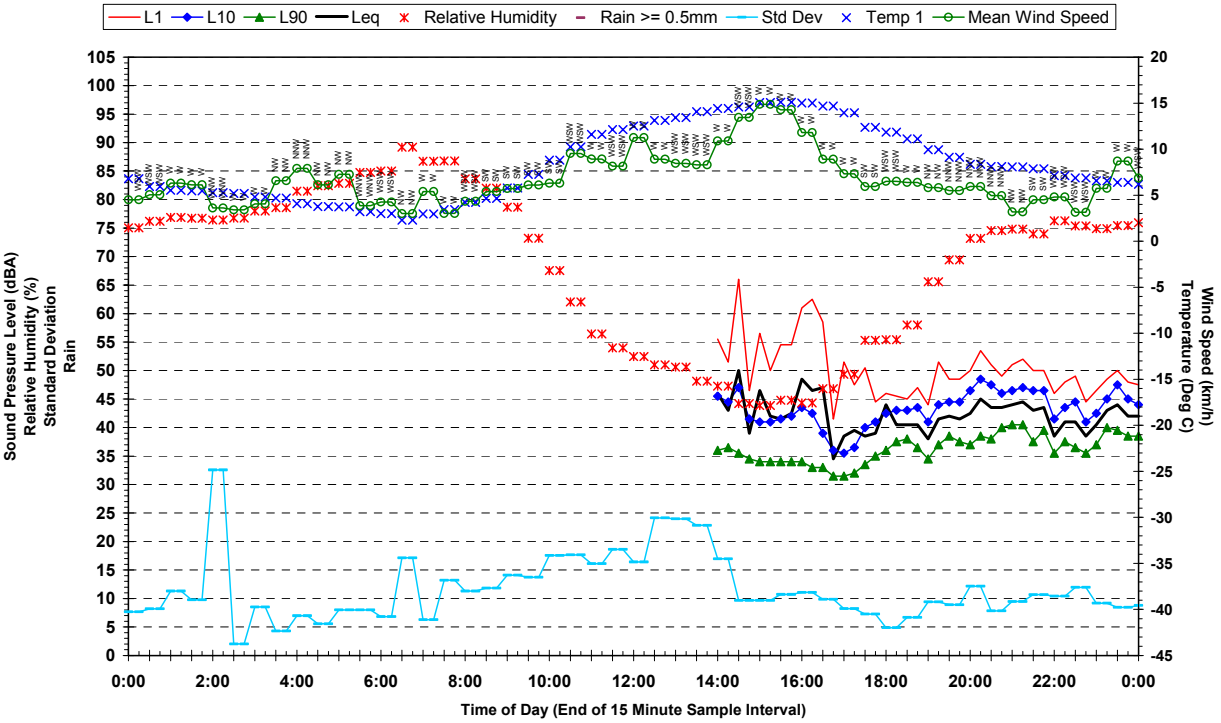
Statistical Ambient Noise Levels
NAG 5 - Residence Reference 90 - Thursday 16 August 2007



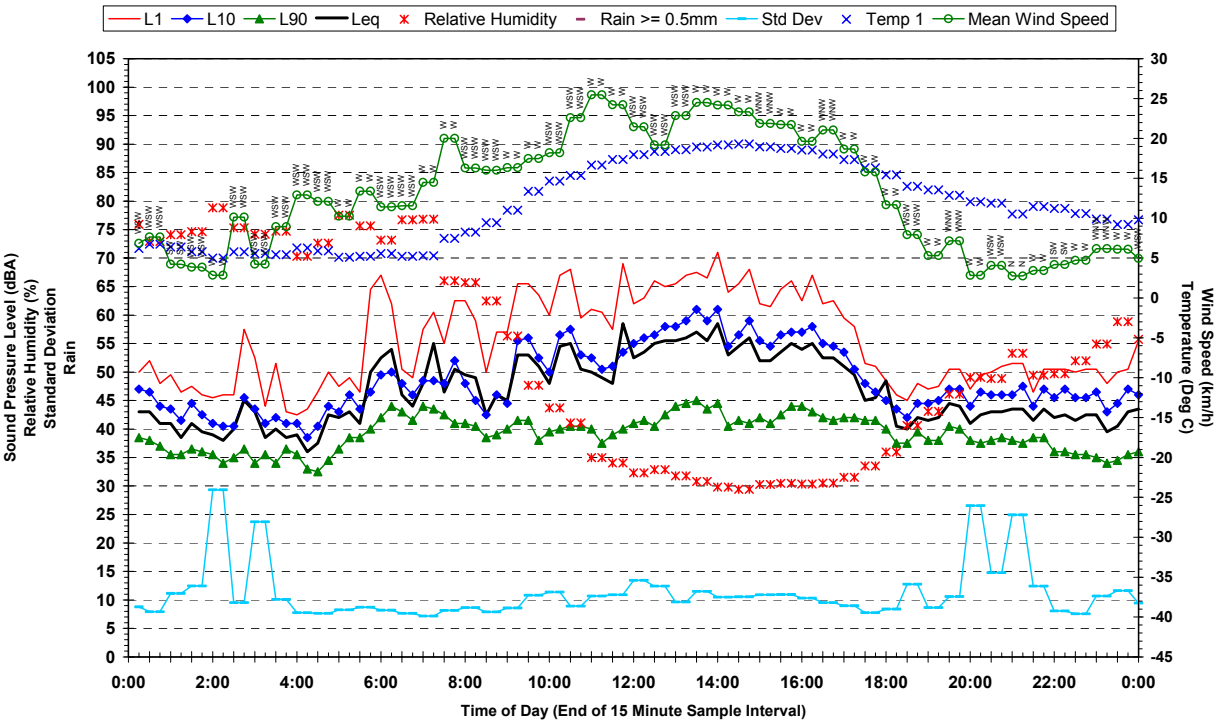
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Unattended Ambient Noise and Weather Data - Noise Assessment Group 6 - Residence Reference 117

Statistical Ambient Noise Levels
NAG 6 - Residence Reference 117 - Tuesday 7 August 2007

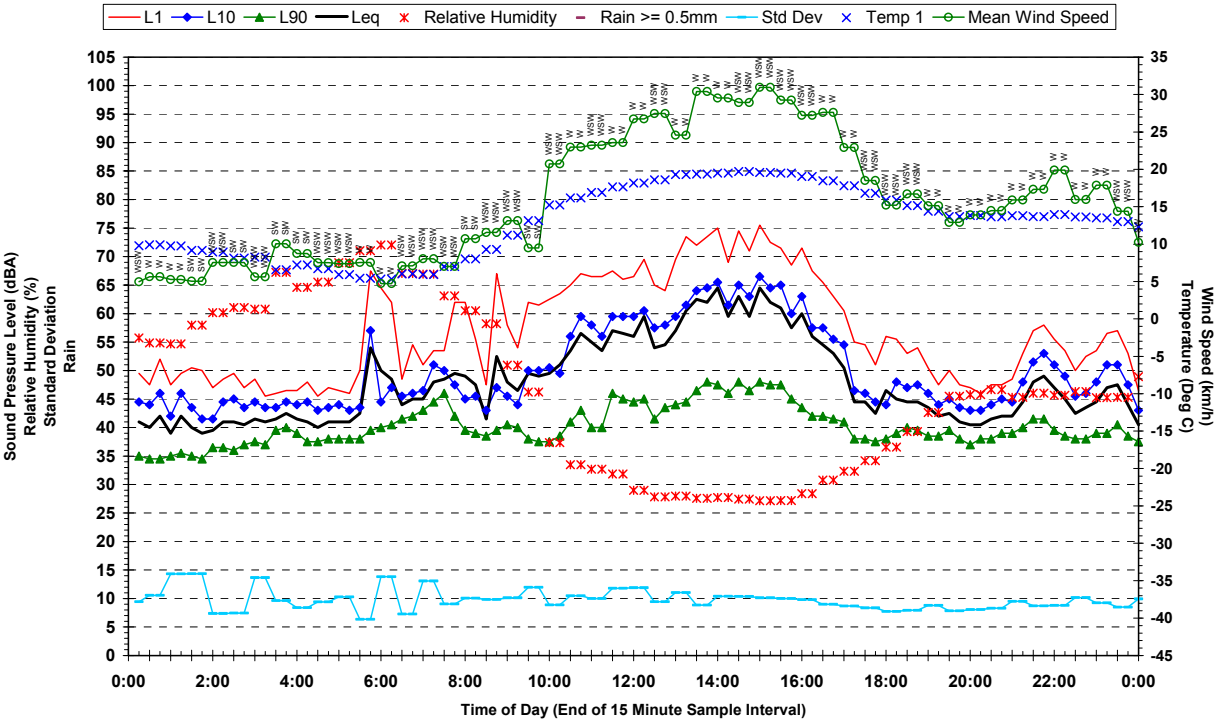


Statistical Ambient Noise Levels
NAG 6 - Residence Reference 117 - Wednesday 8 August 2007

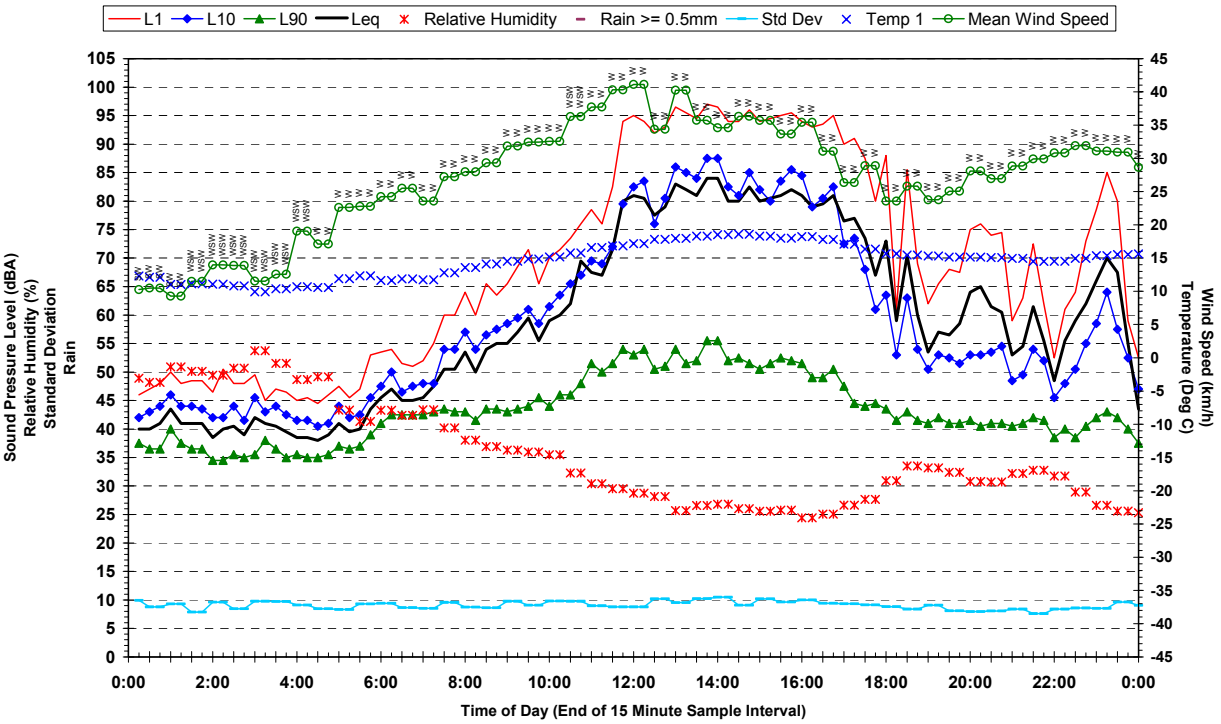


Unattended Ambient Noise and Weather Data - Noise Assessment Group 6 - Residence Reference 117

Statistical Ambient Noise Levels
NAG 6 - Residence Reference 117 - Thursday 9 August 2007

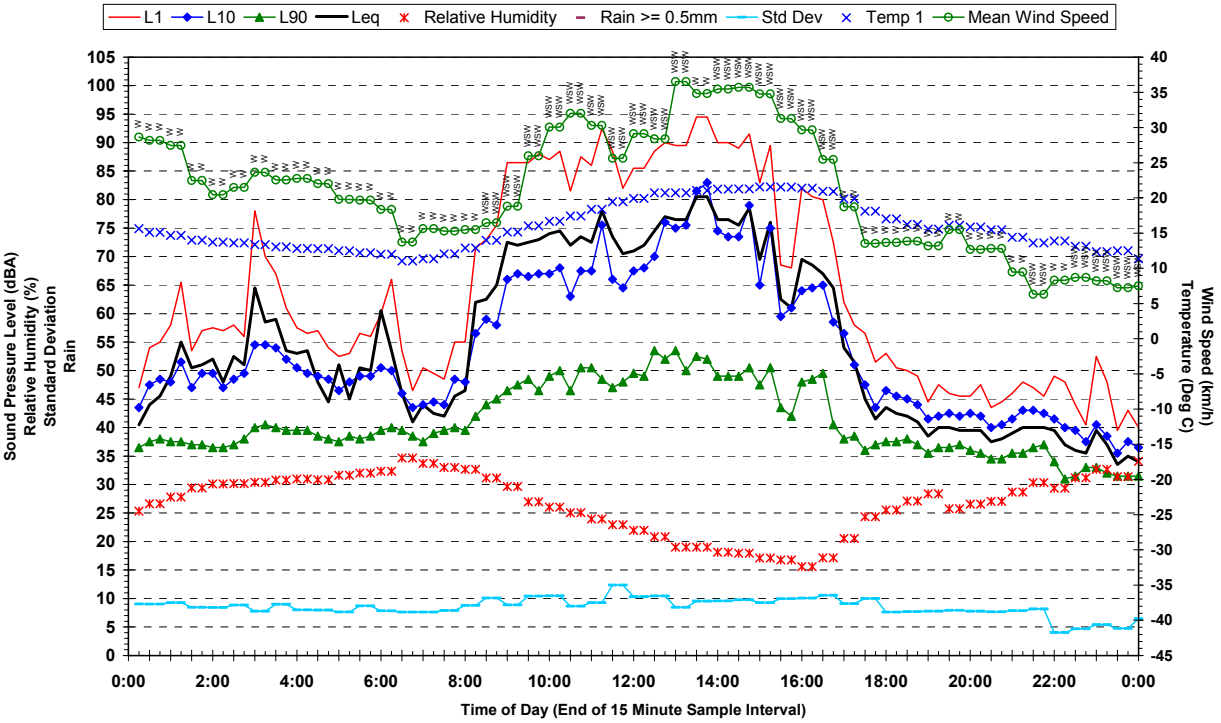


Statistical Ambient Noise Levels
NAG 6 - Residence Reference 117 - Friday 10 August 2007

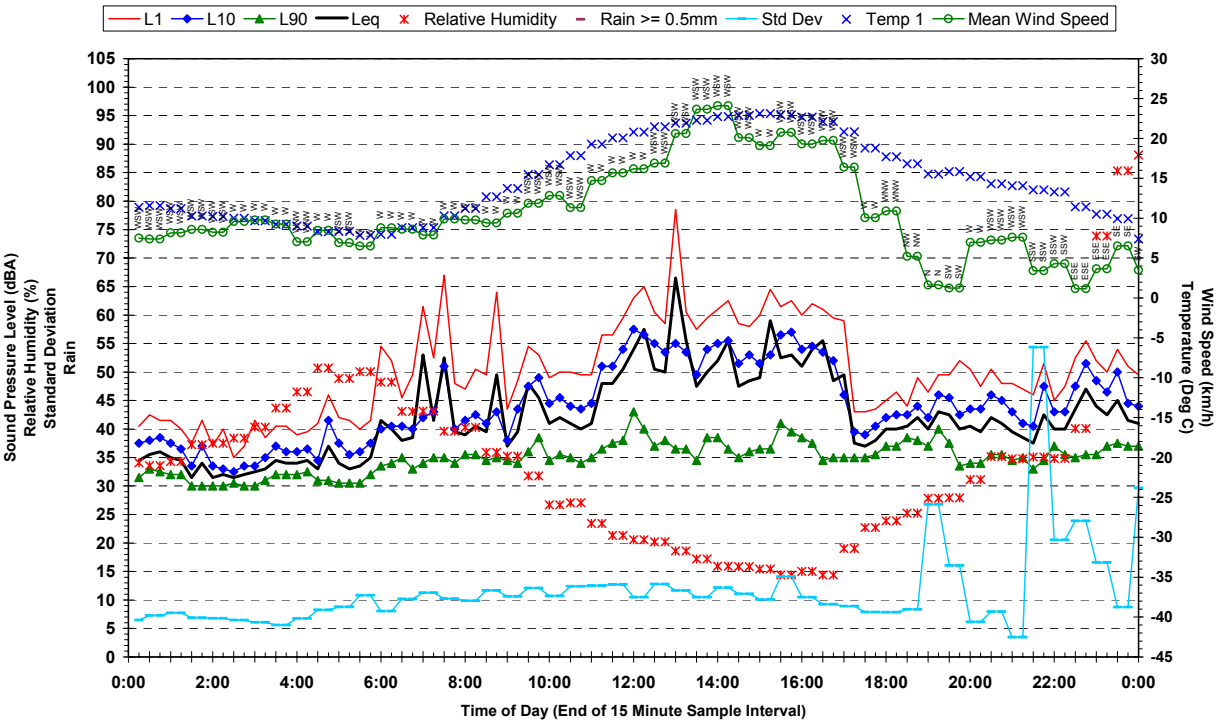


Unattended Ambient Noise and Weather Data - Noise Assessment Group 6 - Residence Reference 117

Statistical Ambient Noise Levels
NAG 6 - Residence Reference 117 - Saturday 11 August 2007

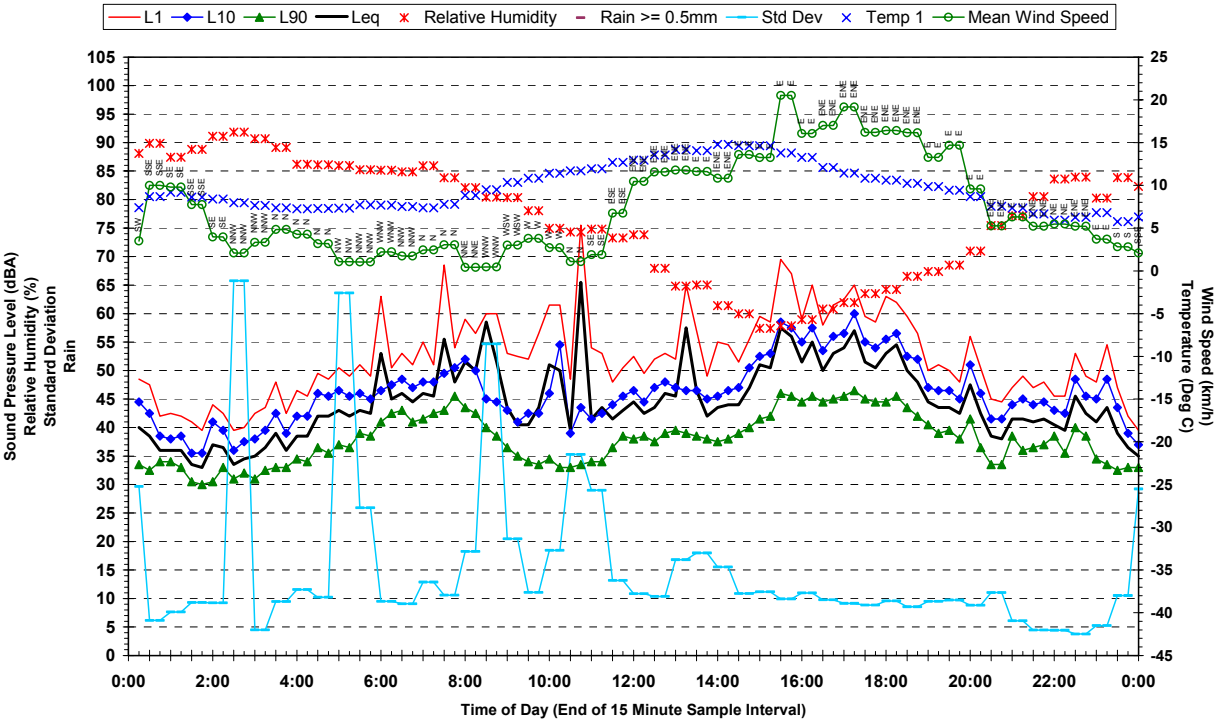


Statistical Ambient Noise Levels
NAG 6 - Residence Reference 117 - Sunday 12 August 2007

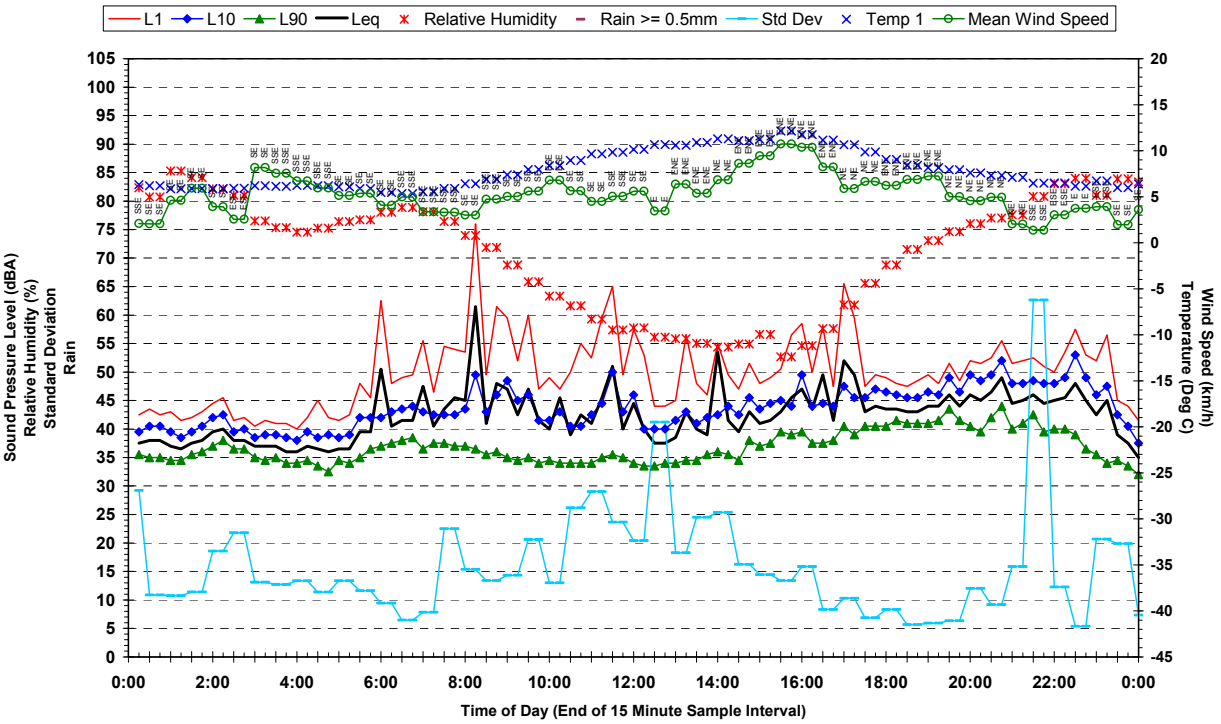


Unattended Ambient Noise and Weather Data - Noise Assessment Group 6 - Residence Reference 117

Statistical Ambient Noise Levels
NAG 6 - Residence Reference 117 - Monday 13 August 2007

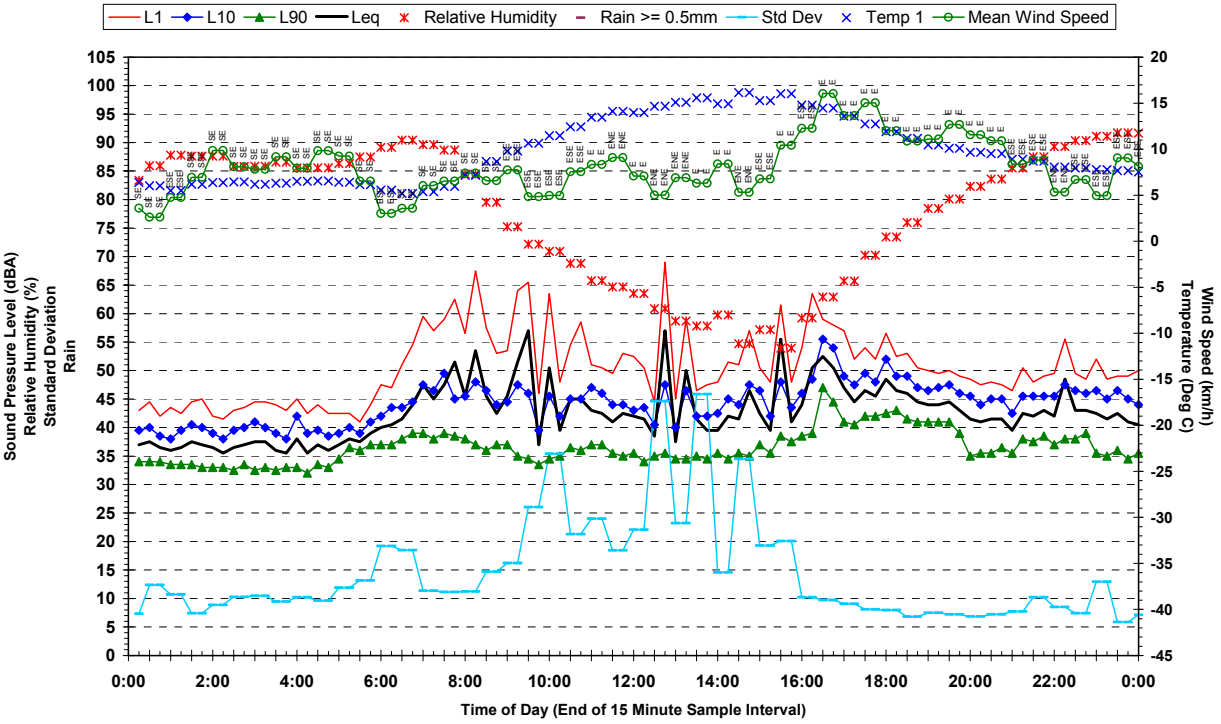


Statistical Ambient Noise Levels
NAG 6 - Residence Reference 117 - Tuesday 14 August 2007

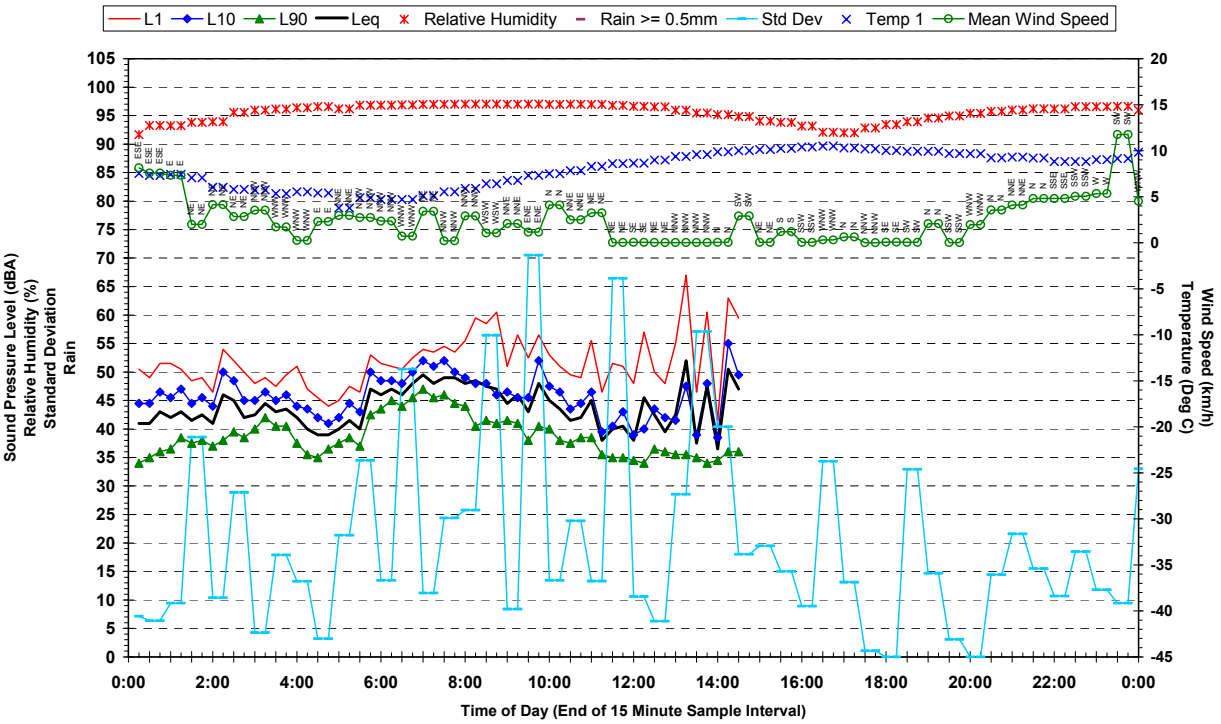


Unattended Ambient Noise and Weather Data - Noise Assessment Group 6 - Residence Reference 117

Statistical Ambient Noise Levels
NAG 6 - Residence Reference 117 - Wednesday 15 August 2007



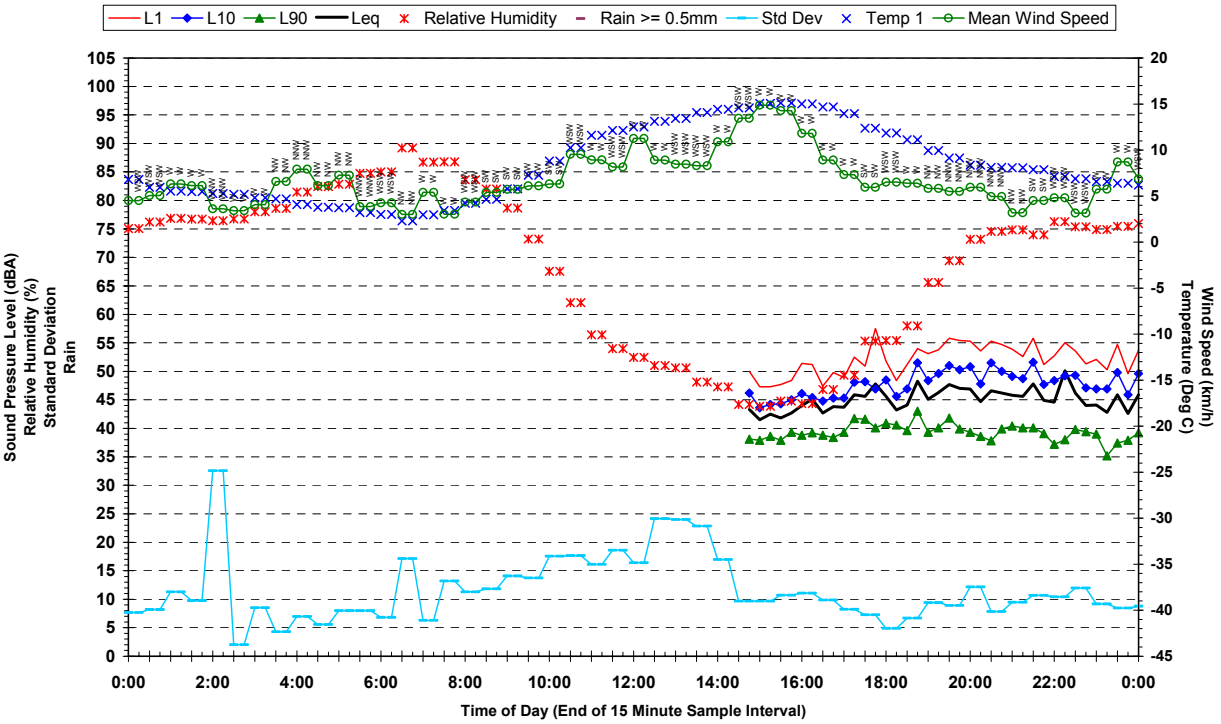
Statistical Ambient Noise Levels
NAG 6 - Residence Reference 117 - Thursday 16 August 2007



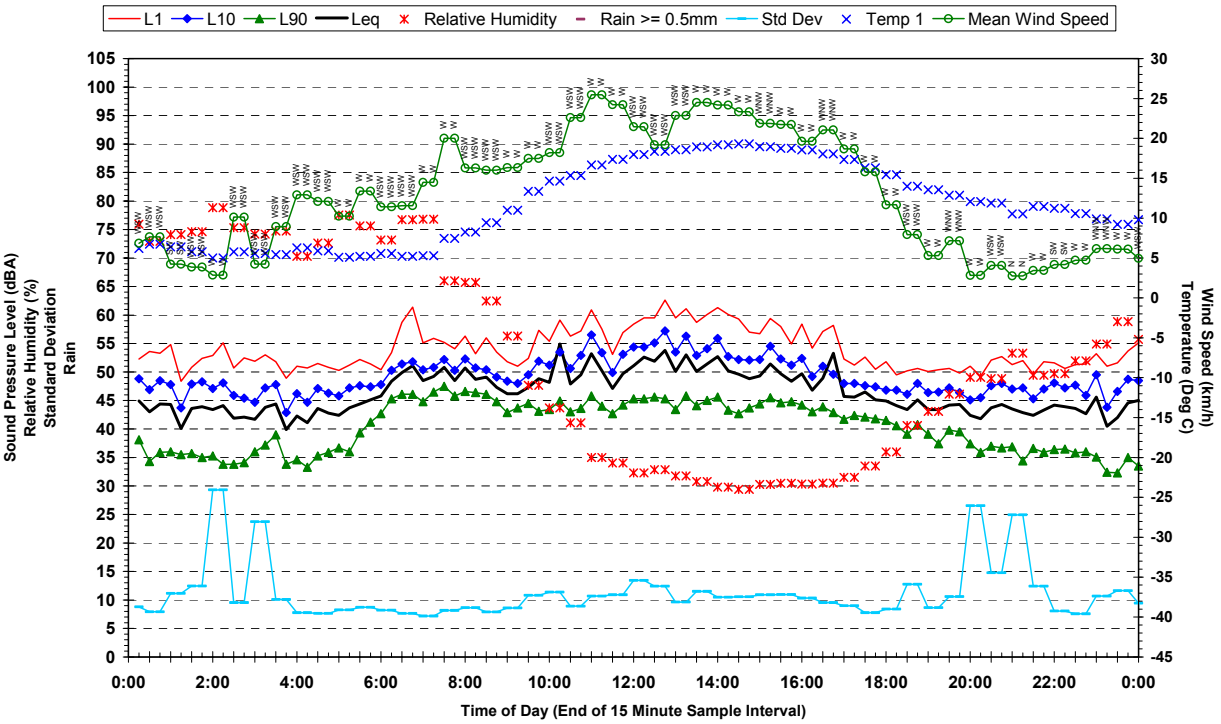
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Unattended Ambient Noise and Weather Data - Noise Assessment Group 7 - Residence Reference 110

Statistical Ambient Noise Levels
NAG 7- Residence Reference 110 - Tuesday 7 August 2007

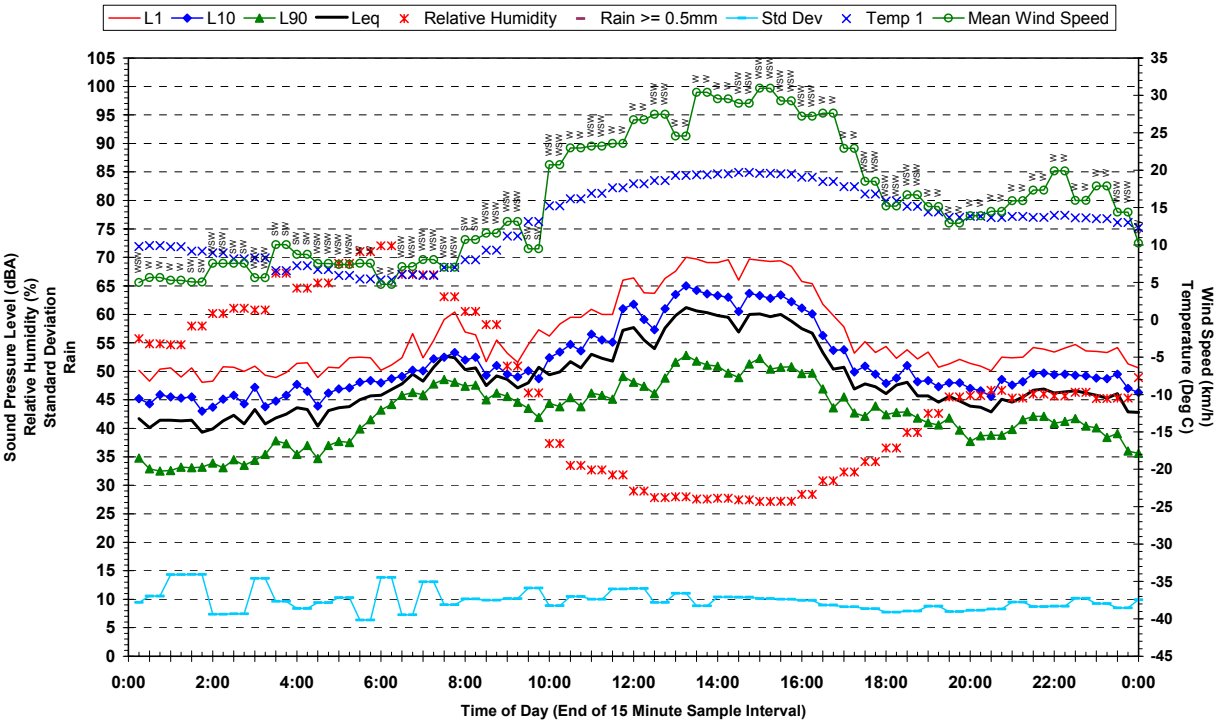


Statistical Ambient Noise Levels
NAG 7- Residence Reference 110 - Wednesday 8 August 2007

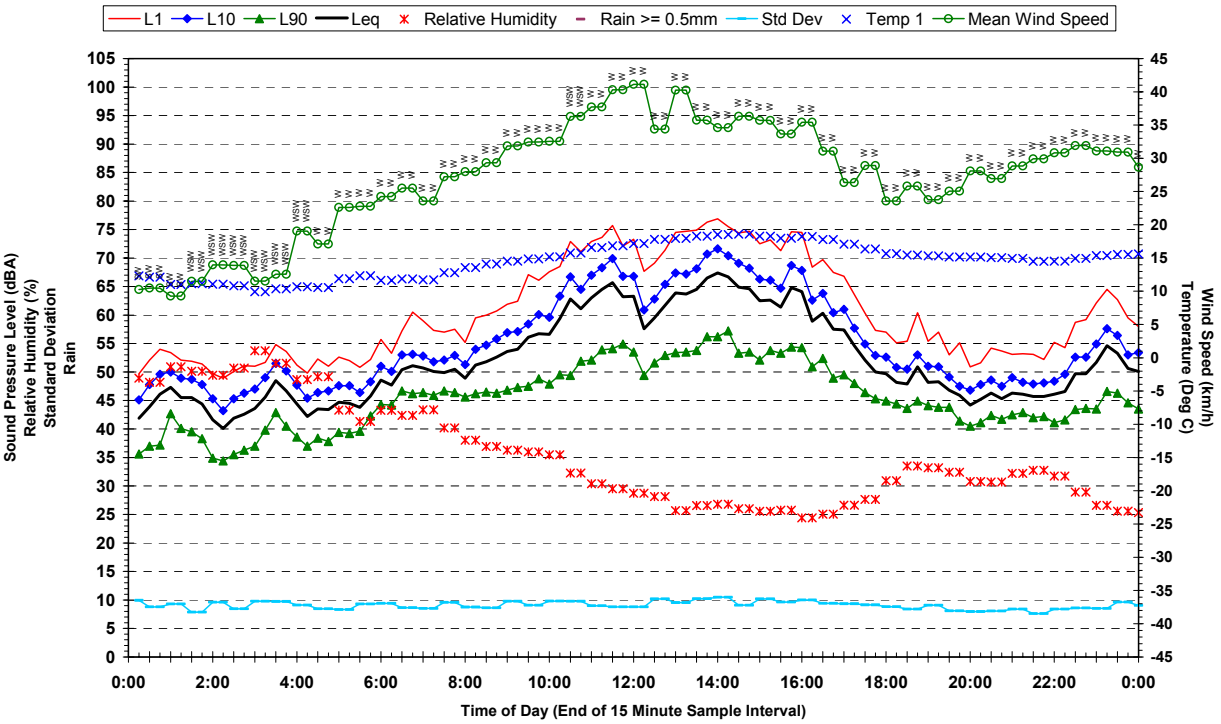


Unattended Ambient Noise and Weather Data - Noise Assessment Group 7 - Residence Reference 110

Statistical Ambient Noise Levels
NAG 7- Residence Reference 110 - Thursday 9 August 2007

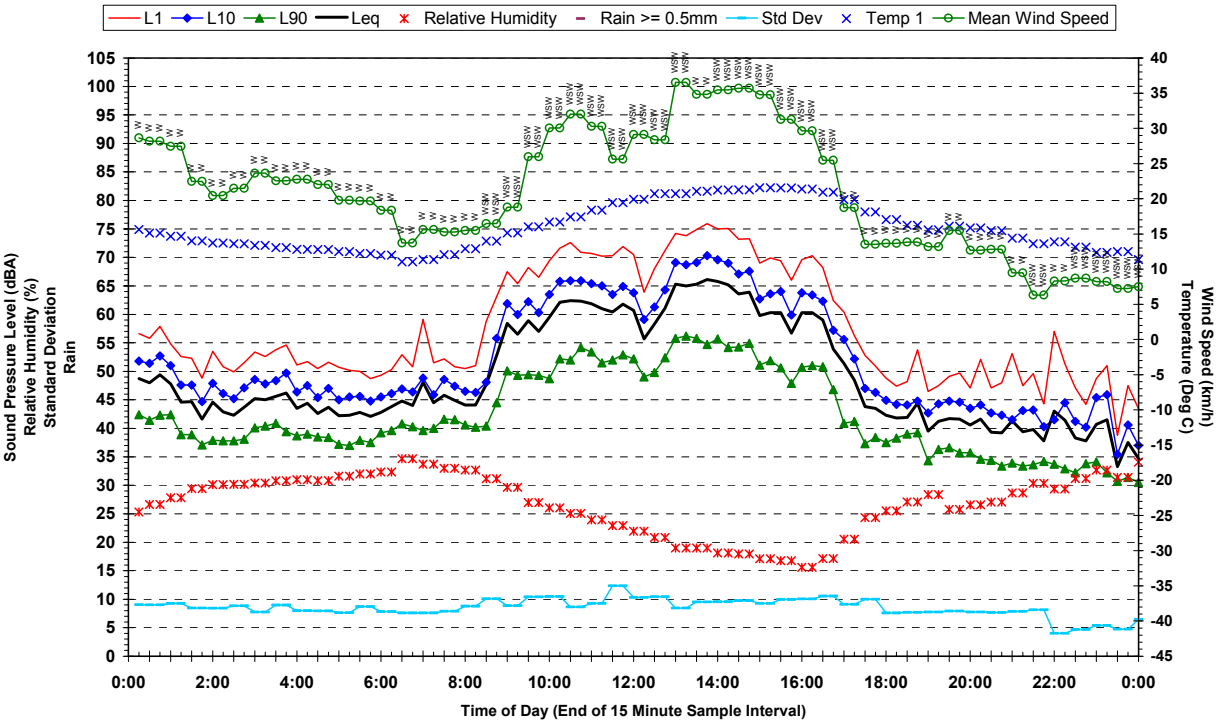


Statistical Ambient Noise Levels
NAG 7- Residence Reference 110 - Friday 10 August 2007

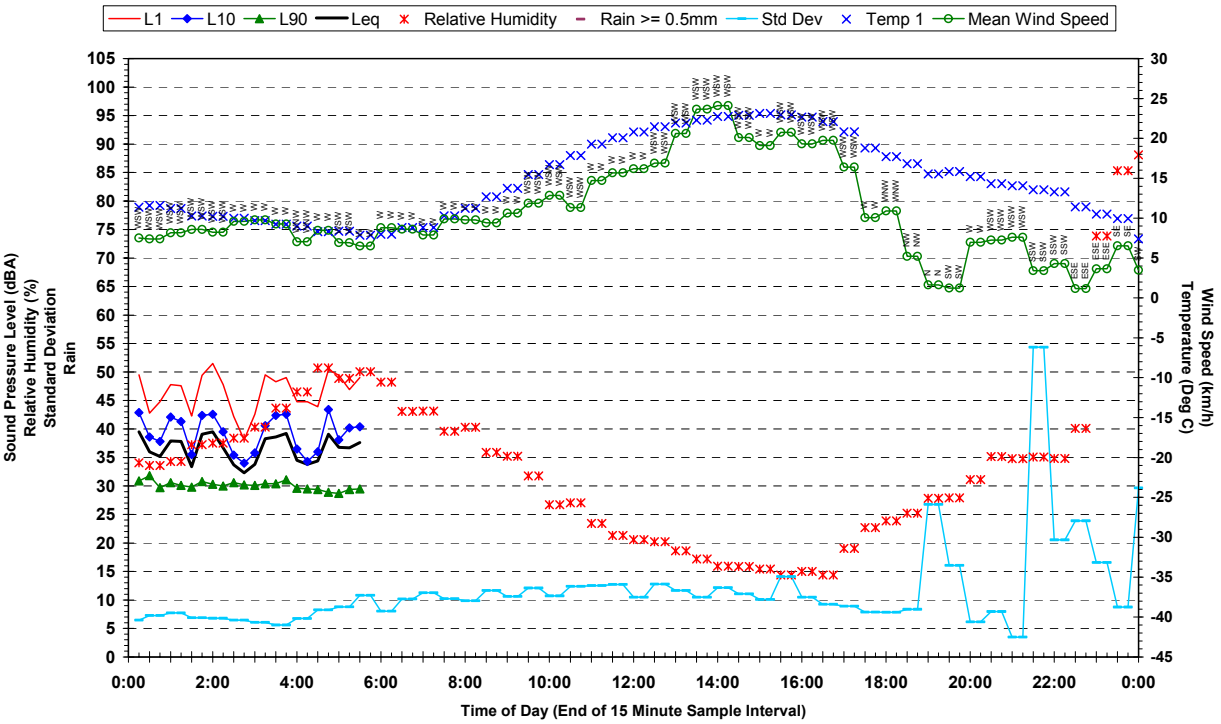


Unattended Ambient Noise and Weather Data - Noise Assessment Group 7 - Residence Reference 110

Statistical Ambient Noise Levels
NAG 7- Residence Reference 110 - Saturday 11 August 2007



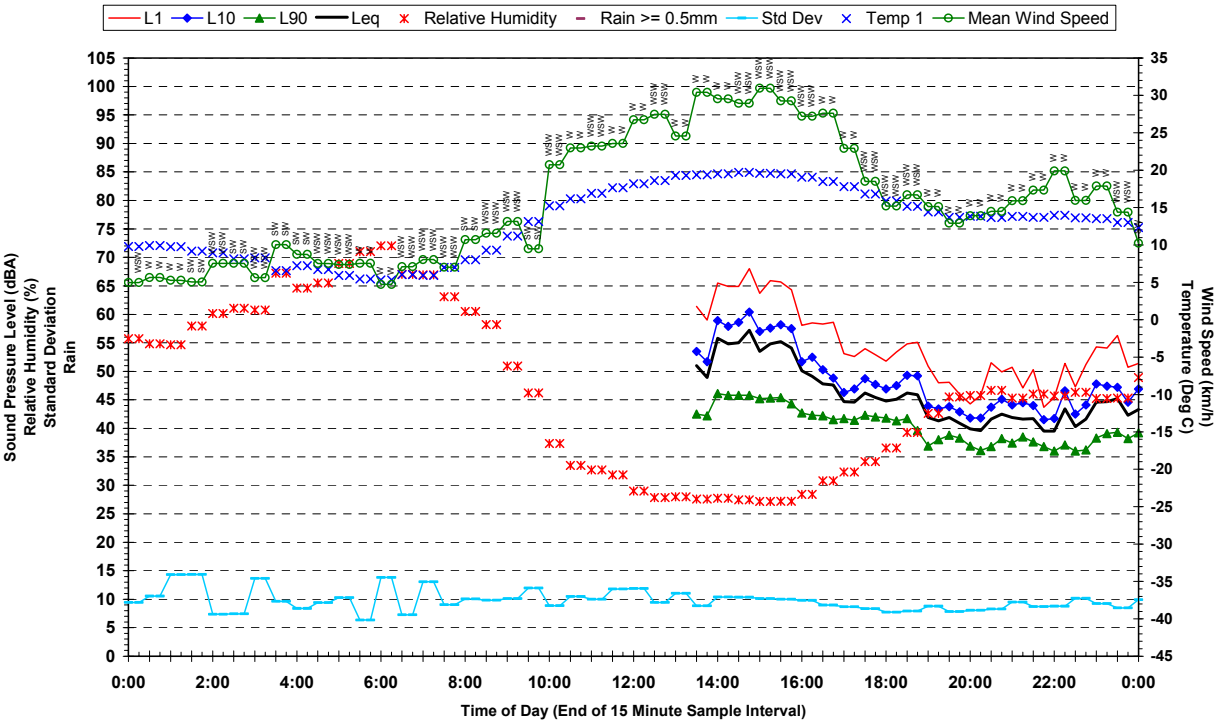
Statistical Ambient Noise Levels
NAG 7- Residence Reference 110 - Sunday 12 August 2007



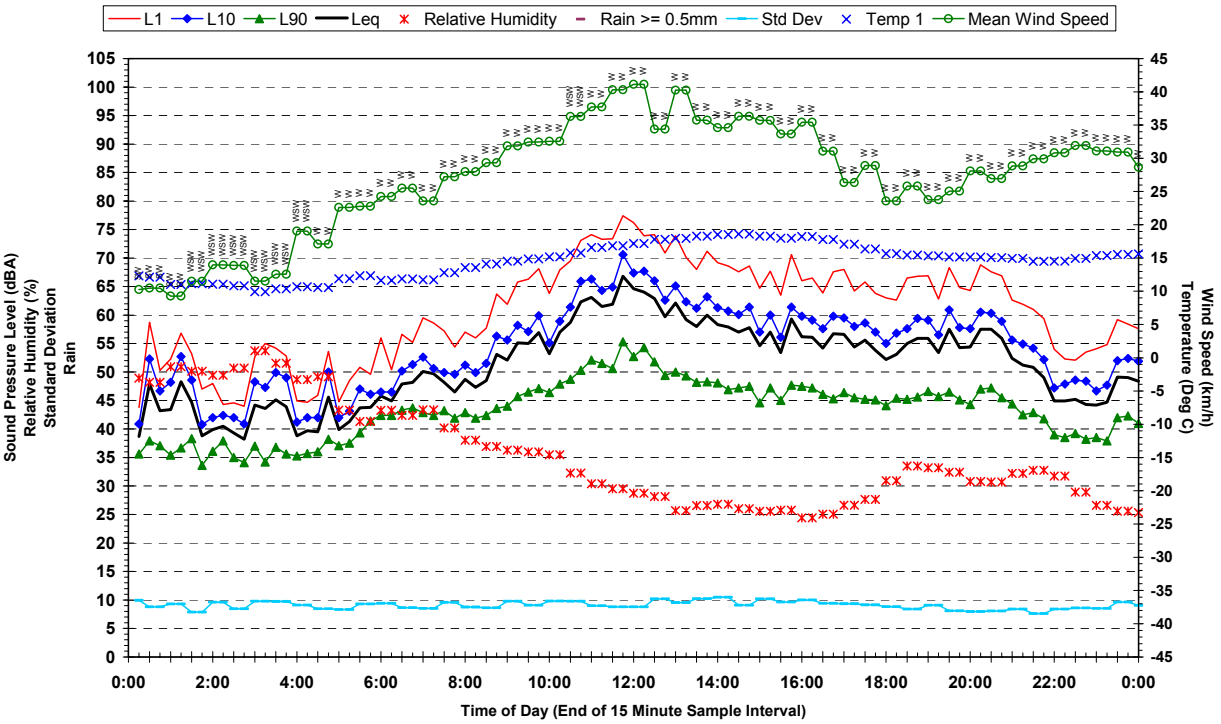
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Unattended Ambient Noise and Weather Data - Noise Assessment Group 8 - Residence Reference 142

Statistical Ambient Noise Levels
NAG 8 - Residence Reference 142 - Thursday 9 August 2007

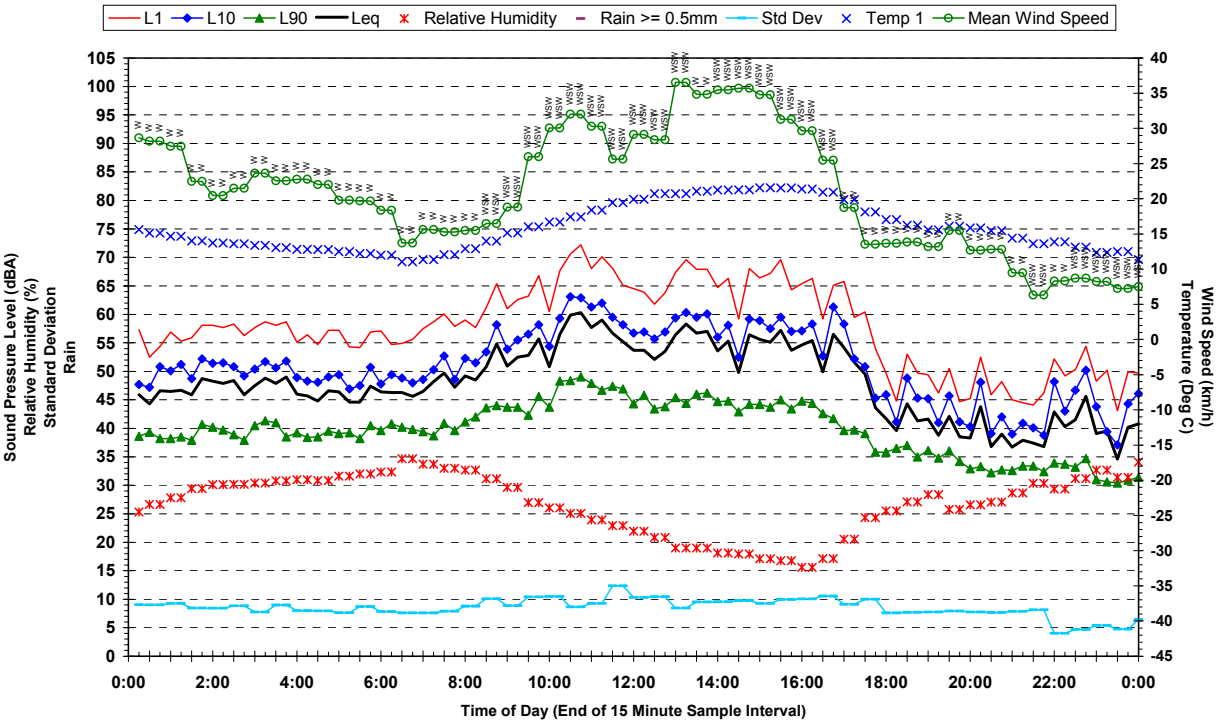


Statistical Ambient Noise Levels
NAG 8 - Residence Reference 142 - Friday 10 August 2007

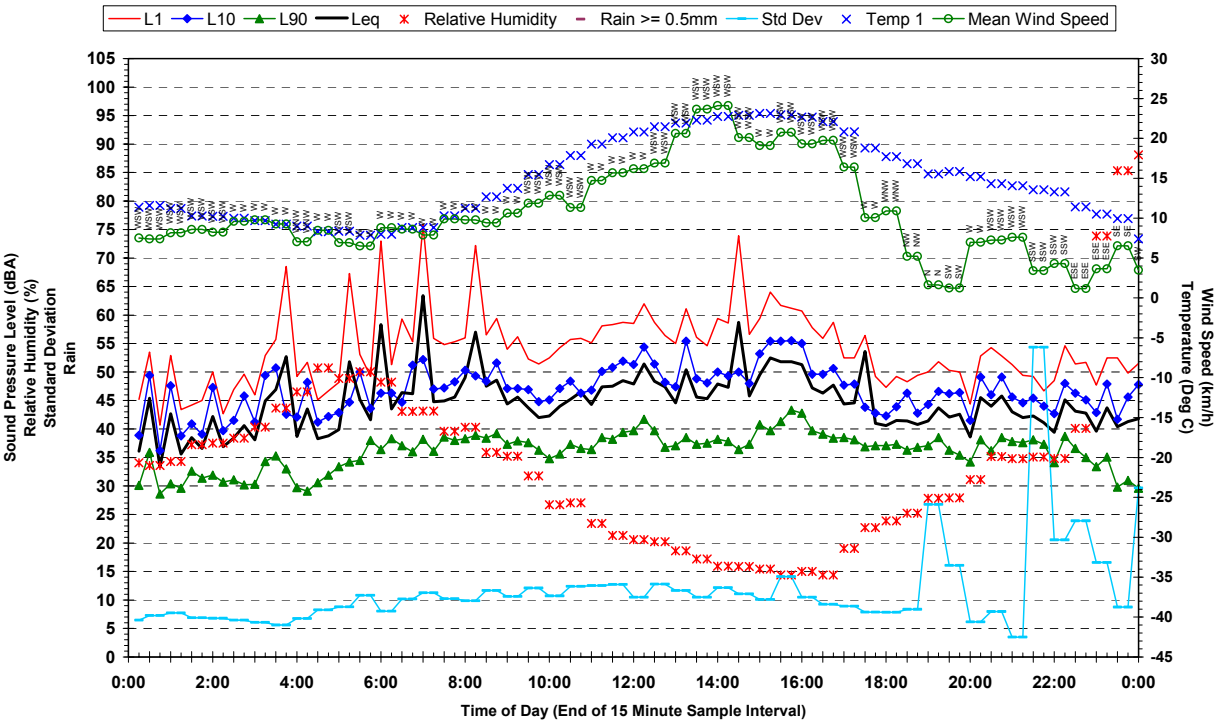


Unattended Ambient Noise and Weather Data - Noise Assessment Group 8 - Residence Reference 142

Statistical Ambient Noise Levels
NAG 8 - Residence Reference 142 - Saturday 11 August 2007

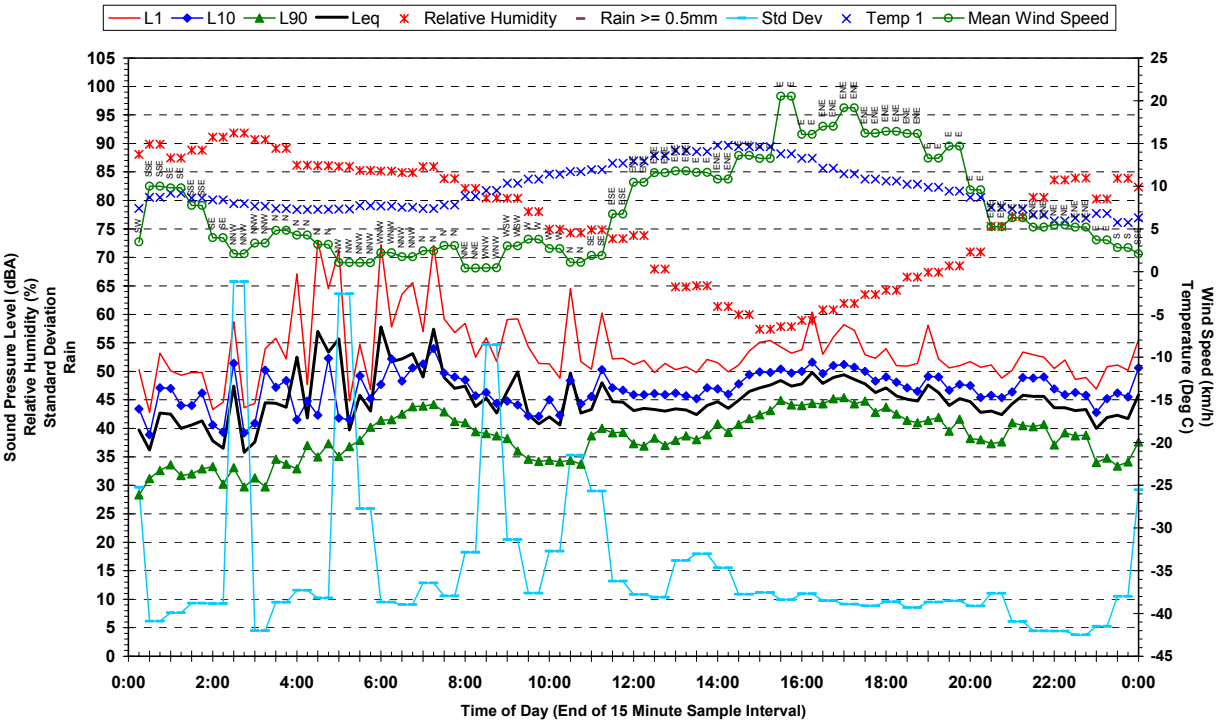


Statistical Ambient Noise Levels
NAG 8 - Residence Reference 142 - Sunday 12 August 2007

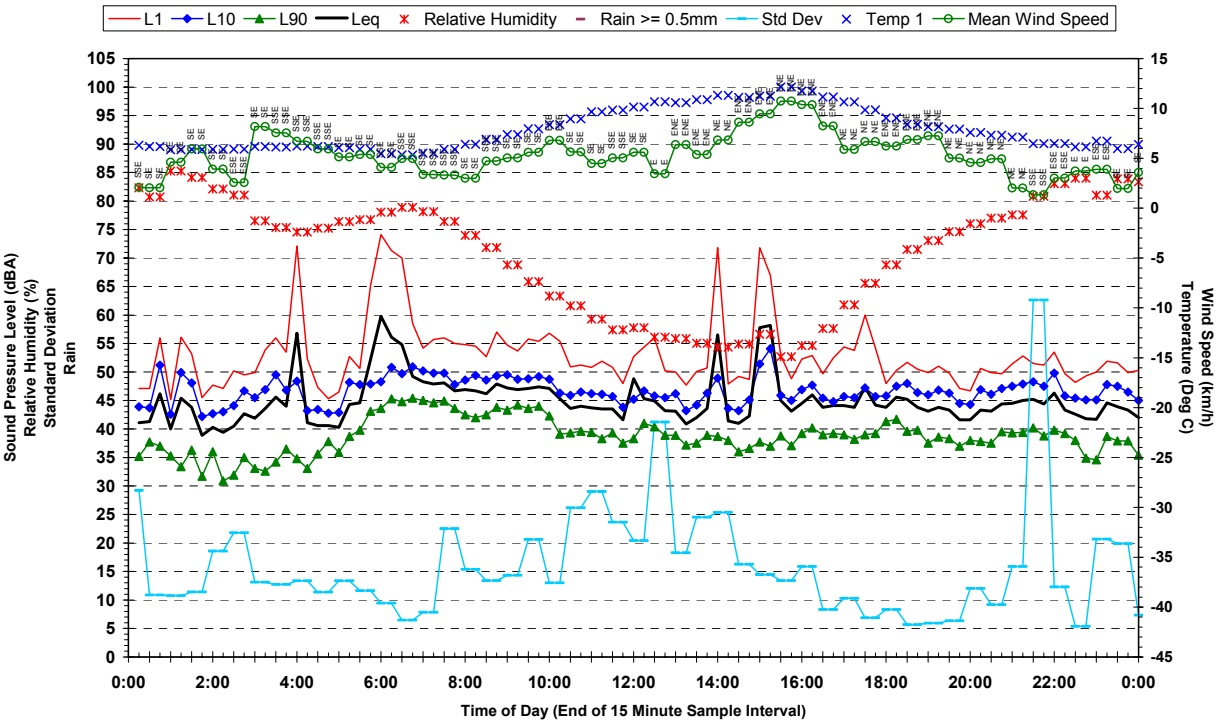


Unattended Ambient Noise and Weather Data - Noise Assessment Group 8 - Residence Reference 142

Statistical Ambient Noise Levels
NAG 8 - Residence Reference 142 - Monday 13 August 2007

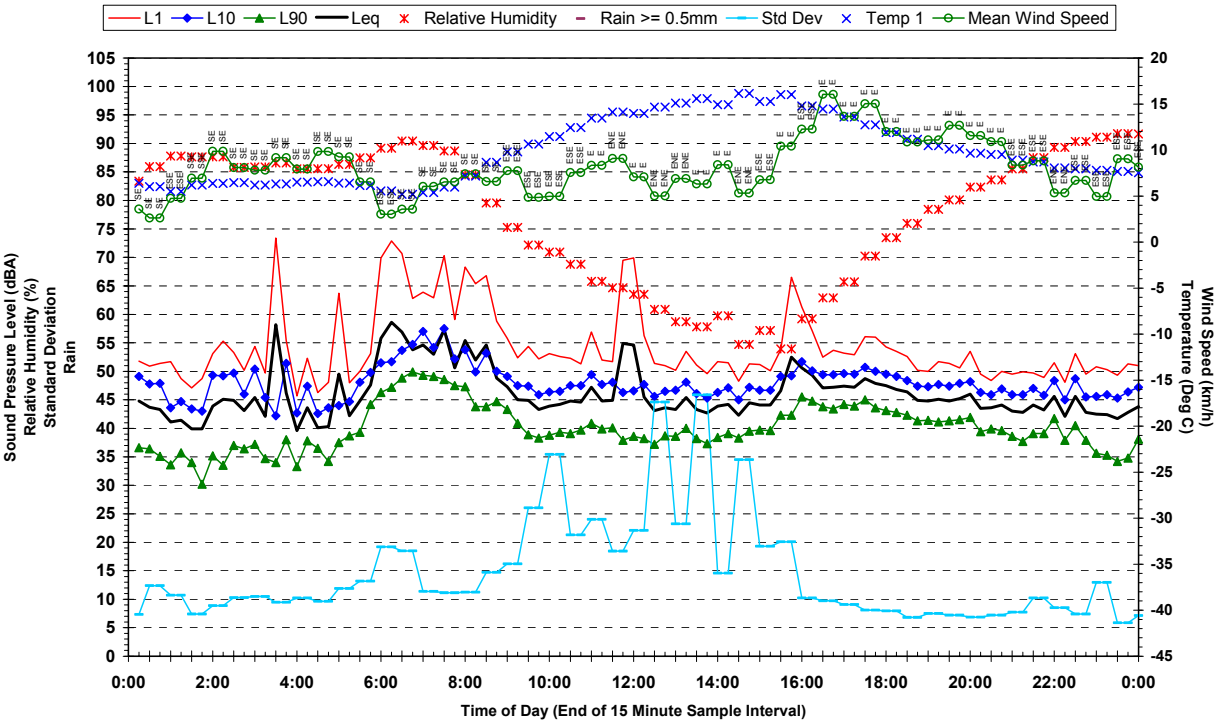


Statistical Ambient Noise Levels
NAG 8 - Residence Reference 142 - Tuesday 14 August 2007

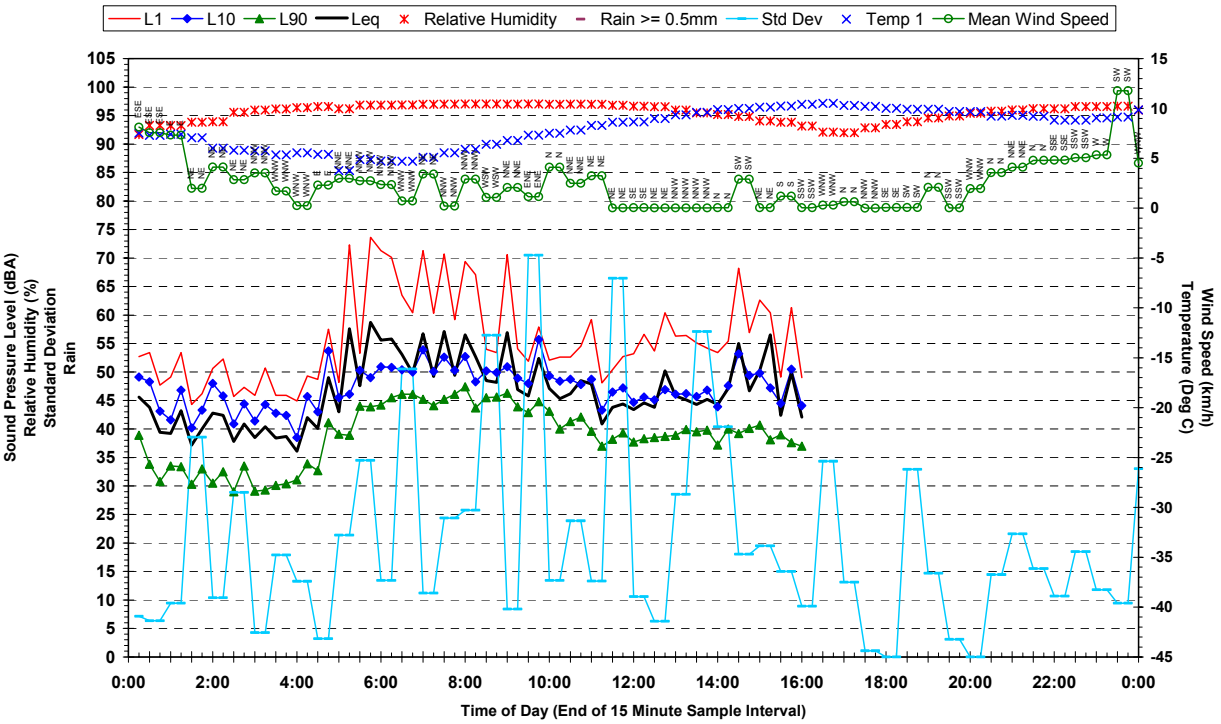


Unattended Ambient Noise and Weather Data - Noise Assessment Group 8 - Residence Reference 142

Statistical Ambient Noise Levels
NAG 8 - Residence Reference 142 - Wednesday 15 August 2007

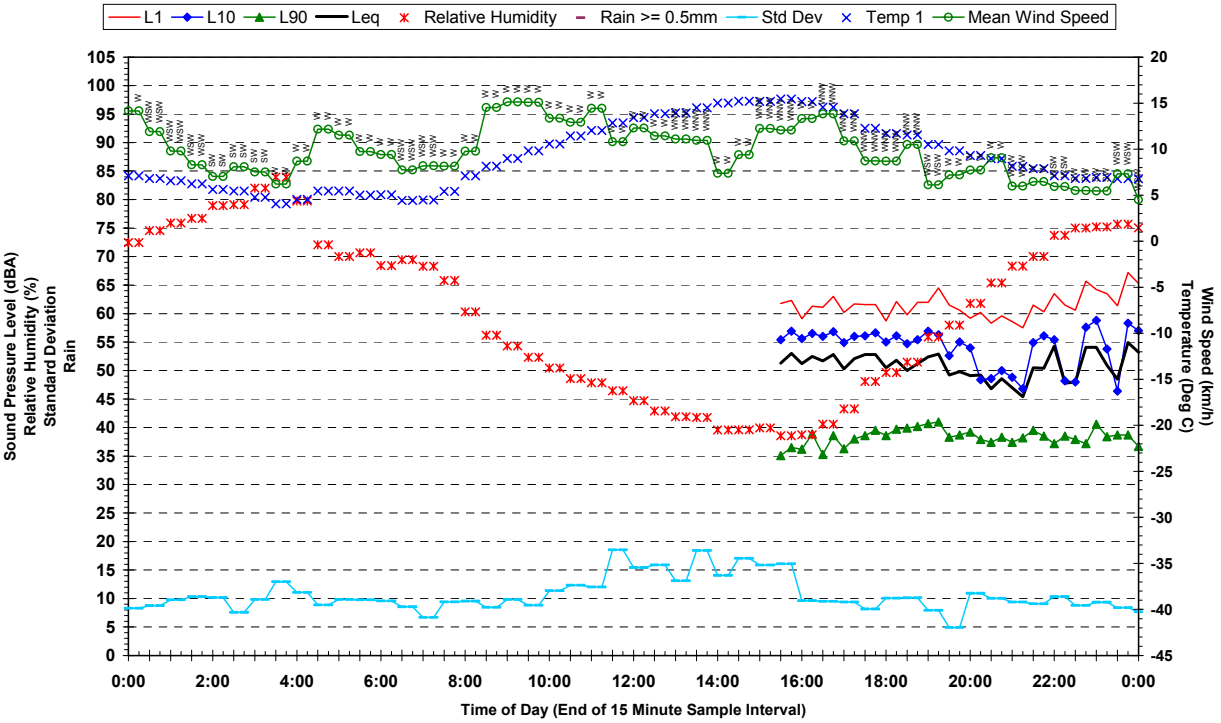


Statistical Ambient Noise Levels
NAG 8 - Residence Reference 142 - Thursday 16 August 2007

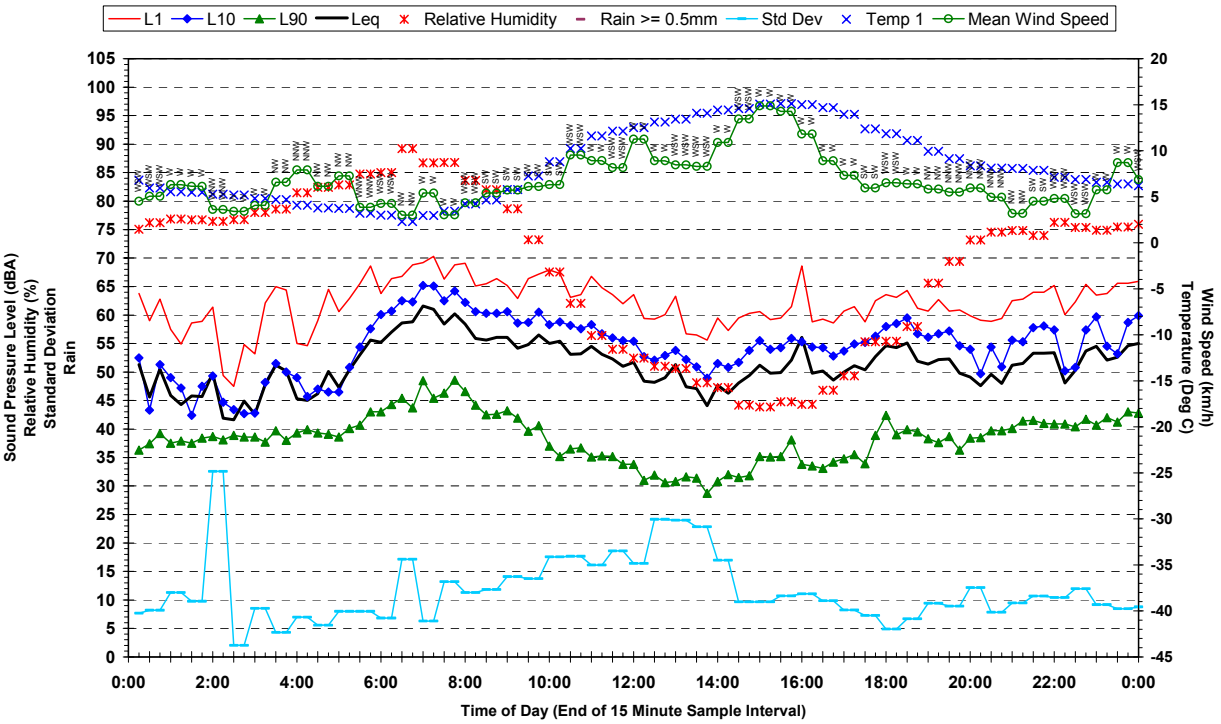


Unattended Ambient Noise and Weather Data - Noise Assessment Group 9 - Residence Reference 143

Statistical Ambient Noise Levels
NAG 9 - Residence Reference 143 - Monday 6 August 2007

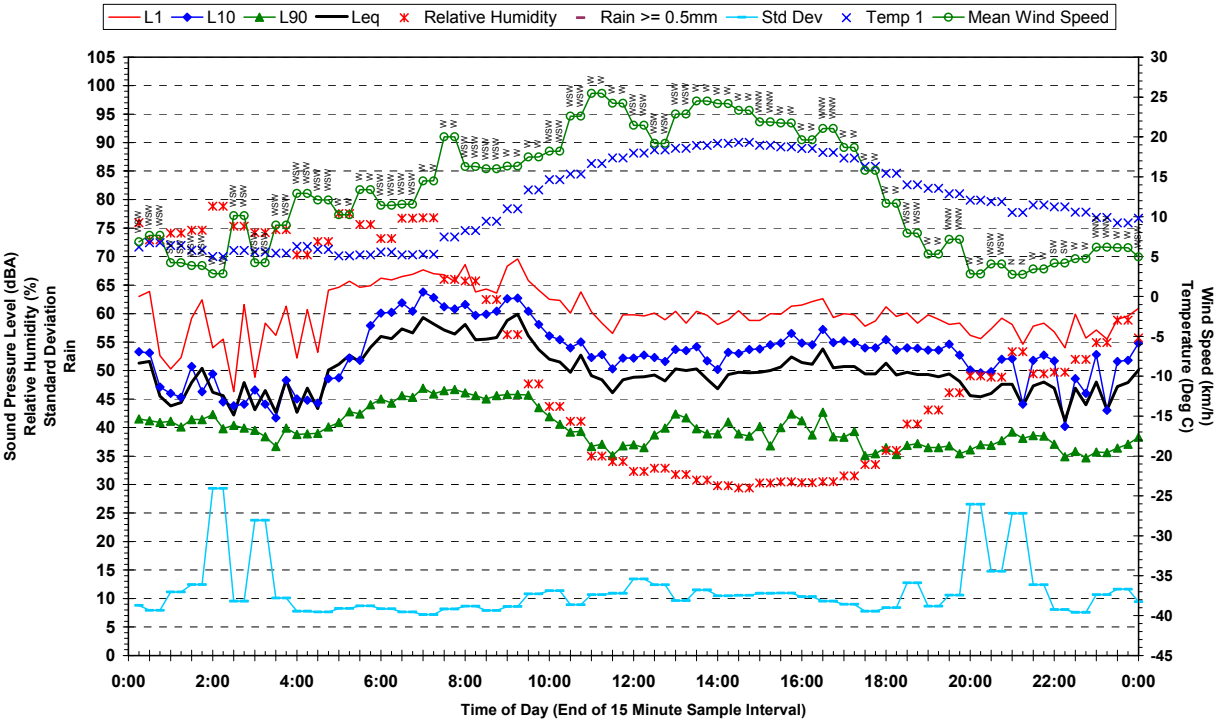


Statistical Ambient Noise Levels
NAG 9 - Residence Reference 143 - Tuesday 7 August 2007

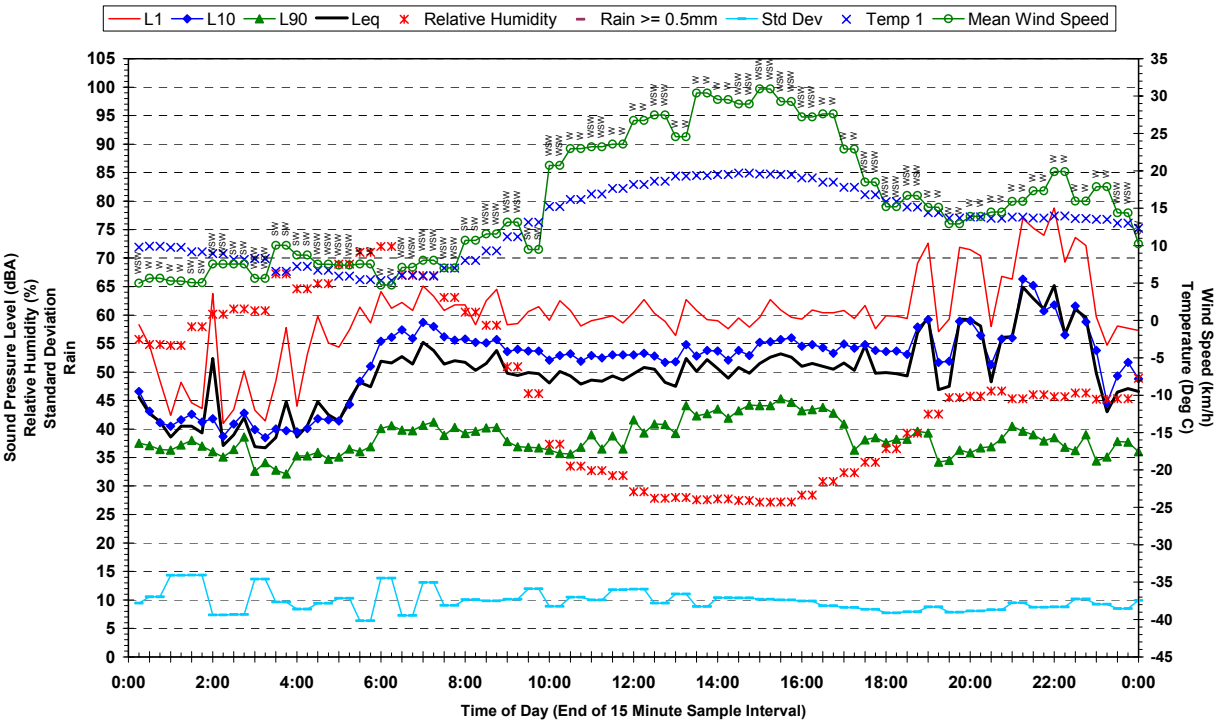


Unattended Ambient Noise and Weather Data - Noise Assessment Group 9 - Residence Reference 143

Statistical Ambient Noise Levels
NAG 9 - Residence Reference 143 - Wednesday 8 August 2007

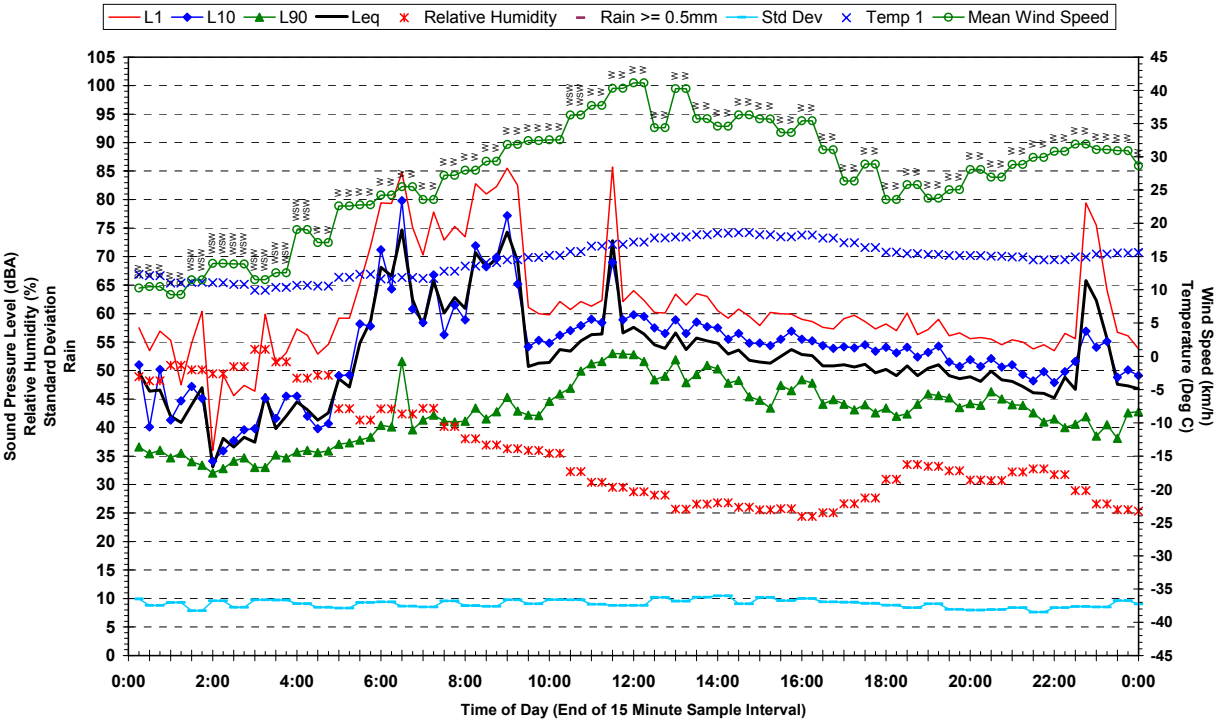


Statistical Ambient Noise Levels
NAG 9 - Residence Reference 143 - Thursday 9 August 2007

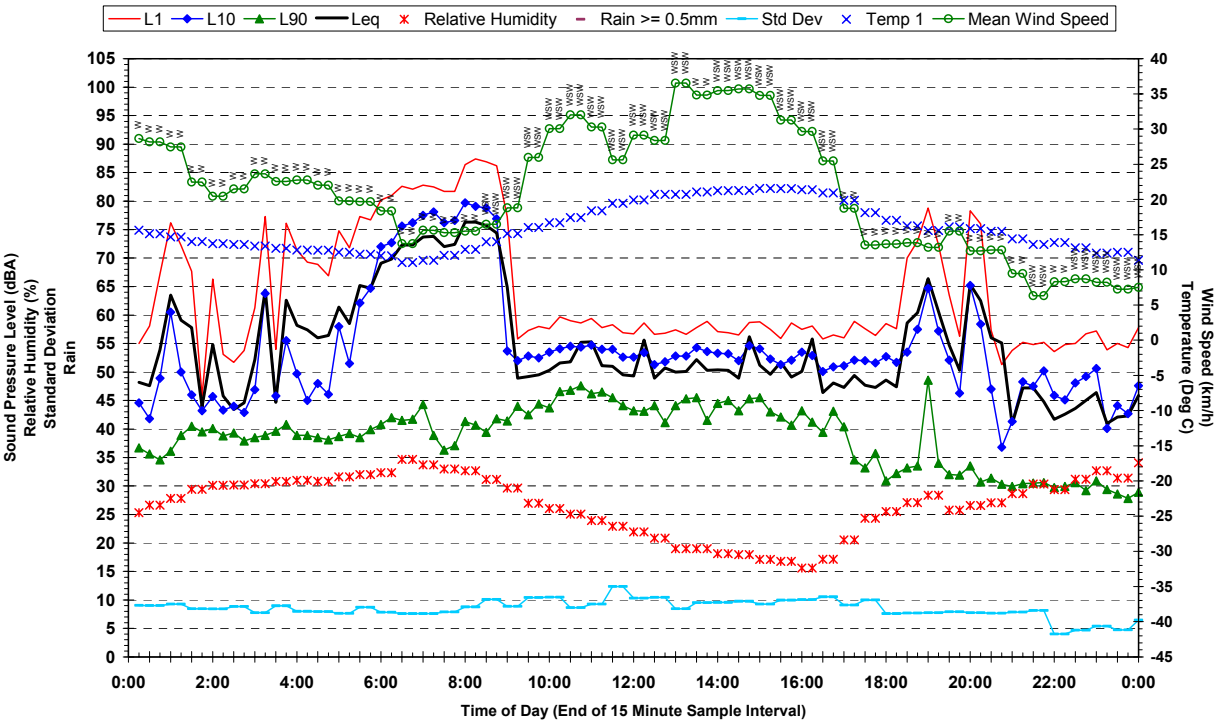


Unattended Ambient Noise and Weather Data - Noise Assessment Group 9 - Residence Reference 143

Statistical Ambient Noise Levels
NAG 9 - Residence Reference 143 - Friday 10 August 2007

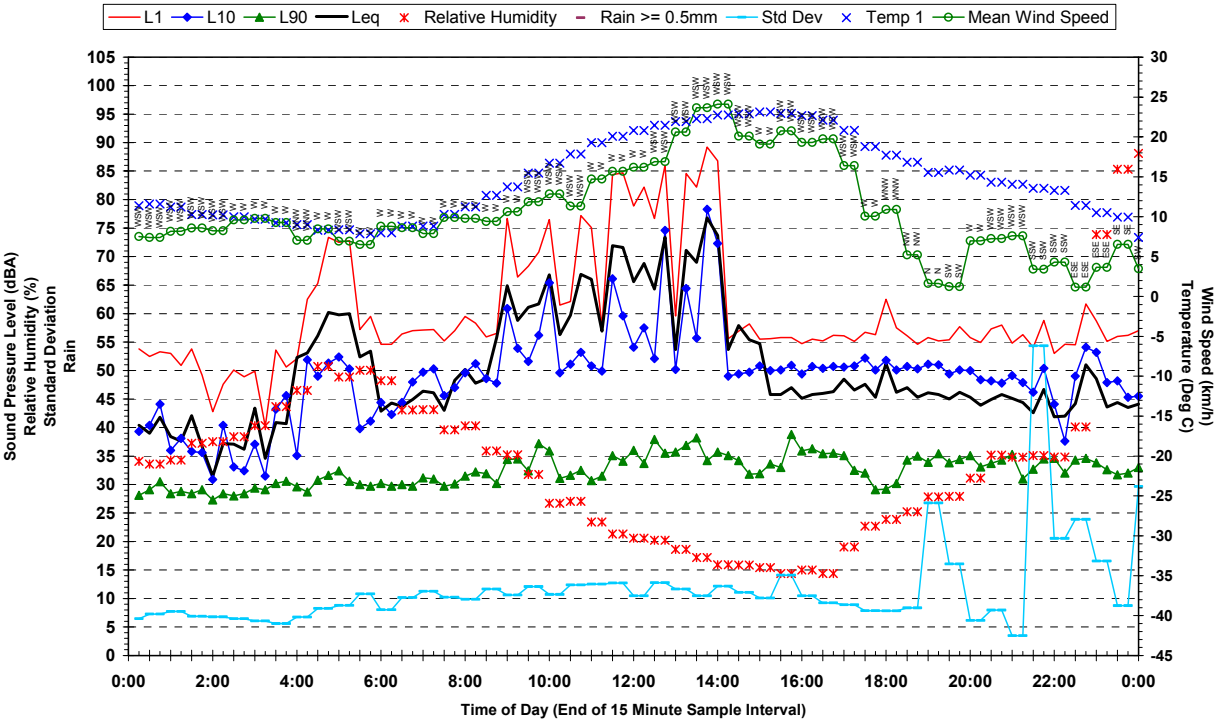


Statistical Ambient Noise Levels
NAG 9 - Residence Reference 143 - Saturday 11 August 2007

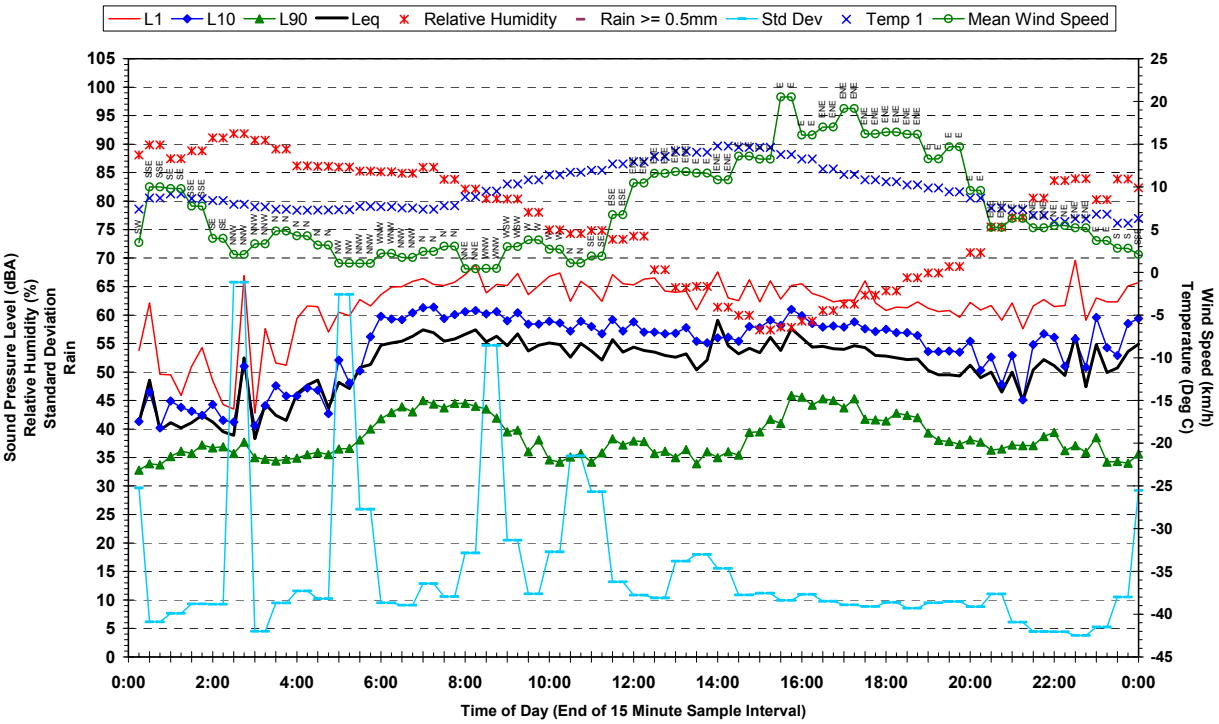


Unattended Ambient Noise and Weather Data - Noise Assessment Group 9 - Residence Reference 143

Statistical Ambient Noise Levels
NAG 9 - Residence Reference 143 - Sunday 12 August 2007

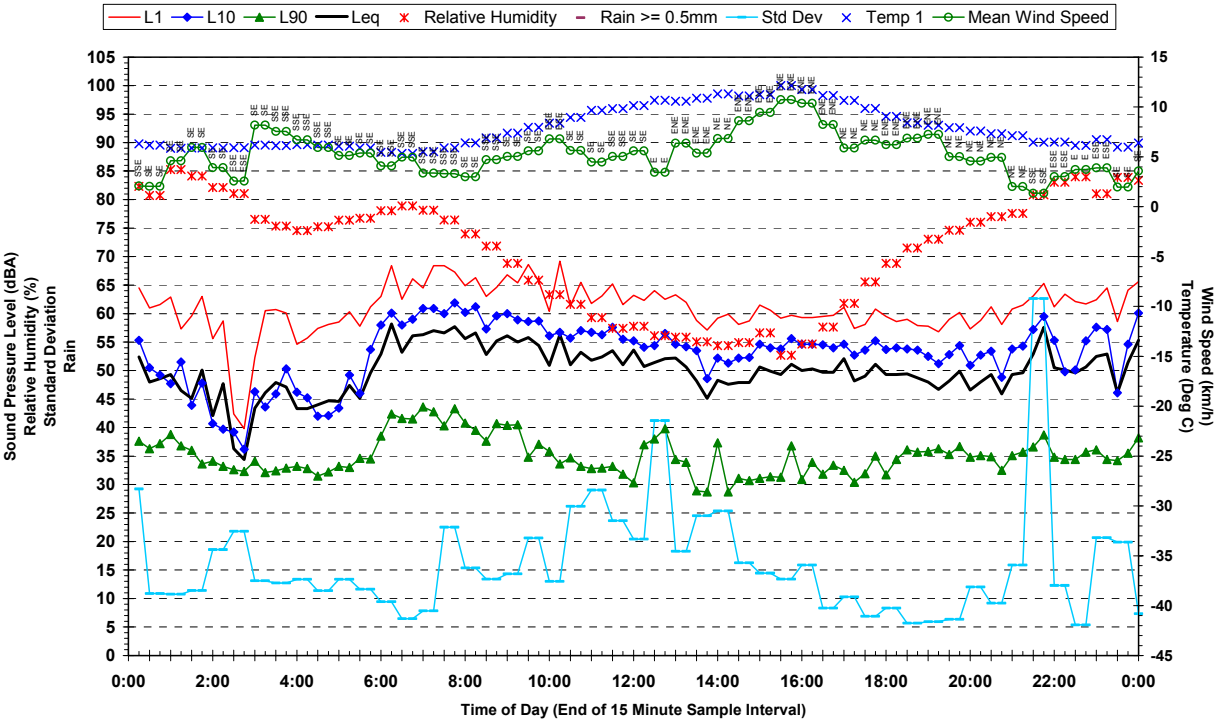


Statistical Ambient Noise Levels
NAG 9 - Residence Reference 143 - Monday 13 August 2007

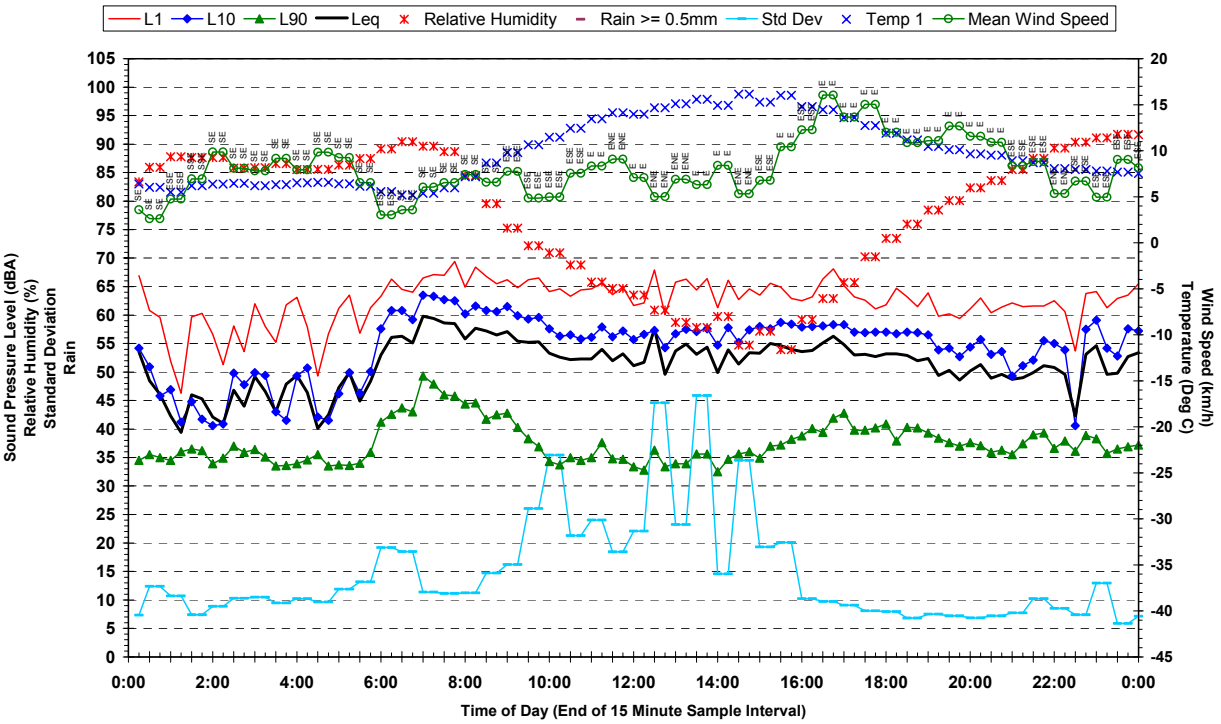


Unattended Ambient Noise and Weather Data - Noise Assessment Group 9 - Residence Reference 143

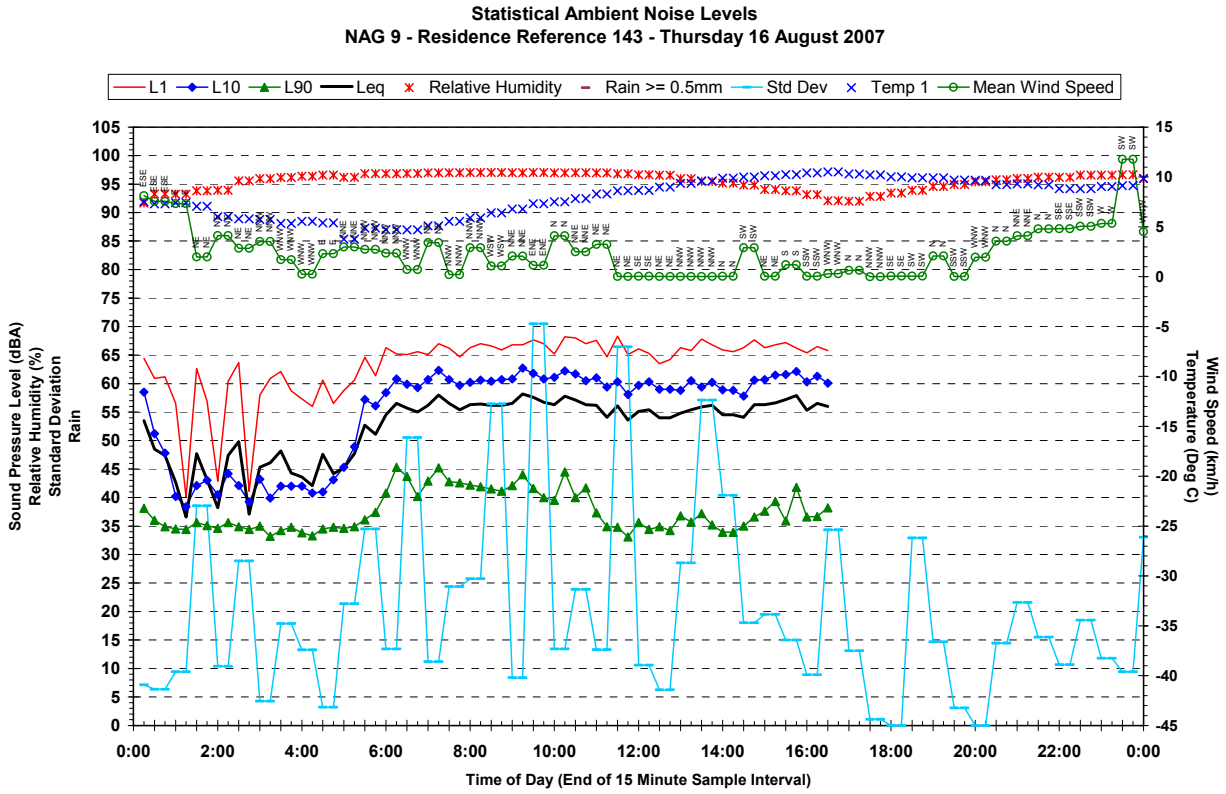
Statistical Ambient Noise Levels
NAG 9 - Residence Reference 143 - Tuesday 14 August 2007



Statistical Ambient Noise Levels
NAG 9 - Residence Reference 143 - Wednesday 15 August 2007

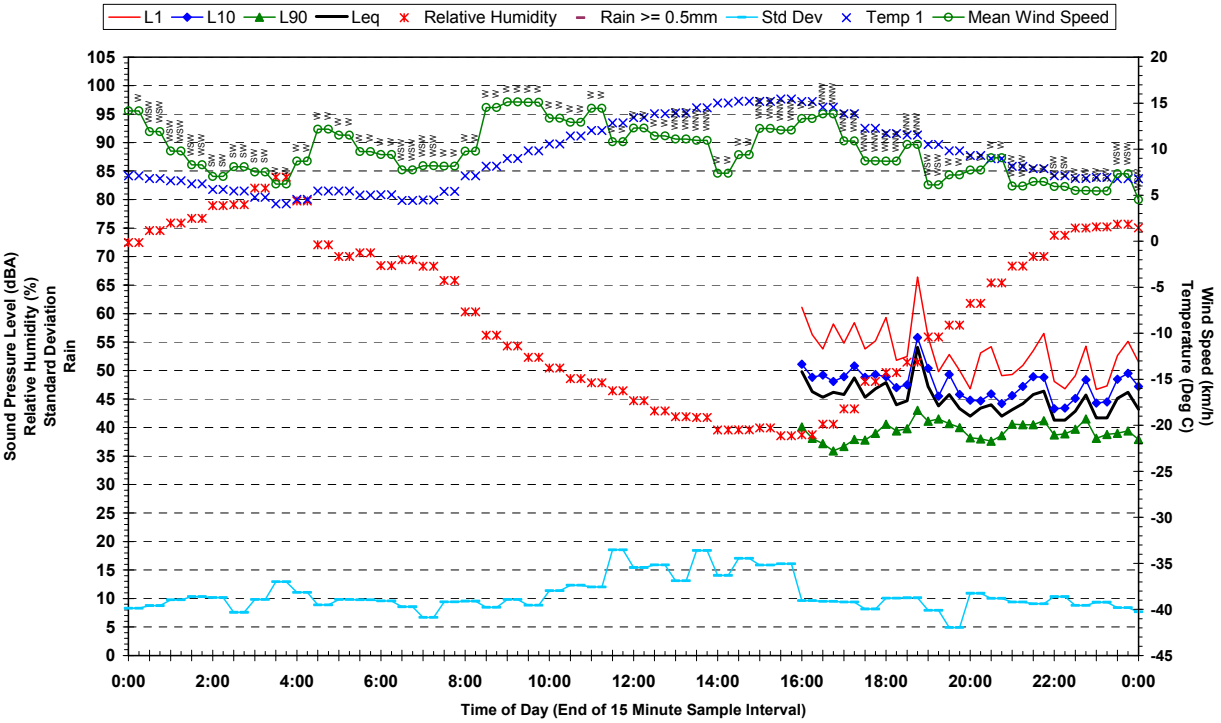


Unattended Ambient Noise and Weather Data - Noise Assessment Group 9 - Residence Reference 143

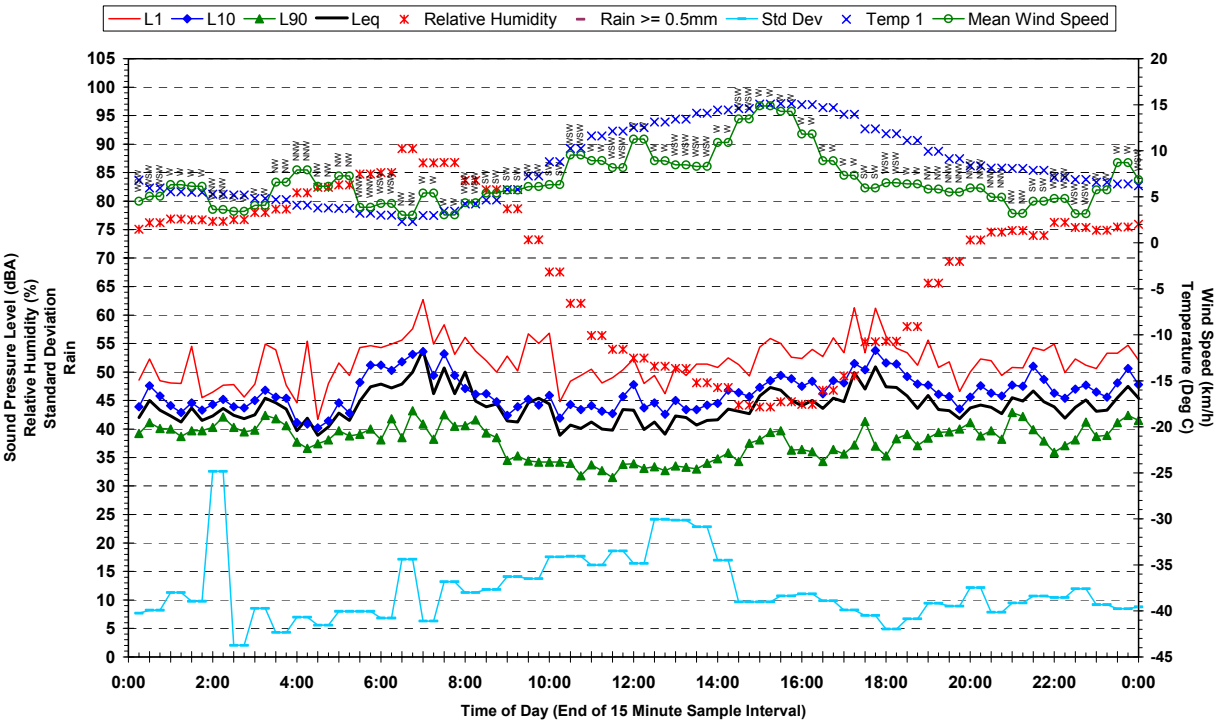


Unattended Ambient Noise and Weather Data - Noise Assessment Group 10 - Residence Reference 8

Statistical Ambient Noise Levels
NAG 10 - Residence Reference 8 - Monday 6 August 2007

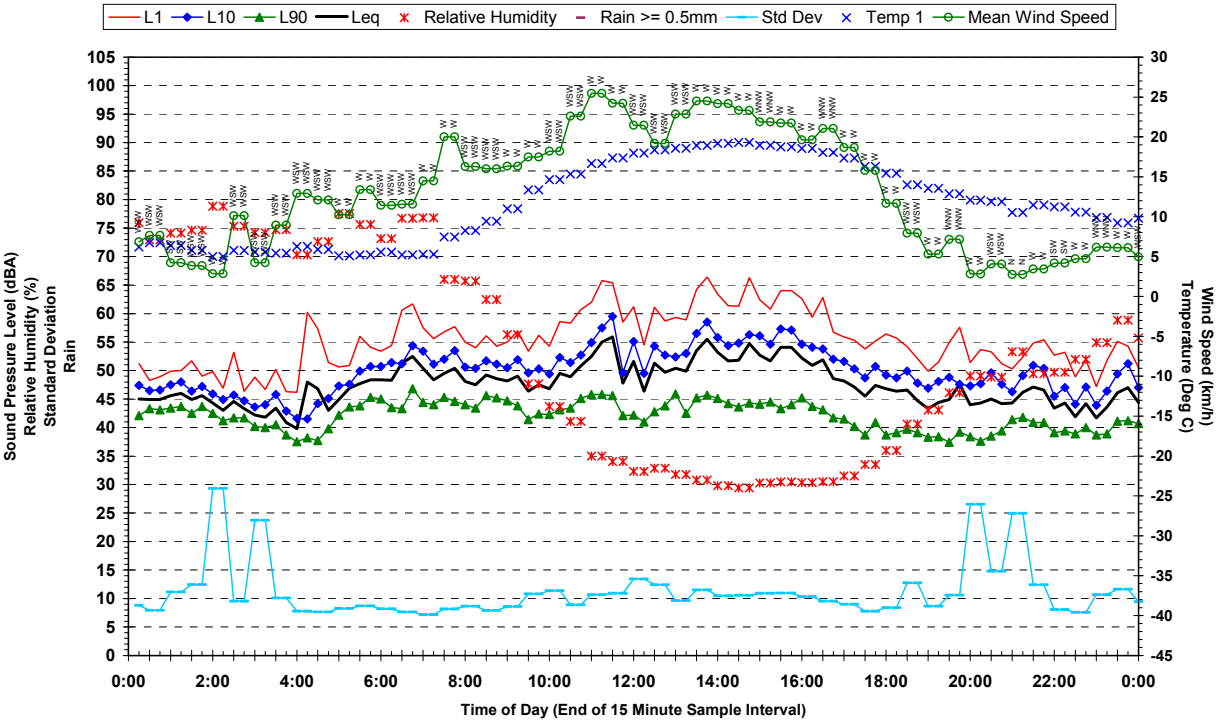


Statistical Ambient Noise Levels
NAG 10 - Residence Reference 8 - Tuesday 7 August 2007

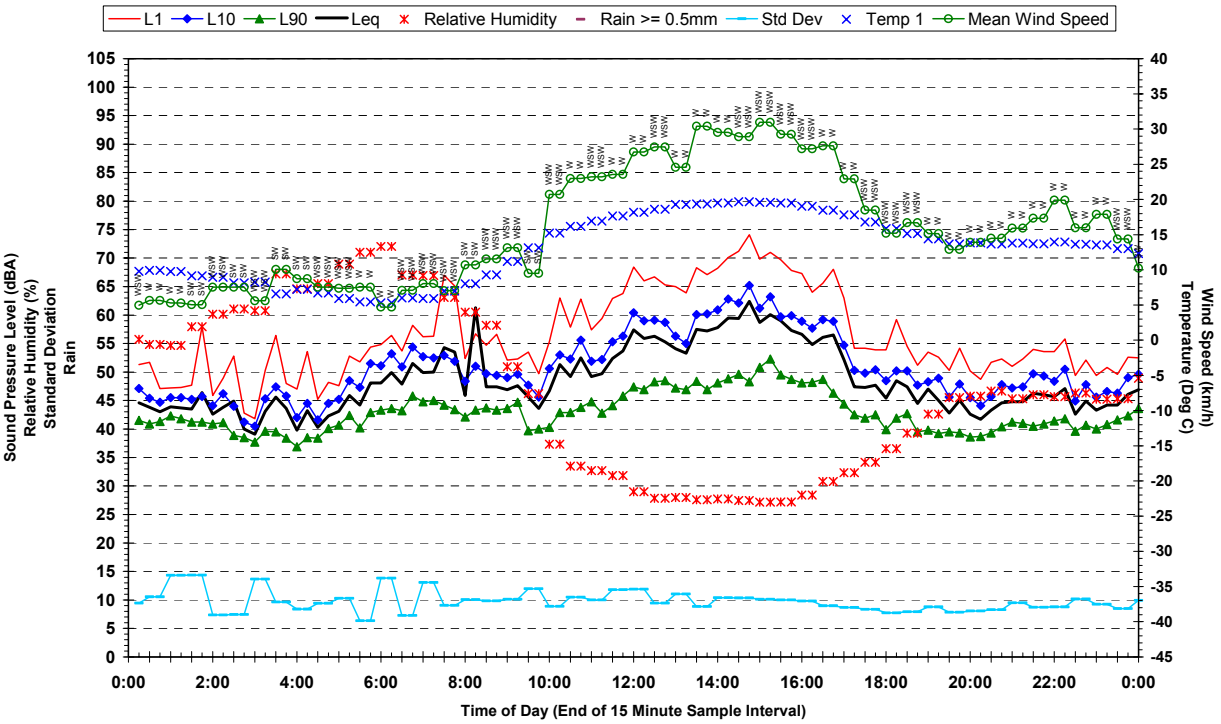


Unattended Ambient Noise and Weather Data - Noise Assessment Group 10 - Residence Reference 8

Statistical Ambient Noise Levels
NAG 10 - Residence Reference 8 - Wednesday 8 August 2007

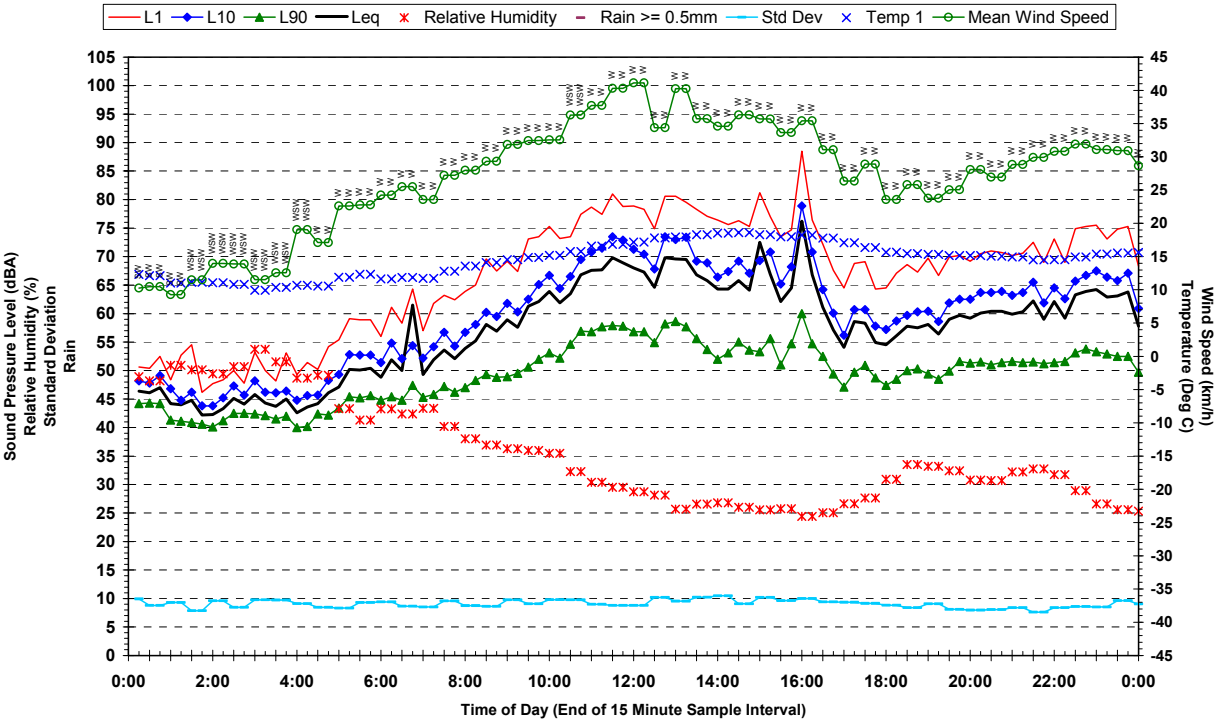


Statistical Ambient Noise Levels
NAG 10 - Residence Reference 8 - Thursday 9 August 2007

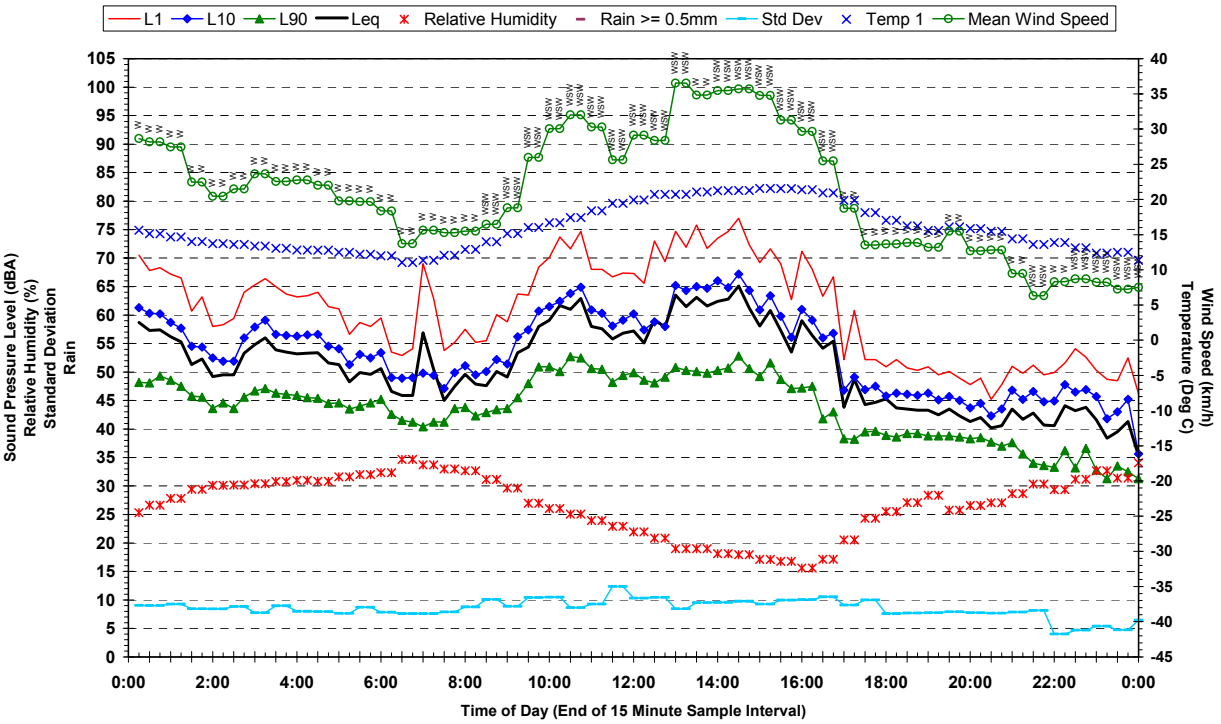


Unattended Ambient Noise and Weather Data - Noise Assessment Group 10 - Residence Reference 8

Statistical Ambient Noise Levels
NAG 10 - Residence Reference 8 - Friday 10 August 2007

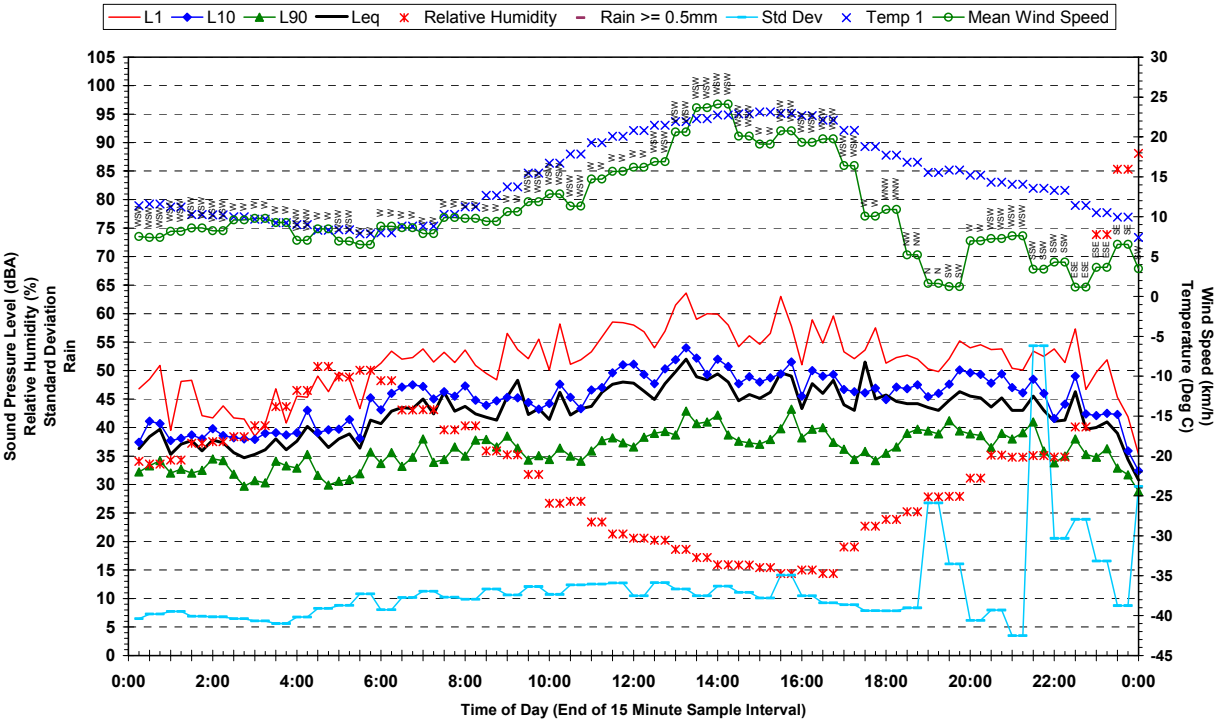


Statistical Ambient Noise Levels
NAG 10 - Residence Reference 8 - Saturday 11 August 2007

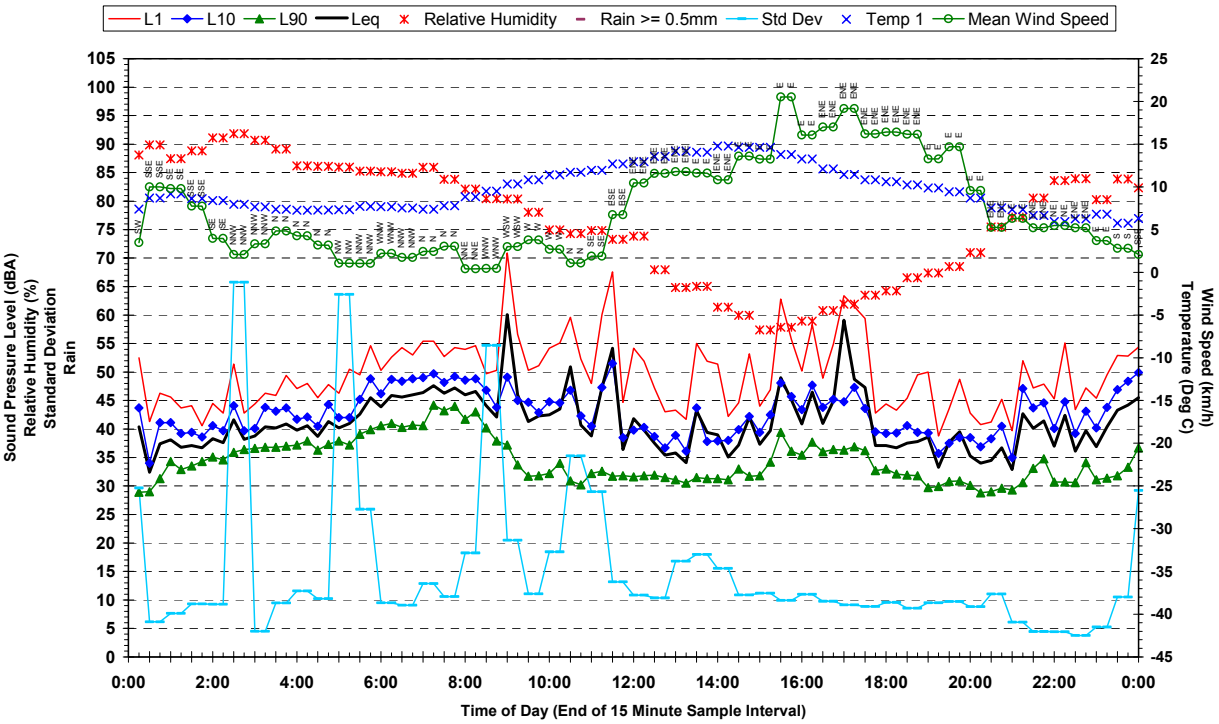


Unattended Ambient Noise and Weather Data - Noise Assessment Group 10 - Residence Reference 8

Statistical Ambient Noise Levels
NAG 10 - Residence Reference 8 - Sunday 12 August 2007

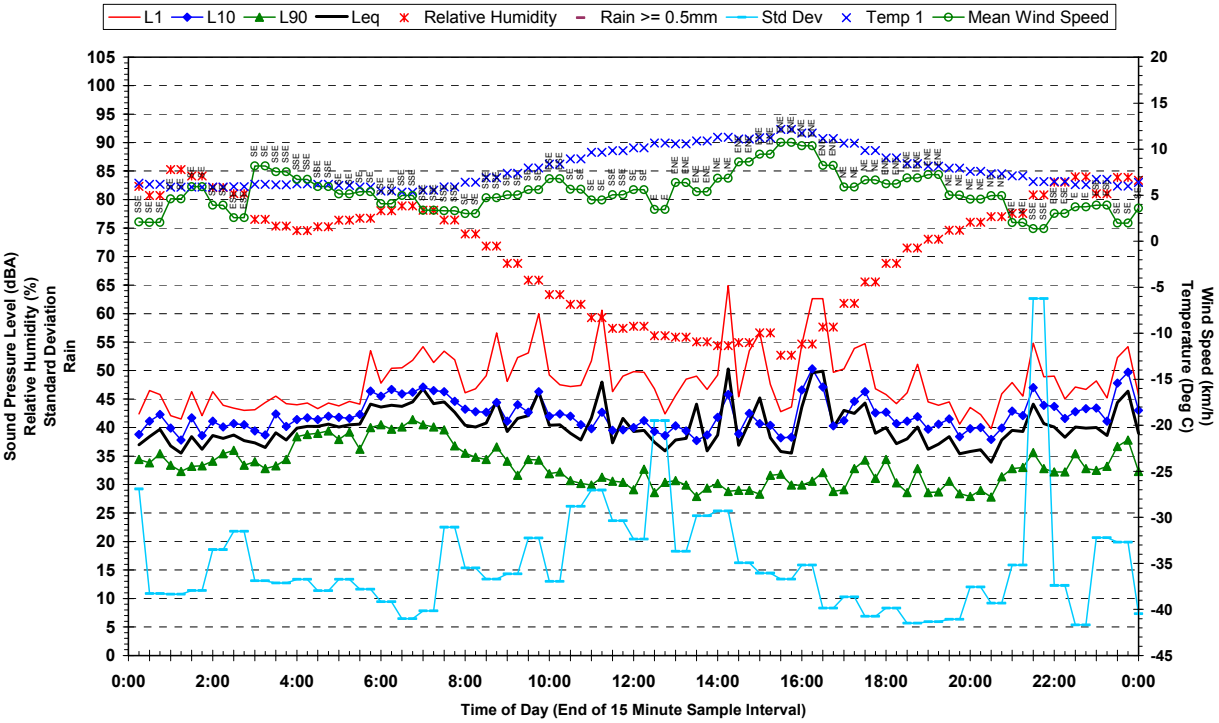


Statistical Ambient Noise Levels
NAG 10 - Residence Reference 8 - Monday 13 August 2007

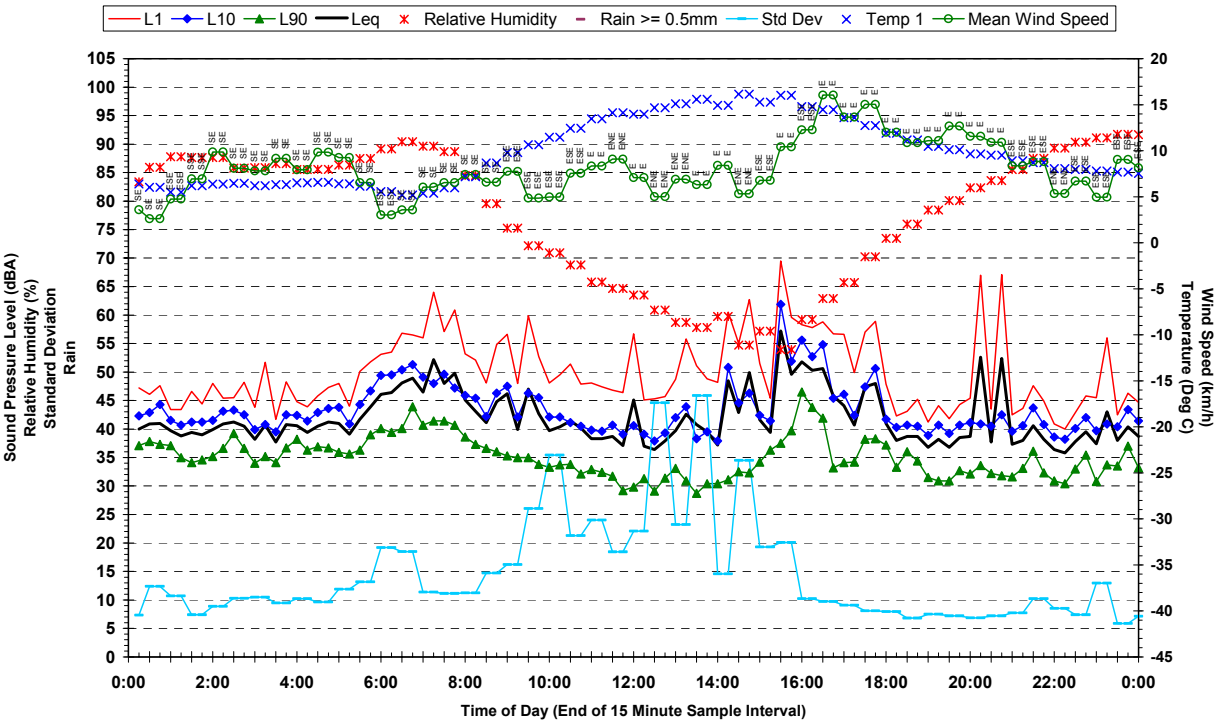


Unattended Ambient Noise and Weather Data - Noise Assessment Group 10 - Residence Reference 8

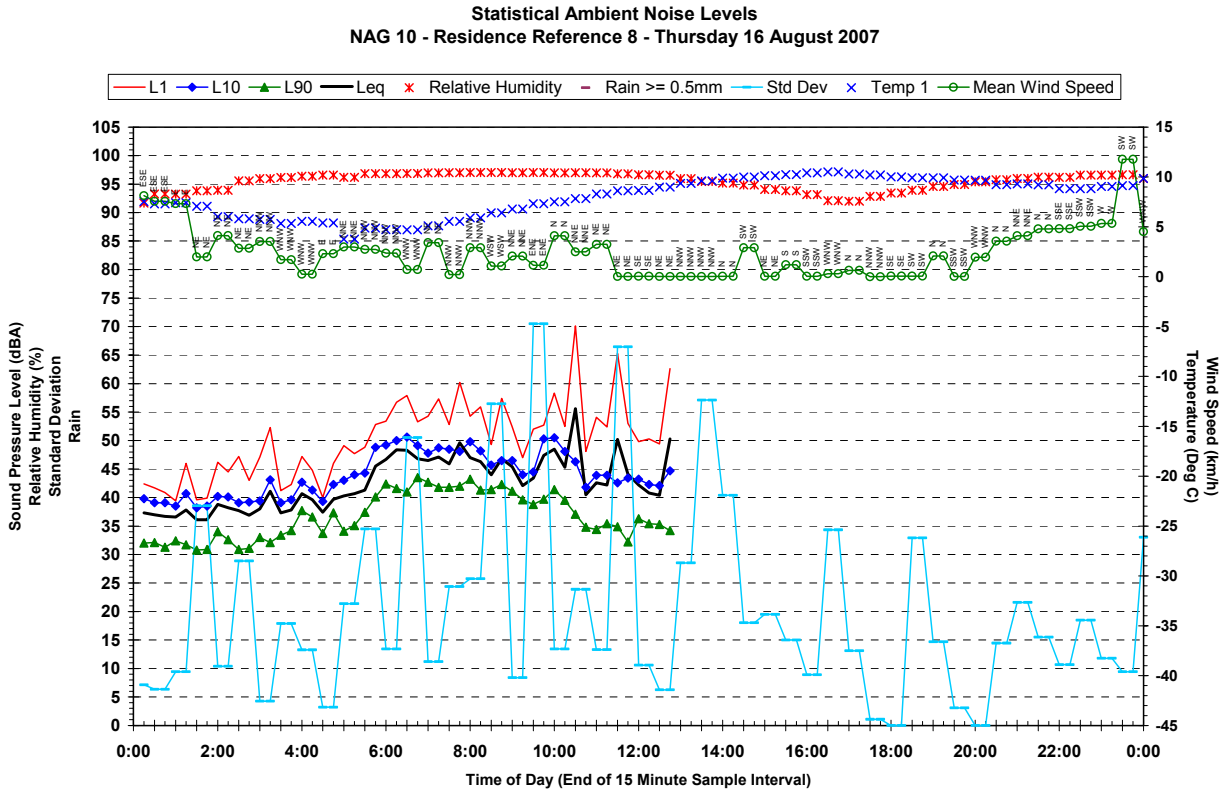
Statistical Ambient Noise Levels
NAG 10 - Residence Reference 8 - Tuesday 14 August 2007



Statistical Ambient Noise Levels
NAG 10 - Residence Reference 8 - Wednesday 15 August 2007

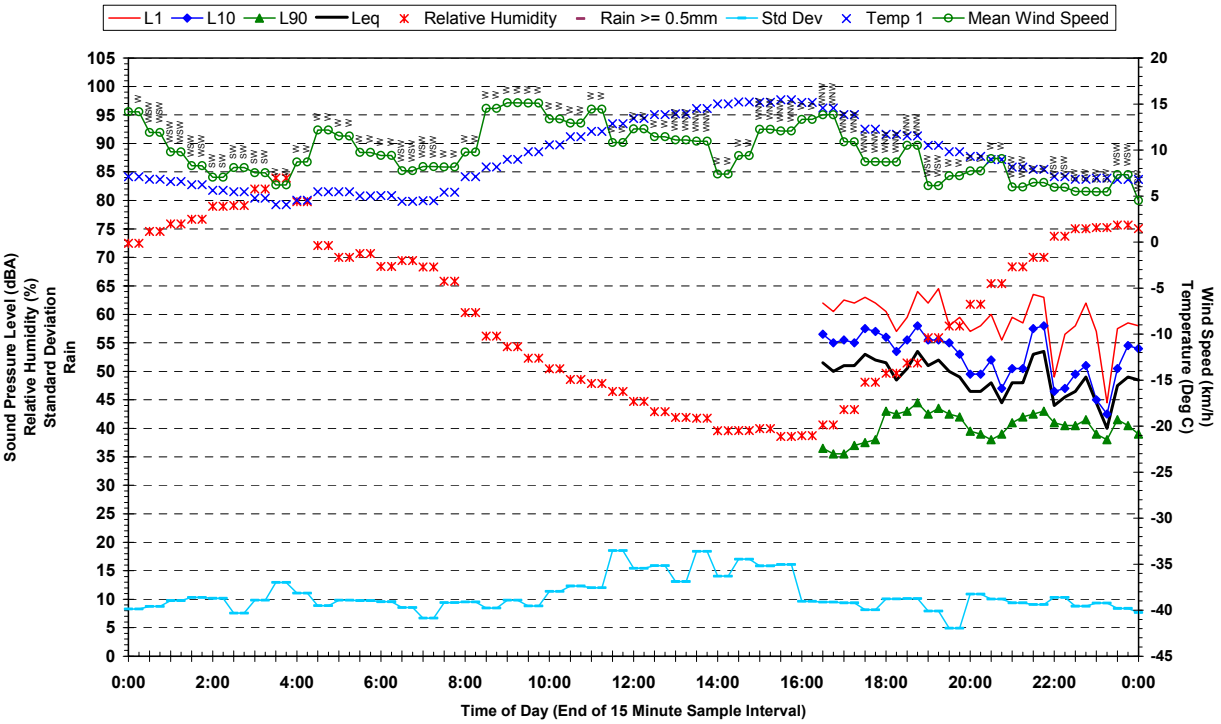


Unattended Ambient Noise and Weather Data - Noise Assessment Group 10 - Residence Reference 8

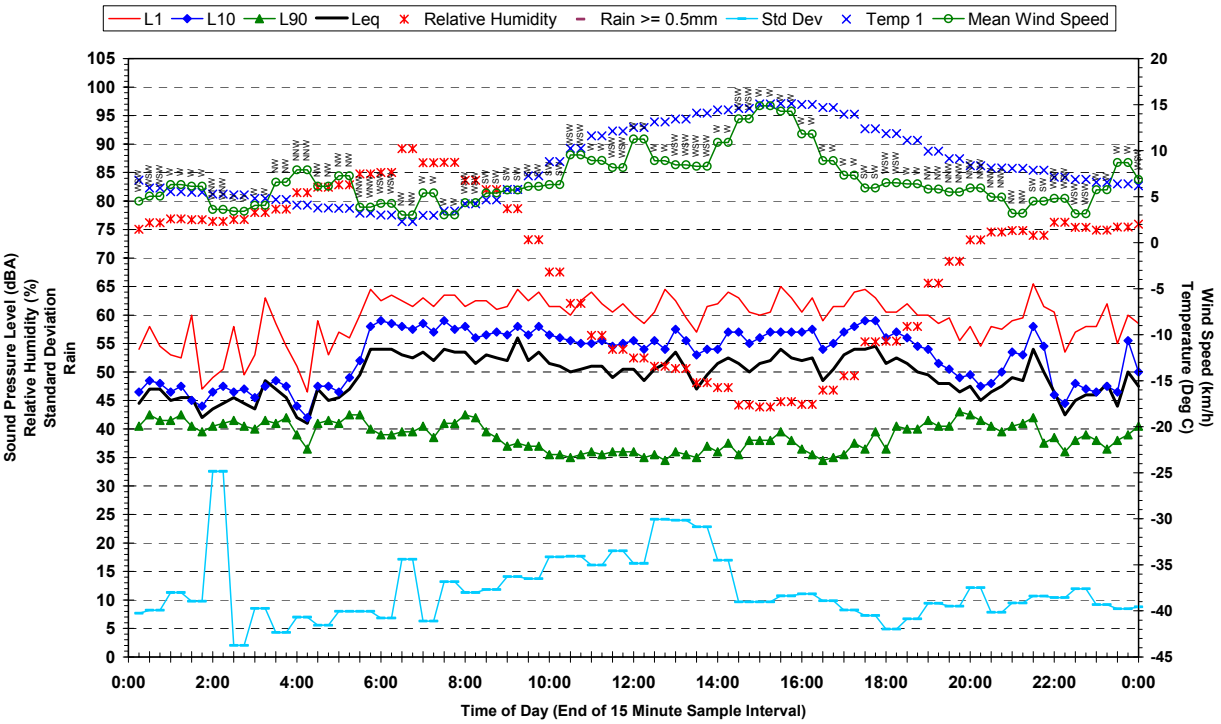


Unattended Ambient Noise and Weather Data - Noise Assessment Group 11 - Residence Reference 16

Statistical Ambient Noise Levels
NAG 11- Residence Reference 16 - Monday 6 August 2007

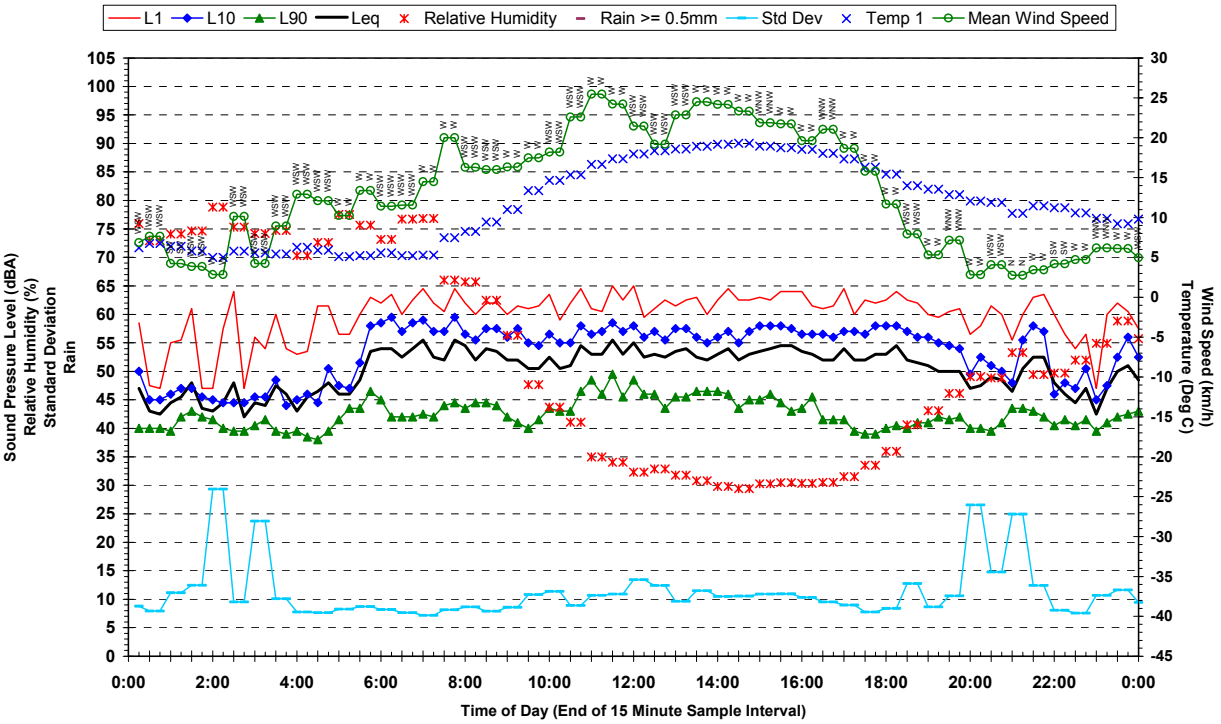


Statistical Ambient Noise Levels
NAG 11- Residence Reference 16 - Tuesday 7 August 2007

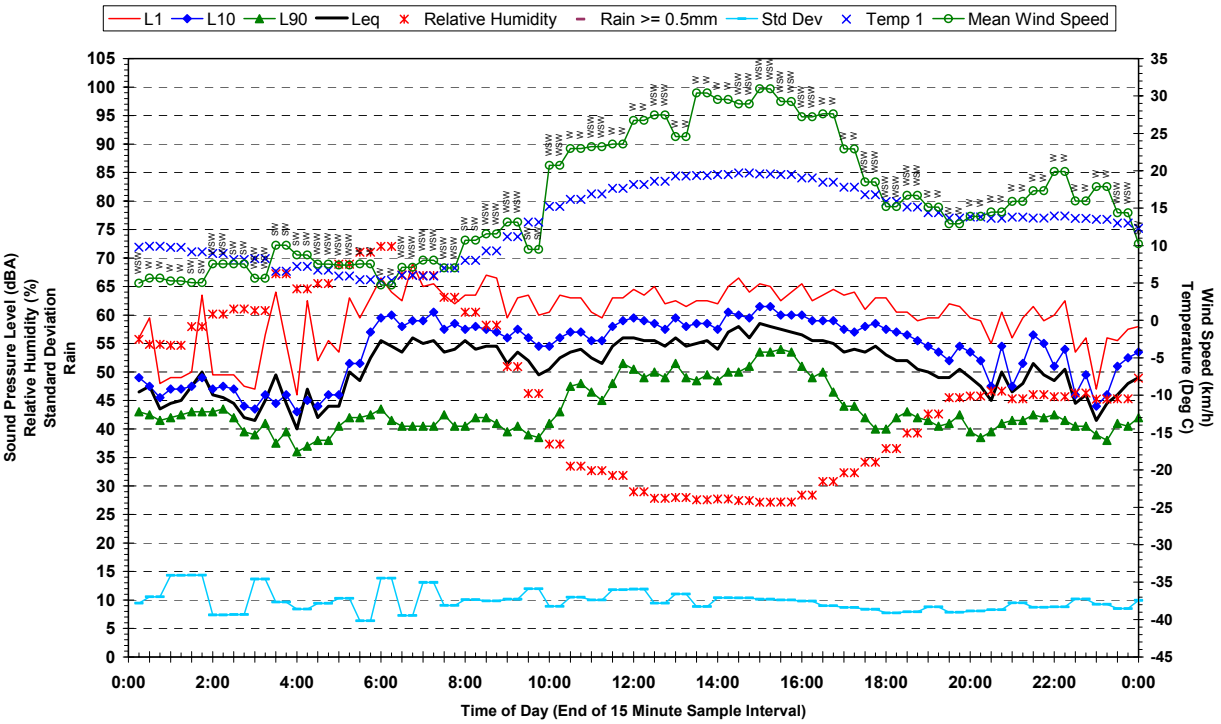


Unattended Ambient Noise and Weather Data - Noise Assessment Group 11 - Residence Reference 16

Statistical Ambient Noise Levels
NAG 11- Residence Reference 16 - Wednesday 8 August 2007

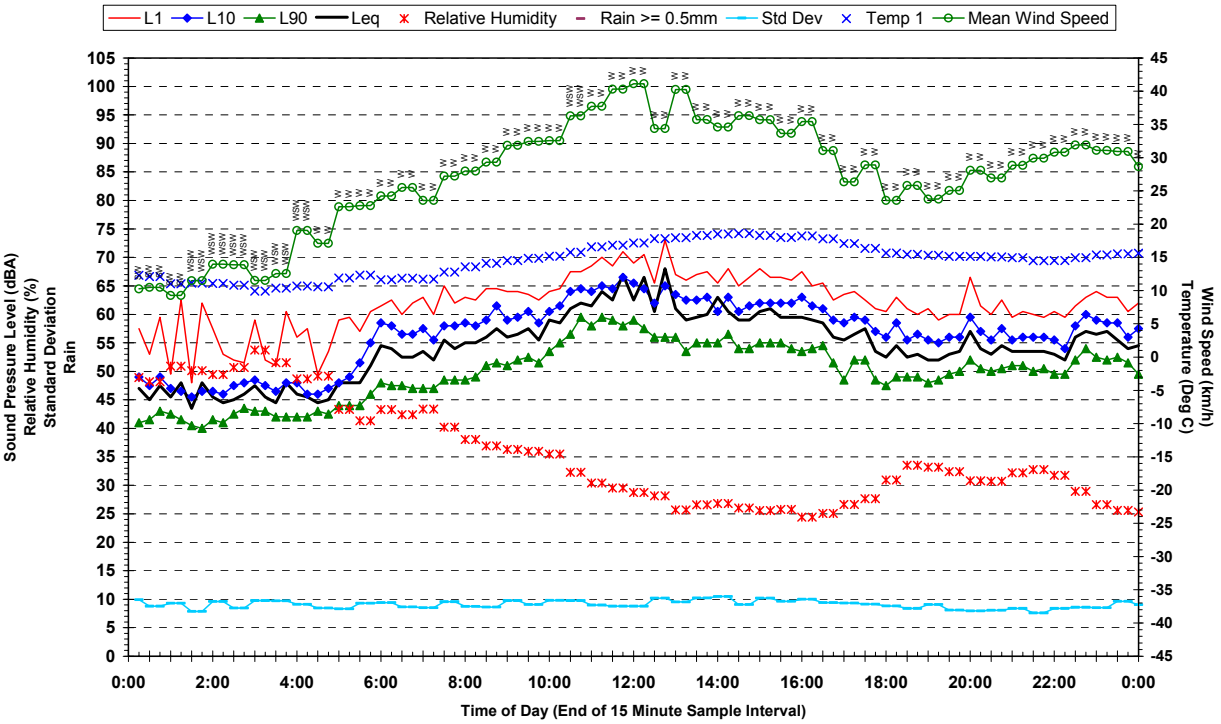


Statistical Ambient Noise Levels
NAG 11- Residence Reference 16 - Thursday 9 August 2007

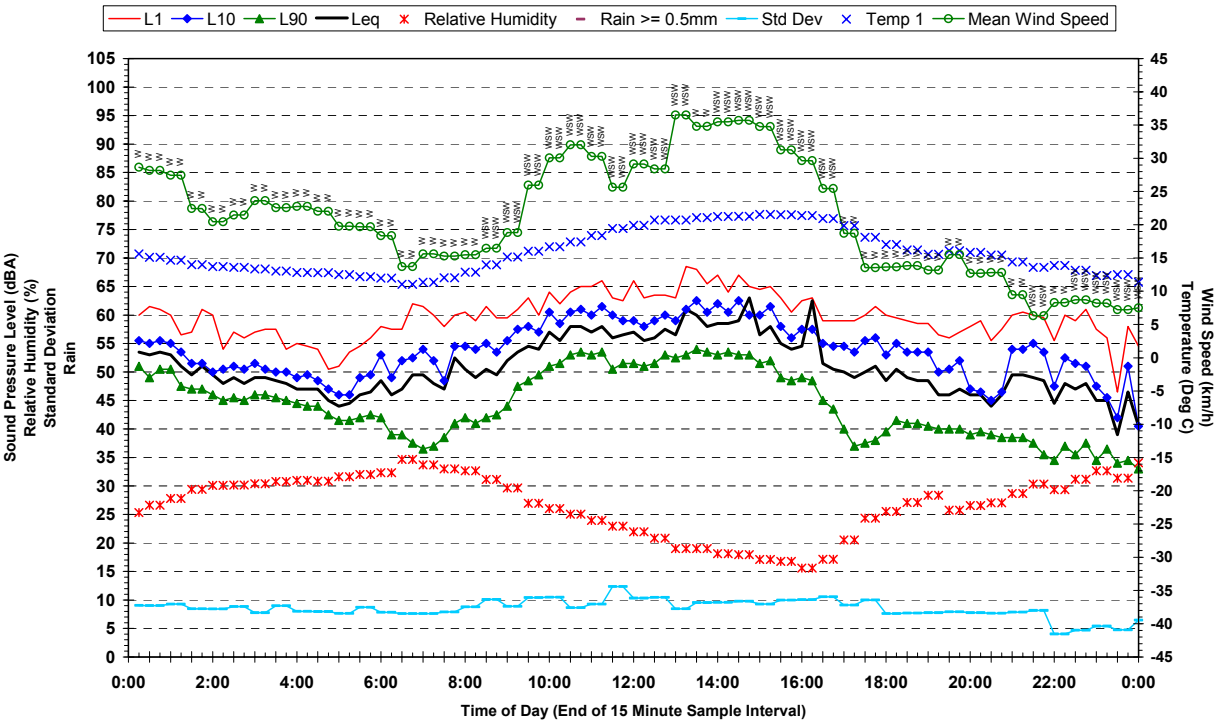


Unattended Ambient Noise and Weather Data - Noise Assessment Group 11 - Residence Reference 16

Statistical Ambient Noise Levels
NAG 11- Residence Reference 16 - Friday 10 August 2007

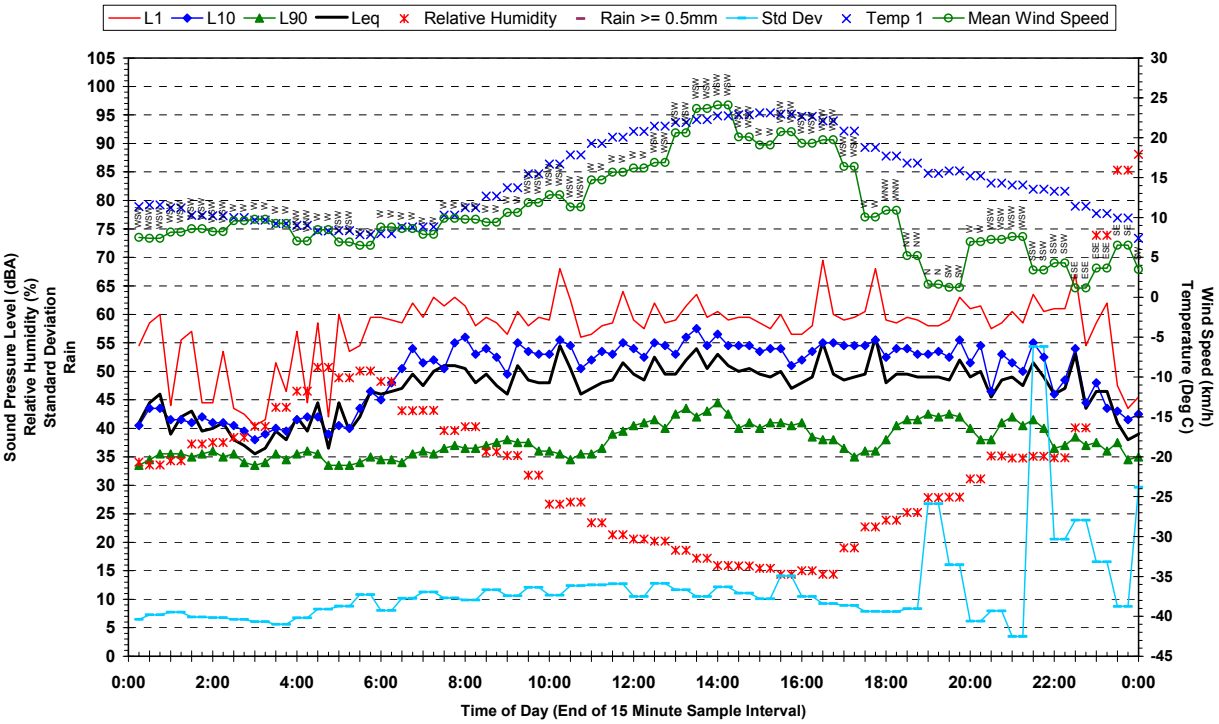


Statistical Ambient Noise Levels
NAG 11- Residence Reference 16 - Saturday 11 August 2007

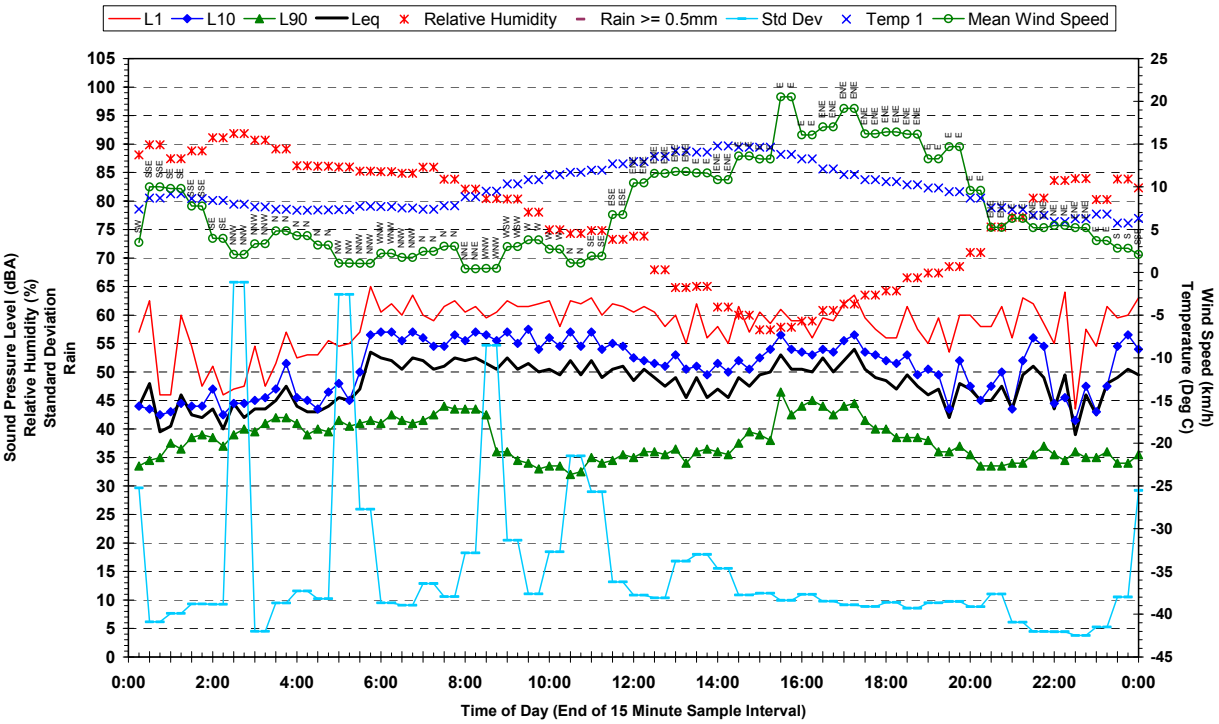


Unattended Ambient Noise and Weather Data - Noise Assessment Group 11 - Residence Reference 16

Statistical Ambient Noise Levels
NAG 11- Residence Reference 16 - Sunday 12 August 2007

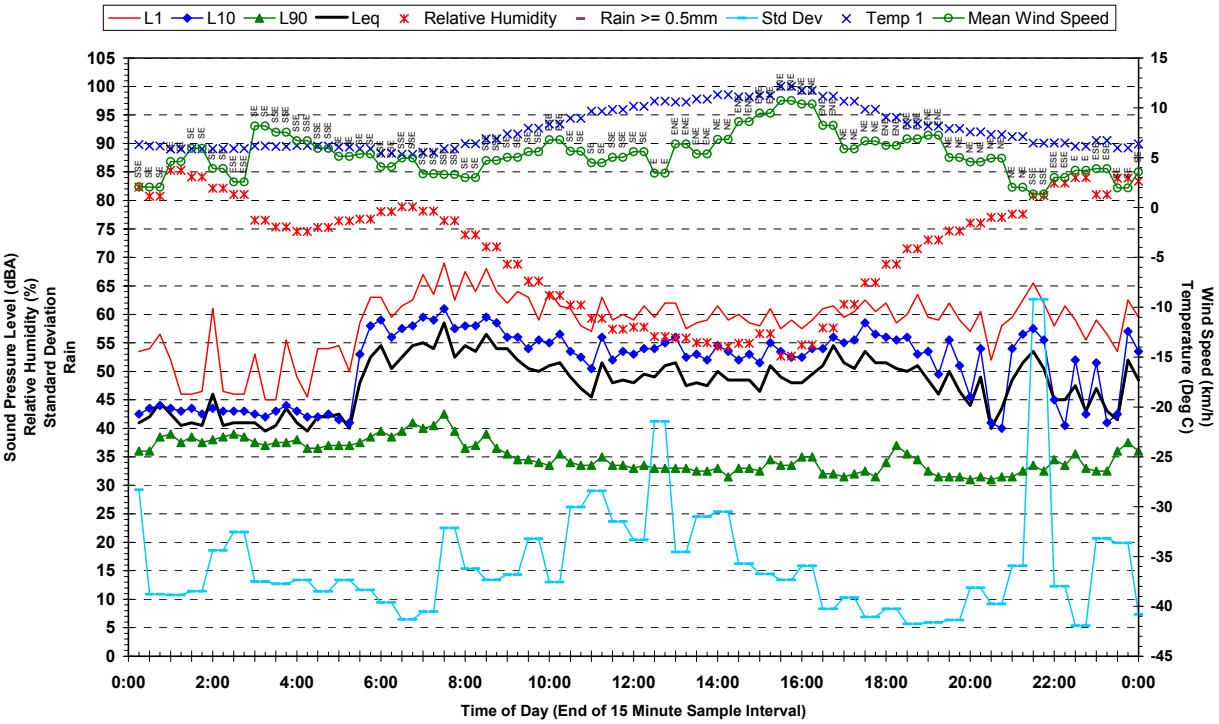


Statistical Ambient Noise Levels
NAG 11- Residence Reference 16 - Monday 13 August 2007

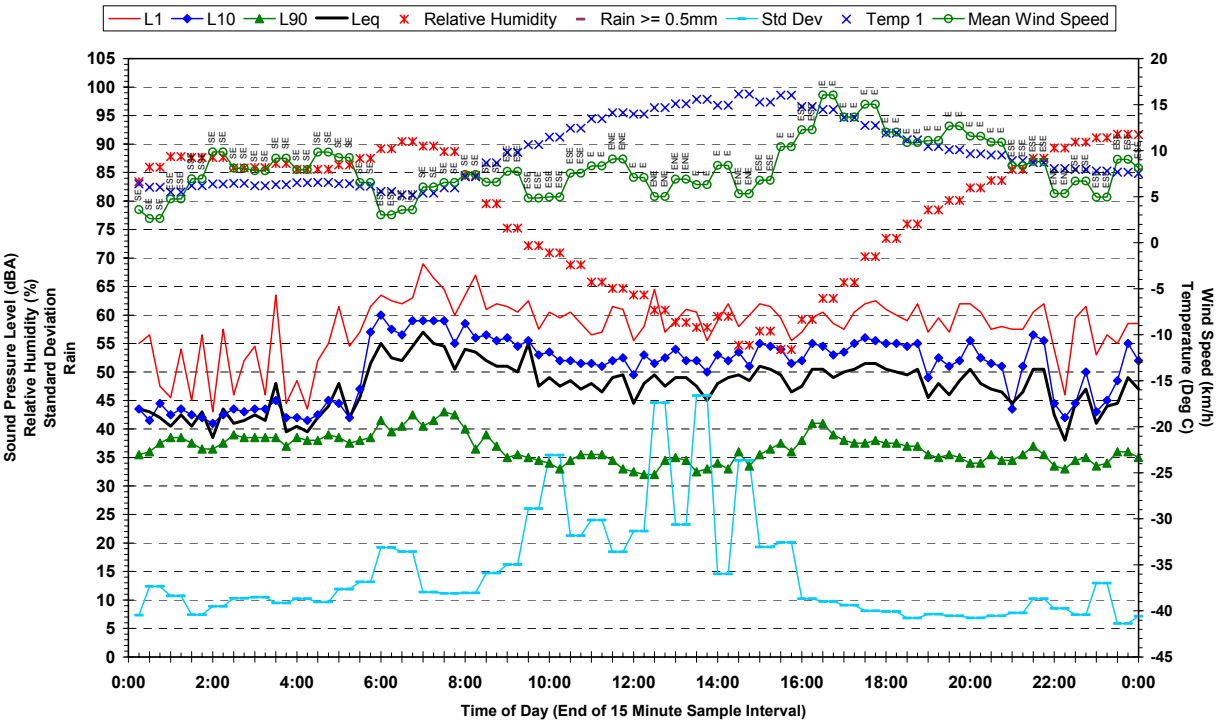


Unattended Ambient Noise and Weather Data - Noise Assessment Group 11 - Residence Reference 16

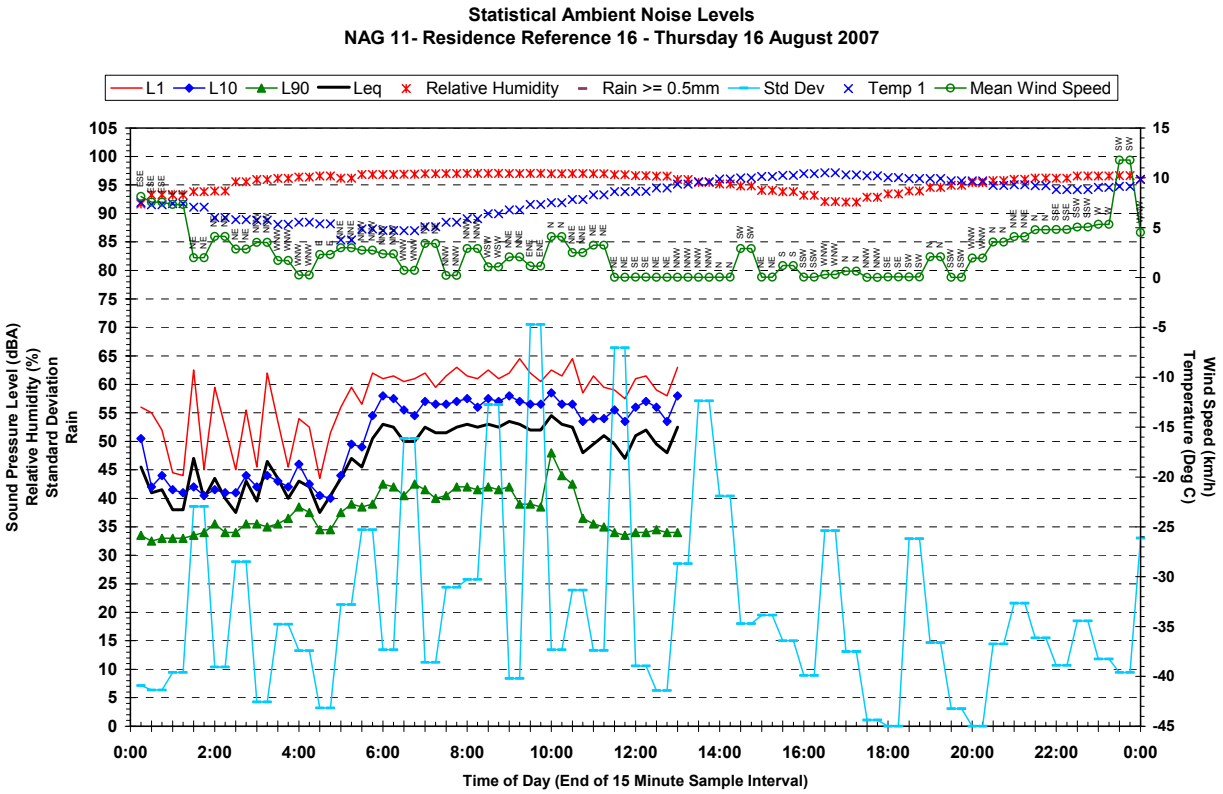
Statistical Ambient Noise Levels
NAG 11- Residence Reference 16 - Tuesday 14 August 2007



Statistical Ambient Noise Levels
NAG 11- Residence Reference 16 - Wednesday 15 August 2007

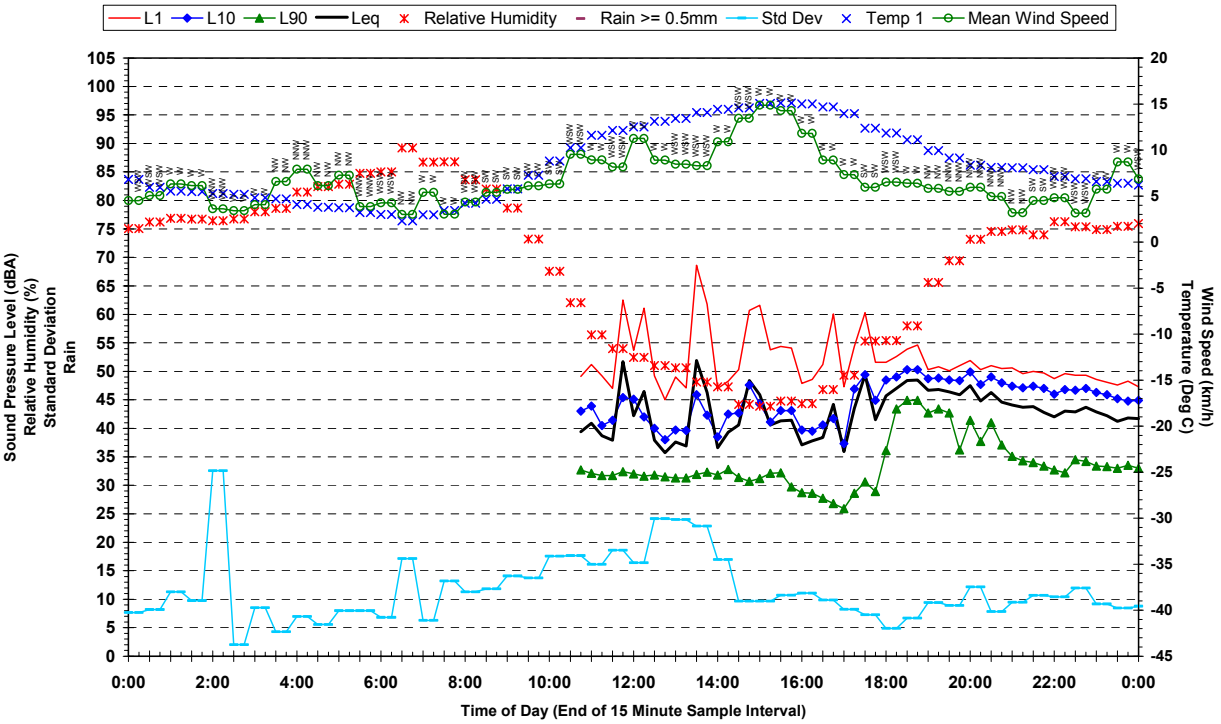


Unattended Ambient Noise and Weather Data - Noise Assessment Group 11 - Residence Reference 16

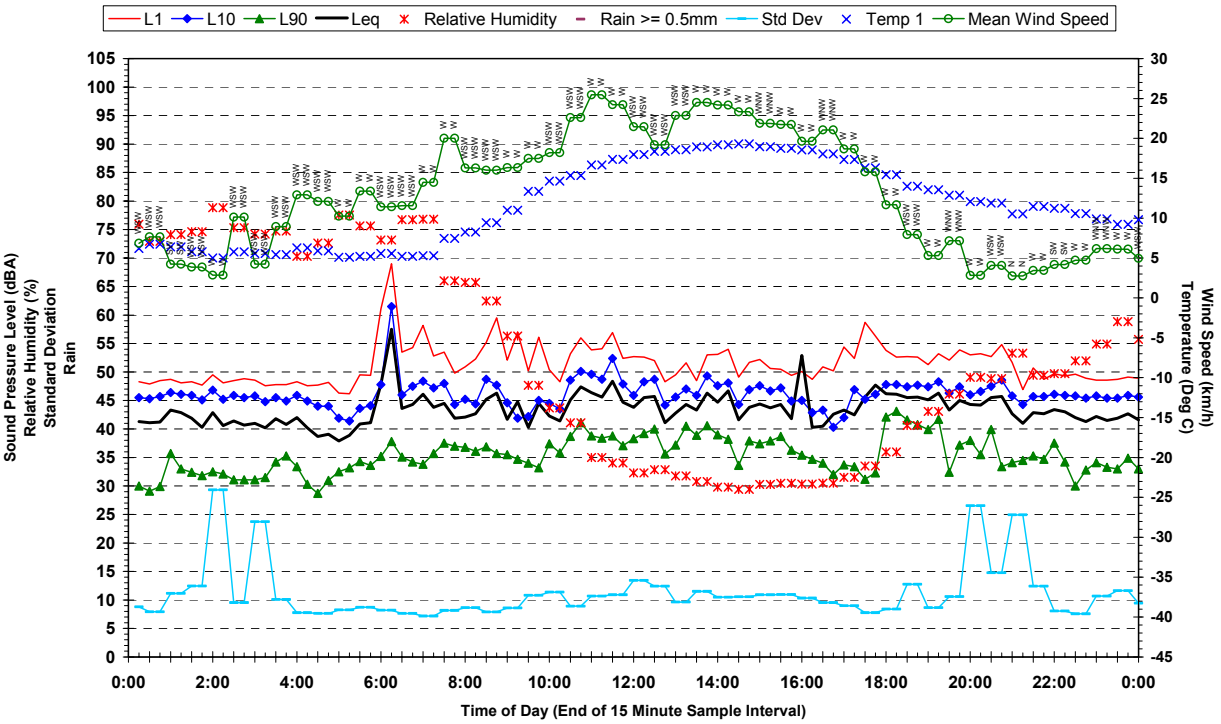


Unattended Ambient Noise and Weather Data - Noise Assessment Group 12 - Residence Reference 54

Statistical Ambient Noise Levels
NAG 12 - Residence Reference 54 - Tuesday 7 August 2007

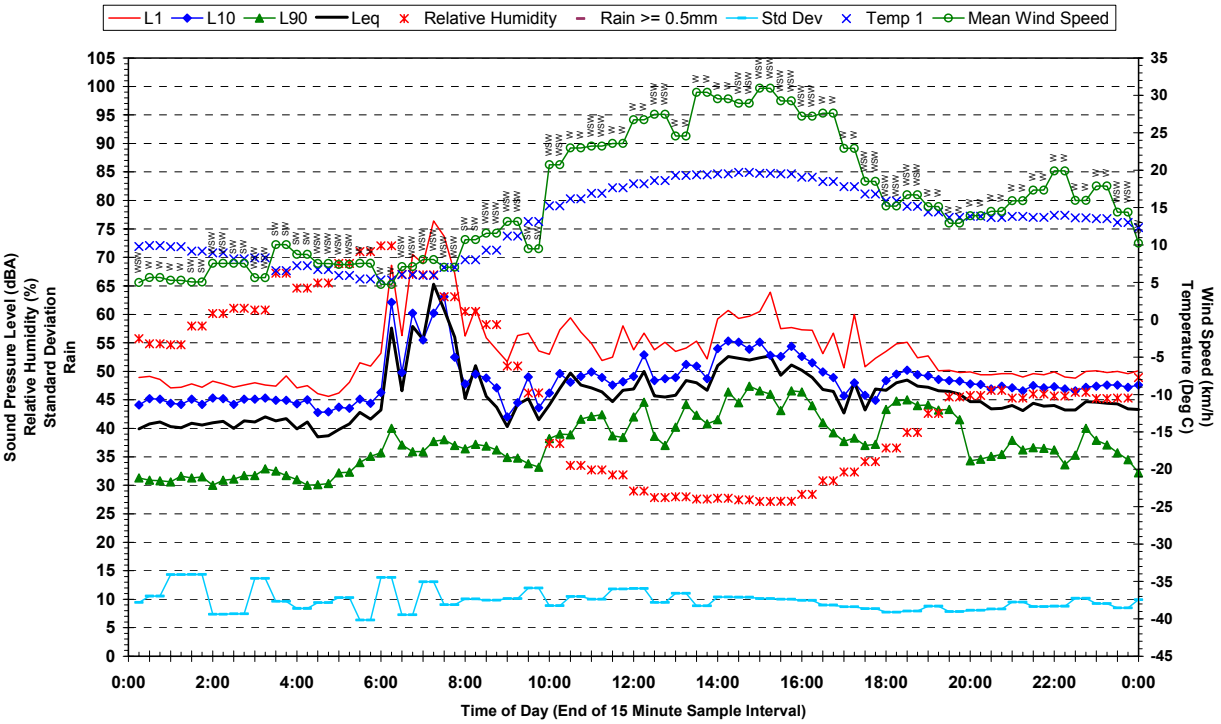


Statistical Ambient Noise Levels
NAG 12 - Residence Reference 54 - Wednesday 8 August 2007

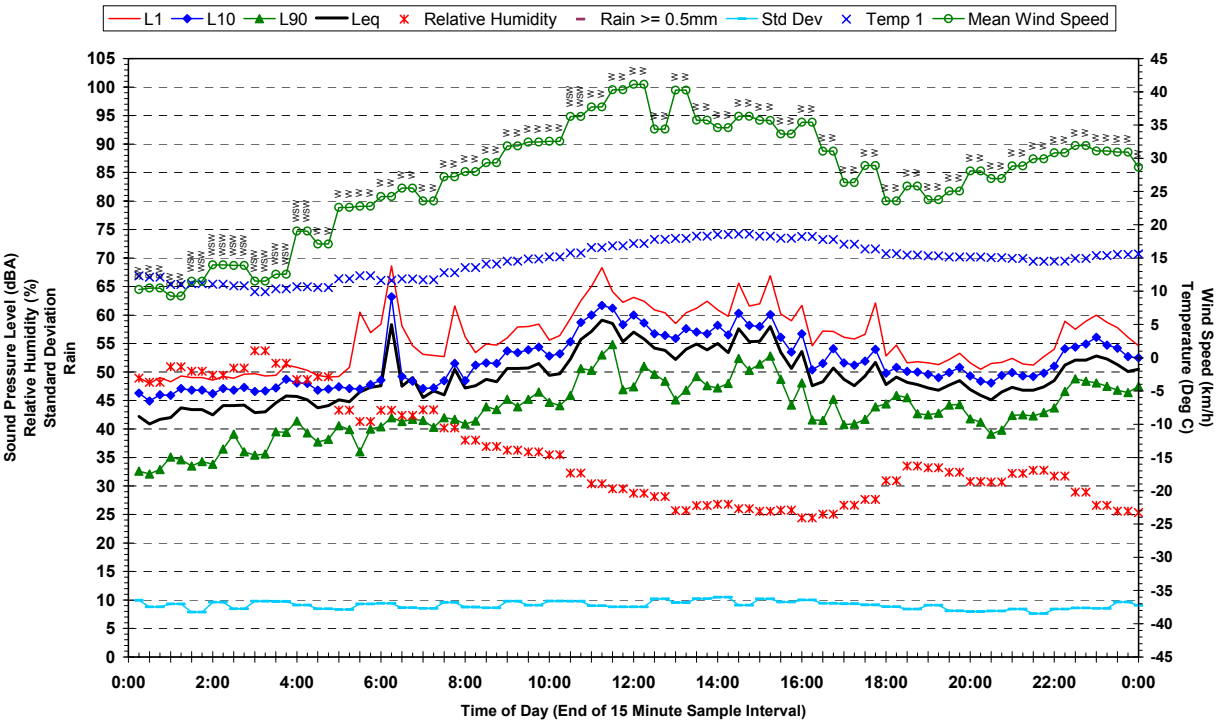


Unattended Ambient Noise and Weather Data - Noise Assessment Group 12 - Residence Reference 54

Statistical Ambient Noise Levels
NAG 12 - Residence Reference 54 - Thursday 9 August 2007

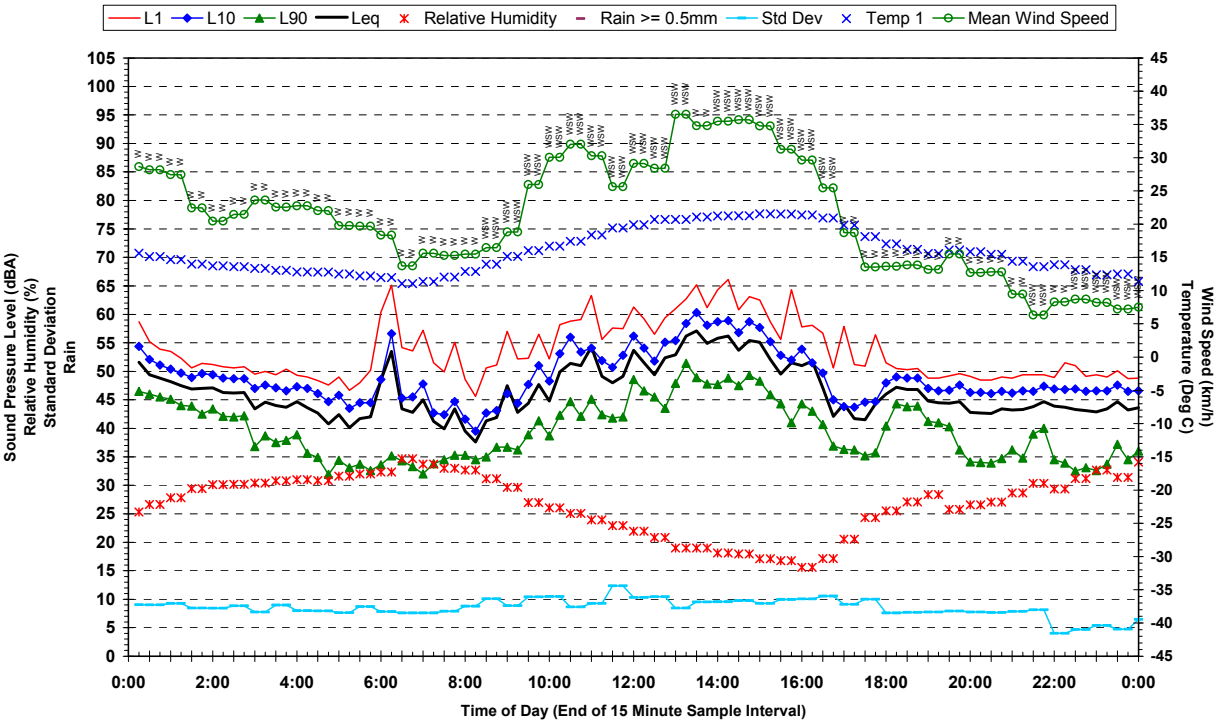


Statistical Ambient Noise Levels
NAG 12 - Residence Reference 54 - Friday 10 August 2007

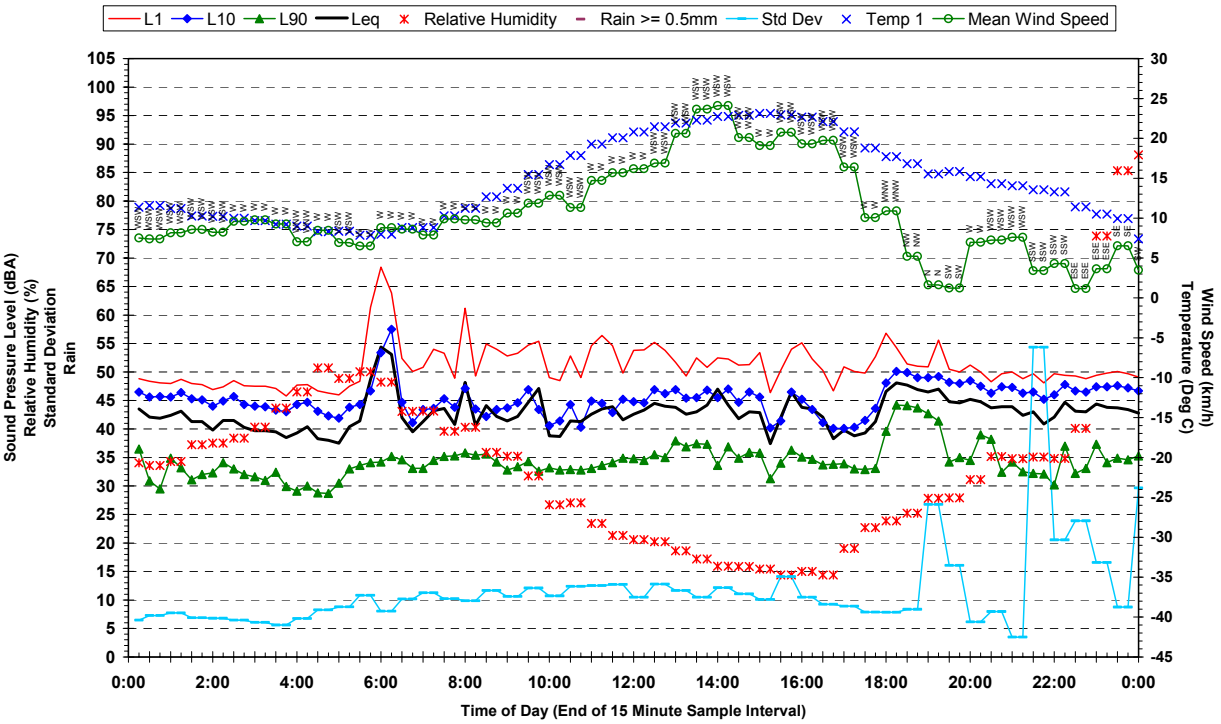


Unattended Ambient Noise and Weather Data - Noise Assessment Group 12 - Residence Reference 54

Statistical Ambient Noise Levels
NAG 12 - Residence Reference 54 - Saturday 11 August 2007

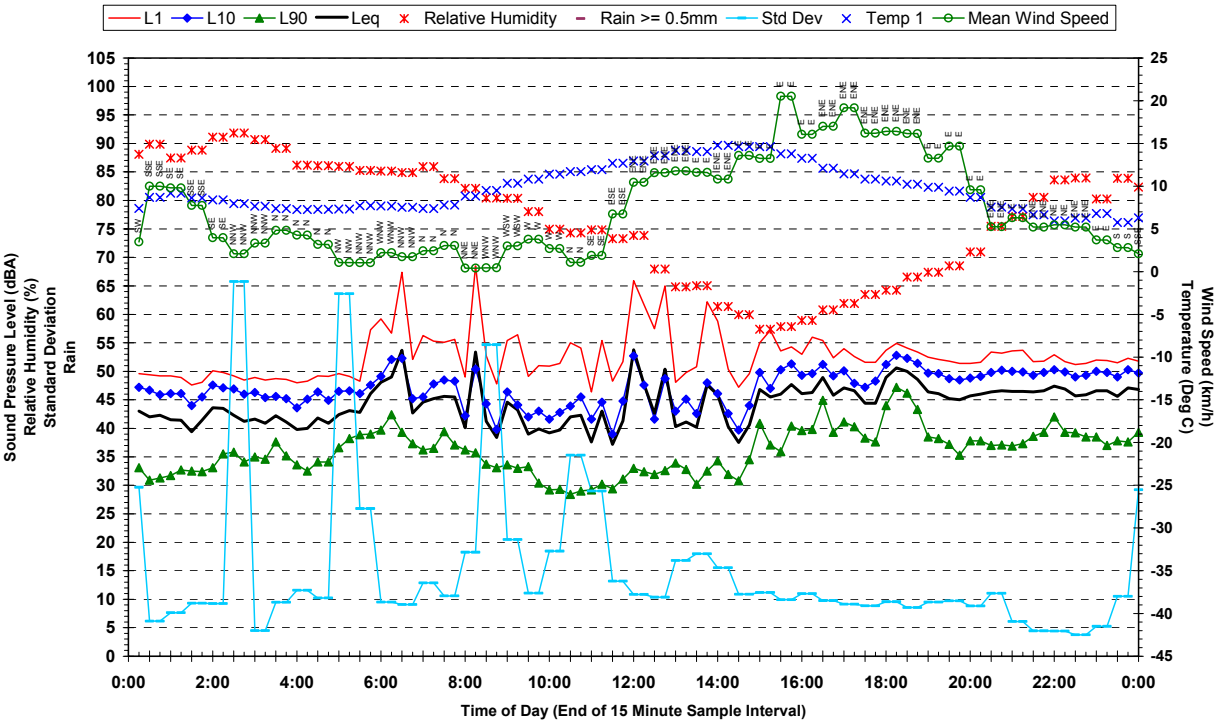


Statistical Ambient Noise Levels
NAG 12 - Residence Reference 54 - Sunday 12 August 2007

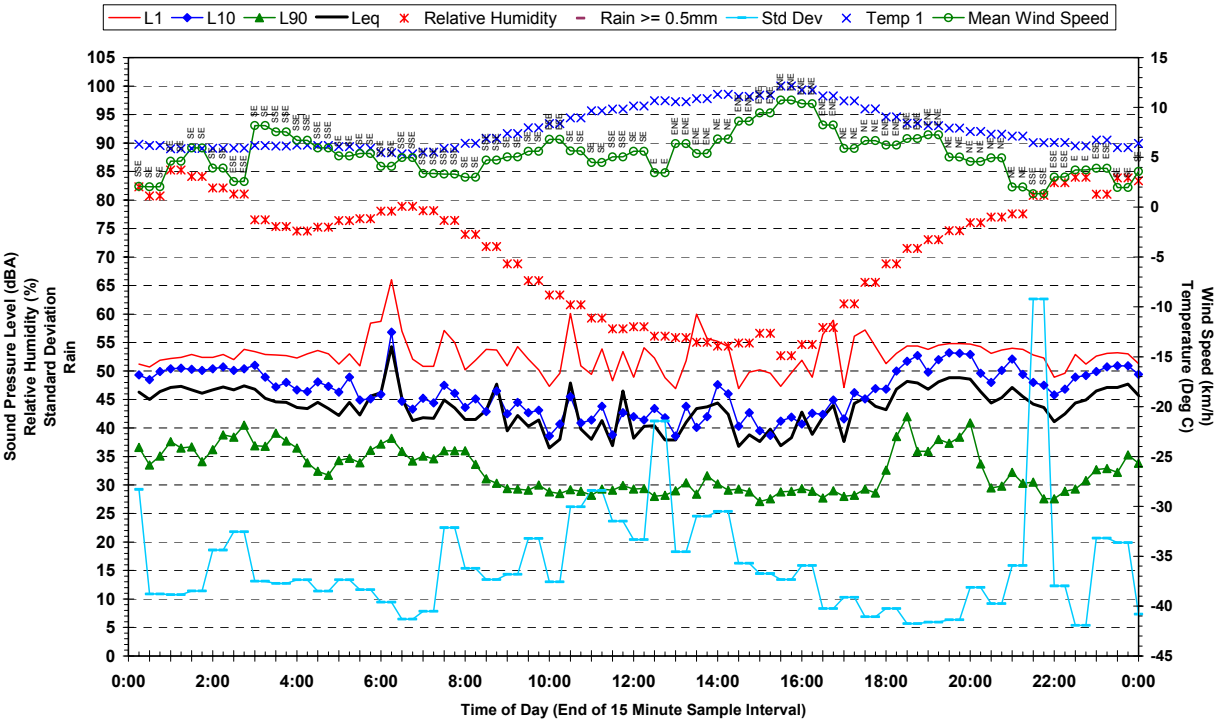


Unattended Ambient Noise and Weather Data - Noise Assessment Group 12 - Residence Reference 54

Statistical Ambient Noise Levels
NAG 12 - Residence Reference 54 - Monday 13 August 2007

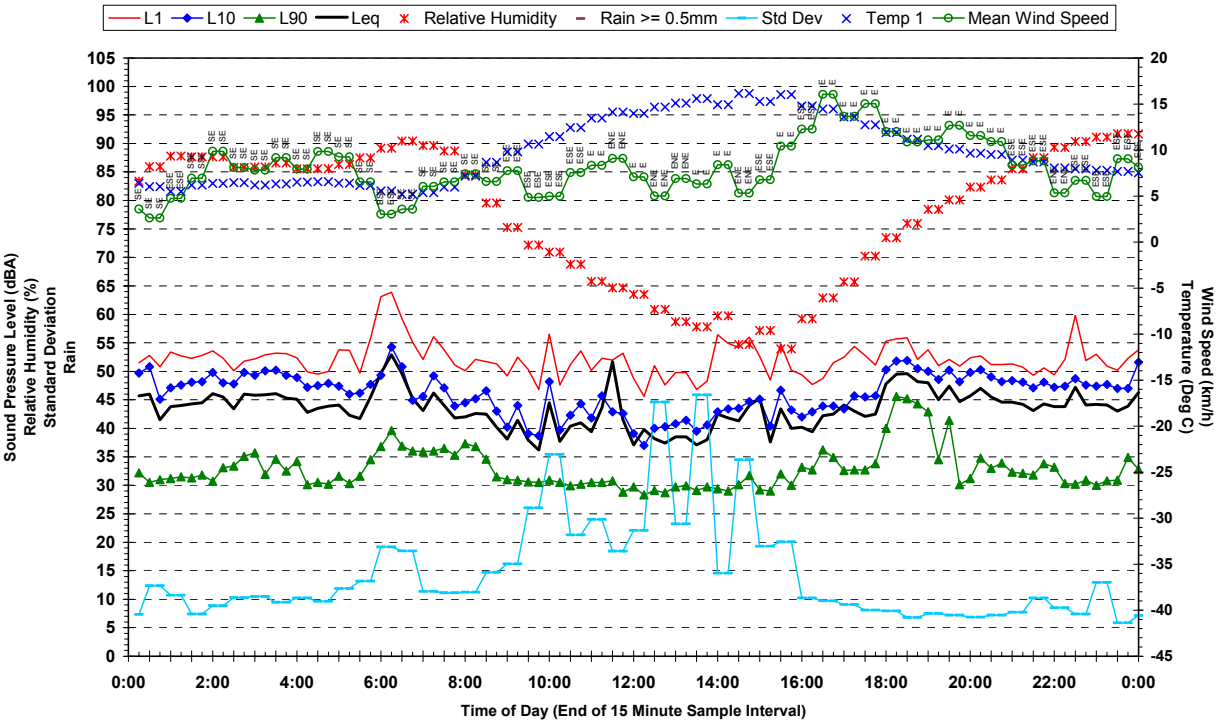


Statistical Ambient Noise Levels
NAG 12 - Residence Reference 54 - Tuesday 14 August 2007

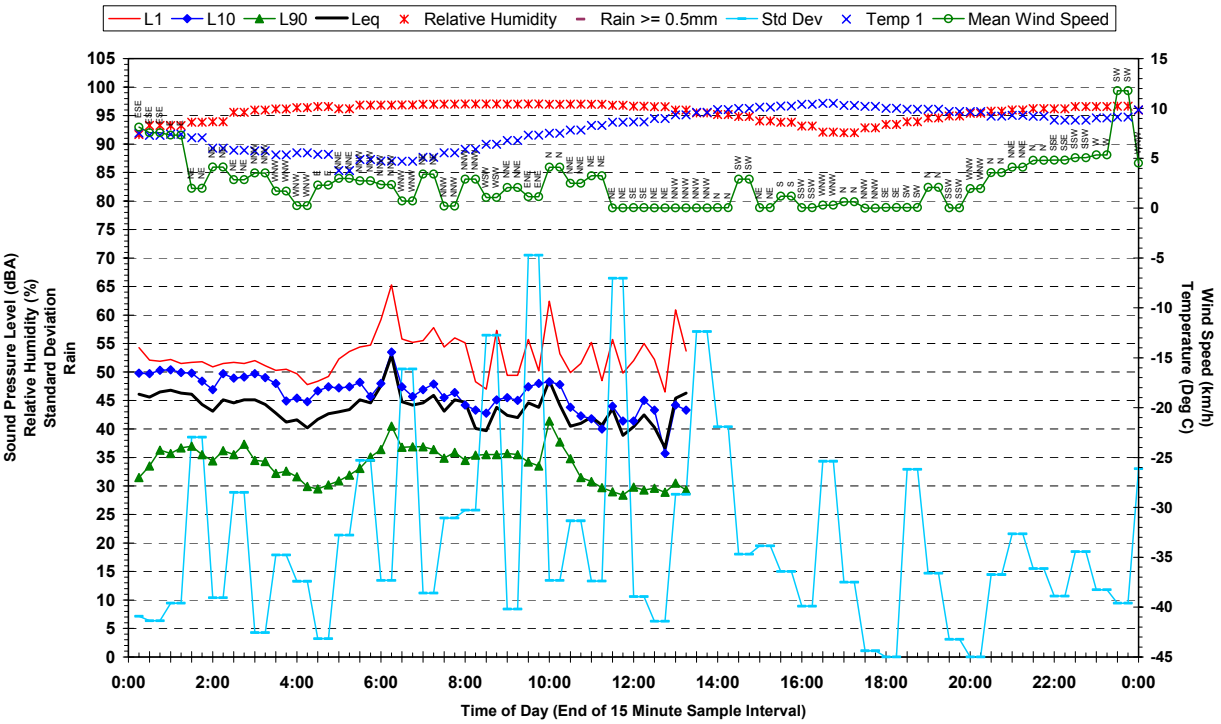


Unattended Ambient Noise and Weather Data - Noise Assessment Group 12 - Residence Reference 54

Statistical Ambient Noise Levels
NAG 12 - Residence Reference 54 - Wednesday 15 August 2007



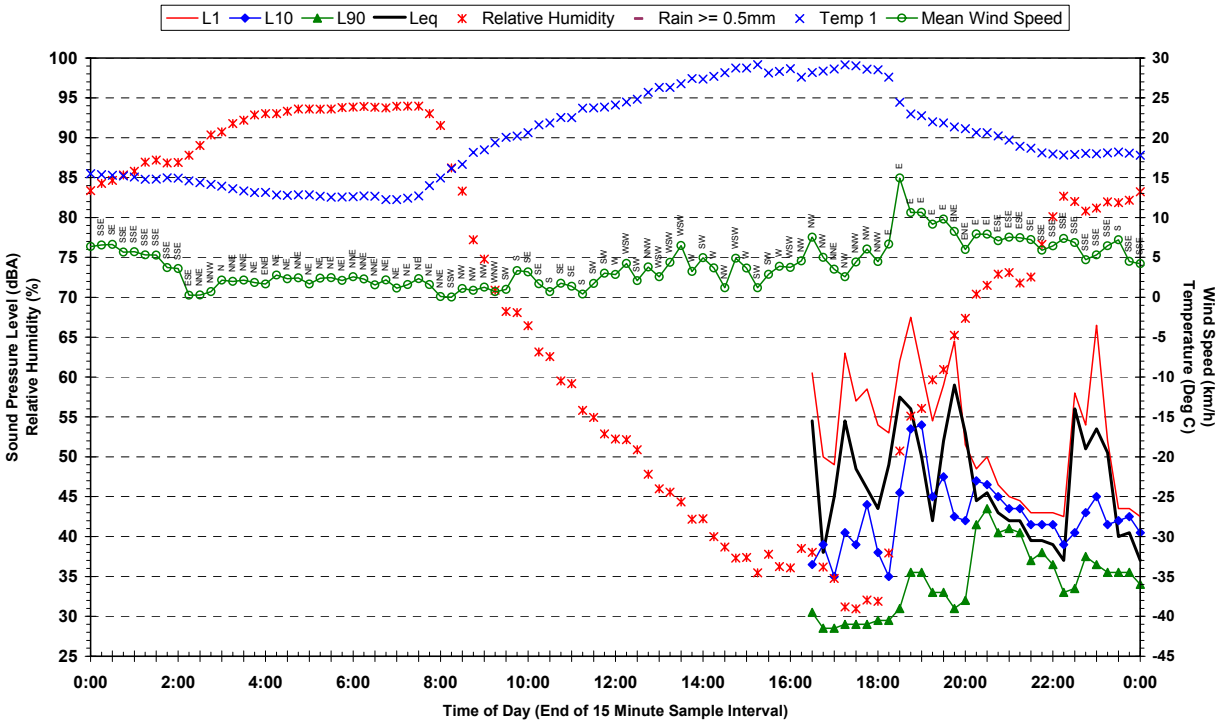
Statistical Ambient Noise Levels
NAG 12 - Residence Reference 54 - Thursday 16 August 2007



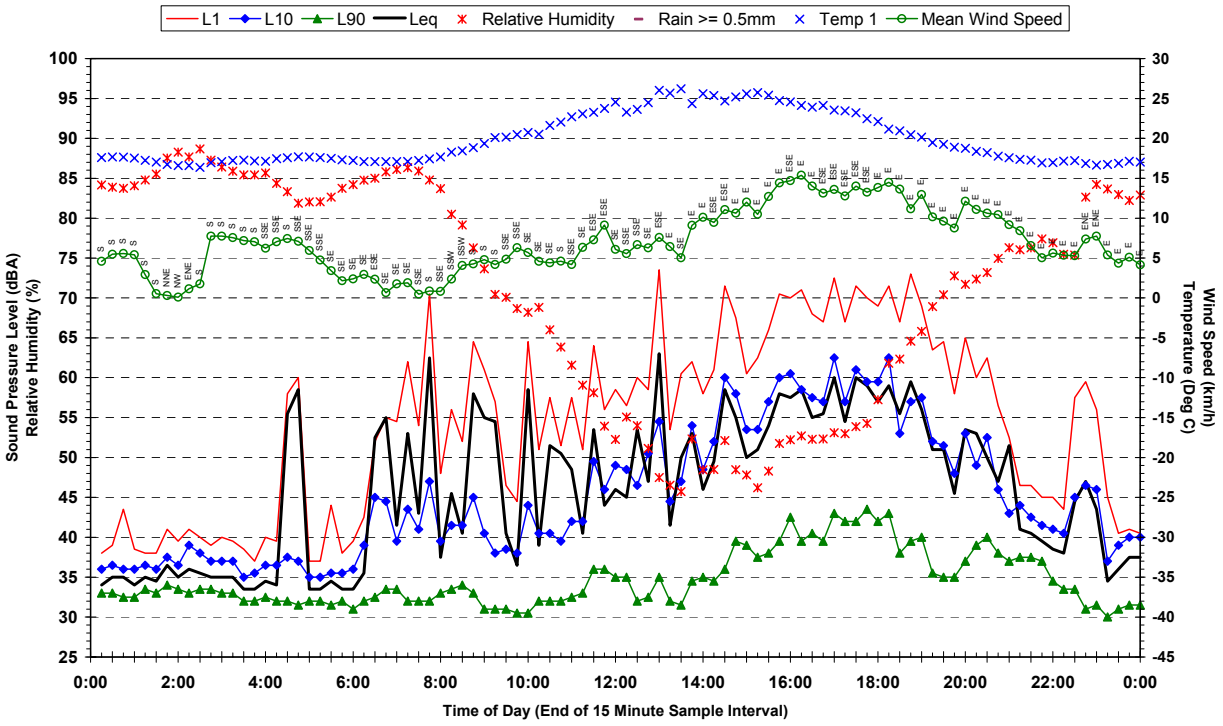
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Unattended Ambient Noise and Weather Data - Noise Assessment Group A - Residence Reference 31

Statistical Ambient Noise Levels
NAG A - Residence Reference 31 - Wednesday 9 March 2005

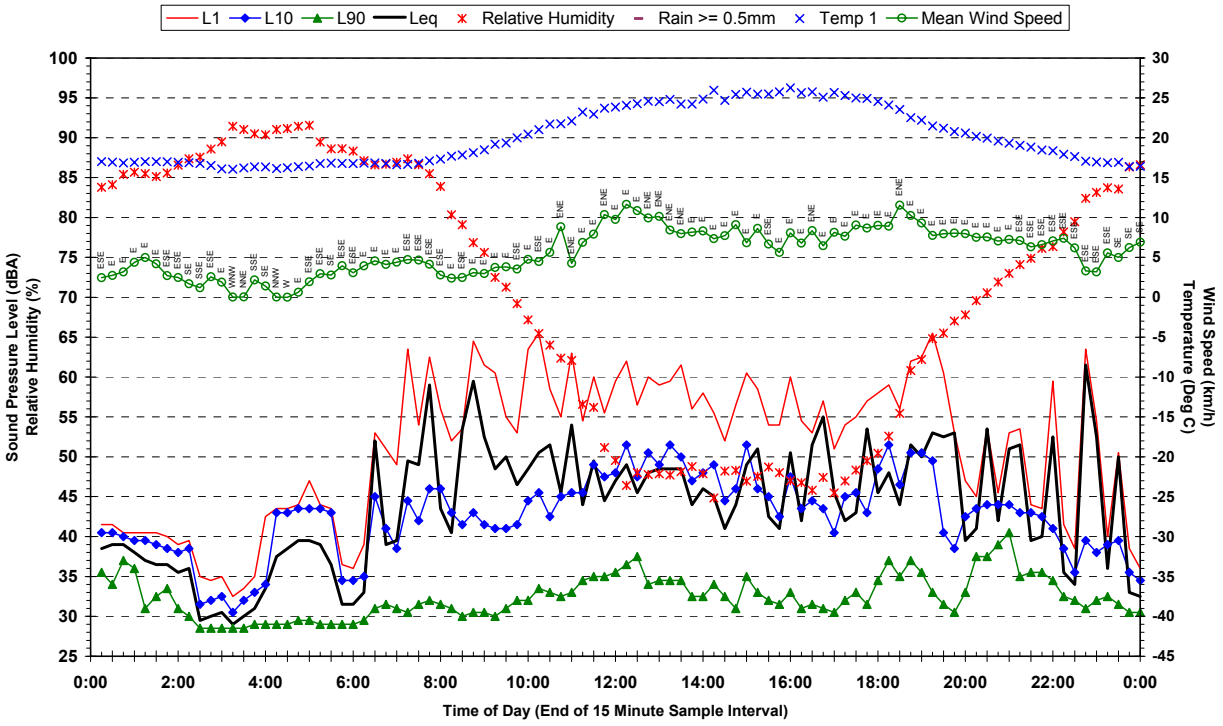


Statistical Ambient Noise Levels
NAG A - Residence Reference 31 - Thursday 10 March 2005

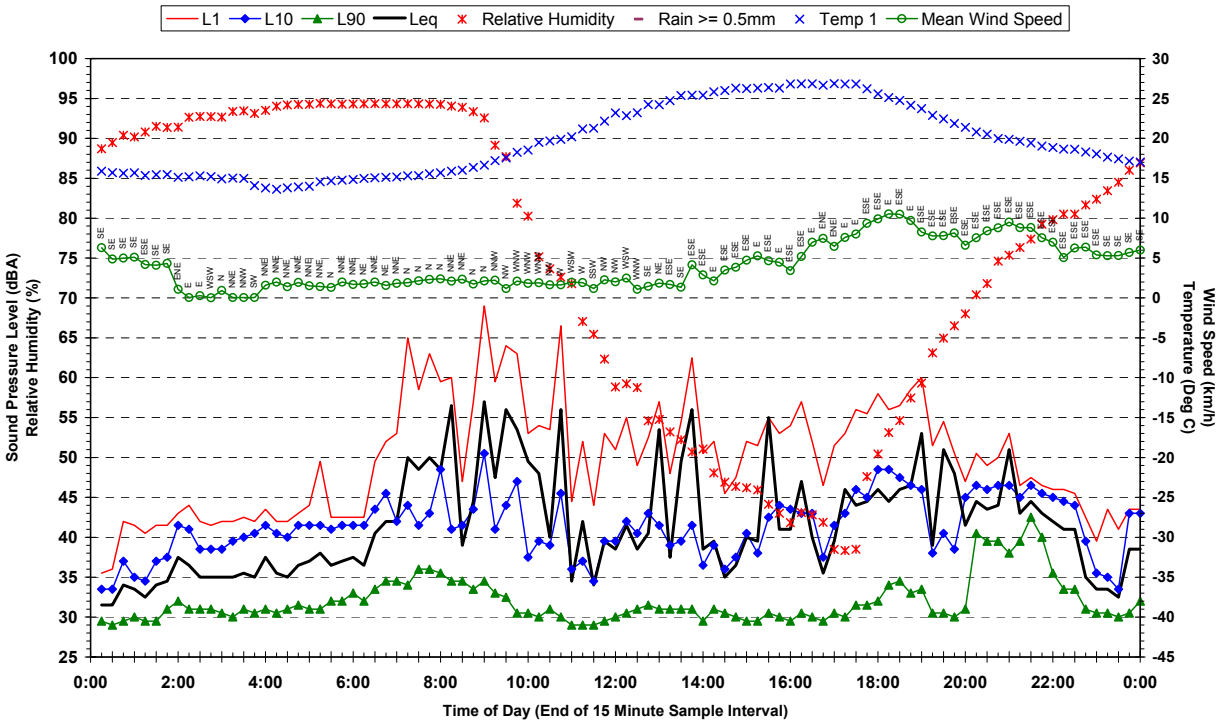


Unattended Ambient Noise and Weather Data - Noise Assessment Group A - Residence Reference 31

Statistical Ambient Noise Levels
NAG A - Residence Reference 31 - Friday 11 March 2005

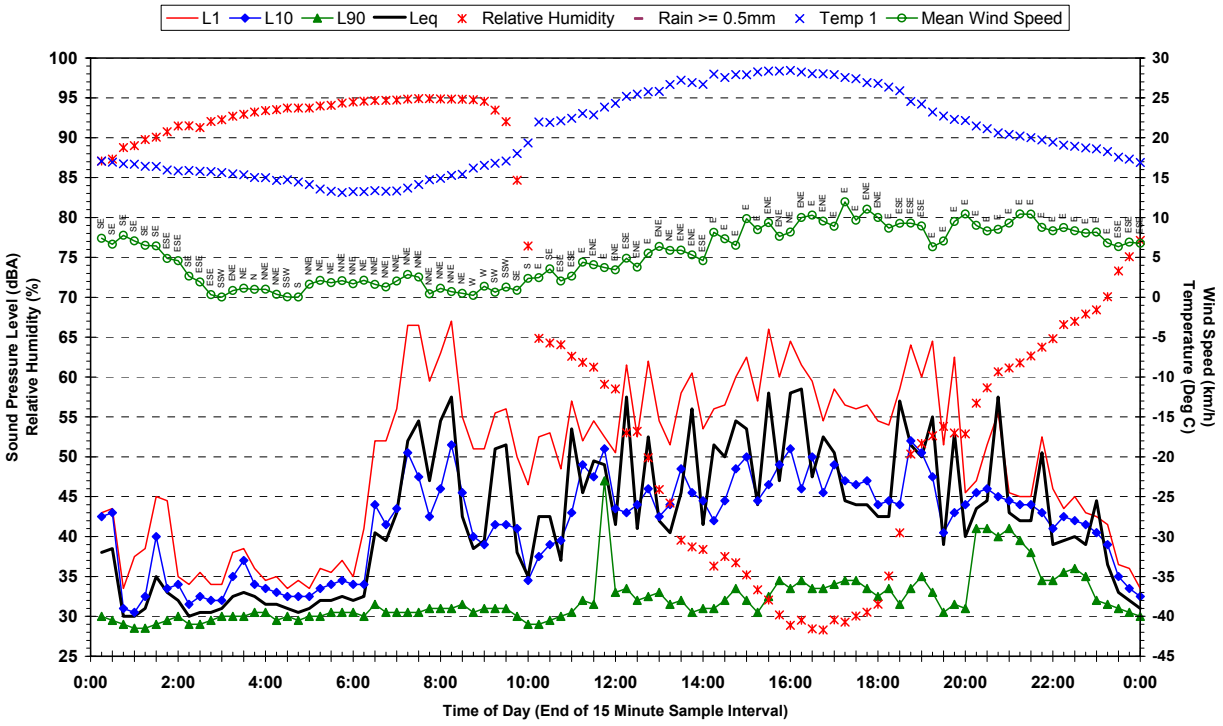


Statistical Ambient Noise Levels
NAG A - Residence Reference 31 - Saturday 12 March 2005

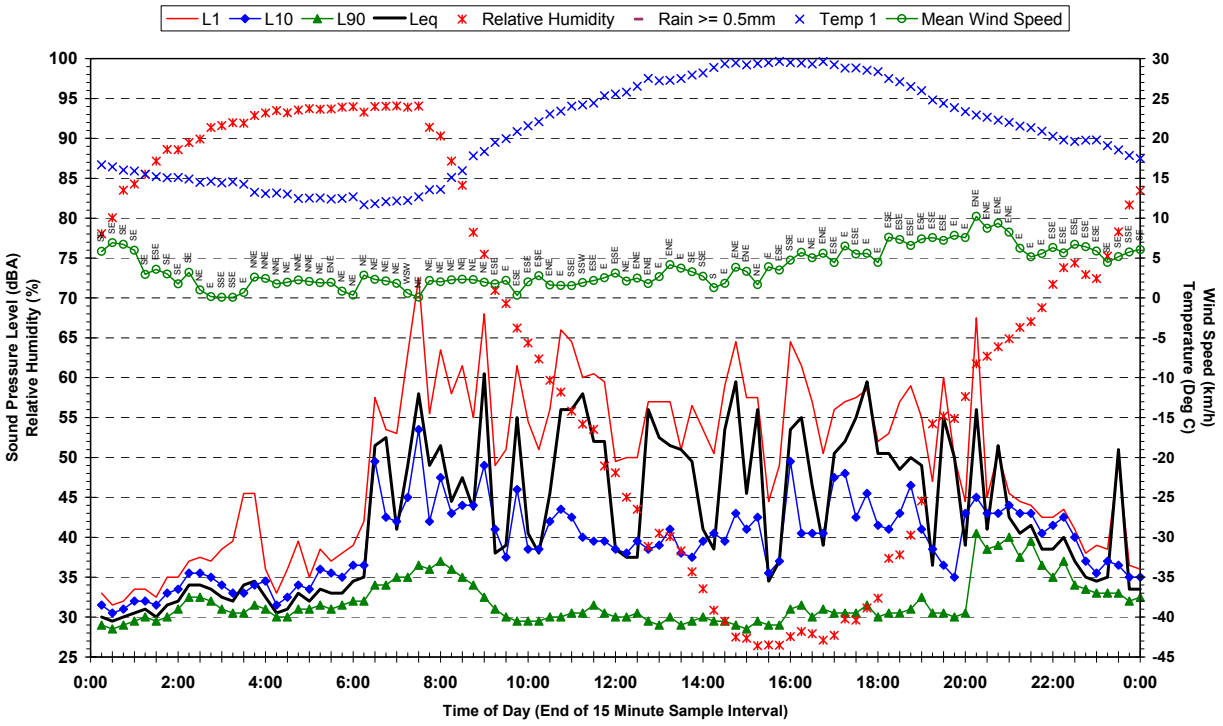


Unattended Ambient Noise and Weather Data - Noise Assessment Group A - Residence Reference 31

Statistical Ambient Noise Levels
NAG A - Residence Reference 31 - Sunday 13 March 2005

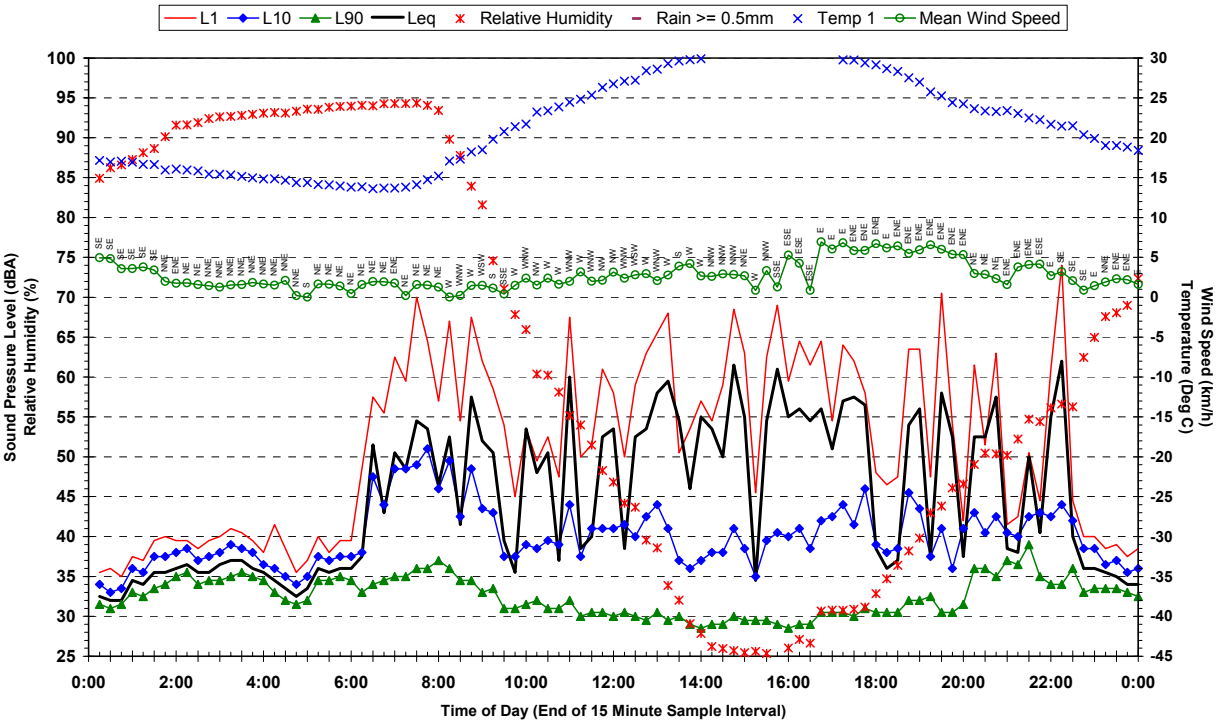


Statistical Ambient Noise Levels
NAG A - Residence Reference 31 - Monday 14 March 2005

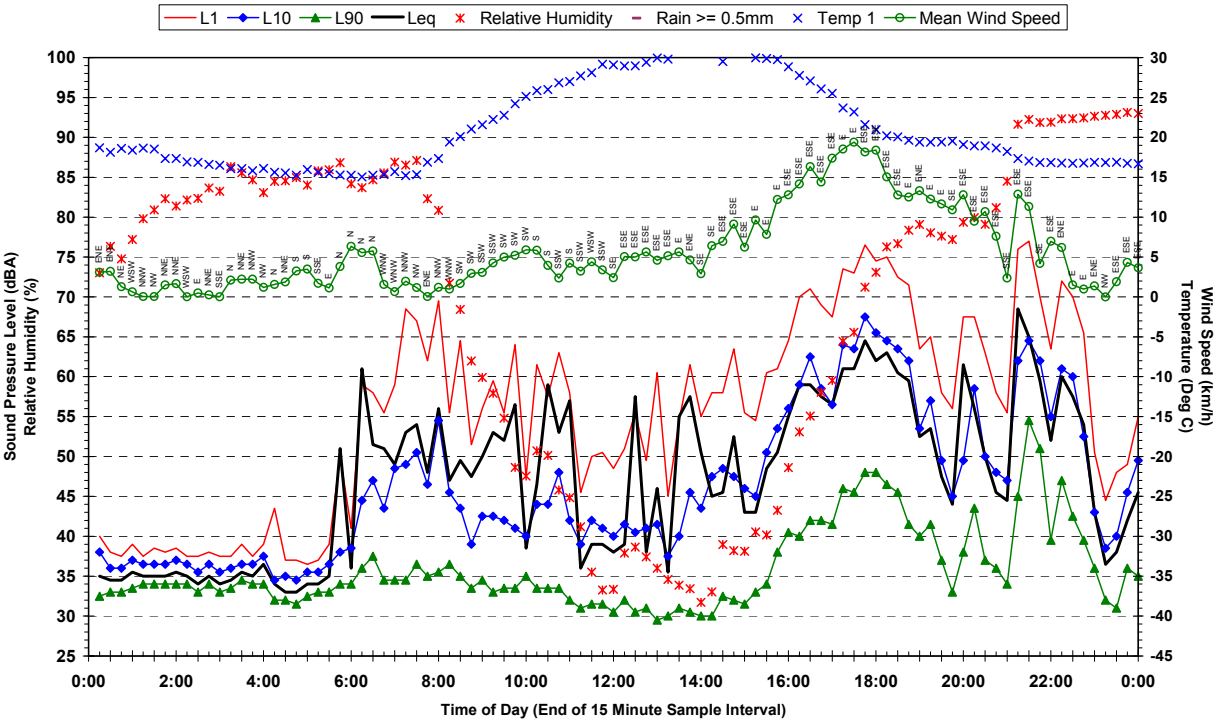


Unattended Ambient Noise and Weather Data - Noise Assessment Group A - Residence Reference 31

Statistical Ambient Noise Levels
NAG A - Residence Reference 31 - Tuesday 15 March 2005

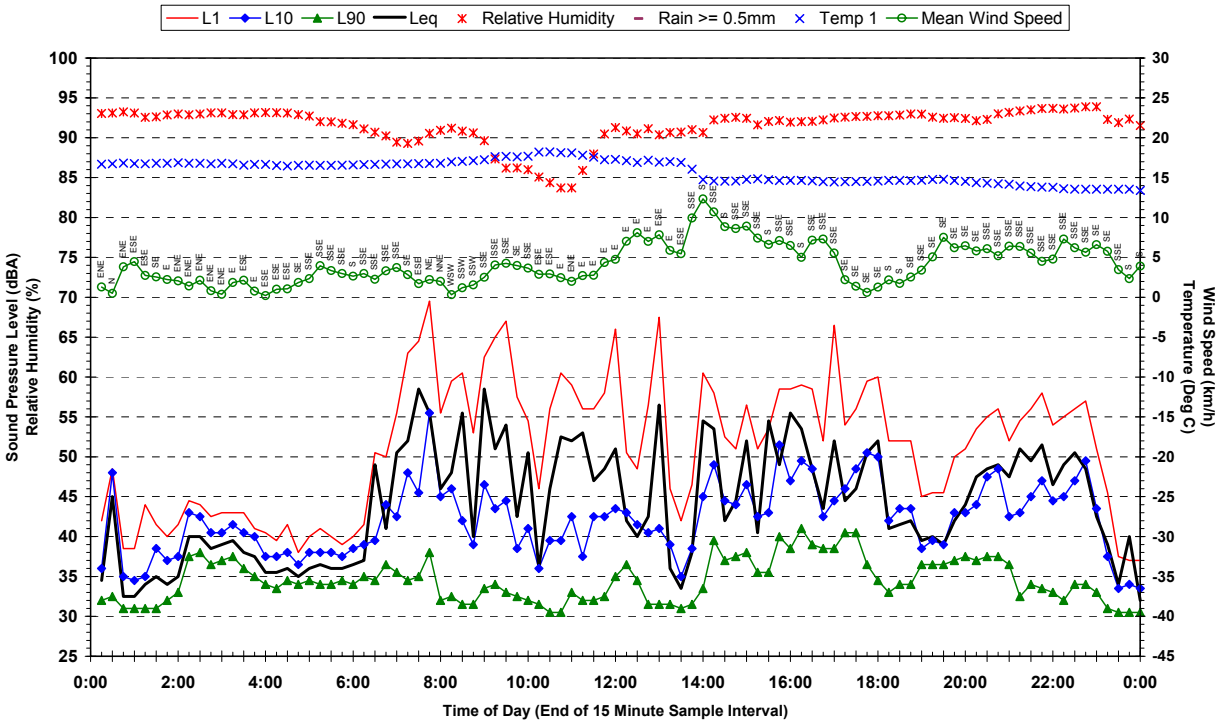


Statistical Ambient Noise Levels
NAG A - Residence Reference 31 - Wednesday 16 March 2005

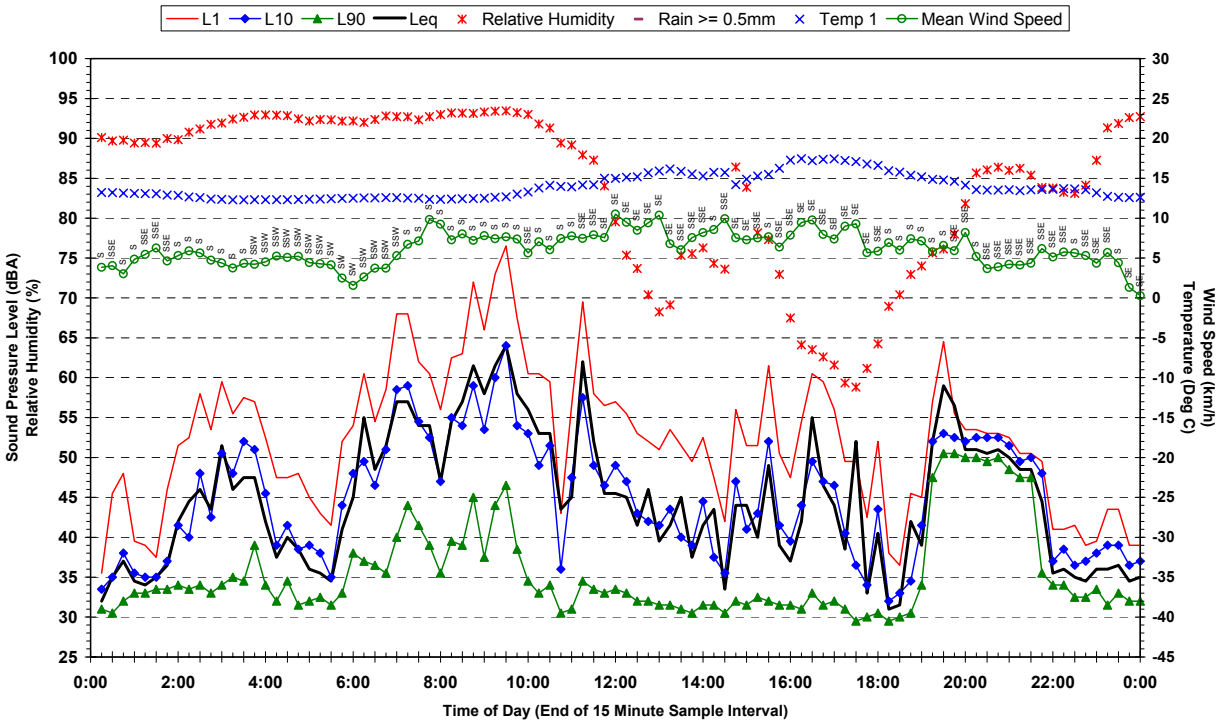


Unattended Ambient Noise and Weather Data - Noise Assessment Group A - Residence Reference 31

Statistical Ambient Noise Levels
NAG A - Residence Reference 31 - Thursday 17 March 2005

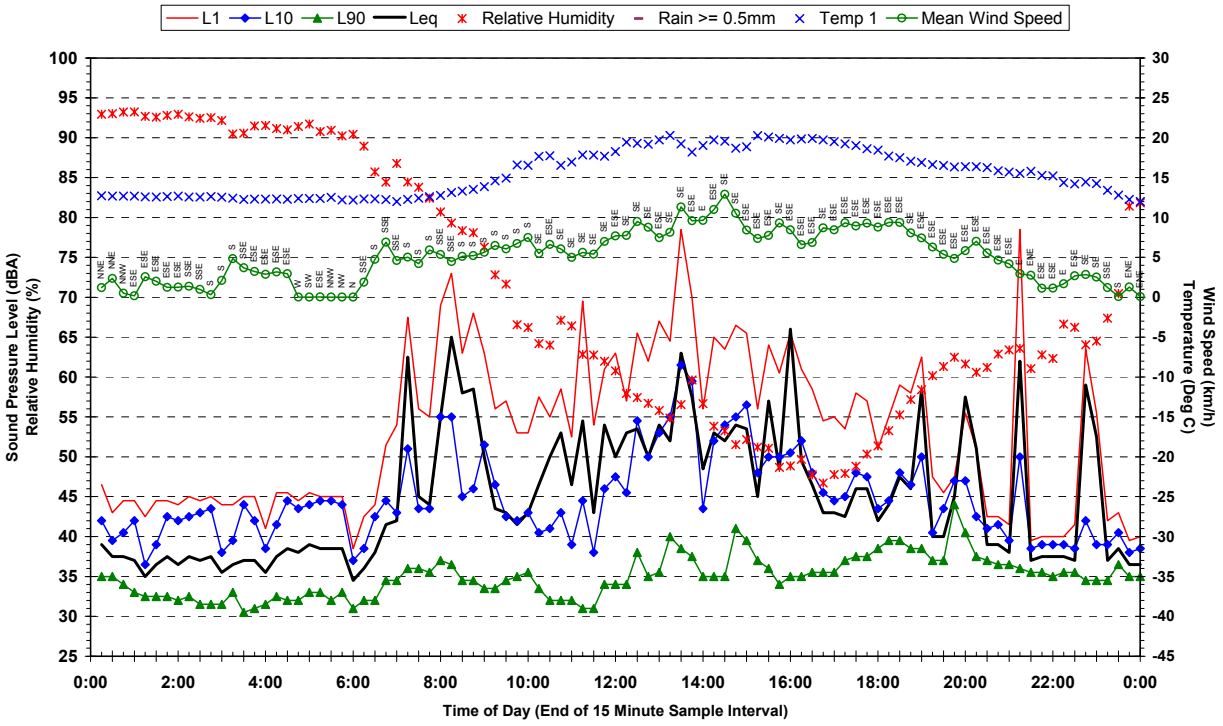


Statistical Ambient Noise Levels
NAG A - Residence Reference 31 - Friday 18 March 2005

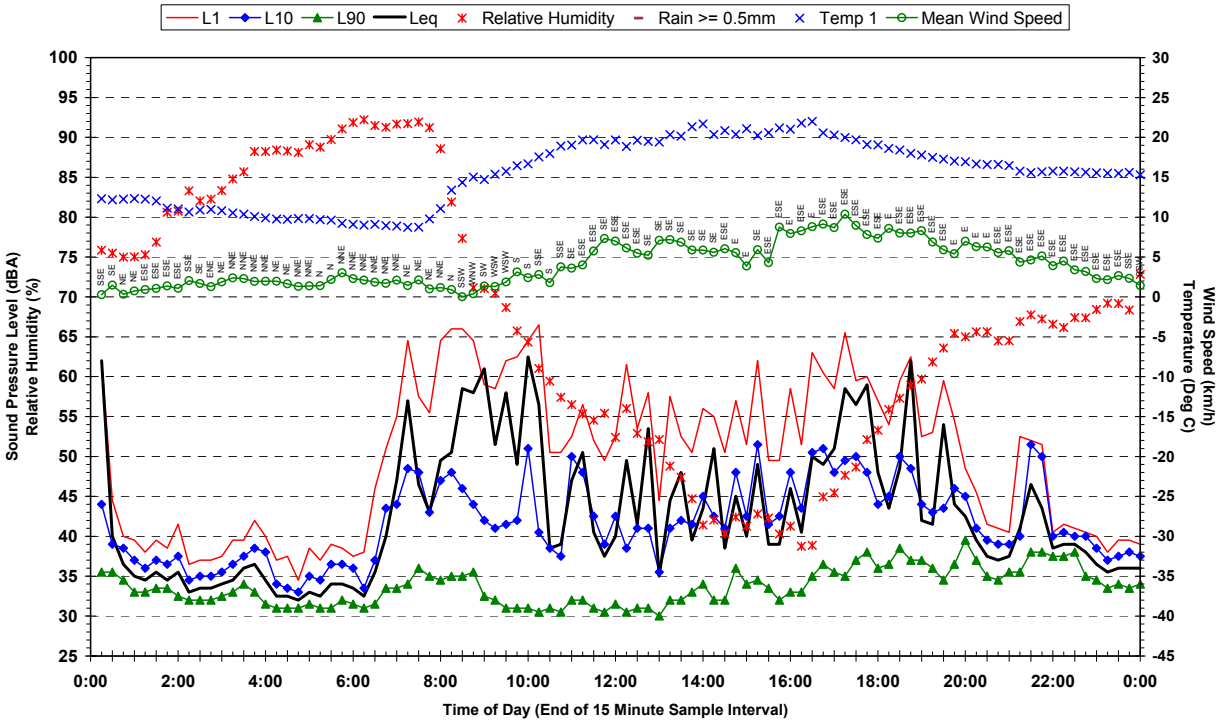


Unattended Ambient Noise and Weather Data - Noise Assessment Group A - Residence Reference 31

Statistical Ambient Noise Levels
NAG A - Residence Reference 31 - Saturday 19 March 2005

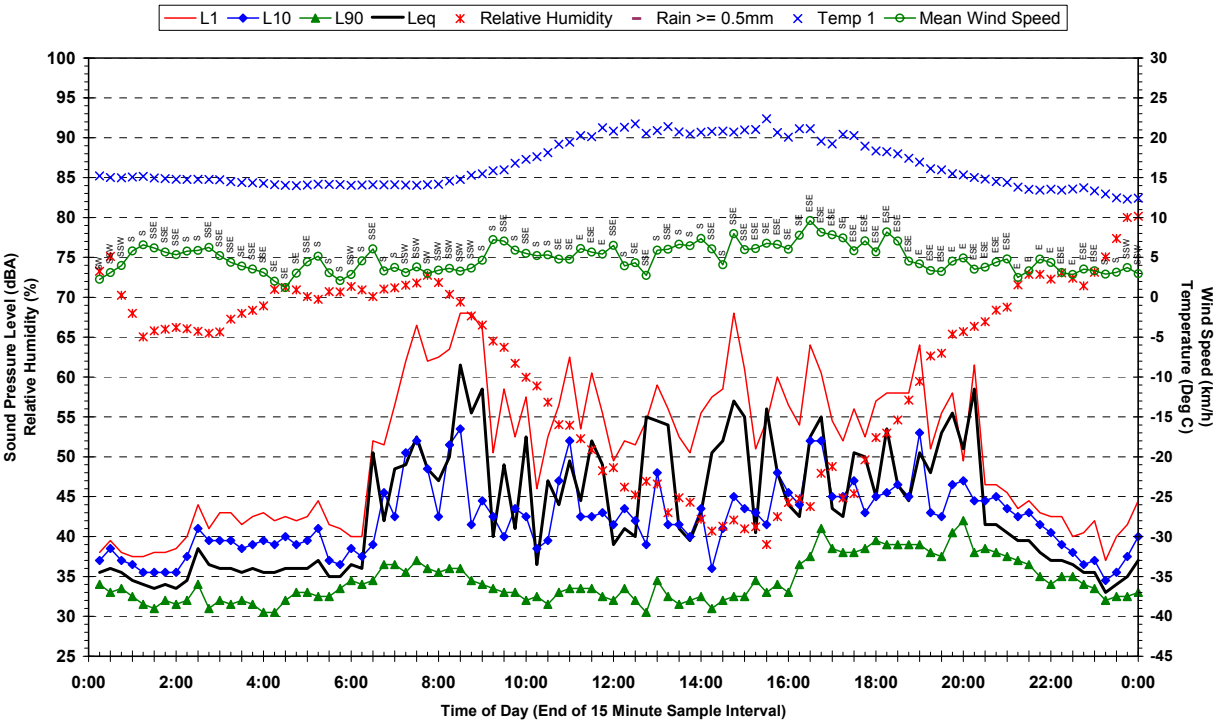


Statistical Ambient Noise Levels
NAG A - Residence Reference 31 - Sunday 20 March 2005

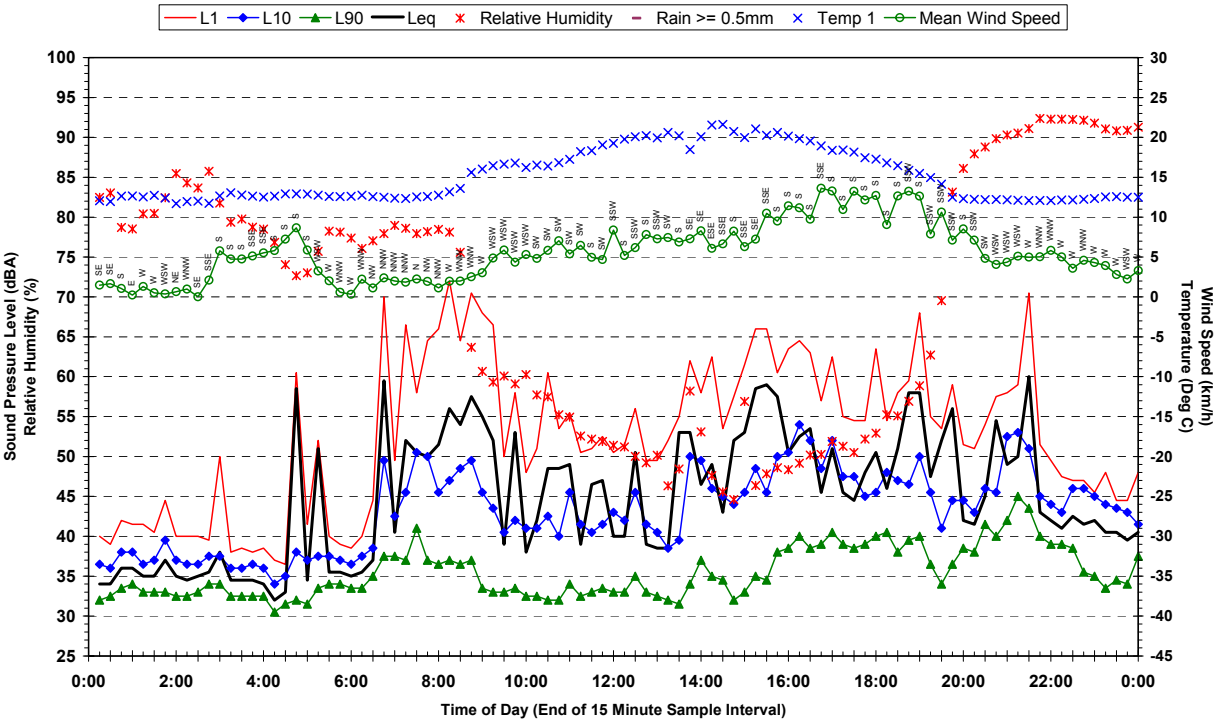


Unattended Ambient Noise and Weather Data - Noise Assessment Group A - Residence Reference 31

Statistical Ambient Noise Levels
NAG A - Residence Reference 31 - Monday 21 March 2005

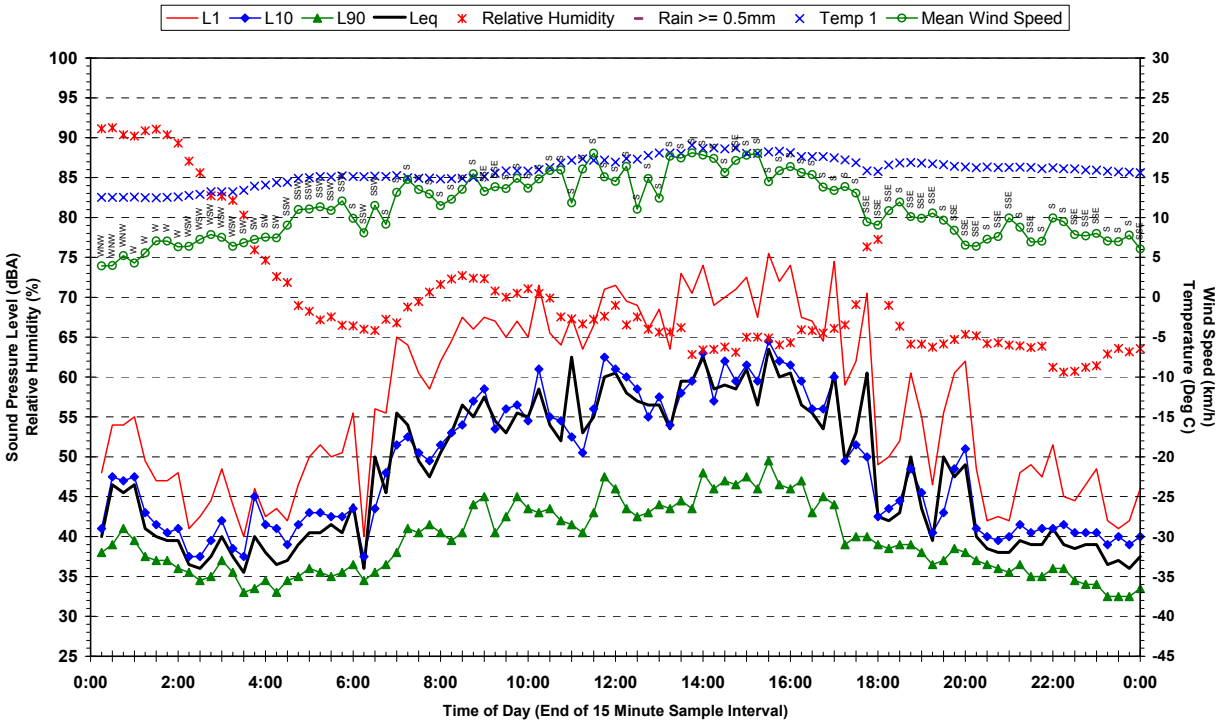


Statistical Ambient Noise Levels
NAG A - Residence Reference 31 - Tuesday 22 March 2005

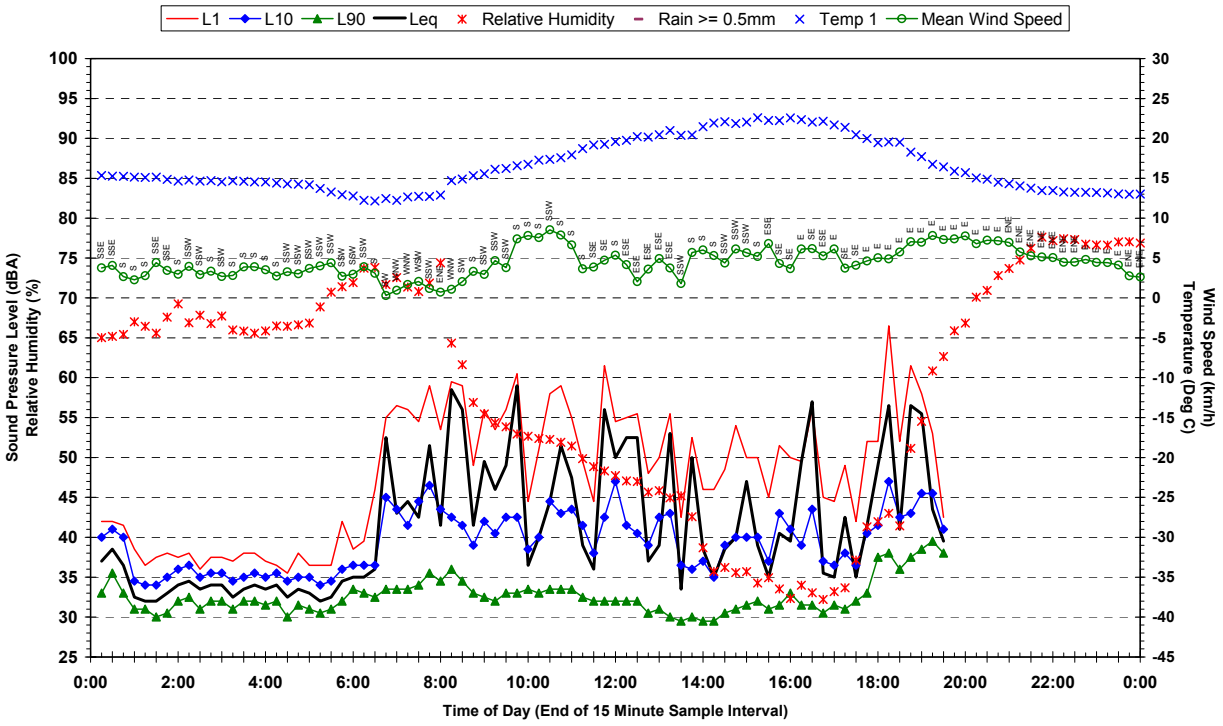


Unattended Ambient Noise and Weather Data - Noise Assessment Group A - Residence Reference 31

Statistical Ambient Noise Levels
NAG A - Residence Reference 31 - Wednesday 23 March 2005

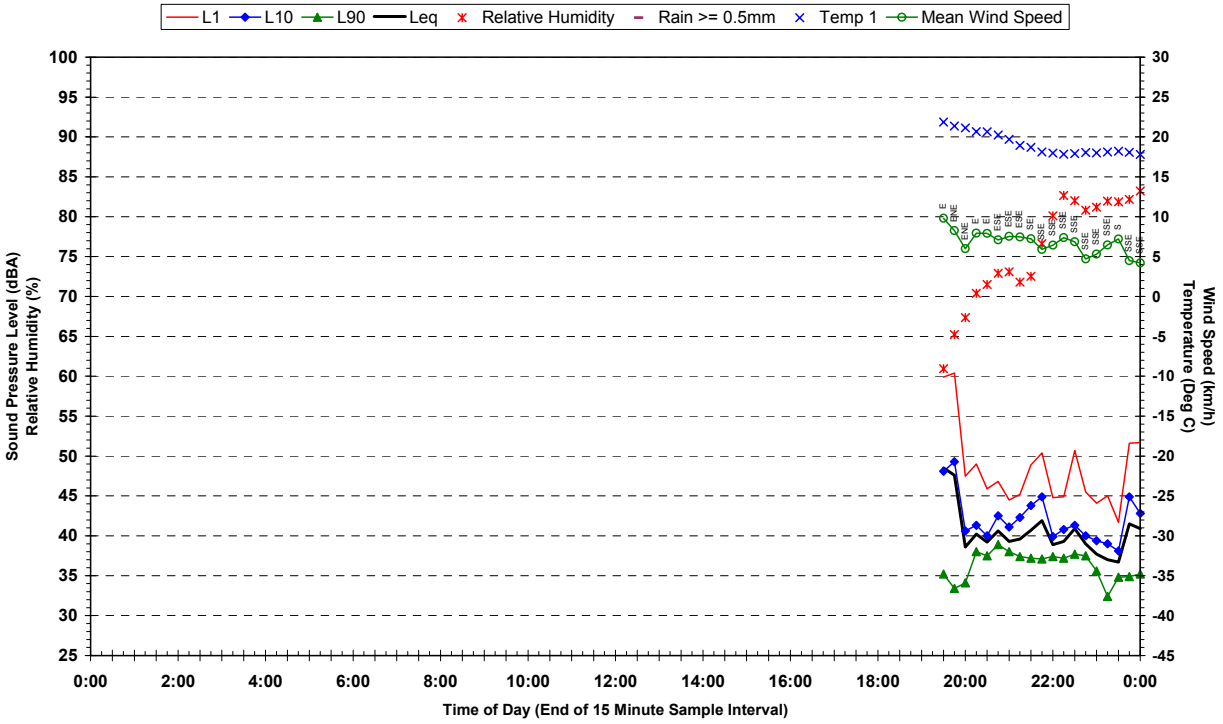


Statistical Ambient Noise Levels
NAG A - Residence Reference 31 - Thursday 24 March 2005

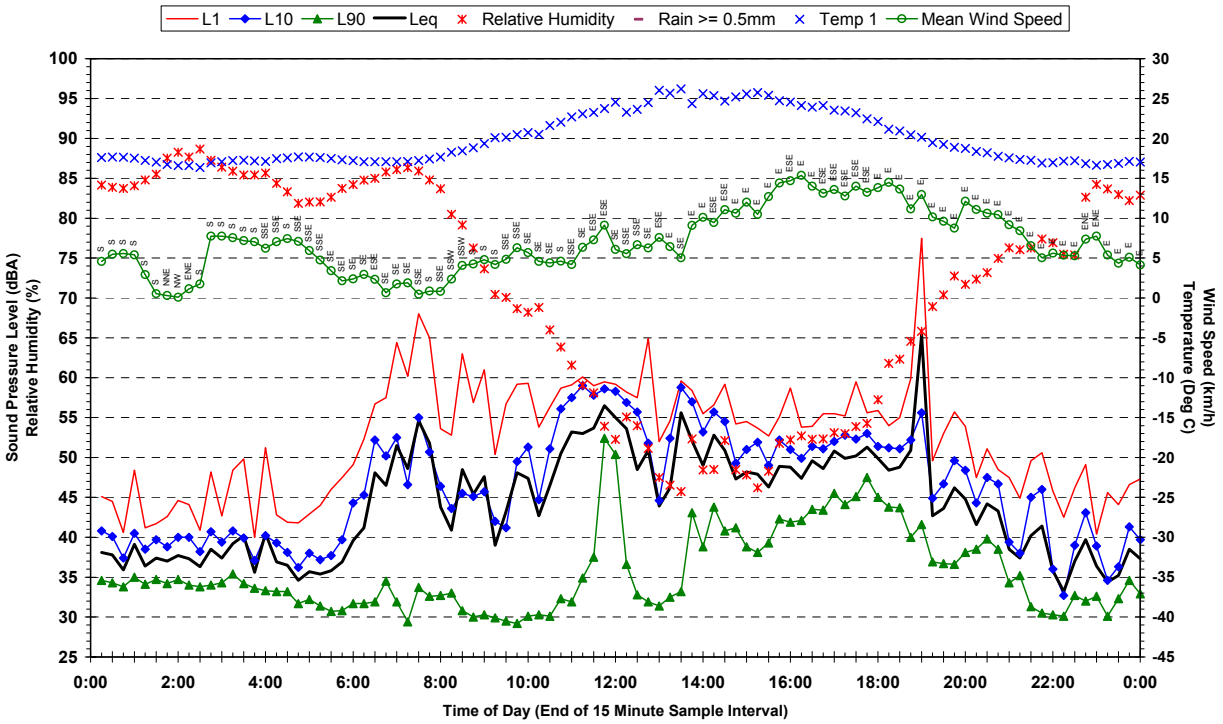


Unattended Ambient Noise and Weather Data - Noise Assessment Group B - Residence Reference 45

Statistical Ambient Noise Levels
NAG B - Residence Reference 45 - Wednesday 9 March 2005

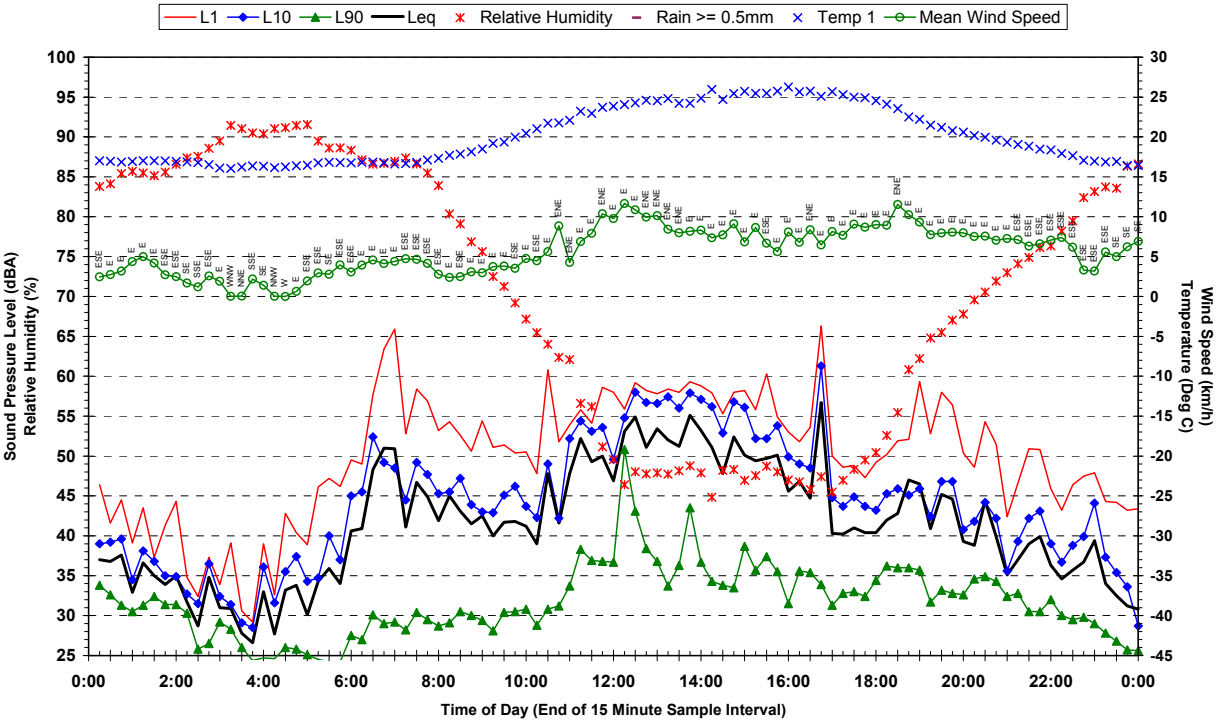


Statistical Ambient Noise Levels
NAG B - Residence Reference 45 - Thursday 10 March 2005

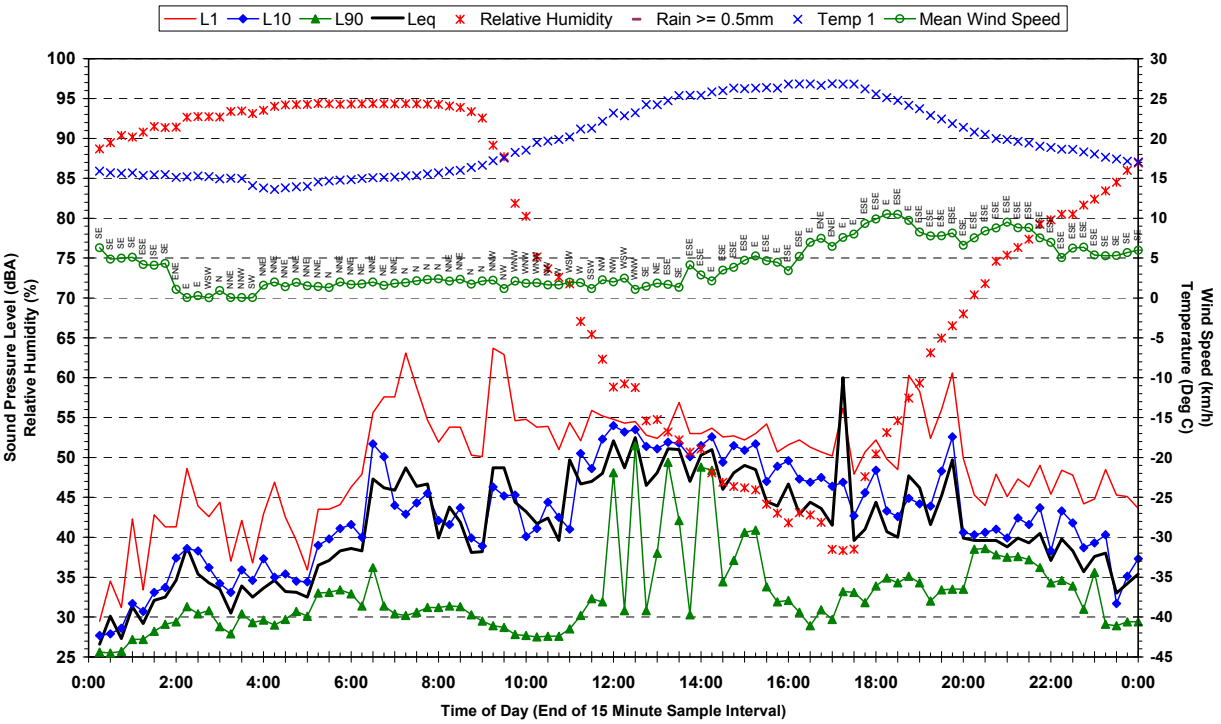


Unattended Ambient Noise and Weather Data - Noise Assessment Group B - Residence Reference 45

Statistical Ambient Noise Levels
NAG B - Residence Reference 45 - Friday 11 March 2005

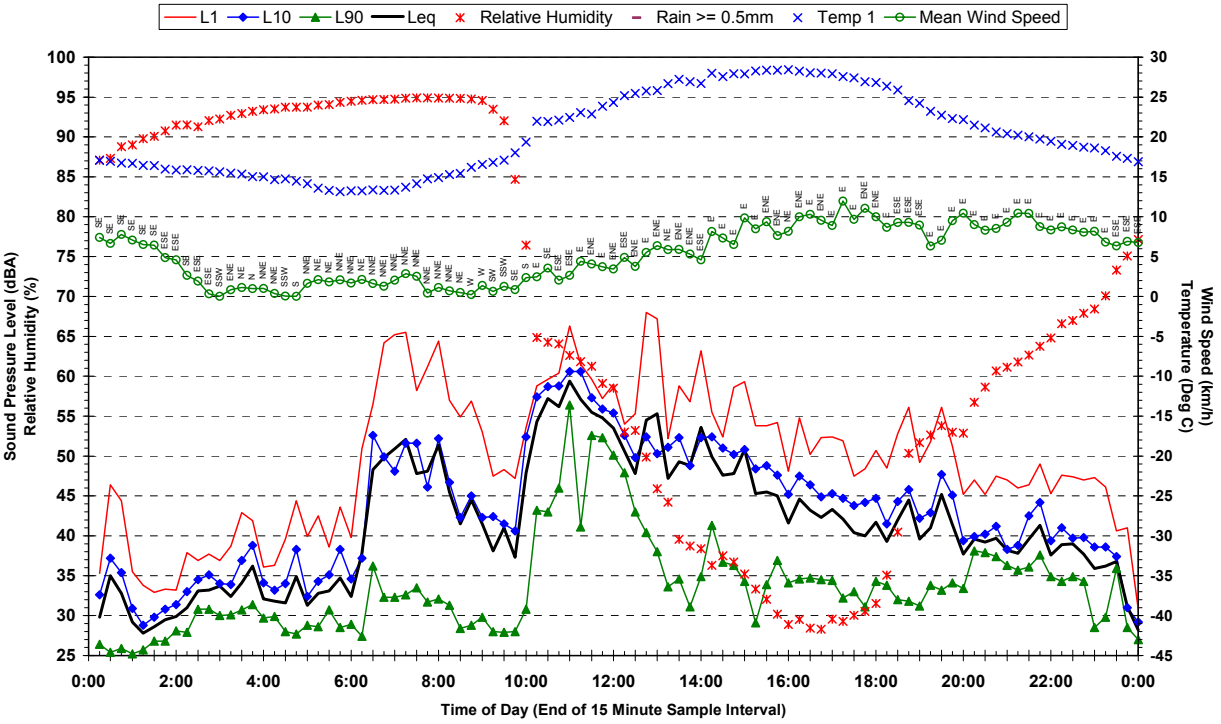


Statistical Ambient Noise Levels
NAG B - Residence Reference 45 - Saturday 12 March 2005

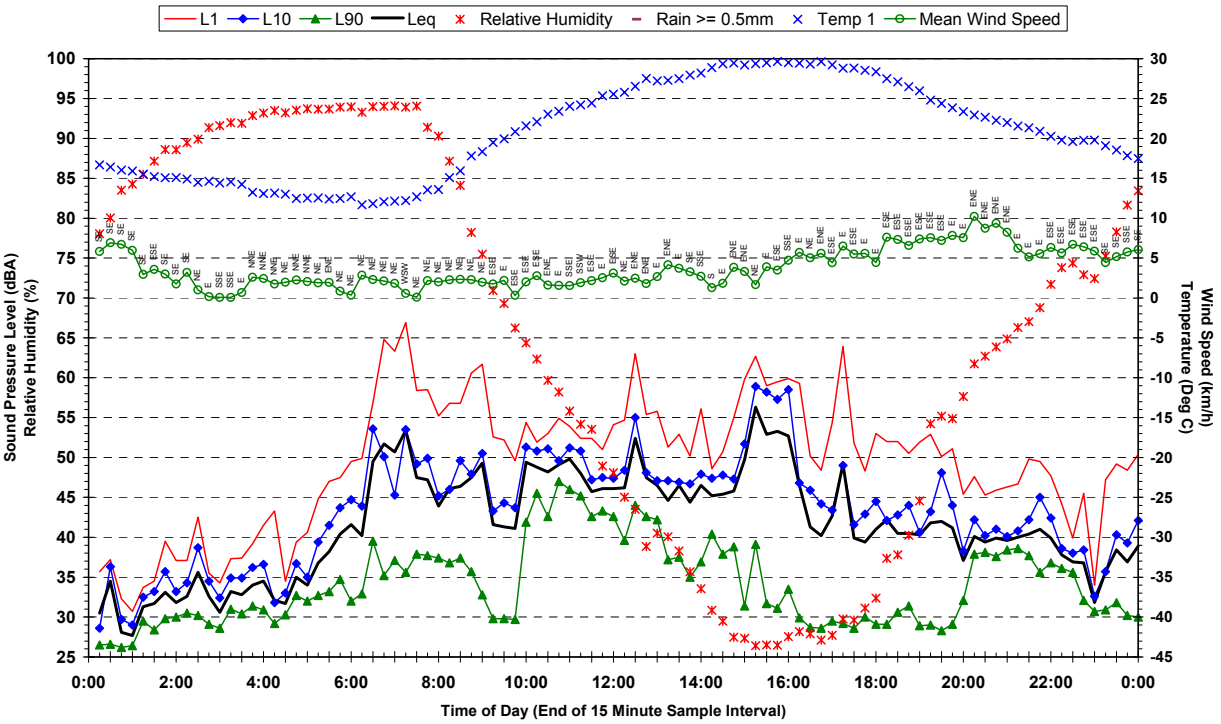


Unattended Ambient Noise and Weather Data - Noise Assessment Group B - Residence Reference 45

Statistical Ambient Noise Levels
NAG B - Residence Reference 45 - Sunday 13 March 2005

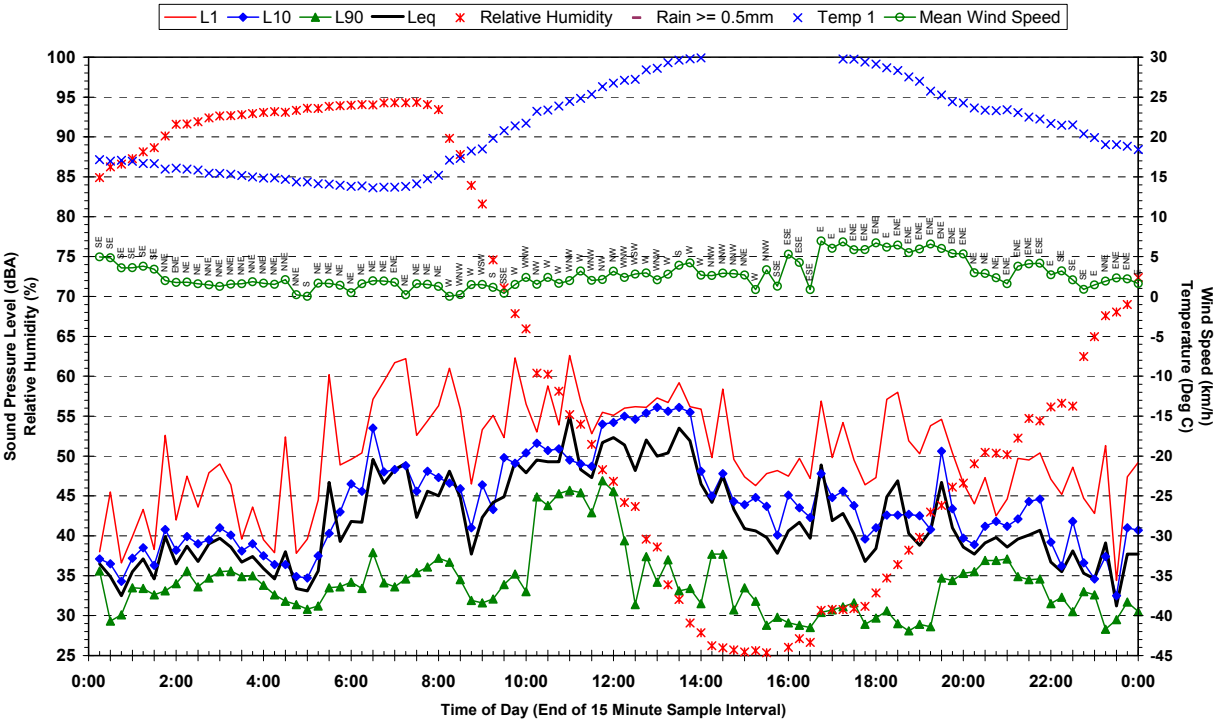


Statistical Ambient Noise Levels
NAG B - Residence Reference 45 - Monday 14 March 2005

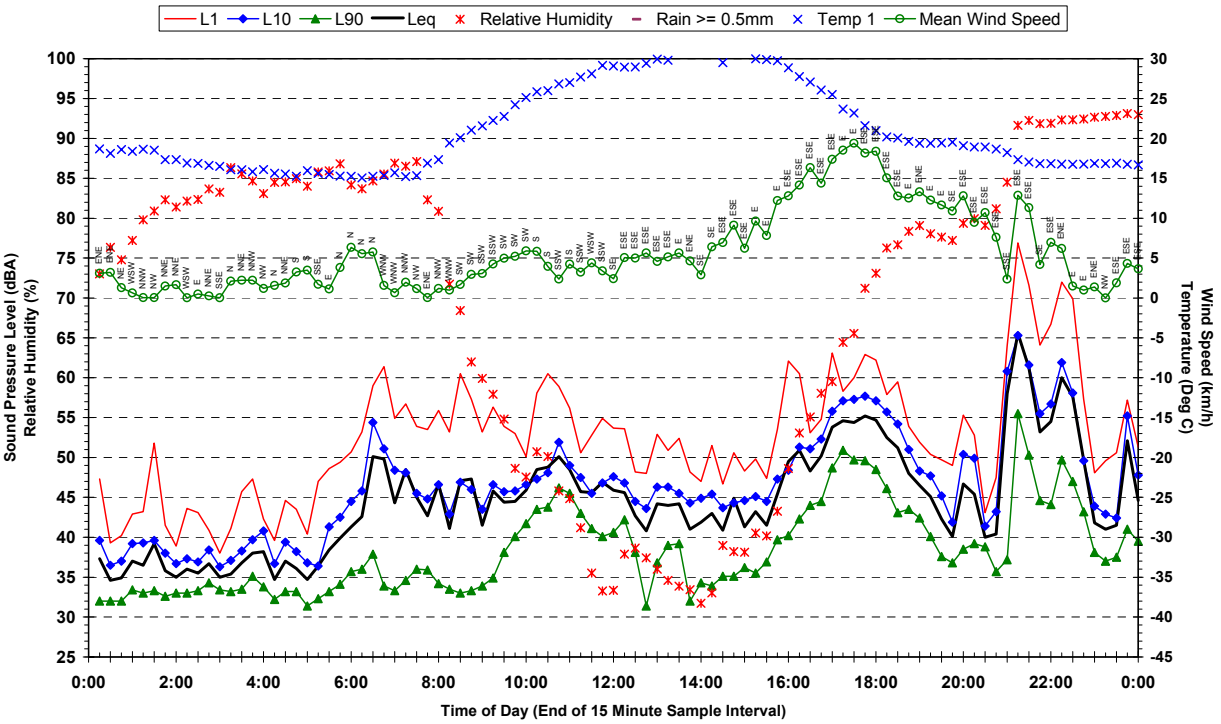


Unattended Ambient Noise and Weather Data - Noise Assessment Group B - Residence Reference 45

Statistical Ambient Noise Levels
NAG B - Residence Reference 45 - Tuesday 15 March 2005

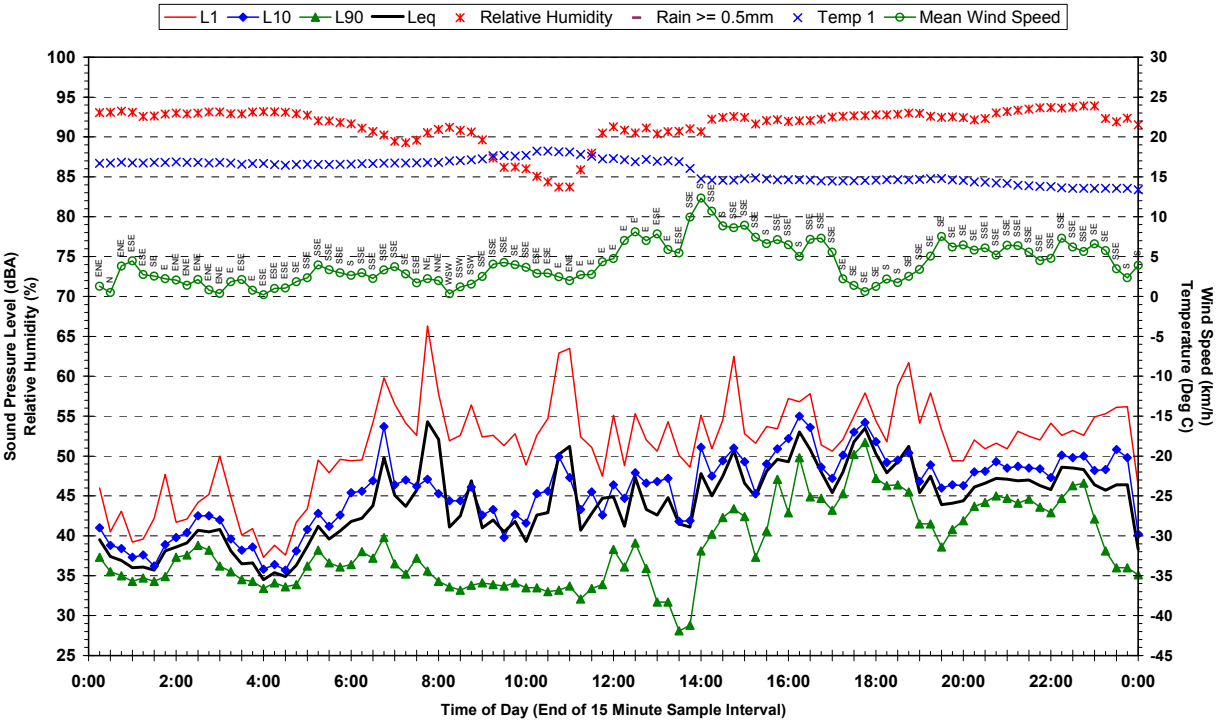


Statistical Ambient Noise Levels
NAG B - Residence Reference 45 - Wednesday 16 March 2005

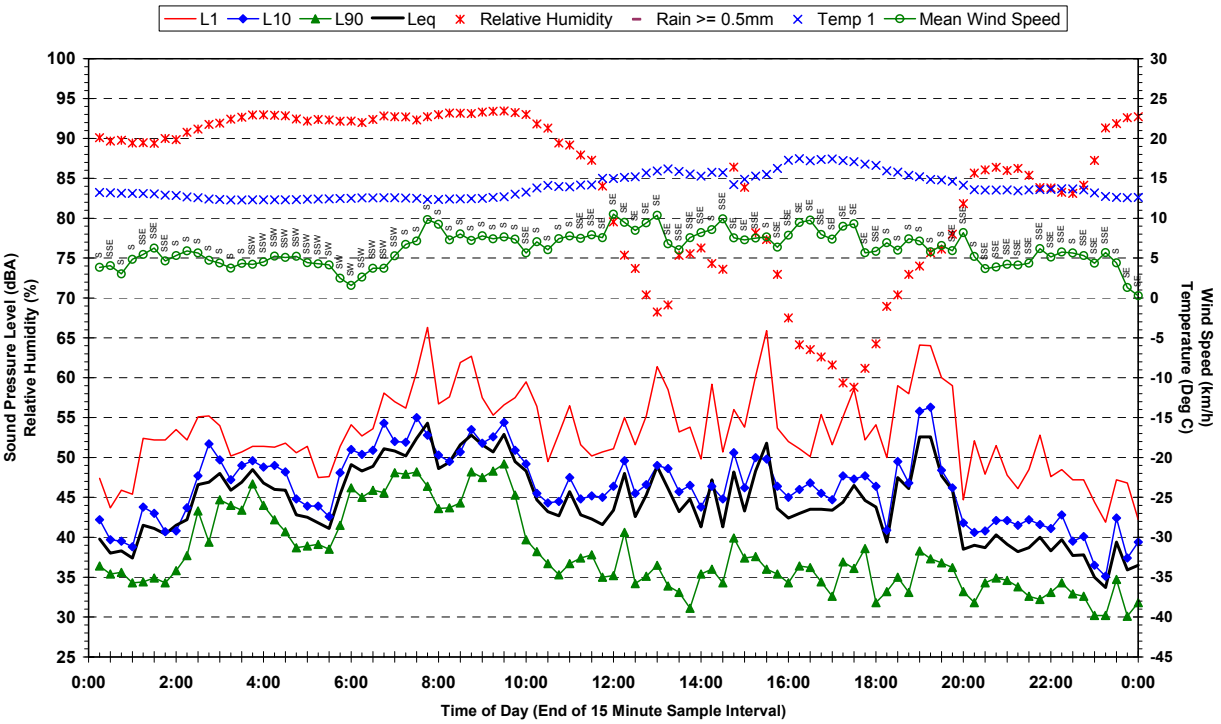


Unattended Ambient Noise and Weather Data - Noise Assessment Group B - Residence Reference 45

Statistical Ambient Noise Levels
NAG B - Residence Reference 45 - Thursday 17 March 2005

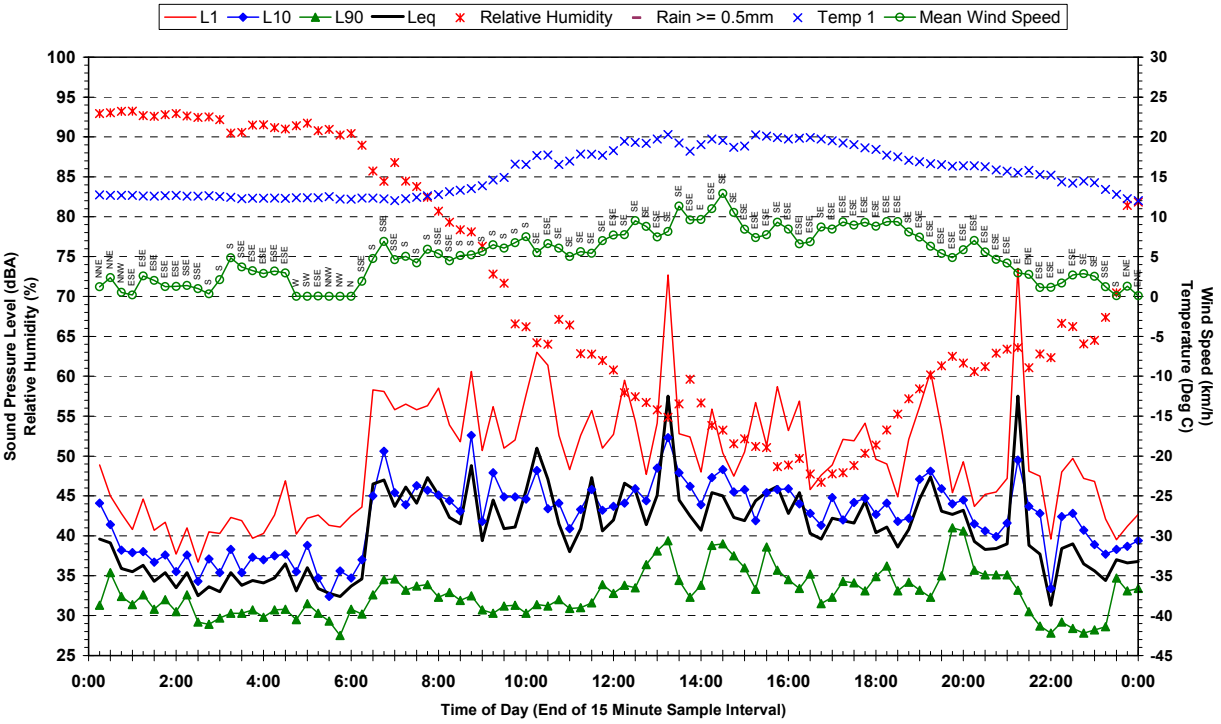


Statistical Ambient Noise Levels
NAG B - Residence Reference 45 - Friday 18 March 2005

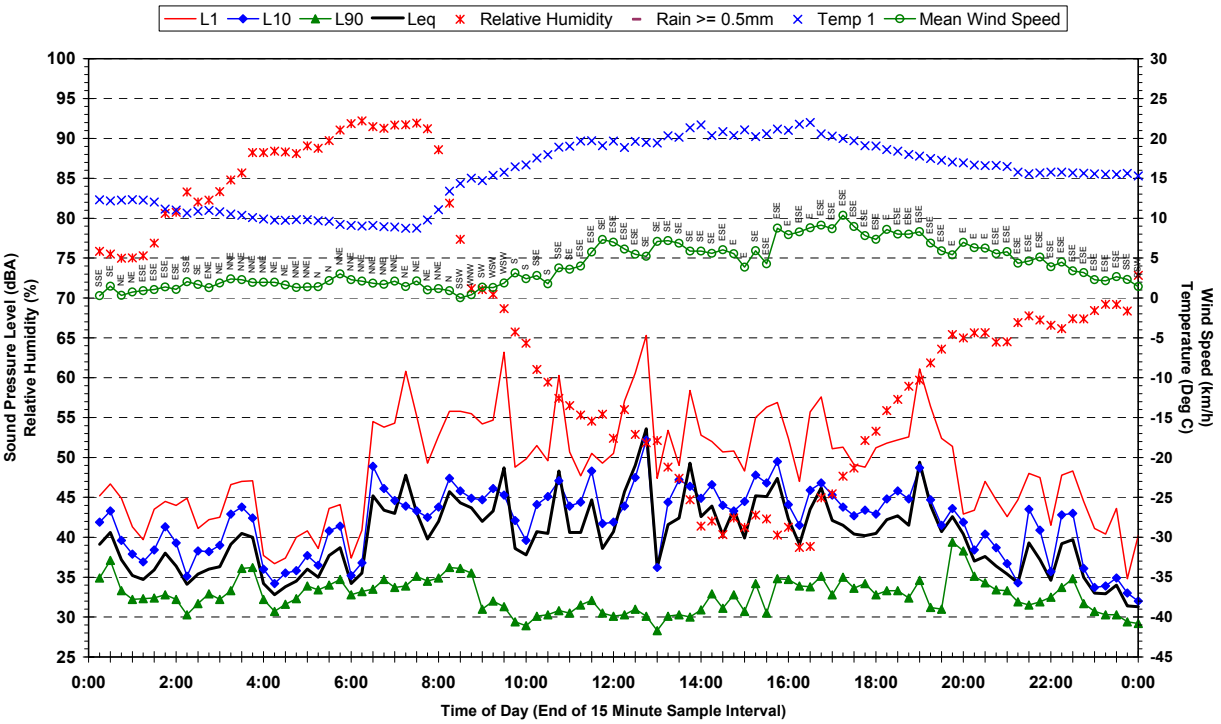


Unattended Ambient Noise and Weather Data - Noise Assessment Group B - Residence Reference 45

Statistical Ambient Noise Levels
NAG B - Residence Reference 45 - Saturday 19 March 2005

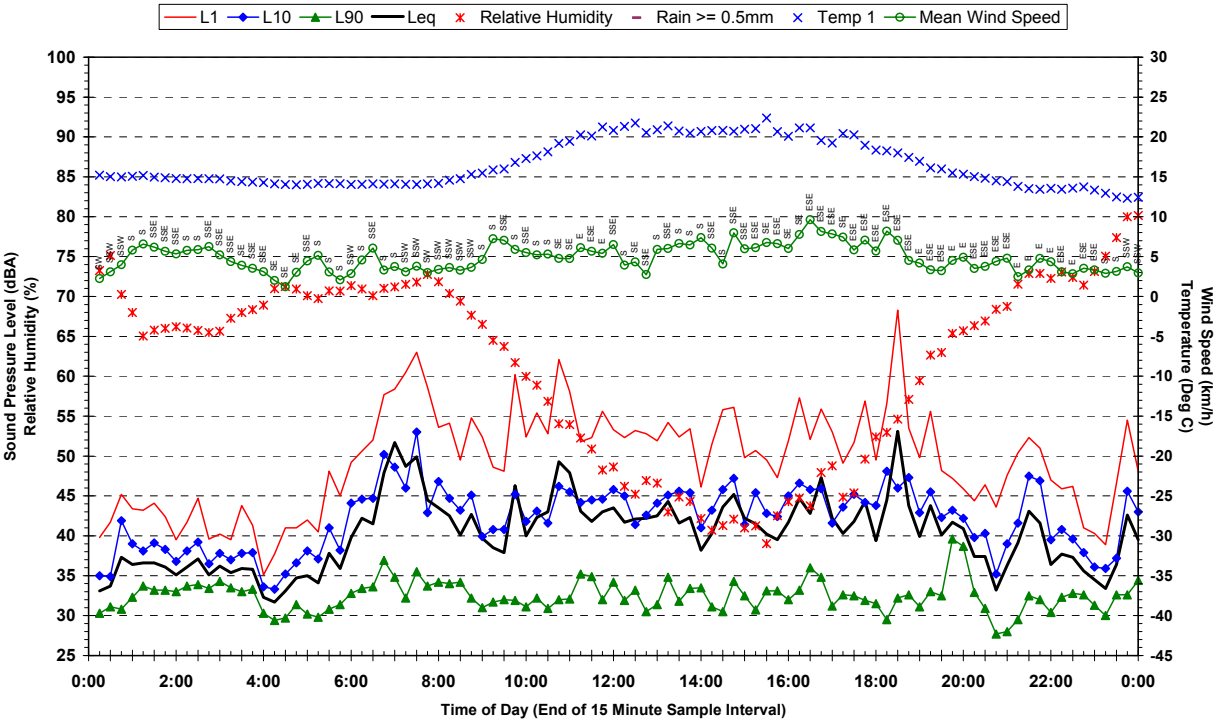


Statistical Ambient Noise Levels
NAG B - Residence Reference 45 - Sunday 20 March 2005

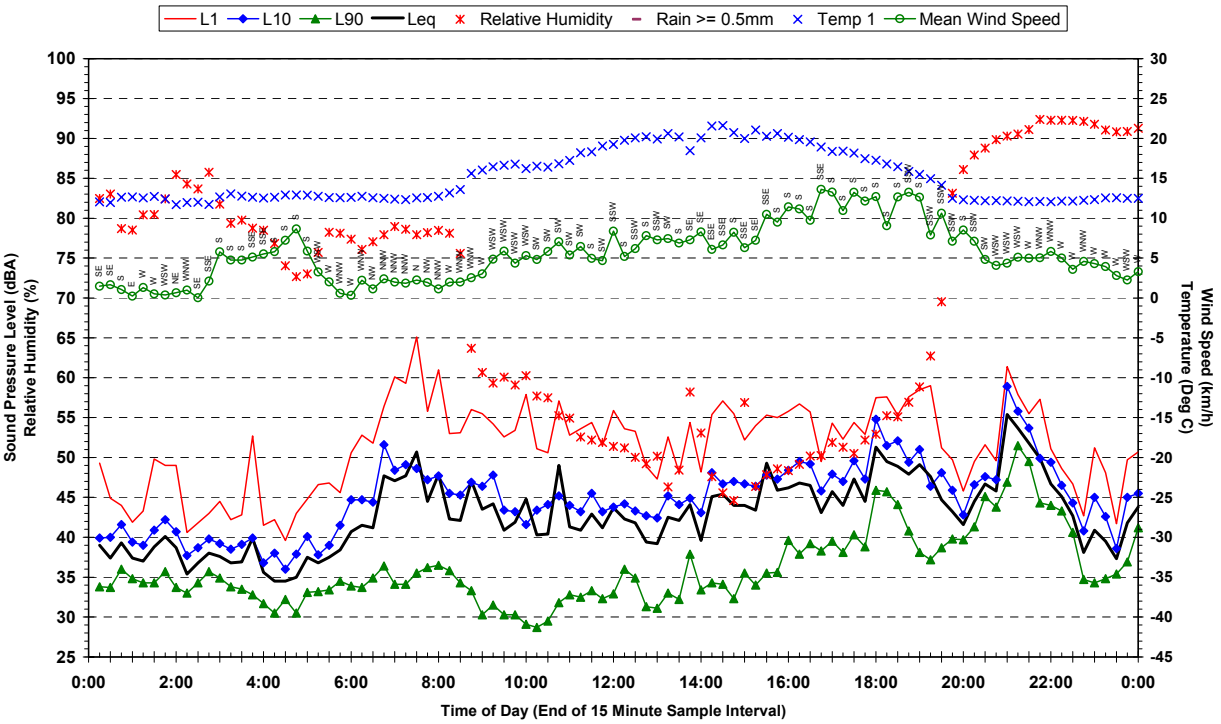


Unattended Ambient Noise and Weather Data - Noise Assessment Group B - Residence Reference 45

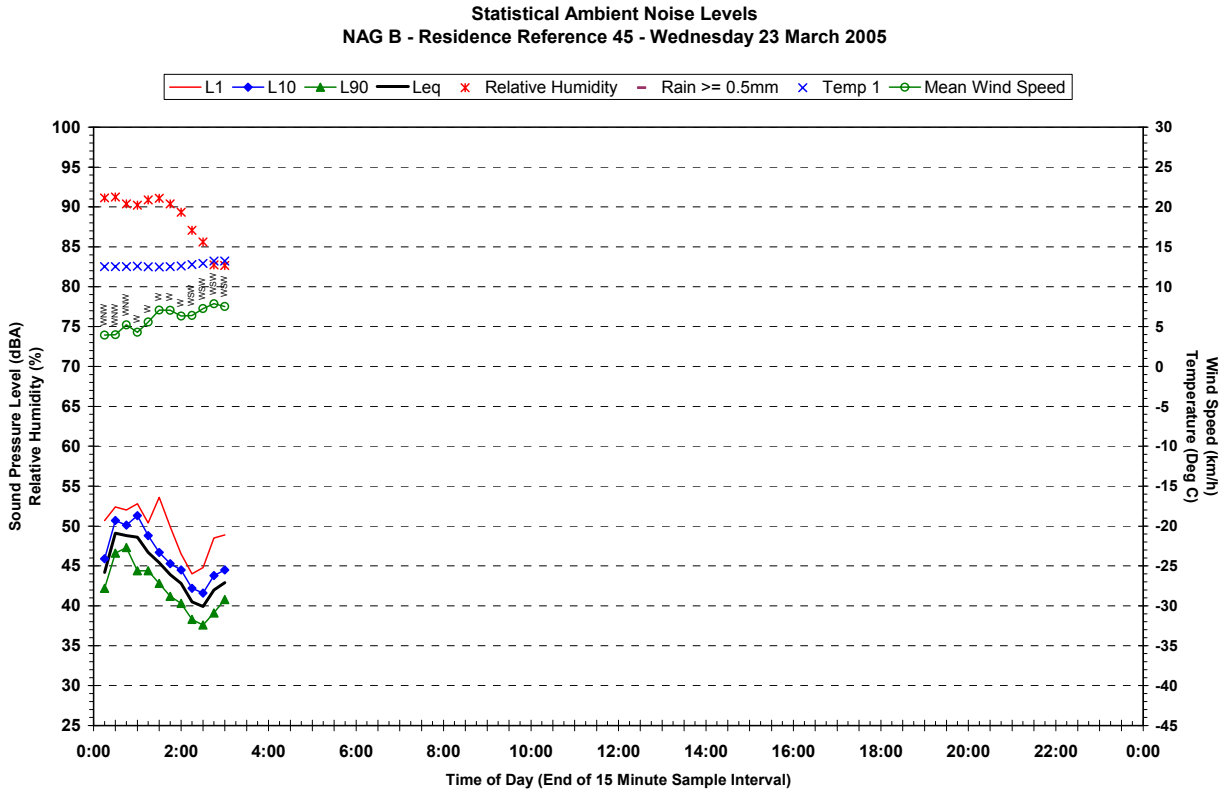
Statistical Ambient Noise Levels
NAG B - Residence Reference 45 - Monday 21 March 2005



Statistical Ambient Noise Levels
NAG B - Residence Reference 45 - Tuesday 22 March 2005

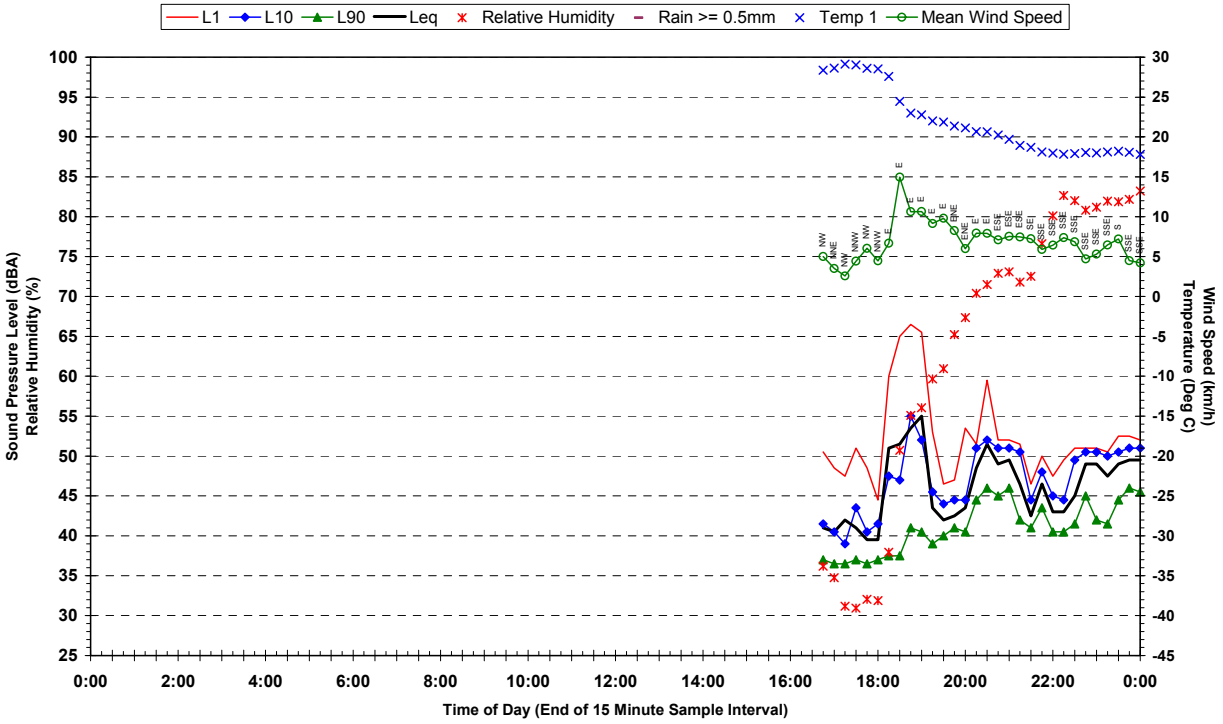


Unattended Ambient Noise and Weather Data - Noise Assessment Group B - Residence Reference 45

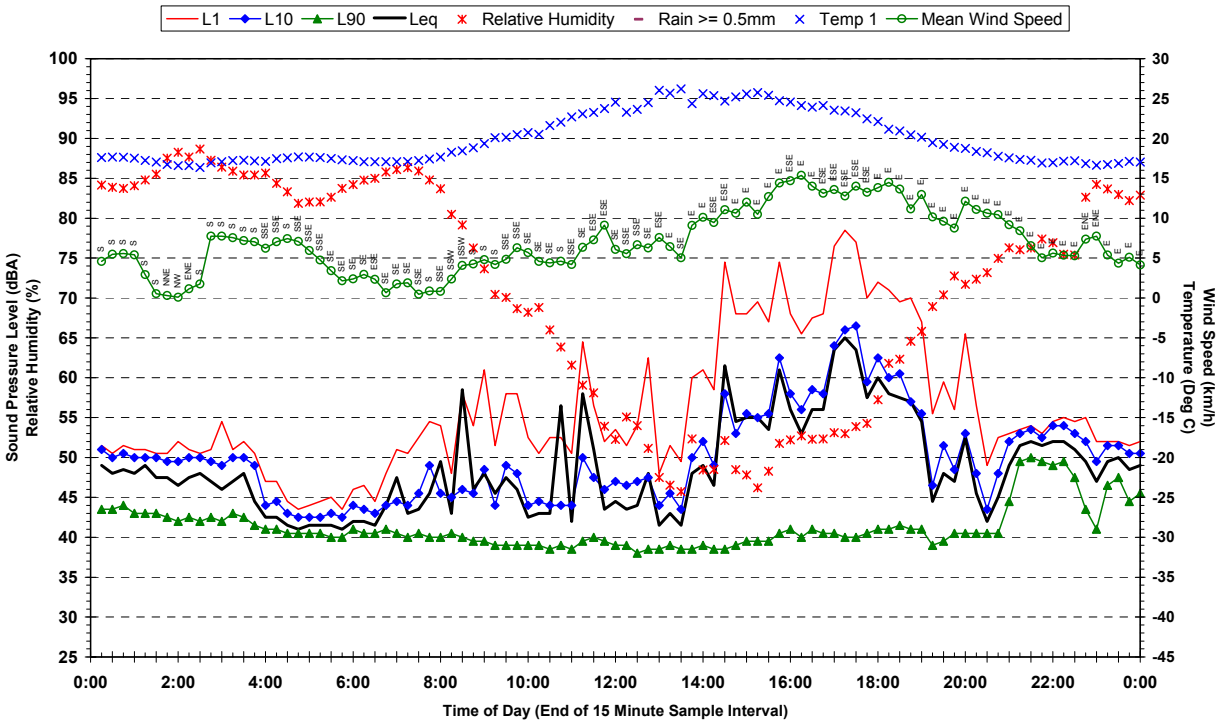


Unattended Ambient Noise and Weather Data - Noise Assessment Group C - Residence Reference 64

Statistical Ambient Noise Levels
NAG C - Residence Reference 64 - Wednesday 9 March 2005

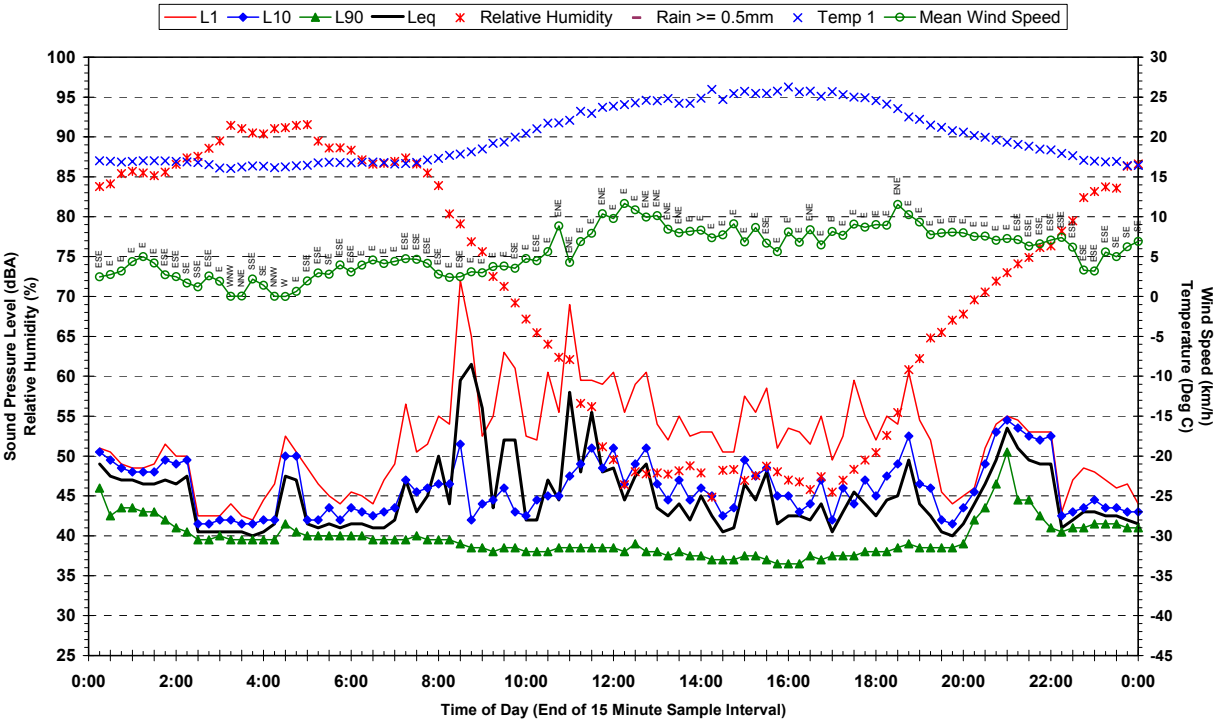


Statistical Ambient Noise Levels
NAG C - Residence Reference 64 - Thursday 10 March 2005

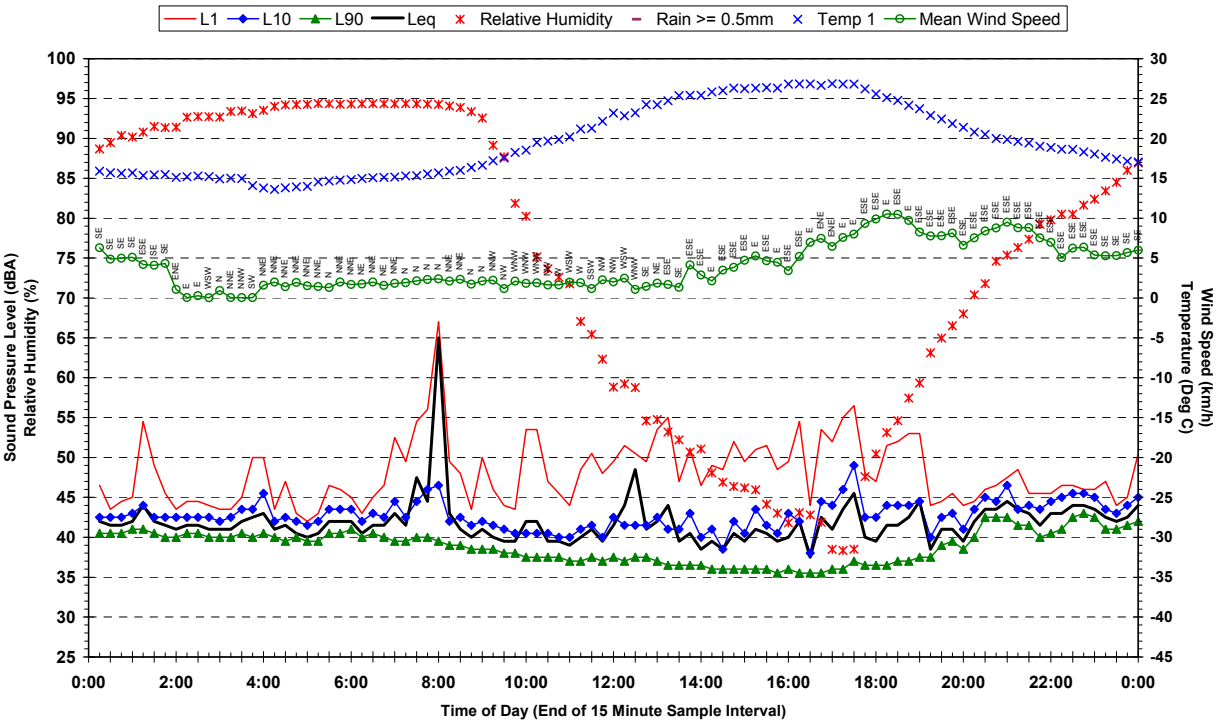


Unattended Ambient Noise and Weather Data - Noise Assessment Group C - Residence Reference 64

Statistical Ambient Noise Levels
NAG C - Residence Reference 64 - Friday 11 March 2005

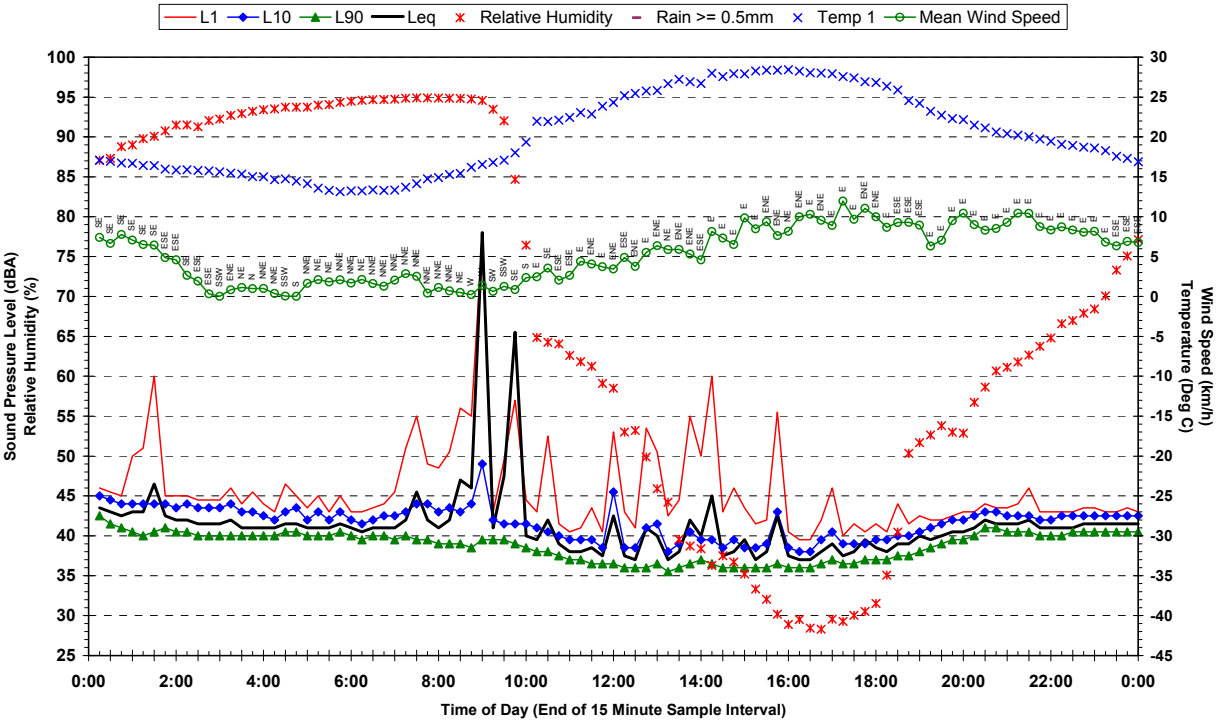


Statistical Ambient Noise Levels
NAG C - Residence Reference 64 - Saturday 12 March 2005

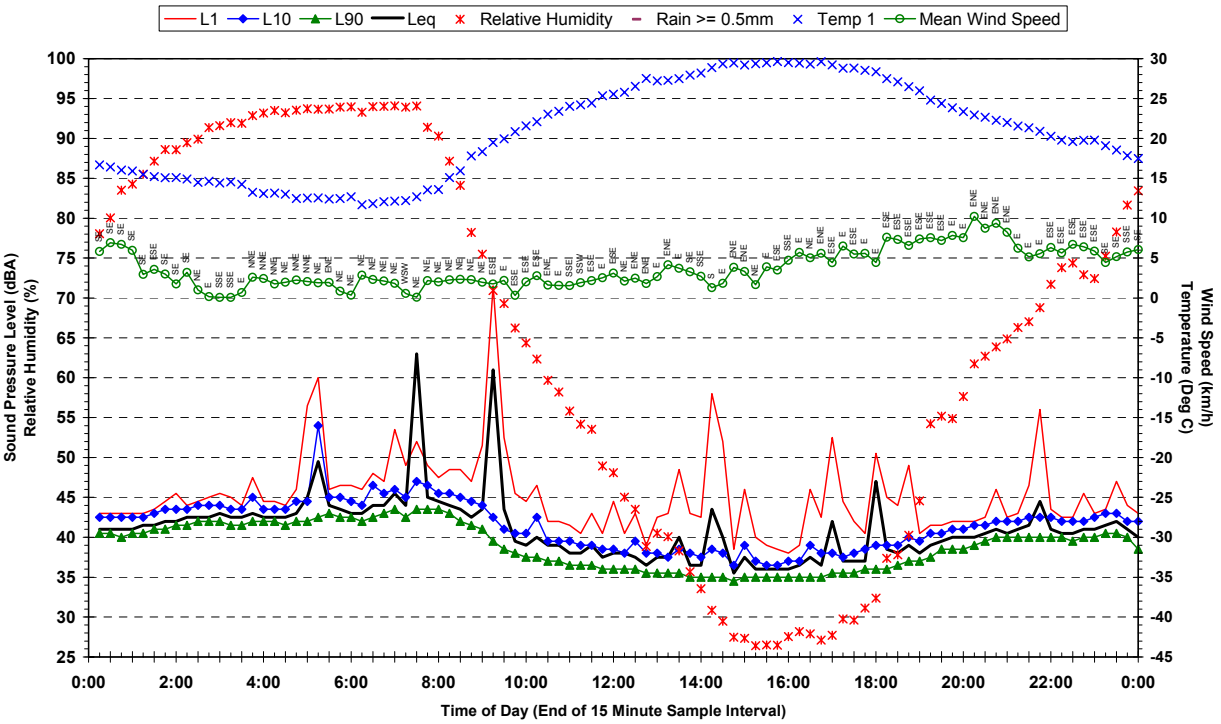


Unattended Ambient Noise and Weather Data - Noise Assessment Group C - Residence Reference 64

Statistical Ambient Noise Levels
NAG C - Residence Reference 64 - Sunday 13 March 2005

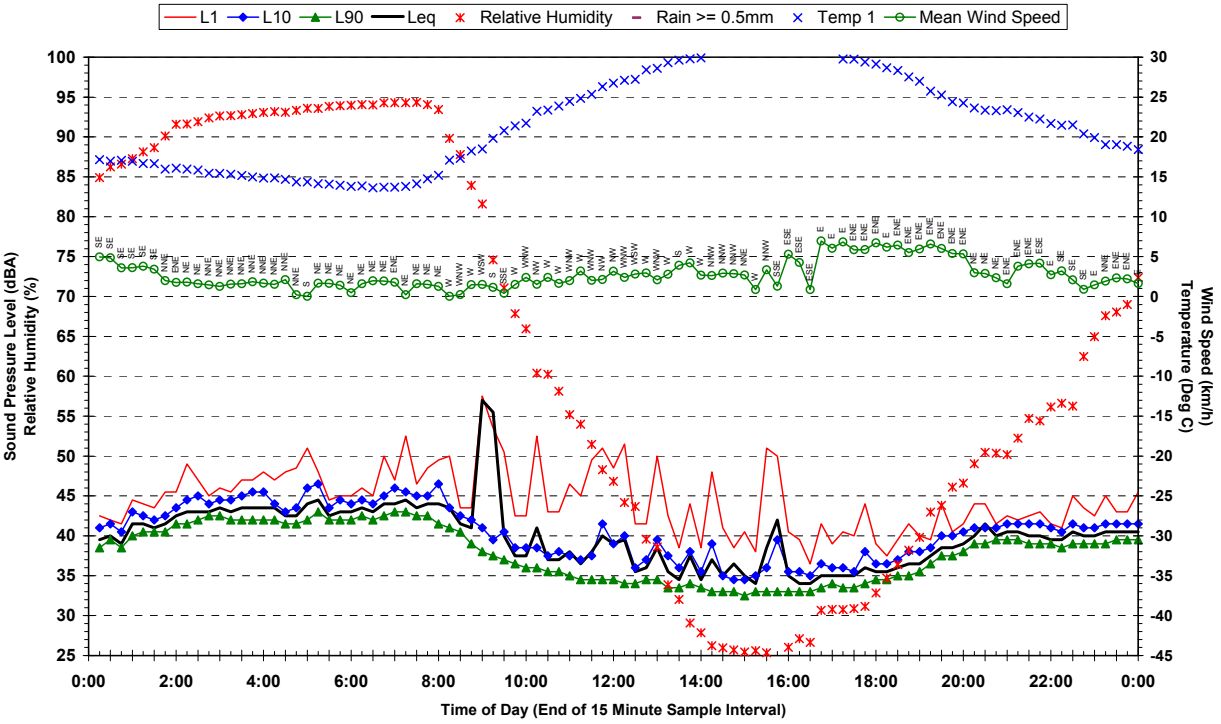


Statistical Ambient Noise Levels
NAG C - Residence Reference 64 - Monday 14 March 2005

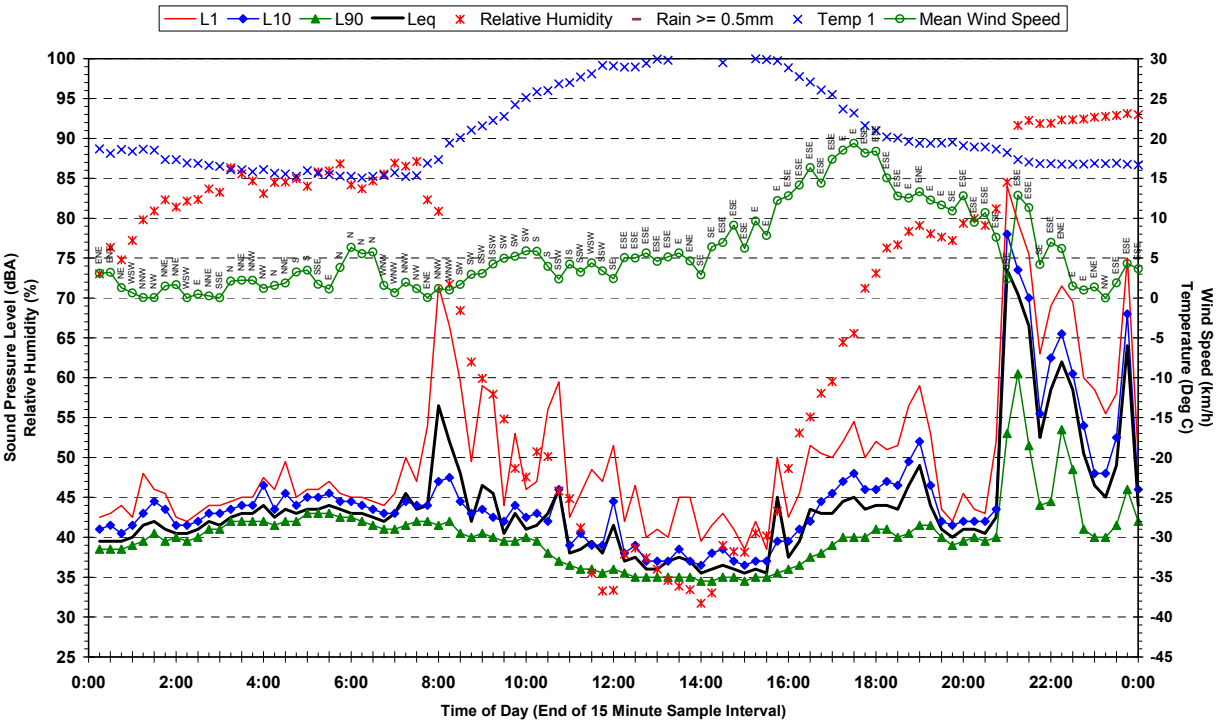


Unattended Ambient Noise and Weather Data - Noise Assessment Group C - Residence Reference 64

Statistical Ambient Noise Levels
NAG C - Residence Reference 64 - Tuesday 15 March 2005

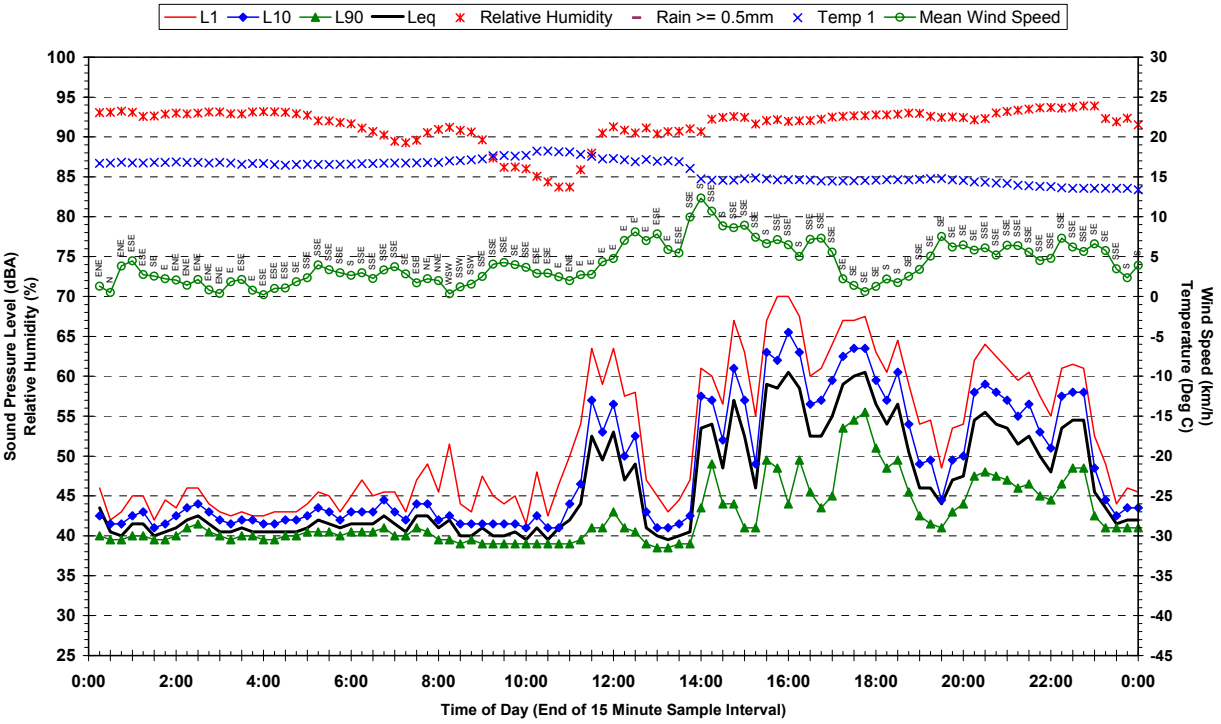


Statistical Ambient Noise Levels
NAG C - Residence Reference 64 - Wednesday 16 March 2005

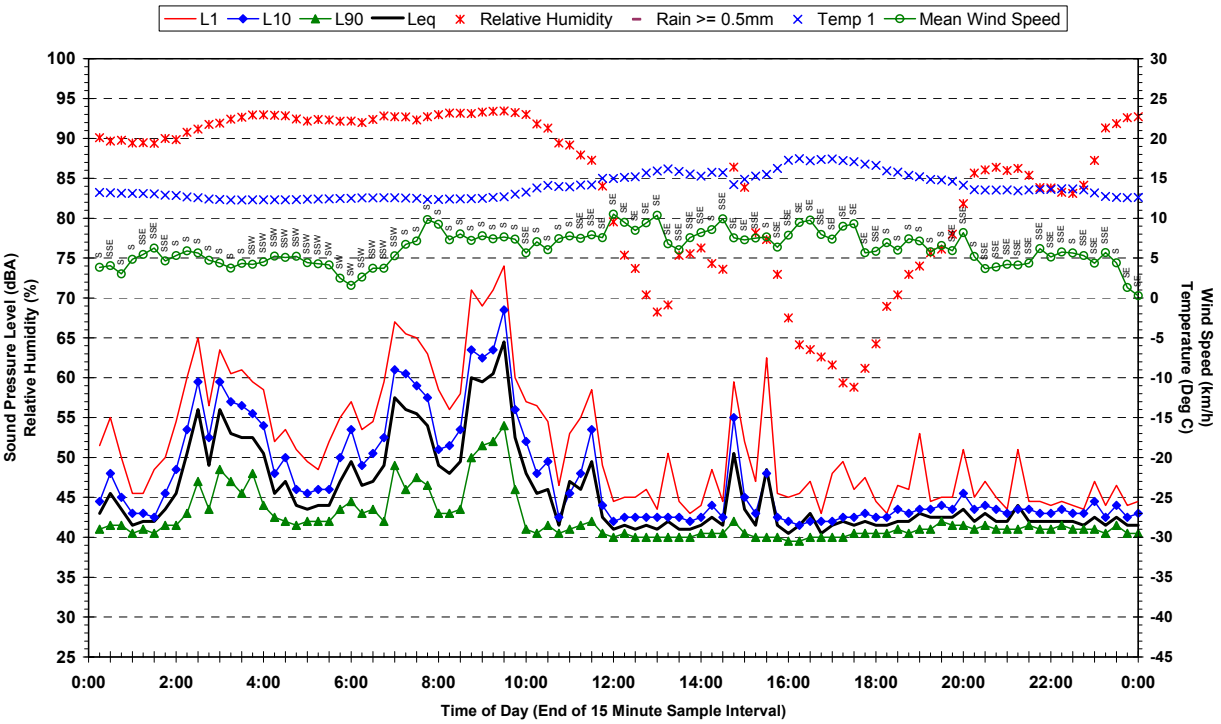


Unattended Ambient Noise and Weather Data - Noise Assessment Group C - Residence Reference 64

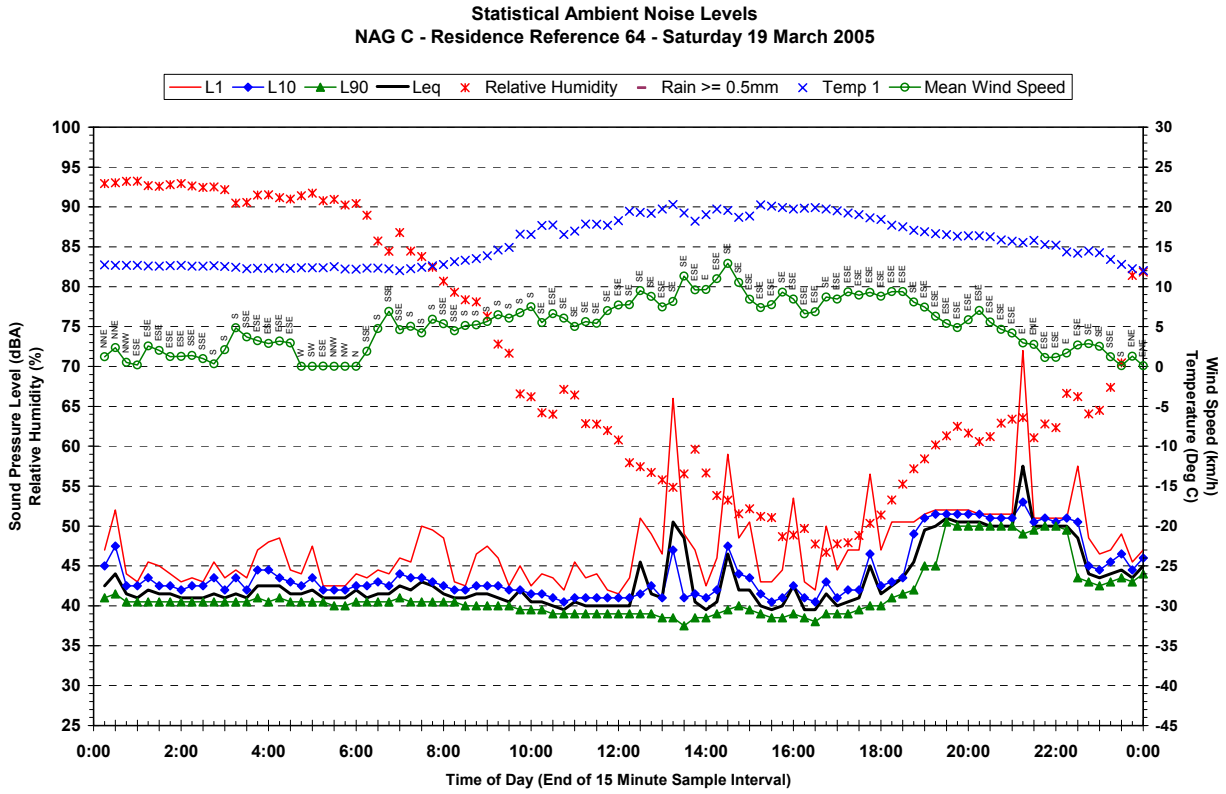
Statistical Ambient Noise Levels
NAG C - Residence Reference 64 - Thursday 17 March 2005

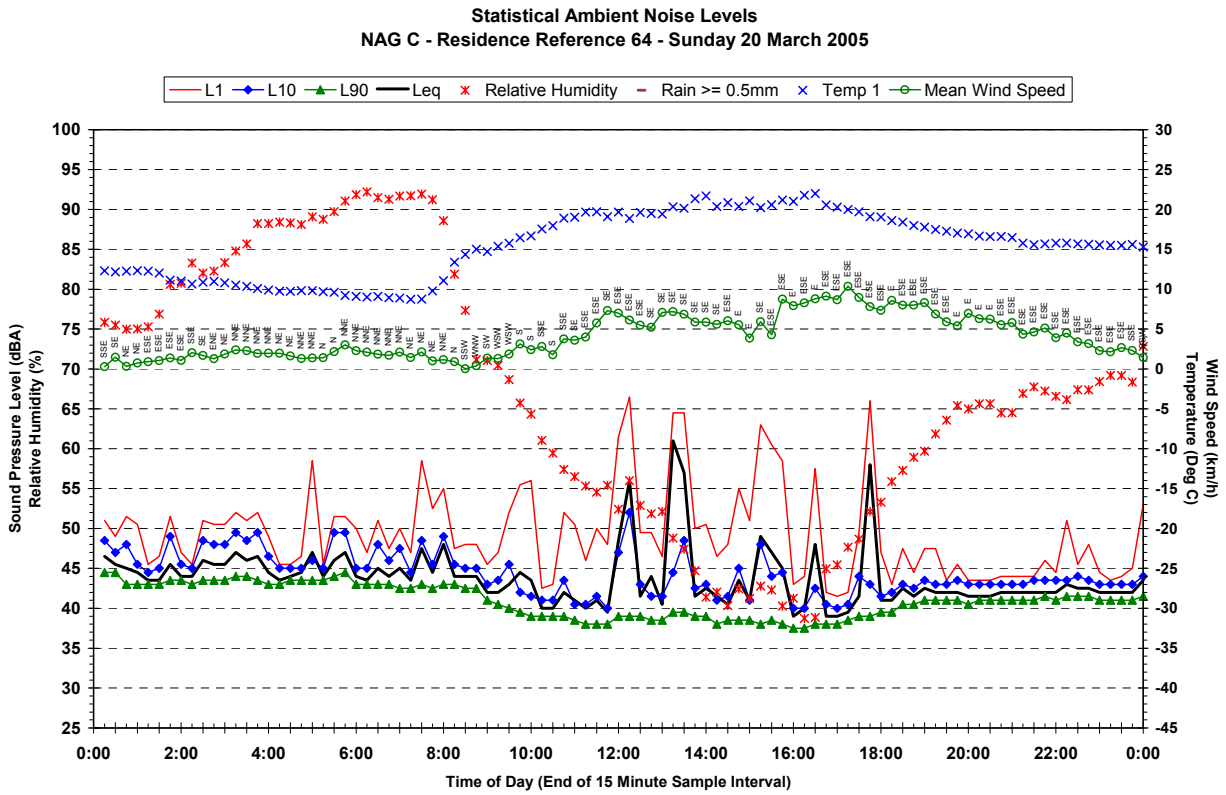


Statistical Ambient Noise Levels
NAG C - Residence Reference 64 - Friday 18 March 2005



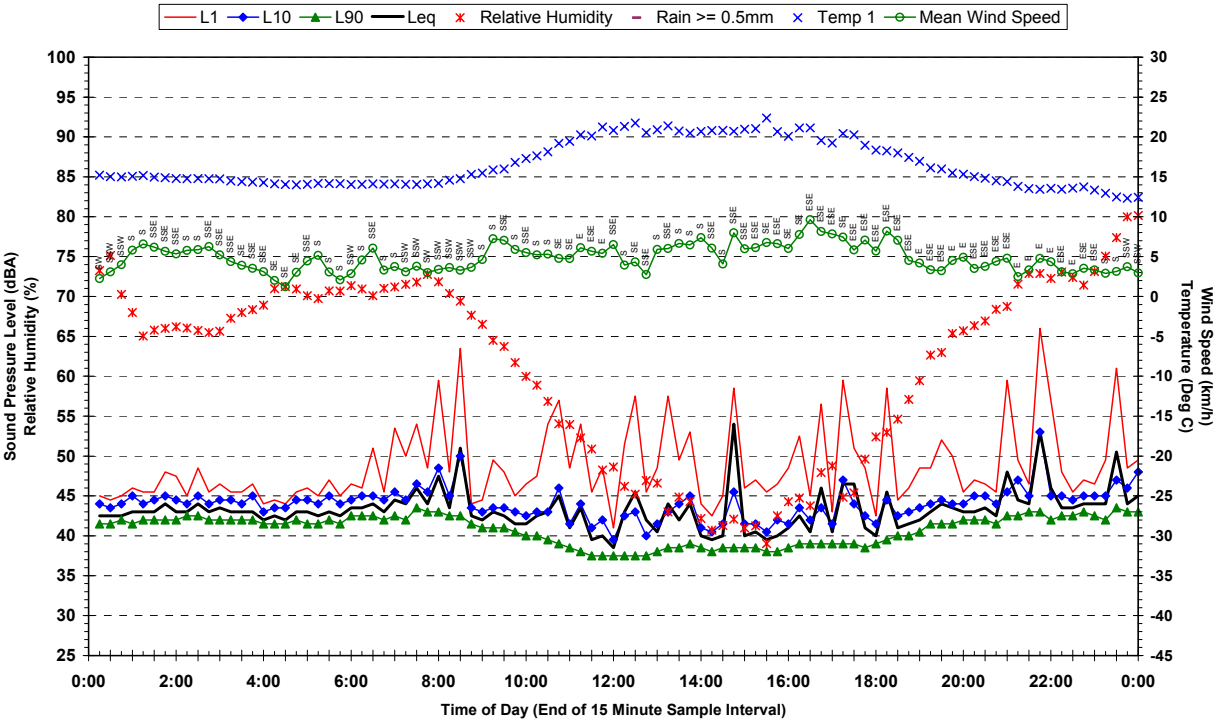
Unattended Ambient Noise and Weather Data - Noise Assessment Group C - Residence Reference 64



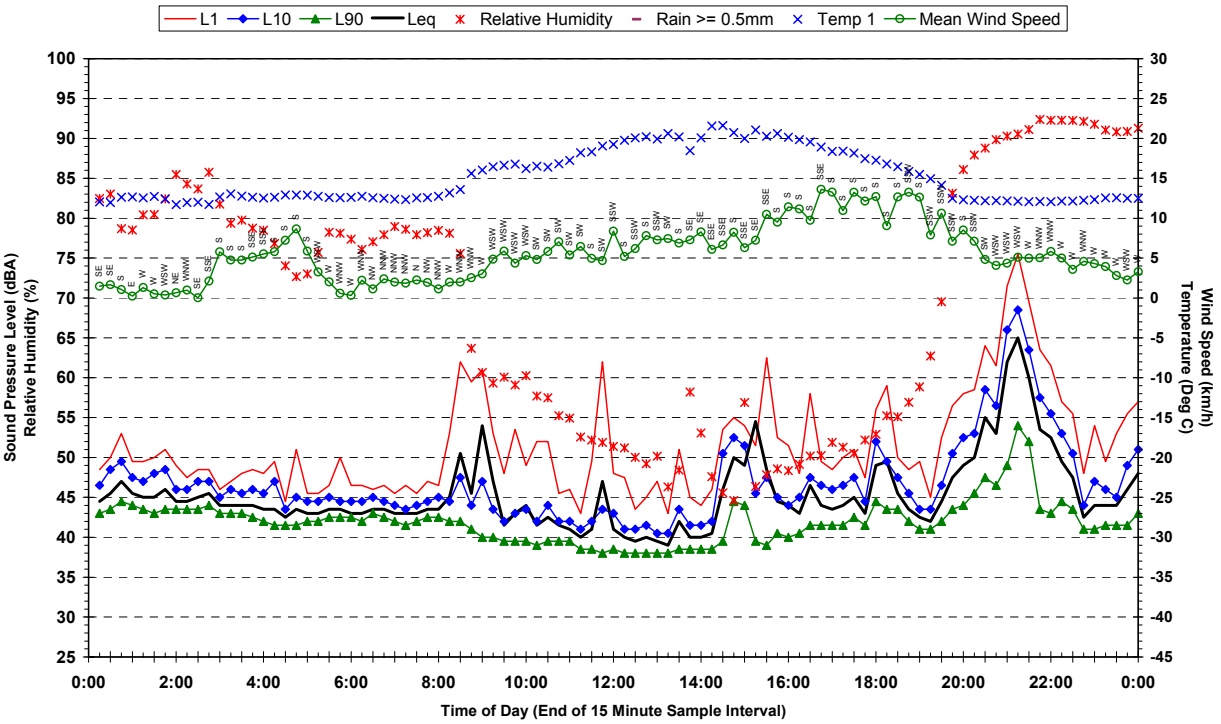


Unattended Ambient Noise and Weather Data - Noise Assessment Group C - Residence Reference 64

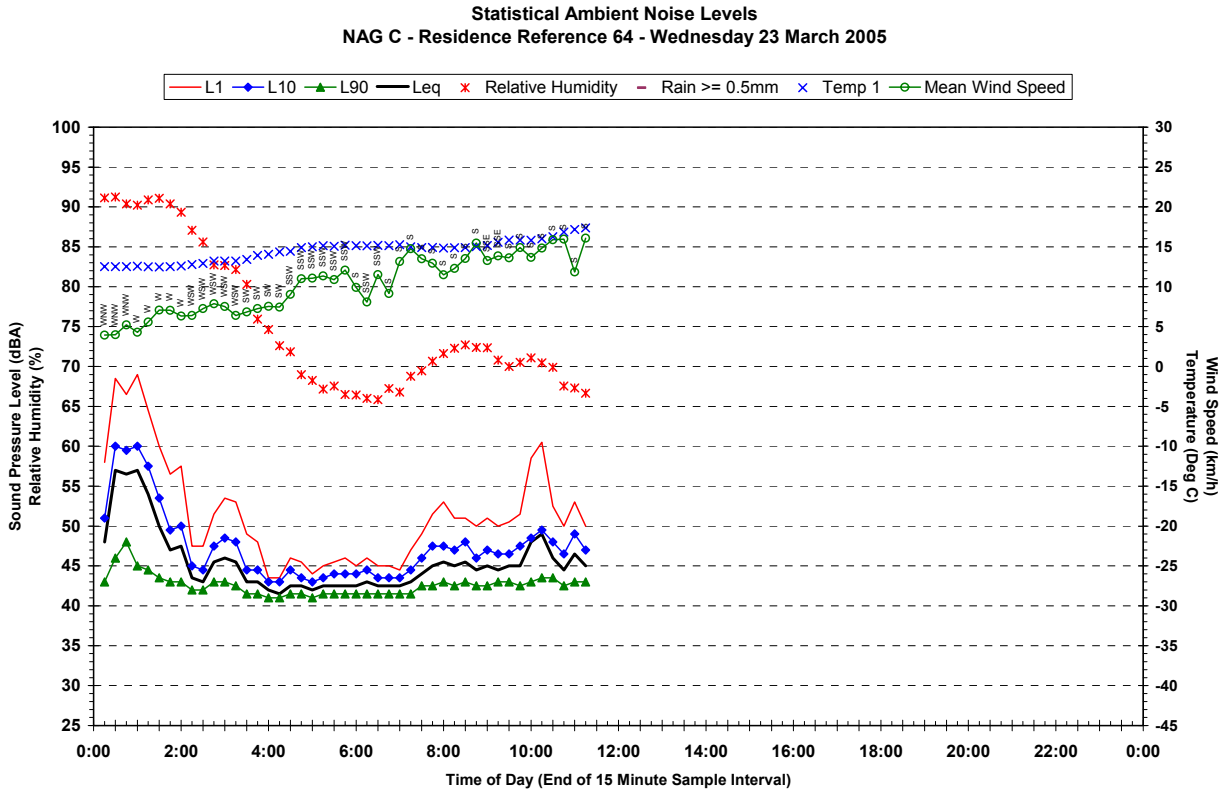
Statistical Ambient Noise Levels
NAG C - Residence Reference 64 - Monday 21 March 2005



Statistical Ambient Noise Levels
NAG C - Residence Reference 64 - Tuesday 22 March 2005

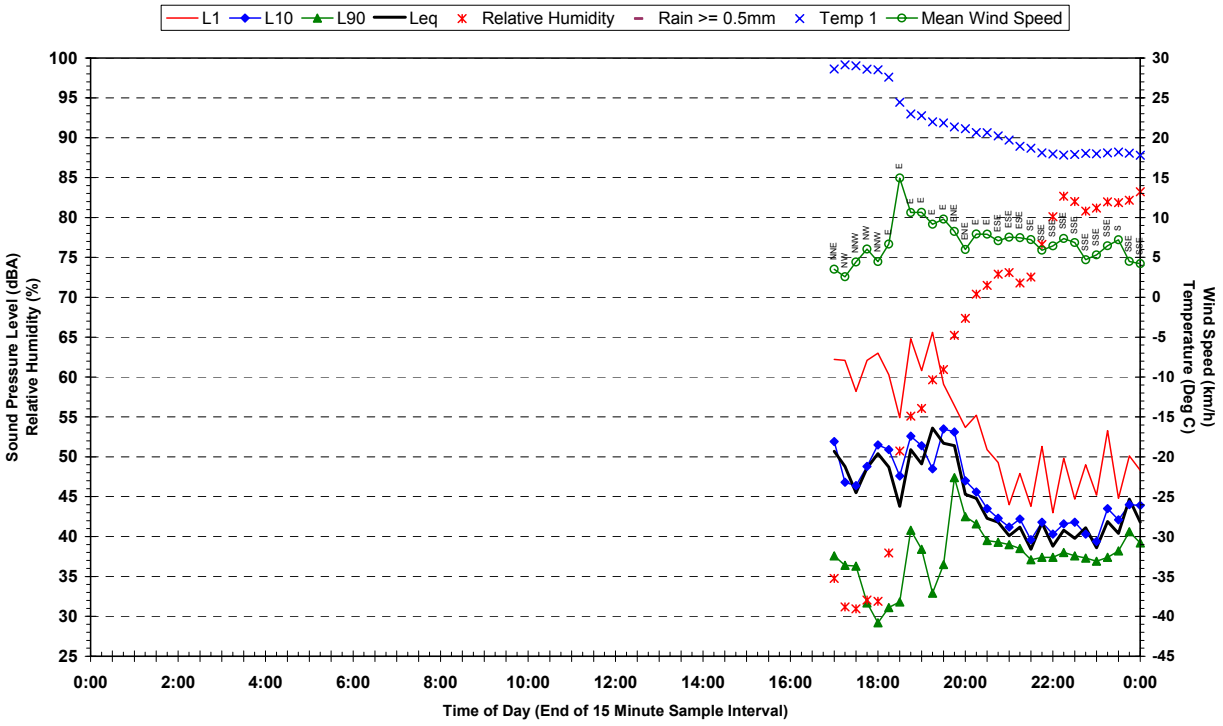


Unattended Ambient Noise and Weather Data - Noise Assessment Group C - Residence Reference 64

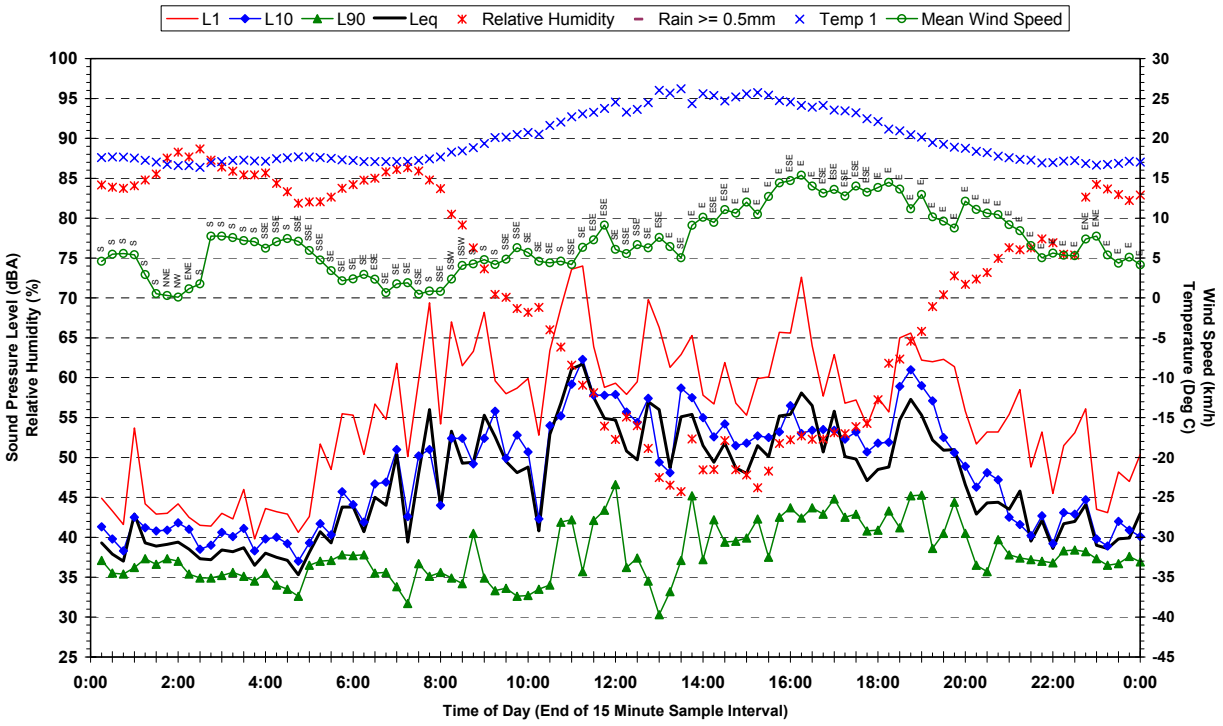


Unattended Ambient Noise and Weather Data - Noise Assessment Group D - Residence Reference 48

Statistical Ambient Noise Levels
NAG D - Residence Reference 48 - Wednesday 9 March 2005

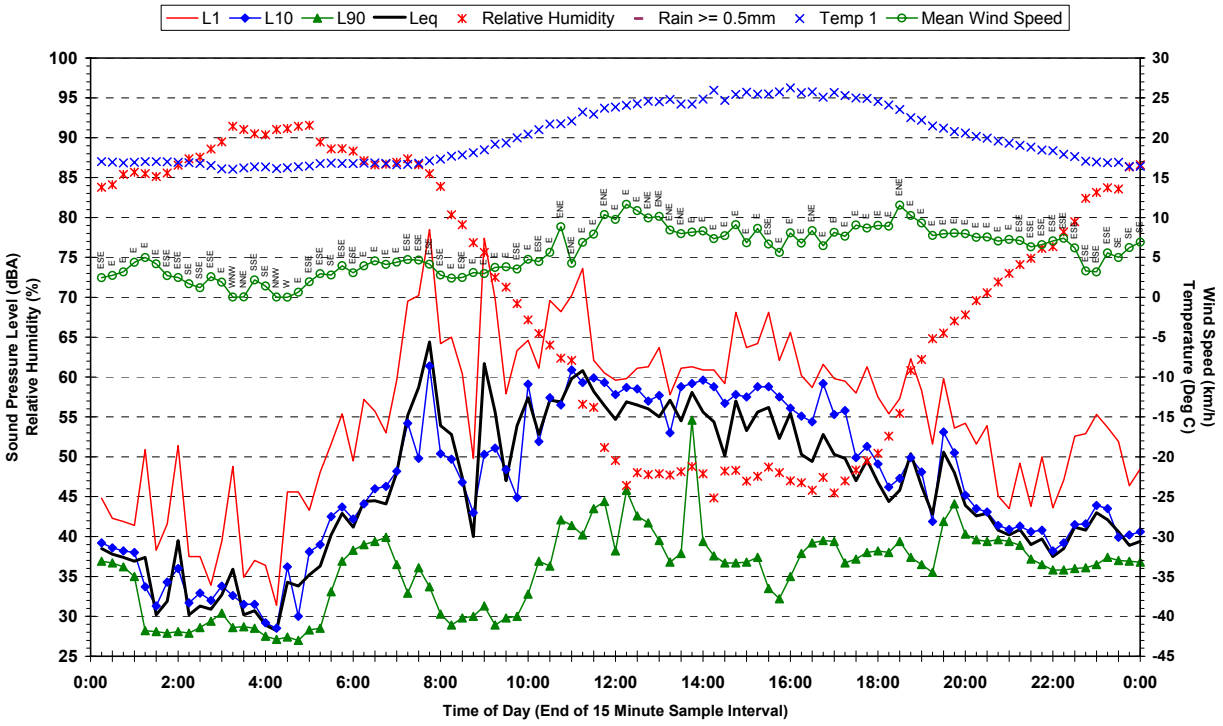


Statistical Ambient Noise Levels
NAG D - Residence Reference 48 - Thursday 10 March 2005

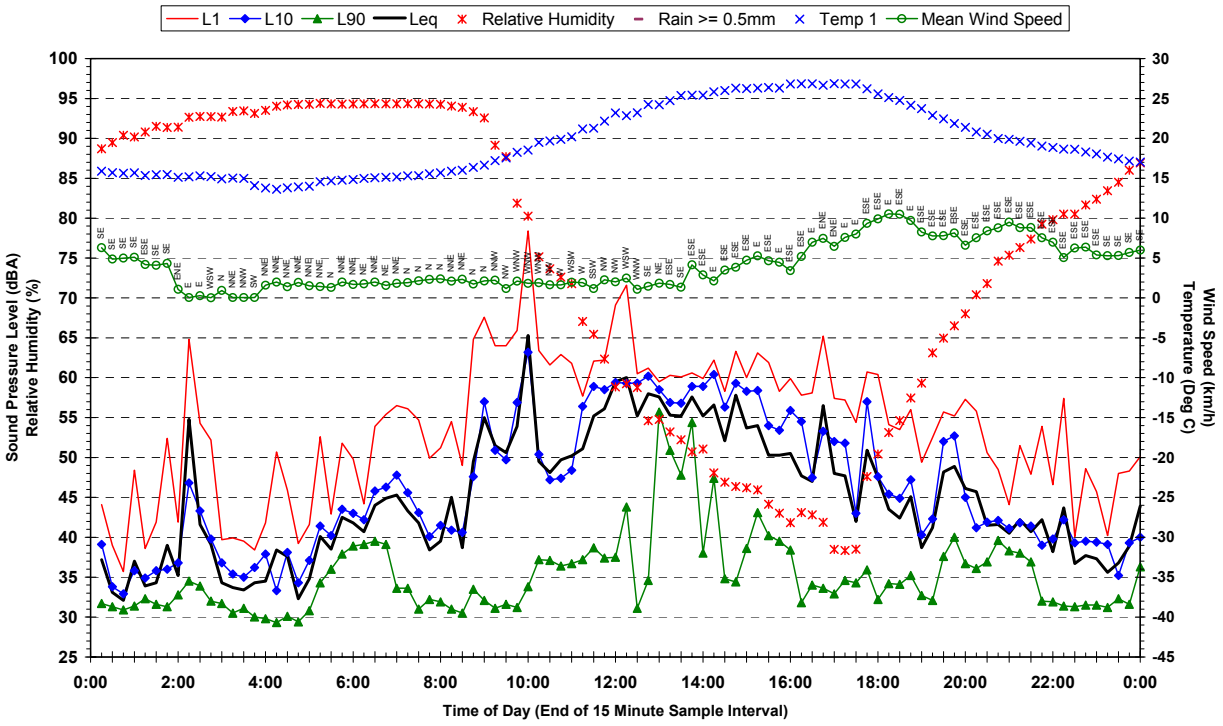


Unattended Ambient Noise and Weather Data - Noise Assessment Group D - Residence Reference 48

Statistical Ambient Noise Levels
NAG D - Residence Reference 48 - Friday 11 March 2005

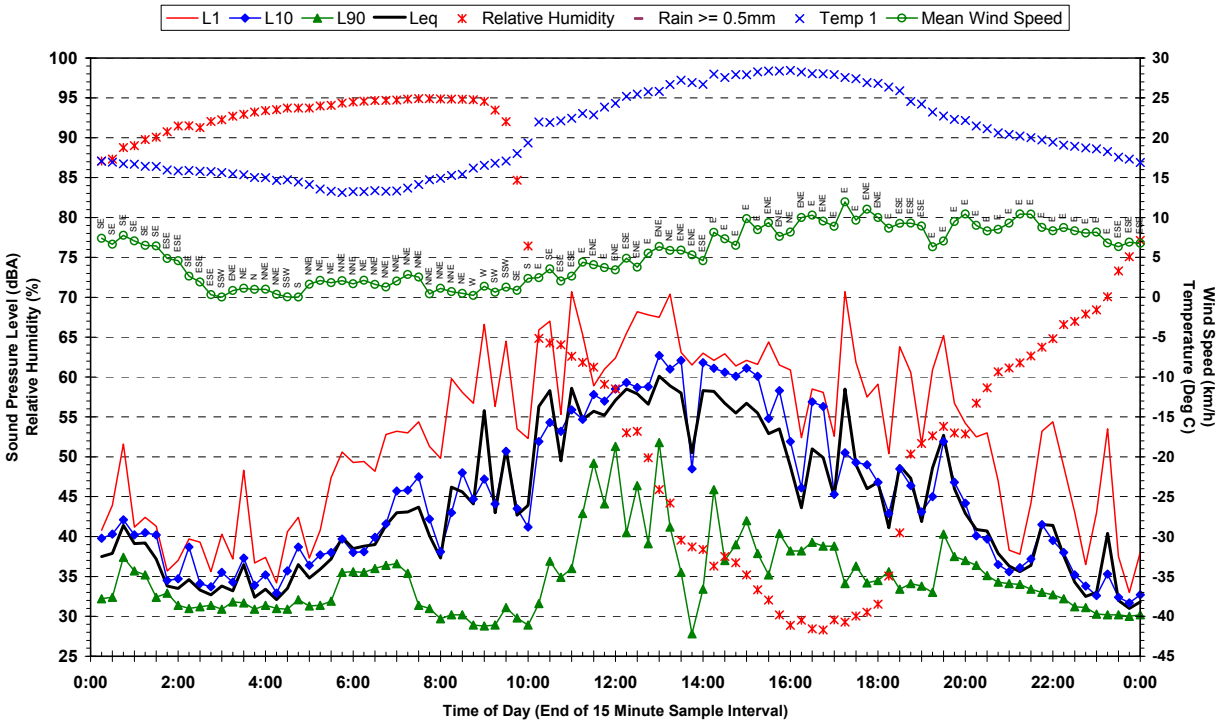


Statistical Ambient Noise Levels
NAG D - Residence Reference 48 - Saturday 12 March 2005

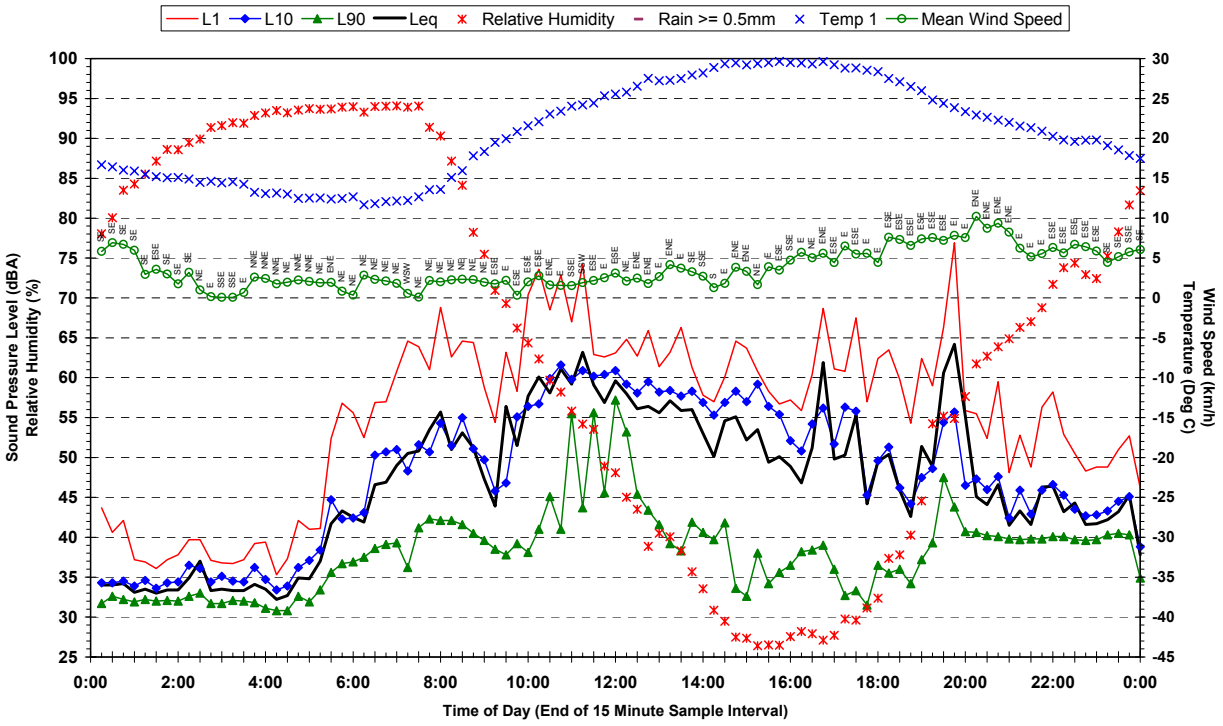


Unattended Ambient Noise and Weather Data - Noise Assessment Group D - Residence Reference 48

Statistical Ambient Noise Levels
NAG D - Residence Reference 48 - Sunday 13 March 2005

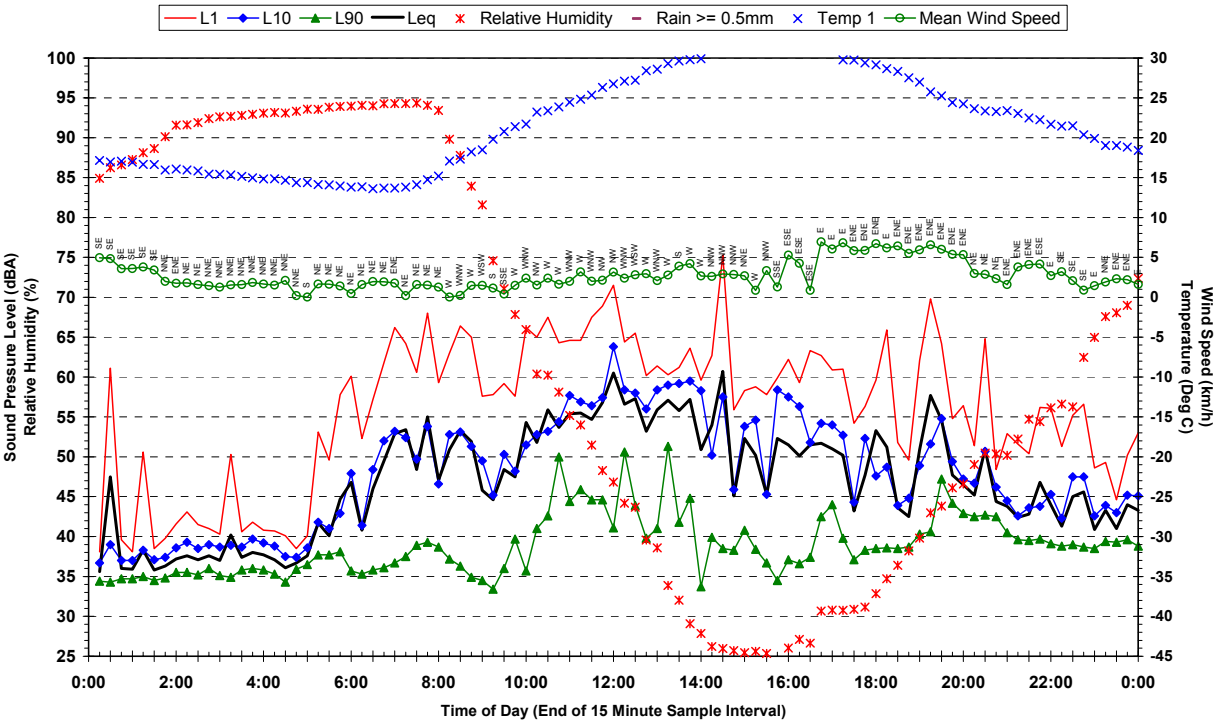


Statistical Ambient Noise Levels
NAG D - Residence Reference 48 - Monday 14 March 2005

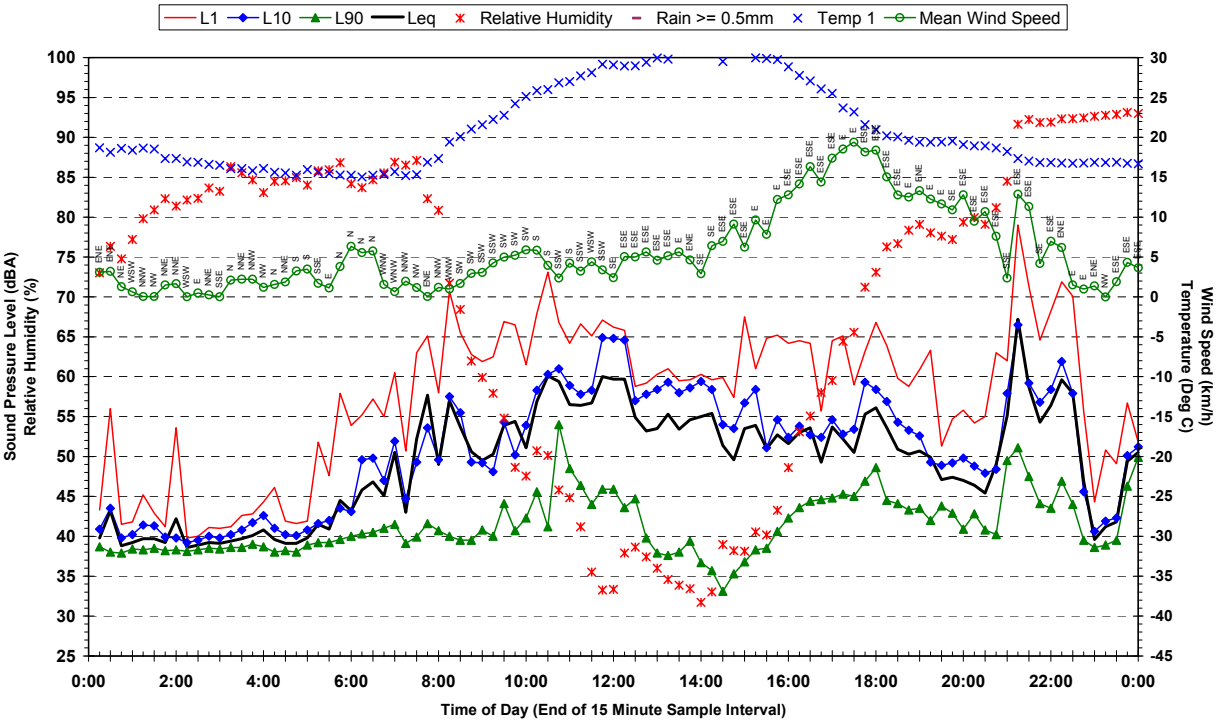


Unattended Ambient Noise and Weather Data - Noise Assessment Group D - Residence Reference 48

Statistical Ambient Noise Levels
NAG D - Residence Reference 48 - Tuesday 15 March 2005

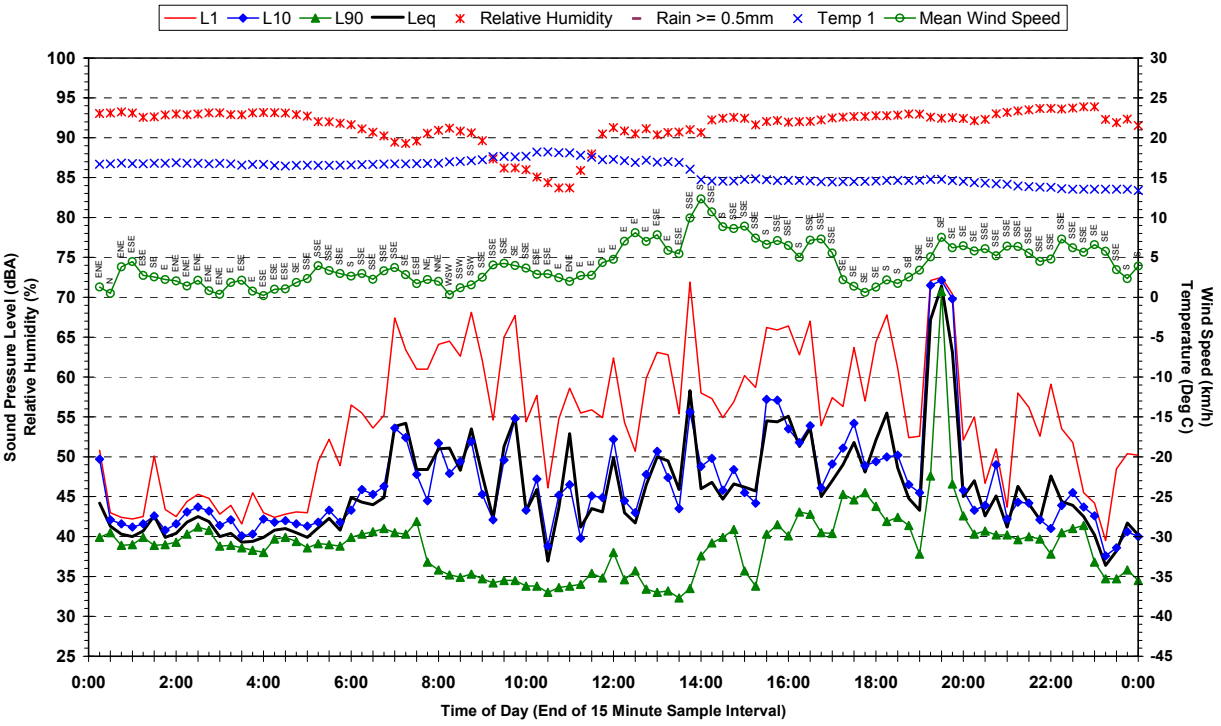


Statistical Ambient Noise Levels
NAG D - Residence Reference 48 - Wednesday 16 March 2005

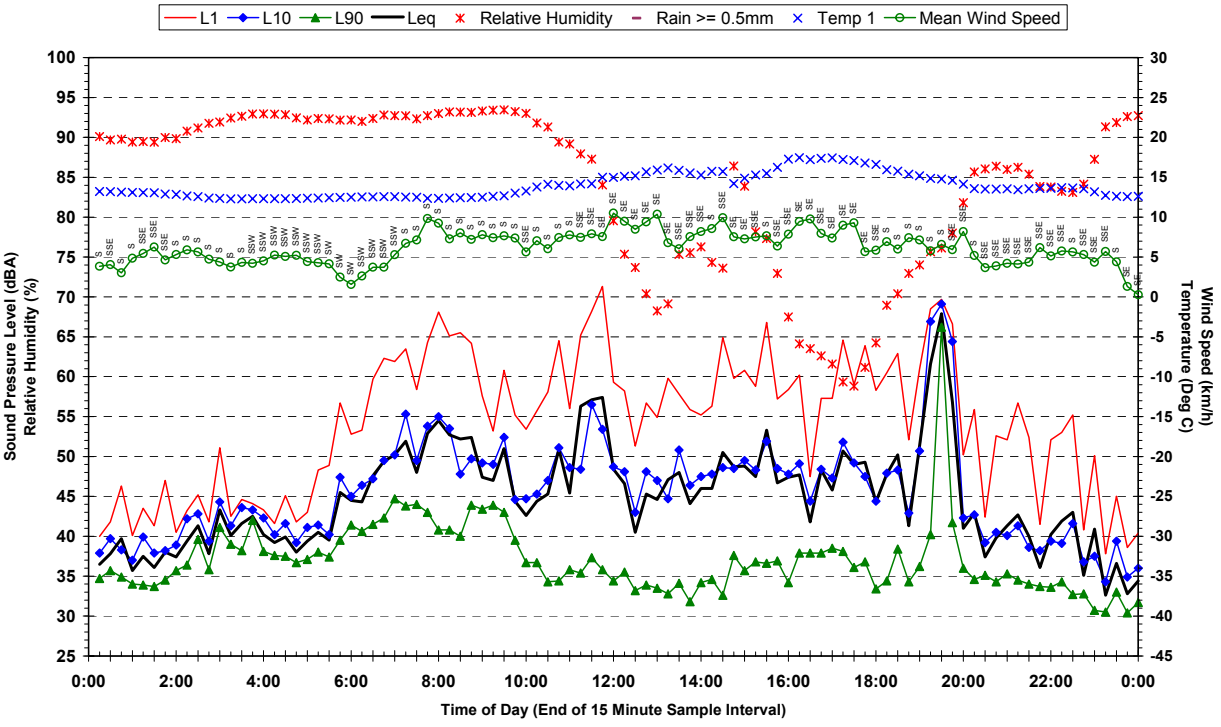


Unattended Ambient Noise and Weather Data - Noise Assessment Group D - Residence Reference 48

Statistical Ambient Noise Levels
NAG D - Residence Reference 48 - Thursday 17 March 2005

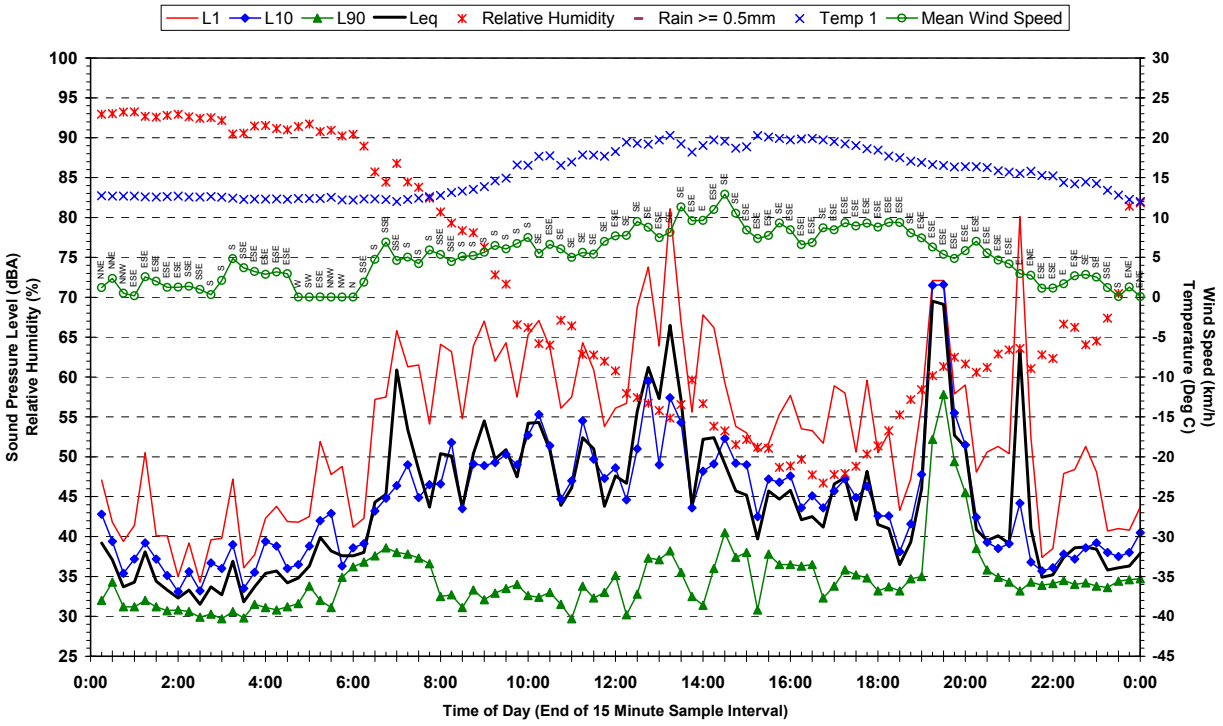


Statistical Ambient Noise Levels
NAG D - Residence Reference 48 - Friday 18 March 2005

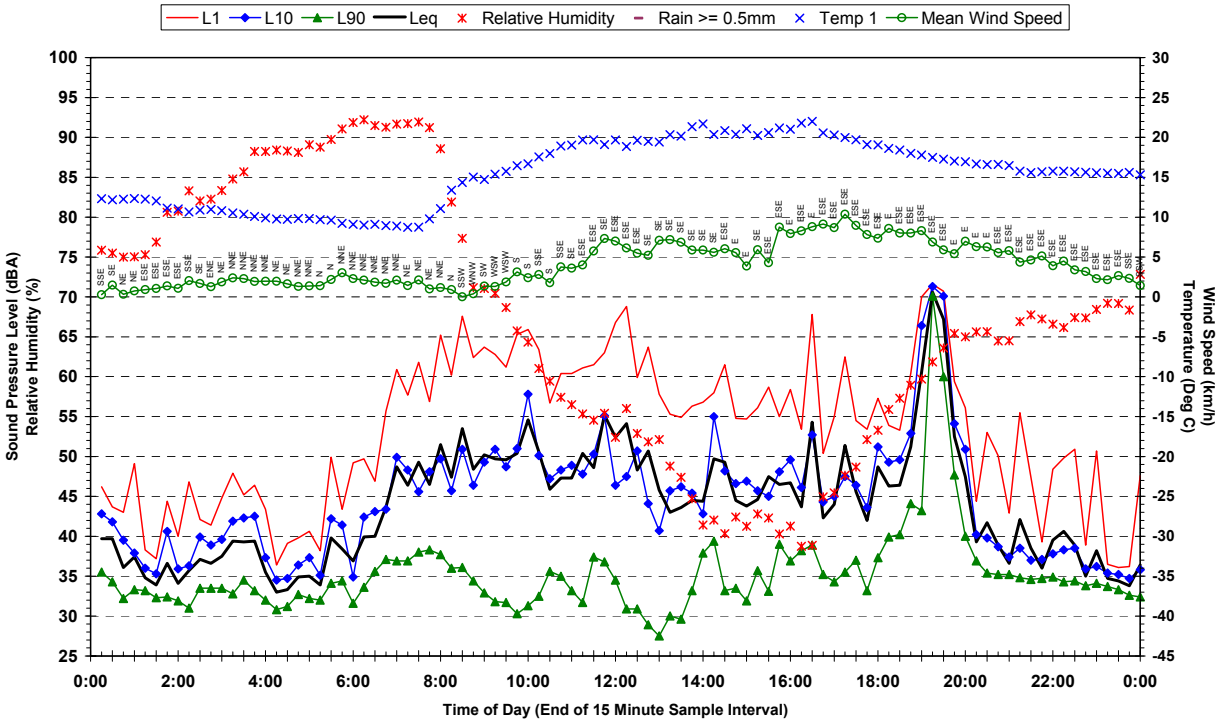


Unattended Ambient Noise and Weather Data - Noise Assessment Group D - Residence Reference 48

Statistical Ambient Noise Levels
NAG D - Residence Reference 48 - Saturday 19 March 2005

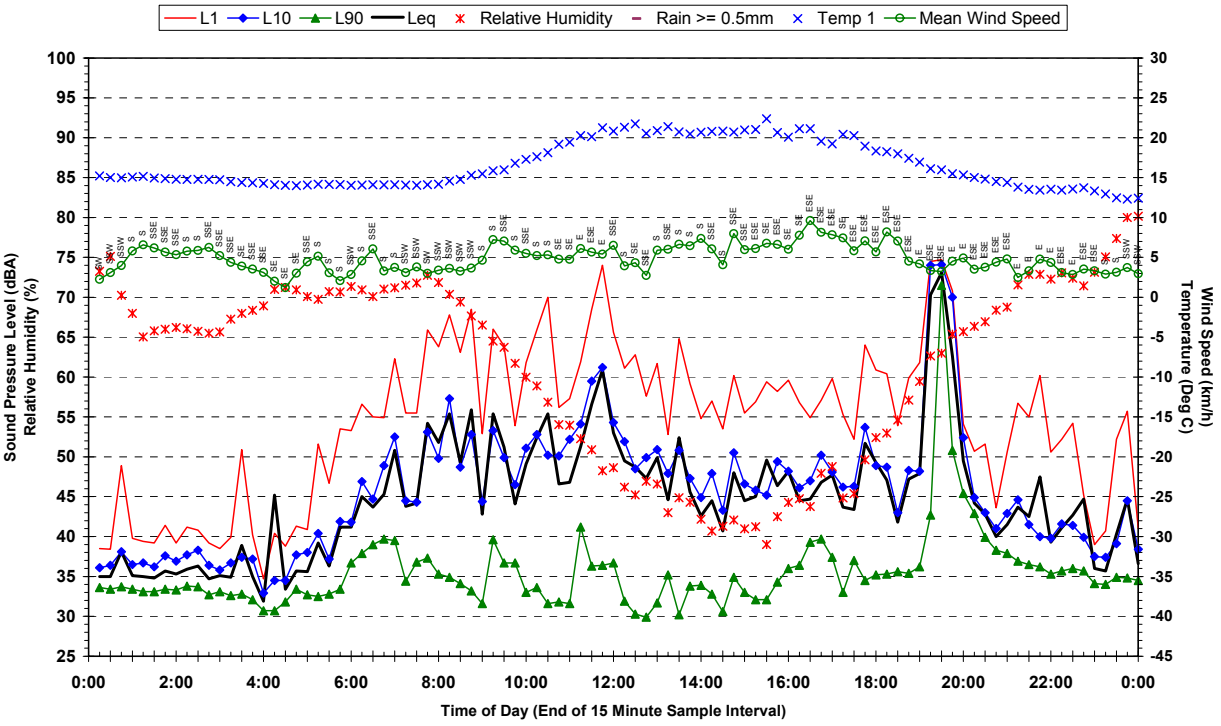


Statistical Ambient Noise Levels
NAG D - Residence Reference 48 - Sunday 20 March 2005

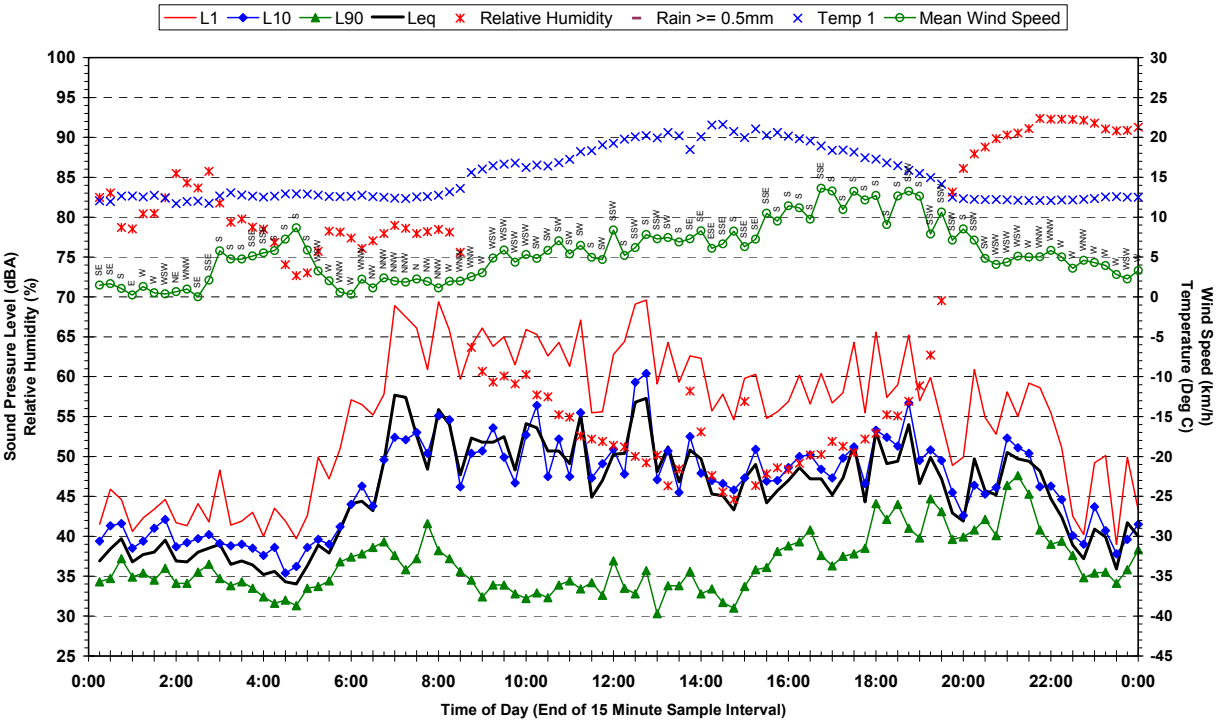


Unattended Ambient Noise and Weather Data - Noise Assessment Group D - Residence Reference 48

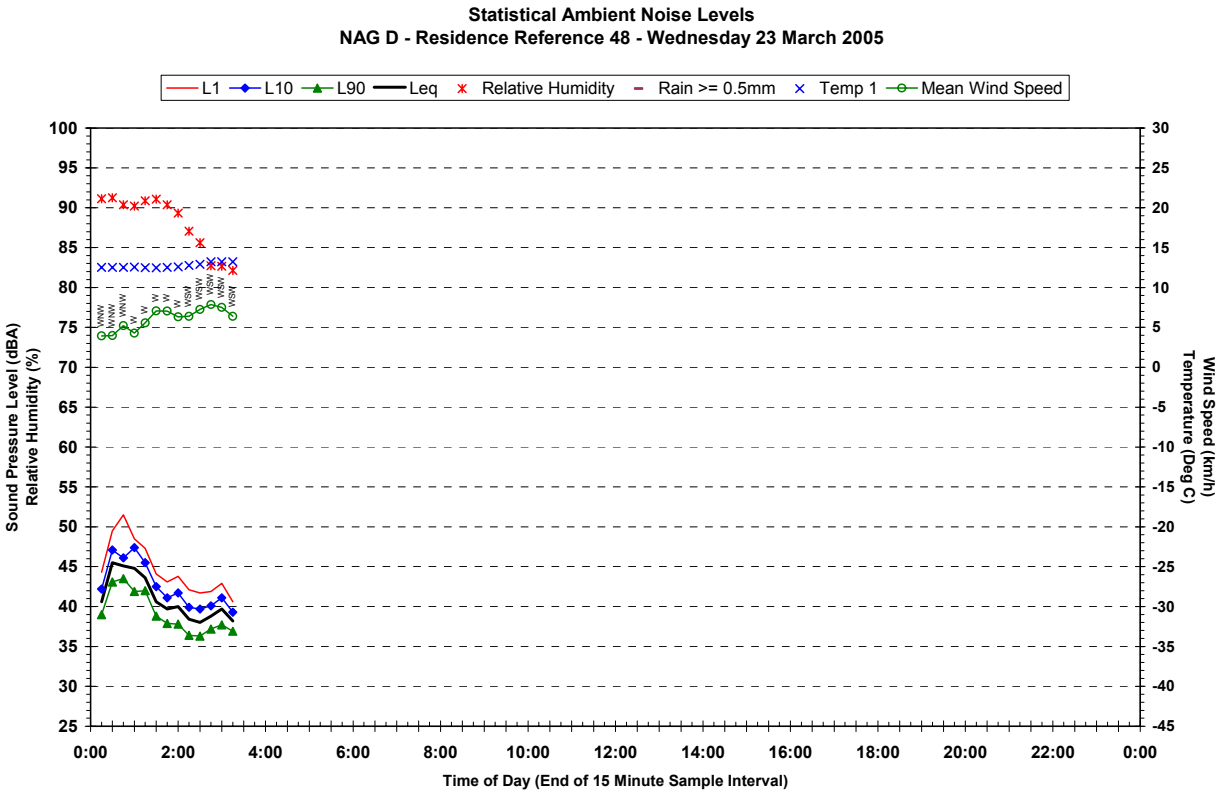
Statistical Ambient Noise Levels
NAG D - Residence Reference 48 - Monday 21 March 2005



Statistical Ambient Noise Levels
NAG D - Residence Reference 48 - Tuesday 22 March 2005

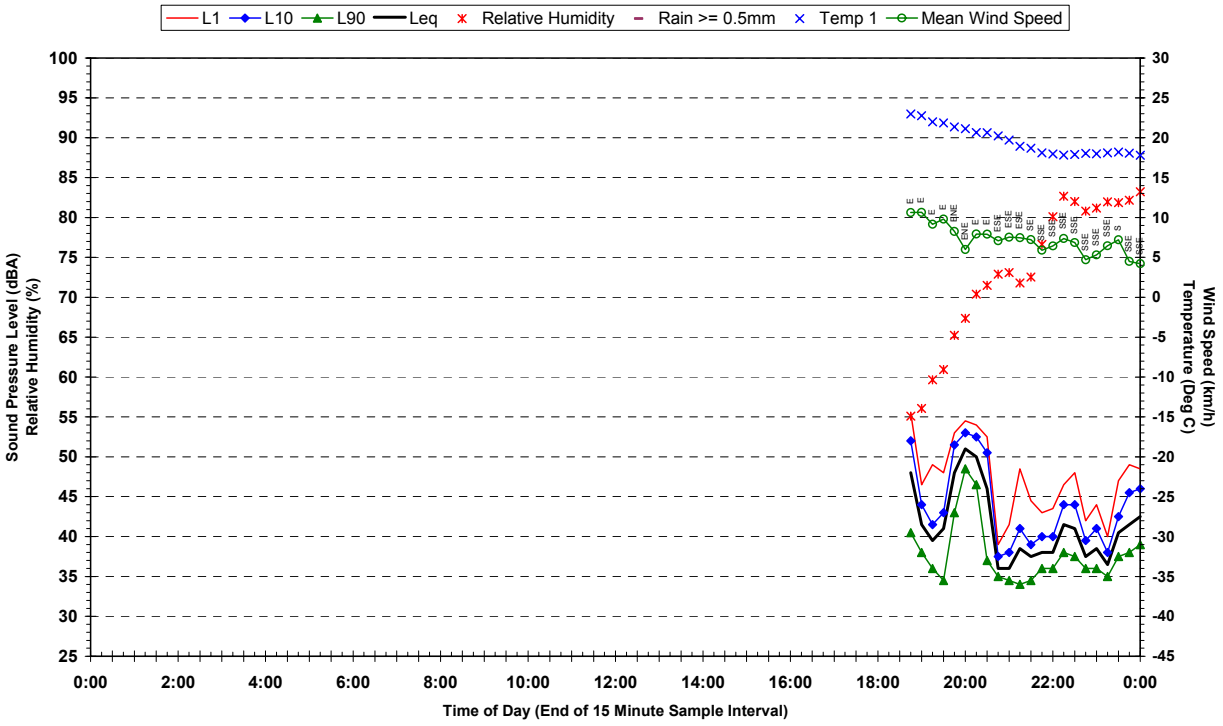


Unattended Ambient Noise and Weather Data - Noise Assessment Group D - Residence Reference 48

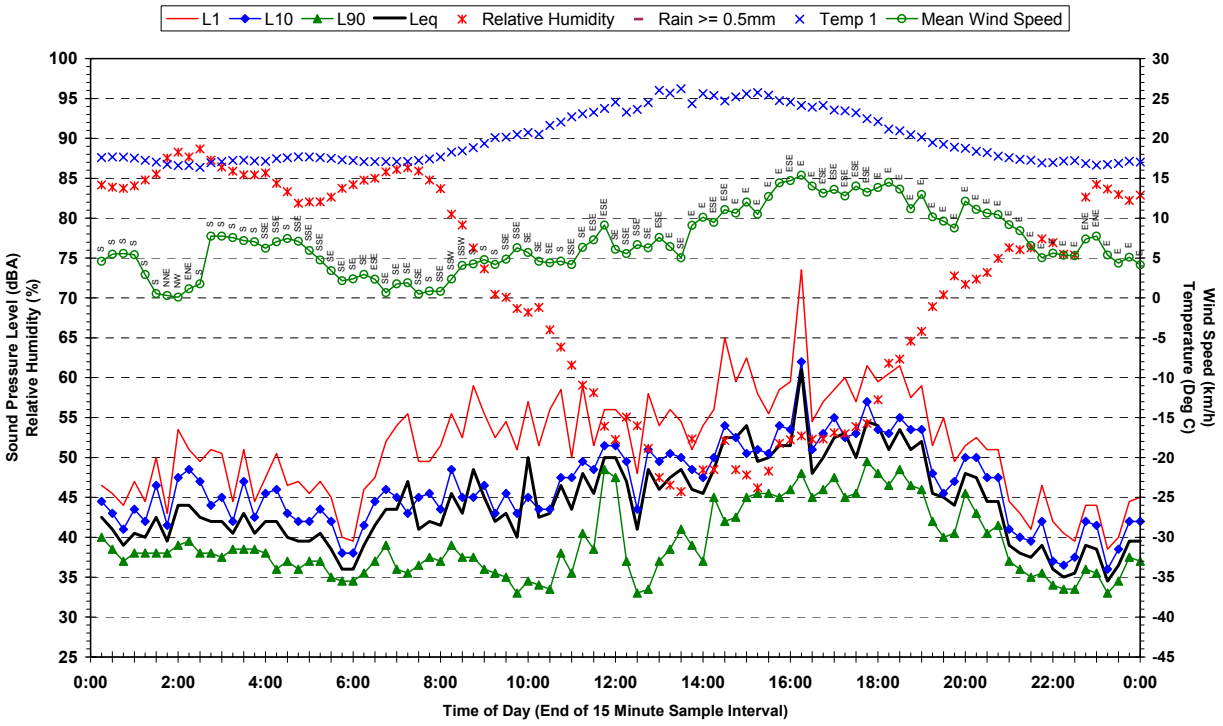


Unattended Ambient Noise and Weather Data - Noise Assessment Group F - Residence Reference 73

Statistical Ambient Noise Levels
NAG F - Residence Reference 73 - Wednesday 9 March 2005

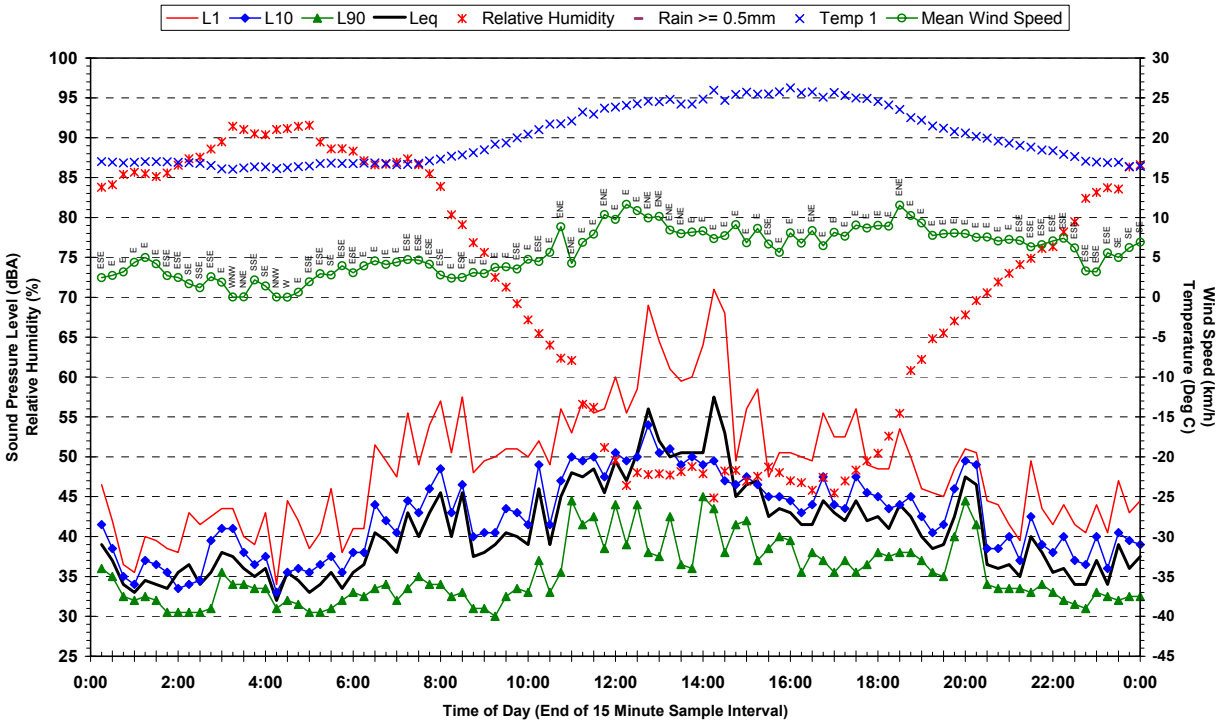


Statistical Ambient Noise Levels
NAG F - Residence Reference 73 - Thursday 10 March 2005

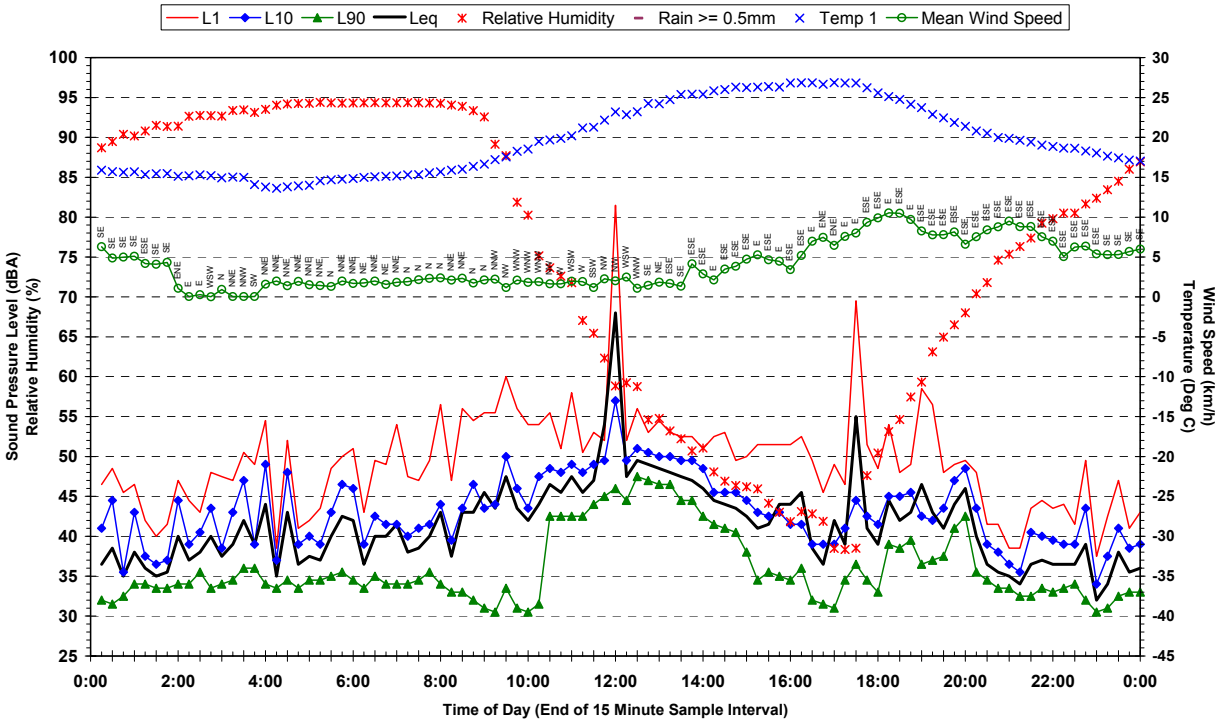


Unattended Ambient Noise and Weather Data - Noise Assessment Group F - Residence Reference 73

Statistical Ambient Noise Levels
NAG F - Residence Reference 73 - Friday 11 March 2005

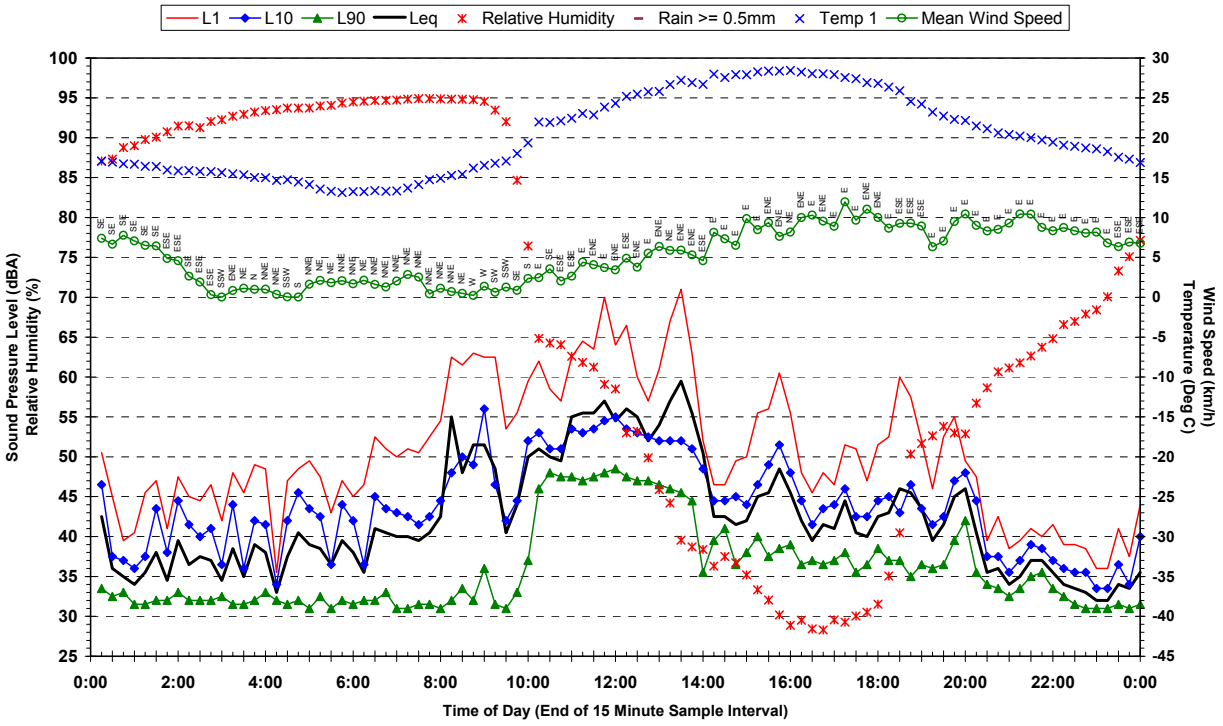


Statistical Ambient Noise Levels
NAG F - Residence Reference 73 - Saturday 12 March 2005

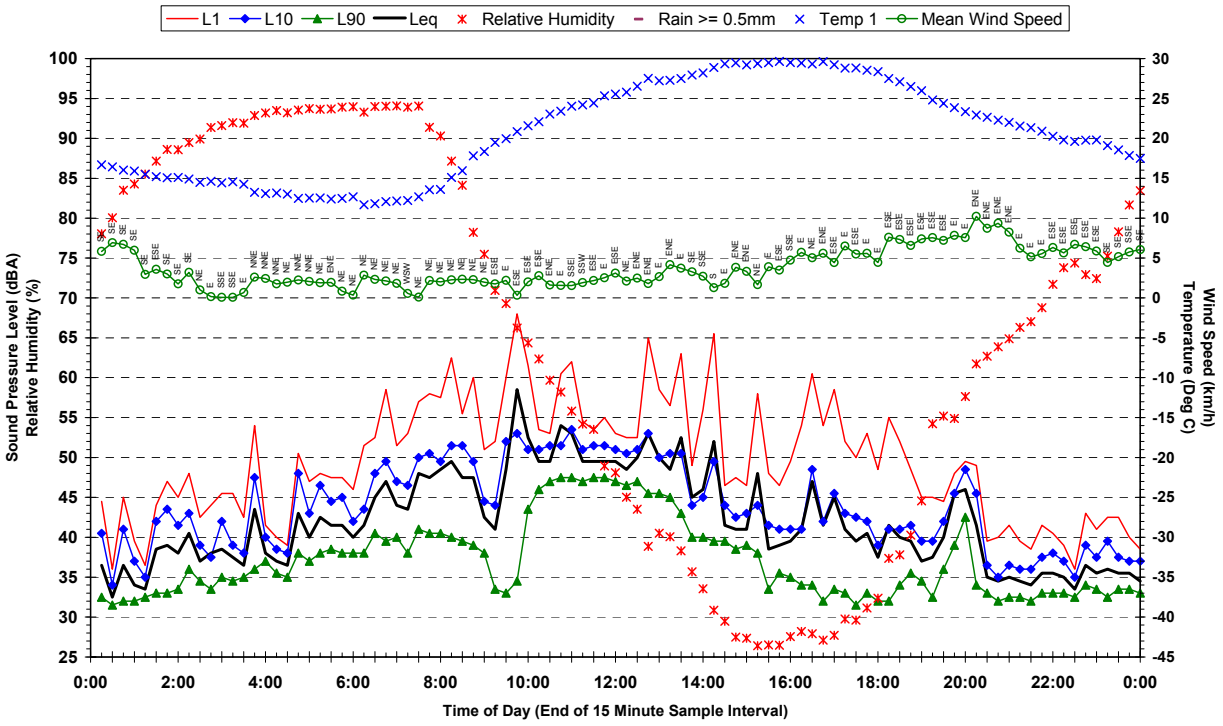


Unattended Ambient Noise and Weather Data - Noise Assessment Group F - Residence Reference 73

Statistical Ambient Noise Levels
NAG F - Residence Reference 73 - Sunday 13 March 2005

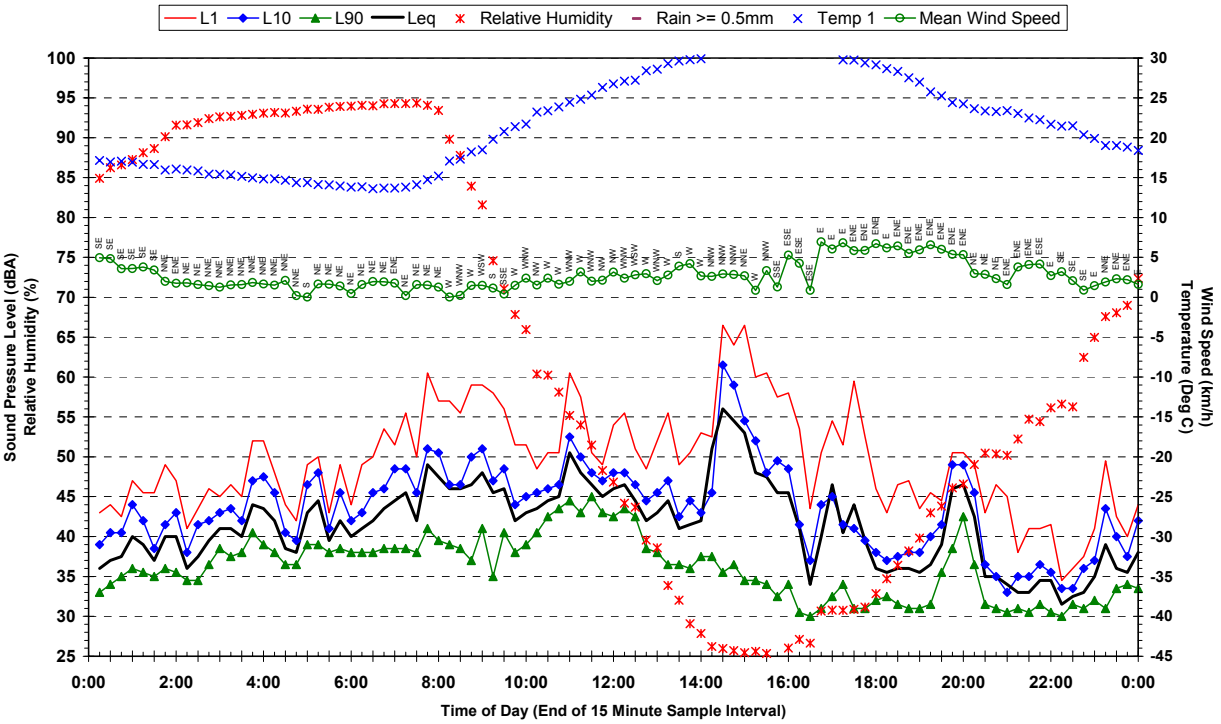


Statistical Ambient Noise Levels
NAG F - Residence Reference 73 - Monday 14 March 2005

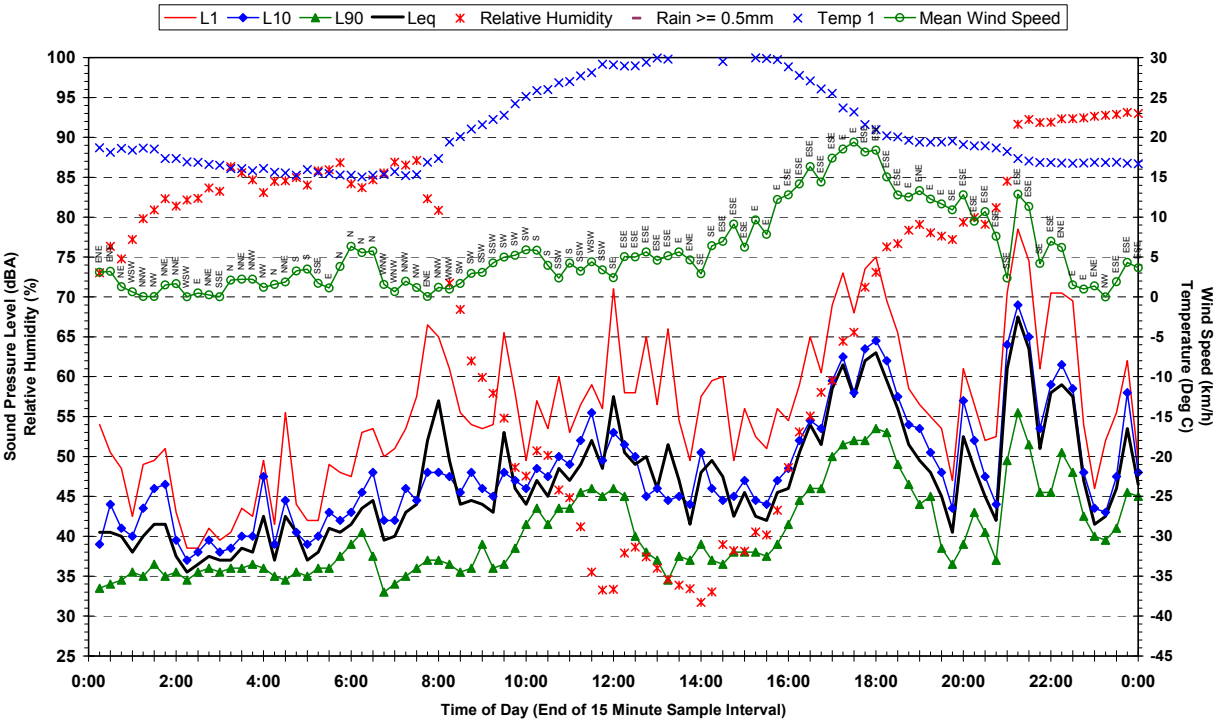


Unattended Ambient Noise and Weather Data - Noise Assessment Group F - Residence Reference 73

Statistical Ambient Noise Levels
NAG F - Residence Reference 73 - Tuesday 15 March 2005

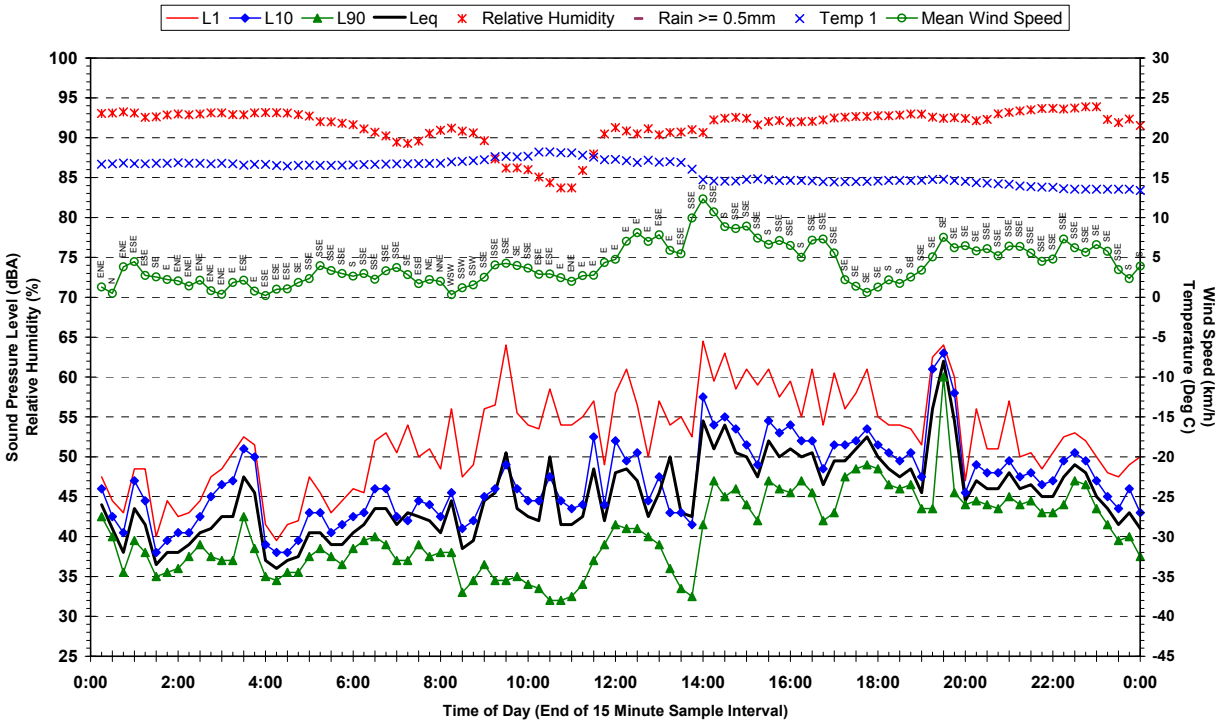


Statistical Ambient Noise Levels
NAG F - Residence Reference 73 - Wednesday 16 March 2005

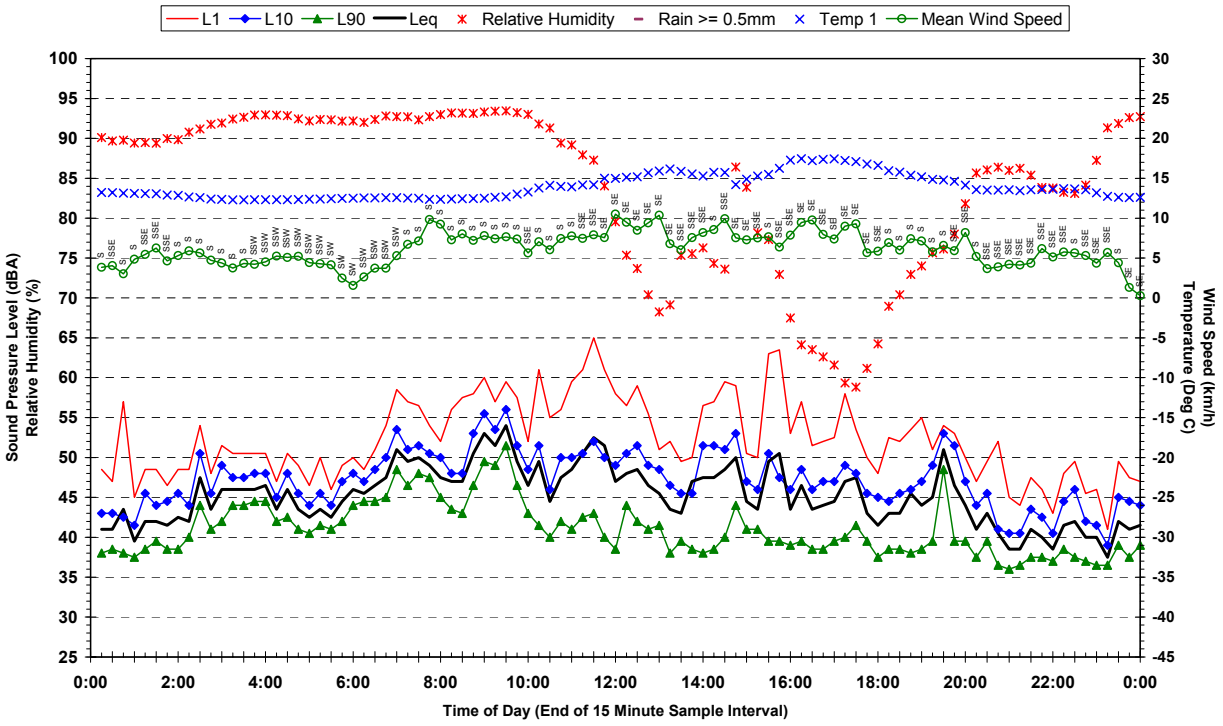


Unattended Ambient Noise and Weather Data - Noise Assessment Group F - Residence Reference 73

Statistical Ambient Noise Levels
NAG F - Residence Reference 73 - Thursday 17 March 2005

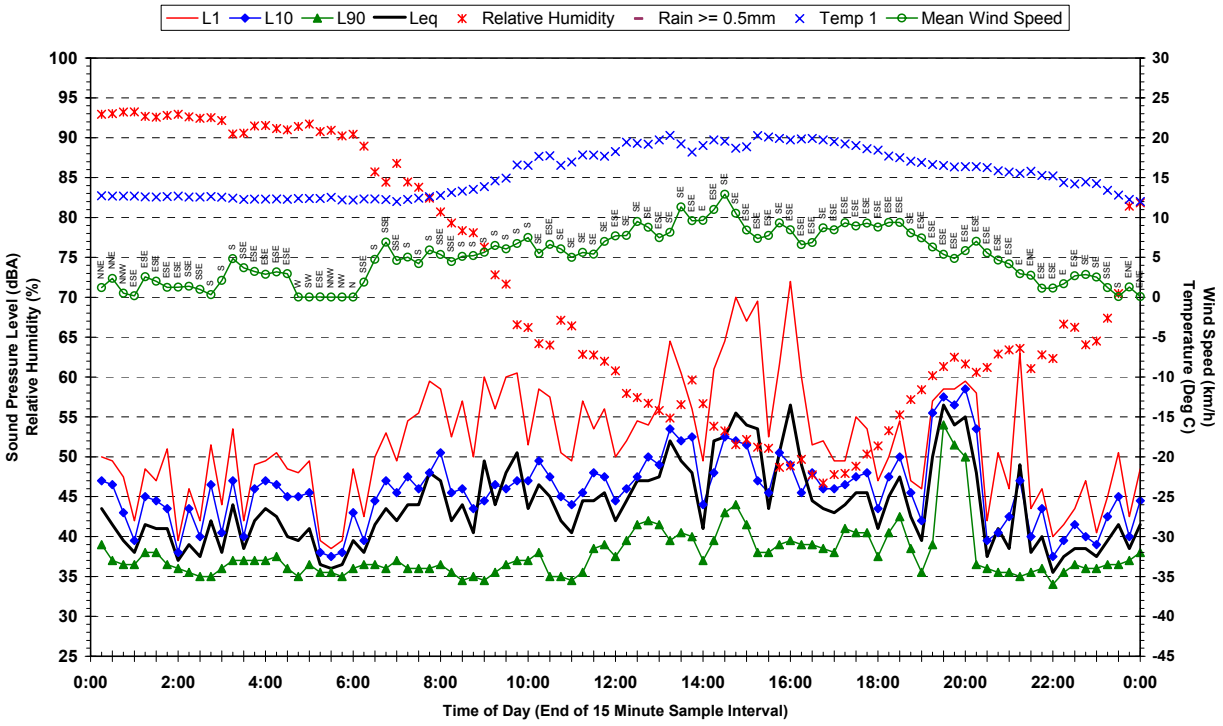


Statistical Ambient Noise Levels
NAG F - Residence Reference 73 - Friday 18 March 2005

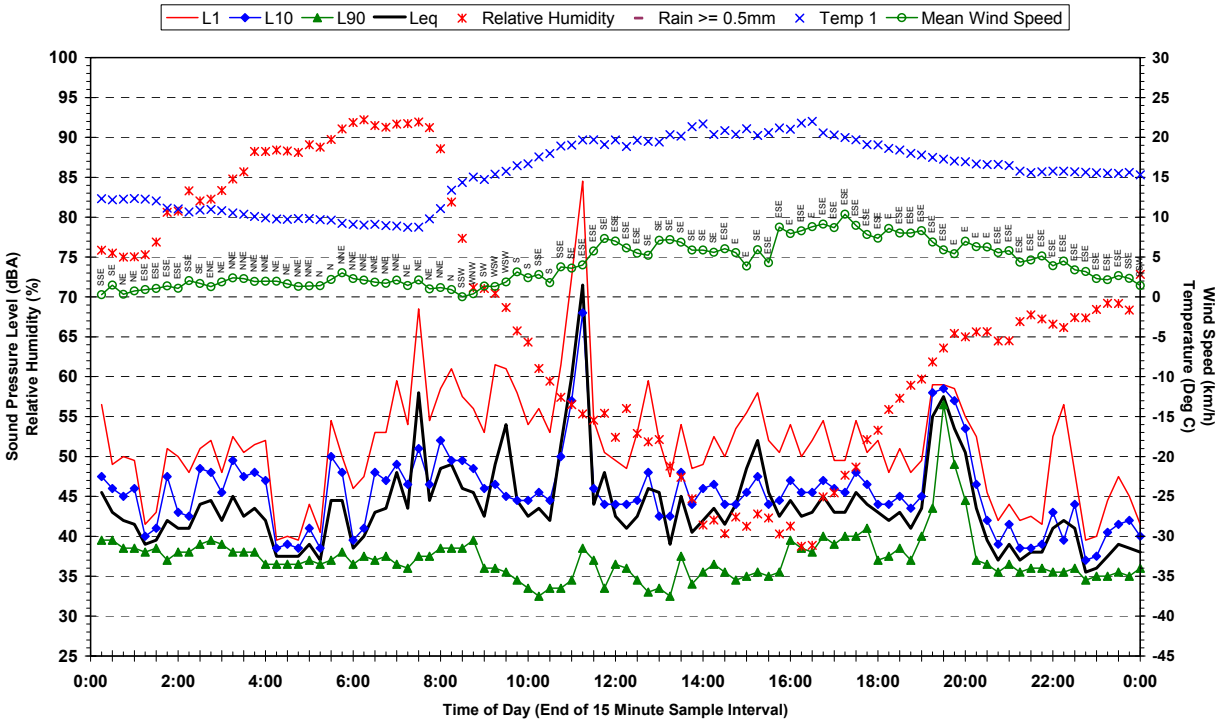


Unattended Ambient Noise and Weather Data - Noise Assessment Group F - Residence Reference 73

Statistical Ambient Noise Levels
NAG F - Residence Reference 73 - Saturday 19 March 2005

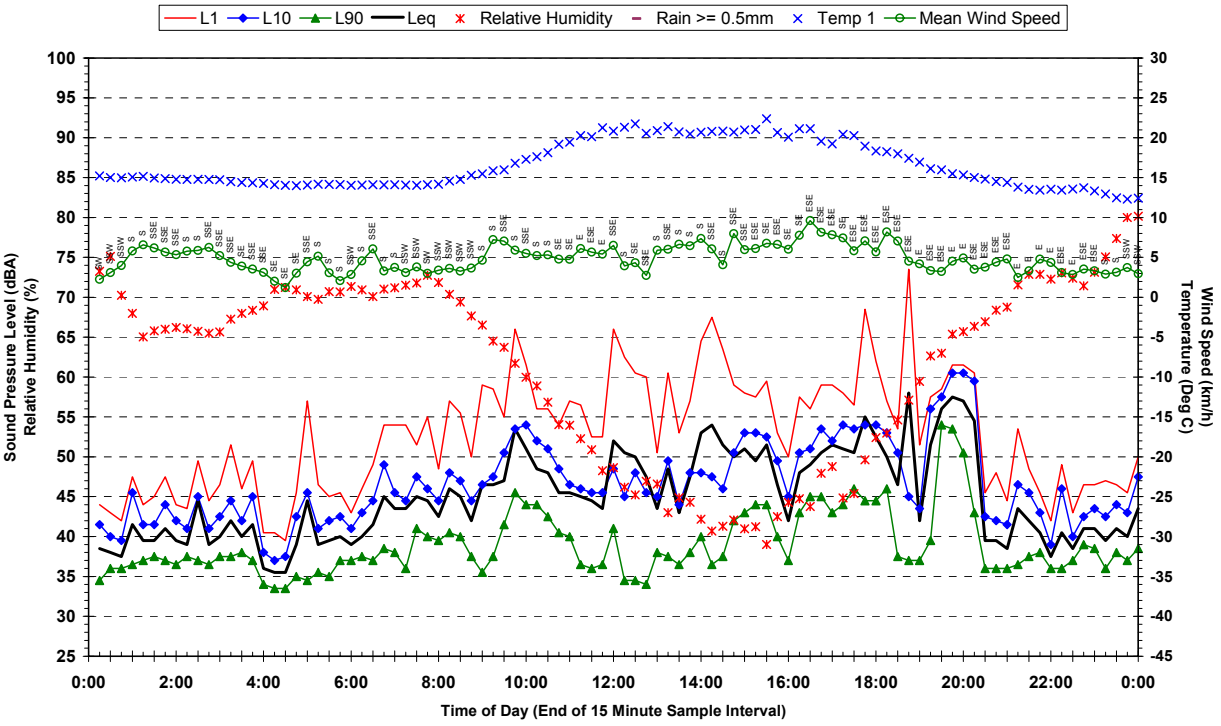


Statistical Ambient Noise Levels
NAG F - Residence Reference 73 - Sunday 20 March 2005

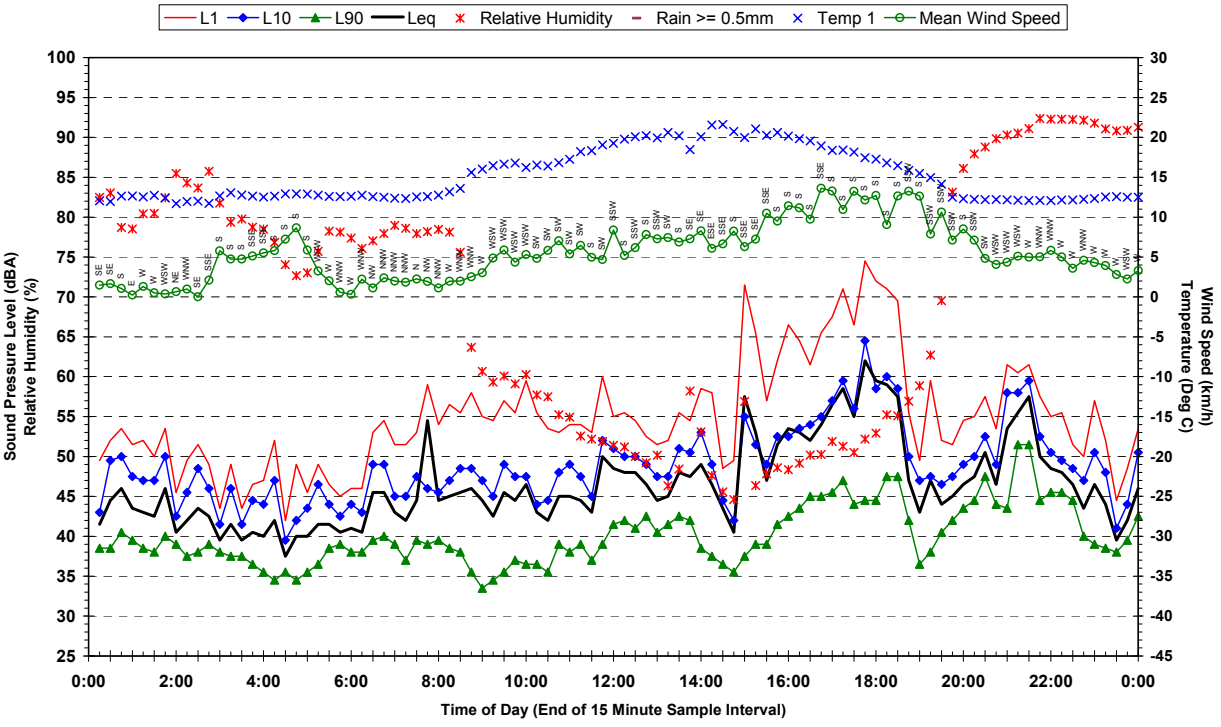


Unattended Ambient Noise and Weather Data - Noise Assessment Group F - Residence Reference 73

Statistical Ambient Noise Levels
NAG F - Residence Reference 73 - Monday 21 March 2005

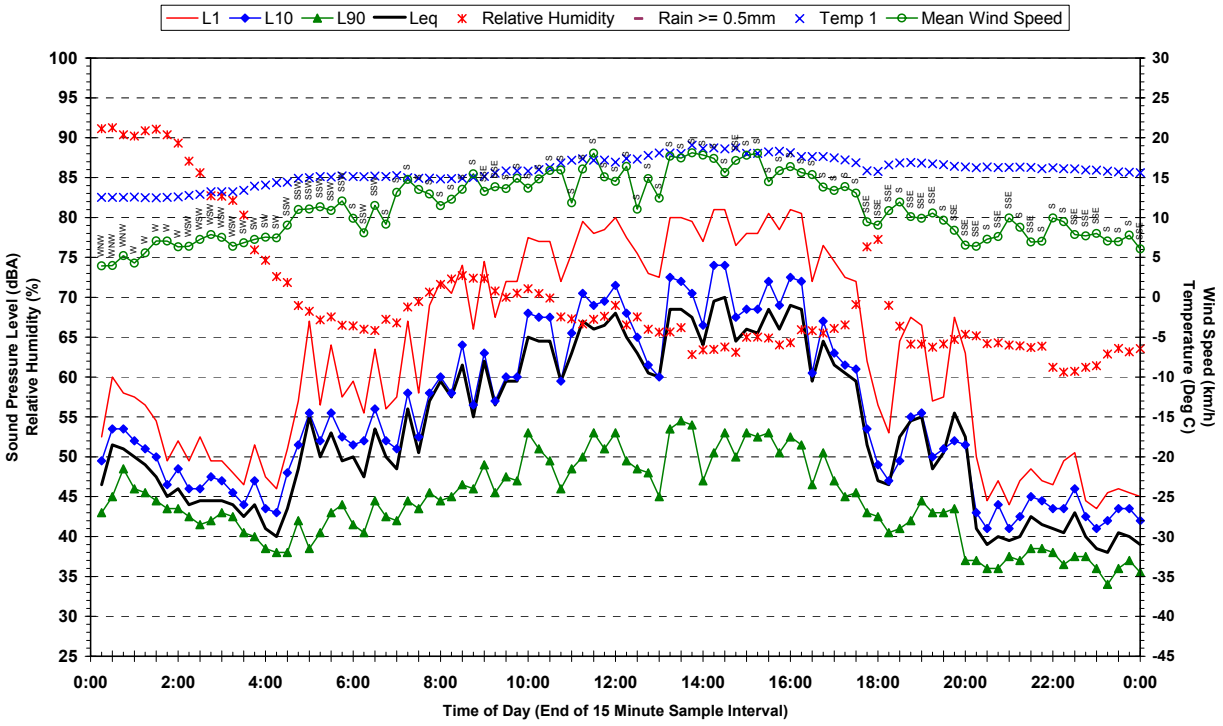


Statistical Ambient Noise Levels
NAG F - Residence Reference 73 - Tuesday 22 March 2005

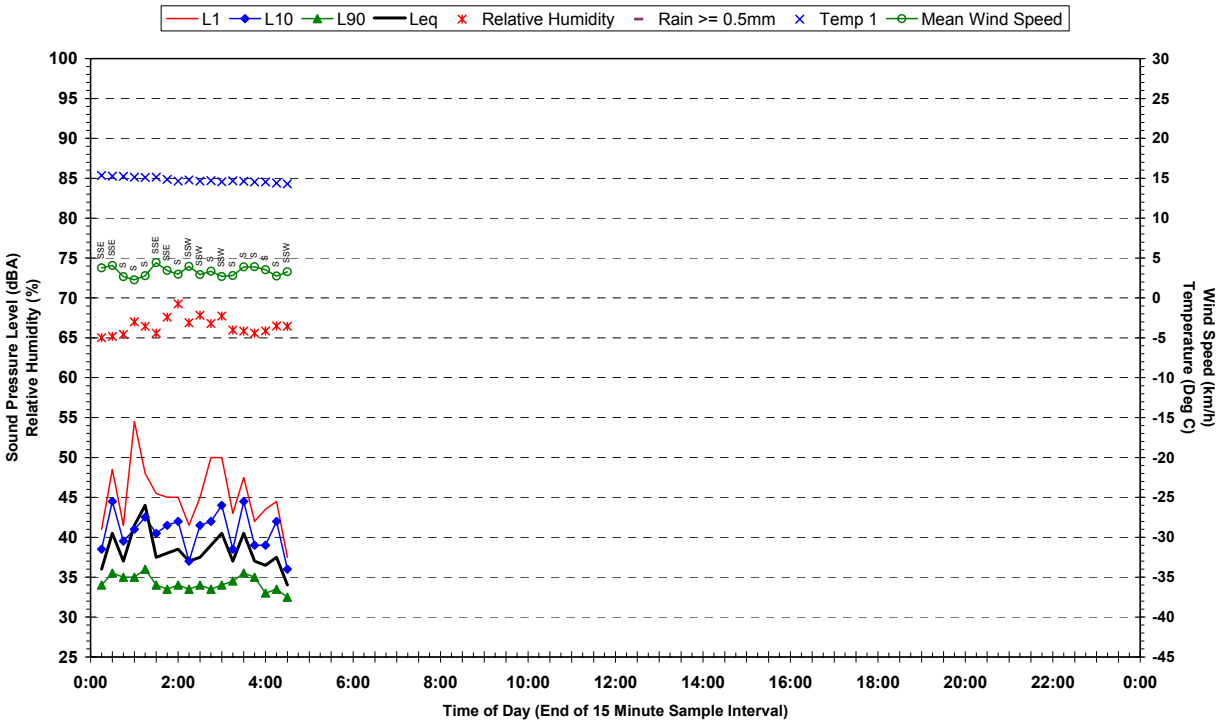


Unattended Ambient Noise and Weather Data - Noise Assessment Group F - Residence Reference 73

Statistical Ambient Noise Levels
NAG F - Residence Reference 73 - Wednesday 23 March 2005

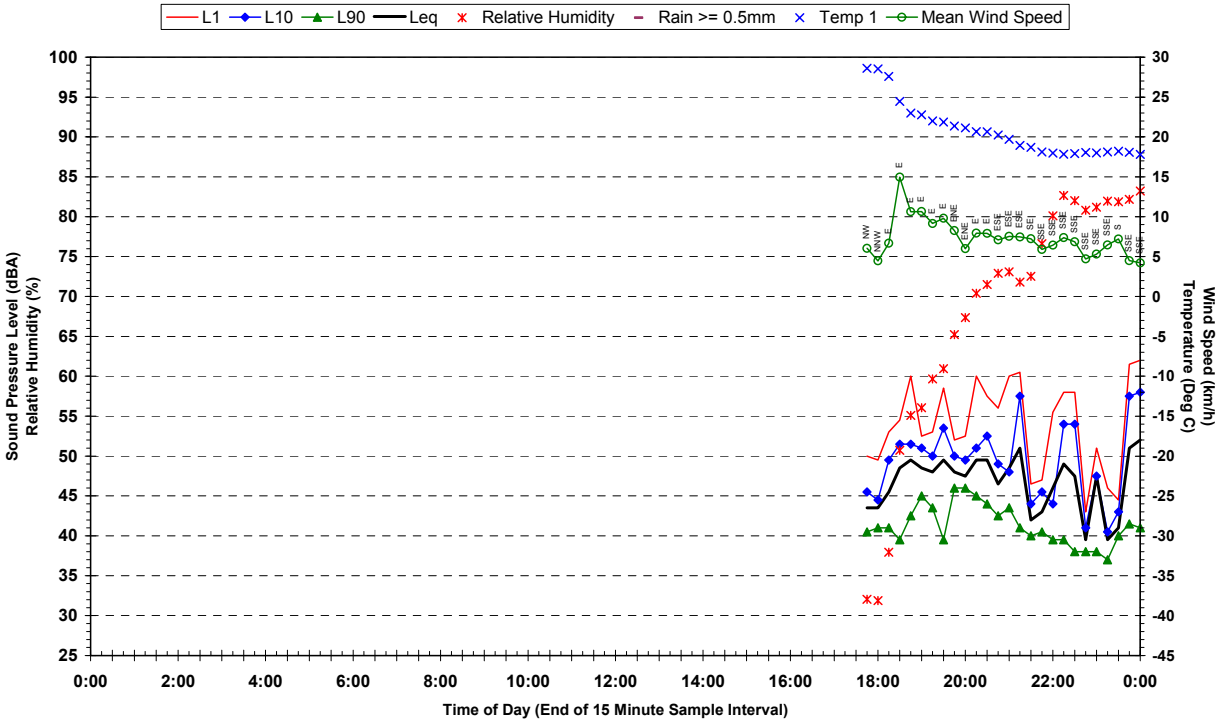


Statistical Ambient Noise Levels
NAG F - Residence Reference 73 - Thursday 24 March 2005

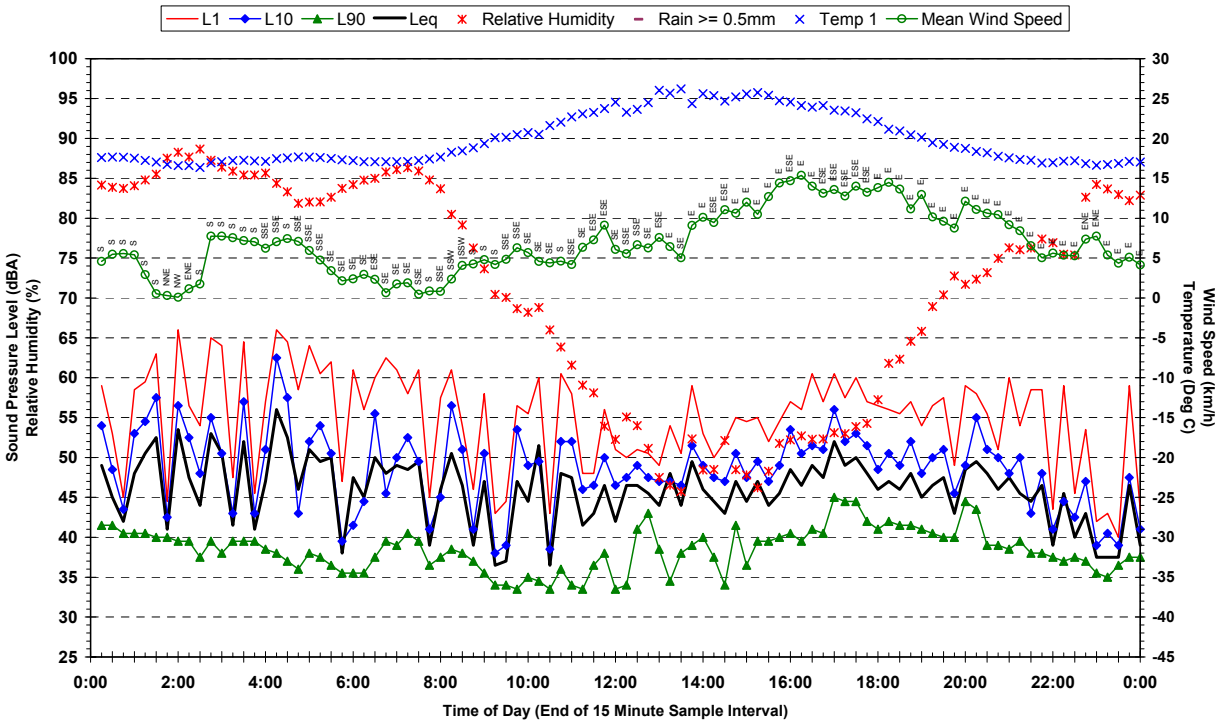


Unattended Ambient Noise and Weather Data - Noise Assessment Group G - Residence Reference 82

Statistical Ambient Noise Levels
NAG G - Residence Reference 82 - Wednesday 9 March 2005

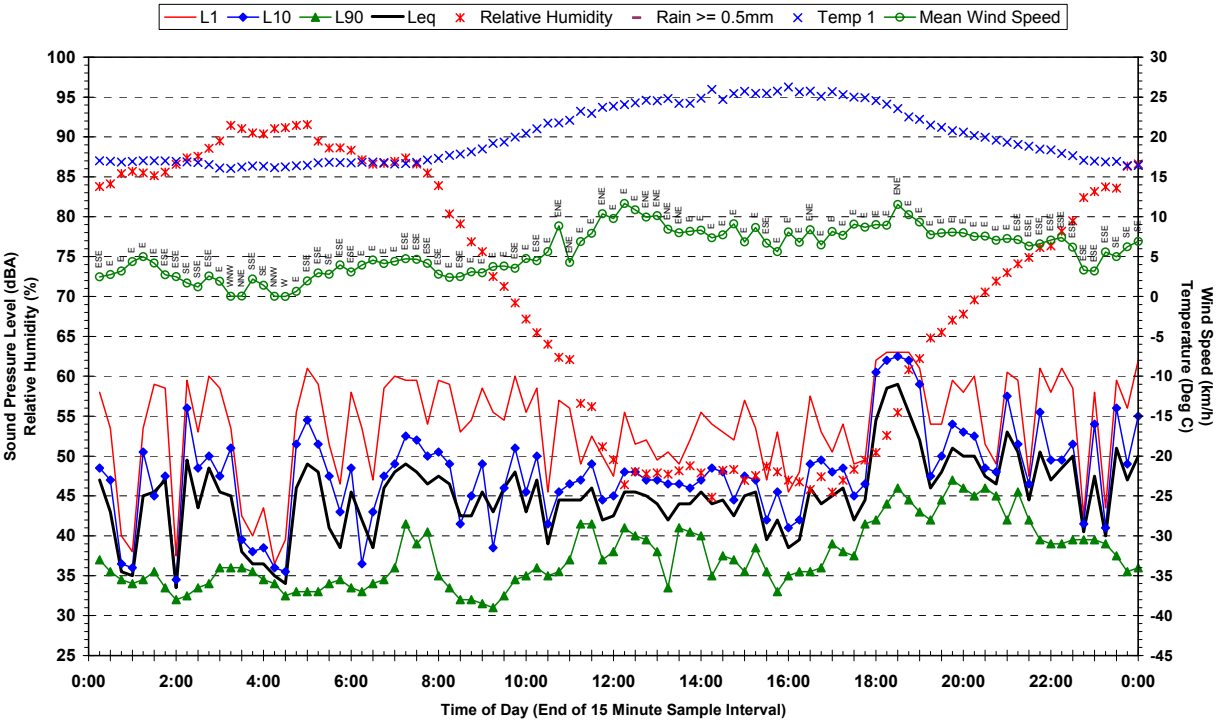


Statistical Ambient Noise Levels
NAG G - Residence Reference 82 - Thursday 10 March 2005

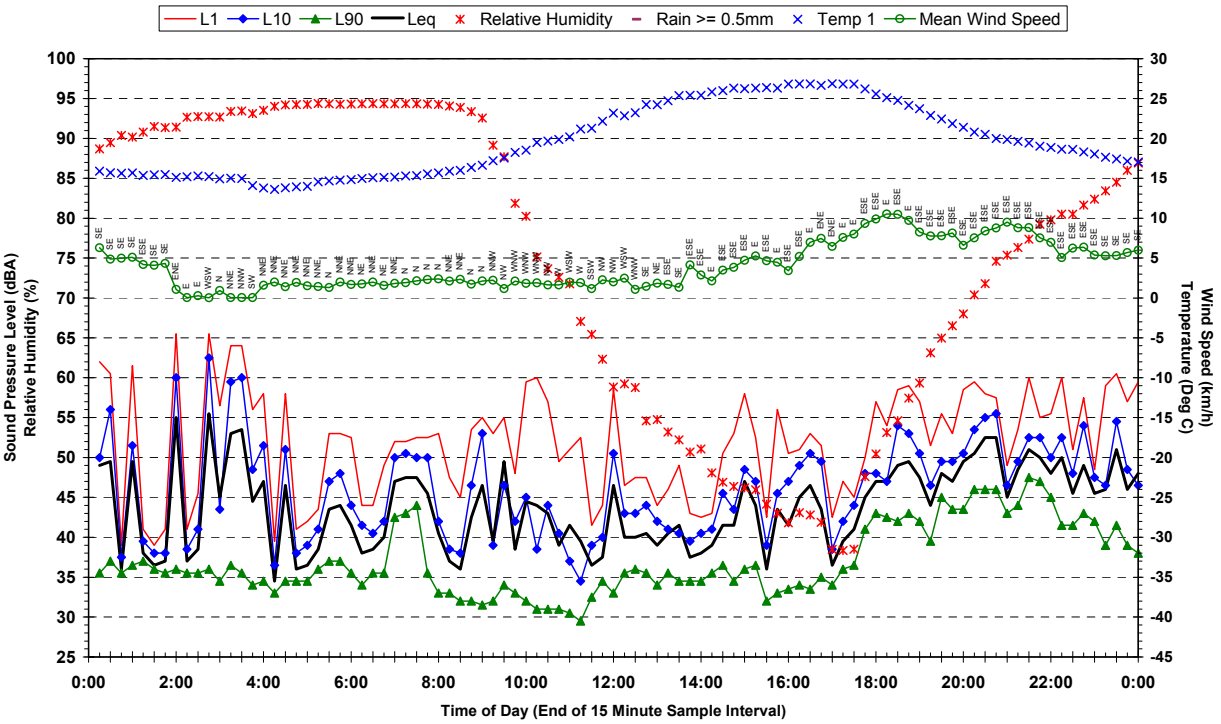


Unattended Ambient Noise and Weather Data - Noise Assessment Group G - Residence Reference 82

Statistical Ambient Noise Levels
NAG G - Residence Reference 82 - Friday 11 March 2005

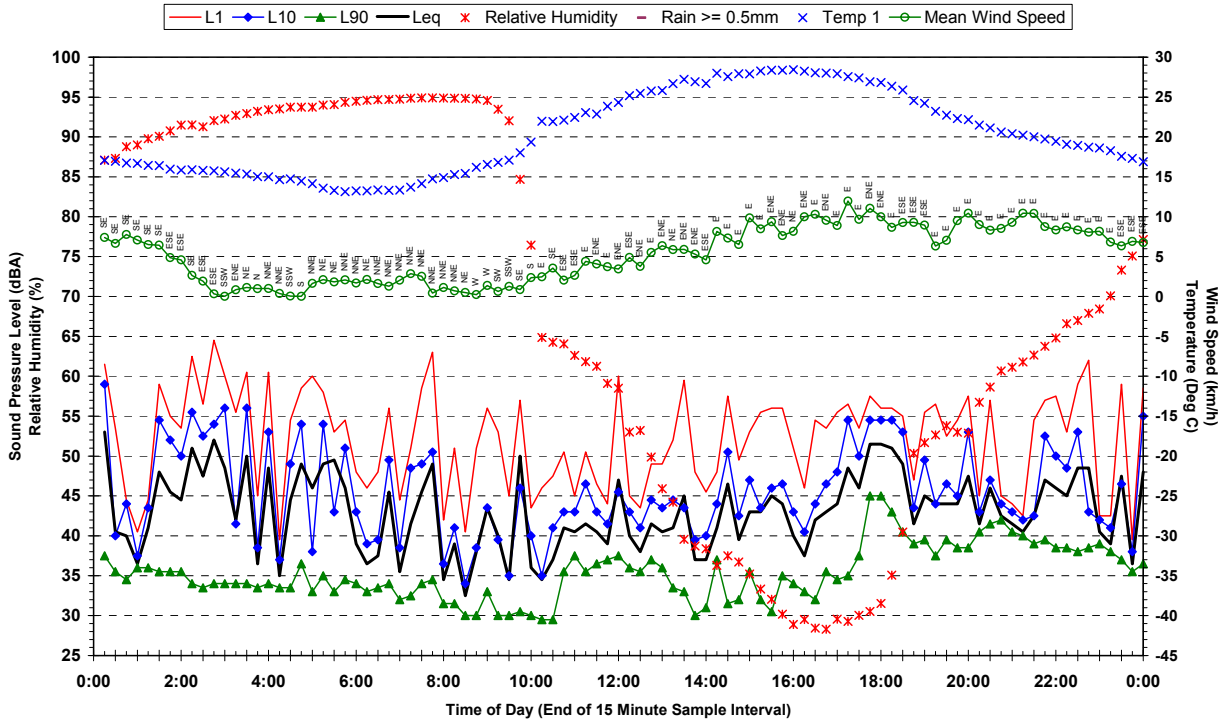


Statistical Ambient Noise Levels
NAG G - Residence Reference 82 - Saturday 12 March 2005

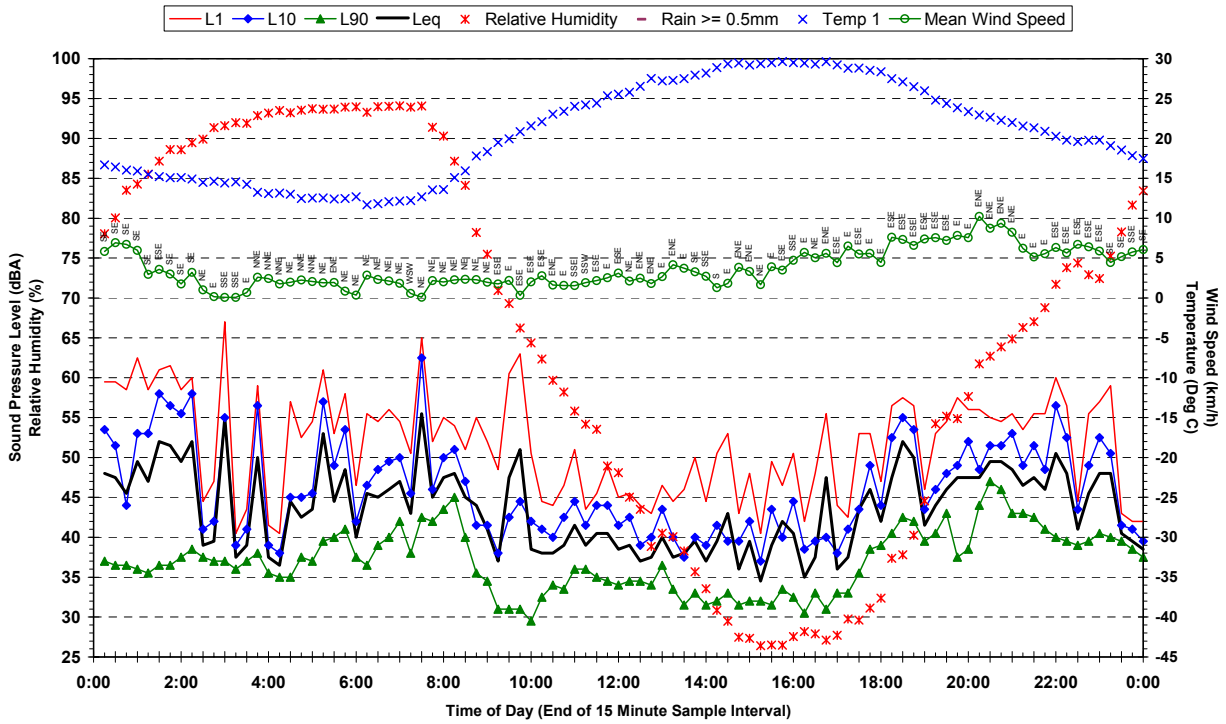


Unattended Ambient Noise and Weather Data - Noise Assessment Group G - Residence Reference 82

Statistical Ambient Noise Levels
NAG G - Residence Reference 82 - Sunday 13 March 2005

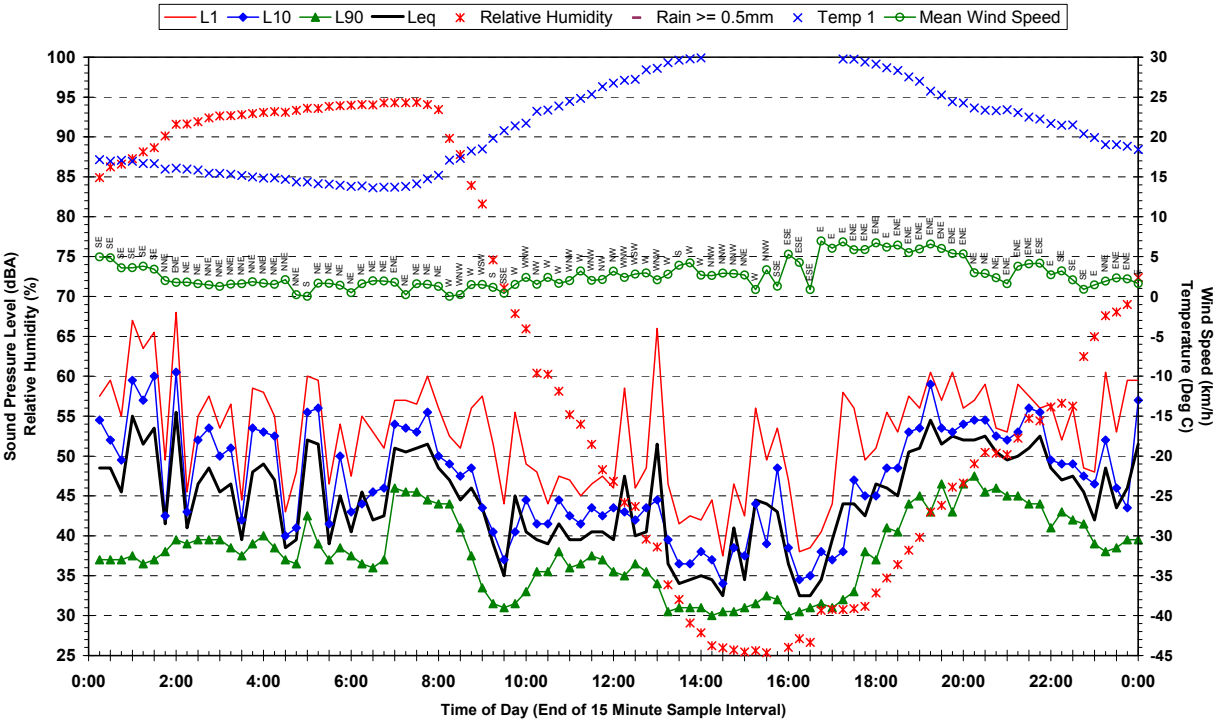


Statistical Ambient Noise Levels
NAG G - Residence Reference 82 - Monday 14 March 2005

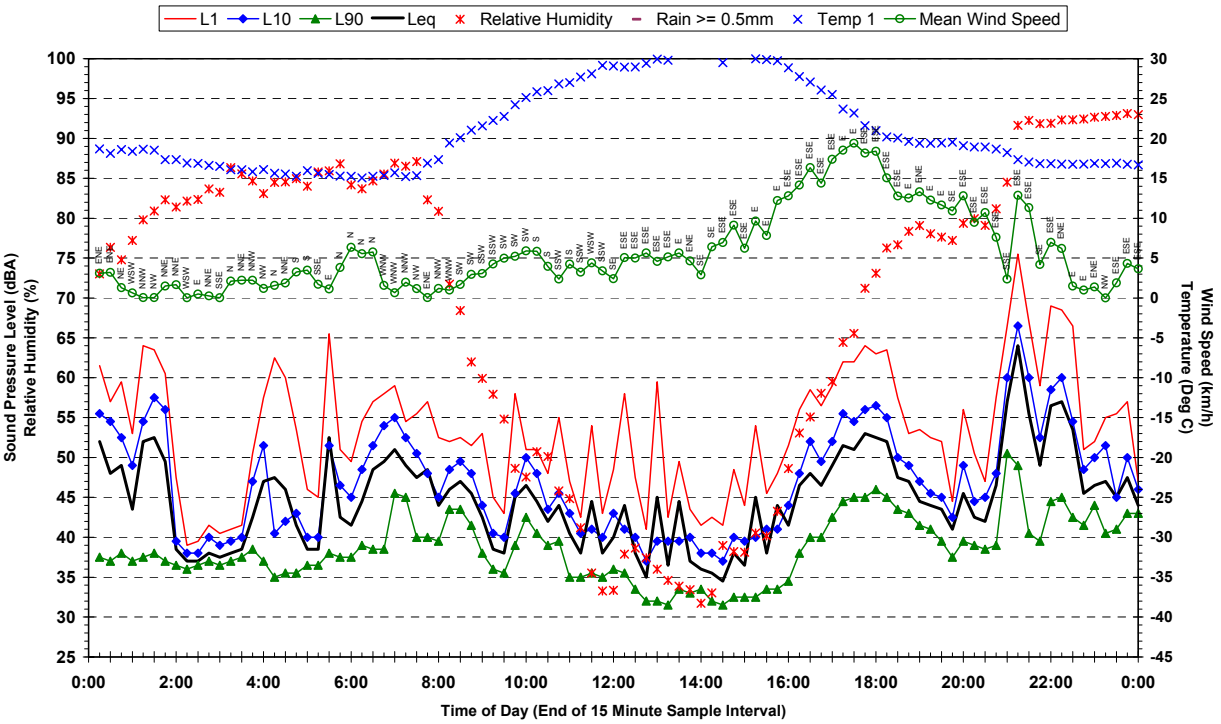


Unattended Ambient Noise and Weather Data - Noise Assessment Group G - Residence Reference 82

Statistical Ambient Noise Levels
NAG G - Residence Reference 82 - Tuesday 15 March 2005

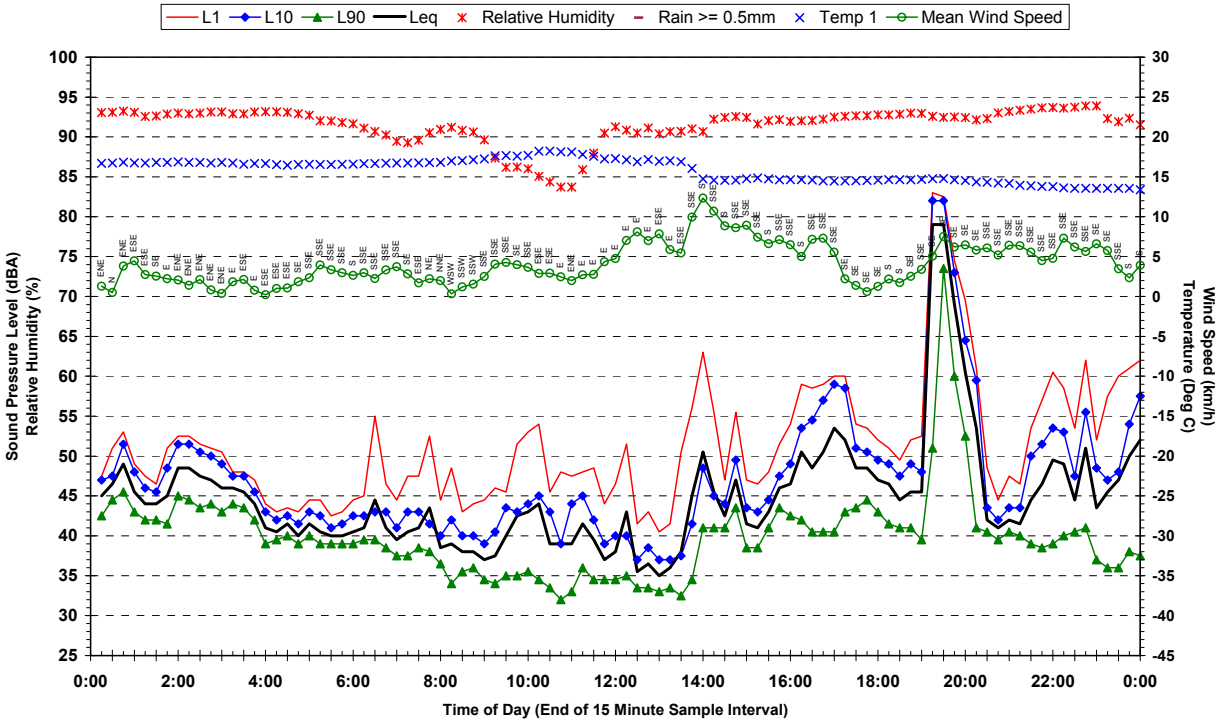


Statistical Ambient Noise Levels
NAG G - Residence Reference 82 - Wednesday 16 March 2005

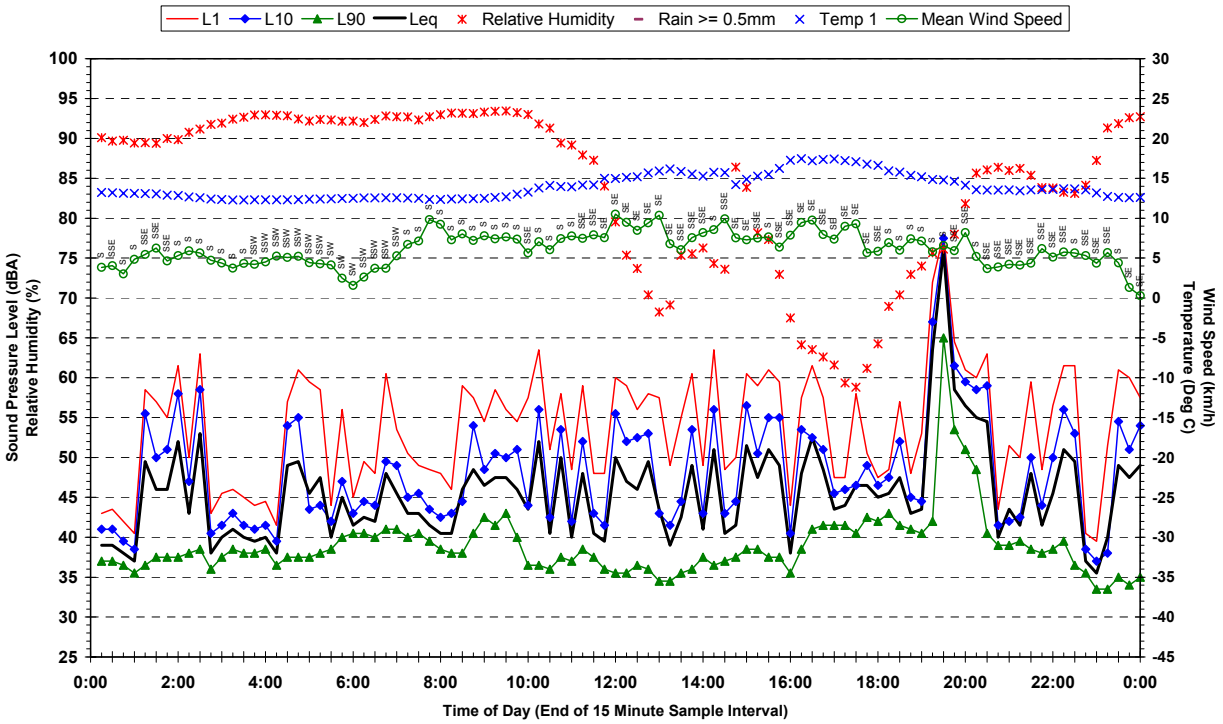


Unattended Ambient Noise and Weather Data - Noise Assessment Group G - Residence Reference 82

Statistical Ambient Noise Levels
NAG G - Residence Reference 82 - Thursday 17 March 2005

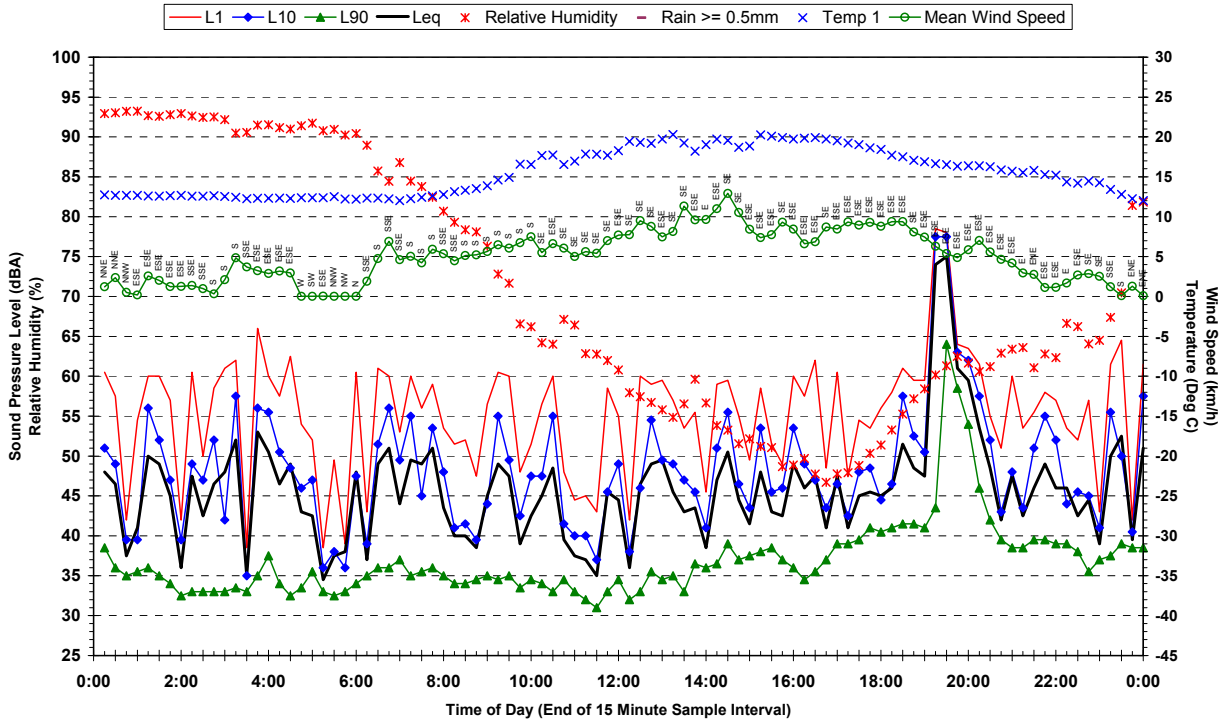


Statistical Ambient Noise Levels
NAG G - Residence Reference 82 - Friday 18 March 2005

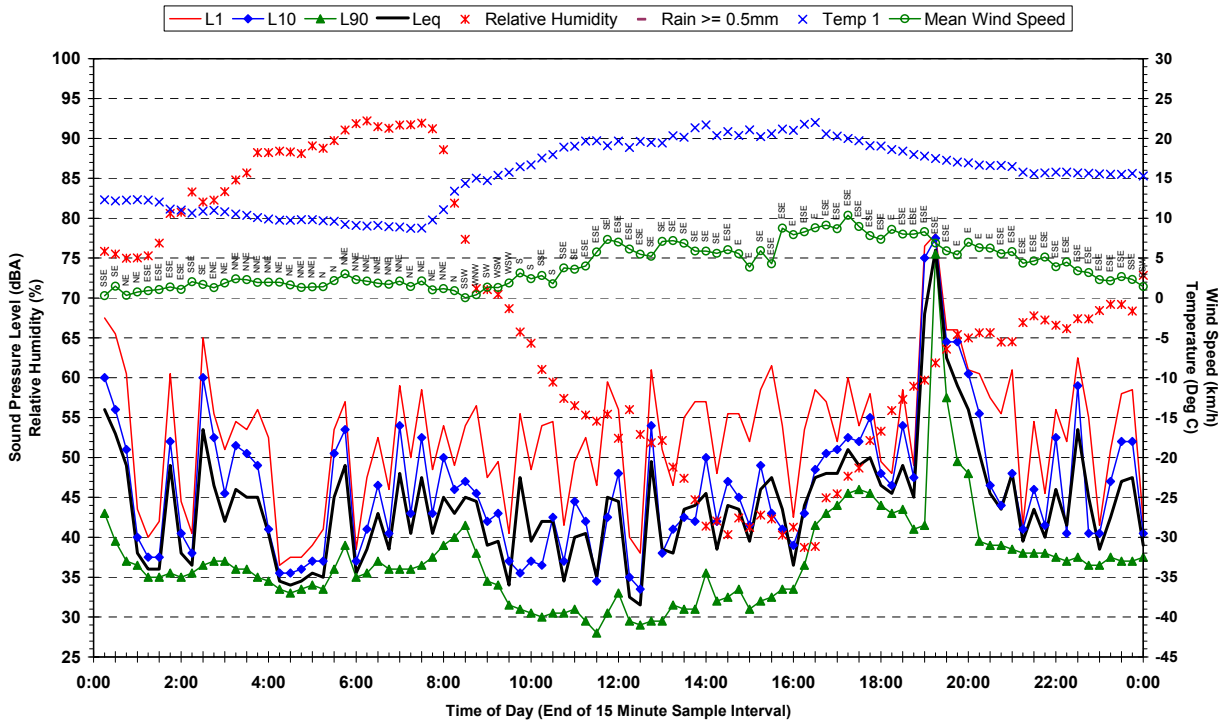


Unattended Ambient Noise and Weather Data - Noise Assessment Group G - Residence Reference 82

Statistical Ambient Noise Levels
NAG G - Residence Reference 82 - Saturday 19 March 2005

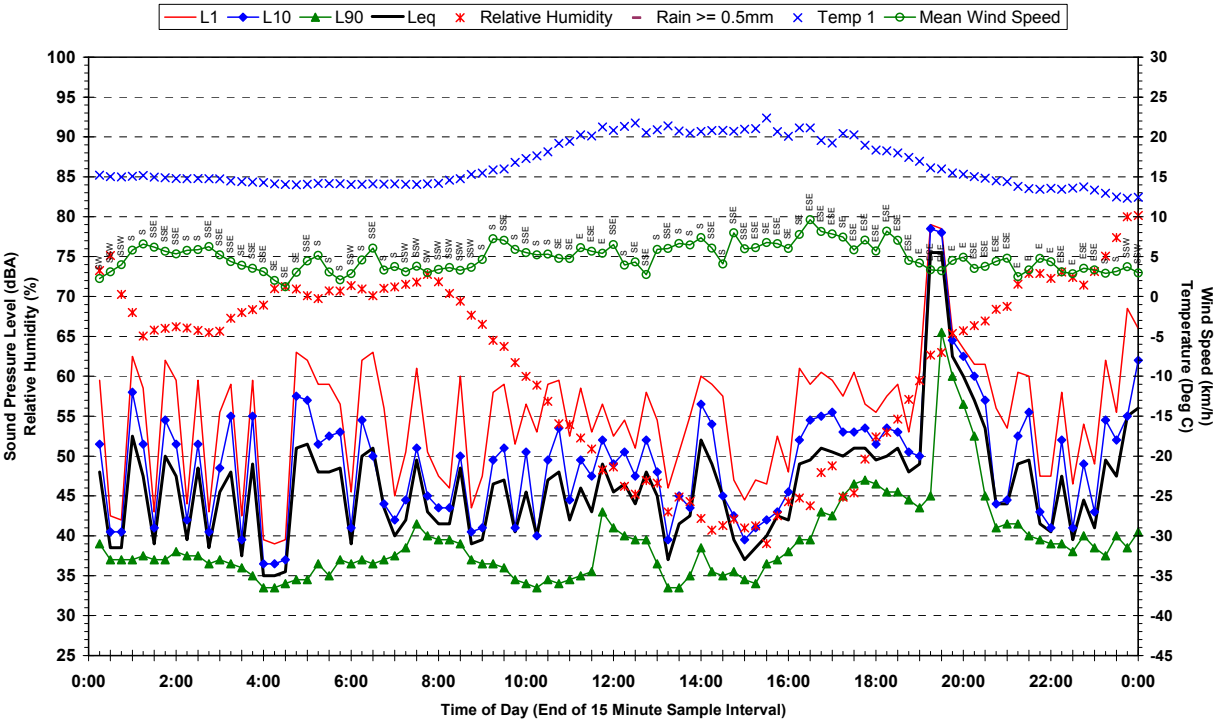


Statistical Ambient Noise Levels
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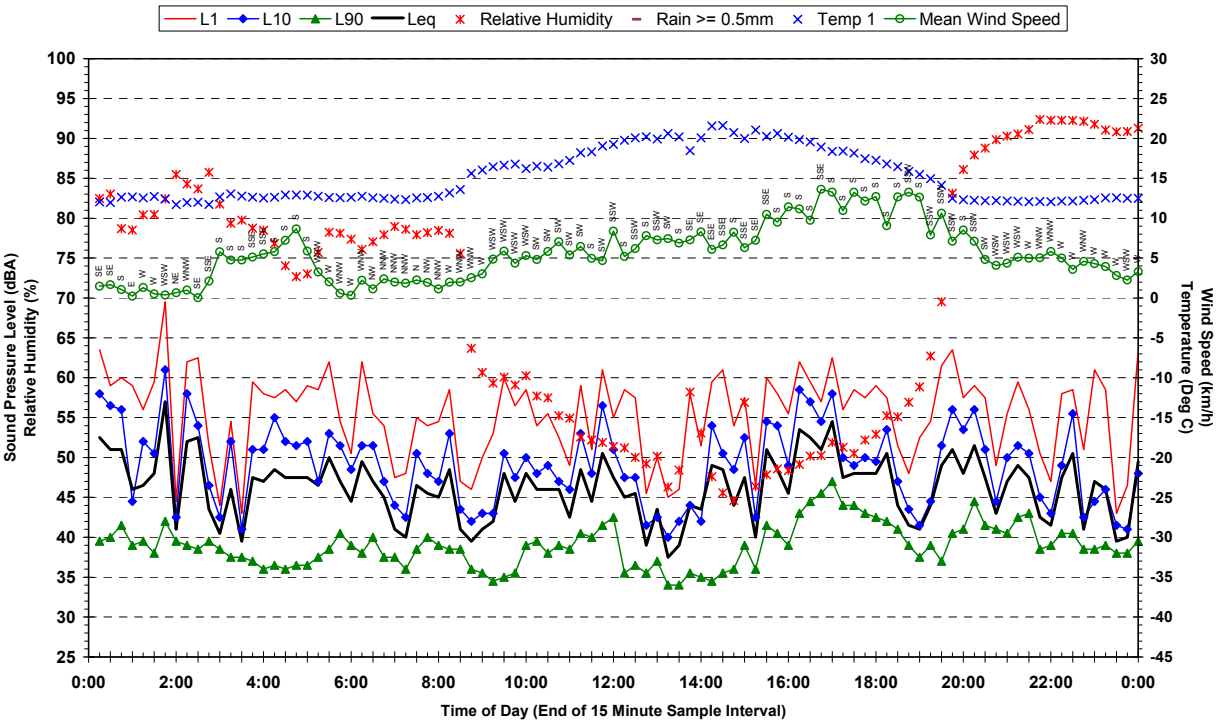


Unattended Ambient Noise and Weather Data - Noise Assessment Group G - Residence Reference 82

Statistical Ambient Noise Levels
NAG G - Residence Reference 82 - Monday 21 March 2005

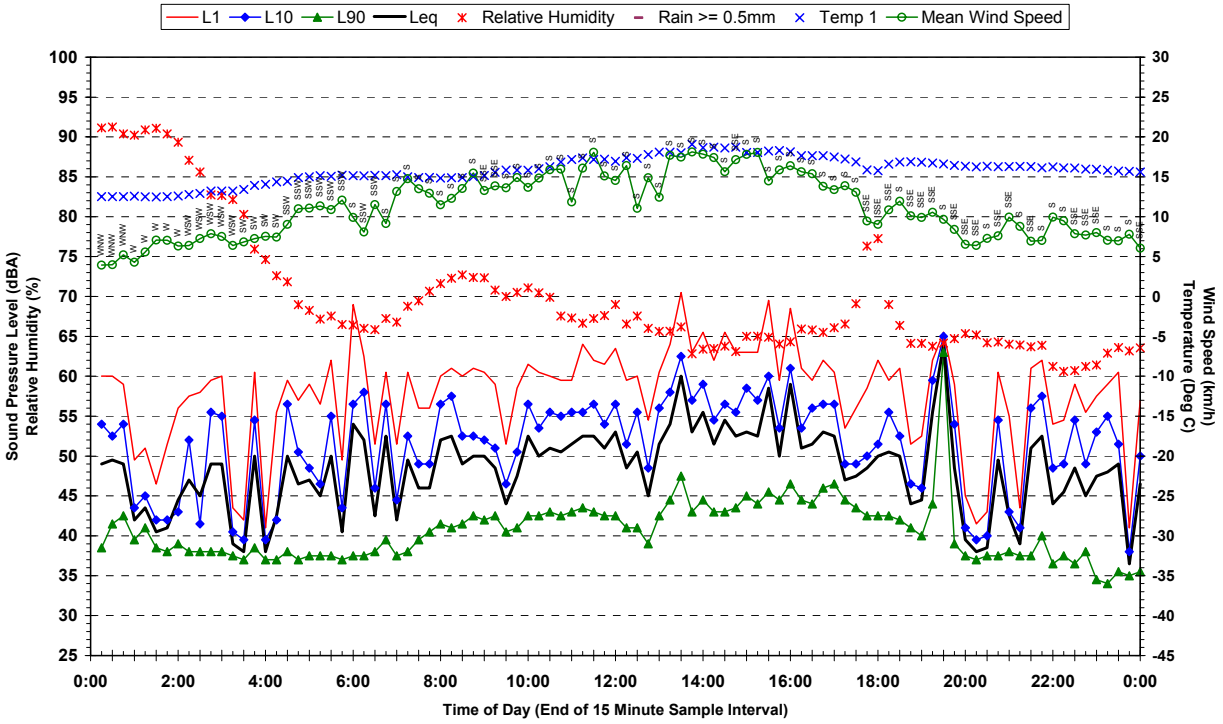


Statistical Ambient Noise Levels
NAG G - Residence Reference 82 - Tuesday 22 March 2005

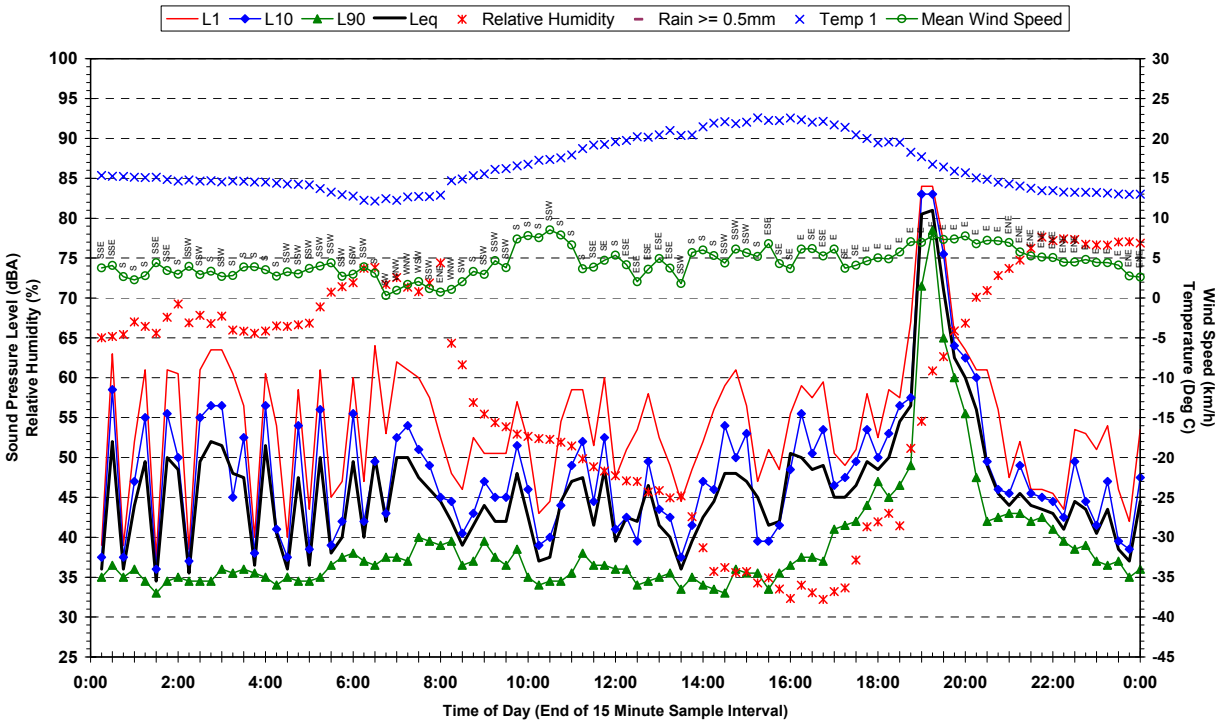


Unattended Ambient Noise and Weather Data - Noise Assessment Group G - Residence Reference 82

Statistical Ambient Noise Levels
NAG G - Residence Reference 82 - Wednesday 23 March 2005

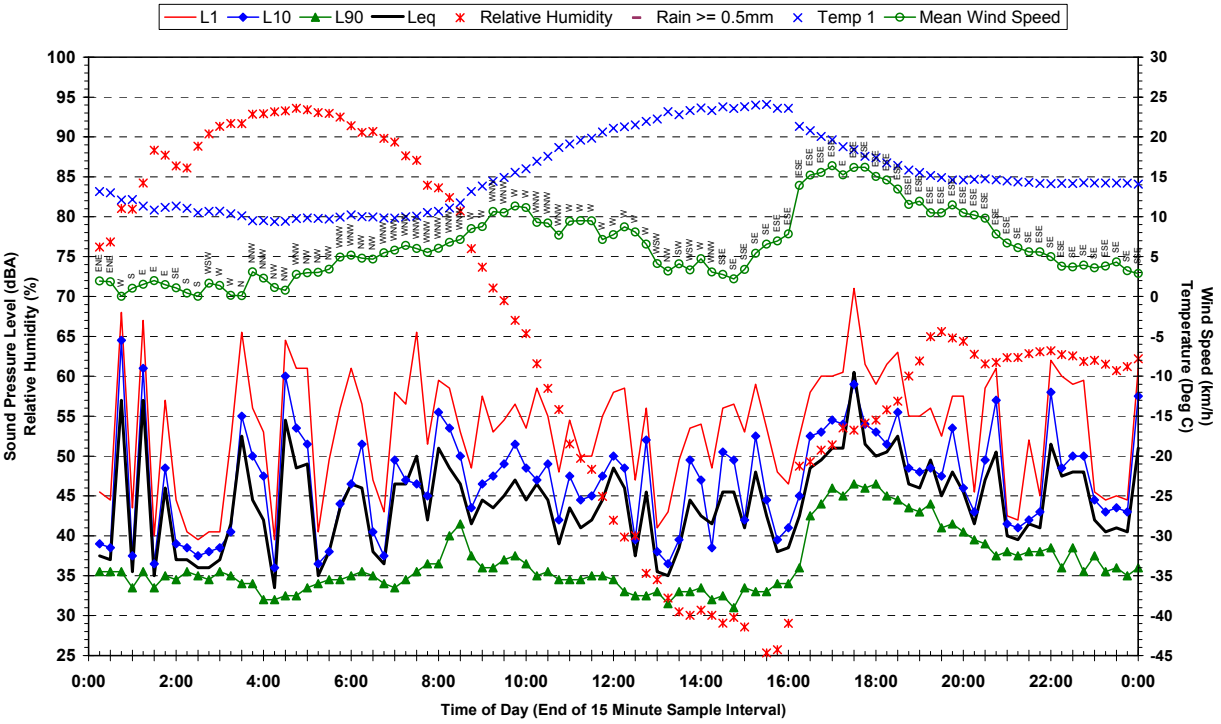


Statistical Ambient Noise Levels
NAG G - Residence Reference 82 - Thursday 24 March 2005

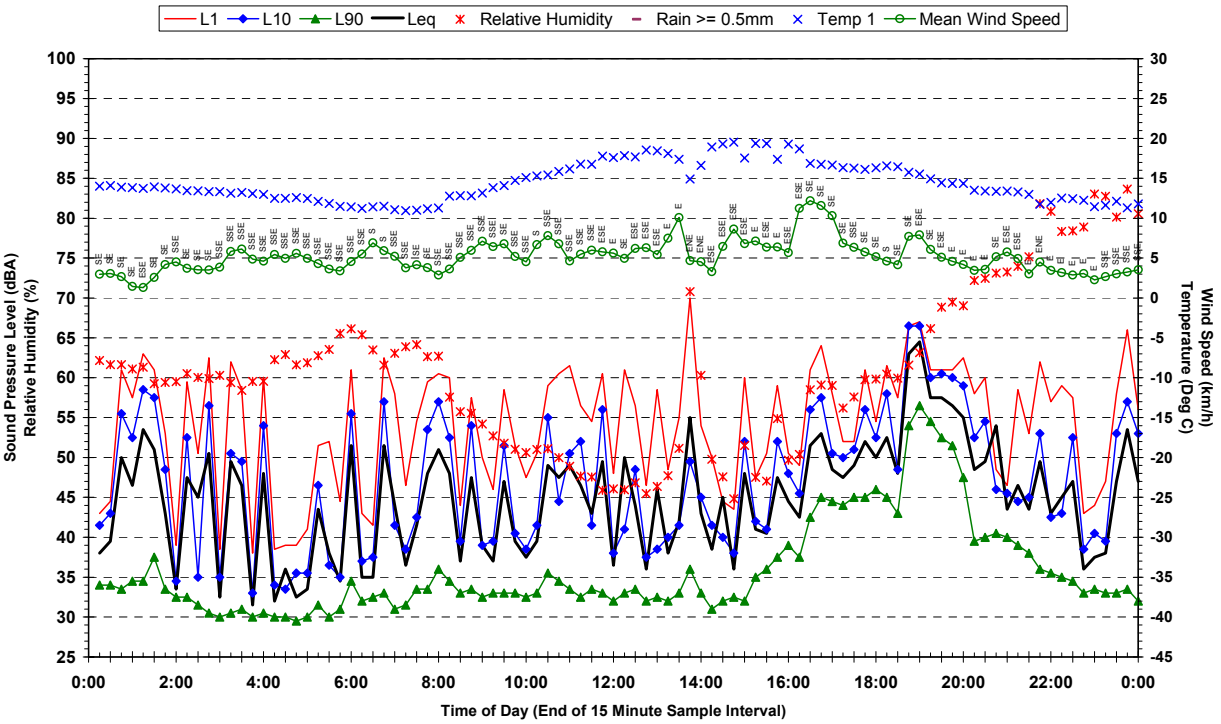


Unattended Ambient Noise and Weather Data - Noise Assessment Group G - Residence Reference 82

Statistical Ambient Noise Levels
NAG G - Residence Reference 82 - Friday 25 March 2005

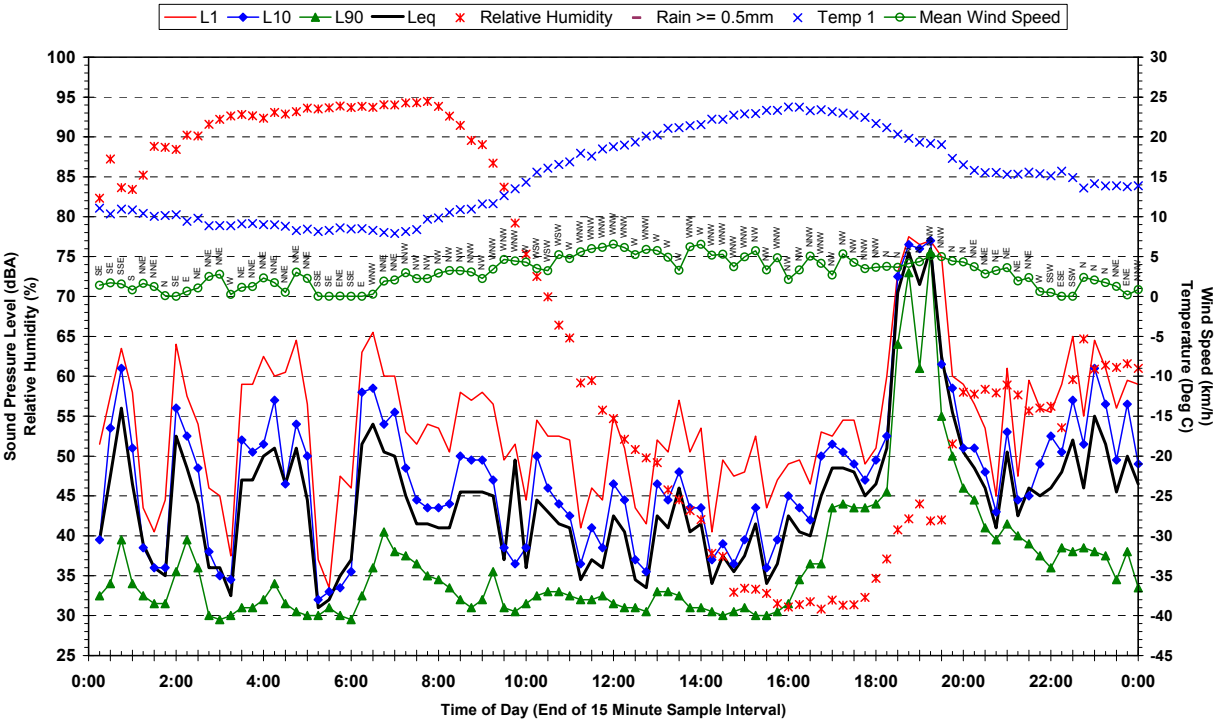


Statistical Ambient Noise Levels
NAG G - Residence Reference 82 - Saturday 26 March 2005

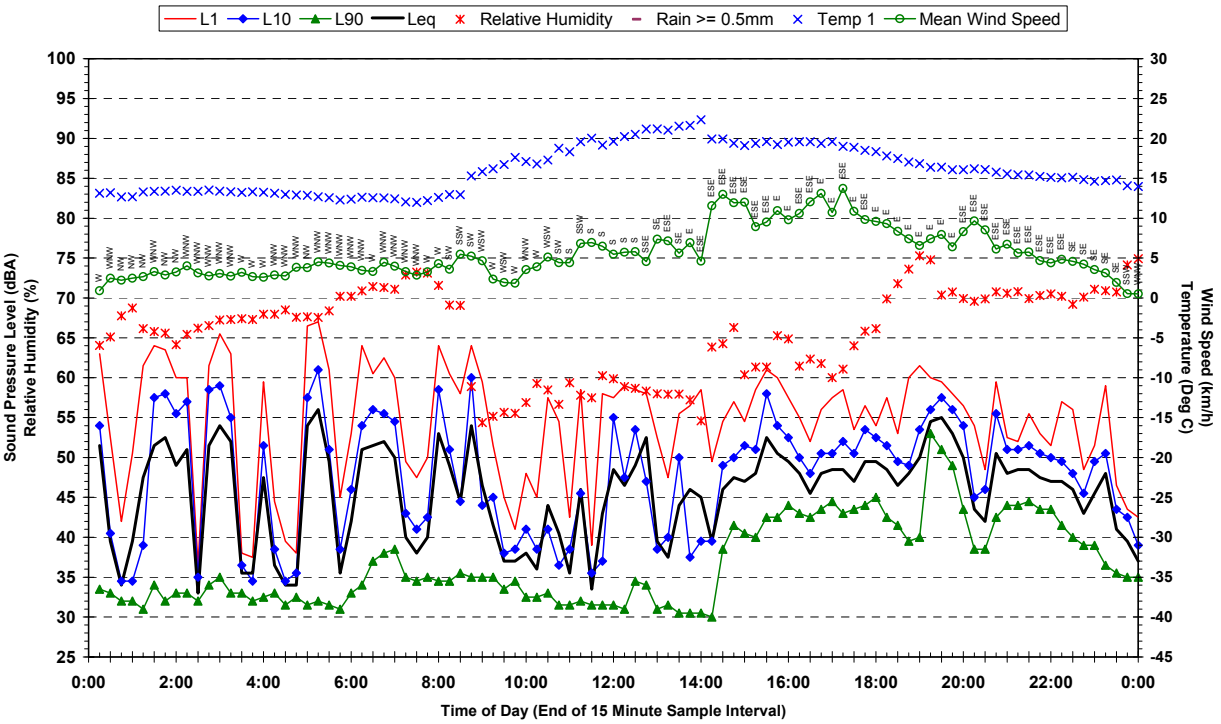


Unattended Ambient Noise and Weather Data - Noise Assessment Group G - Residence Reference 82

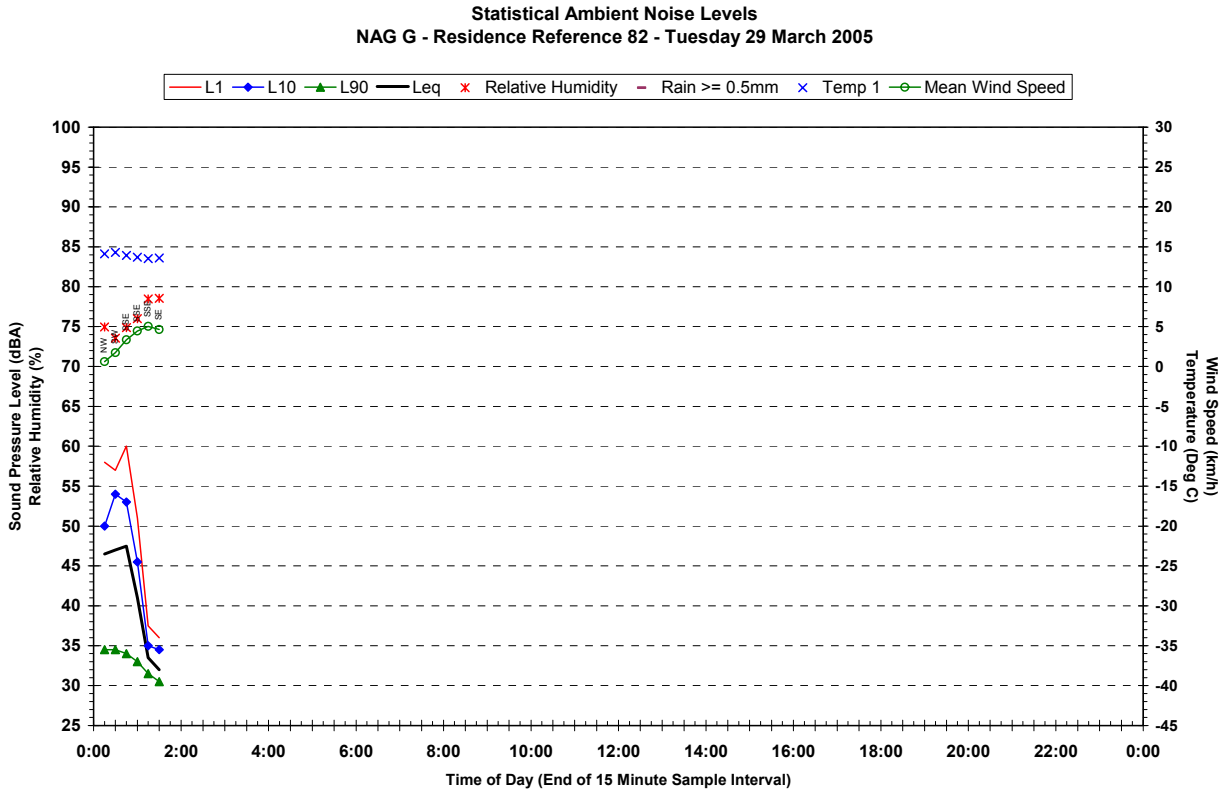
Statistical Ambient Noise Levels
NAG G - Residence Reference 82 - Sunday 27 March 2005



Statistical Ambient Noise Levels
NAG G - Residence Reference 82 - Monday 28 March 2005



Unattended Ambient Noise and Weather Data - Noise Assessment Group G - Residence Reference 82



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Integra Coal Operations Project Area - Meteorological Data Set - 2001 to 2004

Table 1 Seasonal Frequency of Occurrence Wind Speed Intervals - Daytime

Period	Calm (<0.5 m/s)	Wind Direction ±(45°)	Wind Speed		
			0.5 to 1.5m/s	1.5 to 3m/s	0.5 to 3m/s
Summer	3%	SSE	6%	7%	13%
Autumn	7%	SSE	7%	8%	15%
Winter	6%	NW	9%	8%	17%
Spring	4%	NW	6%	5%	11%

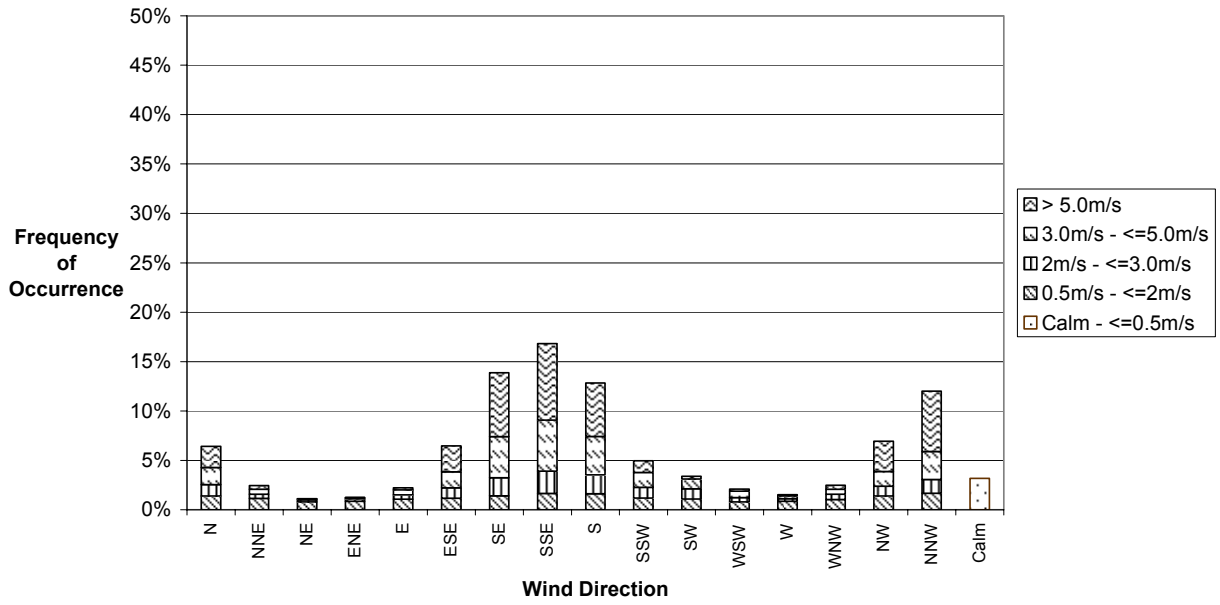
Table 2 Seasonal Frequency of Occurrence Wind Speed Intervals - Evening

Period	Calm (<0.5m/s)	Wind Direction ±(45°)	Wind Speed		
			0.5 to 1.5m/s	1.5 to 3m/s	0.5 to 3m/s
Summer	1%	SSE	2%	5%	7%
Autumn	8%	SE	11%	12%	24%
Winter	9%	ESE	14%	8%	22%
Spring	4%	SE	6%	8%	13%

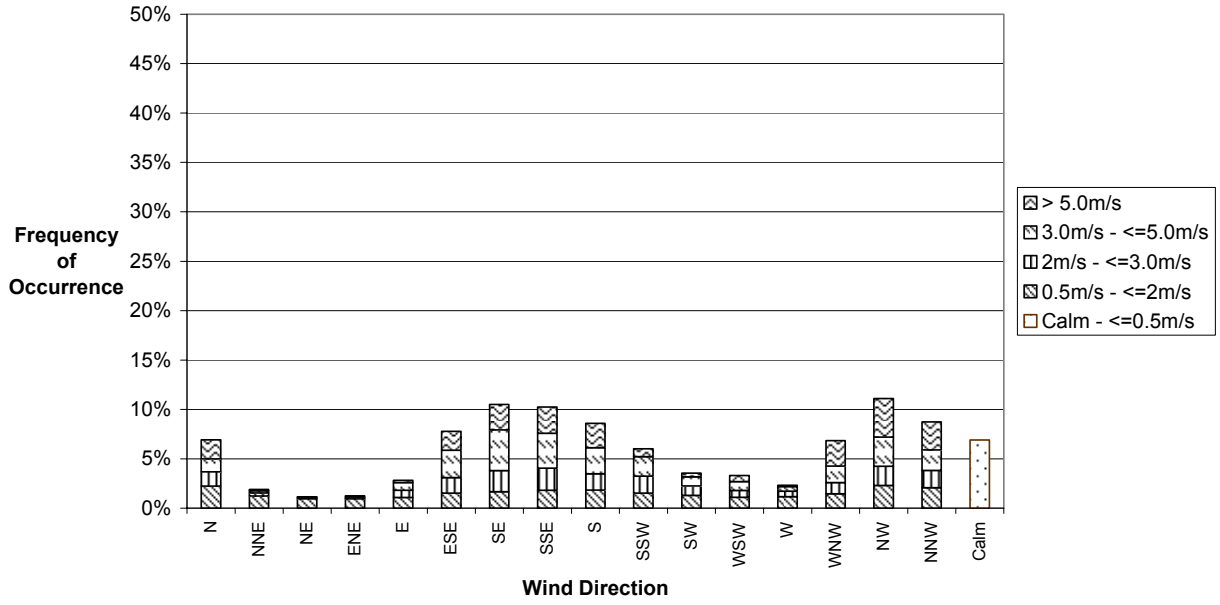
Table 3 Seasonal Frequency of Occurrence Wind Speed Intervals - Night-time

Period	Calm (<0.5m/s)	Wind Direction ±(45°)	Wind Speed		
			0.5 to 1.5m/s	1.5 to 3m/s	0.5 to 3m/s
Summer	10%	S	12%	14%	26%
Autumn	24%	SSE	10%	9%	19%
Winter	19%	NNW	13%	10%	22%
Spring	20%	NNW	11%	6%	17%

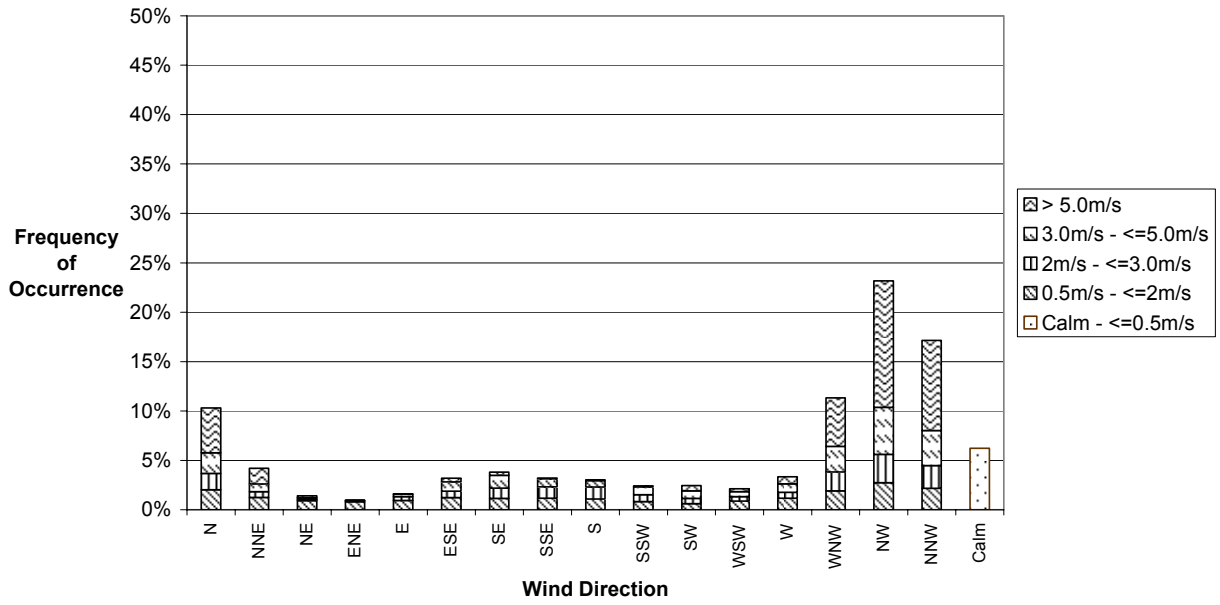
Summer Day Wind Data
January 2001 to December 2004



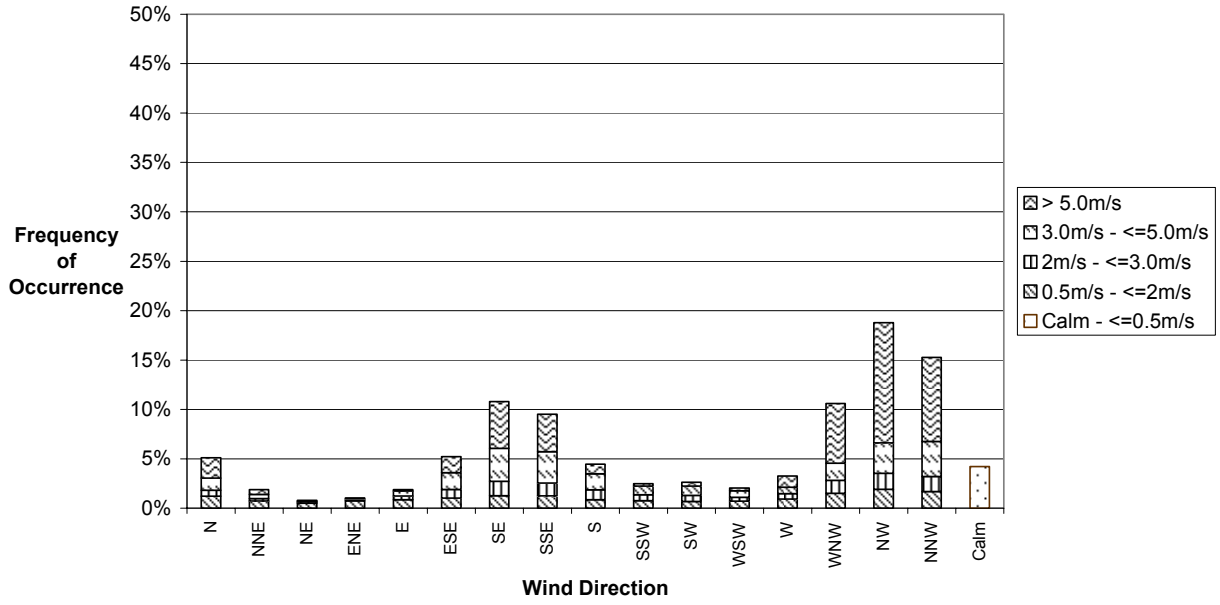
Autumn Day Wind Data
January 2001 to December 2004



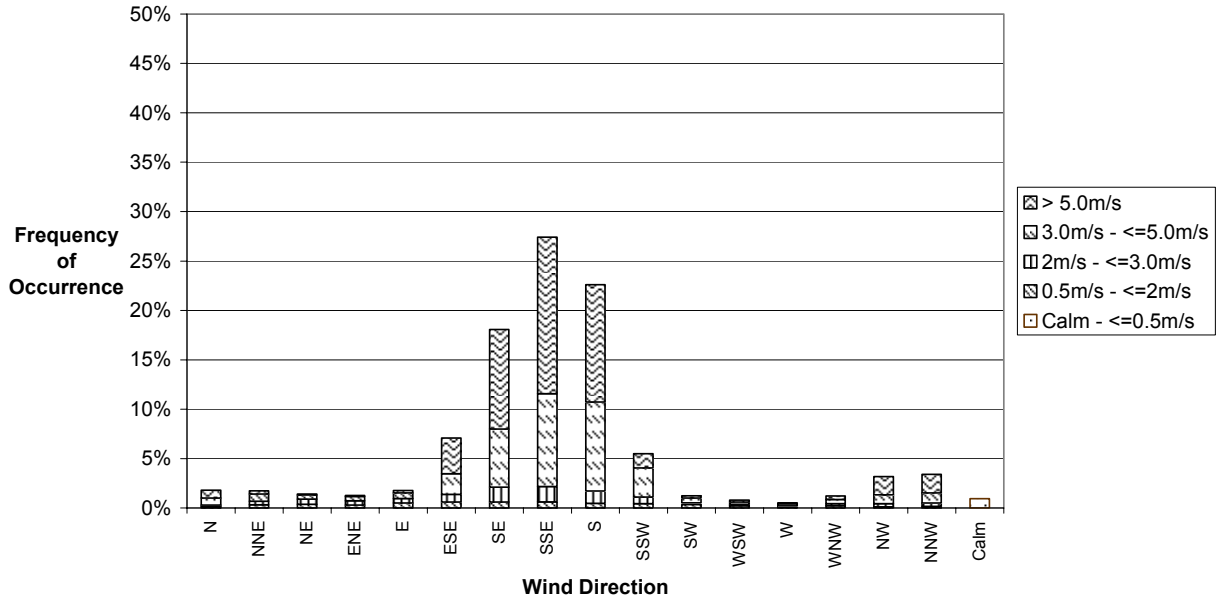
Winter Day Wind Data
January 2001 to December 2004



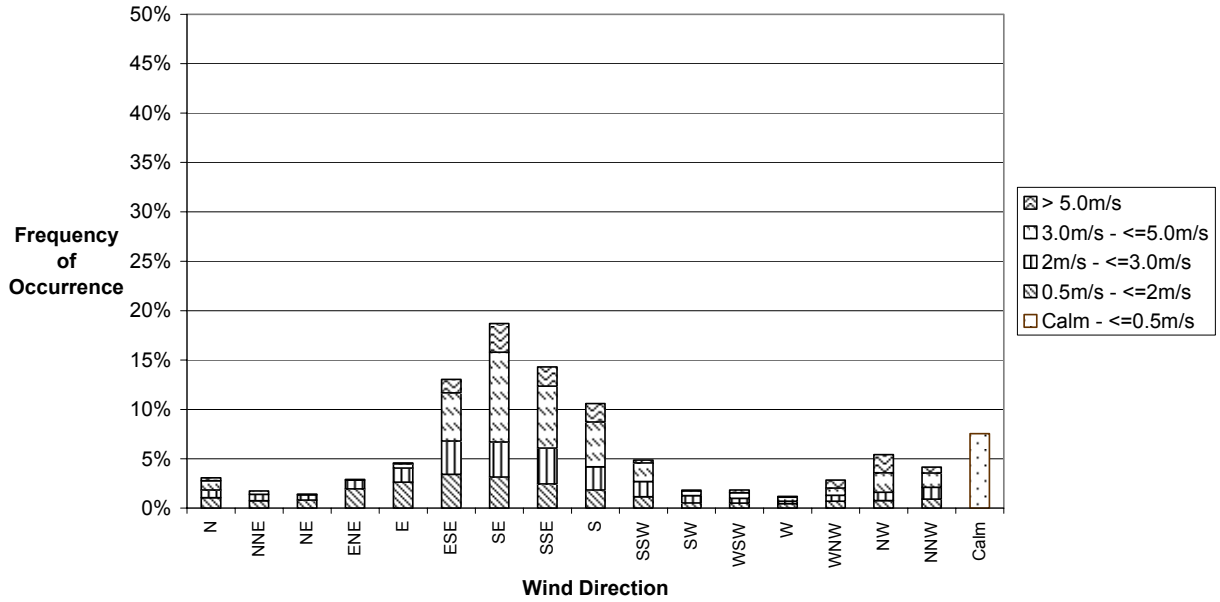
Spring Day Wind Data
January 2001 to December 2004



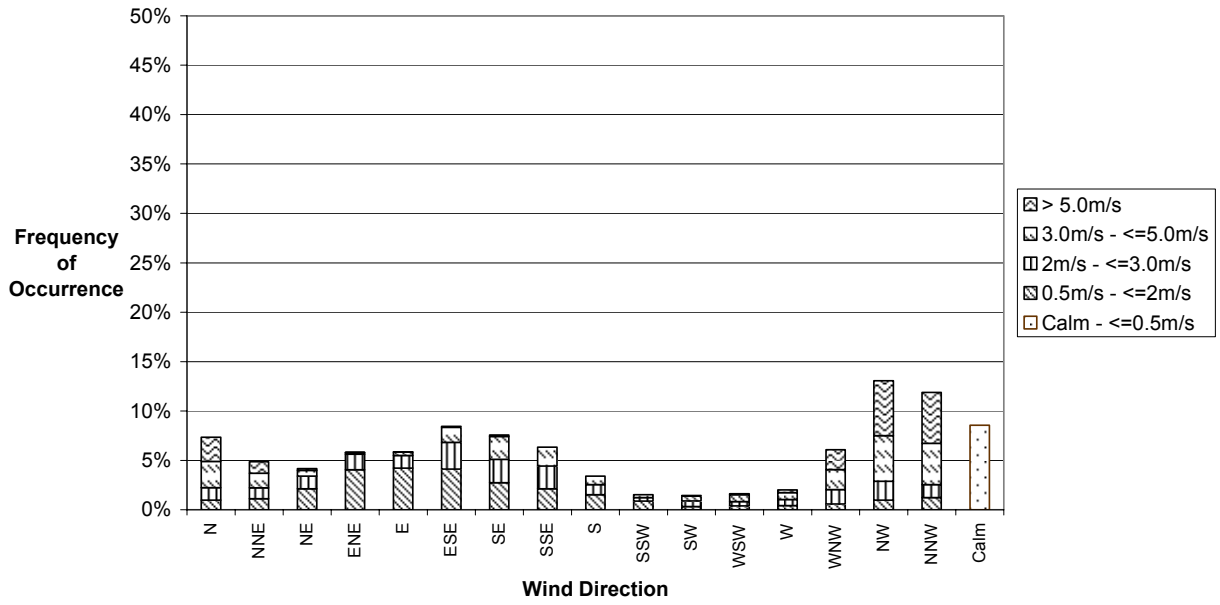
Summer Evening Wind Data
January 2001 to December 2004



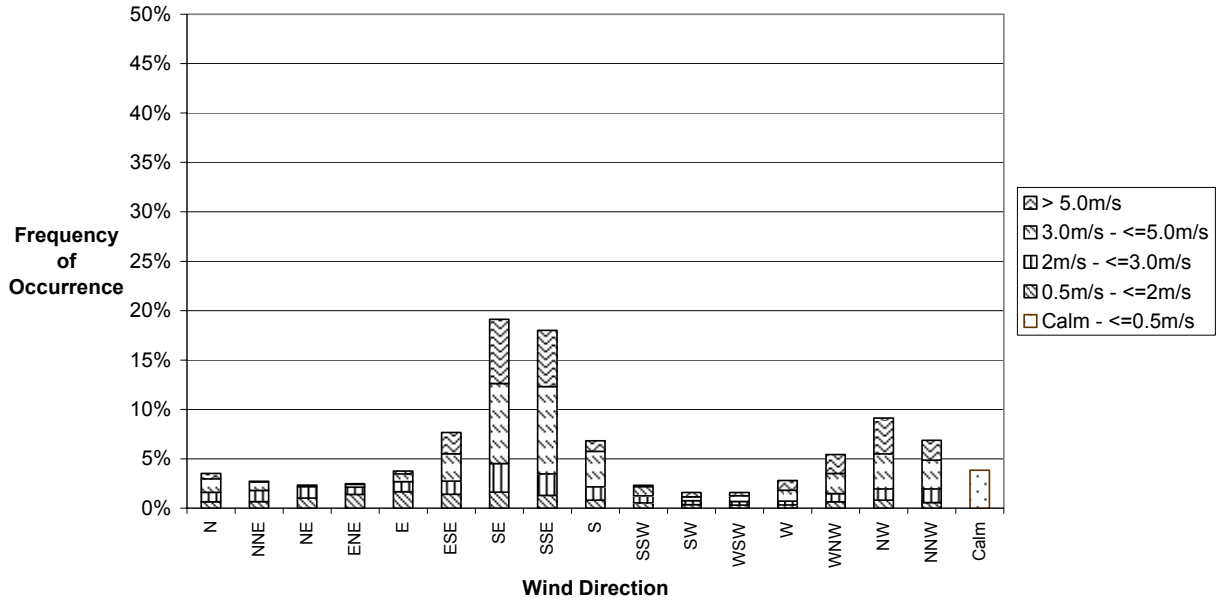
Autumn Evening Wind Data
January 2001 to December 2004



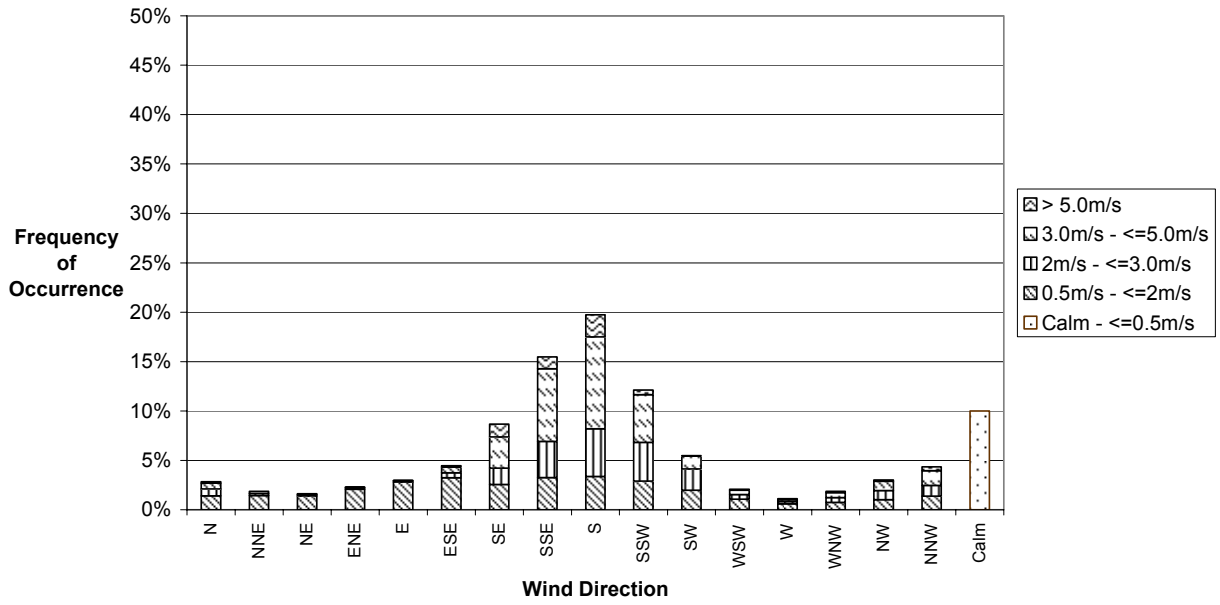
Winter Evening Wind Data
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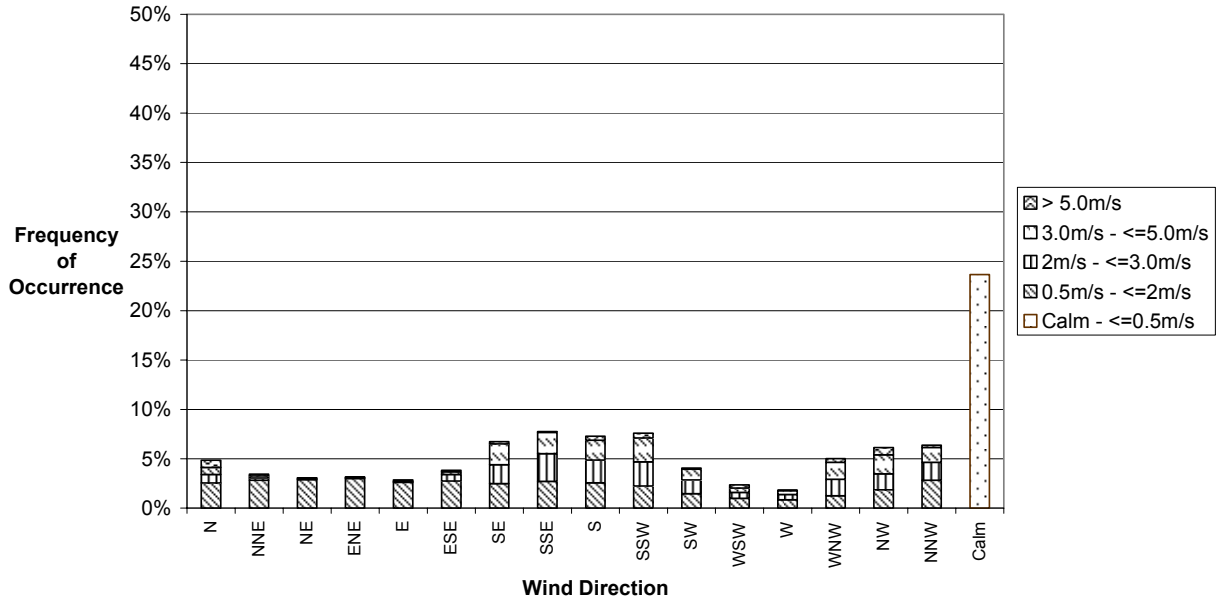
Spring Evening Wind Data
January 2001 to December 2004



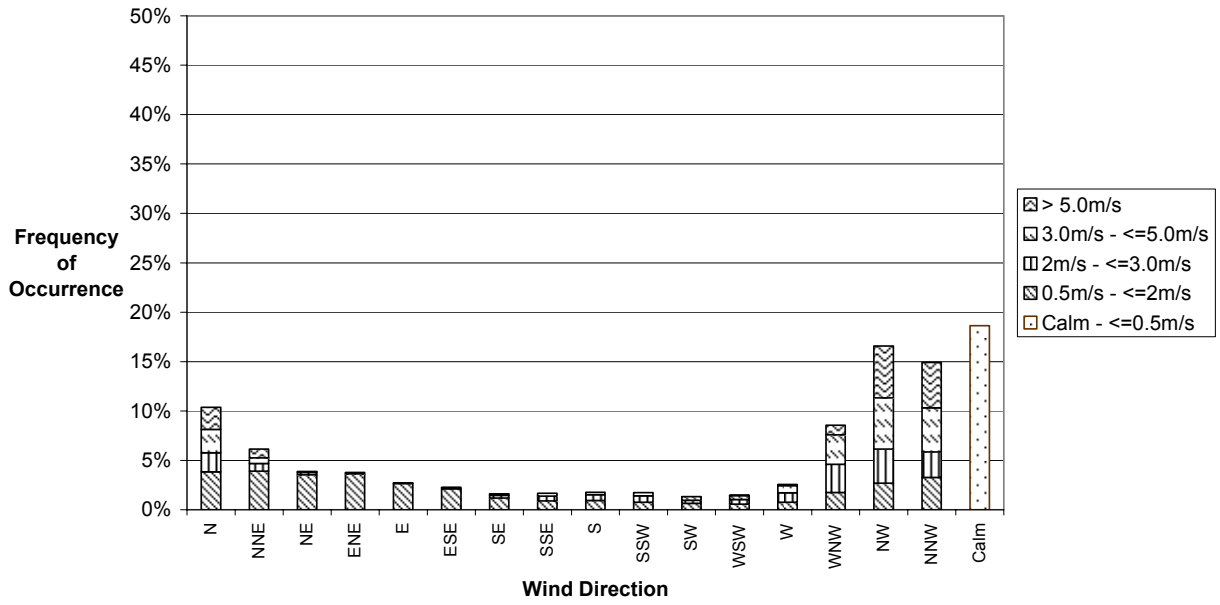
Summer Night Wind Data
January 2001 to December 2004



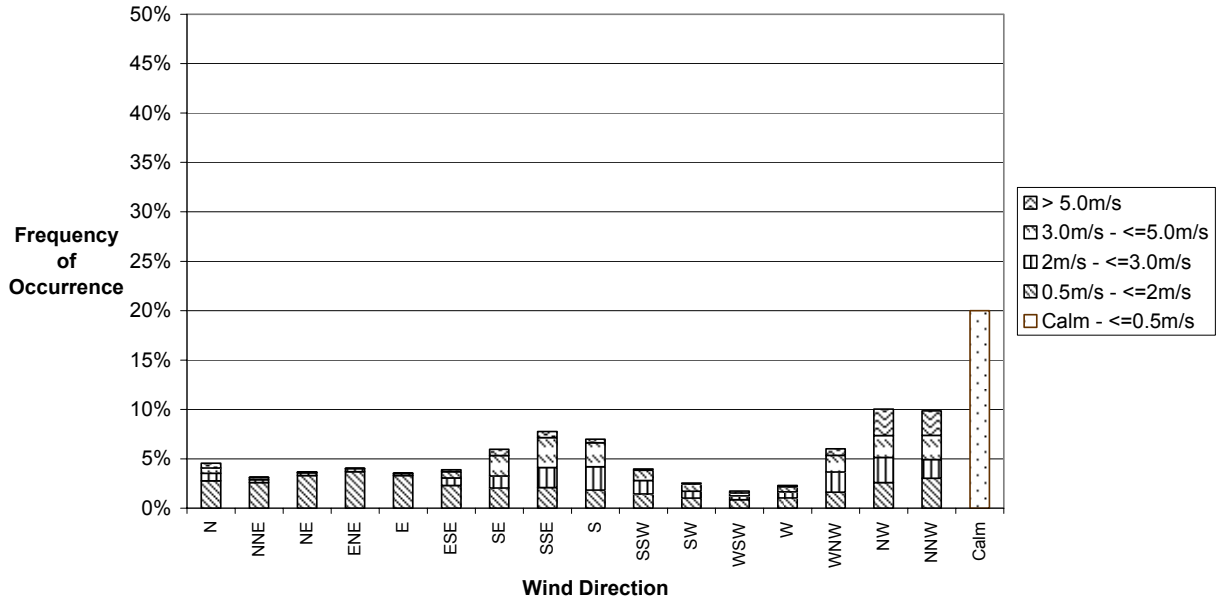
Autumn Night Wind Data
January 2001 to December 2004



Winter Night Wind Data
January 2001 to December 2004



Spring Night Wind Data
January 2001 to December 2004



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Integra Coal Operations Project Area - Meteorological Data Set - 2001 to 2004

Table 1 Frequency of Occurrence of Atmospheric Stability Classes - Day

Stability Class	Frequency of occurrence				Estimated ELR 0°C/100 m	Qualitative Description
	Summer	Autumn	Winter	Spring		
A	26%	21%	15%	22%	<-1.9	Lapse
B	14%	12%	10%	12%	-1.9 to -1.7	Lapse
C	26%	24%	22%	25%	-1.7 to -1.5	Lapse
D	34%	39%	48%	40%	-1.5 to -0.5	Neutral
E	1%	4%	5%	1%	-0.5 to 1.5	Weak Inversion
F	0%	0%	0%	0%	1.5 to 4	Moderate Inversion
G	0%	0%	0%	0%	>4.0	Strong Inversion

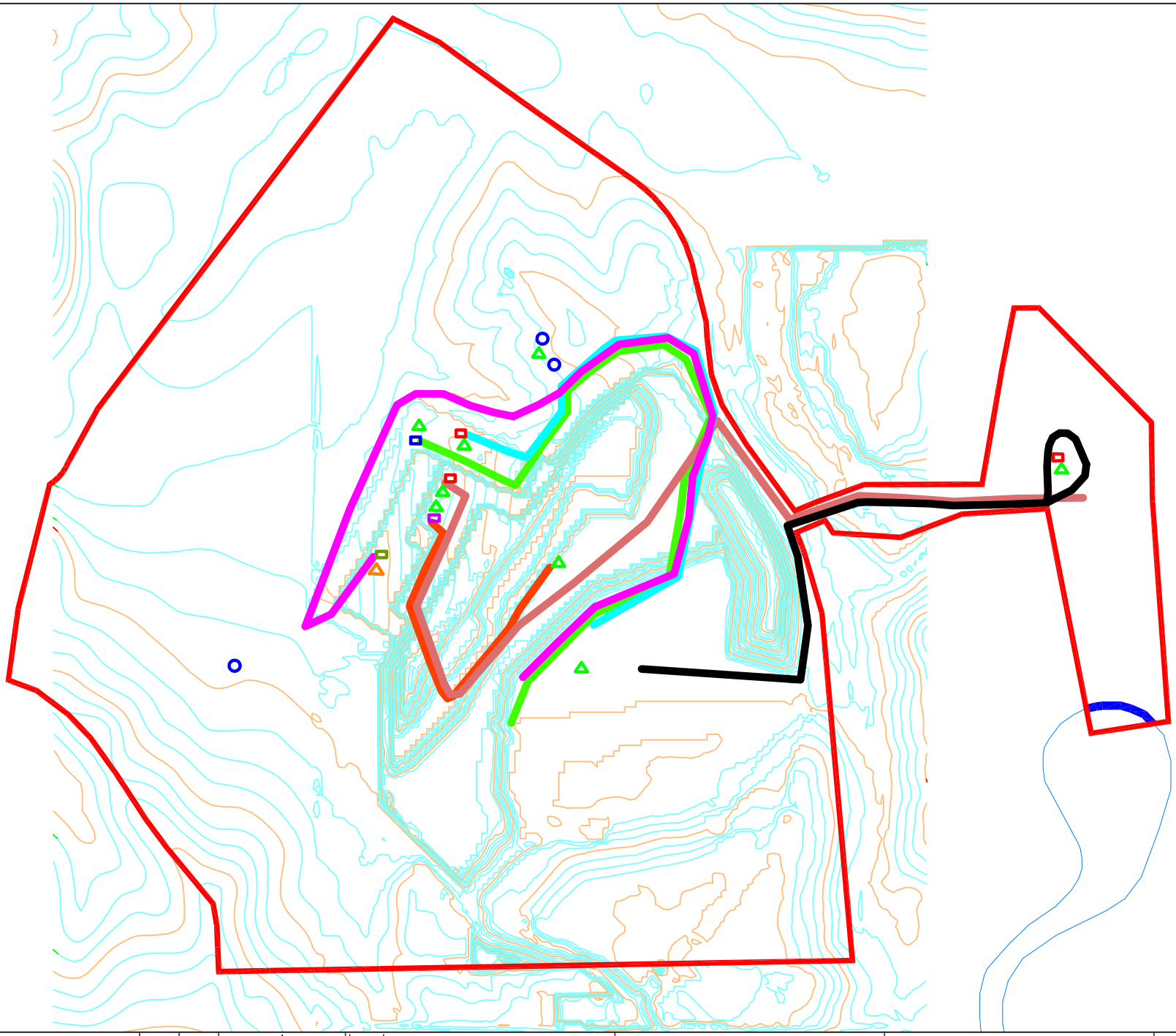
Table 2 Frequency of Occurrence of Atmospheric Stability Classes - Evening and Night-time

Stability Class	Frequency of occurrence				Estimated ELR 0°C/100 m	Qualitative Description
	Summer	Autumn	Winter	Spring		
A	0%	0%	0%	0%	<-1.9	Lapse
B	0%	0%	0%	0%	-1.9 to -1.7	Lapse
C	0%	0%	0%	0%	-1.7 to -1.5	Lapse
D	64%	49%	56%	55%	-1.5 to -0.5	Neutral
E	17%	18%	14%	17%	-0.5 to 1.5	Weak Inversion
F	15%	21%	19%	20%	1.5 to 4	Moderate Inversion
G	5%	11%	11%	8%	>4.0	Strong Inversion

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Map compiled using MapInfo StreetPro Data, © 2006 MapInfo Australia Pty Ltd, URS Australia and PSMA Australia Ltd. URS Australia, MapInfo Australia or PSMA Australia do not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that these companies shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

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5m Ground Contour
20m Ground Contour
Open Cut Extension Area
Rail Loop

0 129 258
Scale = 1:12907

Legend

Coal Haul (RL-10m to RL103m)
Waste Haul (RL108m to RL100m)
Waste Haul (RL80m to RL100m)
Waste Haul (RL75m to RL100m)
Waste Haul (RL35m to RL100m)
Waste Haul (RL-10m to RL35m)

FEL
Shovel
Excavator (EX5500)
Excavator (EX3600)
Dozer
RTD
Drill
Train

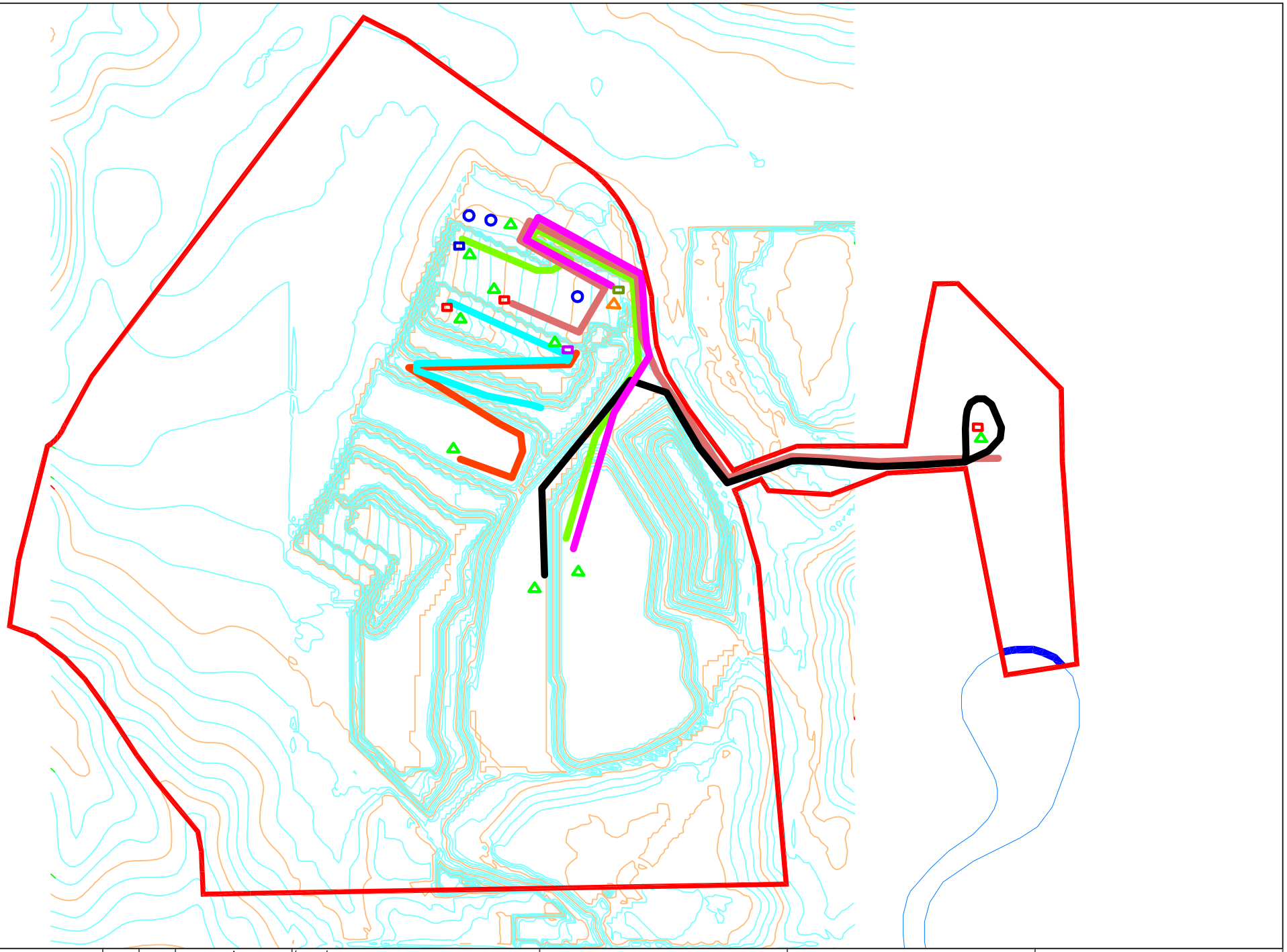
Heggies Pty Ltd
2 Lincoln Street
Lane Cove NSW 2066 Australia
PO Box 176 Lane Cove NSW 1595
Email address sydney@heggies.com.au
Telephone 02 9427 8100 Facsimilie 02 9427 8200

10-5202 Integra Open Cut Project
Full Pit Year 1

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	04/09/09		YL	HS

FILE NAME: 10-5202 Scenarios - 743 Year 1.dwg
DRAWING No.: 10-5202 743Y1
REVISION: 0

75 mm ON ORIGINAL



5m Ground Contour
20m Ground Contour
Open Cut Extension Area
Rail Loop

0 129 258
Scale = 1:12907

Legend

Coal Haul (RL23m to RL103m)
Waste Haul (RL108m to RL100m)
Waste Haul (RL-60m to RL45m)
Waste Haul (RL0m to RL145m)
Waste Haul (RL52m to RL145m)
Waste Haul (RL-10m to RL95m)

FEL
Shovel
Excavator (EX5500)
Excavator (EX3600)
Dozer
RTD
Drill
Train

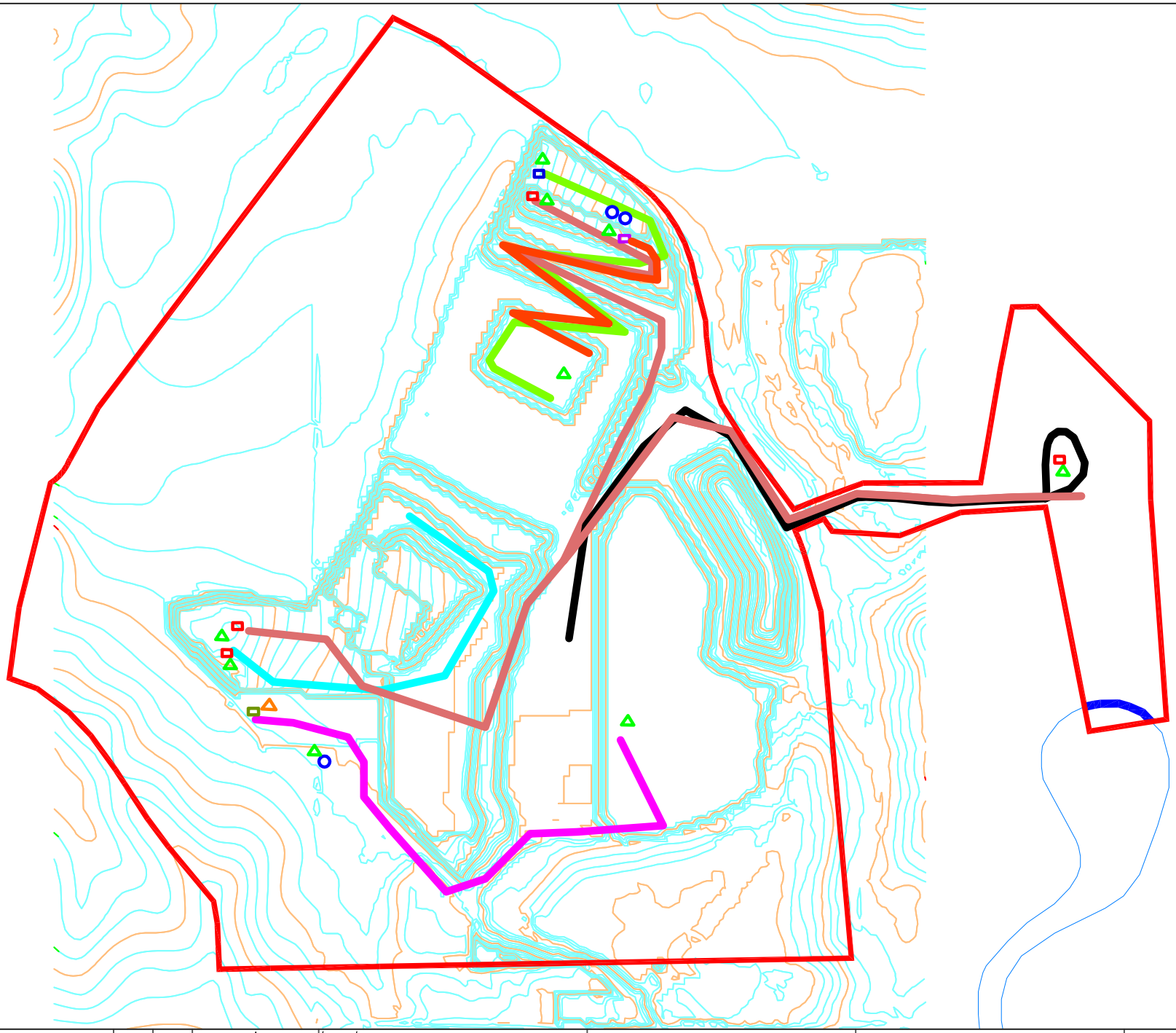
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2 Lincoln Street
Lane Cove NSW 2066 Australia
PO Box 176 Lane Cove NSW 1595
Email address sydney@heggies.com.au
Telephone 02 9427 8100 Facsimile 02 9427 8200

10-5202 Integra Open Cut Project
Fulll Pit Year 4

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	04/09/09		YL	MB

FILE NAME: 10-5202 Scenarios - 743 Year 4.dwg
DRAWING No.: 10-5202 743Y4
REVISION: 0

75 mm ON ORIGINAL



5m Ground Contour
20m Ground Contour
Open Cut Extension Area
Rail Loop

0 129 258
Scale = 1:12907

Legend

Coal Haul (RL-55m to RL103m)
Waste Haul (RL108m to RL100m)
Waste Haul (RL-10m to RL0m)
Waste Haul (RL-8m to RL135m)
Waste Haul (RL75m to RL145m)
Waste Haul (RL-17m to RL135m)

FEL
Shovel
Excavator (EX5500)
Excavator (EX3600)
Dozer
RTD
Drill
Train

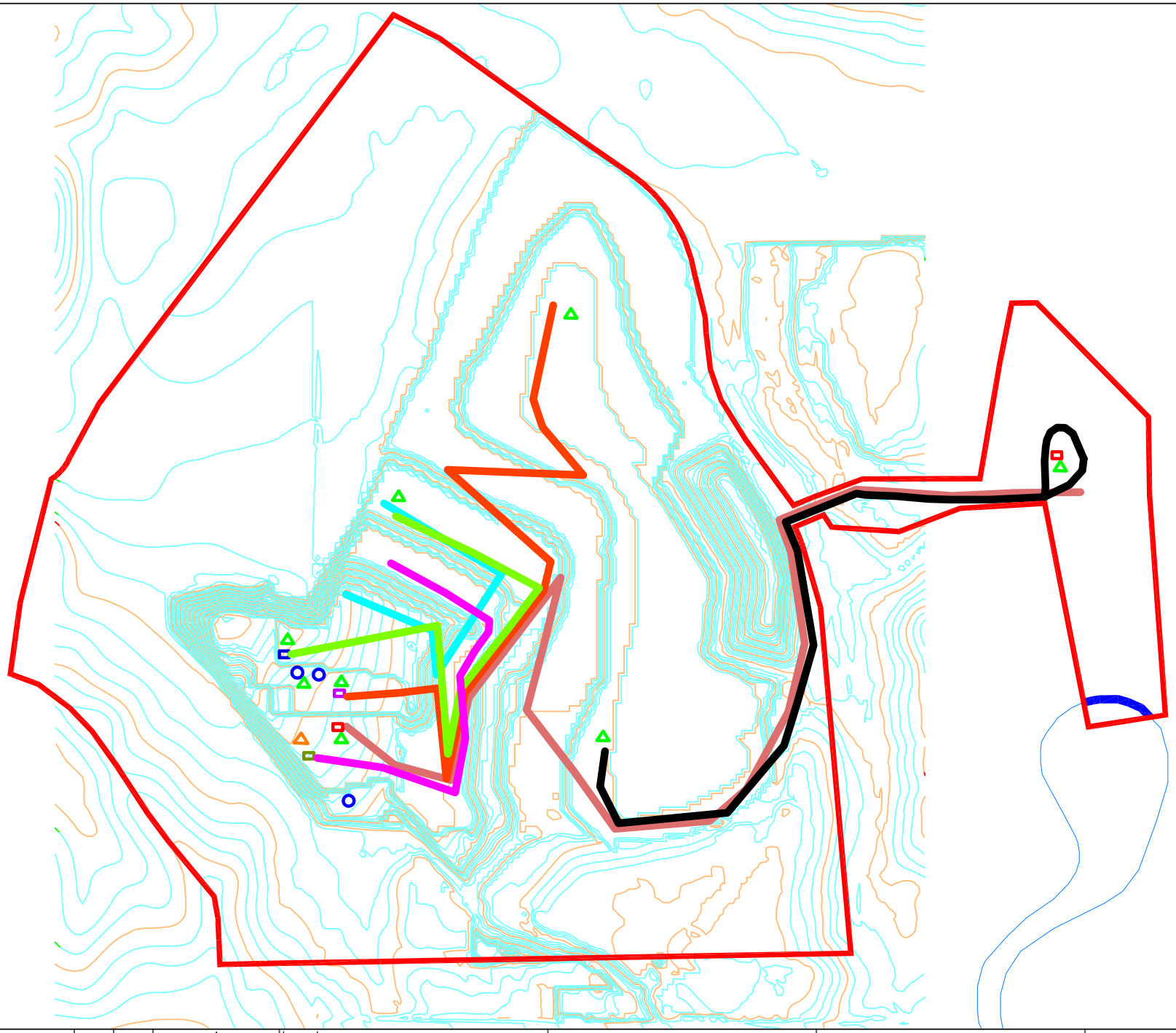
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PO Box 176 Lane Cove NSW 1595
Email address sydney@heggies.com.au
Telephone 02 9427 8100 Facsimilie 02 9427 8200

10-5202 Integra Open Cut Project
Full Pit Year 6

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	04/06/06		YL	HS

FILE NAME: 10-5202 Scenarios - 743 Year 6.dwg
DRAWING No.: 10-5202 743Y6
REVISION: 0

75 mm ON ORIGINAL



5m Ground Contour
20m Ground Contour
Open Cut Extension Area
Rail Loop

0 129 258
Scale = 1:12907

Legend

Coal Haul (RL-32m to RL103m)
Waste Haul (RL108m to RL140m)
Waste Haul (RL-100m to RL50m)
Waste Haul (RL-120m to RL50m)
Waste Haul (RL-35m to RL0m)
Waste Haul (RL-70m to RL145m)

FEL
Shovel
Excavator (EX5500)
Excavator (EX3600)
Dozer
RTD
Drill
Train

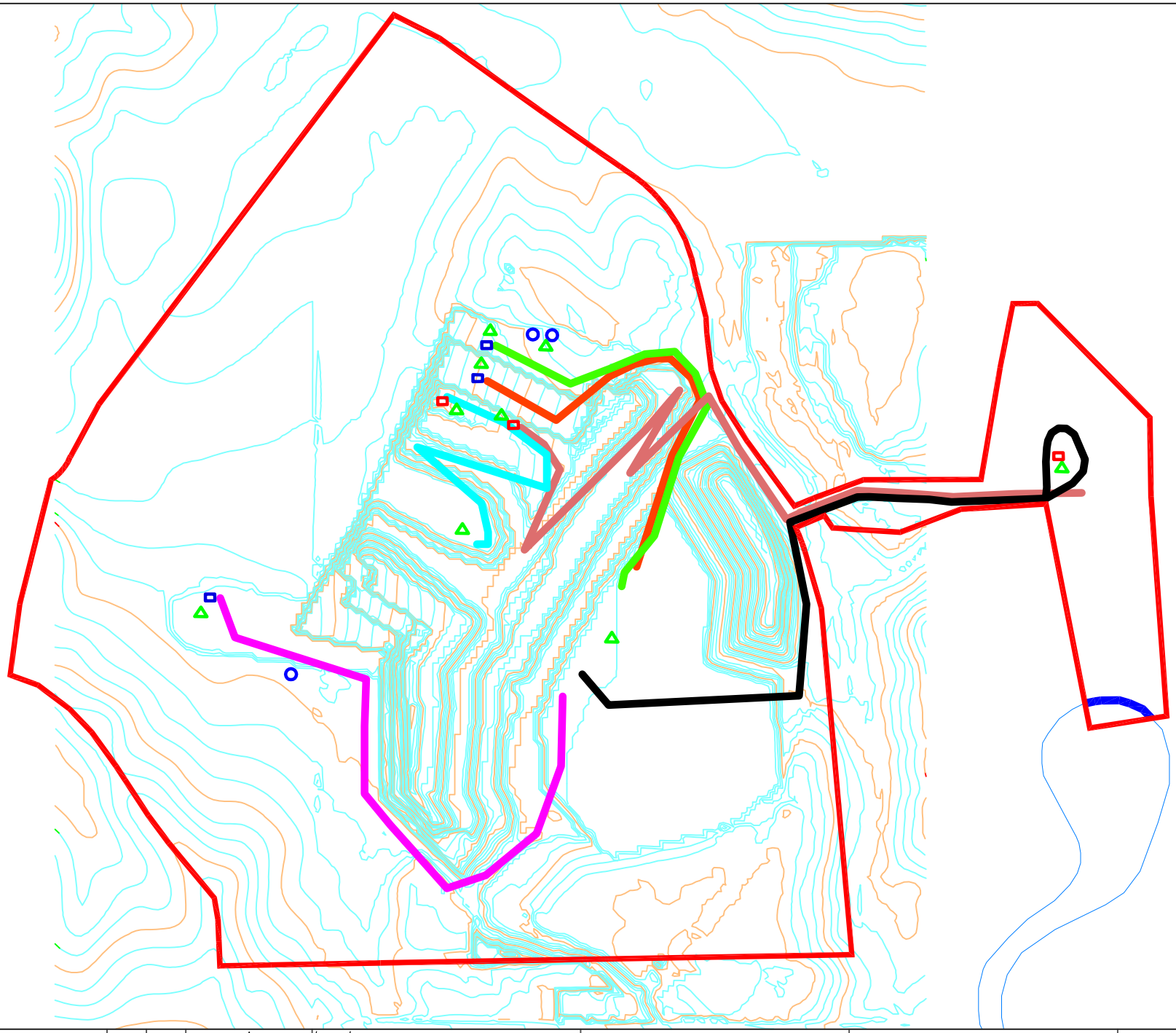
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PO Box 176 Lane Cove NSW 1595
Email address sydney@heggies.com.au
Telephone 02 9427 8100 Facsimile 02 9427 8200

10-5202 Integra Open Cut Project
Full Pit Year 8

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	04/09/09		YL	MB

FILE NAME: 10-5202 Scenarios - 743 Year 8.dwg
DRAWING No.: 10-5202 743Y8
REVISION: 0

75 mm ON ORIGINAL



5m Ground Contour
20m Ground Contour
Open Cut Extension Area
Rail Loop

Legend

Coal Haul (RL-33m to RL103m)
Waste Haul (RL108m to RL135m)
Waste Haul (RL-60m to RL45m)
Waste Haul (RL70m to RL135m)
Waste Haul (RL65m to RL132m)
Waste Haul (RL4m to RL135m)

FEL
Shovel
Excavator (EX5500)
Excavator (EX3600)
Dozer
RTD
Drill
Train

0 129 258
Scale = 1:12907

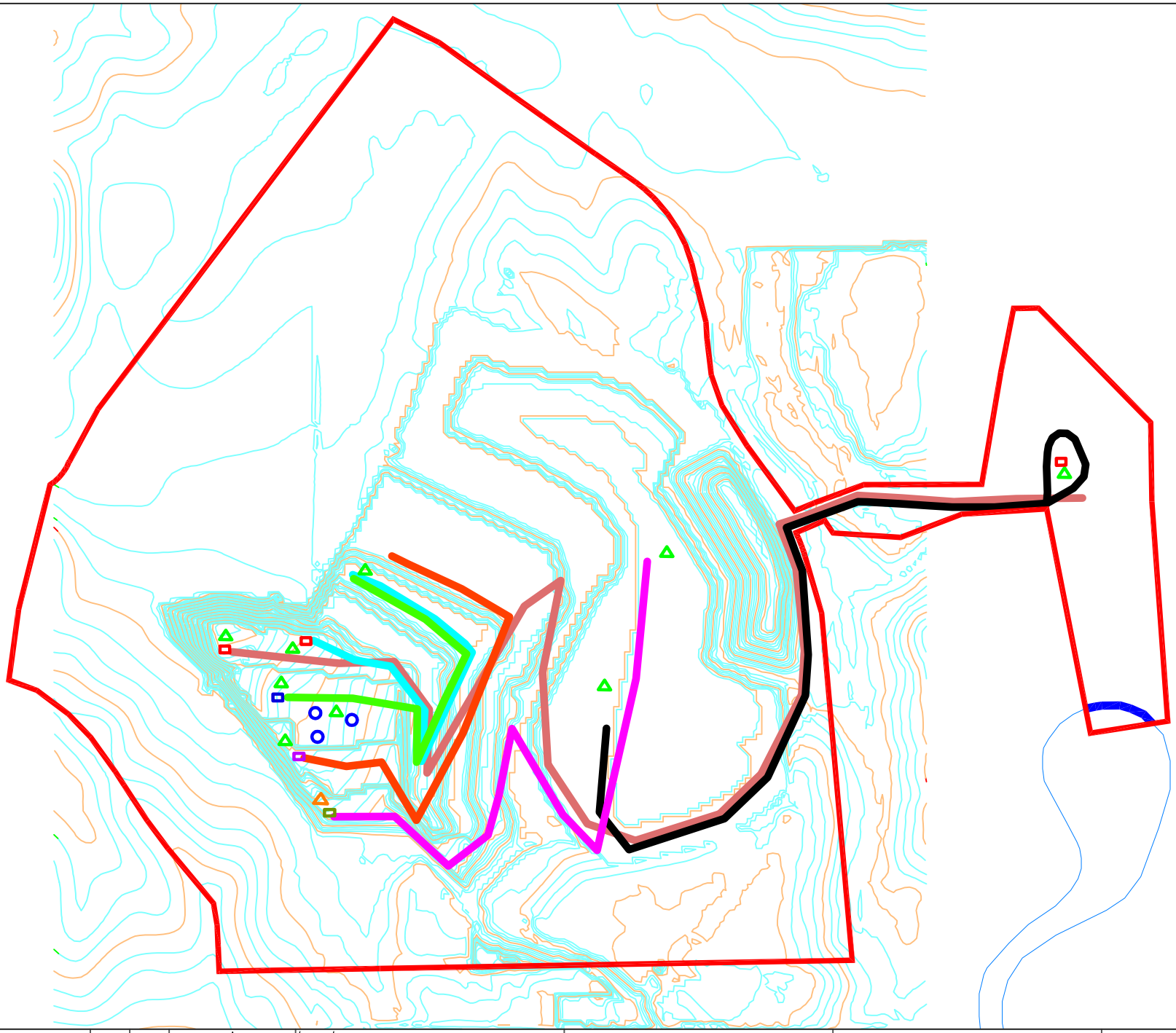
REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
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Lane Cove NSW 2066 Australia
PO Box 176 Lane Cove NSW 1595
Email address sydney@heggies.com.au
Telephone 02 9427 8100 Facsimilie 02 9427 8200

10-5202 Integra Open Cut Project
Part Pit Year 3

FILE NAME: 10-5202 Scenarios - 767 Year 3.dwg
DRAWING No.: 10-5202 767Y3
REVISION: 0

75 mm ON ORIGINAL



5m Ground Contour
20m Ground Contour
Open Cut Extension Area
Rail Loop

0 129 258
Scale = 1:12907

Legend

Coal Haul (RL-135m to RL103m)
Waste Haul (RL108m to RL140m)
Waste Haul (RL-117m to RL0m)
Waste Haul (RL-85m to RL0m)
Waste Haul (RL35m to RL145m)
Waste Haul (RL-37m to RL45m)

FEL
Shovel
Excavator (EX5500)
Excavator (EX3600)
Dozer
RTD
Drill
Train

Heggies Pty Ltd
2 Lincoln Street
Lane Cove NSW 2066 Australia
PO Box 176 Lane Cove NSW 1595
Email address sydney@heggies.com.au
Telephone 02 9427 8100 Facsimile 02 9427 8200

10-5202 Integra Open Cut Project
Part Pit Year 6

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	04/06/09		YL	MB

FILE NAME: 10-5202 Scenarios - 767 Year 6.dwg
DRAWING No.: 10-5202 743Y1
REVISION: 0

75 mm ON ORIGINAL

YEAR 1 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – NON-MINE OWNED RESIDENCES

Full Pit Operation - Year 1 $L_{Aeq(15minute)}$ Intrusive Noise Emissions (dBA re 20µPa)

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
1	80	32	25	32	35	32	27	33	38	33	0	33	35	0	**41**[2]	36
3	87	41	18	**41**[2]	38	42	19	**42**[1]	40	42	0	**42**[2]	40	0	**46**[3]	39
	106	39	14	**39**[1]	38	40	15	40	40	41	0	**41**[1]	41	0	**46**[3]	39
4	88	25	11	25	39	25	11	26	42	26	0	26	33	0	**38**[1]	37
	91	27	11	27	39	27	12	27	42	28	0	28	33	0	**39**[1]	37
	94	27	11	27	39	27	12	27	42	28	0	28	32	0	37	37
	95	28	12	28	39	28	12	29	42	29	0	29	33	0	**38**[1]	37
	96	29	12	29	39	29	13	29	42	30	0	30	34	0	**39**[1]	37
	99	26	11	26	39	27	11	27	42	27	0	27	31	0	36	37
	100	25	10	26	39	26	11	26	42	27	0	27	31	0	36	37
	105	27	11	27	39	28	11	28	42	28	0	28	34	0	**40**[2]	37
	161	29	12	29	39	29	13	29	42	30	0	30	39	0	**39**[1]	37
5	103	25	10	26	50	26	11	26	46	27	0	27	33	0	33	42
	104	26	11	26	50	26	11	26	46	27	0	27	36	0	36	42
	111	38	15	38	50	39	15	39	46	40	0	40	46	0	**46**[2]	42
	112	36	13	36	50	37	13	37	46	37	0	37	44	0	**44**[1]	42
	118	32	14	32	50	33	15	33	46	34	0	34	41	0	41	42
	120	32	14	32	50	33	15	33	46	34	0	34	40	0	40	42
	121	28	10	29	50	29	11	29	46	29	0	29	38	0	38	42
	123	26	9	26	50	26	9	26	46	27	0	27	37	0	37	42
	125	29	11	29	50	29	12	29	46	30	0	30	38	0	38	42
	126	26	9	27	50	27	10	27	46	27	0	27	37	0	37	42
	129	28	12	28	50	29	12	29	46	29	0	29	40	0	40	42
	139	21	9	21	50	21	10	21	46	22	0	22	35	0	35	42
	154	35	14	35	50	36	14	36	46	37	0	37	42	0	42	42
	156	35	13	35	50	35	14	36	46	36	0	36	42	0	42	42
	157	32	14	32	50	33	15	33	46	34	0	34	40	0	40	42
	159	32	14	32	50	33	15	33	46	34	0	34	41	0	41	42

YEAR 1 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – NON-MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
6	132	21	8	22	39	22	8	22	41	22	0	22	37	0	37	38
	133	23	9	24	39	24	9	24	41	24	0	24	35	0	35	38
	137	19	5	20	39	20	6	20	41	21	0	21	34	0	34	38
7	108	43	14	43	45	43	14	**43**[1]	42	44	0	**44**[2]	49	0	**49**[3]	39
	109	44	15	44	45	44	15	**44**[1]	42	45	0	**45**[3]	49	0	**49**[3]	39
	110	43	15	43	45	44	15	**44**[1]	42	44	0	**44**[2]	48	0	**48**[3]	39
	Dulwich	51	15	**51**[3]	45	51	15	**51**[3]	42	51	0	**51**[3]	53	0	**53**[3]	39
8	142	15	3	16	42	16	4	16	42	16	0	16	27	0	27	35
9	2	29	19	29	37	29	20	30	40	30	0	30	36	0	36	38
	3	26	19	27	37	27	20	28	40	27	0	27	38	0	38	38
	4	28	16	28	37	28	16	28	40	29	0	29	38	0	38	38
	143	18	8	18	37	18	8	19	40	19	0	19	34	0	34	38
	144	20	10	20	37	20	11	21	40	21	0	21	35	0	35	38
	145	20	9	21	37	21	10	21	40	21	0	21	35	0	35	38
	146	19	9	19	37	19	10	20	40	20	0	20	34	0	34	38
	147	20	10	20	37	20	11	21	40	21	0	21	35	0	35	38
	148	20	11	20	37	20	12	21	40	21	0	21	34	0	34	38
	149	20	11	21	37	21	12	21	40	21	0	21	32	0	32	38
	150	20	12	21	37	21	13	22	40	21	0	21	34	0	34	38
	151	20	11	21	37	21	12	22	40	22	0	22	35	0	35	38
	152	23	15	24	37	24	17	25	40	25	0	25	35	0	35	38
10	5	29	22	29	36	29	23	30	39	30	0	30	39	0	**39**[1]	37
	6	29	21	30	36	30	22	30	39	30	0	30	40	0	**40**[2]	37
	8	30	9	30	36	30	9	30	39	31	0	31	41	0	**41**[2]	37
	9	29	13	29	36	30	14	30	39	30	0	30	41	0	**41**[2]	37
	10	29	9	29	36	29	10	29	39	30	0	30	40	0	**40**[2]	37
	11	29	13	29	36	29	14	29	39	30	0	30	40	0	**40**[2]	37
	13	30	11	30	36	31	11	31	39	32	0	32	42	0	**42**[2]	37
11	7	29	23	30	38	29	23	30	41	30	0	30	38	0	38	39
	12	29	22	29	38	29	23	30	41	30	0	30	39	0	39	39

YEAR 1 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – NON-MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
11	14	30	24	31	38	31	25	32	41	32	0	32	41	0	**41**[1]	39
	15	30	23	30	38	30	24	31	41	31	0	31	39	0	39	39
	16	30	25	31	38	31	26	32	41	32	0	32	41	0	**41**[1]	39
	17	25	24	27	38	25	25	28	41	26	0	26	35	0	35	39
	18	23	25	27	38	23	26	28	41	24	0	24	32	0	32	39
	19	21	33	34	38	21	34	35	41	22	0	22	36	0	36	39
	20	21	36	36	38	22	37	37	41	22	0	22	35	0	35	39
	21	21	36	36	38	21	37	37	41	22	0	22	35	0	35	39
12	50	24	31	31	35	24	32	32	38	25	0	25	35	0	35	35
	51	23	30	31	35	24	31	32	38	25	0	25	34	0	34	35
	52	22	27	28	35	22	28	29	38	23	0	23	27	0	27	35
	53	24	28	30	35	25	29	31	38	25	0	25	35	0	35	35
	54	24	27	29	35	25	28	29	38	26	0	26	36	0	36	35
	55	23	28	29	35	24	29	30	38	24	0	24	30	0	30	35
	56	24	25	28	35	25	26	29	38	26	0	26	33	0	33	35
	57	24	27	29	35	25	28	30	38	26	0	26	35	0	35	35
	62	25	26	29	35	25	27	29	38	26	0	26	37	0	**37**[1]	35
A	22	23	36	36	36	23	37	37	39	24	0	24	35	0	35	36
	23	23	36	36	36	24	37	37	39	24	0	24	36	0	36	36
	24	20	29	30	36	20	30	30	39	21	0	21	31	0	31	36
	25	19	31	31	36	20	32	32	39	20	0	21	33	0	33	36
	26	19	30	30	36	19	31	31	39	20	0	20	32	0	32	36
	27	19	29	29	36	19	30	31	39	20	0	20	32	0	32	36
	28	18	25	26	36	18	27	27	39	19	0	19	31	0	31	36
	29	20	27	28	36	21	28	29	39	21	0	21	33	0	33	36
	30	20	32	32	36	21	33	33	39	21	0	21	33	0	33	36
	31	20	34	35	36	21	35	36	39	22	0	22	33	0	33	36
	32	20	36	36	36	21	37	37	39	21	0	21	33	0	33	36
	34	21	38	**38**[1]	36	22	39	39	39	22	0	22	33	0	33	36
	35	20	38	**38**[1]	36	21	39	39	39	21	0	21	32	0	32	36
	36	20	27	28	36	20	27	28	39	21	0	21	32	0	32	36

YEAR 1 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – NON-MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
A	37	18	22	23	36	18	23	24	39	19	0	19	23	0	23	36
	38	20	27	28	36	21	28	29	39	21	0	21	33	0	33	36
	39	18	23	24	36	18	24	25	39	19	0	19	23	0	23	36
	40	17	21	23	36	17	22	23	39	18	0	18	21	0	21	36
	41	14	16	18	36	15	16	18	39	15	0	15	18	0	18	36
	42	20	28	29	36	21	29	30	39	22	0	22	33	0	33	36
	43	21	33	33	36	21	34	34	39	22	0	22	34	0	34	36
C	47	25	29	31	35	26	30	31	37	26	0	26	31	0	31	35
	63	25	26	29	35	26	27	30	37	26	0	26	34	0	34	35
	64	27	29	31	35	27	30	32	37	28	0	28	34	0	34	35
D	44	21	32	32	37	22	32	33	41	22	0	22	31	0	31	38
	48	23	28	29	37	23	28	29	41	24	0	24	29	0	29	38
	49	23	27	29	37	23	28	29	41	24	0	24	34	0	34	38
F	65	27	26	29	39	27	27	30	40	28	0	28	35	0	35	40
	66	26	27	29	39	26	28	30	40	27	0	27	33	0	33	40
	67	27	29	31	39	28	31	32	40	28	0	28	34	0	34	40
	68	29	31	33	39	30	32	34	40	31	0	31	38	0	38	40
	71	31	31	34	39	32	32	35	40	33	0	33	40	0	40	40
	72	32	31	34	39	32	32	35	40	33	0	33	40	0	40	40
	73	32	30	34	39	33	31	35	40	33	0	33	40	0	40	40
	76	33	30	34	39	33	31	35	40	34	0	34	41	0	**41**[1]	40

Note 1: Marginal Noise Management Zone 1 to 2 dBA above project specific criteria (bold text)

Note 2: Moderate Noise Management Zone 3 to 5 dBA above project specific criteria (bold text)

Note 3: Noise Affection Zone >5 dBA above project specific criteria (bold text and shaded cell)

YEAR 4 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – NON-MINE OWNED RESIDENCES

Full Pit Operation - Year 4 $L_{Aeq(15minute)}$ Intrusive Noise Emissions (dBA re 20µPa)

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
1	80	32	30	34	35	33	31	35	38	34	8	34	41	9	**41[2]**	36
3	87	40	21	**40[1]**	38	41	22	**41[1]**	40	41	4	**41[1]**	45	6	**45[3]**	39
	106	37	17	37	38	38	18	38	40	38	-3	38	43	-1	**43[2]**	39
4	88	23	13	24	39	24	13	24	42	24	0	24	37	1	37	37
	91	25	14	26	39	26	14	26	42	26	0	26	37	1	37	37
	94	26	13	26	39	26	14	26	42	27	0	27	37	1	37	37
	95	26	14	26	39	27	14	27	42	27	0	27	37	1	37	37
	96	27	14	27	39	28	15	28	42	28	1	28	38	2	**38[1]**	37
	99	26	13	26	39	26	13	26	42	27	-1	27	35	0	35	37
	100	24	12	25	39	25	13	25	42	25	-1	26	36	0	36	37
	105	26	13	26	39	26	14	26	42	27	2	27	38	2	**38[1]**	37
	161	27	14	27	39	28	15	28	42	28	1	28	38	2	**38[1]**	37
5	103	23	12	24	50	24	13	24	46	24	-14	24	33	-12	33	42
	104	24	12	24	50	24	13	25	46	25	-2	25	35	-1	35	42
	111	34	16	35	50	35	17	35	46	36	0	36	42	2	42	42
	112	35	15	35	50	35	15	35	46	36	1	36	41	3	41	42
	118	30	16	30	50	30	17	30	46	31	0	31	38	0	38	42
	120	30	16	30	50	31	17	31	46	31	-6	31	36	-4	36	42
	121	26	13	26	50	26	14	27	46	27	-9	27	35	-7	35	42
	123	24	11	24	50	24	11	24	46	25	-8	25	34	-5	34	42
	125	26	13	27	50	27	14	27	46	28	-9	28	35	-7	35	42
	126	24	11	24	50	25	12	25	46	25	-6	25	34	-4	34	42
	129	27	13	27	50	27	14	27	46	28	-7	28	37	-5	37	42
	139	20	9	20	50	21	10	21	46	21	-9	21	32	-7	32	42
	154	33	15	33	50	34	16	34	46	34	0	34	42	0	42	42
	156	32	16	32	50	33	16	33	46	34	0	34	42	0	42	42
	157	30	16	30	50	31	17	31	46	31	-6	31	40	0	40	42
	159	30	16	30	50	30	17	30	46	31	0	31	41	0	41	42
6	132	21	9	21	39	21	10	22	41	22	-6	22	33	-5	33	38

YEAR 4 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – NON-MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
6	133	23	10	23	39	24	11	24	41	24	-5	24	33	-5	33	38
	137	18	7	18	39	18	8	18	41	19	-7	19	30	-6	30	38
7	108	39	16	39	45	40	16	40	42	41	2	**41[1]**	45	4	**45[3]**	39
	109	39	16	39	45	40	16	40	42	40	1	**40[1]**	44	3	**44[2]**	39
	110	39	17	39	45	40	17	40	42	40	1	**40[1]**	45	3	**45[3]**	39
8	142	14	4	14	42	15	5	15	42	15	-8	15	27	-7	27	35
9	2	28	17	28	37	29	18	29	40	29	1	29	35	3	35	38
	3	26	18	27	37	27	18	27	40	27	1	28	37	14	37	38
	4	27	18	28	37	28	19	29	40	29	2	29	38	14	38	38
	143	16	8	17	37	17	8	17	40	17	-9	17	33	-7	33	38
	144	19	8	19	37	19	9	19	40	19	-4	19	34	-4	34	38
	145	19	8	19	37	19	9	20	40	20	-3	20	34	-1	34	38
	146	17	9	18	37	18	10	18	40	18	-6	18	33	-4	33	38
	147	18	10	19	37	19	11	19	40	19	-5	19	34	-3	34	38
	148	18	11	19	37	19	12	20	40	19	-6	19	34	-4	34	38
	149	19	11	20	37	20	11	20	40	20	-4	20	32	-3	32	38
	150	19	12	20	37	20	12	20	40	20	-5	20	34	-3	34	38
	151	20	10	20	37	20	11	21	40	21	-5	21	35	-4	35	38
	152	22	13	23	37	23	14	24	40	24	1	24	34	2	34	38
10	5	28	21	29	36	29	21	30	39	30	3	30	38	9	**38[1]**	37
	6	29	21	30	36	30	22	30	39	30	3	30	40	8	**40[2]**	37
	8	29	22	30	36	30	23	31	39	31	4	31	41	8	**41[2]**	37
	9	29	22	30	36	29	22	30	39	30	5	30	41	8	**41[2]**	37
	10	28	22	29	36	29	22	30	39	29	5	29	40	7	**40[2]**	37
	11	29	23	30	36	29	23	30	39	30	5	30	40	8	**40[2]**	37
	13	30	23	31	36	31	24	32	39	32	6	32	42	8	**42[2]**	37
11	7	28	20	29	38	29	20	30	41	30	3	30	38	7	38	39
	12	29	21	29	38	30	22	30	41	30	4	30	39	6	39	39
	14	30	23	31	38	31	24	32	41	32	5	32	40	7	**40[1]**	39
	15	30	23	30	38	31	23	31	41	32	3	32	39	5	39	39

YEAR 4 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – NON-MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
11	16	31	24	31	38	31	25	32	41	32	6	32	41	8	**41**[1]	39
	17	24	20	25	38	24	20	26	41	25	1	25	35	4	35	39
	18	22	19	24	38	22	20	24	41	23	2	23	32	4	32	39
	19	19	21	23	38	20	22	24	41	20	8	21	36	10	36	39
	20	20	22	24	38	21	23	25	41	22	9	22	35	11	35	39
	21	20	22	24	38	21	22	24	41	21	9	22	35	10	35	39
12	50	24	30	31	35	24	31	32	38	25	11	25	35	13	35	35
	51	23	29	30	35	24	30	31	38	25	11	25	33	12	33	35
	52	22	26	27	35	23	26	28	38	23	7	23	28	9	28	35
	53	24	28	30	35	25	29	30	38	26	8	26	34	10	34	35
	54	25	30	31	35	26	31	32	38	27	9	27	34	11	34	35
	55	23	26	27	35	23	27	28	38	24	7	24	31	8	31	35
	56	24	27	29	35	25	28	30	38	26	8	26	31	9	31	35
	57	24	26	28	35	25	27	29	38	26	7	26	33	8	33	35
	62	26	32	33	35	26	33	34	38	27	12	28	36	13	**36**[1]	35
A	22	23	22	25	36	23	23	26	39	24	8	24	35	10	35	36
	23	23	23	26	36	23	24	27	39	24	10	24	36	12	36	36
	24	20	20	23	36	20	20	23	39	21	7	21	31	9	31	36
	25	19	19	22	36	20	20	23	39	21	6	21	32	7	32	36
	26	19	18	22	36	19	19	22	39	20	5	20	31	6	31	36
	27	19	18	21	36	19	19	22	39	20	4	20	31	5	31	36
	28	17	16	20	36	18	17	21	39	19	-4	19	29	-2	29	36
	29	20	20	23	36	21	21	24	39	21	2	21	31	5	31	36
	30	20	20	23	36	21	21	24	39	21	6	21	31	7	31	36
	31	20	21	24	36	21	22	25	39	22	8	22	32	9	32	36
	32	20	21	24	36	21	22	24	39	22	9	22	32	11	32	36
	34	21	24	26	36	21	25	26	39	22	11	22	33	12	33	36
	35	20	27	27	36	20	27	28	39	21	11	21	33	14	33	36
	36	20	24	25	36	21	25	26	39	21	7	22	32	9	32	36
	37	17	19	21	36	18	20	22	39	18	8	19	23	10	23	36
	38	21	23	25	36	21	24	26	39	22	7	22	32	8	32	36

YEAR 4 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – NON-MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
A	39	18	20	22	36	19	21	23	39	19	2	19	23	4	24	36
	40	16	18	20	36	17	18	20	39	17	3	17	21	5	21	36
	41	14	13	16	36	14	14	17	39	14	5	15	23	6	23	36
	42	20	23	25	36	21	24	26	39	22	7	22	32	8	32	36
	43	21	24	26	36	22	25	26	39	22	10	22	33	11	33	36
C	47	25	34	34	35	25	34	35	37	26	20	27	35	22	35	35
	63	25	31	32	35	26	32	33	37	27	13	27	37	16	**37[1]**	35
	64	28	32	33	35	28	32	34	37	29	15	29	38	17	**38[2]**	35
D	44	21	26	27	37	21	27	28	41	22	16	23	32	18	33	38
	48	23	29	30	37	23	29	30	41	24	17	25	31	19	31	38
	49	23	30	31	37	23	31	32	41	24	15	24	35	18	35	38
F	65	26	32	33	39	27	33	34	40	28	9	28	35	10	35	40
	66	25	33	33	39	26	34	34	40	26	10	26	33	11	33	40
	67	27	32	33	39	27	33	34	40	28	11	28	34	12	34	40
	68	29	35	36	39	30	36	37	40	31	11	31	37	12	37	40
	71	32	37	38	39	33	38	39	40	34	11	34	39	13	39	40
	72	32	37	38	39	33	38	39	40	34	11	34	39	13	39	40
	73	33	37	39	39	34	38	40	40	35	12	35	40	13	40	40
	76	34	35	38	39	35	36	39	40	36	11	36	41	12	**41[1]**	40

Note 1: Marginal Noise Management Zone 1 to 2 dBA above project specific criteria (bold text)

Note 2: Moderate Noise Management Zone 3 to 5 dBA above project specific criteria (bold text)

Note 3: Noise Affection Zone >5 dBA above project specific criteria (bold text and shaded cell)

YEAR 6 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – NON-MINE OWNED RESIDENCES

Full Pit Operation - Year 6 $L_{Aeq(15minute)}$ Intrusive Noise Emissions (dBA re 20µPa)

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
1	80	32	30	34	35	33	30	35	38	34	12	34	39	13	**39[2]**	36
3	87	39	26	**39[1]**	38	40	26	40	40	41	8	**41[1]**	44	9	**44[2]**	39
	106	39	20	**39[1]**	38	40	20	40	40	41	3	**41[1]**	44	5	**44[2]**	39
4	88	28	13	28	39	28	13	28	42	29	3	29	38	4	**38[1]**	37
	91	29	14	29	39	29	14	29	42	30	3	30	38	4	**38[1]**	37
	94	27	13	27	39	28	14	28	42	28	2	28	38	4	**38[1]**	37
	95	29	14	29	39	30	14	30	42	30	3	30	38	4	**38[1]**	37
	96	31	15	31	39	32	15	32	42	33	3	33	39	4	**39[1]**	37
	99	26	13	26	39	27	13	27	42	27	2	27	36	3	36	37
	100	25	13	26	39	26	13	26	42	26	2	27	36	3	36	37
	105	29	14	29	39	30	14	30	42	30	4	30	40	5	**40[2]**	37
	161	31	15	31	39	32	15	32	42	33	3	33	39	4	**39[1]**	37
5	103	24	13	24	50	24	14	25	46	25	-7	25	34	-5	34	42
	104	25	13	25	50	25	13	25	46	26	1	26	34	2	34	42
	111	38	19	38	50	39	20	39	46	40	2	40	46	3	**46[2]**	42
	112	33	20	33	50	34	21	34	46	34	4	34	43	4	**43[1]**	42
	118	31	17	31	50	32	18	32	46	32	2	32	40	3	40	42
	120	31	18	31	50	31	18	31	46	32	2	32	40	3	40	42
	121	28	14	28	50	28	15	29	46	29	1	29	36	2	36	42
	123	25	12	25	50	26	12	26	46	26	0	26	35	2	35	42
	125	28	14	28	50	29	15	29	46	29	0	29	36	1	36	42
	126	25	12	25	50	26	13	26	46	26	1	26	35	2	35	42
	129	26	15	26	50	26	16	27	46	27	0	27	36	2	36	42
	139	22	6	22	50	22	7	23	46	23	-14	23	33	-12	33	42
	154	33	17	33	50	33	18	33	46	34	2	34	41	4	41	42
	156	32	17	32	50	33	17	33	46	34	2	34	40	3	40	42
	157	31	18	31	50	31	18	31	46	32	2	32	40	3	40	42
	159	31	17	31	50	32	18	32	46	32	2	32	40	3	40	42

YEAR 6 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – NON-MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
6	132	22	10	22	39	22	10	22	41	23	-2	23	34	-1	34	38
	133	23	12	23	39	24	12	24	41	24	-3	24	35	-2	35	38
	137	19	7	19	39	19	8	19	41	20	-3	20	31	-3	31	38
7	108	46	20	**46[1]**	45	46	21	**46[2]**	42	47	5	**47[3]**	51	6	**51[3]**	39
	109	48	19	**48[2]**	45	48	20	**48[3]**	42	49	4	**49[3]**	52	5	**52[3]**	39
	110	46	22	**46[1]**	45	47	22	**47[2]**	42	47	4	**47[3]**	51	5	**51[3]**	39
8	142	15	1	15	42	15	2	15	42	16	-7	16	27	-6	27	35
9	2	28	17	28	37	29	13	29	40	30	-11	30	36	-9	36	38
	3	26	18	27	37	27	12	27	40	27	0	27	37	1	37	38
	4	27	18	28	37	28	12	28	40	29	-1	29	38	1	38	38
	143	17	5	18	37	18	5	18	40	18	-4	18	33	-3	33	38
	144	20	6	20	37	20	7	21	40	21	-1	21	34	0	34	38
	145	20	6	20	37	21	7	21	40	21	-1	21	35	0	35	38
	146	18	5	19	37	19	6	19	40	19	-3	19	33	-2	33	38
	147	19	6	19	37	20	7	20	40	20	-2	20	34	-1	34	38
	148	20	6	20	37	20	7	21	40	21	-10	21	34	-8	34	38
	149	20	5	21	37	21	6	21	40	21	-13	21	32	-11	32	38
	150	21	6	21	37	21	7	21	40	22	-12	22	35	-10	35	38
	151	21	6	21	37	21	7	21	40	22	-15	22	35	-13	35	38
	152	23	8	23	37	23	9	23	40	24	-7	24	34	-5	34	38
10	5	29	21	30	36	30	15	30	39	31	2	31	39	3	**39[1]**	37
	6	29	21	30	36	30	16	30	39	31	2	31	40	3	**40[2]**	37
	8	30	22	30	36	30	9	30	39	31	4	31	41	5	**41[2]**	37
	9	29	22	30	36	29	13	30	39	30	5	30	41	6	**41[2]**	37
	10	28	22	29	36	29	10	29	39	29	5	29	40	6	**40[2]**	37
	11	28	23	29	36	29	13	29	39	30	5	30	40	6	**40[2]**	37
	13	30	23	31	36	31	11	31	39	31	6	31	41	7	**41[2]**	37
11	7	28	20	29	38	29	15	29	41	30	1	30	38	2	38	39
	12	28	21	29	38	29	16	29	41	30	3	30	39	4	39	39
	14	30	23	31	38	31	17	31	41	32	5	32	41	6	**41[1]**	39

YEAR 6 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – NON-MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
11	15	29	23	30	38	30	17	30	41	31	4	31	39	5	39	39
	16	30	24	31	38	31	19	31	41	31	6	31	41	7	**41**[1]	39
	17	24	20	25	38	24	15	25	41	25	-4	25	35	-2	35	39
	18	22	19	24	38	22	14	23	41	23	-7	23	32	-5	32	39
	19	20	21	23	38	20	18	22	41	21	1	21	36	3	36	39
	20	21	22	24	38	21	21	24	41	22	4	22	35	6	35	39
	21	21	22	24	38	21	21	24	41	22	3	22	35	5	35	39
12	50	25	30	31	35	25	28	30	38	26	10	26	34	12	34	35
	51	24	29	30	35	24	27	29	38	25	10	25	33	11	33	35
	52	22	26	27	35	23	24	26	38	23	8	24	30	10	30	35
	53	25	28	30	35	26	26	29	38	27	8	27	34	10	34	35
	54	26	30	32	35	27	27	30	38	27	8	27	34	10	34	35
	55	23	26	28	35	24	24	27	38	25	7	25	31	8	31	35
	56	25	27	29	35	25	25	28	38	26	8	26	32	9	32	35
	57	25	26	29	35	26	24	28	38	26	7	26	33	8	33	35
	62	27	32	33	35	27	28	31	38	28	11	28	36	13	**36**[1]	35
A	22	23	22	26	36	24	25	27	39	24	6	24	35	8	35	36
	23	23	23	26	36	24	25	28	39	25	5	25	35	8	35	36
	24	20	20	23	36	21	20	23	39	22	3	22	31	5	31	36
	25	20	19	22	36	20	21	24	39	21	5	21	32	6	32	36
	26	19	18	22	36	20	21	23	39	20	3	21	31	4	31	36
	27	19	18	22	36	20	21	23	39	21	2	21	31	3	31	36
	28	18	16	20	36	19	17	21	39	19	-7	19	30	-5	30	36
	29	21	20	23	36	21	22	25	39	22	4	22	31	5	31	36
	30	21	20	23	36	21	23	25	39	22	3	22	31	5	31	36
	31	21	21	24	36	22	25	26	39	22	5	22	32	7	32	36
	32	21	21	24	36	21	24	26	39	22	7	22	32	8	32	36
	34	21	24	26	36	22	27	28	39	22	8	23	34	10	34	36
	35	21	27	28	36	21	23	25	39	22	10	22	33	11	33	36
	36	21	24	26	36	21	20	24	39	22	6	22	32	7	32	36
	37	18	19	22	36	18	17	21	39	19	7	19	25	8	25	36

YEAR 6 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – NON-MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
A	38	22	23	25	36	22	22	25	39	23	6	23	32	7	32	36
	39	19	20	23	36	19	18	22	39	20	2	20	24	4	24	36
	40	17	18	20	36	17	15	19	39	18	5	18	24	6	24	36
	41	14	13	17	36	14	11	16	39	14	4	15	24	5	24	36
	42	22	23	26	36	22	24	26	39	23	6	23	32	7	32	36
	43	22	24	26	36	23	24	26	39	23	9	24	33	10	33	36
C	47	26	34	34	35	26	33	34	37	27	16	27	34	18	34	35
	63	26	31	32	35	26	29	31	37	27	14	27	36	16	**36**[1]	35
	64	28	32	33	35	28	31	33	37	29	17	29	36	19	**36**[1]	35
D	44	21	26	27	37	22	25	27	41	22	13	23	33	15	33	38
	48	24	29	30	37	24	28	30	41	25	13	25	32	16	32	38
	49	23	30	31	37	24	29	30	41	24	14	25	34	16	34	38
F	65	26	32	33	39	27	31	32	40	28	10	28	35	11	35	40
	66	26	33	33	39	26	30	32	40	27	11	27	34	12	34	40
	67	26	32	33	39	27	30	32	40	28	12	28	35	13	35	40
	68	30	35	36	39	31	34	36	40	32	13	32	37	14	37	40
	71	32	37	38	39	33	37	38	40	34	14	34	39	16	39	40
	72	33	37	38	39	33	37	39	40	34	14	34	38	16	38	40
	73	32	37	38	39	33	37	39	40	34	14	34	39	16	39	40
	76	34	35	38	39	35	33	37	40	35	14	35	40	16	40	40

Note 1: Marginal Noise Management Zone 1 to 2 dBA above project specific criteria (bold text)

Note 2: Moderate Noise Management Zone 3 to 5 dBA above project specific criteria (bold text)

Note 3: Noise Affection Zone >5 dBA above project specific criteria (bold text and shaded cell)

YEAR 8 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – NON-MINE OWNED RESIDENCES

Full Pit Operation - Year 8 $L_{Aeq(15minute)}$ Intrusive Noise Emissions (dBA re 20µPa)

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
1	80	26	0	26	35	27	0	27	38	28	0	28	35	0	35	36
3	87	33	0	33	38	34	0	34	40	35	0	35	40	0	**40[1]**	39
	106	33	0	33	38	34	0	34	40	35	0	35	41	0	**41[1]**	39
4	88	23	0	23	39	23	0	23	42	24	0	24	33	0	33	37
	91	24	0	24	39	25	0	25	42	26	0	26	33	0	33	37
	94	24	0	24	39	24	0	24	42	25	0	25	32	0	32	37
	95	25	0	25	39	25	0	25	42	26	0	26	33	0	33	37
	96	25	0	25	39	26	0	26	42	27	0	27	34	0	34	37
	99	23	0	23	39	24	0	24	42	24	0	24	31	0	31	37
	100	23	0	23	39	23	0	23	42	24	0	24	31	0	31	37
	105	25	0	25	39	25	0	25	42	26	0	26	34	0	34	37
	161	25	0	25	39	26	0	26	42	27	0	27	30	0	30	37
5	103	26	0	26	50	22	0	22	46	22	0	22	31	0	31	42
	104	33	0	33	50	23	0	23	46	24	0	24	42	0	42	42
	111	33	0	33	50	38	0	38	46	38	0	38	37	0	37	42
	111	23	0	23	50	31	0	31	46	32	0	32	35	0	35	42
	118	24	0	24	50	28	0	28	46	29	0	29	37	0	37	42
	120	24	0	24	50	28	0	28	46	29	0	29	33	0	33	42
	121	25	0	25	50	26	0	26	46	26	0	26	32	0	32	42
	123	25	0	25	50	24	0	24	46	24	0	24	34	0	34	42
	125	23	0	23	50	26	0	26	46	27	0	27	32	0	32	42
	126	23	0	23	50	24	0	24	46	25	0	25	36	0	36	42
	129	25	0	25	50	31	0	31	46	31	0	31	32	0	32	42
	139	20	0	20	50	21	0	21	46	21	0	21	30	0	30	42
	154	30	0	30	50	31	0	31	46	32	0	32	38	0	38	42
	156	29	0	29	50	30	0	30	46	31	0	31	37	0	37	42
	157	27	0	27	50	28	0	28	46	29	0	29	37	0	37	42
	159	27	0	27	50	28	0	28	46	29	0	29	35	0	35	42
6	132	25	0	25	39	25	0	25	41	26	0	26	33	0	33	38

YEAR 8 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – NON-MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
6	133	23	0	23	39	24	0	24	41	25	0	25	33	0	33	38
	137	20	0	20	39	20	0	20	41	21	0	21	30	0	30	38
7	108	38	0	38	45	39	0	39	42	39	0	39	44	0	**44**[2]	39
	109	40	0	40	45	40	0	40	42	40	0	**40**[1]	45	0	**45**[3]	39
	110	38	0	38	45	39	0	39	42	39	0	39	44	0	**44**[2]	39
8	142	13	0	13	42	13	0	13	42	14	0	14	27	0	27	35
9	2	28	0	28	37	28	0	28	40	29	0	29	35	0	35	38
	3	25	0	25	37	26	0	26	40	27	0	27	37	0	37	38
	4	27	0	27	37	28	0	28	40	28	0	28	37	0	37	38
	143	16	0	16	37	16	0	16	40	17	0	17	32	0	32	38
	144	18	0	18	37	19	0	19	40	20	0	20	33	0	33	38
	145	19	0	19	37	19	0	19	40	20	0	20	34	0	34	38
	146	17	0	17	37	17	0	17	40	18	0	18	33	0	33	38
	147	18	0	18	37	18	0	18	40	19	0	19	34	0	34	38
	148	19	0	19	37	19	0	19	40	20	0	20	34	0	34	38
	149	20	0	20	37	20	0	20	40	21	0	21	32	0	32	38
	150	20	0	20	37	20	0	20	40	21	0	21	34	0	34	38
	151	20	0	20	37	20	0	20	40	21	0	21	34	0	34	38
	152	22	0	22	37	22	0	22	40	23	0	23	34	0	34	38
10	5	28	0	28	36	29	0	29	39	30	0	30	38	0	**38**[1]	37
	6	28	0	28	36	29	0	29	39	30	0	30	39	0	**39**[1]	37
	8	29	0	29	36	30	0	30	39	31	0	31	40	0	**40**[2]	37
	9	28	0	28	36	29	0	29	39	29	0	29	41	0	**41**[2]	37
	10	28	0	28	36	28	0	28	39	29	0	29	39	0	**39**[1]	37
	11	28	0	28	36	29	0	29	39	29	0	29	40	0	**40**[2]	37
	13	30	0	30	36	30	0	30	39	31	0	31	41	0	**41**[2]	37
11	7	28	0	28	38	29	0	29	41	29	0	29	37	0	37	39
	12	28	0	28	38	29	0	29	41	30	0	30	38	0	38	39
	14	30	0	30	38	31	0	31	41	31	0	31	40	0	**40**[1]	39
	15	29	0	29	38	30	0	30	41	31	0	31	37	0	37	39

YEAR 8 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – NON-MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
11	16	29	0	29	38	30	0	30	41	31	0	31	40	0	**40**[1]	39
	17	23	0	23	38	24	0	24	41	24	0	24	34	0	34	39
	18	21	0	21	38	22	0	22	41	22	0	22	31	0	31	39
	19	18	0	18	38	19	0	19	41	19	0	19	35	0	35	39
	20	19	0	19	38	20	0	20	41	21	0	21	35	0	35	39
	21	19	0	19	38	20	0	20	41	20	0	20	34	0	34	39
12	50	21	0	21	35	22	0	22	38	23	0	23	32	0	32	35
	51	19	0	19	35	19	0	19	38	20	0	20	32	0	32	35
	52	18	0	18	35	18	0	18	38	19	0	19	25	0	25	35
	53	20	0	20	35	21	0	21	38	22	0	22	31	0	31	35
	54	20	0	20	35	21	0	21	38	22	0	22	31	0	31	35
	55	18	0	18	35	19	0	19	38	19	0	19	28	0	28	35
	56	19	0	19	35	20	0	20	38	21	0	21	29	0	29	35
	57	20	0	20	35	20	0	20	38	21	0	21	31	0	31	35
	62	22	0	22	35	23	0	23	38	24	0	24	32	0	32	35
A	22	22	0	22	36	23	0	23	39	23	0	23	33	0	33	36
	23	23	0	23	36	23	0	23	39	24	0	24	34	0	34	36
	24	19	0	19	36	20	0	20	39	20	0	20	30	0	30	36
	25	19	0	19	36	19	0	19	39	20	0	20	30	0	30	36
	26	18	0	18	36	19	0	19	39	19	0	19	29	0	29	36
	27	18	0	18	36	19	0	19	39	20	0	20	28	0	28	36
	28	16	0	16	36	17	0	17	39	18	0	18	28	0	28	36
	29	19	0	19	36	20	0	20	39	21	0	21	30	0	30	36
	30	19	0	19	36	20	0	20	39	21	0	21	29	0	29	36
	31	19	0	19	36	20	0	20	39	21	0	21	30	0	30	36
	32	19	0	19	36	20	0	20	39	20	0	20	31	0	31	36
	34	20	0	20	36	20	0	20	39	21	0	21	31	0	31	36
	35	18	0	18	36	18	0	18	39	19	0	19	31	0	31	36
	36	18	0	18	36	19	0	19	39	20	0	20	28	0	28	36
	37	15	0	15	36	15	0	15	39	16	0	16	23	0	23	36
	38	19	0	19	36	19	0	19	39	20	0	20	29	0	29	36

YEAR 8 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – NON-MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
A	39	15	0	15	36	16	0	16	39	17	0	17	22	0	22	36
	40	14	0	14	36	15	0	15	39	15	0	15	22	0	22	36
	41	11	0	11	36	12	0	12	39	12	0	12	20	0	20	36
	42	18	0	18	36	19	0	19	39	20	0	20	30	0	30	36
	43	19	0	19	36	20	0	20	39	21	0	21	31	0	31	36
C	47	21	0	21	35	22	0	22	37	23	0	23	29	0	29	35
	63	21	0	21	35	22	0	22	37	23	0	23	32	0	32	35
	64	22	0	22	35	23	0	23	37	24	0	24	31	0	31	35
D	44	17	0	17	37	18	0	18	41	19	0	19	31	0	31	38
	48	19	0	19	37	20	0	20	41	21	0	21	27	0	27	38
	49	20	0	20	37	20	0	20	41	21	0	21	29	0	29	38
F	65	21	0	21	39	22	0	22	40	23	0	23	31	0	31	40
	66	19	0	19	39	20	0	20	40	21	0	21	31	0	31	40
	67	20	0	20	39	21	0	21	40	22	0	22	31	0	31	40
	68	23	0	23	39	24	0	24	40	25	0	25	34	0	34	40
	71	25	0	25	39	26	0	26	40	27	0	27	35	0	35	40
	72	25	0	25	39	26	0	26	40	27	0	27	35	0	35	40
	73	26	0	26	39	27	0	27	40	28	0	28	35	0	35	40
	76	27	0	27	39	28	0	28	40	29	0	29	36	0	36	40

Note 1: Marginal Noise Management Zone 1 to 2 dBA above project specific criteria (bold text)

Note 2: Moderate Noise Management Zone 3 to 5 dBA above project specific criteria (bold text)

Note 3: Noise Affection Zone >5 dBA above project specific criteria (bold text and shaded cell)

YEAR 3 - PART PIT OPERATION INTRUSIVE NOISE EMISSIONS – NON-MINE OWNED RESIDENCES

Part Pit Operation - Year 3 $L_{Aeq(15minute)}$ Intrusive Noise Emissions (dBA re 20µPa)

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
1	80	30	30	33	35	30	31	34	38	31	8	31	38	9	**38[1]**	36
3	87	39	21	**40[1]**	38	40	22	40	40	41	4	**41[1]**	46	6	**46[3]**	39
	106	40	17	**40[1]**	38	41	18	**41[1]**	40	40	-3	**40[1]**	46	-1	**46[3]**	39
4	88	26	13	26	39	27	13	27	42	27	0	27	38	1	**38[1]**	37
	91	29	14	29	39	30	14	30	42	31	0	31	39	1	**39[1]**	37
	94	27	13	27	39	27	14	28	42	28	0	28	38	1	**38[1]**	37
	95	29	14	29	39	29	14	30	42	30	0	30	39	1	**39[1]**	37
	96	31	14	31	39	31	15	31	42	32	1	32	40	2	**40[2]**	37
	99	27	13	27	39	27	13	27	42	28	-1	28	37	0	37	37
	100	26	12	26	39	26	13	27	42	27	-1	27	37	0	37	37
	105	28	13	28	39	29	14	29	42	28	2	28	40	2	**40[2]**	37
	161	31	14	31	39	31	15	31	42	32	1	32	40	2	**40[2]**	37
5	103	25	12	25	50	25	13	26	46	25	-14	25	33	-12	33	42
	104	25	12	26	50	26	13	26	46	25	-2	25	36	-1	36	42
	111	40	16	40	50	41	17	41	46	40	0	40	47	2	**47[2]**	42
	112	36	15	36	50	37	15	37	46	36	1	36	43	3	**43[1]**	42
	118	32	16	33	50	33	17	33	46	32	0	33	40	0	40	42
	120	33	16	33	50	33	17	34	46	33	-6	33	40	-4	40	42
	121	28	13	28	50	29	14	29	46	28	-9	28	37	-7	37	42
	123	26	11	26	50	26	11	26	46	26	-8	26	36	-5	36	42
	125	29	13	29	50	29	14	29	46	29	-9	29	38	-7	38	42
	126	26	11	26	50	27	12	27	46	26	-6	26	37	-4	37	42
	129	28	13	28	50	28	14	28	46	28	-7	28	39	-5	39	42
	139	21	9	21	50	22	10	22	46	21	-9	21	33	-7	33	42
	154	36	15	36	50	36	16	36	46	36	0	36	42	1	42	42
	156	34	16	34	50	35	16	35	46	34	0	34	42	1	42	42
	157	33	16	33	50	33	17	34	46	33	-6	33	40	-4	40	42
	159	32	16	33	50	33	17	33	46	32	0	33	40	0	40	42

YEAR 3 - PART PIT OPERATION INTRUSIVE NOISE EMISSIONS – NON-MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
6	132	22	9	22	39	23	10	23	41	22	-6	22	36	-5	36	38
	133	23	10	24	39	24	11	24	41	23	-5	23	36	-5	36	38
	137	18	7	19	39	19	8	19	41	18	-7	18	33	-6	33	38
7	108	48	16	**48[2]**	45	49	16	**49[3]**	42	48	2	**48[3]**	52	4	**52[3]**	39
	109	49	16	**49[2]**	45	50	16	**50[3]**	42	49	1	**49[3]**	54	3	**54[3]**	39
	110	47	17	**47[1]**	45	48	17	**48[3]**	42	47	1	**47[3]**	53	3	**53[3]**	39
	Dulwich	49	16	**49[2]**	45	50	16	**50[3]**	42	49	1	**49[3]**	51	3	**51[3]**	39
8	142	15	4	15	42	15	5	15	42	15	-8	15	27	-7	27	35
9	2	28	17	29	37	29	18	29	40	30	1	30	36	3	36	38
	3	26	18	27	37	27	18	27	40	27	1	27	38	14	38	38
	4	27	18	28	37	28	19	29	40	29	2	29	38	14	38	38
	143	17	8	18	37	18	8	18	40	17	-9	17	33	-7	33	38
	144	20	8	20	37	20	9	20	40	20	-4	20	34	-4	34	38
	145	20	8	20	37	20	9	21	40	20	-3	20	35	-1	35	38
	146	19	9	19	37	19	10	19	40	19	-6	19	34	-4	34	38
	147	19	10	20	37	20	11	20	40	19	-5	19	35	-3	35	38
	148	20	11	20	37	20	12	21	40	20	-6	20	34	-4	34	38
	149	20	11	20	37	20	11	21	40	20	-4	20	32	-3	32	38
	150	20	12	21	37	21	12	21	40	20	-5	20	35	-3	35	38
	151	20	10	21	37	21	11	21	40	20	-5	20	35	-4	35	38
	152	23	13	24	37	24	14	24	40	23	1	23	35	2	35	38
10	5	29	21	29	36	30	21	30	39	30	3	30	39	9	**39[1]**	37
	6	29	21	30	36	30	22	31	39	31	3	31	40	8	**40[2]**	37
	8	30	22	31	36	31	23	31	39	31	4	31	41	8	**41[2]**	37
	9	29	22	30	36	30	22	30	39	30	5	30	41	8	**41[2]**	37
	10	28	22	29	36	29	22	30	39	30	5	30	40	7	**40[2]**	37
	11	29	23	30	36	29	23	30	39	30	5	30	40	8	**40[2]**	37
	13	30	23	31	36	31	24	32	39	31	6	32	41	8	**41[2]**	37
11	7	29	20	29	38	29	20	30	41	30	3	30	38	7	38	39
	12	28	21	29	38	29	22	30	41	30	4	30	39	6	39	39

YEAR 3 - PART PIT OPERATION INTRUSIVE NOISE EMISSIONS – NON-MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
11	14	30	23	31	38	31	24	32	41	32	5	32	41	7	**41[1]**	39
	15	30	23	30	38	31	23	31	41	31	3	31	39	5	39	39
	16	30	24	31	38	31	25	32	41	32	6	32	41	8	**41[1]**	39
	17	24	20	26	38	25	20	26	41	25	1	25	35	4	35	39
	18	22	19	24	38	23	20	25	41	23	2	23	32	4	32	39
	19	20	21	23	38	20	22	24	41	21	8	21	36	10	36	39
	20	21	22	24	38	21	23	25	41	22	9	22	35	11	35	39
	21	21	22	24	38	21	22	25	41	22	9	22	35	10	35	39
12	50	22	30	31	35	22	31	31	38	23	11	23	33	13	33	35
	51	21	29	29	35	22	30	30	38	23	11	23	33	12	33	35
	52	21	26	27	35	21	26	28	38	22	7	22	26	9	26	35
	53	23	28	29	35	23	29	30	38	24	8	24	33	10	33	35
	54	23	30	31	35	24	31	32	38	24	9	24	33	11	33	35
	55	22	26	27	35	23	27	28	38	23	7	23	30	8	30	35
	56	23	27	29	35	24	28	29	38	25	8	25	31	9	31	35
	57	23	26	28	35	24	27	29	38	25	7	25	33	8	33	35
	62	24	32	32	35	24	33	33	38	25	12	25	35	13	35	35
A	22	23	22	26	36	24	23	26	39	24	8	24	34	10	34	36
	23	23	23	26	36	24	24	27	39	24	10	25	35	12	35	36
	24	20	20	23	36	21	20	23	39	21	7	21	31	9	31	36
	25	19	19	22	36	20	20	23	39	21	6	21	32	7	32	36
	26	19	18	22	36	19	19	22	39	20	5	20	31	6	31	36
	27	19	18	22	36	20	19	22	39	20	4	20	30	5	30	36
	28	18	16	20	36	18	17	21	39	19	-4	19	29	-2	29	36
	29	20	20	23	36	21	21	24	39	21	2	22	31	5	31	36
	30	20	20	23	36	21	21	24	39	21	6	22	31	7	31	36
	31	21	21	24	36	21	22	25	39	22	8	22	31	9	32	36
	32	20	21	24	36	21	22	24	39	22	9	22	32	11	32	36
	34	21	24	26	36	21	25	26	39	22	11	22	32	12	33	36
	35	20	27	27	36	20	27	28	39	21	11	21	32	14	32	36
	36	20	24	25	36	20	25	26	39	21	7	21	30	9	30	36

YEAR 3 - PART PIT OPERATION INTRUSIVE NOISE EMISSIONS – NON-MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
A	37	17	19	21	36	17	20	22	39	18	8	18	22	10	23	36
	38	20	23	25	36	20	24	26	39	21	7	21	32	8	32	36
	39	17	20	22	36	18	21	23	39	18	2	18	23	4	23	36
	40	16	18	20	36	16	18	20	39	17	3	17	21	5	21	36
	41	13	13	16	36	13	14	17	39	14	5	14	18	6	19	36
	42	19	23	25	36	19	24	25	39	20	7	20	31	8	31	36
	43	20	24	25	36	20	25	26	39	21	10	21	32	11	32	36
C	47	23	34	34	35	23	34	35	37	24	20	25	30	22	31	35
	63	23	31	32	35	24	32	33	37	25	13	25	33	16	34	35
	64	25	32	32	35	26	32	33	37	26	15	27	34	17	34	35
D	44	20	26	27	37	20	27	28	41	21	16	22	32	18	32	38
	48	21	29	29	37	21	29	30	41	22	17	23	29	19	29	38
	49	22	30	31	37	22	31	32	41	23	15	23	33	18	33	38
F	65	26	32	33	39	26	33	34	40	27	9	27	34	10	34	40
	66	24	33	33	39	25	34	34	40	26	10	26	32	11	32	40
	67	26	32	33	39	26	33	34	40	27	11	27	33	12	33	40
	68	28	35	36	39	29	36	37	40	29	11	29	36	12	36	40
	71	30	37	38	39	31	38	39	40	32	11	32	38	13	38	40
	72	30	37	38	39	31	38	38	40	32	11	32	37	13	37	40
	73	31	37	38	39	31	38	39	40	32	12	32	38	13	38	40
	76	31	35	37	39	32	36	38	40	32	11	32	39	12	39	40

Note 1: Marginal Noise Management Zone 1 to 2 dBA above project specific criteria (bold text)

Note 2: Moderate Noise Management Zone 3 to 5 dBA above project specific criteria (bold text)

Note 3: Noise Affection Zone >5 dBA above project specific criteria (bold text and shaded cell)

YEAR 6 - PART PIT OPERATION INTRUSIVE NOISE EMISSIONS - NON-MINE OWNED RESIDENCES

Part Pit Operation - Year 6 $L_{Aeq(15minute)}$ Intrusive Noise Emissions (dBA re 20µPa)

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
1	80	23	30	31	35	24	30	31	38	24	12	24	36	13	36	36
3	87	33	26	34	38	34	26	34	40	34	8	34	41	9	**41**[1]	39
	106	34	20	34	38	35	20	35	40	35	3	35	42	5	**42**[2]	39
4	88	25	13	25	39	25	13	25	42	26	3	26	34	4	34	37
	91	26	14	26	39	27	14	27	42	27	3	27	34	4	34	37
	94	25	13	25	39	25	14	25	42	25	2	25	32	4	32	37
	95	26	14	26	39	26	14	27	42	27	3	27	33	4	33	37
	96	27	15	27	39	27	15	28	42	28	3	28	35	4	35	37
	99	24	13	24	39	24	13	25	42	25	2	25	32	3	32	37
	100	23	13	24	39	24	13	24	42	24	2	24	32	3	32	37
	105	27	14	27	39	27	14	27	42	27	4	27	35	5	35	37
	161	27	15	27	39	27	15	28	42	28	3	28	35	4	35	37
5	103	22	13	22	50	22	14	23	46	23	-7	23	31	-5	31	42
	104	22	13	22	50	22	13	23	46	23	1	23	31	2	31	42
	111	34	19	34	50	35	20	35	46	35	2	35	40	3	40	42
	112	30	20	30	50	30	21	31	46	31	4	31	38	4	38	42
	118	28	17	28	50	28	18	29	46	29	2	29	35	3	35	42
	120	28	18	29	50	29	18	29	46	30	2	30	36	3	36	42
	121	26	14	26	50	26	15	26	46	26	1	27	33	2	33	42
	123	24	12	24	50	24	12	24	46	24	0	24	32	2	32	42
	125	26	14	27	50	27	15	27	46	27	0	27	33	1	33	42
	126	24	12	24	50	24	13	25	46	25	1	25	32	2	32	42
	129	24	15	25	50	25	16	25	46	25	0	25	34	2	34	42
	139	22	6	22	50	22	7	23	46	23	-14	23	33	-12	33	42
	154	31	17	31	50	31	18	31	46	32	2	32	31	17	31	42
	156	30	17	30	50	31	17	31	46	31	2	31	37	3	30	42
	157	28	18	29	50	29	18	29	46	30	2	30	36	3	28	42
	159	28	17	28	50	28	18	29	46	29	2	29	35	3	28	42
6	132	22	10	22	39	22	10	23	41	23	-2	23	33	-1	33	38
	133	22	12	23	39	23	12	23	41	24	-3	24	33	-2	33	38

YEAR 6 - PART PIT OPERATION INTRUSIVE NOISE EMISSIONS - NON-MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
6	137	17	7	17	39	17	8	18	41	18	-3	18	31	-3	31	38
7	108	40	20	40	45	40	21	40	42	41	5	**41[1]**	45	6	**45[3]**	39
	109	41	19	41	45	41	20	41	42	41	4	**41[1]**	45	5	**45[3]**	39
	110	39	22	39	45	39	22	39	42	40	4	**40[1]**	44	5	**44[2]**	39
	Dulwich	32	20	32	45	32	21	32	42	33	4	33	39	6	39	39
8	142	13	1	14	42	14	2	14	42	15	-7	15	27	-6	27	35
9	2	28	17	29	37	29	13	29	40	30	-11	30	36	-9	36	38
	3	26	18	27	37	27	12	27	40	28	0	28	37	1	37	38
	4	27	18	28	37	28	12	28	40	29	-1	29	37	1	37	38
	143	17	5	17	37	17	5	17	40	18	-4	18	32	-3	32	38
	144	20	6	20	37	20	7	20	40	21	-1	21	34	0	34	38
	145	20	6	20	37	20	7	20	40	21	-1	21	34	0	34	38
	146	18	5	18	37	18	6	19	40	19	-3	19	33	-2	33	38
	147	19	6	19	37	20	7	20	40	20	-2	20	34	-1	34	38
	148	20	6	20	37	20	7	21	40	21	-10	21	34	-8	34	38
	149	20	5	21	37	21	6	21	40	22	-13	22	32	-11	32	38
	150	21	6	21	37	21	7	21	40	22	-12	22	34	-10	34	38
	151	20	6	20	37	21	7	21	40	22	-15	22	35	-13	35	38
	152	22	8	22	37	23	9	23	40	23	-7	23	34	-5	34	38
10	5	28	21	29	36	29	15	29	39	30	2	30	38	3	**38[1]**	37
	6	29	21	29	36	29	16	30	39	30	2	30	39	3	**39[1]**	37
	8	29	22	30	36	30	9	30	39	31	4	31	40	5	**40[2]**	37
	9	29	22	29	36	29	13	29	39	30	5	30	41	6	**41[2]**	37
	10	28	22	29	36	29	10	29	39	29	5	29	40	6	**40[2]**	37
	11	28	23	29	36	29	13	29	39	30	5	30	40	6	**40[2]**	37
	13	30	23	31	36	31	11	31	39	31	6	31	41	7	**41[3]**	37
11	7	28	20	29	38	29	15	29	41	30	1	30	37	2	37	39
	12	28	21	29	38	29	16	29	41	30	3	30	39	4	39	39
	14	30	23	31	38	31	17	31	41	32	5	32	40	6	**40[1]**	39
	15	29	23	30	38	30	17	30	41	31	4	31	38	5	38	39

YEAR 6 - PART PIT OPERATION INTRUSIVE NOISE EMISSIONS - NON-MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
11	16	30	24	31	38	31	19	31	41	31	6	31	40	7	**40**[1]	39
	17	23	20	25	38	24	15	24	41	24	-4	24	34	-2	34	39
	18	22	19	24	38	22	14	23	41	23	-7	23	31	-5	31	39
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	20	20	22	24	38	20	21	23	41	21	4	21	35	6	35	39
	21	19	22	24	38	20	21	23	41	20	3	21	35	5	35	39
12	50	19	30	30	35	19	28	29	38	20	10	20	32	12	32	35
	51	19	29	29	35	19	27	28	38	20	10	20	32	11	32	35
	52	18	26	26	35	18	24	25	38	19	8	19	24	10	24	35
	53	19	28	29	35	20	26	27	38	20	8	21	32	10	32	35
	54	19	30	31	35	20	27	28	38	20	8	21	32	10	32	35
	55	19	26	26	35	19	24	25	38	20	7	20	28	8	28	35
	56	20	27	28	35	20	25	26	38	21	8	21	29	9	30	35
	57	19	26	27	35	20	24	26	38	20	7	21	31	8	31	35
	62	19	32	32	35	20	28	29	38	20	11	21	33	13	33	35
A	22	23	22	25	36	23	25	27	39	24	6	24	33	8	33	36
	23	23	23	26	36	23	25	27	39	24	5	24	34	8	34	36
	24	19	20	22	36	20	20	23	39	21	3	21	30	5	30	36
	25	19	19	22	36	20	21	24	39	20	5	20	30	6	30	36
	26	18	18	21	36	19	21	23	39	20	3	20	29	4	29	36
	27	19	18	21	36	19	21	23	39	20	2	20	29	3	29	36
	28	17	16	20	36	18	17	20	39	18	-7	18	28	-5	28	36
	29	19	20	23	36	20	22	24	39	21	4	21	30	5	30	36
	30	19	20	23	36	20	23	25	39	21	3	21	30	5	30	36
	31	20	21	24	36	20	25	26	39	21	5	21	30	7	30	36
	32	19	21	24	36	20	24	26	39	21	7	21	31	8	31	36
	34	20	24	25	36	20	27	28	39	21	8	21	31	10	31	36
	35	18	27	27	36	18	23	24	39	19	10	19	31	11	31	36
	36	19	24	25	36	19	20	23	39	20	6	20	29	7	29	36

YEAR 6 - PART PIT OPERATION INTRUSIVE NOISE EMISSIONS - NON-MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
A	37	15	19	21	36	16	17	19	39	16	7	17	21	8	21	36
	38	18	23	24	36	18	22	23	39	19	6	19	30	7	30	36
	39	16	20	22	36	16	18	20	39	17	2	17	21	4	22	36
	40	15	18	19	36	15	15	18	39	16	5	16	20	6	20	36
	41	12	13	16	36	12	11	15	39	13	4	13	18	5	18	36
	42	17	23	24	36	17	24	25	39	17	6	18	30	7	30	36
	43	18	24	25	36	18	24	25	39	19	9	19	31	10	31	36
C	47	20	34	34	35	21	33	33	37	21	16	22	27	18	27	35
	63	19	31	31	35	20	29	29	37	20	14	21	31	16	31	35
	64	20	32	32	35	21	31	32	37	21	17	23	31	19	31	35
D	44	17	26	27	37	18	25	26	41	18	13	19	30	15	30	38
	48	18	29	29	37	19	28	29	41	19	13	20	25	16	25	38
	49	19	30	31	37	19	29	30	41	20	14	21	29	16	29	38
F	65	20	32	33	39	20	31	31	40	21	10	21	32	11	32	40
	66	19	33	33	39	20	30	31	40	20	11	21	30	12	31	40
	67	21	32	32	39	21	30	31	40	22	12	22	30	13	30	40
	68	21	35	35	39	22	34	34	40	22	13	23	34	14	34	40
	71	24	37	37	39	24	37	37	40	25	14	25	35	16	35	40
	72	24	37	37	39	24	37	37	40	25	14	25	35	16	35	40
	73	24	37	37	39	24	37	38	40	25	14	25	36	16	36	40
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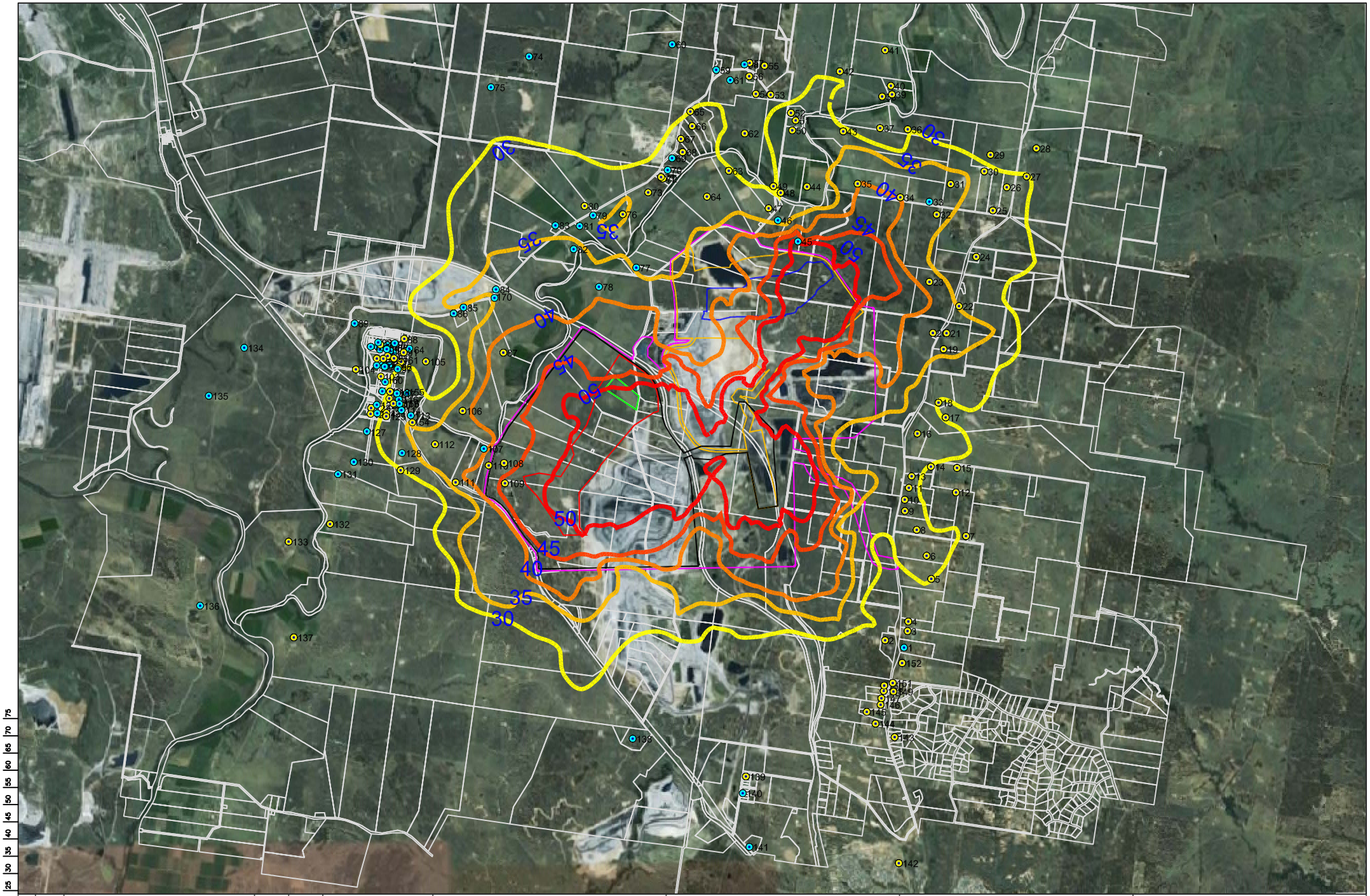
Note 1: Marginal Noise Management Zone 1 to 2 dBA above project specific criteria (bold text)

Note 2: Moderate Noise Management Zone 3 to 5 dBA above project specific criteria (bold text)

Note 3: Noise Affection Zone >5 dBA above project specific criteria (bold text and shaded cell)

Map compiled using MapInfo StreetPro Data, © 2006 MapInfo Australia Pty Ltd, URS Australia and PSMA Australia Ltd. URS Australia, MapInfo Australia or PSMA Australia do not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that these companies shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

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Receptors (Mine Owned)
Receptors (None-Mine Owned)

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	23/02/09		YL	MB

0 505 1010
Scale = 1:50499

Legend
- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

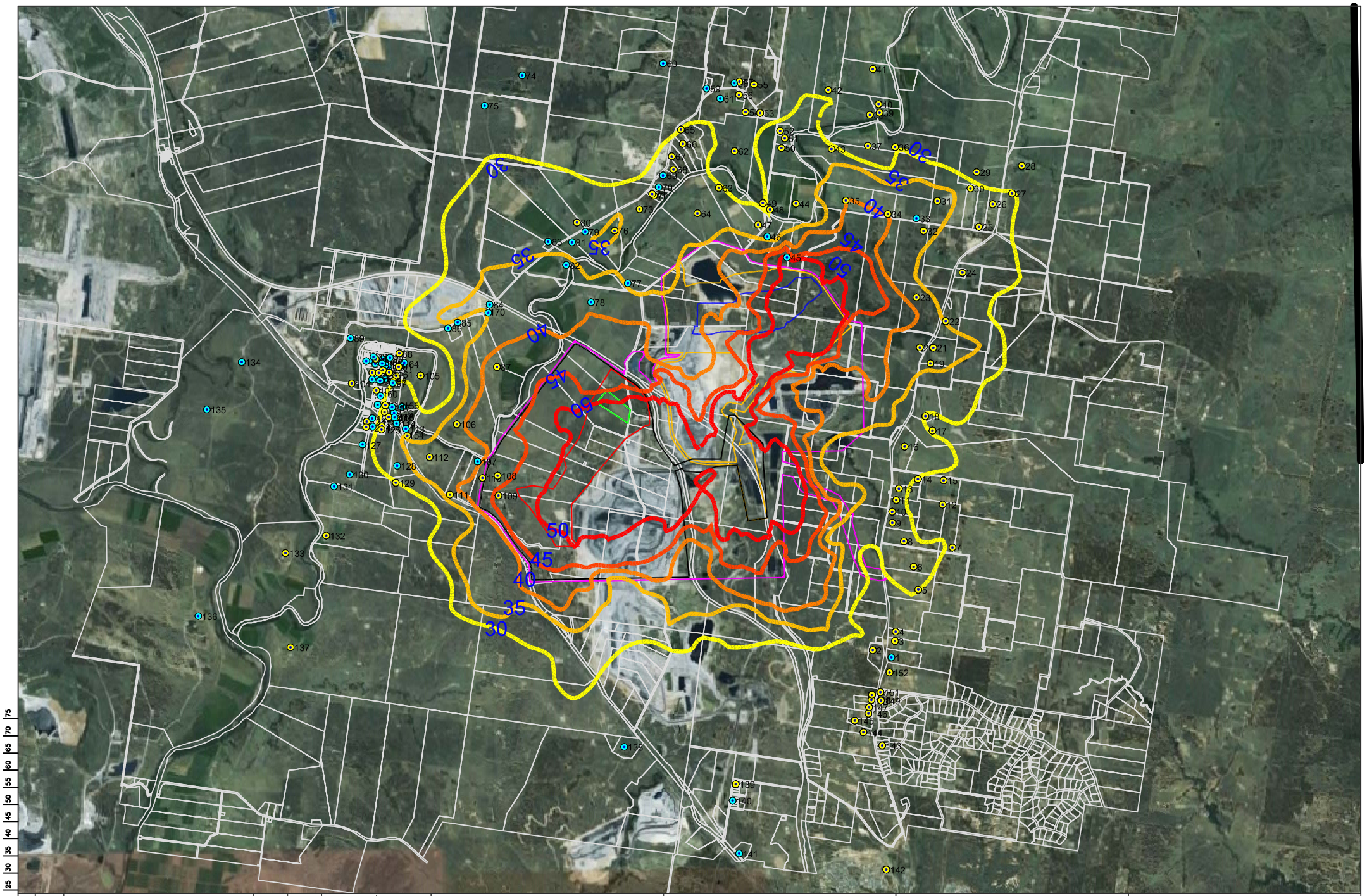
- Open Cut Project Area
- Open Cut Extension Area
- Mine Area: Full Pit Extent
- North Open Cut Boundary
- North Open Cut
- Dulwich

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10-5202 Integra Open Cut Project
Full Pit Extent Year 1 - Daytime

FILE NAME: 10-5202 Noise Contours - 743 Year 1 - Daytime.dwg
DRAWING No.: 10-5202 743Y1 - Evening
REVISION: 0

75 mm ON ORIGINAL



75 mm ON ORIGINAL

Receptors (Mine Owned)
Receptors (None-Mine Owned)

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	23/02/09		YL	MB

0 505 1010
Scale = 1:50499

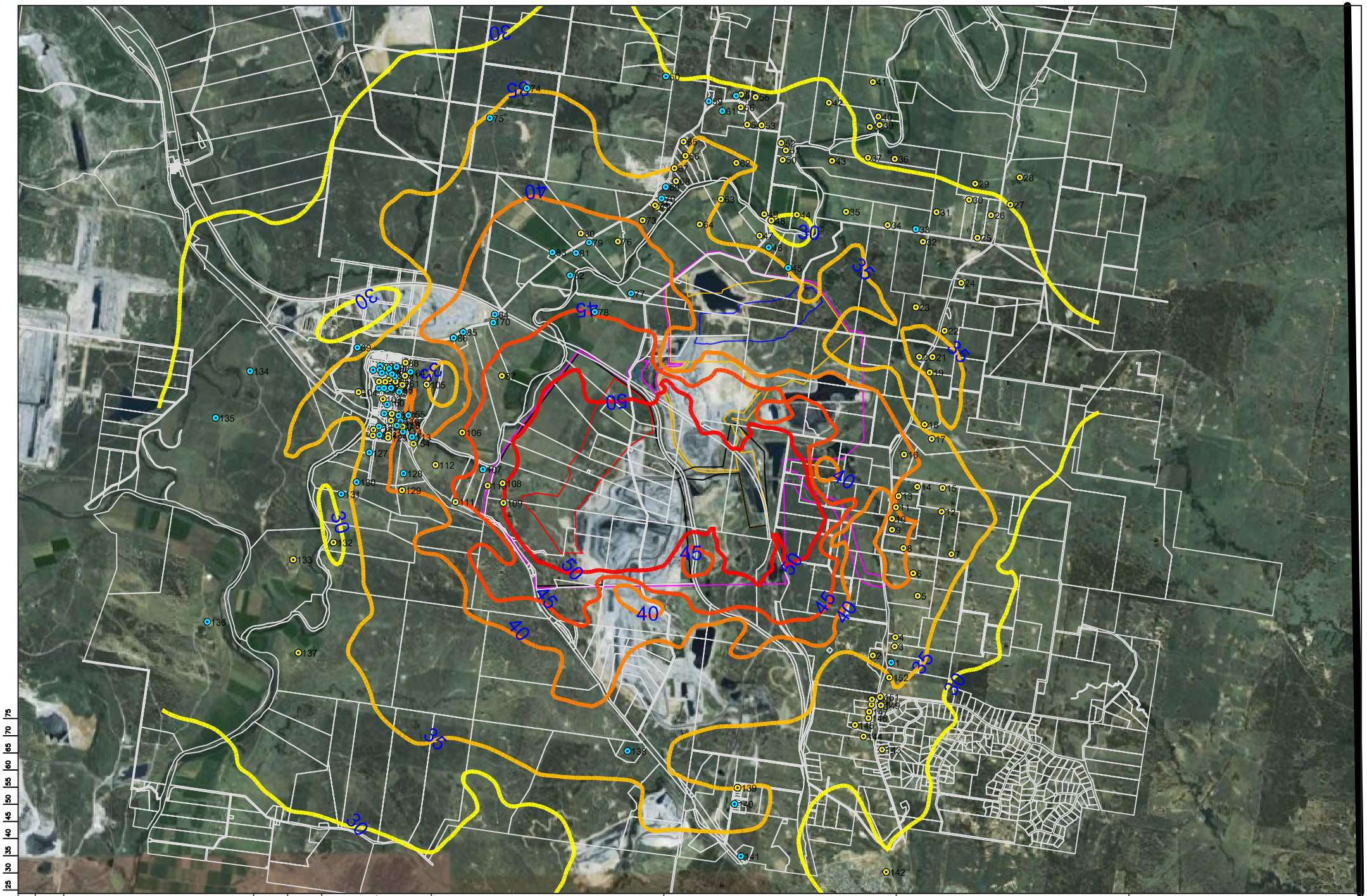
Legend
- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

- Open Cut Project Area
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10-5202 Integra Open Cut Project
Full Pit Extent Year 1 - Evening

FILE NAME: 10-5202 Noise Contours - 743 Year 1 - Evening.dwg
DRAWING No.: 10-5202 743Y1 - Evening
REVISION: 0



75 mm ON ORIGINAL

Receptors (Mine Owned)
Receptors (None-Mine Owned)

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	23/02/09		YL	MB

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Scale = 1:51202

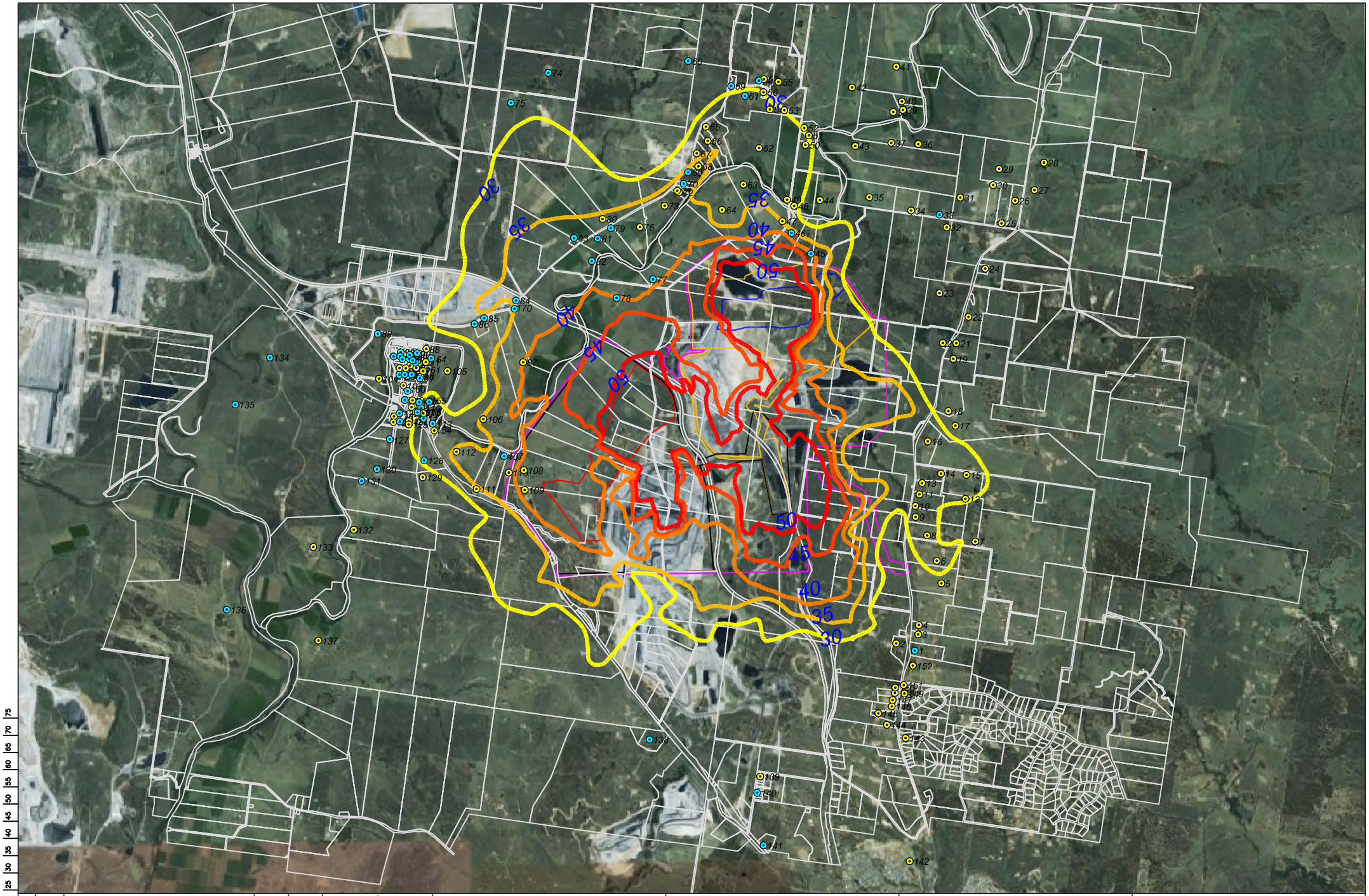
Legend
- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

- Open Cut Project Area
- Open Cut Extension Area
- Mine Area: Full Pit Extent
- North Open Cut Boundary
- North Open Cut
- Dulwich

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10-5202 Integra Open Cut Project
Full Pit Extent Year 1
Night (3degC/100m)

FILE NAME: 10-5202 Noise Contours - 743 Year 1 - Night.dwg
DRAWING No.: 10-5202 743Y1 - Night (3degC/100m)
REVISION: 0



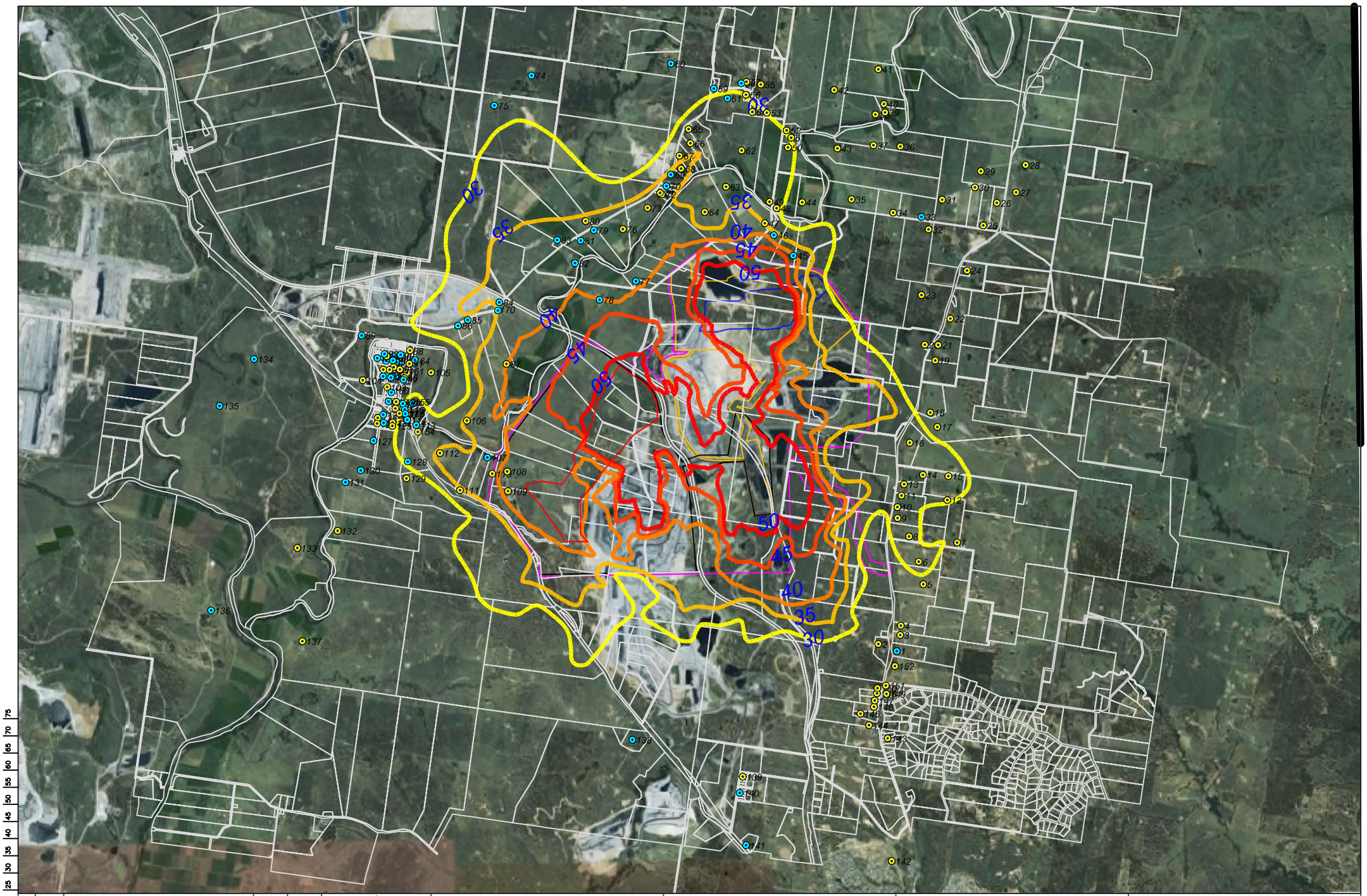
75 mm ON ORIGINAL

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	23/02/09		YL	MB

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10-5202 Integra Open Cut Project
Full Pit Extent Year 4 - Daytime

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 743 Year 4 - Daytime.dwg	10-5202 743Y4 - Daytime	0



75 mm ON ORIGINAL

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	24/09/06		YL	MB

Receptors (Mine Owned)
Receptors (None-Mine Owned)

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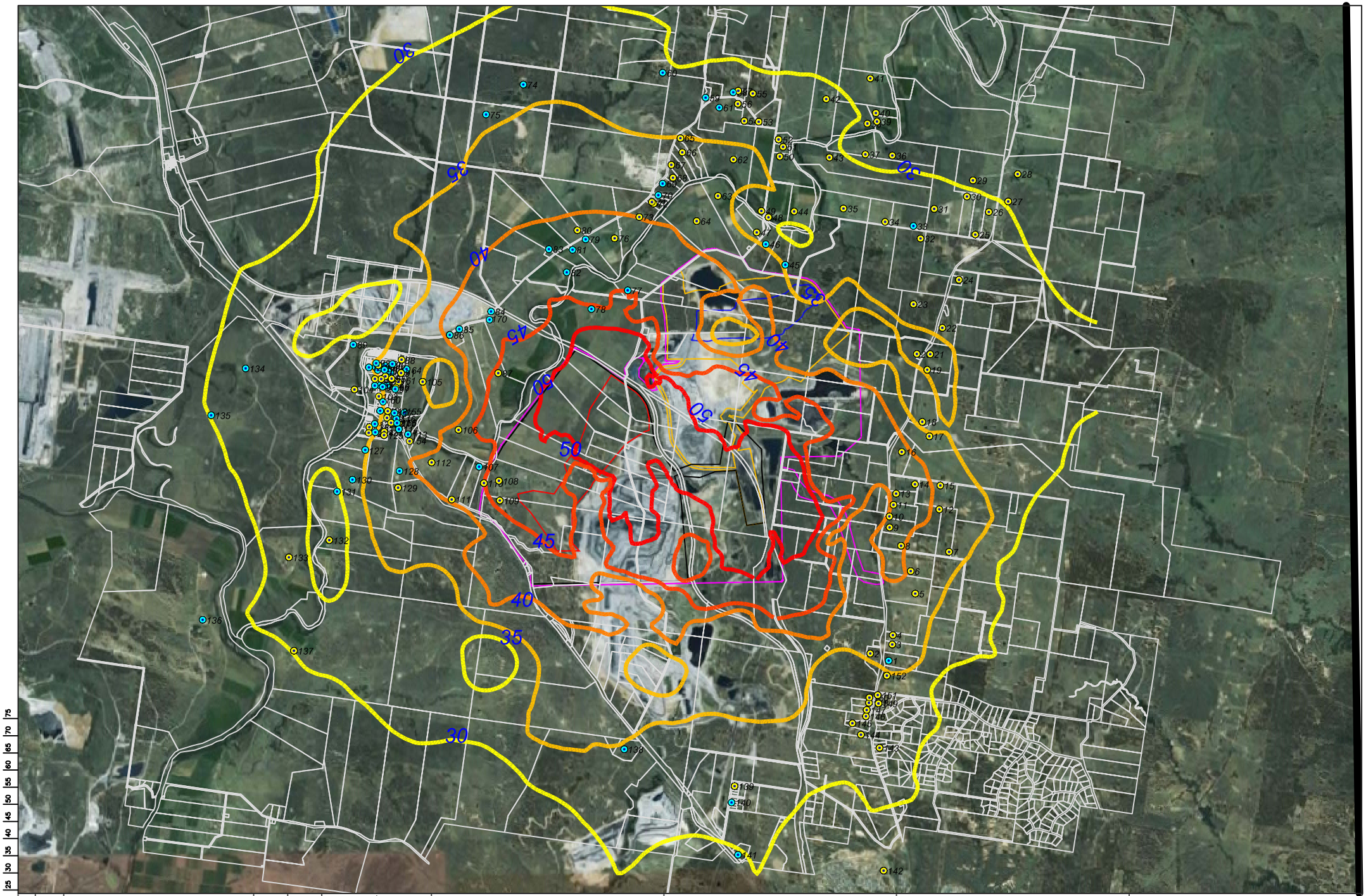
Legend
- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

- Open Cut Project Area
- Open Cut Extension Area
- Mine Area: Full Pit Extent
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- North Open Cut

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10-5202 Integra Open Cut Project
Full Pit Extent Year 4 - Evening

FILE NAME: 10-5202 Noise Contours - 743 Year 4 - Evening.dwg
DRAWING No.: 10-5202 743Y4 - Evening
REVISION: 0



75 mm ON ORIGINAL

Receptors (Mine Owned)
Receptors (None-Mine Owned)

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	23/02/09		YL	MB

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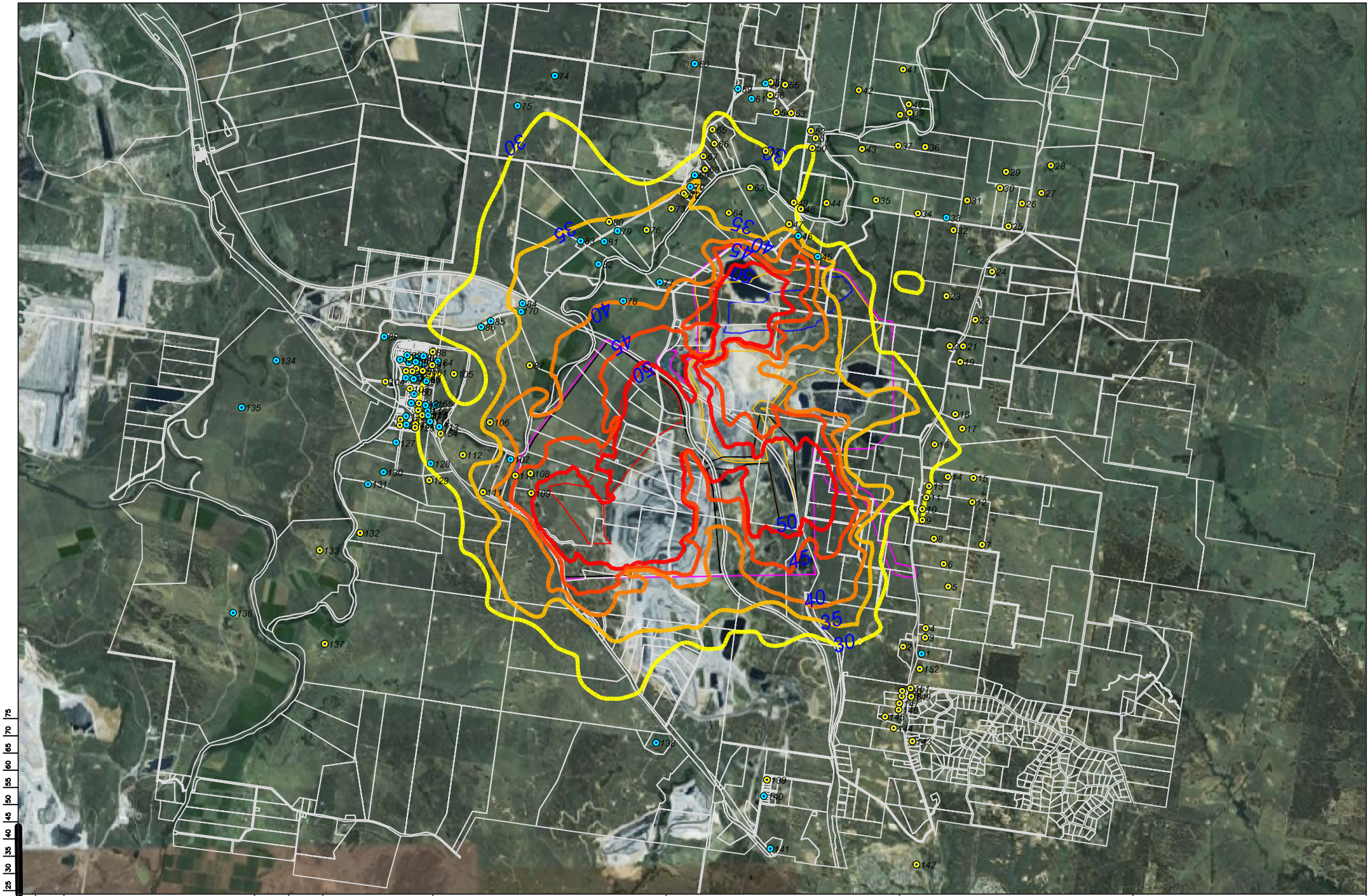
Legend
- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

- Open Cut Project Area
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10-5202 Integra Open Cut Project
Full Pit Extent Year 4
Night (3degC/100m)

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 743 Year 4 - Night.dwg	10-5202 743Y4 - Night (3degC/100m)	0



75 mm ON ORIGINAL

Receptors (Mine Owned)
Receptors (None-Mine Owned)

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	23/02/09		YL	MB

0 511 1022
Scale = 1:51054

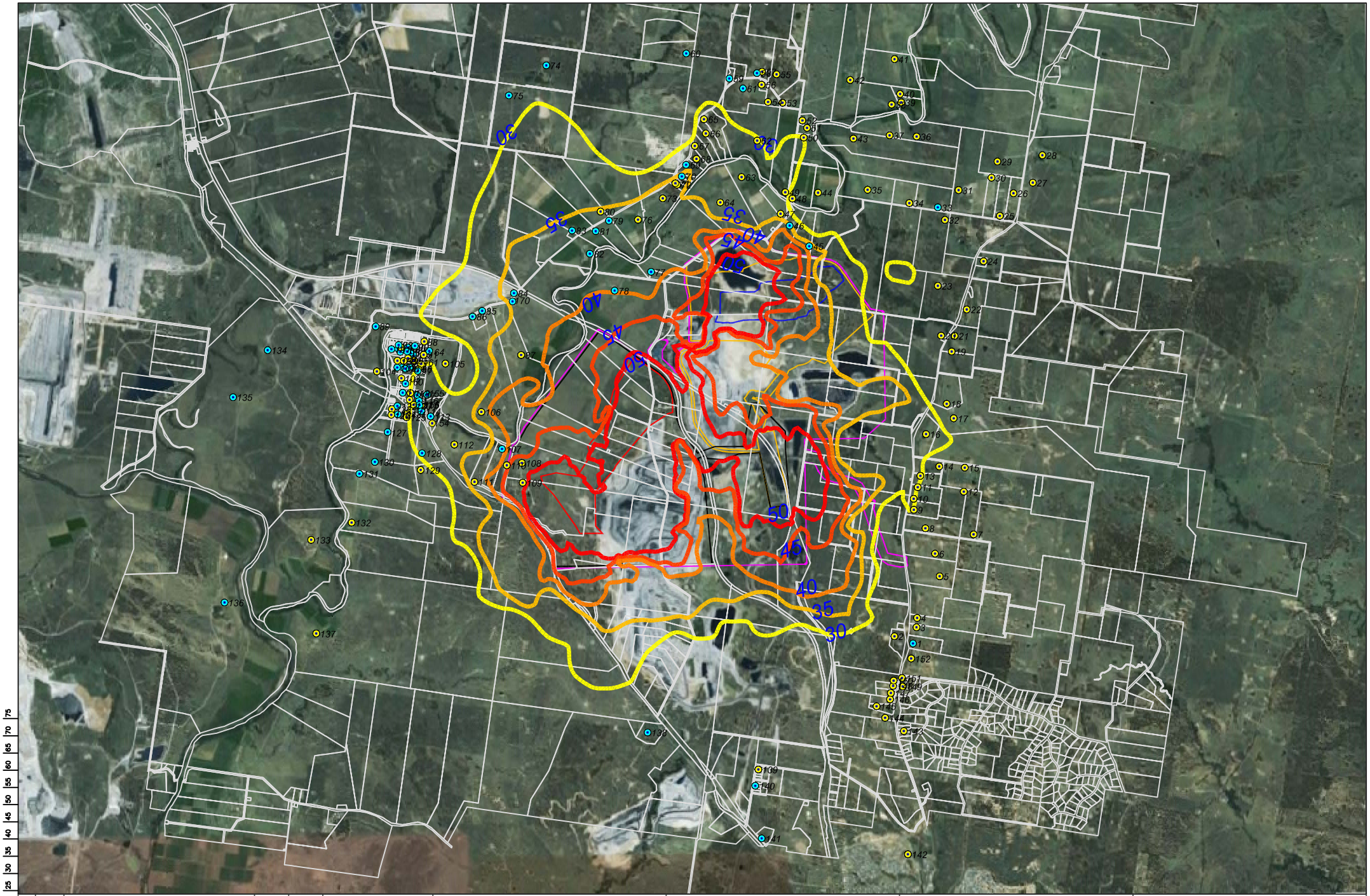
Legend
- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

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10-5202 Integra Open Cut Project
Full Pit Extent Year 6 - Daytime

FILE NAME: 10-5202 Noise Contours - 743 Year 6 - Daytime.dwg
DRAWING No.: 10-5202 743Y6 - Daytime
REVISION: 0



Receptors (Mine Owned)
Receptors (None-Mine Owned)

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	23/02/09		YL	MB

0 511 1022
Scale = 1:51054

Legend
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- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

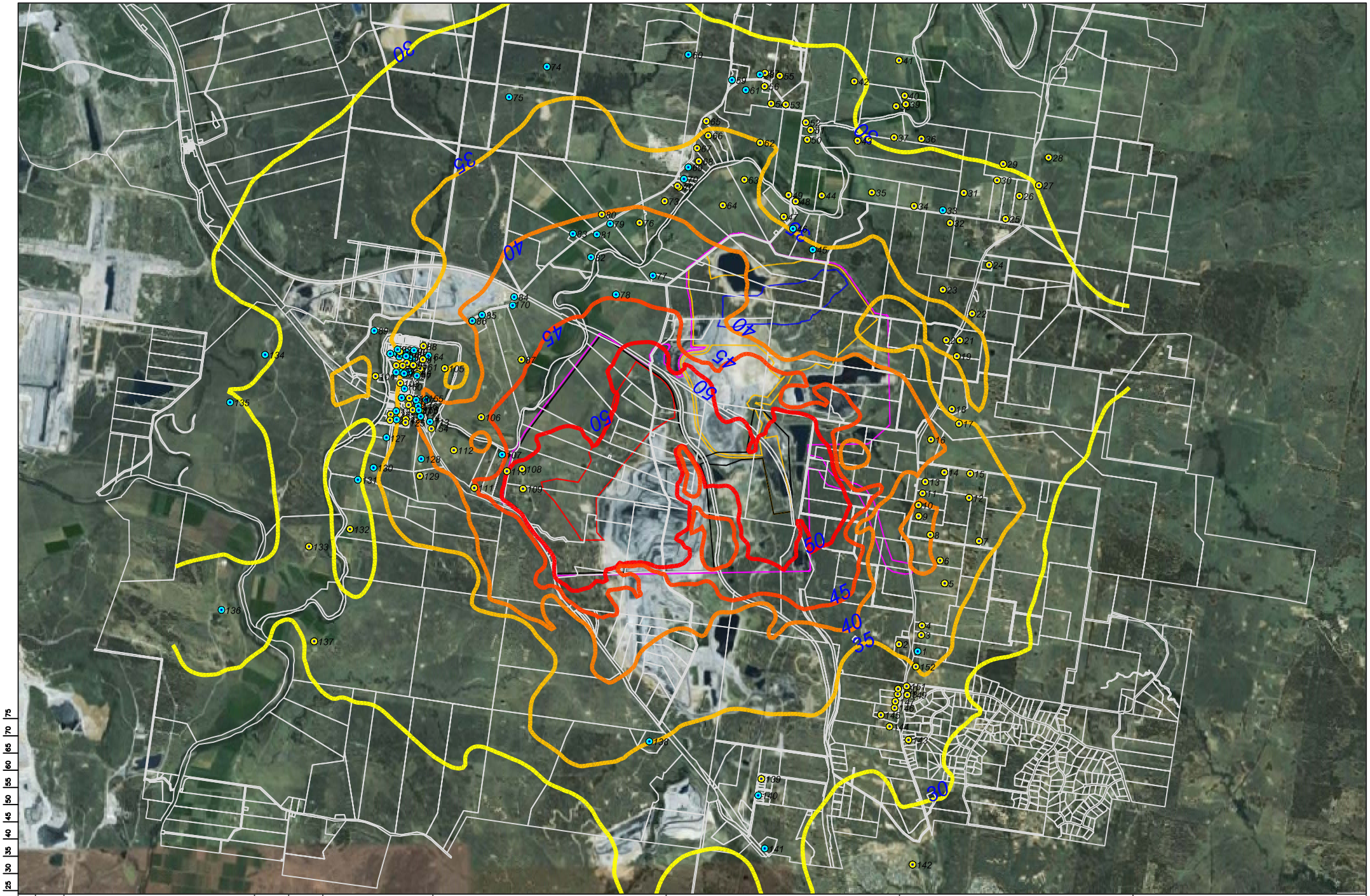
- Open Cut Project Area
- Open Cut Extension Area
- Mine Area: Full Pit Extent
- North Open Cut Boundary
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10-5202 Integra Open Cut Project
Full Pit Extent Year 6 - Evening

FILE NAME: 10-5202 Noise Contours - 743 Year 6 - Evening.dwg
DRAWING No.: 10-5202 743Y6 - Evening
REVISION: 0

75 mm ON ORIGINAL



75 mm ON ORIGINAL

Receptors (Mine Owned)
Receptors (None-Mine Owned)

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	23/02/09		YL	MB

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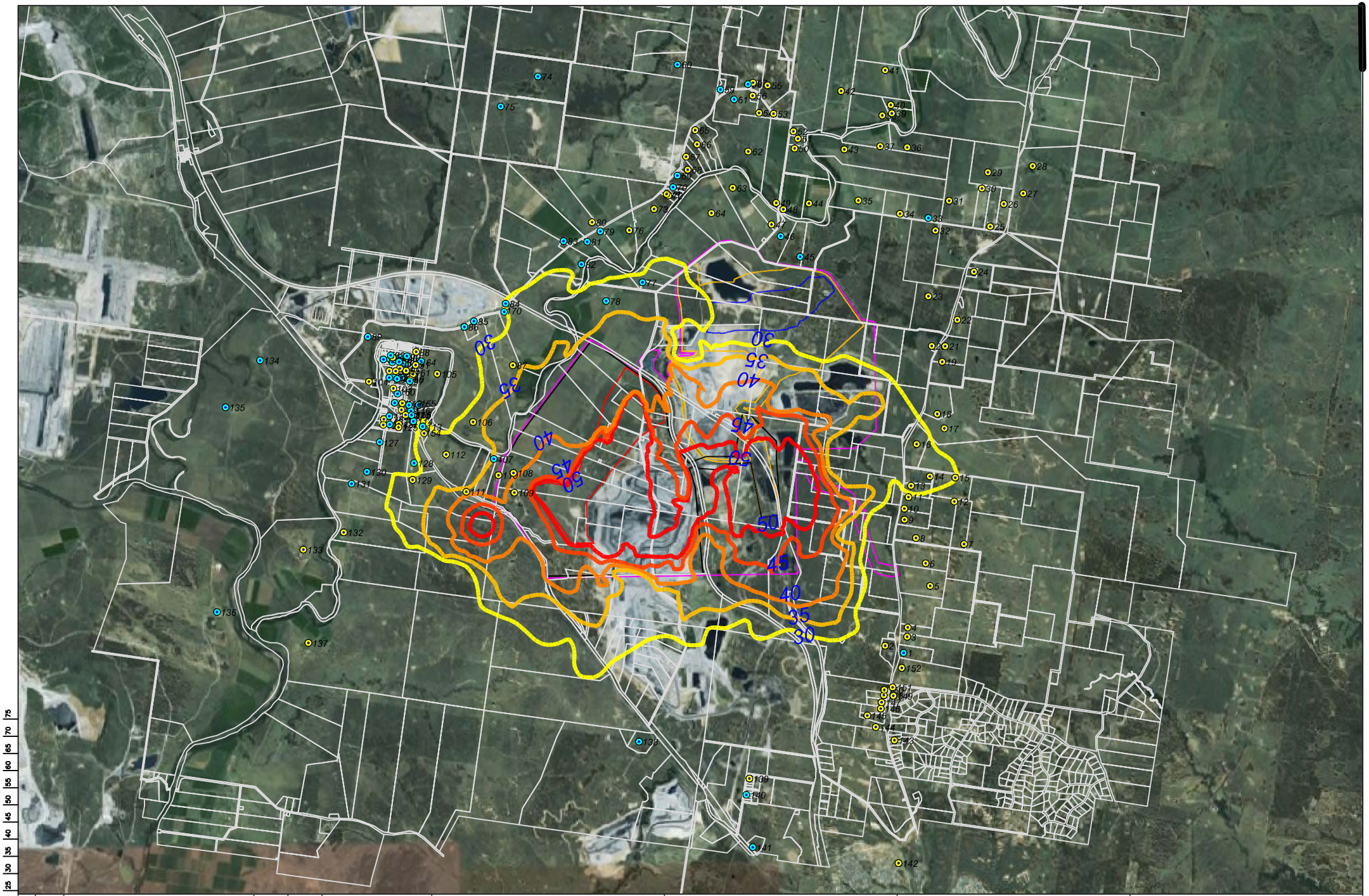
Legend
- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

- Open Cut Project Area
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10-5202 Integra Open Cut Project
Full Pit Extent Year 6
Night (3degC/100m)

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 743 Year 6 - Night.dwg	10-5202 743Y6 - Night (3degC/100m)	0



75 mm ON ORIGINAL

Receptors (Mine Owned)
Receptors (None-Mine Owned)

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	23/02/09		YL	MB

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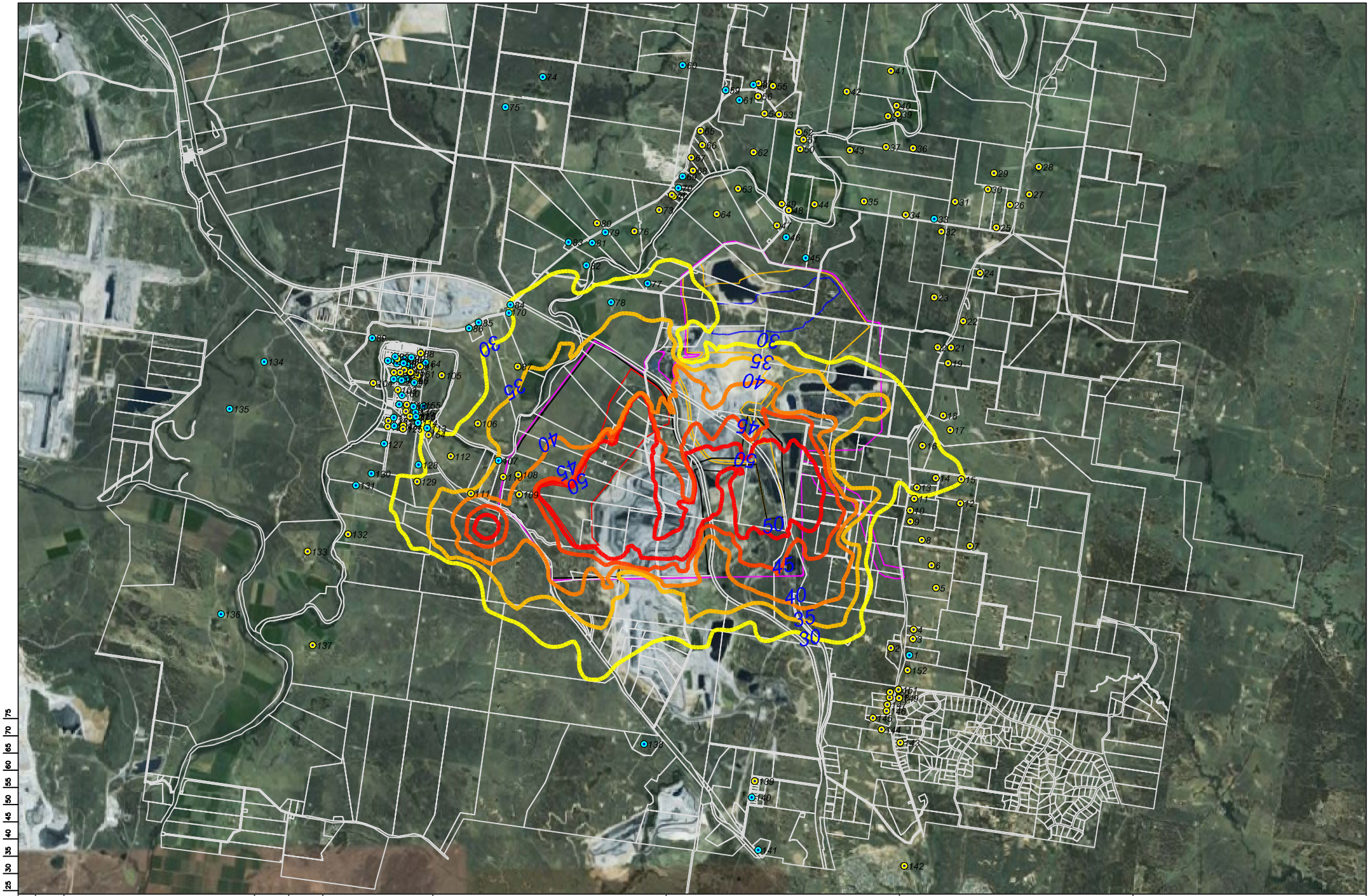
Legend
- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

- Open Cut Project Area
- Open Cut Extension Area
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- North Open Cut

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10-5202 Integra Open Cut Project
Full Pit Extent Year 8 - Daytime

FILE NAME: 10-5202 Noise Contours - 743 Year 8 - Daytime.dwg
DRAWING No.: 10-5202 743Y8 - Daytime
REVISION: 0



75 mm ON ORIGINAL

Receptors (Mine Owned)
Receptors (None-Mine Owned)

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	23/02/09		YL	MB

0 511 1022
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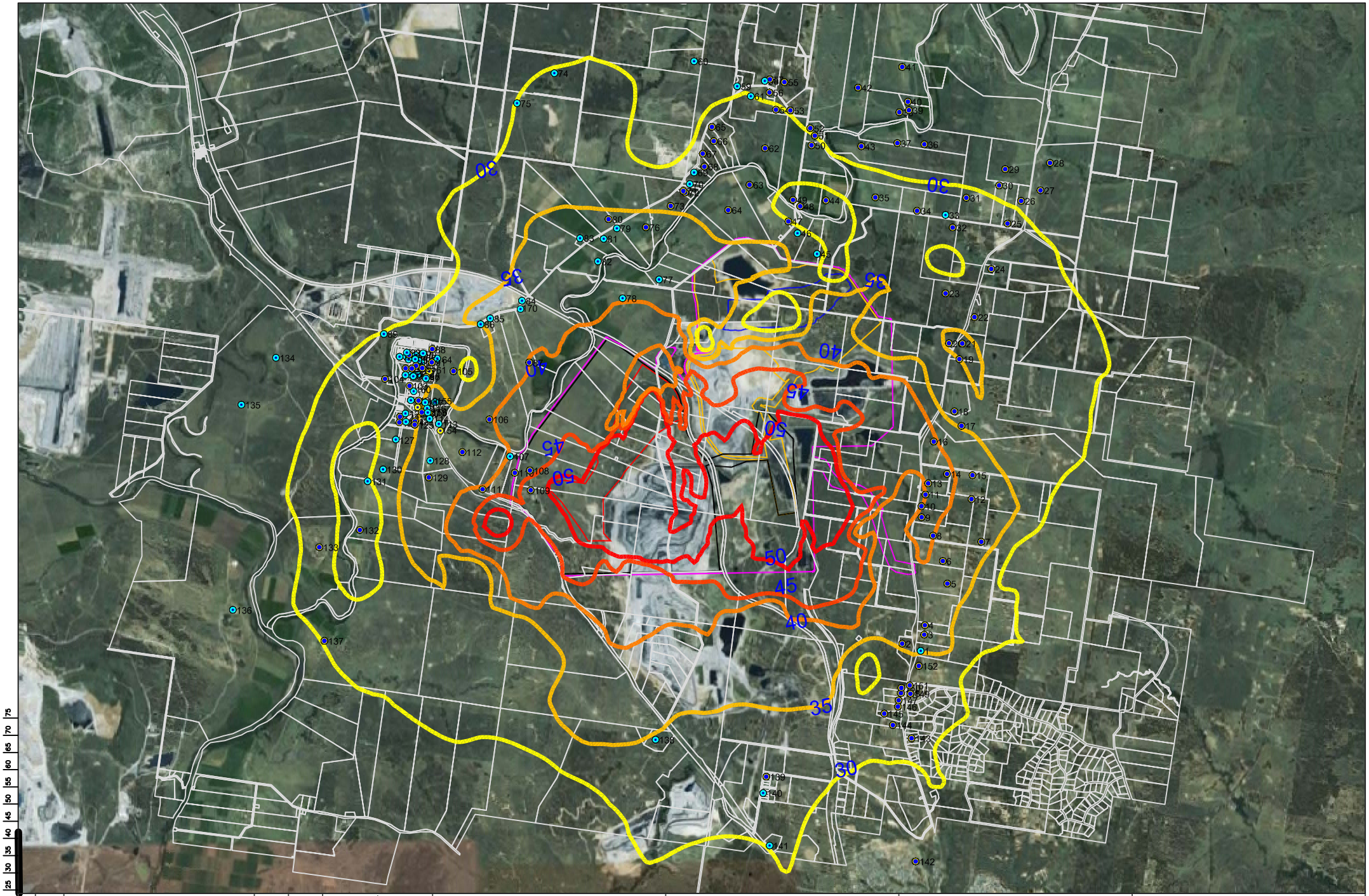
Legend
- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

- Open Cut Project Area
- Open Cut Extension Area
- Mine Area: Full Pit Extent
- North Open Cut Boundary
- North Open Cut

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10-5202 Integra Open Cut Project
Full Pit Extent Year 8 - Evening

FILE NAME: 10-5202 Noise Contours - 743 Year 8 - Evening.dwg
DRAWING No.: 10-5202 743Y8 - Evening
REVISION: 0



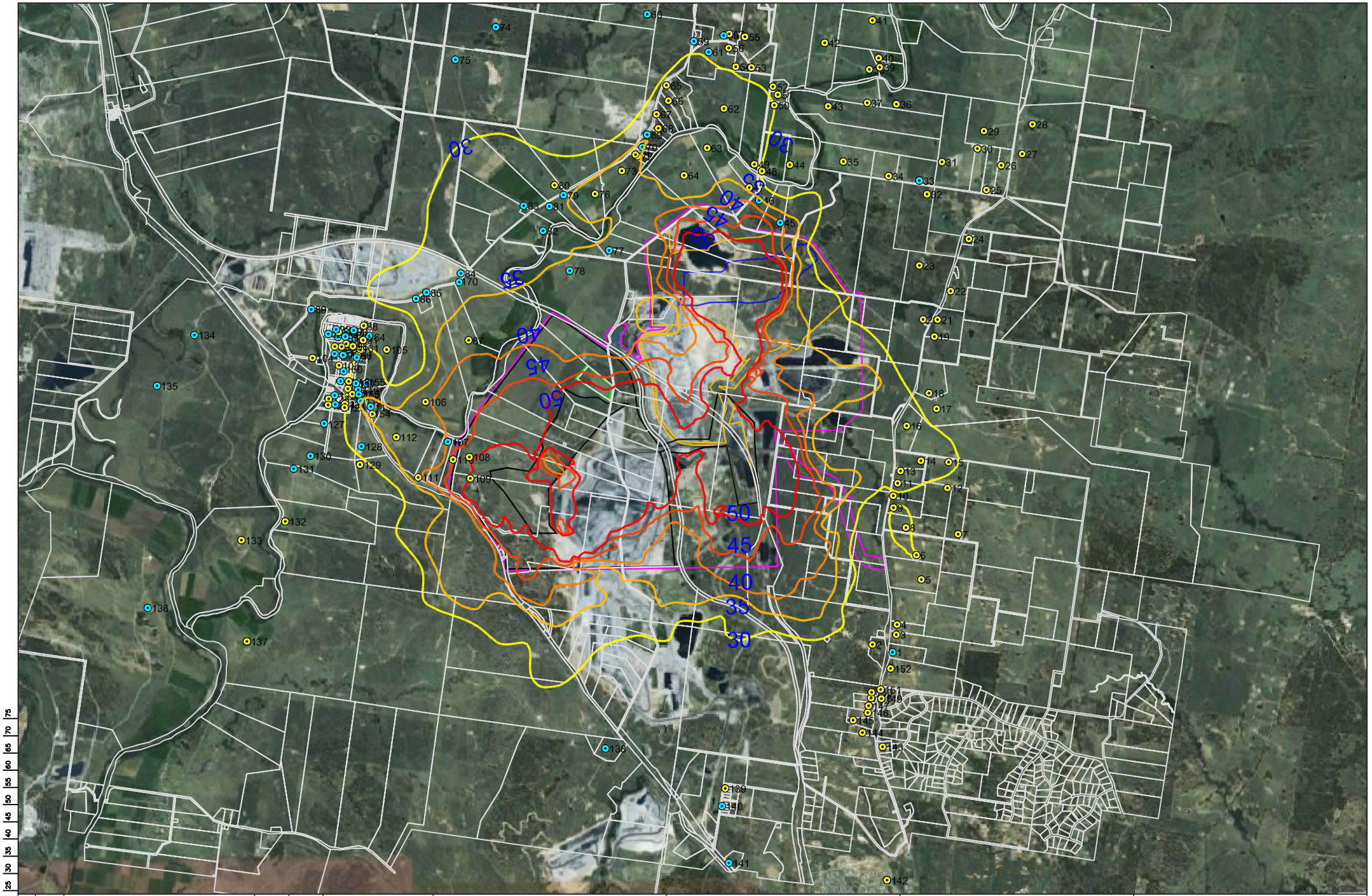
75 mm ON ORIGINAL

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	23/02/09		YL	MB

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10-5202 Integra Open Cut Project
Full Pit Extent Year 8
Night (3degC/100m)

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 743 Year 8 - Night.dwg	10-5202 743Y8 - Night (3degC/100m)	0



75 mm ON ORIGINAL

Receptors (Mine Owned)
Receptors (None-Mine Owned)

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	23/02/09		YL	MB

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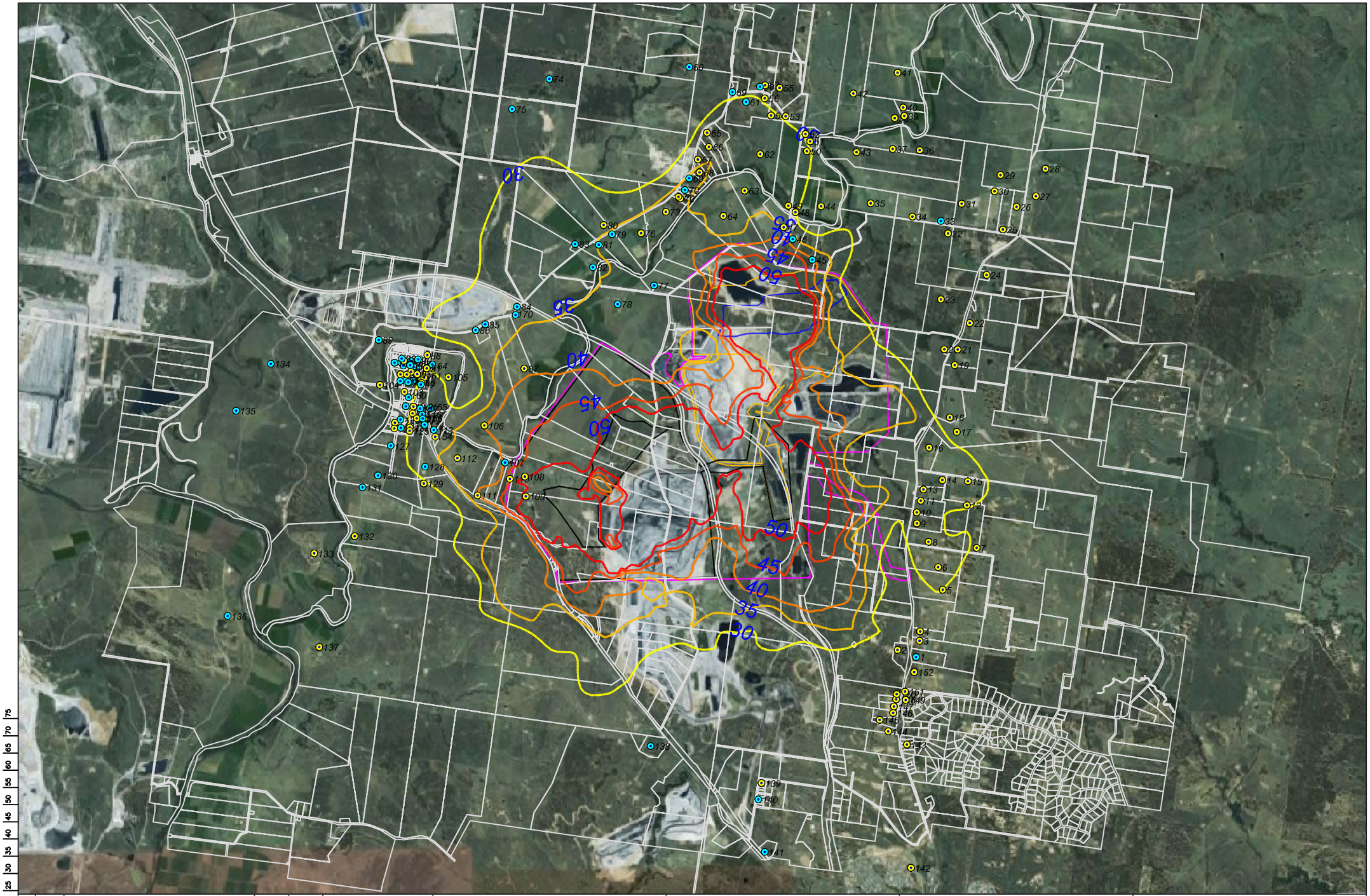
Legend
- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

- Open Cut Project Area
- Open Cut Extension Area
- Mine Area: Full Pit Extent
- North Open Cut Boundary
- North Open Cut
- Dulwich

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10-5202 Integra Open Cut Project
Part Pit Extent Year 3 - Daytime

FILE NAME: 10-5202 Noise Contours - 767 Year 3 - Daytime.dwg
DRAWING No.: 10-5202 767Y3 - Daytime
REVISION: 0



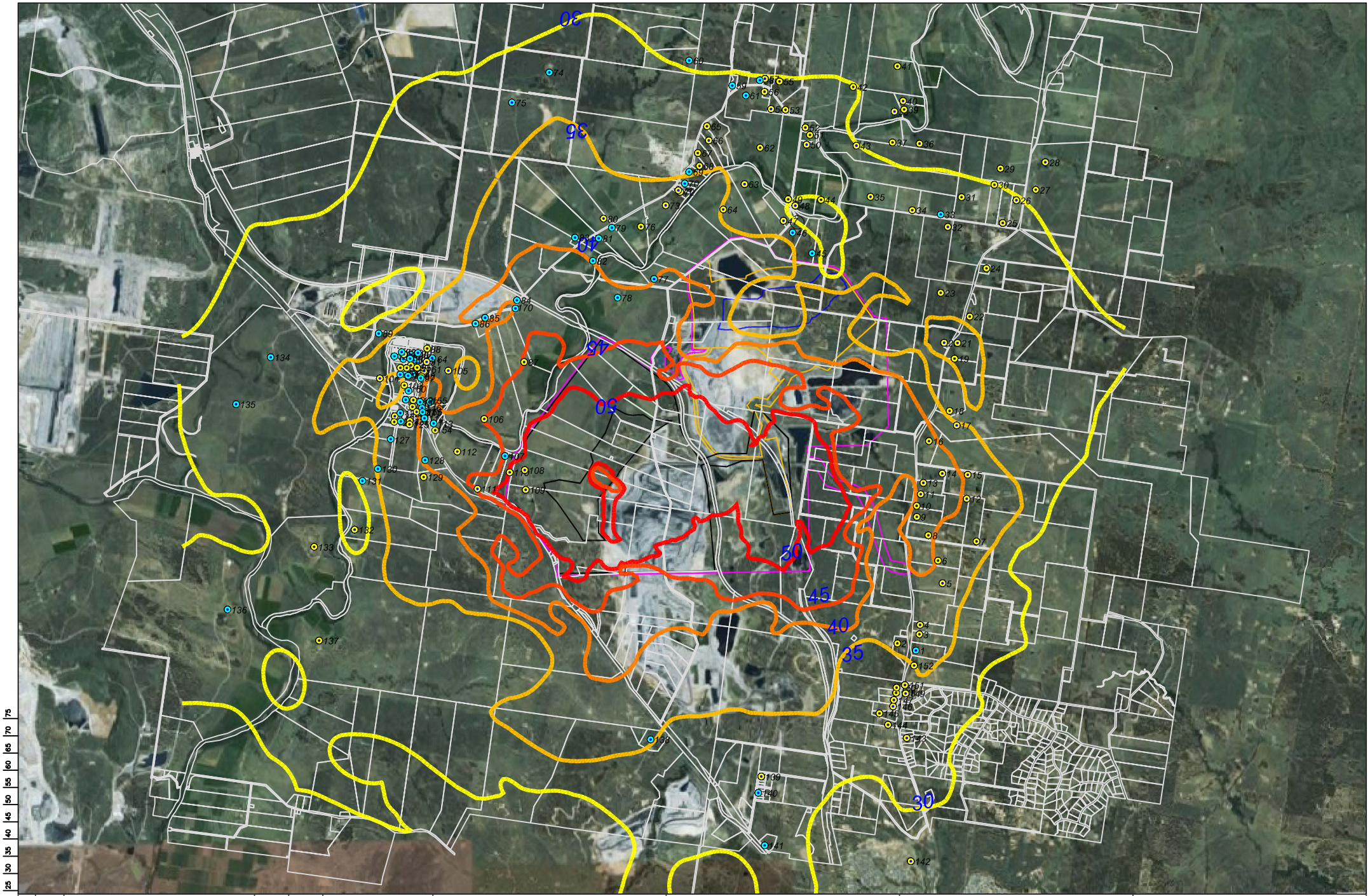
75 mm ON ORIGINAL

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	23/02/09		YL	MB

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10-5202 Integra Open Cut Project
Part Pit Extent Year 3 - Evening

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 767 Year 3 - Evening.dwg	10-5202 767Y3 - Evening	0



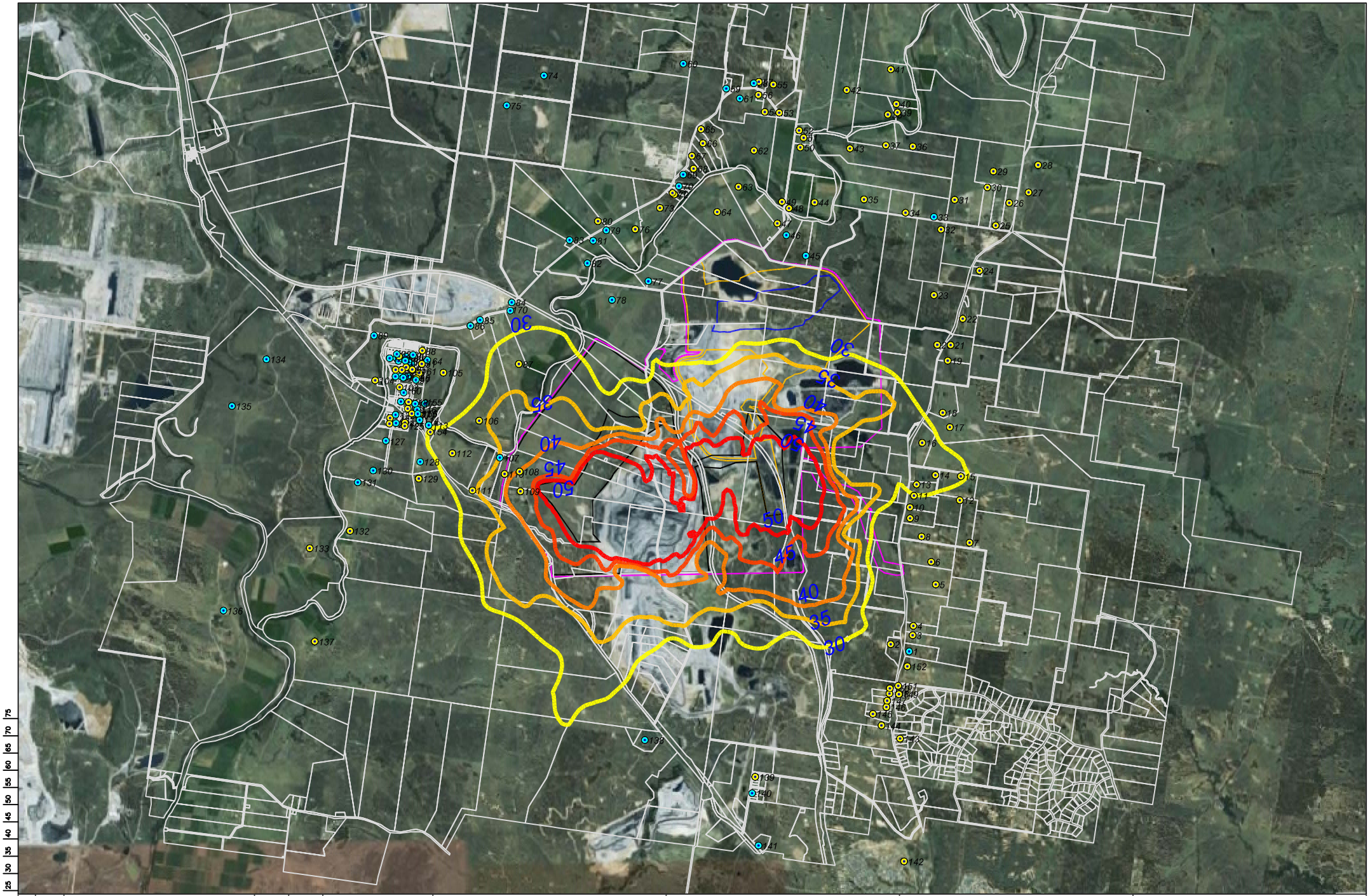
75 mm ON ORIGINAL

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	23/02/09		YL	MB

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10-5202 Integra Open Cut Project
Part Pit Extent Year 3
Night (3degC/100m)

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 767 Year 3 - Night.dwg	10-5202 767Y3 - Night (3degC/100m)	0



75 mm ON ORIGINAL

Receptors (Mine Owned)
Receptors (None-Mine Owned)

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	23/02/09		YL	MB

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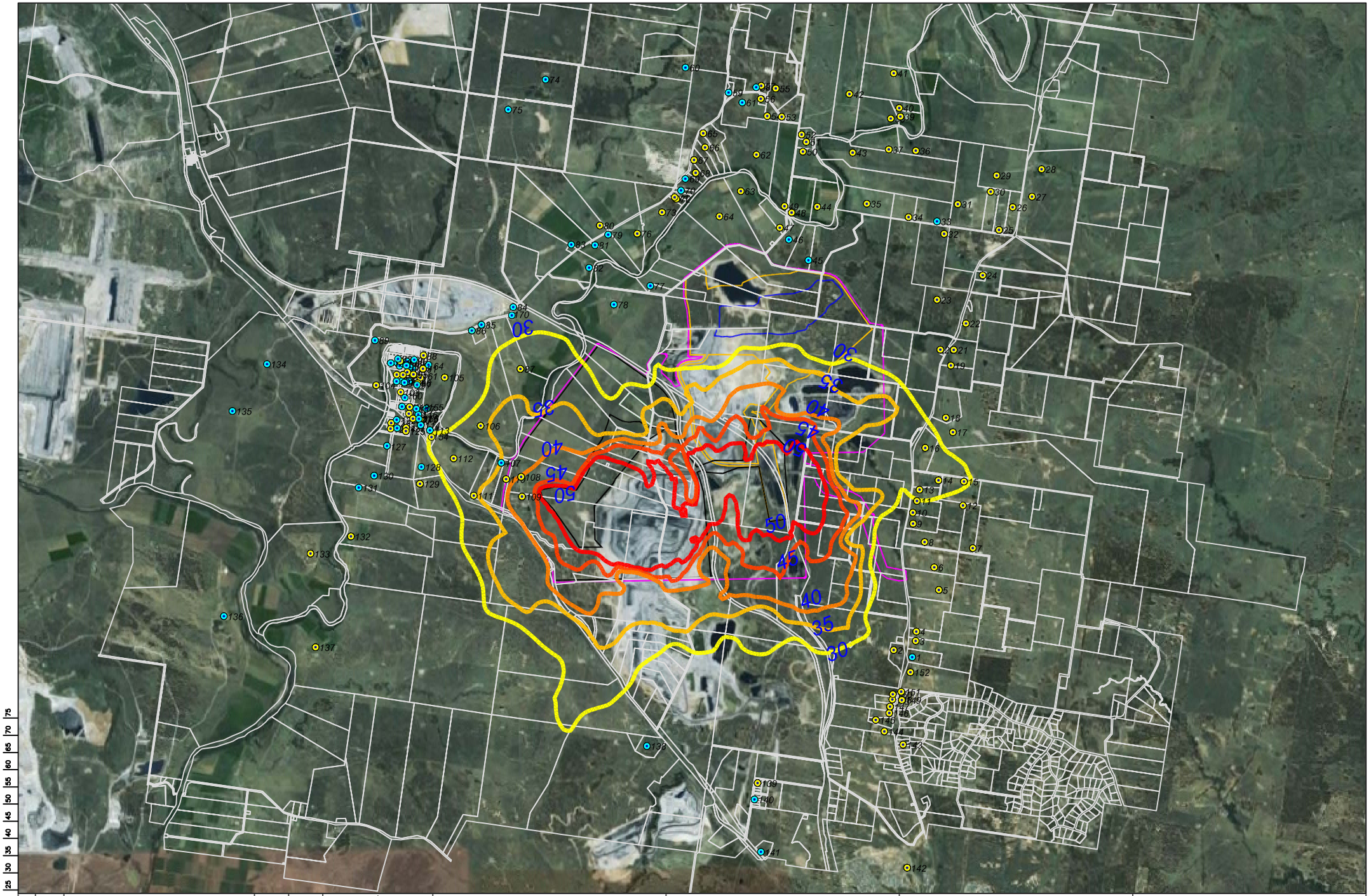
Legend
- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

- Open Cut Project Area
- Open Cut Extension Area
- Mine Area: Full Pit Extent
- North Open Cut Boundary
- North Open Cut
- Dulwich

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10-5202 Integra Open Cut Project
Part Pit Extent Year 6 - Daytime

FILE NAME: 10-5202 Noise Contours - 767 Year 6 - Daytime.dwg
DRAWING No.: 10-5202 767Y6 - Daytime
REVISION: 0



Receptors (Mine Owned)
Receptors (None-Mine Owned)

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	23/02/09		YL	MB

0 511 1022
Scale = 1:51054

Legend
- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

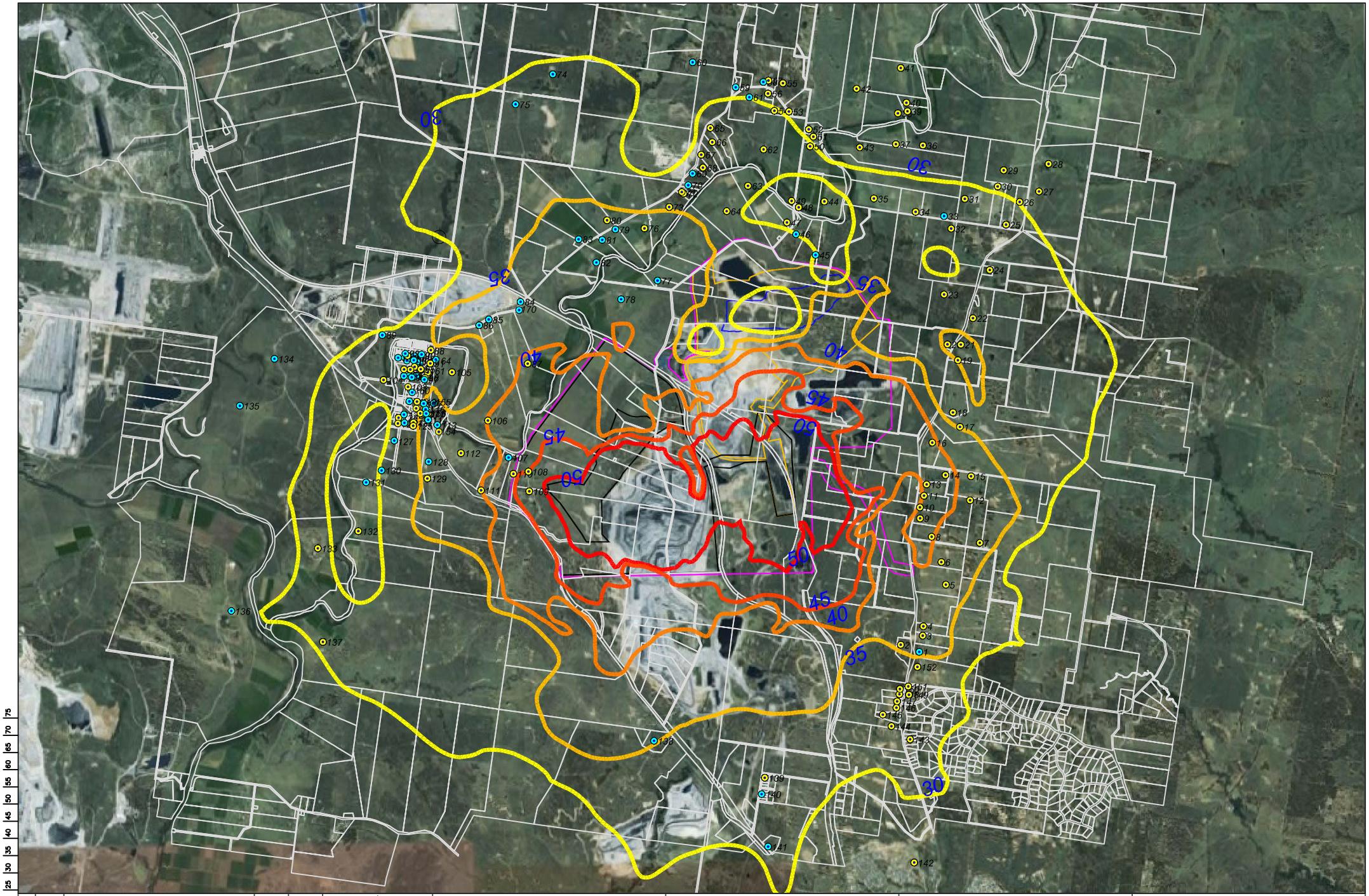
- Open Cut Project Area
- Open Cut Extension Area
- Mine Area: Full Pit Extent
- North Open Cut Boundary
- North Open Cut
- Dulwich

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10-5202 Integra Open Cut Project
Part Pit Extent Year 6 - Evening

FILE NAME: 10-5202 Noise Contours - 767 Year 6 - Evening.dwg
DRAWING No.: 10-5202 767Y6 - Evening
REVISION: 0

75 mm ON ORIGINAL



75 mm ON ORIGINAL

Receptors (Mine Owned)
Receptors (None-Mine Owned)

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	23/02/09		YL	MB

0 511 1022
Scale = 1:51054

Legend
- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
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- Open Cut Project Area
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10-5202 Integra Open Cut Project
Part Pit Extent Year 6
Night (3degC/100m)

FILE NAME: 10-5202 Noise Contours - 767 Year 6 - Night.dwg
DRAWING No.: 10-5202 767Y6 - Night (3degC/100m)
REVISION: 0

YEAR 1 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – MINE OWNED RESIDENCES

Full Pit Operation - Year 1 $L_{Aeq(15minute)}$ Intrusive Noise Emissions (dBA re 20µPa)

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
1	77	32	25	33	35	33	26	34	38	33	0	33	41	0	**41**[2]	36
	78	38	26	**38**[2]	35	39	27	**39**[1]	38	40	0	**40**[2]	46	0	**46**[3]	36
	79	32	25	33	35	33	26	33	38	33	0	33	41	0	**41**[2]	36
	81	32	25	33	35	33	26	34	38	34	0	34	42	0	**42**[3]	36
	83	31	22	32	35	32	24	33	38	33	0	33	42	0	**42**[3]	36
2	84	34	21	35	36	35	22	35	39	36	0	36	43	0	**43**[2]	39
	85	32	19	32	36	33	21	33	39	33	0	33	41	0	**41**[1]	39
	86	33	20	33	36	34	21	34	39	34	0	34	41	0	**41**[1]	39
	170	34	21	35	36	35	22	35	39	36	0	36	43	0	**43**[2]	39
4	90	25	11	25	39	26	11	26	42	26	0	26	38	0	**38**[1]	37
	92	25	11	25	39	26	12	26	42	26	0	26	38	0	**38**[1]	37
	93	26	11	26	39	26	11	26	42	27	0	27	37	0	37	37
	97	29	12	30	39	30	13	30	42	31	0	31	39	0	**39**[1]	37
	98	28	11	28	39	29	12	29	42	29	0	29	35	0	35	37
	101	25	11	25	39	26	11	26	42	26	0	26	37	0	37	37
	102	26	11	26	39	26	12	26	42	27	0	27	33	0	33	37
	155	35	13	35	39	35	14	36	42	36	0	36	42	0	**42**[2]	37
	162	28	11	28	39	29	12	29	42	29	0	29	35	0	35	37
	163	28	11	28	39	29	12	29	42	29	0	29	35	0	35	37
	164	27	11	27	39	27	12	27	42	28	0	28	39	0	**39**[1]	37
	165	27	11	27	39	27	12	27	42	28	0	28	39	0	**39**[1]	37
	166	26	11	26	39	26	11	26	42	27	0	27	37	0	37	37
	167	26	11	26	39	26	11	26	42	27	0	27	37	0	37	37
	168	25	11	25	39	26	12	26	42	26	0	26	38	0	**38**[1]	37
	169	26	11	26	39	26	11	26	42	27	0	27	37	0	37	37
5	89	30	17	30	50	30	18	31	46	31	0	31	38	0	38	42
	113	35	14	35	50	36	14	36	46	37	0	37	42	0	42	42

YEAR 1 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
5	114	35	13	35	50	36	14	36	46	37	0	37	42	0	42	42
	115	35	13	35	50	35	14	36	46	36	0	36	42	0	42	42
	116	33	14	33	50	34	14	34	46	35	0	35	42	0	42	42
	117	33	14	33	50	33	15	34	46	34	0	34	42	0	42	42
	119	26	10	26	50	27	11	27	46	27	0	27	34	0	34	42
	122	27	9	27	50	27	10	27	46	28	0	28	38	0	38	42
	124	28	10	28	50	28	10	28	46	29	0	29	38	0	38	42
	127	29	11	29	50	30	12	30	46	30	0	30	37	0	37	42
	128	32	13	32	50	32	13	32	46	33	0	33	40	0	40	42
	138	24	10	24	50	25	10	25	46	25	0	25	38	0	38	42
	140	20	9	20	50	20	9	21	46	21	0	21	35	0	35	42
	141	20	10	20	50	20	11	20	46	21	0	21	34	0	34	42
	158	32	14	32	50	33	15	33	46	34	0	34	40	0	40	42
	160	26	10	26	50	27	11	27	46	27	0	27	34	0	34	42
6	130	26	9	26	39	26	10	26	41	27	0	27	37	0	37	38
	131	24	9	24	39	25	9	25	41	26	0	26	36	0	36	38
	134	20	6	20	39	21	6	21	41	21	0	21	31	0	31	38
	135	22	8	22	39	22	8	22	41	23	0	23	31	0	31	38
	136	21	7	21	39	22	8	22	41	22	0	22	32	0	32	38
7	107	40	14	40	45	41	14	41	42	42	0	**42**[2]	47	0	**47**[3]	39
9	1	24	17	25	37	25	18	26	40	25	0	25	31	0	31	38
12	58	25	24	27	35	25	25	28	38	26	0	26	35	0	35	35
	59	22	23	26	35	23	24	26	38	24	0	24	29	0	29	35
	60	21	16	22	35	21	17	23	38	22	0	22	29	0	29	35
	61	24	25	27	35	24	26	28	38	25	0	25	32	0	32	35
A	33	20	37	**37**[1]	36	20	37	38	39	21	0	21	33	0	33	36
B	45	24	49	**49**[3]	35	25	50	**50**[3]	37	25	0	25	37	0	**37**[1]	35
	46	25	33	34	35	26	34	34	37	26	0	26	38	0	**38**[2]	35

YEAR 1 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
F	69	30	31	33	39	31	32	34	40	32	0	32	39	0	39	40
	70	30	31	34	39	31	32	35	40	32	0	32	39	0	39	40
	74	26	17	27	39	27	18	27	40	28	0	28	35	0	35	40
	75	27	17	28	39	28	18	28	40	29	0	29	36	0	36	40
G	82	34	24	35	38	35	25	35	41	36	0	36	43	0	**43[2]**	39

Note 1: Marginal Noise Management Zone 1 to 2 dBA above project specific criteria (bold text)

Note 2: Moderate Noise Management Zone 3 to 5 dBA above project specific criteria (bold text)

Note 3: Noise Affection Zone >5 dBA above project specific criteria (bold text and shaded cell)

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YEAR 4 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – MINE OWNED RESIDENCES

Full Pit Operation - Year 4 $L_{Aeq(15minute)}$ Intrusive Noise Emissions (dBA re 20µPa)

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
1	77	35	33	**37**[1]	35	36	34	38	38	36	12	36	45	14	**45**[3]	36
	78	41	31	**41**[3]	35	41	31	**42**[2]	38	42	10	**42**[2]	47	11	**47**[3]	36
	79	32	31	35	35	33	32	36	38	34	9	34	41	10	**41**[2]	36
	81	33	31	35	35	34	32	36	38	35	6	35	42	9	**42**[3]	36
	83	32	29	34	35	33	30	35	38	34	5	34	41	7	**41**[2]	36
2	84	35	23	35	36	36	24	36	39	36	5	36	42	6	**42**[2]	39
	85	32	21	32	36	32	22	33	39	33	3	33	40	5	**40**[1]	39
	86	32	20	33	36	33	21	34	39	34	3	34	40	4	**40**[1]	39
	170	35	23	35	36	36	24	36	39	36	5	36	42	6	**42**[2]	39
4	90	24	13	24	39	24	13	24	42	25	0	25	37	1	37	37
	92	24	13	24	39	24	14	25	42	25	0	25	36	1	36	37
	93	24	13	25	39	25	13	25	42	25	0	25	37	1	37	37
	97	28	14	28	39	28	15	29	42	29	0	29	37	1	37	37
	98	26	13	26	39	27	14	27	42	27	0	27	36	0	36	37
	101	24	13	24	39	24	13	25	42	25	0	25	36	1	36	37
	102	24	12	24	39	25	13	25	42	25	-14	25	33	-12	33	37
	155	32	16	32	39	33	16	33	42	34	0	34	38	1	**38**[1]	37
	162	26	13	26	39	27	14	27	42	27	0	27	36	0	36	37
	163	26	13	26	39	27	14	27	42	27	0	27	36	0	36	37
	164	25	14	26	39	26	14	26	42	26	0	26	37	1	37	37
	165	25	14	26	39	26	14	26	42	26	0	26	37	1	37	37
	166	24	13	25	39	25	13	25	42	25	0	25	37	1	37	37
	167	24	13	25	39	25	13	25	42	25	0	25	37	1	37	37
	168	24	13	24	39	24	14	25	42	25	0	25	36	1	36	37
	169	24	13	25	39	25	13	25	42	25	0	25	37	1	37	37
5	89	28	18	29	50	29	19	29	46	30	0	30	36	2	36	42
	113	33	15	33	50	34	16	34	46	34	0	34	40	1	40	42

YEAR 4 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
5	114	32	15	33	50	33	16	33	46	34	0	34	39	1	39	42
	115	32	16	32	50	33	16	33	46	34	0	34	38	1	38	42
	116	31	16	31	50	32	16	32	46	33	0	33	38	1	38	42
	117	30	16	30	50	31	17	31	46	32	0	32	38	1	38	42
	119	24	12	24	50	24	13	24	46	25	-8	25	32	-6	32	42
	122	24	11	25	50	25	12	25	46	25	-8	25	34	-6	34	42
	124	25	12	25	50	26	13	26	46	26	-6	26	34	-4	34	42
	127	27	13	27	50	27	14	28	46	28	-8	28	35	-6	35	42
	128	30	14	30	50	31	15	31	46	32	-1	32	38	2	38	42
	138	23	9	23	50	24	10	24	46	25	-5	25	35	-3	35	42
	140	19	9	19	50	20	9	20	46	21	-10	21	32	-9	32	42
	141	19	10	19	50	20	10	20	46	20	-8	20	31	-7	31	42
	158	30	16	30	50	31	17	31	46	31	-6	31	36	-4	36	42
	160	24	12	24	50	24	13	24	46	25	-8	25	32	-6	32	42
6	130	24	11	24	39	25	12	25	41	25	-12	25	35	-10	35	38
	131	23	10	23	39	24	11	24	41	24	-13	24	34	-11	34	38
	134	19	9	19	39	19	9	20	41	20	-17	20	28	-16	28	38
	135	20	9	20	39	20	10	21	41	21	-10	21	29	-9	29	38
	136	20	9	21	39	21	9	21	41	22	-6	22	30	-2	30	38
7	107	38	16	38	45	39	16	39	42	39	2	39	44	4	**44[2]**	39
9	1	23	15	24	37	23	16	24	40	24	2	24	32	3	32	38
12	58	24	28	29	35	25	29	30	38	26	8	26	34	9	34	35
	59	22	24	26	35	22	25	27	38	23	5	23	31	8	31	35
	60	20	19	22	35	20	20	23	38	21	1	21	31	4	31	35
	61	23	29	30	35	23	30	31	38	24	8	24	33	10	33	35
A	33	20	22	24	36	21	22	25	39	21	9	21	32	11	32	36
B	45	25	41	**41[3]**	35	26	42	**42[2]**	37	26	24	28	37	26	**37[1]**	35
	46	26	38	**38[2]**	35	27	39	**39[1]**	37	28	22	29	37	24	**37[1]**	35

YEAR 4 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
F	69	31	35	37	39	31	36	38	40	32	11	32	38	12	38	40
	70	30	36	37	39	31	37	38	40	32	11	32	38	13	38	40
	74	26	20	27	39	27	21	28	40	29	2	29	33	3	33	40
	75	27	22	28	39	28	23	29	40	29	2	29	34	3	34	40
G	82	36	30	37	38	37	31	38	41	38	8	38	43	9	**43[2]**	39

Note 1: Marginal Noise Management Zone 1 to 2 dBA above project specific criteria (bold text)

Note 2: Moderate Noise Management Zone 3 to 5 dBA above project specific criteria (bold text)

Note 3: Noise Affection Zone >5 dBA above project specific criteria (bold text and shaded cell)

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YEAR 6 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – MINE OWNED RESIDENCES

Full Pit Operation - Year 6 $L_{Aeq(15minute)}$ Intrusive Noise Emissions (dBA re 20µPa)

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
1	77	34	33	**36**[1]	35	34	36	38	38	35	19	35	42	21	**42**[3]	36
	78	39	31	**39**[2]	35	39	33	**40**[2]	38	40	16	**40**[2]	45	17	**45**[3]	36
	79	32	31	35	35	33	31	35	38	34	13	34	40	14	**40**[2]	36
	81	33	29	35	35	34	30	35	38	34	12	34	40	14	**40**[2]	36
	83	32	27	34	35	33	28	34	38	34	11	34	39	12	**39**[2]	36
2	84	34	26	35	36	35	27	36	39	36	8	36	41	9	**41**[1]	39
	85	32	23	33	36	33	24	33	39	34	6	34	40	7	**40**[1]	39
	86	32	23	32	36	33	24	33	39	33	6	33	40	7	**40**[1]	39
	170	34	26	35	36	35	27	36	39	36	8	36	41	9	**41**[1]	39
4	90	27	13	28	39	28	13	28	42	29	3	29	38	4	**38**[1]	37
	92	26	13	27	39	27	13	27	42	27	2	27	37	3	37	37
	93	26	13	26	39	27	14	27	42	27	3	27	38	4	**38**[1]	37
	97	31	15	31	39	32	15	32	42	33	3	33	39	4	**39**[1]	37
	98	27	14	27	39	28	14	28	42	28	2	28	36	3	36	37
	101	25	13	26	39	26	13	26	42	26	2	26	36	3	36	37
	102	24	13	25	39	25	13	25	42	25	-9	25	34	-7	34	37
	155	32	17	32	39	33	17	33	42	34	2	34	40	3	**40**[2]	37
	162	27	14	27	39	28	14	28	42	28	2	28	36	3	36	37
	163	27	14	27	39	28	14	28	42	28	2	28	36	3	36	37
	164	29	14	29	39	29	14	29	42	30	3	30	38	4	**38**[1]	37
	165	29	14	29	39	29	14	29	42	30	3	30	38	4	**38**[1]	37
	166	26	13	26	39	27	14	27	42	27	3	27	38	4	**38**[1]	37
	167	26	13	26	39	27	14	27	42	27	3	27	38	4	**38**[1]	37
	168	26	13	27	39	27	13	27	42	27	2	27	37	3	37	37
	169	26	13	26	39	27	14	27	42	27	3	27	38	4	**38**[1]	37
5	89	31	19	31	50	32	20	32	46	33	1	33	37	2	37	42

YEAR 6 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
	113	33	17	33	50	33	18	33	46	34	2	34	41	4	41	42
5	114	32	17	32	50	33	17	33	46	34	2	34	41	3	41	42
	115	32	17	32	50	33	17	33	46	34	2	34	40	3	40	42
	116	32	17	32	50	32	17	33	46	33	2	33	40	3	40	42
	117	31	17	32	50	32	18	32	46	33	2	33	40	3	40	42
	119	26	13	26	50	26	14	26	46	27	1	27	33	2	33	42
	122	26	12	26	50	26	13	27	46	27	0	27	35	2	35	42
	124	26	13	27	50	27	14	27	46	28	1	28	36	2	36	42
	127	26	15	27	50	27	15	27	46	28	-1	28	34	0	34	42
	128	30	17	30	50	31	18	31	46	31	2	31	38	3	38	42
	138	26	7	26	50	27	7	27	46	27	-4	27	36	-3	36	42
	140	21	6	21	50	22	6	22	46	22	-12	22	34	-10	34	42
	141	20	7	21	50	21	7	21	46	22	-5	22	33	-4	33	42
	158	31	18	31	50	31	18	31	46	32	2	32	40	3	40	42
	160	26	13	26	50	26	14	26	46	27	1	27	33	2	33	42
6	130	24	13	24	39	24	13	25	41	25	-3	25	35	-1	35	38
	131	23	12	23	39	24	13	24	41	24	-4	24	35	-2	35	38
	134	19	8	19	39	20	9	20	41	20	-11	20	28	-9	28	38
	135	20	10	21	39	21	10	21	41	22	-4	22	29	-4	29	38
	136	20	9	20	39	20	10	20	41	21	-5	21	31	-4	31	38
7	107	38	21	38	45	38	22	38	42	39	5	39	44	6	**44**[2]	39
9	1	23	15	24	37	24	9	24	40	24	-16	24	32	-15	32	38
12	58	25	28	30	35	26	26	29	38	27	7	27	34	8	34	35
	59	22	24	26	35	23	22	25	38	23	8	23	31	9	31	35
	60	21	19	23	35	21	18	23	38	22	6	22	31	7	31	35
	61	24	29	30	35	24	25	28	38	25	8	25	32	9	32	35
A	33	21	22	24	36	21	25	26	39	22	6	22	32	8	32	36
B	45	25	41	**41**[3]	35	26	38	**38**[1]	37	26	17	27	37	19	**37**[1]	35
	46	27	38	**39**[2]	35	28	38	**39**[1]	37	28	17	29	37	19	**37**[1]	35

YEAR 6 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
F	69	31	35	37	39	32	36	37	40	32	13	32	37	14	38	40
	70	30	36	37	39	31	37	38	40	32	14	32	38	15	38	40
	74	27	20	28	39	28	19	28	40	29	4	29	33	5	33	40
	75	27	22	28	39	28	22	29	40	29	4	29	34	5	34	40
G	82	35	30	36	38	35	31	37	41	36	13	36	42	14	**42**[2]	39

Note 1: Marginal Noise Management Zone 1 to 2 dBA above project specific criteria (bold text)

Note 2: Moderate Noise Management Zone 3 to 5 dBA above project specific criteria (bold text)

Note 3: Noise Affection Zone >5 dBA above project specific criteria (bold text and shaded cell)

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YEAR 8 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – MINE OWNED RESIDENCES

Full Pit Operation - Year 8 $L_{Aeq(15minute)}$ Intrusive Noise Emissions (dBA re 20µPa)

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
1	77	30	0	30	35	31	0	31	38	32	0	32	38	0	**38**[1]	36
	78	32	0	32	35	33	0	33	38	34	0	34	39	0	**39**[2]	36
	79	27	0	27	35	28	0	28	38	28	0	28	36	0	36	36
	81	27	0	27	35	28	0	28	38	29	0	29	36	0	36	36
	83	26	0	26	35	27	0	27	38	28	0	28	36	0	36	36
2	84	28	0	28	36	29	0	29	39	30	0	30	35	0	35	39
	85	28	0	28	36	29	0	29	39	30	0	30	35	0	35	39
	86	28	0	28	36	29	0	29	39	30	0	30	35	0	35	39
	170	28	0	28	36	29	0	29	39	30	0	30	35	0	35	39
4	90	23	0	23	39	23	0	23	42	24	0	24	32	0	32	37
	92	23	0	23	39	23	0	24	42	24	0	24	31	0	31	37
	93	23	0	23	39	24	0	24	42	24	0	24	31	0	31	37
	97	26	0	26	39	27	0	27	42	28	0	28	35	0	35	37
	98	24	0	24	39	24	0	24	42	25	0	25	31	0	31	37
	101	23	0	23	39	23	0	23	42	24	0	24	31	0	31	37
	102	22	0	22	39	22	0	22	42	23	0	23	30	0	30	37
	155	29	0	29	39	30	0	30	42	31	0	31	37	0	37	37
	162	24	0	24	39	24	0	24	42	25	0	25	31	0	31	37
	163	24	0	24	39	24	0	24	42	25	0	25	31	0	31	37
	164	24	0	25	39	25	0	25	42	26	0	26	33	0	33	37
	165	24	0	25	39	25	0	25	42	26	0	26	33	0	33	37
	166	23	0	23	39	24	0	24	42	24	0	24	31	0	31	37
	167	23	0	23	39	24	0	24	42	24	0	24	31	0	31	37
	168	23	0	23	39	23	0	24	42	24	0	24	31	0	31	37
	169	23	0	23	39	24	0	24	42	24	0	24	31	0	31	37
5	89	26	0	26	50	26	0	26	46	27	0	27	35	0	35	42
	113	30	0	30	50	31	0	31	46	32	0	32	38	0	38	42

YEAR 8 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
5	114	30	0	30	50	31	0	31	46	31	0	31	38	0	38	42
	115	29	0	29	50	30	0	30	46	31	0	31	37	0	37	42
	116	28	0	28	50	29	0	29	46	30	0	30	37	0	37	42
	117	28	0	28	50	29	0	29	46	30	0	30	37	0	37	42
	119	23	0	23	50	24	0	24	46	24	0	24	31	0	31	42
	122	24	0	24	50	24	0	24	46	25	0	25	33	0	33	42
	124	25	0	25	50	25	0	25	46	26	0	26	33	0	33	42
	127	25	0	25	50	26	0	26	46	26	0	26	32	0	32	42
	128	29	0	29	50	30	0	30	46	30	0	30	35	0	35	42
	138	24	0	24	50	25	0	25	46	26	0	26	35	0	35	42
	140	19	0	19	50	20	0	20	46	21	0	21	32	0	32	42
	141	19	0	19	50	20	0	20	46	21	0	21	31	0	31	42
	158	27	0	27	50	28	0	28	46	29	0	29	37	0	37	42
	160	23	0	23	50	24	0	24	46	24	0	24	31	0	31	42
6	130	24	0	24	39	25	0	25	41	25	0	25	32	0	32	38
	131	25	0	25	39	26	0	26	41	26	0	26	32	0	32	38
	134	17	0	17	39	18	0	18	41	18	0	18	26	0	26	38
	135	18	0	18	39	18	0	18	41	19	0	19	26	0	26	38
	136	20	0	20	39	20	0	20	41	21	0	21	29	0	29	38
7	107	35	0	35	45	36	0	36	42	37	0	37	41	0	**41**[1]	39
9	1	23	0	23	37	23	0	23	40	24	0	24	31	0	31	38
12	58	20	0	20	35	20	0	20	38	21	0	21	31	0	31	35
	59	17	0	17	35	18	0	18	38	18	0	18	25	0	25	35
	60	16	0	16	35	16	0	16	38	17	0	17	24	0	24	35
	61	18	0	18	35	19	0	19	38	20	0	20	29	0	29	35
A	33	19	0	19	36	19	0	19	39	20	0	20	31	0	31	36
B	45	22	0	22	35	23	0	23	37	24	0	24	33	0	33	35
	46	24	0	24	35	25	0	25	37	26	0	26	32	0	32	35

YEAR 8 - FULL PIT OPERATION INTRUSIVE NOISE EMISSIONS – MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
F	69	24	0	24	39	25	0	25	40	26	0	26	34	0	34	40
	70	24	0	24	39	25	0	25	40	26	0	26	34	0	34	40
	74	20	0	20	39	21	0	21	40	22	0	22	31	0	31	40
	75	21	0	21	39	22	0	22	40	22	0	23	31	0	31	40
G	82	29	0	29	38	30	0	30	41	30	0	30	36	0	36	39

Note 1: Marginal Noise Management Zone 1 to 2 dBA above project specific criteria (bold text)

Note 2: Moderate Noise Management Zone 3 to 5 dBA above project specific criteria (bold text)

Note 3: Noise Affection Zone >5 dBA above project specific *criteria (bold text and shaded cell)*

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YEAR 3 - PART PIT OPERATION INTRUSIVE NOISE EMISSIONS - MINE OWNED RESIDENCES

Part Pit Operation - Year 3 $L_{Aeq(15minute)}$ Intrusive Noise Emissions (dBA re 20µPa)

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
1	77	30	33	35	35	30	34	35	38	31	12	31	40	14	**40**[2]	36
	78	35	31	**36**[1]	35	35	31	37	38	36	10	36	43	11	**43**[3]	36
	79	30	31	34	35	31	32	35	38	31	9	32	38	10	**38**[1]	36
	81	30	31	33	35	31	32	34	38	32	6	32	38	9	**38**[1]	36
	83	29	29	32	35	30	30	33	38	31	5	31	38	7	**38**[1]	36
2	84	32	23	33	36	33	24	33	39	33	5	33	41	6	**41**[1]	39
	85	31	21	32	36	32	22	32	39	33	3	33	40	5	**40**[1]	39
	86	31	20	32	36	32	21	32	39	33	3	33	39	4	39	39
	170	32	23	33	36	33	24	33	39	33	5	33	41	6	**41**[1]	39
4	90	27	13	27	39	27	13	28	42	28	0	28	38	1	**38**[1]	37
	92	26	13	26	39	26	14	27	42	27	0	27	37	1	37	37
	93	26	13	26	39	26	13	26	42	27	0	27	38	1	**38**[1]	37
	97	31	14	31	39	32	15	32	42	33	0	33	40	1	**40**[2]	37
	98	28	13	28	39	28	14	28	42	29	0	29	36	0	36	37
	101	25	13	26	39	26	13	26	42	25	0	25	37	1	37	37
	102	25	12	25	39	25	13	26	42	25	-14	25	35	-12	35	37
	155	34	16	34	39	35	16	35	42	34	0	34	42	1	**42**[2]	37
	162	28	13	28	39	28	14	28	42	29	0	29	36	0	36	37
	163	28	13	28	39	28	14	28	42	29	0	29	36	0	36	37
	164	29	14	29	39	30	14	30	42	31	0	31	39	1	**39**[1]	37
	165	29	14	29	39	30	14	30	42	31	0	31	39	1	**39**[1]	37
	166	26	13	26	39	26	13	26	42	27	0	27	38	1	**38**[1]	37
	167	26	13	26	39	26	13	26	42	27	0	27	38	1	**38**[1]	37
	168	26	13	26	39	26	14	27	42	27	0	27	37	1	37	37
	169	26	13	26	39	26	13	26	42	27	0	27	38	1	**38**[1]	37
5	89	31	18	31	50	31	19	32	46	32	0	32	38	2	38	42

YEAR 3 - PART PIT OPERATION INTRUSIVE NOISE EMISSIONS - MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
5	113	36	15	36	50	36	16	36	46	36	0	36	42	1	42	42
	114	35	15	35	50	36	16	36	46	35	0	35	41	1	41	42
	115	34	16	34	50	35	16	35	46	34	0	34	42	1	42	42
	116	33	16	33	50	34	16	34	46	33	0	33	42	1	42	42
	117	33	16	33	50	34	17	34	46	33	0	33	41	1	41	42
	119	27	12	27	50	27	13	27	46	27	-8	27	34	-6	34	42
	122	27	11	27	50	27	12	27	46	27	-8	27	37	-6	37	42
	124	27	12	27	50	28	13	28	46	27	-6	27	37	-4	37	42
	127	28	13	28	50	28	14	29	46	28	-8	28	37	-6	37	42
	128	31	14	31	50	32	15	32	46	31	-1	31	39	2	39	42
	138	24	9	24	50	25	10	25	46	24	-5	24	36	-3	36	42
	140	20	9	20	50	21	9	21	46	20	-10	20	34	-9	34	42
	141	20	10	20	50	20	10	21	46	20	-8	20	33	-7	33	42
	158	33	16	33	50	33	17	34	46	33	-6	33	40	-4	40	42
	160	27	12	27	50	27	13	27	46	27	-8	27	34	-6	34	42
6	130	25	11	25	39	26	12	26	41	25	-12	25	37	-10	37	38
	131	24	10	24	39	24	11	24	41	24	-13	24	36	-11	36	38
	134	20	9	20	39	20	9	21	41	20	-17	20	29	-16	29	38
	135	21	9	21	39	22	10	22	41	21	-10	21	31	-9	31	38
	136	21	9	21	39	22	9	22	41	21	-6	21	32	-2	32	38
7	107	42	16	42	45	43	16	**43**[1]	42	42	2	**42**[2]	47	4	**47**[3]	39
9	1	23	15	24	37	24	16	25	40	25	2	25	32	3	32	38
12	58	24	28	29	35	24	29	30	38	25	8	25	33	9	33	35
	59	21	24	26	35	22	25	27	38	22	5	22	29	8	29	35
	60	20	19	22	35	20	20	23	38	21	1	21	29	4	29	35
	61	23	29	30	35	23	30	31	38	24	8	24	31	10	31	35
A	33	20	22	24	36	21	22	25	39	21	9	22	32	11	32	36
B	45	24	41	**41**[3]	35	24	42	**42**[2]	37	25	24	27	35	26	**36**[1]	35
	46	24	38	**38**[2]	35	25	39	**39**[1]	37	25	22	27	35	24	**36**[1]	35

YEAR 3 - PART PIT OPERATION INTRUSIVE NOISE EMISSIONS - MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
F	69	29	35	36	39	30	36	37	40	30	11	30	36	12	36	40
	70	29	36	37	39	30	37	38	40	31	11	31	36	13	36	40
	74	25	20	26	39	25	21	27	40	26	2	26	33	3	33	40
	75	25	22	27	39	26	23	27	40	27	2	27	34	3	34	40
G	82	32	30	34	38	32	31	35	41	33	8	33	39	9	39	39

Note 1: Marginal Noise Management Zone 1 to 2 dBA above project specific criteria (bold text)

Note 2: Moderate Noise Management Zone 3 to 5 dBA above project specific criteria (bold text)

Note 3: Noise Affection Zone >5 dBA above project specific criteria (bold text and shaded cell)

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YEAR 6 - PART PIT OPERATION INTRUSIVE NOISE EMISSIONS - MINE OWNED RESIDENCES

Part Pit Operation - Year 6 $L_{Aeq(15minute)}$ Intrusive Noise Emissions (dBA re 20µPa)

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
1	77	24	33	33	35	24	36	36	38	25	19	26	36	21	36	36
	78	27	31	32	35	28	33	34	38	28	16	28	39	17	**39**[2]	36
	79	23	31	32	35	24	31	31	38	24	13	25	36	14	36	36
	81	23	29	30	35	24	30	31	38	25	12	25	36	14	36	36
	83	24	27	29	35	24	28	30	38	25	11	25	36	12	36	36
2	84	27	26	29	36	27	27	30	39	28	8	28	35	9	35	39
	85	27	23	29	36	28	24	29	39	29	6	29	36	7	36	39
	86	28	23	29	36	28	24	30	39	29	6	29	36	7	36	39
	170	27	26	29	36	27	27	30	39	28	8	28	35	9	35	39
4	90	25	13	25	39	25	13	25	42	26	3	26	33	4	33	37
	92	24	13	24	39	24	13	25	42	25	2	25	32	3	32	37
	93	24	13	24	39	24	14	25	42	25	3	25	32	4	32	37
	97	28	15	28	39	28	15	29	42	29	3	29	35	4	35	37
	98	24	14	25	39	25	14	25	42	25	2	25	32	3	32	37
	101	23	13	24	39	24	13	24	42	24	2	24	32	3	32	37
	102	22	13	22	39	22	13	23	42	23	-9	23	31	-7	31	37
	155	30	17	30	39	31	17	31	42	31	2	31	37	3	37	37
	162	24	14	25	39	25	14	25	42	25	2	25	32	3	32	37
	163	24	14	25	39	25	14	25	42	25	2	25	32	3	32	37
	164	26	14	26	39	27	14	27	42	27	3	27	34	4	34	37
	165	26	14	26	39	27	14	27	42	27	3	27	34	4	34	37
	166	24	13	24	39	24	14	25	42	25	3	25	32	4	32	37
	167	24	13	24	39	24	14	25	42	25	3	25	32	4	32	37
	168	24	13	24	39	24	13	25	42	25	2	25	32	3	32	37
	169	24	13	24	39	24	14	25	42	25	3	25	32	4	32	37
5	89	27	19	28	50	28	20	28	46	28	1	28	36	2	36	42
	113	31	17	31	50	31	18	31	46	32	2	32	37	4	37	42
	114	30	17	30	50	31	17	31	46	31	2	31	37	3	37	42

YEAR 6 - PART PIT OPERATION INTRUSIVE NOISE EMISSIONS - MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
5	115	30	17	30	50	31	17	31	46	31	2	31	37	3	37	42
	116	28	17	29	50	29	17	29	46	30	2	30	37	3	37	42
	117	28	17	28	50	29	18	29	46	30	2	30	37	3	37	42
	119	24	13	24	50	24	14	24	46	24	1	25	31	2	31	42
	122	24	12	24	50	24	13	25	46	25	0	25	32	2	32	42
	124	25	13	25	50	25	14	26	46	26	1	26	32	2	32	42
	127	25	15	25	50	25	15	26	46	26	-1	26	32	0	32	42
	128	27	17	28	50	28	18	28	46	28	2	28	34	3	34	42
	138	26	7	26	50	26	7	26	46	27	-4	27	36	-3	36	42
	140	21	6	21	50	22	6	22	46	22	-12	22	33	-10	33	42
	141	21	7	21	50	21	7	21	46	22	-5	22	32	-4	32	42
	158	28	18	29	50	29	18	29	46	30	2	30	36	3	36	42
	160	24	13	24	50	24	14	24	46	24	1	25	31	2	31	42
6	130	22	13	23	39	23	13	23	41	23	-3	23	32	-1	32	38
	131	22	12	22	39	22	13	22	41	22	-4	22	32	-2	32	38
	134	19	8	19	39	19	9	19	41	19	-11	19	26	-9	26	38
	135	19	10	19	39	19	10	20	41	20	-4	20	27	-4	27	38
	136	18	9	19	39	19	10	19	41	19	-5	19	29	-4	29	38
7	107	36	21	36	45	36	22	37	42	37	5	37	41	6	**41**[1]	39
9	1	23	15	24	37	24	9	24	40	25	-16	25	31	-15	31	38
12	58	19	28	28	35	20	26	27	38	20	7	21	32	8	32	35
	59	18	24	25	35	18	22	23	38	19	8	19	23	9	23	35
	60	17	19	21	35	17	18	21	38	17	6	18	23	7	24	35
	61	19	29	29	35	19	25	26	38	20	8	20	28	9	28	35
A	33	19	22	24	36	20	25	26	39	20	6	20	31	8	31	36
B	45	22	41	**41**[3]	35	22	38	**38**[1]	37	23	17	24	33	19	33	35
	46	21	38	**38**[2]	35	22	38	**38**[1]	37	22	17	24	32	19	32	35
F	69	22	35	36	39	23	36	36	40	23	13	24	34	14	35	40
	70	23	36	36	39	23	37	37	40	24	14	24	34	15	34	40

YEAR 6 - PART PIT OPERATION INTRUSIVE NOISE EMISSIONS - MINE OWNED RESIDENCES

Noise Assessment Group	Residence Reference	Daytime (Non-Adverse)			Project Specific Criteria	Evening (Non-Adverse)			Project Specific Criteria	Night-time (Non-Adverse)			Night-time (Adverse Winter)			Project Specific Criteria
		IOC	NOC	Project Total		IOC	NOC	Project Total		IOC	NOC	Project Total	IOC	NOC	Project Total	
F	74	20	20	23	39	20	19	23	40	21	4	21	32	5	32	40
	75	21	22	24	39	21	22	25	40	22	4	22	32	5	32	40
G	82	25	30	31	38	25	31	32	41	26	13	26	35	14	35	39

Note 1: Marginal Noise Management Zone 1 to 2 dBA above project specific criteria (bold text)

Note 2: Moderate Noise Management Zone 3 to 5 dBA above project specific criteria (bold text)

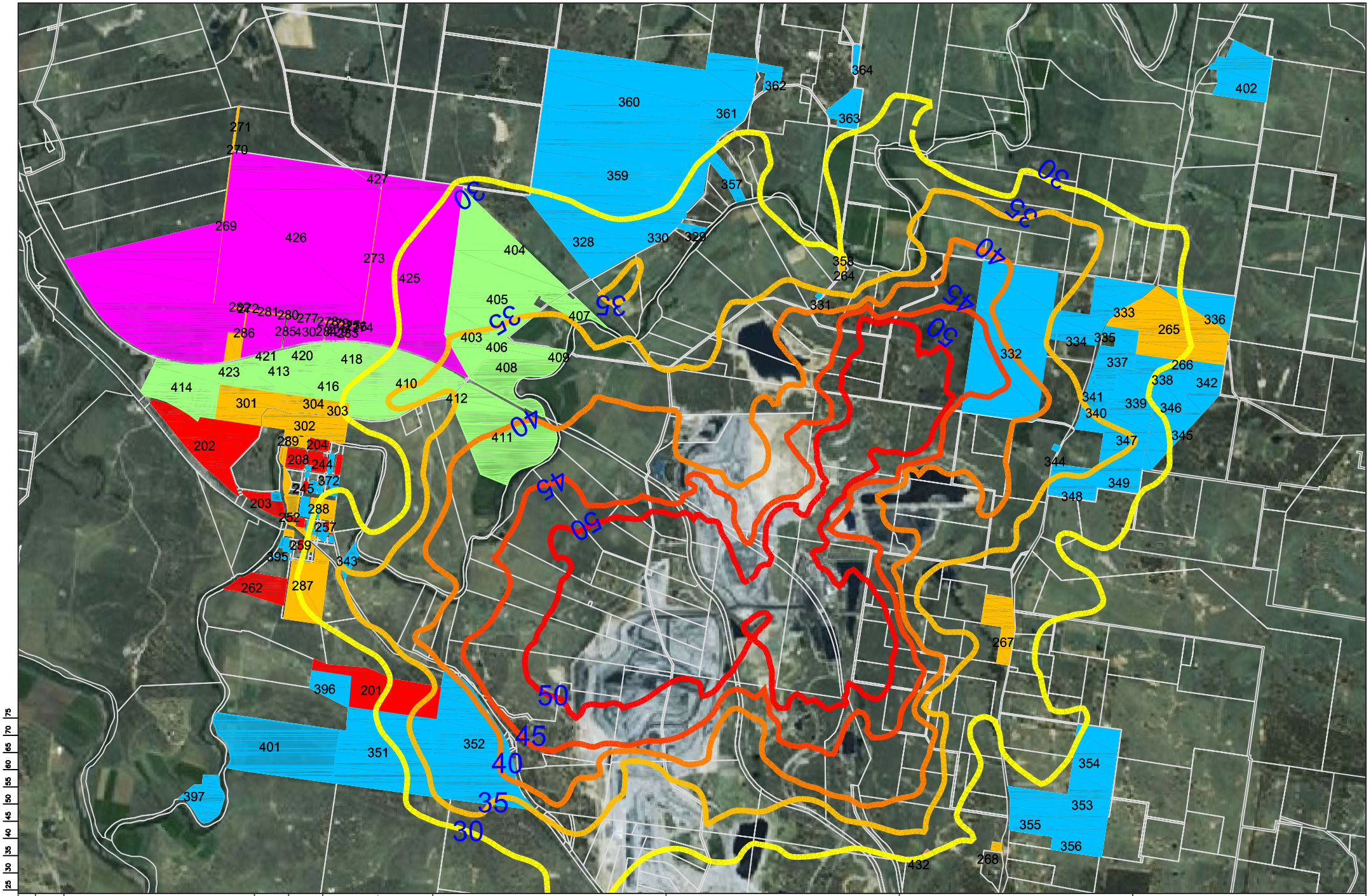
Note 3: Noise Affection Zone >5 dBA above project specific criteria (bold text and shaded cell)

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Intrusive Noise Emission Contours - Vacant Land

Map compiled using MapInfo StreetPro Data, © 2006 MapInfo Australia Pty Ltd, URS Australia and PSMA Australia Ltd. URS Australia, MapInfo Australia or PSMA Australia do not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that these companies shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

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75 mm ON ORIGINAL

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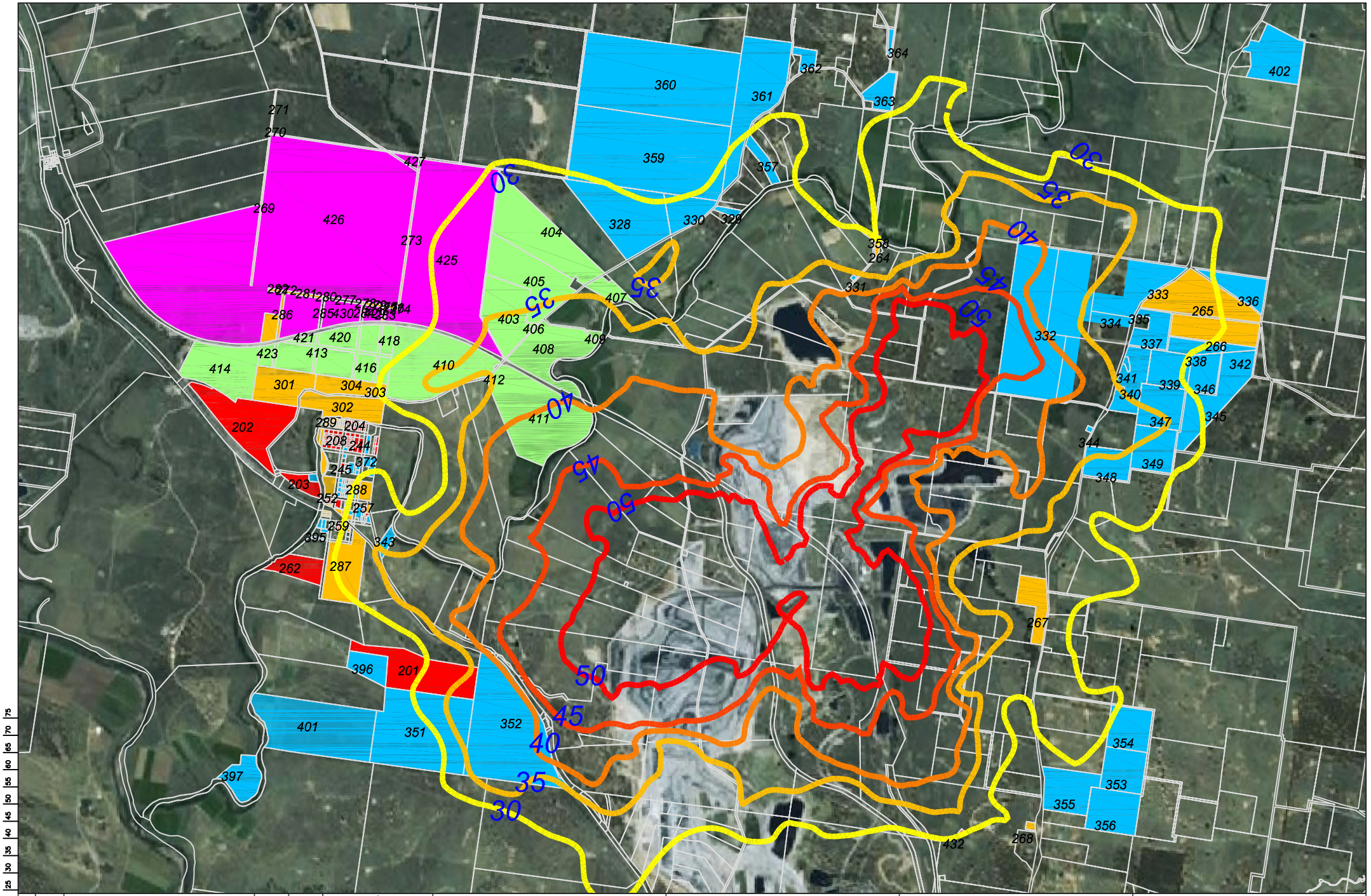
Legend

- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

Heggies Pty Ltd
2 Lincoln Street
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Telephone 02 9427 8100 Facsimile 02 9427 8200

10-5202 Integra Open Cut Project
Vacant Land
Full Pit Extent Year 1 - Daytime

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 743 Year 1 - Daytime.dwg	10-5202 743Y1 - Daytime	0



REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	02/10/00		YL	MB

75 mm ON ORIGINAL

0 369 738

Scale = 1:36913

Legend

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- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

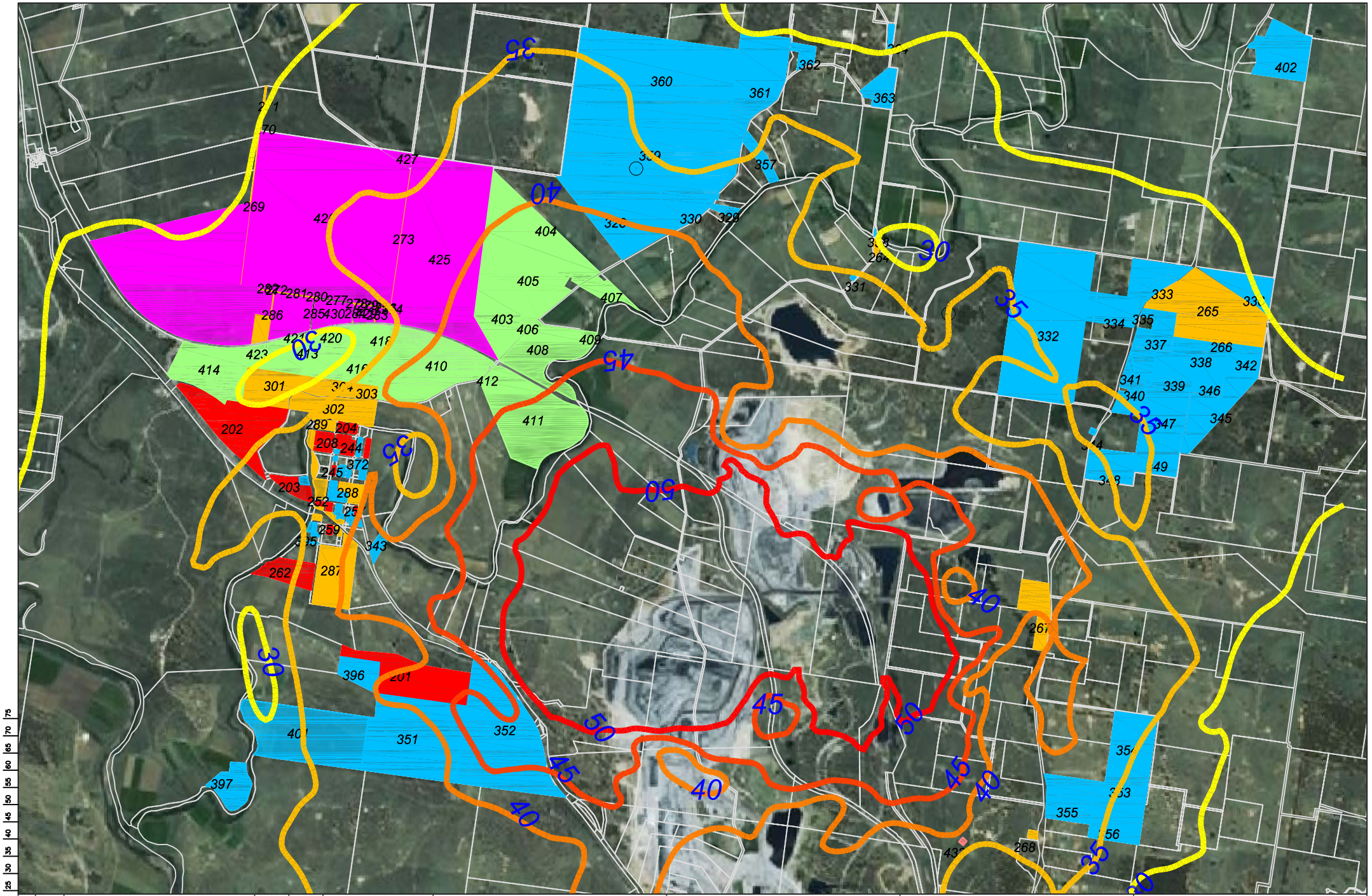
Heggies Pty Ltd
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10-5202 Integra Open Cut Project
Vacant Land
Full Pit Extent Year 1 - Evening

FILE NAME: 10-5202 Noise Contours - 743 Year 1 - Evening.dwg

DRAWING No.: 10-5202 743Y1 - Evening

REVISION: 0



75 mm ON ORIGINAL

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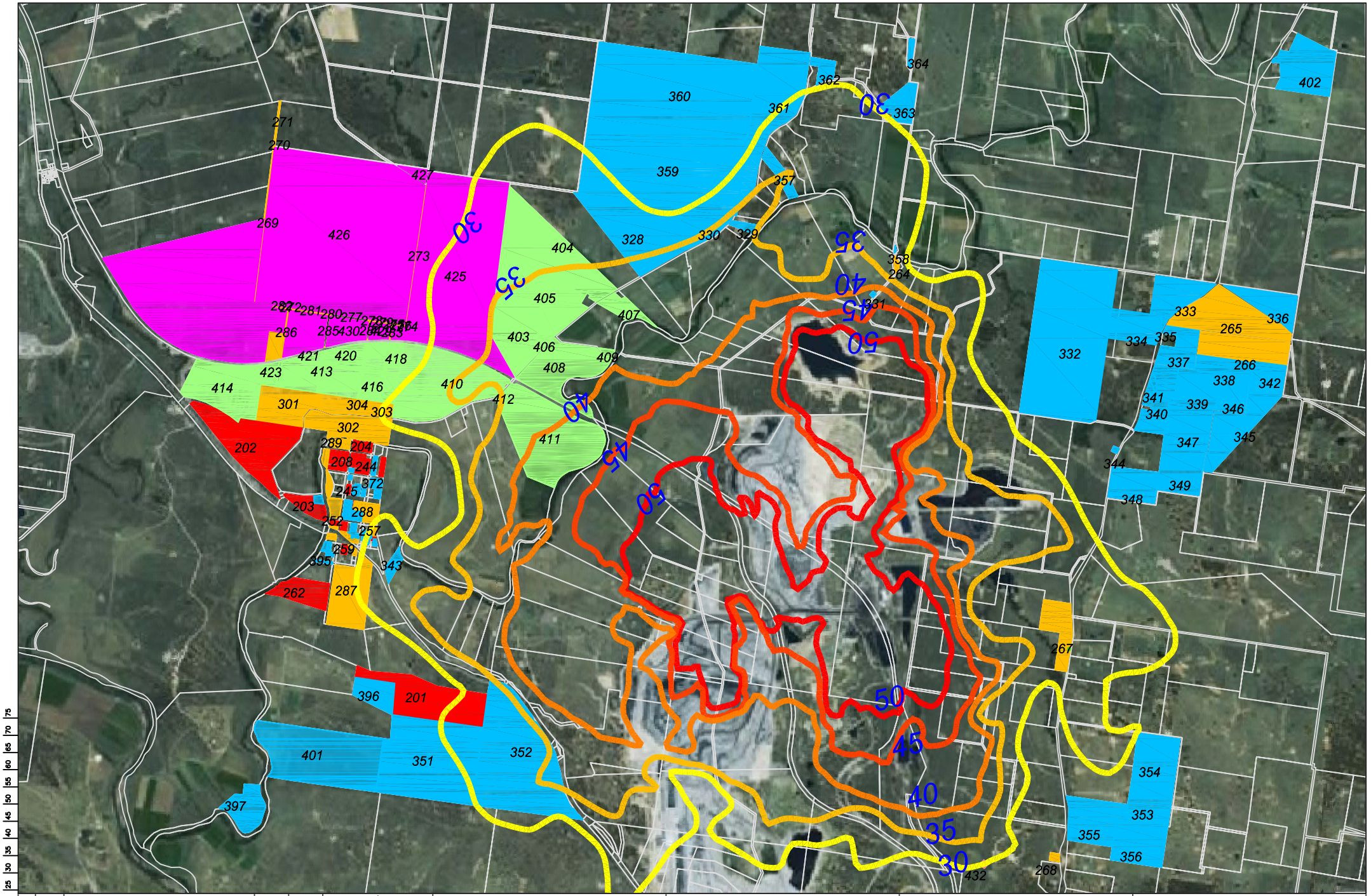
Legend

- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

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10-5202 Integra Open Cut Project
Vacant Land - Full Pit Extent Year 1
Night (3degC/100m)

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 743 Year 1 - Night.dwg	10-5202 743Y1 - Night (3degC/100m)	0



75 mm ON ORIGINAL

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	02/10/00		YL	MB

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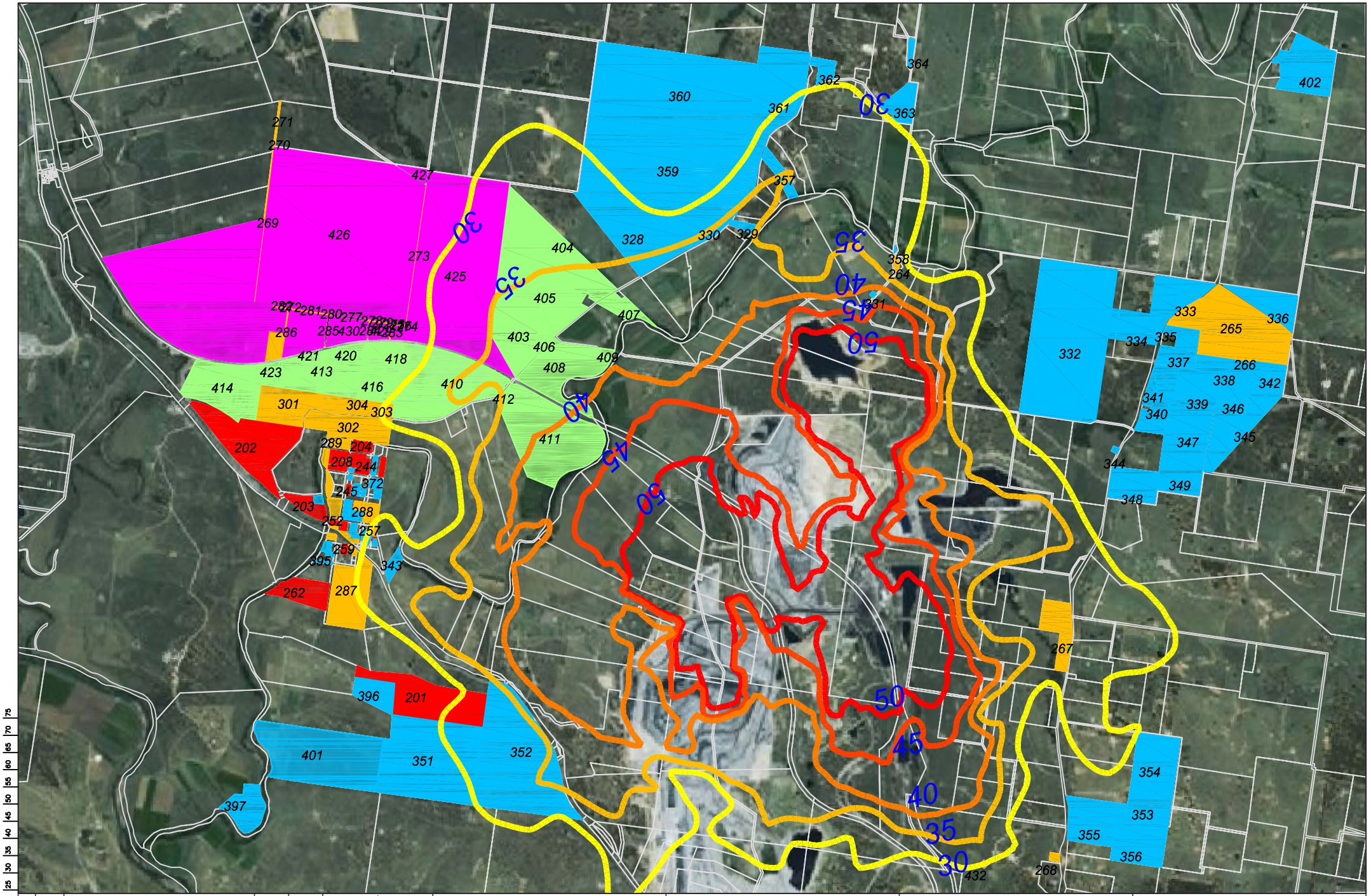
Legend

- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

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10-5202 Integra Open Cut Project
Vacant Land
Full Pit Extent Year 4 - Daytime

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 743 Year 4 - Daytime.dwg	10-5202 743Y4 - Daytime	0



75 mm ON ORIGINAL

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	02/10/08		YL	MB

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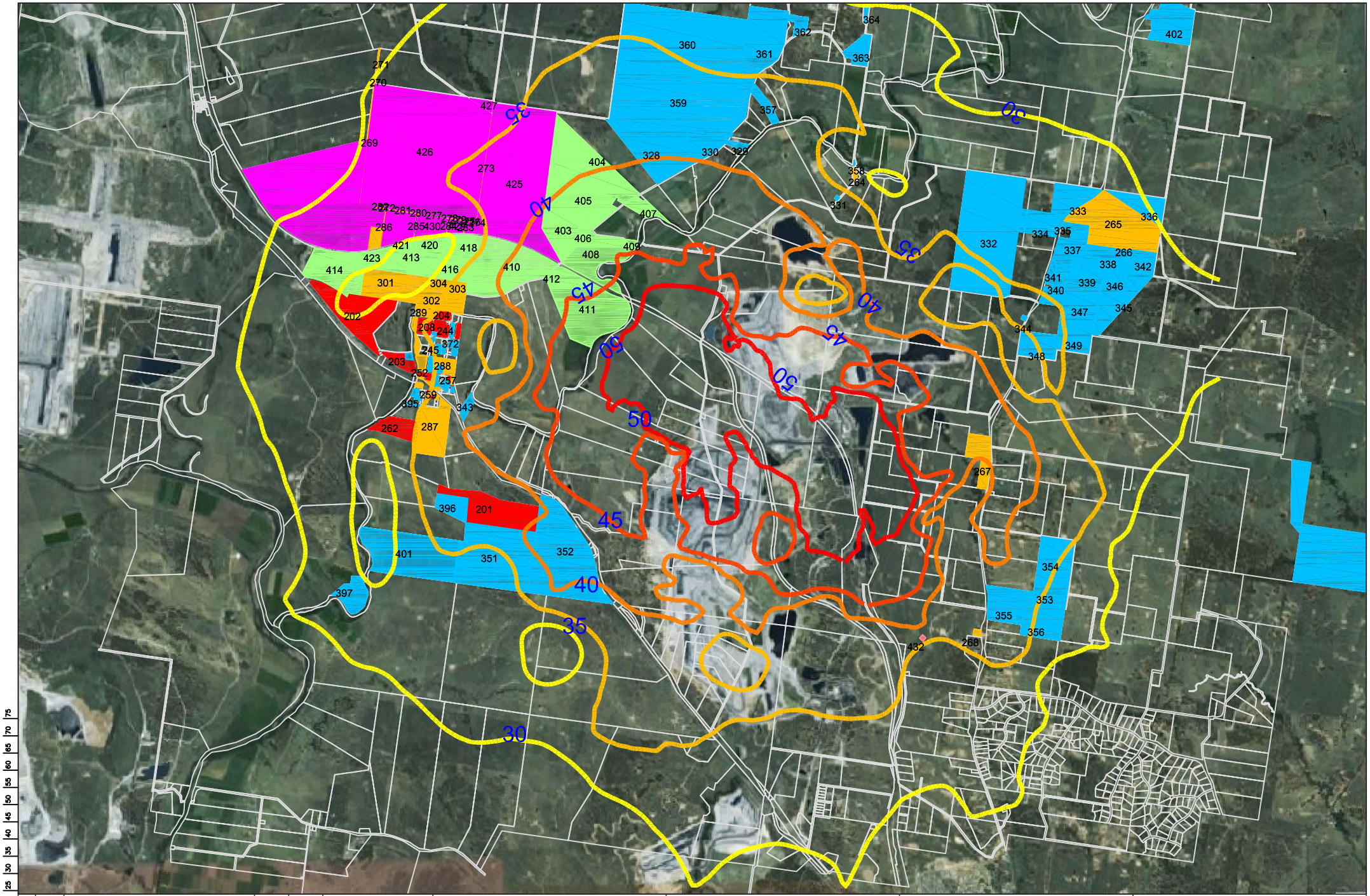
Legend

- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

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10-5202 Integra Open Cut Project
Vacant Land
Full Pit Extent Year 4 - Evening

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 743 Year 4 - Evening.dwg	10-5202 743Y4 - Evening	0



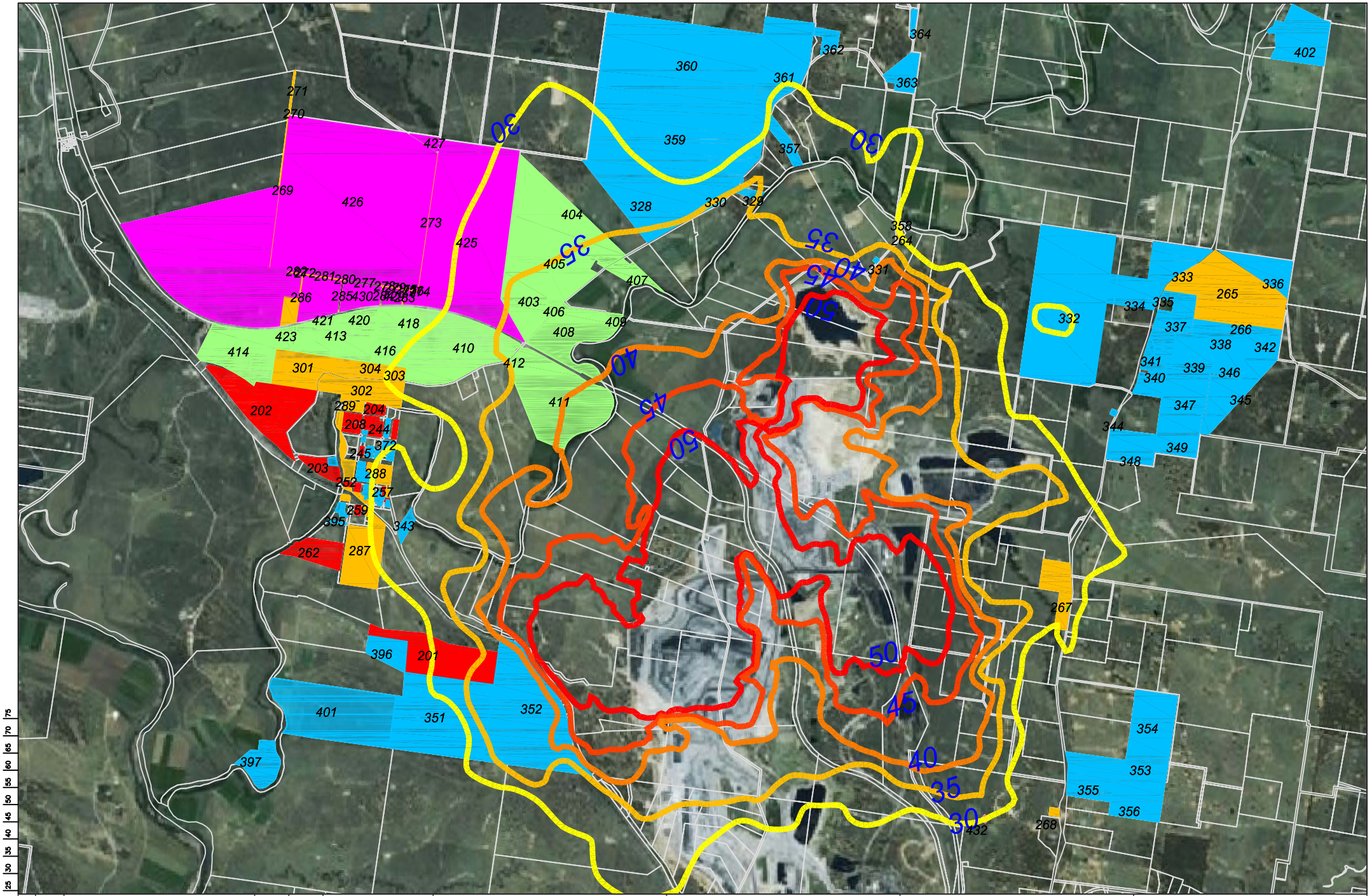
75 mm ON ORIGINAL

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
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10-5202 Integra Open Cut Project
Vacant Land - Full Pit Extent Year 4
Night (3degC/100m)

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 743 Year 4 - Night.dwg	10-5202 743Y4 - Night (3degC/100m)	0



Legend

- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

0 367 734

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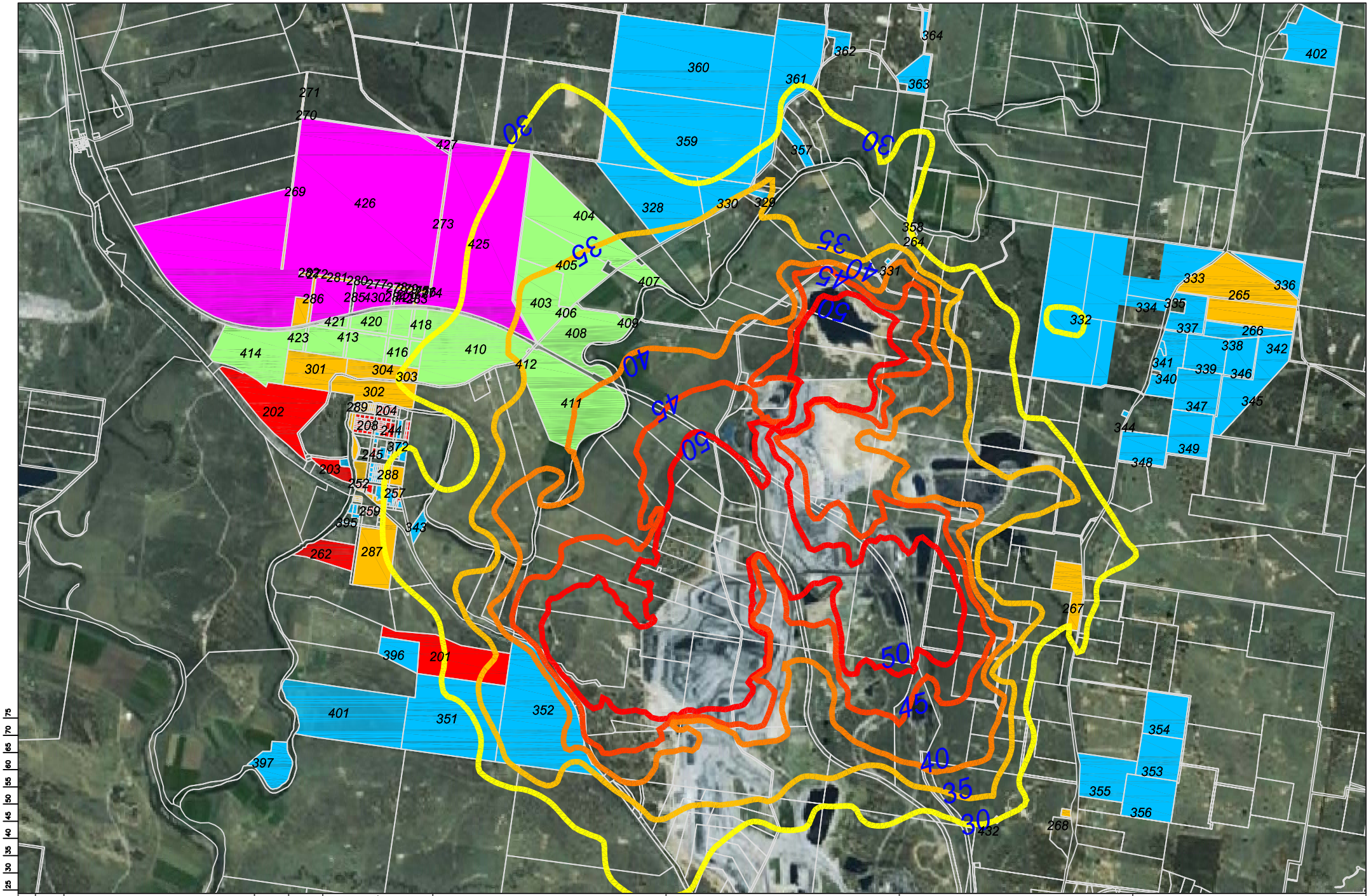
75 mm ON ORIGINAL

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	02/10/08		YL	MB

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10-5202 Integra Open Cut Project
Vacant Land
Full Pit Extent Year 6 - Daytime

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 743 Year 6 - Daytime.dwg	10-5202 743Y6 - Daytime	0



75 mm ON ORIGINAL

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
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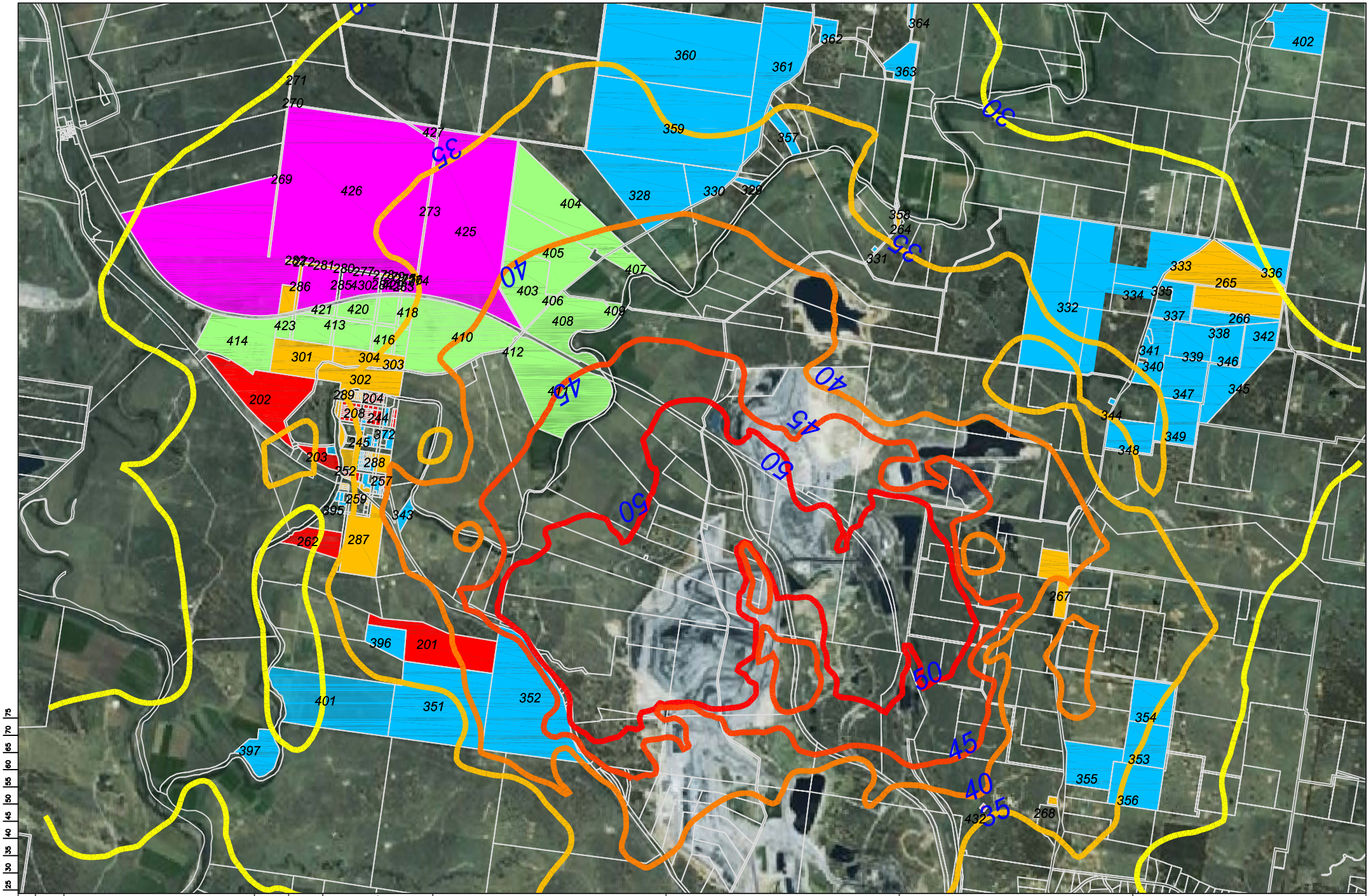
Legend

- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

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10-5202 Integra Open Cut Project
vacant Land
Full Pit Extent Year 6 - Evening

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 743 Year 6 - Evening.dwg	10-5202 743Y6 - Evening	0



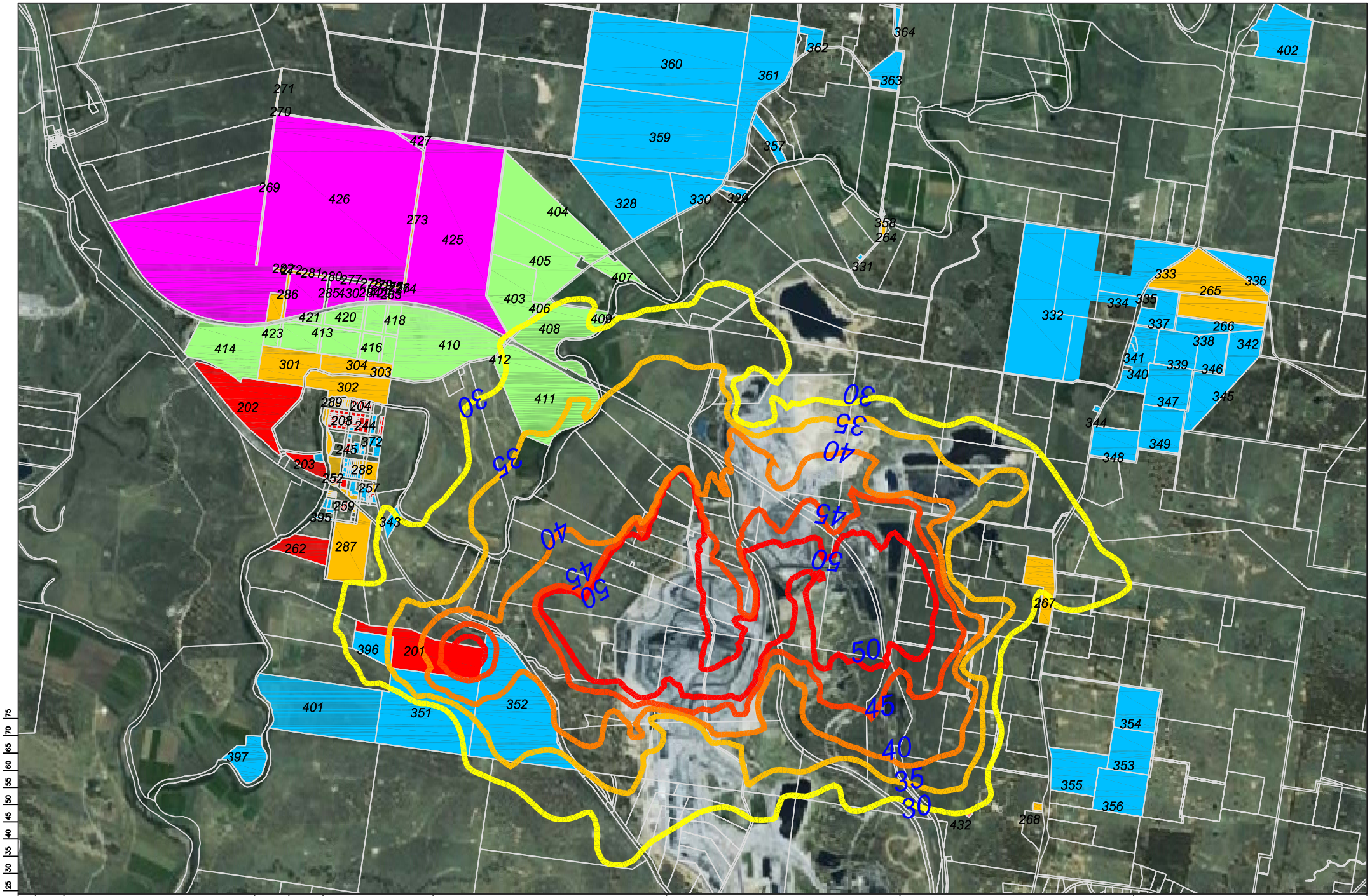
75 mm ON ORIGINAL

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	02/10/08		YL	MB

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10-5202 Integra Open Cut Project
Vacant Land - Full Pit Extent Year 6
Night (3degC/100m)

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 743 Year 6 - Night.dwg	10-5202 743Y6 - Night (3degC/100m)	0



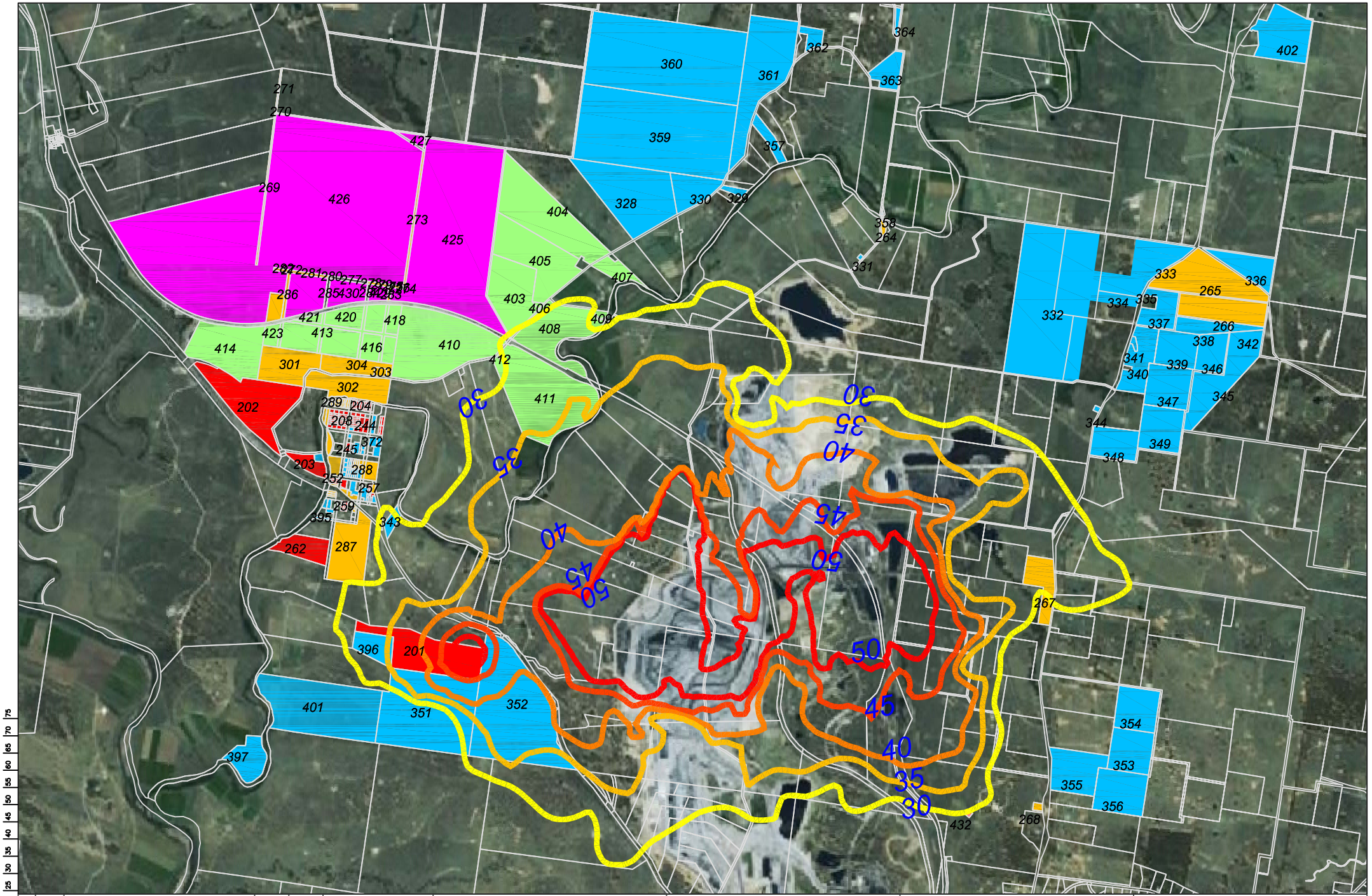
75 mm ON ORIGINAL

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	02/10/08		YL	MB

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10-5202 Integra Open Cut Project
Vacant Land
Full Pit Extent Year 8 - Daytime

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 743 Year 8 - Daytime.dwg	10-5202 743Y8 - Daytime	0



75 mm ON ORIGINAL

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
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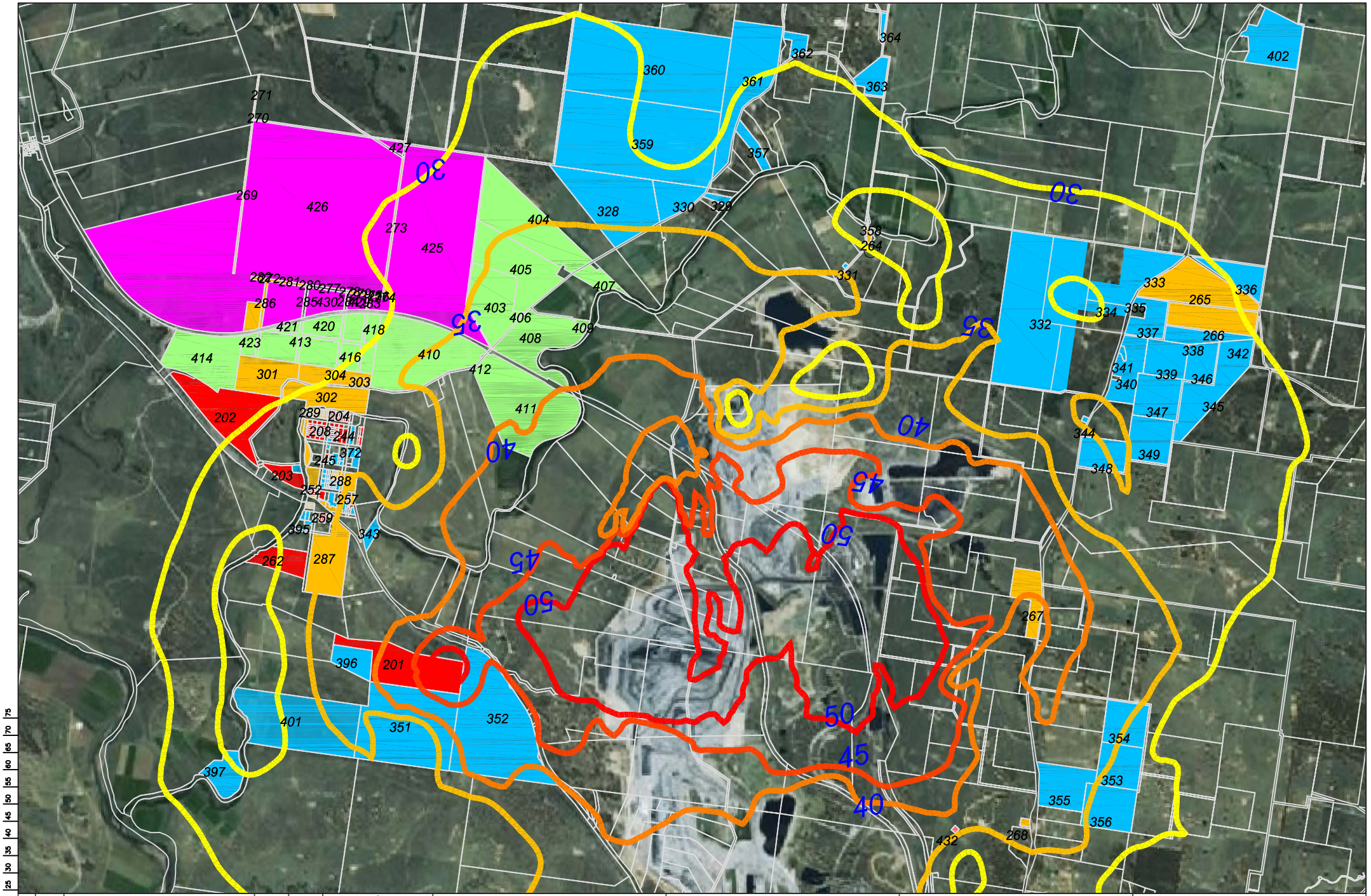
Legend

- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

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10-5202 Integra Open Cut Project
Vacant Land
Full Pit Extent Year 8 - Evening

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 743 Year 8 - Evening.dwg	10-5202 743Y8 - Evening	0



75 mm ON ORIGINAL

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	02/10/08		YL	MB

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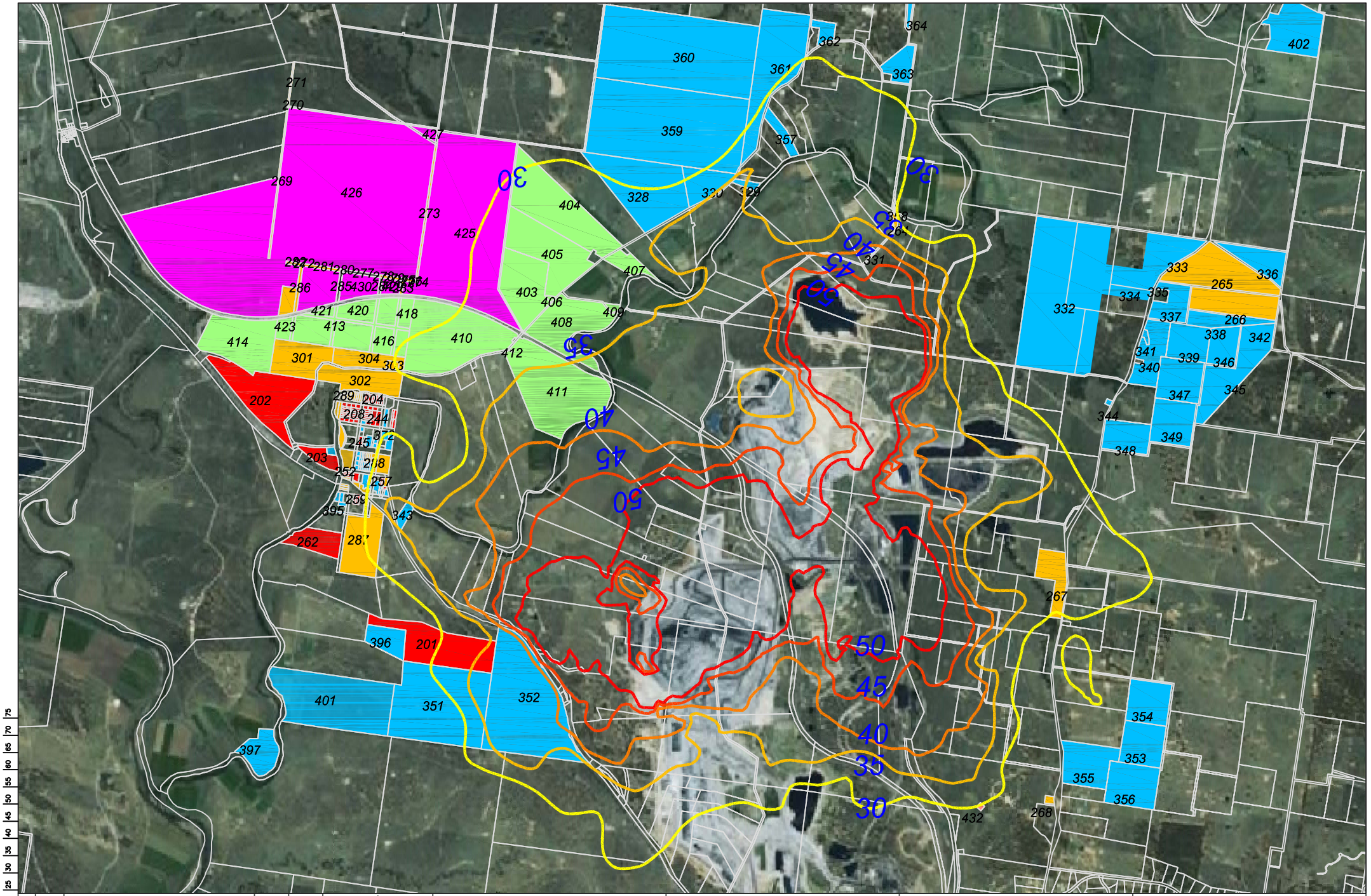
Legend

- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

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Telephone 02 9427 8100 Facsimile 02 9427 8200

10-5202 Integra Open Cut Project
Vacant Land - Full Pit Extent Year 8
Night (3degC/100m)

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 743 Year 8 - Night.dwg	10-5202 743Y8 - Night (3degC/100m)	0



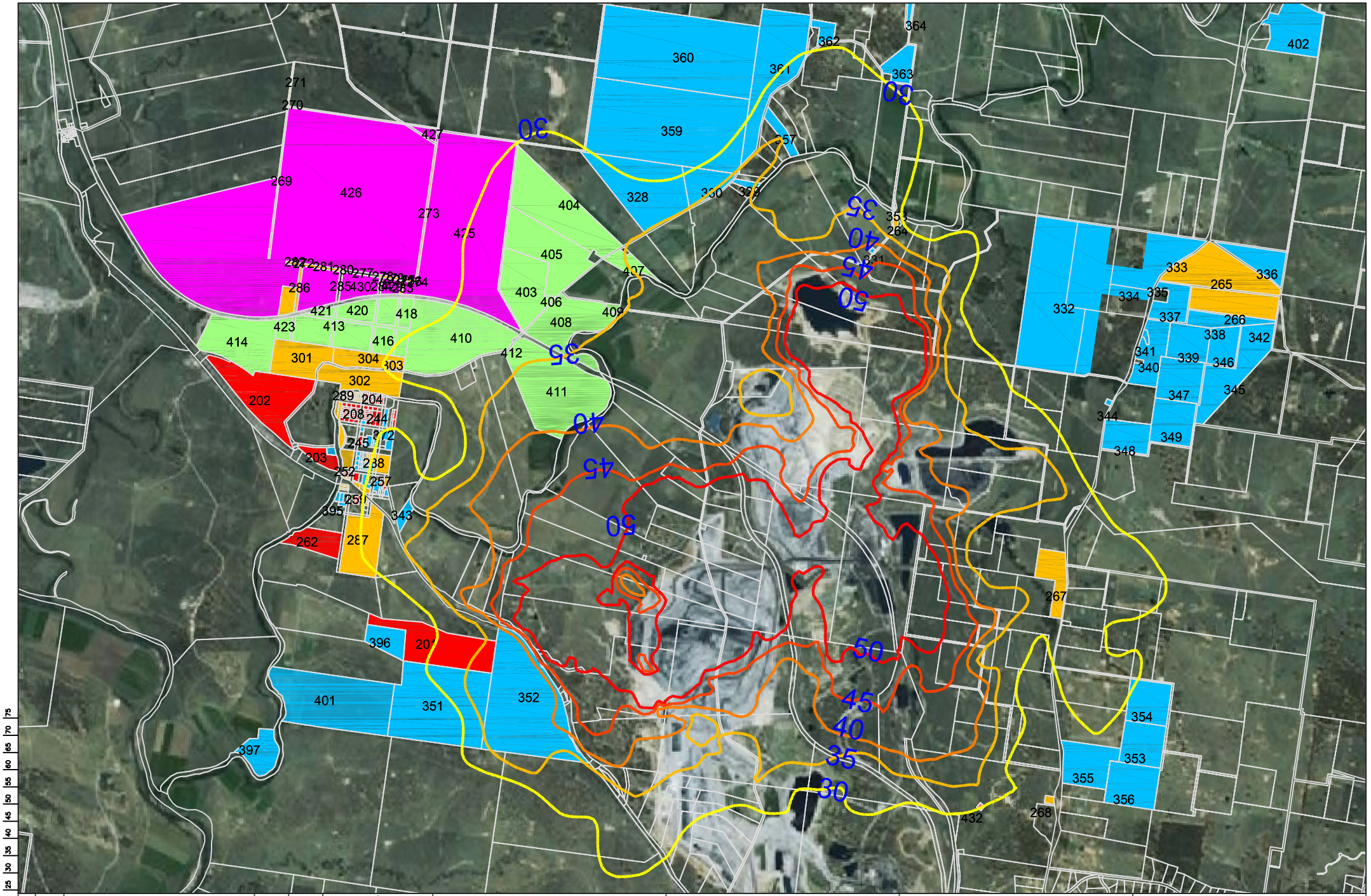
75 mm ON ORIGINAL

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	02/10/08		YL	MB

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Lane Cove NSW 2066 Australia
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Email address sydney@heggies.com.au
Telephone 02 9427 8100 Facsimile 02 9427 8200

10-5202 Integra Open Cut Project
Vacant Land
Part Pit Extent Year 3 - Daytime

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 767 Year 3 - Daytime.dwg	10-5202 767Y3 - Daytime	0



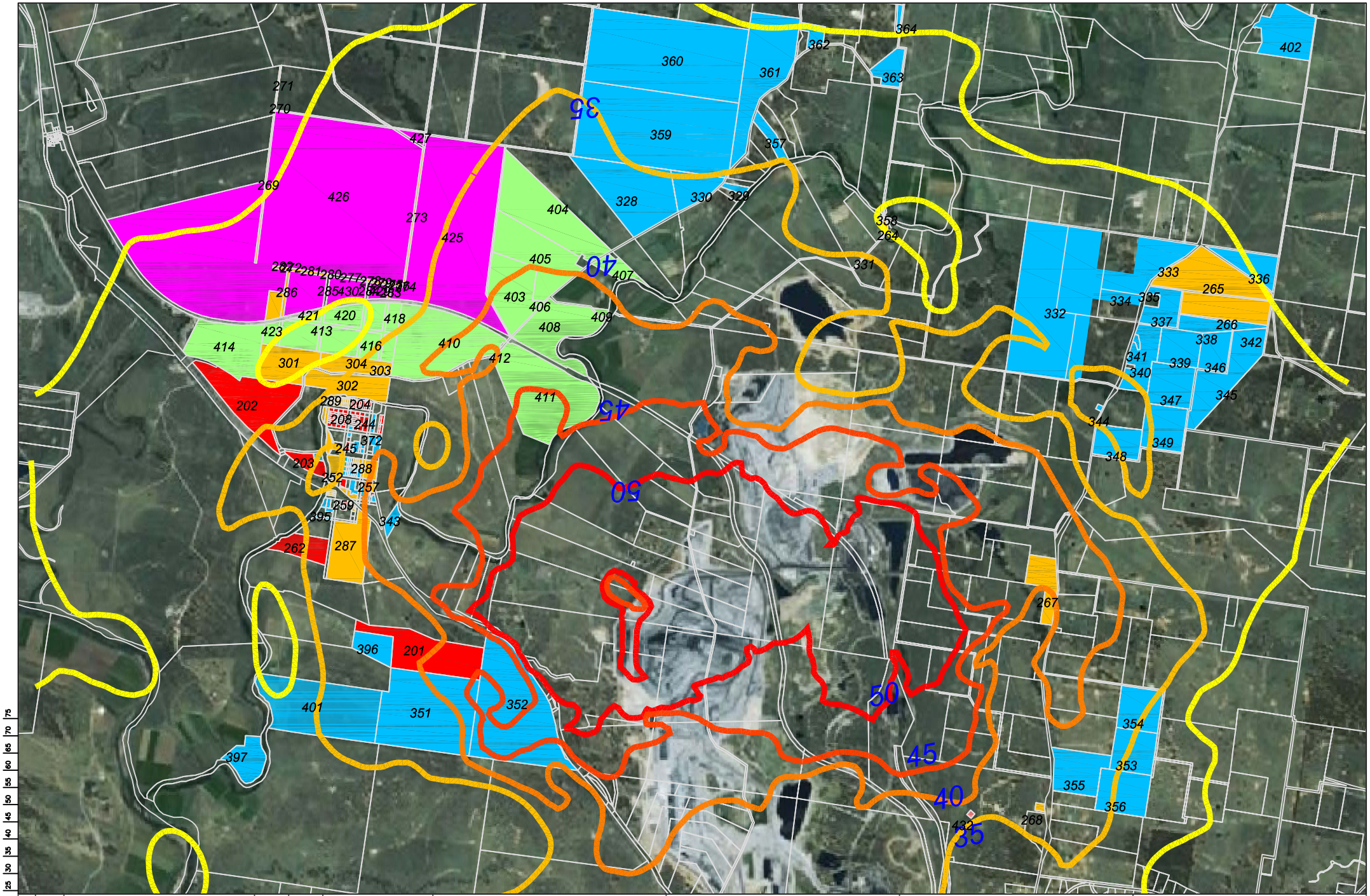
75 mm ON ORIGINAL

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	02/10/08		YL	MB

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10-5202 Integra Open Cut Project
Vacant Land
Part Pit Extent Year 3 - Evening

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 767 Year 3 - Evening.dwg	10-5202 767Y3 - Evening	0



75 mm ON ORIGINAL

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	02/10/08		YL	MB

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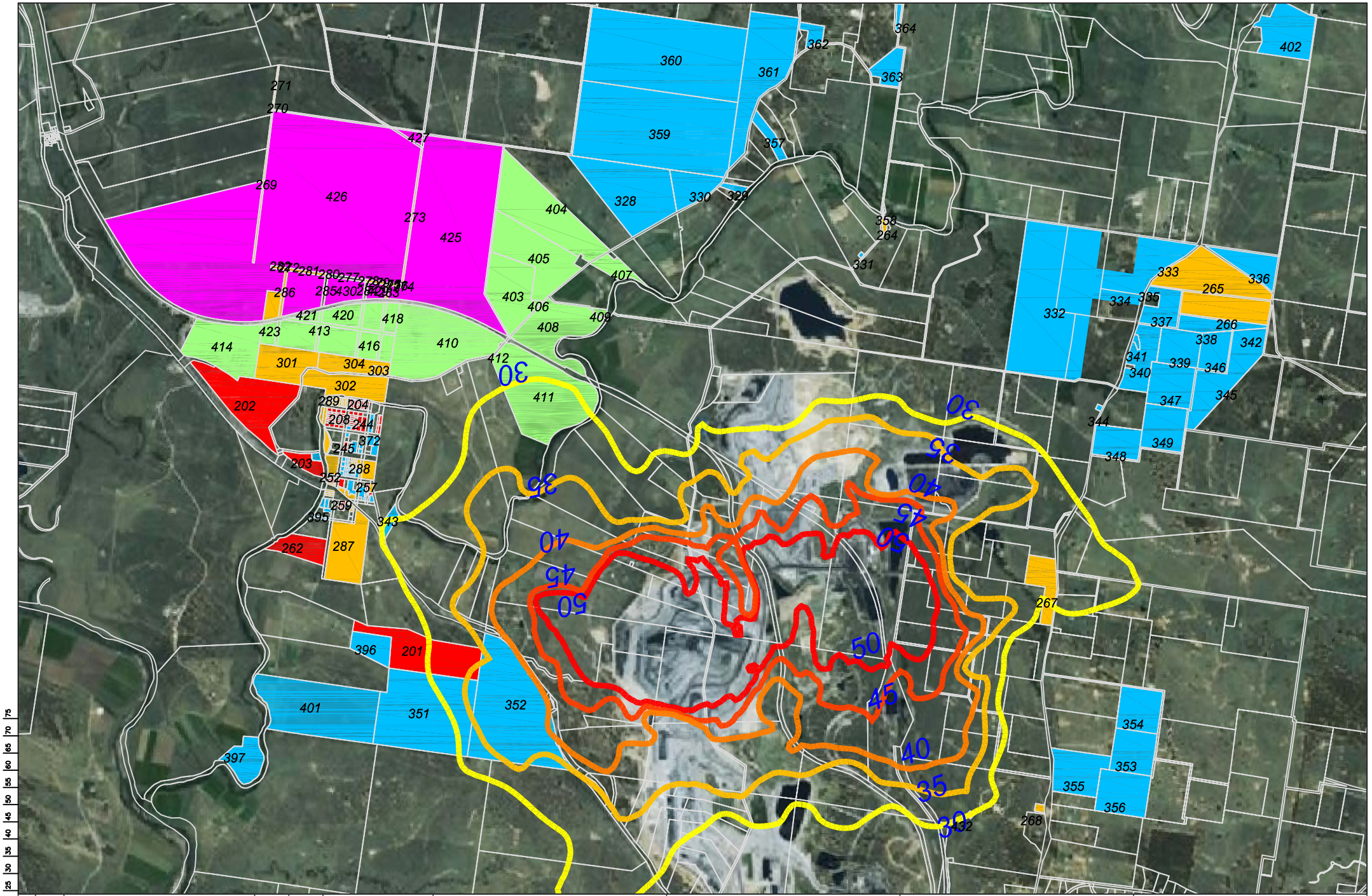
Legend

- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

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10-5202 Integra Open Cut Project
Vacant Land - Part Pit Extent Year 3
Night (3degC/100m)

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 767 Year 3 - Night.dwg	10-5202 767Y3 - Night (3degC/100m)	0



75 mm ON ORIGINAL

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	02/10/00		YL	MB

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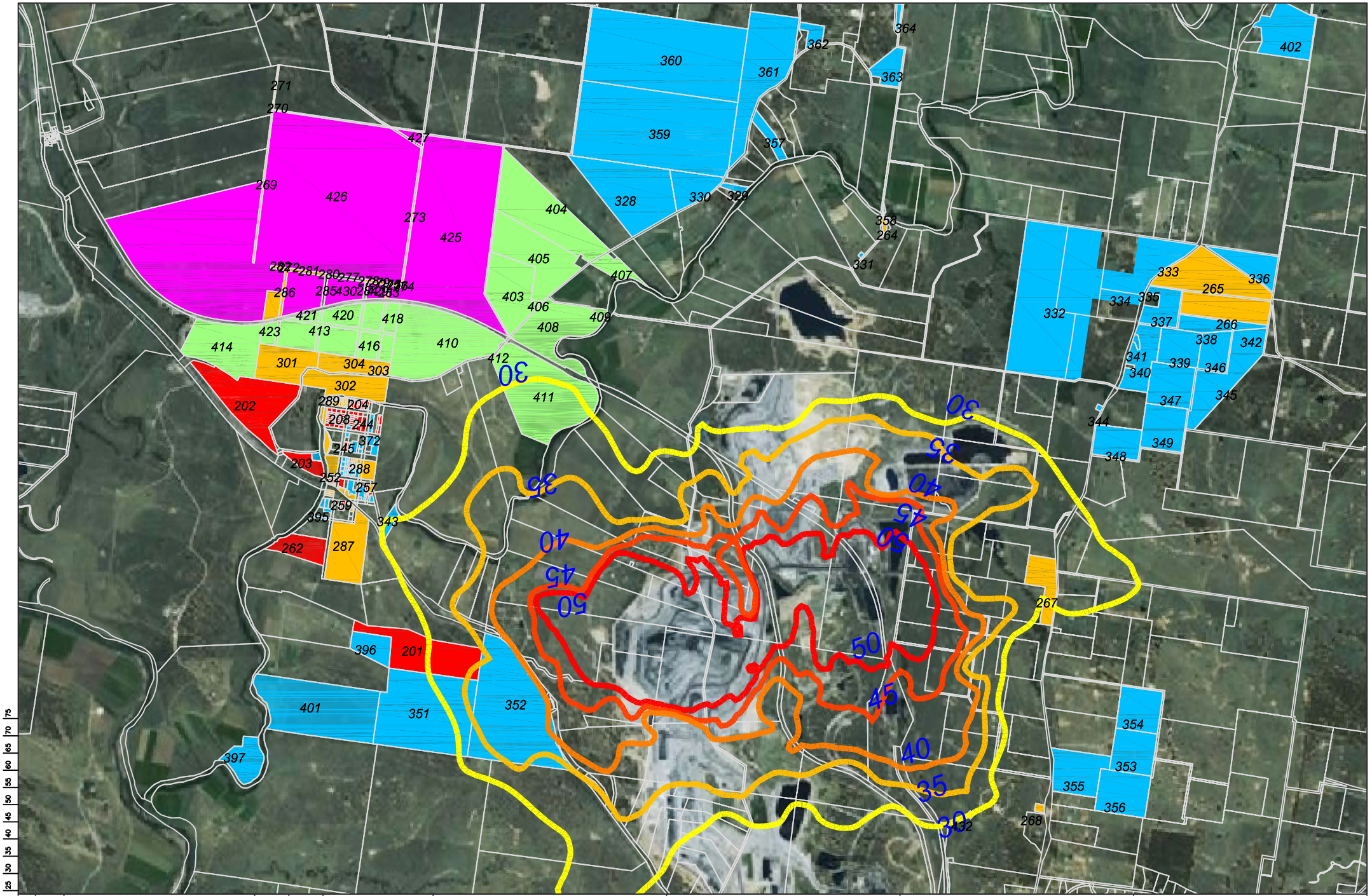
Legend

- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

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10-5202 Integra Open Cut Project
Vacant Land
Part Pit Extent Year 6 - Daytime

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 767 Year 6 - Daytime.dwg	10-5202 767Y6 - Daytime	0



75 mm ON ORIGINAL

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	02/10/08		YL	MB

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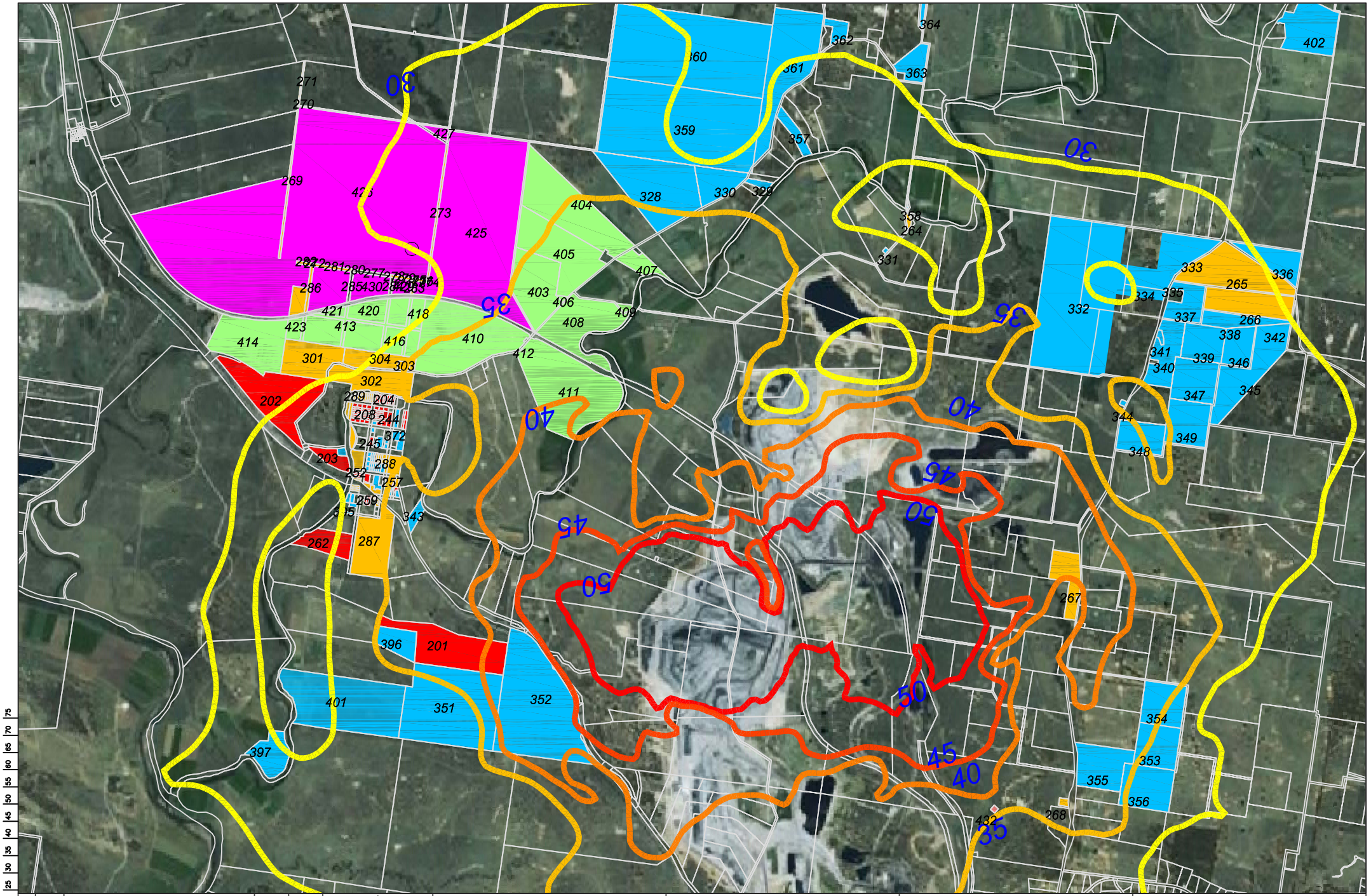
Legend

- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

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10-5202 Integra Open Cut Project
Vacant Land
Part Pit Extent Year 6 - Evening

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 767 Year 6 - Evening.dwg	10-5202 767Y6 - Evening	0



75 mm ON ORIGINAL

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	02/10/08		YL	MB

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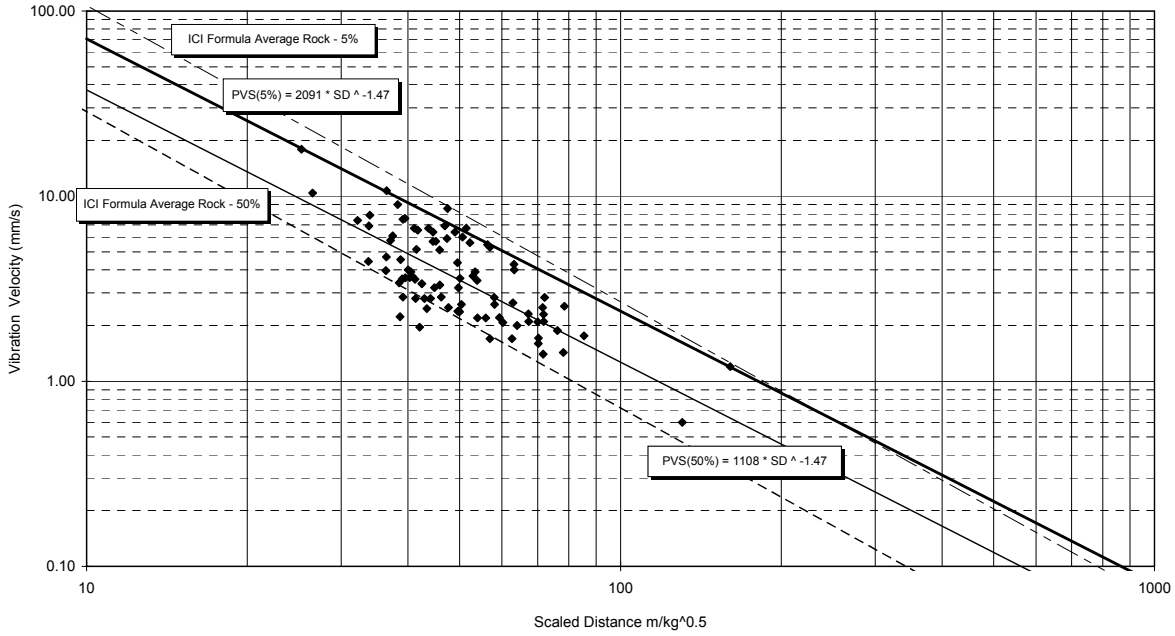
Legend
- 50 dBA Noise Contour
- 45 dBA Noise Contour
- 40 dBA Noise Contour
- 35 dBA Noise Contour
- 30 dBA Noise Contour

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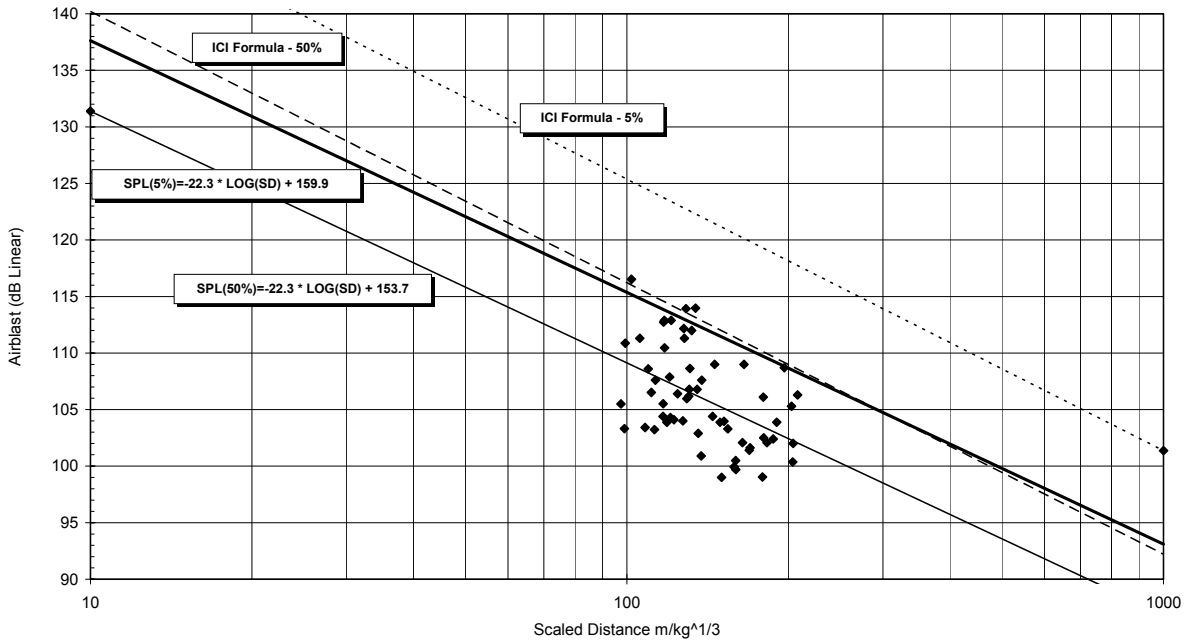
10-5202 Integra Open Cut Project
Vacant land - Part Pit Extent Year 6
Night (3degC/100m)

FILE NAME	DRAWING No.	REVISION
10-5202 Noise Contours - 767 Year 6 - Night.dwg	10-5202 767Y6 - Night (3degC/100m)	0

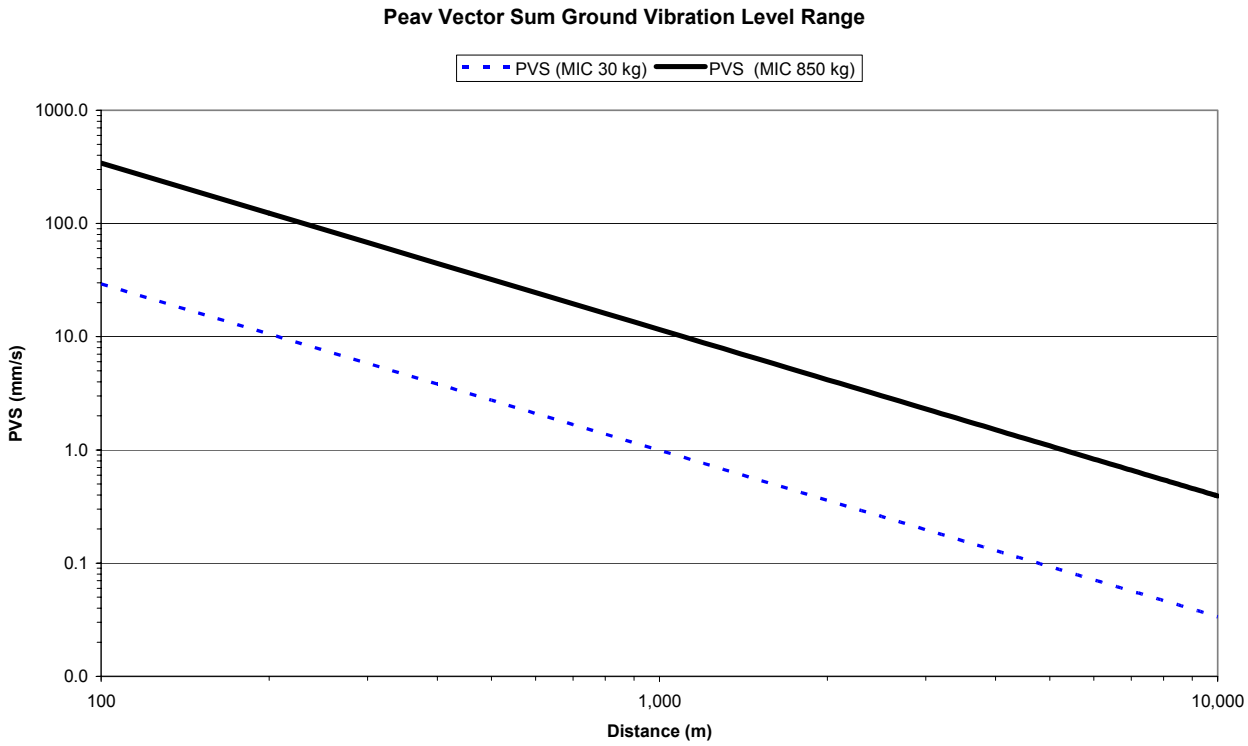
Integra Open Cut Project
PVS Ground Vibration Velocity Site Law

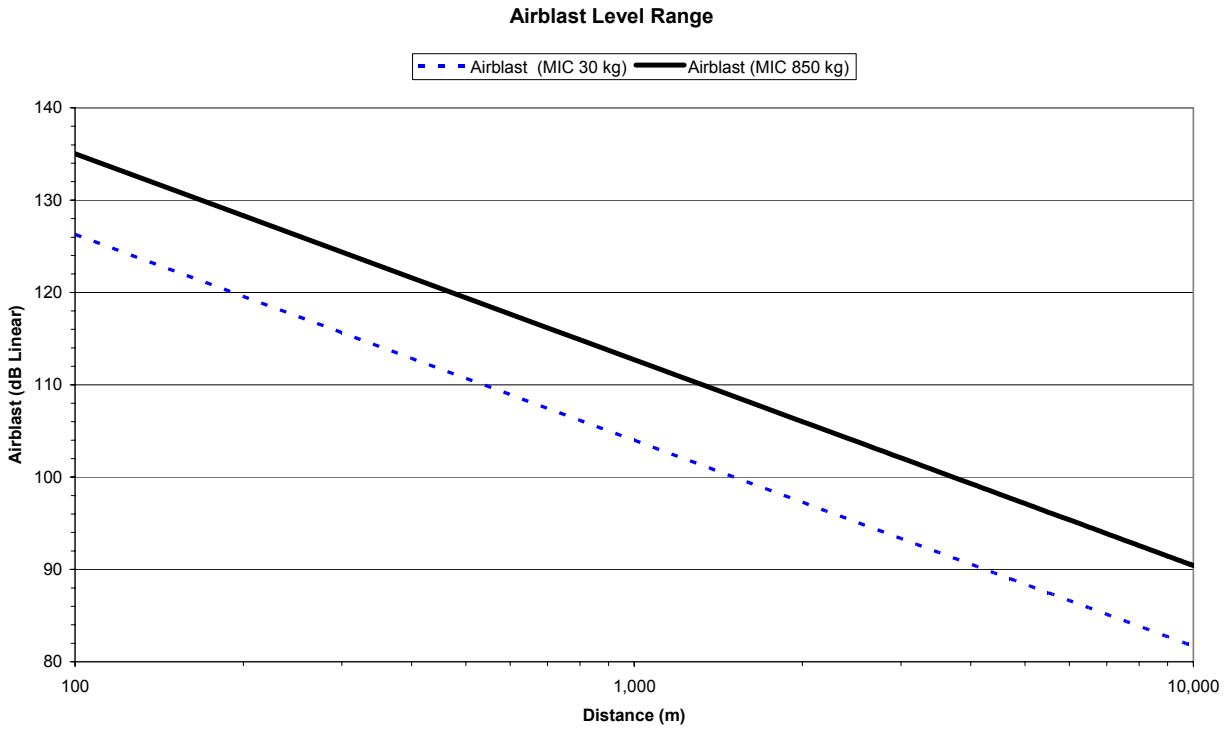


Integra Open Cut Project
Peak Linear Airblast Site Law



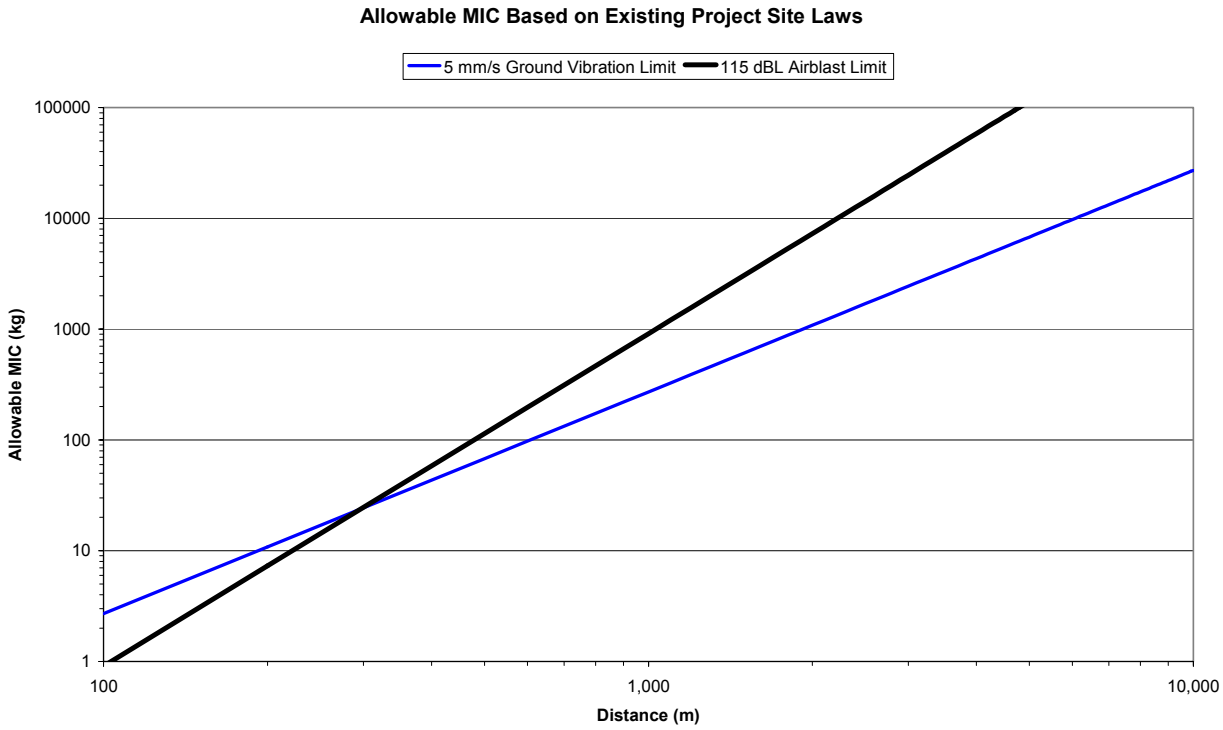
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Peav Vector Sum Ground Vibration Level Range
PVS (MIC 30 kg)
PVS (MIC 850 kg)
1000.0
100.0
10.0
1.0
0.1
0.0
PVS (mm/s)
100
1,000
10,000
Distance (m)


Airblast Level Range
Airblast (MIC 30 kg)
Airblast (MIC 850 kg)
140
130
120
110
100
90
80
Airblast (dB Linear)
100
1,000
10,000
Distance (m)

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Allowable MIC versus Distance



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