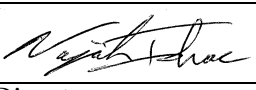


The GPT Group

Storage & Distribution
Centre Lenore Lane -
Erskine Park
Acoustic Investigation
Site H – Target Off-Site
Reserve

December 2008

Reference: J08012RP1

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INTRODUCTION

This noise impact assessment has been prepared to accompany a Project Application for the proposed Target Australia's off-site reserve at Connect Erskine Park Complex, Lenore Lane, Erskine Park. The complex is located south of Lenore Lane, Erskine Park, within the Penrith Local Government Area.

The Erskine Park Complex has an area of approximately 38 ha and is located in the CSR Limited's land holdings adjacent to Lenore Lane. It is part of the Erskine Park Employment Area.

The proposed site comprises two buildings, the Target off-site reserve being of approximately 13,175m², plus 600m² of office and amenities space, with a total site area of approximately 27,235m² encompassing car parking, truck hardstand and docks and landscaping. The other building is a speculative shed of similar size. The site is the southern most portion of the complex bound by a Sydney Water pipeline to the south, by an approved industrial site to the north, proposed industrial site to the east, and land fill to the west.

Local residences are located to the north within the residential area of Erskine Park, approximately 1,100m from the proposed Target site. Approximately 350m south of the site, beyond the water supply pipeline, is the Emmaus Retirement Village 'future' residences. Further south on Bakers Lane are the Emmaus Catholic College, Trinity Catholic Primary School and Mamre Christian College. Other existing residential receivers are a few isolated properties located north of and fronting Lenore Lane.

1.1

ACOUSTIC GLOSSARY

Environmental noise levels are commonly expressed in dB(A). The A-weighting scale follows the average human hearing response and enables comparison of the intensity of noise with different frequency characteristics. Noise from environmental sources such as vehicles often varies with time. For this reason, noise emission from such sources is often described in terms of statistical noise descriptors. The following descriptors are commonly used to assess noise:

- dB(A) Noise level measurement units are decibels (dB). The "A" weighting indicates that a filter has been applied to the measured results to mimic the human response to noise;
- L_{max} - The absolute maximum noise level in a noise sample;
- L₁₀ - The noise level which is exceeded for 10 per cent of the time and is approximately the average of the maximum noise levels;

- L_{90} - The noise level exceeded for 90 per cent of the time and is approximately the average of the minimum noise levels. The L_{90} level is often referred to as the "background" noise level and is commonly used as a basis for determining noise criteria for assessment purposes;
- L_{eq} - This level represents the "equivalent" or average noise energy during a measurement period. The L_{eq} (24 hour) noise descriptor simply refers to the L_{eq} noise level calculated over a 24 hour period. Indeed, any of the above noise descriptors may be defined in this way, with an accompanying time period (eg. L_{10} (20 minute)) as required;
- Sound Power Level L_w or SWL - This is a measure of the total power radiated by a source. The Sound Power of a source is a fundamental property of the source and is independent of the surrounding environment; and
- L_p - Sound Pressure Level - The level of sound pressure, expressed in decibels, as measured by a standard sound level meter with a microphone. This differs from L_w in that this is the received sound as opposed to the sound 'intensity'.

The following concepts offer qualitative guidance in respect of the average response to changes in noise levels:

- differences in noise level of less than approximately 2 dB are generally imperceptible in practice;
- differences in noise level of around 5 dB are considered to be significant;
- a difference in noise level of around 10 dB is generally perceived to be a doubling (or halving) of the loudness of the noise.

The NSW Department of Environment and Climate Change (DECC) seeks to regulate noise from industrial noise sources through its Industrial Noise Policy (INP).

The INP includes a method for prescribing noise criteria for the purpose of assessing potential noise impacts from a source. This methodology is prescribed in terms of the measured "assessment background levels" and "rating background levels" of noise:

- ABL - The Assessment Background Level is the lowest tenth percentile value of the L_{90} levels measured for each day/evening/night assessment period respectively; and
- RBL - The Rating Background Level is defined as the overall single value representative background level for each of the day, evening and night periods respectively. The RBL is calculated as the median value of the corresponding ABL's (eg. for each night period of the monitoring cycle). RBL's account for temporal variation of background noise and are used in determining the intrusiveness criterion for industrial noise.

For industrial noise there are three assessment periods – Day/Evening/Night. **Day** is the time period from 7:00 am to 6:00 pm (Monday to Saturday) or 8:00 am to 6:00 pm on Sundays and public holidays. **Evening** is the time period from 6:00 pm to 10:00 pm. **Night** is the time period from 10:00 pm to 7:00 am (Monday to Saturday) or 10:00 pm to 8:00 am on Sundays and public holidays.

The Environmental Protection Authority's (EPA's) definition of an **Industrial Noise Source** is one that generally does not move from place to place, for example, a stationary source. Except where other more specific noise control guidelines apply (for example, construction activities, road or rail traffic, emergency diesel generators etc.) all industrial noise sources that are scheduled under the *Protection of the Environment Operations Act 1997* are considered to be industrial sources. In general, these include:

- rotating machinery;
- impacting mechanical sources;
- other mechanical equipment and machinery such as conveyors;
- mobile sources confined to a particular location, such as draglines and haul trucks.

Facilities, usually comprising many sources of sound including:

- industrial premises;
- extractive industries;
- commercial premises;
- -warehousing facilities; and
- -maintenance and repair facilities. (In this case, the industrial noise source is understood to encompass all the activities taking place within the property boundary of the site).

For road traffic noise there are two assessment periods - Day and Night. **Day** is the time period from 7:00 am to 10:00 pm. Daytime noise descriptors often carry the 15hr identifier - eg. $L_{eq,15hr}$. **Night** is the time period from 10:00 pm to 7:00 am. Night time noise descriptors often carry the 9hr identifier - eg. $L_{eq,9hr}$.

1.2

KEY NOISE ISSUES

The main potential noise issues with respect to the proposal are broadly as follows:

- Noise from earthworks. We understand that earthworks for the subject site have been completed.
- Noise associated with the construction;
- Noise associated with the operation, which is expected to be dominated by on-site trucking movements and loading/unloading at the docks;
- Noise associated with the increased traffic to/from the site during construction and operation; and
- Cumulative noise from all existing and proposed industrial operations part of the larger development scheme (ie. Concept Plan) incorporating similar operations.

The acoustic study focussed on the key issues and included noise measurement, derivation of suitable criteria in accordance with NSW Government's Industrial Noise Policy (INP) and recommendations for suitable mitigation such that residential properties are not adversely impacted. The assessment will also extend to traffic noise impact on residences in accordance with the Environmental Criteria for Road Traffic Noise (ECRTN).

A key element in assessing environmental noise impact from industry is to quantify the ambient and background noise, including any existing industrial noise where relevant. From our observations, the dominant noise sources at existing residential areas at the time are related to construction activities and earthworks as well as traffic on Erskine Park Road and Mamre Road.

The existing acoustic environment was measured by means of both short-term attended and long-term unattended noise monitoring. Long term unattended noise monitoring was conducted in order to establish the level of ambient noise at residences. This was supplemented by attended noise monitoring to quantify the existing industrial and road traffic noise at potentially affected receivers.

Existing operating industry in the region is limited to a landfill west of the site. Limited observations during break in construction activities indicate that the landfill operations are not audible above road traffic noise at residential locations.

2.1**LONG TERM UNATTENDED NOISE MONITORING**

During our site visit the noise from the on going construction activities in the area was audible at the Lenore Lane residences, which are expected to be potentially affected by future operations on site. Since construction noise does not represent the usual background noise levels present at these locations, long term monitoring could not be performed at these locations. In accordance with the guidance in the INP, noise logging was conducted at the nearest representative unaffected location.

The long term noise monitoring was conducted at two locations from 1 to 15 July 2005 as described in *Table 2.1* and shown in *Figure 2.1*.

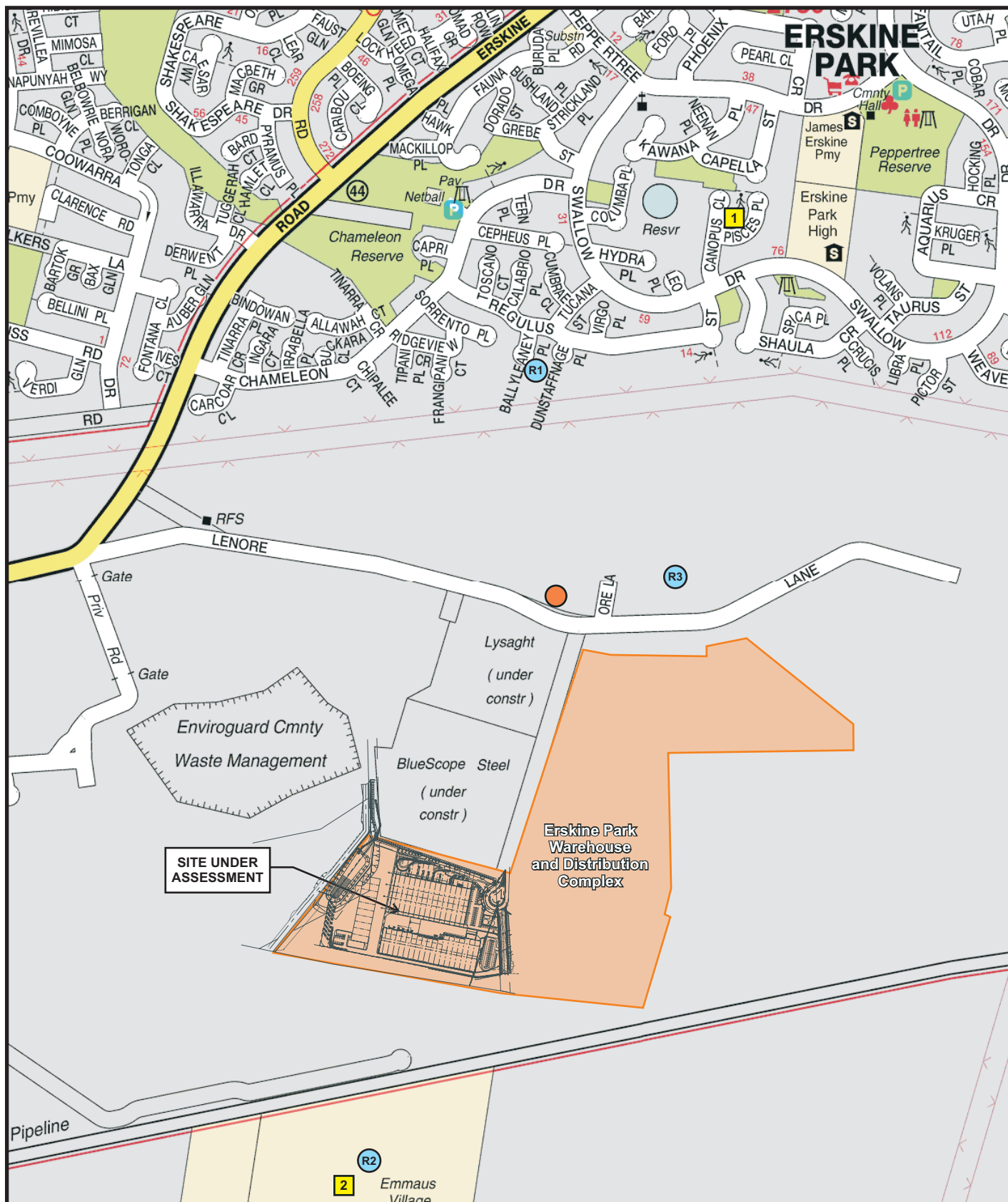
It should be noted that the monitoring was conducted during school holidays. These were therefore compared to data measured during non-holiday periods in similar locations, part of studies for adjacent developments. Specifically, the approved Coles Myer Distribution facility immediately east of the site.

For Lenore Lane, the resulting RBL values are consistent with that derived for neighbouring developments. The night RBL values are identical, whilst the day and evening RBLs are 1 dB lower (more conservative) in this study.

For Erskine Park residences, RBL values for the evening and night periods are at least 1 dB lower (more conservative) in this study, whilst the daytime RBL is the same or lower than that for St Clair residences used in other studies.

Table 2.1 *Details of Long Term Monitoring Locations*

ID	Location	Approximate Position with respect to the site	Approximate Position with respect to Lenore Lane
Location 1	1 Pisces Place, Erskine Park	1100m North	900m North
Location 2	Emmaus Village, Bakers Lane, Erskine Park	400m South	1200m South



- Legend**
- Complex Boundary
 - Spot Check
 - Loggers
 - Assessment Locations

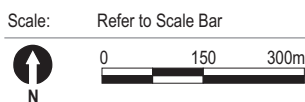


Figure 2.1

Site, Noise Monitoring and Assessment Locations

Connect Erskine Park | Site H Target

Ref: J08012Fig2.1

28/11/2008

Source: UBD

The Rating Background noise Levels (RBL) and ambient noise levels derived from long term noise monitoring at the two locations are summarised in *Table 2.2*. *Annex A* contains daily noise data and charts for each location. The measurement data was analysed in accordance with the INP, using weather data from the Bureau of Meteorology's Horsley Park station.

Table 2.2 Summary of Measured Background and Ambient Noise Levels

¹ Location	Rating Background Level			Ambient (L _{eq}) Noise Level		
	Day dB(A)	Evening dB(A)	Night dB(A)	Day dB(A)	Evening dB(A)	Night dB(A)
1. Pisces Place, Erskine Park	36	36	32	52	45	42
2. Emmaus Village, Bakers Lane, Erskine Park	38	37	33	54	42	44
1. Levels shown are weather excluded.						

2.2 SHORT TERM ATTENDED MONITORING

In order to identify the current noise climate in the area, observations were made near the residences at Lenore Lane in the absence of any construction activity. These observations were supplemented by attended noise measurements to compare the background levels at Lenore Lane, with the long term data. The dominant noise source at Lenore Lane, in the absence of construction noise was observed to be road traffic noise from Erskine Park Road, Mamre Road and the M4 Motorway.

The attended 15 minute noise measurements at Lenore Lane are correlated with the unattended data in *Table 2.3*.

Table 2.3 Comparison of Noise Levels at different locations

Date and Time	Location ID	Location	Noise Monitoring Type	L ₉₀ Levels, dB(A)
01/07/2005 17:15-17:30	L1	1 Pisces Place, Erskine Park	Unattended long term logging	47
	L2	Emmaus Village, Bakers Lane, Erskine Park	Unattended long term Logging	42
	S1	Lenore Lane (Intersection of Lenore Lane and Ore Lane)	Attended 15 minute measurement	43
14/07/2005 23:30-23:45	L1	1 Pisces Place, Erskine Park	Unattended long term logging	33
	L2	Emmaus Village, Bakers Lane, Erskine Park	Unattended long term Logging	34
	S1	Lenore Lane (Intersection of Lenore Lane and Ore Lane)	Attended 15 minute measurement	32

Based on the above measurements, it is considered appropriate to adopt the data for 1 Pisces Place, Erskine Park as representative of Lenore Lane residences. The representative RBL values at Lenore Lane are therefore 36dB(A), 36dB(A) and 32dB(A) for the day, evening and night respectively.

2.3 PREVAILING WEATHER CONDITIONS

The site's operational criteria are derived from the NSW Government Industrial Noise Policy (INP) which prescribes goals that are assessable under prevailing weather conditions.

The efficiency of noise propagation over long distances can be significantly affected by the weather conditions. Of most interest are source to receiver winds and the presence of temperature inversions as both these conditions can enhance received noise levels. To account for these phenomena the DECC in their INP specify weather analysis procedures to determine the prevalent weather conditions that enhance noise propagation with a view to determining whether they can be described as a feature of the project area.

In this study one year's half-hourly weather data from the Bureau of Meteorology's weather station at Horsley Park was analysed. This was done in accordance with the procedures defined in the INP, and as otherwise advised by the DECC.

2.3.1 Prevailing Winds

The INP recommends consideration of wind effects if they are a "feature" of the area.

The INP defines "feature" as the presence of source-to-receiver wind speed (measured at 10 m above ground level) of 3 m/s or less, occurring for 30% of the time in any assessment period and season.

This is further clarified by defining source-to-receiver wind direction as being the directional component of wind. The INP states that where wind is identified to be feature of the area then assessment of noise impacts should consider the highest wind speed below 3 m/s, which is considered to prevail for at least 30% of the time.

A thorough review of the vector components of the half-hourly wind data described above was undertaken. The INP assessable wind directions are graphically demonstrated in *Annex B*, where the wind rose arm approaches or exceeds the 30% threshold as indicated by the rose.

It is demonstrated that assessable source-to-receiver winds do not occur during day and evening assessment periods but do occur during the night time assessment period. Hence, winds are considered a feature of the area only during the night time. To that end, the normal operating hours is expected to be 7am to 5pm, and hence wind effects will not require assessment.

2.3.2

Temperature Inversions

The INP states that the assessment of the impact of temperature inversions be confined to the night time noise assessment period where temperature inversions occur. Appendix F of the Industrial Noise Policy (INP) states (with respect to the percentage occurrence of stability class F during winter nights):

“It is recommended that locations that are approaching a 30 percent occurrence level as well as those locations that either equal or exceed the 30 percent level be considered when assessing the effects of temperature inversions on noise levels.”

No information on the prevalence of temperature inversions for the region has been obtained. For the purposes of this assessment, it will be conservatively assumed that a temperature inversion of 3°C/100m occurs on more than 30% of winter nights, in accordance with the guidance in the INP. However, the normal operating hours of this site is expected to be 7am to 5pm, and hence temperature inversion effects will not require assessment.

3 NOISE CRITERIA

3.1 OPERATIONAL NOISE

3.1.1 Industrial Noise Criteria

The NSW Government's INP stipulates guidelines for assessment of noise from the operation of industrial facilities.

Assessment criteria for residences potentially affected by noise from industries should achieve the following objectives:

1. protection of the community from excessive intrusive noise; and
2. preservation of the amenity for specific land uses.

Both criteria need to be met.

3.1.2 Residential Intrusiveness

The intrusiveness criterion requires that the $L_{Aeq,15min}$ noise levels from the newly-introduced source during each of the day, evening and night time periods do not exceed the existing rating background noise levels (RBL) by more than 5dB at the most affected noise sensitive location. *Table 3.1* shows the derived project specific noise criteria.

Table 3.1 Intrusiveness Noise Criteria

Receiver No	Location	Criterion, $L_{eq,15minute}$ dB(A)		
		Day	Evening	Night
1	1 Pisces Place, Erskine Park	41	41	37
2	Emmaus Village, Baker Lane	43	42	38
3	Residence on Lenore Lane	41	41	37

1. Criteria are based on the Existing Background Noise levels presented in *Table 4.2*.

3.1.3 Amenity

The INP stipulates acceptable and maximum noise levels from all industry consistent with maintaining amenity for specific land uses. The acceptable target noise levels are presented in *Table 3.2* for each assessment period and for appropriate surrounding land uses. In this case the 'suburban' category has been applied to determine the target noise levels at the existing residences. Also presented are goals for school classrooms that apply to the teaching facilities on Bakers Lane, Erskine Park.

Table 3.2 Noise Amenity Targets for Specific Land Uses

Residential Land use	Target acceptable amenity industrial noise levels, dB(A) _{Leq,period}		
	Day	Evening	Night
Suburban	55	45	40
Urban	60	50	45
School classroom - internal	35 - 40 Noisiest 1-hour when in use		
1. These target levels apply to the total noise attributable to all industrial sites (as scheduled in the Protection of Environment (Operations) Act).			

In this case, given that the existing industrial noise, as observed during a site visit, does not approach the targets in *Table 3.2*, the suggested amenity levels have been applied unmodified. However, consideration to possible future developments has been given as described in the cumulative noise section later. Both the amenity and intrusiveness criteria apply to the project. *Table 3.3* summarises the applicable criteria. In all cases, the intrusiveness criteria are the limiting (lower) and therefore adopted criteria.

Table 3.3 Project Specific Noise Criteria

		RBL, dB(A)	Intrusiveness, dB(A) $L_{eq,15min}$	Amenity (Suburban), dB(A) $L_{eq,period}$	Project Specific Level, dB(A)
Location 1	Day	36	41	55	41
	Evening	36	41	45	41
	Night	32	37	40	37
Location 2	Day	38	43	55	43
	Evening	37	42	45	42
	Night	33	38	40	38
Location 3	Day	36	41	55	41
	Evening	36	41	45	41
	Night	32	37	40	37

3.1.4 Sleep Disturbance

It should be noted that the normal operating hours of the site are 7am to 5pm and therefore sleep disturbance issues are not relevant. The following is provided for reference only, in the event that night operations are approved in future.

The INP criteria are appropriate for assessing noise from continuous and intermittent sources, such as engine noise from mobile plant and general processing plant and equipment. However, transient noise sources such as reversing alarms also require assessment.

Given the transient nature of these events, the L_{eq} noise level from such sources would not be representative since the noise in question may not be present for much of the time. Hence, the above criteria are not appropriate for this type of noise.

The most important effect of these transient noises would be the possibility of disturbing the sleep of nearby residents. The DECC's Environmental Noise Control Manual (ENCM) indicates that to prevent sleep disturbance, the $L_{1,1min}$ noise level from an intrusive source should not exceed the background noise level by more than 15dB. More recent advice from the DECC has confirmed that the L_{max} descriptor is to be used in lieu of the $L_{1,1min}$. On this basis, the maximum noise level from any operational event should not exceed the levels shown in *Table 3.4* for the night time assessment period.

Table 3.4 ***Project Specific Sleep Disturbance Noise Criteria***

Receiver No	Location	L_{max} Criteria, dB(A)
1	1 Pisces Place, Erskine Park	47
2	Emmaus Village, Bakers Lane, Erskine Park	48
3	Lenore Lane	47

1. Criteria are based on the Existing Background Noise levels presented in *Table 2.2*.
2. Sleep disturbance criteria apply during the night assessment period only.
3. Criteria are assessable at the façade of the most affected sleeping area.

However, this criterion does not take account of more recent research on the effects on sleep of road traffic noise. The DECC's Environmental Criteria for Road Traffic Noise (ECRTN) policy indicates that maximum noise levels below 50 - 55dB(A) inside residences from road traffic sources are unlikely to cause awakening reactions. If bedroom windows are partly open, this corresponds to an external maximum noise level of approximately **60 - 65 dB(A)** outside a residence.

In our experience, adopting the former more stringent criterion would be desirable in the first instance, and if exceedances are predicted, consideration should be given to the potential number of such events and the more recent research above.

3.2 ***CONSTRUCTION NOISE CRITERIA***

Construction noise is explicitly excluded from the DECC's INP, and the assessment criteria for construction noise set out in the Environmental Noise Control Manual ENCM (DECC, 1994) will be used (pending finalisation of the DECC's Draft Construction Noise Guidelines issued in 2008 for comment).

3.2.1 ***Time Restriction***

The fundamental method of regulating construction noise impacts is by way of time restrictions. The ENCM specifies time limits for construction activities where construction noise is audible at residential premises, and are outlined below:

- Monday to Friday, 7:00 am to 6:00 pm;

- Saturday, 8:00 am to 1:00 pm, otherwise 7:00 am to 1:00 pm if inaudible at residential premises; and
- no construction on Sundays or public holidays.

The proposed construction hours will be 7am to 6pm Monday to Friday and 7am to 1pm Saturdays. Where construction that will be audible at residential locations outside these hours is necessary, a separate permit will be required specific to those activities. It is often the case that if construction noise is inaudible at residences, then works can occur outside these times.

3.2.2 **Level Restriction**

As a guide for assessing potential impact, the ENCM also provides a quantitative approach. The suggested level based restrictions are expressed in terms of the L_{10} level of noise from the construction site. The criteria depend on the existing background noise level at the assessment location and apply to residential premises only.

The DECC's criteria for noise from construction sites as assessed at residential properties are:

- for construction periods of four weeks and under, the L_{10} noise level due to the construction site should not exceed the existing L_{90} background noise level by more than 20 dB;
- for construction periods of between four and 26 weeks, the L_{10} noise level due to the construction site should not exceed the existing L_{90} background noise level by more than 10 dB; and

It is generally understood that for construction periods greater than 26 weeks, the L_{10} noise level due to the construction site should not exceed the existing L_{90} background noise level by more than 5 dB, which is comparable to the operational intrusiveness noise criteria.

The assessment will focus on the construction of buildings and associated concrete works. The total construction period is expected to be less than 6 months. Based on the rating background noise levels determined in *Table 2.2*, *Table 3.5* details the construction noise criteria for the proposal.

Table 3.5 Daytime Construction Noise Criteria

Receiver No	Location	Construction noise criteria, $L_{10,15\text{minute}}$ dB(A)
1	1 Pisces Place, Erskine Park	46
2	Emmaus Village, Bakers Lane, Erskine Park	48
3	Lenore Lane	46
1. Criteria are based on the Existing Background Noise levels presented in <i>Table 2.2</i> .		

3.3

ROAD TRAFFIC NOISE

The potential impacts of traffic noise resulting from both the construction and operational related traffic on public roads are assessed against criteria defined in the NSW *Government's Environmental Criteria for Road Traffic Noise* (ECRTN).

Site related traffic will use routes that are currently relatively heavily trafficked and part of the broader road network. Within closer proximity to the site, residences that could be affected by site related traffic are the few isolated existing properties of Lenore Lane.

The upgrade of Lenore Lane to a four lane (dual carriageway) industrial standard collector road is near completion or complete. This is to cater for the future expansion of industrial land uses (including this proposal) and therefore will increasingly carry a higher volume of traffic with a relatively large proportion of heavy vehicles. Further, it is understood that Development Applications for similar industrial land uses that will utilise Lenore Lane are being considered or approved. Site related traffic and associated noise will therefore be similar to these developments, once operational.

Section 2.2 of the ECRTN states that some industries are by necessity in locations that are often not served by arterial roads. Heavy vehicles must be able to get to their bases of operation, and this may mean travelling on local roads. To this end, the concept of 'principal haulage routes' has been endorsed by the then Department of Urban Affairs and Planning's North Coast Extractive Industries Standing Committee. Where local authorities identify a 'principal haulage route', the noise criteria for the route should be at least as high as those for collector roads, recognising the intent that they carry a different level and mix of traffic to say local roads. Thus, although Lenore Lane can currently be classified as a local road, it can be identified as a 'principal haulage route' for the proposed developments. Further, following the approved upgrade of Lenore Lane, it will operate as a collector road in any case. The noise criteria for Lenore Lane can then be set as **60 dB(A) $L_{eq,1hr}$** daytime and **55 dB(A) $L_{eq,1hr}$** night time.

PREDICTED NOISE IMPACT

As noted earlier, the key noise issues associated with the proposed development include operational noise, construction noise and noise associated with expected increase in road traffic. These issues have been addressed based on worst case scenario predictions and past experience with similar developments.

4.1**OPERATIONAL NOISE**

The following assessment is based on Site Plan drawing SP-LE-DA-000 dated 03 December 2008, Issue P2, and as provided by Hansen Yuncken (refer to Annex C). This drawing depicts the subject property as Site Area H1 and H3. As stated previously, it is understood that the proposed off-site reserve will be used 7am to 5pm and 7 days per week. Site traffic access will be via the cul-de-sac at the southern end of Templar Road, which runs south off Lenore Drive.

General noise producing operations on site would include pallet handling and truck movements. In particular, on-site trucking activities will be the dominate noise source. To that end, site plans depict numerous loading dock capacity, all beneath an awning structure located along the northern side of the building. Of acoustic significance is the fact that the loading areas, and therefore most of the trucking activities, are shielded by the Target building to the south and similar sized buildings to the north, part of other proposed developments. This therefore affords considerably shielding from receptors north and south of the site.

We also understand that there exist potential future developments that will include similar structures to the west of the site. This will also offer considerable acoustic shielding from site operations.

The noise predictions include results for two scenarios, one being the assumption whereby all loading docks will be in use simultaneously at one building (or alternatively half at each building) during the day (eg 17 docks). The other is an arbitrary number of trucks (31) on site, selected on the basis of remaining below all adopted noise criteria. Trucks will reverse into these docks and powered or unpowered forklifts will be used to load/unload them from beneath awning structures on the northern side of the building.

Based on data in our files for similar operations, the noise emission levels from on-site trucking operations were used to predict received noise at residences. The results of noise predictions are summarised in *Table 4.1*.

The representative sound power level associated with a truck is 99 dB(A)
 $L_{eq,15min}$

Table 4.1 Operational Noise Predictions

Receptor	Predicted Daytime $L_{eq,15min}$ Noise Level (Calm Weather), dB(A)		Daytime Criteria, $L_{eq,15minute}$, dB(A)
	17 Trucks	31 Trucks	
1. Erskine Park Residences	34	36	41
2. Emmaus Retirement Village	41	43	43
3. Lenore Lane Residences	37	40	41

The results in *Table 4.1* demonstrate that daytime noise from the site, with loading docks operational as described earlier, will be within noise goals at all receiver locations during calm weather conditions.

It is understood that the Lenore Lane residential properties are zoned industrial use. It is therefore probable that these residential properties are developed for industrial land use.

4.2 CUMULATIVE INDUSTRIAL NOISE

As mentioned earlier, there are approved adjacent industrial developments that potentially could affect the same residential receivers assessed part of this study. If we assume an equal distribution of noise criteria from say one other industrial site adjacent to and hence having similar impacts as the subject proposal, a 3dB reduction in the Amenity noise criteria would apply. This implies a modified suburban residential amenity goal for the subject site of 52dB(A) $L_{eq,11hr}$ for the daytime period.

This generally does not alter the project specific noise targets derived earlier. It should be noted that operations at sites further away from the subject site will result in different received noise levels at given receiver locations. Further, the $L_{eq,period}$ noise level from the site will be significantly reduced from the above predicted $L_{eq,15minute}$. A detailed cumulative noise impact assessment should be undertaken once details of proposed operations at neighbouring sites are clarified.

4.3 CONSTRUCTION NOISE

4.3.1 Earthworks Noise

We understand that all earthworks have been completed for the subject site and therefore no further assessment is provided.

4.3.2 Building Construction

Noise from proposed building works on site was predicted for the surrounding residential locations. Simultaneous operation of 6 trucks and 2 cranes were used to represent typical activities.

Representative sound power levels associated with these equipment used in noise modelling are summarised in *Table 4.2*.

Table 4.2 Representative Equipment Sound Power Levels

Equipment	L _{10,15min} Sound Power Level, dB(A)
Dump Trucks	103
Crane	115

A worst case scenario assuming the simultaneous operation of all aforementioned construction equipment was used for the analysis. *Table 4.3* lists the predicted noise levels at the potentially worst affected residential receivers due to construction activities. It should be noted that the assessment location at Emmaus Village is that of the future residences at the north most part of the village and therefore most affected. However, these dwellings have not been constructed and are part of a master plan for the site. Construction at the subject site may be complete before these dwellings are occupied, hence nullifying potential impacts.

Table 4.3 Predicted Construction Noise Levels at Worst Affected Residential Receivers

Receiver	Predicted L _{10,15min} Noise Level, dB(A)	L _{10,15min} Criteria, dB(A)
1. Erskine Park	41	46
2. Emmaus Village	53	48
3. Lenore Lane	45	46

Table 4.3 demonstrates that the noisiest of construction works will be within relevant DECC goals at most residential locations. The exception is a predicted exceedance at the closest residences, part of the proposed Emmaus Village expansion. It should be noted that these calculations represent the likely noisiest 15 minute period on any one day and are not necessarily representative of daily noise from construction.

4.4

ROAD TRAFFIC NOISE

The potential for noise impacts associated with the expected increase in traffic on Lenore Lane was investigated. The number of vehicles associated with site operation on Lenore Lane is based on the information provided by Hansen Yuncken of 45 truck movements per day and the understanding that there will be 50 staff per shift.

Table 4.4 and Table 4.5 list the peak traffic conditions and the associated predicted traffic noise levels at the worst affected residence on Lenore Lane (assumed to be 30m from the roadway) for the Operational and Construction phases respectively.

Table 4.4 Predicted Road Traffic Noise during Operational Phase – Lenore Lane

Period		Number of Vehicles (Peak Hour)		Leq,1hr Noise Level, dB(A)	Criteria Leq,1hr dB(A)
		In	Out	(Peak Hour)	
Day	Time (7am – 10pm)	22 Trucks, 50 Cars	22 Trucks	58	60

Table 4.5 Predicted Road Traffic Noise during Construction Phase – Lenore Lane

Period		Vehicles (Typical Hour)		Noise Level, dB(A) (Typical Hour)	Criteria Leq,1hr dB(A)
		In	Out		
Day	Time (7am – 10pm)	10 Trucks	10 Trucks	53	60

The results demonstrate that daytime traffic noise impacts will be below relevant criteria for both operational and construction related traffic.

The subject proposal will not be dissimilar to future Lenore Lane traffic, related to approved adjacent developments. To that end, the purpose of the approved Lenore Lane upgrade is primarily to service such developments. Further, the Lenore Lane upgrade DA is likely to have highlighted traffic noise impacts on the existing isolated Lenore Lane residences. It is also unclear whether this road upgrade will necessitate that affected residential properties are redeveloped into non-noise sensitive land use. It is understood, that an agreement (formal or otherwise) or similar measures are in place between industrial property holders or developers and owners of these few isolated residential properties.

5.1 CONSTRUCTION

While there is the potential for construction noise to exceed the recommended criteria (without mitigation) at the potentially closest residences, there are several mitigation measures that may be employed to reduce noise impacts. These include:

- Scheduling construction activities such that the concurrent operation of plant is limited;
- Preparation of a construction noise management plan (to be included in the project Environmental Management Plan) prior to construction to ensure that all employees understand and take responsibility for noise control at site;
- Properly maintaining plant to ensure rated noise emission levels are not exceeded;
- Undertaking construction activities guided by *AS2436-1981 "Guide to Noise Control on Construction, Maintenance and Demolition Sites"*;
- Providing a contact telephone number via which the public may seek information or make a complaint. A log of complaints should be maintained and actioned by the site superintendent in a responsive manner.

5.2 OPERATIONS

Operational noise predictions indicate that sensitive receivers will not be exposed to noise above relevant criteria. There are mitigation measures that may be employed to further reduce noise impacts. These include:

- Scheduling truck movements and loading dock operations such that concurrent operation of vehicles is minimised. This would include limiting onsite vehicle idling while loading; and
- Preparation of an operational noise management plan (to be included in the project Environmental Management Plan) prior to operation to ensure that all employees understand and take responsibility for noise control at site.

CONCLUSION

We have completed a noise impact survey and assessment of the proposed construction and operation of Target Australia's off-site reserve at Lenore Lane, Erskine Park. The proposal is expected to comply with the relevant construction, operational and road traffic noise criteria at sensitive residential locations.

Annex A

Long Term Monitoring Data

Table A.1 Location 1 – 1 Pisces Place, Erskine Park

Date	ABL Day	ABL Evening	ABL Night	Leq 11hr Day	Leq 4hr Evening	Leq 9hr Night
Friday, 01-07-05	0	41.5	32.5	0	47.5	41.8
Saturday, 02-07-05	33.5	30.5	28	49	44	38.3
Sunday, 03-07-05	33.5	31.5	28.5	50	41.6	40
Monday, 04-07-05	34.5	40.5	31.5	52.3	45.2	41.6
Tuesday, 05-07-05	36	42	31.5	49.1	46.5	43.2
Wednesday, 06-07-05	36.5	35.5	34	48.3	43.7	44.9
Thursday, 07-07-05	41	32	27.5	57.9	43.5	42.6
Friday, 08-07-05	36	36	33	52.5	44.3	41.9
Saturday, 09-07-05	0	35	0	0	42	0
Sunday, 10-07-05	0	0	0	0	0	0
Monday, 11-07-05	0	32.5	32.5	0	41.6	40.7
Tuesday, 12-07-05	37	43.5	0	50.9	47.4	0
Wednesday, 13-07-05	0	39	32	0	44.5	43
Thursday, 14-07-05	35.5	34	32	50.4	43.9	43.2
Friday, 15-07-05	0	0	0	0	0	0
Summary Values	36	35.5	32	52.3	44.7	42.2

1. '0' indicates periods with too few valid samples due to weather or logger operation.

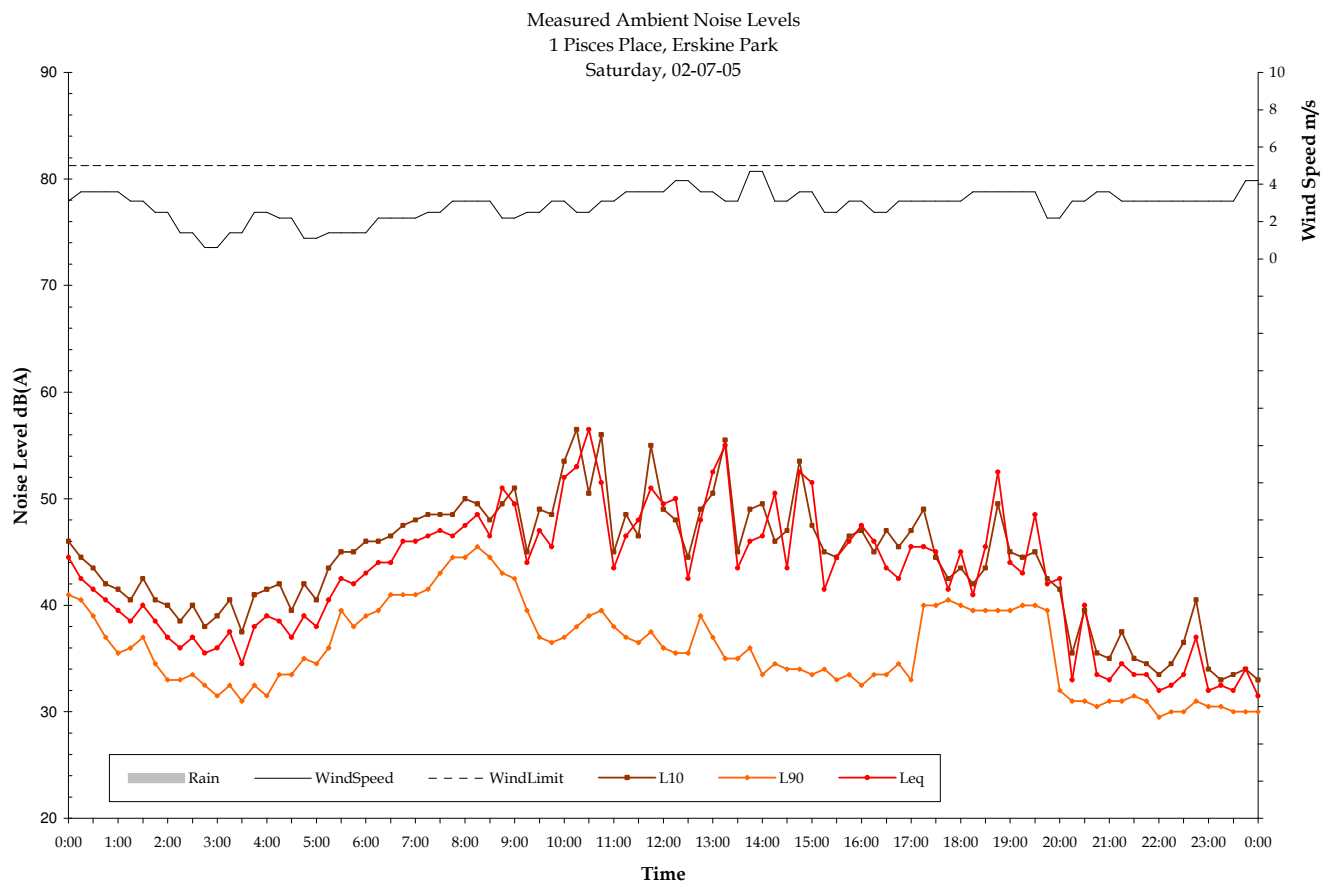
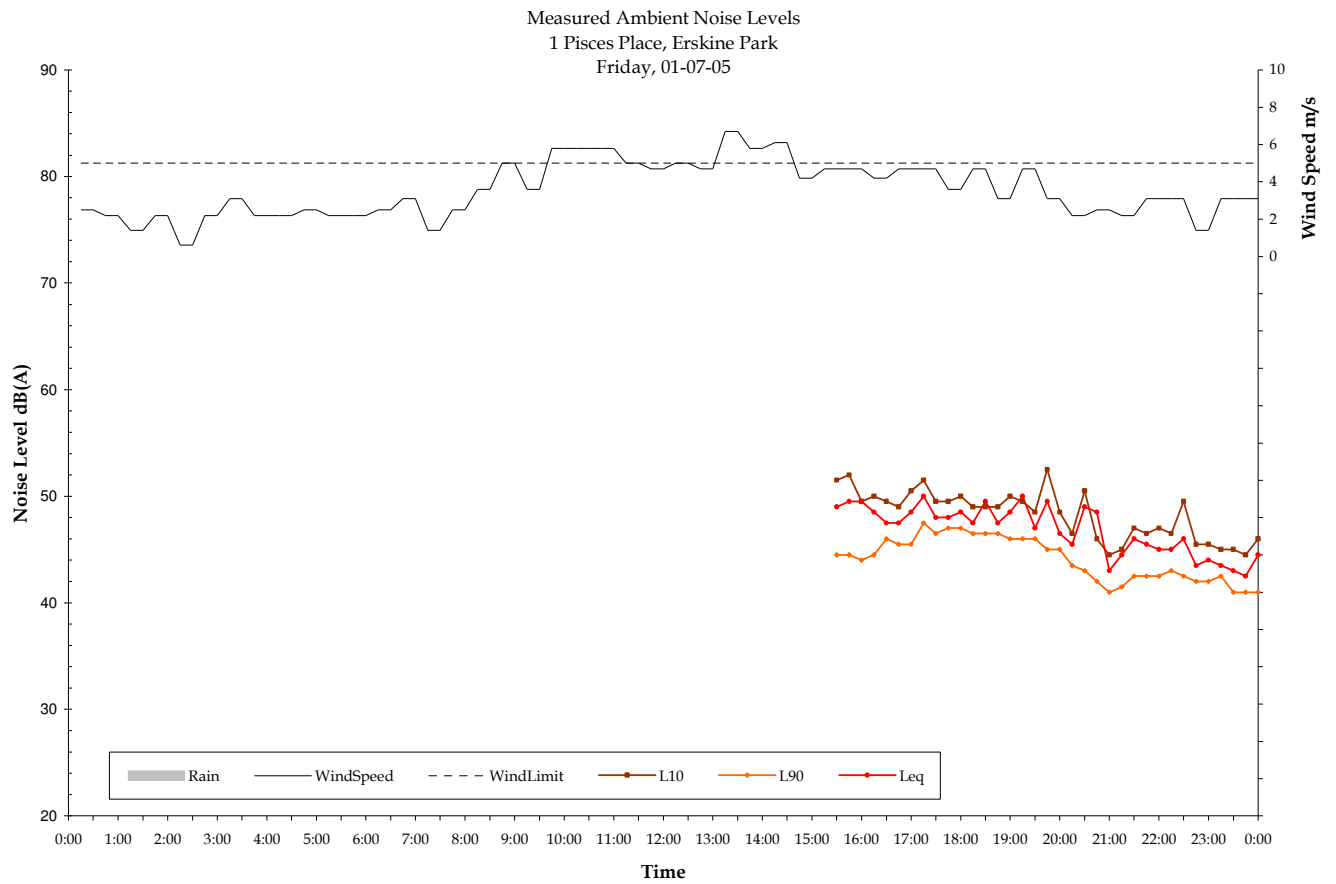
2. Leq24hr encompasses the period 7am to 7am

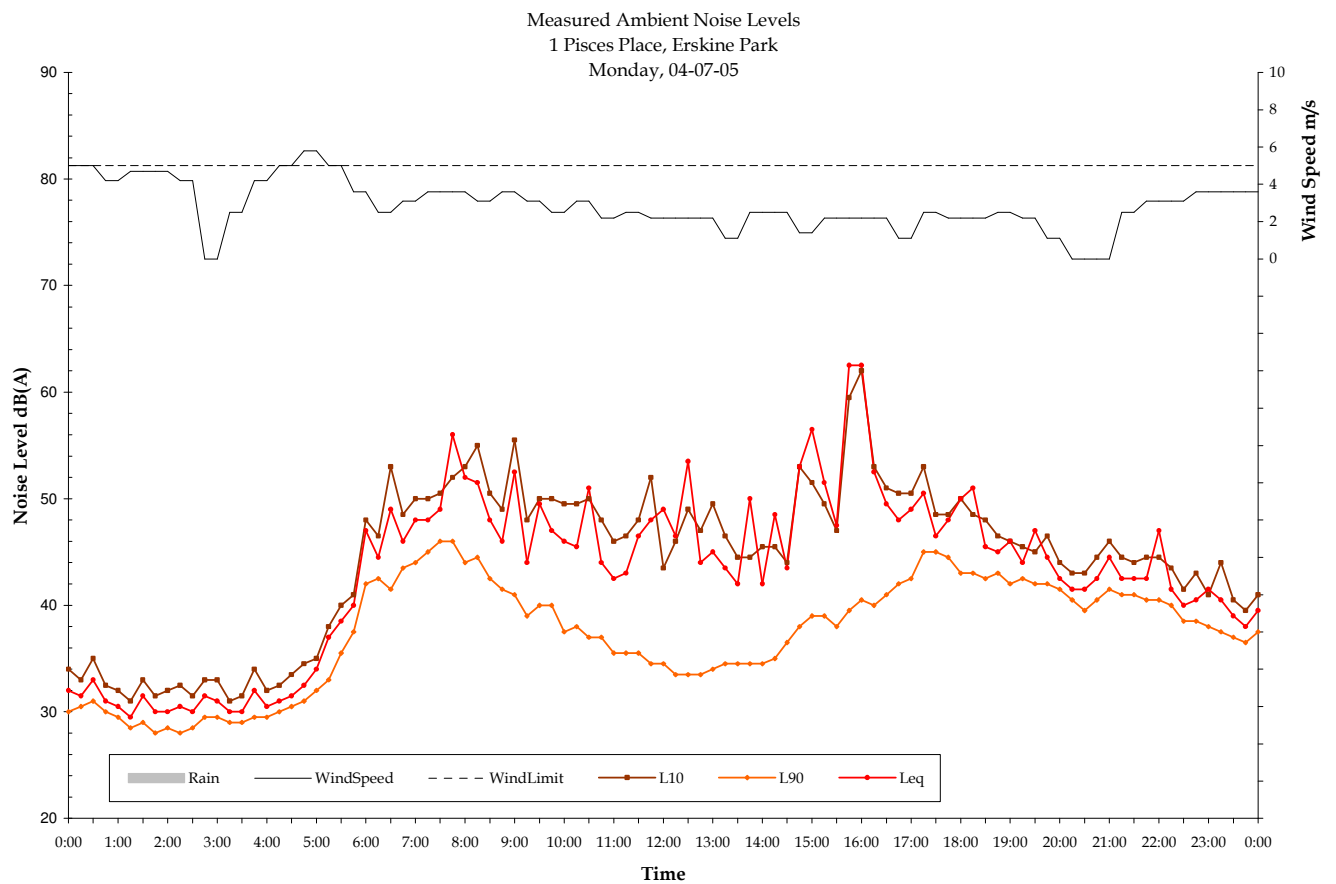
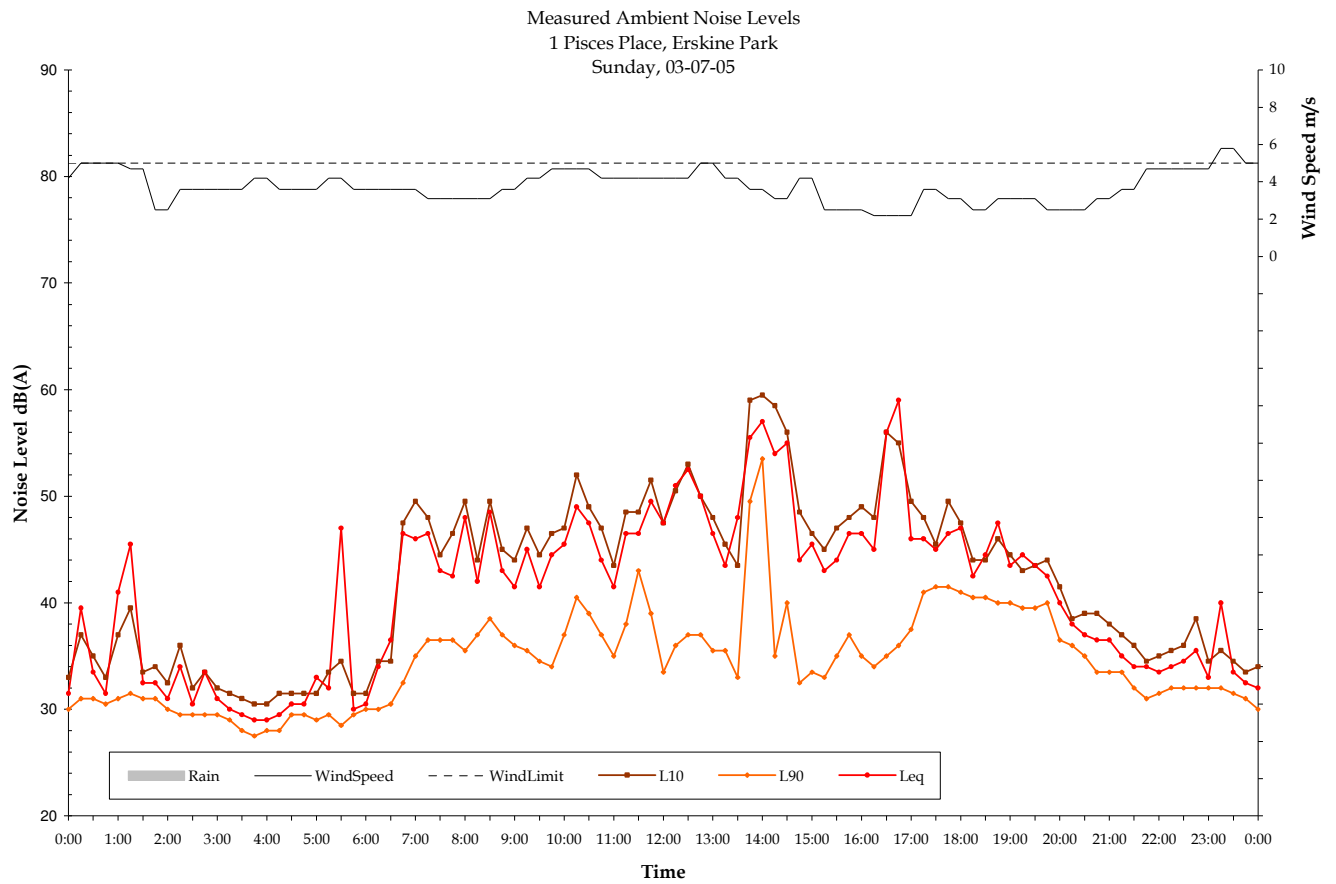
Table A.2 Location 2- Emmaus Village, Bakers Lane, Erskine Park

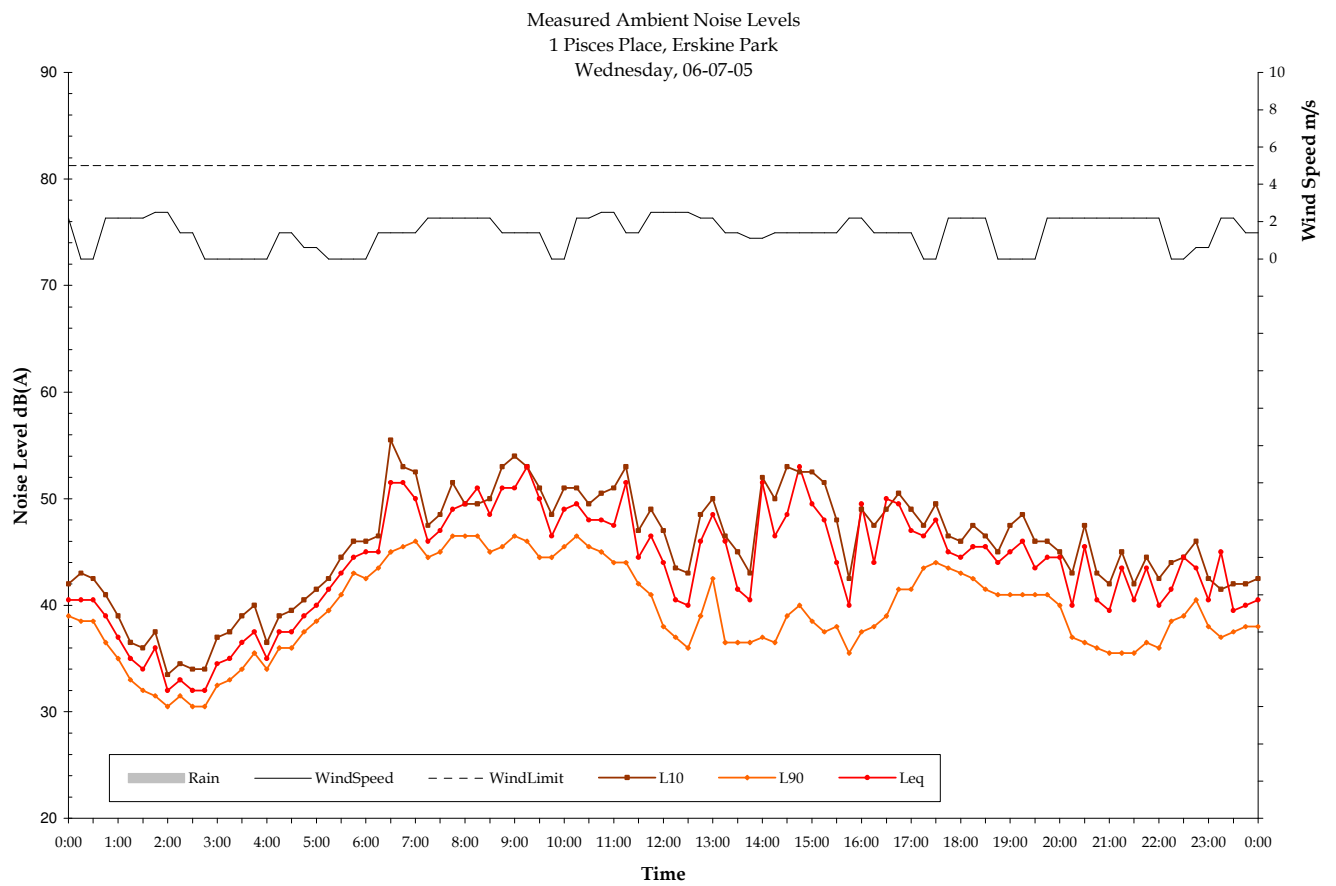
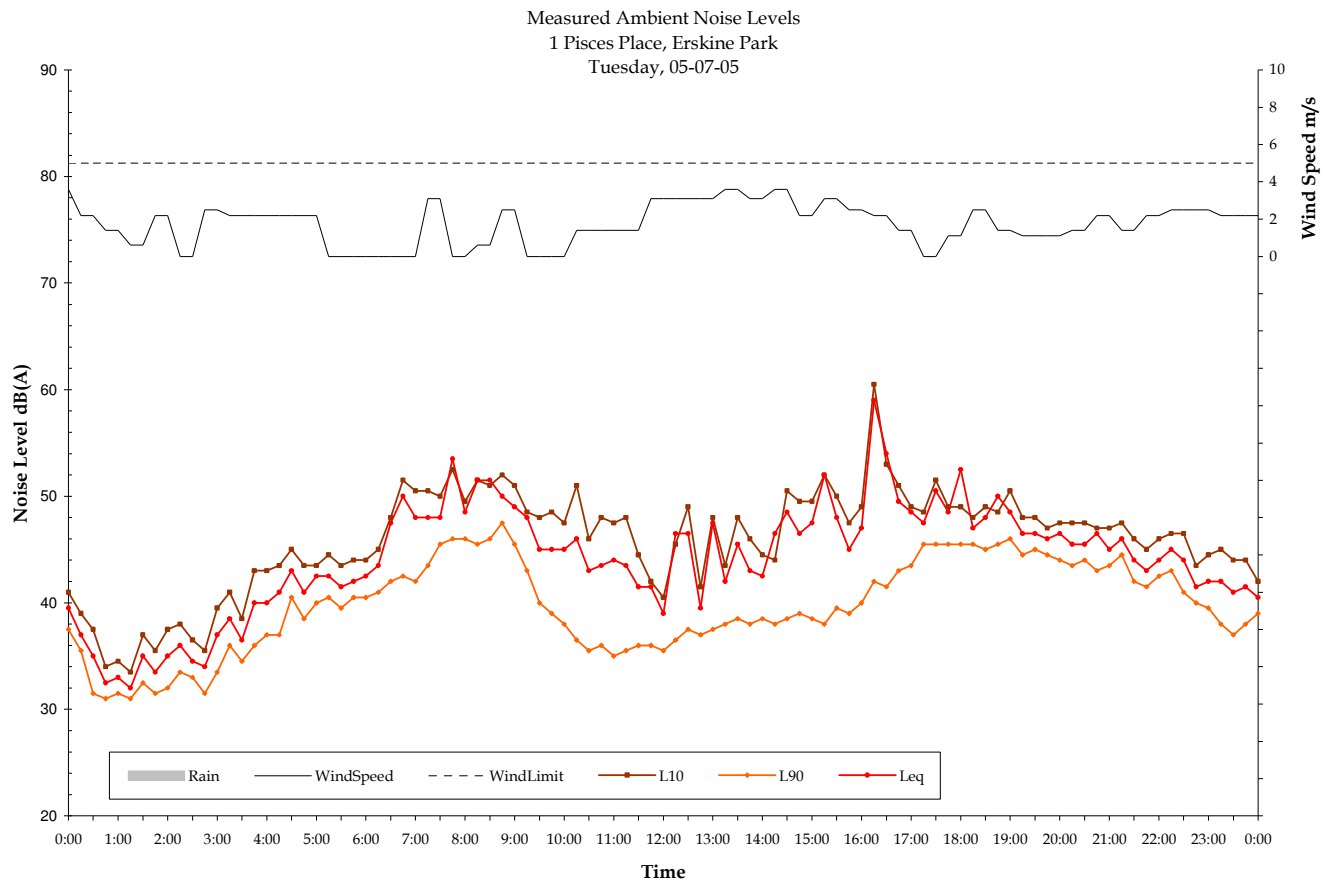
Date	ABL Day	ABL Evening	ABL Night	Leq 11hr Day	Leq 4hr Evening	Leq 9hr Night
Friday, 01-07-05	0	37.5	33.5	0	41.1	41.6
Saturday, 02-07-05	37.5	36.5	33	52.3	41.5	41.1
Sunday, 03-07-05	36.5	35.5	33	52	40.9	43.3
Monday, 04-07-05	37	33.5	32.5	50.5	40.3	44.2
Tuesday, 05-07-05	39.5	37	34	60.2	40.3	44.5
Wednesday, 06-07-05	37.5	35	34.5	49.6	42.2	44.6
Thursday, 07-07-05	41	39	32	50.8	45.4	44.6
Friday, 08-07-05	37	35.5	34	50.1	41.2	40.7
Saturday, 09-07-05	0	36.5	0	0	41.6	0
Sunday, 10-07-05	0	0	0	0	0	0
Monday, 11-07-05	0	35	32.5	0	41.1	45.6
Tuesday, 12-07-05	39	38.5	0	51	43	0
Wednesday, 13-07-05	0	35	32.5	0	42.4	43.9
Thursday, 14-07-05	40.5	36.5	32.5	50.5	43.1	43.1
Friday, 15-07-05	0	0	0	0	0	0
Summary Values	37.5	36.5	33	53.5	42.1	43.6

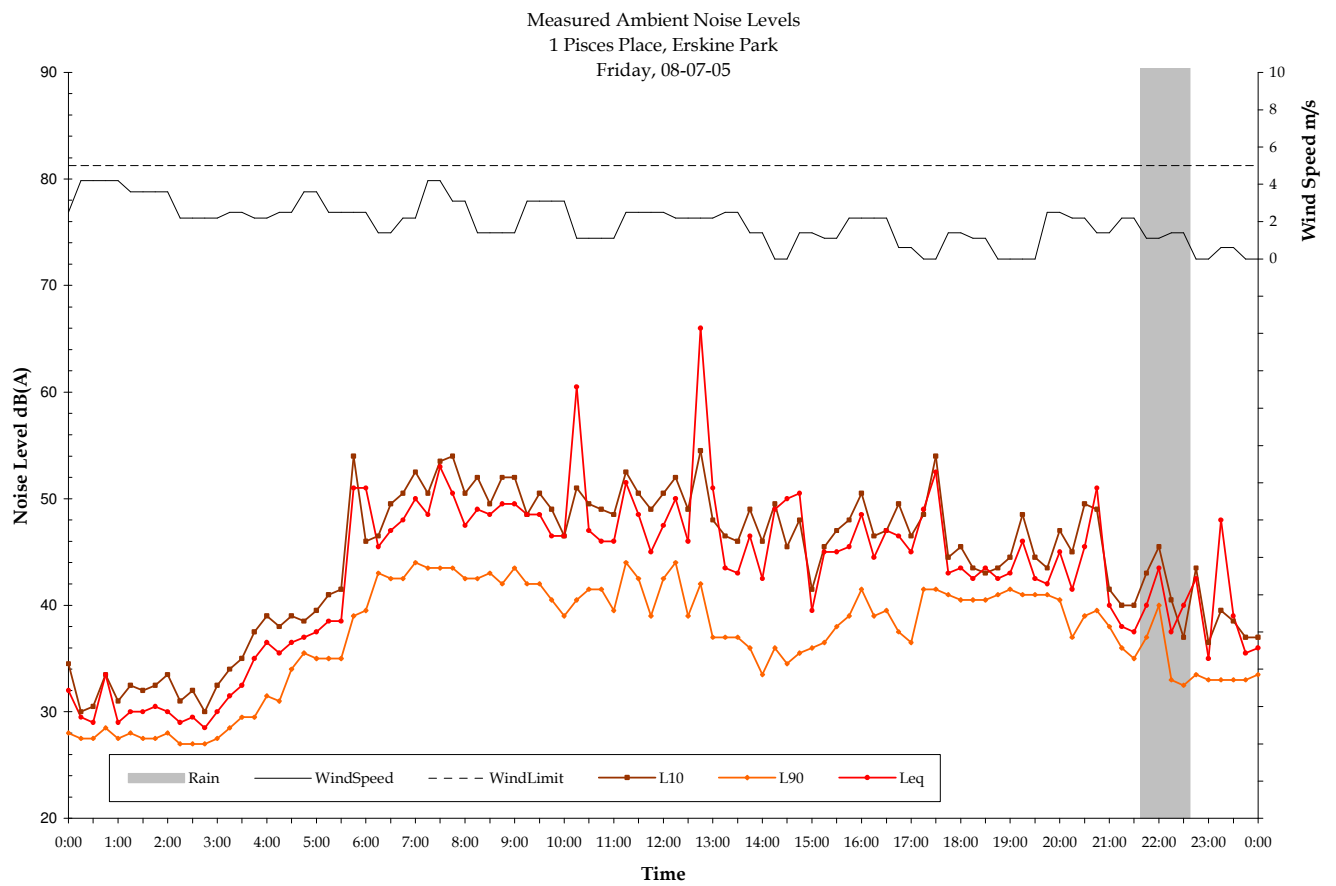
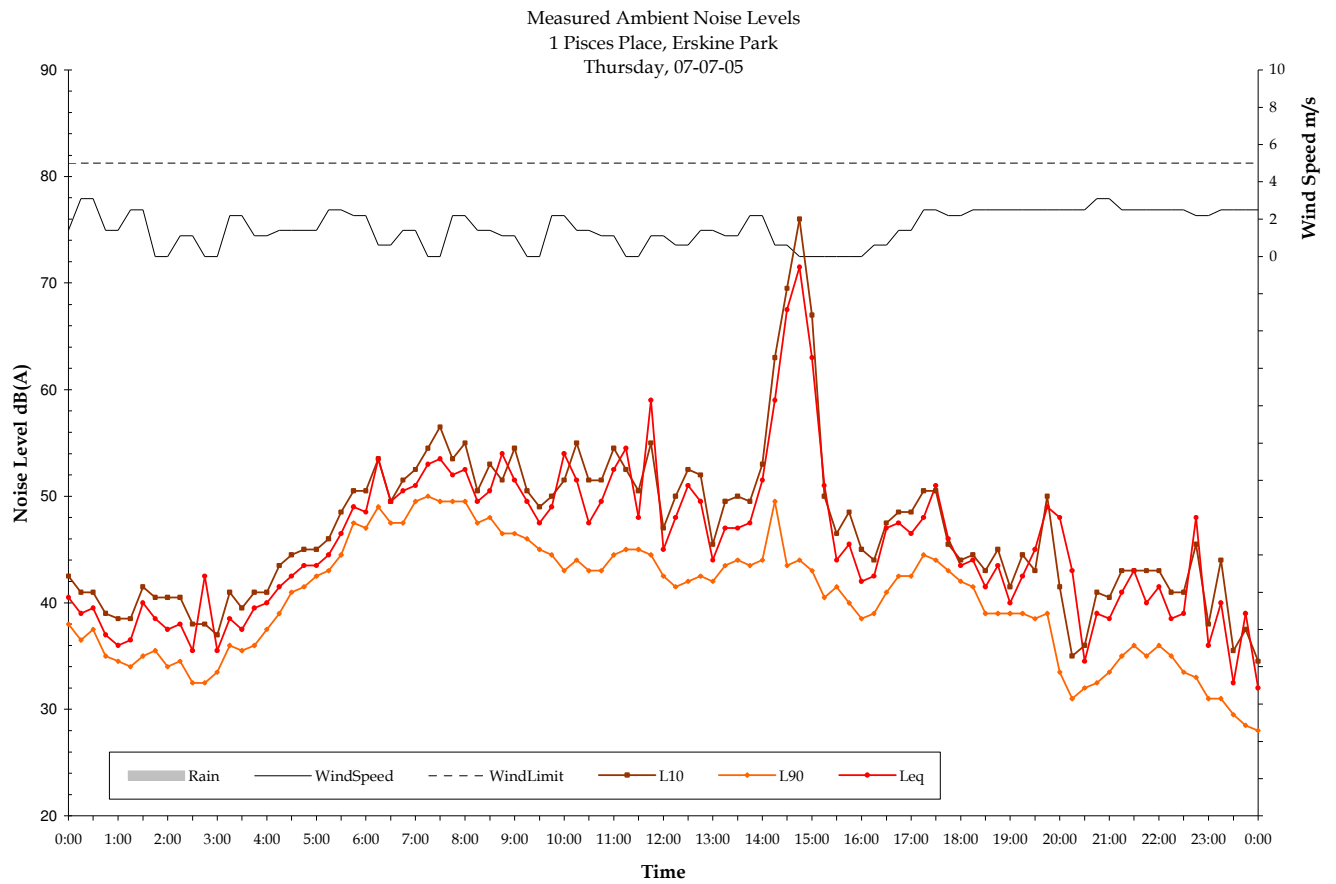
1. '0' indicates periods with too few valid samples due to weather or logger operation.

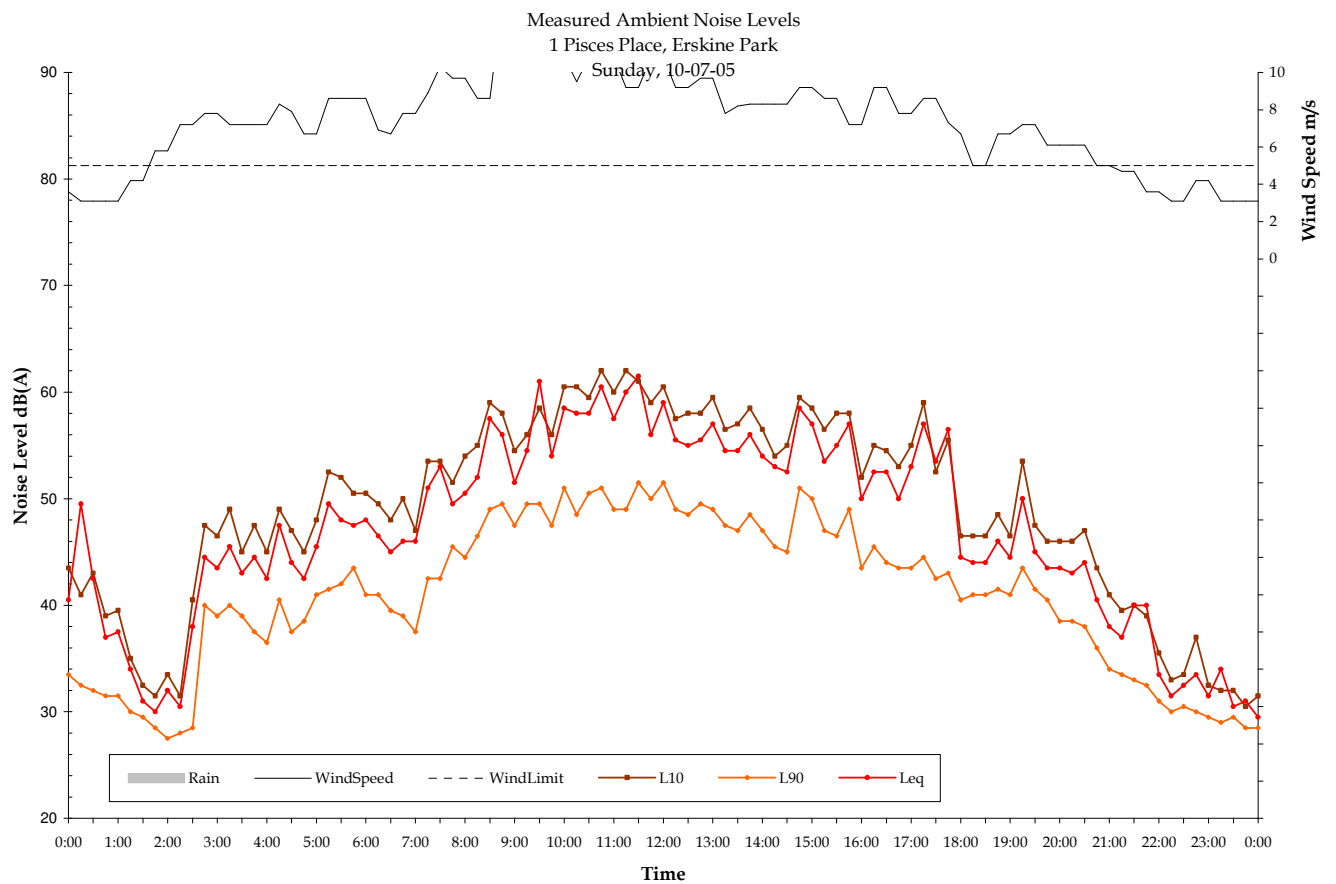
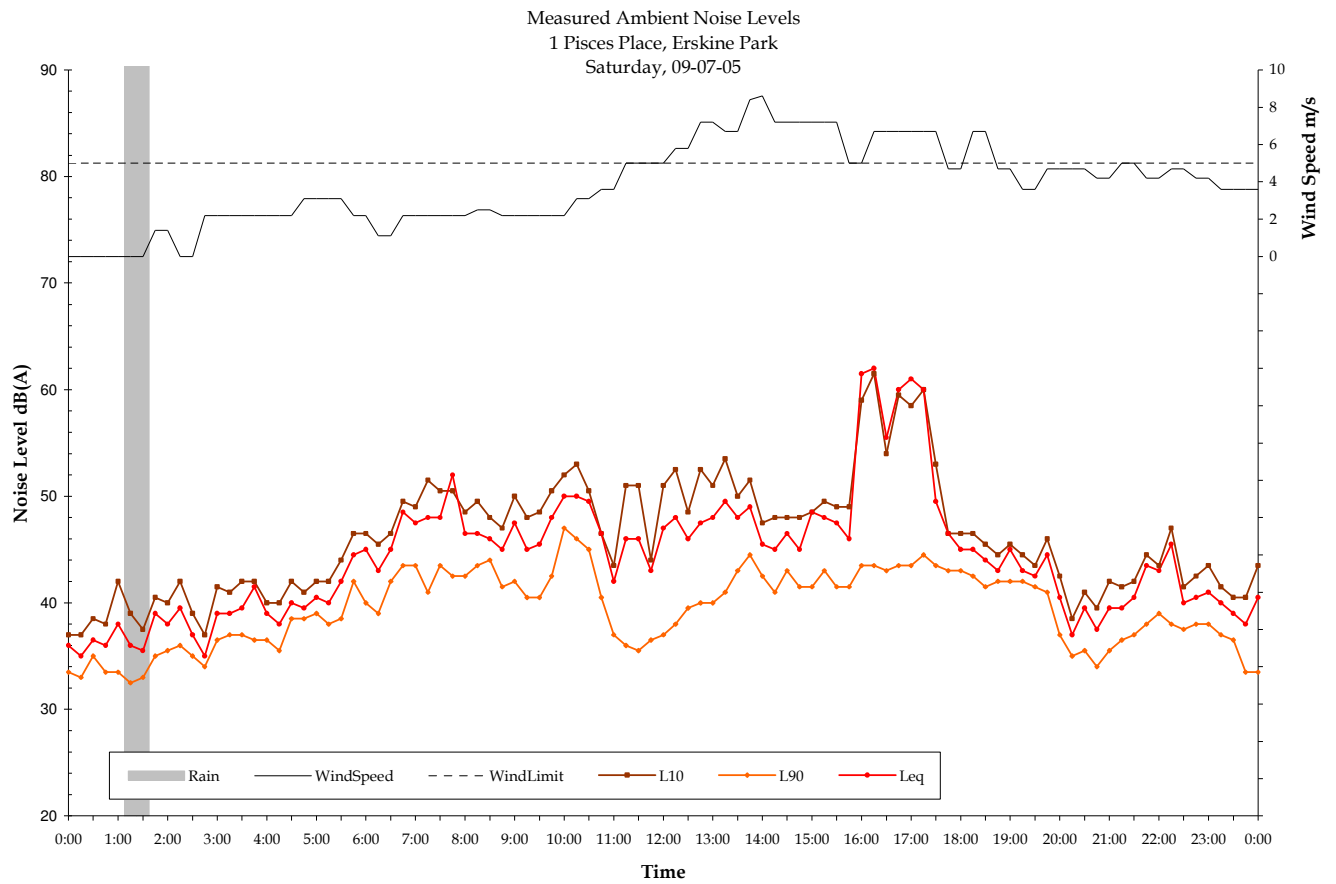
2. Leq24hr encompasses the period 7am to 7am

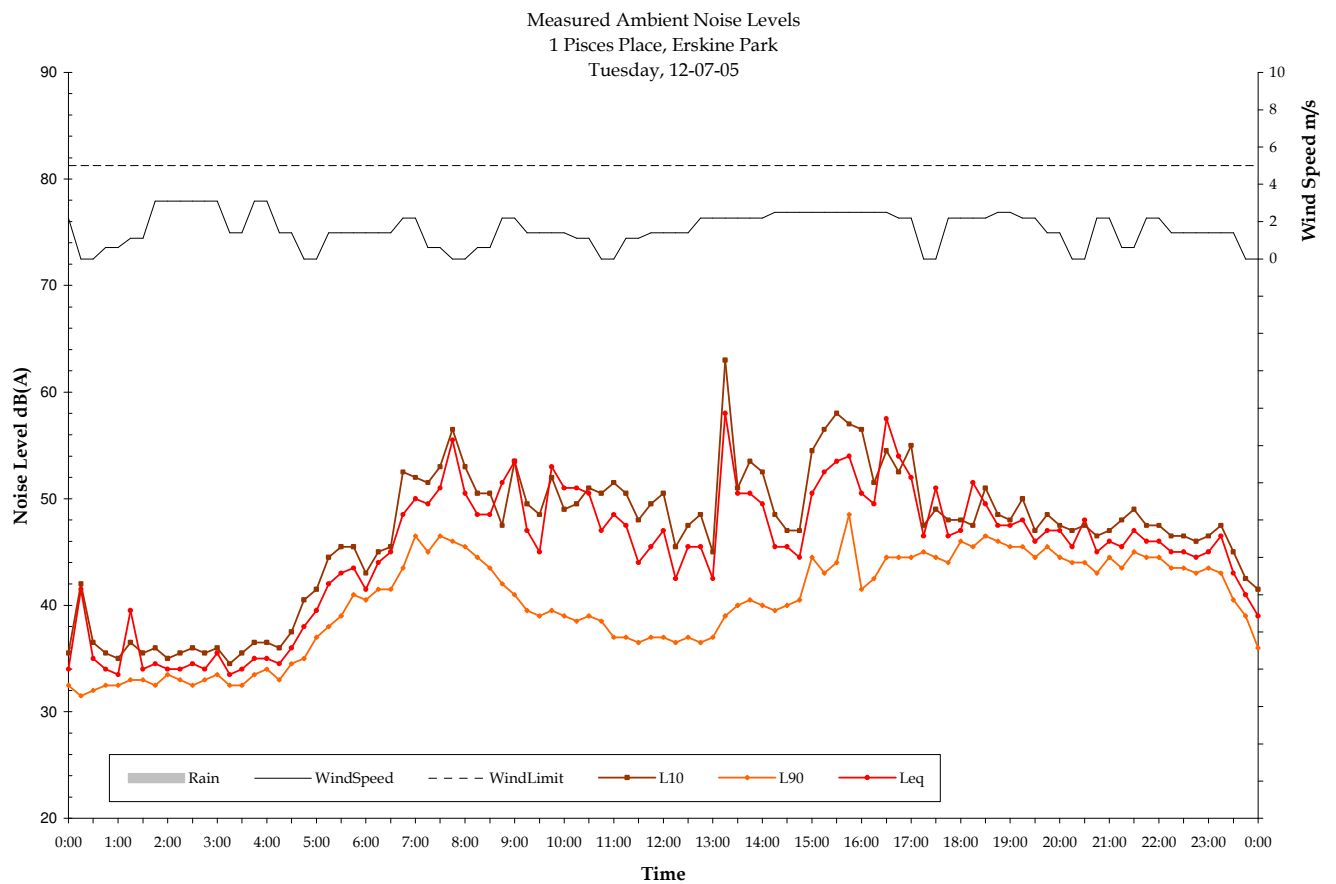
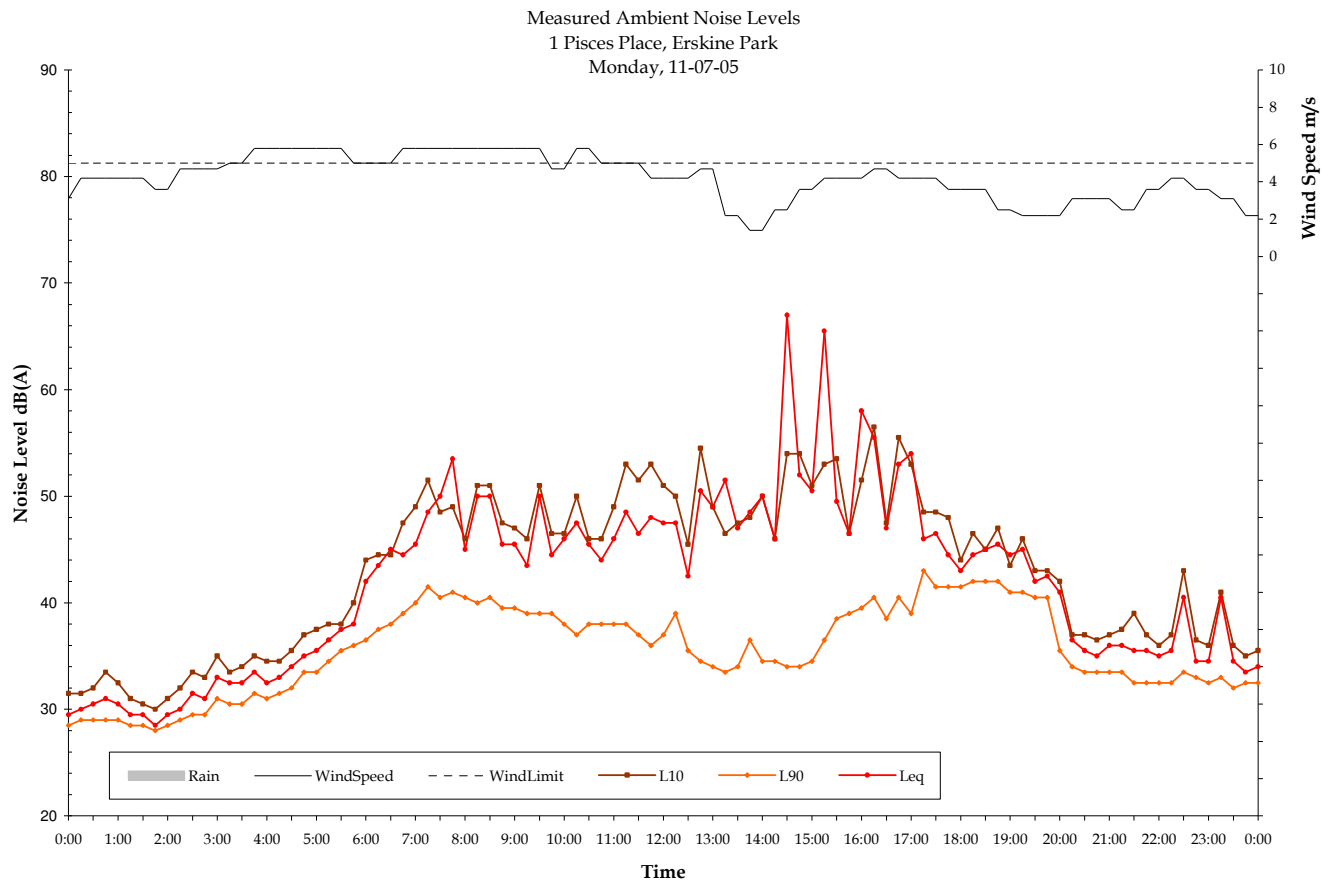


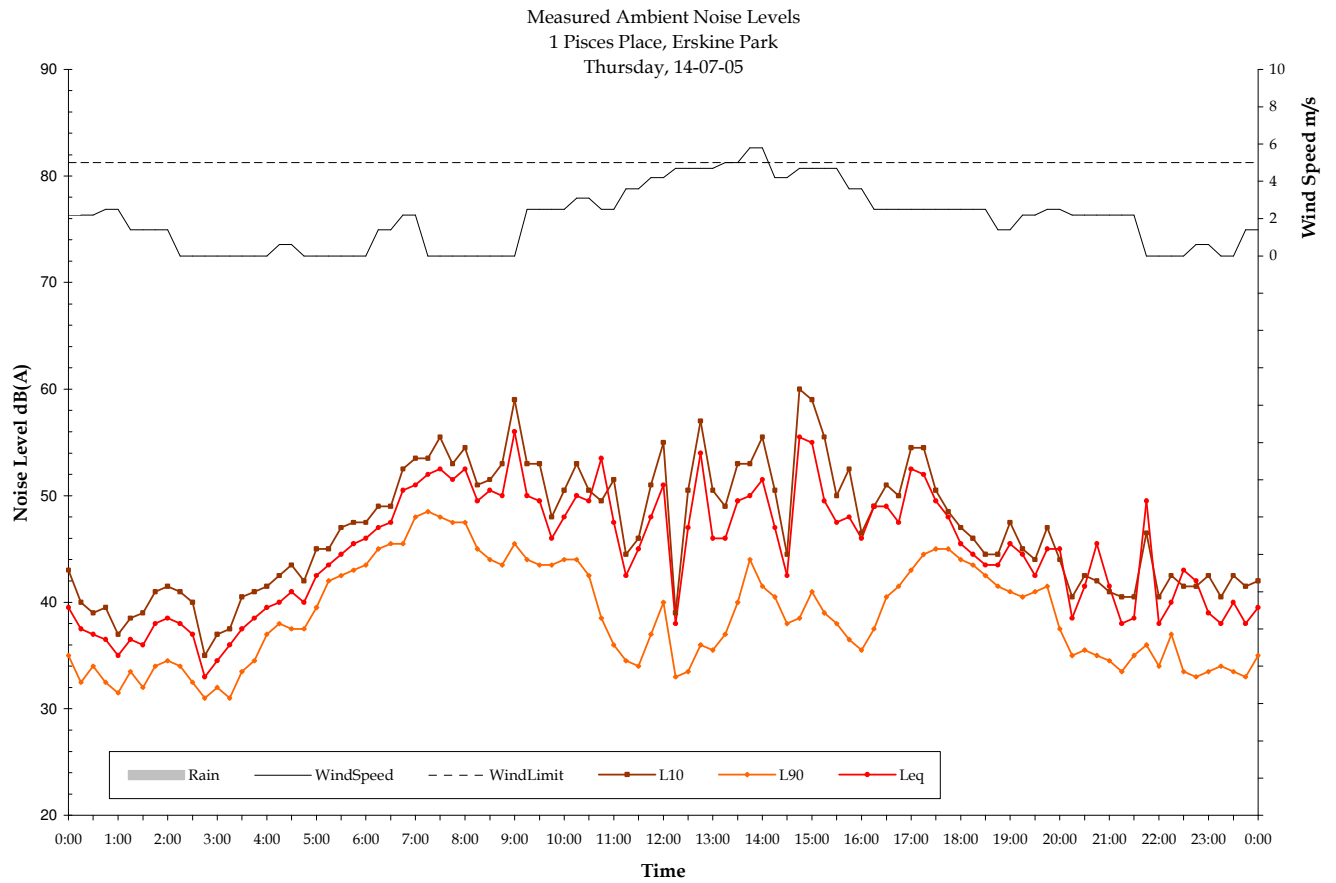
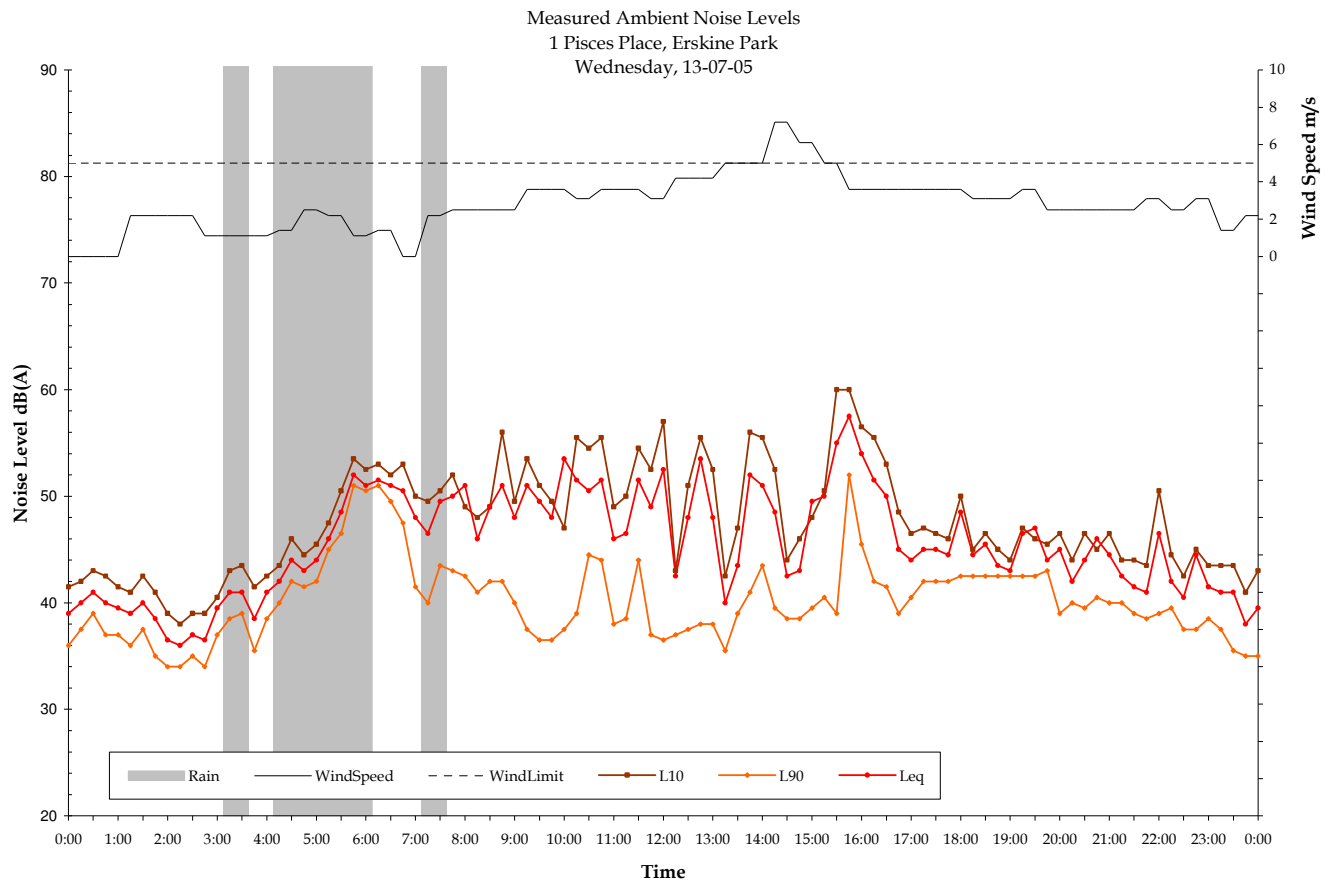




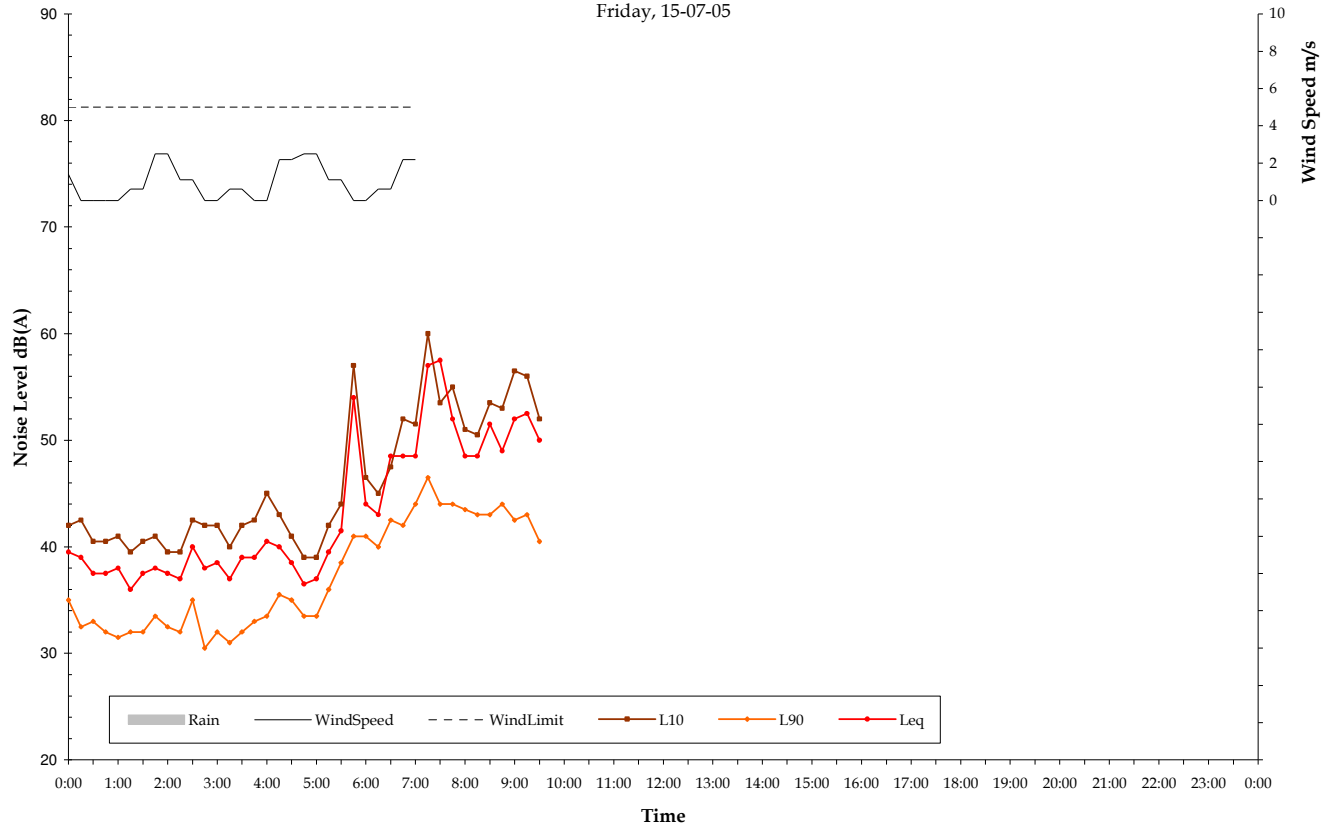


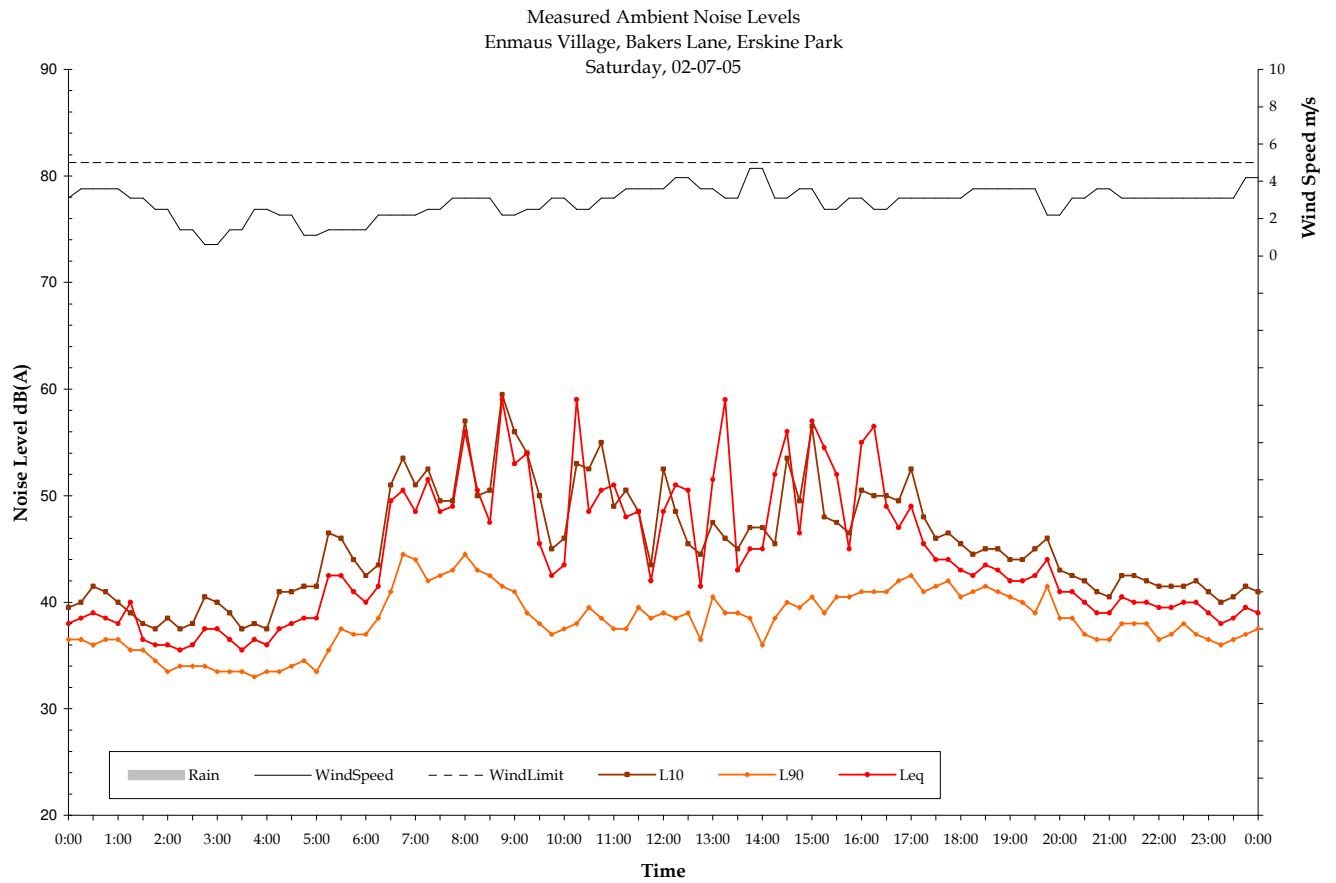
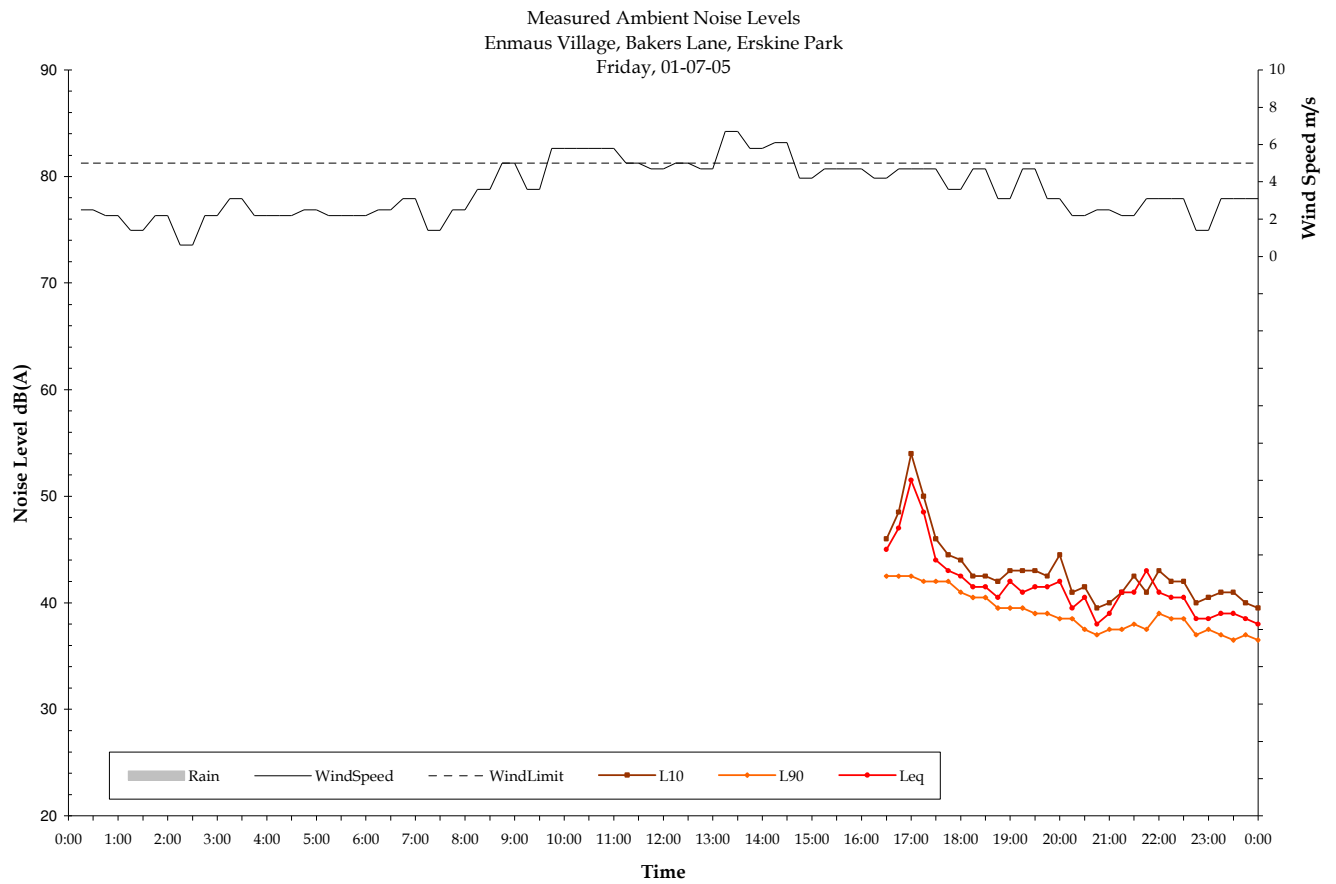


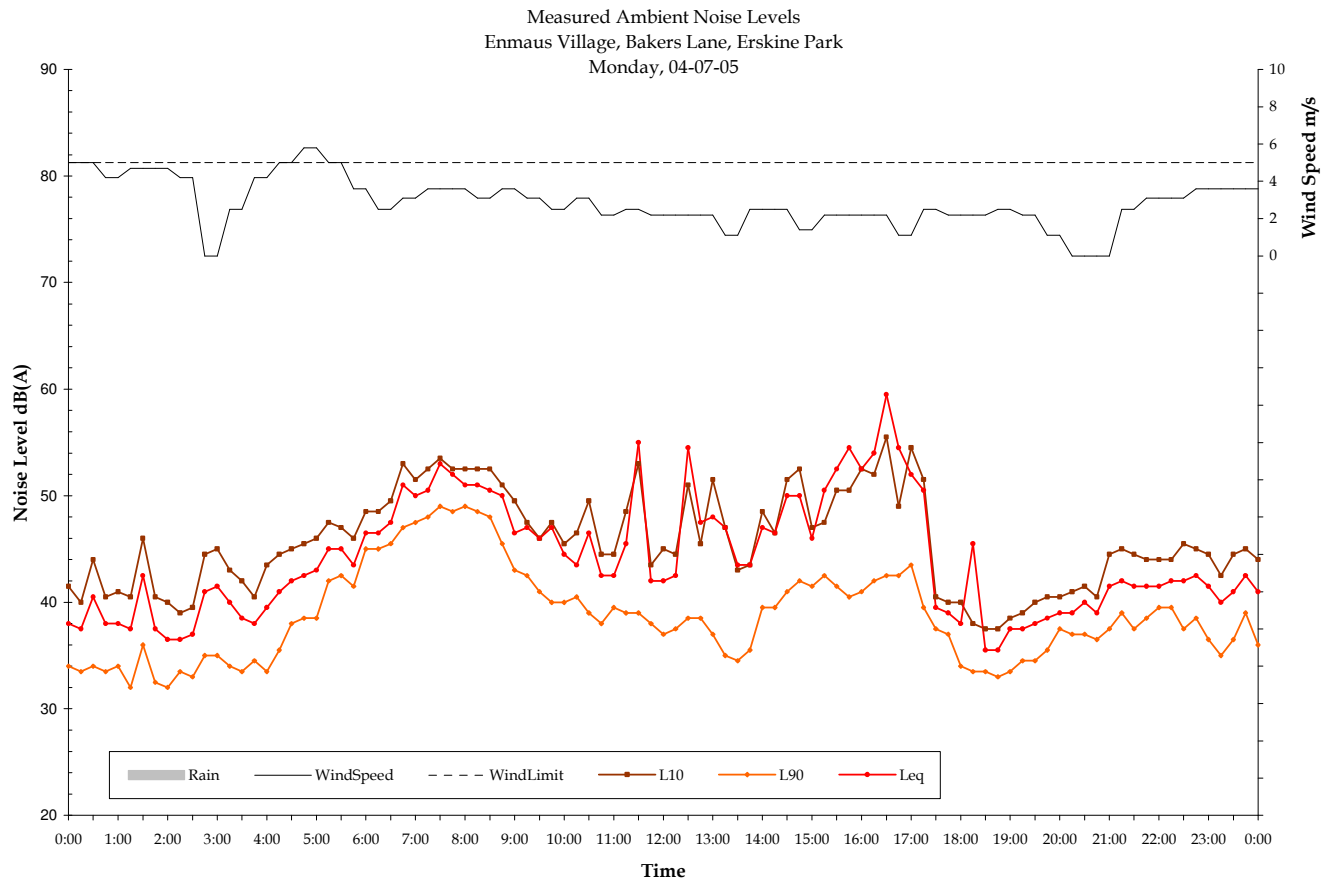
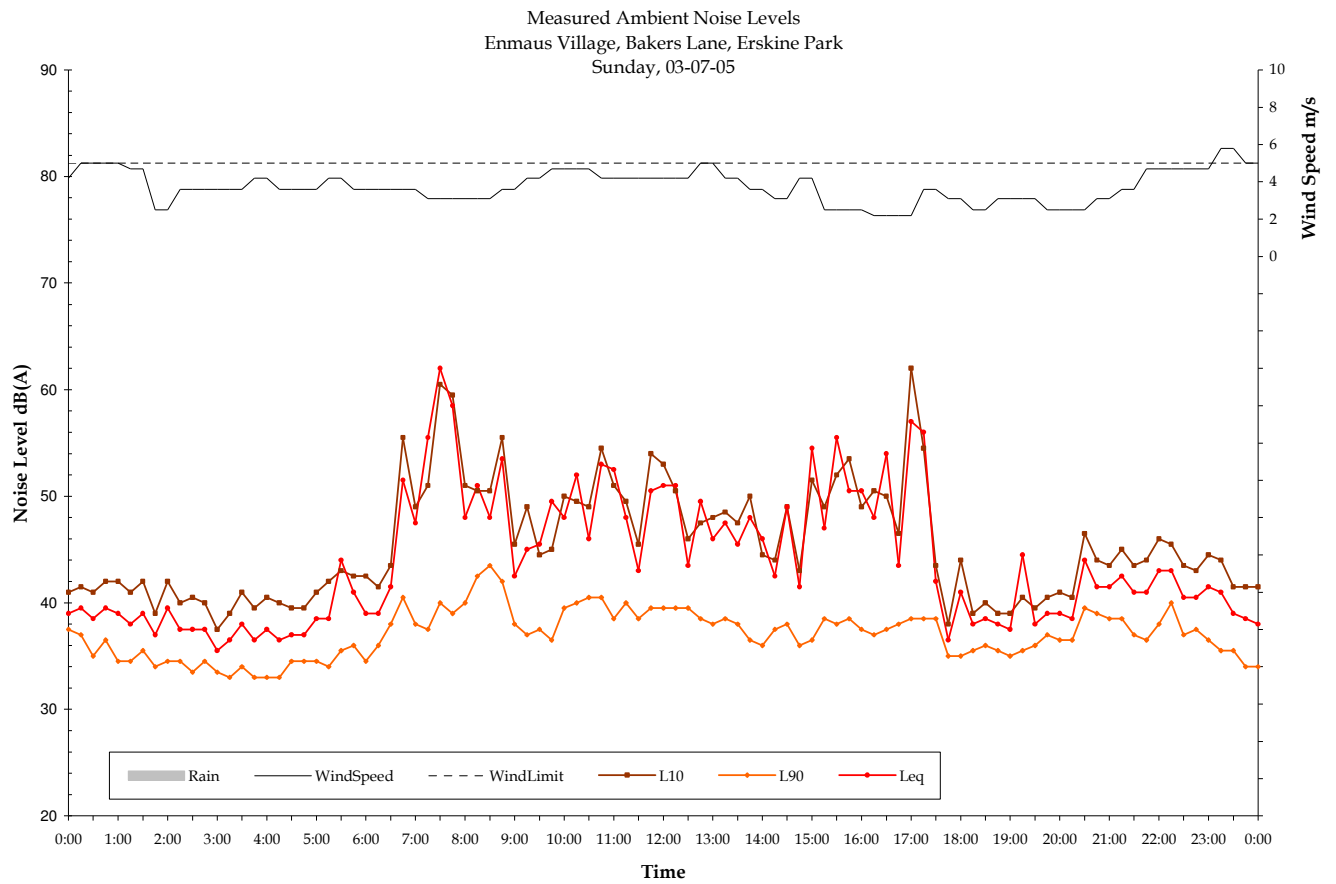


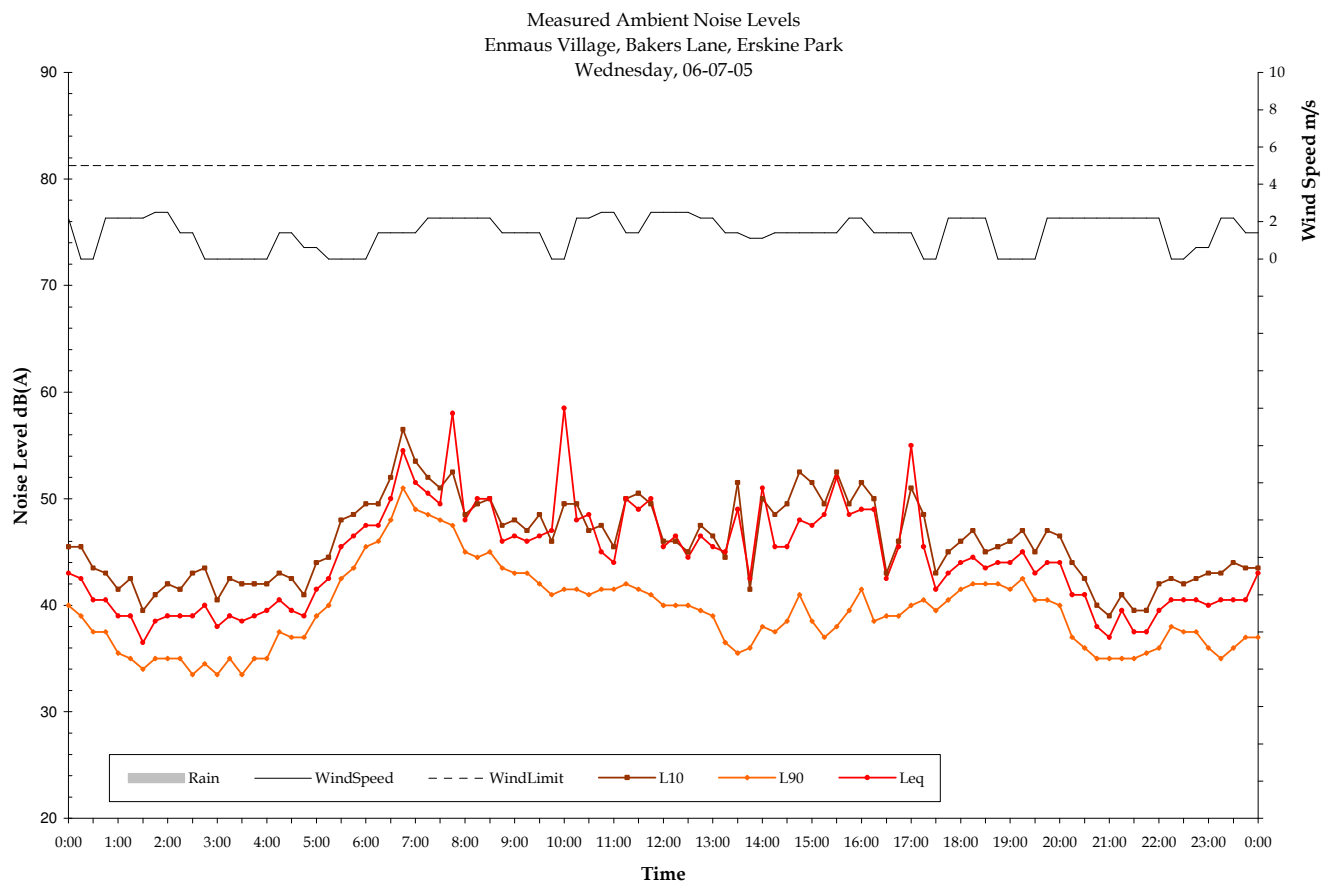
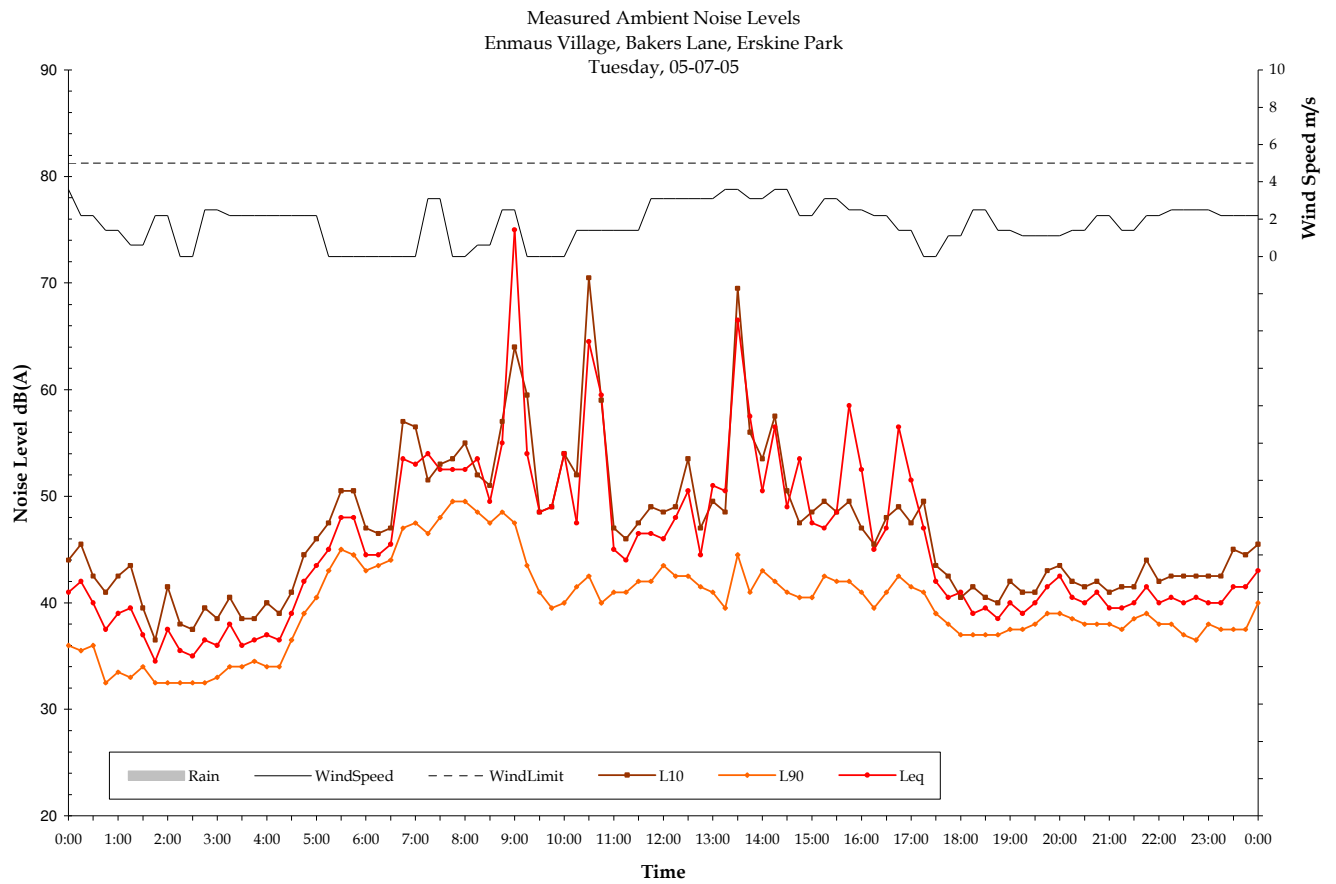


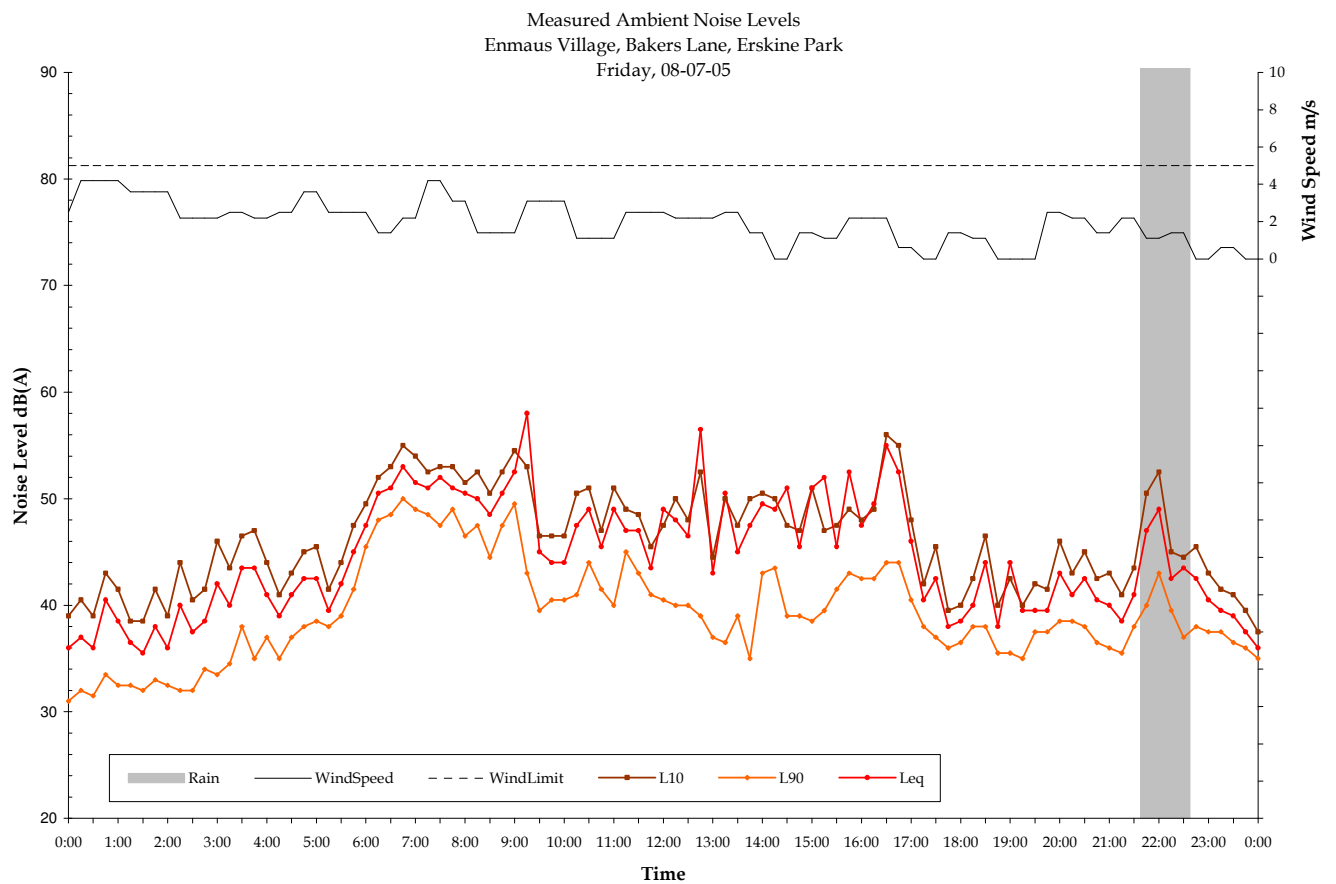
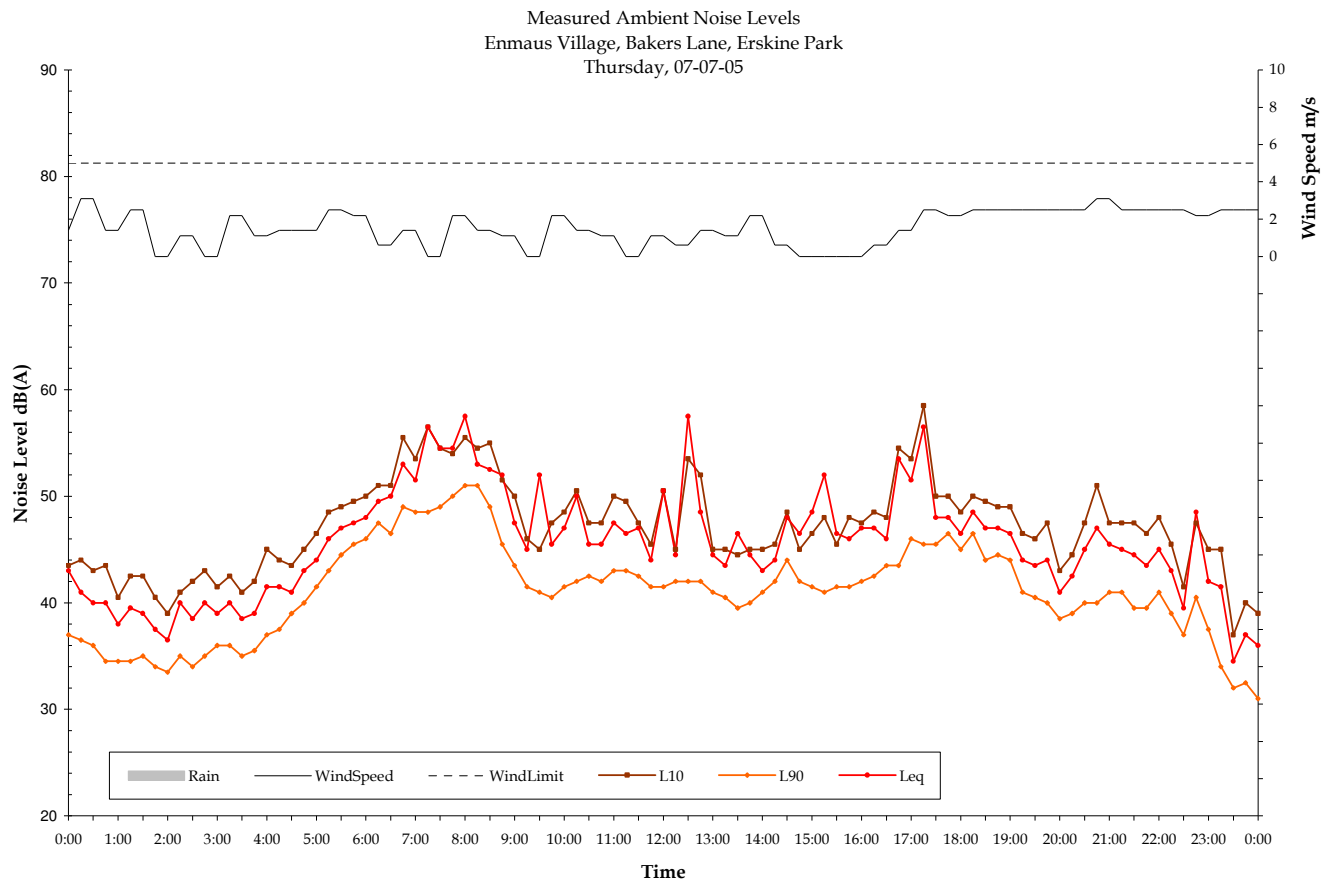
Measured Ambient Noise Levels
1 Pisces Place, Erskine Park
Friday, 15-07-05

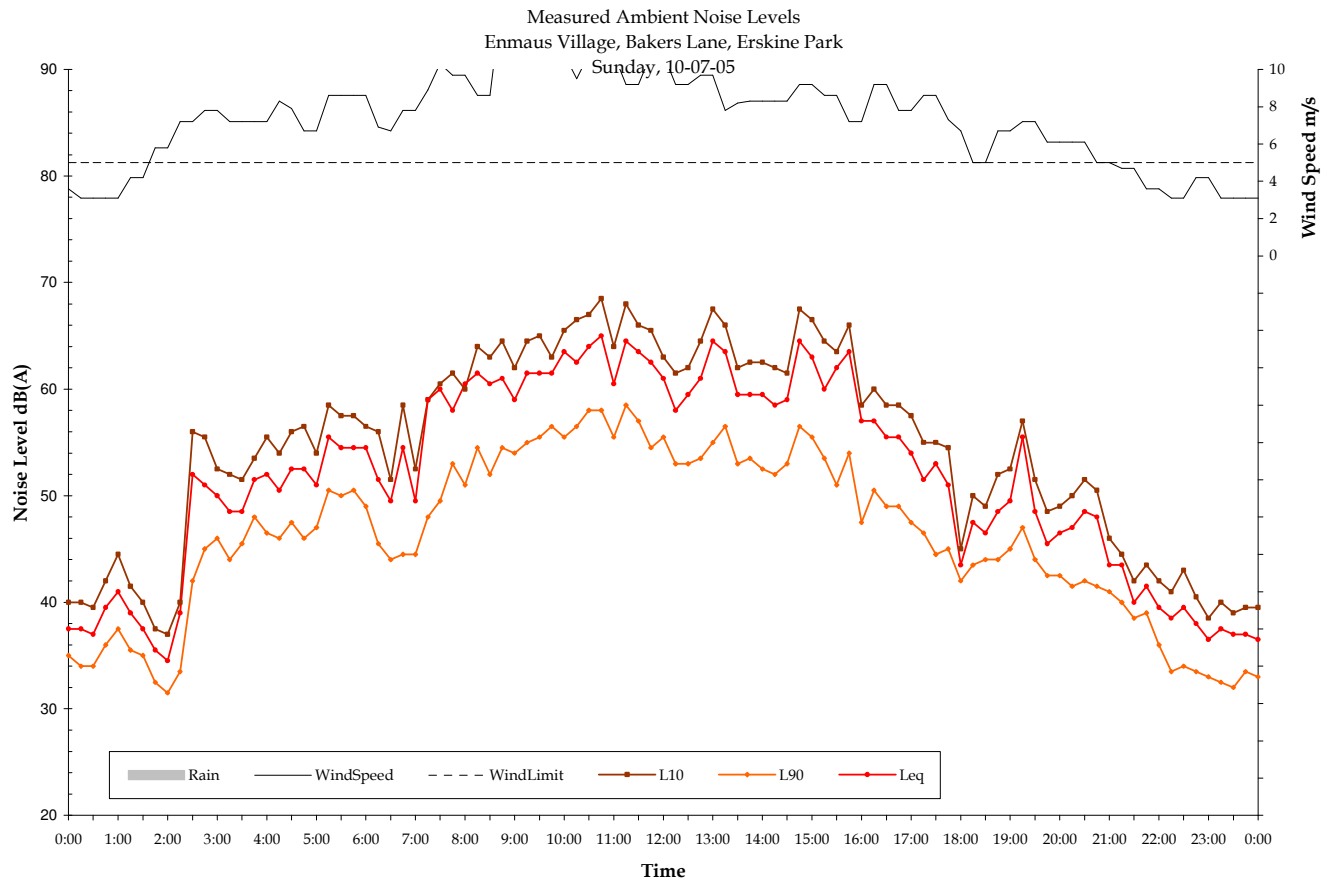
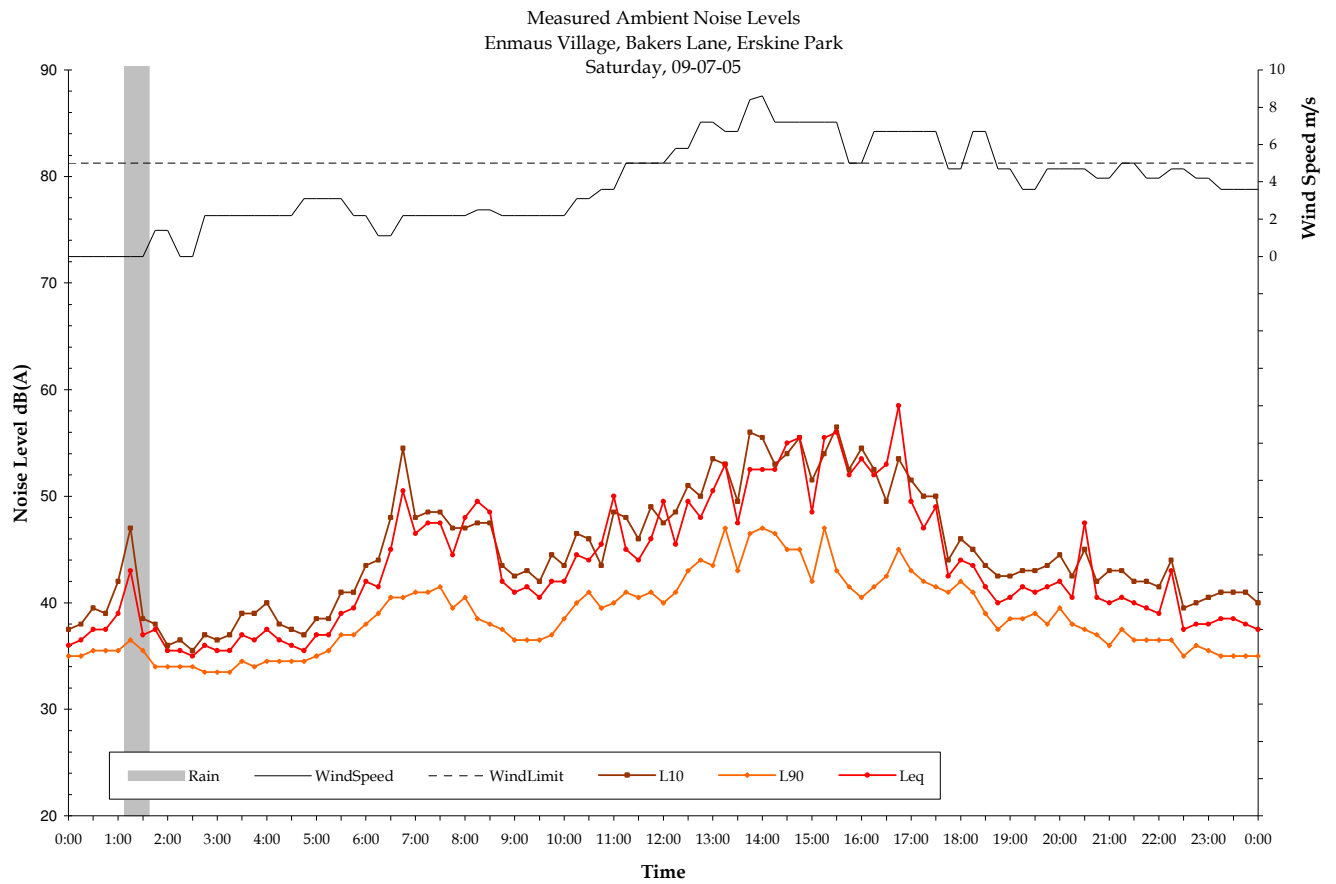


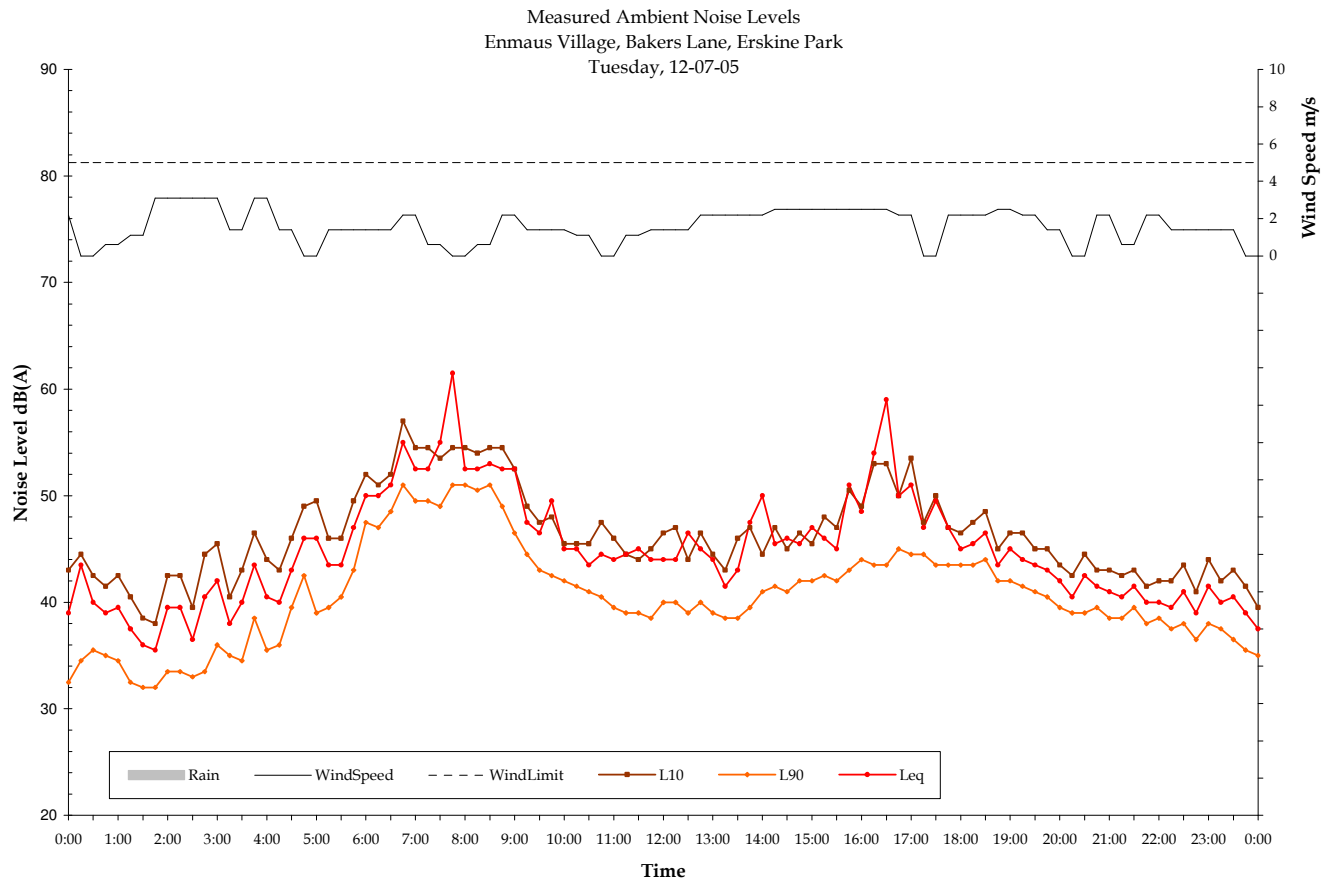
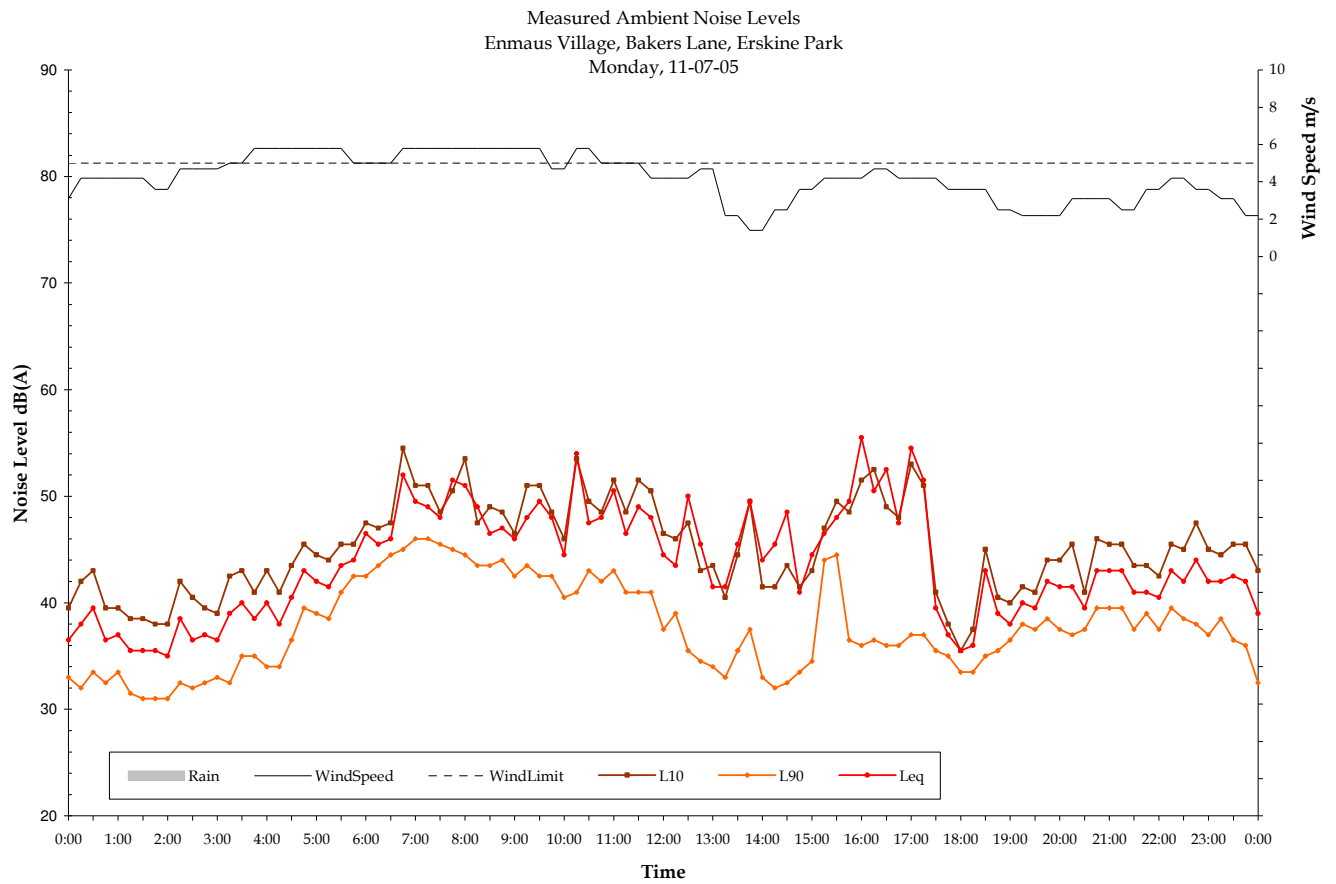


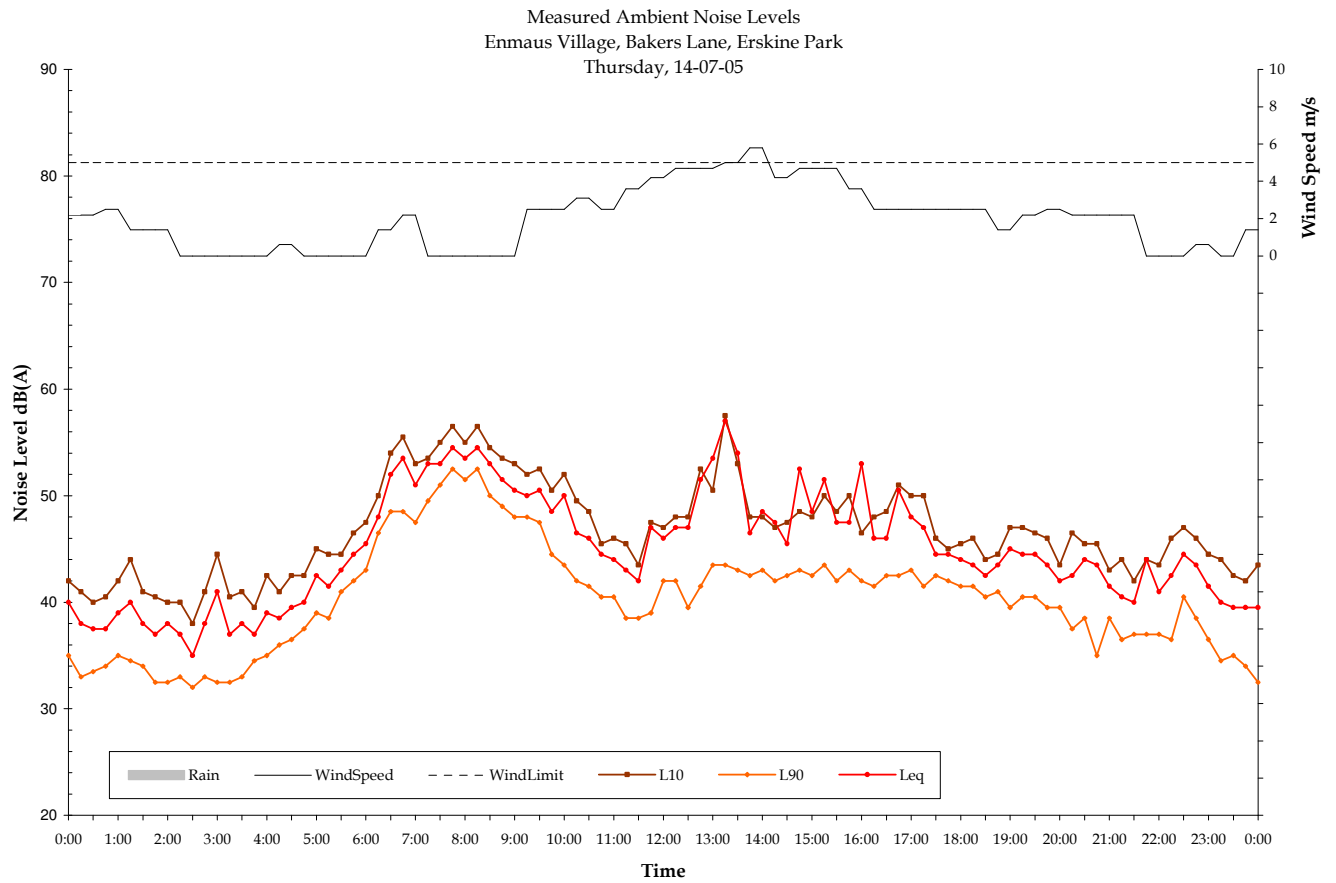
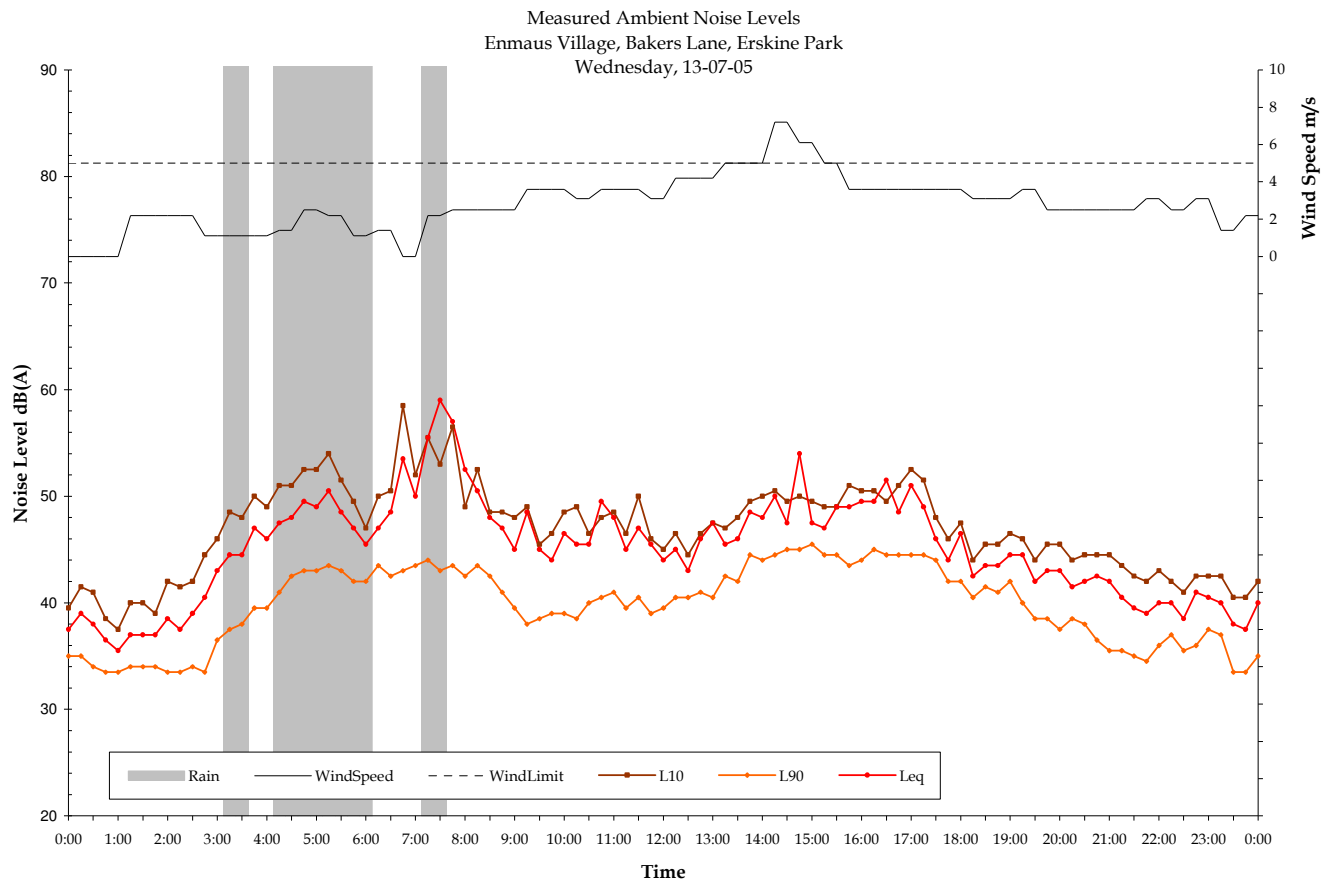




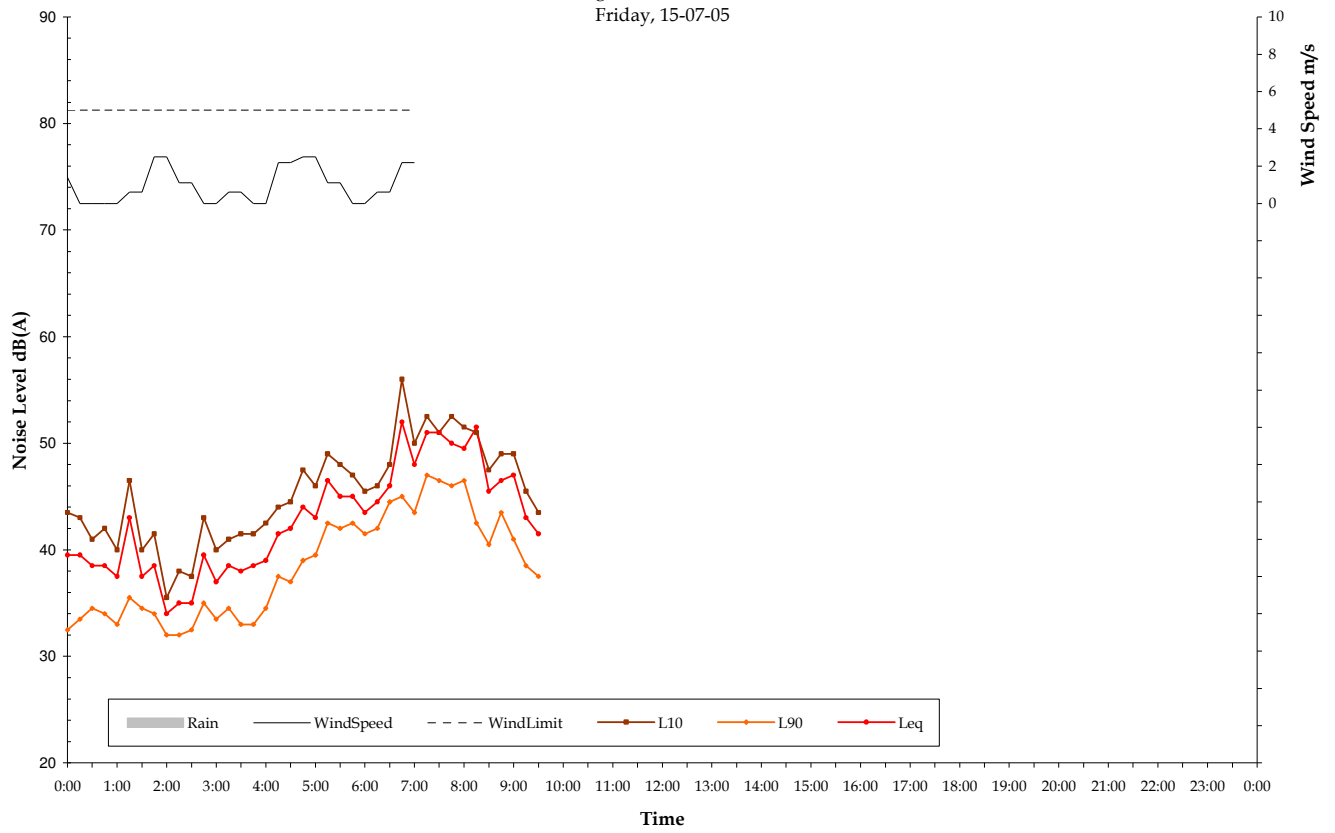








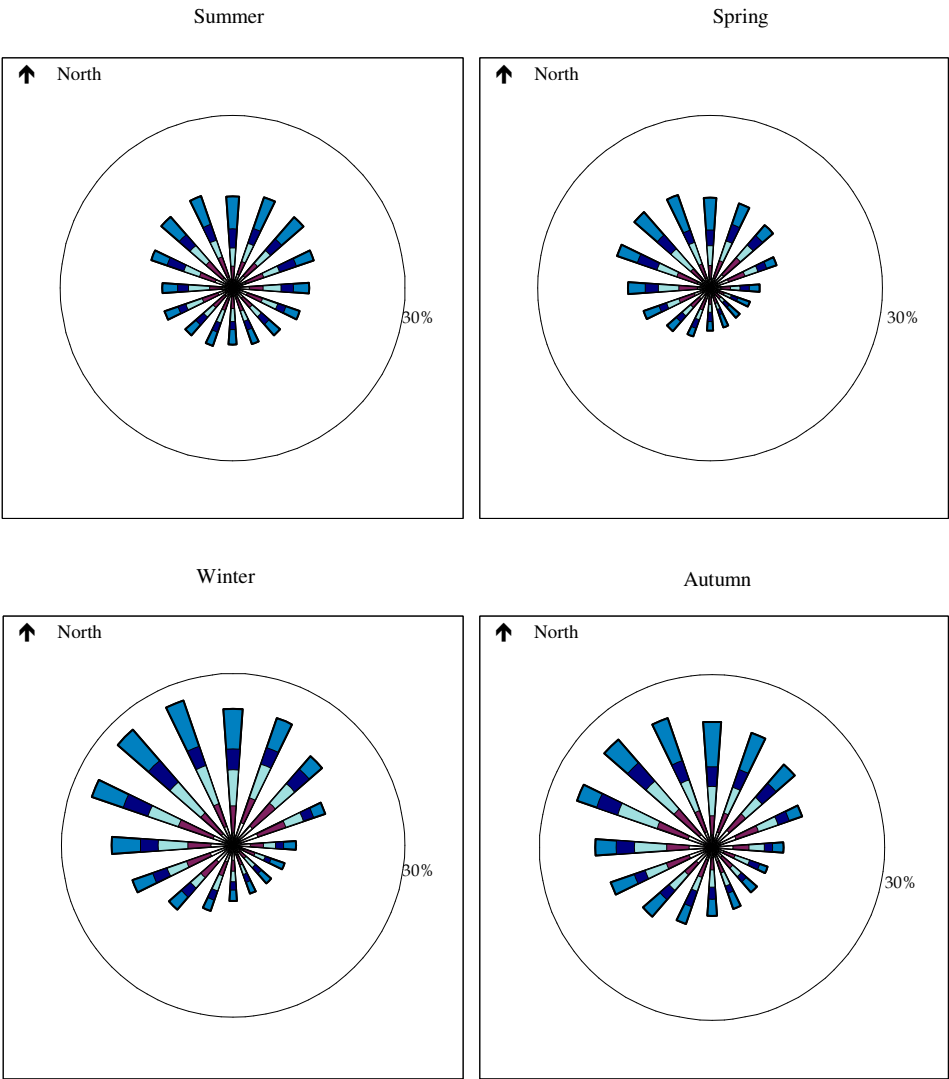
Measured Ambient Noise Levels
Enmaus Village, Bakers Lane, Erskine Park
Friday, 15-07-05



Annex B

Horsley Park Vector Wind Roses

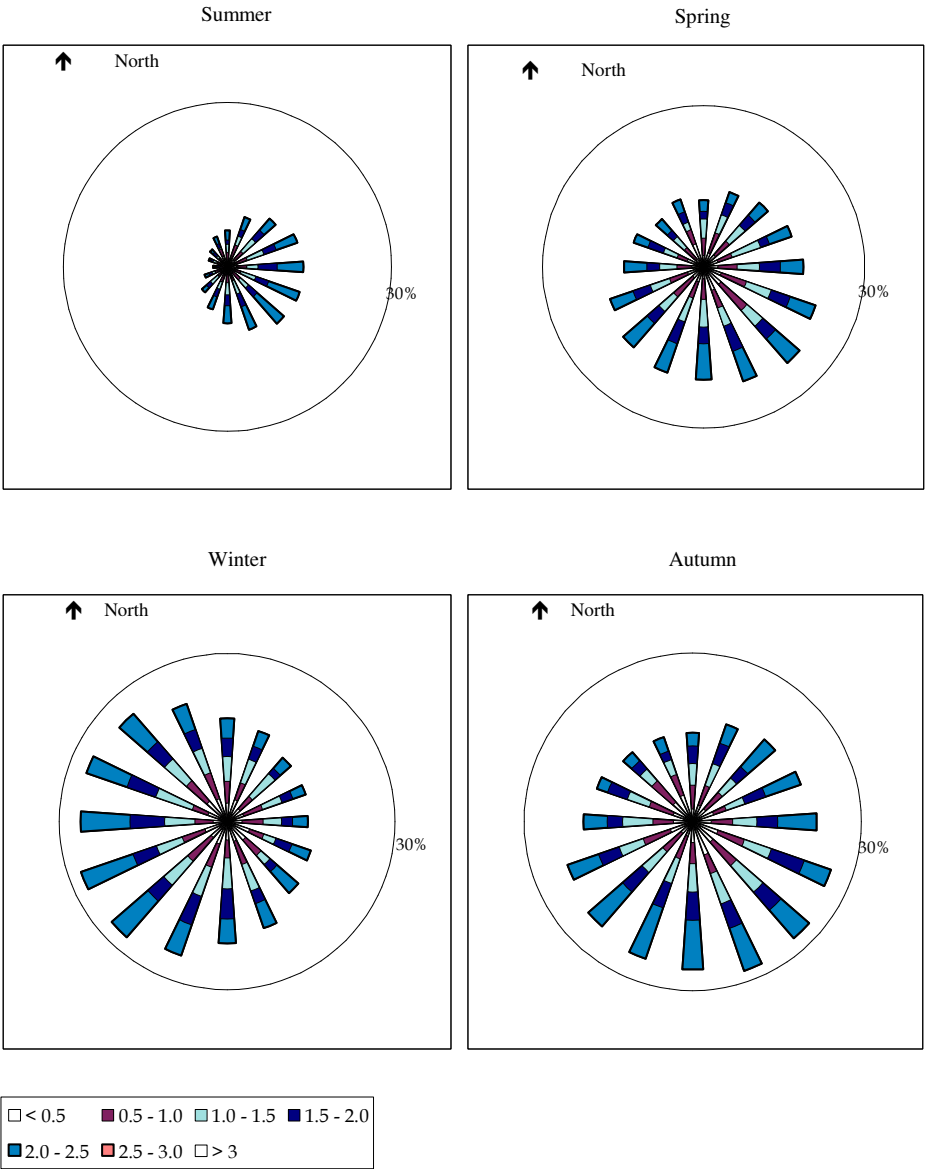
Day



Data Source: Horsley Park AWS (BoM)
Data Range: 30 min, 01-07-04 to 14-07-05

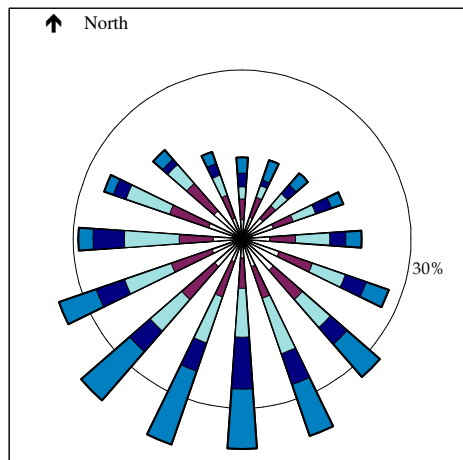
The segments of each arm represent the six valid wind speed classes, with increasing windspeed from the centre outwards. The length of each arm represents the vector components (for each direction) of wind speeds 3m/s or below as a proportion of the total time for the period . The circle represents the 30% occurrence threshold.

Evening

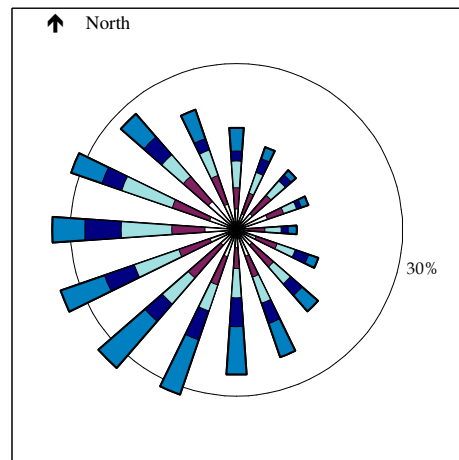


Night

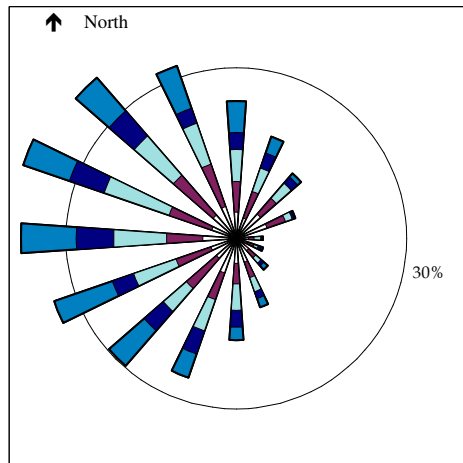
Summer



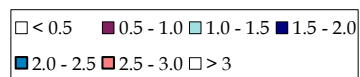
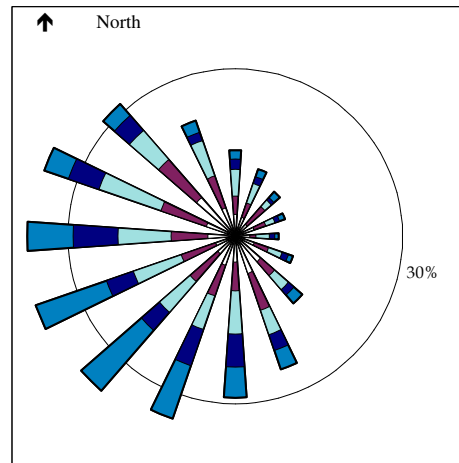
Spring



Winter



Autumn



Annex C

Proposed Site Plan

DRAWING SCHEDULE	
SPLEDA-000	Cover Sheet / Location Plan
SPLEDA-001	Site Plan
SPLEDA-002	Fencing Plan
SPLEDA-010	Facility Overall Floor Plan
SPLEDA-100	Office Floor Plan
SPLEDA-120	Roof Plan
SPLEDA-200	Elevations
SPLEDA-201	Office Elevations
SPLEDA-211	Sections
SPLEDA-500	Indicative Perspective



01 LOCATION PLAN

DA PRELIMINARY

NOT FOR CONSTRUCTION

[illegible]