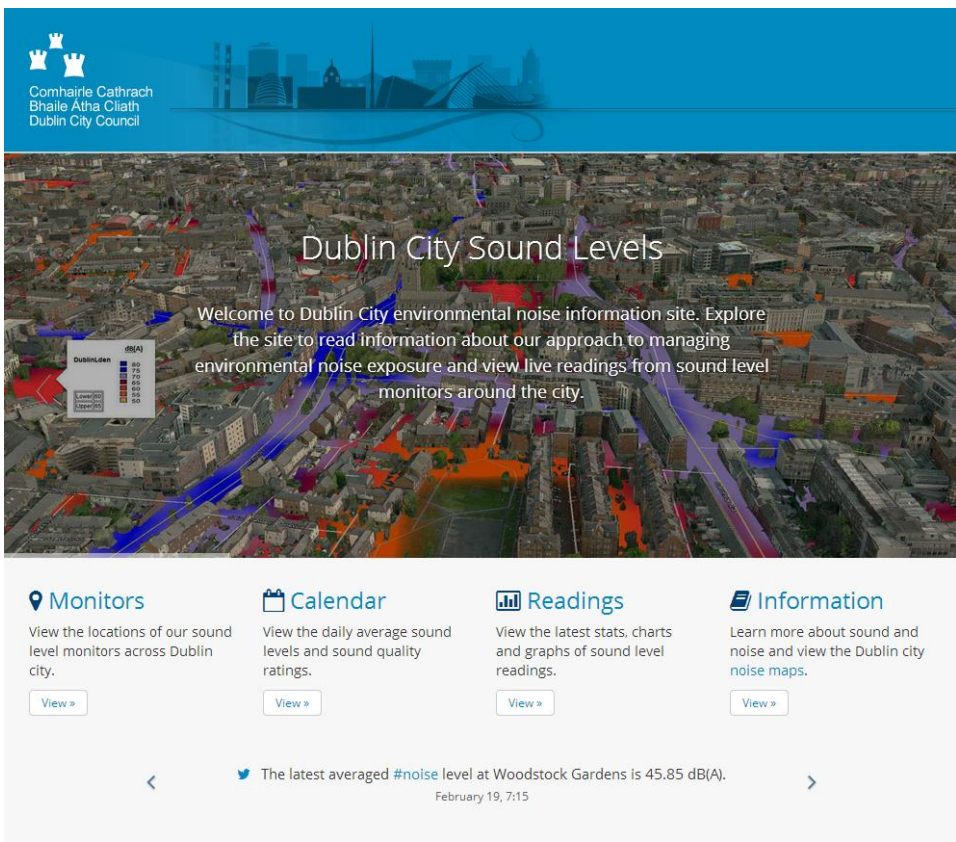


DUBLIN CITY COUNCIL

AMBIENT SOUND MONITORING NETWORK

Annual Report 2014



The screenshot shows the Dublin City Ambient Sound Monitoring Website. At the top is the Dublin City Council logo and name. Below is a large aerial map of Dublin with sound level data overlaid in various colors. A legend on the left indicates sound levels in dB(A) from 50 to 80. The main heading is 'Dublin City Sound Levels'. Below this is a welcome message: 'Welcome to Dublin City environmental noise information site. Explore the site to read information about our approach to managing environmental noise exposure and view live readings from sound level monitors around the city.' There are four main sections: 'Monitors' (View the locations of our sound level monitors across Dublin city), 'Calendar' (View the daily average sound levels and sound quality ratings), 'Readings' (View the latest stats, charts and graphs of sound level readings), and 'Information' (Learn more about sound and noise and view the Dublin city noise maps). Each section has a 'View >' button. Below these sections is a tweet: 'The latest averaged #noise level at Woodstock Gardens is 45.85 dB(A). February 19, 7:15'. At the bottom, it says '© Sonitus Systems 2014' and 'Created and powered by Sonitus Systems'. The website name 'Dublin City Ambient Sound Monitoring Website' and URL 'WWW.DublinCityNoise.com' are also displayed.

Comhairle Cathrach
Baile Átha Cliath
Dublin City Council

Dublin City Sound Levels

Welcome to Dublin City environmental noise information site. Explore the site to read information about our approach to managing environmental noise exposure and view live readings from sound level monitors around the city.

Monitors
View the locations of our sound level monitors across Dublin city.
[View >](#)

Calendar
View the daily average sound levels and sound quality ratings.
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< The latest averaged #noise level at Woodstock Gardens is 45.85 dB(A). February 19, 7:15 >

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Dublin City Ambient Sound Monitoring Website
WWW.DublinCityNoise.com

Produced by
Traffic Noise & Air Quality Unit,
Environment and Transportation Department,
Dublin City Council.

Contact: Ph. 01 2223847; E-mail: noise@cityofdublin.ie

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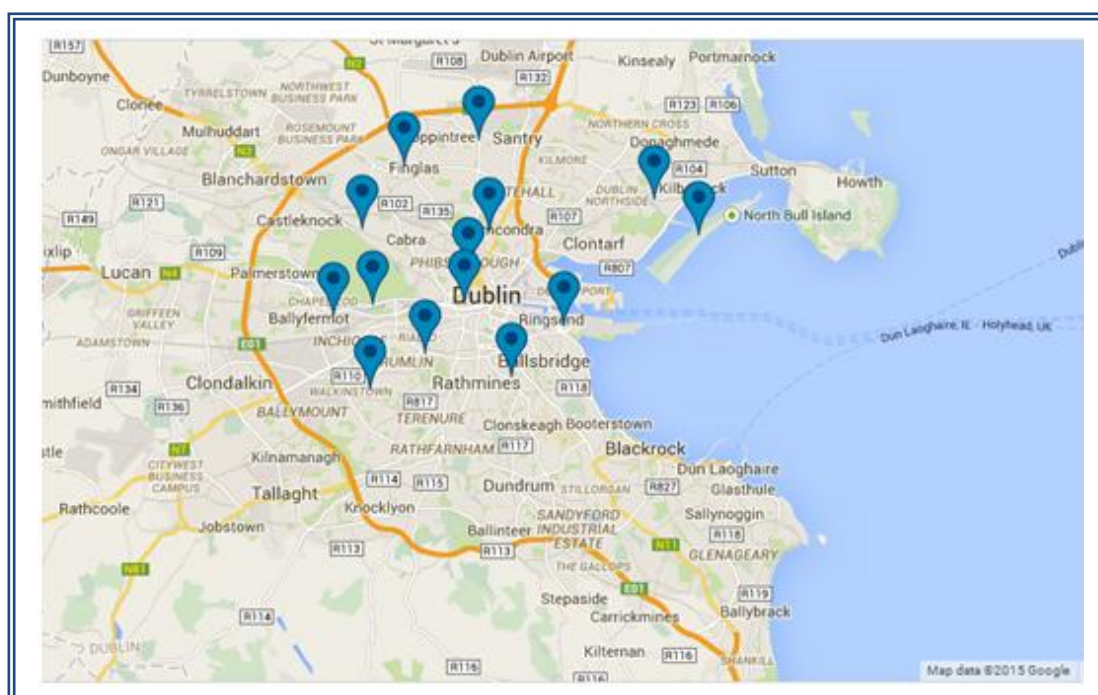
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Introduction

This is the sixth Annual Report for the Dublin City Ambient Sound Monitoring Network. Dublin City Council commenced the installation of a permanent ambient sound monitoring network in 2009. Currently the monitoring network comprises of 14 sites. An additional two sites have been added to the network since 2013. Dolphin's barn site which is in the Dolphin's Barn fire station was added in December 2013 and commenced operation in January 2014. A further site was commissioned in July of 2014 in Finglas, at Mellows Park fire station. The purpose of the network is to measure outdoor ambient sound levels in the City, at sites which are representative of typical sound levels to which citizens are being exposed. It does not measure 'Noise Levels' – See *'What is Noise?'*

Fig. 1 Sound Monitoring Sites - 



It should be noted that sites are selected so that, in so far as is possible, no single dominant sound source, such as major roads, road junctions, industrial sources etc. have a disproportionate influence on the outdoor ambient sound levels being measured. The network currently consists of 14 monitoring locations. These are:-

- 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.
- Blessington St, D1, Blessington Basin
- Millmount Avenue, D9,
- Percy French Road, D12, Walkinstown Library.
- Ringsend, D4, Irishtown Stadium.
- Woodstock Gardens, Ranelagh, D6.
- Chancery Park, Dublin 1, Public Park.
- Dolphin's Barn, Crumlin Rd, Dublin 8.
- Mellows Park, Finglas, Dublin 11.

Dublin City Council Sound Monitoring Website

Our website dedicated to displaying near real-time ambient sound monitoring was thoroughly revamped in 2014 in order to make it more user friendly. One can now see current sound levels at a glance, but can get further historical data by clicking on the provided links and 'drilling down' further into the data. Links are also provided, leading to information as to what the measurement parameters mean and Information on acoustics in general. The revamp of the site was carried out by its original designers – Sonitas Systems, a Trinity College campus company who have also developed the hardware used in the monitoring network. Dublin City Council's collaboration over the years with Trinity College and Sonitas Systems has been of mutual benefit. We would like to feel that this collaboration has enabled Dublin City to continue to be one of the leading cities, not just in Ireland but in Europe, in relation to making available information to the public on long term continuous ambient sound monitoring. As mentioned in last year's report we continue to provide this data to the European Environment Agency's 'Noise Watch' crowd sourcing environmental website. Near real time monitoring data can be found at our website link: <http://www.dublincitynoise.com>. General information on noise, acoustics and associated links can also be found there.

Monitoring Network

The monitoring network measures continuously, 5 minute parcels of sound right throughout the year. These periods of 5 minute sound levels are then converted and presented as average hourly sound levels in decibels (dB (A)). This enables the compilation of *day, evening, night, and Lden* statistics. The averaging of measured data has been carried out logarithmically rather than normal arithmetical averaging. This is in line with the International Standards Organisation 'Recommendation 1996' in relation to long term measurements. The use of this method tends to assign a greater influence on the overall average by higher sound levels for the period being measured. For example, an arithmetical average of four sound levels such as 50dB, 50dB, 50dB and 70dB will result in a 55dB average. Averaged logarithmically these values produced a result of 64.1dB. Therefore it is critical that our sound monitors are so located that no one sound source dominates the sound measurements that could unduly skew the average ambient measurements.

What is Noise?

As already mentioned, our monitoring network measures sound, not noise. So what is 'Noise'? An authoritative report published in the UK in 1963 – known as the Wilson report, defined noise as "sound which is undesired by the recipient". For a noise problem to exist, people and their feelings must be affected, and its assessment is a value judgement rather than a precise physical measurement. The Report also noted that it is well known that the actual loudness of a noise is not by itself a measure of whether it will give rise to annoyance or complaint. The reaction of the hearer is affected, for example, by the type of sound, by whether it occurs during the daytime or at night, by the general level of noise already existing and by whether the hearer has become accustomed to it.

Noise Annoyance, is a term generally 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).*

So what turns a 'physical sound measurement' into a 'subjective noise level' causing annoyance is dependent on the context within which the observer hears the sound/noise. As such, quoting sound levels without putting them into context is somewhat meaningless. This report provides a site location map for each site in order to enable the reader to put the site and its measurements into the context of its physical surroundings i.e. – is it close to a main road, is it in the City or suburbs, is it a Quiet Area? It also defines the time periods over which the measurements are taken.

Guidelines\ Standards for exposure to Ambient Sound levels

Sound emission criteria for 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 Environmental Protection Agency Act 1992. There are no legally binding statutory limits for ambient sound levels, similar to those that currently exist for air quality.

Measurement Parameters

The European Commission requires the use of a parameter called the Lden (Sound Level for Day, Evening and Night) for population exposure assessment. This measurement parameter of *Day-evening-night level* is a descriptor of average daily sound levels throughout a full year, with the addition of a penalty of 5 dB (A) for evening sound (i.e. 19.00-23.00) and a penalty of 10 dB (A) for night time sound (23.00-7.00). Lden has been put forward as a single value parameter for the quantification of annoyance caused by noise. Its one drawback is that it is based on annual average calculations. Therefore, one has to have annualised data before one can use it in any assessments. Our monitoring network fulfils this criteria. Therefore, our assessments of Dublin's environmental acoustic quality is not solely dependent on mathematical computer modelling. The Lden parameter is not a suitable parameter for the assessment of local noise complaints. Average values, or maximum or minimum values over specific periods of time would be more suited to this use.

Areas with desirable\undesirable or high\low sound levels

The Dublin City Council Noise Action Plan December 2013 – November 2018 proposes that areas with undesirable high sound levels are areas with a night time sound level greater than 55 decibels and a daytime level greater than 70 decibels. It also proposes that areas with desirably 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

These guidelines propose a **Night Noise Guideline (NNGL)** ultimate target of 40dB L_{night} outside. An interim target (IT) of 55 dB L_{night}, outside is recommended '*in the situations where the achievement of the NNG is not feasible in the short run for various reasons*' - WHO.

Data Loss

Loss of data is mainly due to the drifting of the calibration of the microphones or power failure at a site. Data which could not be verified with monitor calibration was discarded. There was no instance of vandalism at any of the sites.

Sound Sources

Since commissioning our network in 2009, the measurements indicate, supported by computer modelling, that under normal conditions the dominant sound source in Dublin is traffic. This sound comes from two aspects of traffic – the road surface i.e. wheel\tyre interface where sound levels increase with speed and secondly, engine\ gear change and body rattle sound, normally observed at lower speeds. The average daily summary charts (pages 16 - 23) display double peaks, one between 7-9 a.m. and one between 5-7p.m. These characteristics are similarly to traffic flow patterns on major roads. The charts that do not reflect these characteristics represent areas that are influenced by more natural sounds – sites such as Bull Island.

Weather also has a major influence on our sound measurements. In 2014 very high winds and heavy rain were experienced over a number of periods throughout the year. These episodes are picked up as high sound levels in the hourly and monthly summary charts, (pages 26 -108). Again this year, Bull Island measurements displayed relatively high sound levels during these weather episodes. It is therefore important to reiterate, that an increase in sound levels over a particular period may not necessarily mean an increase in 'noise levels' – noise normally being defined as 'unwanted sound'.

The monitoring site locations are displayed on maps to the rear of this report and provide an indication as to the type of areas in which they are situated. Bull Island, as previously mentioned, tends to be the most erratic site, in that there is no readily discernable pattern to the measured levels. This site is impacted more by the time of the tides and weather rather than sounds from traffic and human activity. Both Bull Island and Blessington Basin sites are designated 'Quiet Areas' and monitoring at these locations will continue into the foreseeable future in order to assess any deterioration in ambient sound levels.

Summary of Results

The measurements for the year 2014 indicate that four locations – Ballymun, Ringsend, Chancery Pk. and Bull Island exceeded the undesirable values of 55dB night\70dB day, with night time values of 58dB(A), 58dB(A), 58dB(A) and 62dB(A) respectively. This also

meant that the WHO NNGL interim target for exterior night time level of 55dB (A) was also exceeded at these sites, although the network average as a whole was below this level with a value of 54dB(A). Two sites – Woodstock Gardens in Ranelagh, and Raheny, met the desirable criteria for night time levels. All sites were well below the undesirable daytime levels of 70dB (A).

Bull Island's sound level is interesting in that this locality has been designated as a 'Quiet Area'. It is considered that the relatively high sound levels measured are due to high winds and wave sounds during the atypical weather events during the year. As already mentioned, the logarithmical averaging of sound measurements tends to assign a greater influence on the overall average by higher sound levels for the period being averaged, even if that period is as long as a year. Indeed the weather seemed to have a greater impact on the traditionally quieter areas measurement's such as Raheny, Ranelagh, Ringsend, and Blessington Basin, and to a lesser extent Walkinstown. See charts on pages 18 -21.

Set out in *fig.2* is a comparison of the Network averages from 2012 to 2014. The 1dB increase year on year in the LDEN is insignificant when the atypical weather conditions are taken into consideration. This follows on from a marginal decrease of 0.5dB for 2012 over 2011 figures. Figure 3 provides more detail on individual site measurements.

Fig.2

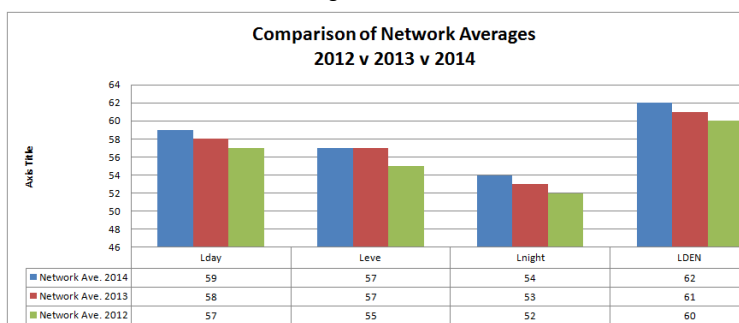
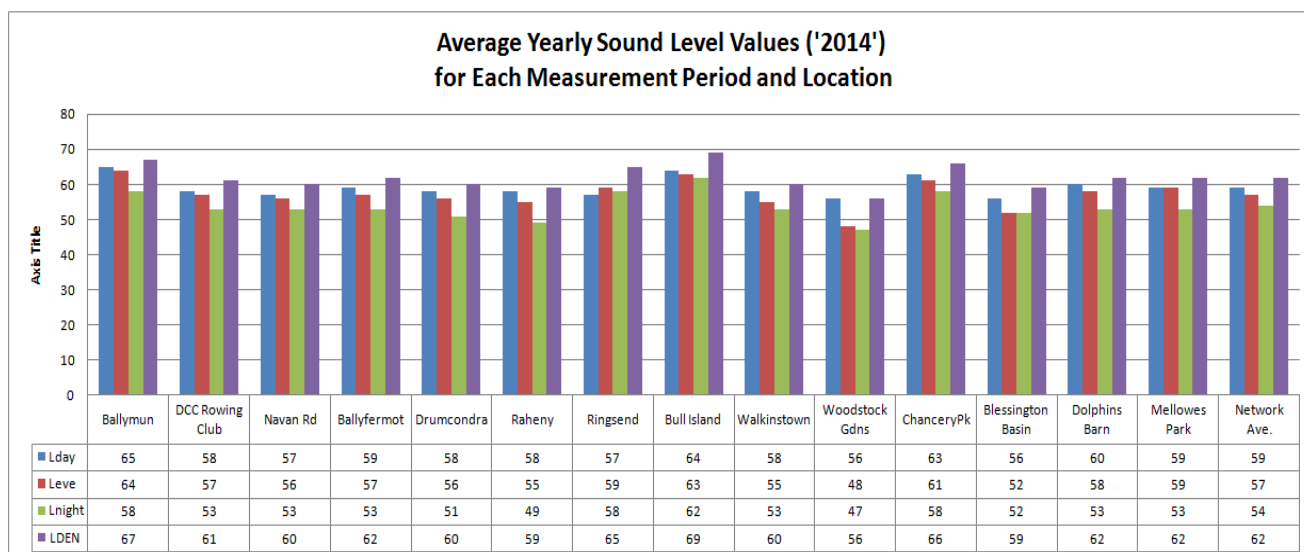


Fig.3



Measurement Results

As mentioned previously, the monitoring network is not a 'noise monitoring' network. The network measures and monitors actual sound - from all sources. No assessment is made as to whether it is unwanted or not. Only when a comparison is made, for instance in this report, with some valid criteria, can a judgement be made as to whether the sound levels are desirable or not. Bull Island is a case in point. It has produced some of the highest sound levels measured of all the monitoring locations. This is due to high winds and rolling waves. Now, most people would consider the sound from high winds and rolling waves as bracing and refreshing while going for a walk along the beach and would actually enjoy being exposed to such sound. Therefore it has to be borne in mind that the ambient sound monitoring network measures all sound from all sources thus giving an indication of the amount of sound - not noise, the general population is exposed to from the hustle and bustle of daily life.

This sixth year of continuous measurements has confirmed the view that traffic is the dominant sound sources at most sites. Hourly sound values 'shadow' traffic volumes as they vary throughout the day. This can be seen in the daily summary charts (page 16-23).

As already mentioned, weather also has an important influence on sound measurements. Exceptional wet and windy episodes were experienced in 2014. These periods had a significant influence on the network measurements. On our website (www.dublincitynoise.ie) we have included average wind and temperature values and an indication as to likelihood of rain, alongside average daily sound values. These can be viewed through the 'Calendar View' page.

Comparison of the Network Lden values with last year shows no significant change in 2014 values over 2013 – one decibel increase. On an individual site by site comparison, the Lden for Ballymun, Chapelizoid, Navan Road, Ballyfermot, Drumcondra, Blessington Basin, and Chancery Park were identical to last year, (2013). Ringsend, Walkinstown and Ranelagh were higher than 2013 results, whereas Raheny and Bull Island were marginally lower. The two new sites, Mellowes Park in Finglas and Dolbhin's Barn in Crumlin, which are both located in fire stations, gave identical Lden values of 62dB(A). This puts them in the top half of the sites in relation to high sound measurements.

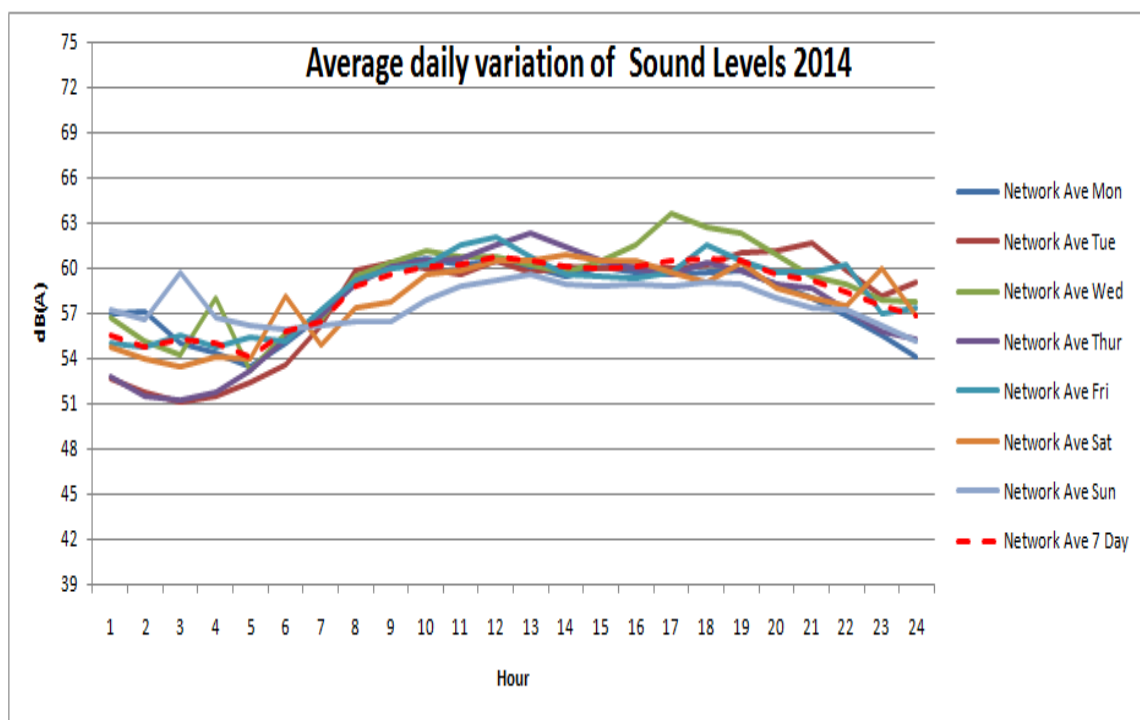
Sound Level Variations

The average daily summaries 'Average LAeq' (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 weekday sound levels (along with traffic levels) start rising at 6 a.m. After approximately 9 a.m. sound levels at most sites level off until 9pm when they start to fall. This year it is interesting to note the somewhat 'erratic' sound levels at Raheny, Ranelagh, Ringsend, and Blessington Basin, and to a lesser extent Walkinstown, where weather seemed to have a greater impact on the traditionally quieter areas measurement's -see charts on pages 18 -21.

The sites with the lowest daytime sound values were Woodstock Gardens and Blessington Basin followed by Navan Road and Ringsend tying for third. The three sites with the highest daytime sound values were Ballymun, Bull Island and Chancery Park – the same as last year. The sites with the lowest night time sound values were Woodstock Garden, Raheny and Drumcondra. The sites with the highest night time sound values were, Bull Island, with Ballymun, Ringsend, and Chancery Park tying for second.

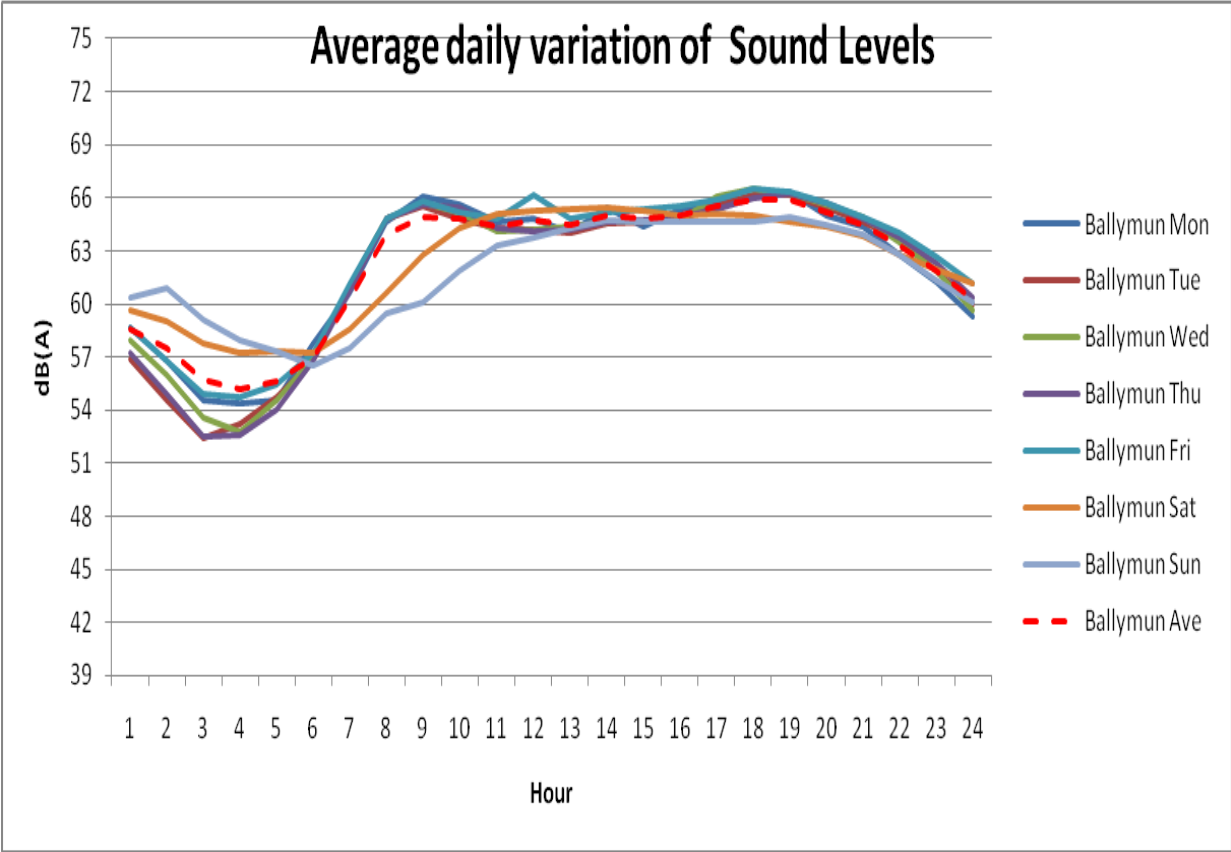
The Monthly Charts presented to the rear of this report provide a detailed view of how average daily sound levels change from day to day and month to month. In 2014, the Network's highest average monthly sound levels occurred in February, followed by December and January. The Network's average monthly lowest levels were experienced in June followed by July and September. This year a median value is provide on the 'Hourly Value Charts'. This is represented by a red horizontal line which marks the mid-point of the hourly data above and below which 50% of the data would reside, if arranged from the lowest value to the highest value.

Fig.4

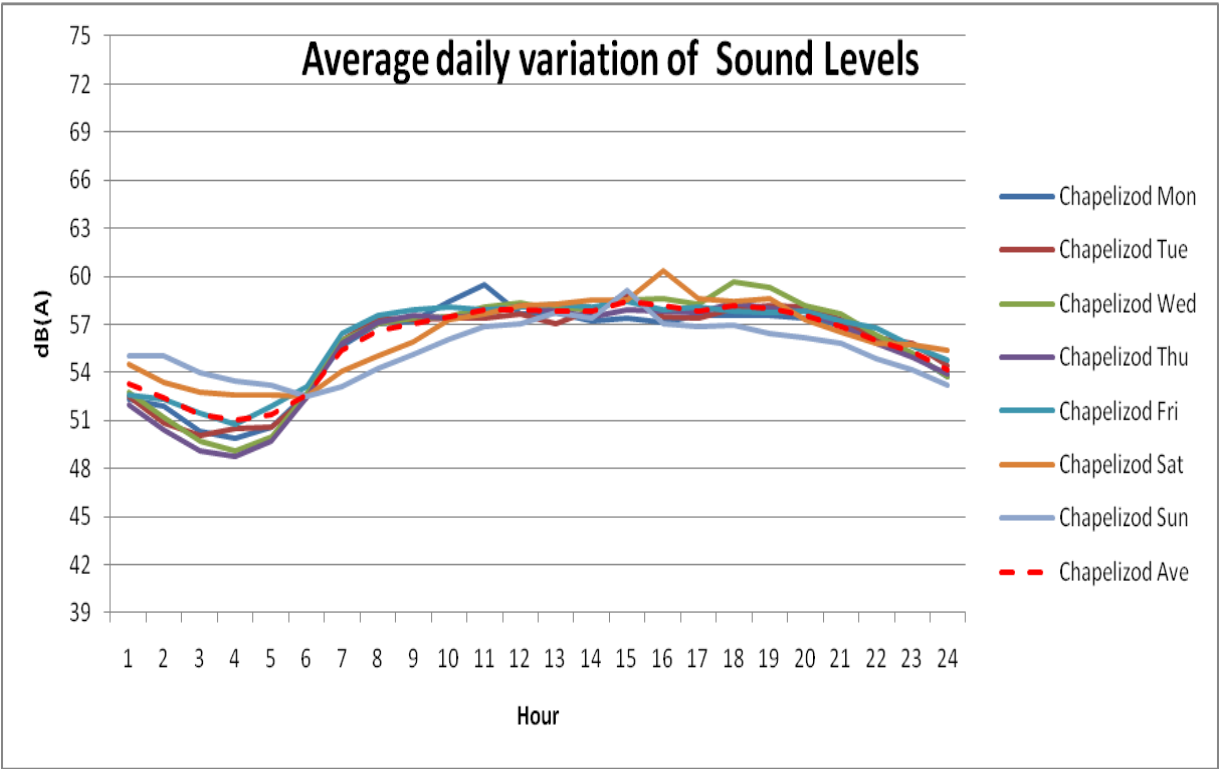


Average Daily Summary Charts

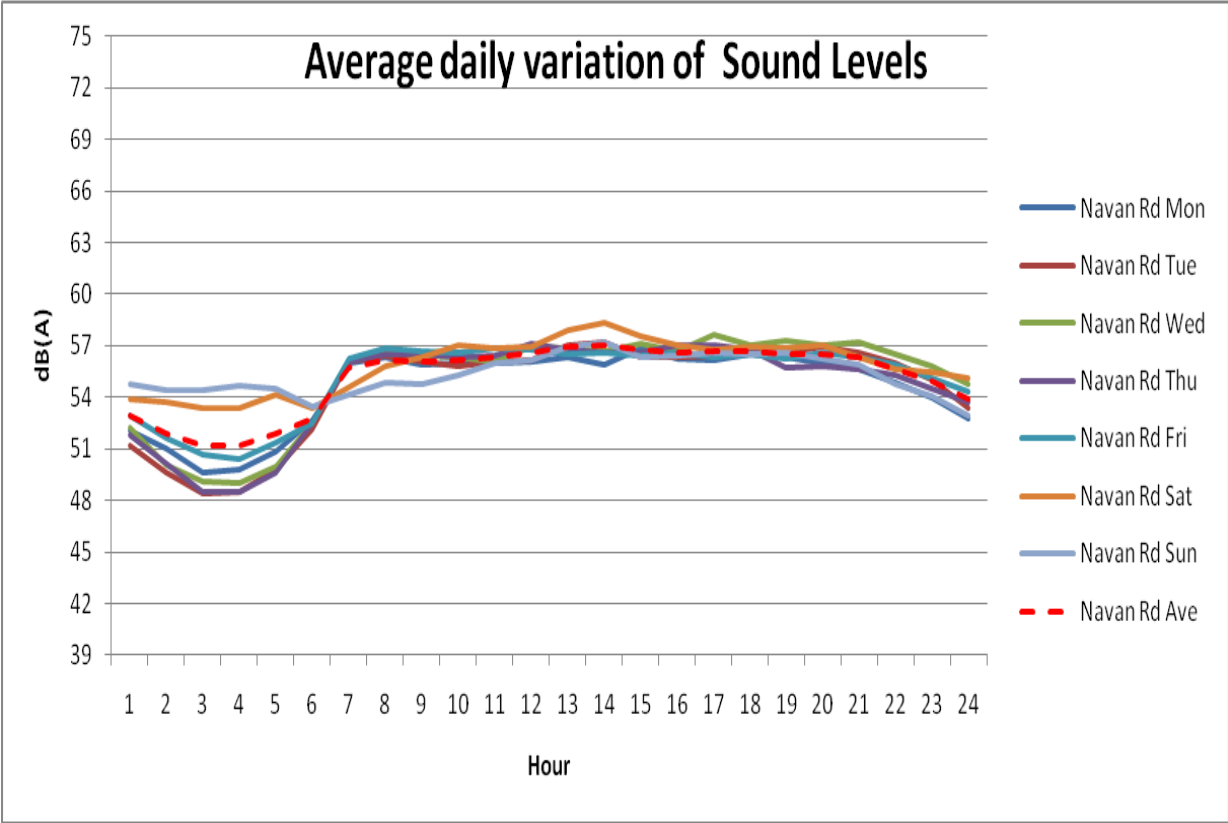
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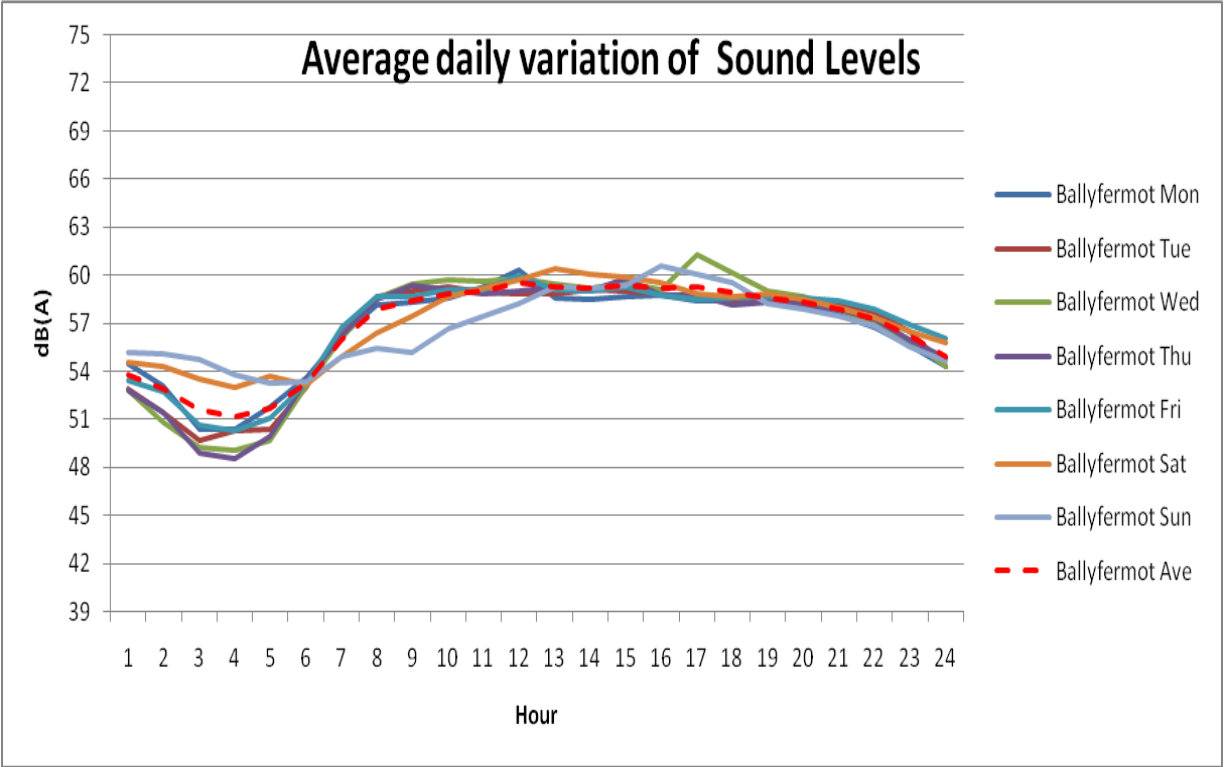
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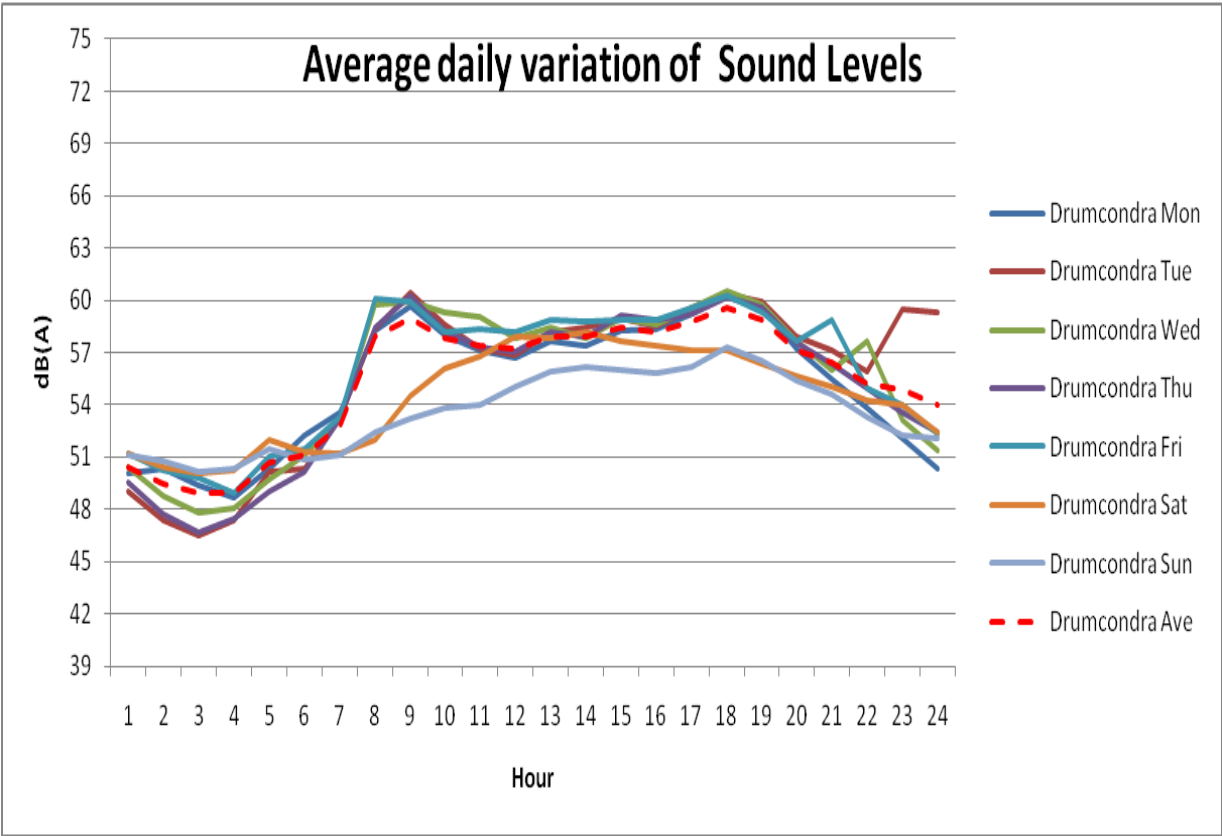
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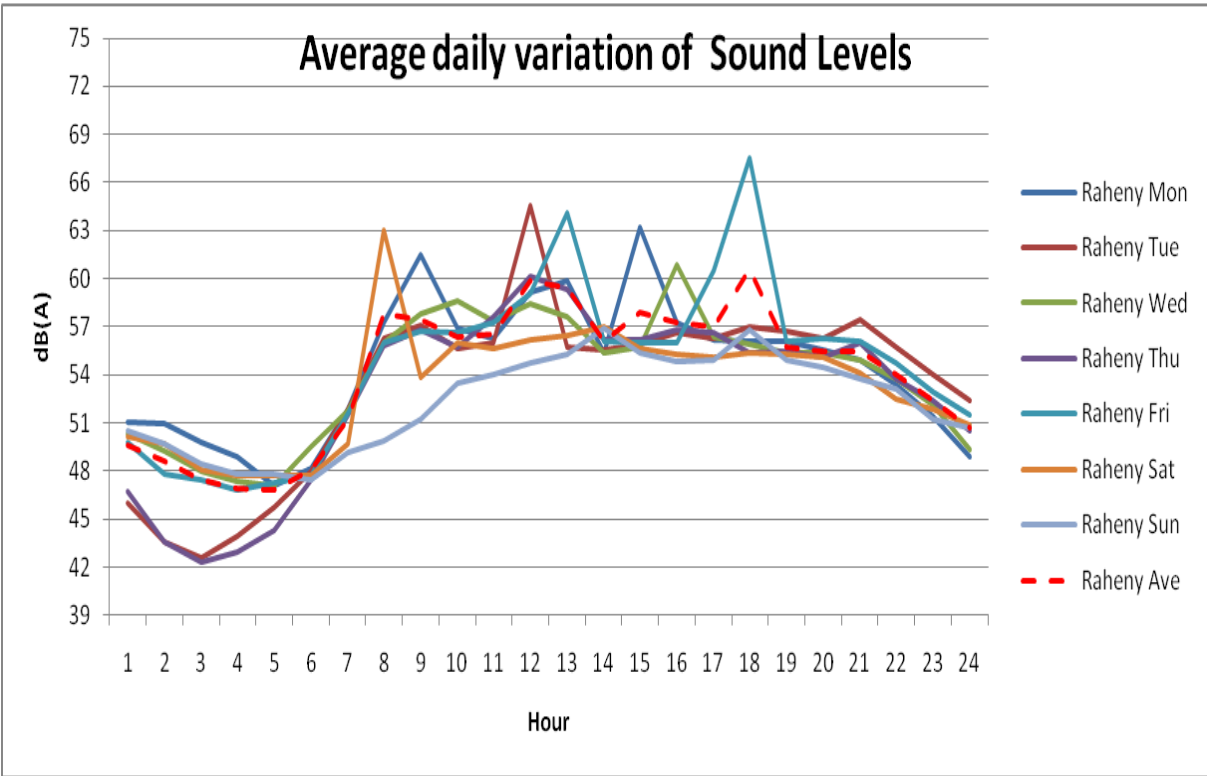
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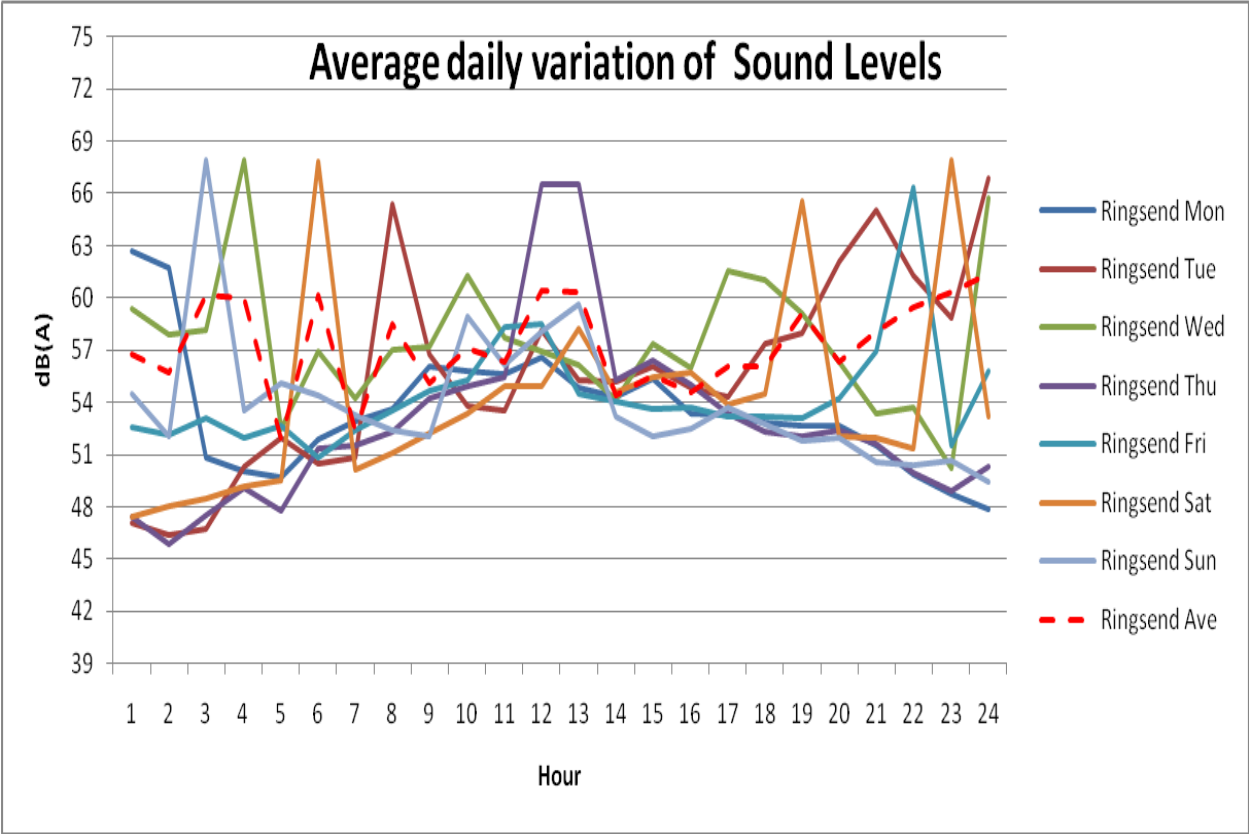
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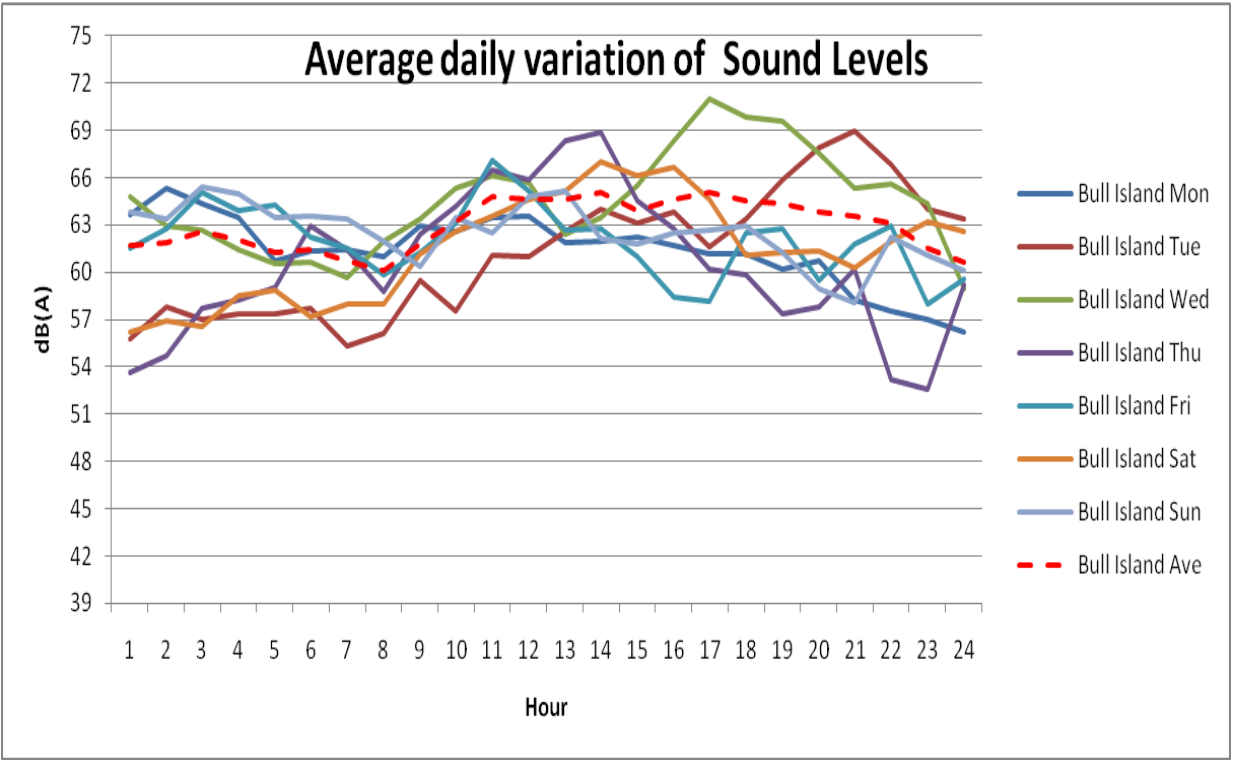
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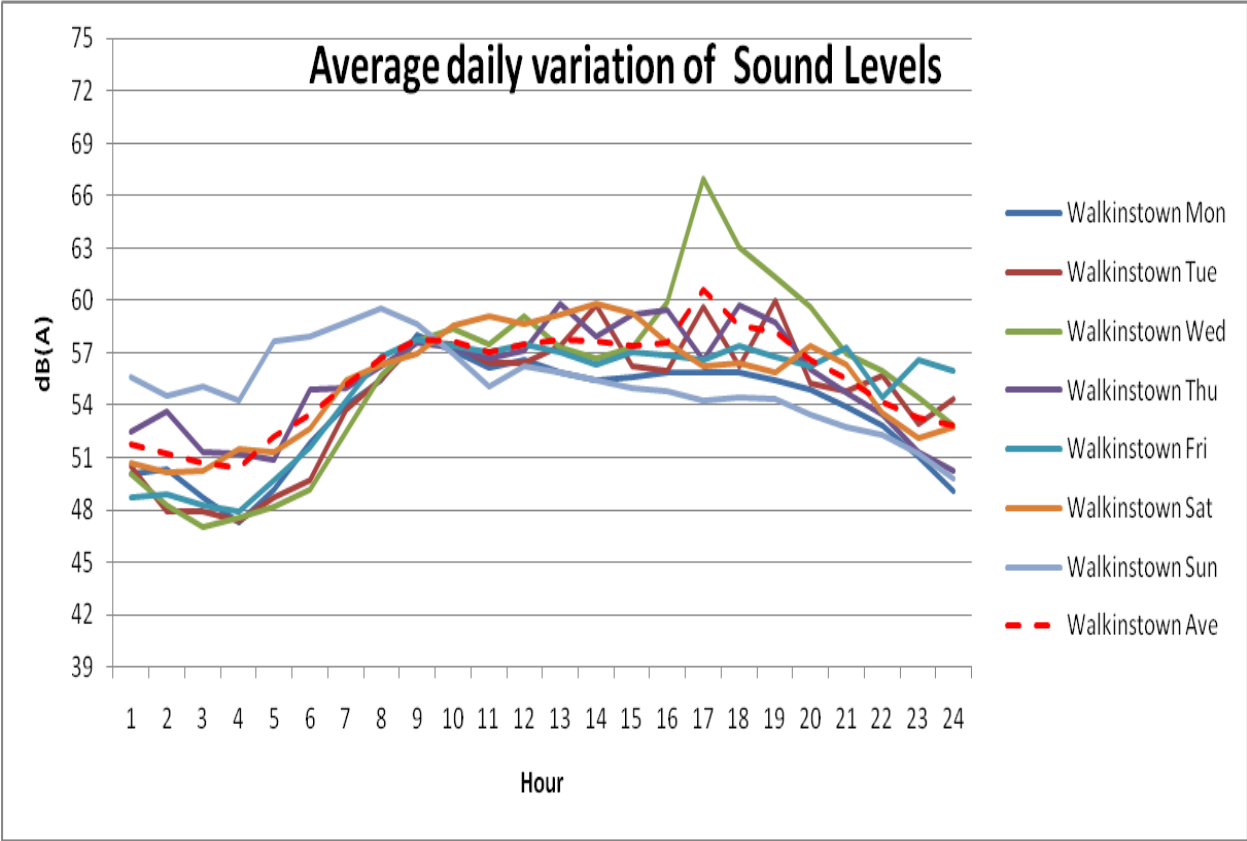
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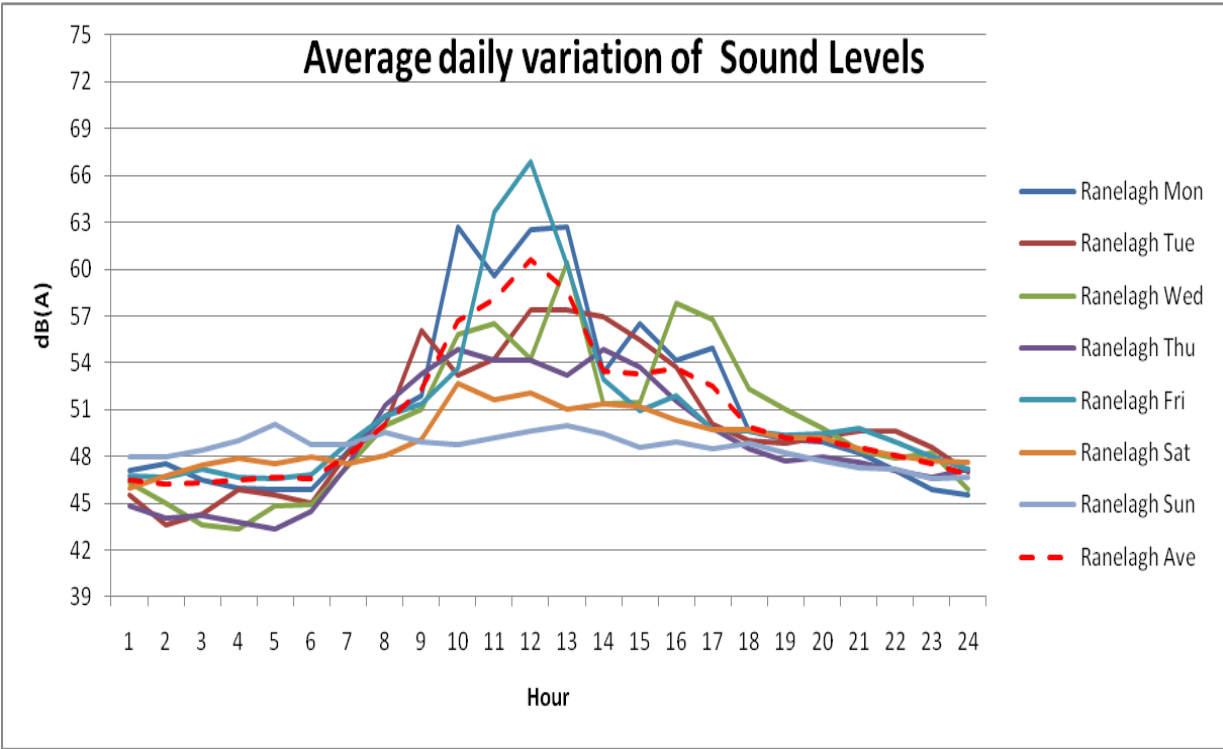
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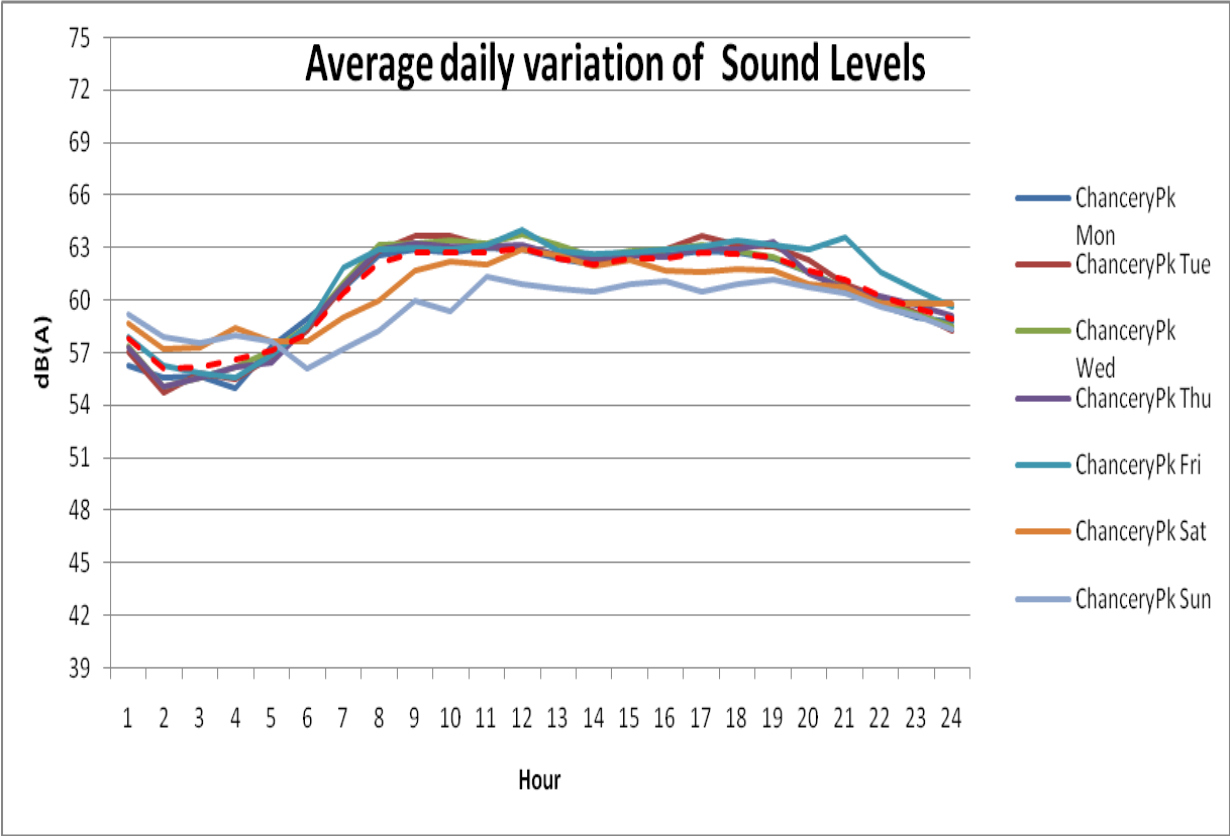
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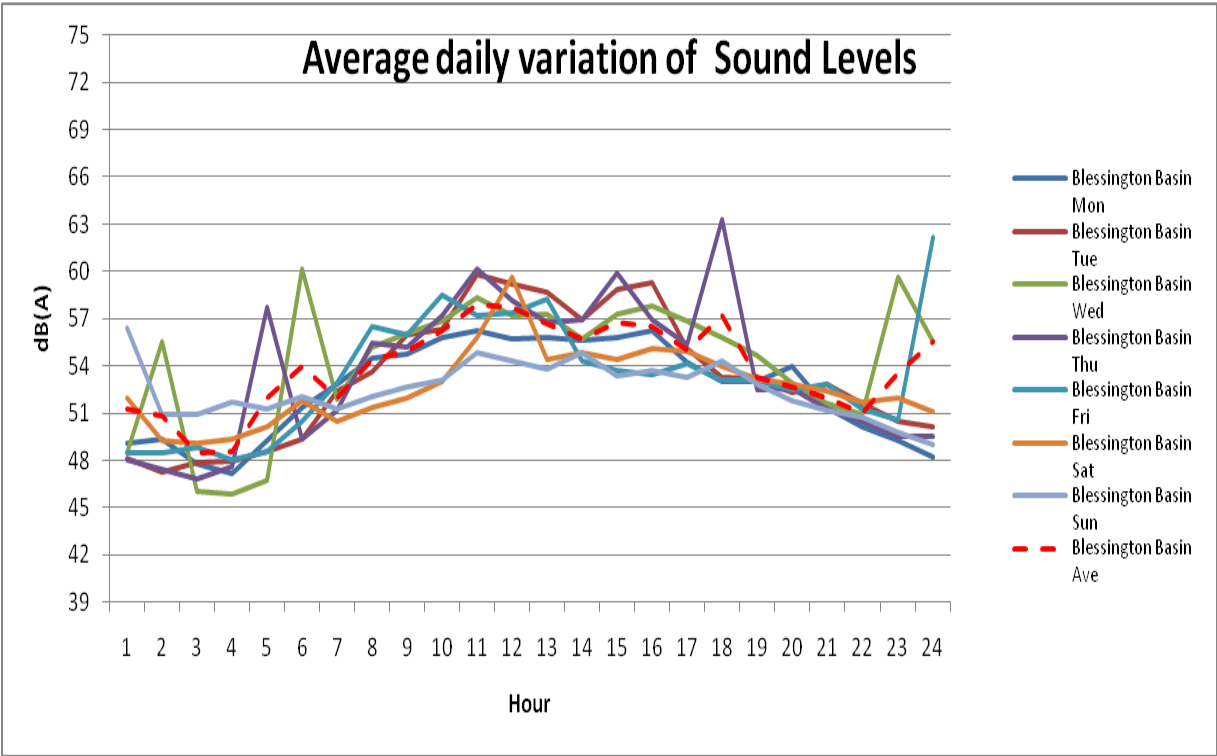
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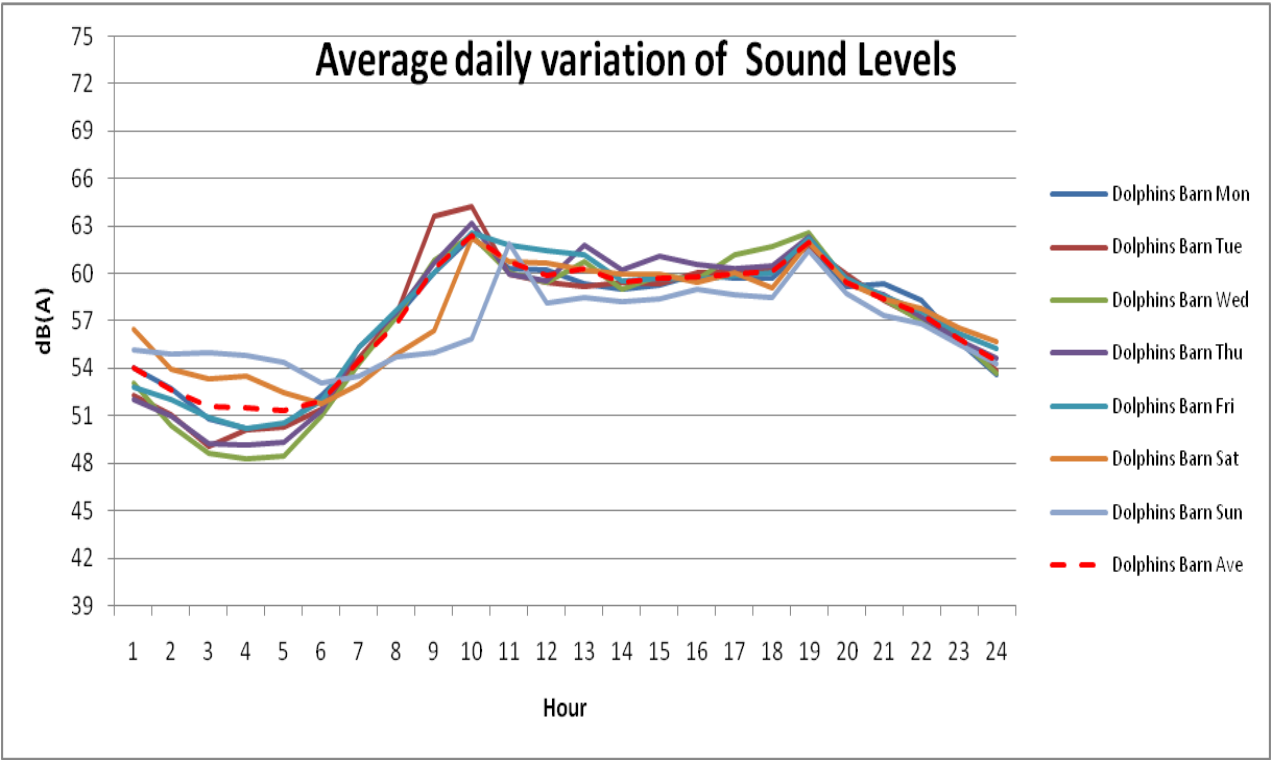
CHANCERY PARK



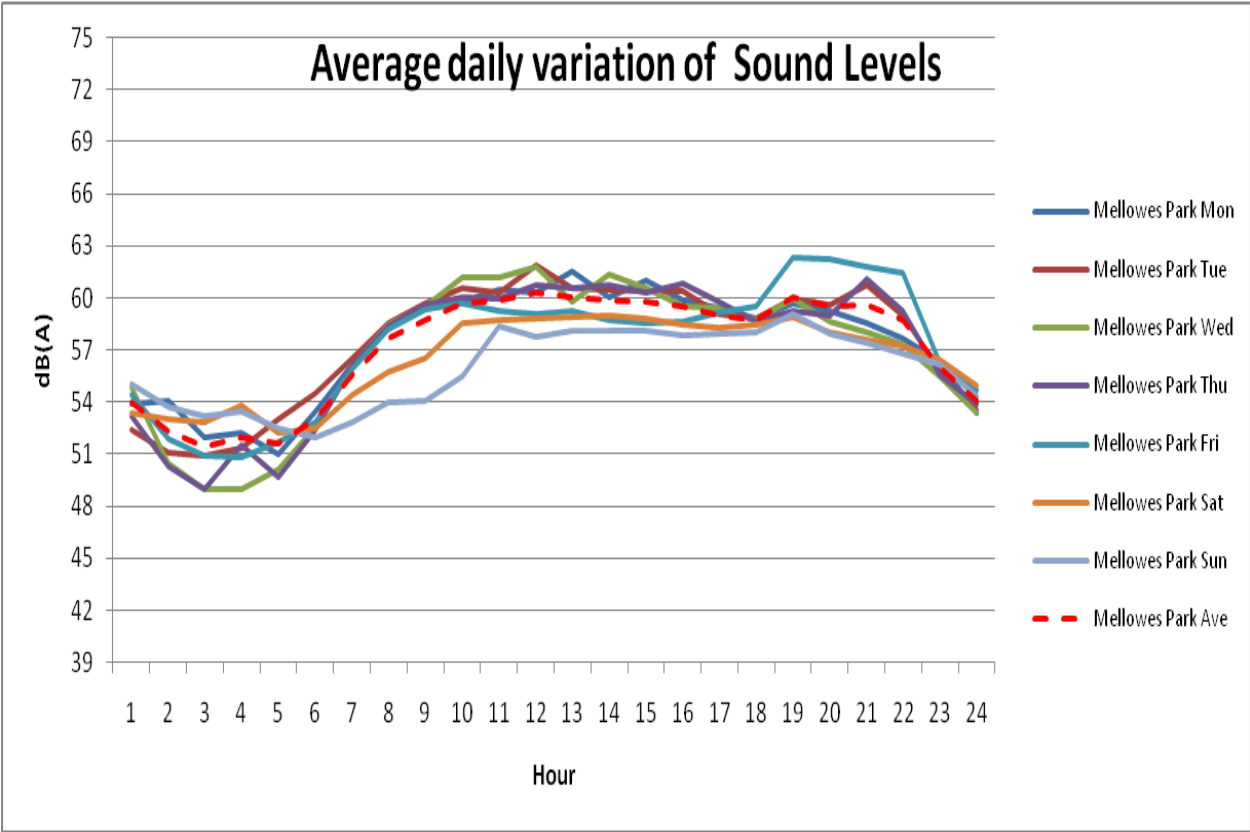
Blessington Basin



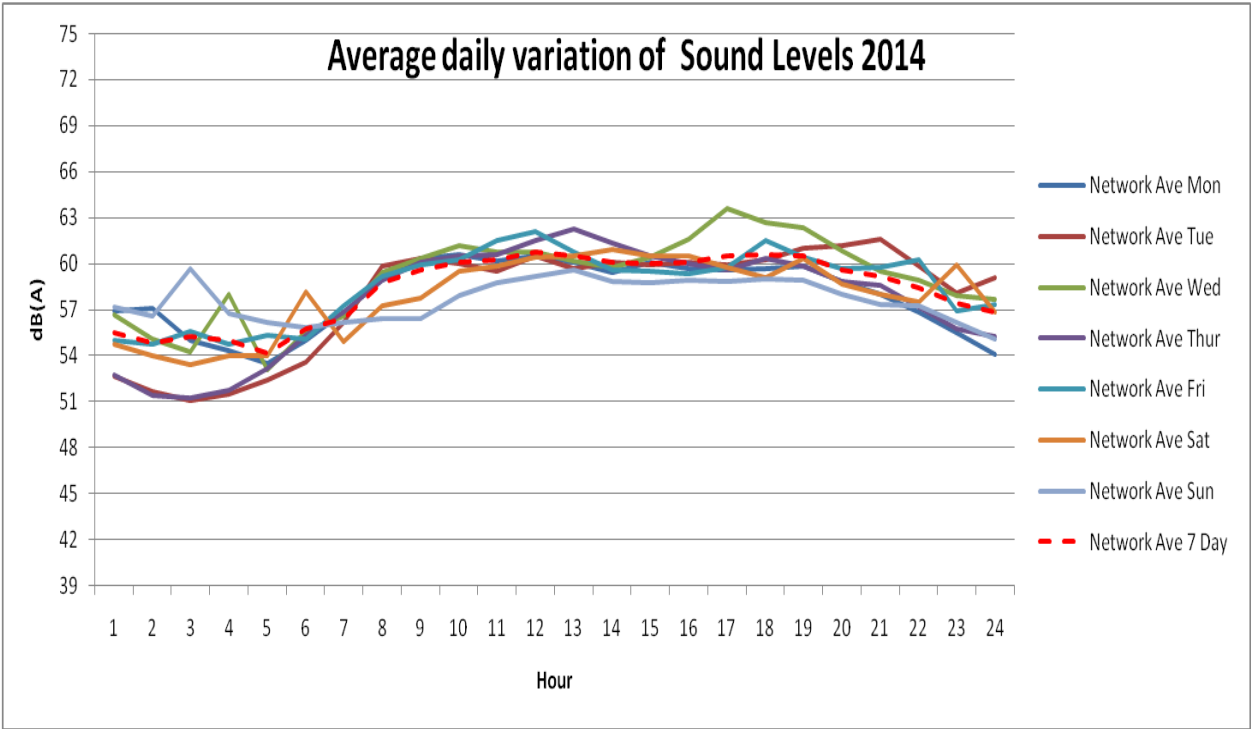
Dolphin’s Barn



Mellowes park

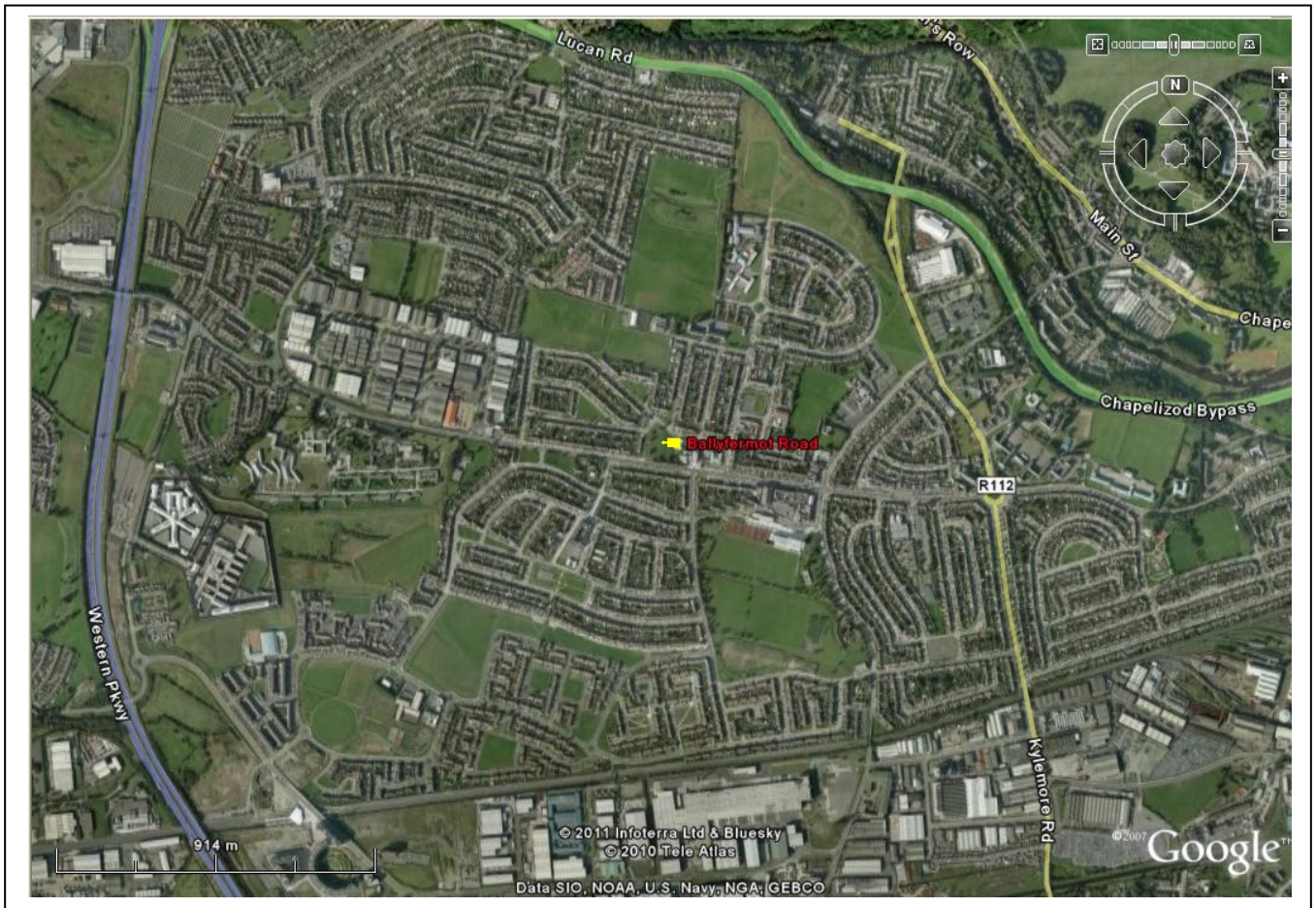


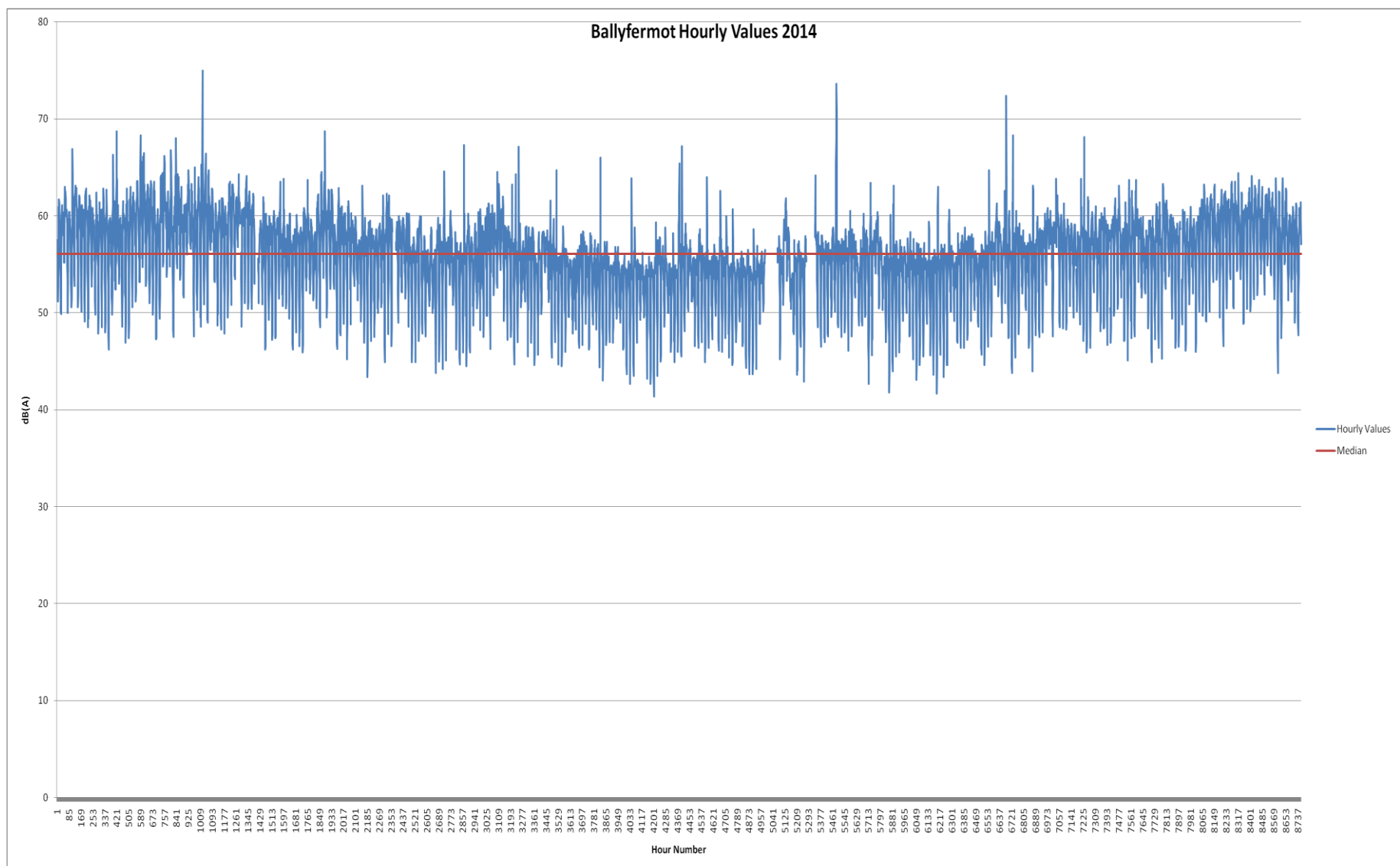
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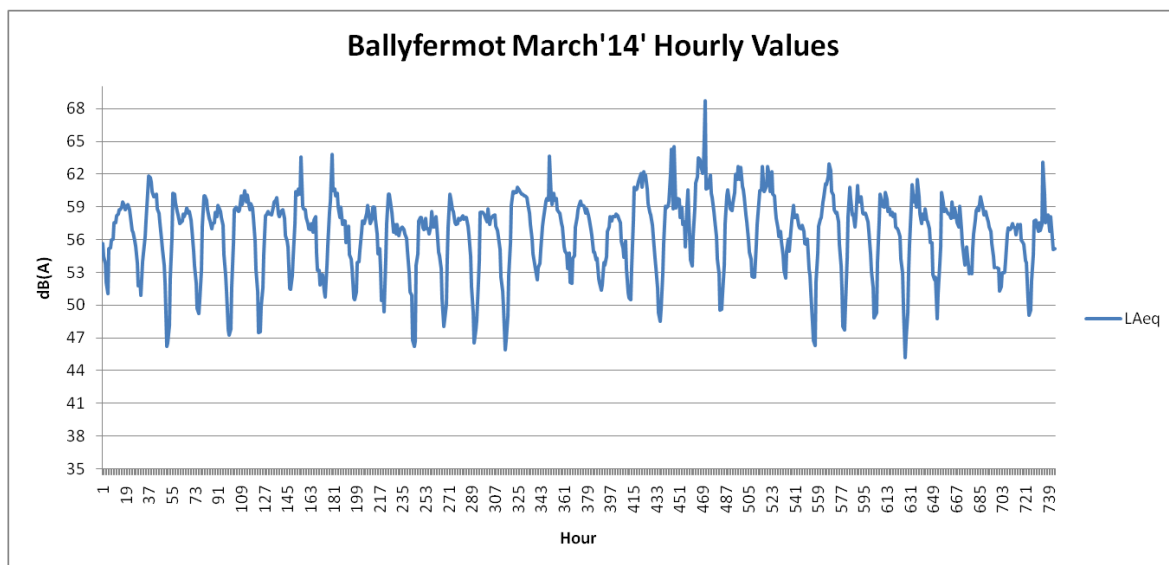
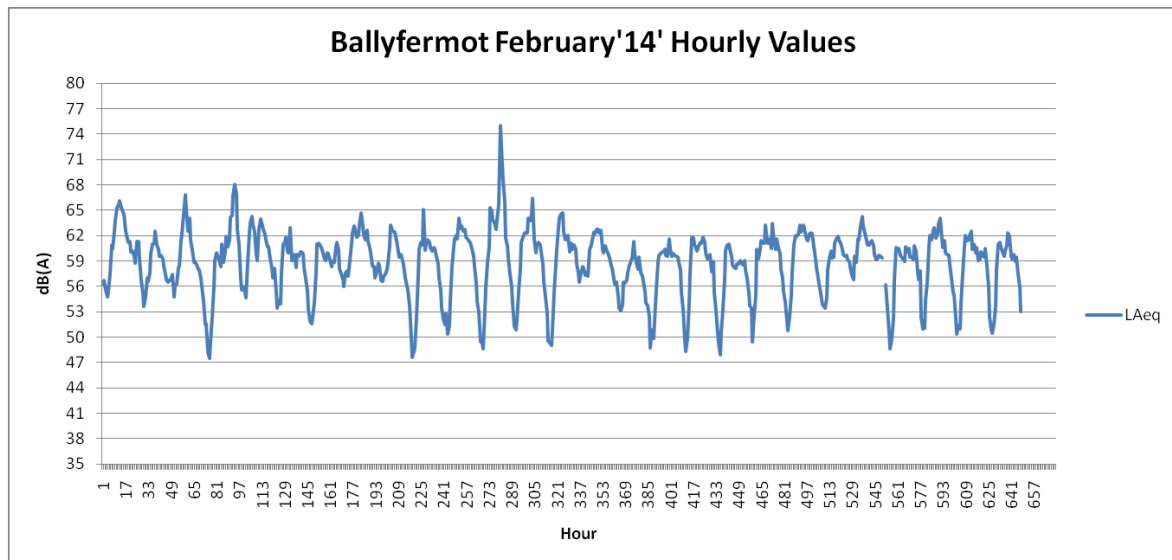
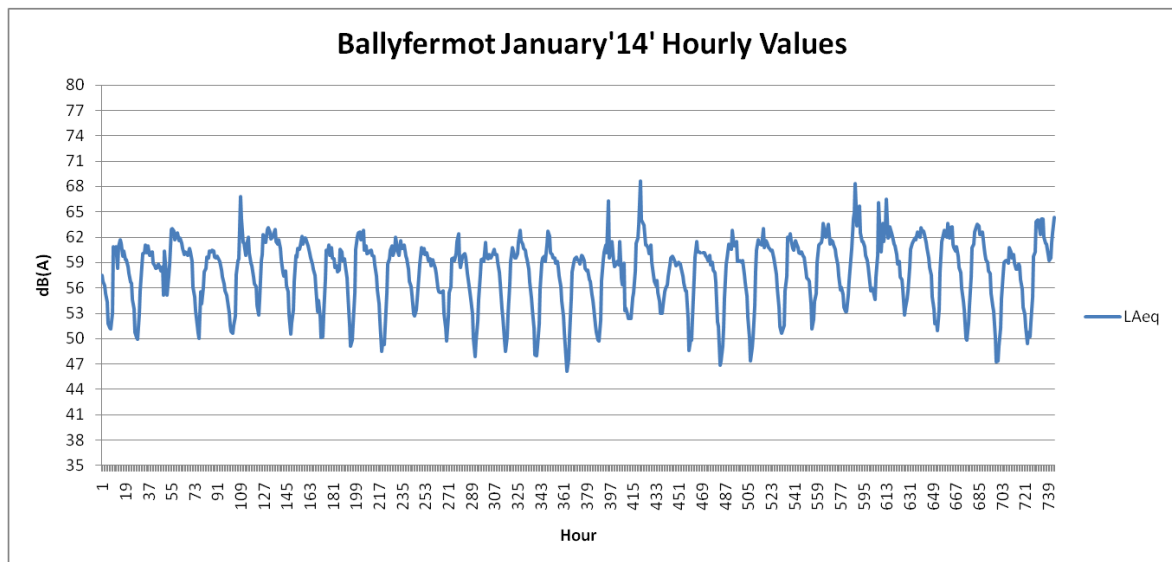


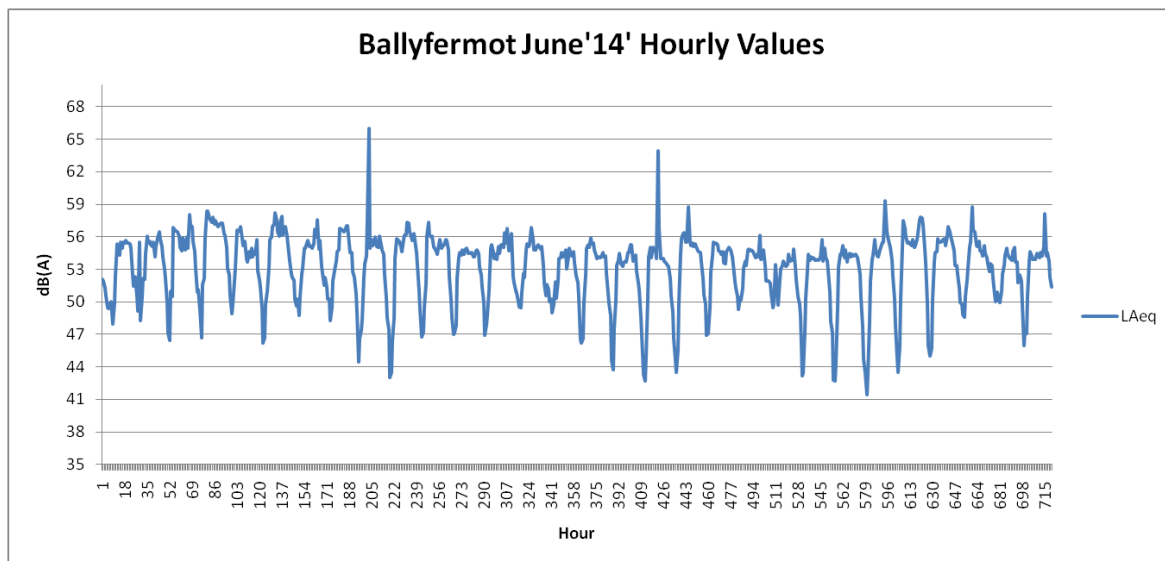
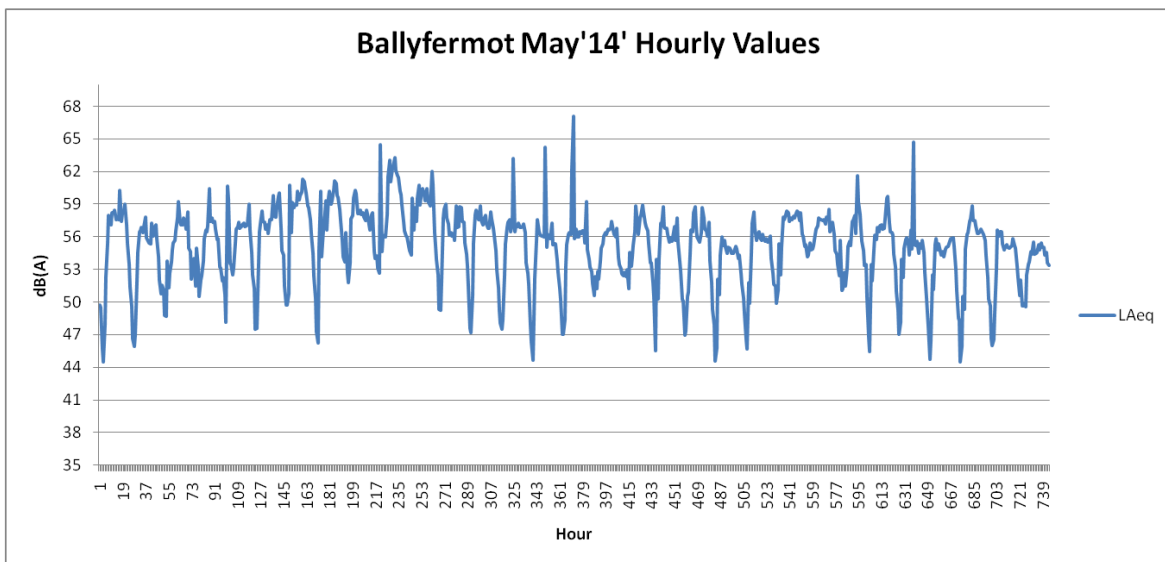
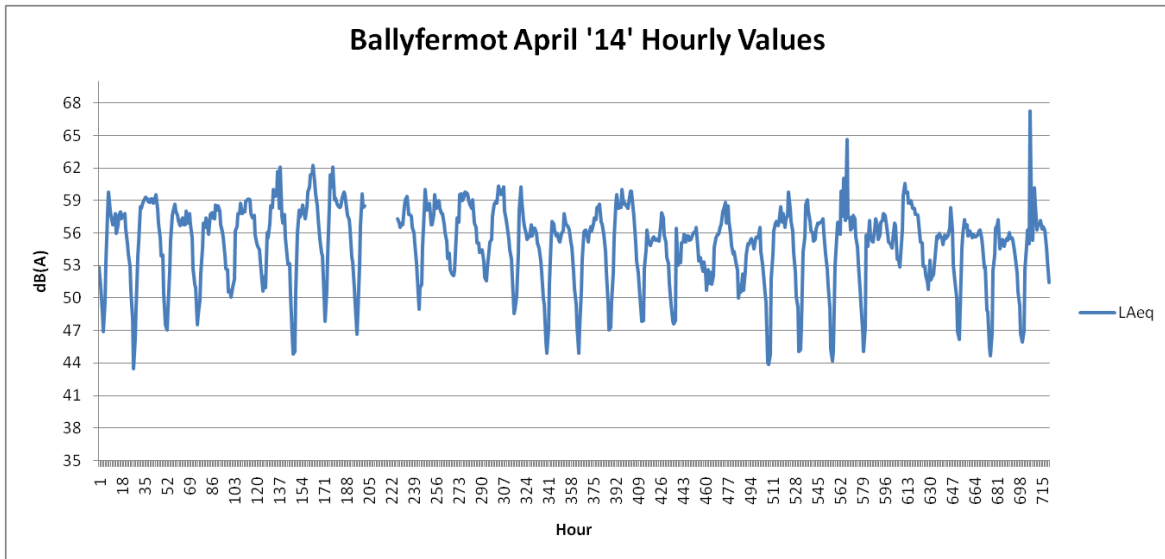
Monthly Summary Charts

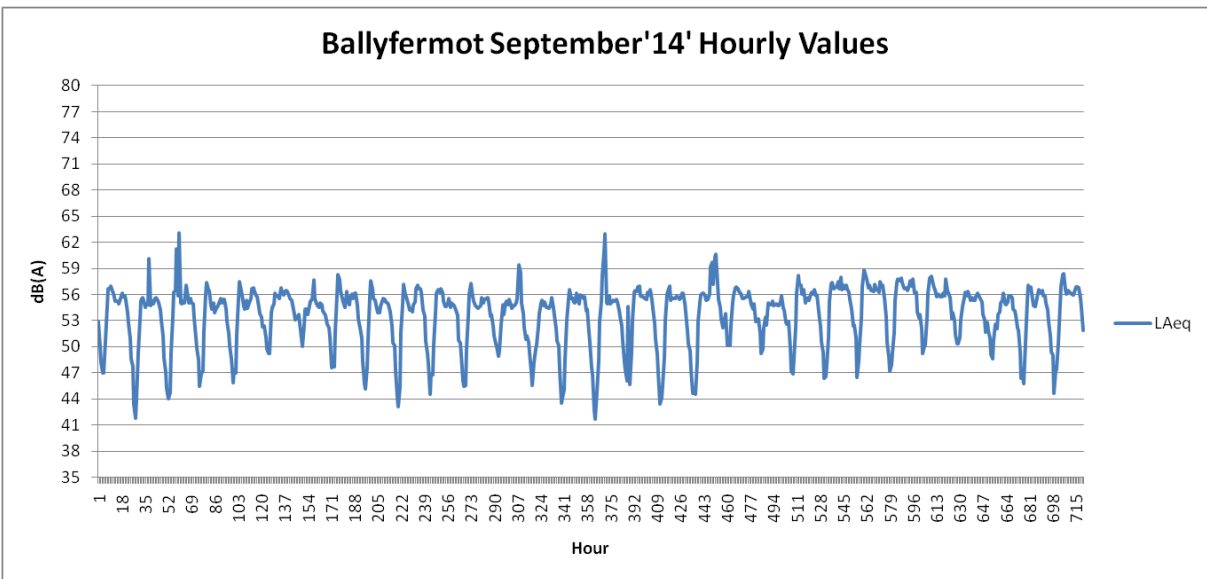
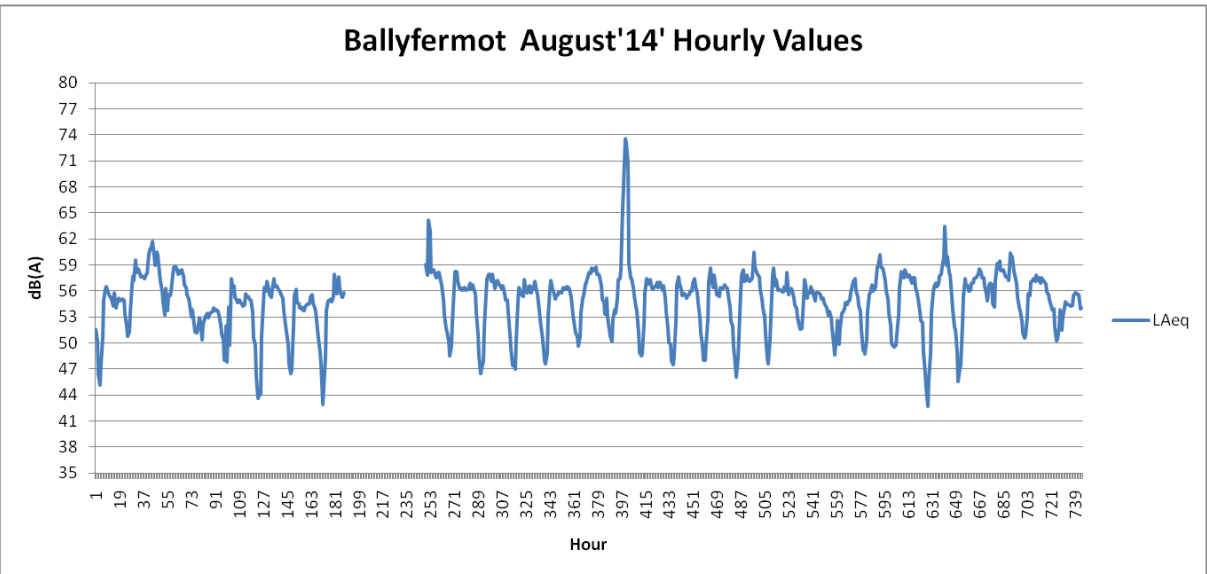
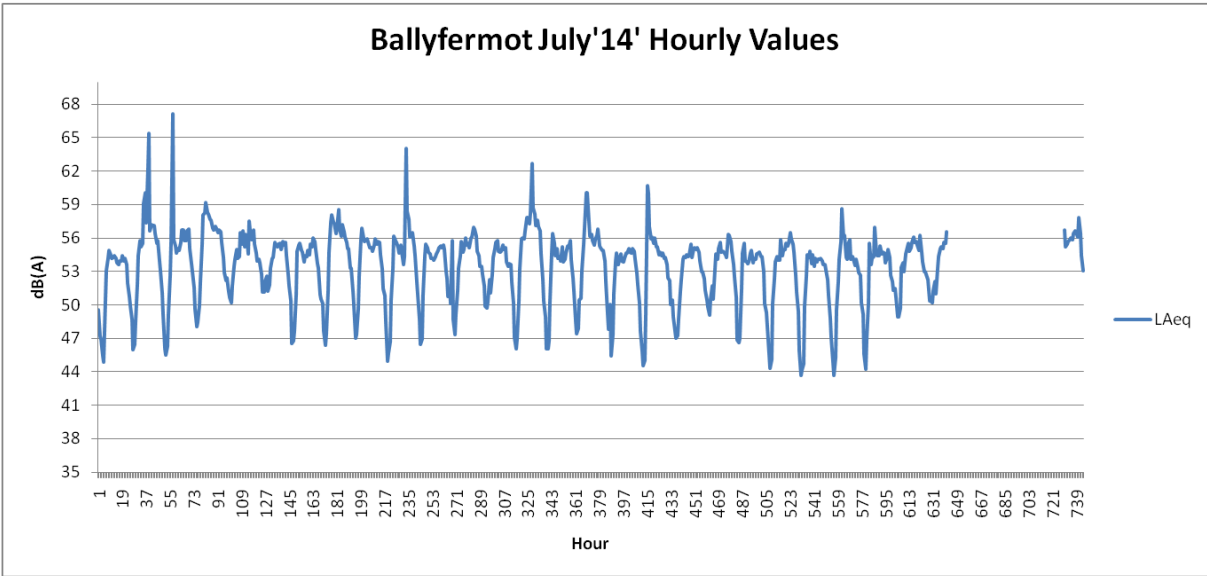
BALLYFERMOT CIVIC CENTRE
BALLYFERMOT ROAD
DUBLIN 10

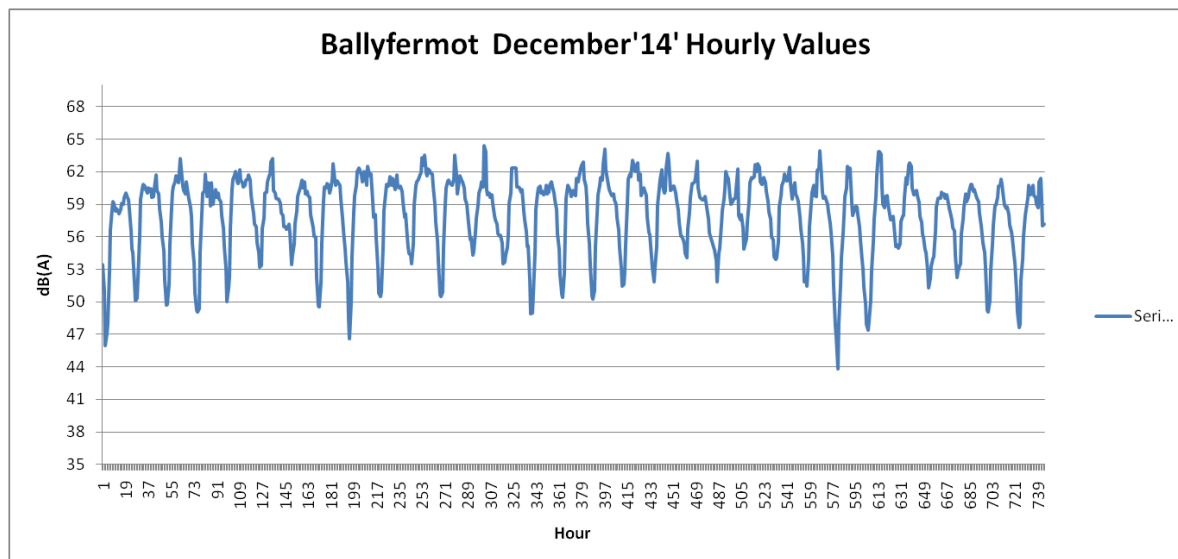
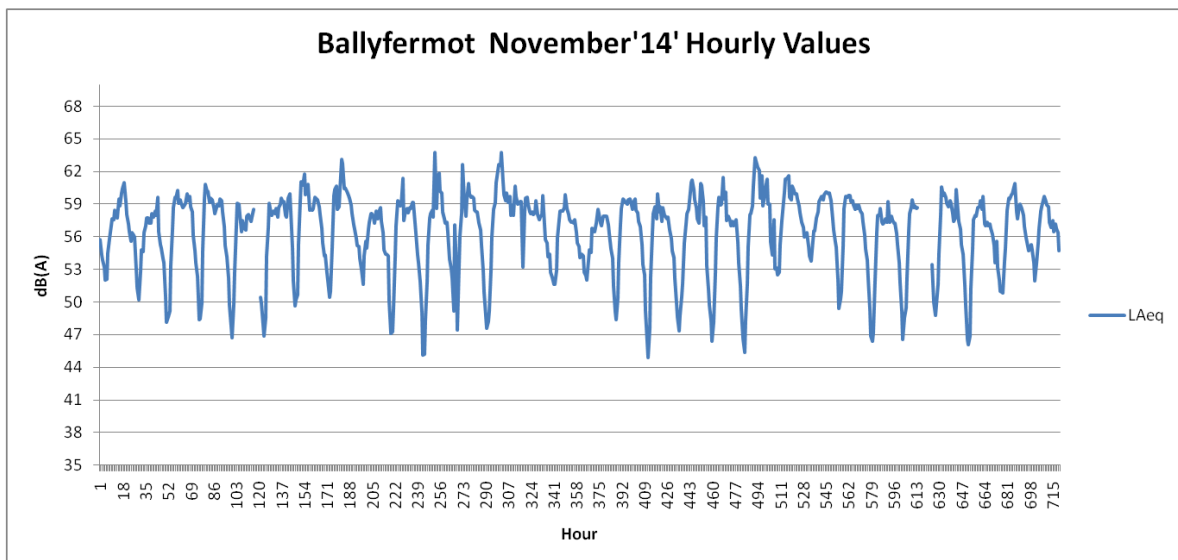
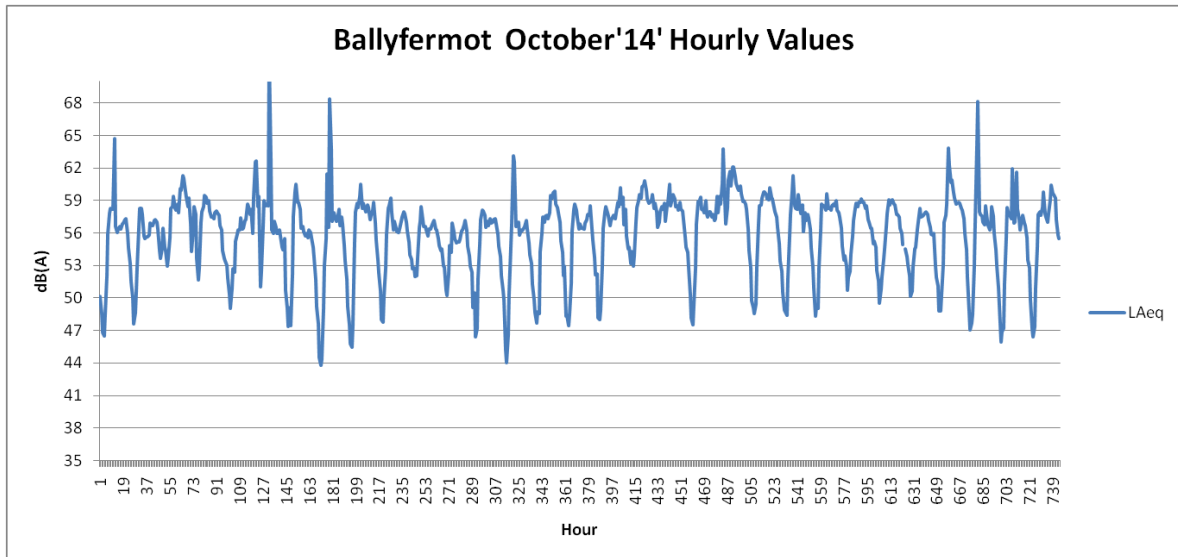






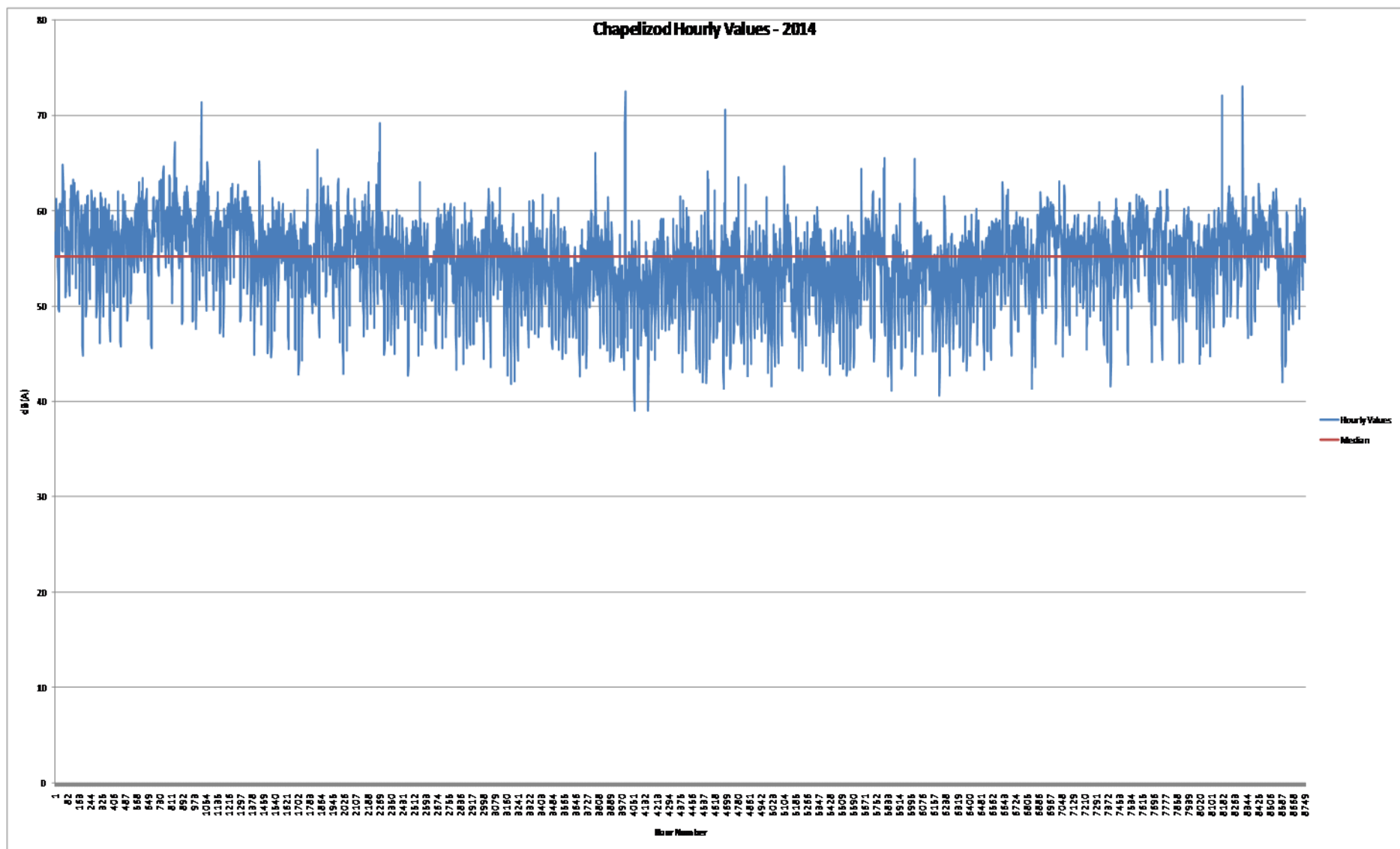


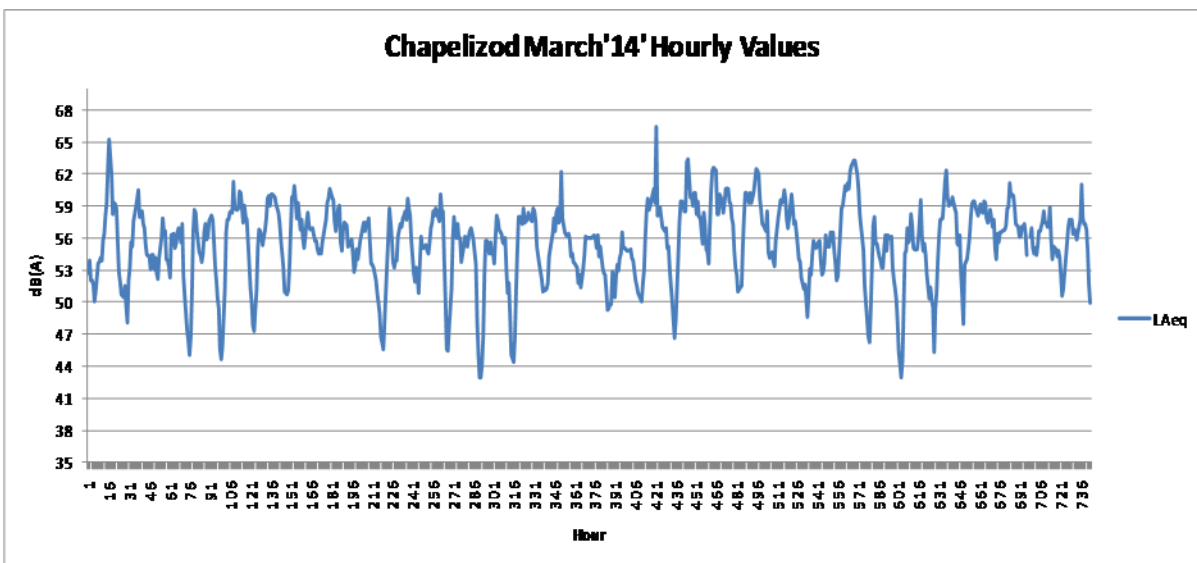
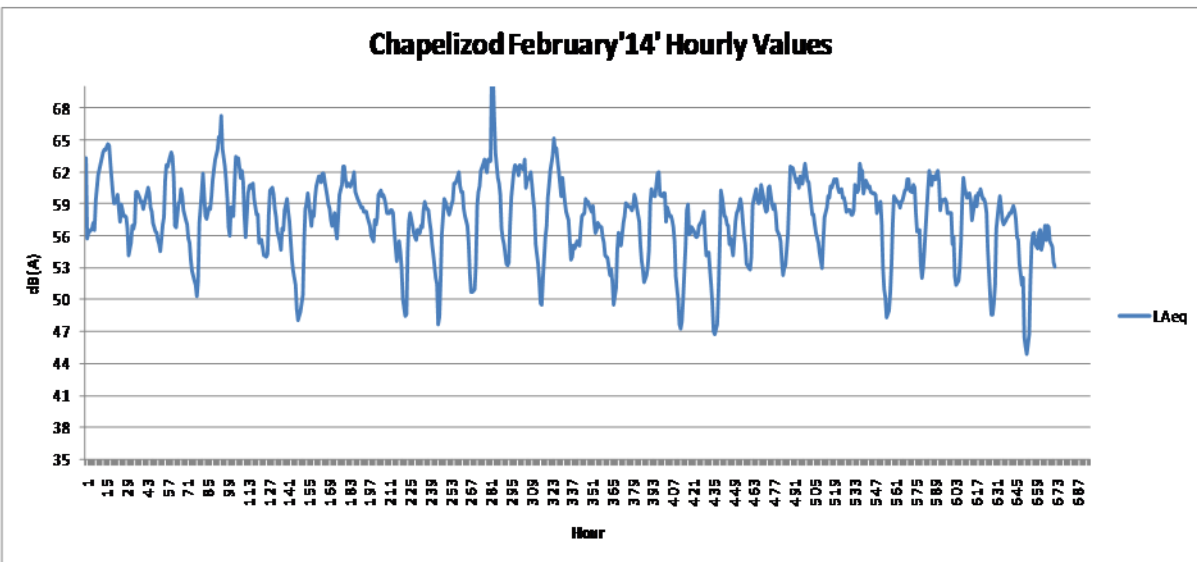
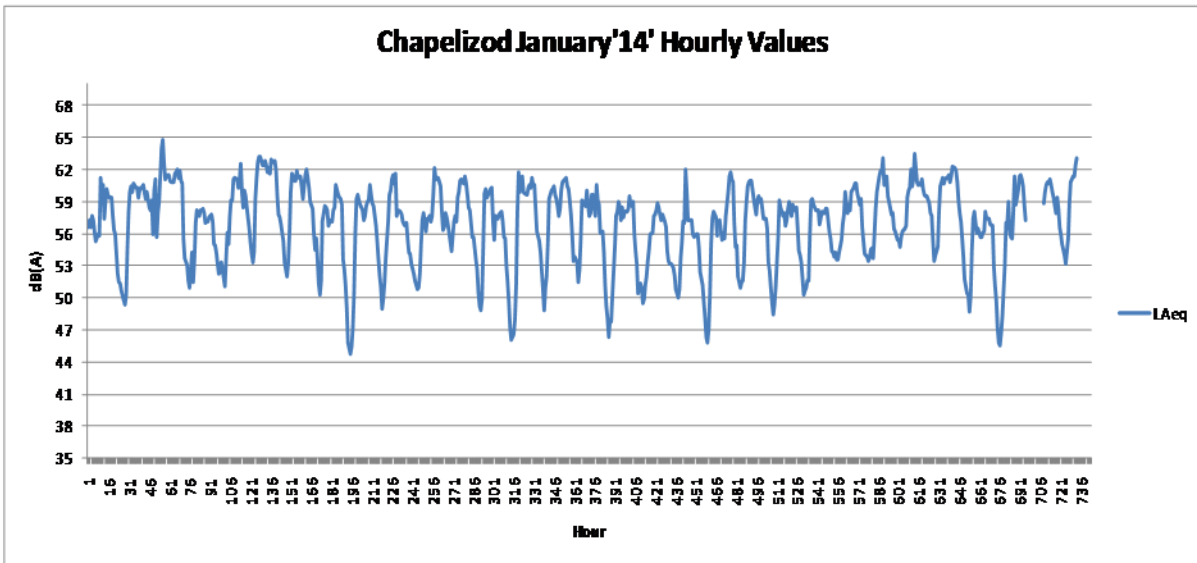


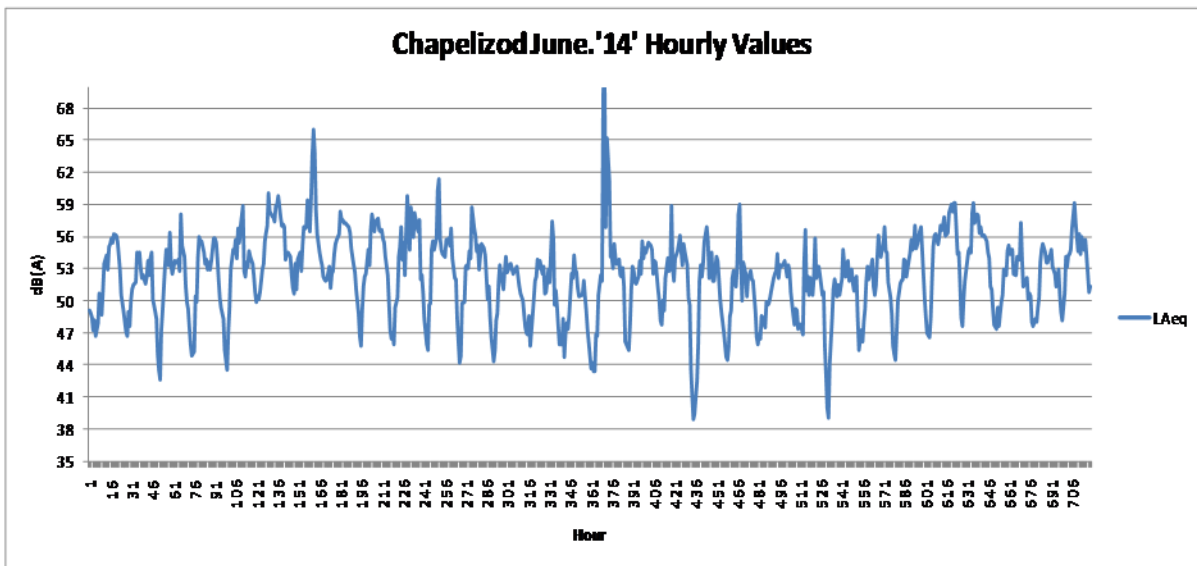
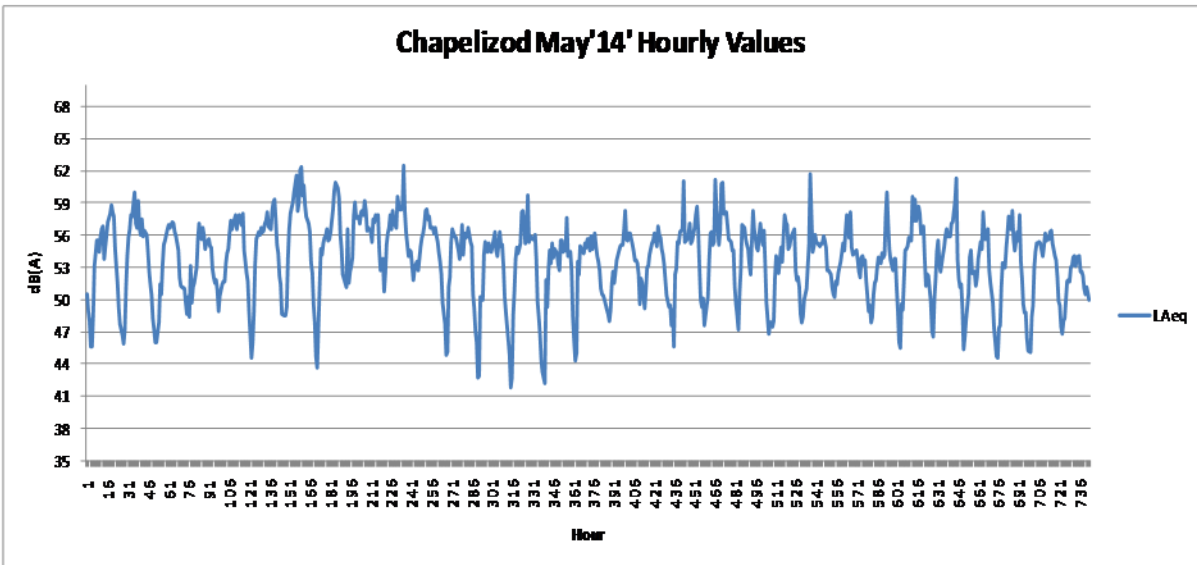
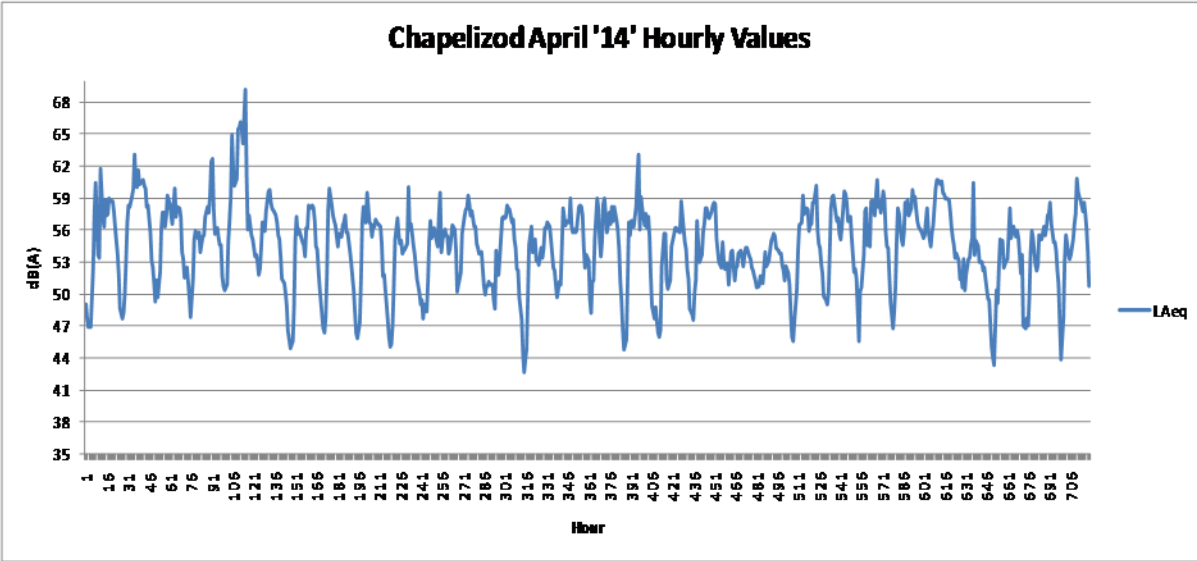


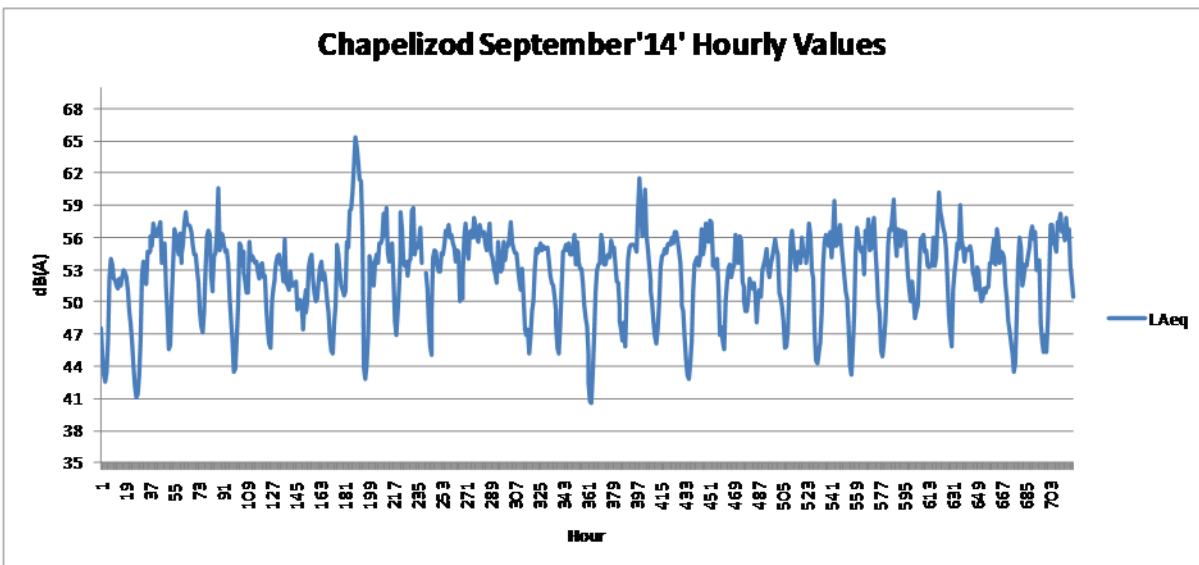
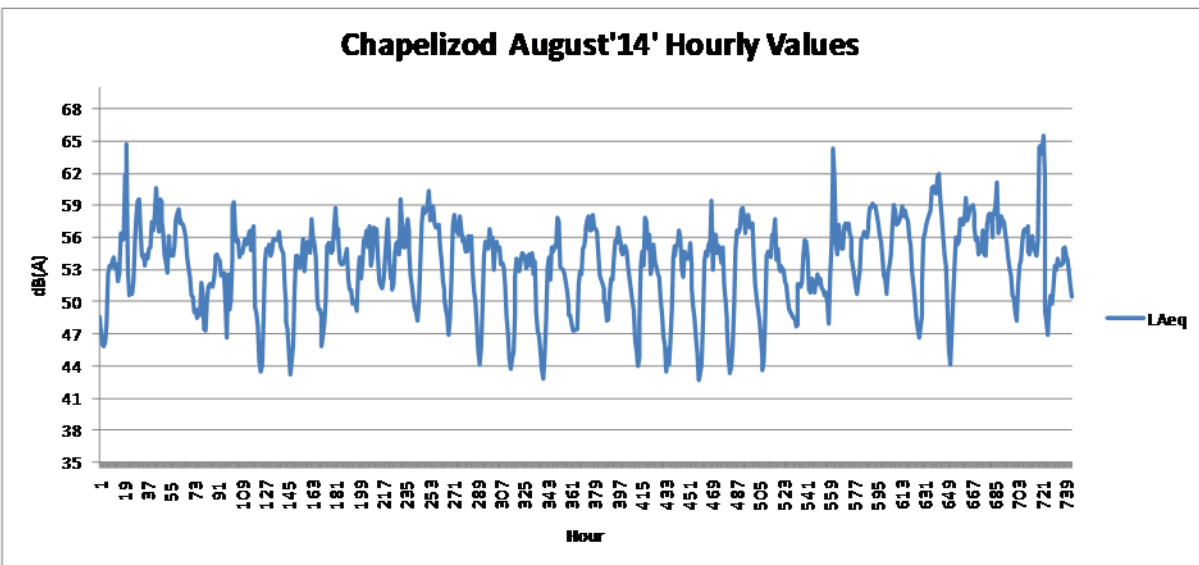
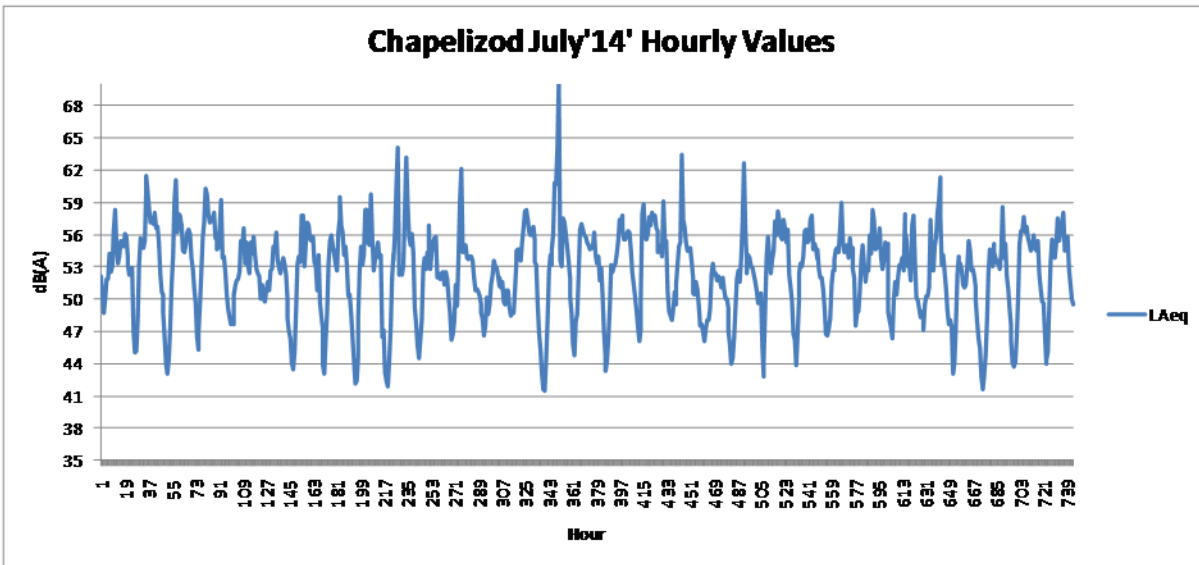
DUBLIN CITY COUNCIL ROWING CLUB
CHAPELIZOD ROAD
DUBLIN 8



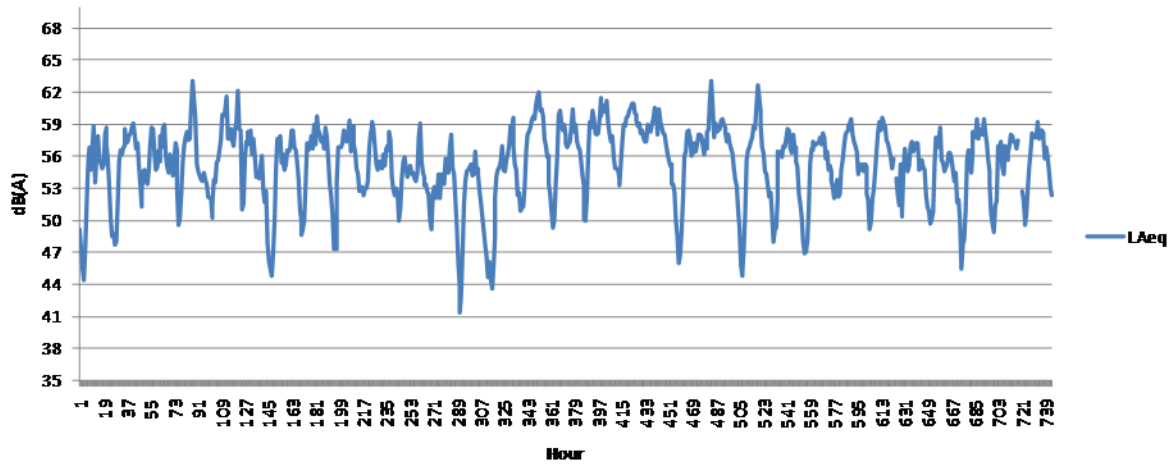




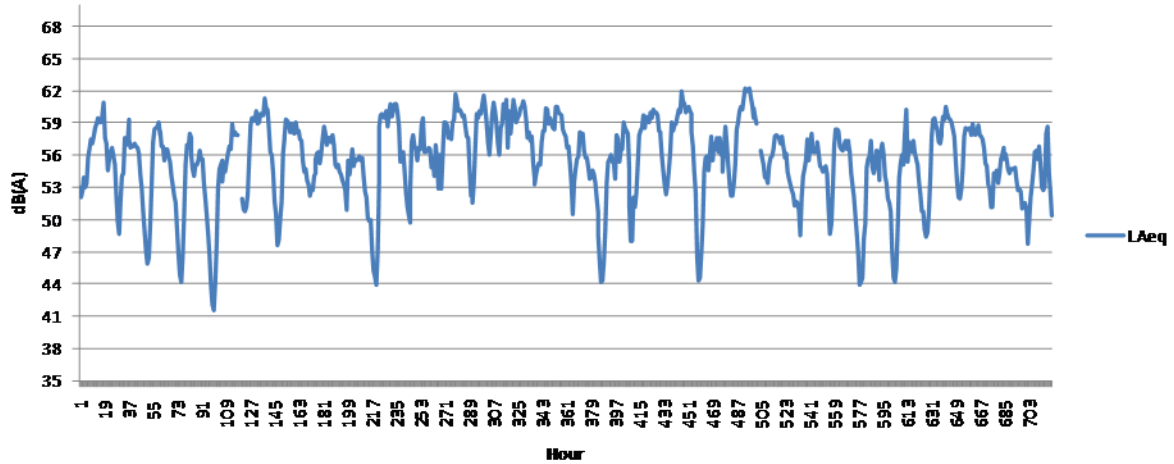




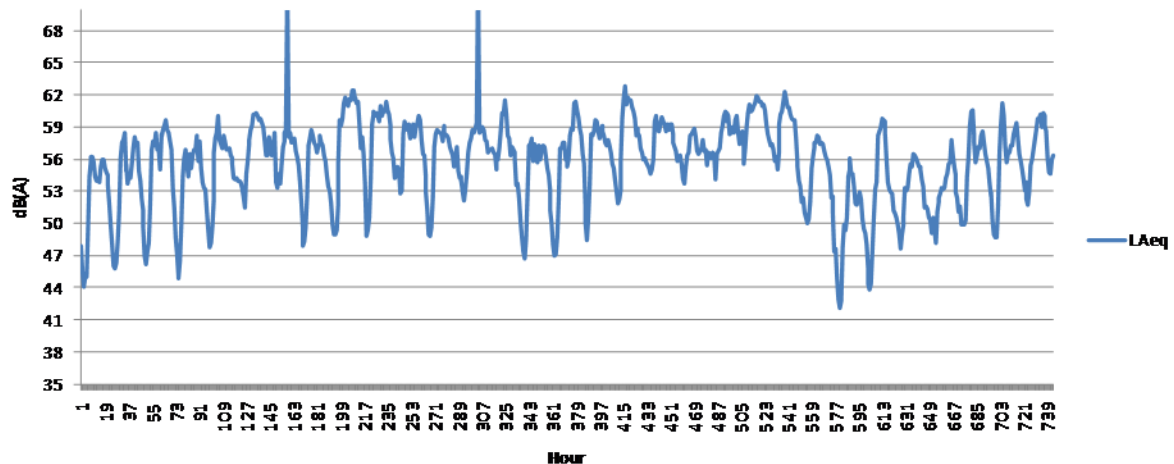
Chapelizod October'14' Hourly Values



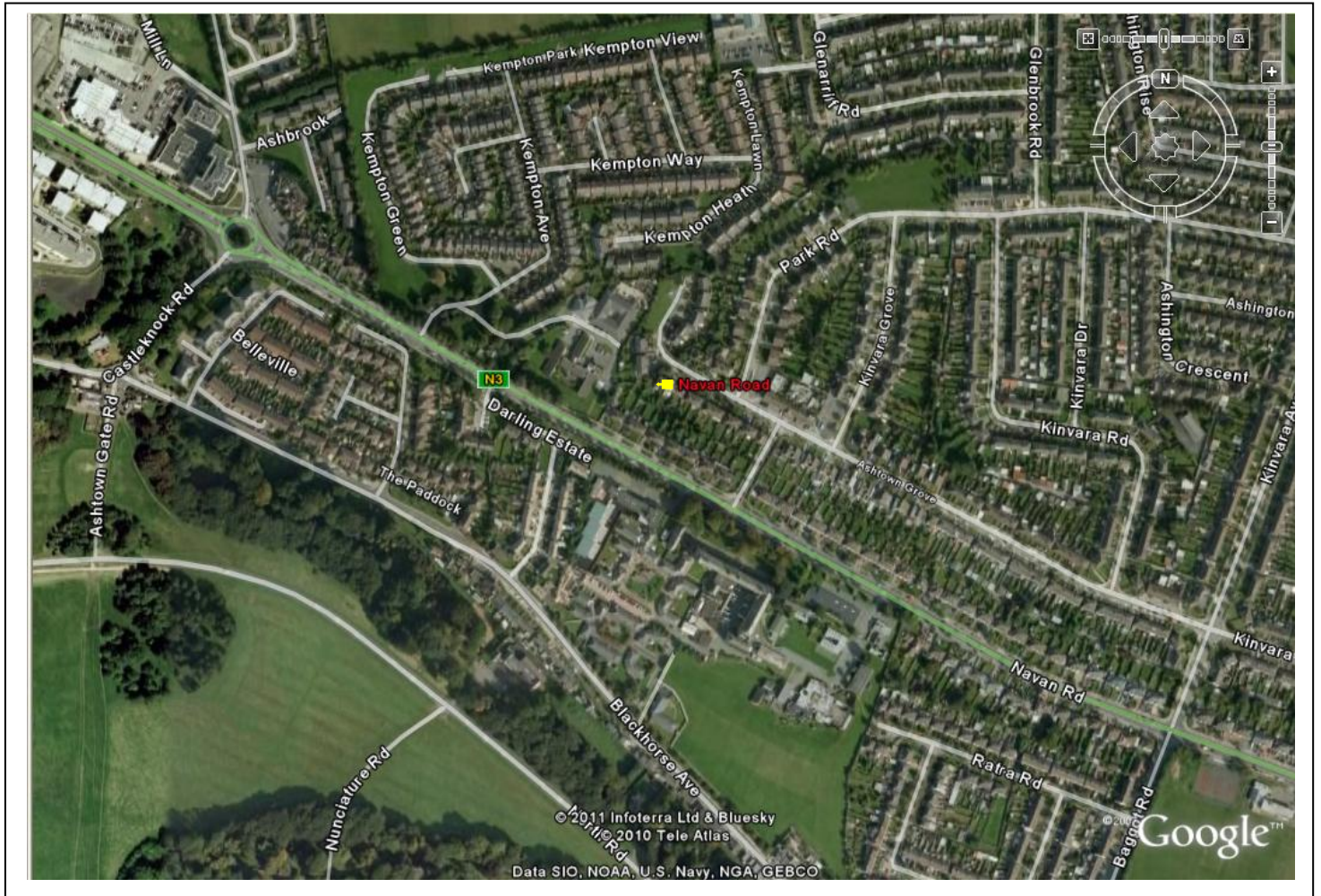
Chapelizod November'14' Hourly Values

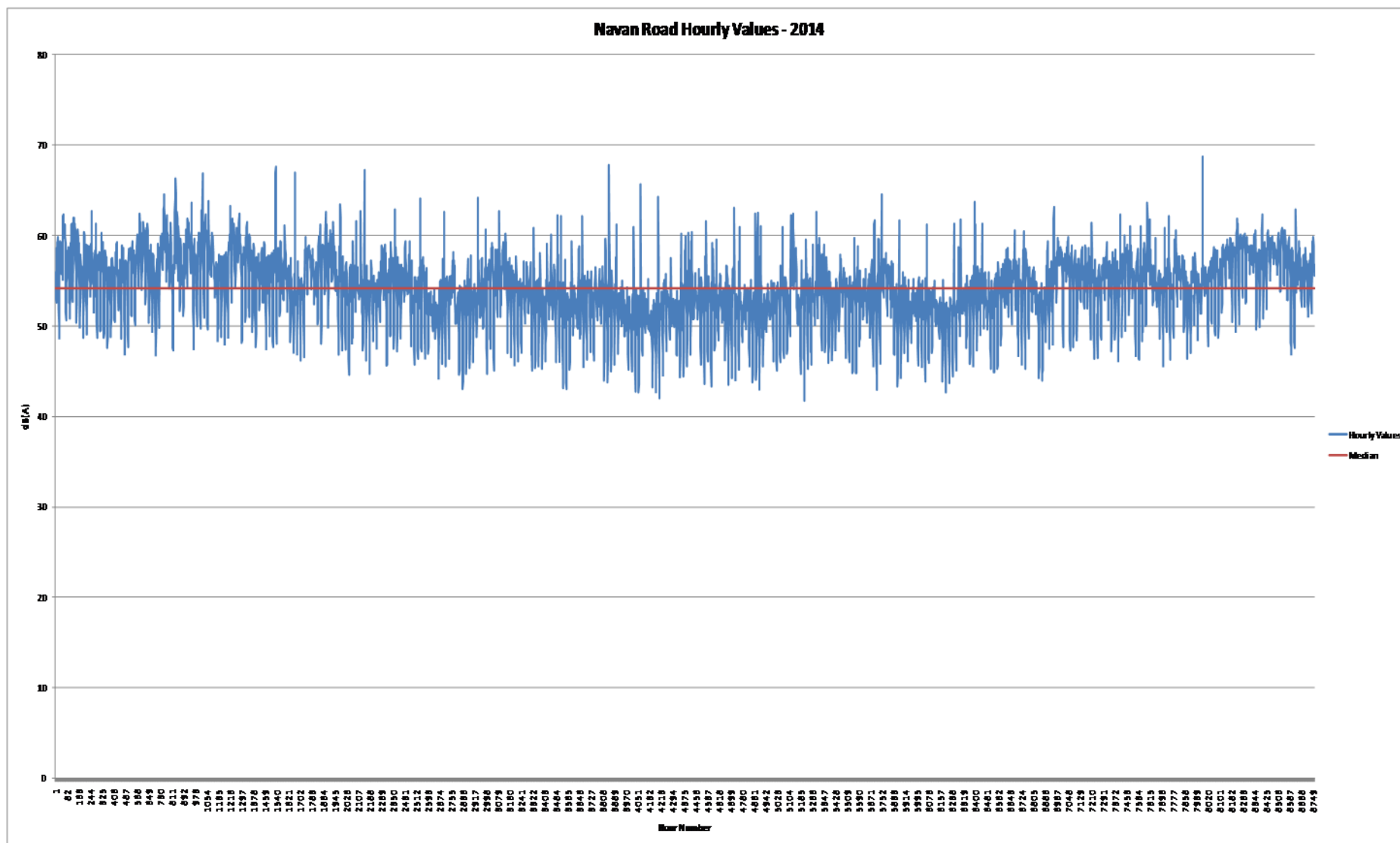


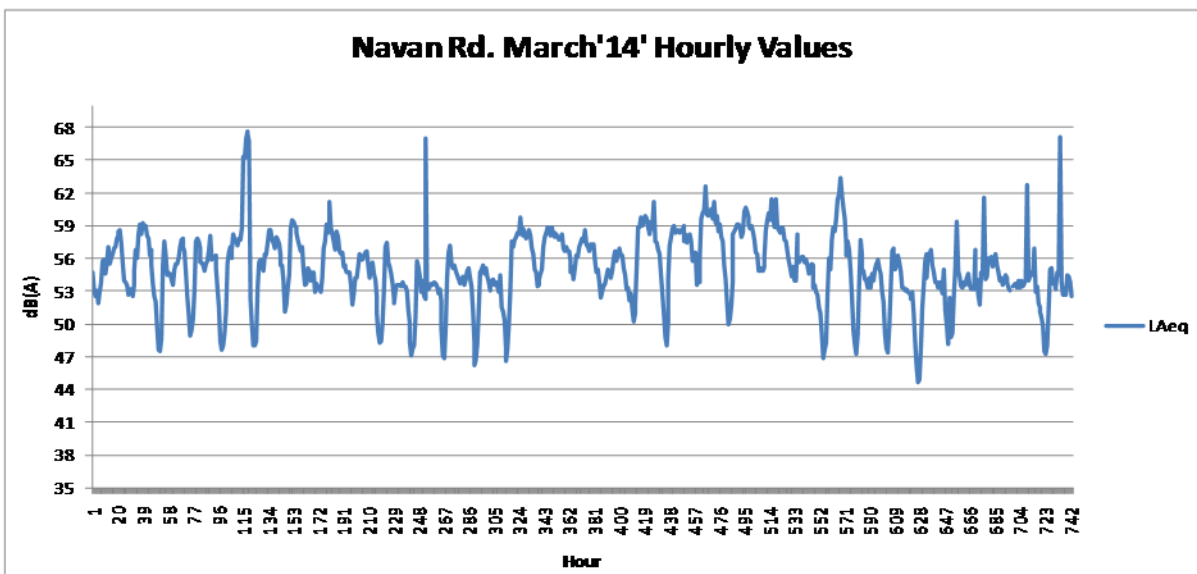
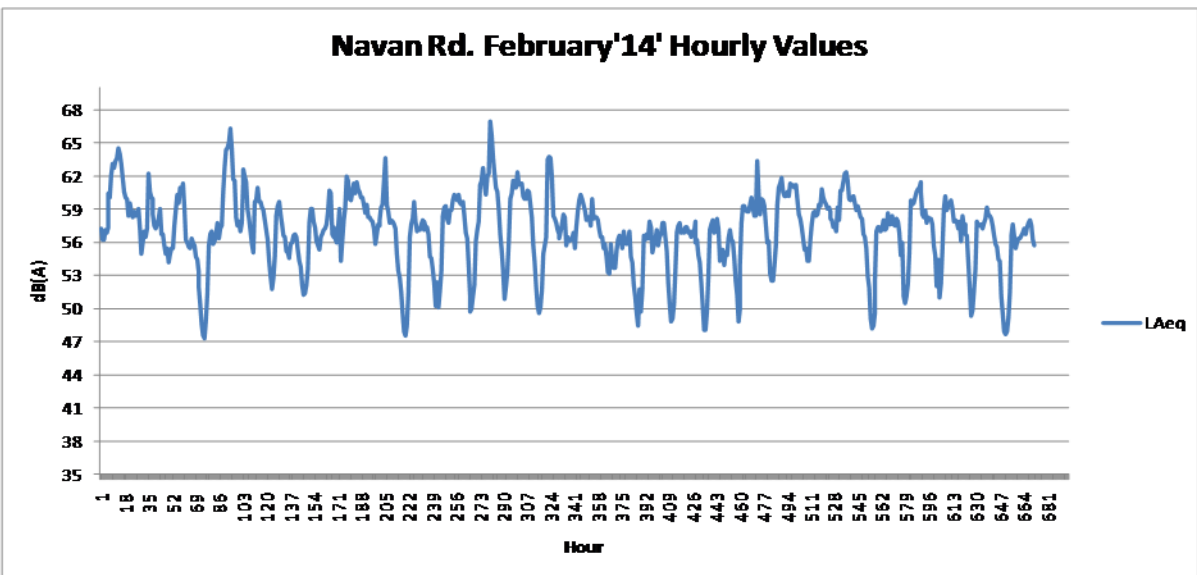
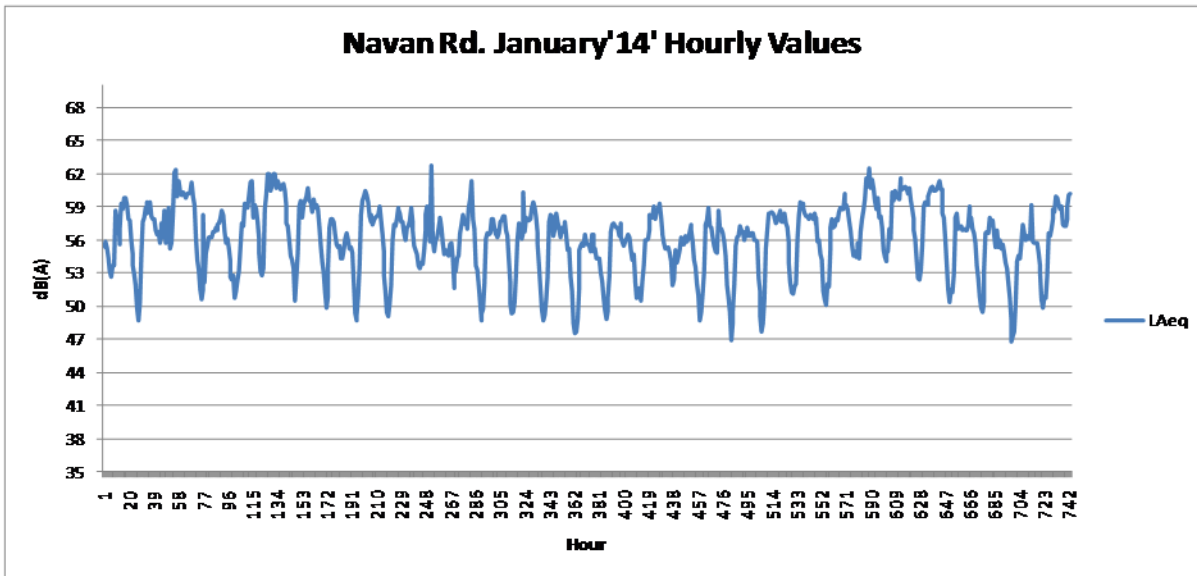
Chapelizod December'14' Hourly Values



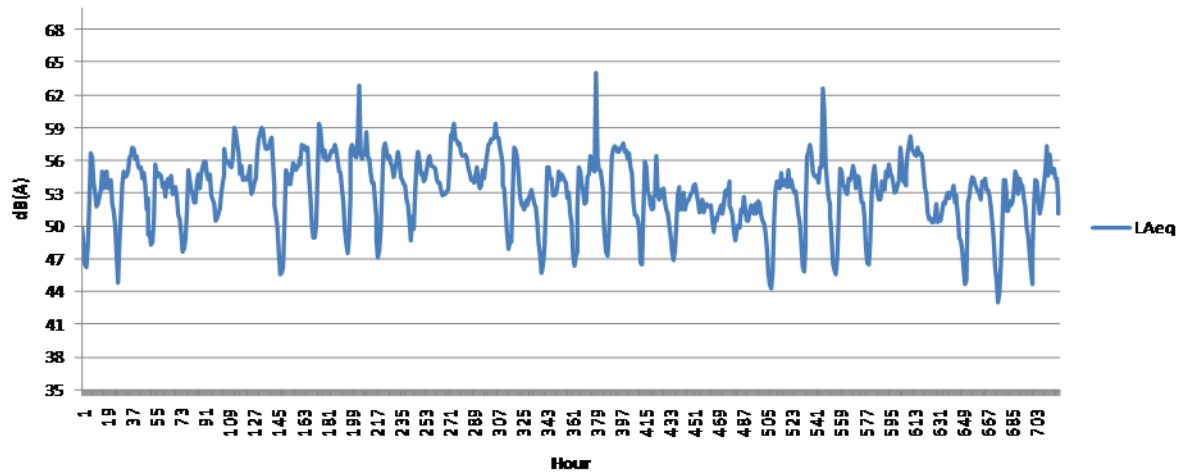
ASHTOWN GROVE
NAVAN ROAD
DUBLIN 7



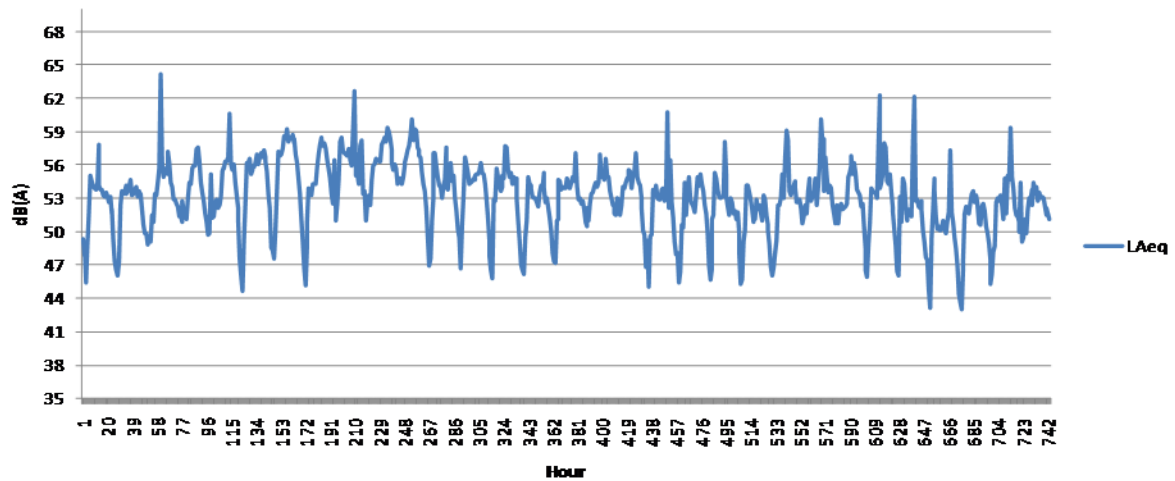




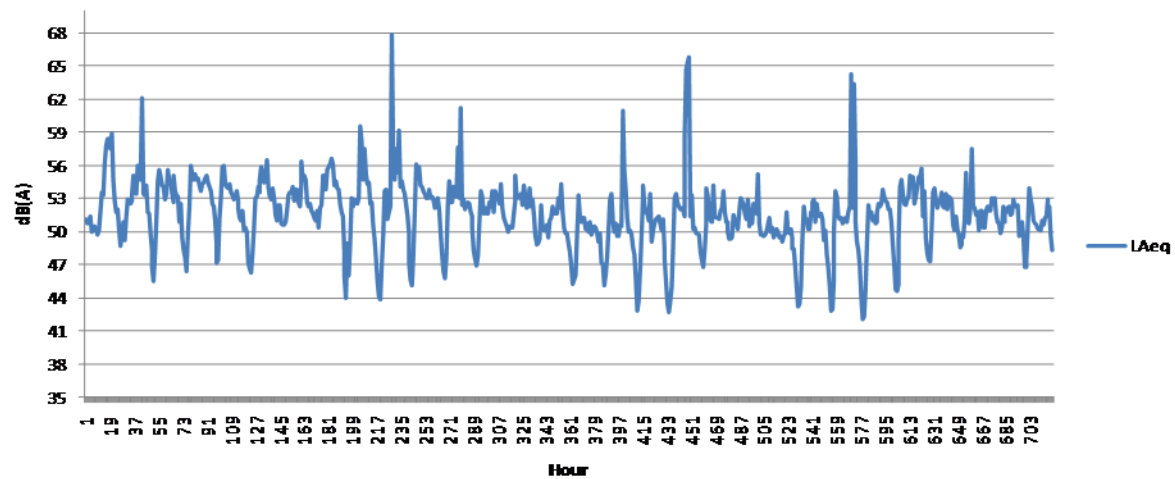
Navan Rd. April '14' Hourly Values



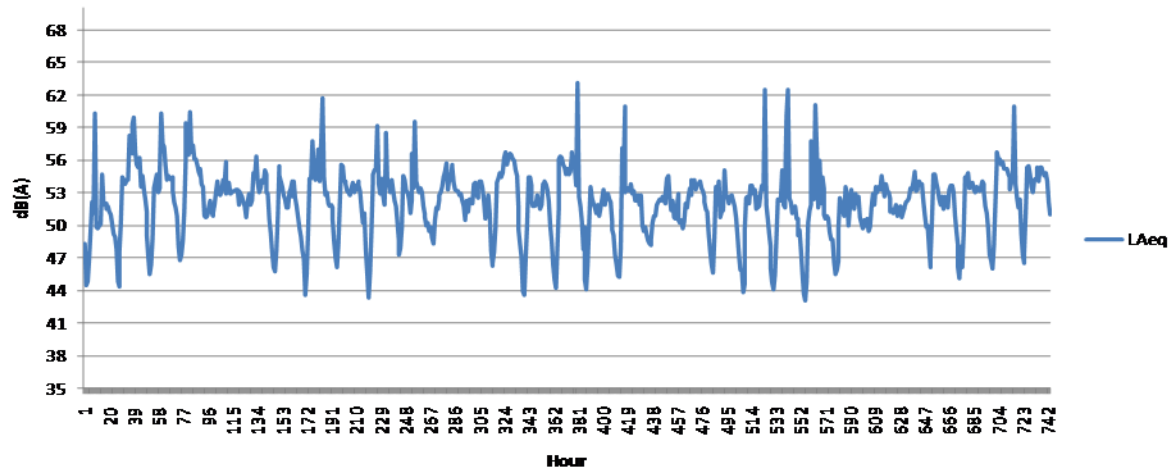
Navan Rd. May '14' Hourly Values



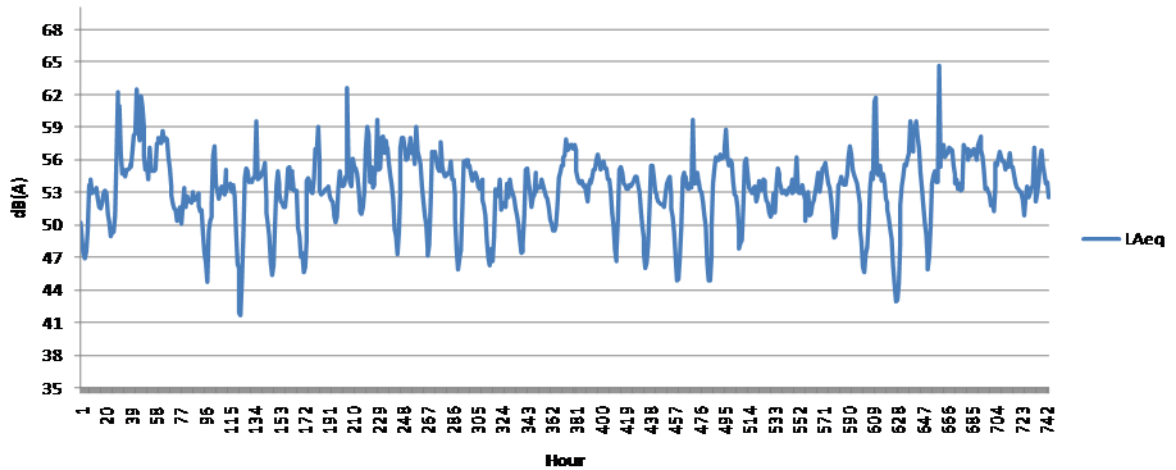
Navan Rd. June '14' Hourly Values



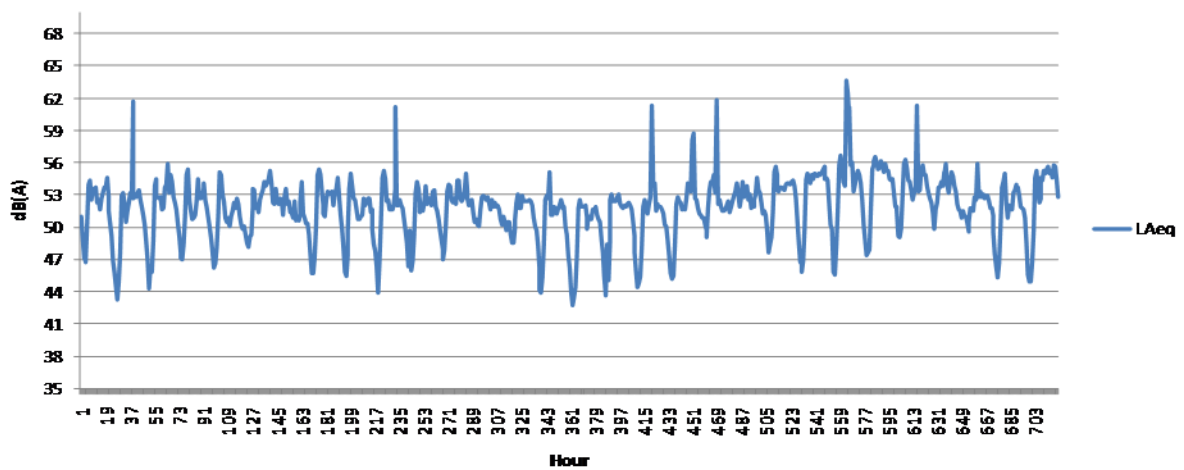
Navan Rd. July'14' Hourly Values



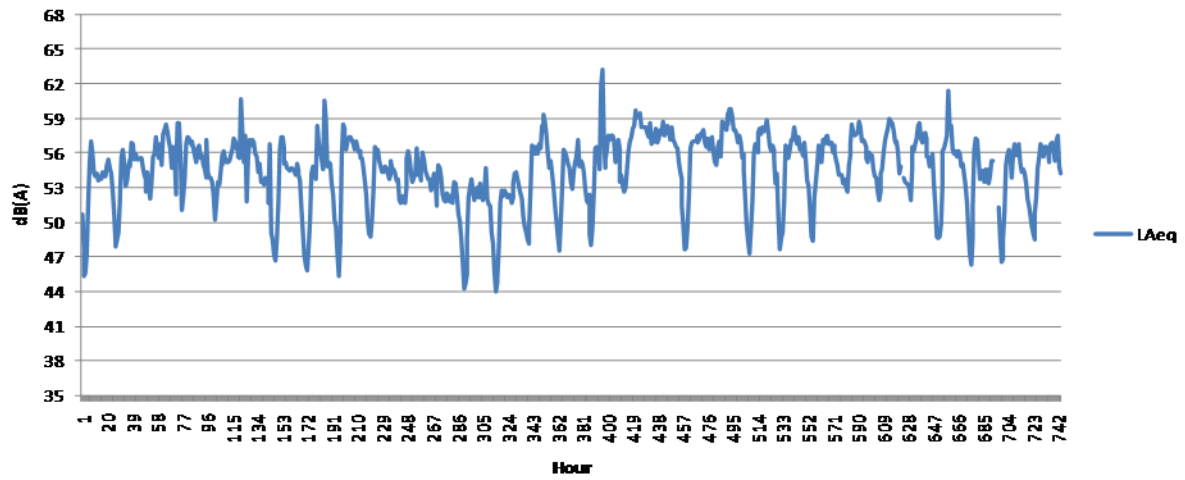
Navan Rd. August'14' Hourly Values



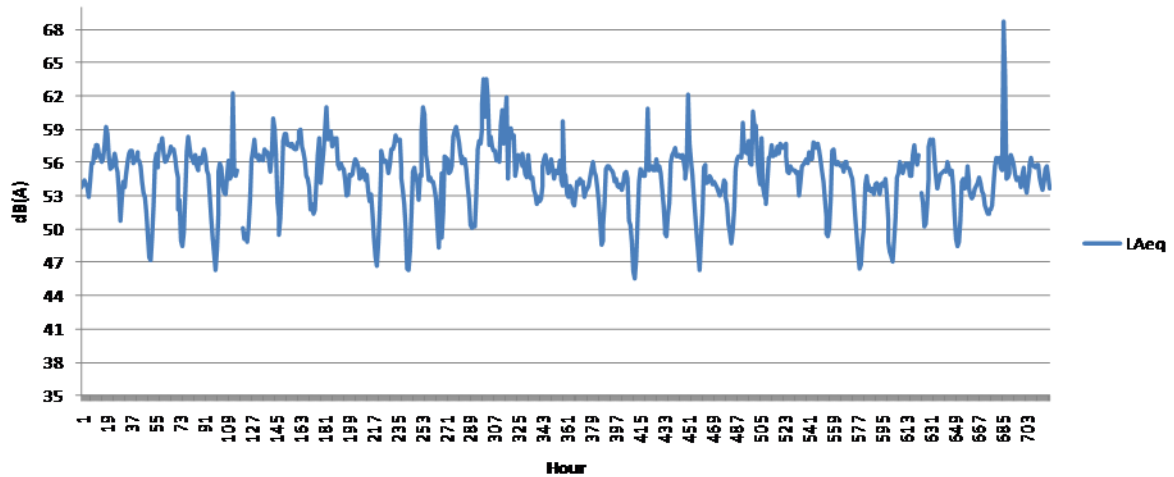
Navan Rd. September'14' Hourly Values



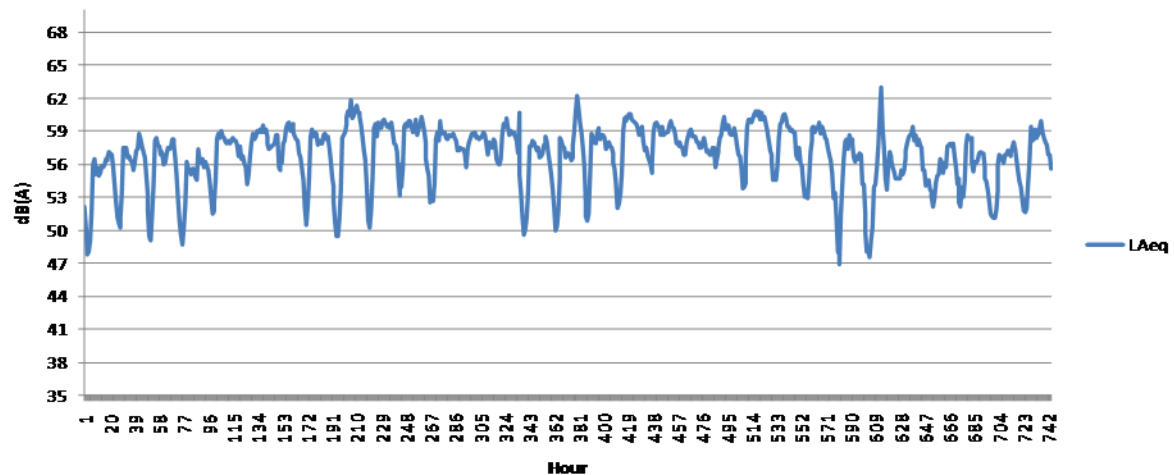
Navan Rd. October'14' Hourly Values



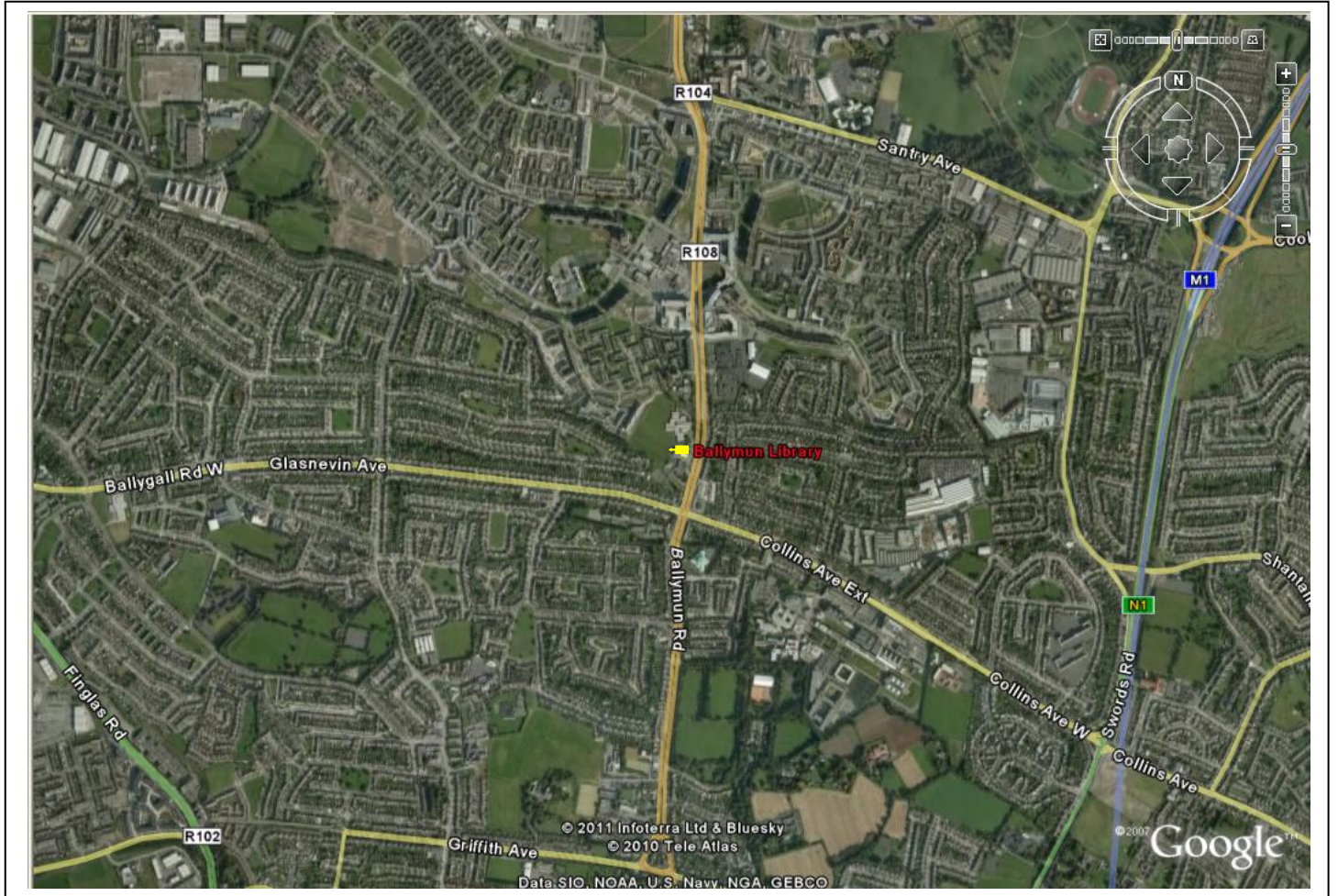
Navan Rd. November'14' Hourly Values

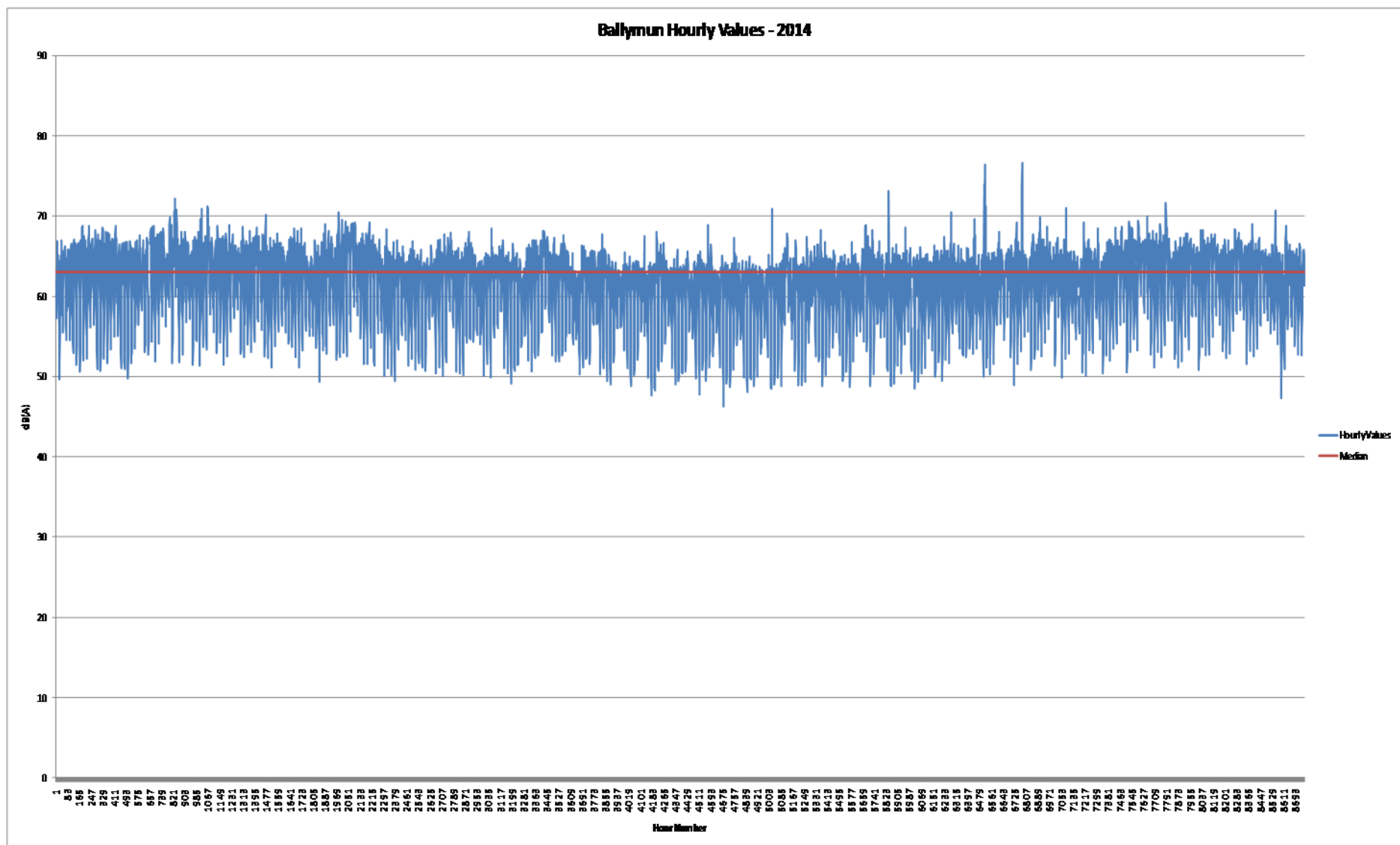


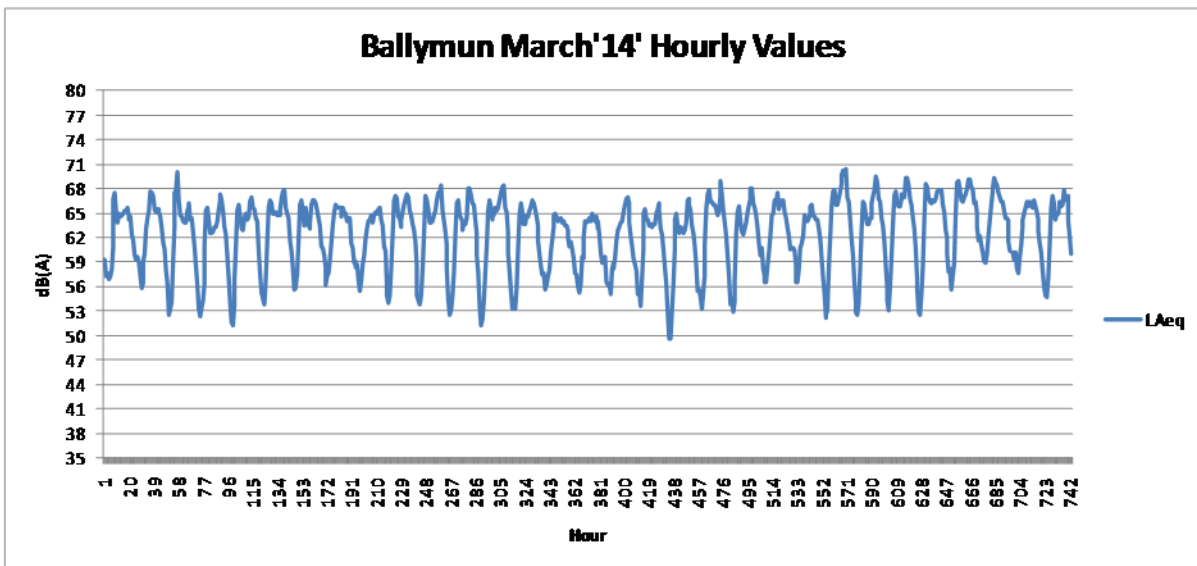
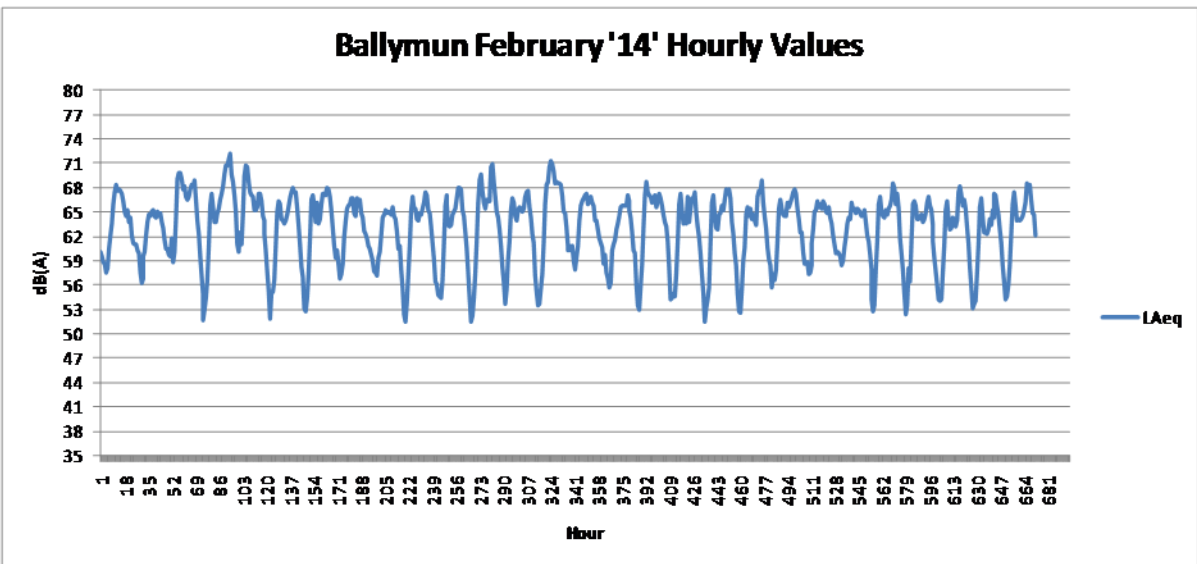
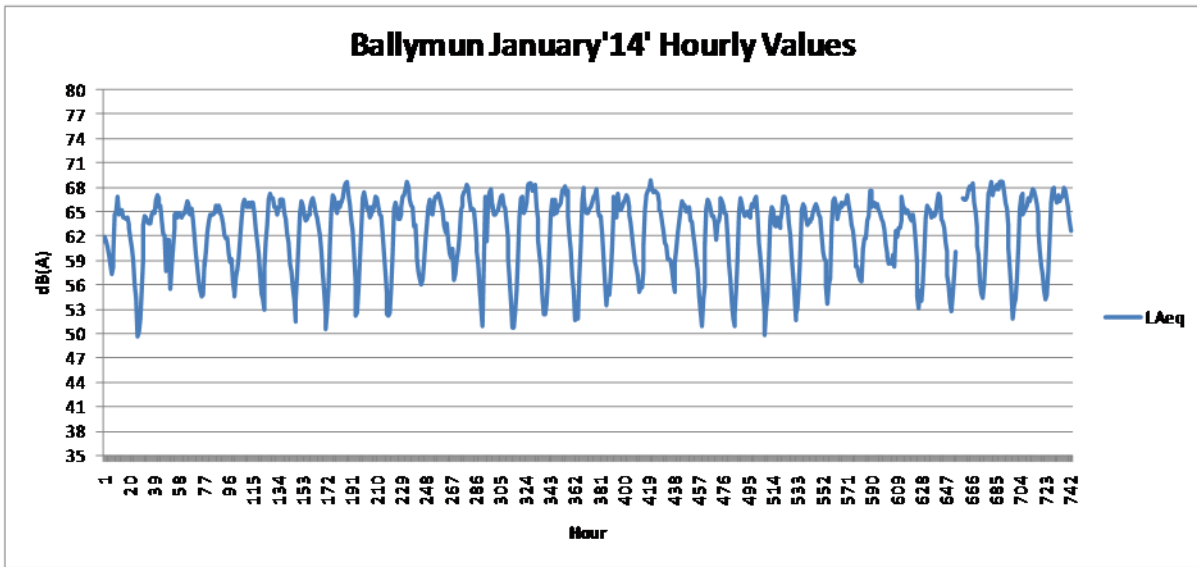
Navan Rd. December'14' Hourly Values

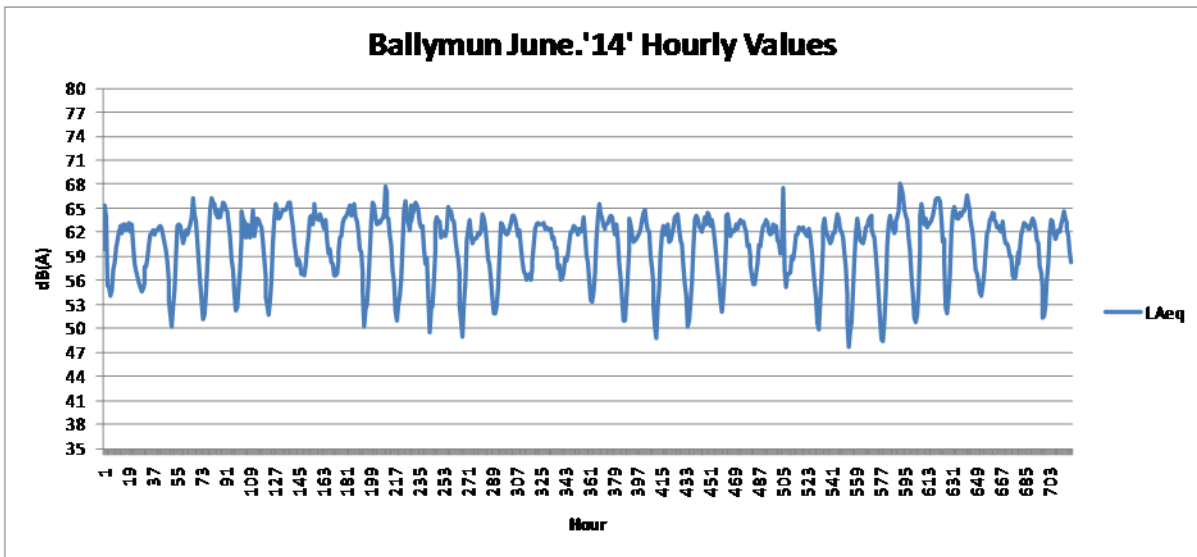
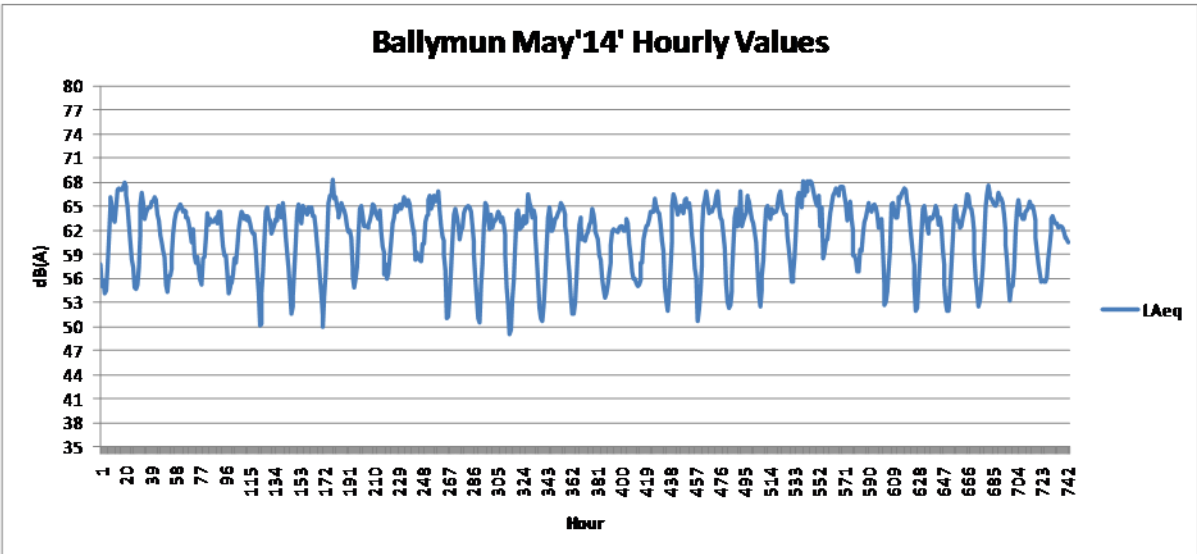
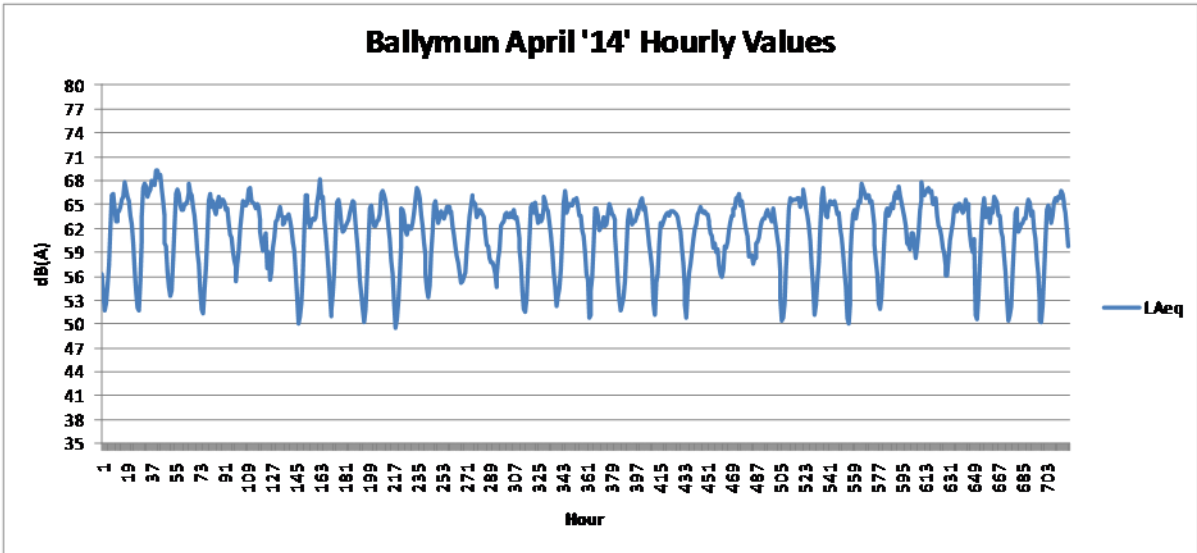


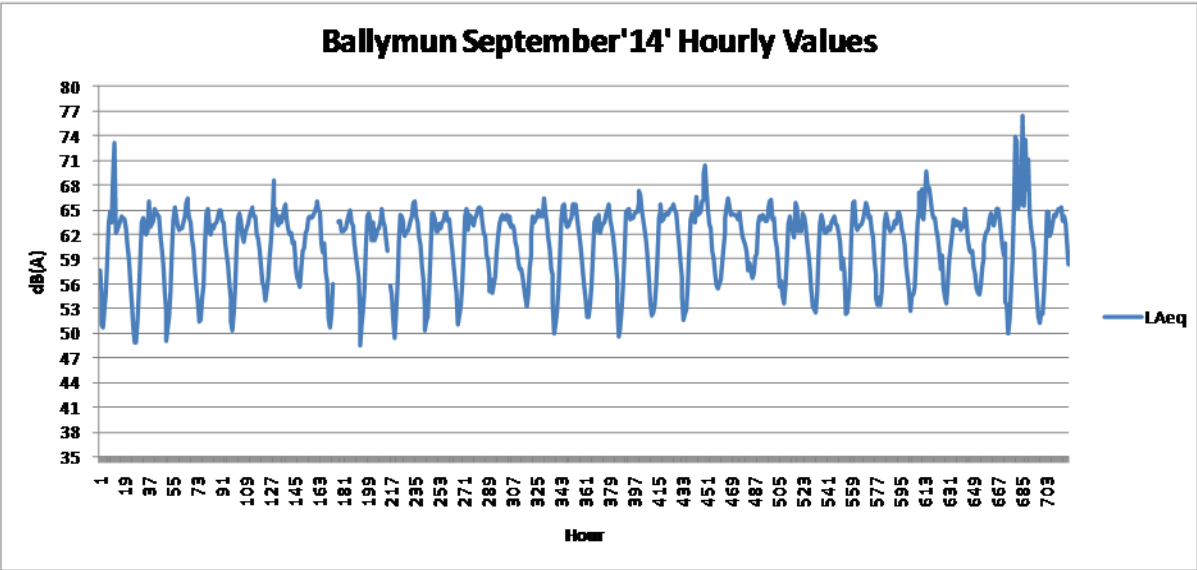
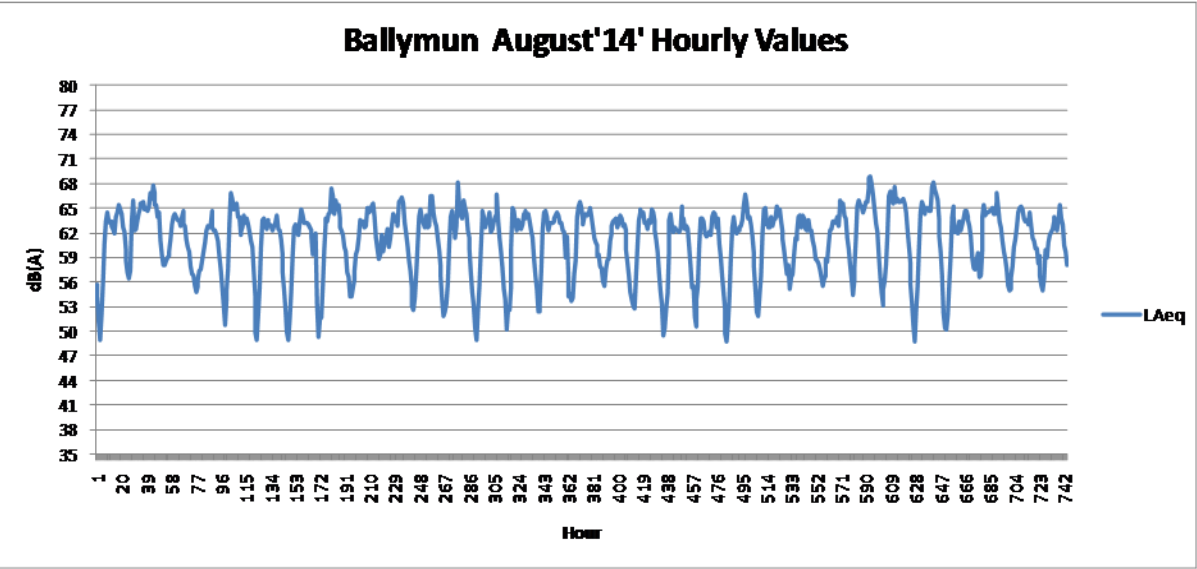
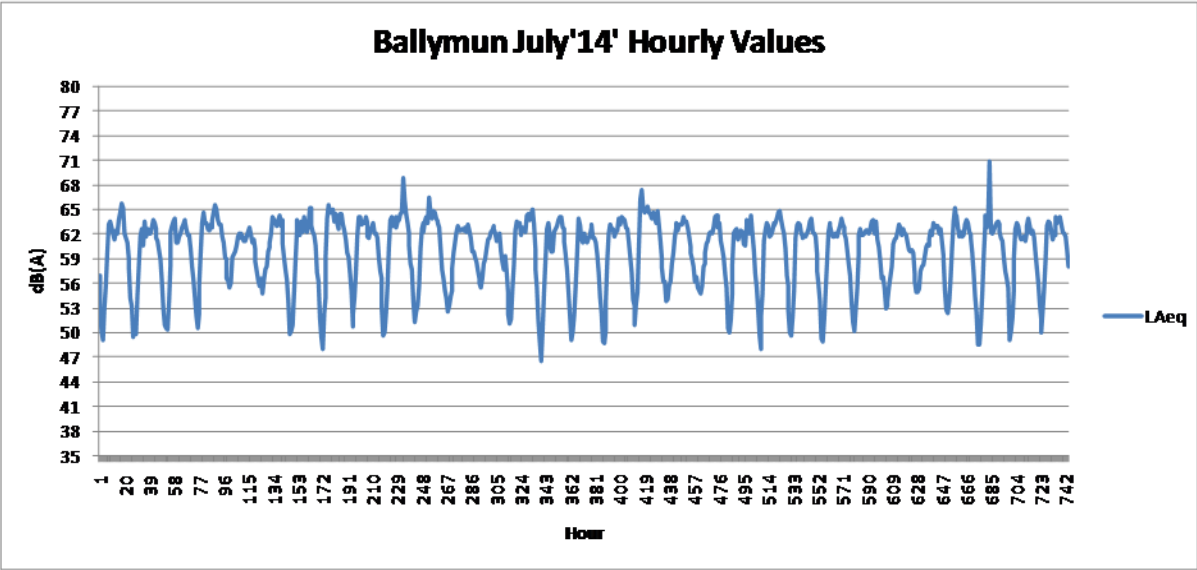
BALLYMUN LIBRARY
BALLYMUN ROAD
DUBLIN 11

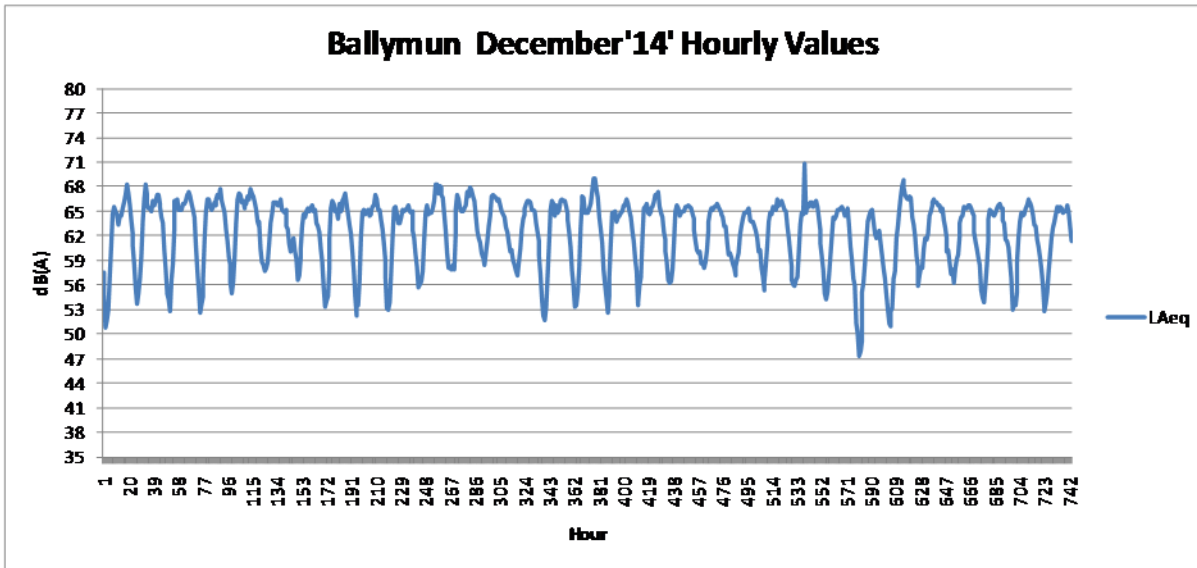
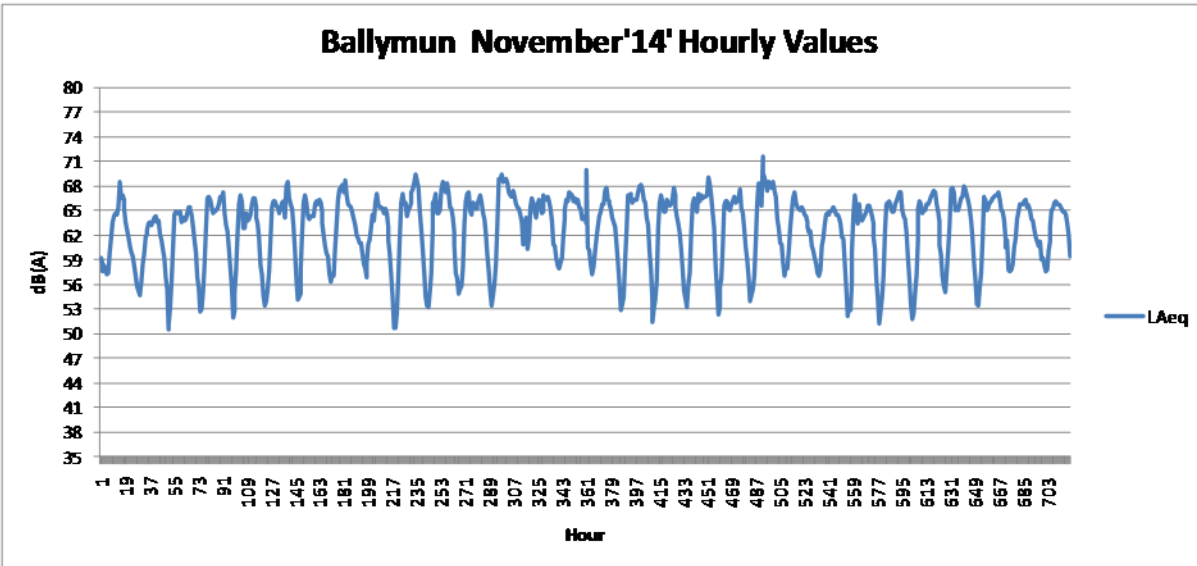
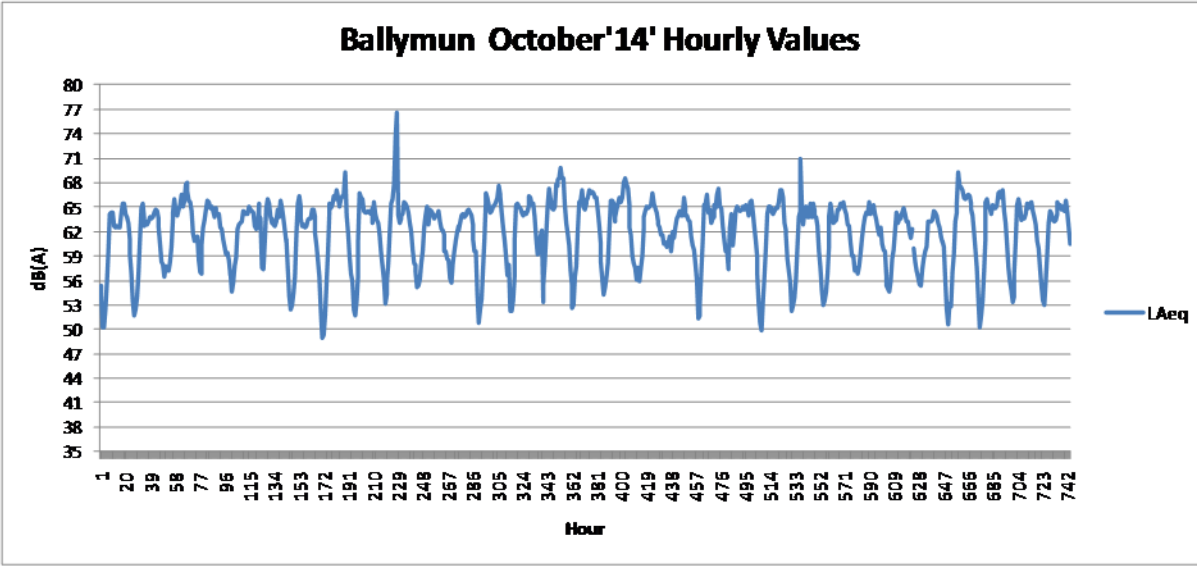






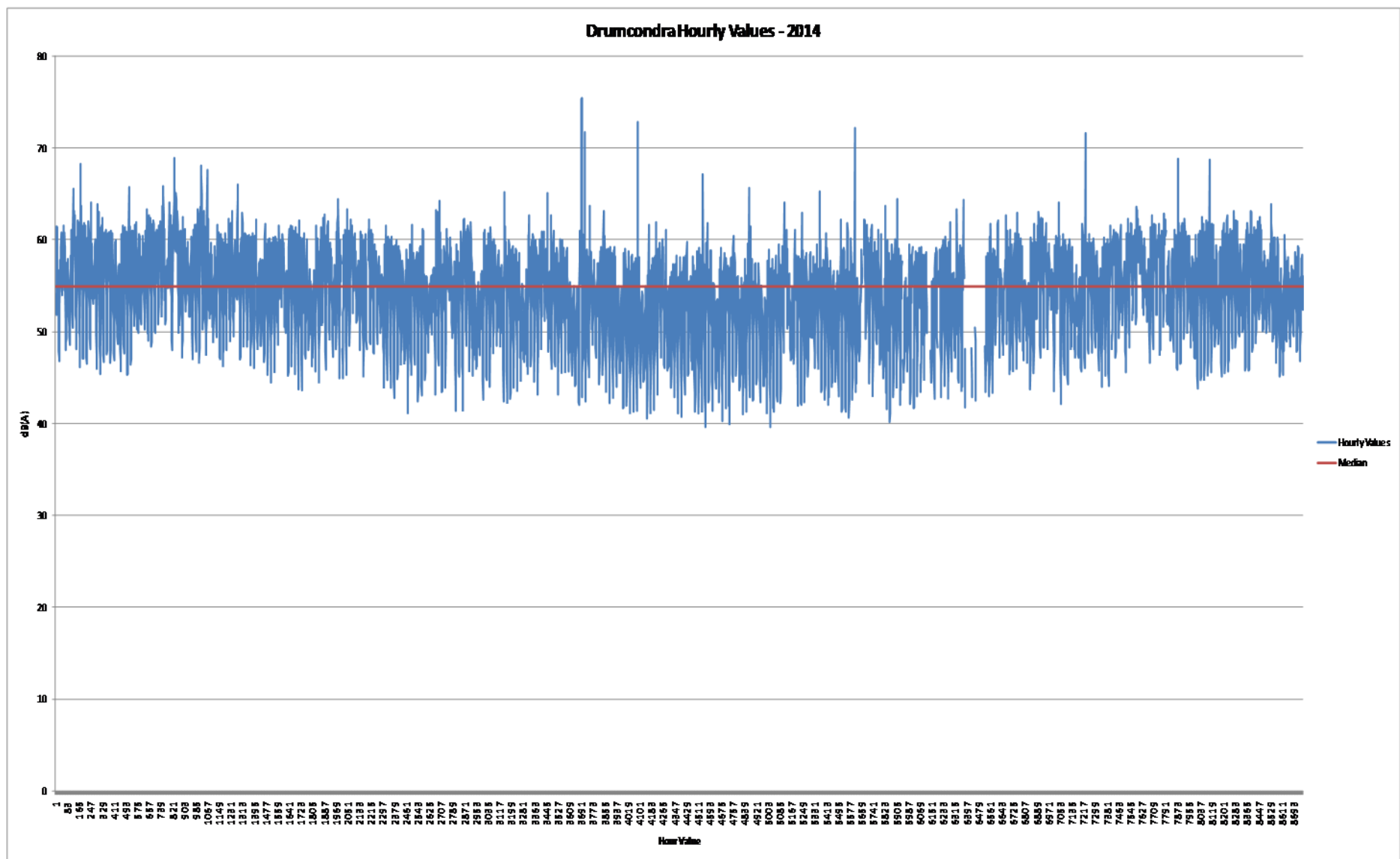


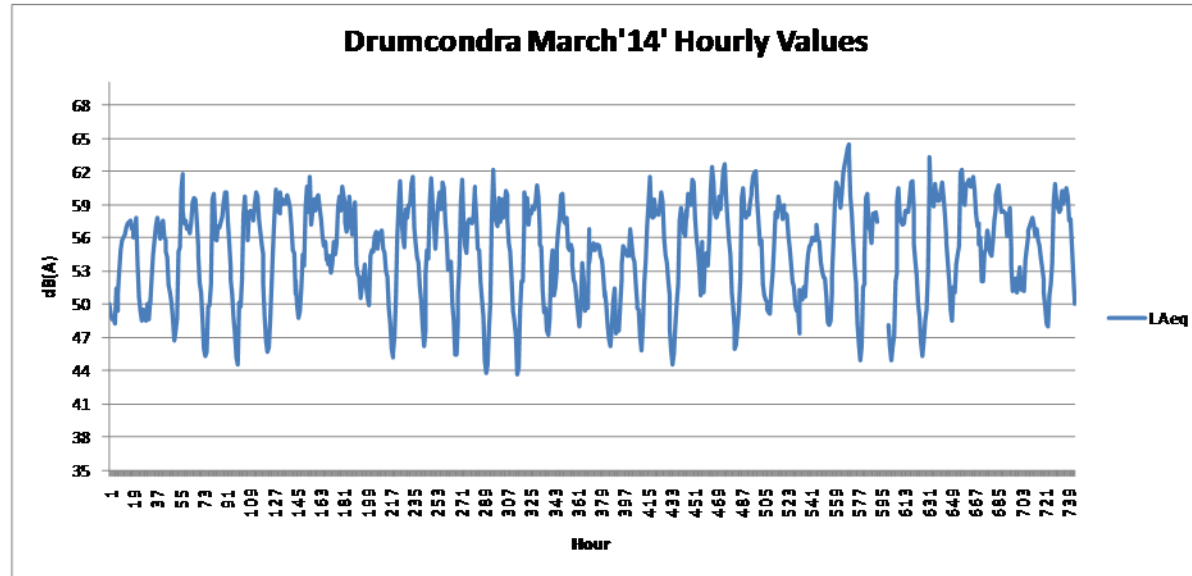
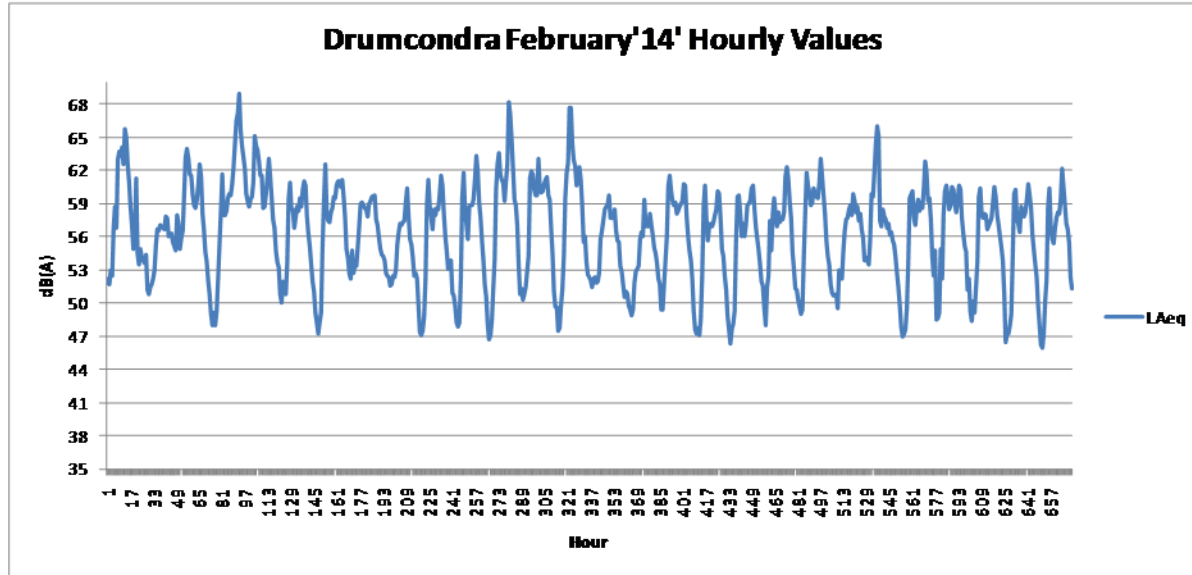
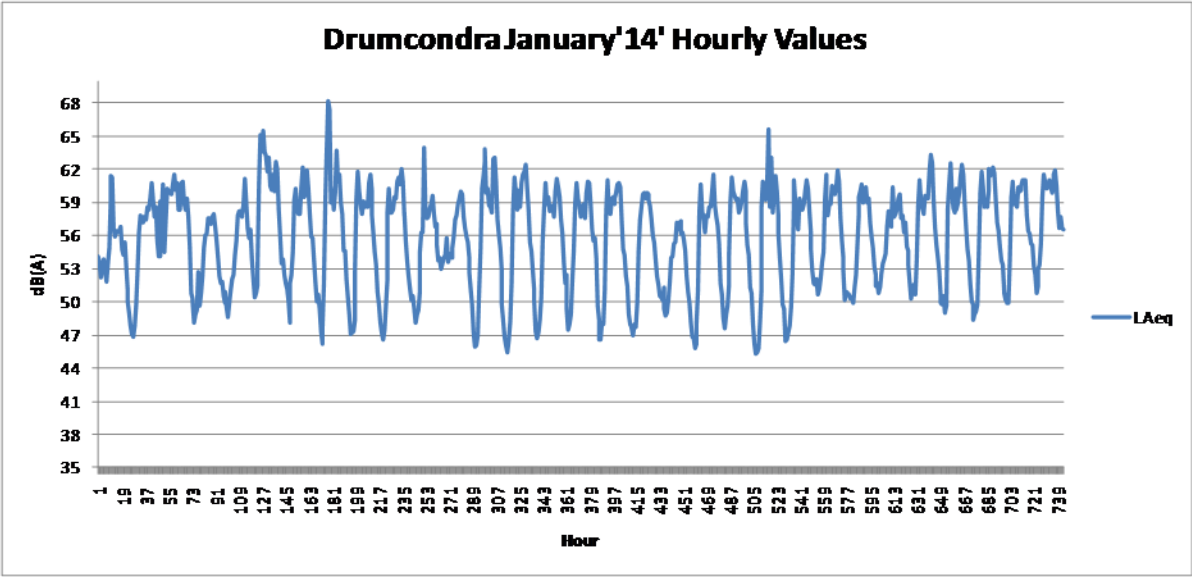


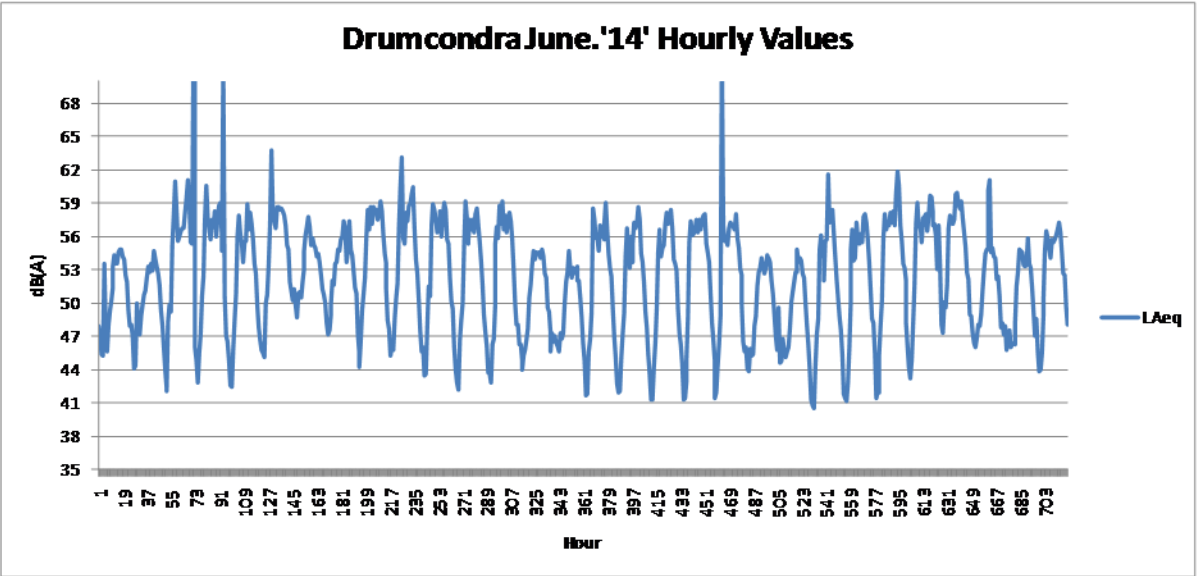
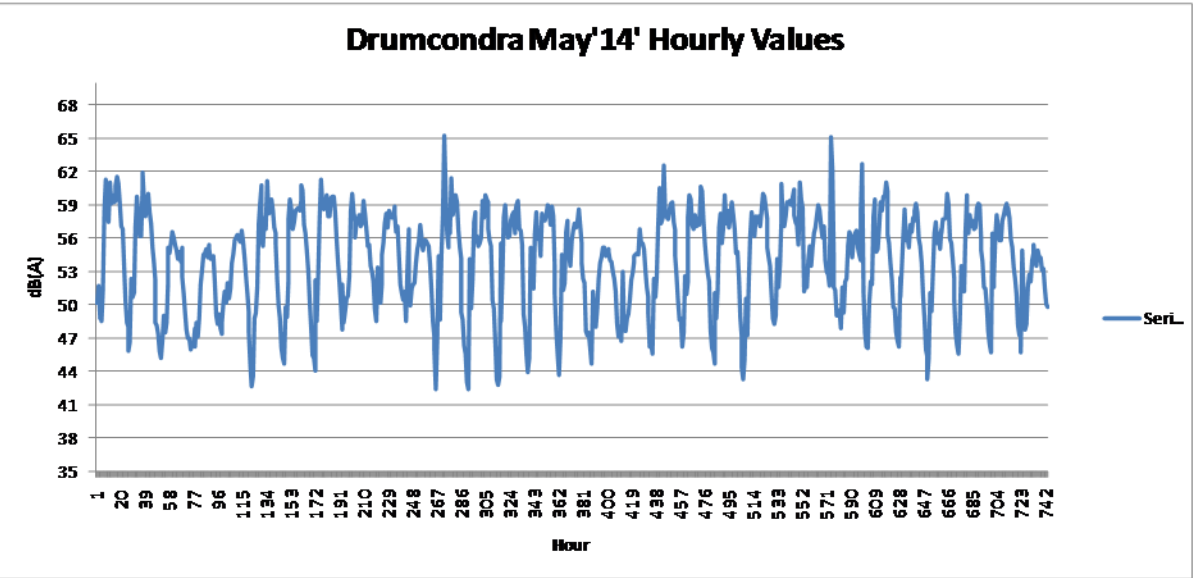
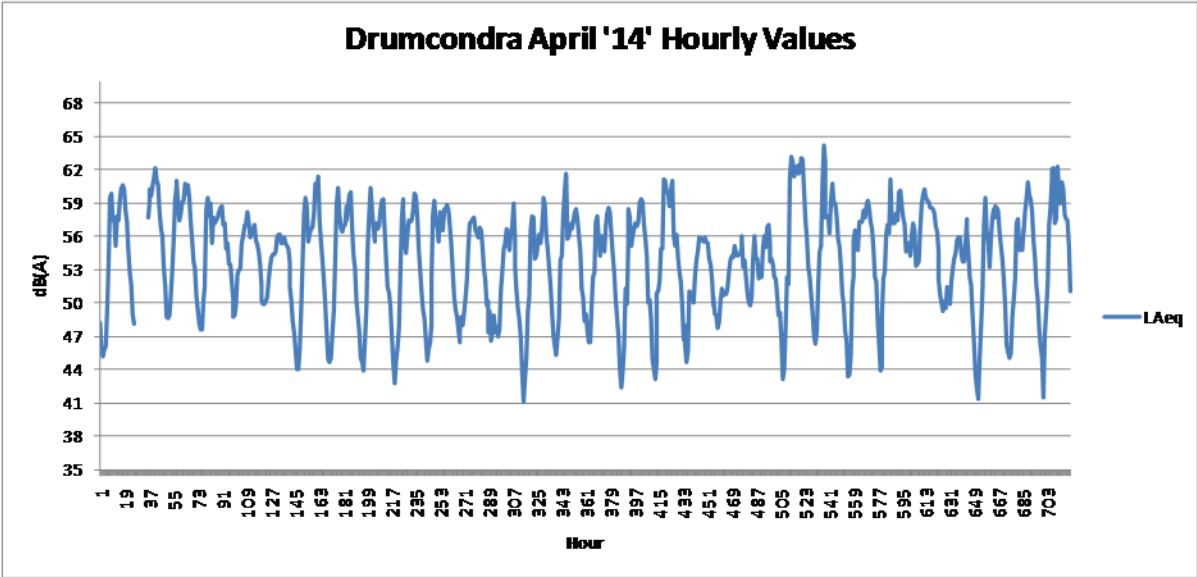


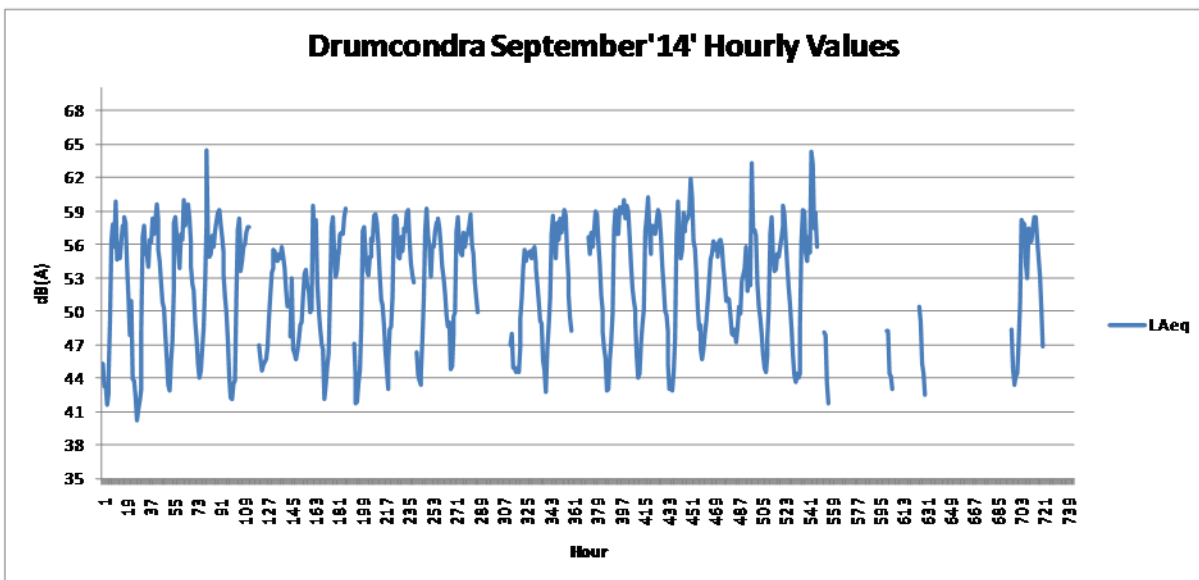
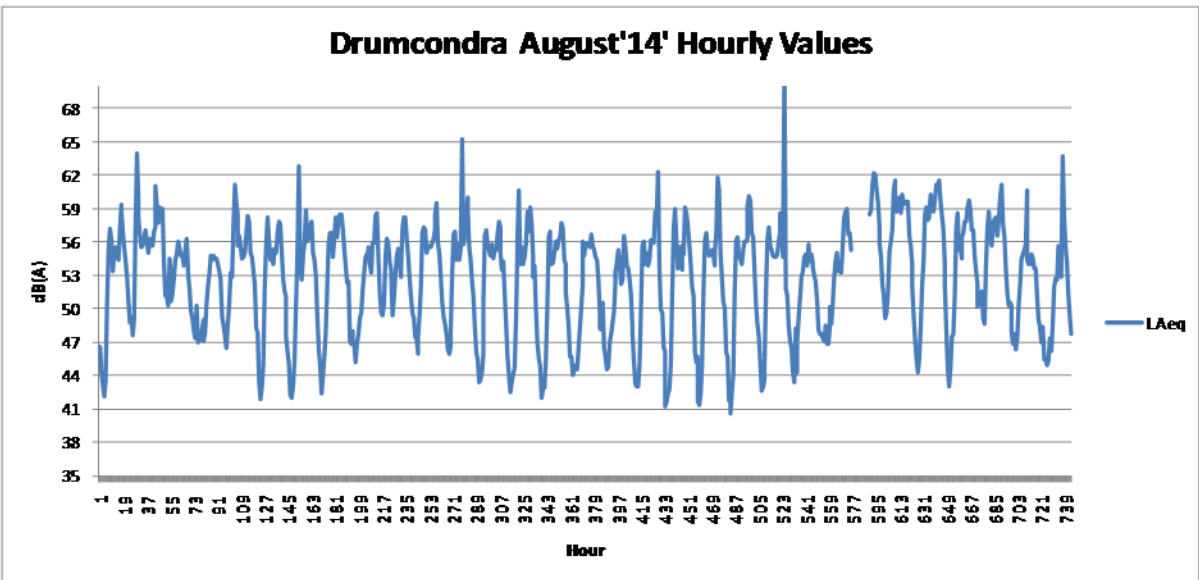
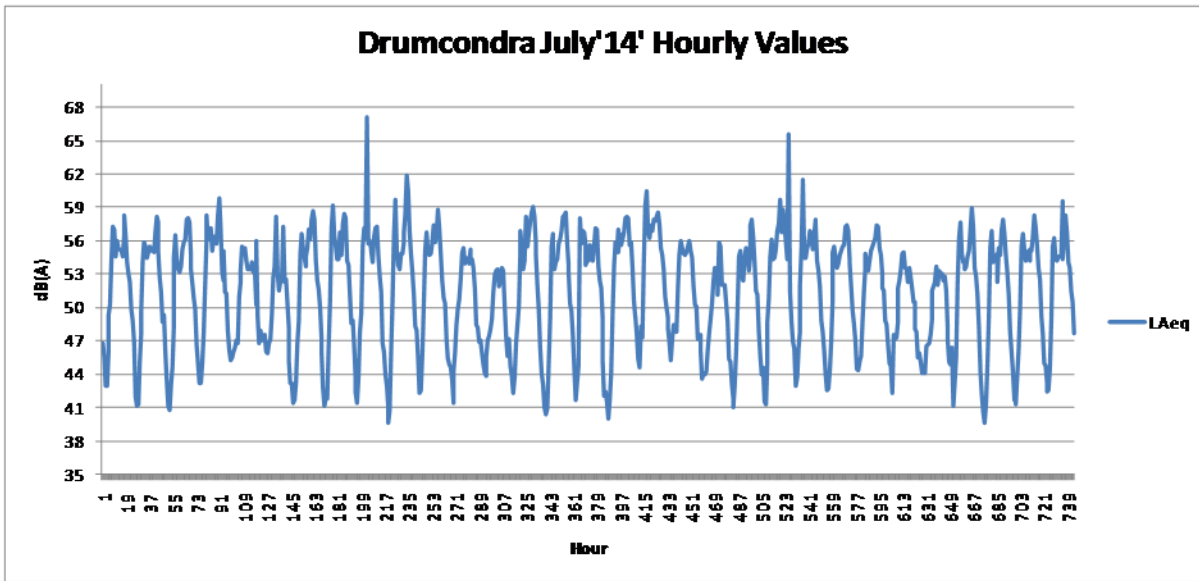
DRUMCONDRA LIBRARY
MILLMOUNT AVENUE
DUBLIN 9

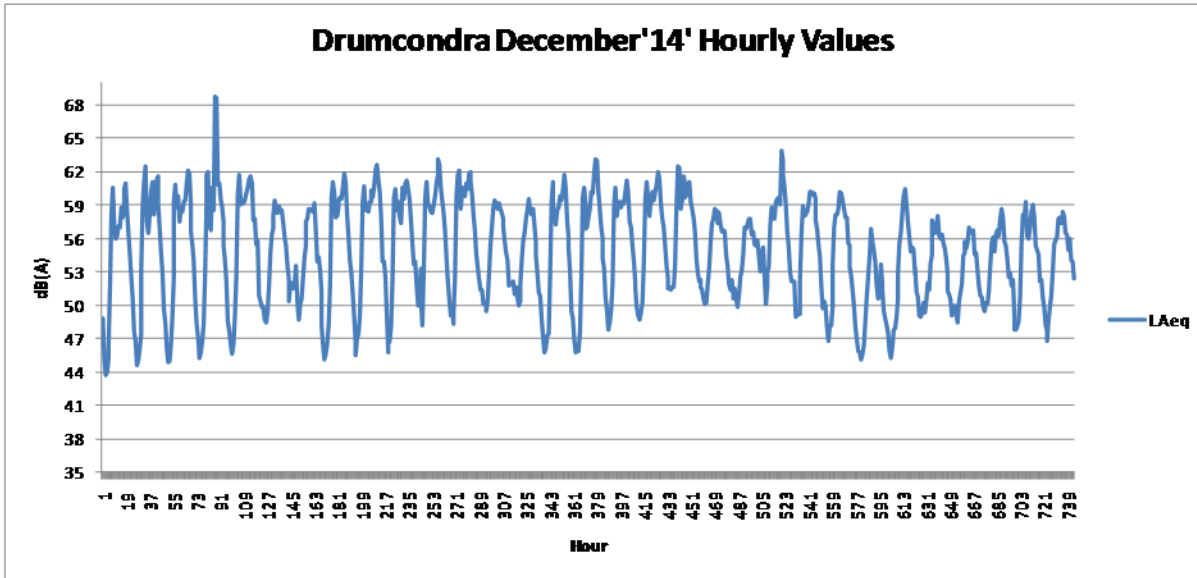
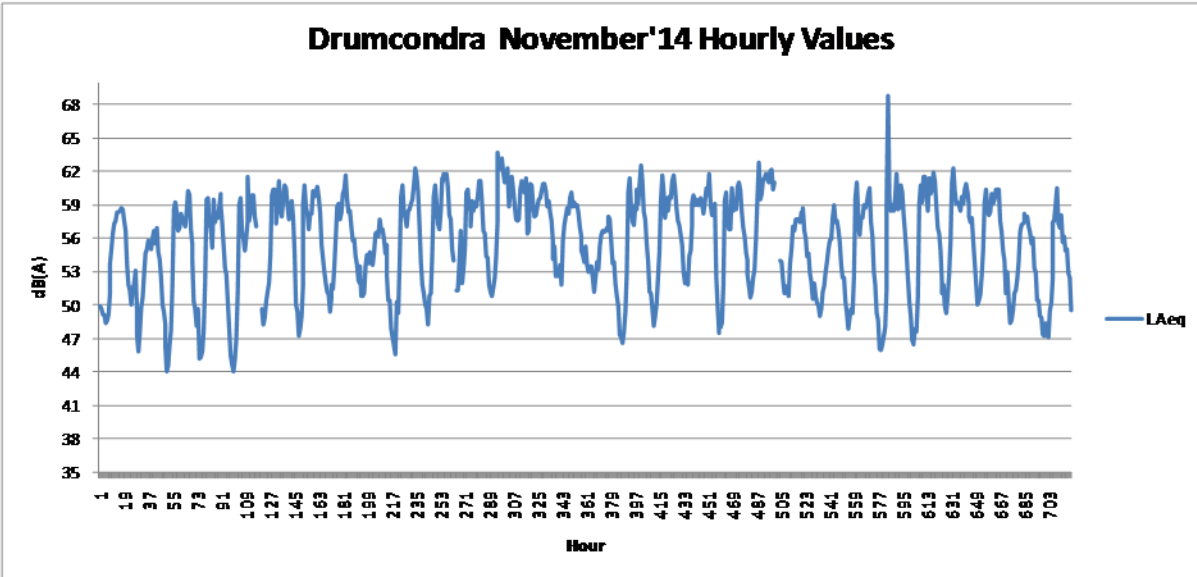
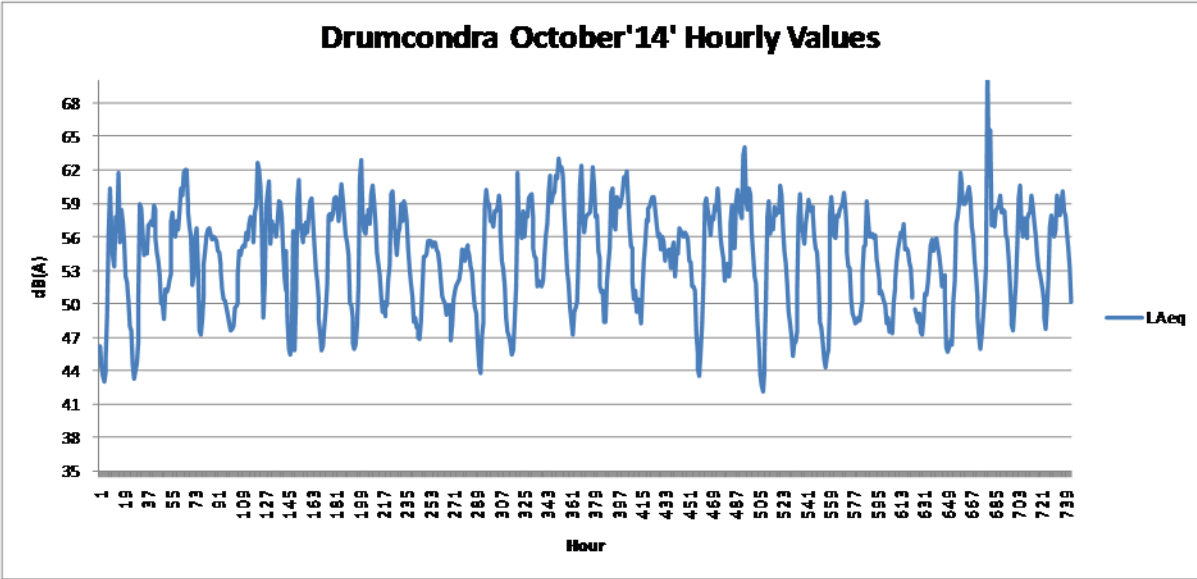






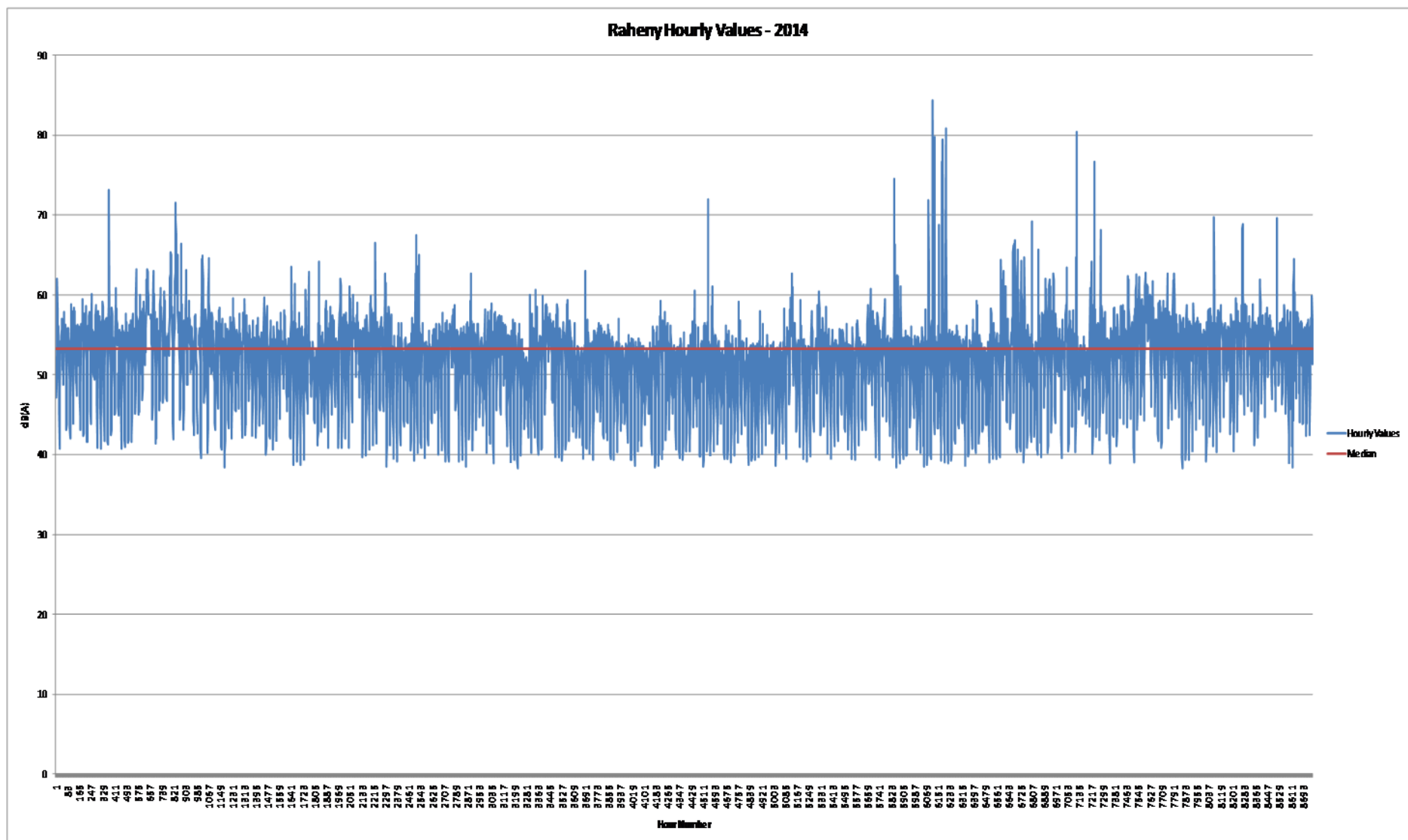


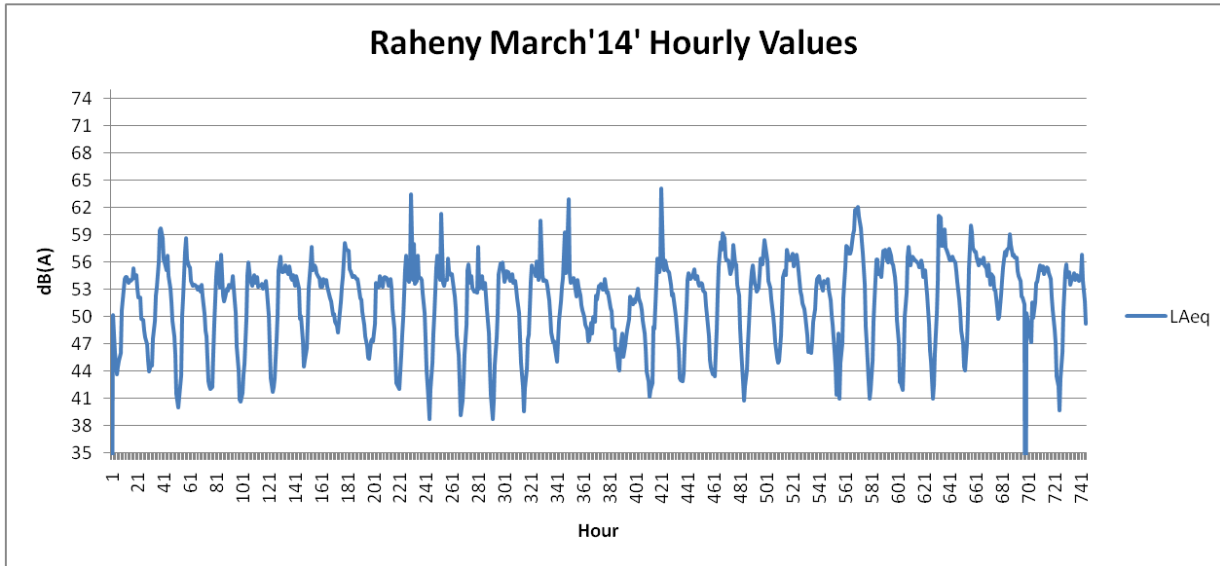
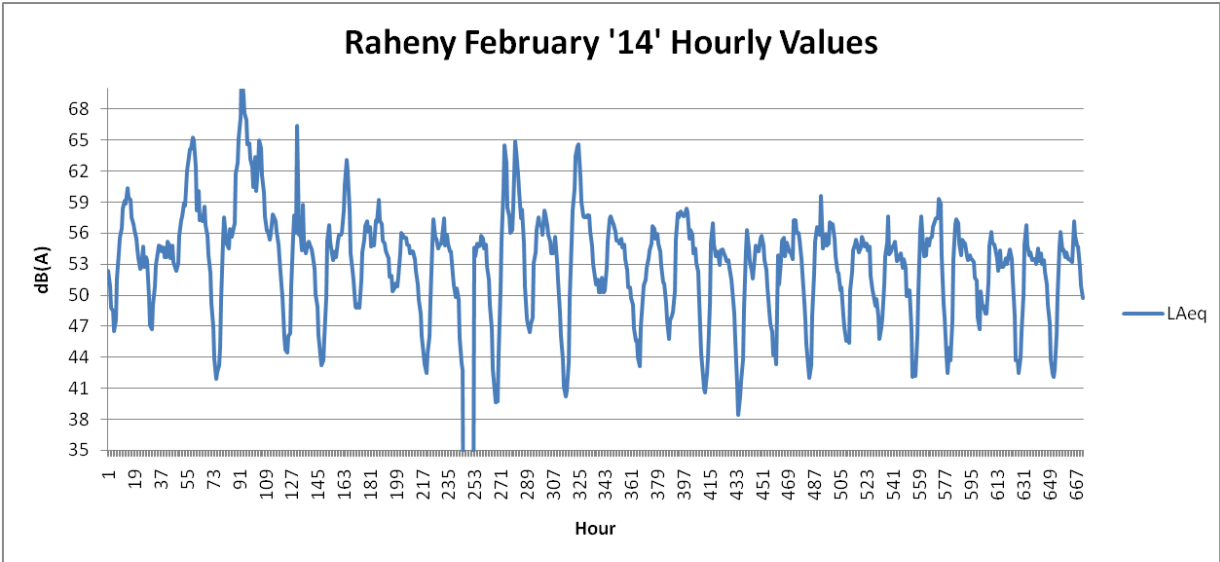
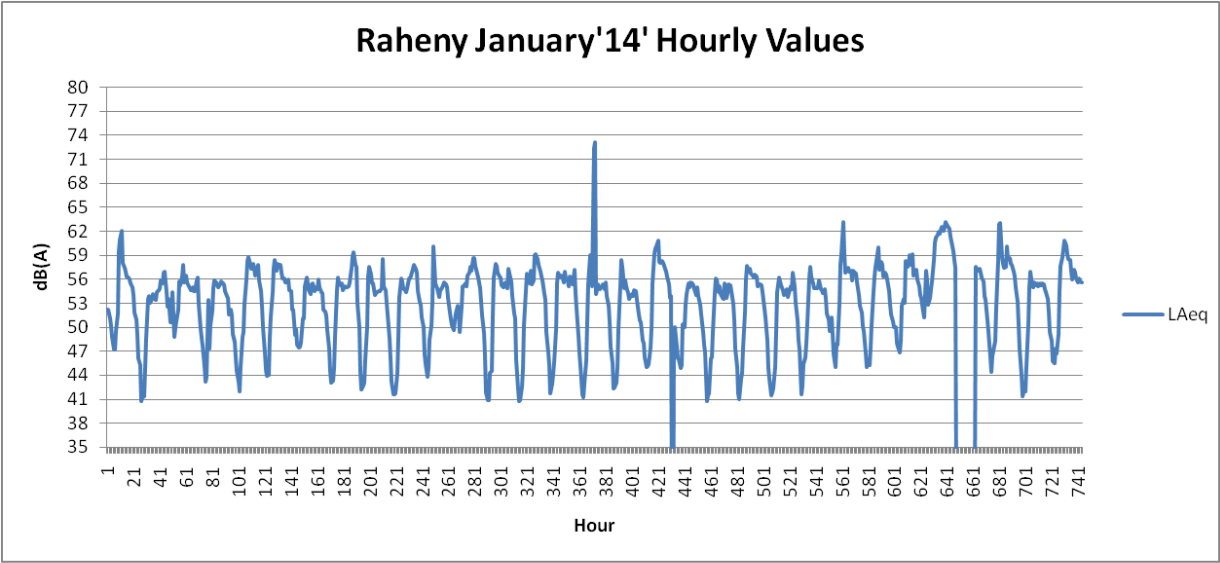


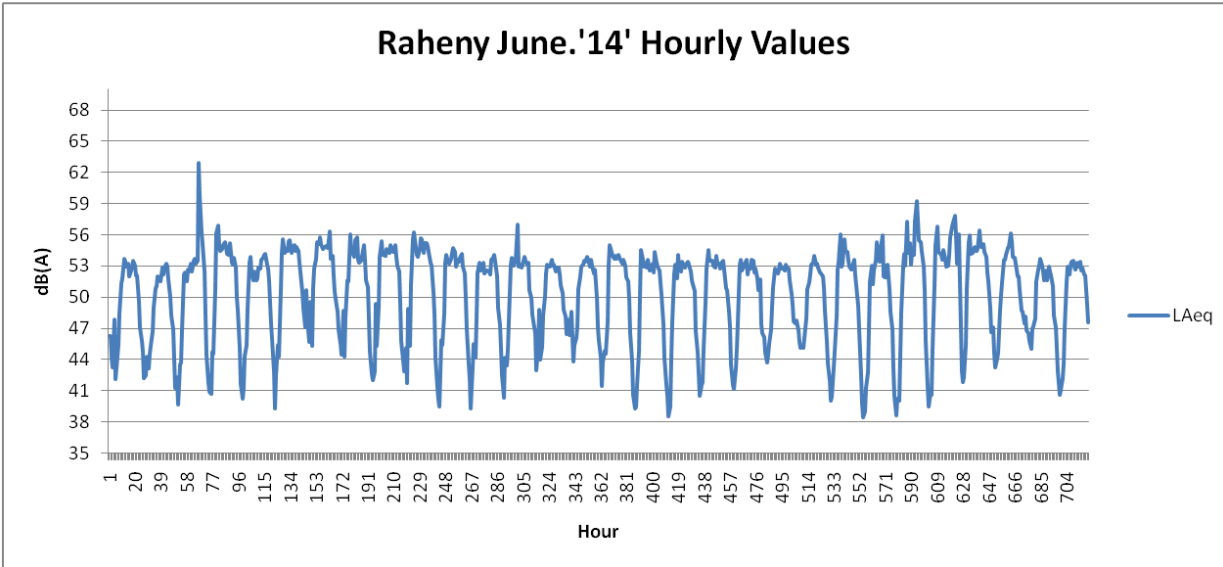
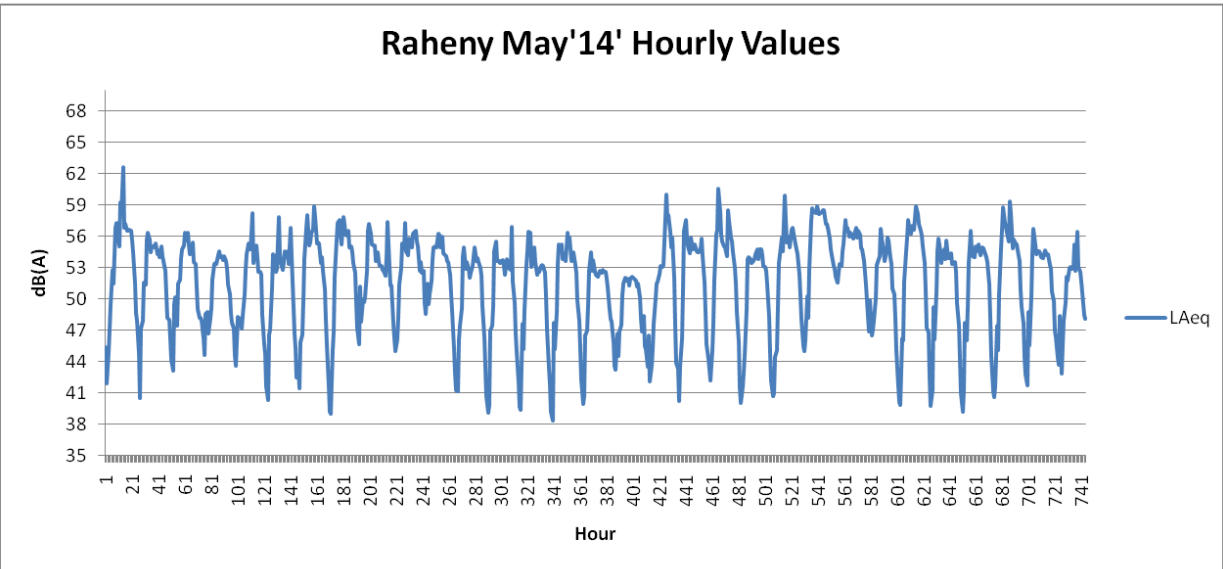
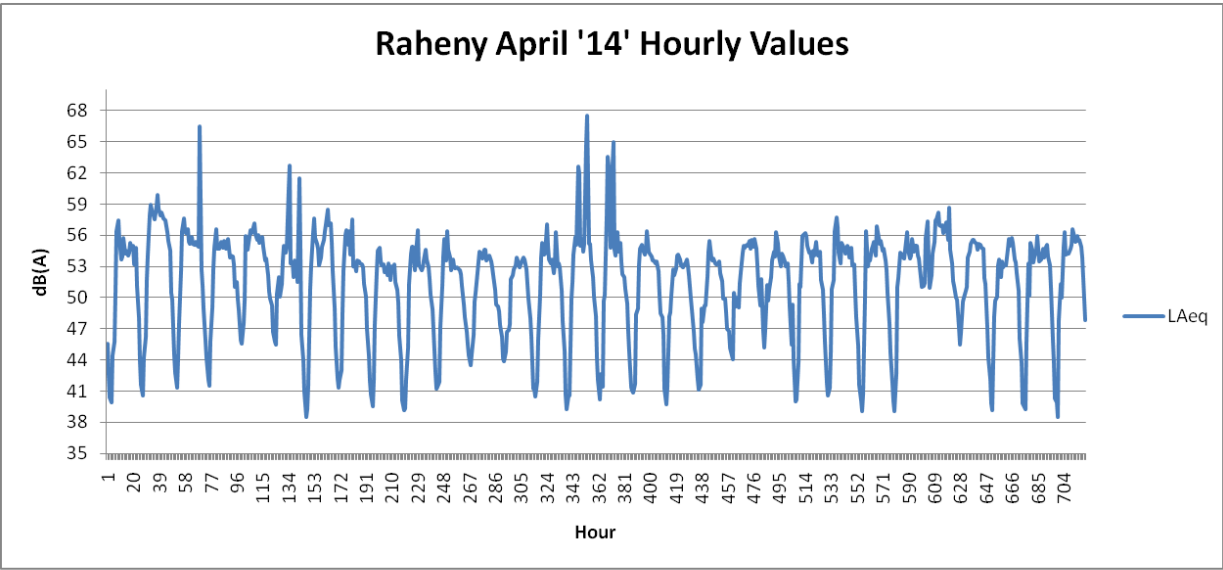


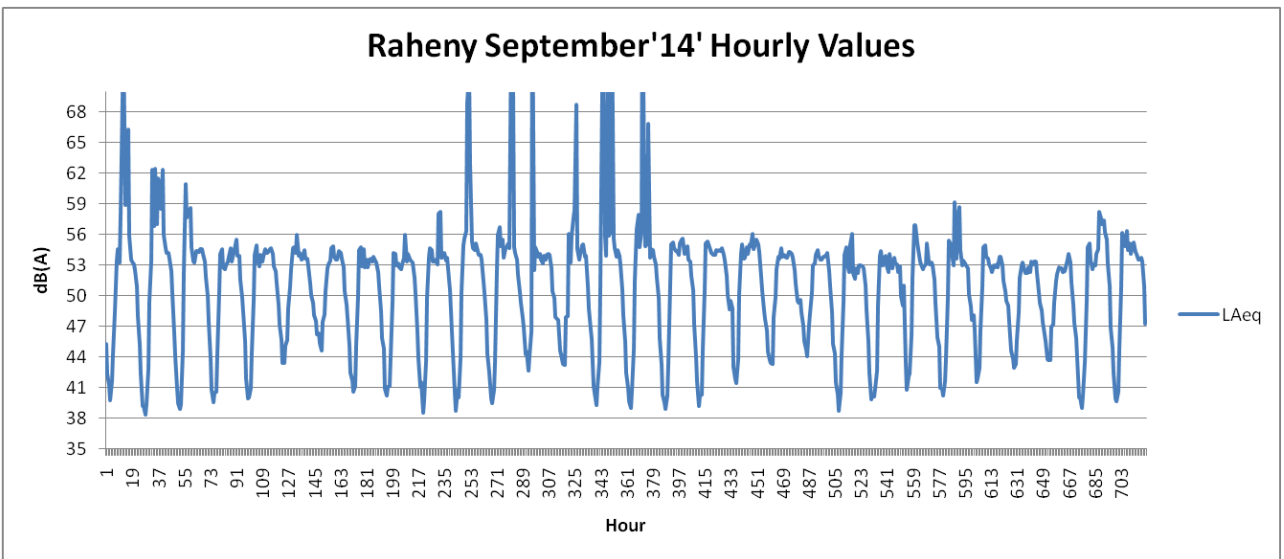
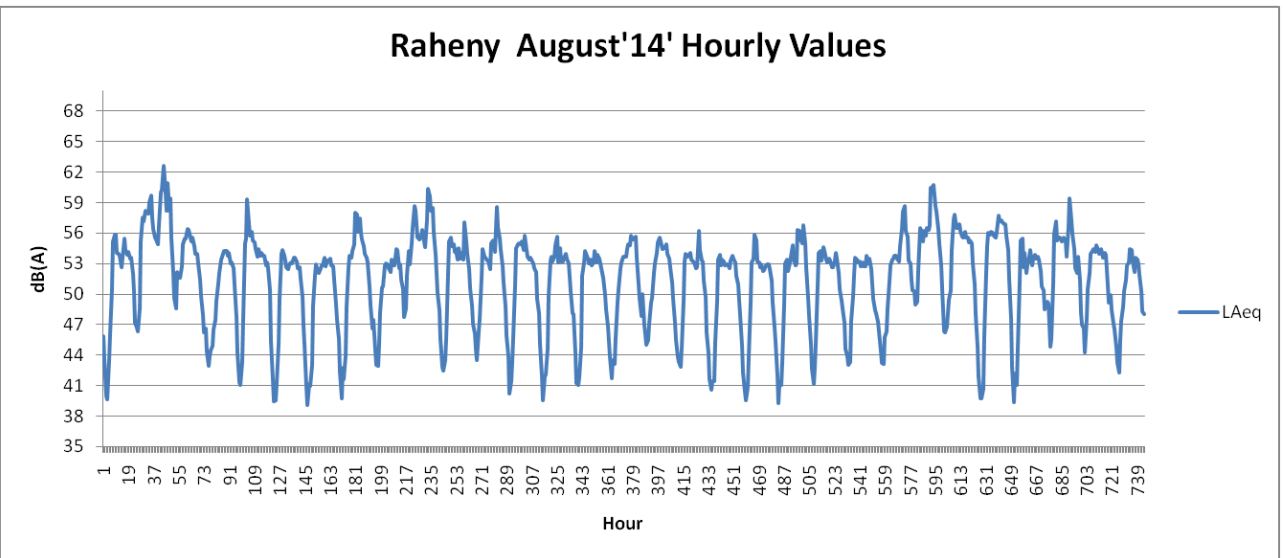
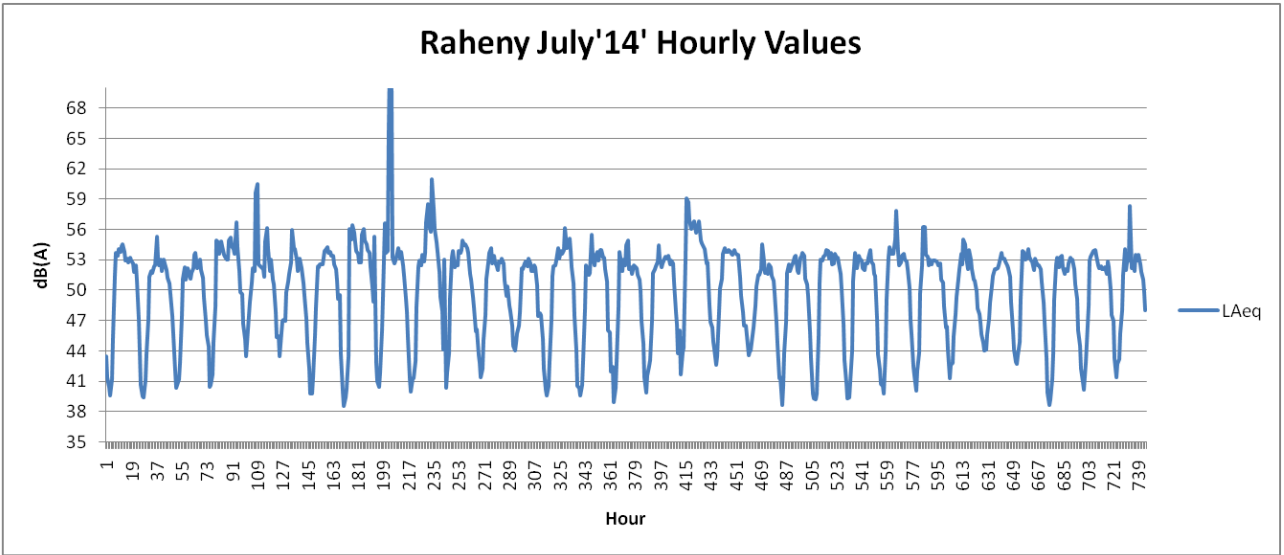
RAHENY LIBRARY
HOWTH ROAD
DUBLIN 5

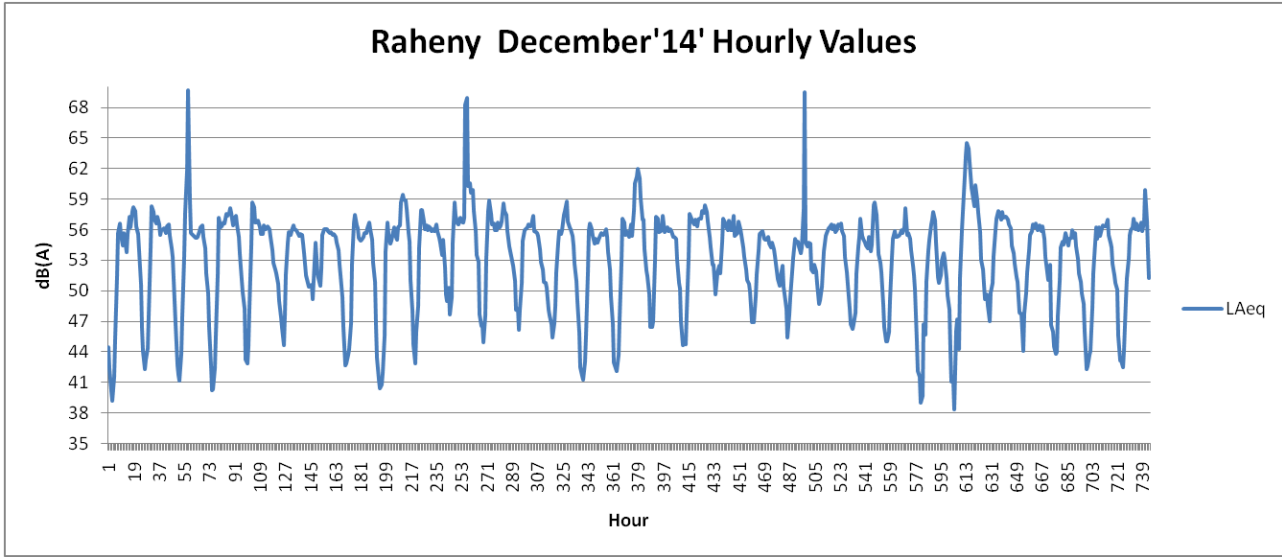
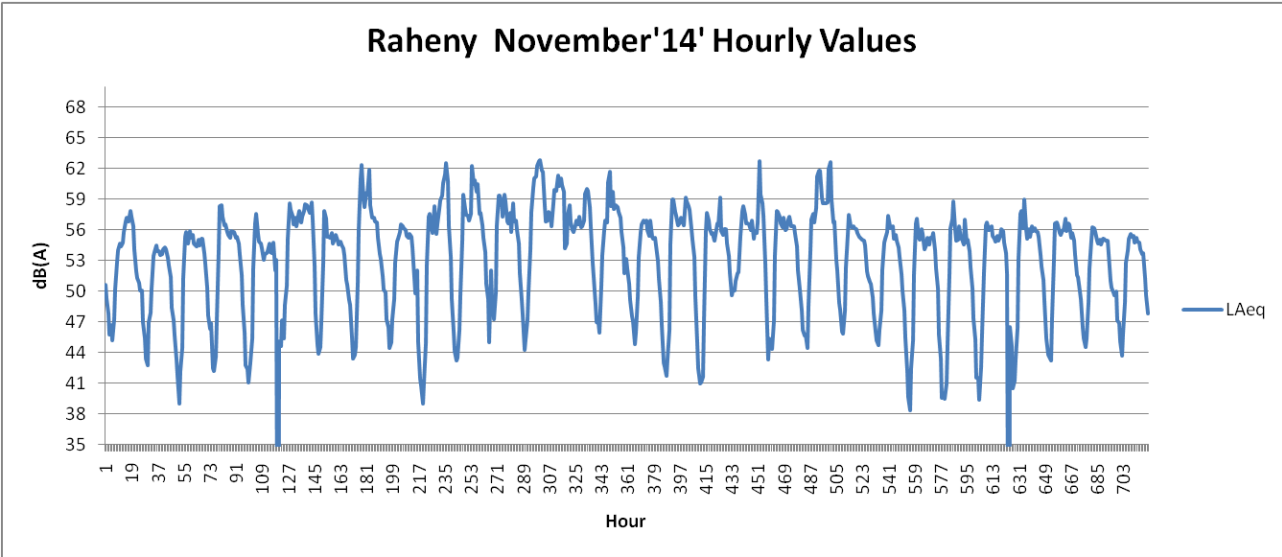
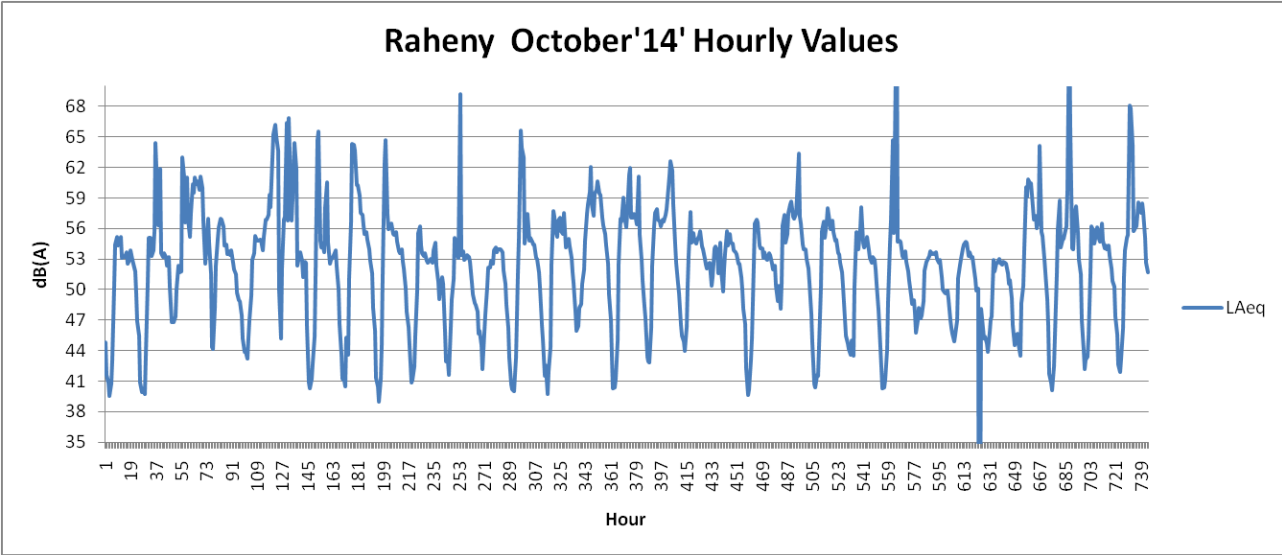




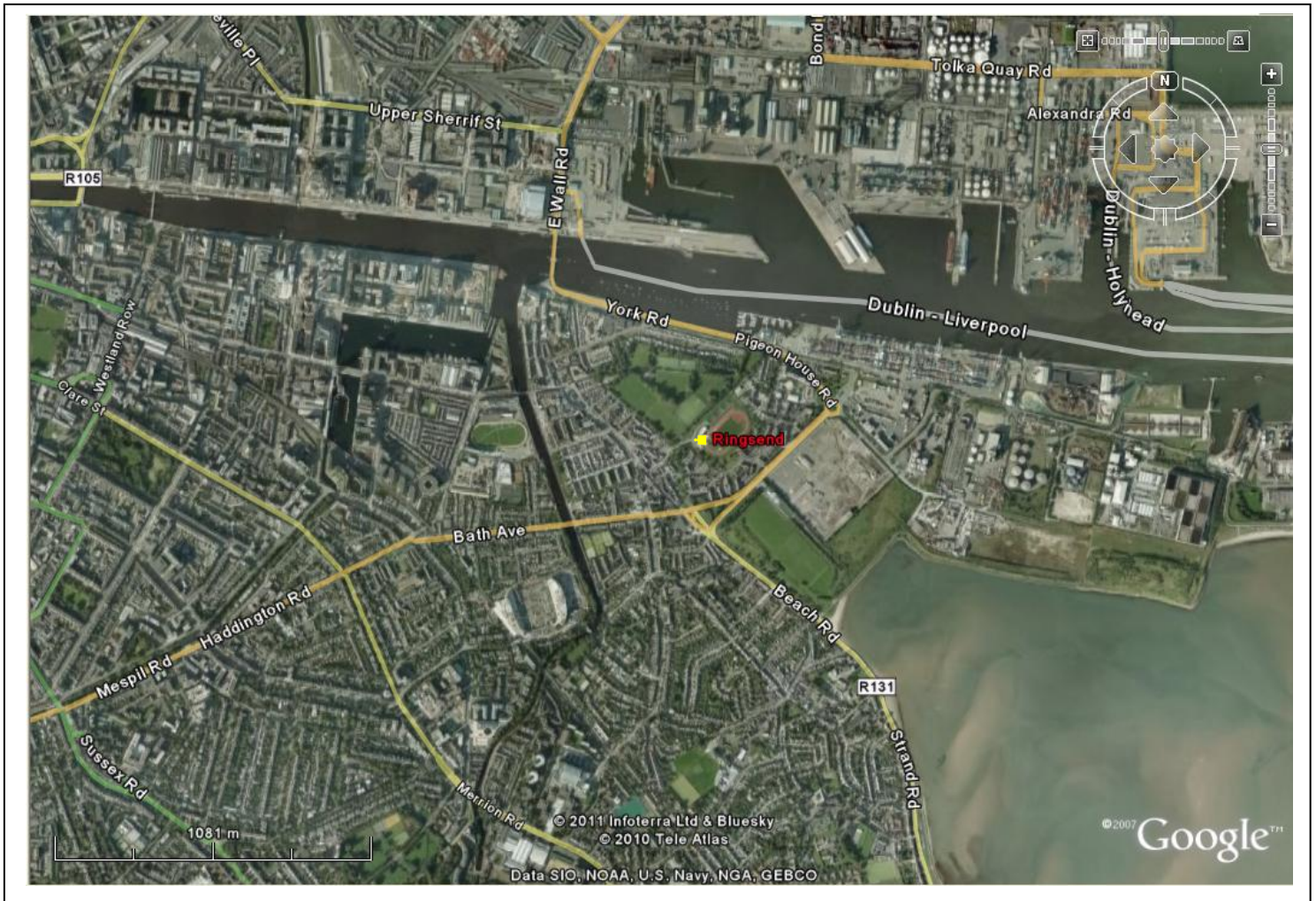


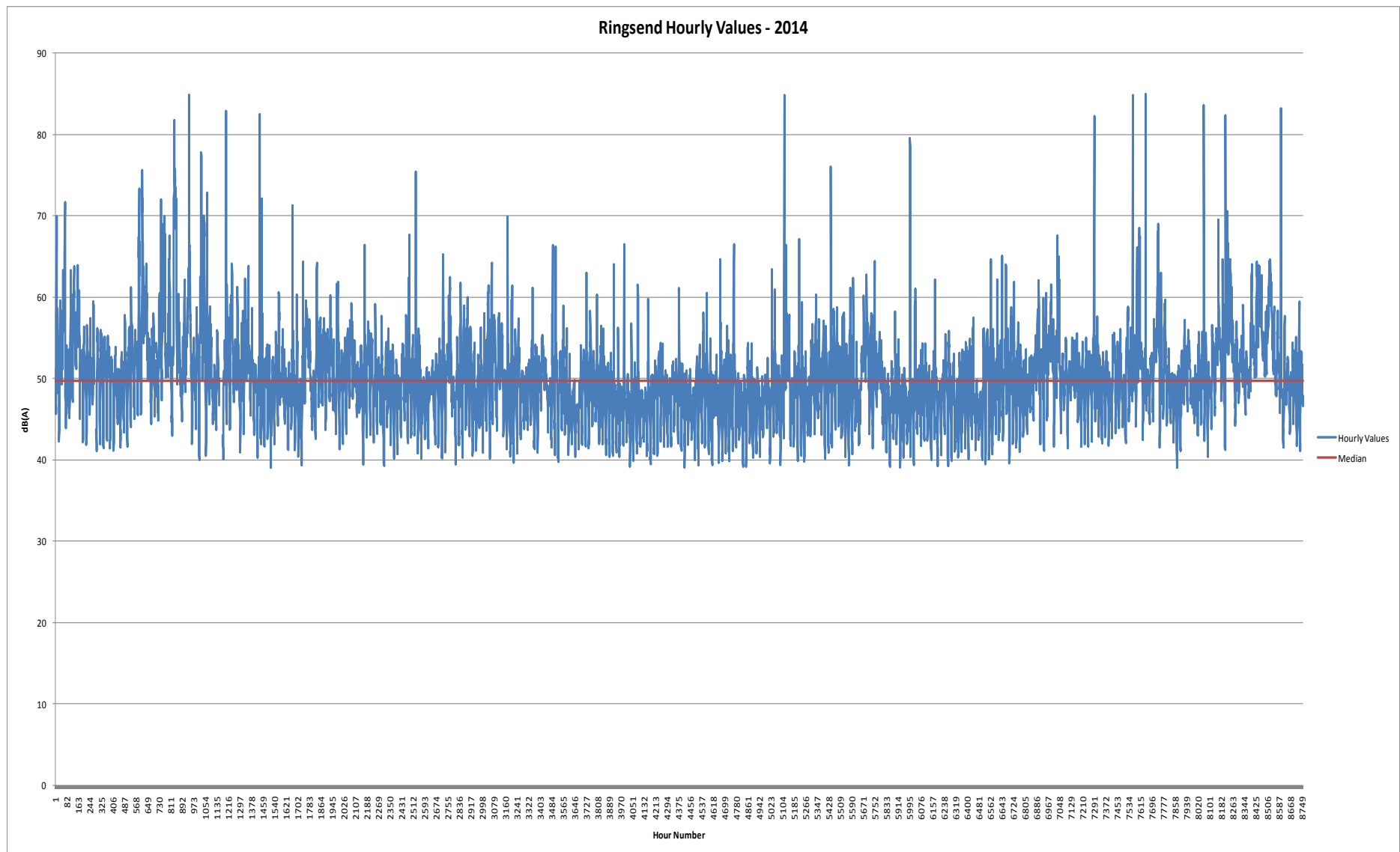


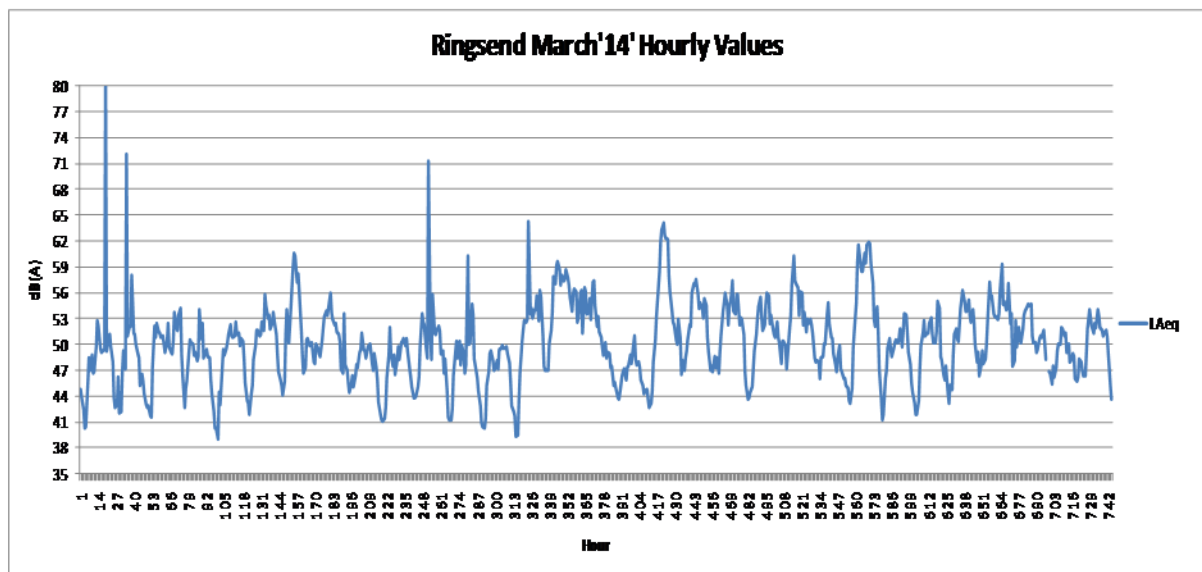
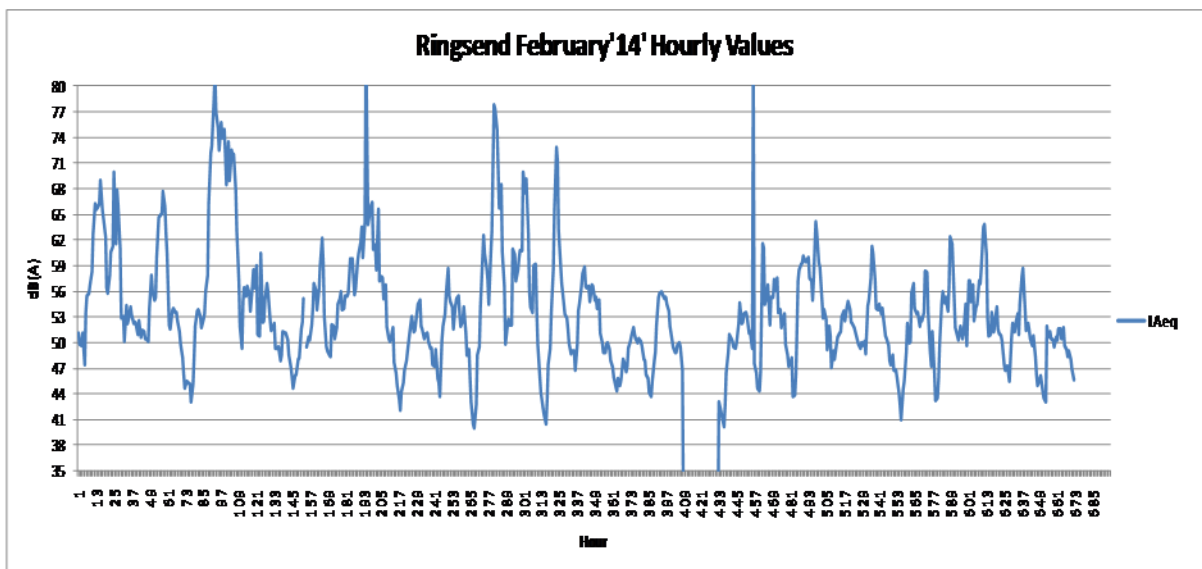
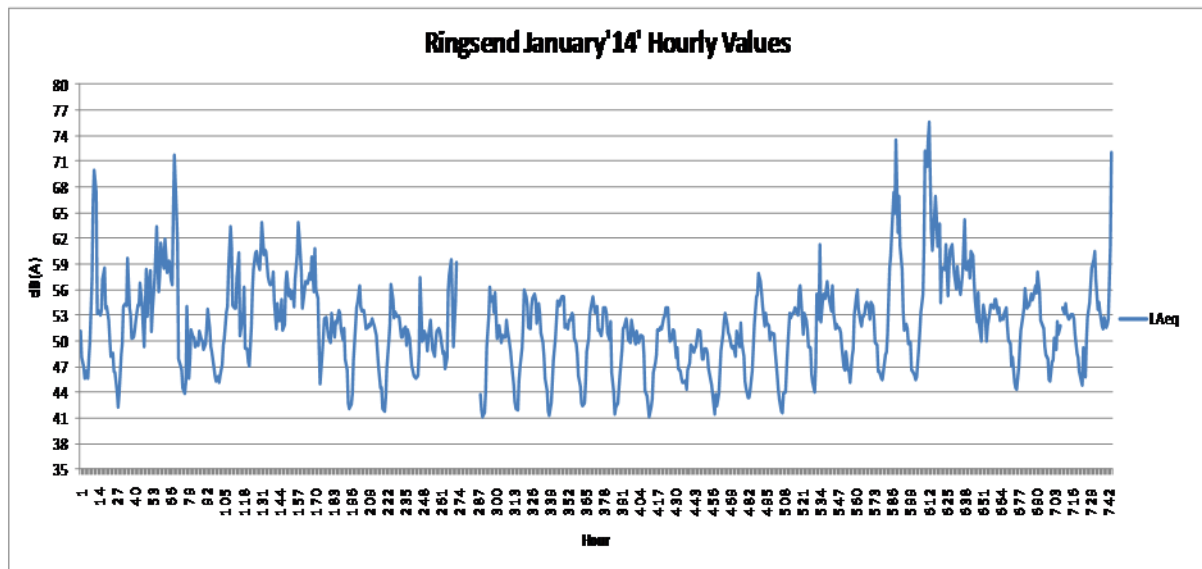


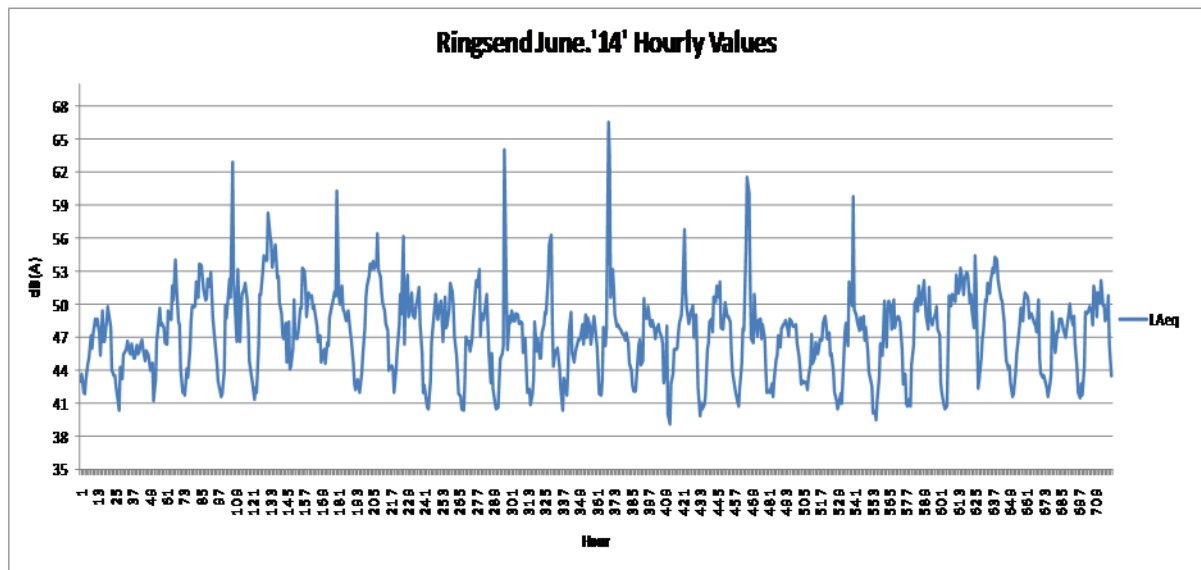
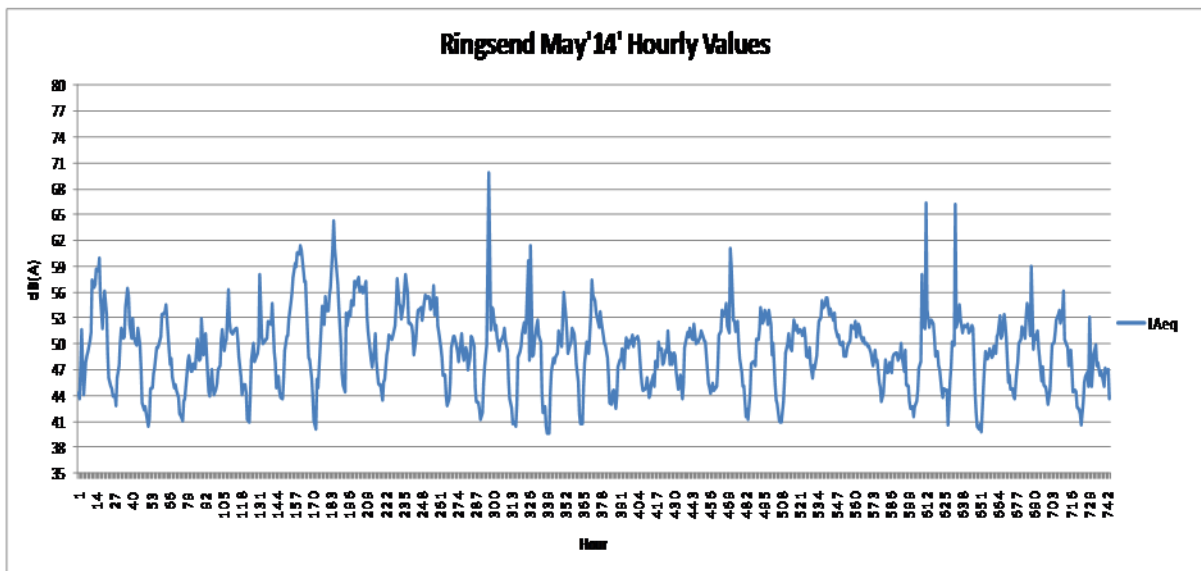
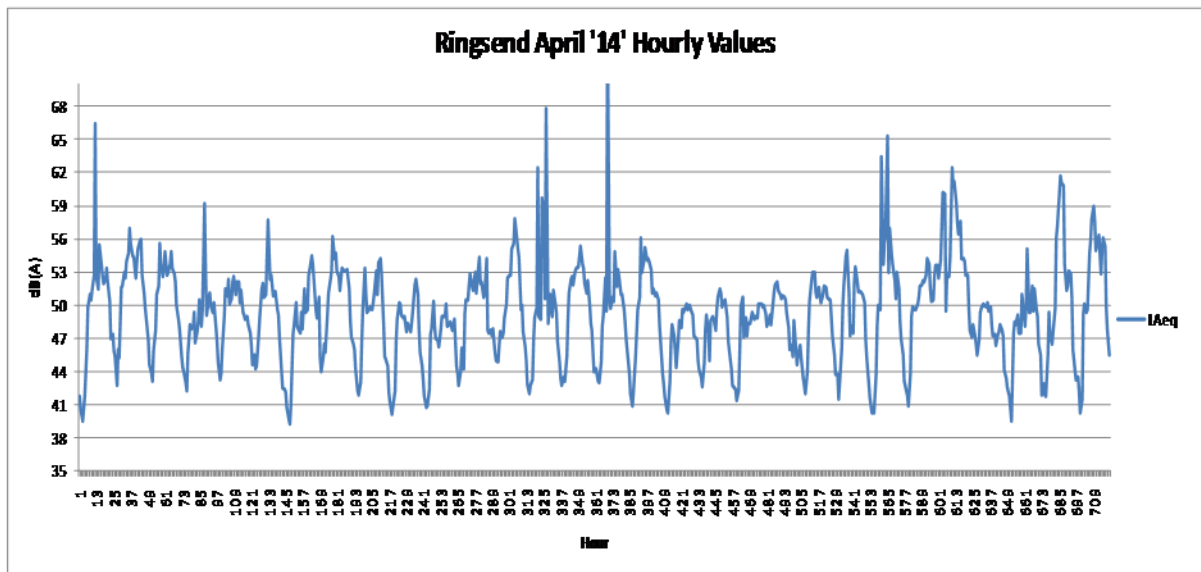


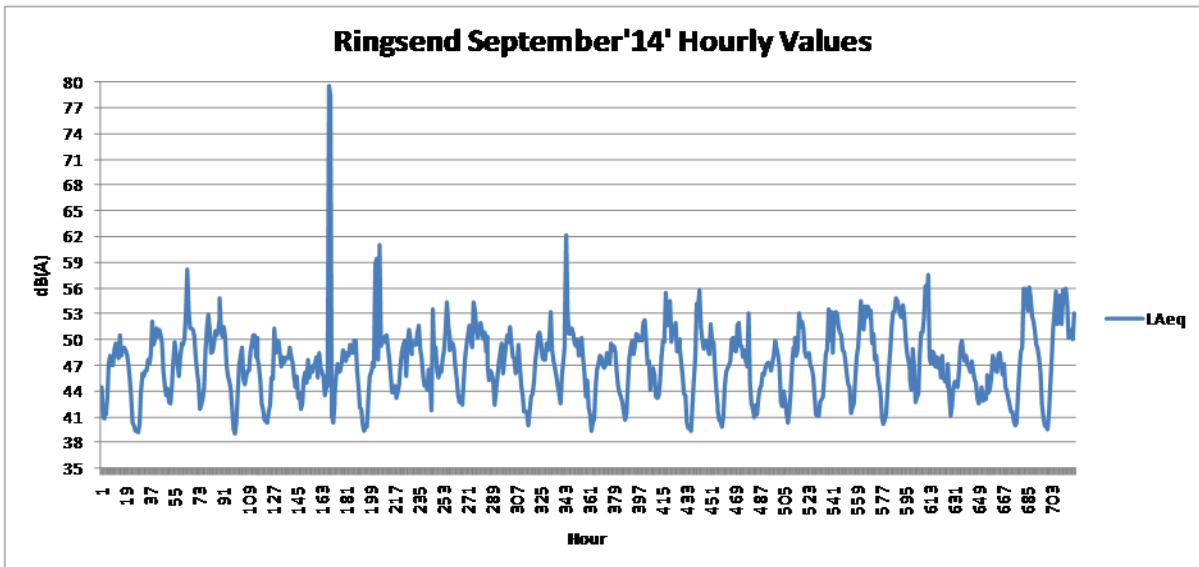
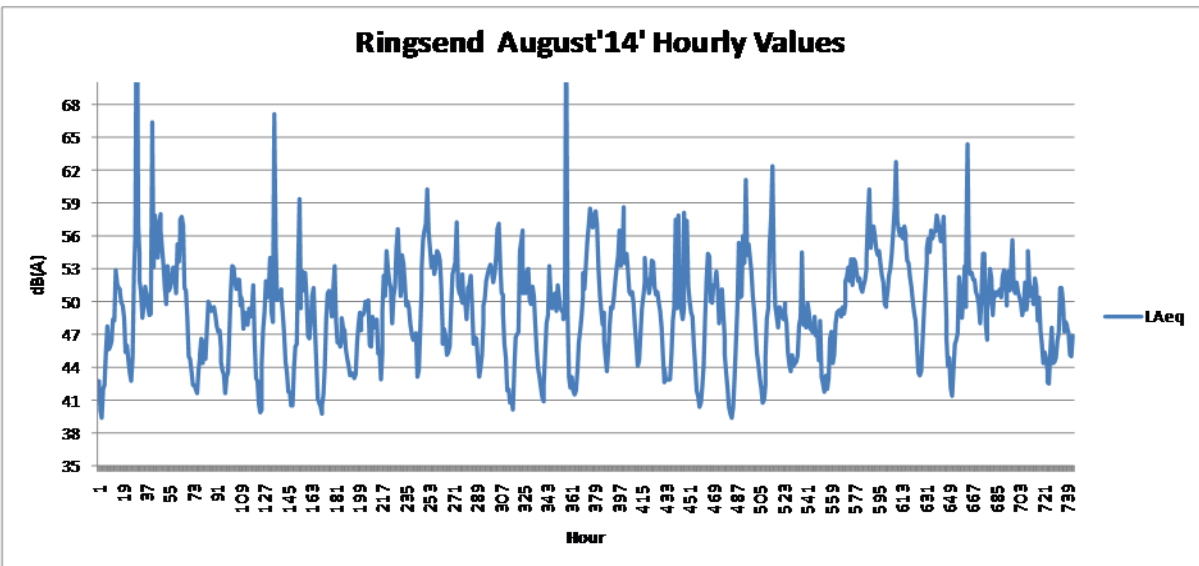
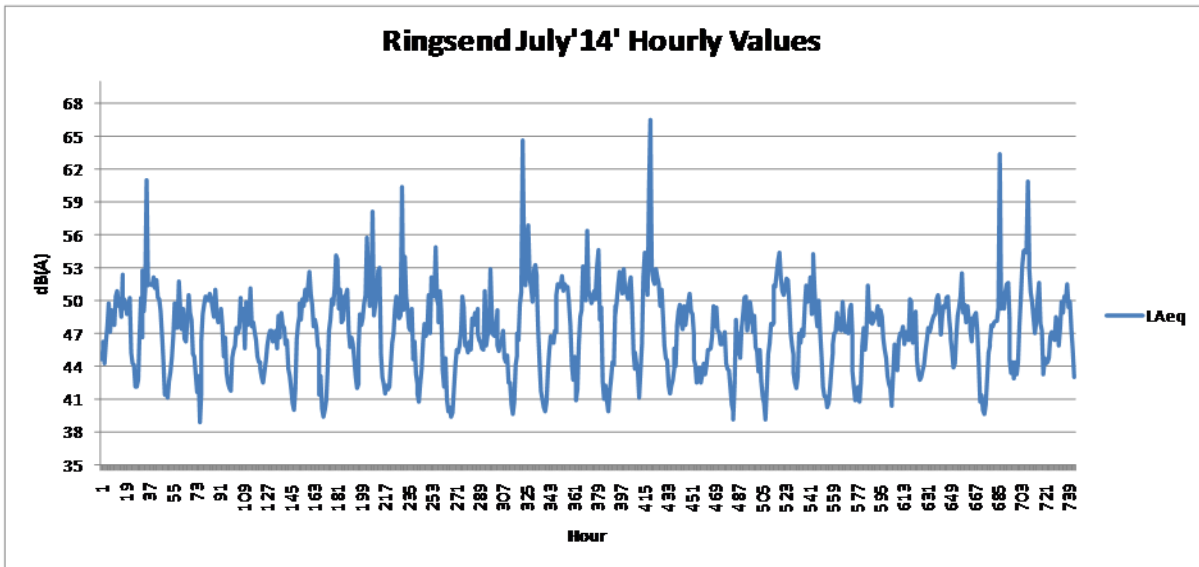
IRISHTOWN SPORTS CENTRE
RINGSEND
DUBLIN 4

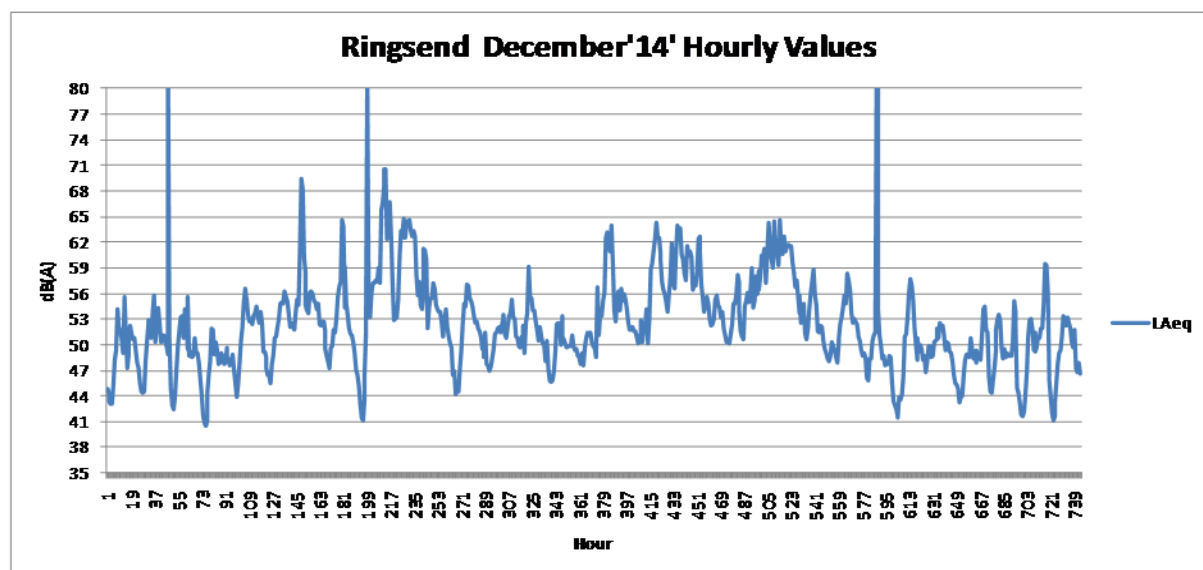
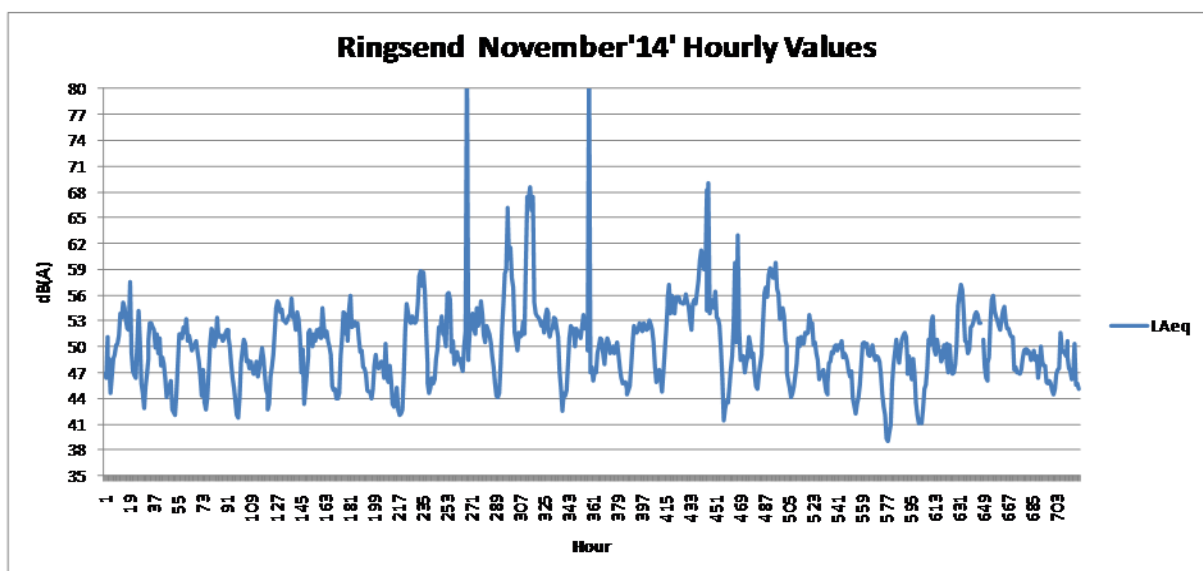
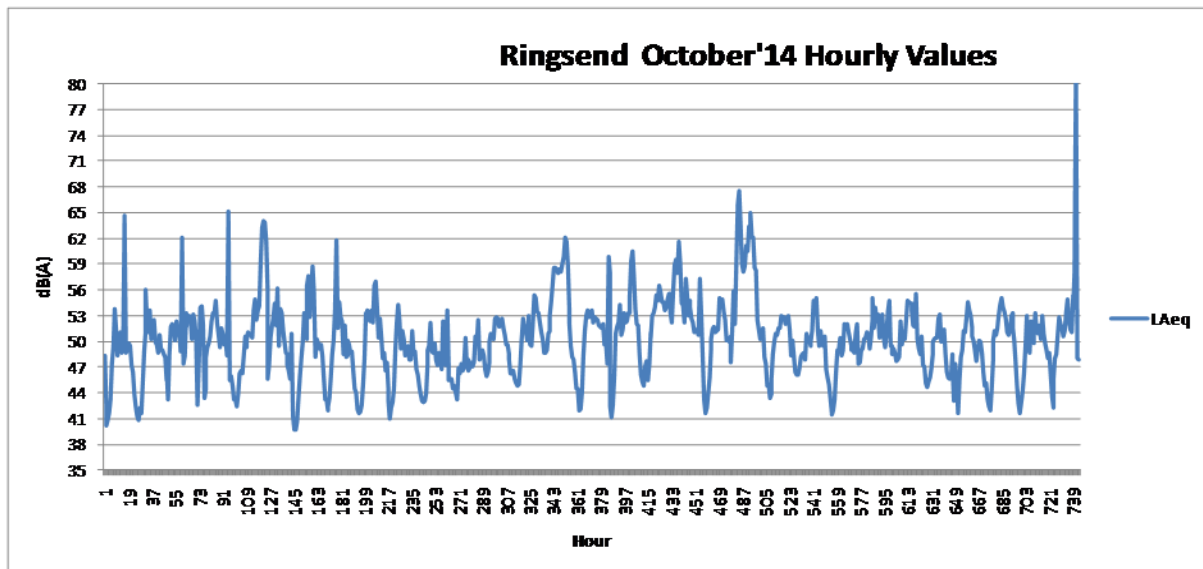






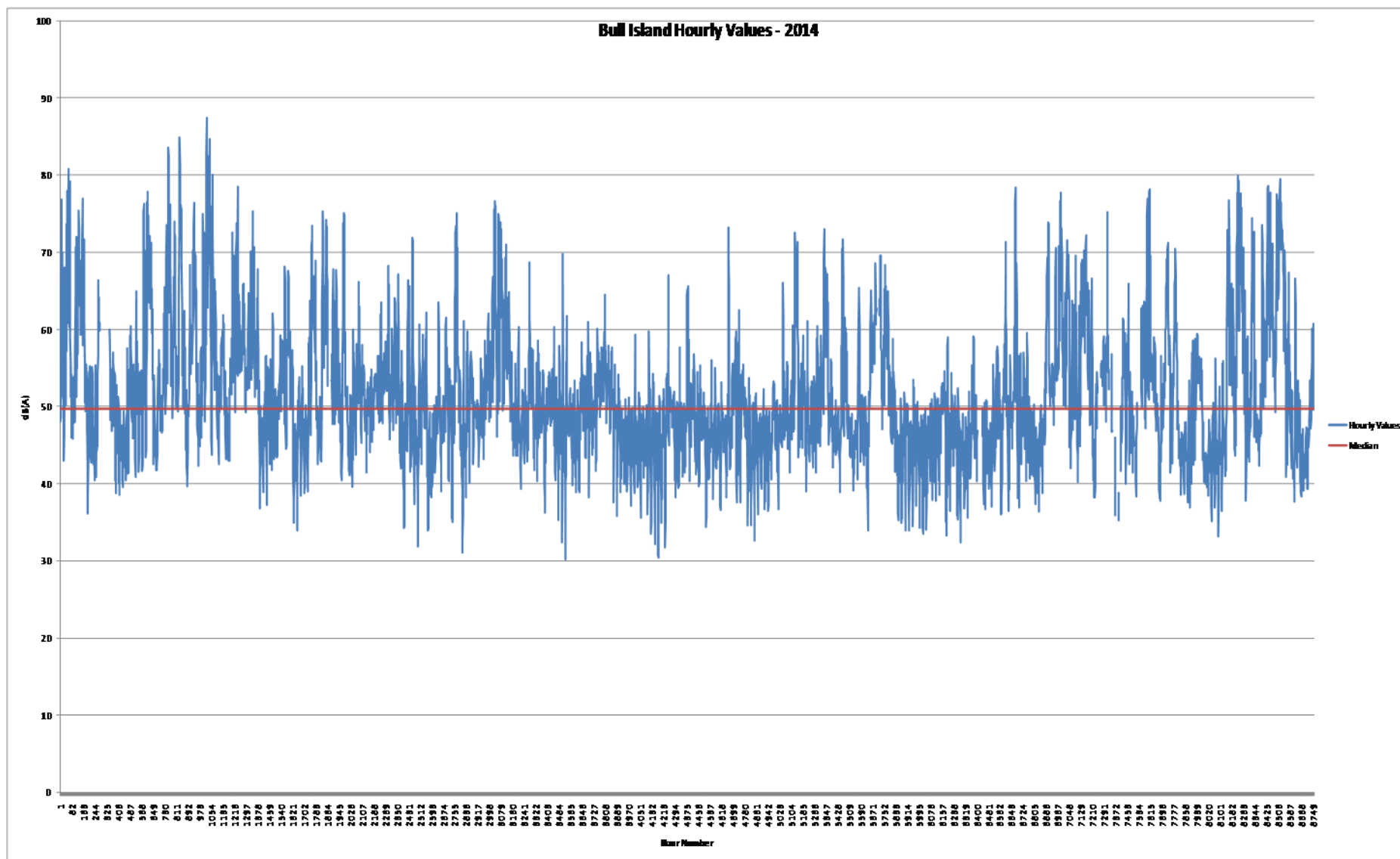


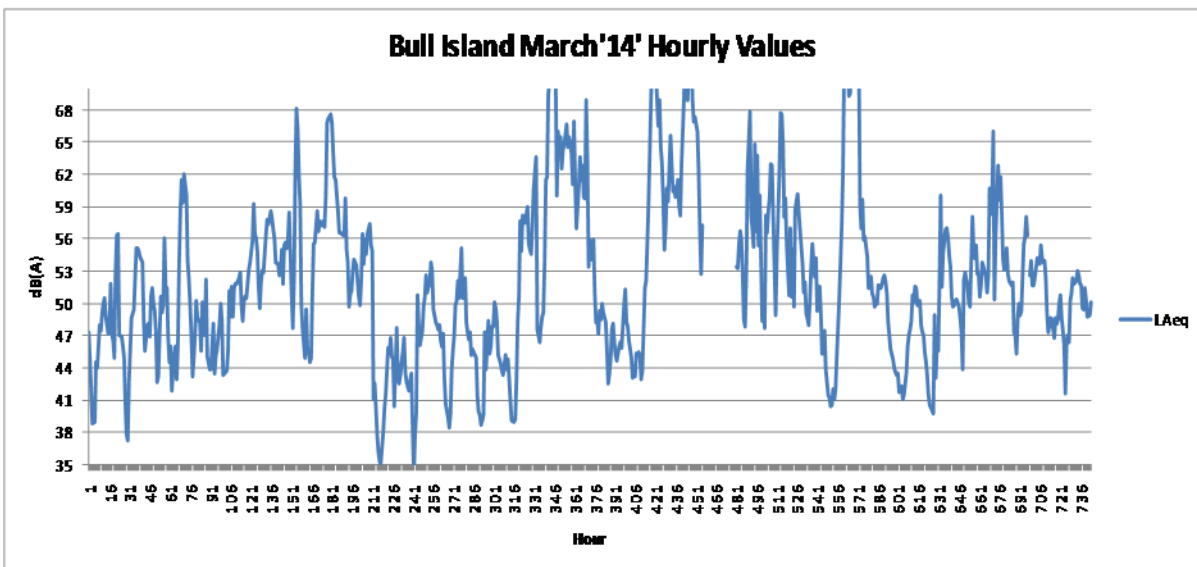
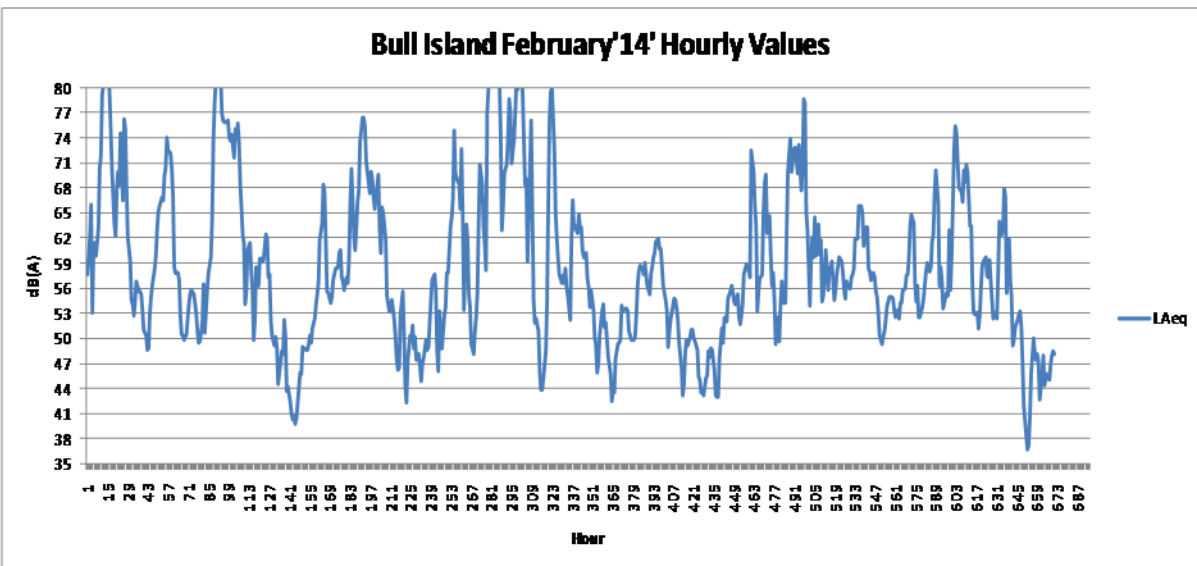
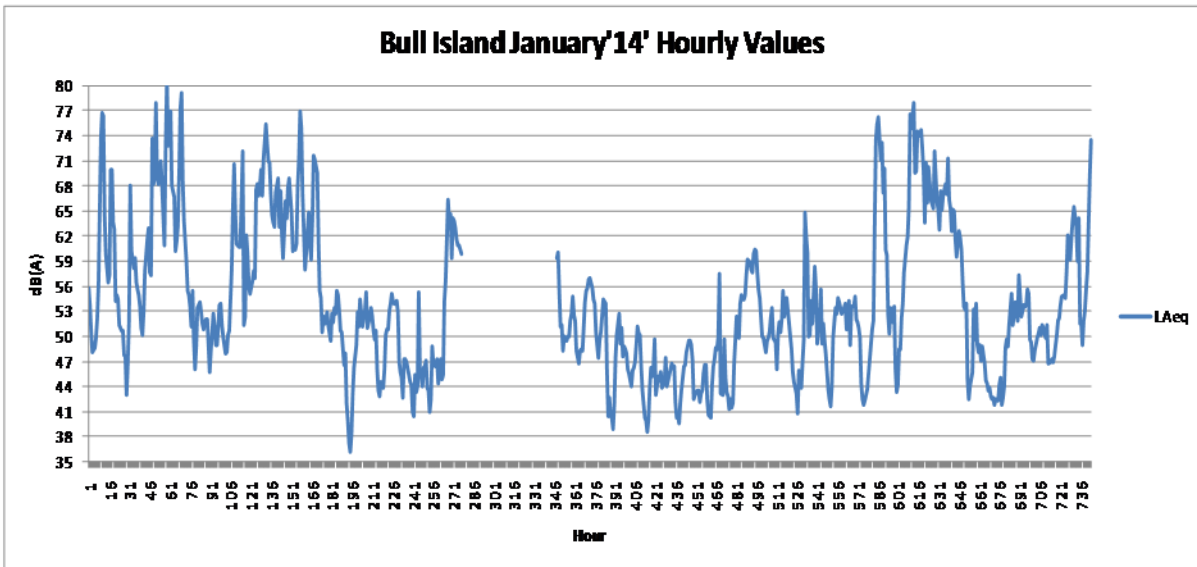


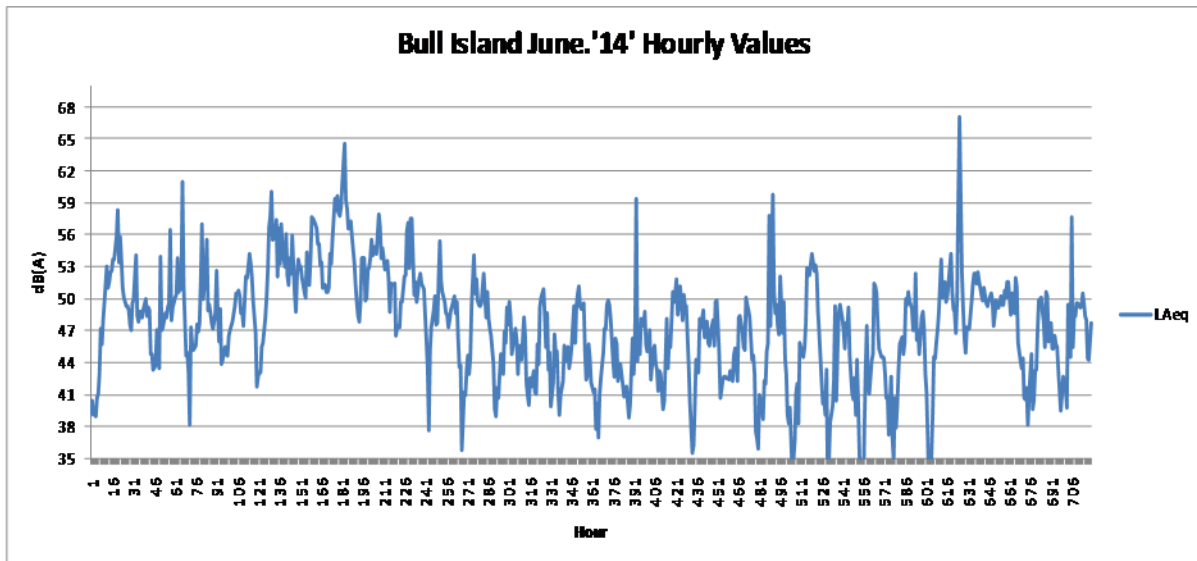
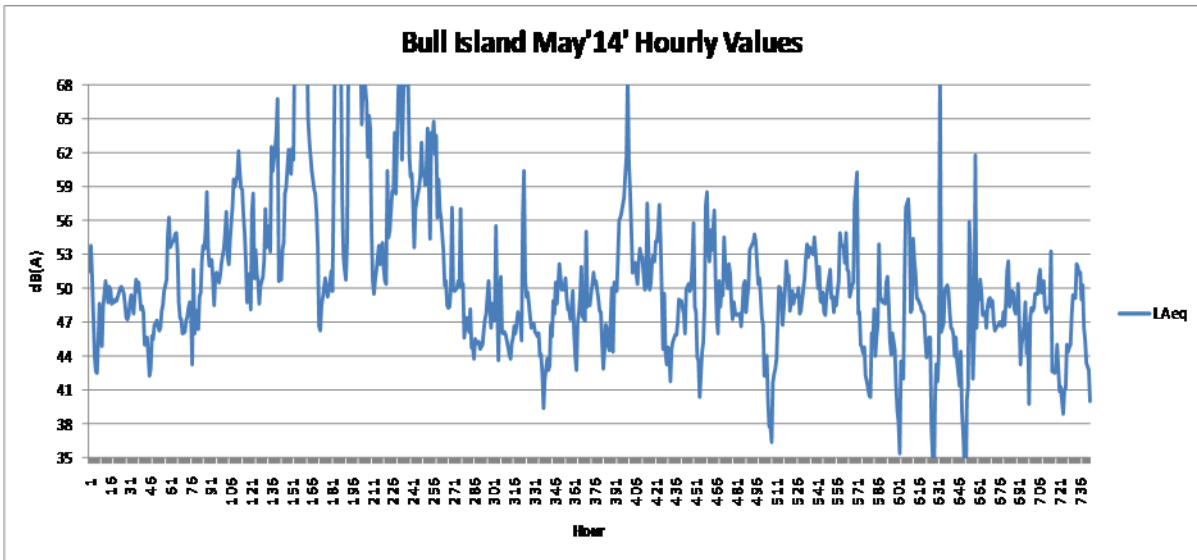
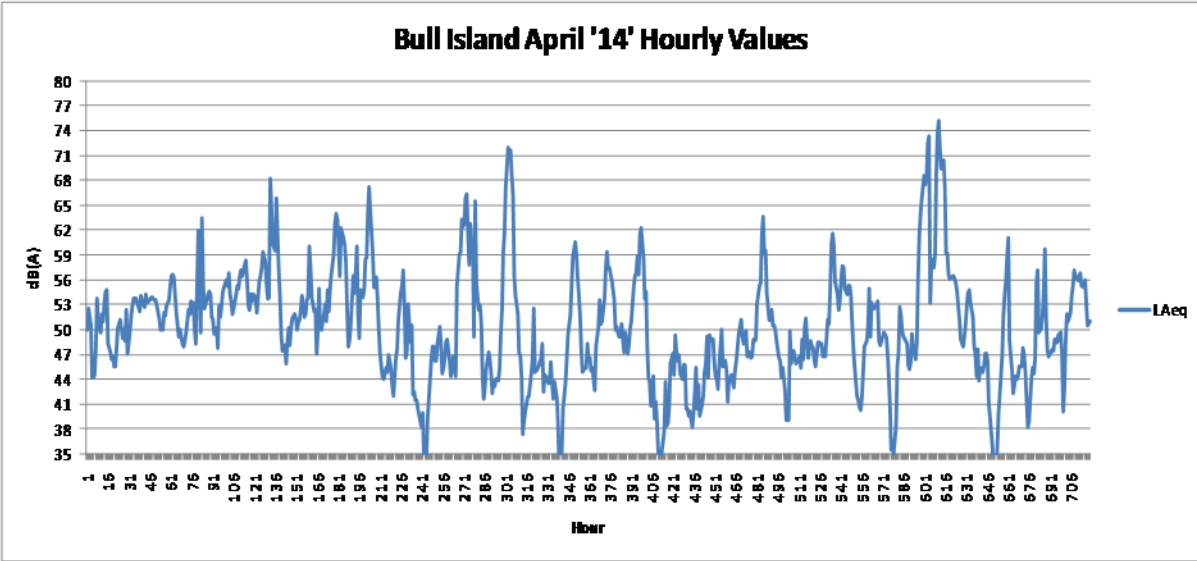


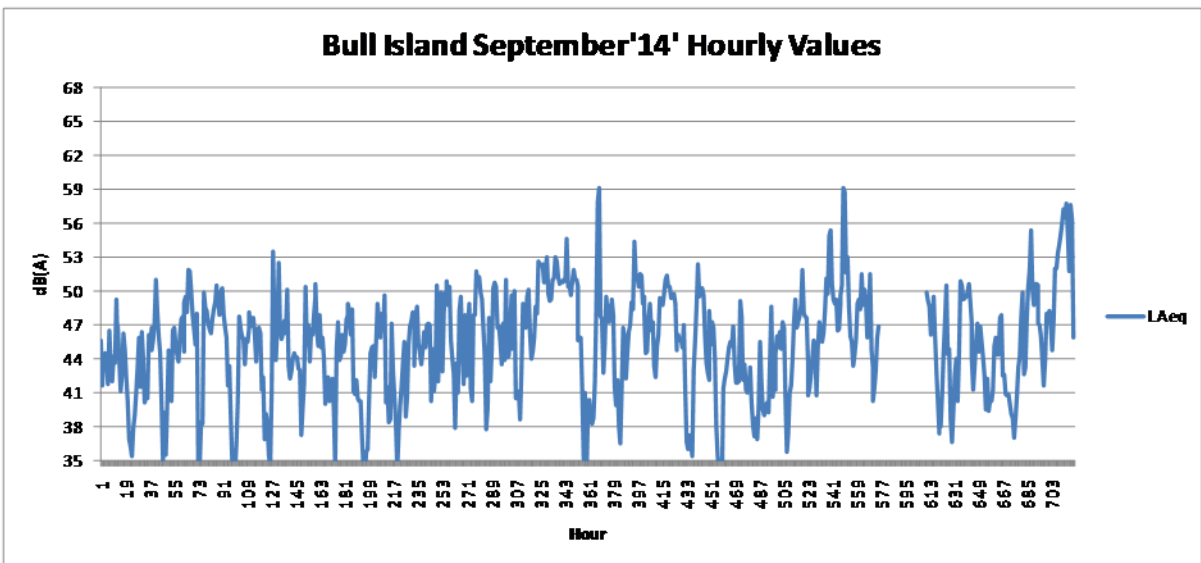
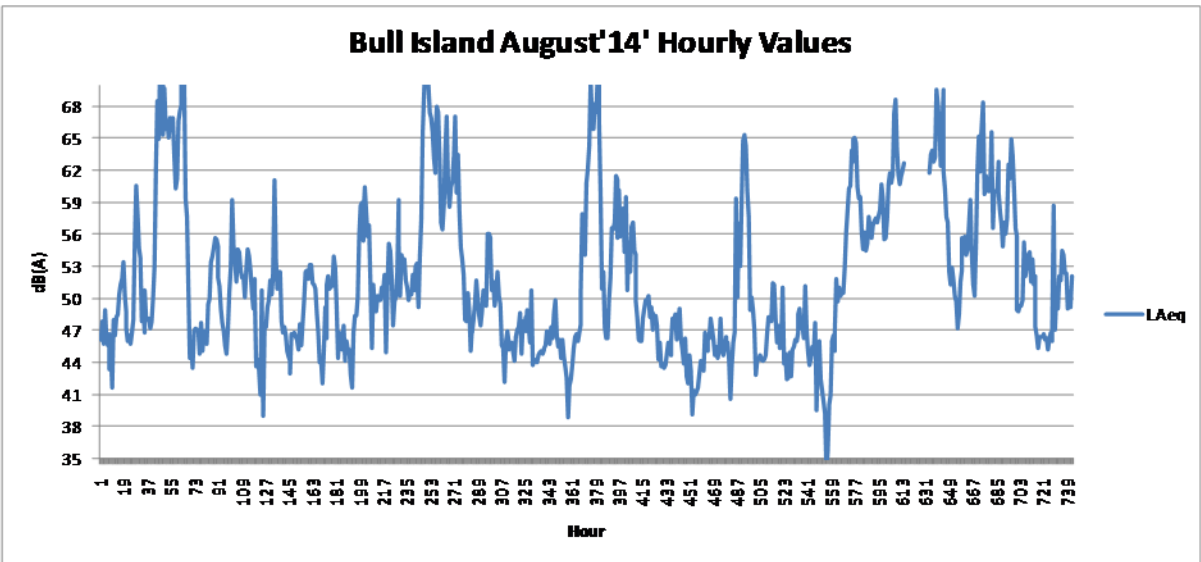
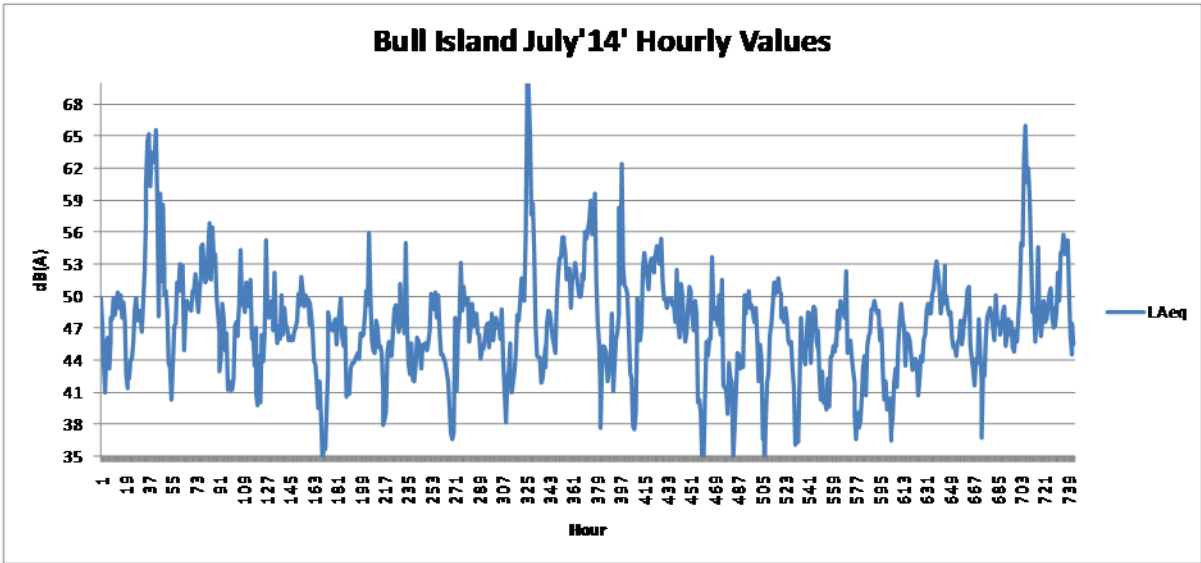
BULL ISLAND INTERPRETATIVE CENTRE
BULL ISLAND
DUBLIN 3

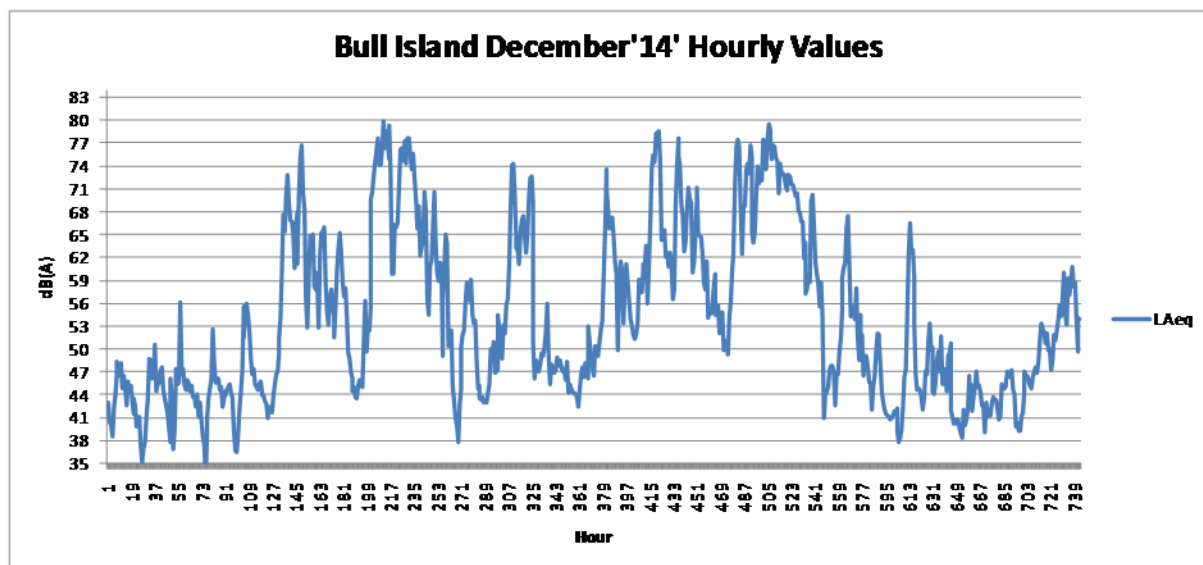
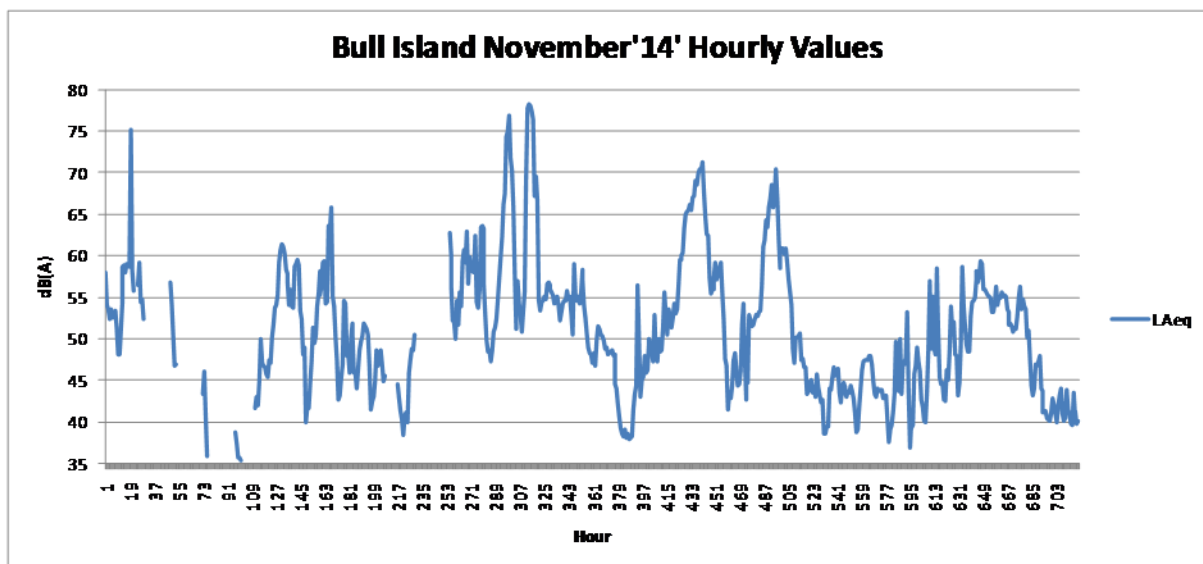
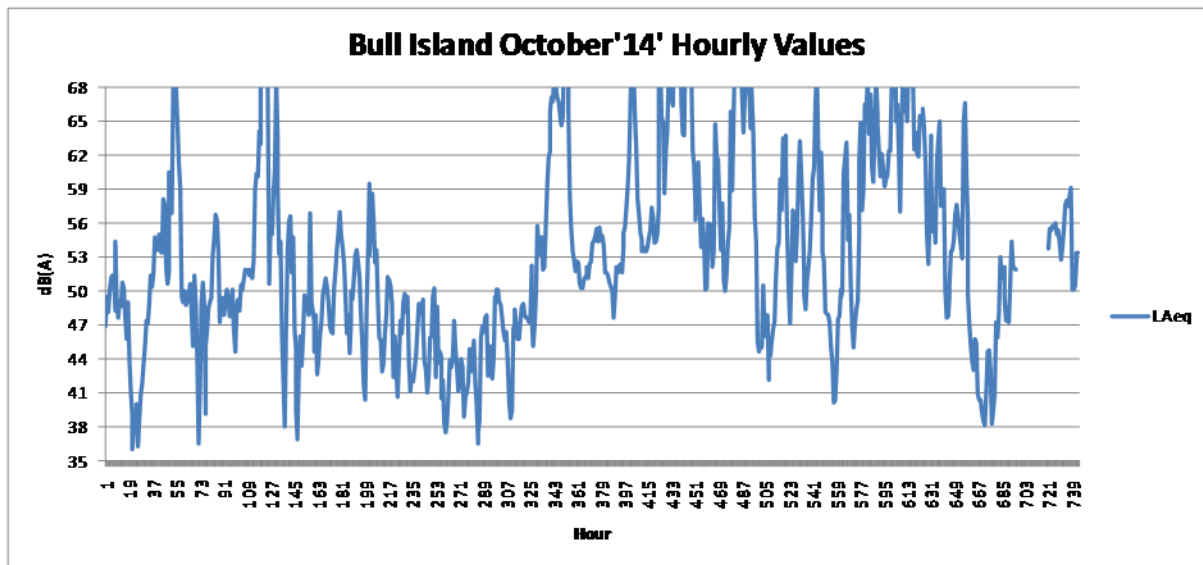






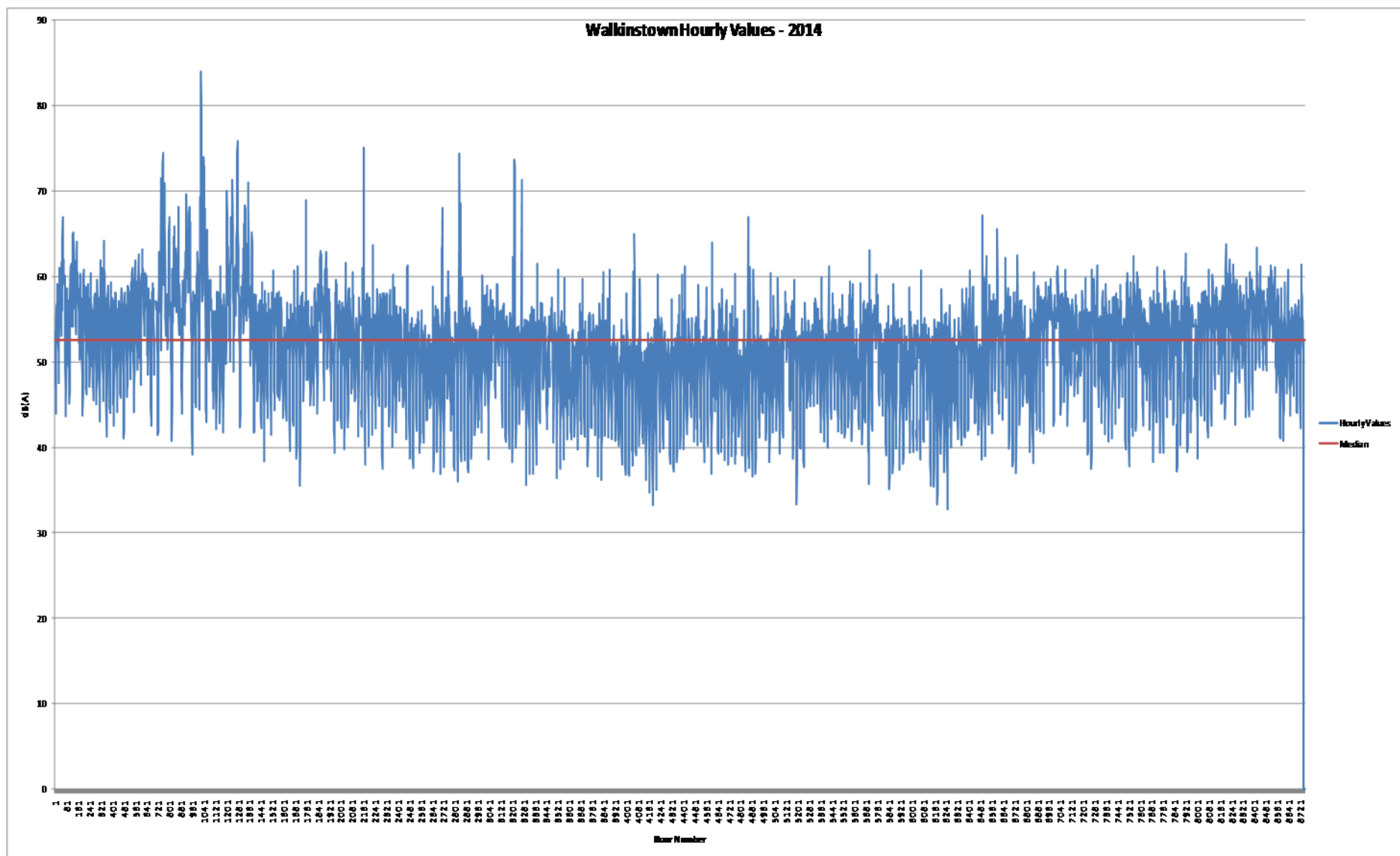


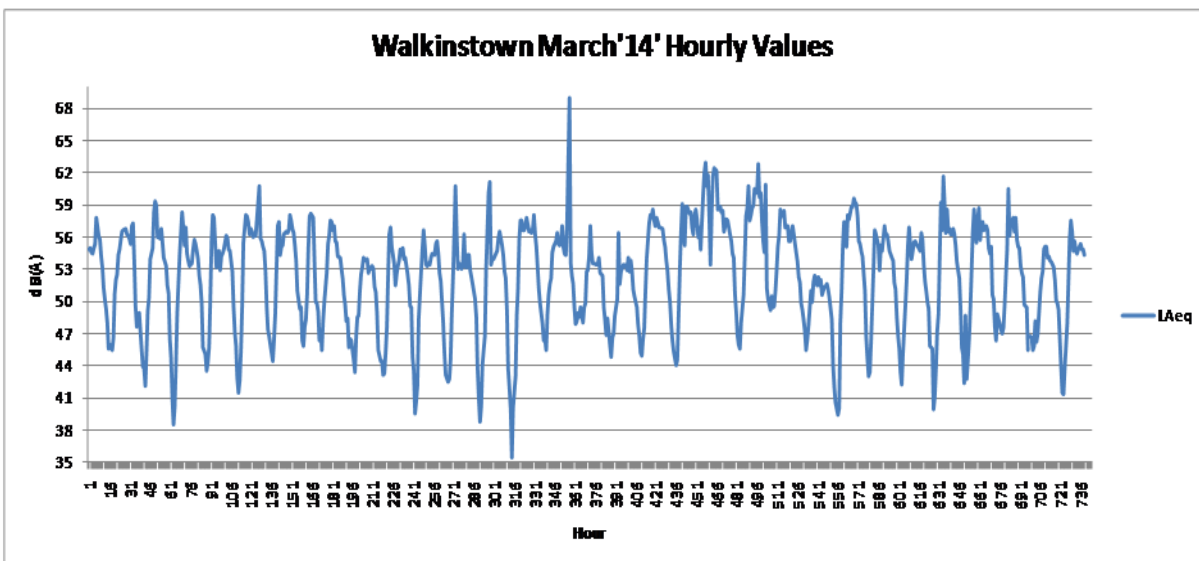
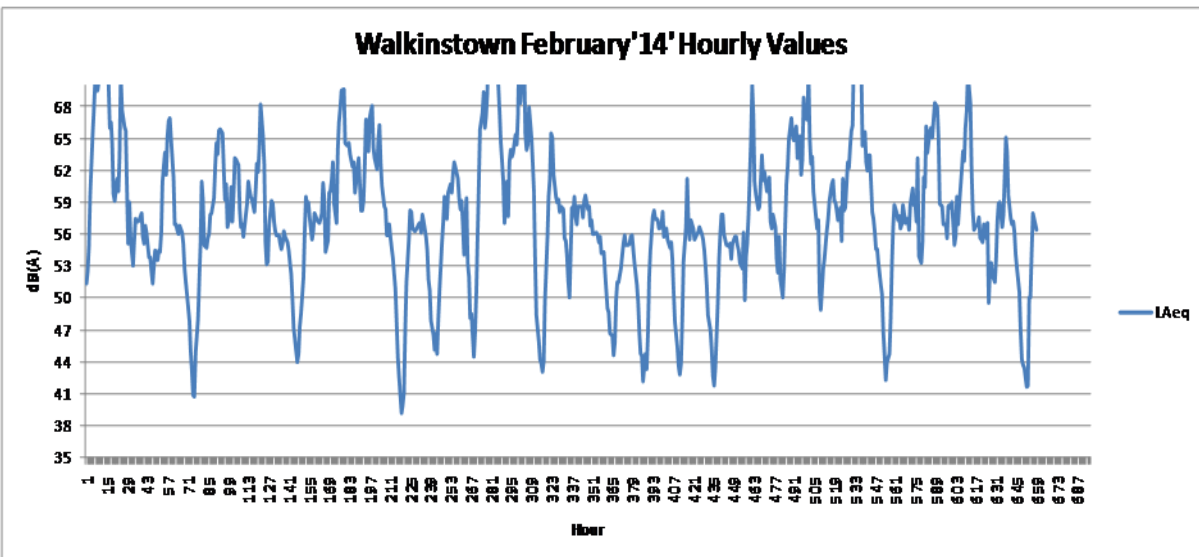
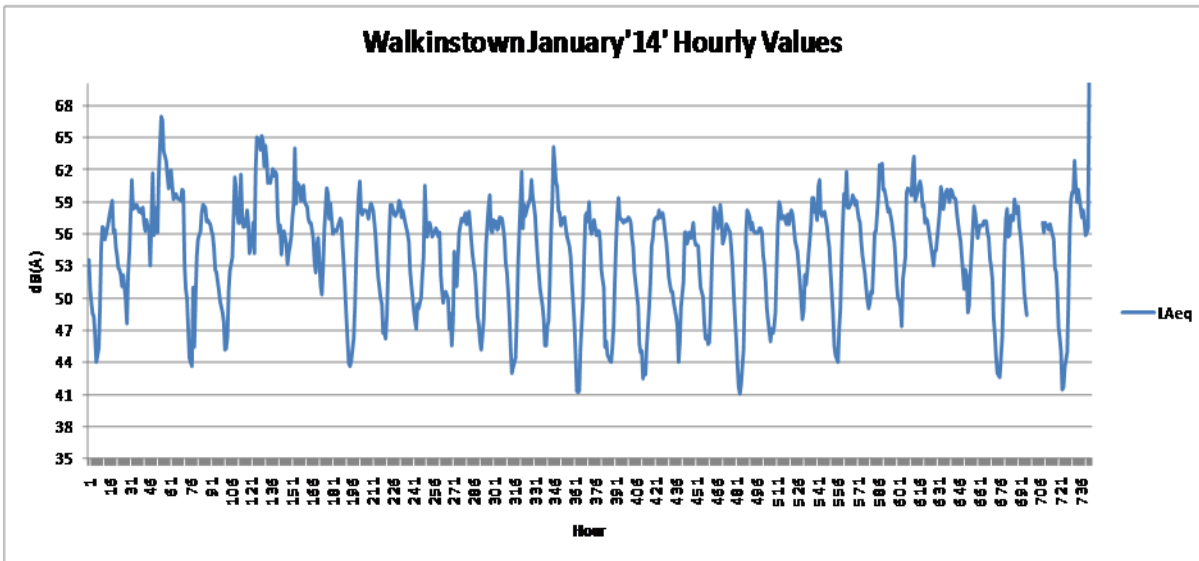


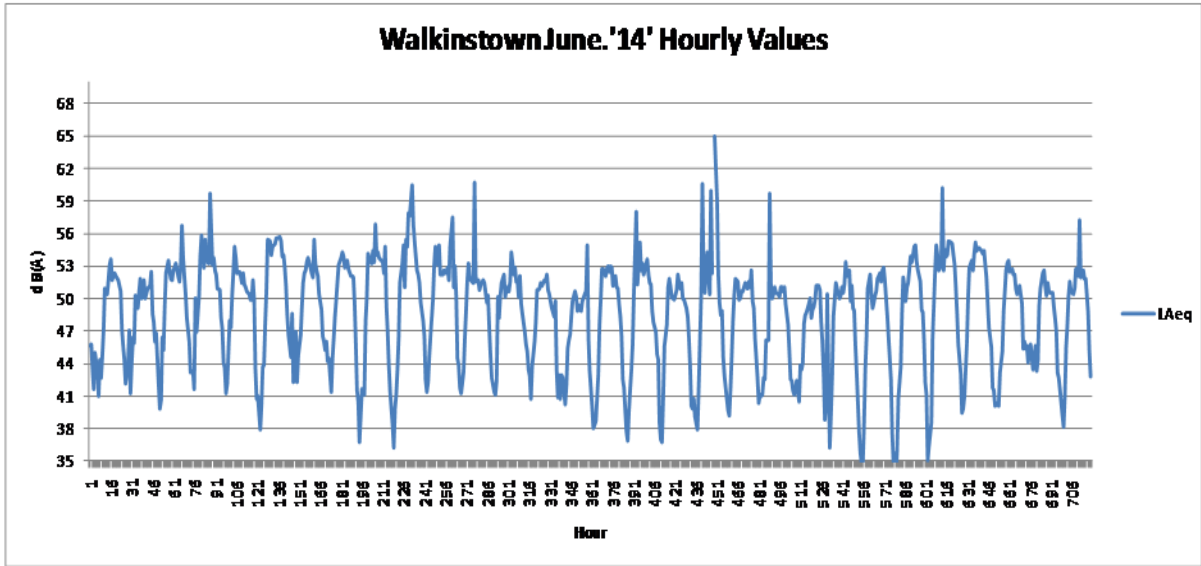
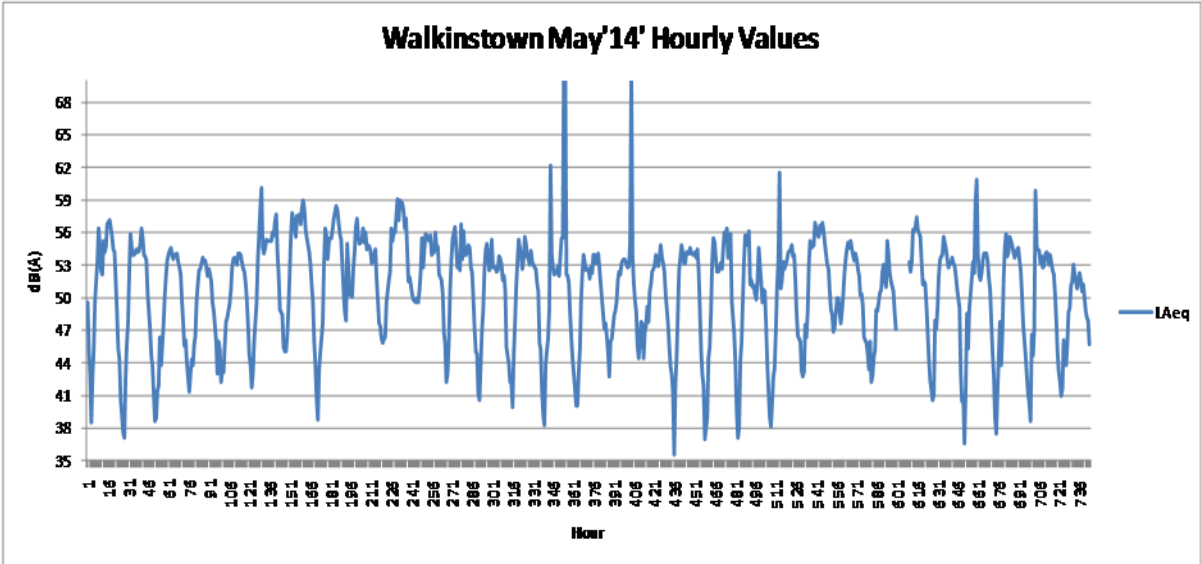
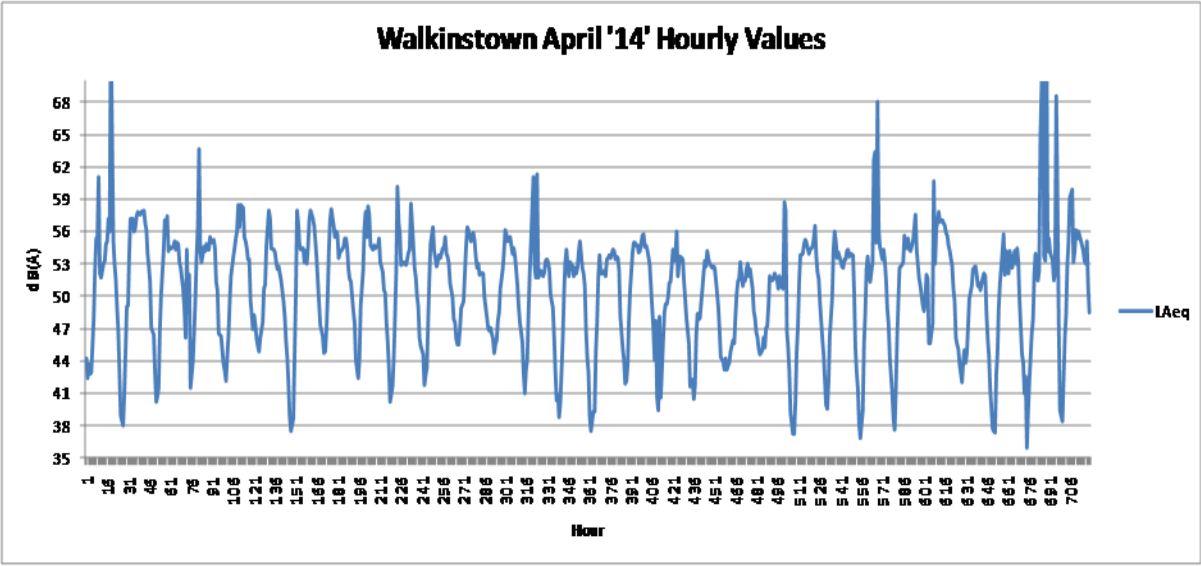


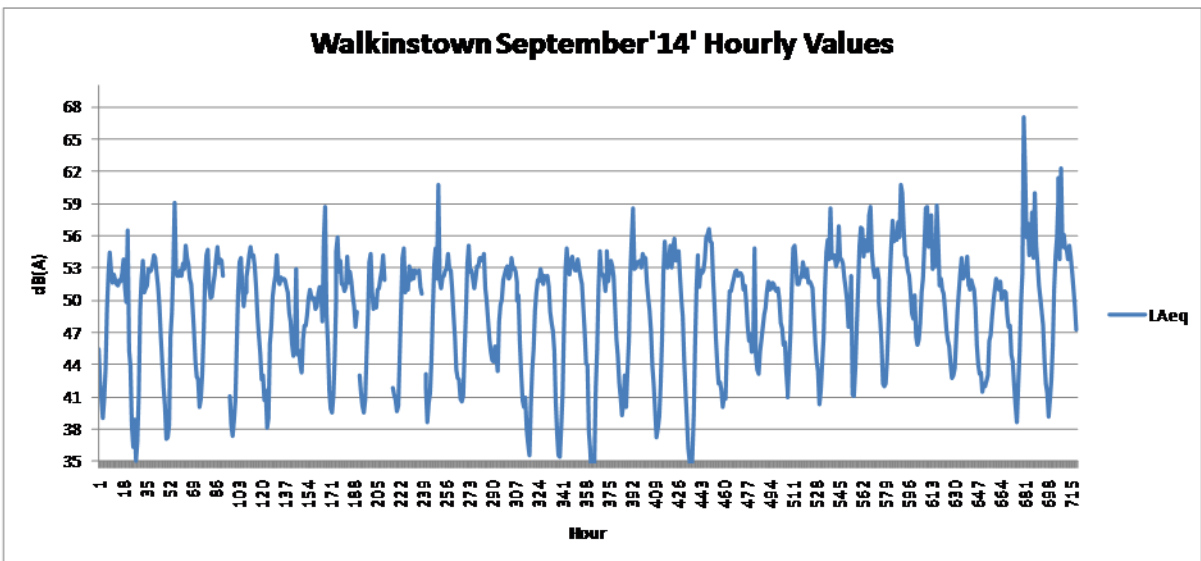
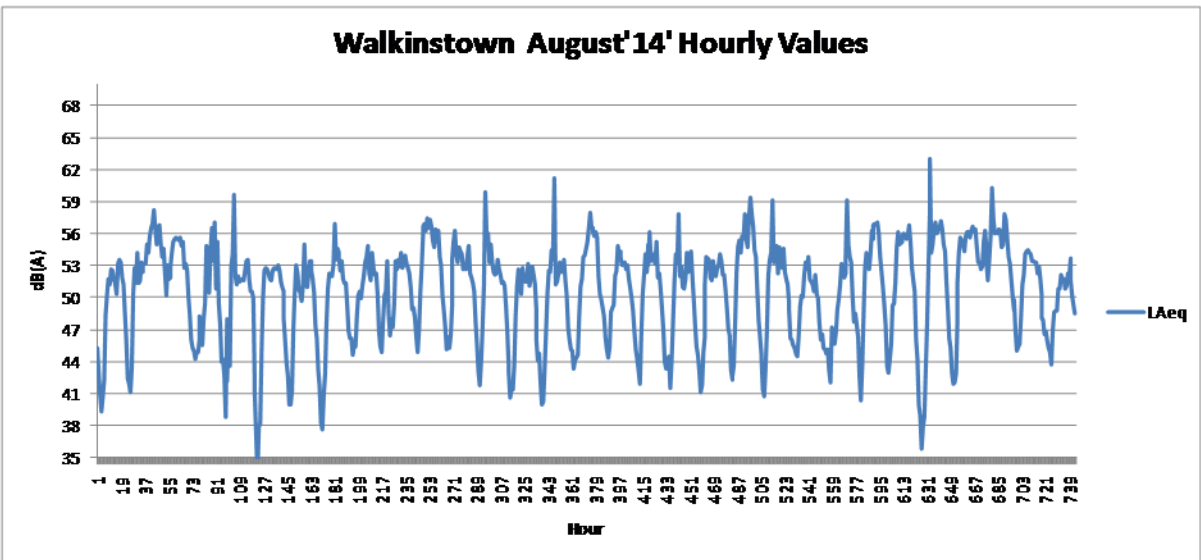
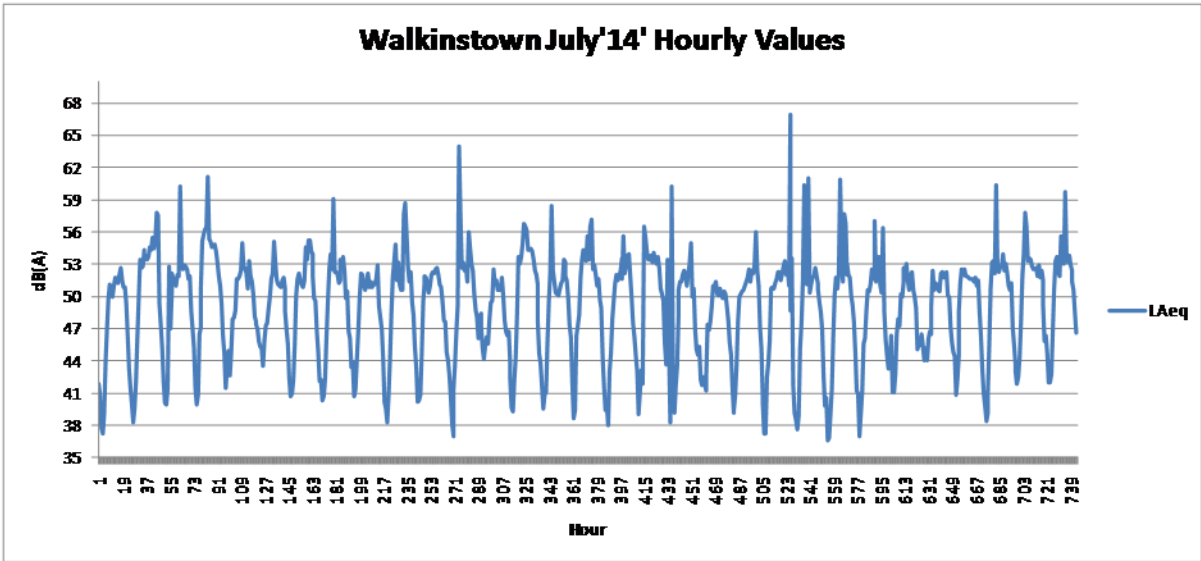
WALKINSTOWN LIBRARY
PERCY FRENCH ROAD
DUBLIN 12

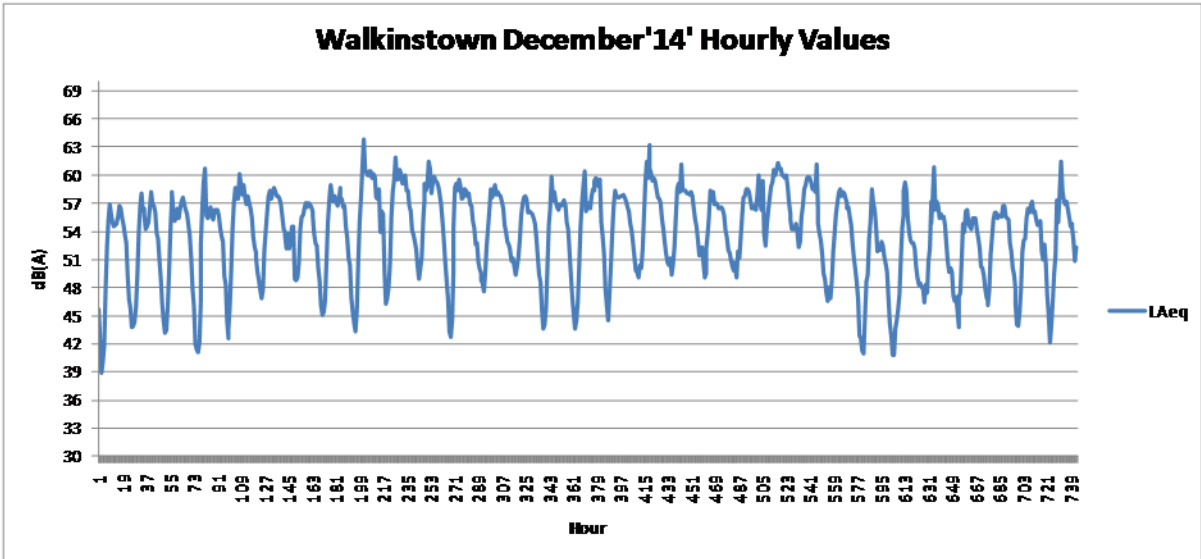
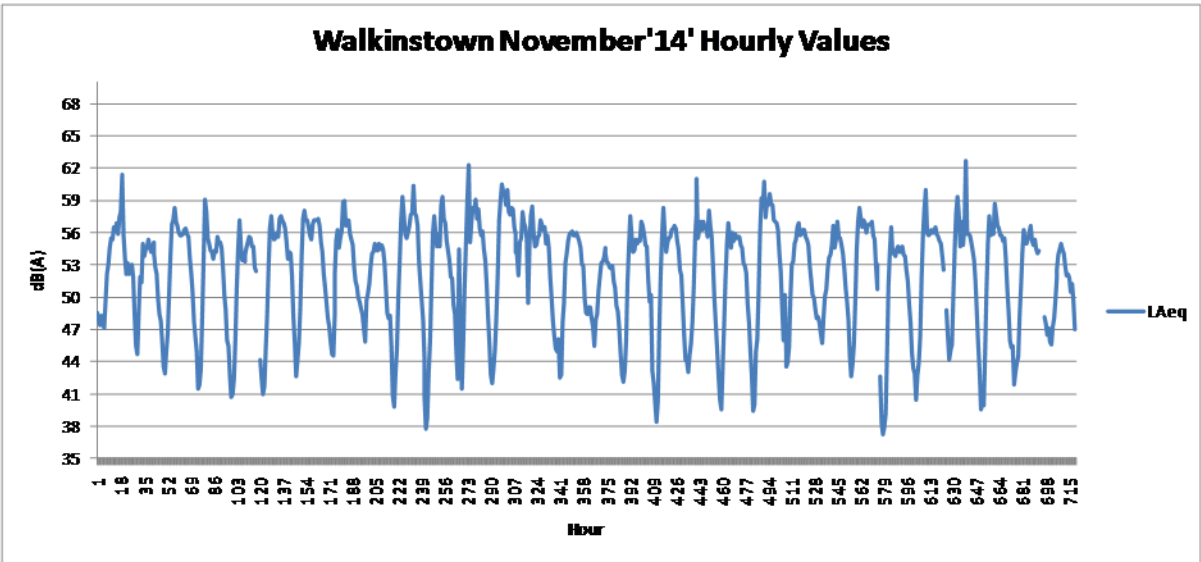
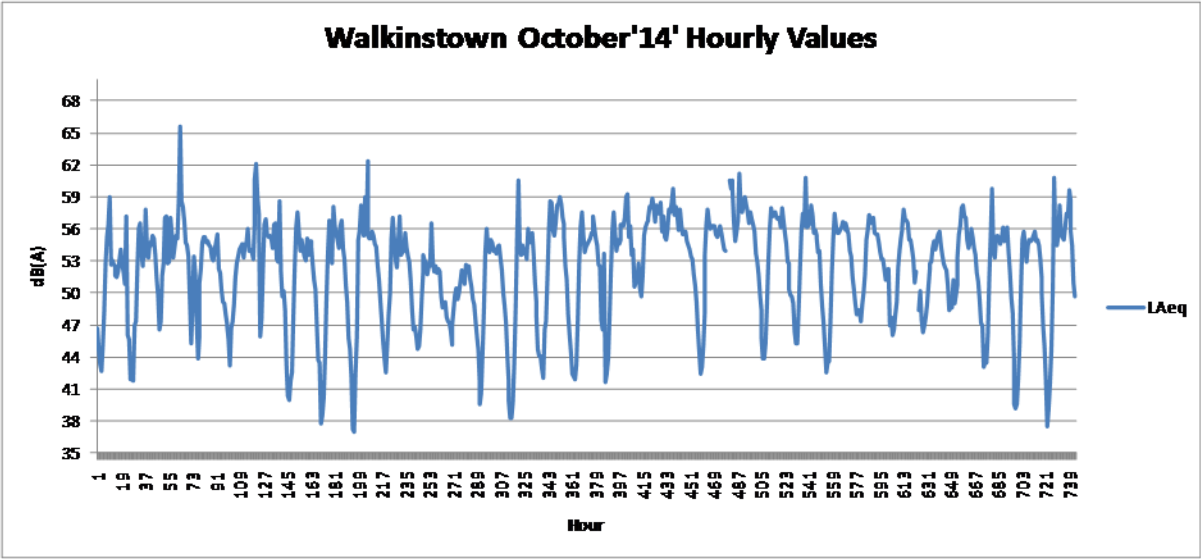






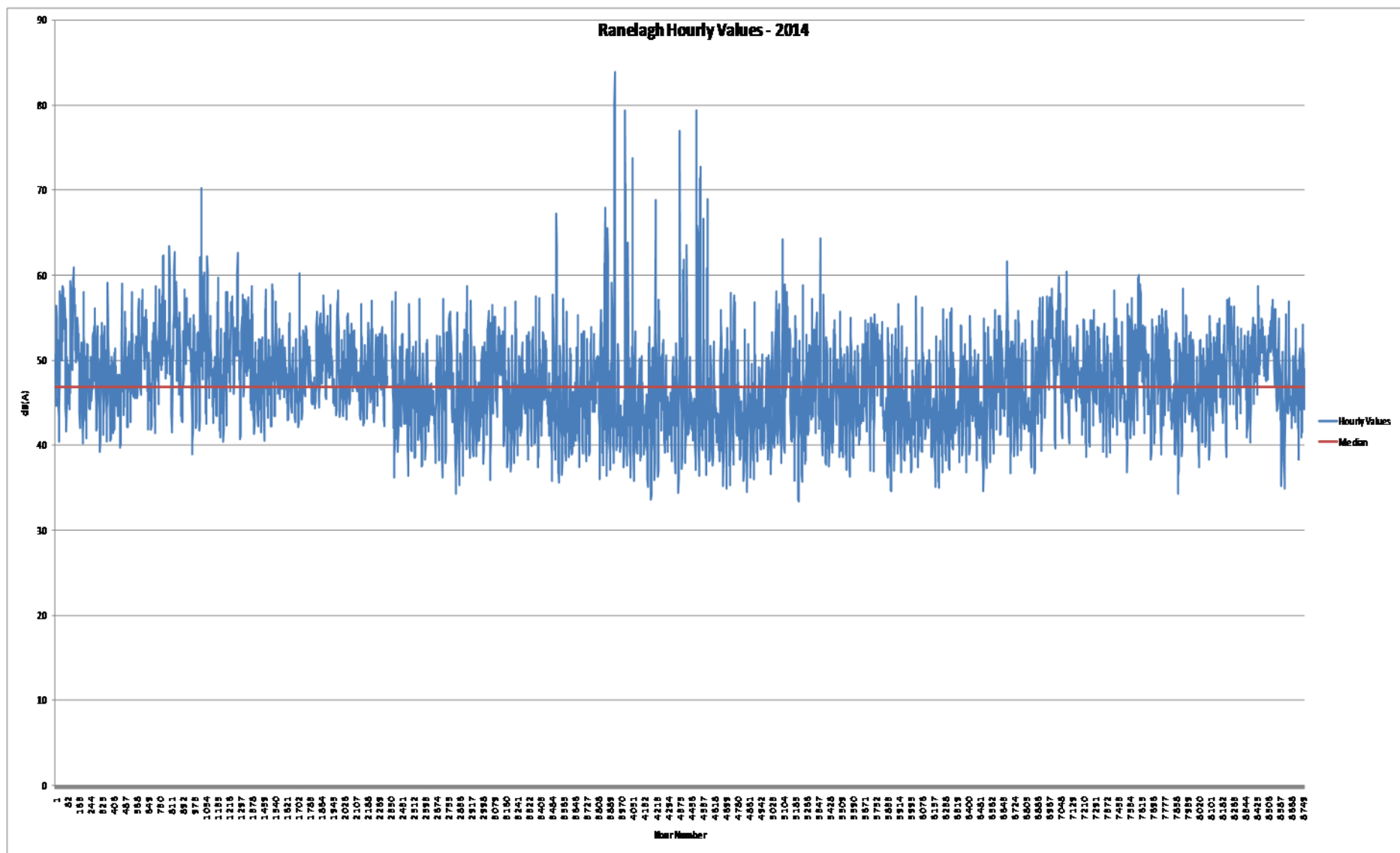


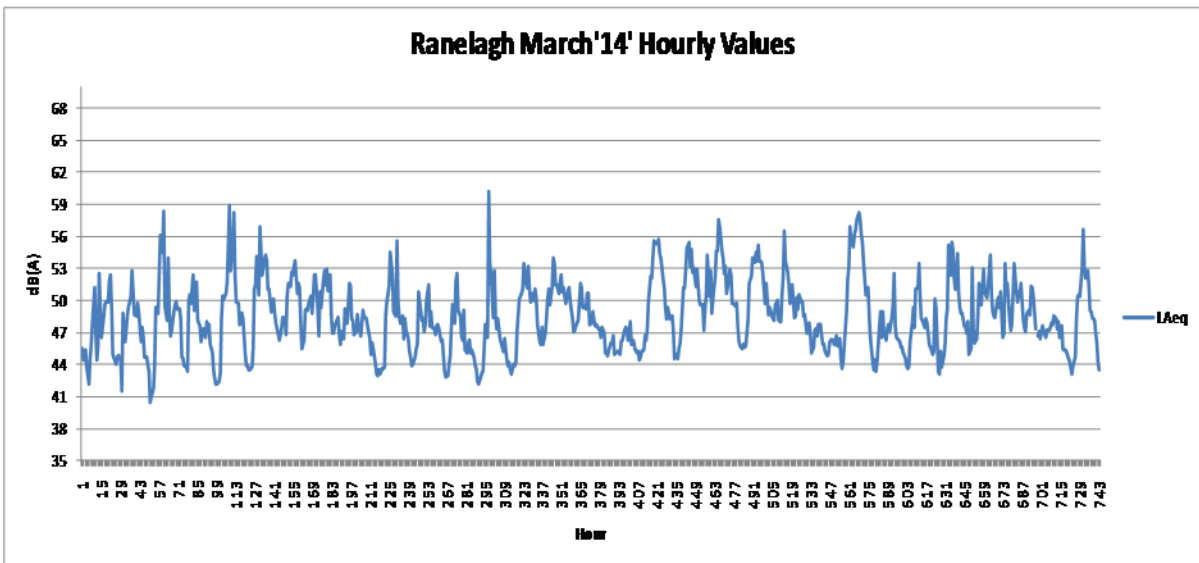
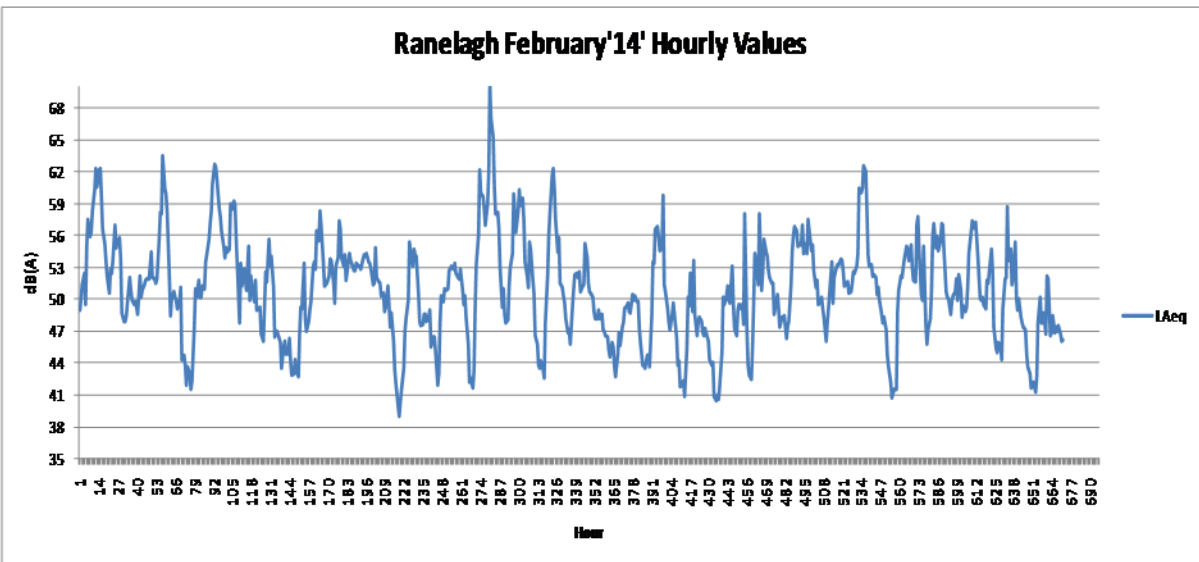
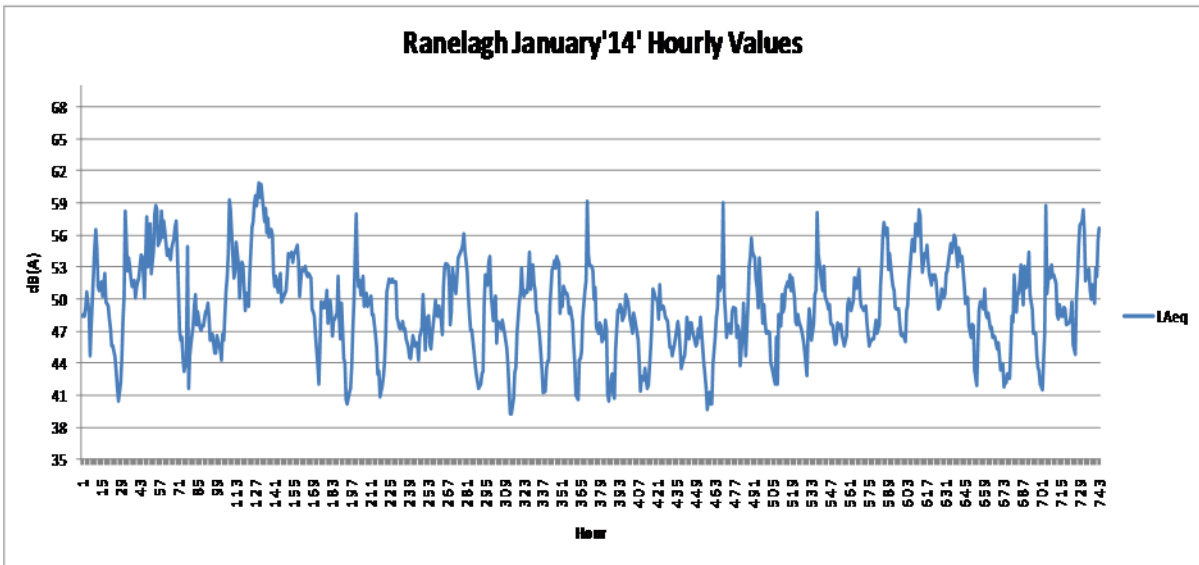


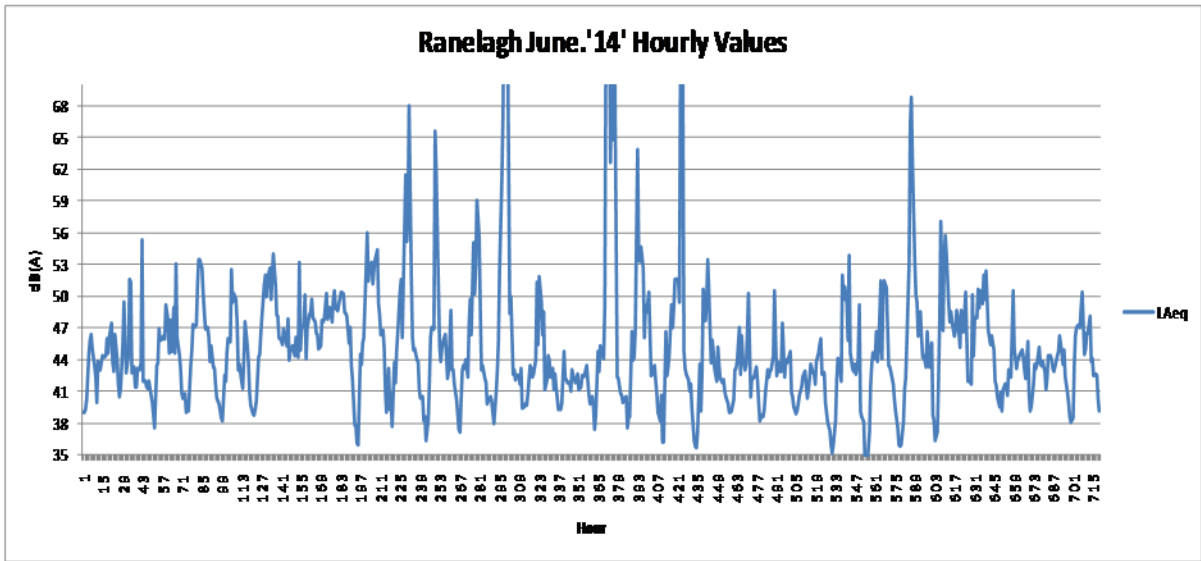
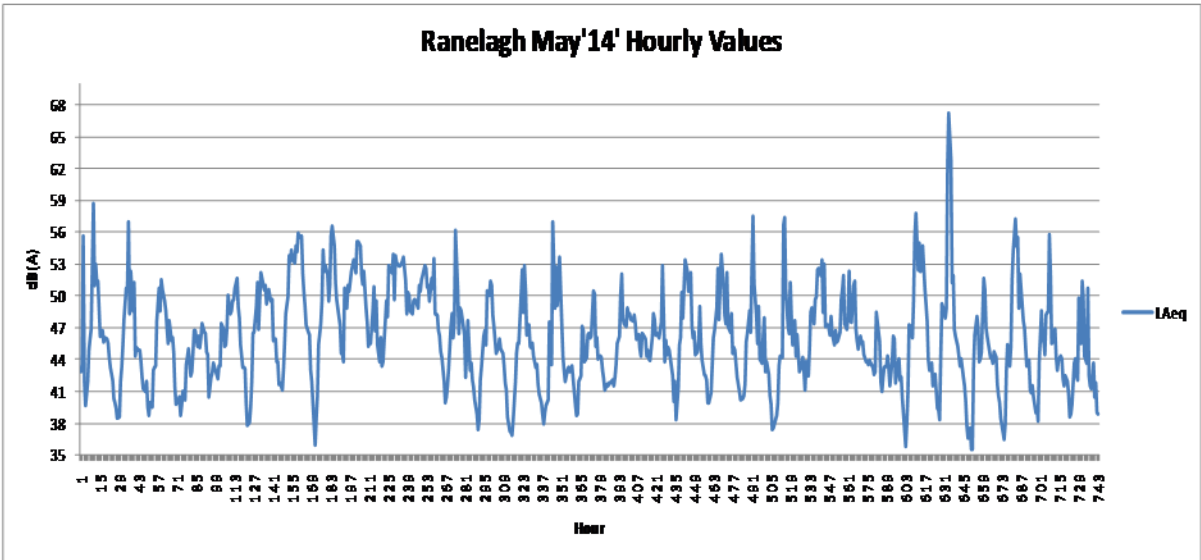
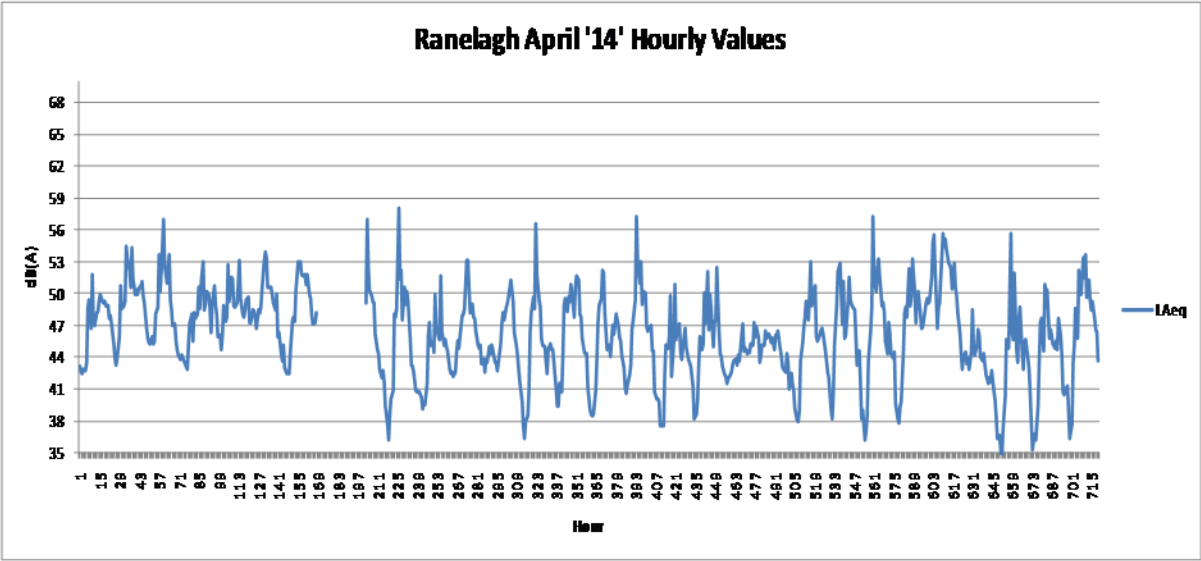


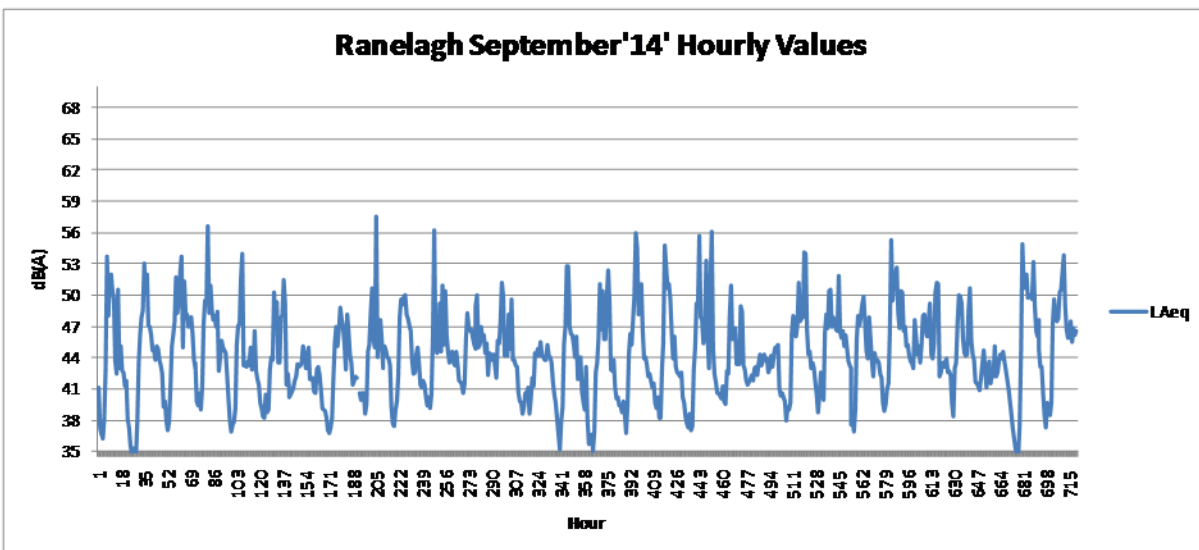
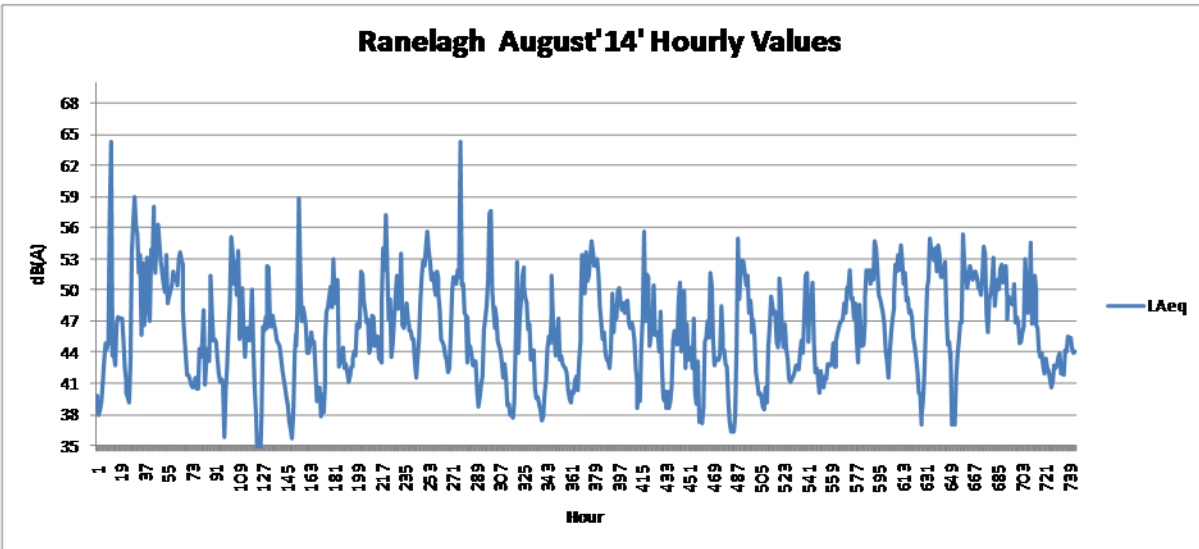
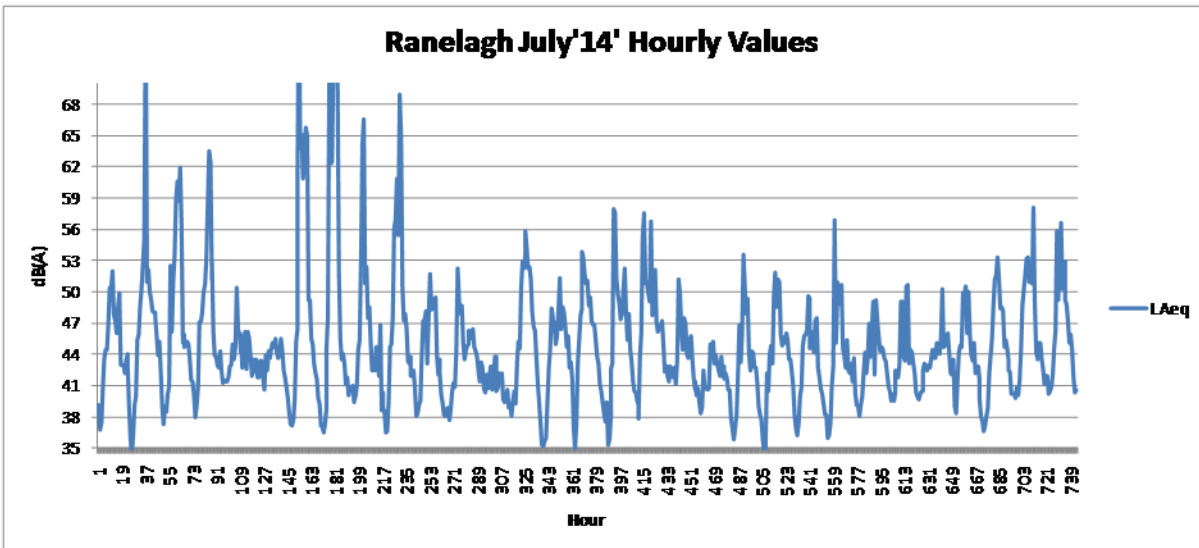
WOODSTOCK STOCK GARDENS
RANELAGH
DUBLIN 6

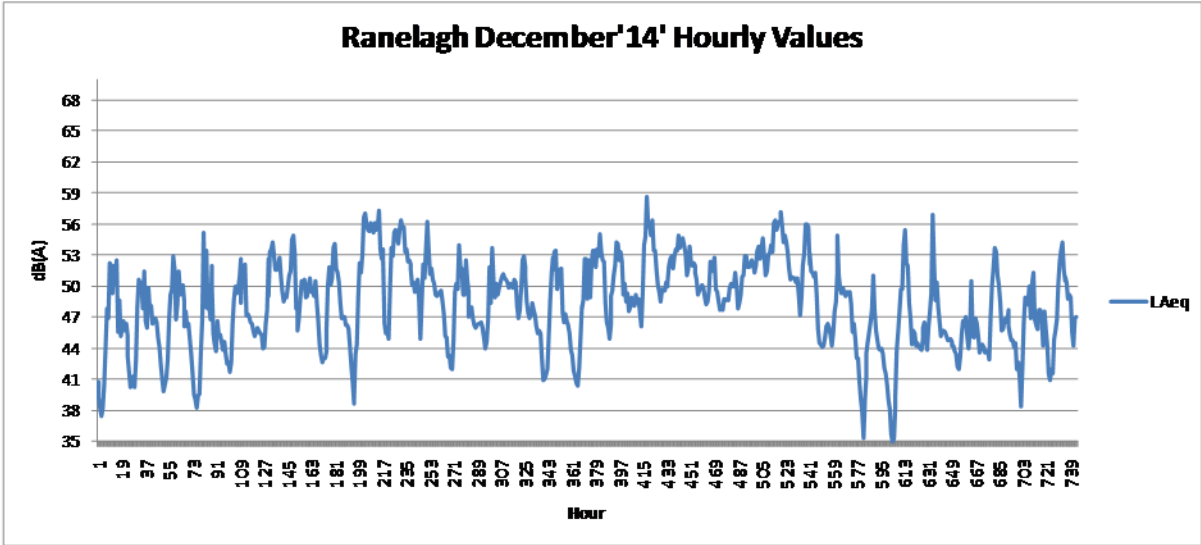
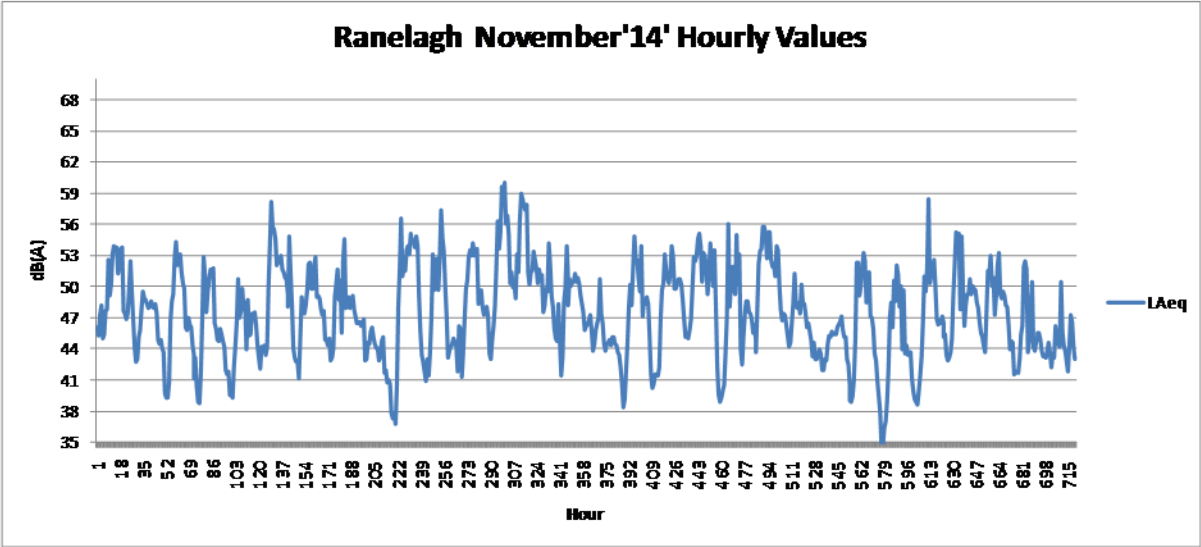
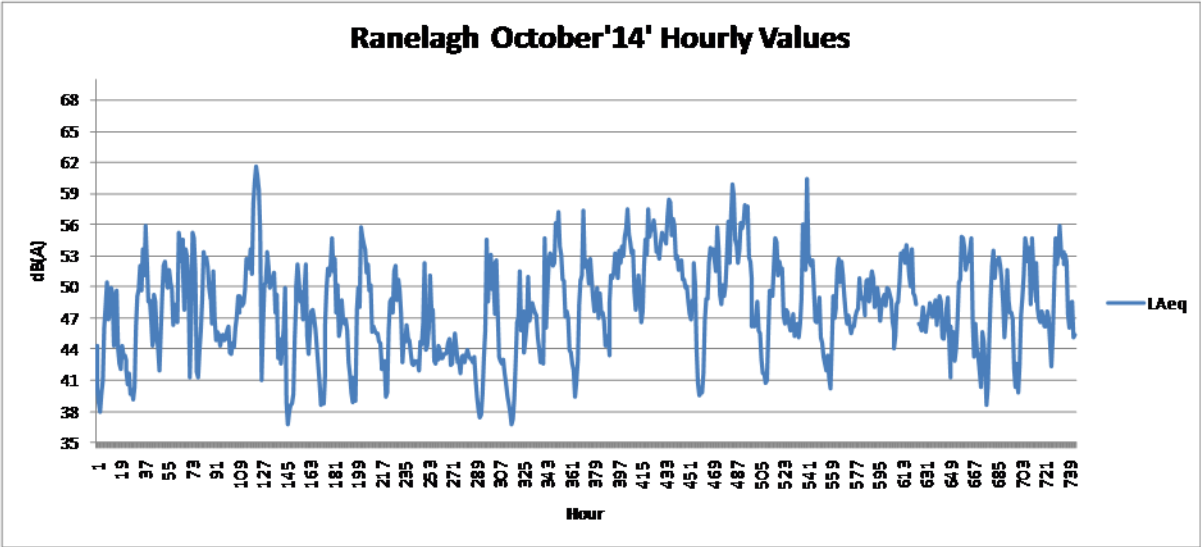




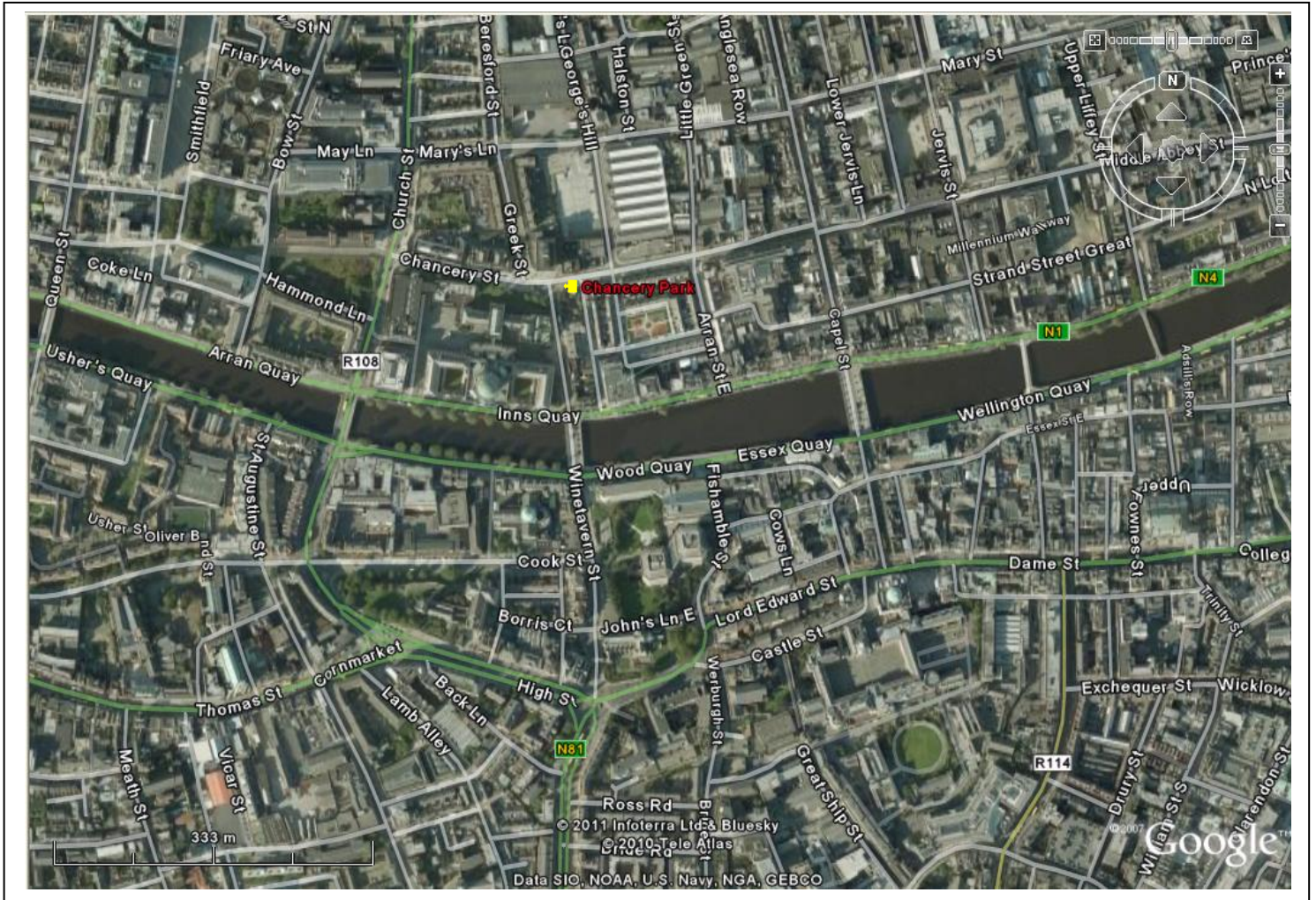


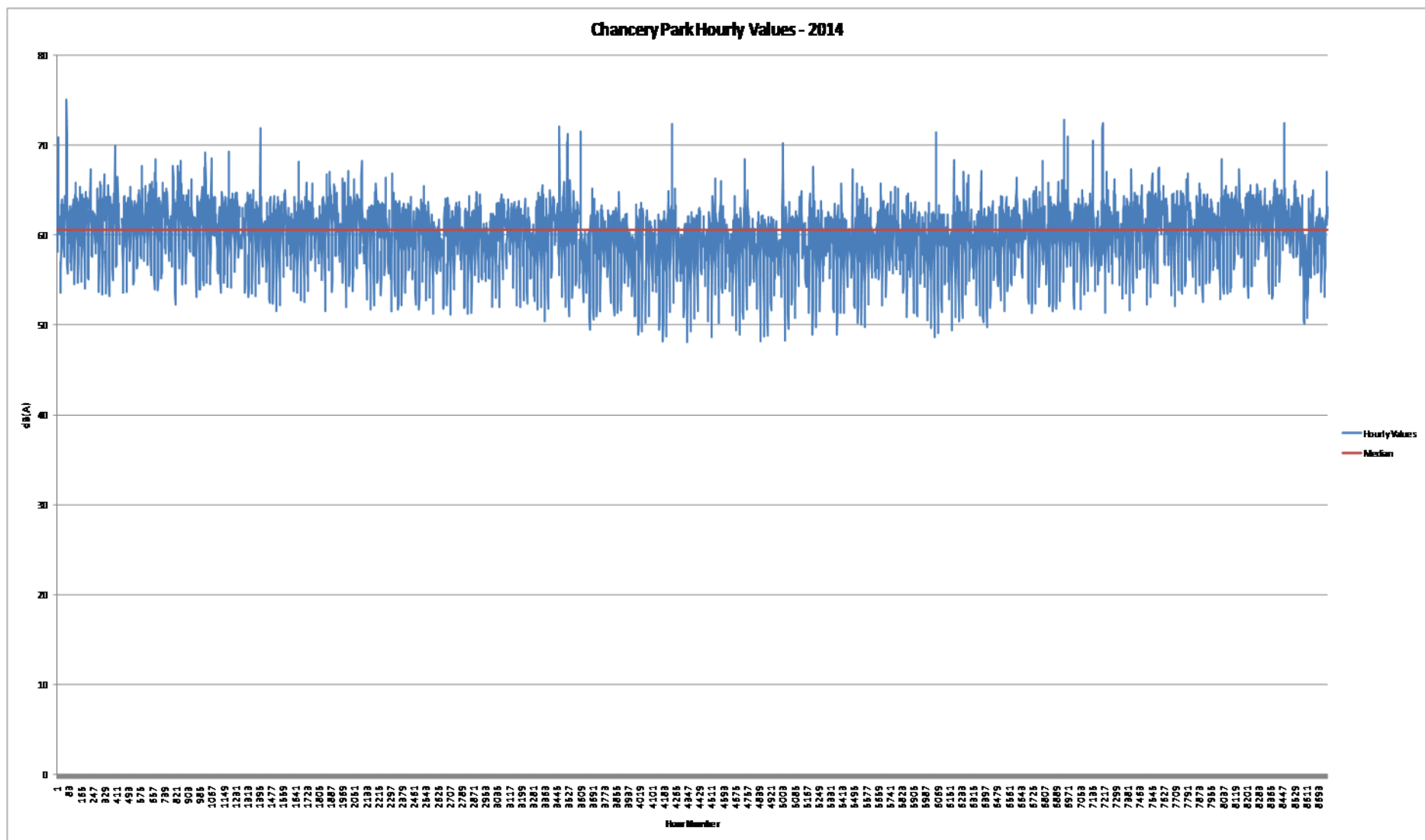


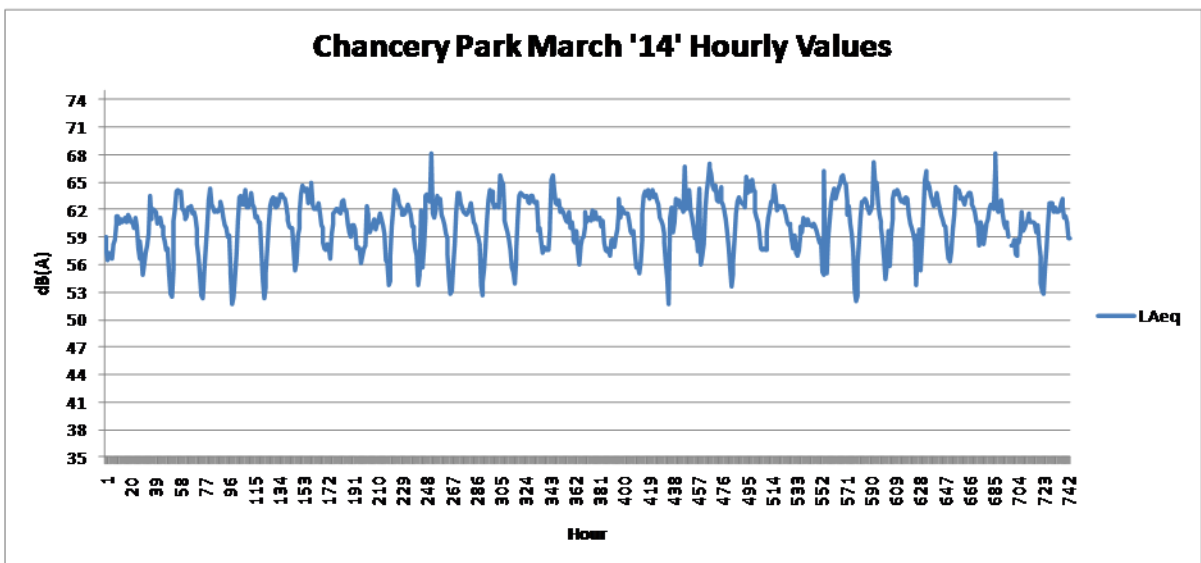
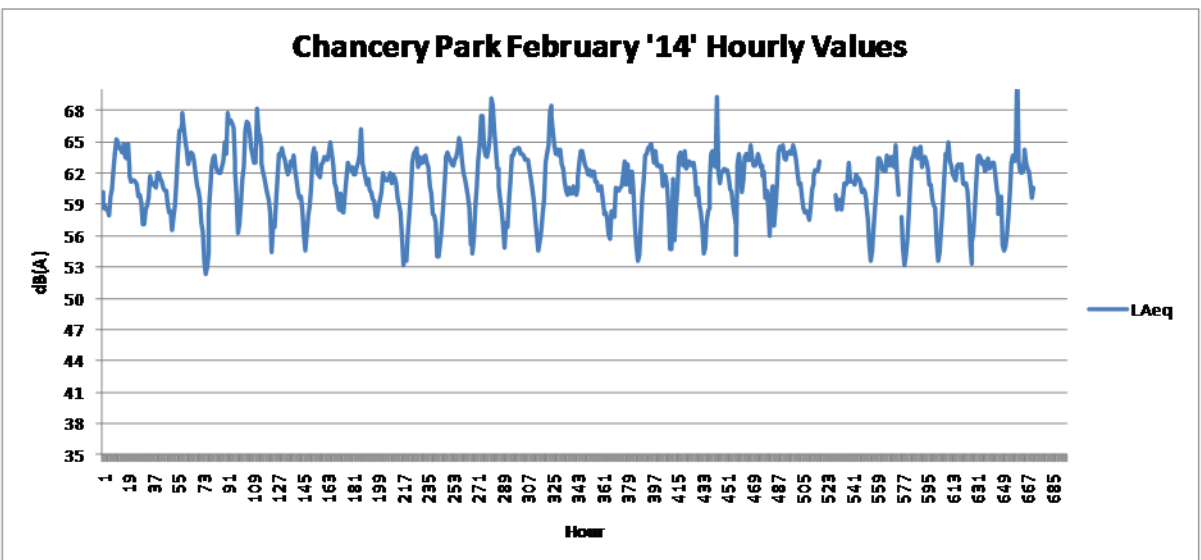
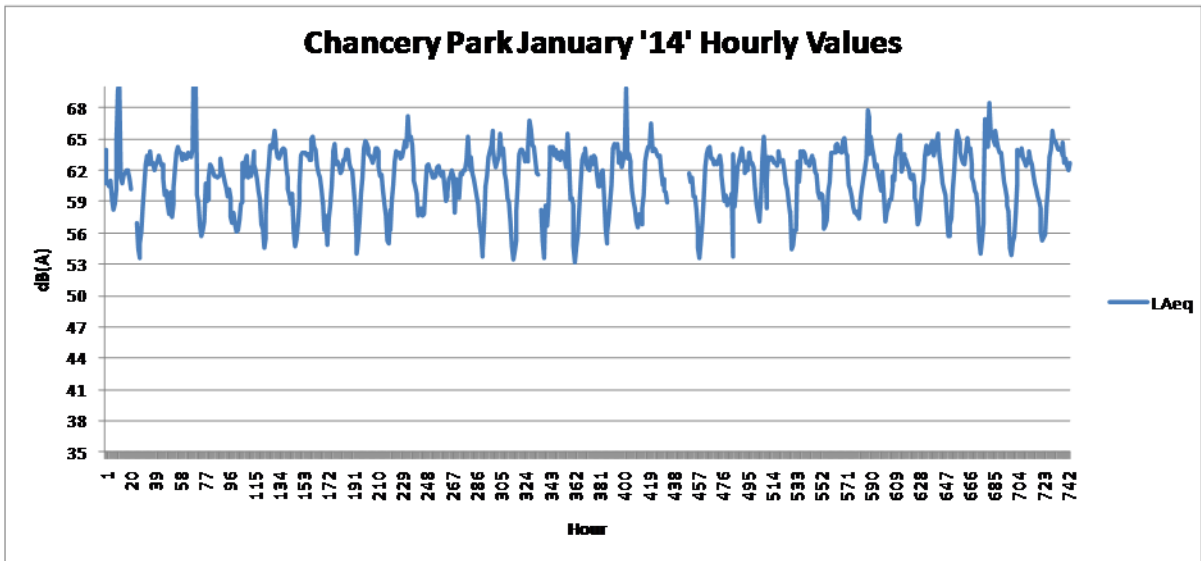




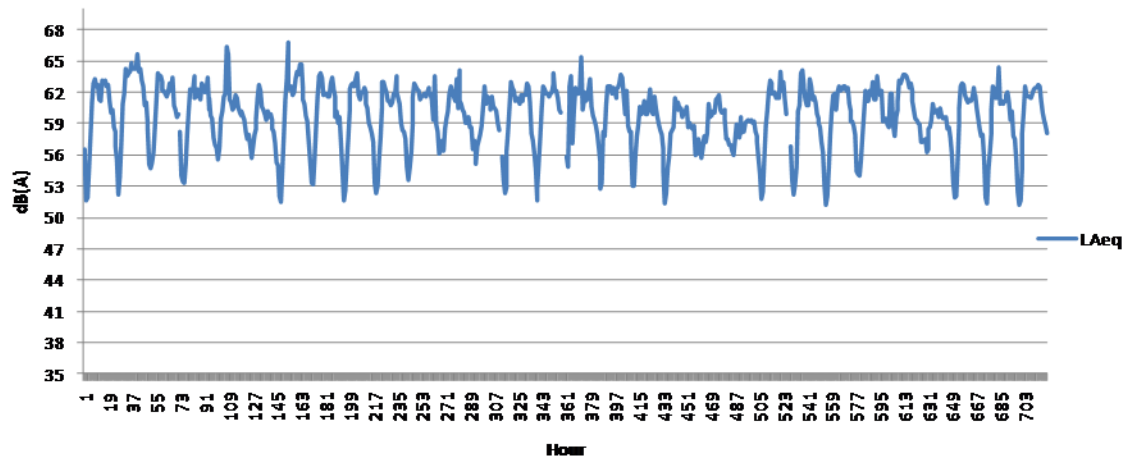
CHANCERY PARK
CHANCERY ST.
DUBLIN 1



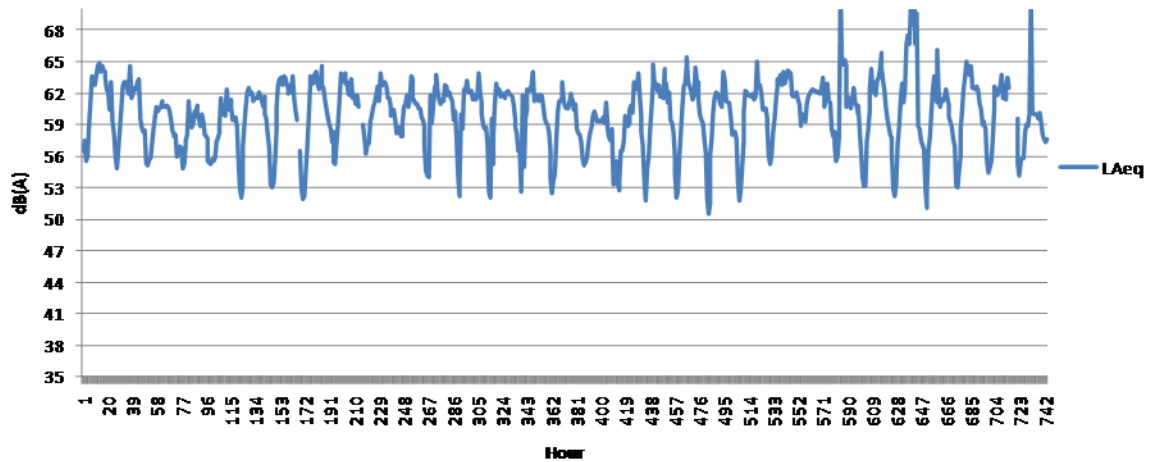




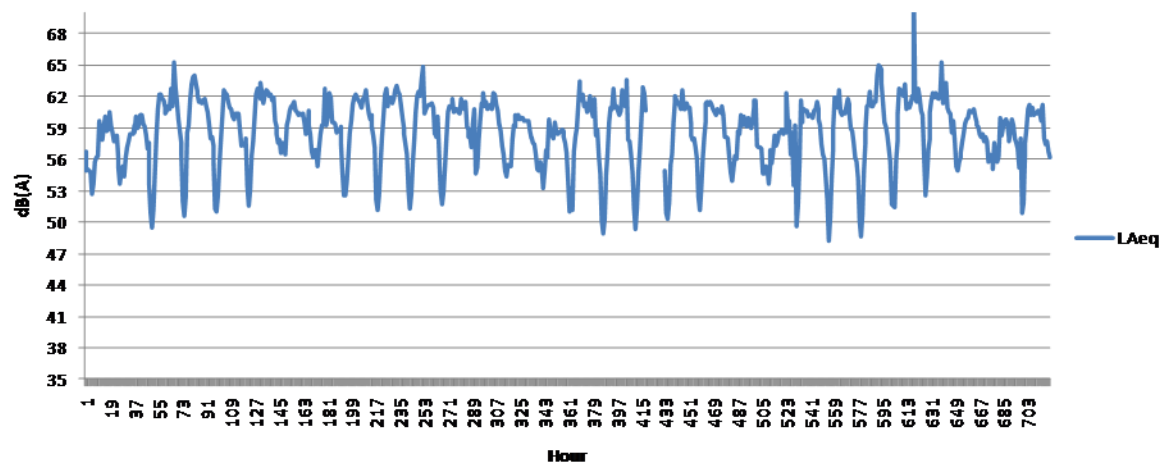
Chancery Park April '14' Hourly Values

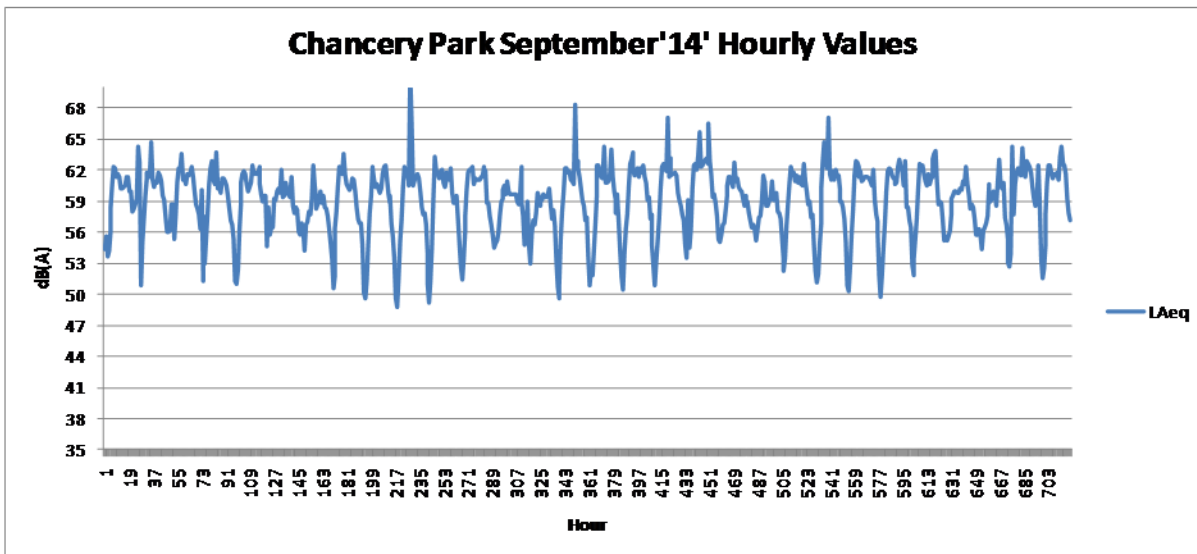
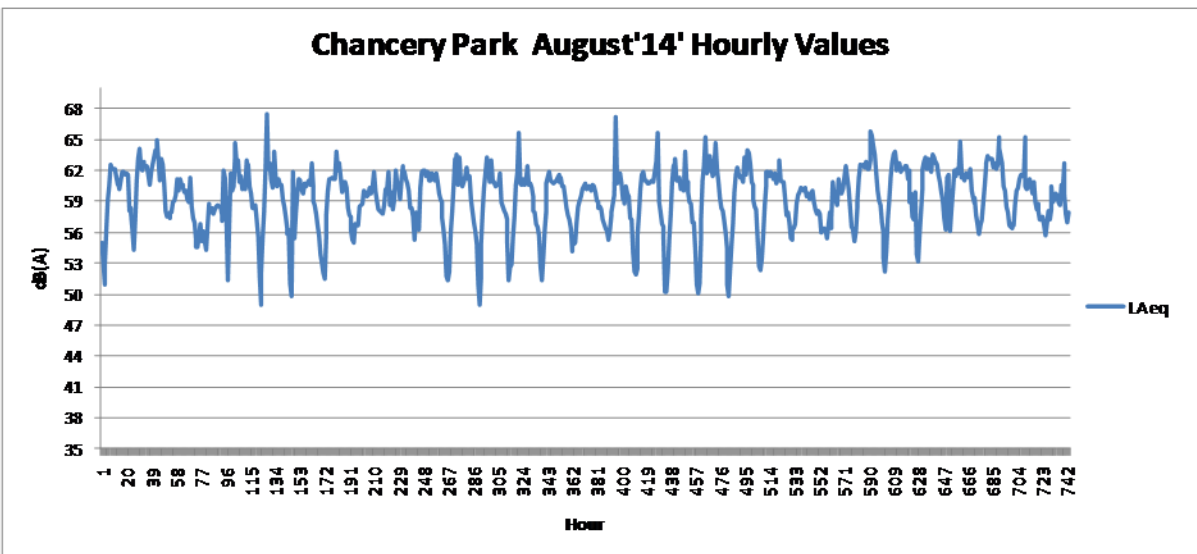
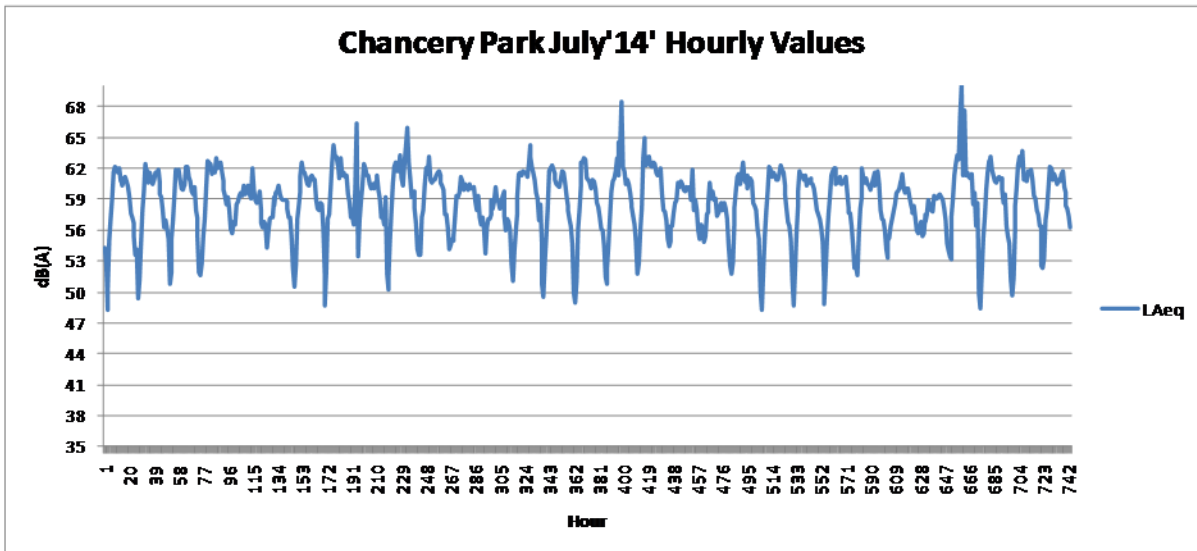


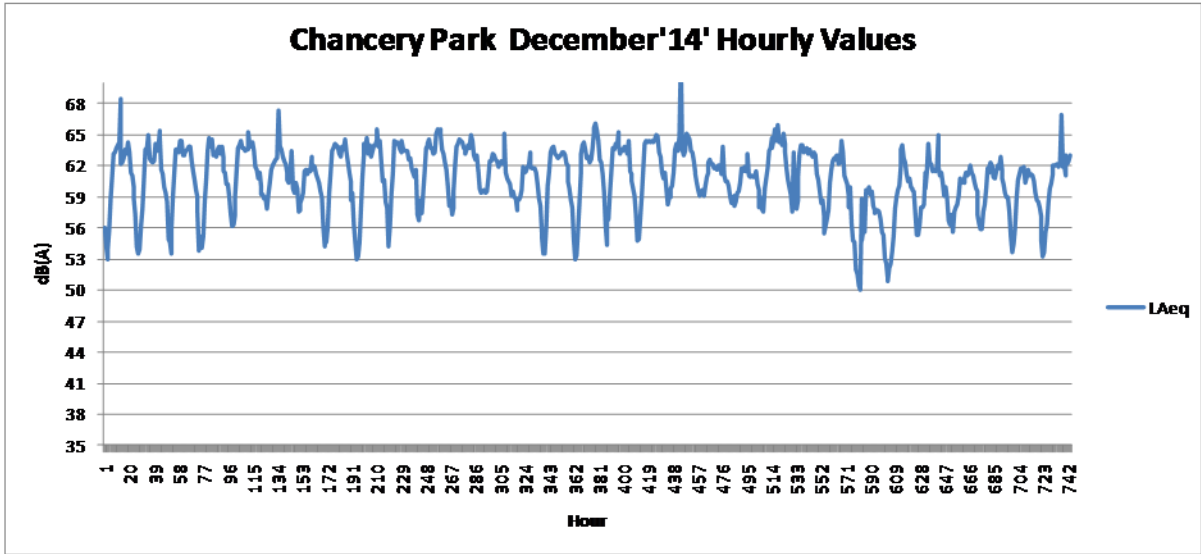
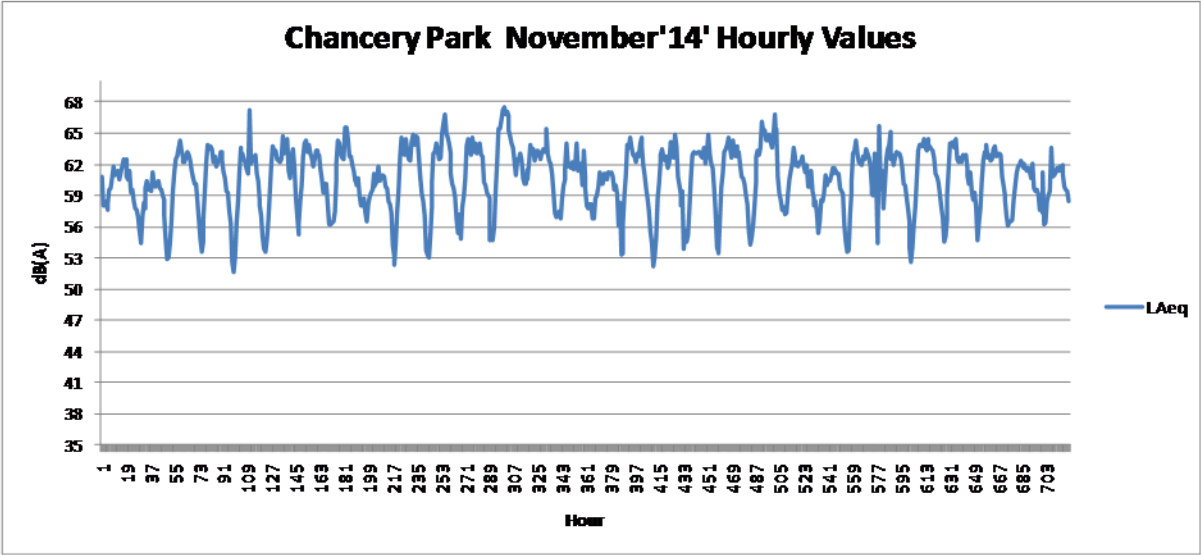
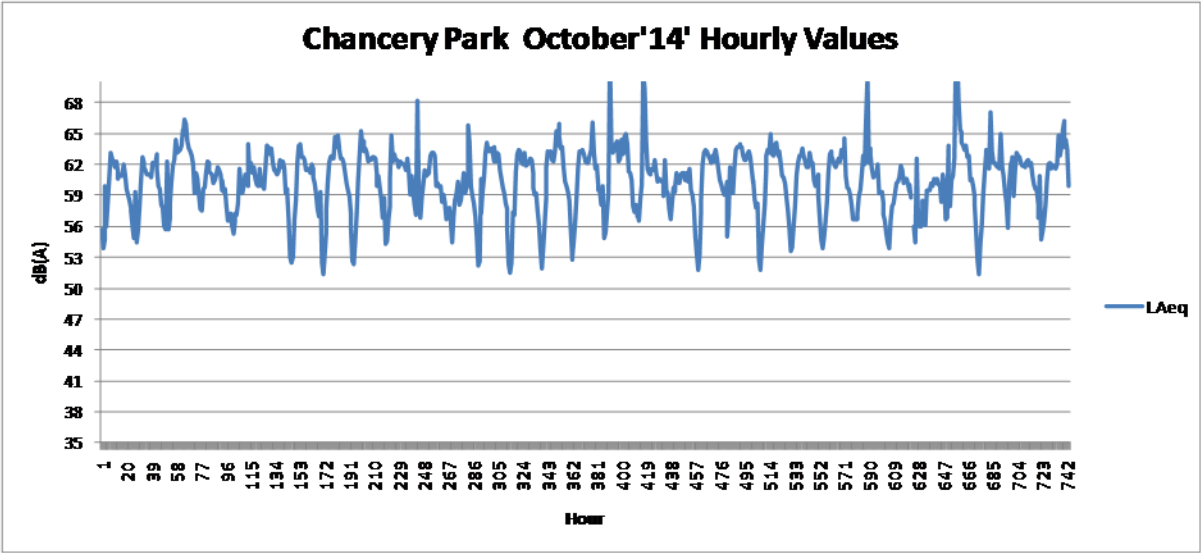
Chancery Park May'14' Hourly Values



Chancery Park June.'14' Hourly Values

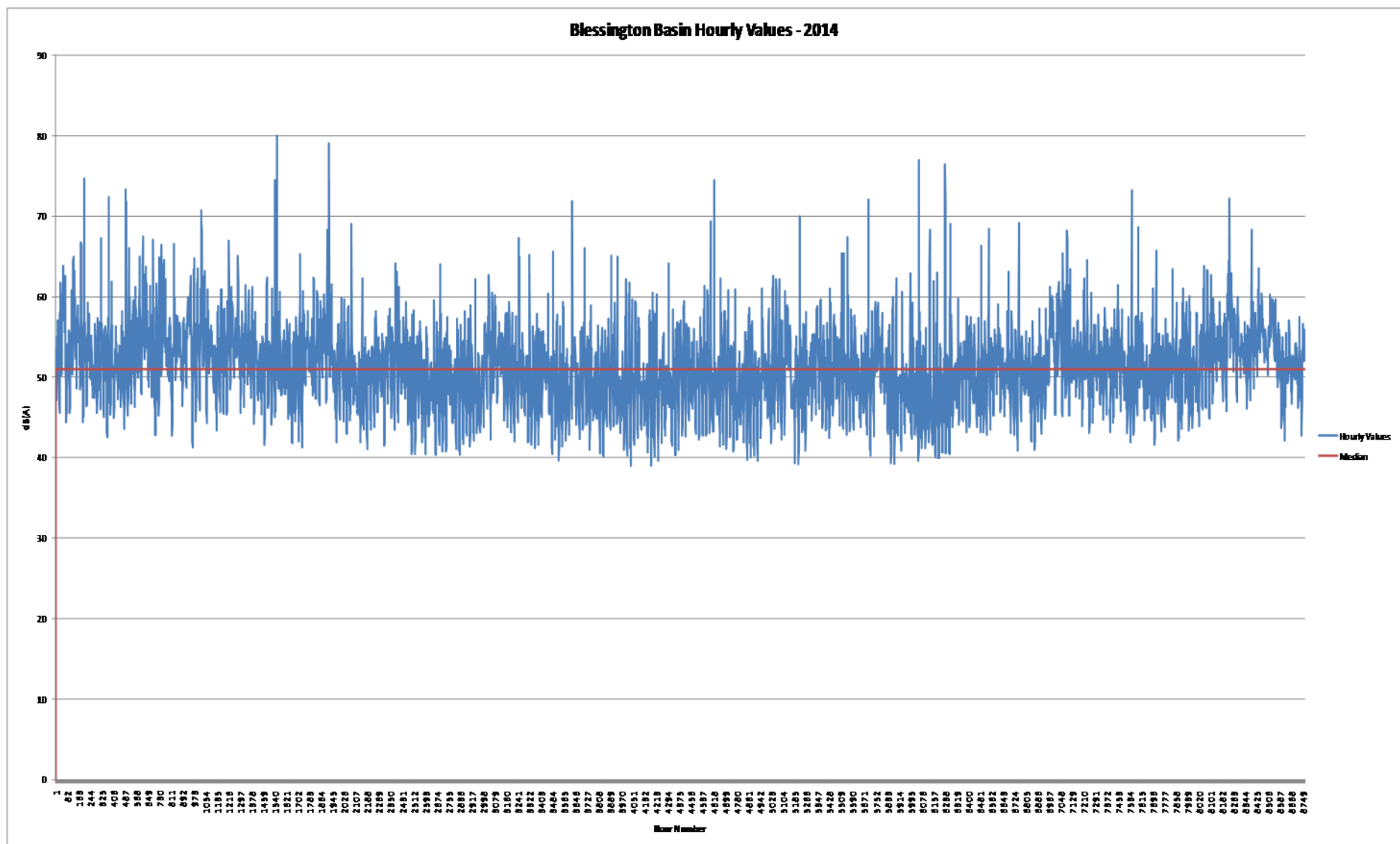


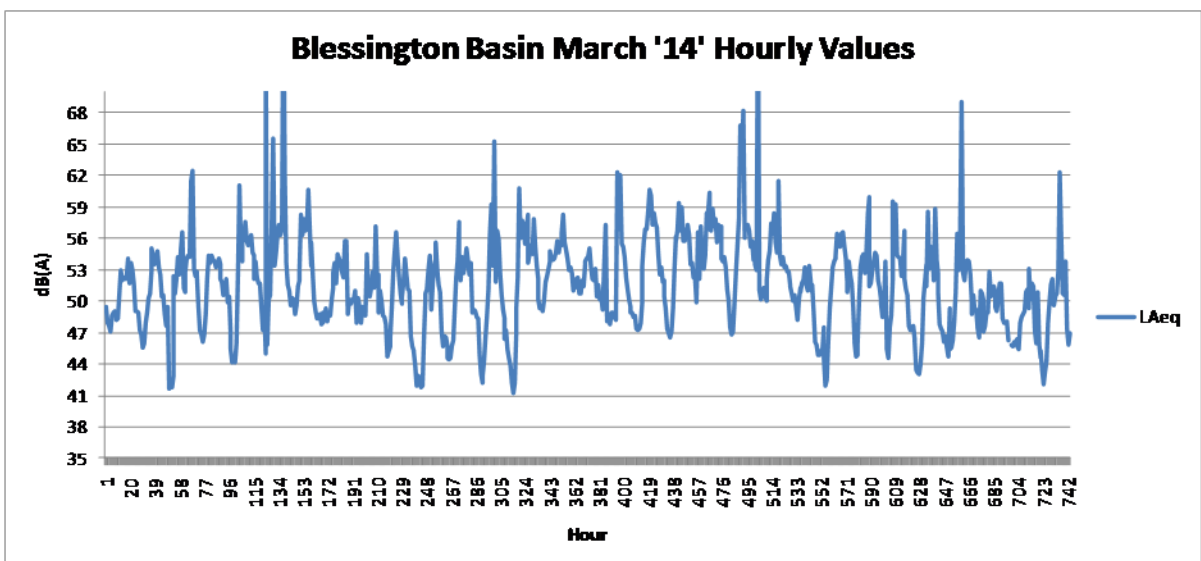
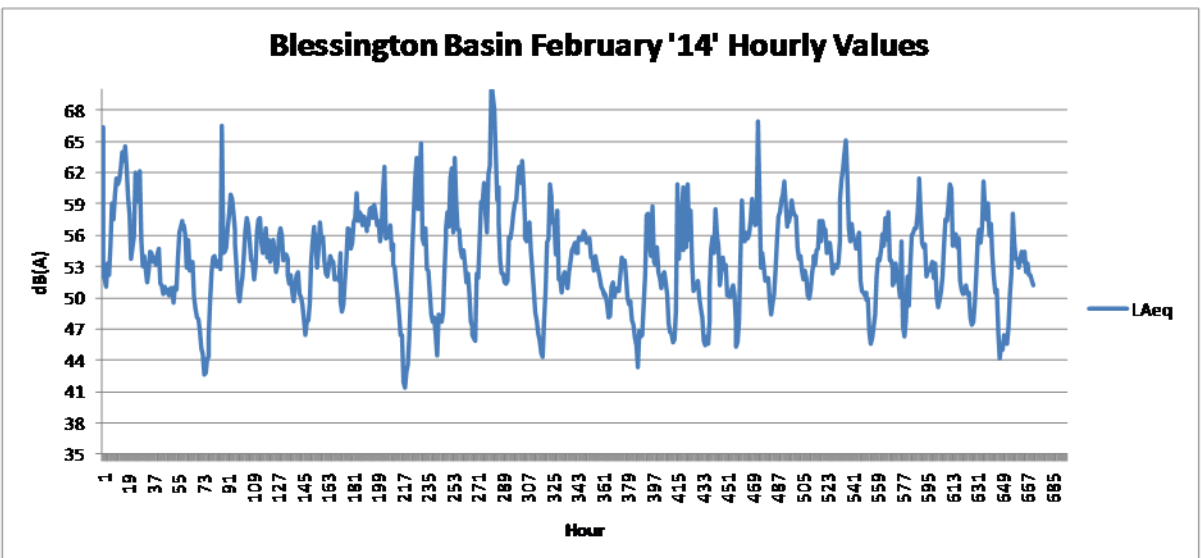
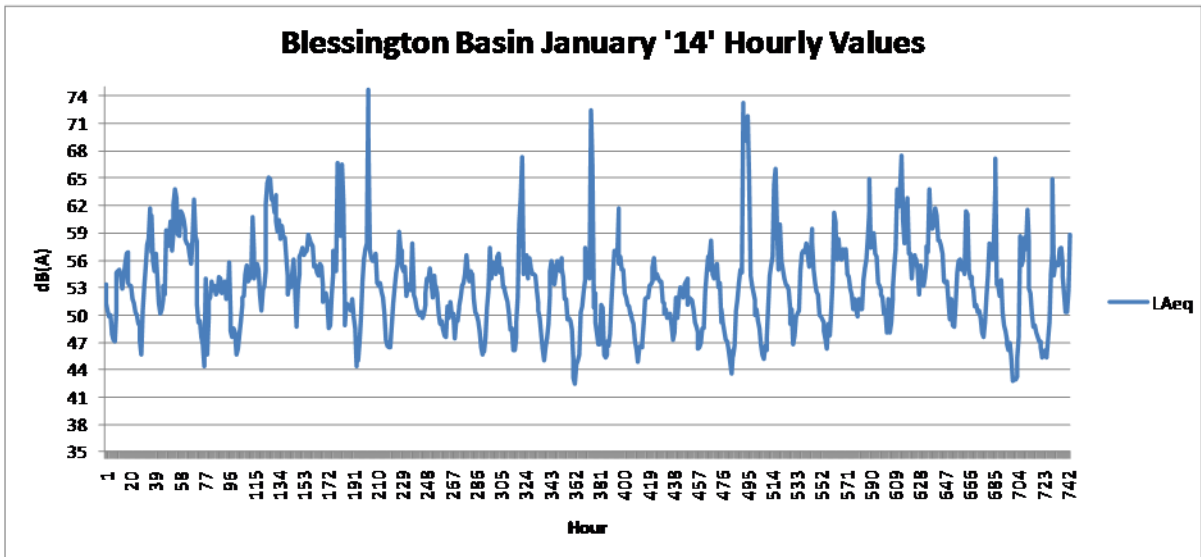




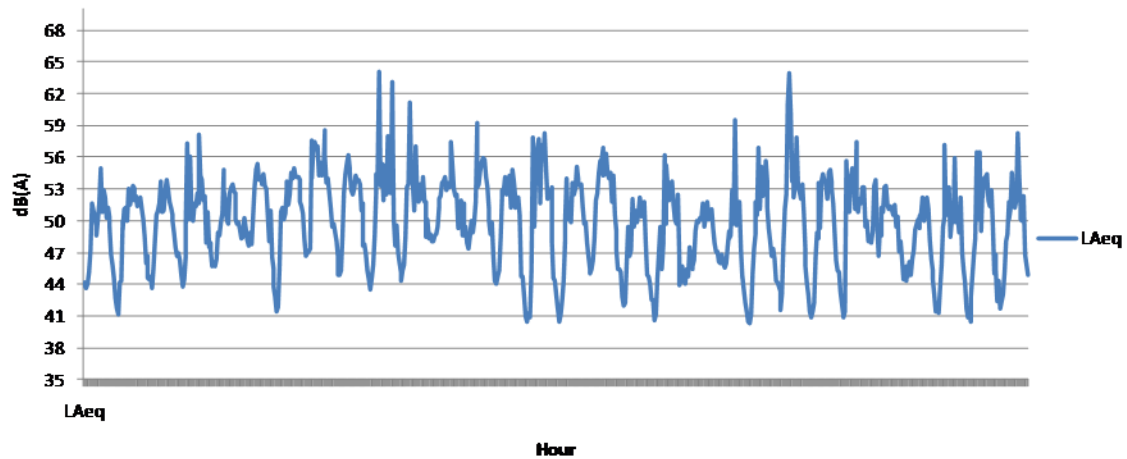
Blessington Basin
Blessington St.
DUBLIN 1



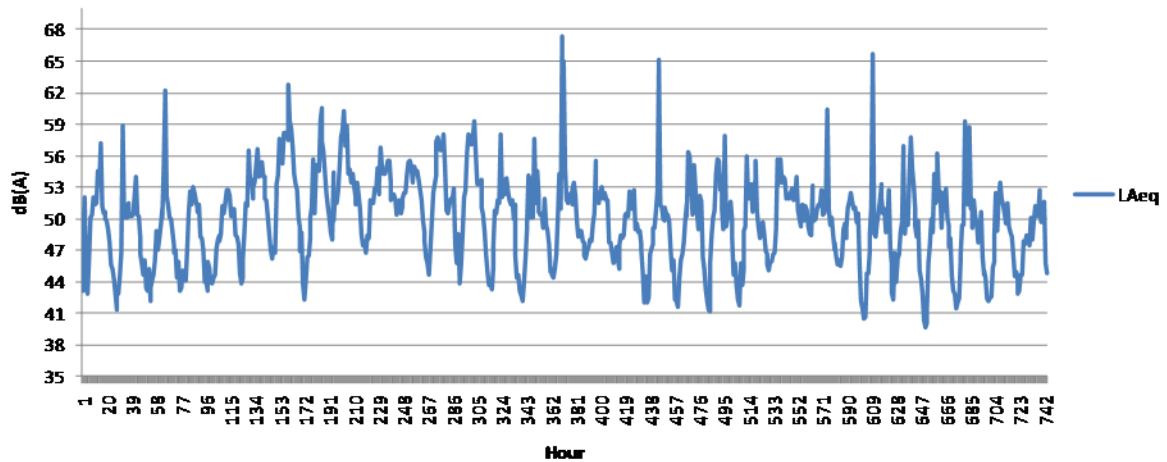




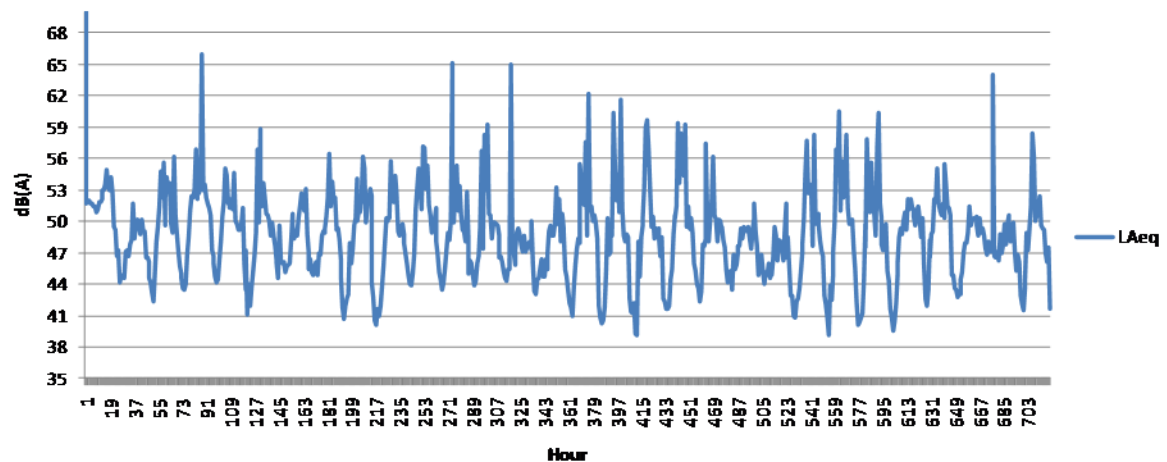
Blessington Basin April '14' Hourly Values

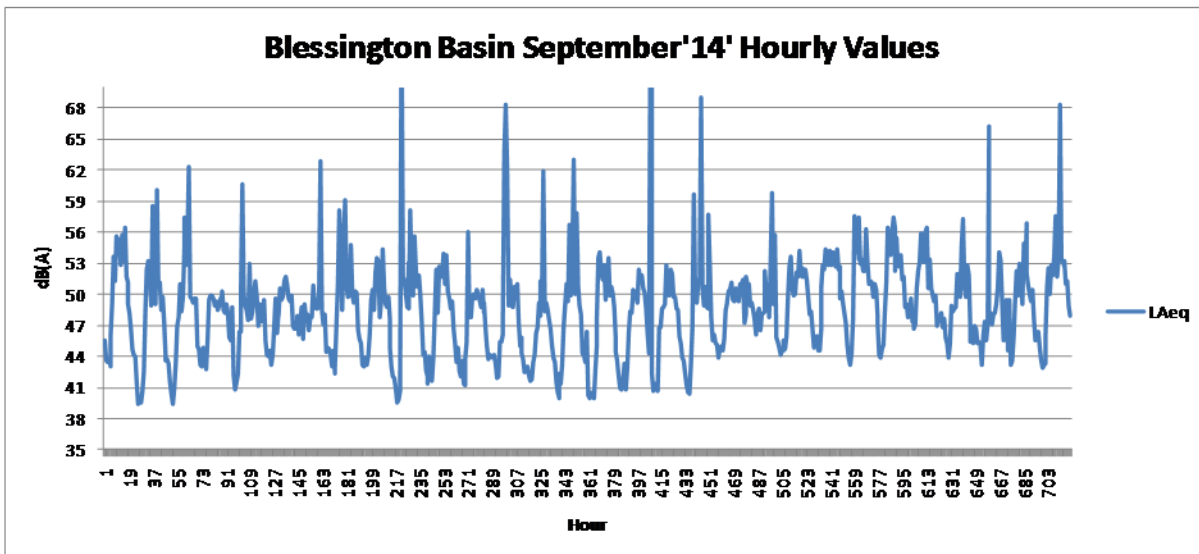
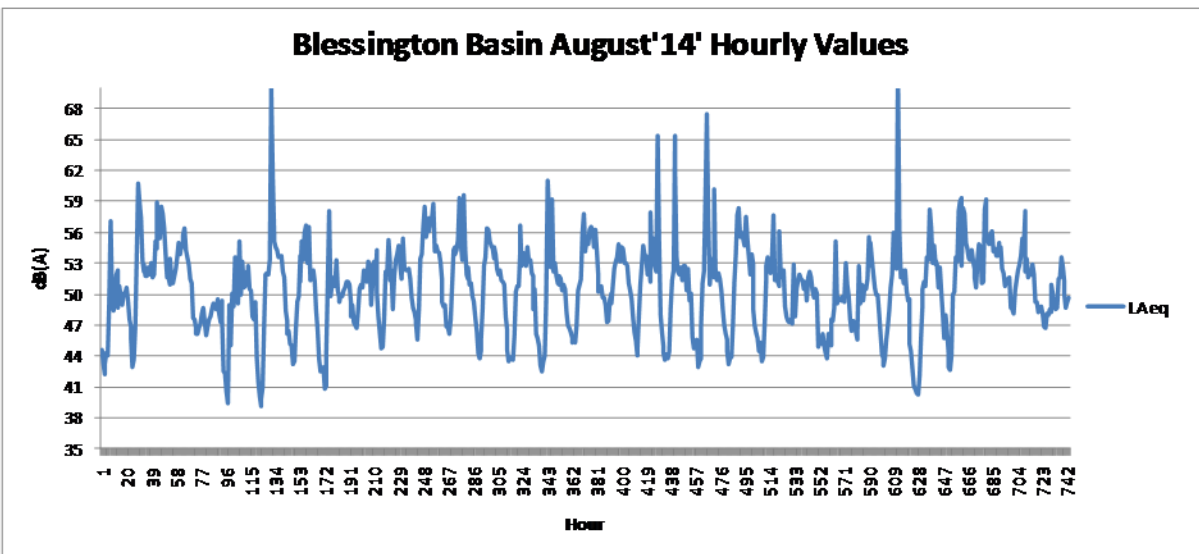
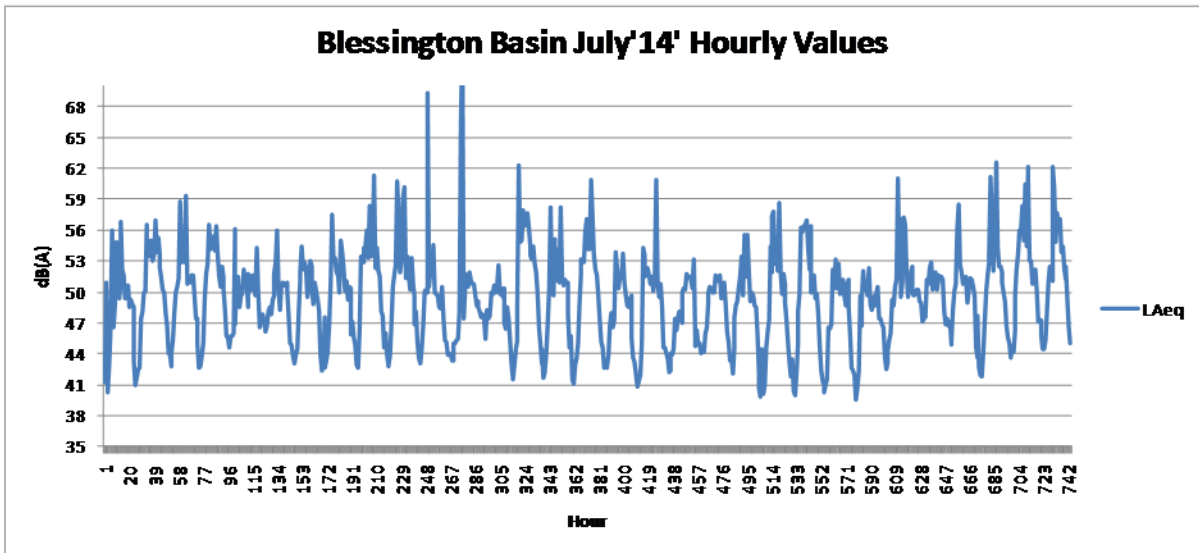


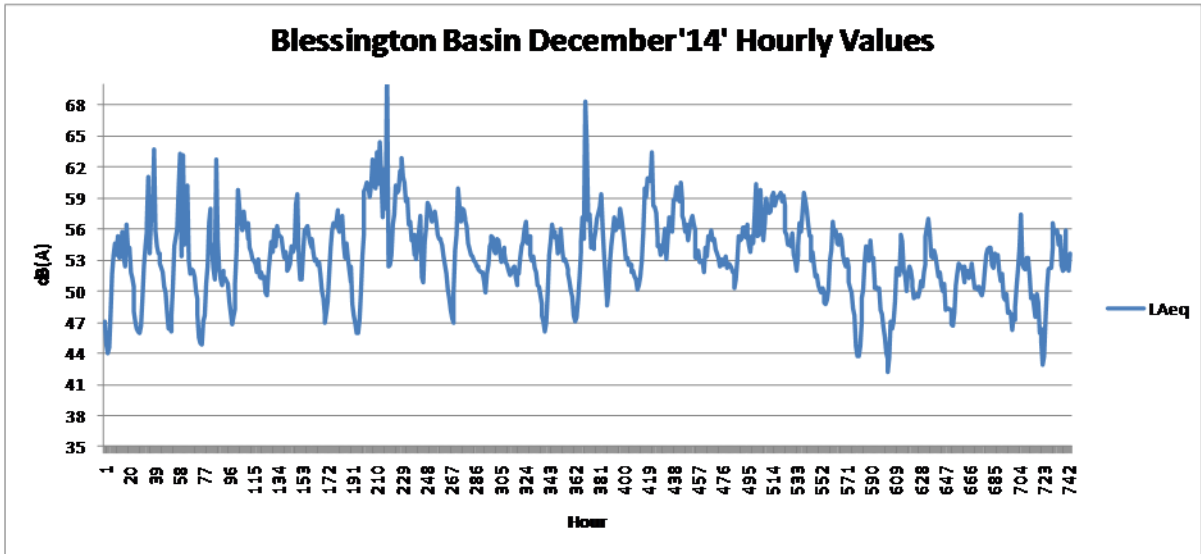
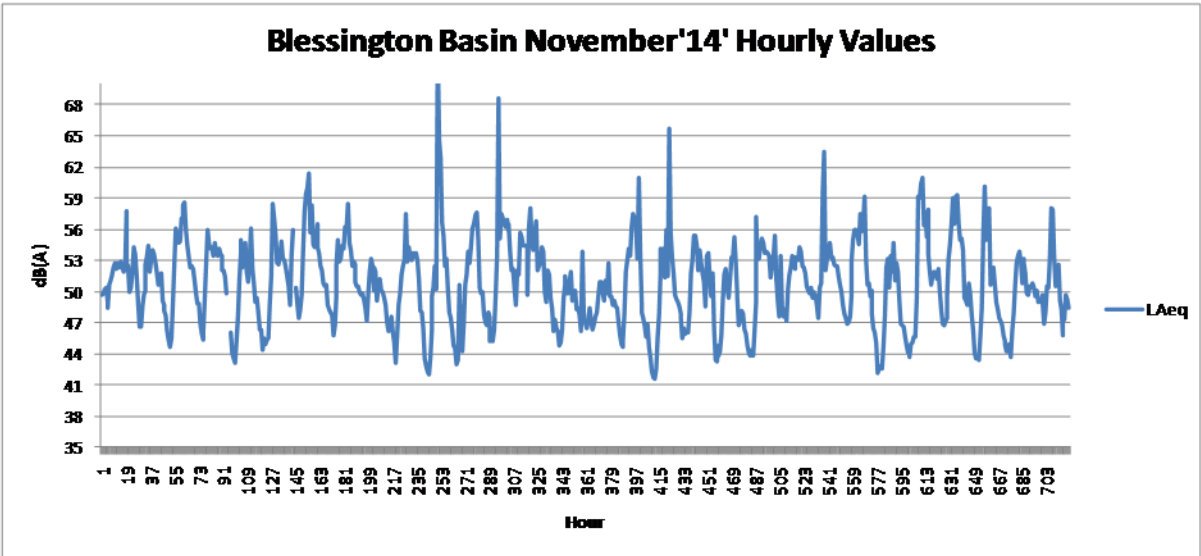
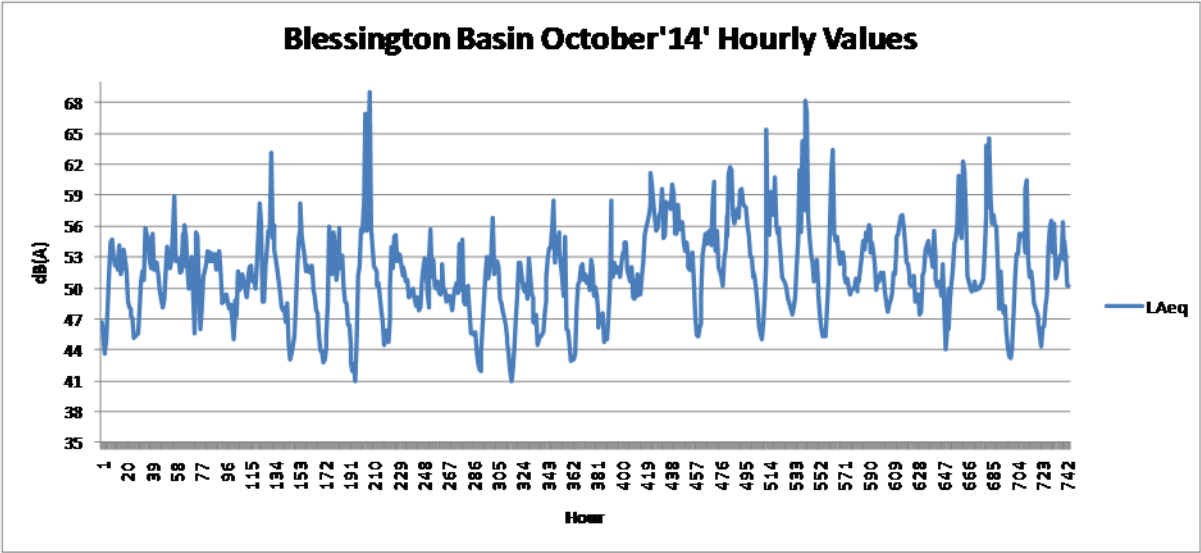
Blessington Basin May '14' Hourly Values



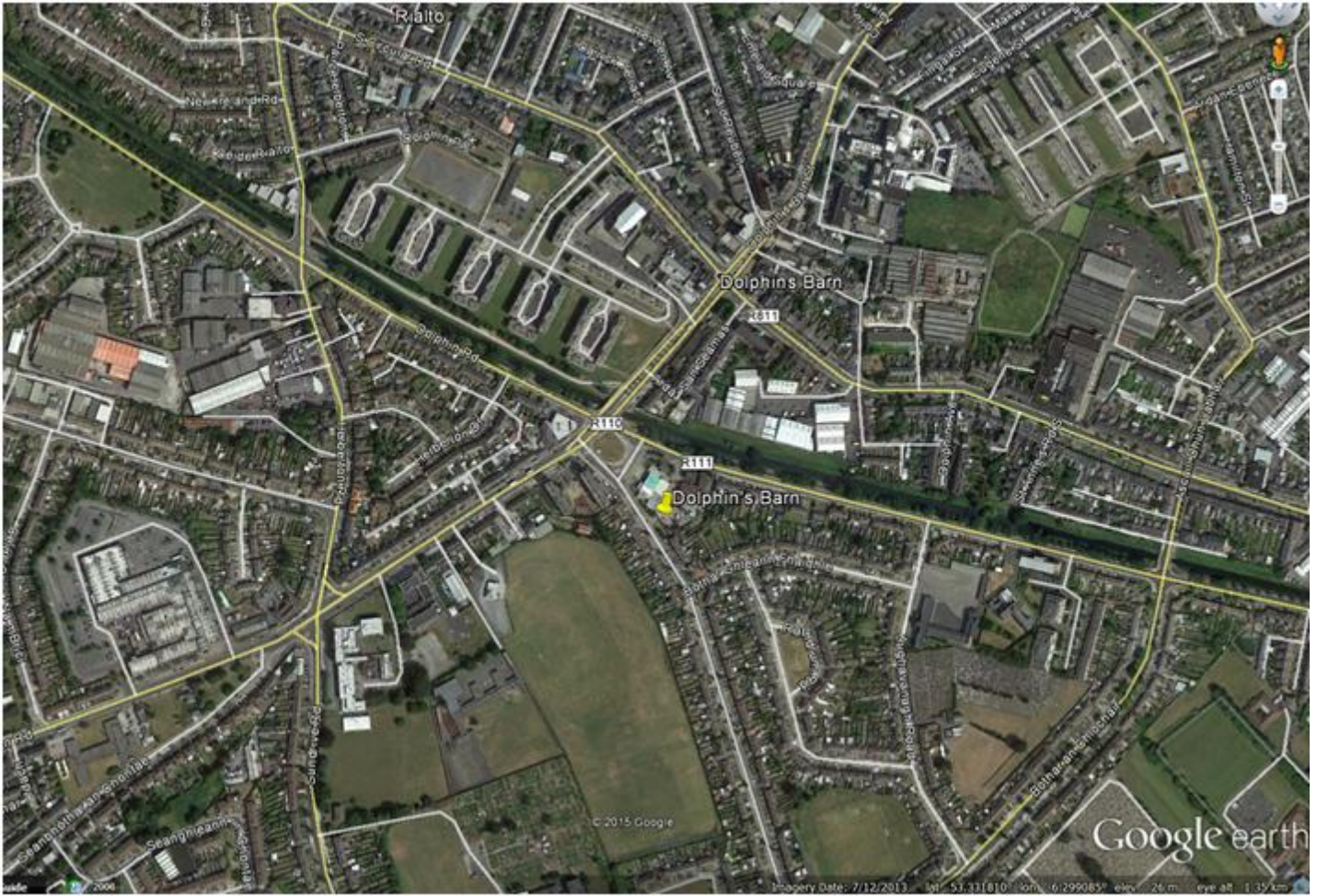
Blessington Basin June '14' Hourly Values

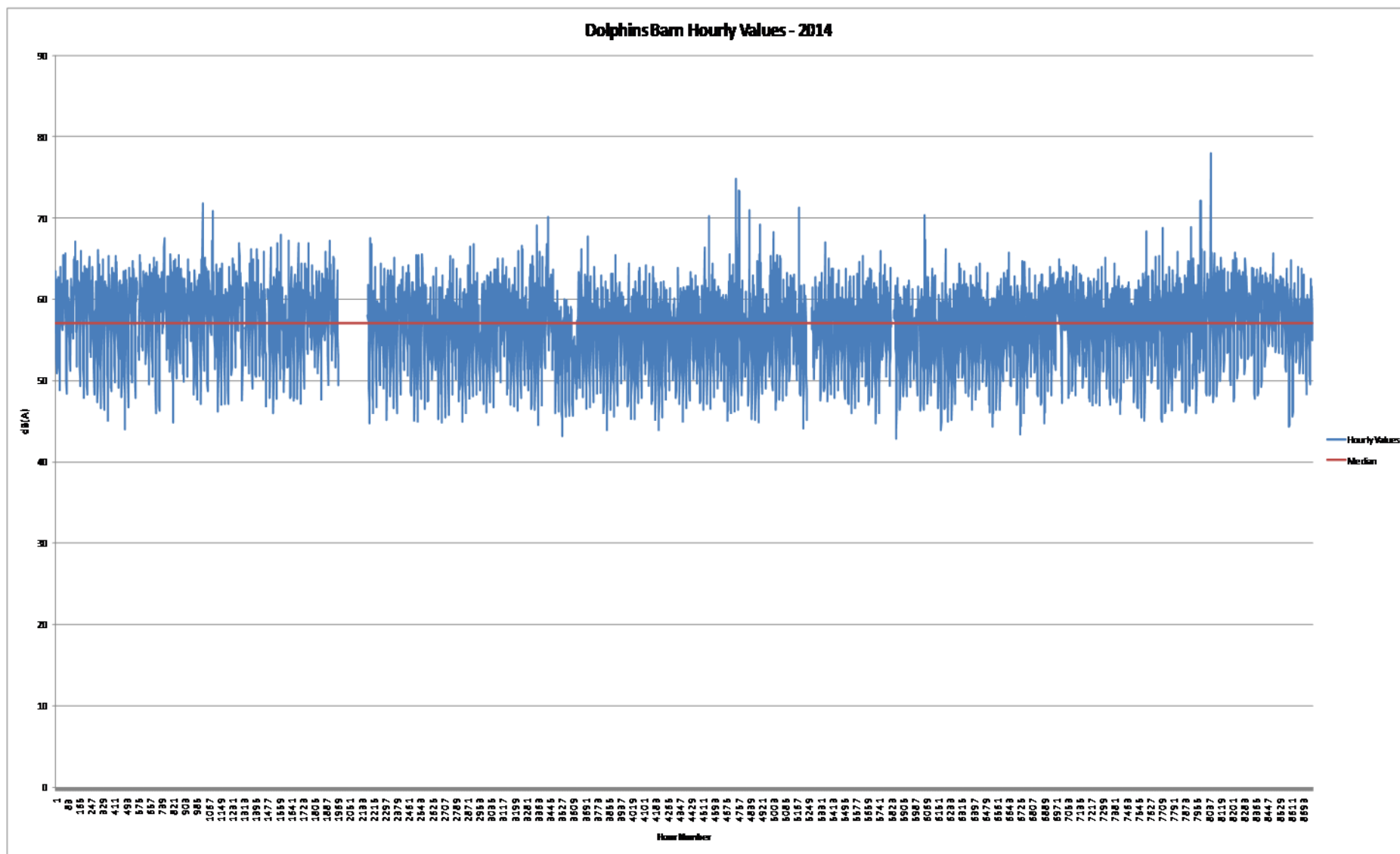




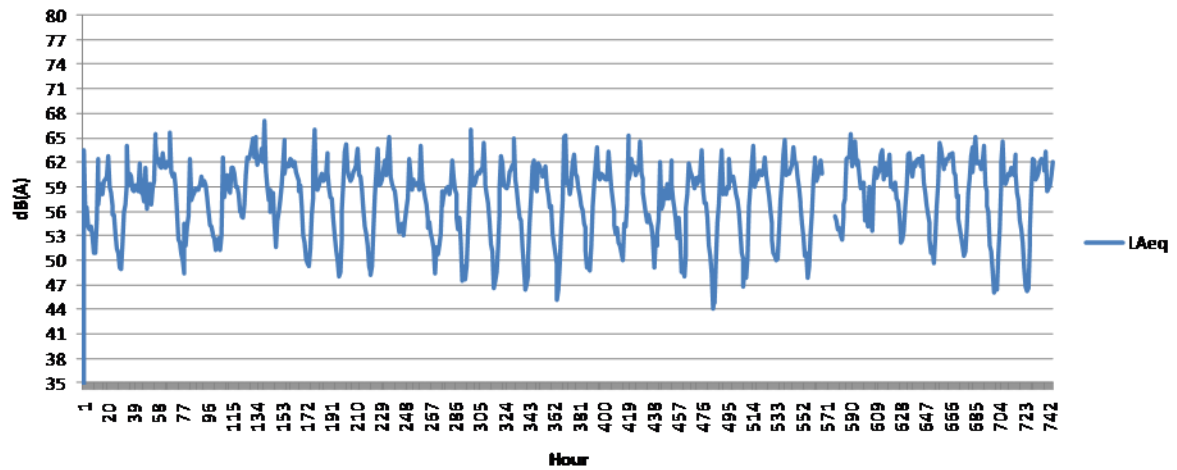


DUBLIN 8

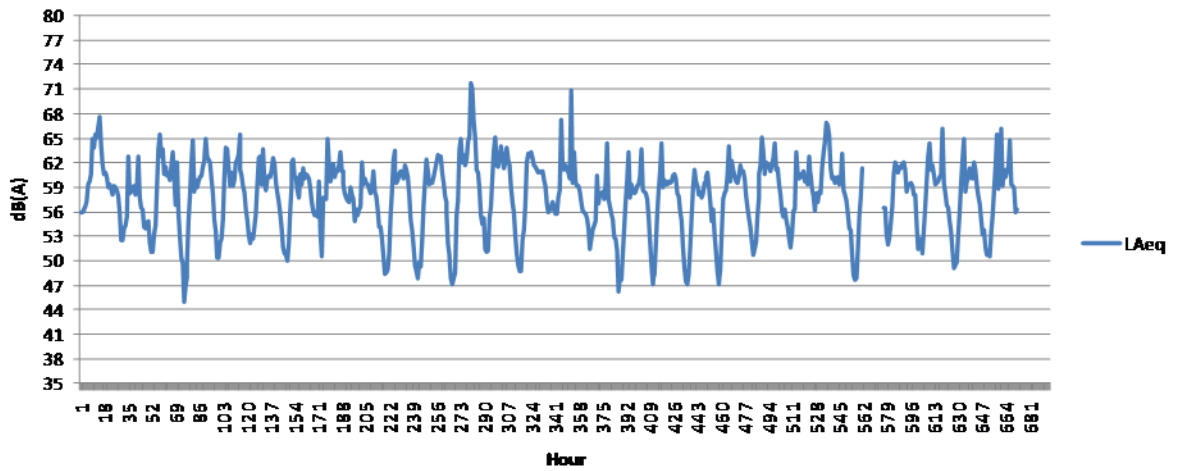




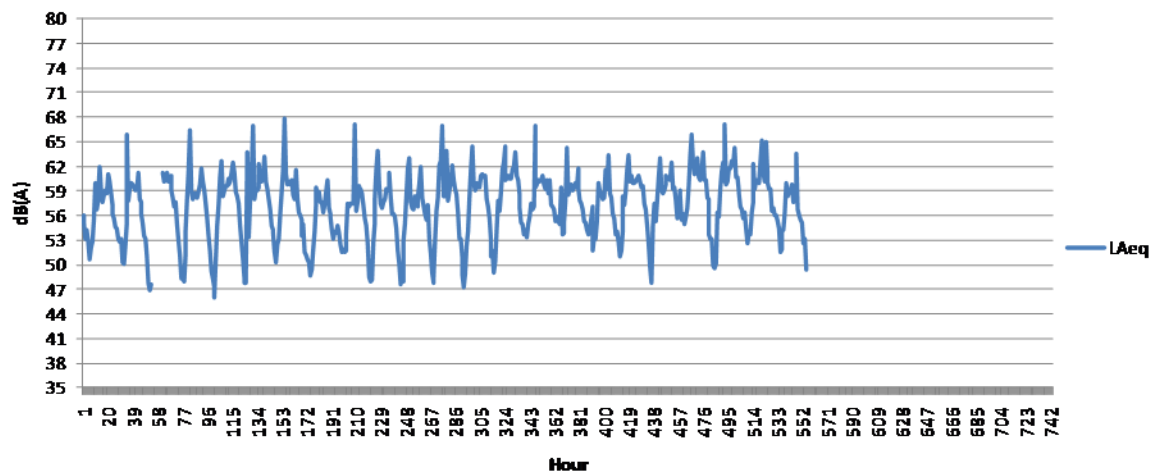
Dolphins Barn January'14' Hourly Values



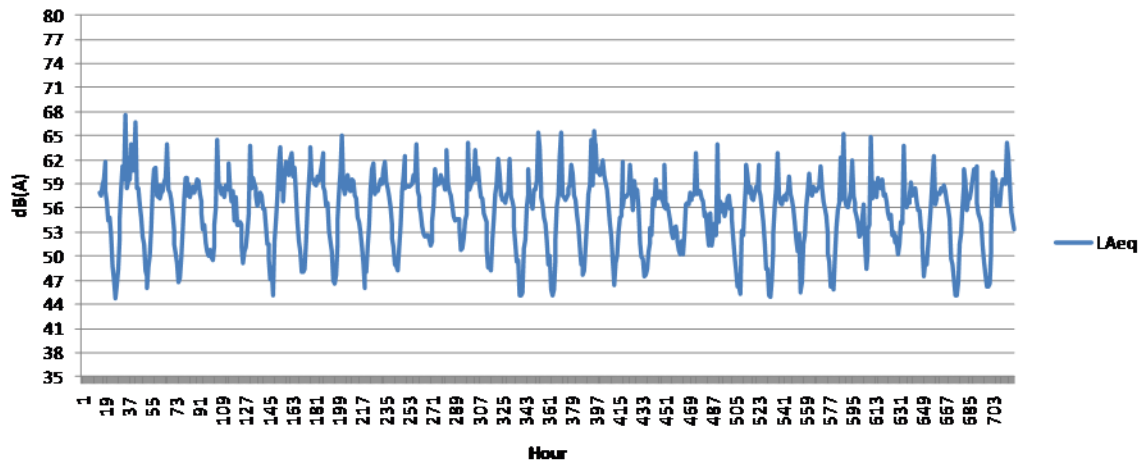
Dolphins Barn February '14' Hourly Values



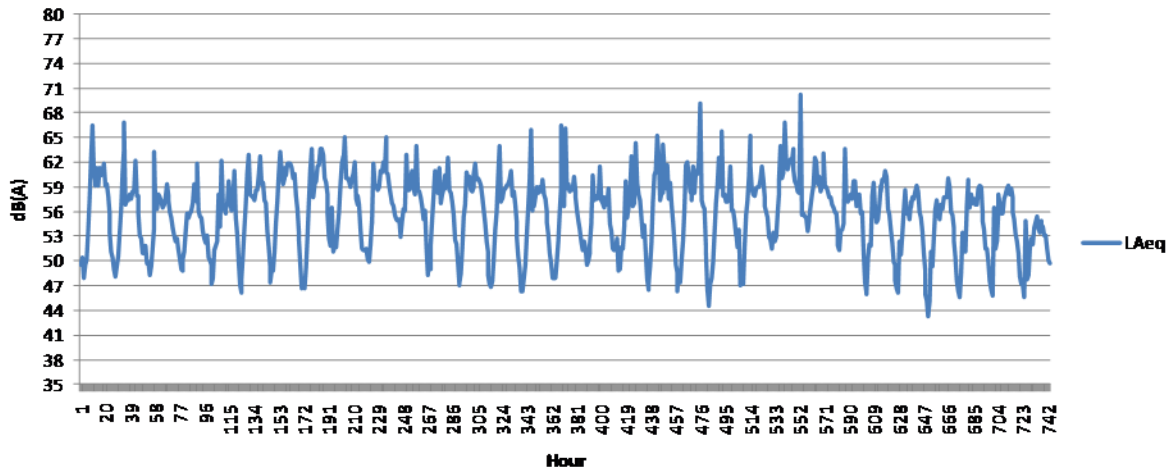
Dolphins Barn March '14' Hourly Values



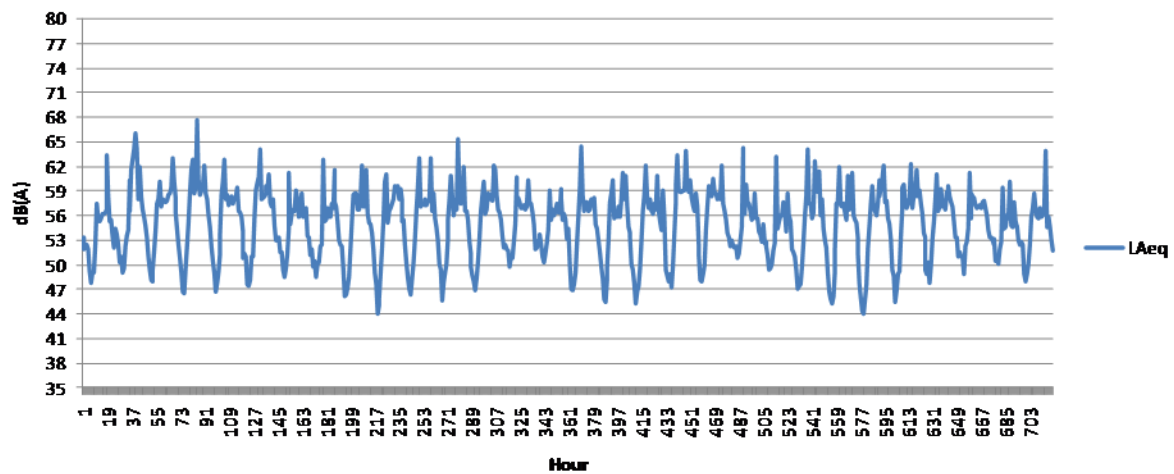
Dolphins Barn April '14' Hourly Values

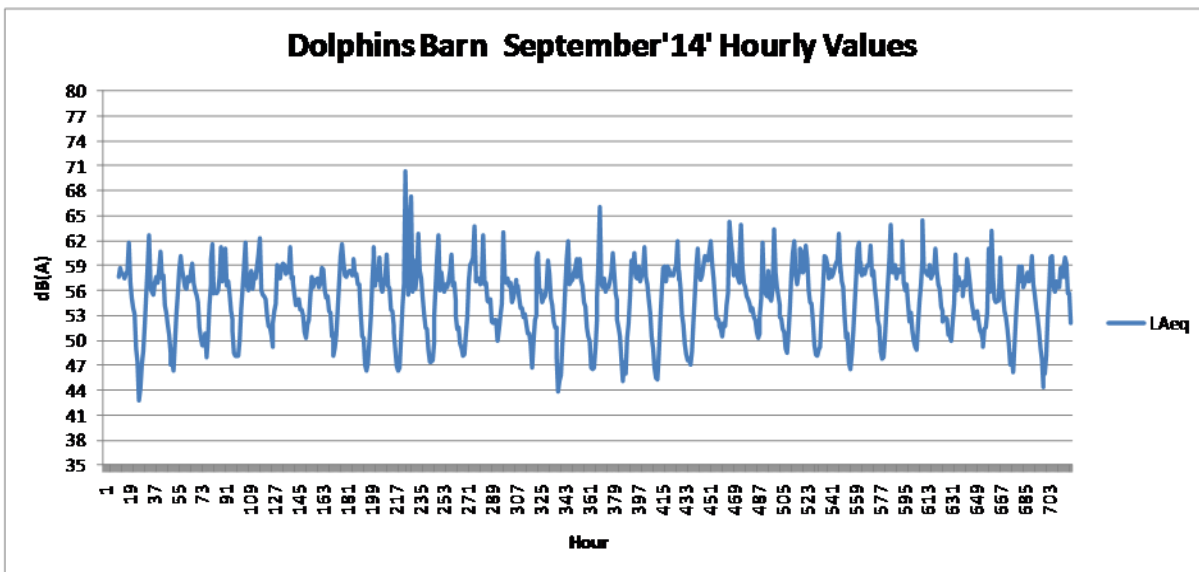
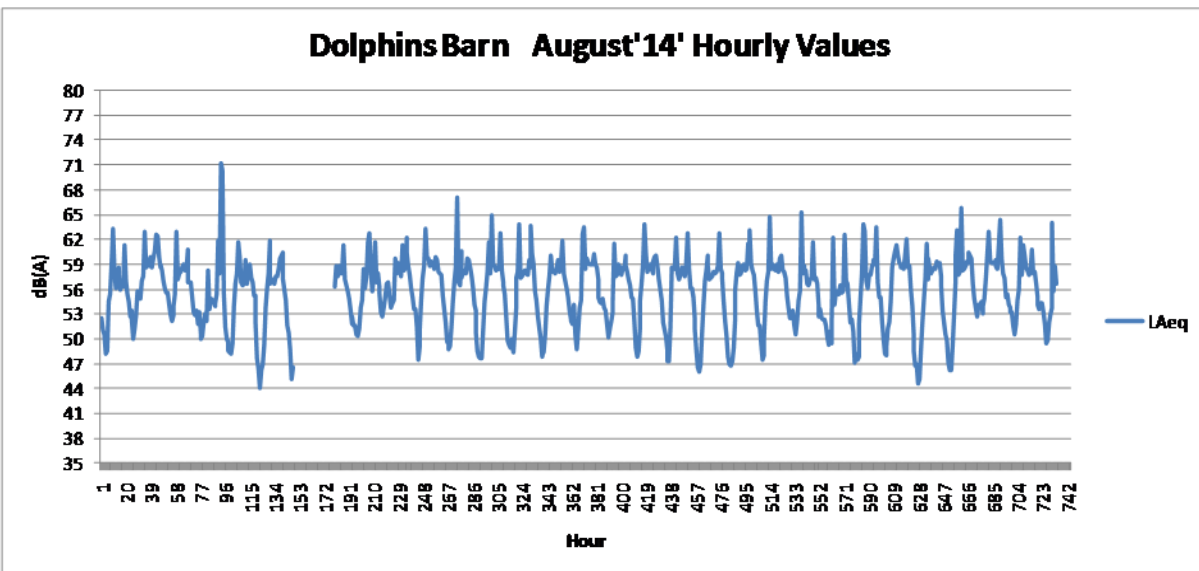
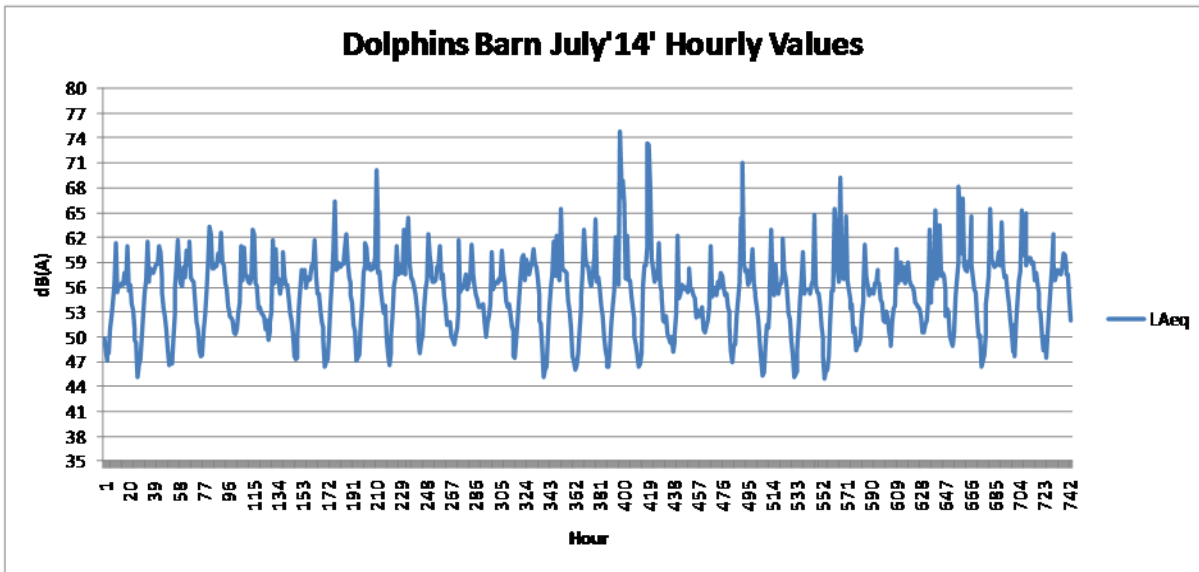


Dolphins Barn May '14' Hourly Values

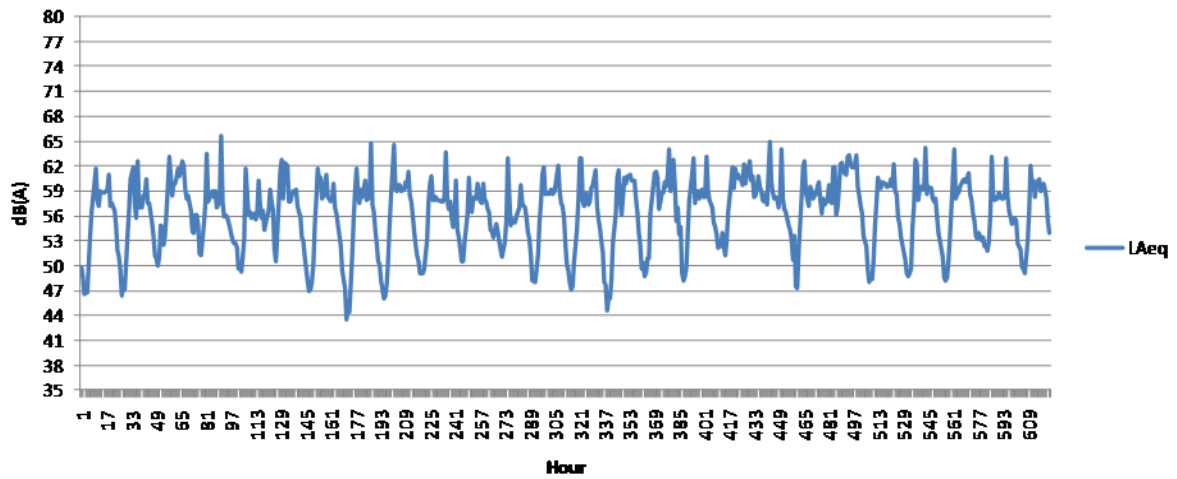


Dolphins Barn June '14' Hourly Values

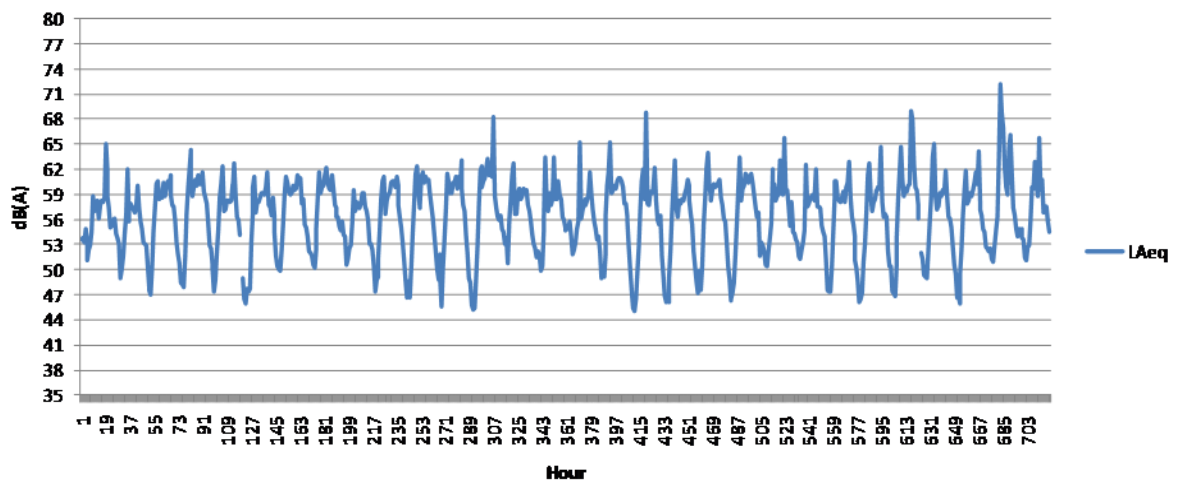




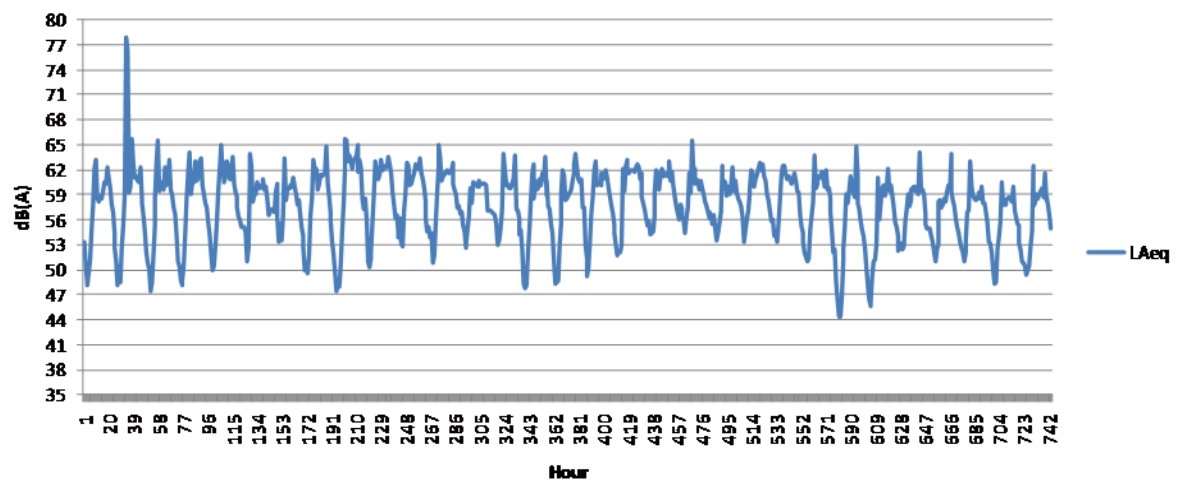
Dolphins Barn October'14' Hourly Values



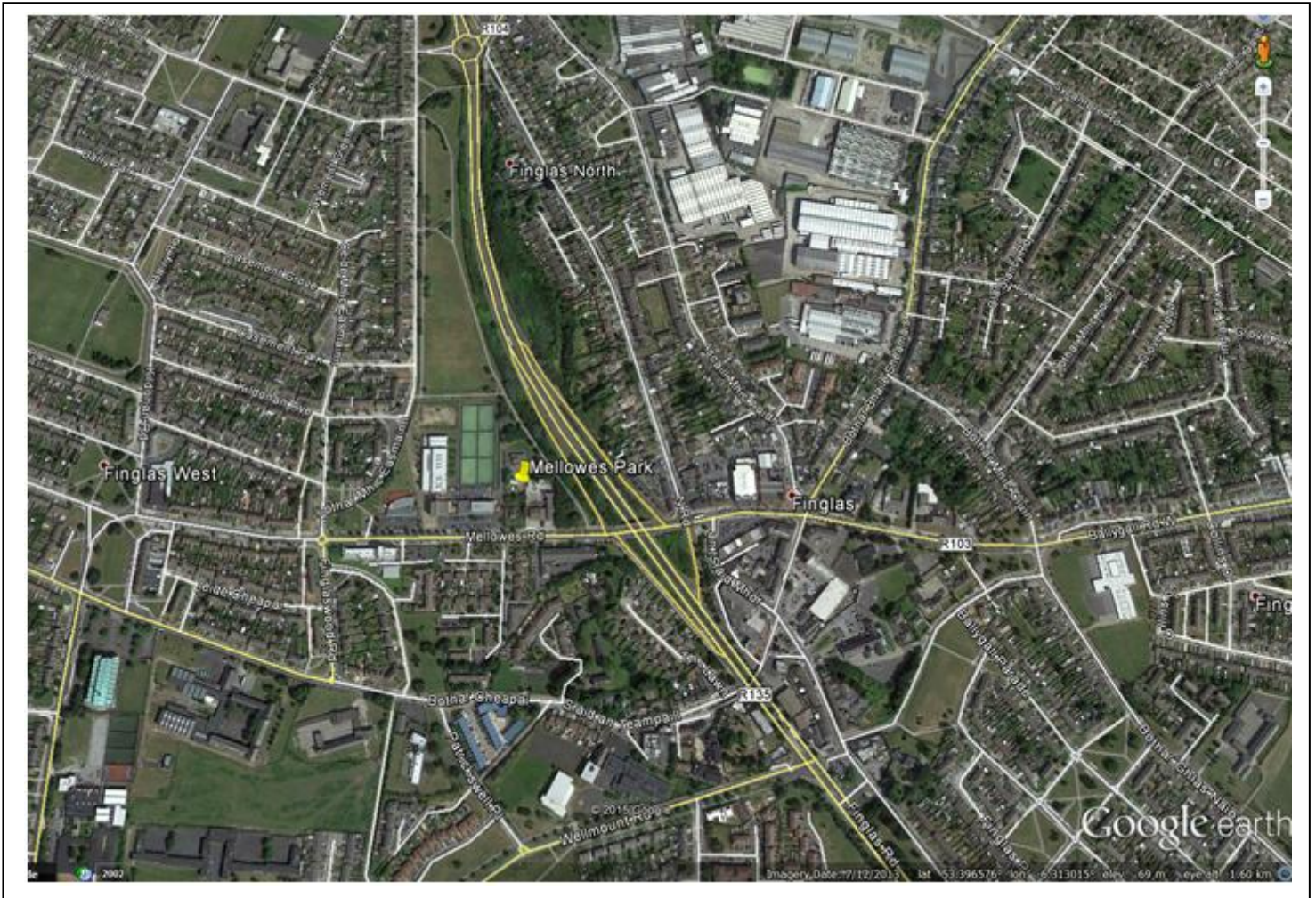
Dolphins Barn November'14' Hourly Values

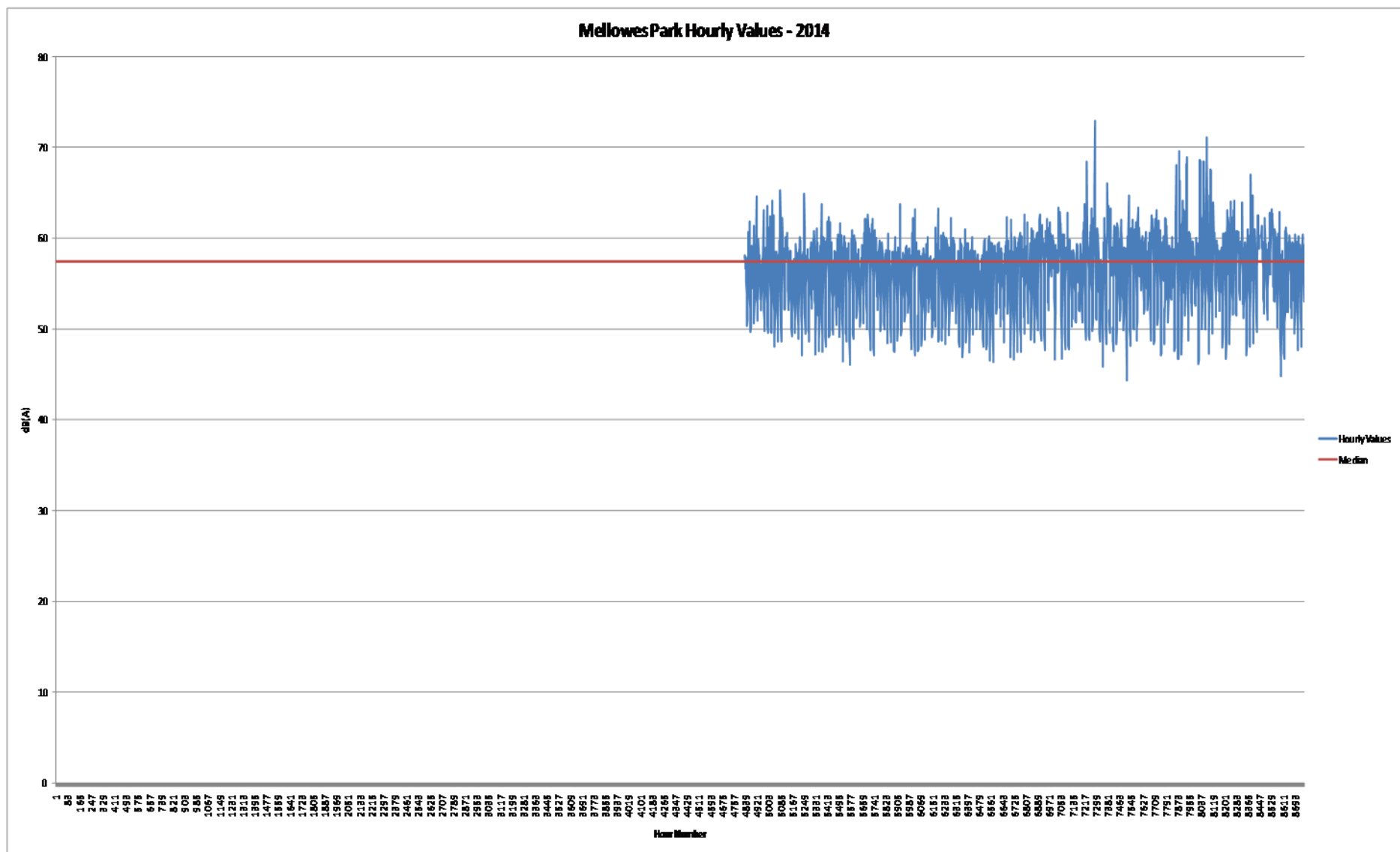


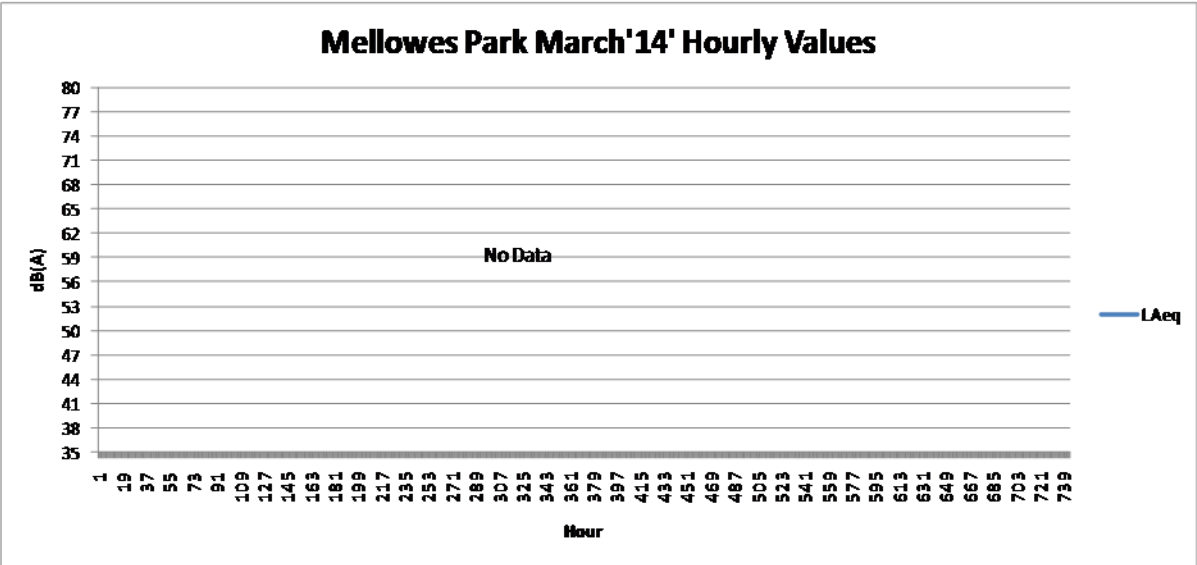
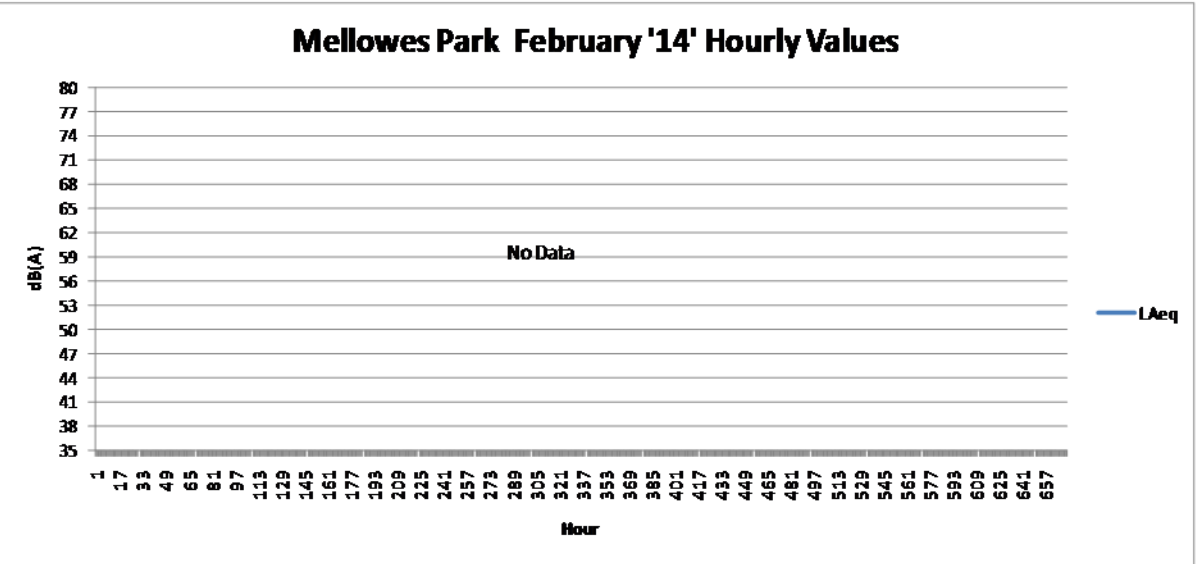
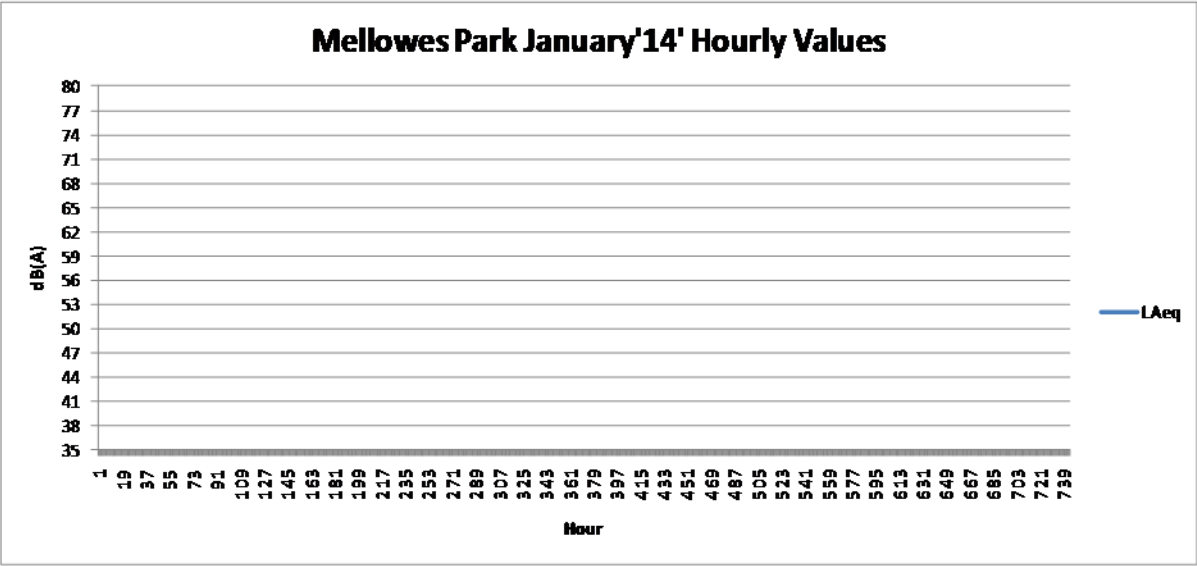
Dolphins Barn December'14' Hourly Values

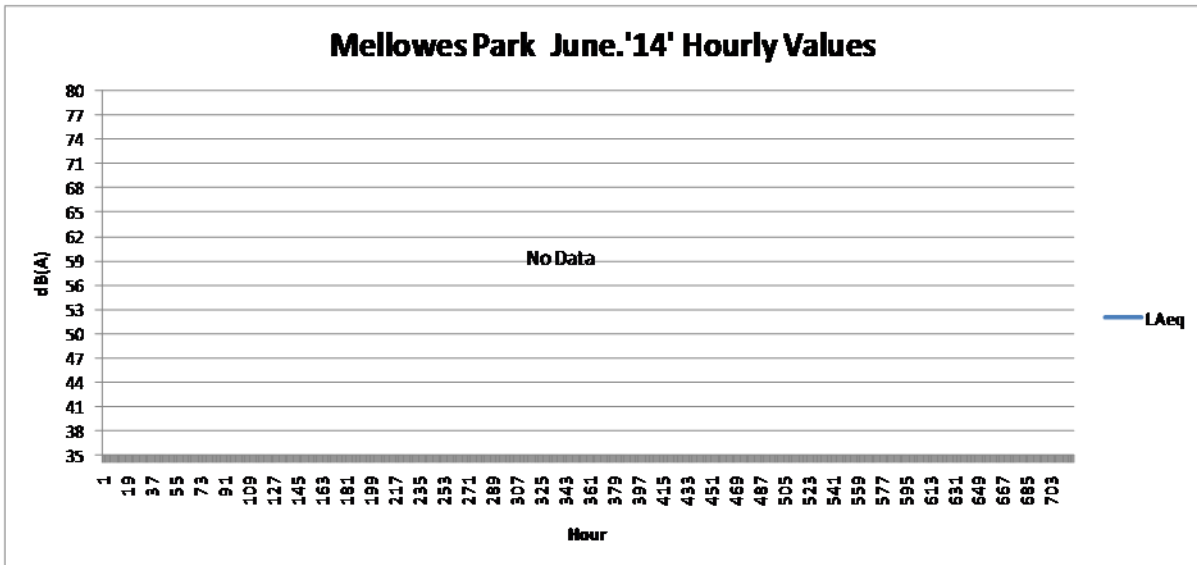
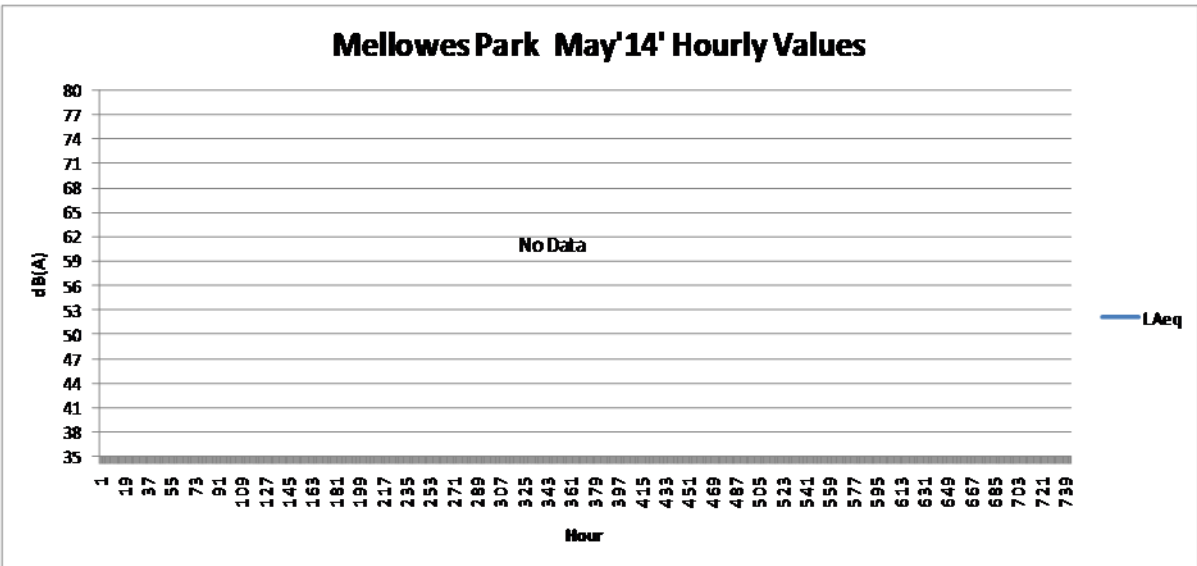
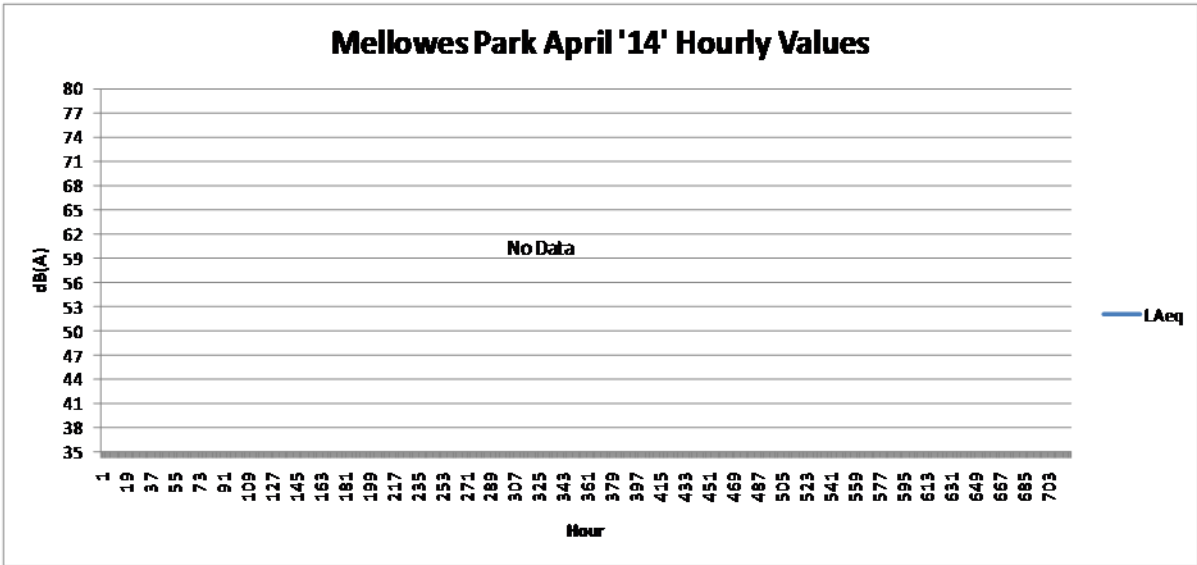


Mellowes Park
Finglas
DUBLIN 11

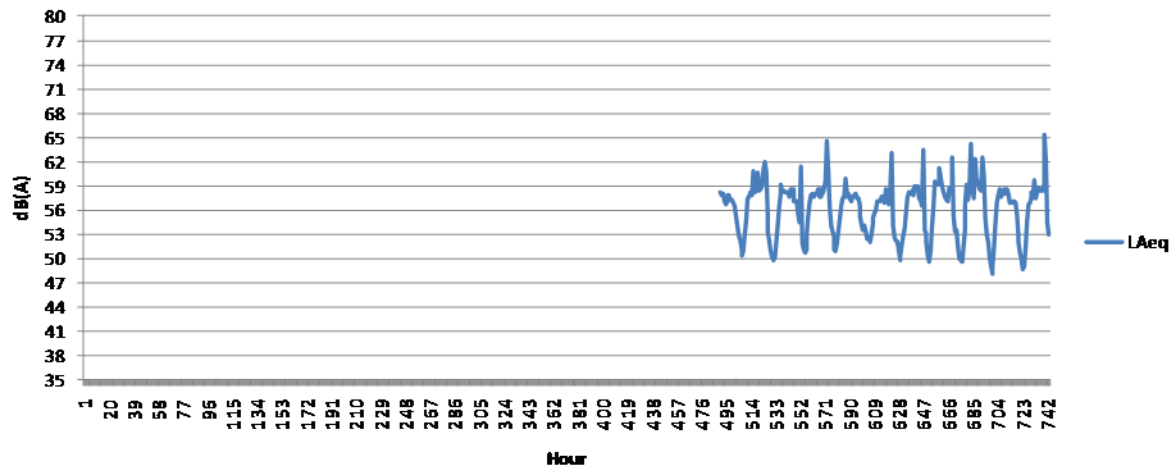




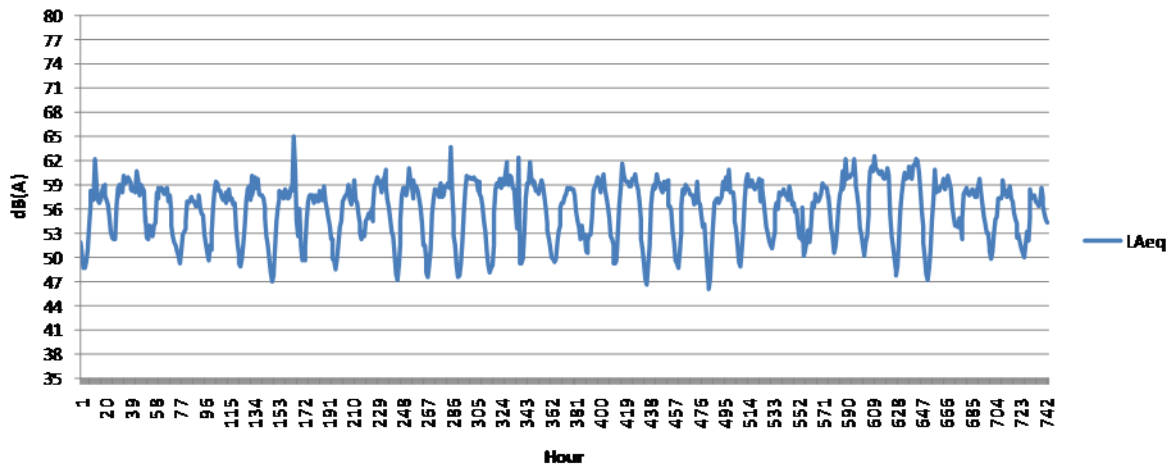




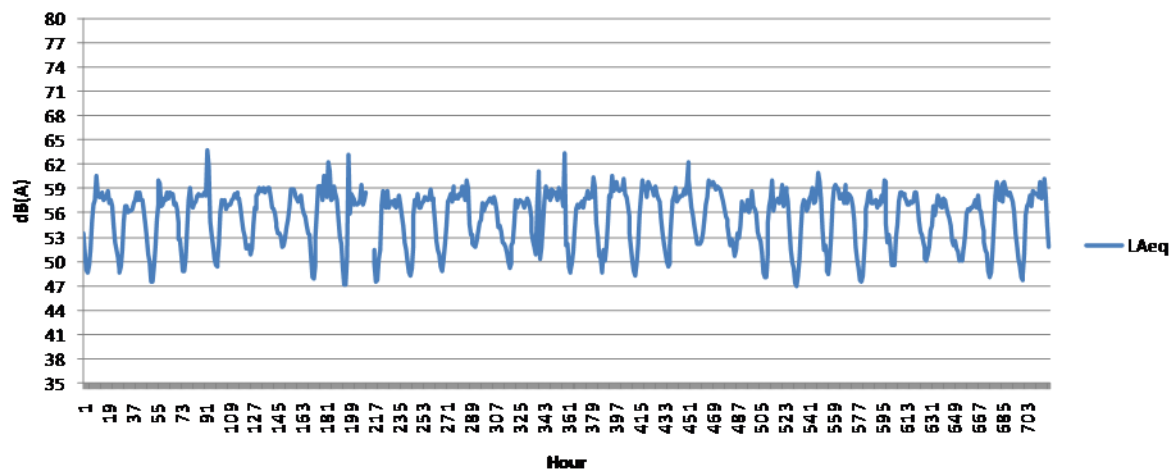
Mellowes Park July'14' Hourly Values

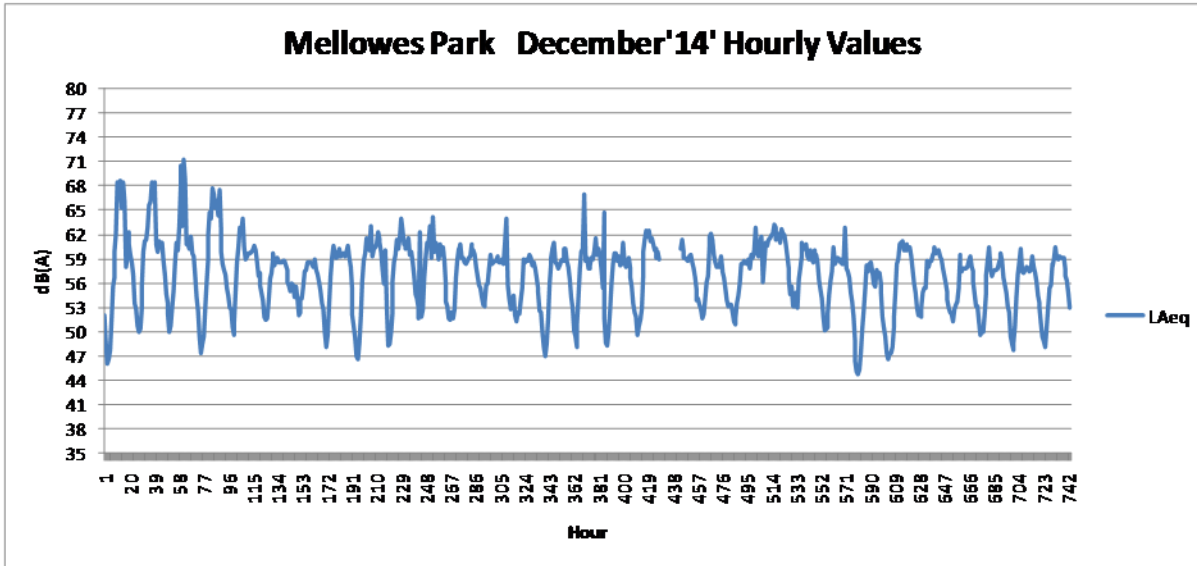
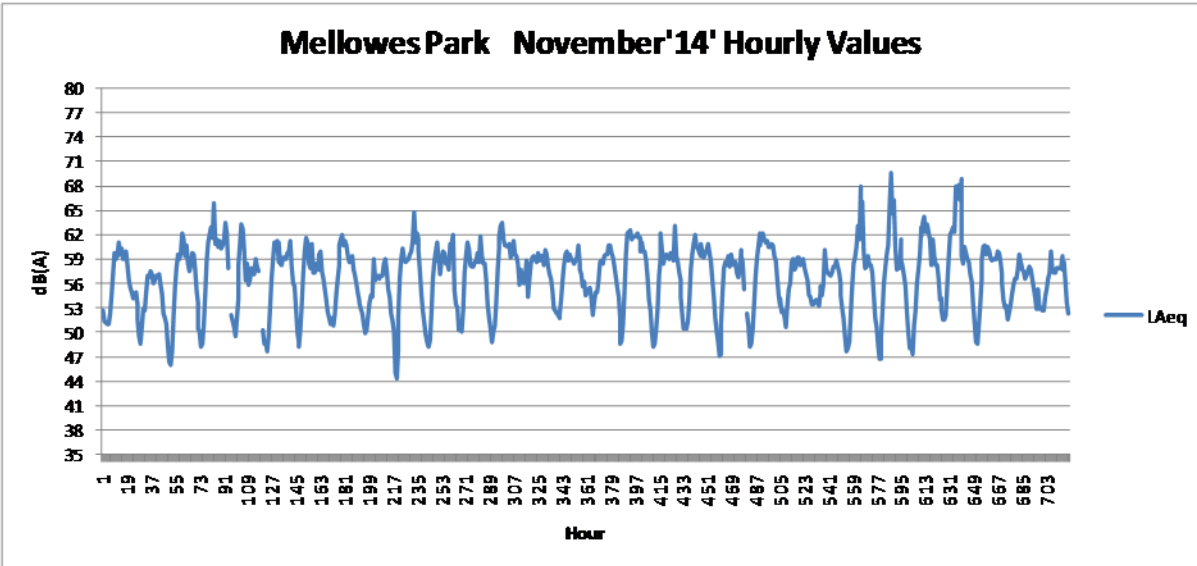
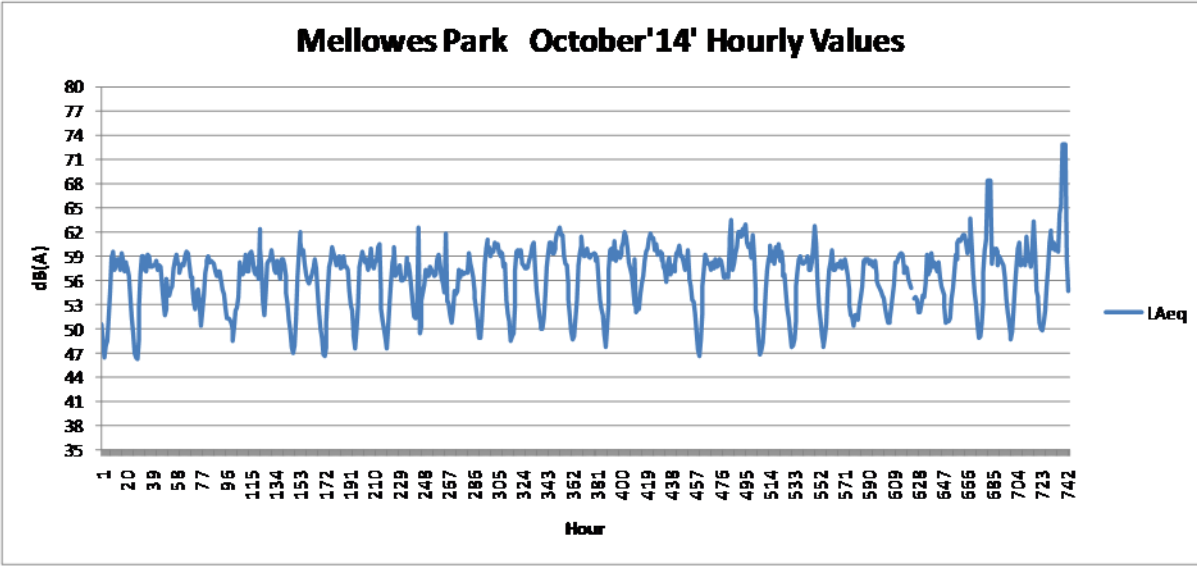


Mellowes Park August'14' Hourly Values



Mellowes Park September'14' Hourly Values





Notes



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