

DUBLIN CITY COUNCIL
AMBIENT SOUND MONITORING NETWORK
Annual Report 2009



Traffic Noise & Air Quality Unit
Roads and Traffic Department,
Dublin City Council

Contact: Ph. 01 2223847; brian.mcmanus@dublincity.ie

Table of Contents

	Page
List of figures	5
Introduction	7
Monitoring Sites	7
Measurement Parameters	8
Sound Sources	8
Compliance with Guidelines	10
Comparison with noise maps	11
Measurements Results	13
Challenges	14
Daily Summary Charts	15
Monthly Summary Charts	23

Contact Information: Traffic Noise & Air Quality Unit

Block 2, Floor 6,

Civic Offices,

Wood Quay.

Dublin 8

Phone: 00353 1 2223847

E-Mail: brian.mcmanus@dublincity.ie

WWW.dublincity.ie

List of Figures

Figure 1: *Sound Monitoring Sites*

Figure 2: *Average Daily Traffic Flows*

Figure 3: *Wind Speeds compared with Sound Levels*

Figure 4: *Average Yearly Values at each site*

Figure 5: *Noise Map results*

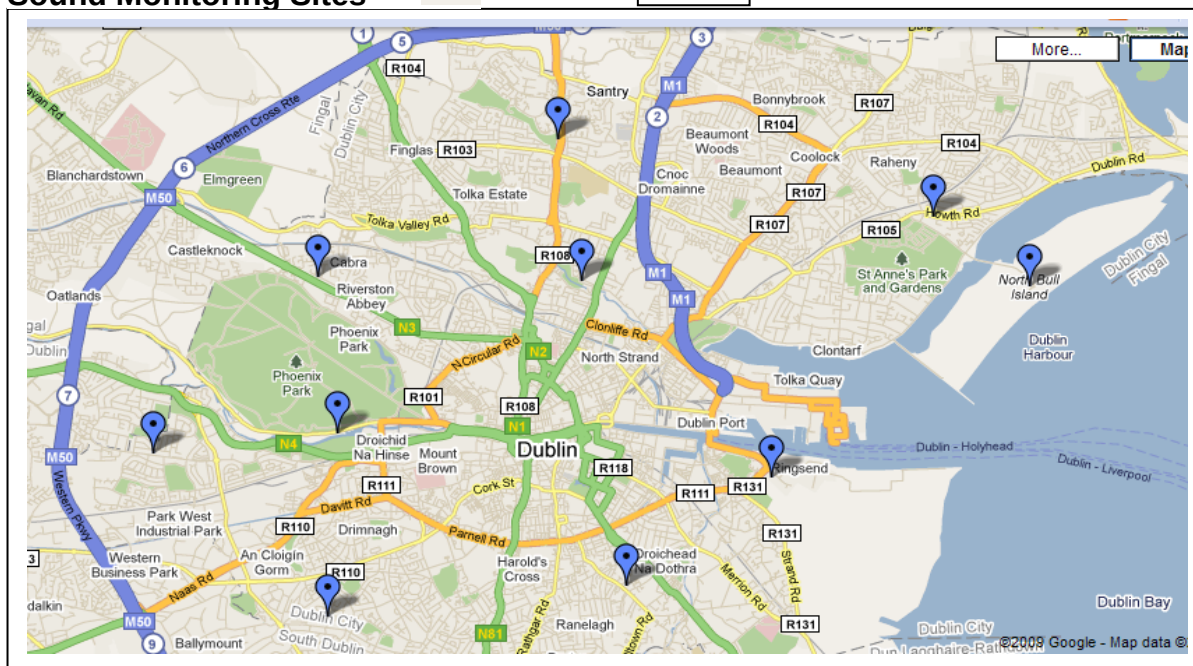
Figure 6: *Differences between Noise Maps and Measured Levels*

Introduction

As part of its commitment under the *Dublin Agglomeration Action Plan relating to the Assessment and Management of Environmental Noise*, Dublin City Council commenced the installation of a permanent ambient sound monitoring network in 2009. The purpose of this network is to measure outdoor ambient sound levels in the City, at representative sites of typical sound levels to which the citizen is being exposed. The data is also being compared with the computer modelled noise maps produced under the Action Plan in order to ascertain whether they provide a true representation of sound levels throughout the City. Dublin City Council is the first local authority in Ireland to install such a network.

Sound Monitoring Sites -

Fig.1



It should be noted that the sound level meters are located so that there is no single dominant source having a significant influence on the outdoor ambient sound levels being measured, such as major roads, road junctions, industrial sources etc.

The network currently consists of ten locations:

- Ashtown, off Navan Rd. D7, Private House
- Ballyfermot Road, D10, Civic Centre
- Ballymun Road, D11, Library
- Bull Island, D3, Interpretative Centre
- Chapelizod Road, D8, Dublin City Council Rowing Club
- Howth Road, D5, Raheny Library
- Millmount Avenue, D9, Drumcondra Library
- Percy French Road, D12, Walkinstown Library
- Ringsend, D4, Irishtown Stadium
- Woodstock Gardens, Ranelagh, D6, Snr. Citizens Residential Scheme

Measurement Parameters

The measurements being taken are over continuous, 5 min periods, which are presented as average hourly sound levels in decibels (dB(A)). These hourly values can be converted to average day, evening, and night time values. As noise maps are presented using a single value called LDEN(Day, evening, night) the above time periods can be converted to this value for comparison with the noise maps.

Sound Sources

The work on computer modelled noise maps has shown that traffic is the dominant sound source in Dublin. This sound comes from two aspects of traffic – the road surface, wheel\tyre interface where sound levels increase with speed and secondly, engine\ gear change and body rattle sound, normally observed at lower speeds.

The measurements from the monitoring sites confirm traffic is the dominant sound source at most sites. Hourly sound values track traffic volumes as they vary throughout the day. It is quiet striking the similarities between Figure 1 showing the average variations in traffic throughout the day and the individual site charts showing the variations of sound - rising on average at approximately 7 in the morning and dropping off at approximately 6-7pm in the evening. It is particularly most noticeable for the period between midnight and 6a.m. in the morning, on Saturdays and Sundays. However the Bull Island site shows no dominant influence from traffic, where as Ringsend shows some influence from traffic but not as strong as at other sites.

Traffic Flows

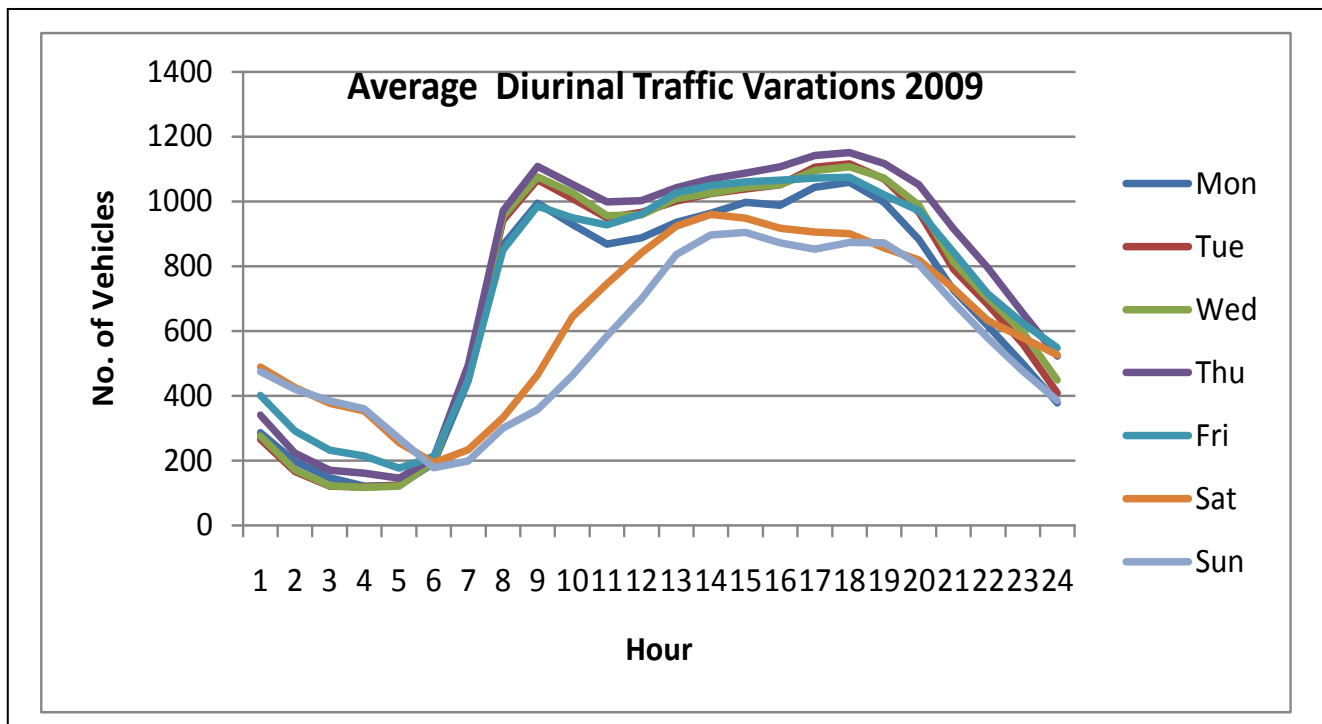


Fig. 2

Weather

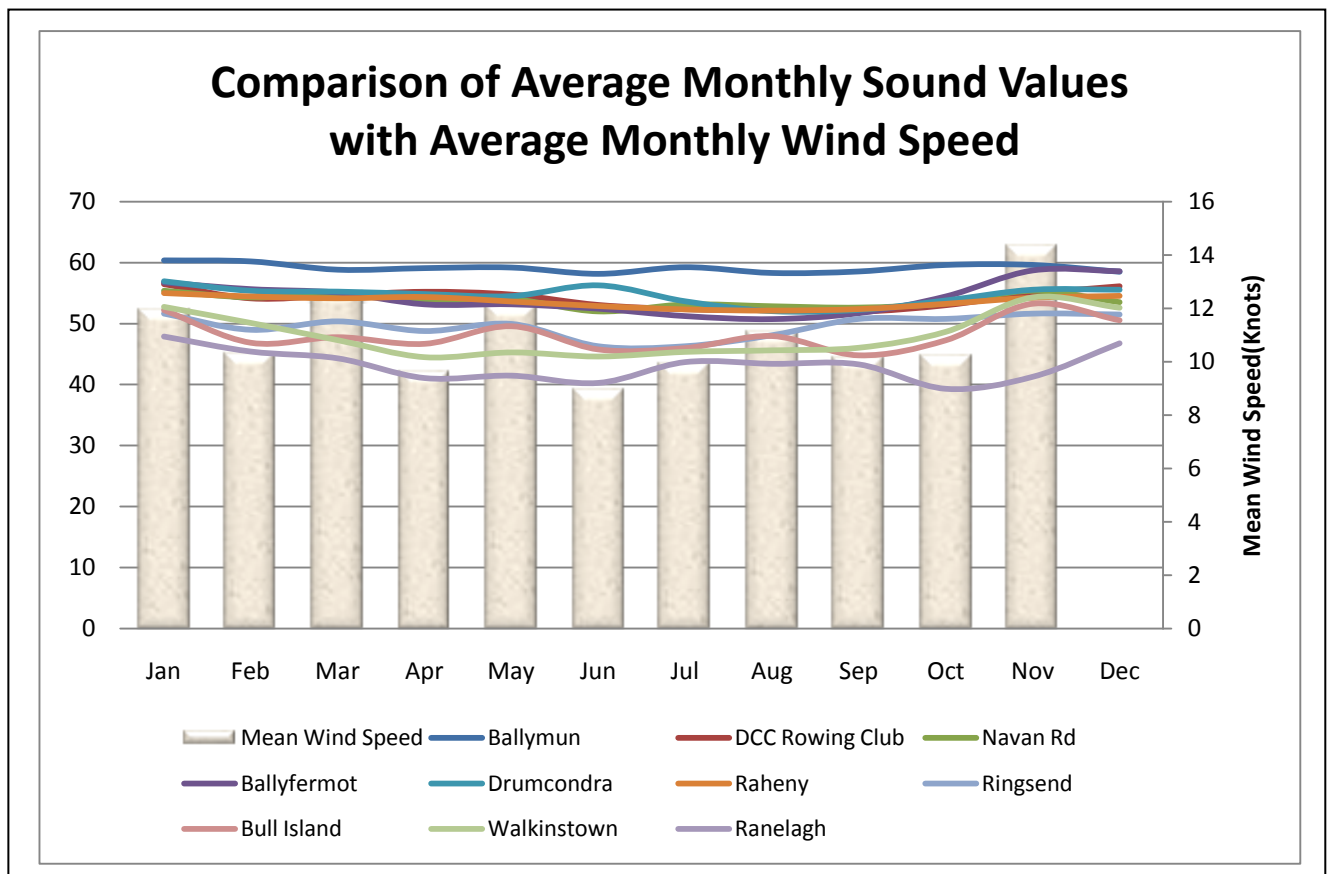


Fig.3

Another influence on the sound measurements can be meteorological conditions, in the Irish context, mainly rain and wind. Rain increases the sound from vehicles travelling on wet road surfaces. On windy occasions sound levels also become elevated. The incoming and outgoing tides and breaking waves also influence the sound measurements at Bull Island.

Figure 3 charts average monthly sound levels against average monthly wind speeds. The influence of the wind depends on how strong the wind is blowing and the pre-existing sound level. As can be seen from figure 3 during the high winds in January and November (between 12 and 15 Knots) sound levels also increased. However during less windy periods sites with less dominant sound sources seemed also to be influenced by winds between 10-13 knots, while the sites with average sound levels above 55dB (A) appeared not to be. Wind speeds below 10 Knots (5m/s) in April and June appeared to have no significant influence on sound levels.

There was no obvious link observed when average monthly rainfall and sound level figures were compared. A more detailed analysis between daily or hourly values may have to be undertaken for a link to be established, if any.

Compliance with Guidelines

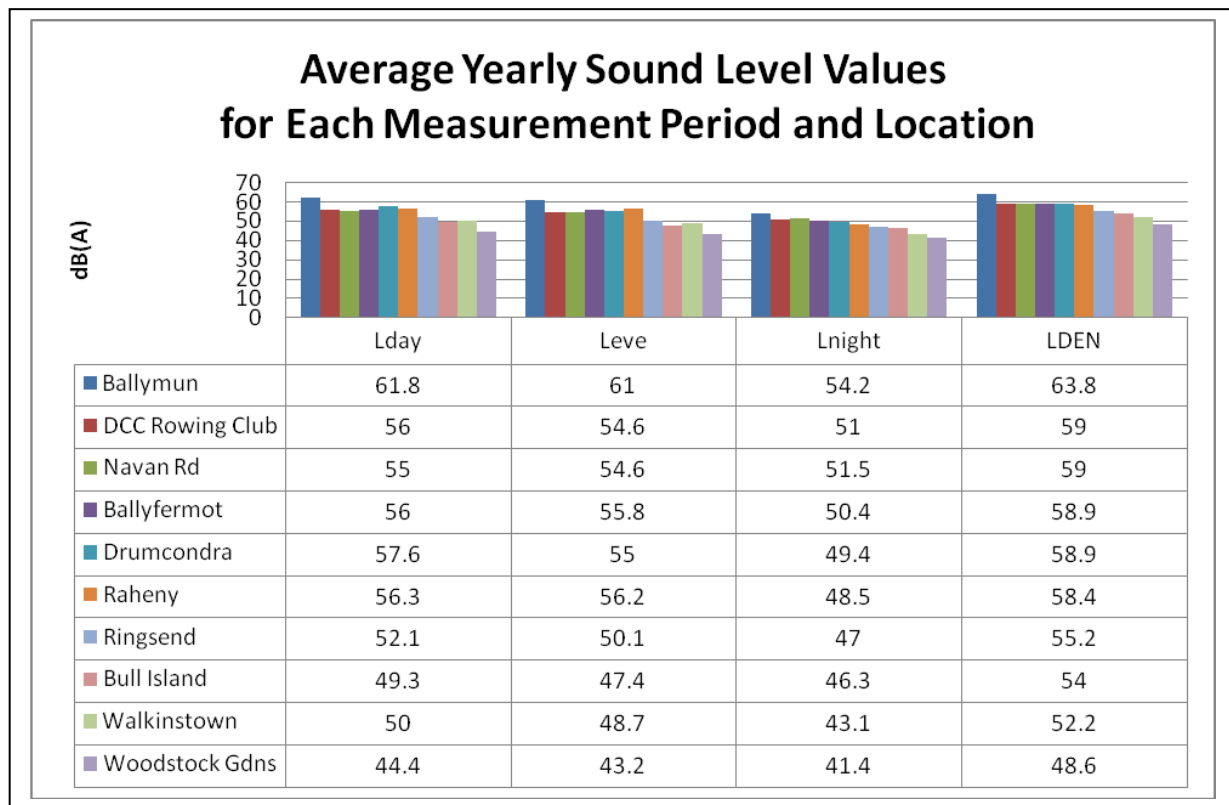


Fig. 4

Sound emission levels from certain sources, outside of the work environment, can be applied and enforced through Integrated Pollution Prevention Control licences, Planning Control, or Section 107-108 of the EPA Act 1992. There are no legally binding statutory limits for ambient sound levels as there are for air quality. However the levels outlined below are used for guidance and comparison purposes.

Areas with desirable\undesirable high\low sound levels

The Noise Action Plan proposes that areas with undesirable high sound levels are areas with a night time level greater than 55 decibels and a daytime level greater than 70 decibels.

Areas with desirable low sound levels are defined as areas with a night time level less than 50 decibels and/or a daytime level less than 55 decibels.

The World Health Organisation Night Noise Guidelines (NNGL) for Europe indicate Night noise guideline (NNG) Lnight, outside = 40 dB; Interim target (IT) Lnight, outside = 55 dB.

The measurements for the year 2009 indicate that none of the locations exceeded the undesirable values of 55dB night\70dB day; 6 of the sites met the desirable criteria for night time levels (Drumcondra, Raheny, Ringsend, Bull Island, Walkinstown, Ranelagh) . Four sites met the desirable value for daytime, (Ringsend, Bull Island, Walkinstown, Ranelagh).

All of the sites met the WHO NNGL interim target for exterior night time level of 55dB.

Comparison with Noise Maps

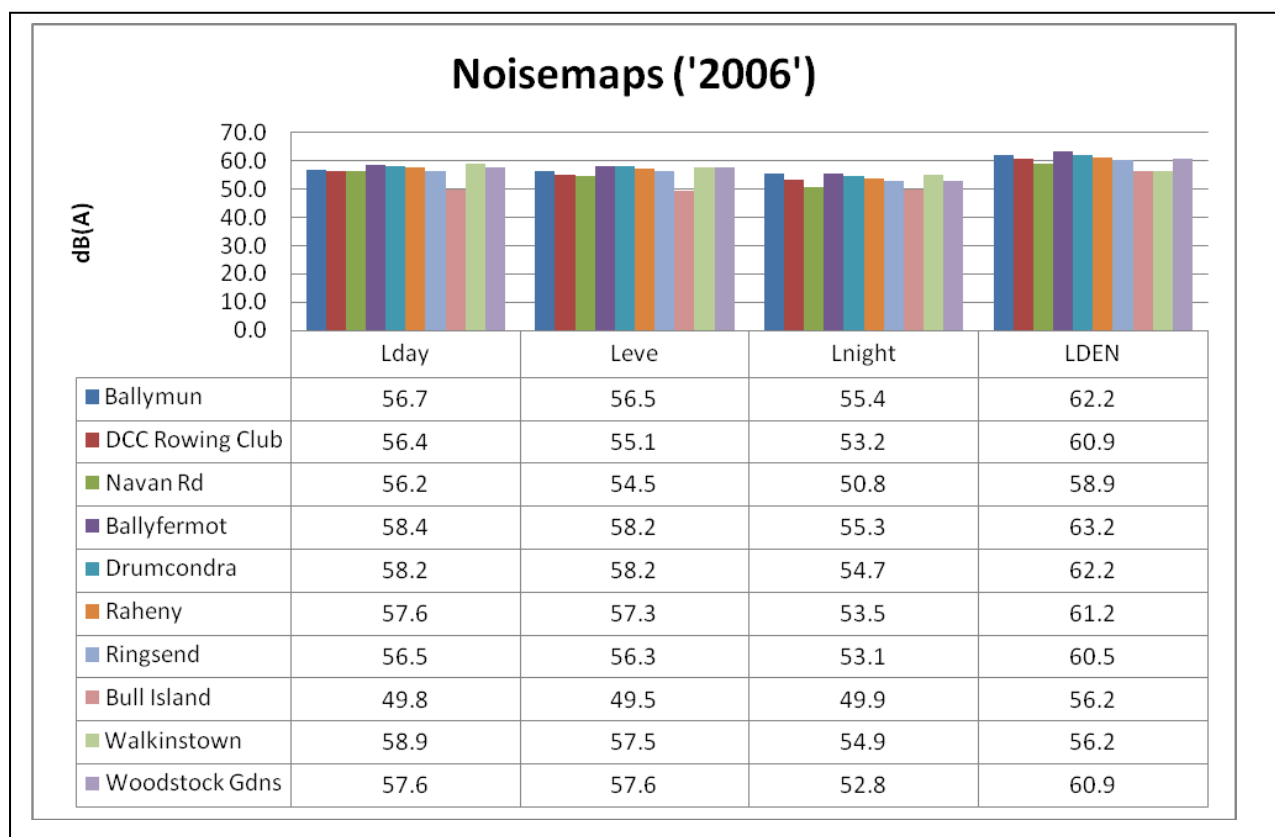


Fig. 5

Comparison with the results of the computer modelled Noisemaps indicate that in the majority of cases the computer model over estimated sound levels. The model is most robust when calculating values close to heavily trafficked roads. This was to be expected as the further one moves away from the road centre line, the more complex the calculations become. As default traffic volumes were used to represent traffic flows in many of the suburban areas further overestimation was inevitable, particularly at night time.

From Fig 5 in can be noted that Ranelagh's (Woodstock Gardens) monitoring location gives somewhat unique results. This location is under review. Its results have been omitted when making comparisons with other sites.

Difference between Noisemap values and Measured Sound values (Noisemaps - Measured Values)

	Lday	Leve	Lnight	LDEN
Ballymun	-5.1	-4.5	1.2	-1.6
DCC Rowing Club	0.4	0.5	2.2	1.9
Navan Rd	1.2	-0.1	-0.7	-0.1
Ballyfermot	2.4	2.4	4.9	4.3
Drumcondra	0.6	3.2	5.3	3.3
Raheny	1.3	1.1	5.0	2.8
Ringsend	4.4	6.2	6.1	5.3
Bull Island	0.5	2.1	3.6	2.2
Walkinstown	8.9	8.8	11.8	4.0
Ranelagh	13.2	14.4	11.4	12.3
Ave. Diff (excluding Woodstock Gdns)	1.6	2.2	4.4	2.4

Fig. 6

As can be seen from figure 6 above, the average difference between the noise maps and measured values is more robust for daytime values and least robust for night time values. To rectify this for the next round of noise mapping in 2012 it may be necessary to get a truer representation of traffic volumes during the night time period rather than using default or daytime values. However it can be concluded that the noise maps represent a worst case scenario.

Measurement Results

The Ambient sound monitoring network measures sound levels in decibels (dB(A)). It does not measure noise. Noise is usually defined as "unwanted sound". "noise" and "sound" are often erroneously interchanged. However '*Noise Annoyance*', is a term general used for all negative feelings such as disturbance, dissatisfaction, displeasure, irritation and nuisance (Guski 1999, Quis, 2002). Adverse effects of noise occur when intended activities of the individual are disturbed. The sound level of the acoustic stimulus, the time of its occurrence, its time domain, its frequency spectrum and its informational content modify the reaction. During sleep, however, unconscious activation of the autonomous system takes place without cognitive control, due to direct interaction between the hearing nerve and higher structures of the central nervous system. Noise indicators such as *Lden* and *Lnight*, in this respect, describe the exposure situation. **(Dr. Wolfgang Babisch, Expert Panel on Noise, EEA)**

The LDEN -average sound level for day, evening and night time periods, is a single value parameter that applies an extra 5dB weighting for the evening and 10dB weighting for the night time periods. It is considered that this gives a truer representation of the impact sound has during the evening and night time periods over and above the day time period.

Using the LDEN parameter it can be seen from figure 4 that the site with the highest sound values for all four 24hr values is Ballymun. Chapelizod Rd(DCC Rowing Club), Navan Rd, Ballyfermot Rd, Drumcondra and Raheny have very similar LDEN values. However this can hide some important issues. So, for example although the Drumcondra site has higher sound levels than Navan Road during the day the reverse is true for the night time. So whilst Drumcondra has met a 'Desirable' night time criteria under the Noise Action Plan, Navan Road has not, even though it has lower sound levels than Drumcondra during the day period. It is true for other monitoring sites also. This adds another complexity to any actions that could be considered for reducing or managing sound levels. It is worth noting the biggest drop off between daytime and night time values is at Drumcondra (8.2dB) followed by Raheny (7.8dB), Ballymun (7.6dB), Walkinstown (6.9dB), Ballyfermot (5.6dB), Ringsend (5.1dB) and Chapelizod (5dB). These sort of reductions could give an observer the impression of 'relative quietness'. Those in the areas with less of a reduction may feel there is no difference between daytime and night time values and the area is 'noisy' all the time. This despite night time values being lower at these sites than those with the larger night time reductions.

The site summaries average leq (sound levels) provide a more detailed view of how sound levels vary from hour to hour throughout the average day and between the different days of the week. During the average day sound levels along with traffic levels start rising at 6 a.m. After approximately 9 a.m. sounds levels at most sites, except Drumcondra, Ballymun and Raheny, level off until between 8-9pm when they start to fall. However average traffic volumes continue to rise gradually throughout the day peaking between 6-7pm when they commence falling off. The previous 3 mentioned sites follow this trend but sound levels don't tend to commence dropping off until 8-9p.m.

The monthly charts give a detailed view of how average daily sound levels change from day to day and month to month. The highest monthly sound levels were experienced at most stations in November followed by January. This coincided with similar high average wind speeds. Again most sites showed sound levels dropping during June, July and August, except for Ballymun, which showed consistent sound levels throughout the year. Bull Island showed the most erratic sound levels of all the monitoring sites and at times it is hard to discern night time from day time values. It is believed that this is due to local conditions such as tide times, wind and general natural sound, such as waves breaking on the beach. As previously stated the Monitoring Network measures sound levels – not noise, which is a subjective evaluation. Average sound levels at Bull Island are higher than suburban sound levels in Ranelagh and Walkinstown. This would seem to be counter intuitive. However this is worth remembering when making judgements in relation to what is considered noisy or not.

Challenges

The main sound source to which people in the Dublin City region are being exposed to is from traffic – during both day time and night time periods. For the night time period four sites are above the desirable level of 50dB (A) – Ballymun, Chapelizod Rd, Navan Rd and Ballyfermot Rd. However all sites are above the WHO NNGL of 40dB (A) and it is unlikely in the short to medium term that this level will be met.

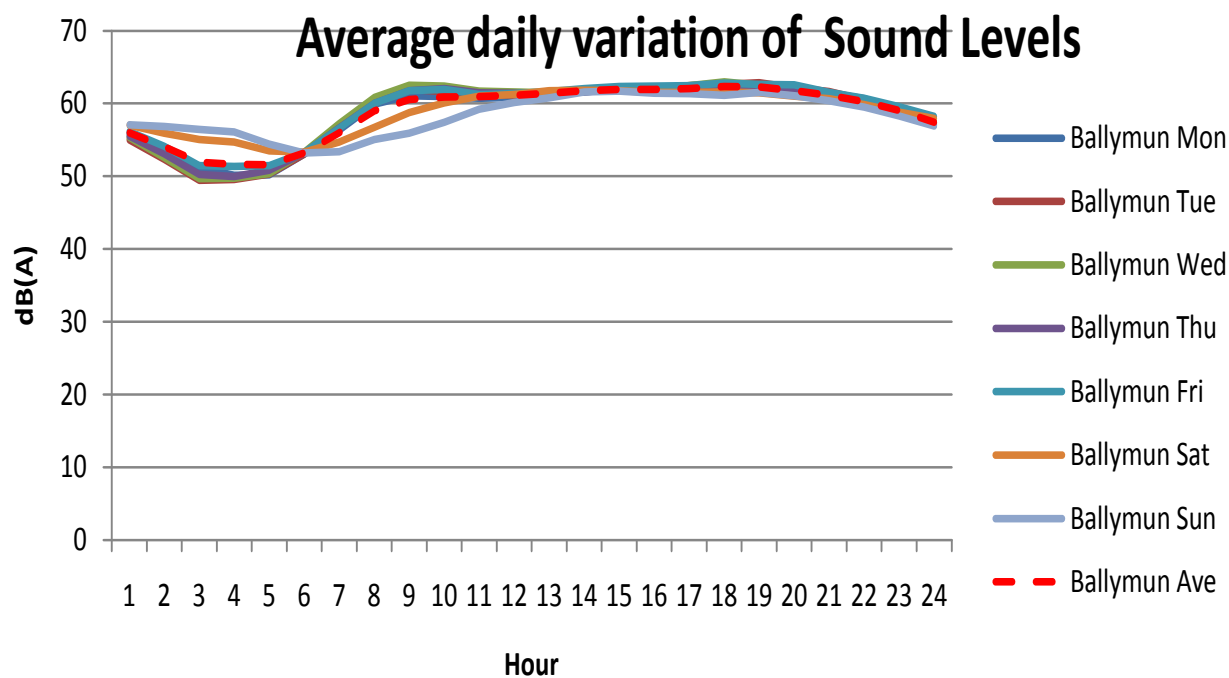
It may be obvious but the most direct way to reduce sound levels is to reduce the number of vehicles on the roads and the speed at which the remaining vehicles travel. For example five axel vehicles have all but been removed from the North Wall\Custom House Quay. However, there has been no significant reduction in sound levels. It is thought that this is due to the increase in speed along these roads due to the removal of the heavy vehicles. At night time sound levels only drop to their lowest at approximately 3-4a.m. in the morning – despite low traffic volumes during the night period. Again this is due to the increased speeds of the remaining vehicles on the roads at those times.

The reduction of vehicles on our roads can come about through a modal shift from the private car used for commuting, to mass transit systems such as bus or rail or through personal modal changes such as walking or cycling. Traffic management policies that reduce traffic speeds, improve traffic flows and distribute traffic flows onto more appropriate roads will compliment these modal shifts.

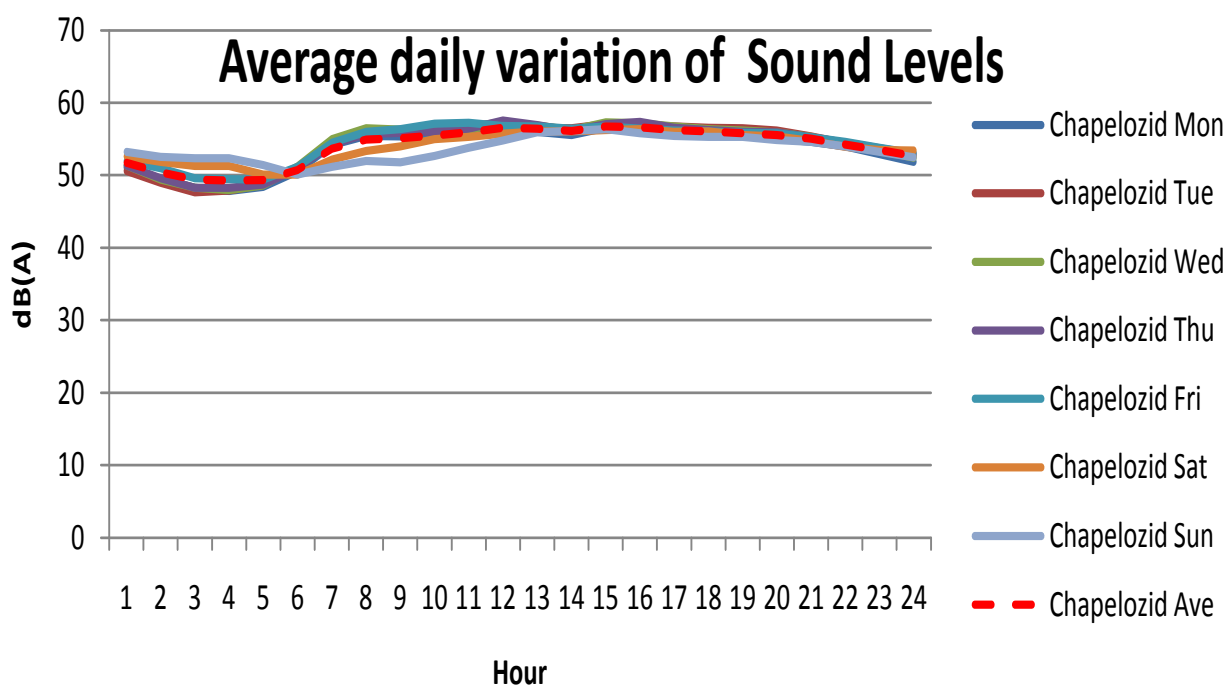
These policies have been integrated into the Noise Action Plan for the Agglomeration of Dublin along with planning policy and the identification of areas that require priority action in order to manage in a proactive way sound sources and sound levels within the City.

Daily Summary Charts

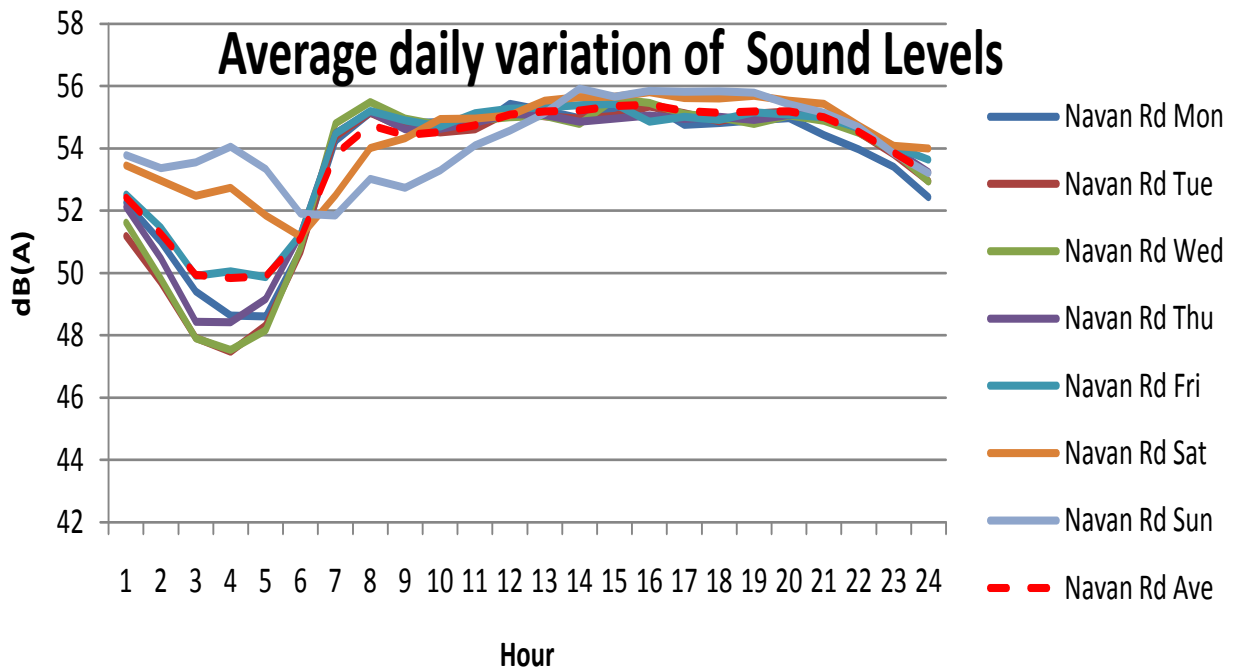
BALLYMUN



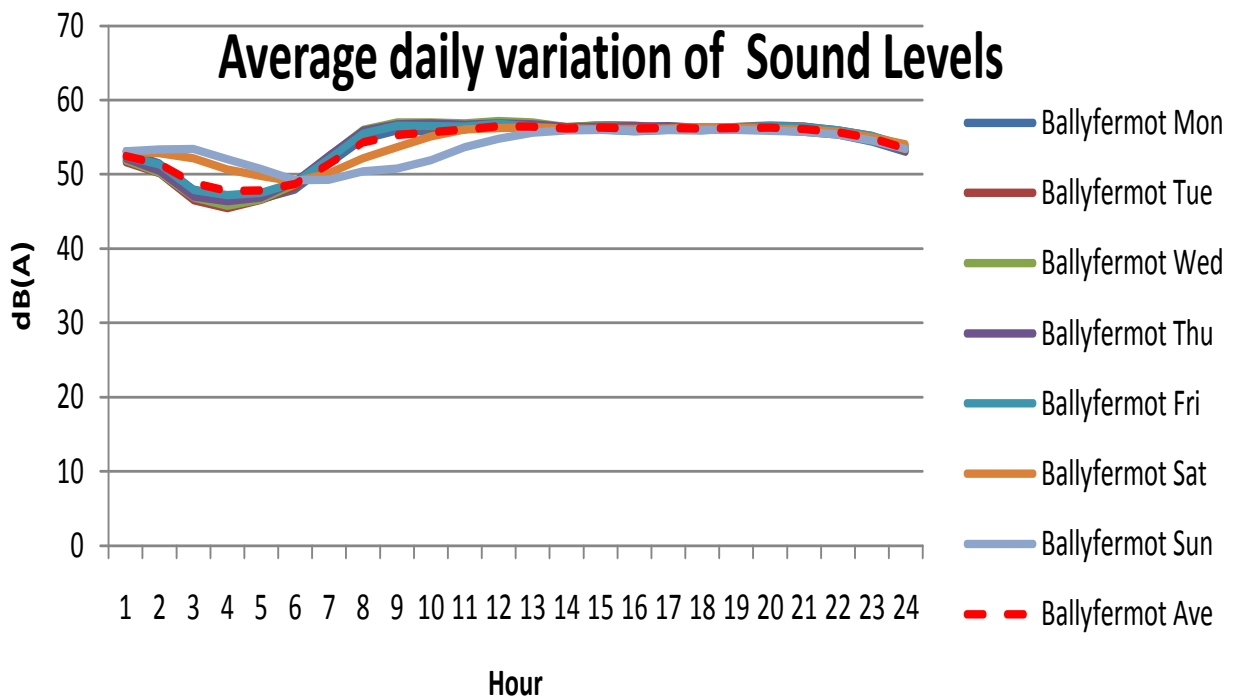
CHAPELOZID



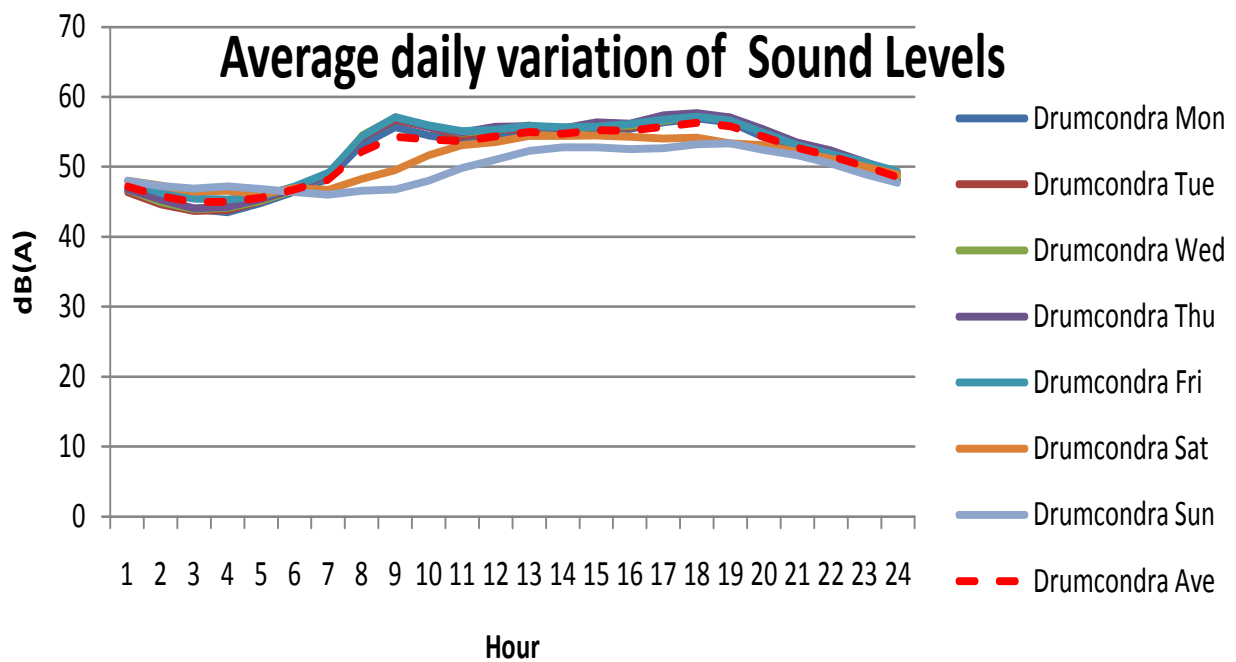
NAVAN RD.



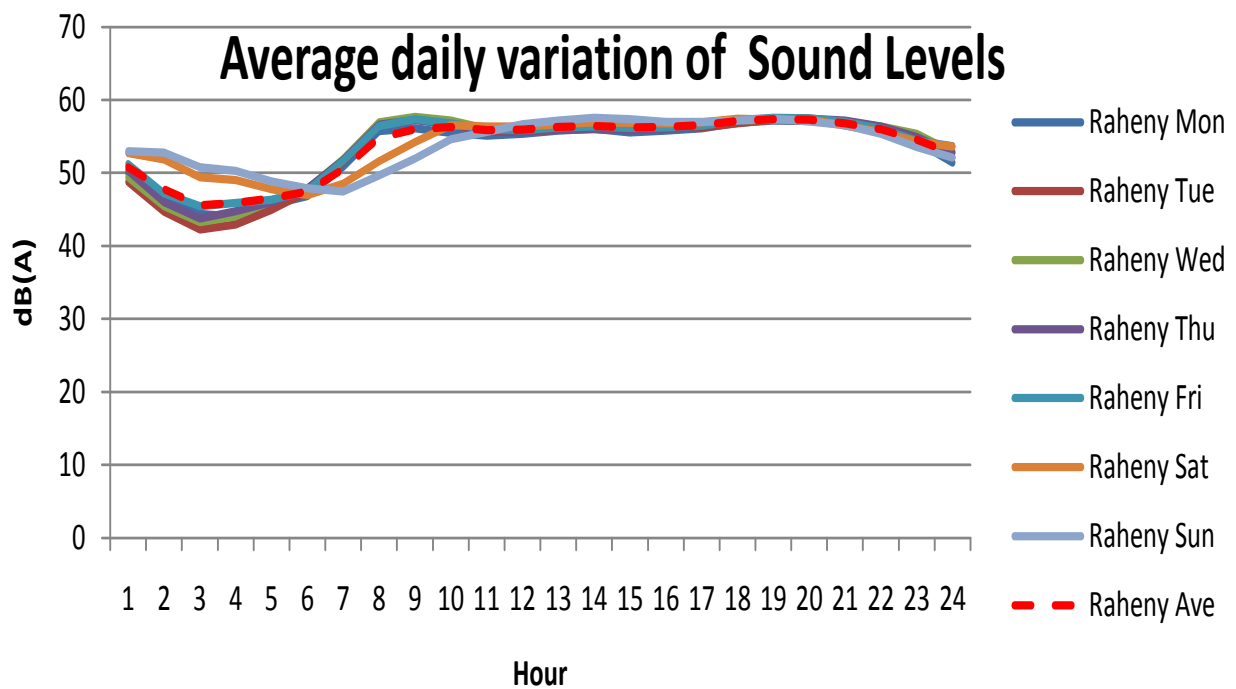
BALLYFERMOT



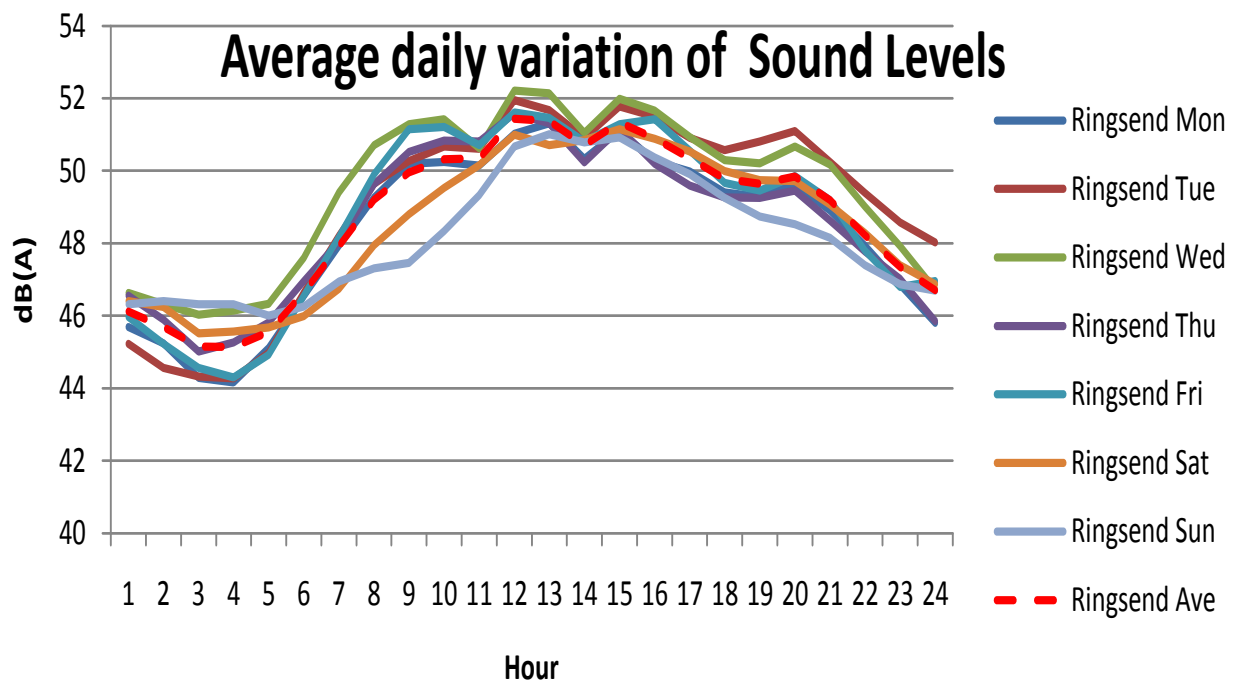
DRUMCONDRA



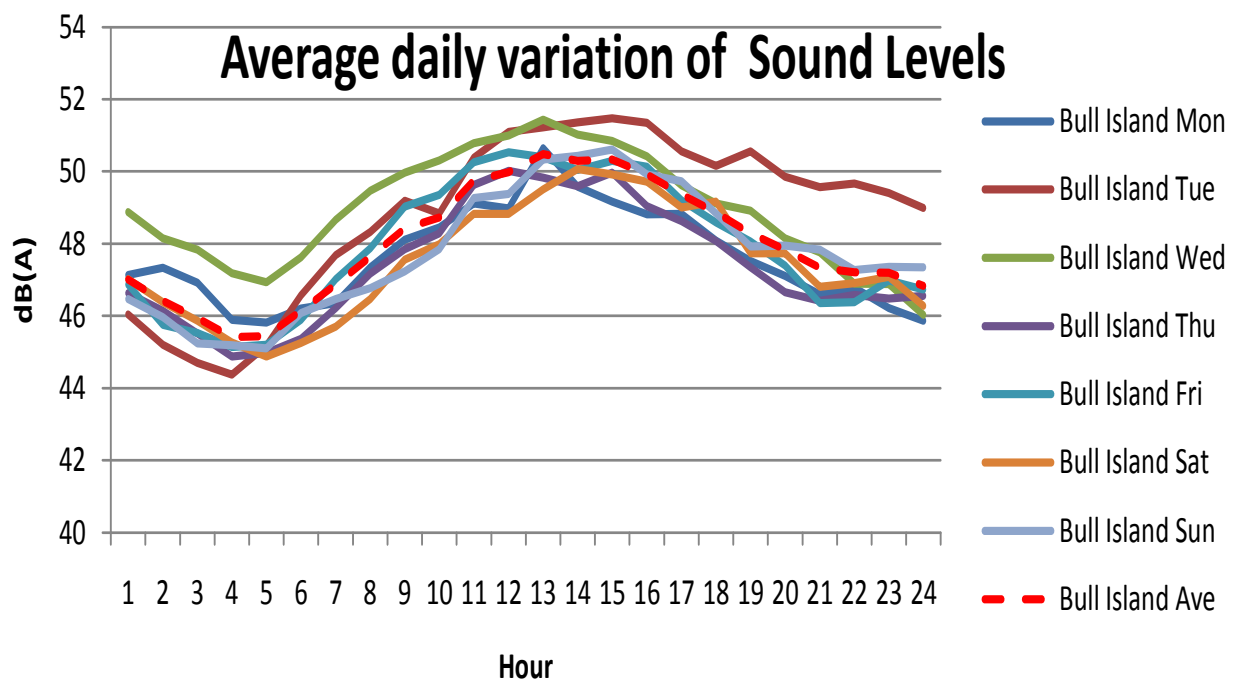
RAHENY



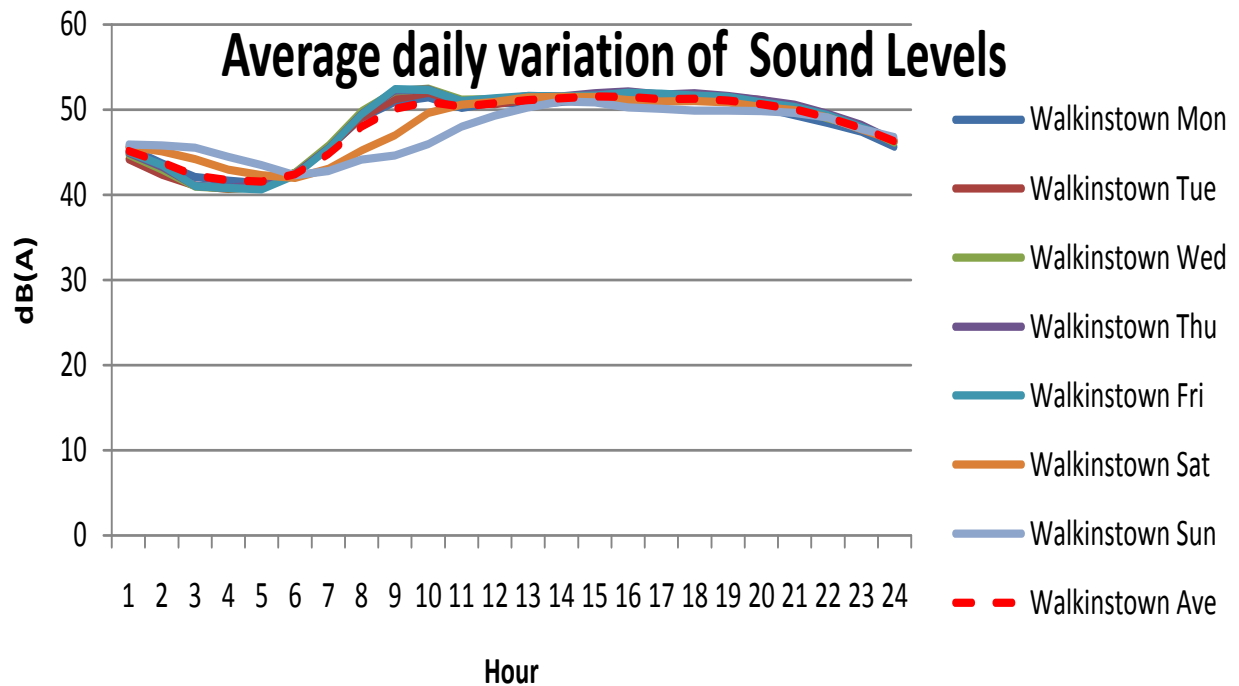
RINGSEND



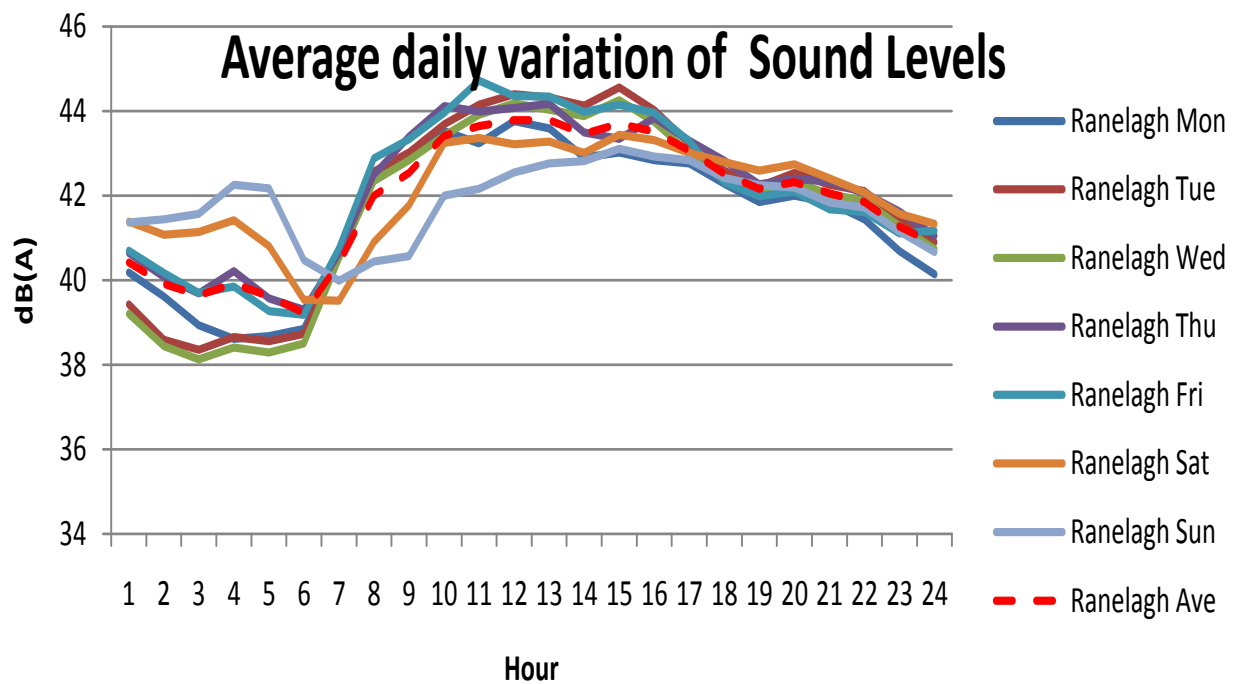
BULL ISLAND



WALKINSTOWN

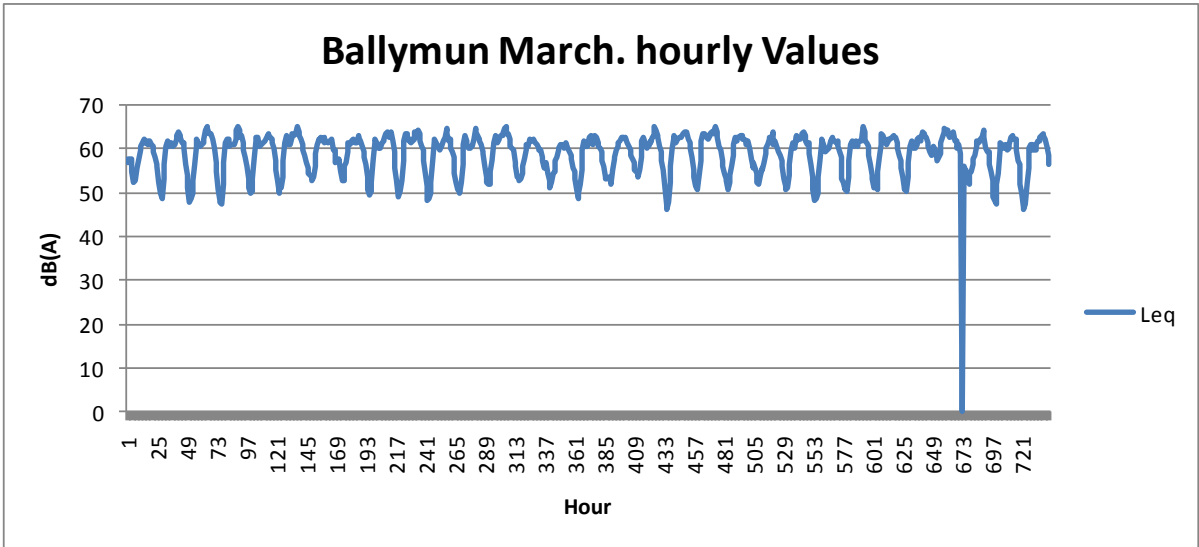
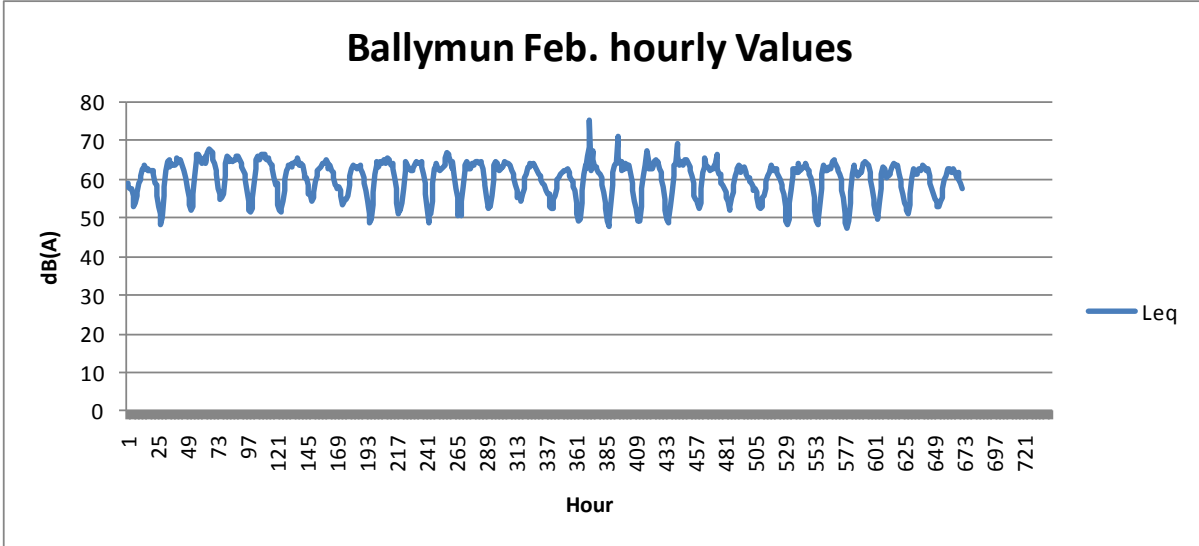
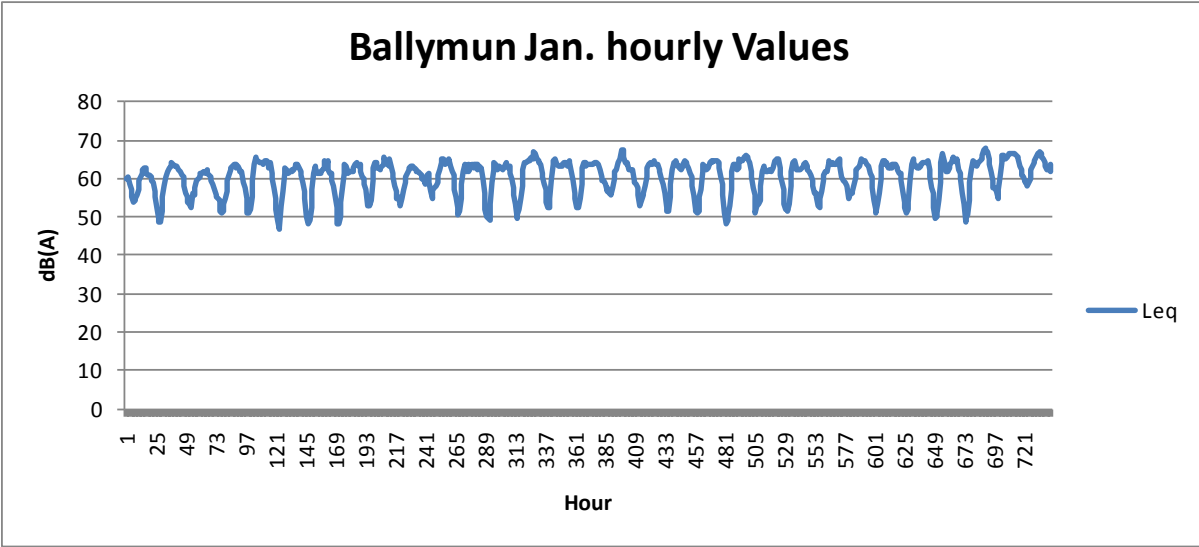


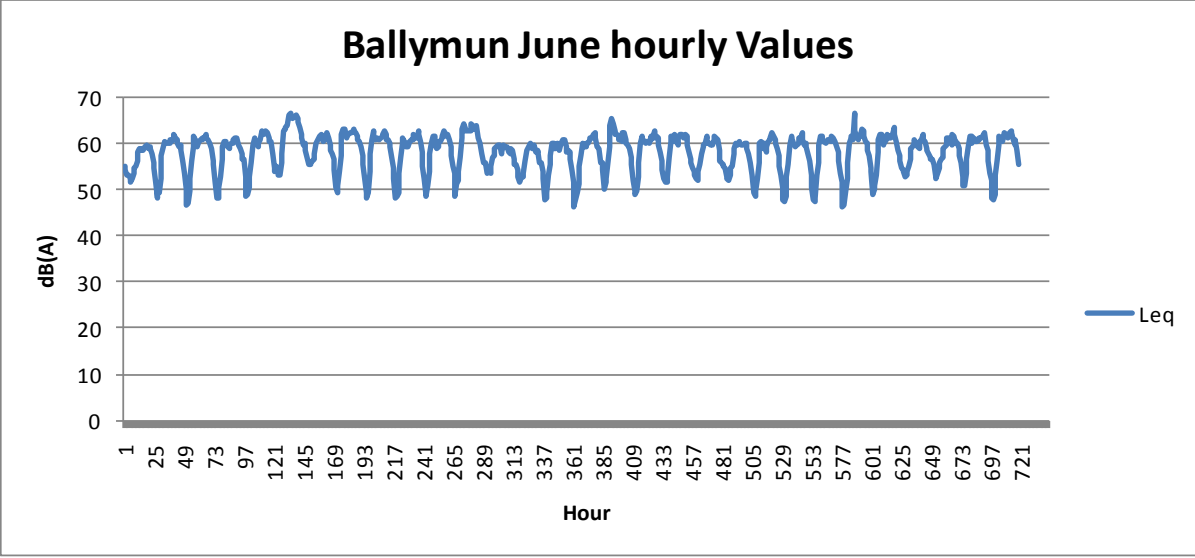
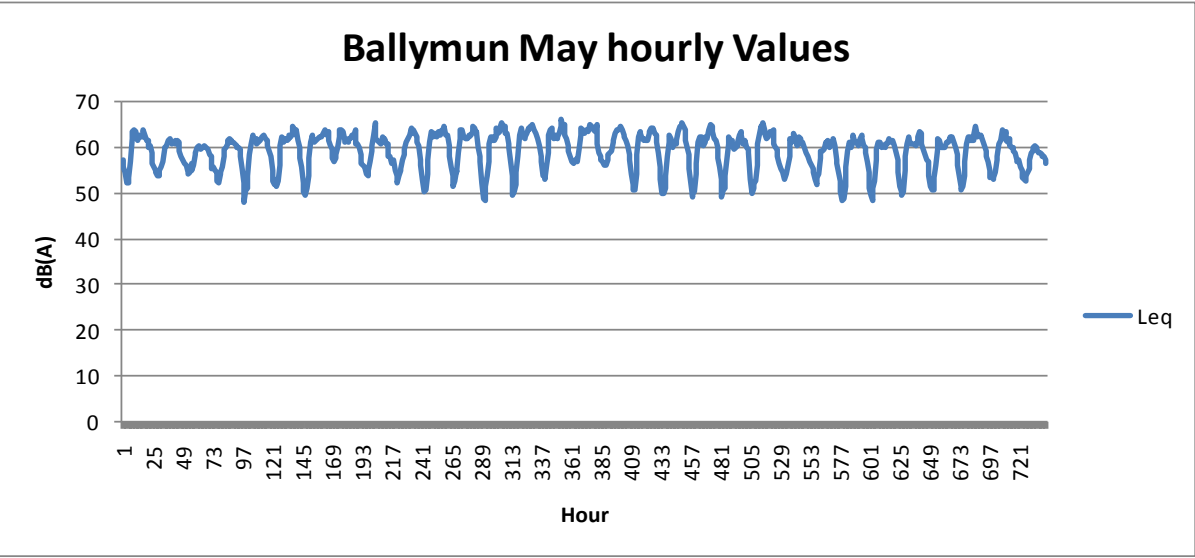
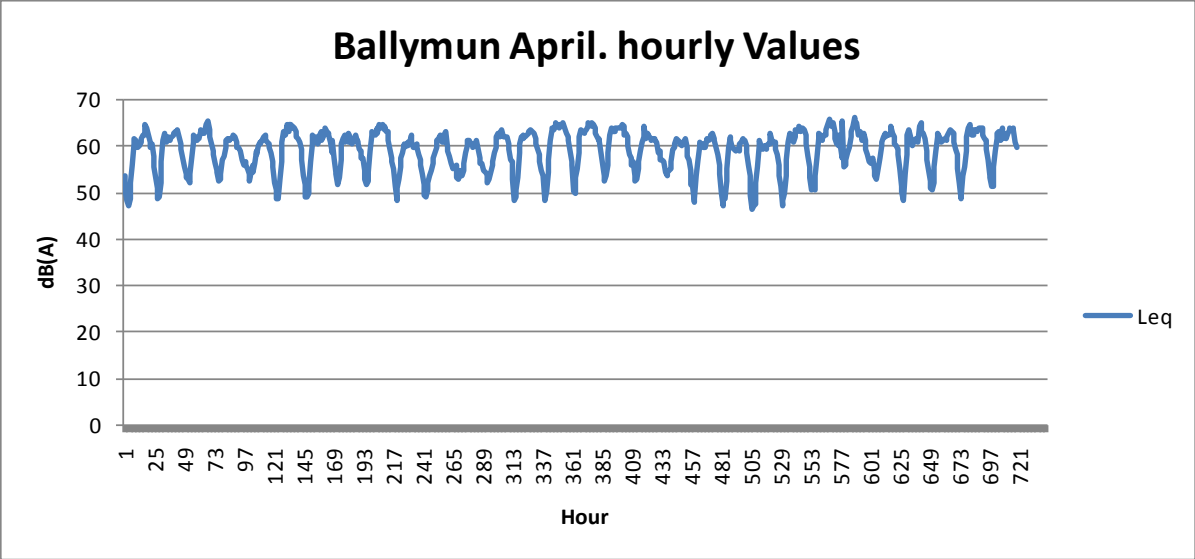
RANELAGH

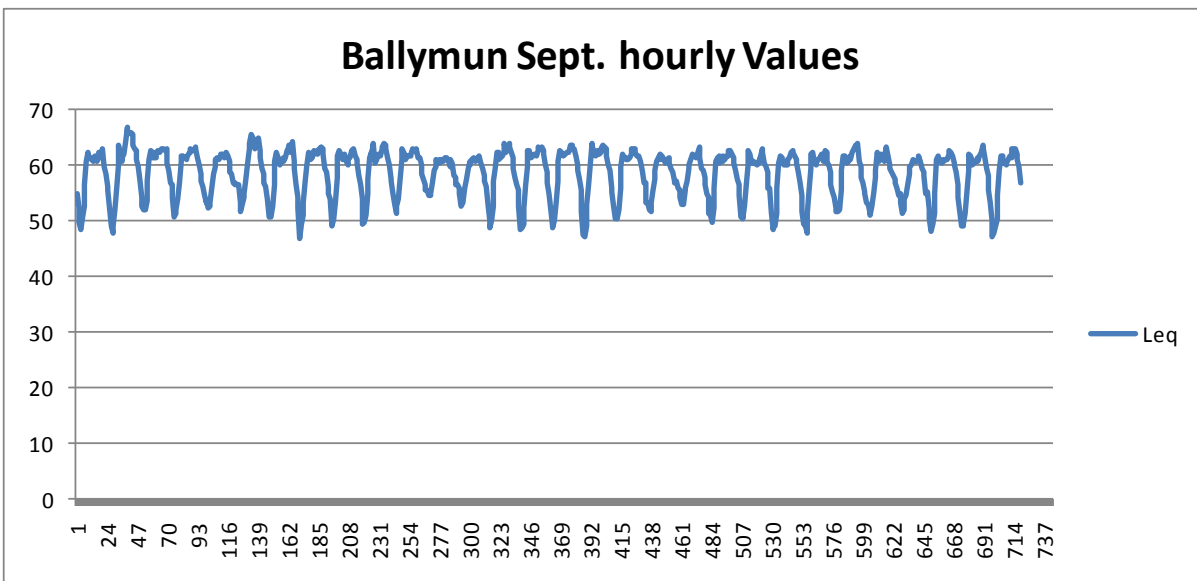
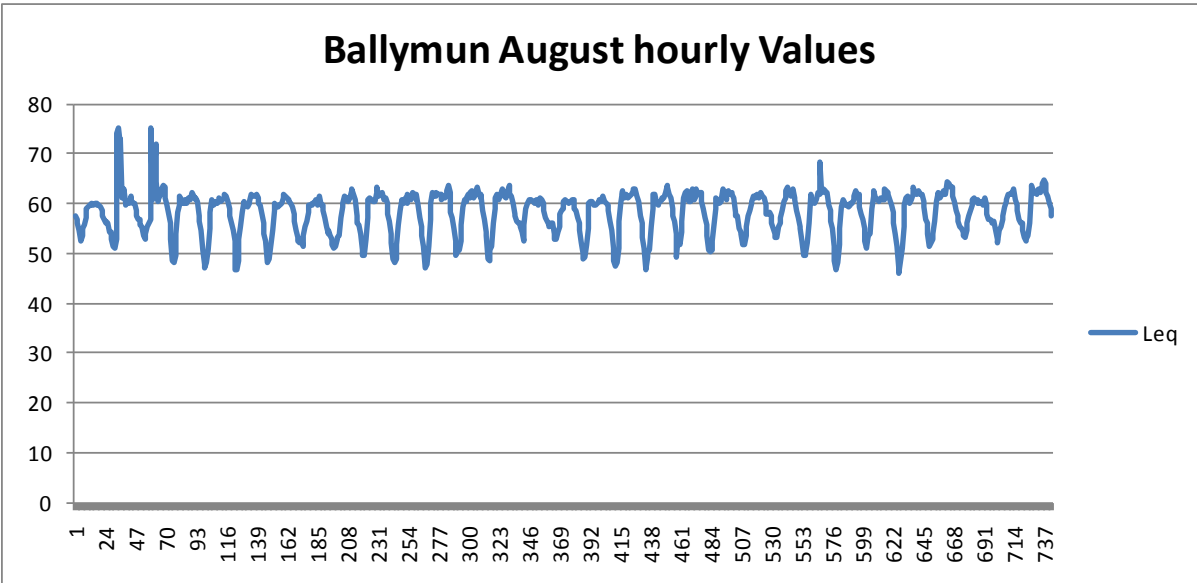
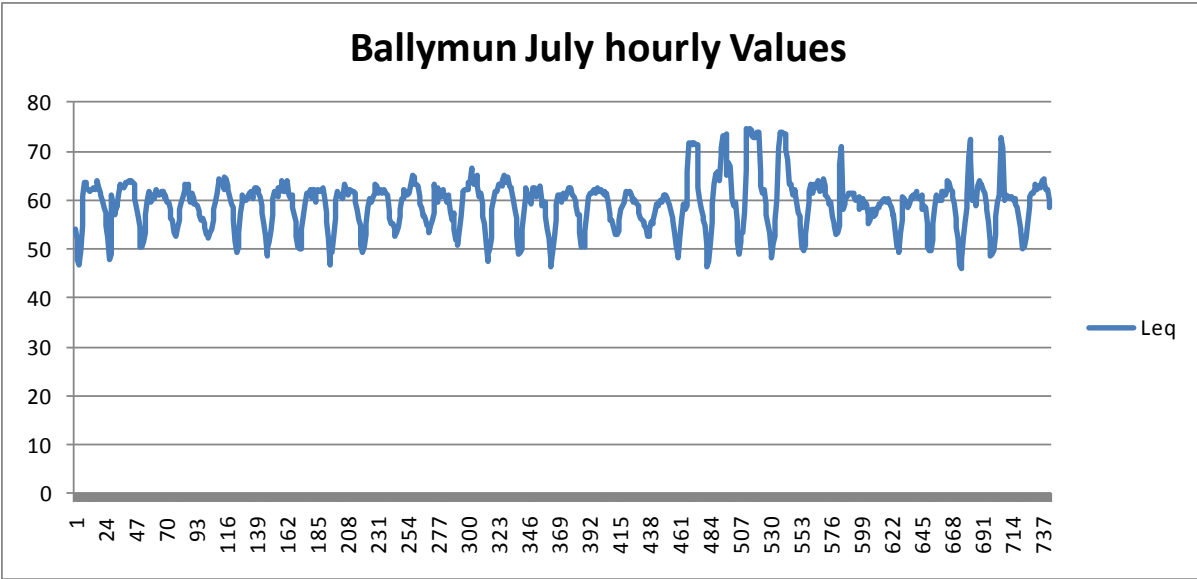


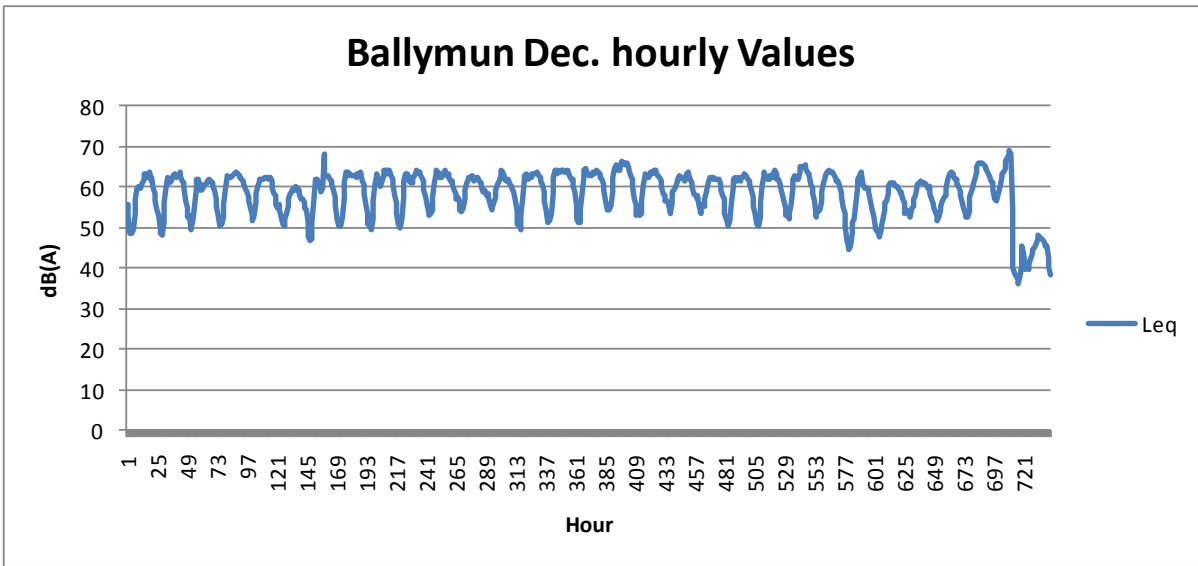
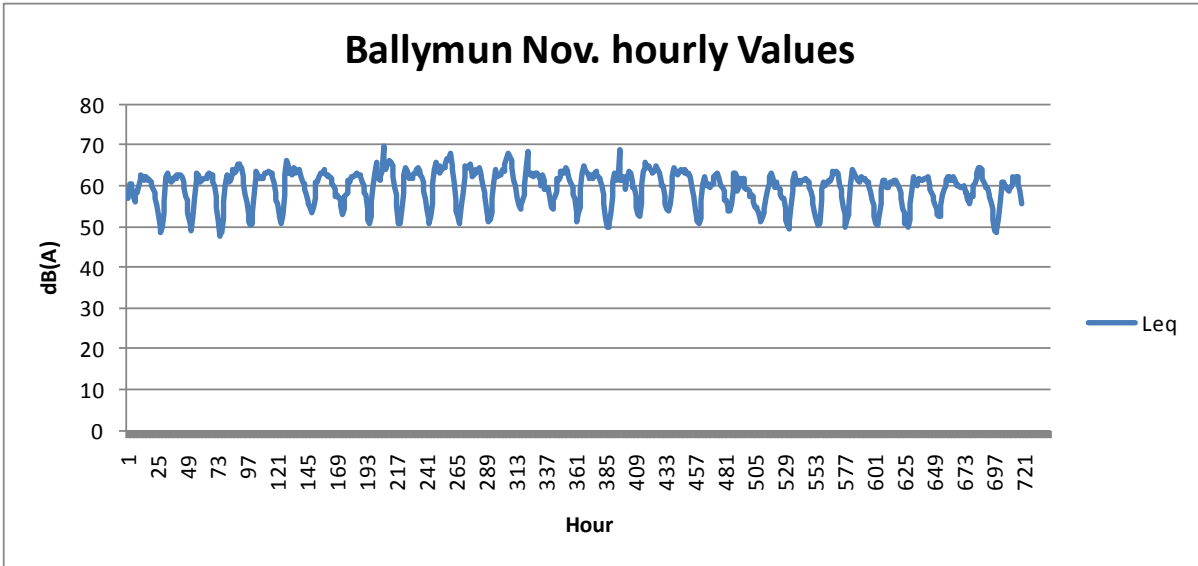
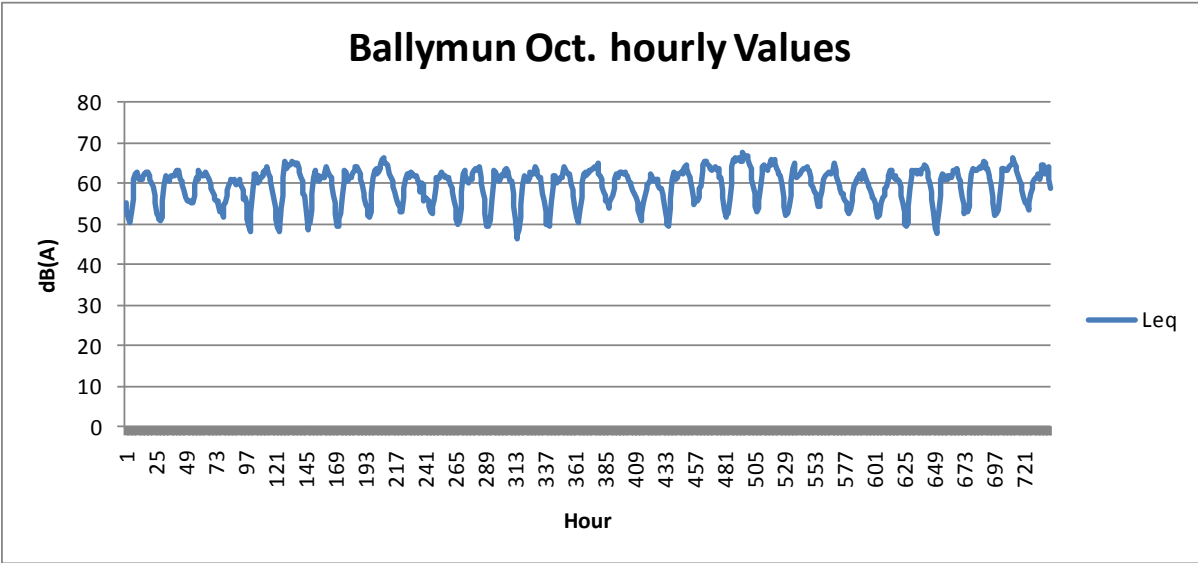
Monthly Summary Charts

**BALLYMUN LIBRARY
BALLYMUN ROAD
DUBLIN 11**

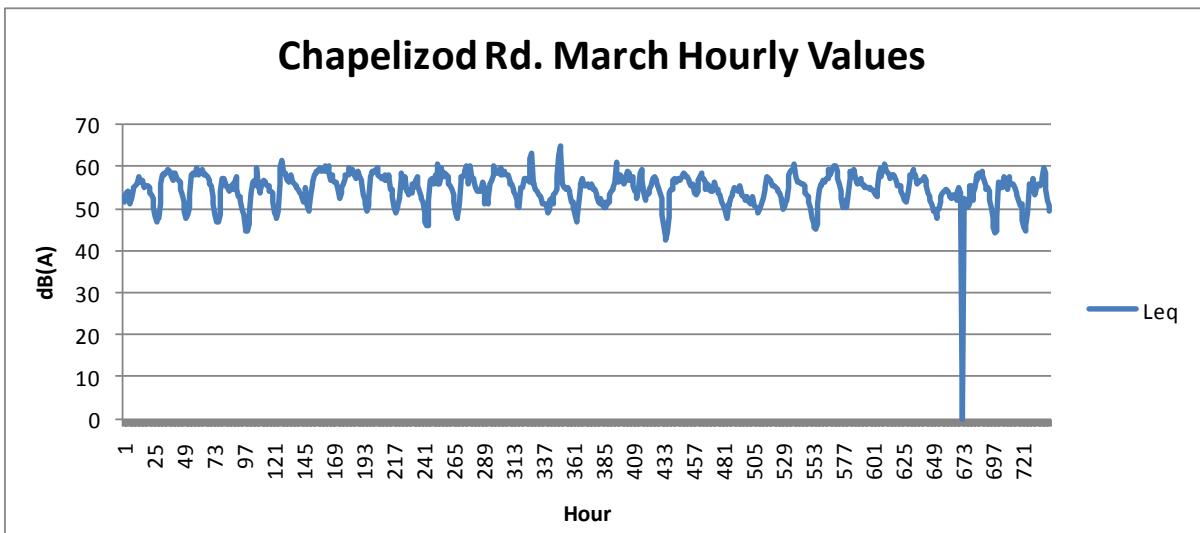
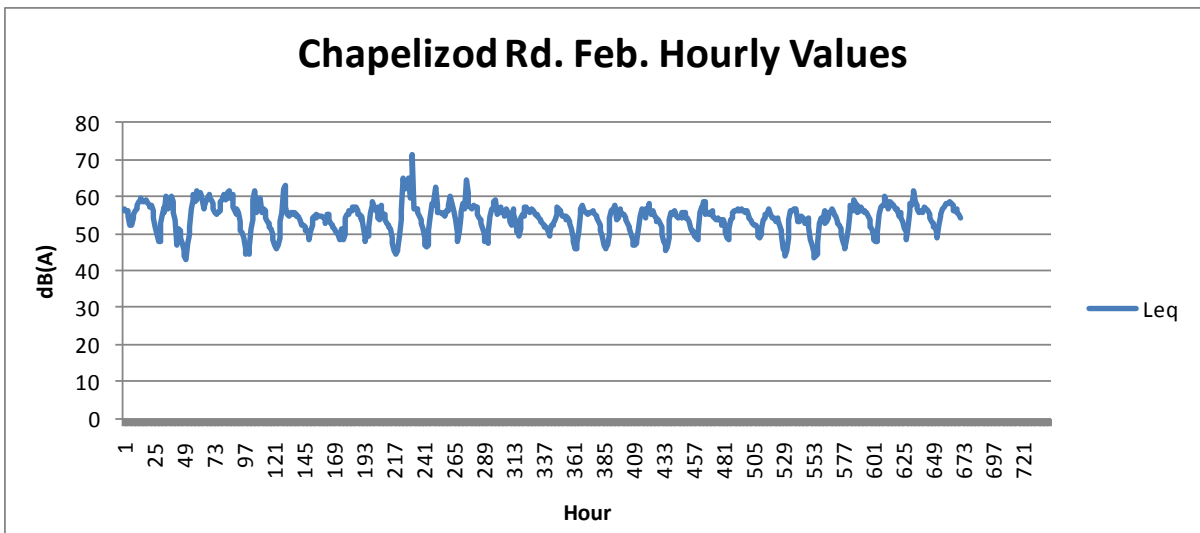
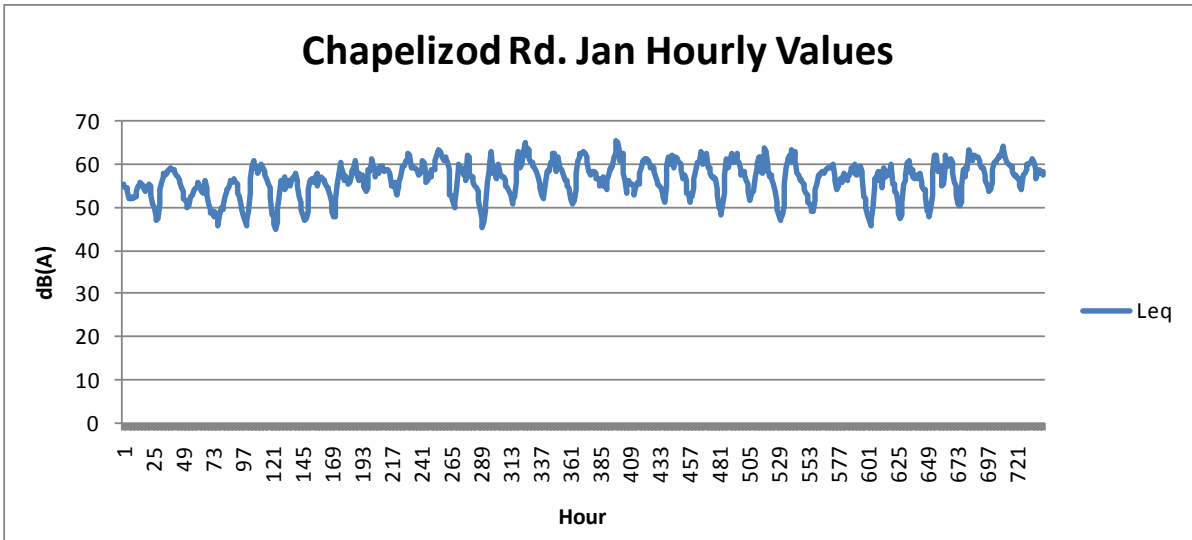




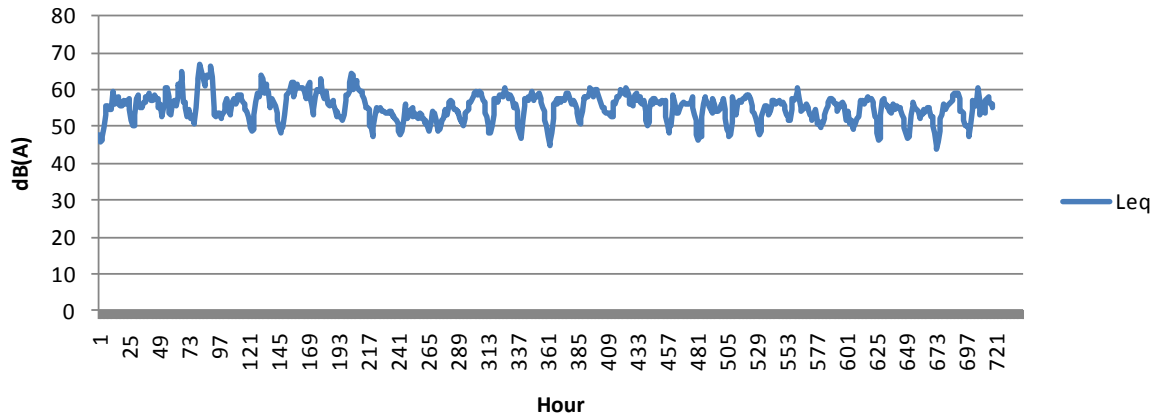




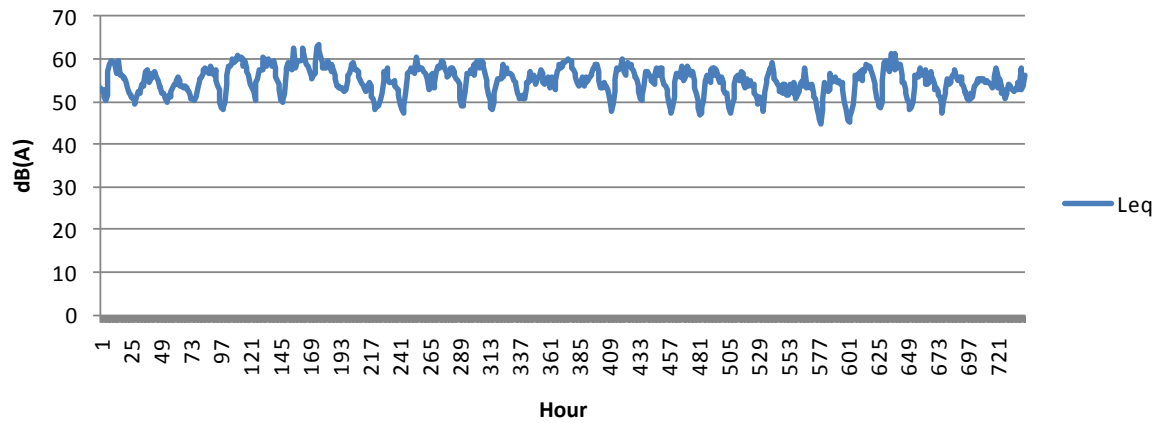
DUBLIN CITY COUNCIL ROWING CLUB
CHAPELIZOD ROAD
DUBLIN 8



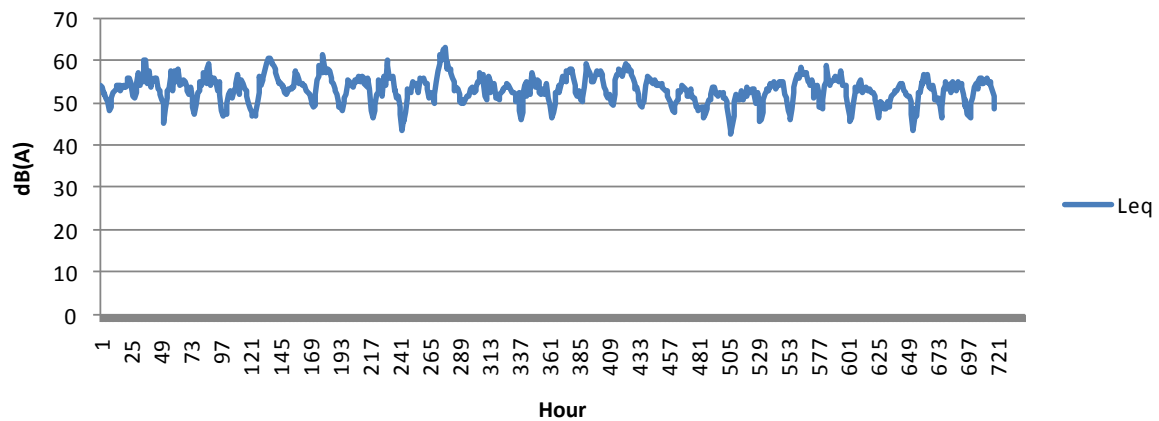
Chapelizod Rd. April Hourly Values



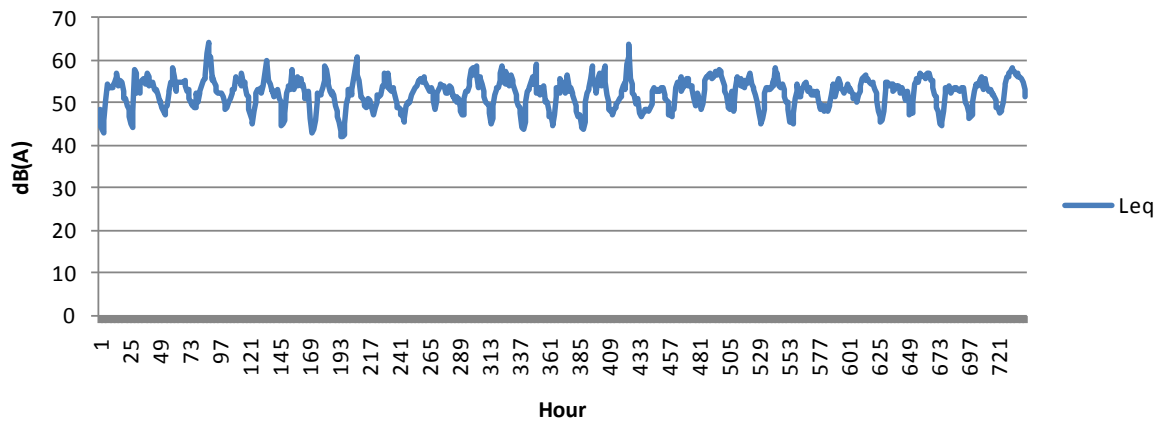
Chapelizod Rd. May Hourly Values



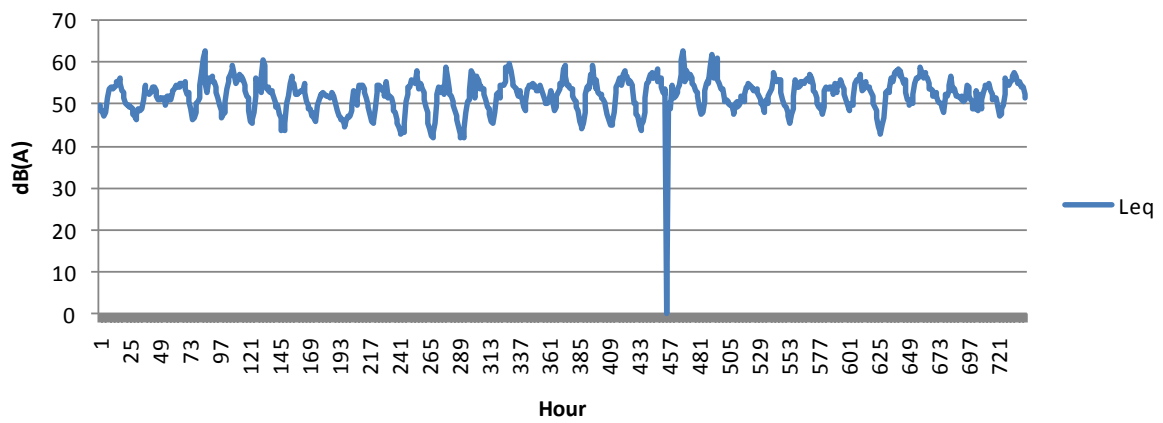
Chapelizod Rd. June Hourly Values



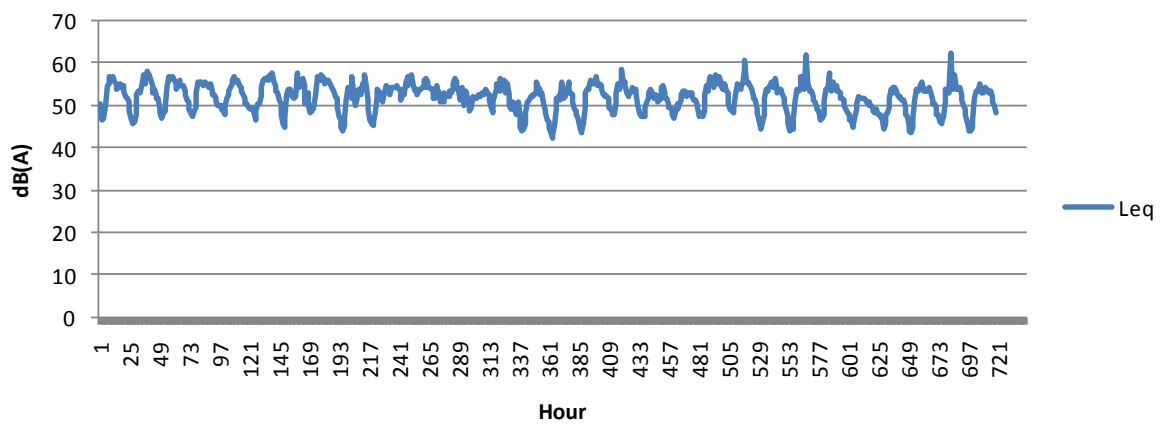
Chapelizod Rd. July Hourly Values



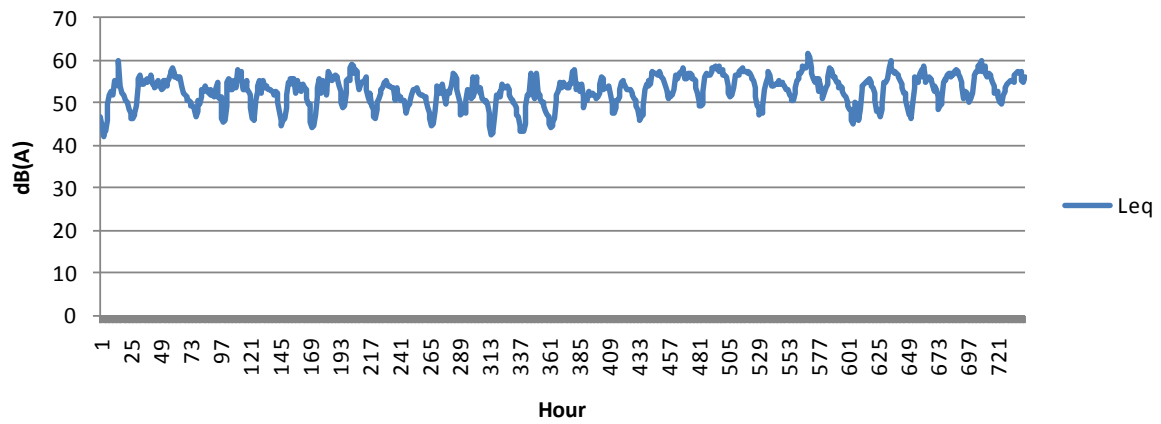
Chapelizod Rd. August Hourly Values



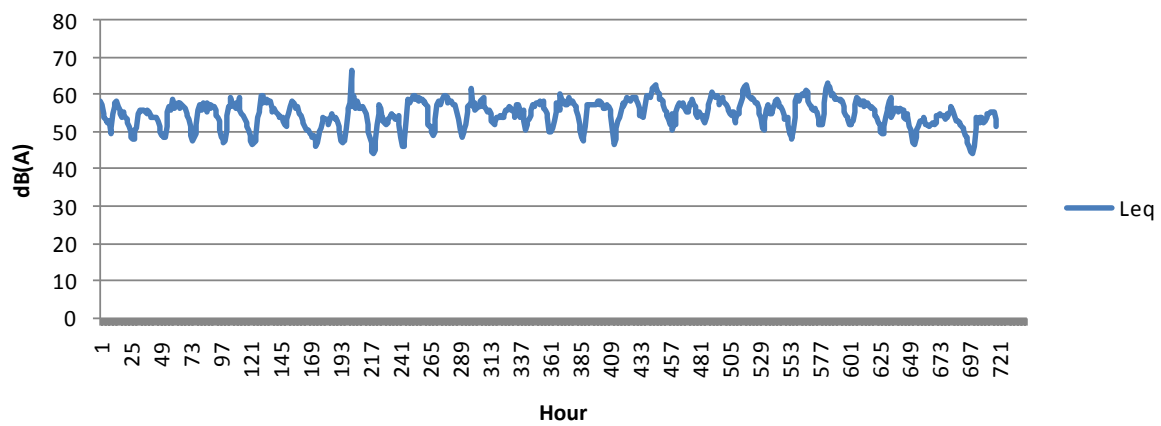
Chapelizod Rd. Sept. Hourly Values



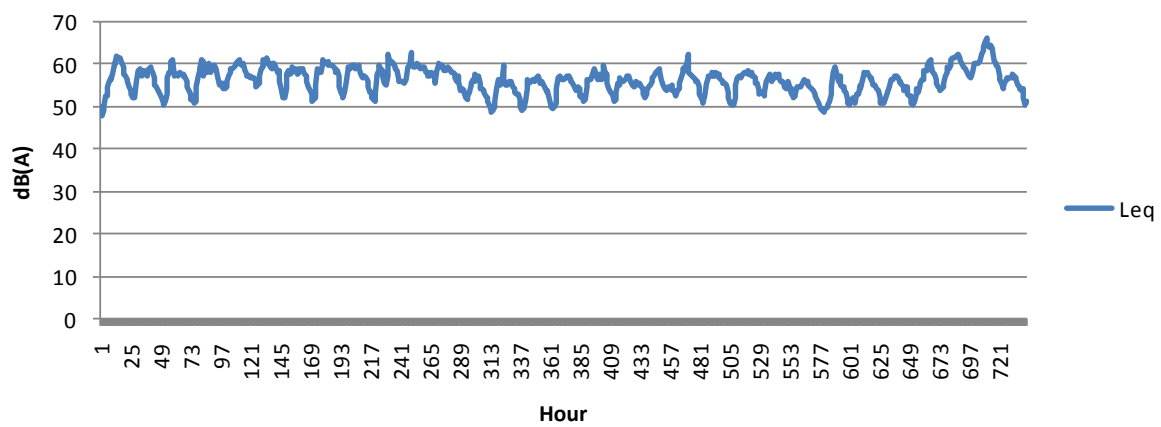
Chapelizod Rd. Oct. Hourly Values



Chapelizod Rd. Nov. Hourly Values

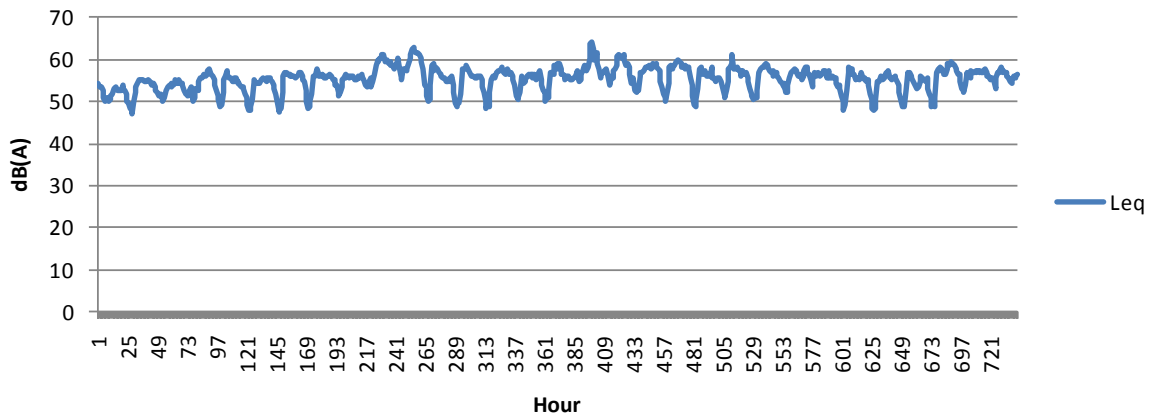


Chapelizod Rd. Dec. Hourly Values

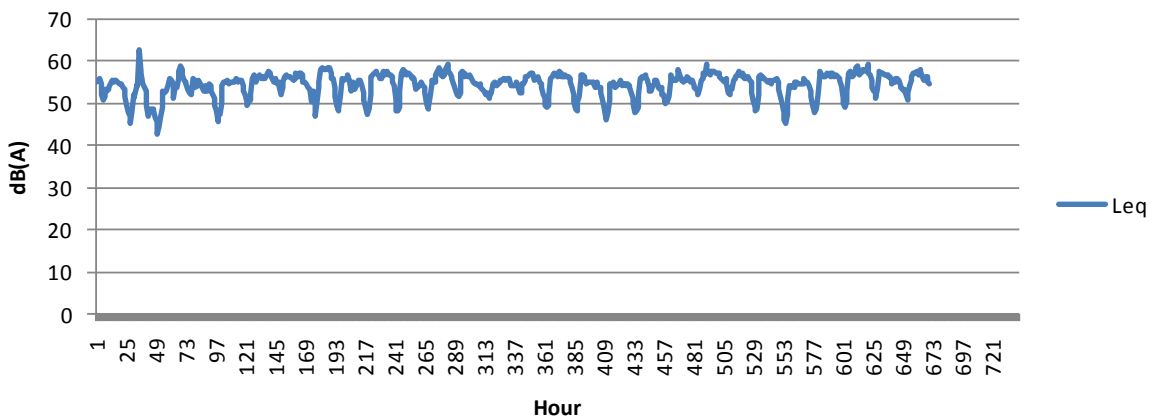


**ASHTOWN GROVE
NAVAN ROAD
DUBLIN 7**

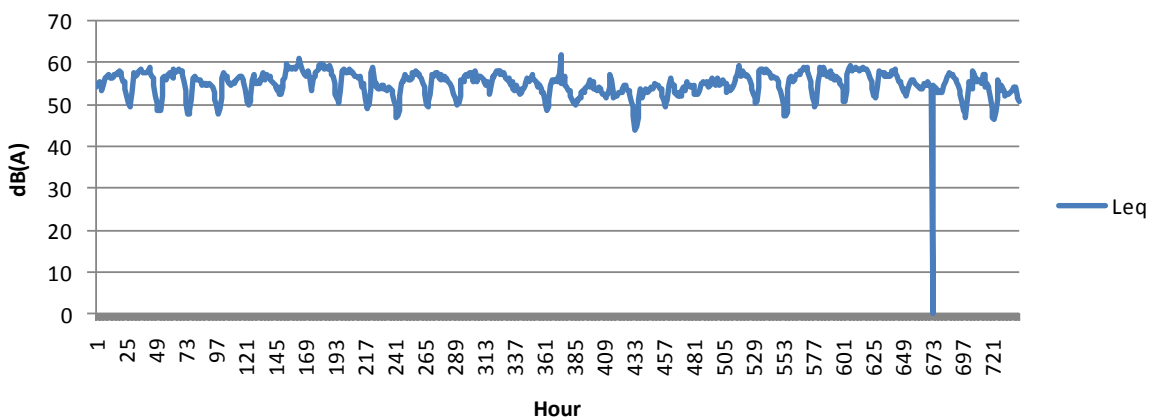
Navan Rd. Jan. Hourly values



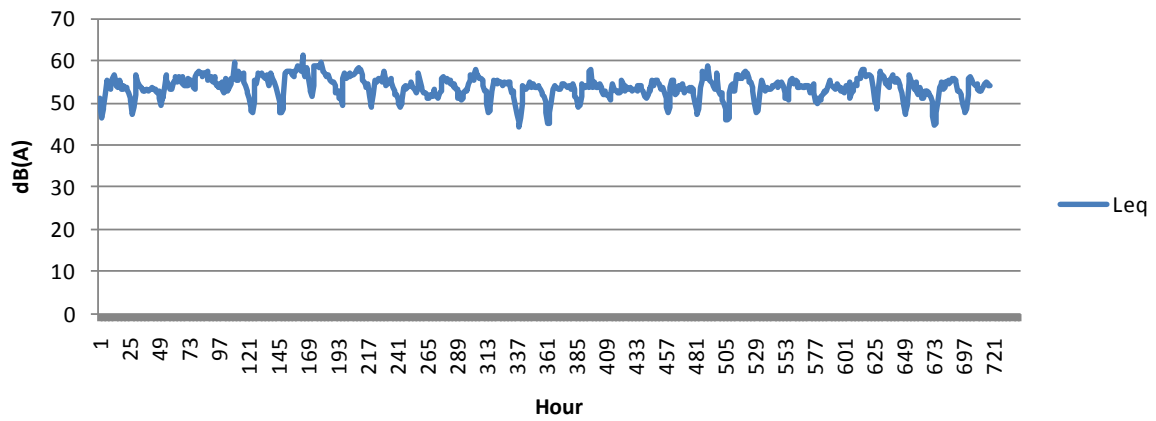
Navan Rd. Feb. Hourly values



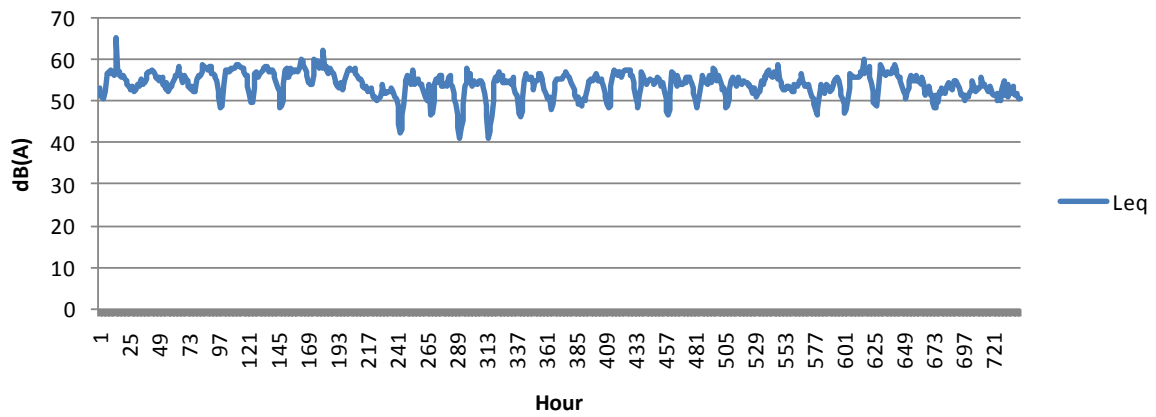
Navan Rd. March. Hourly values



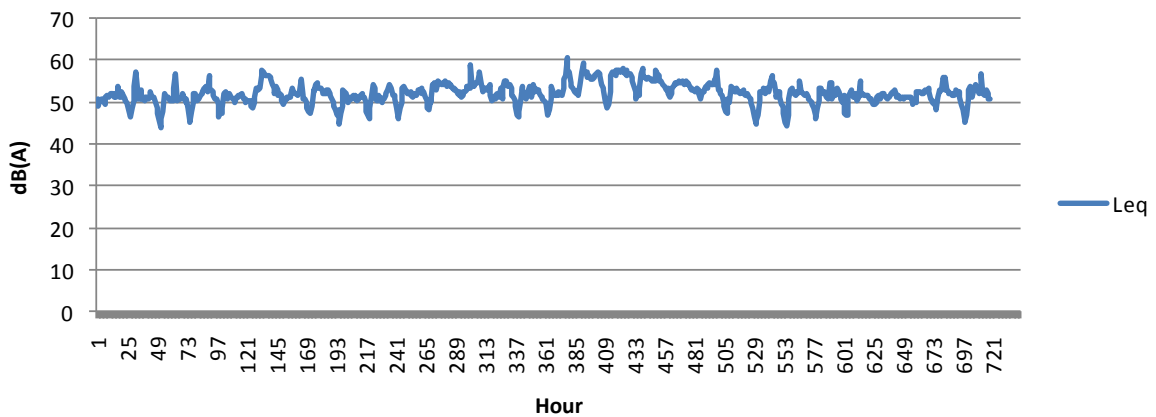
Navan Rd. April. Hourly values

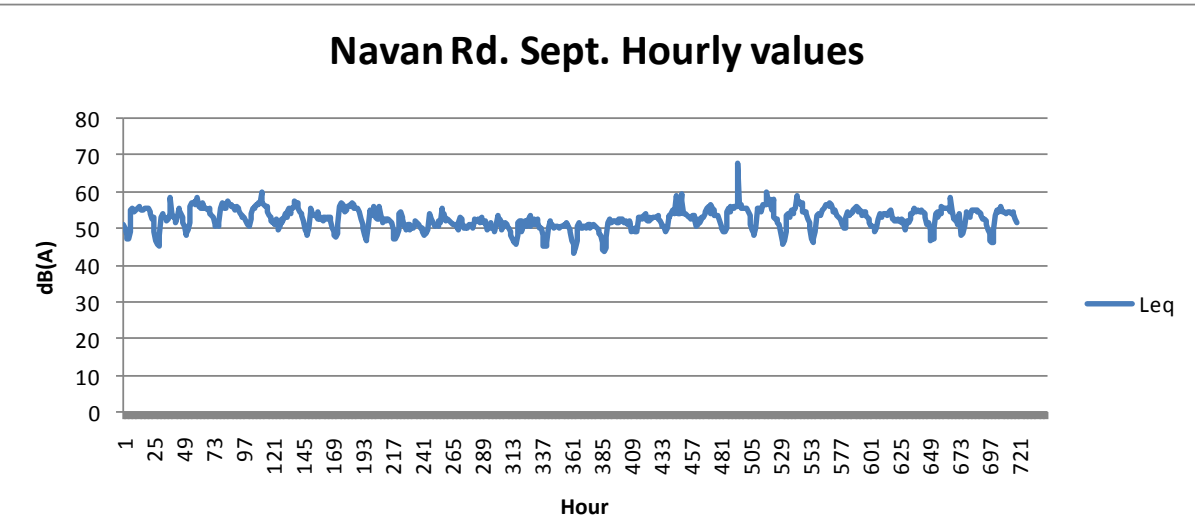
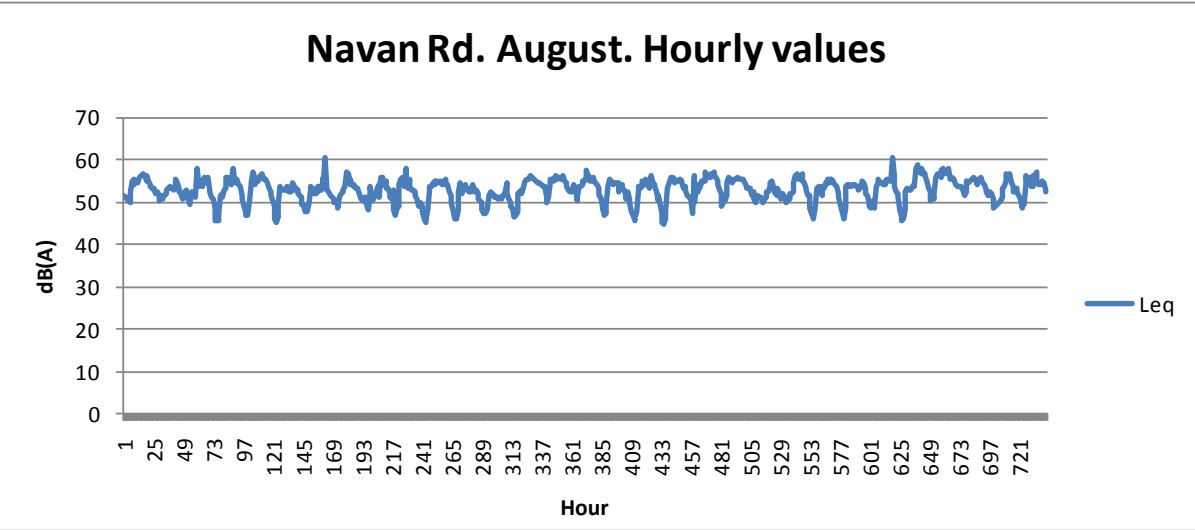
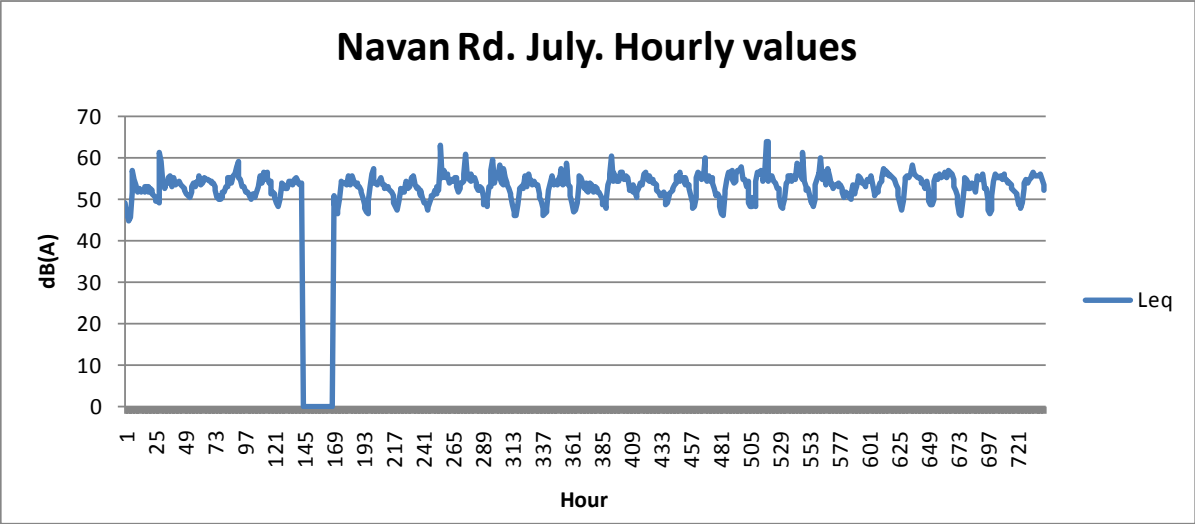


Navan Rd. May. Hourly values

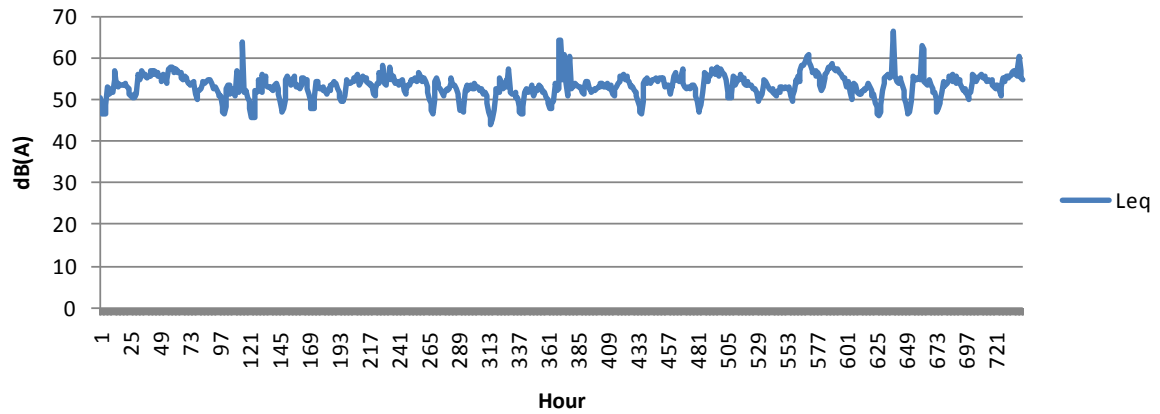


Navan Rd. June. Hourly values

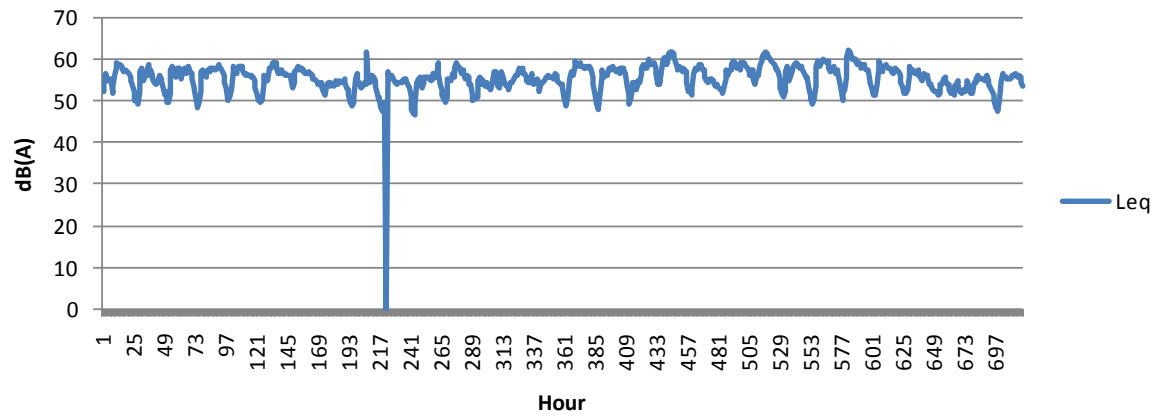




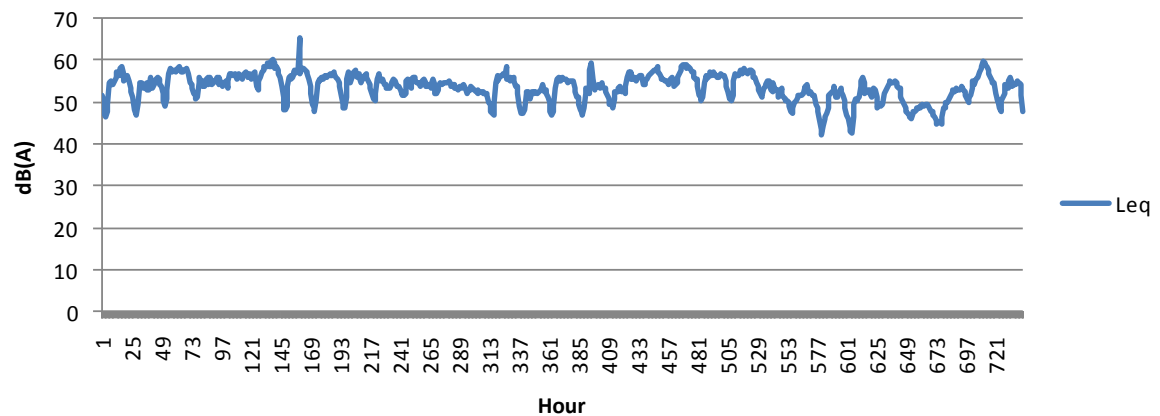
Navan Rd. Oct. Hourly values



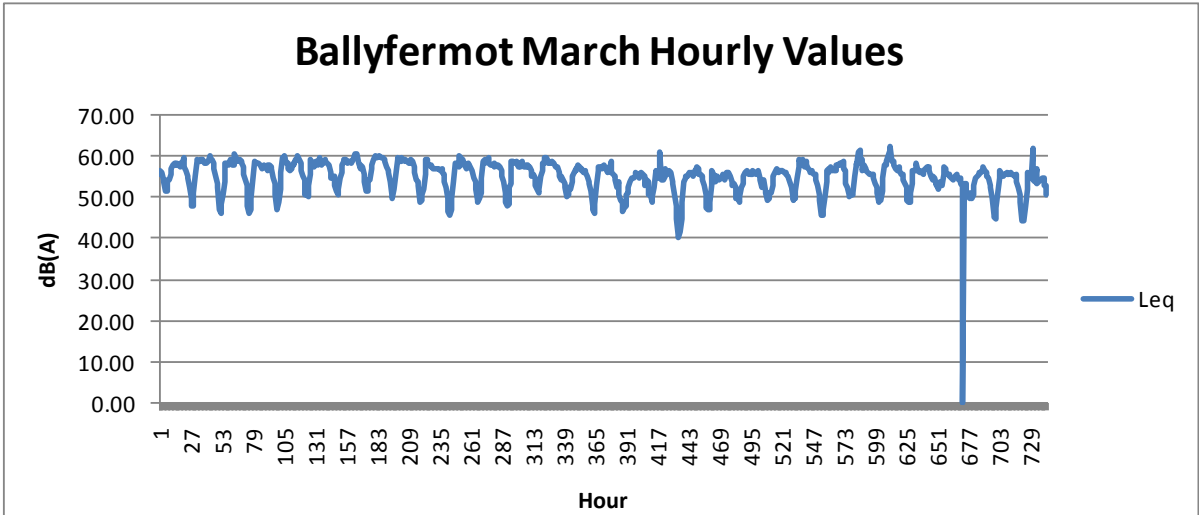
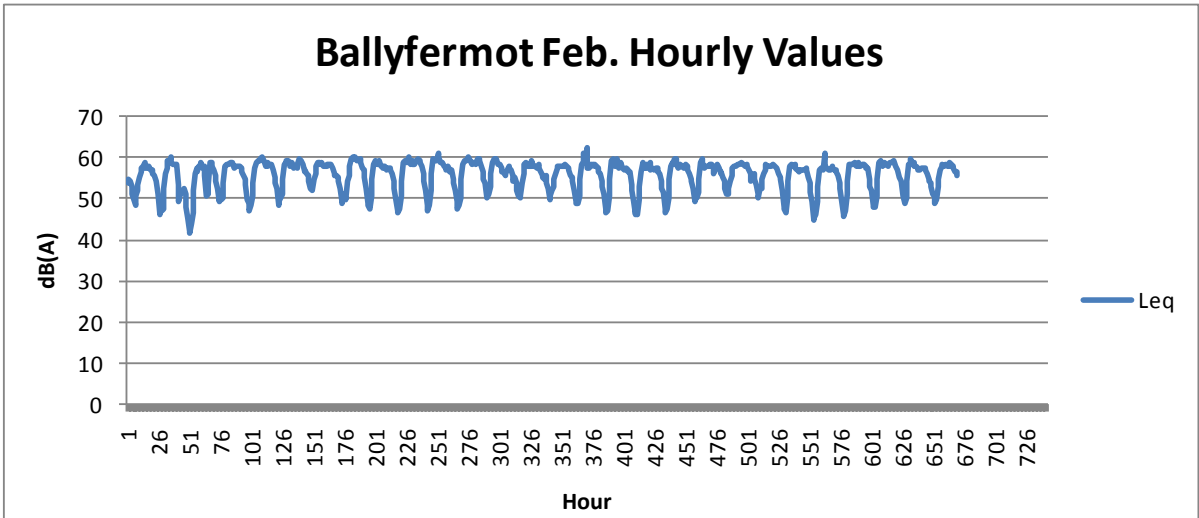
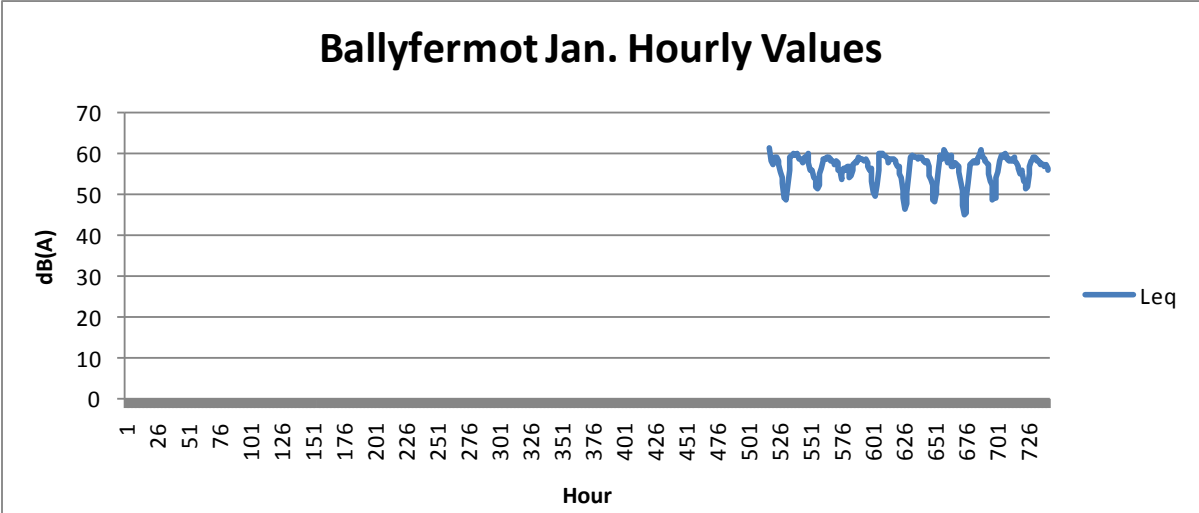
Navan Rd. Nov. Hourly values



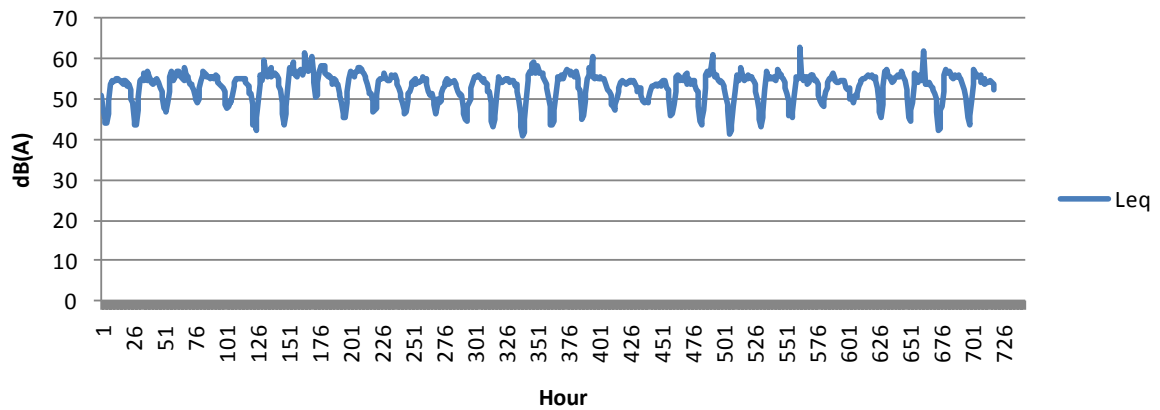
Navan Rd. Dec. Hourly values



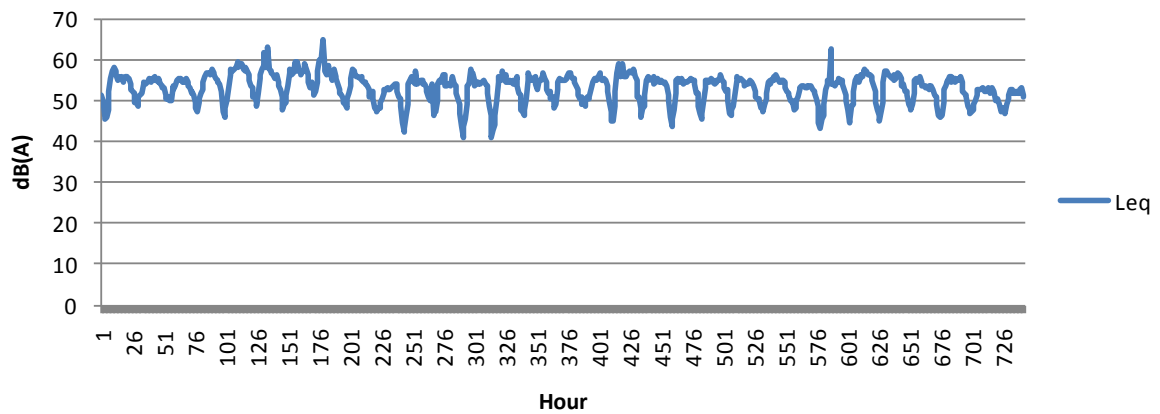
**BALLYFERMOT CIVIC CENTRE
BALLYFERMOT ROAD
DUBLIN 10**



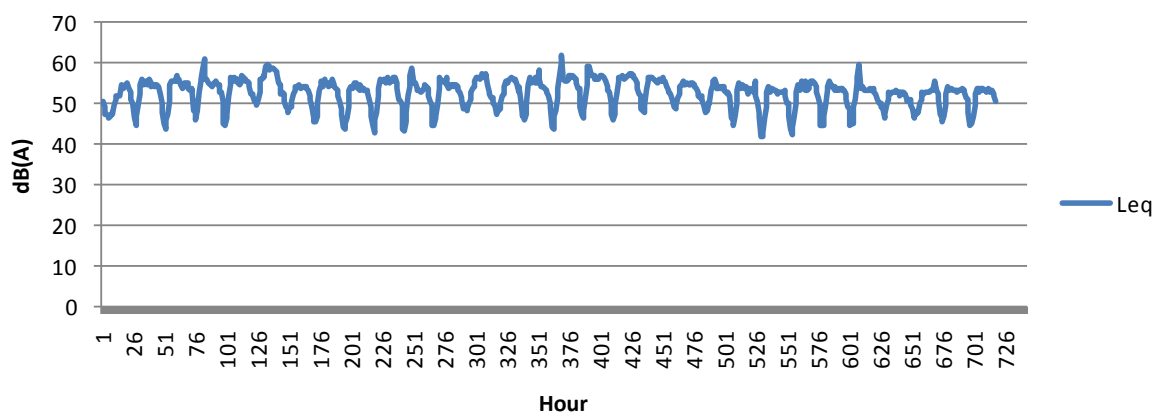
Ballyfermot April Hourly Values



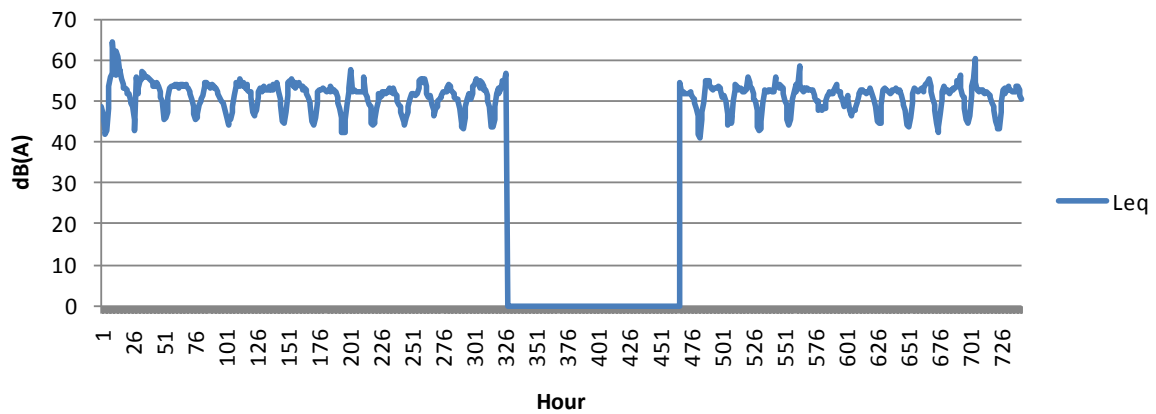
Ballyfermot May Hourly Values



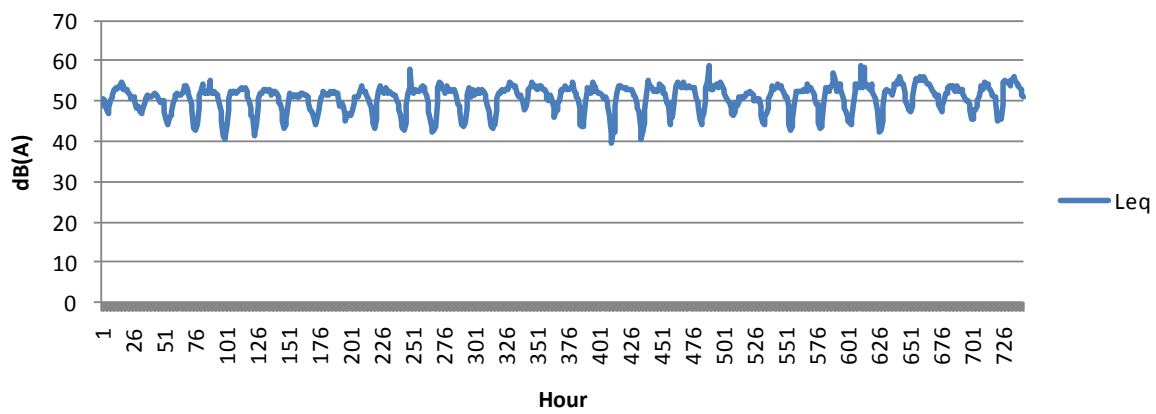
Ballyfermot June Hourly Values



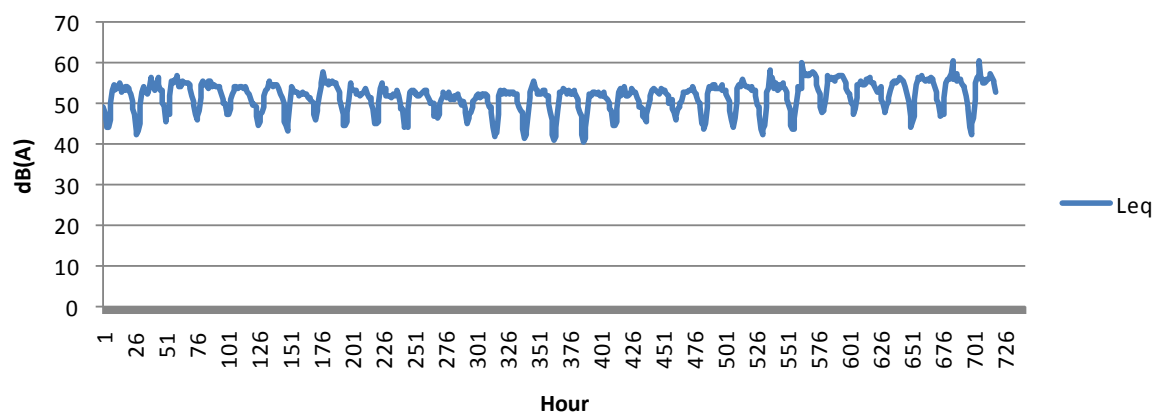
Ballyfermot July Hourly Values

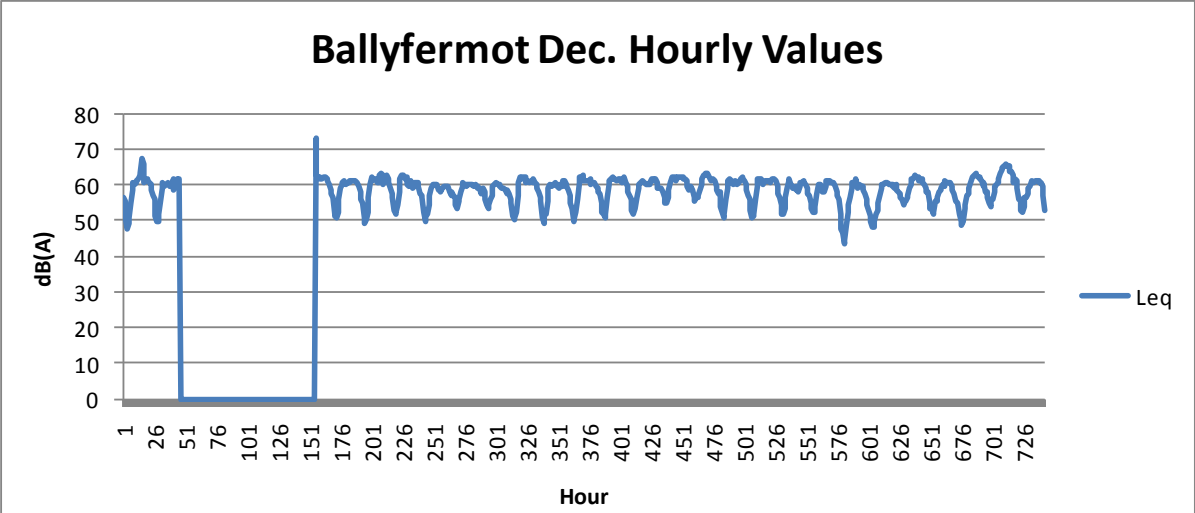
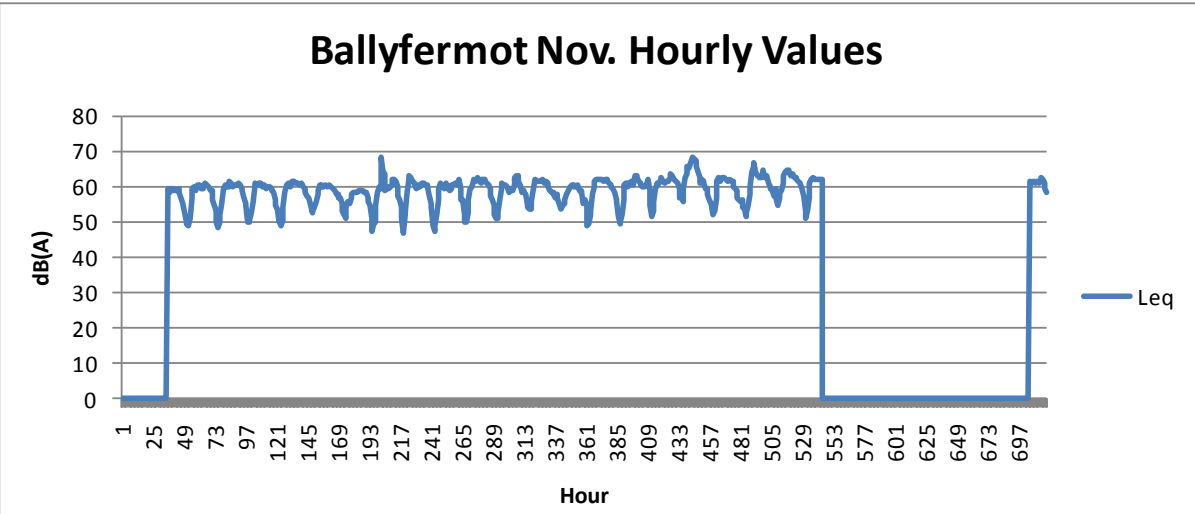
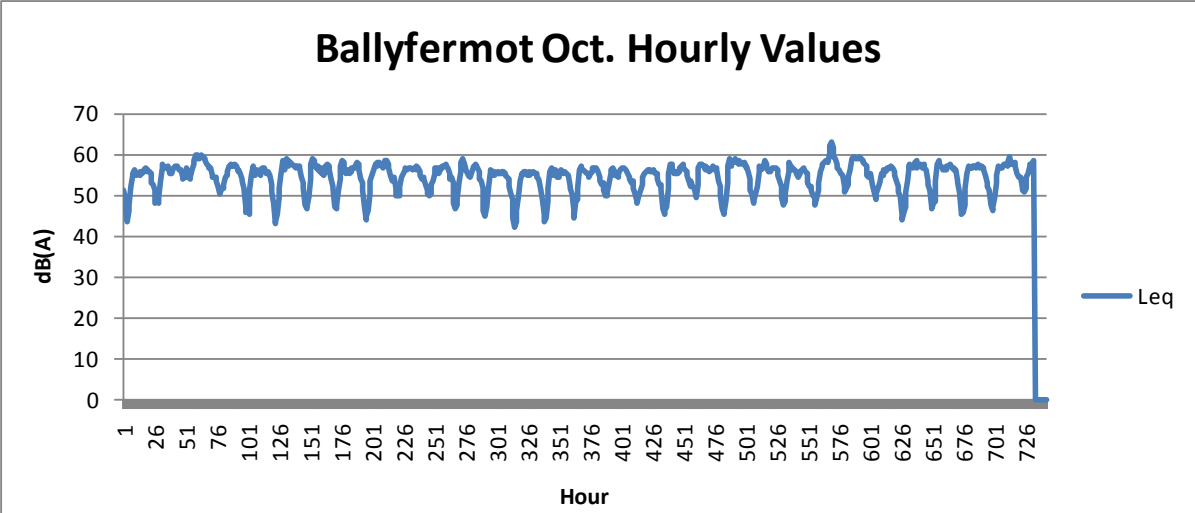


Ballyfermot August Hourly Values

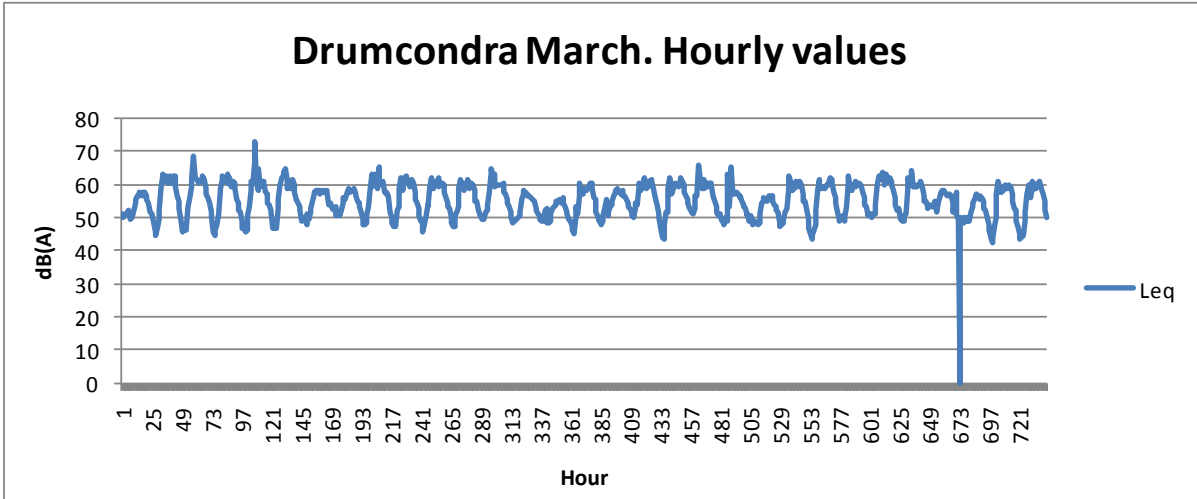
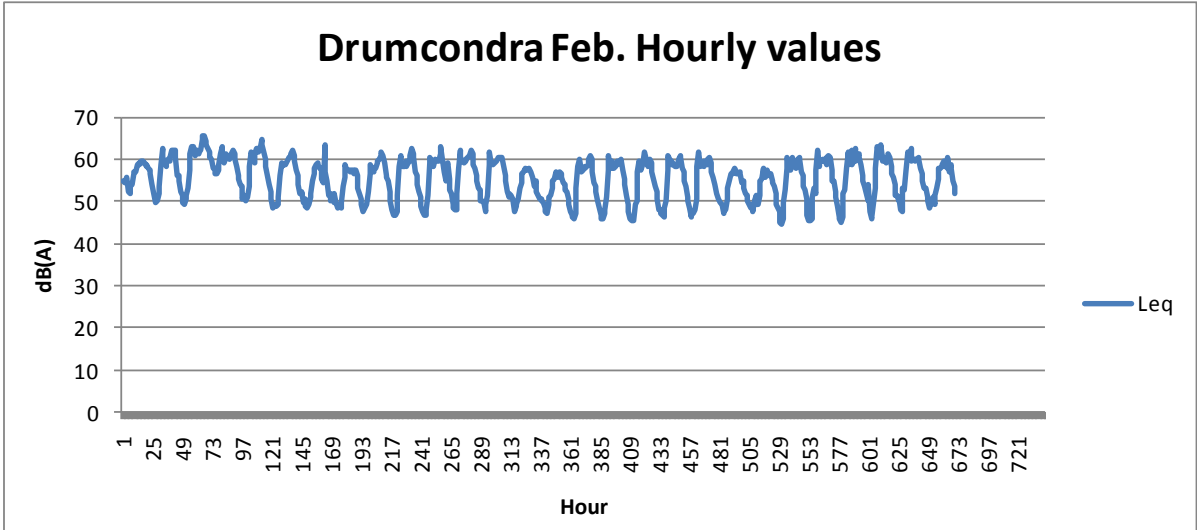
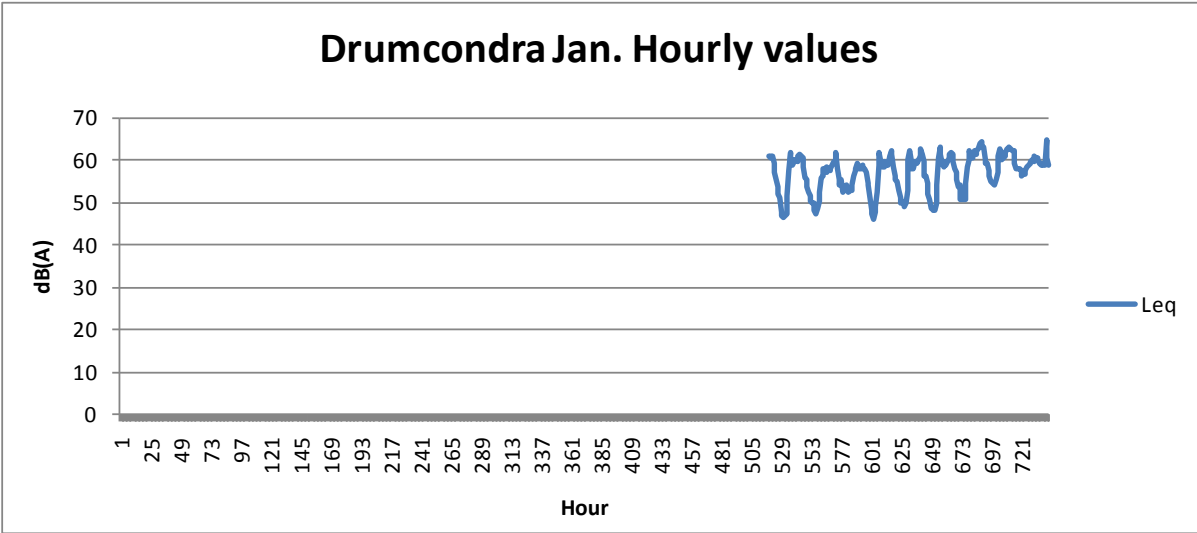


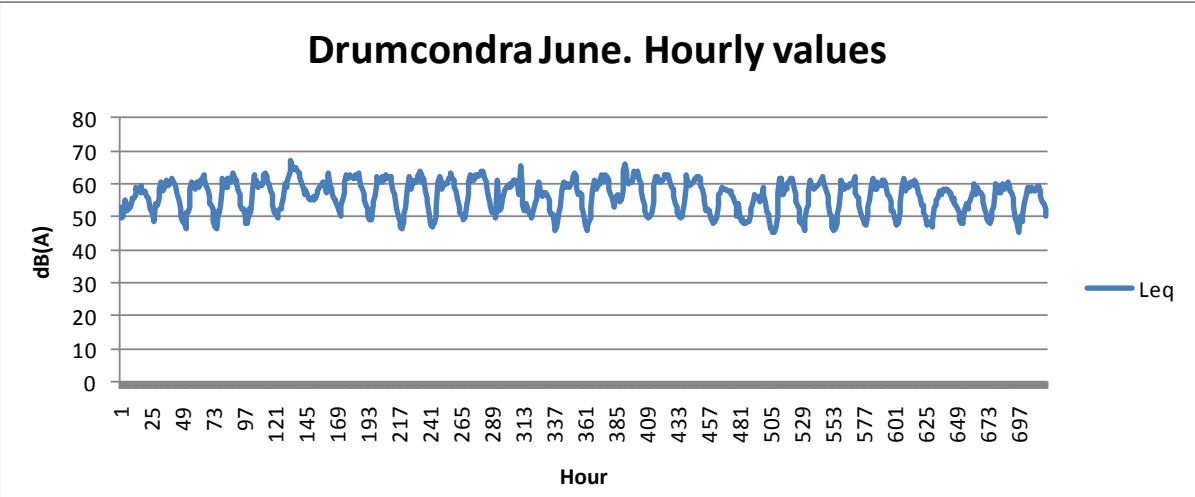
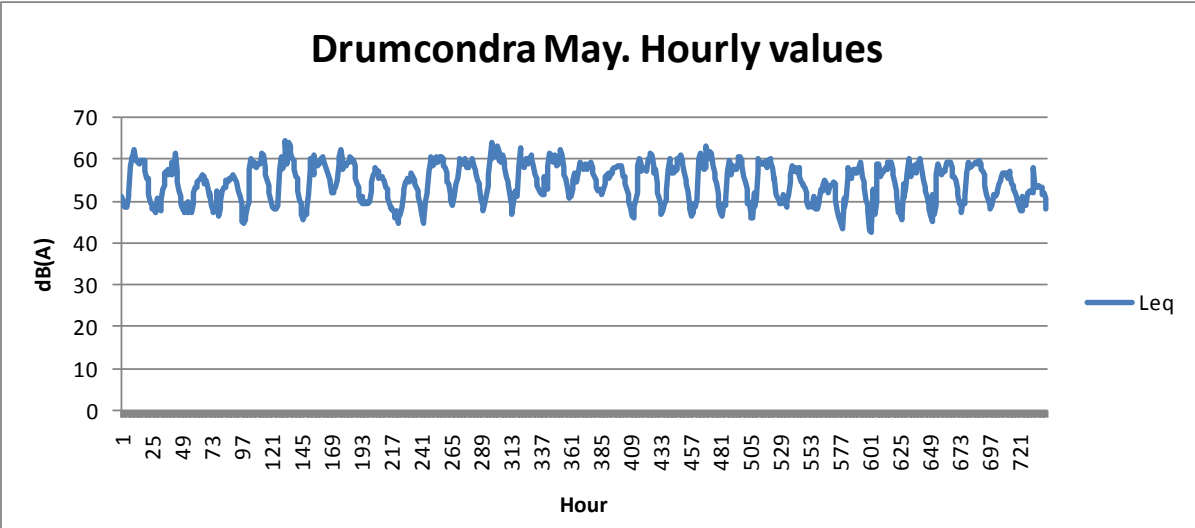
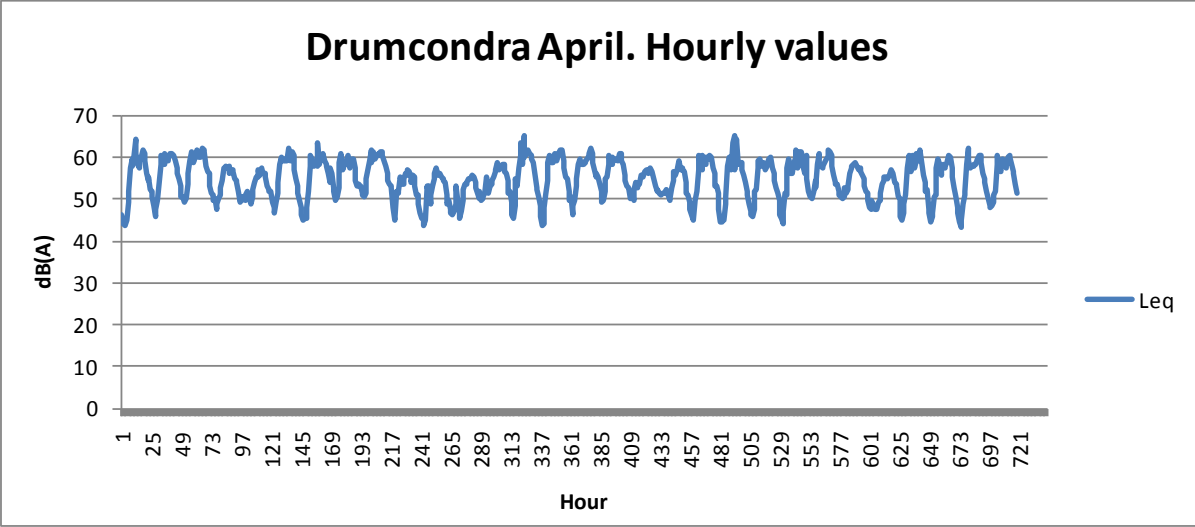
Ballyfermot Sept. Hourly Values



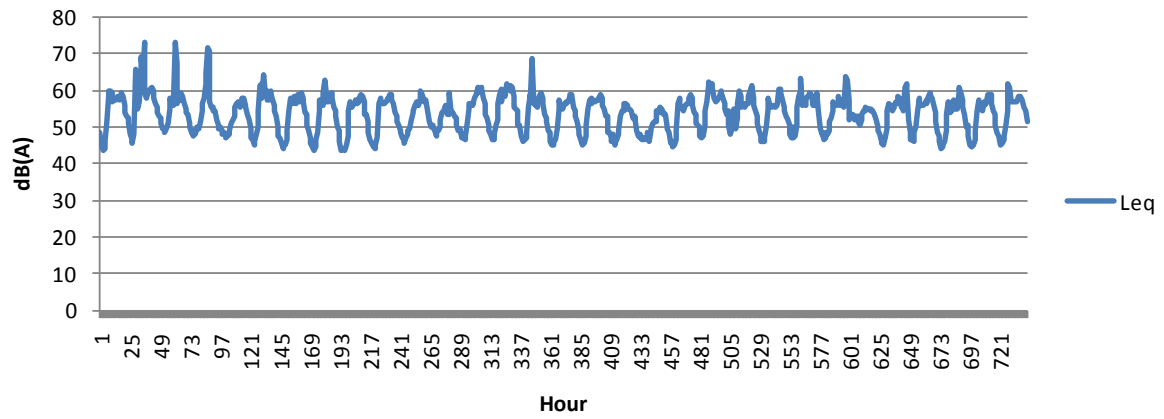


**DRUMCONDRA LIBRARY
MILLMOUNT AVENUE
DUBLIN 9**

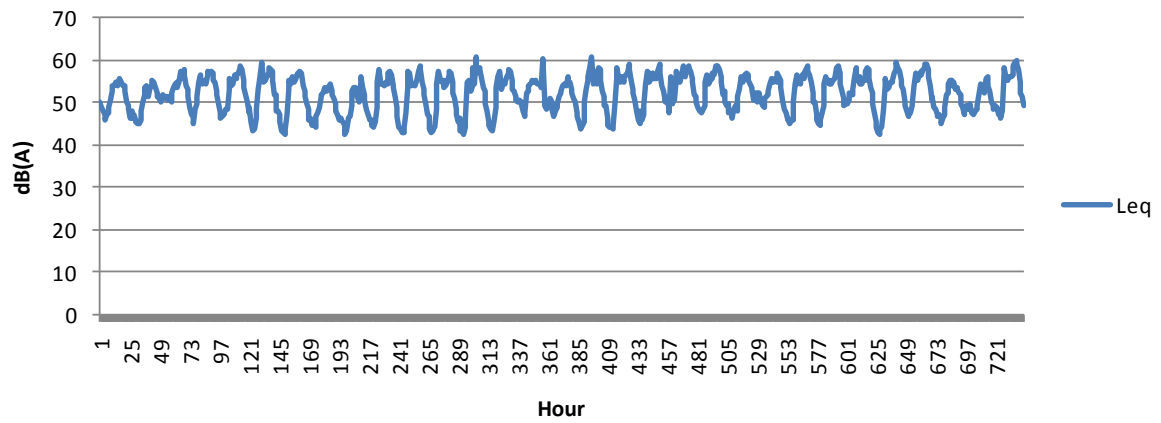




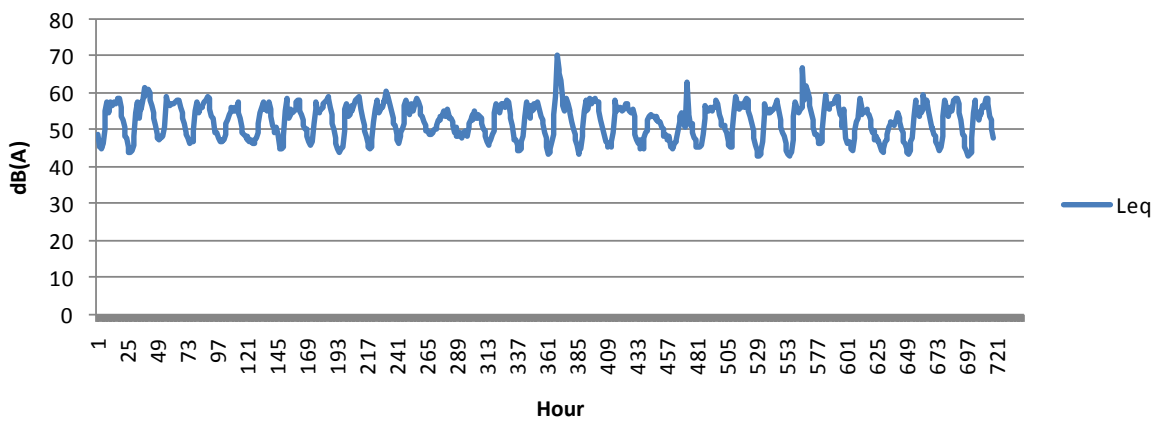
Drumcondra July. Hourly values



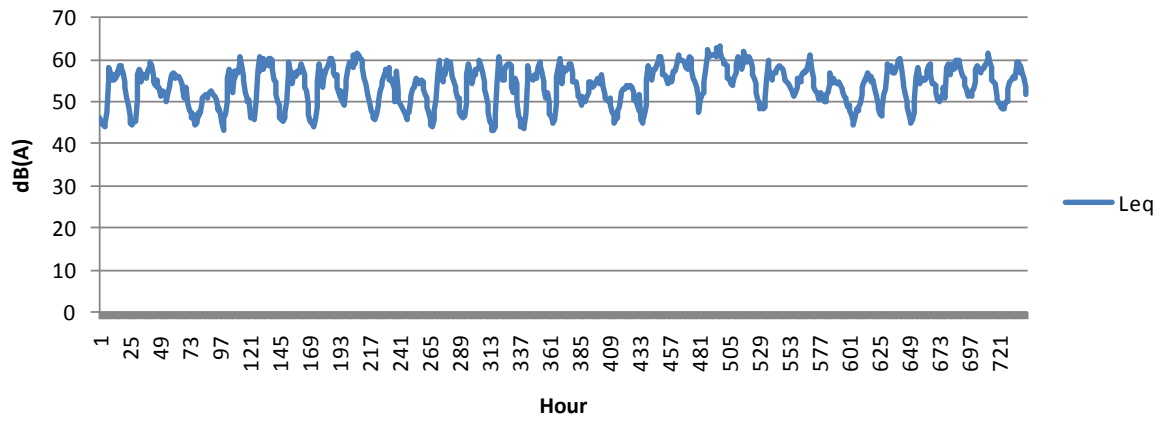
Drumcondra August. Hourly values



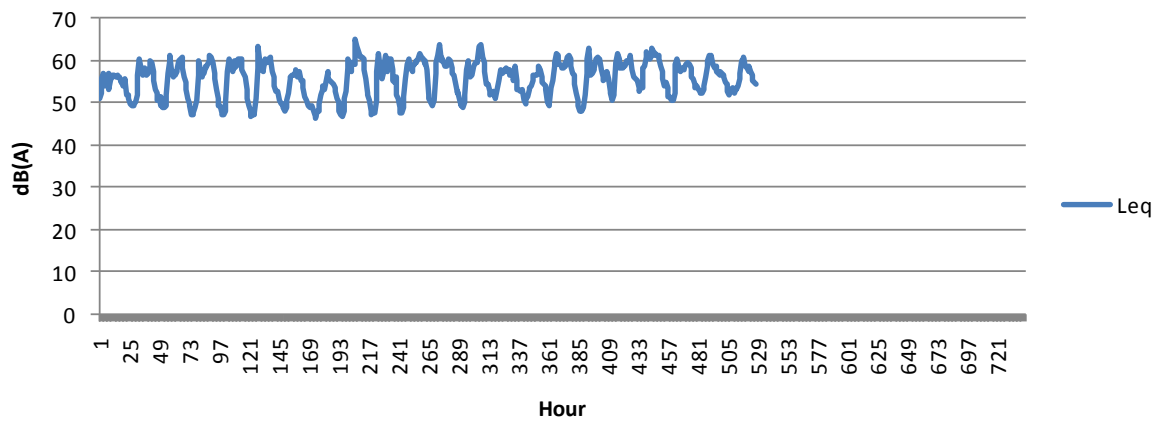
Drumcondra Sept. Hourly values



Drumcondra Oct. Hourly values



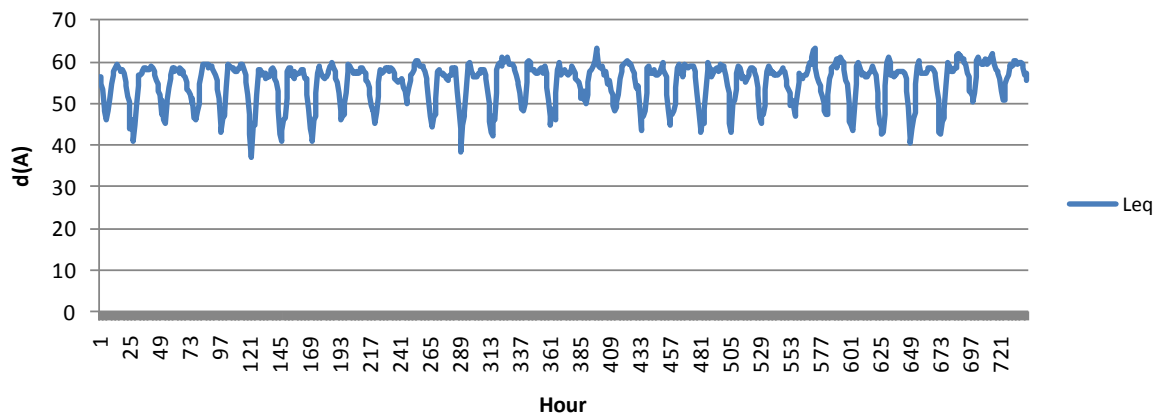
Drumcondra Nov. Hourly values



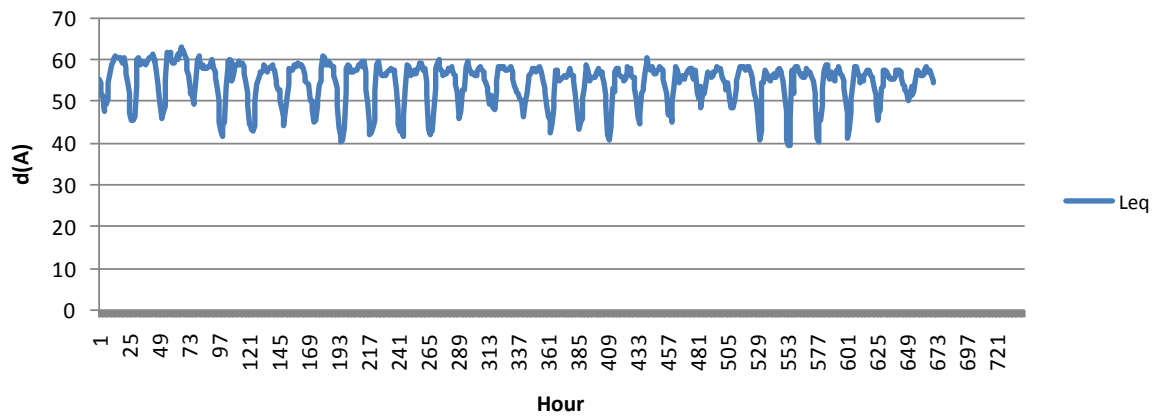
No Data December

**RAHENY LIBRARY
HOWTH ROAD
DUBLIN 5**

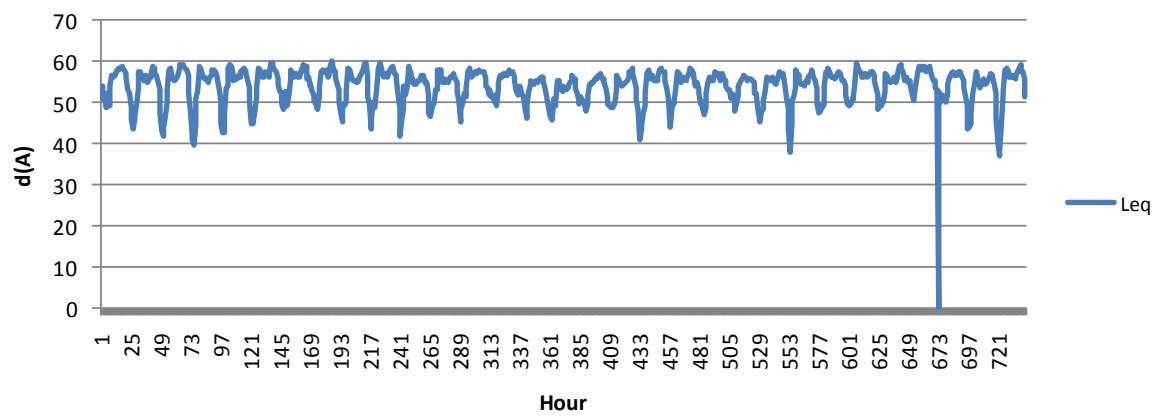
Raheny Jan. Hourly Values



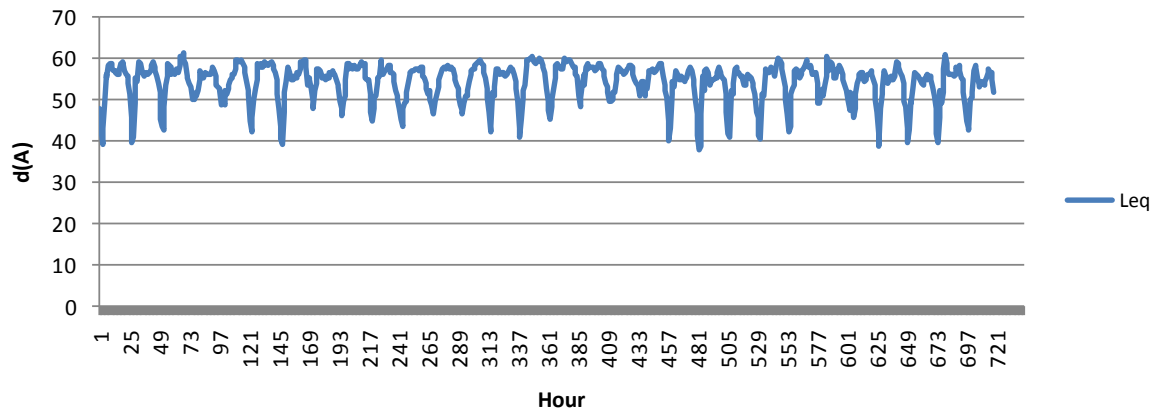
Raheny Feb. Hourly Values



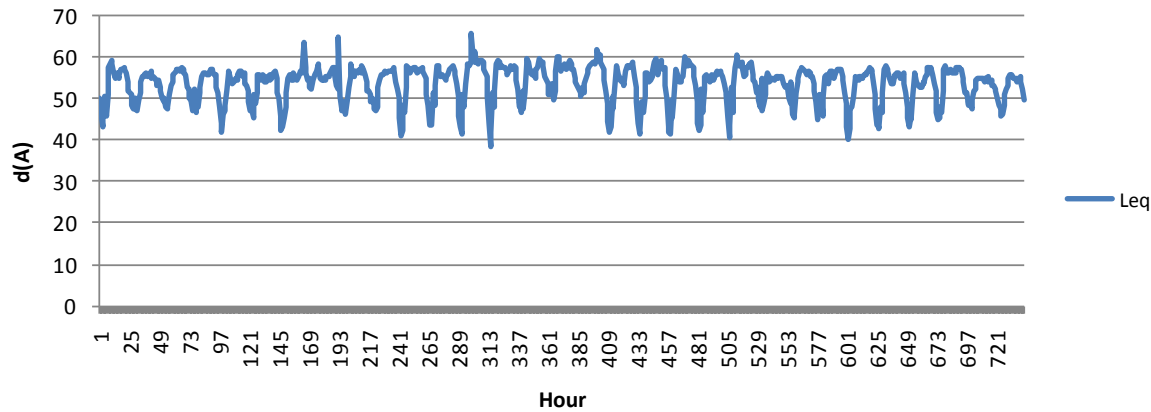
Raheny March. Hourly Values



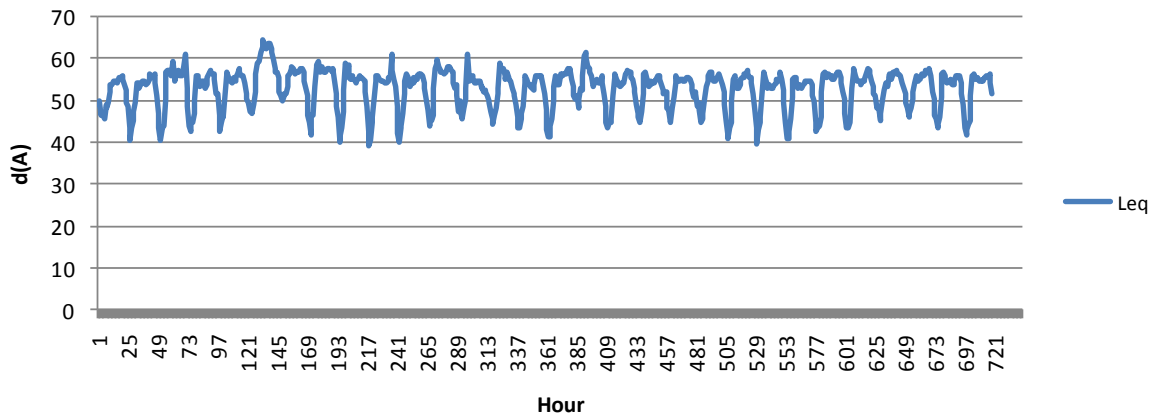
Raheny April. Hourly Values



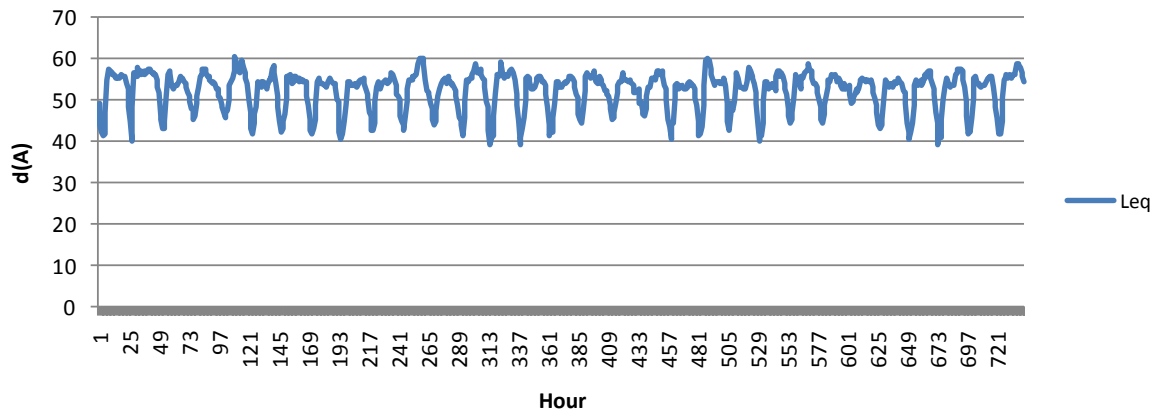
Raheny May. Hourly Values



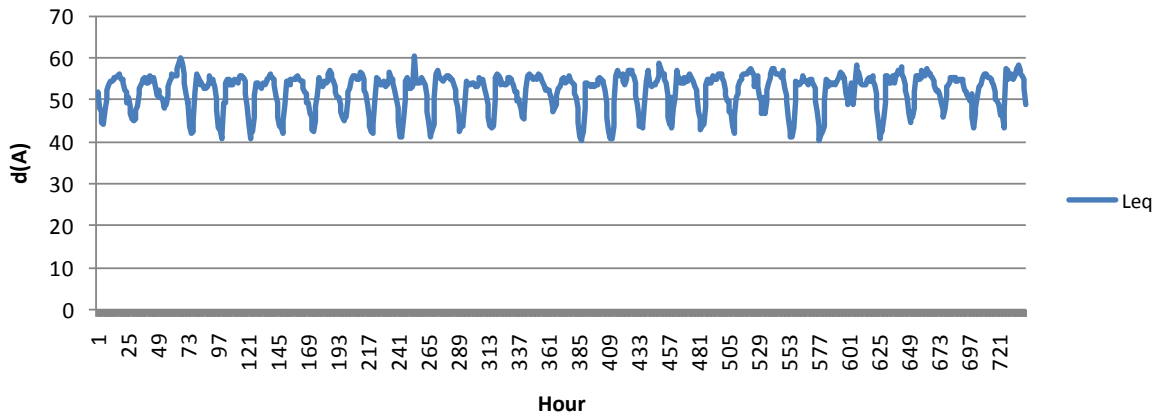
Raheny June. Hourly Values



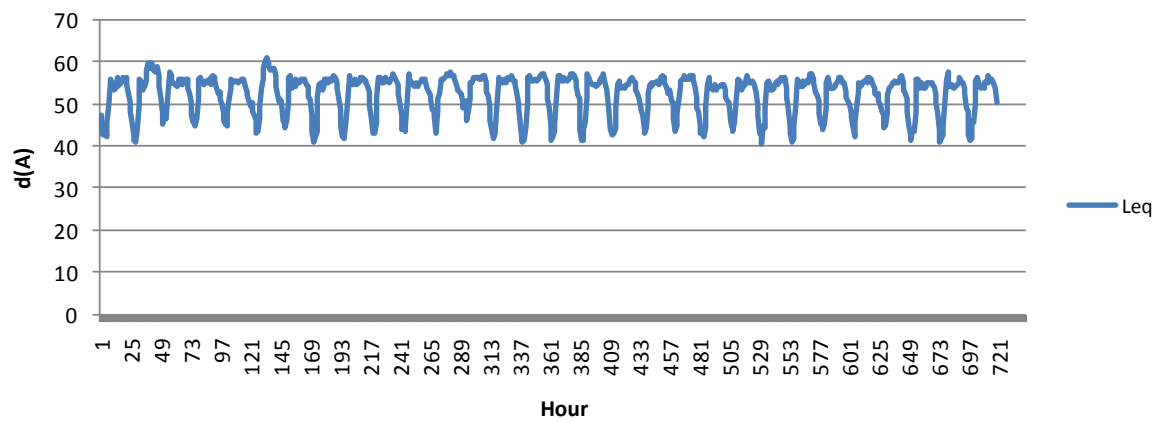
Raheny July. Hourly Values



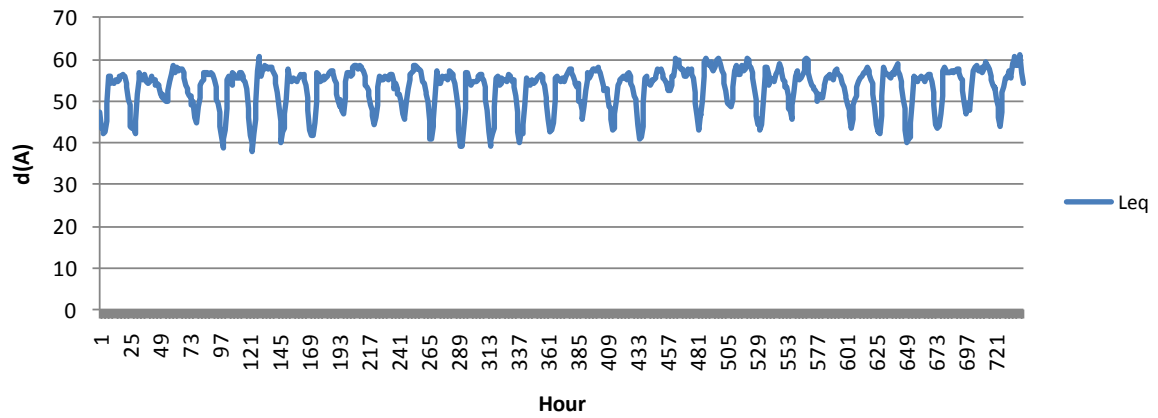
Raheny August. Hourly Values



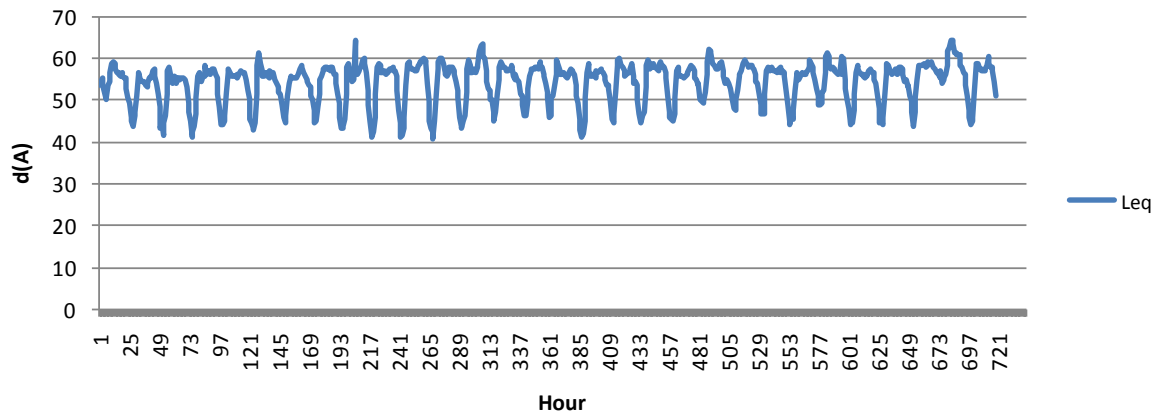
Raheny Sept. Hourly Values



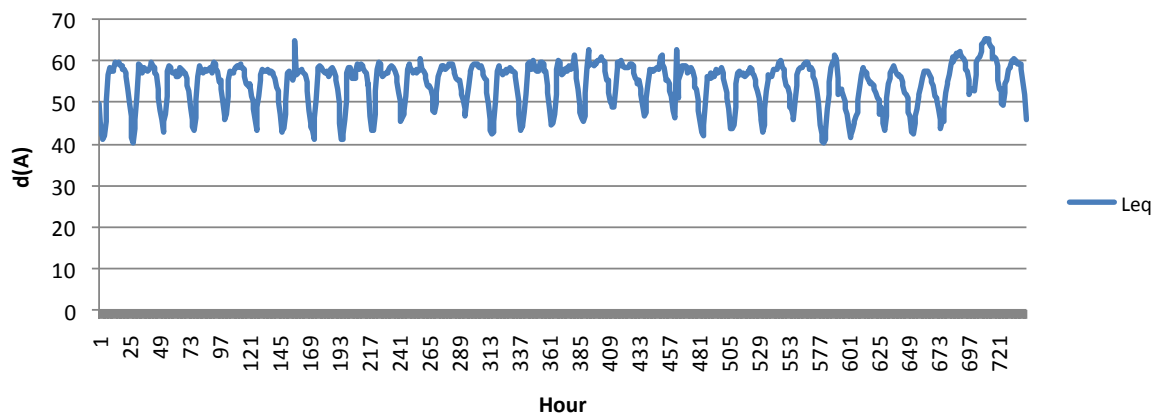
Raheny Oct. Hourly Values



Raheny Nov. Hourly Values

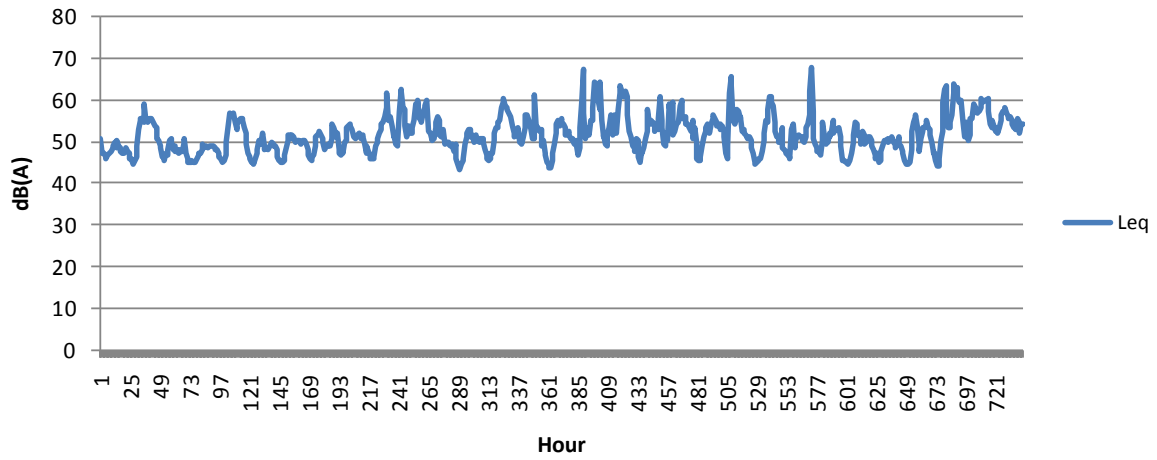


Raheny Dec. Hourly Values

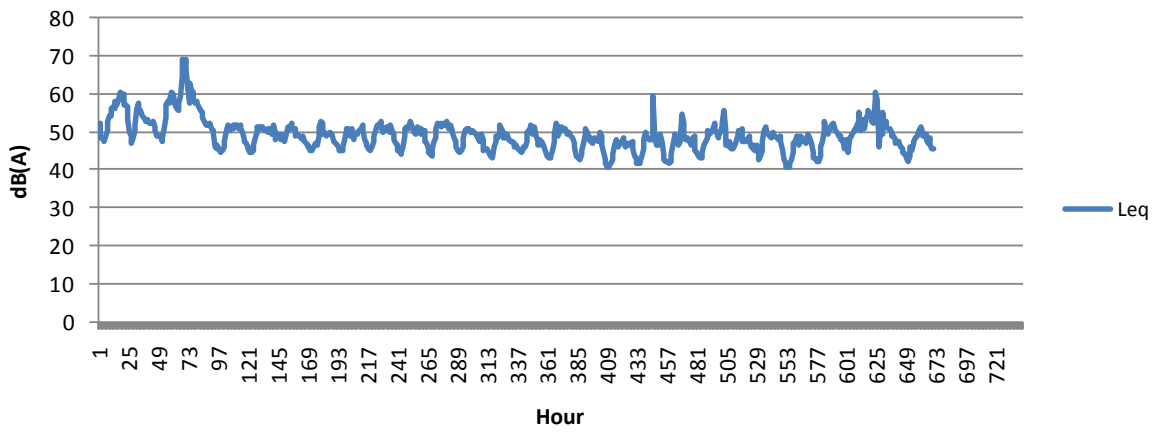


**IRISHTOWN SPORTS CENTRE
RINGSEND
DUBLIN 4**

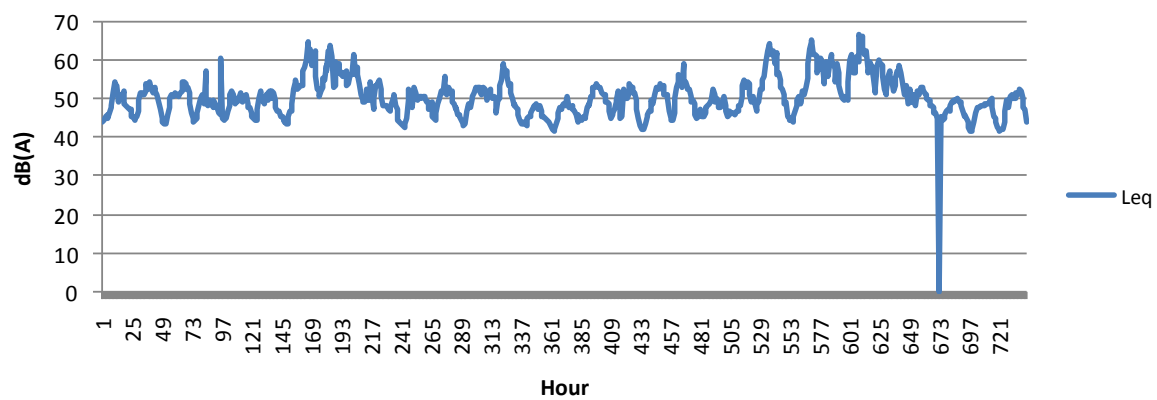
Ringsend Jan. Hourly Values



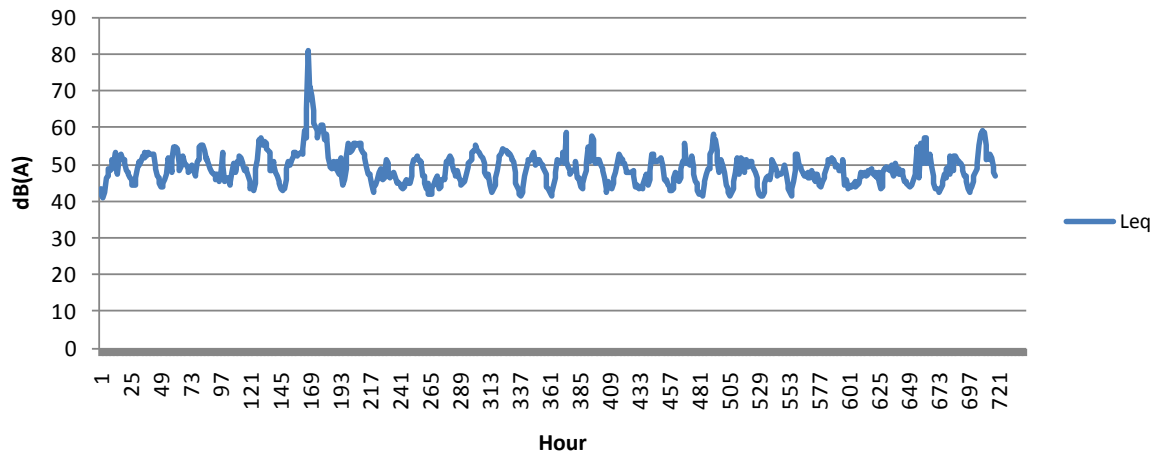
Ringsend Feb. Hourly Values



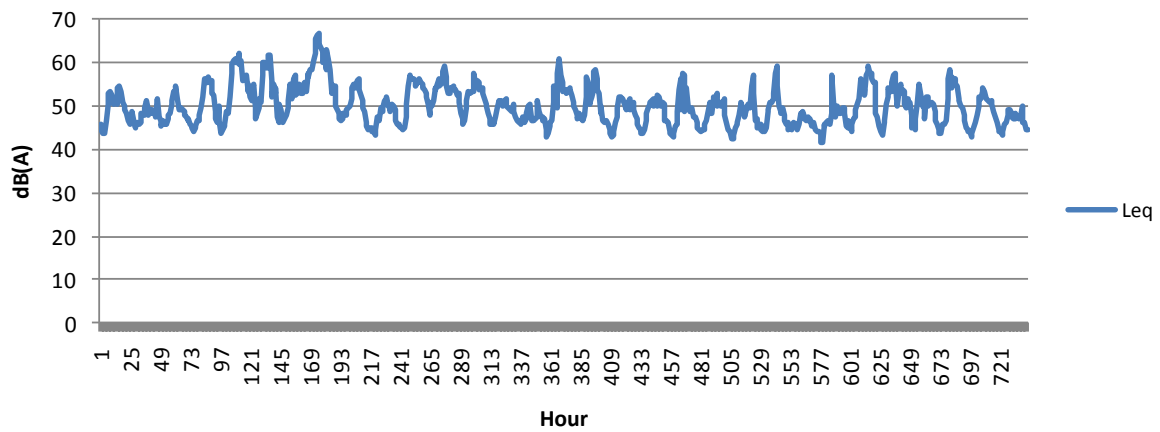
Ringsend March. Hourly Values



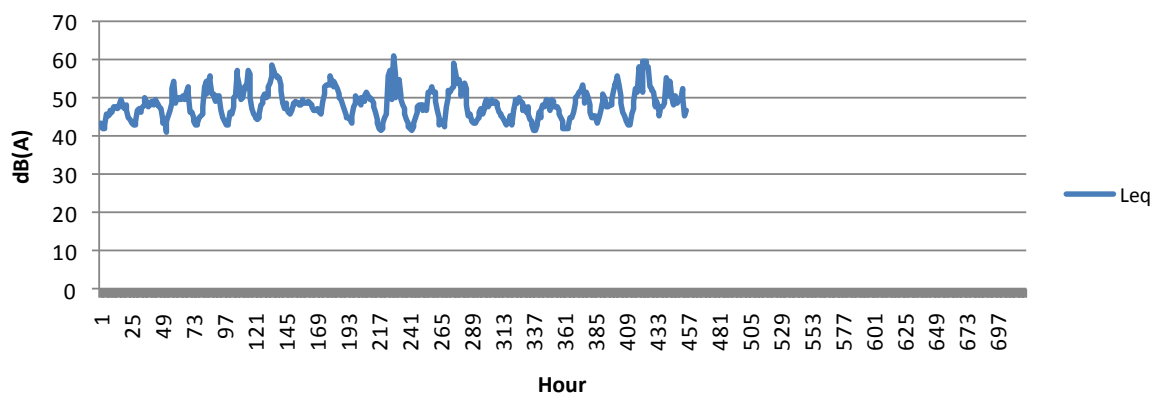
Ringsend April. Hourly Values



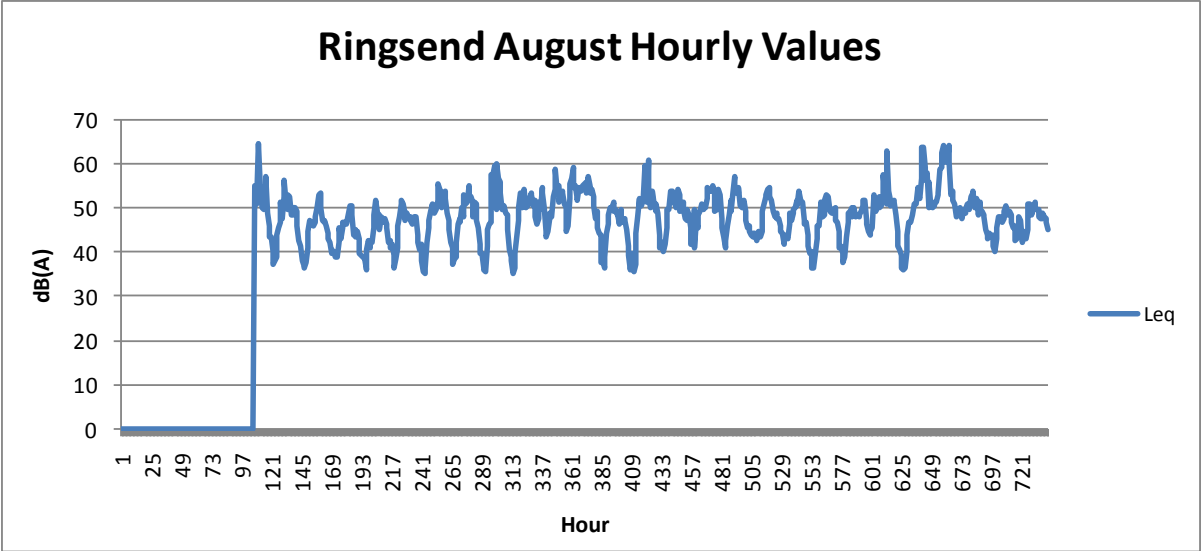
Ringsend May. Hourly Values



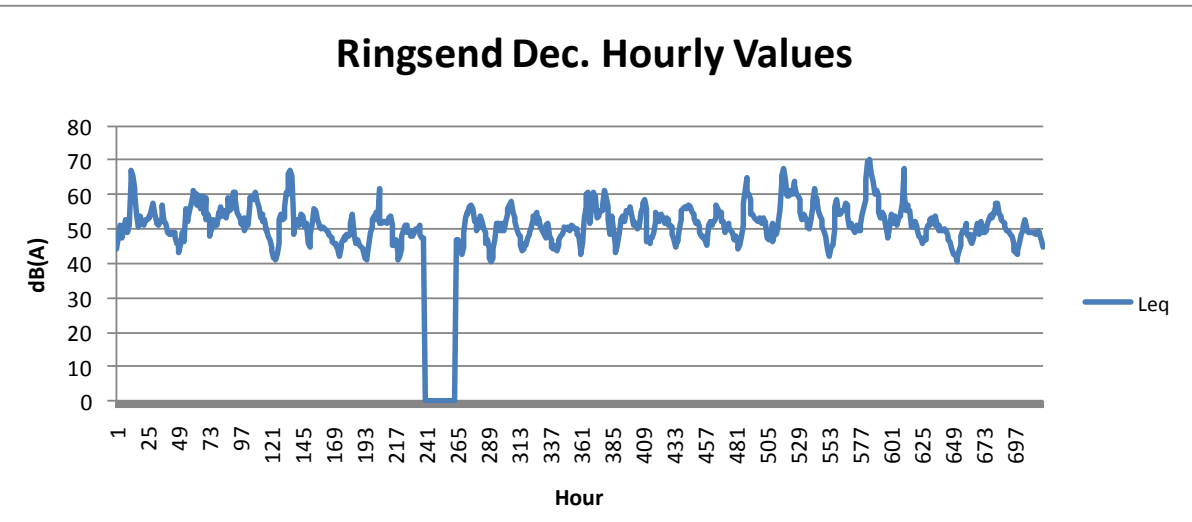
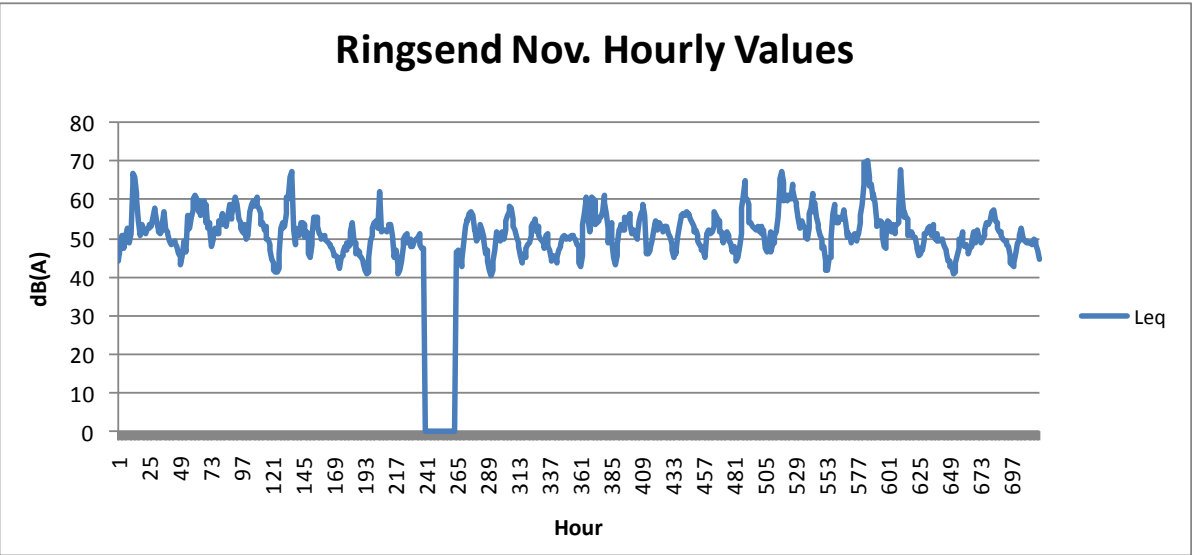
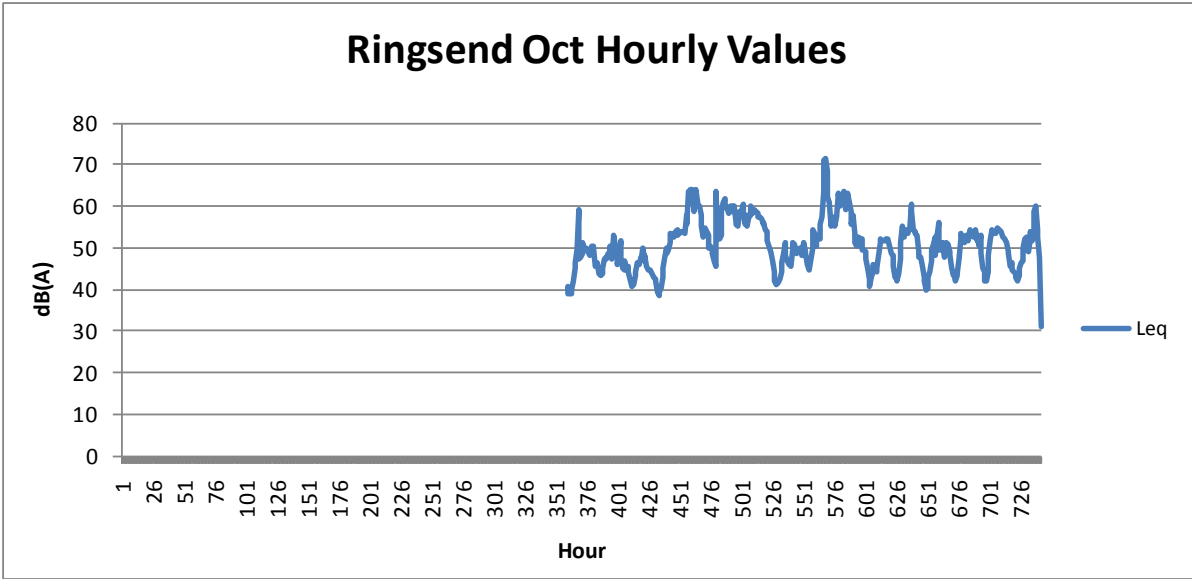
Ringsend June. Hourly Values



No Data July

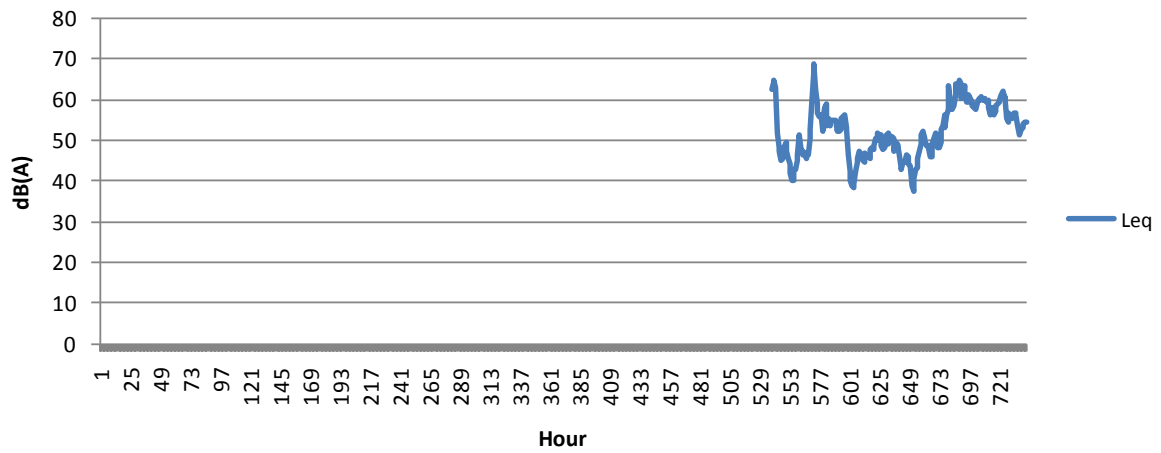


No Data September

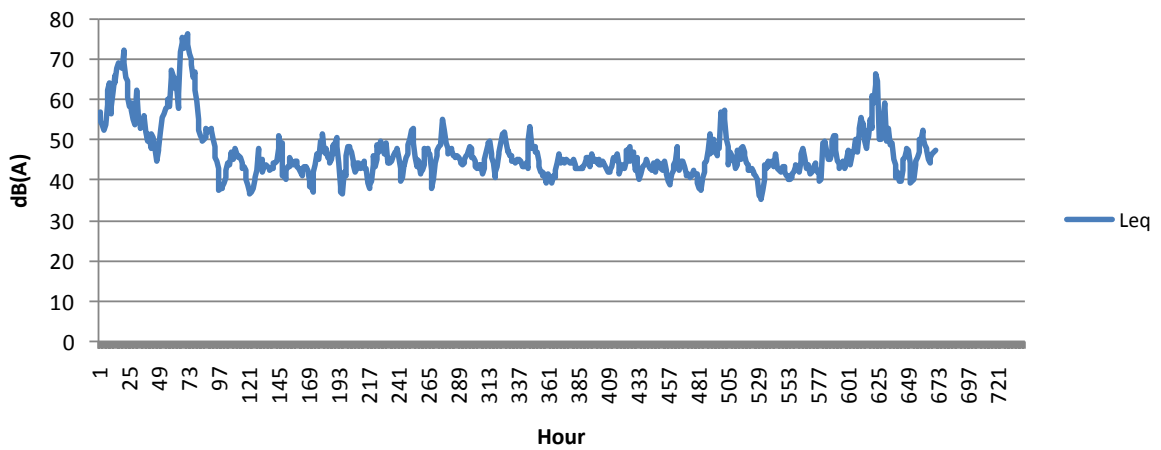


BULL ISLAND INTERPRETATIVE CENTRE
BULL ISLAND
DUBLIN 3

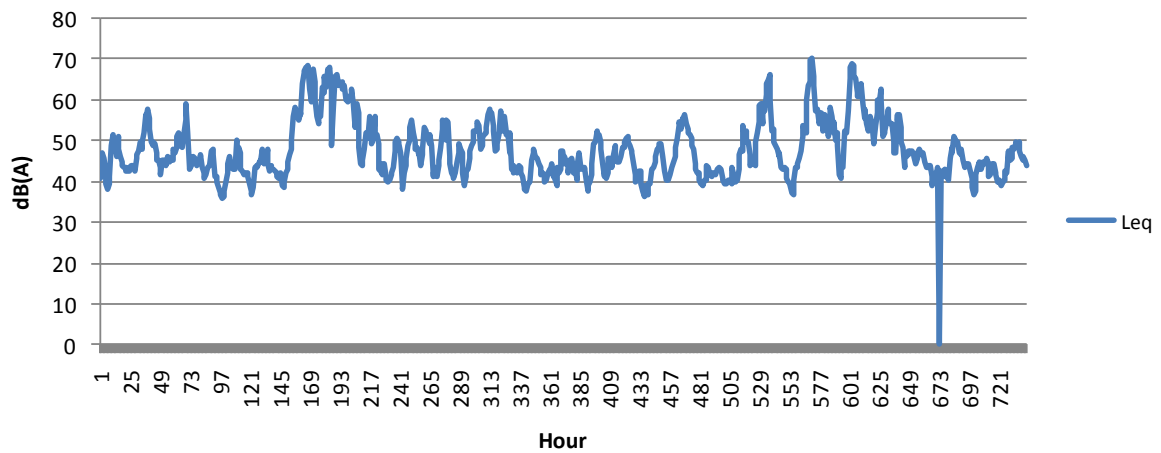
Bull Island Jan. Hourly Values



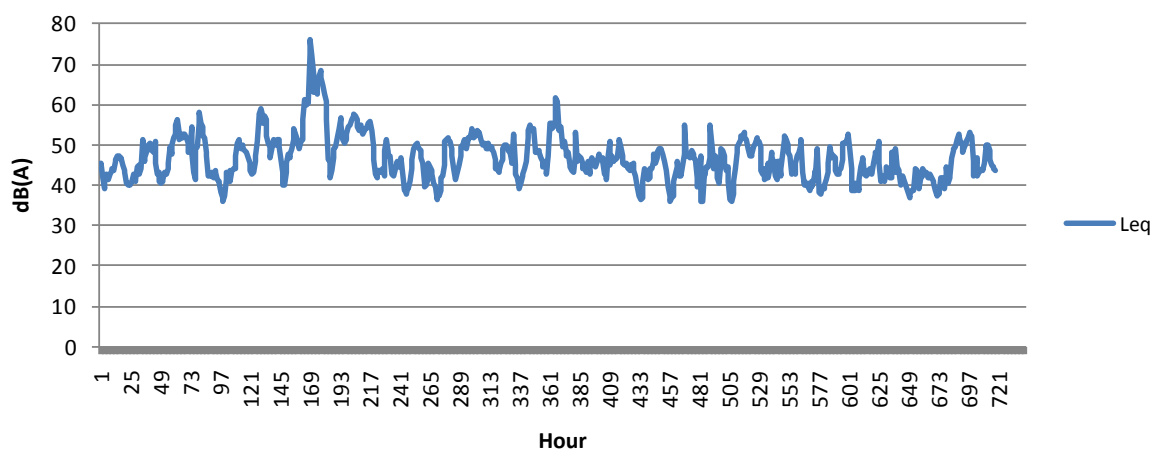
Bull Island Feb. Hourly Values



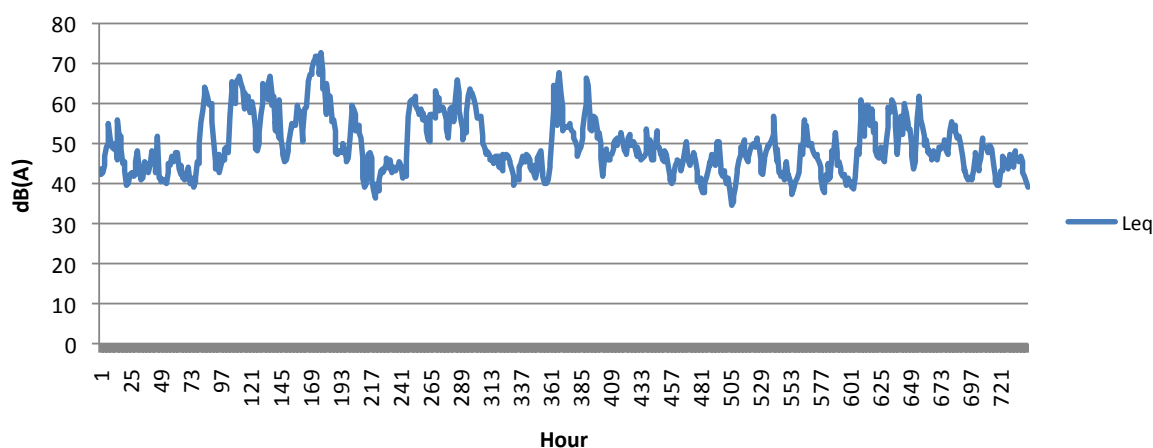
Bull Island March. Hourly Values



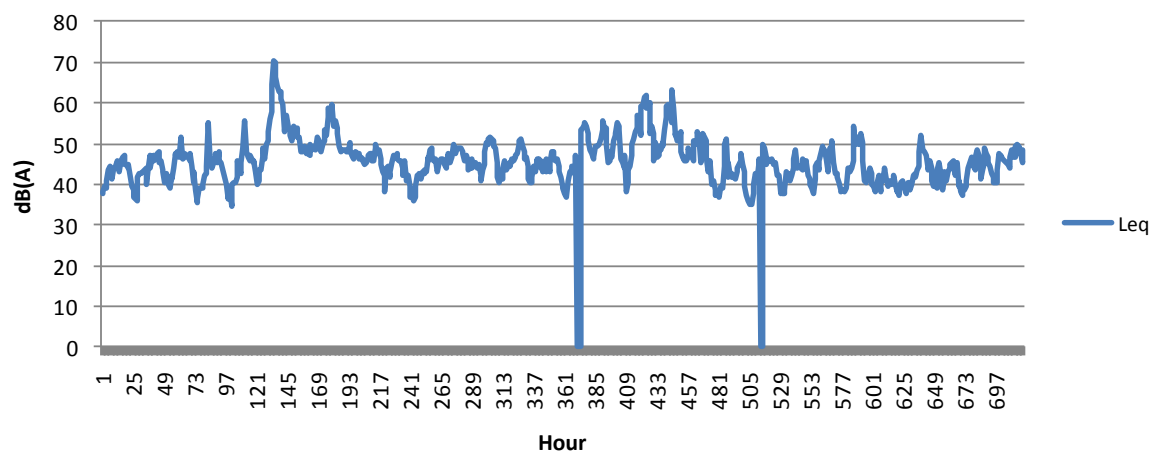
Bull Island April. Hourly Values



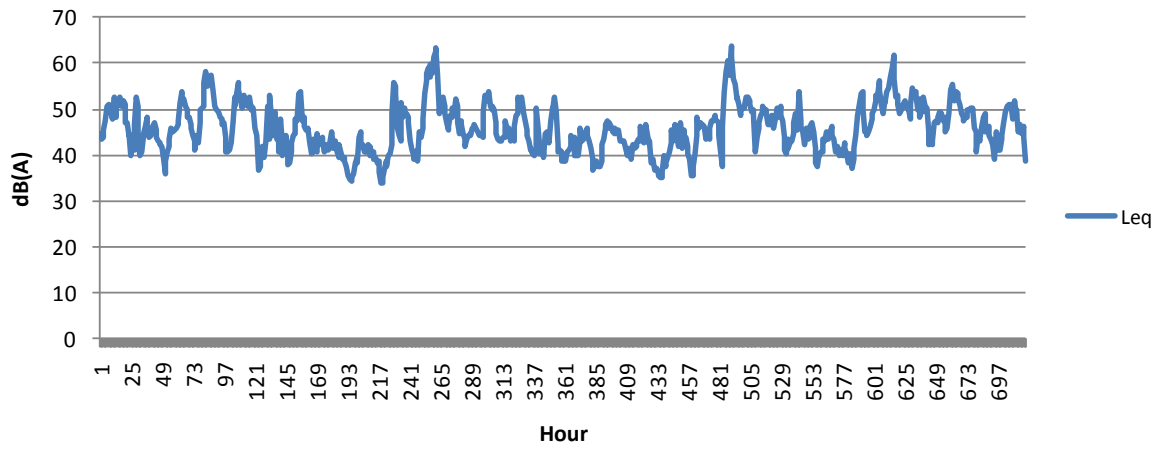
Bull Island May. Hourly Values



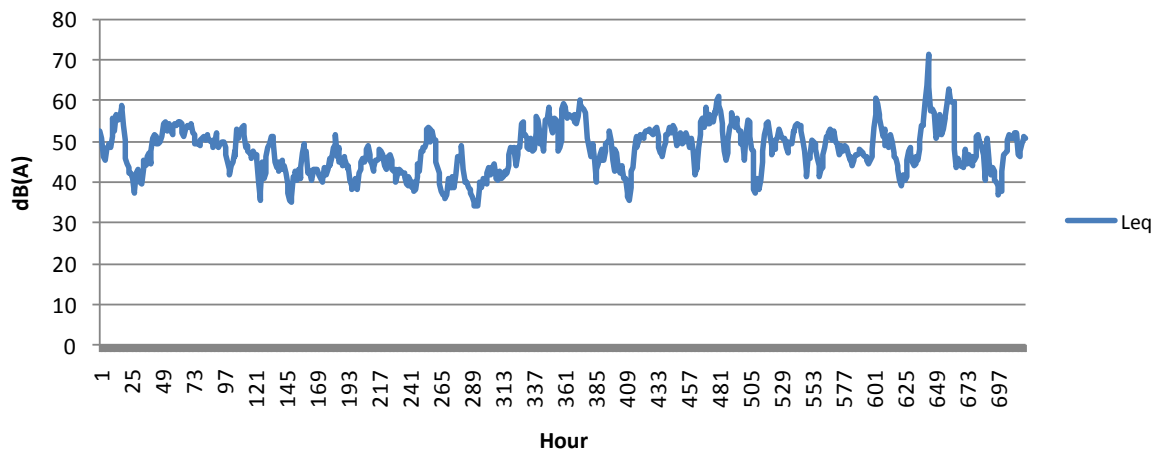
Bull Island June Hourly Values



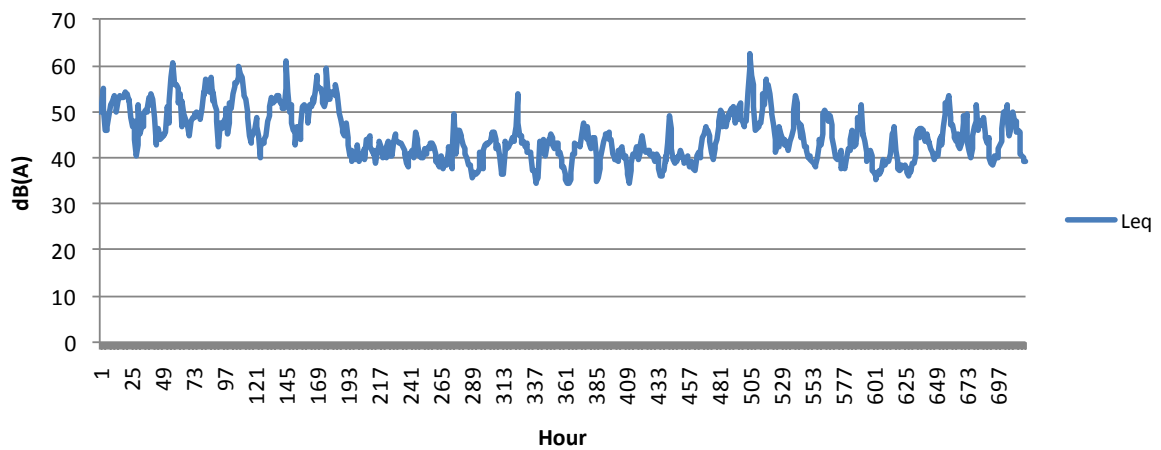
Bull Island July Hourly Values



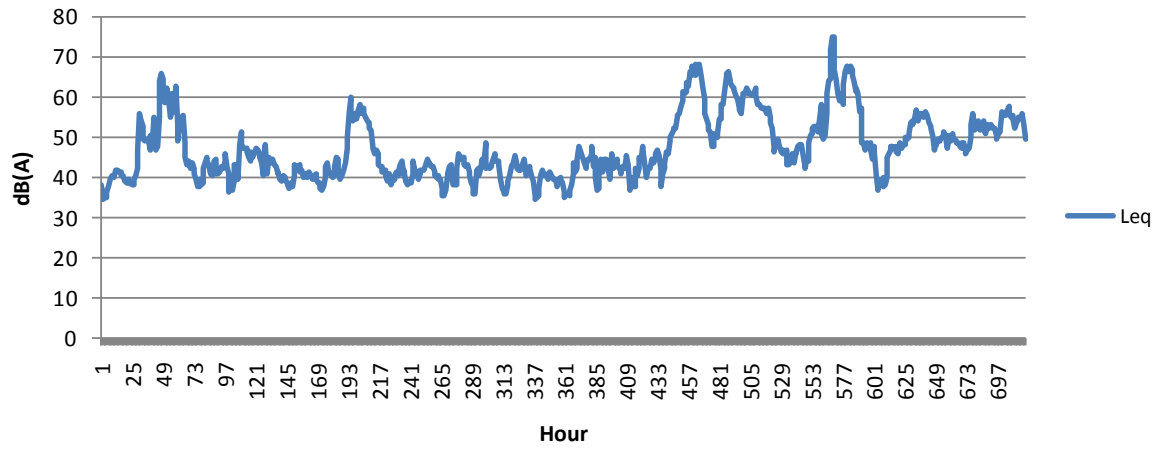
Bull Island August Hourly Values



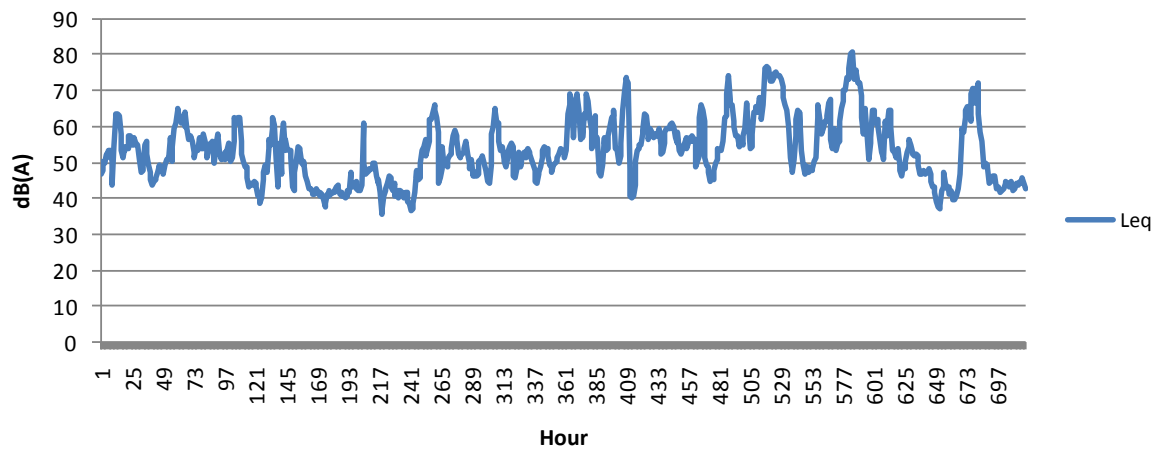
Bull Island Sept. Hourly Values



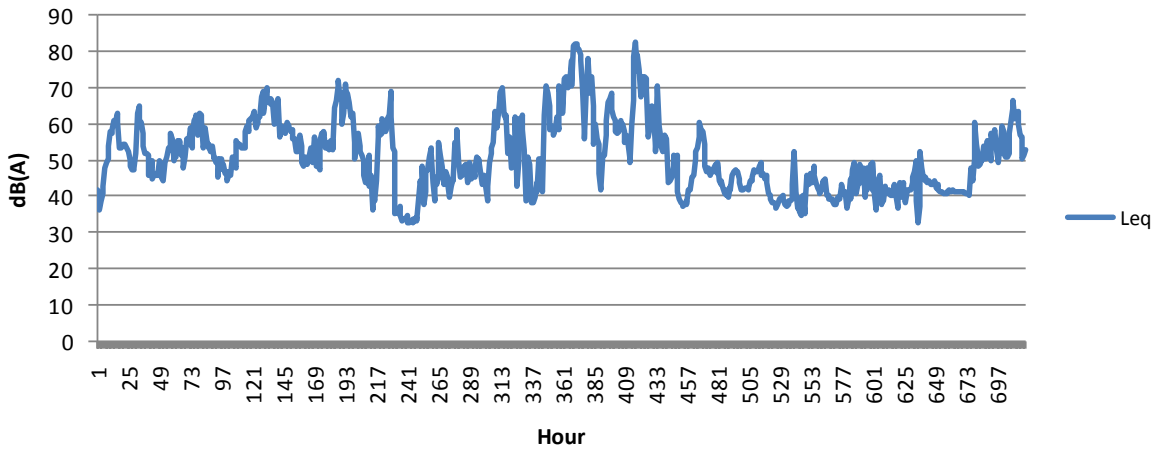
Bull Island Oct. Hourly Values



Bull Island Nov. Hourly Values

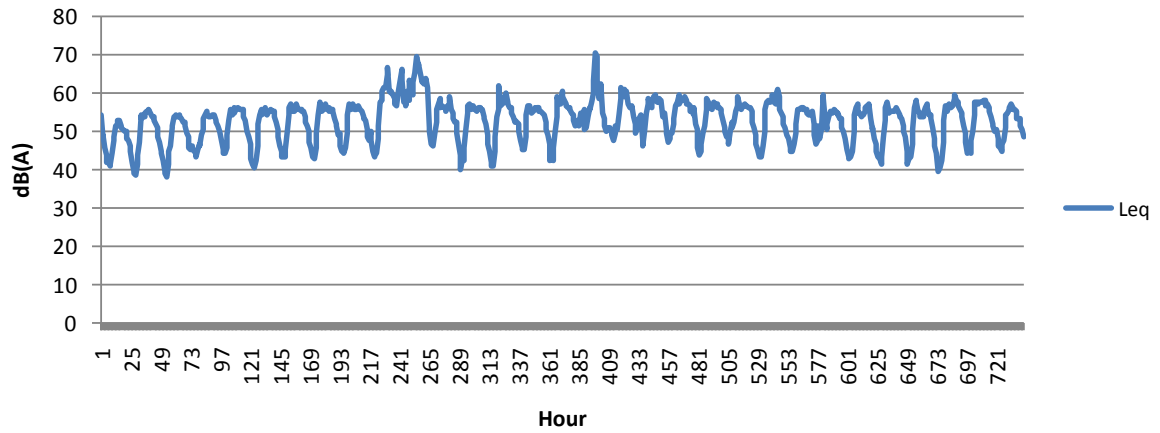


Bull Island Dec. Hourly Values

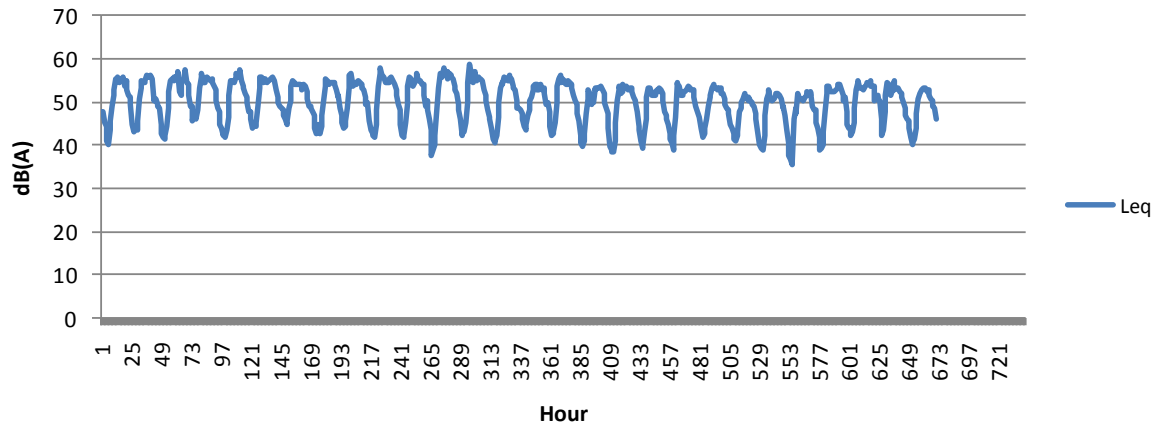


**WALKINSTOWN LIBRARY
PERCY FRENCH ROAD
DUBLIN 12**

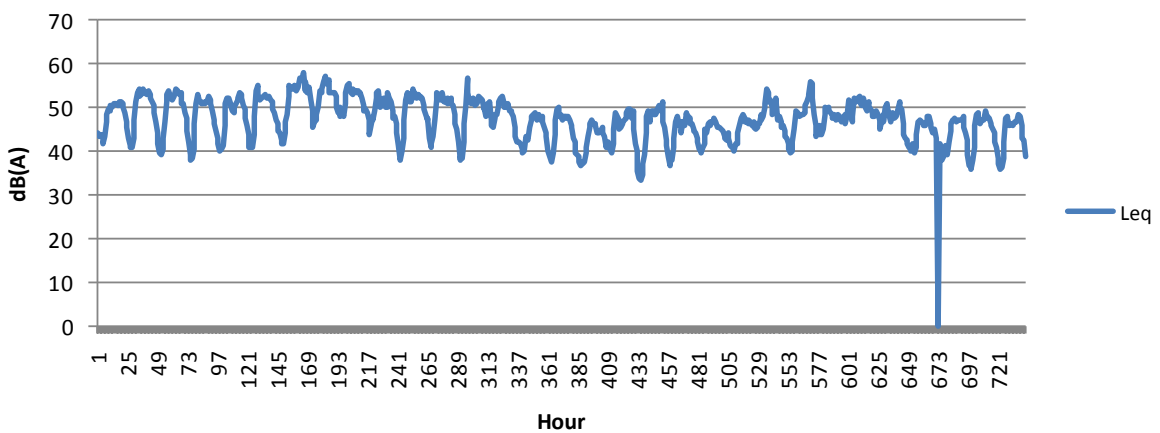
Walkinstown Jan. Hourly Values



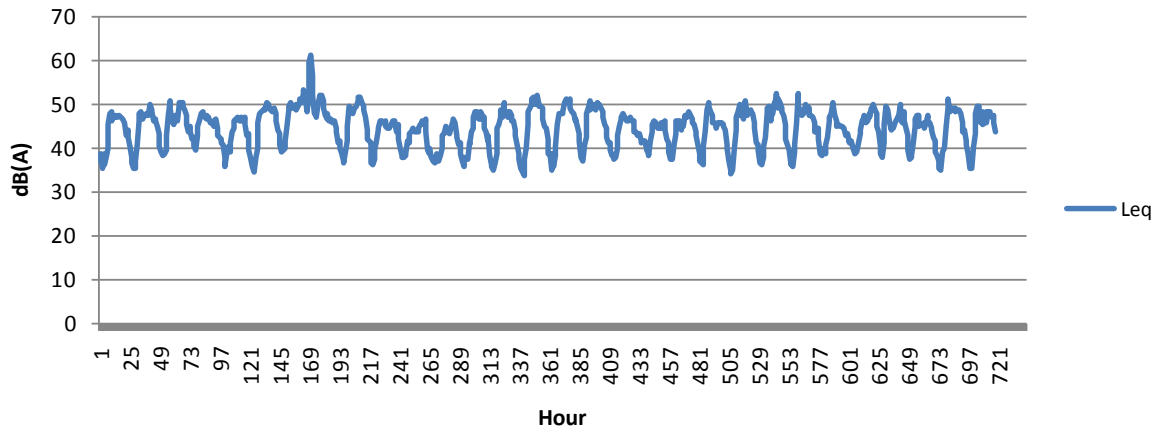
Walkinstown Feb. Hourly Values



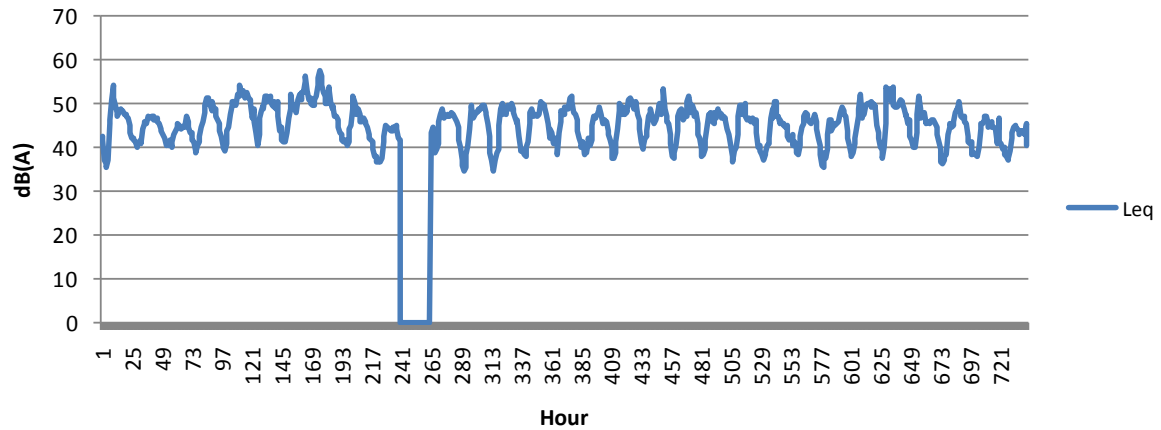
Walkinstown March. Hourly Values



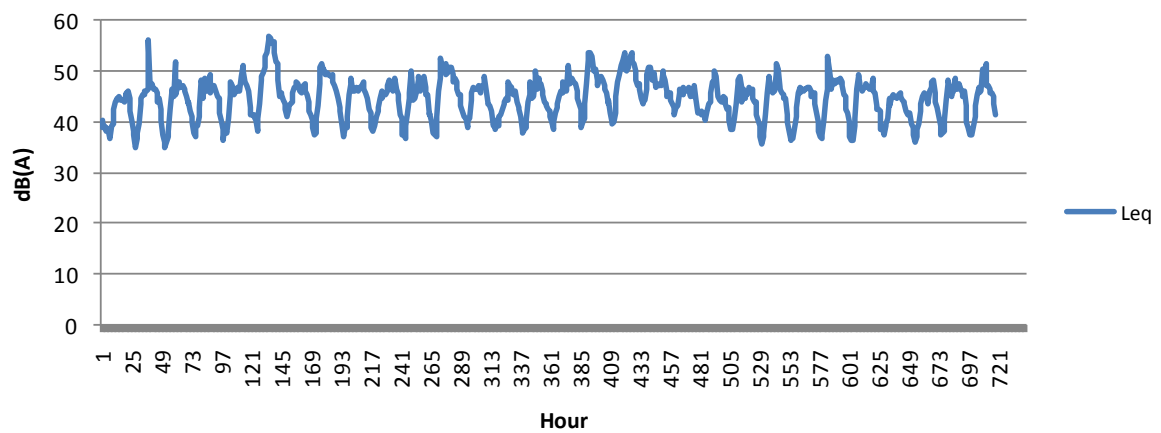
Walkinstown April. Hourly Values



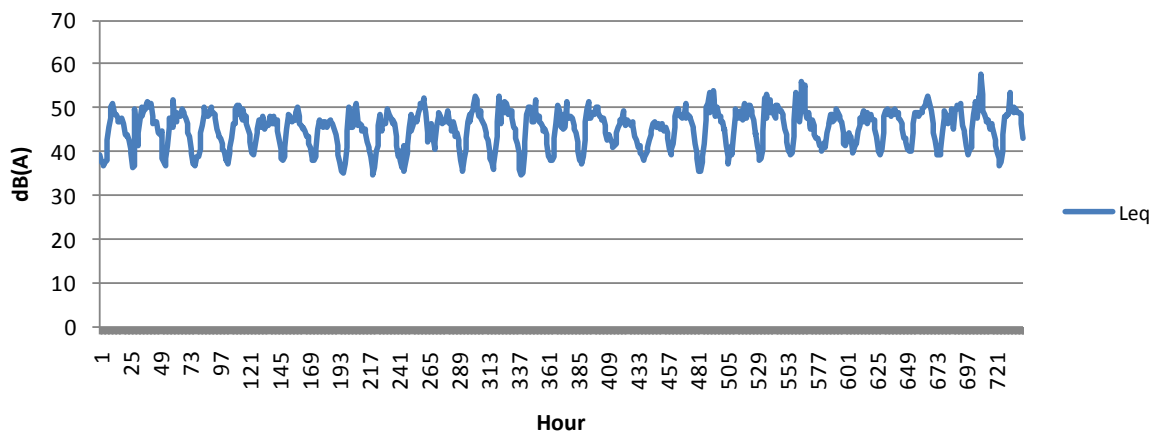
Walkinstown May. Hourly Values



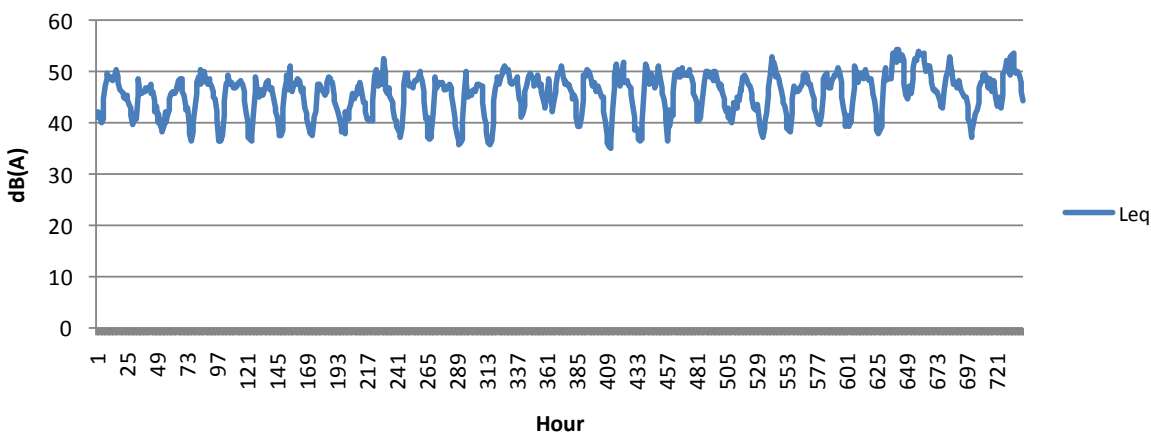
Walkinstown June. Hourly Values



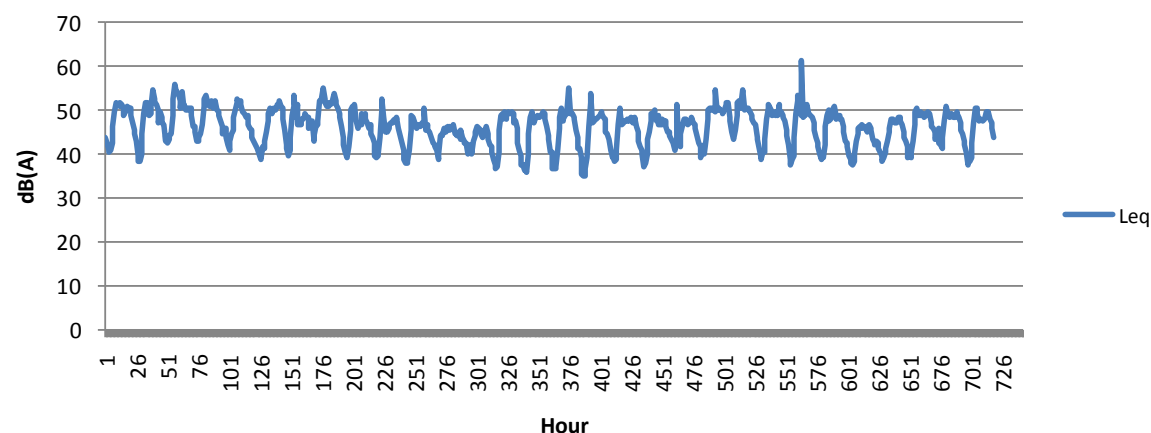
Walkinstown July. Hourly Values



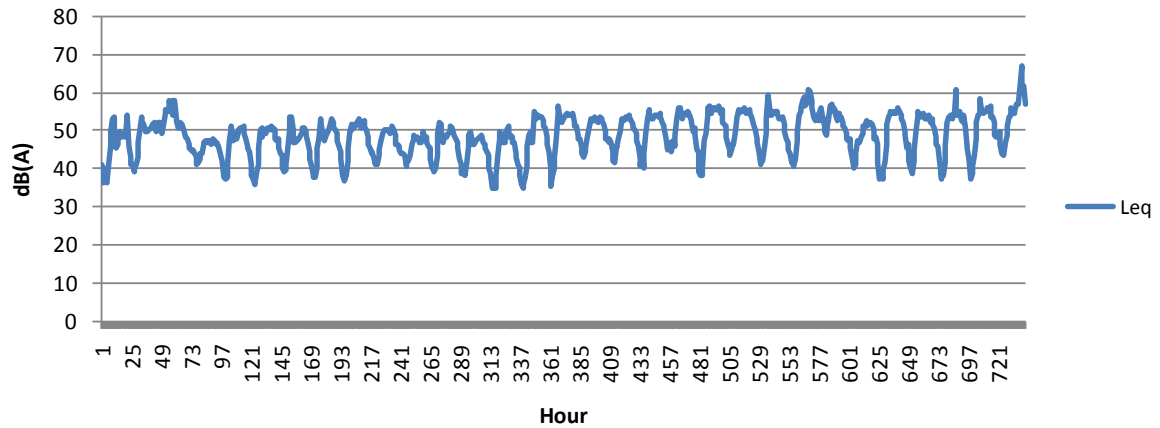
Walkinstown August. Hourly Values



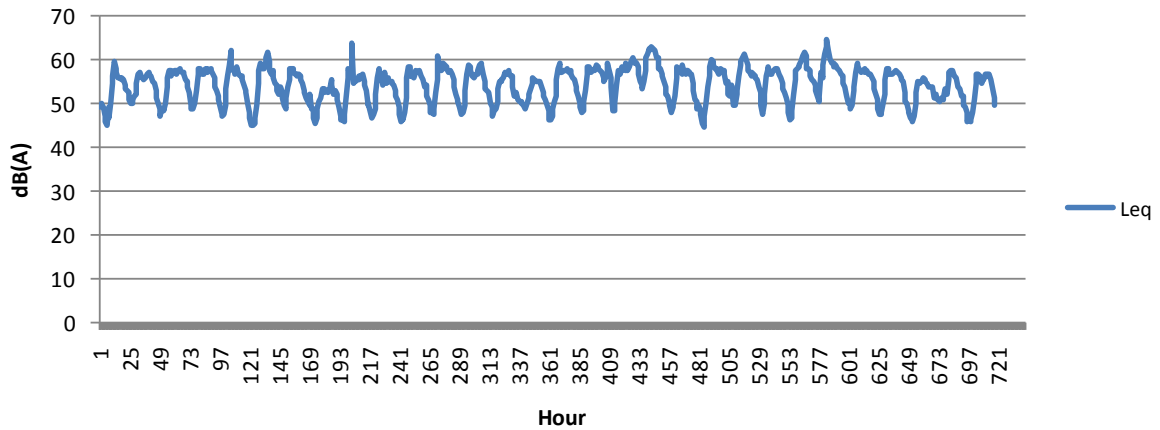
Walkinstown Sept. Hourly Values



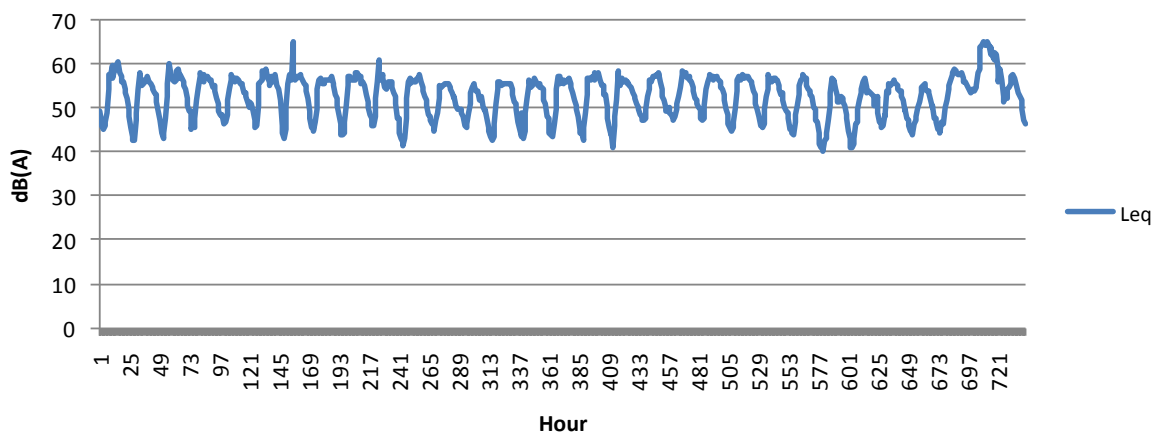
Walkinstown Oct. Hourly Values



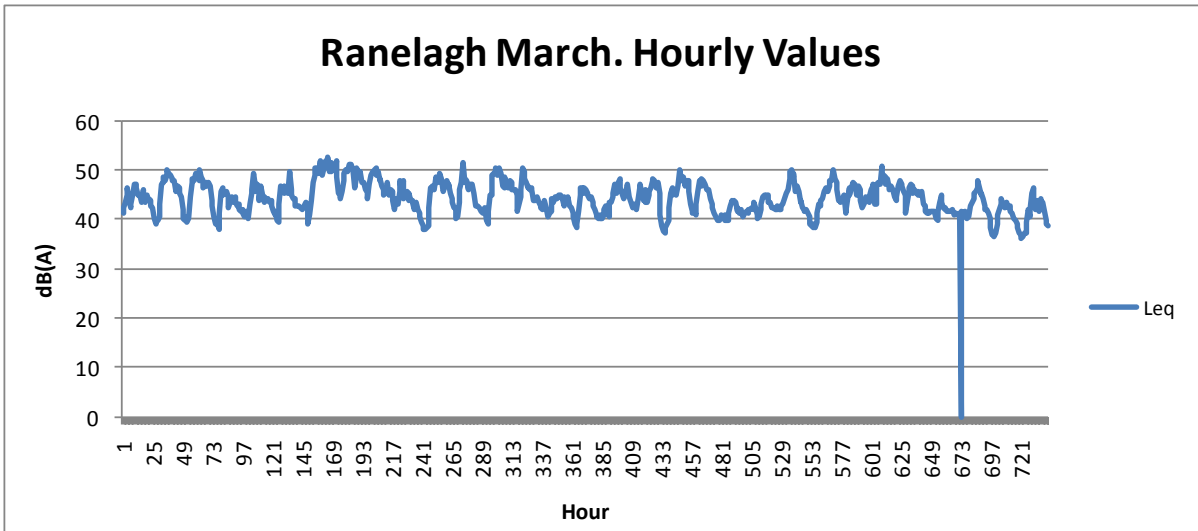
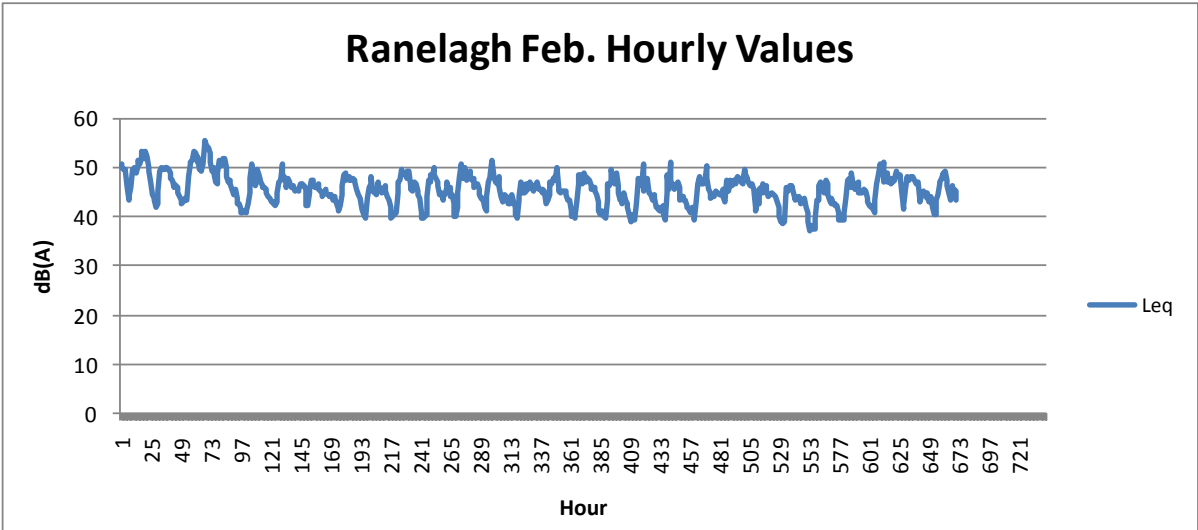
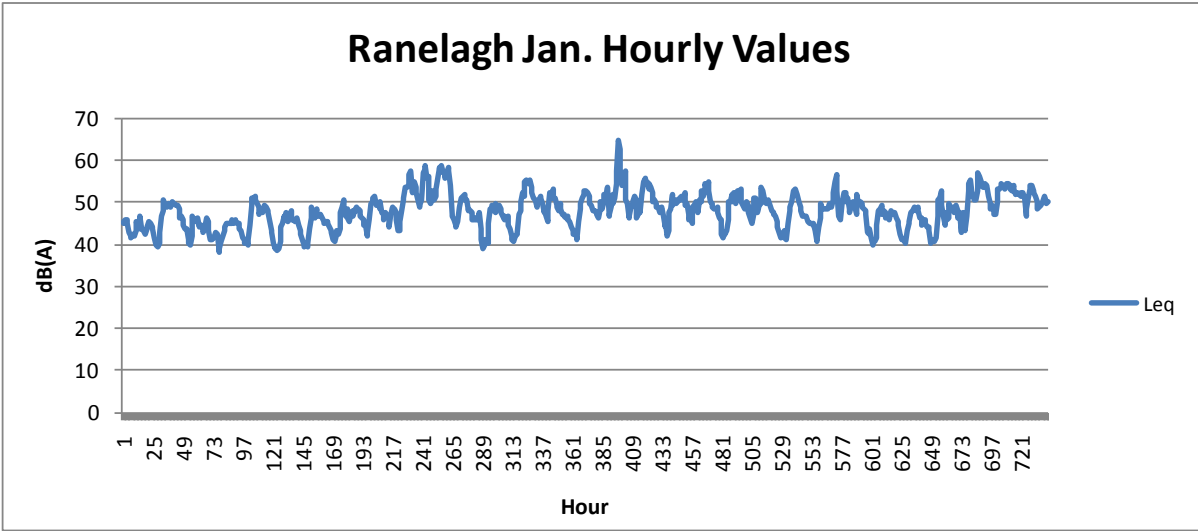
Walkinstown Nov. Hourly Values

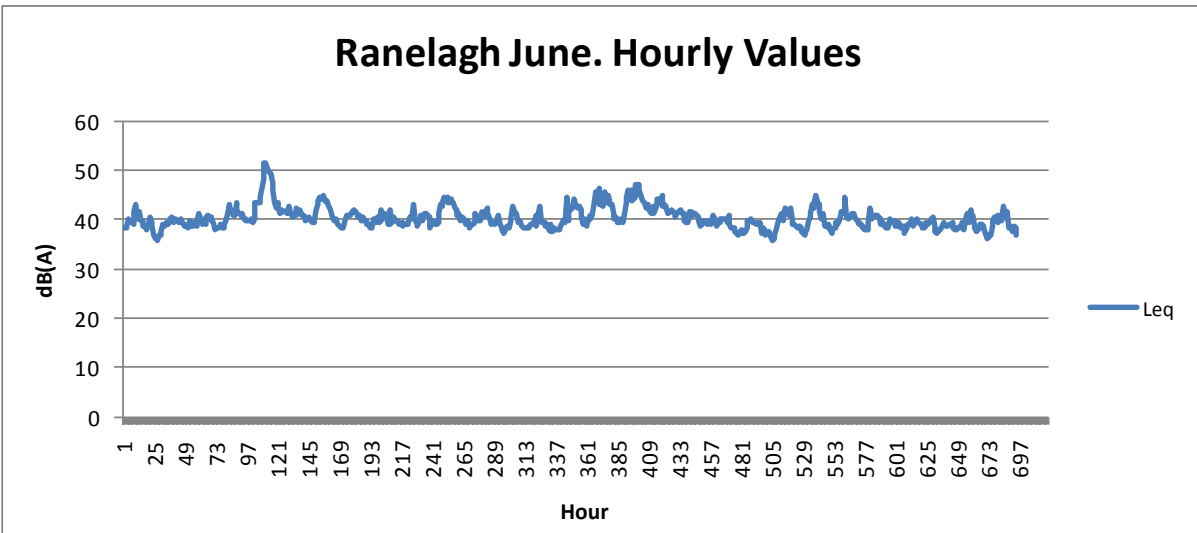
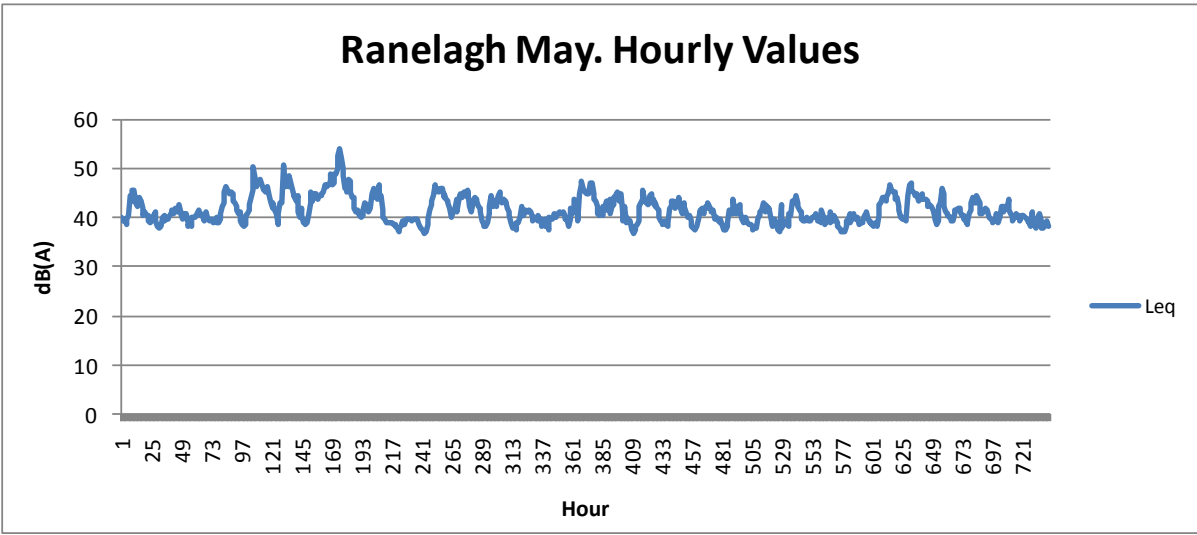
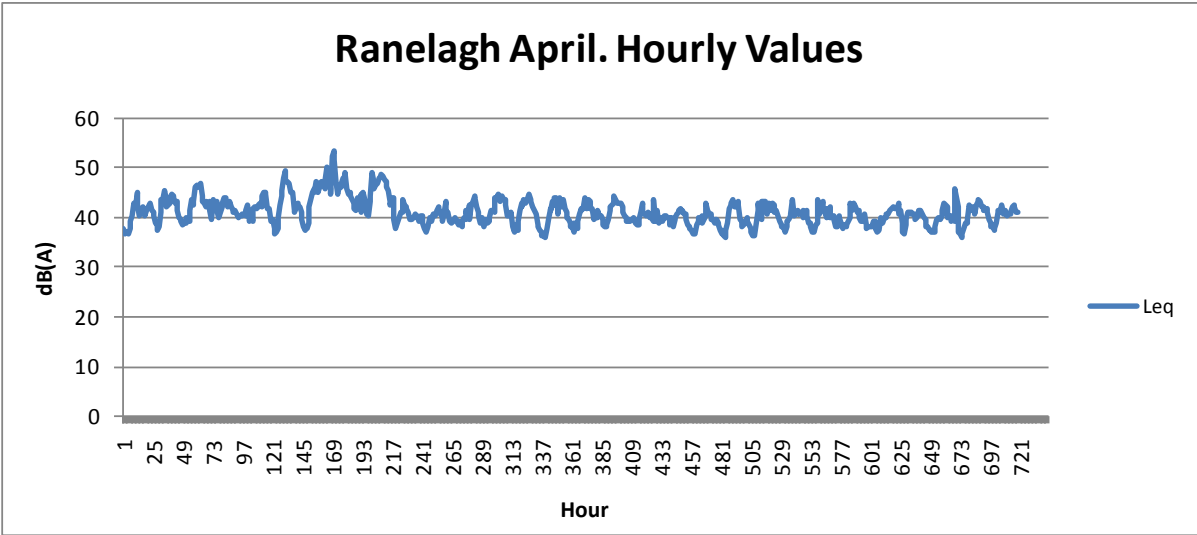


Walkinstown Dec. Hourly Values

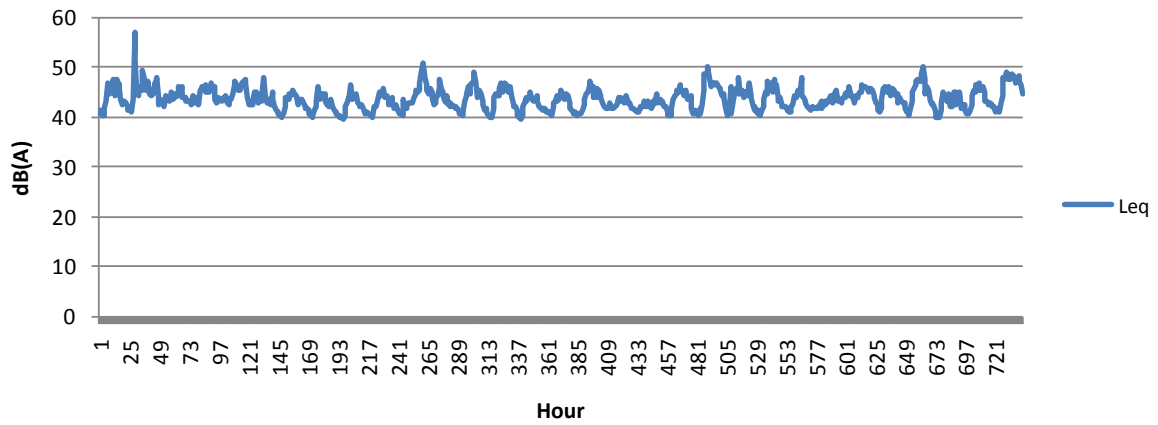


**WOODSTOCK STOCK GARDENS
RANELAGH
DUBLIN 6**

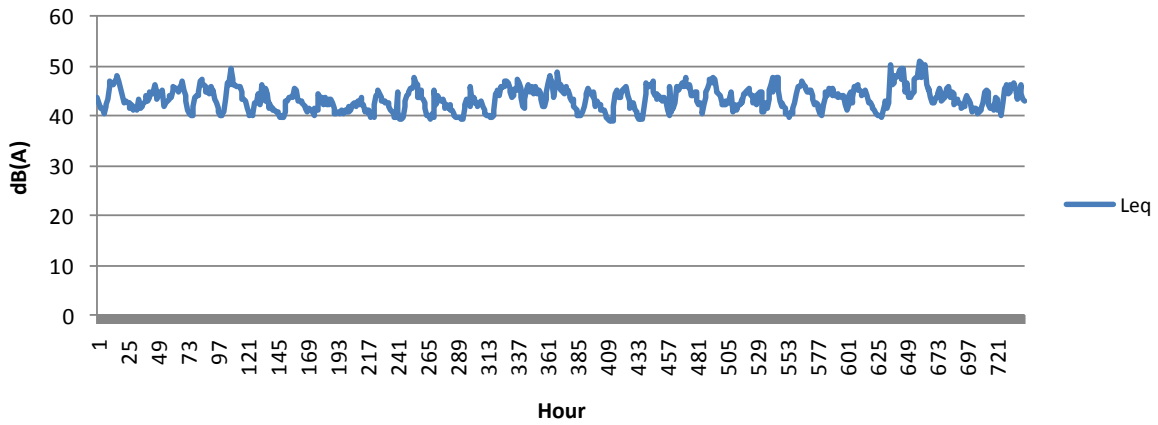




Ranelagh July. Hourly Values



Ranelagh August. Hourly Values



Ranelagh Sept. Hourly Values

