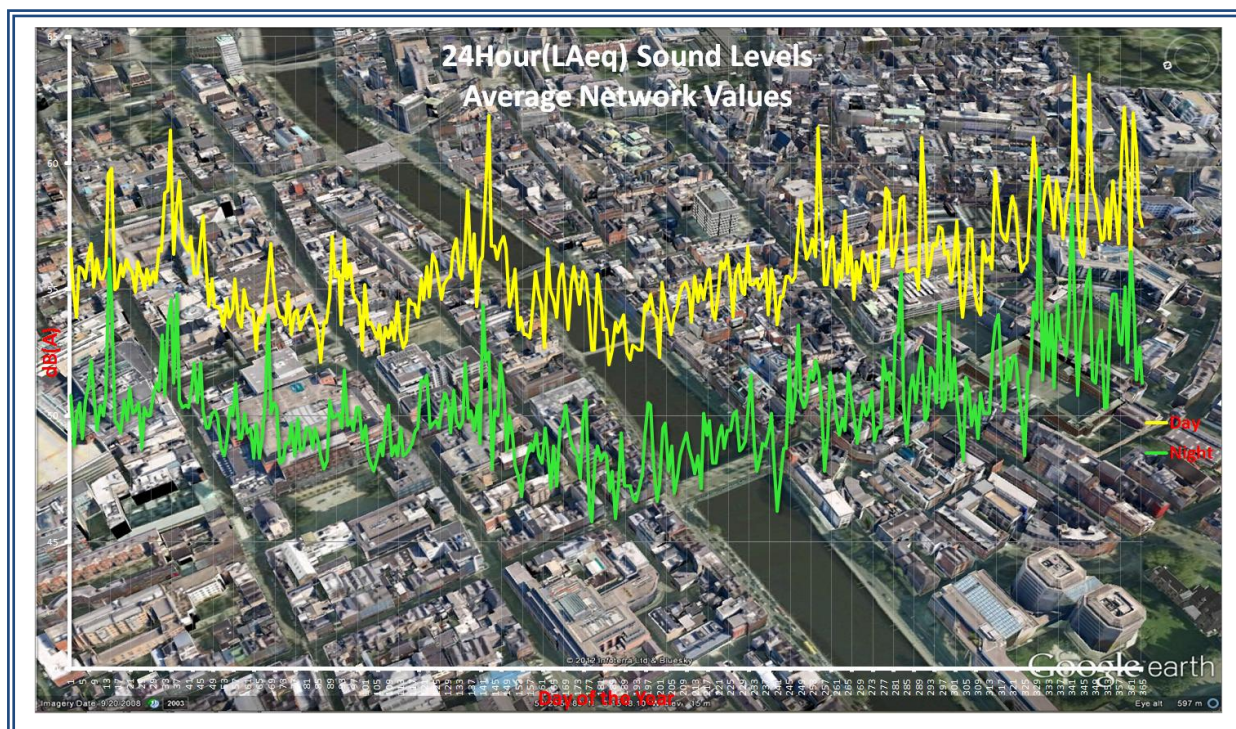


DUBLIN CITY COUNCIL

AMBIENT SOUND MONITORING NETWORK

Annual Report For 2011



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

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www.dublincity.ie

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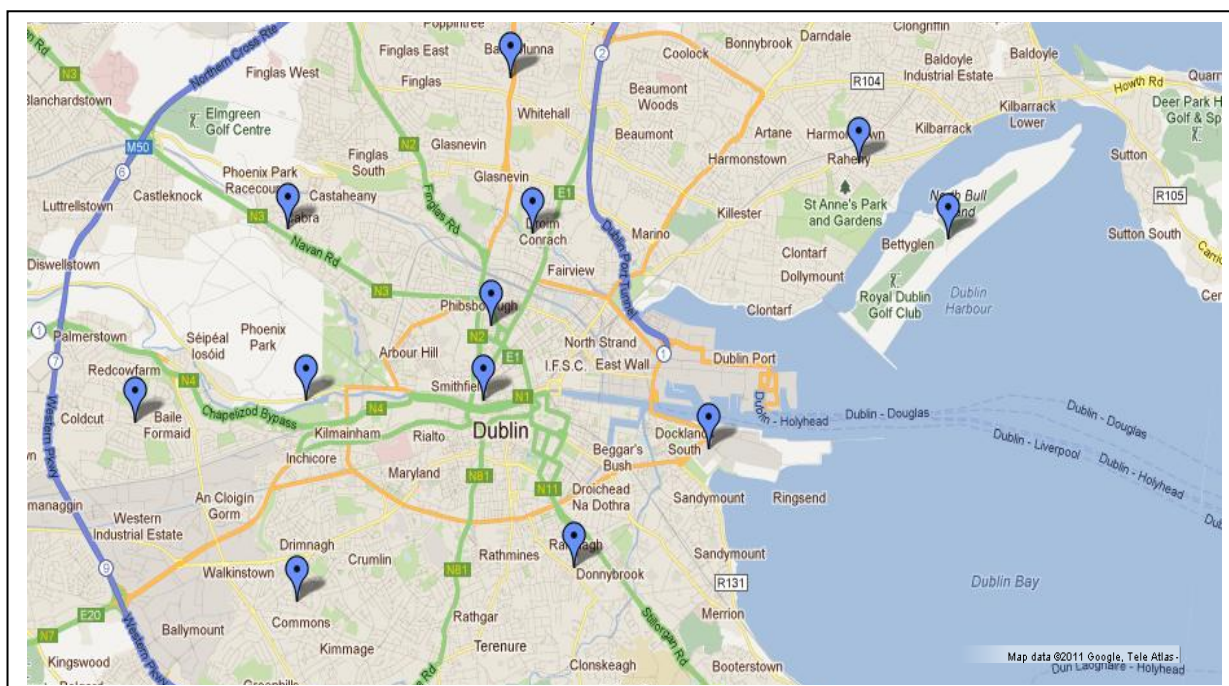
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Introduction

This is the third Annual Report for the Dublin Ambient Sound Monitoring Network. Dublin City Council commenced the installation of a permanent ambient sound monitoring network in 2009. Again in 2011 an additional monitor was placed in Blessington Basin at the top of Blessington St. This is in order to assess whether this small park could be designated as a Quiet Area under the 'Action Plan' relating to the assessment and management of environmental noise. Currently the monitoring network composes of 12 sites. It is anticipated that there will be further expansion of the network in 2012, subject to site availability. 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.

Fig. 1 Sound Monitoring Sites - 



It should be noted that the sound level meters are located so that there is no single dominant source such as major roads, road junctions, industrial sources etc. having a significant influence on the outdoor ambient sound levels being measured. The network currently consists of 12 monitoring locations with 11 being reported on this year.

- 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 Basin, Blessington St, D1.
- Millmount Avenue, D9, Drumcondra Library
- Percy French Road, D12, Walkinstown Library
- Ringsend, D4, Irishtown Stadium
- Woodstock Gardens, Ranelagh, D6, Snr. Citizens Residential Scheme
- Chancery Park, Public Park, Dublin 1

Measurement Parameters

The European Commission requires the use of a parameter called the Lden (Sound Level for Day, Evening and Night) in population exposure assessment. This measurement parameter of *Day-evening-night level* is a descriptor of average sound levels over a whole day 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.

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.

Sound Sources

Work carried out by Dublin City Council on computer modelled noise maps has shown that traffic is one of the dominant sound sources in Dublin. 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. Whilst measurements at the monitoring locations are influenced by traffic generated sounds the monitors are located so that the measurements are not totally dominated by this source. The aim is to measure total ambient sound without one source dominating another. So whilst the location at Chancery Park – to the side of the Four Courts, is close to the Luas Red Line, measurements will include sound from the LUAS, sound from traffic on the Quays, sound from deliveries to the Markets area and sound from activities in the park itself. As this location is close to residential properties it gives a good representation of the overall sound, that people in that area are being exposed to throughout the year.

The second dominant sound source is the weather. It may be stating the obvious, but the sound levels at the monitoring sites become elevated once there is an increase in wind speed and/or a heavy rain showers. This can be seen from the measurements at the Bull Island site which is heavily influenced by wind and wave sounds. It is therefore important to understand that an increase in sound levels over a particular period may not necessarily mean an increase in ‘noise levels’ – noise being defined as unwanted sound. Having said that, the weekly and monthly measurements demonstrate regular and repeating sound patterns. This can only be as a result of manmade sound emissions.

The site locations are displayed on maps to the rear of this report and give an indication as to the type of area they are situated in. Bull Island, again this year, tends to be the most erratic site in that there is no readily discernable pattern to the measured levels. As already stated, this site would be impacted more by the time of the tides and weather rather than sounds from traffic and human activity.

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 a correct calibration was discarded. There was no instance of vandalism at any of the sites this year, but birds did manage to pull asunder the foam wind shields from two microphone assemblies. This resulted in the discarding of data at those sites during the periods without a wind shield.

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 currently existing air quality standards. However the levels outlined below are used for guidance and comparison purposes.

Areas with desirable\undesirable or high\low sound levels

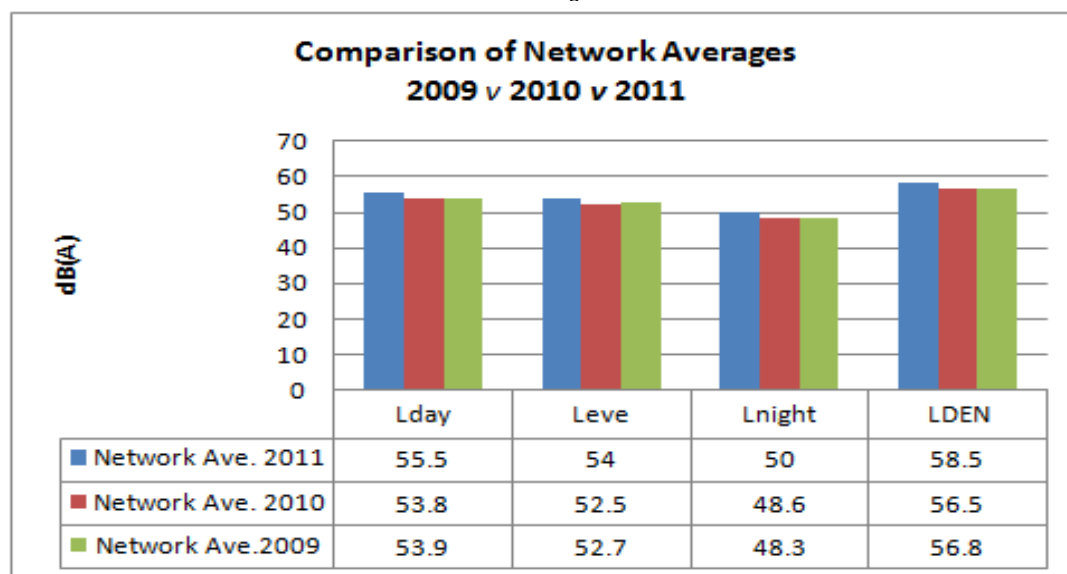
The Dublin City Council Noise Action Plan Oct 2008-Nov2013 proposes that areas with undesirable high sound levels are areas with a night time sound level greater than 55 decibels and a daytime level greater than 70 decibels. Areas with desirably low sound levels are defined as areas with a night time 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)** Lnight for outside = 40 dB; Interim target (IT) Lnight, outside = 55 dB.

Summary Results

Fig.2



Summary Results *contd.*

The measurements for the year 2011 indicate that only one of the locations – Ballymun, marginally exceeded the undesirable values of 55dB night\70dB day, with a night time value of 55.3dB(A). This was an increase of 0.5 of a decibel on 2010. Six of the sites, this year again, met the desirable criteria for night time levels (Drumcondra, Raheny, Ringsend, Bull Island, Walkinstown, Ranelagh). The overall Network Average also met the desirable night time level with a value of 50dB (A). Four sites - a decrease from seven in 2010, met the desirable value for daytime, (Ringsend, Bull Island, Walkinstown, Woodstock Gdns\Ranelagh). The Network Average of 55.5dB(A) was just 0.5dB outside the desirable daytime value. All of the sites except Ballymun met the WHO NNGL interim target for exterior night time level of 55dB(A). Set out in *fig.2* is a comparison of the Network averages for 2009, 2010 and 2011. Figures 3&4 display more detail for the individual sites. The 2011 Network yearly average figures show 1.4-2dB change on year 2010.

Fig.3

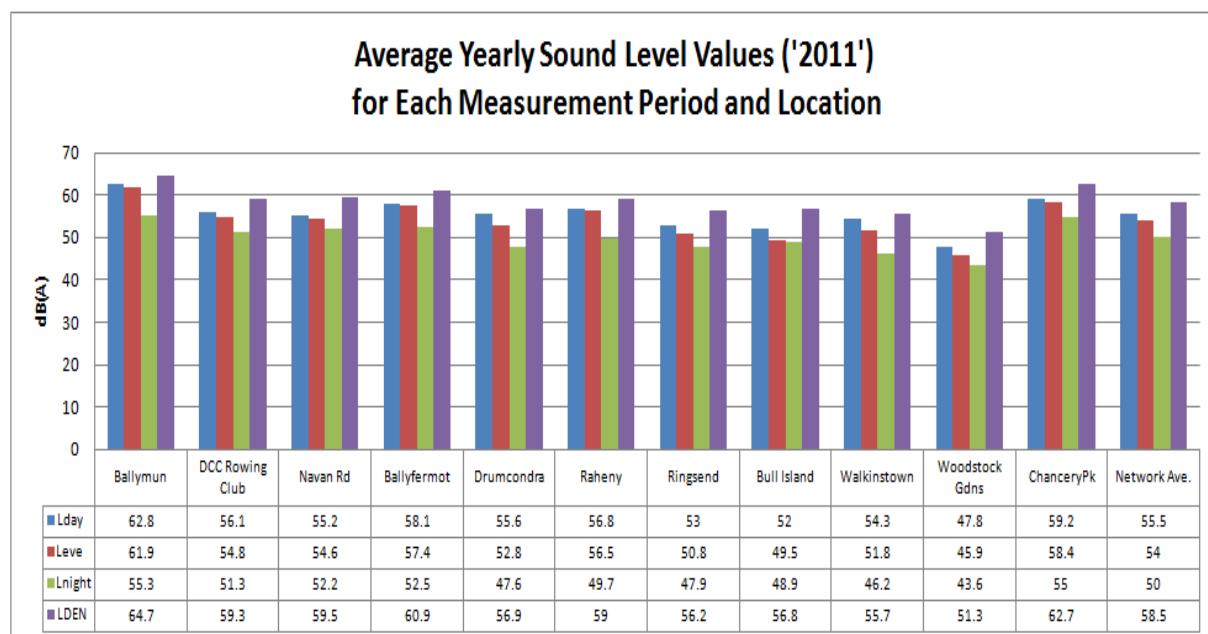
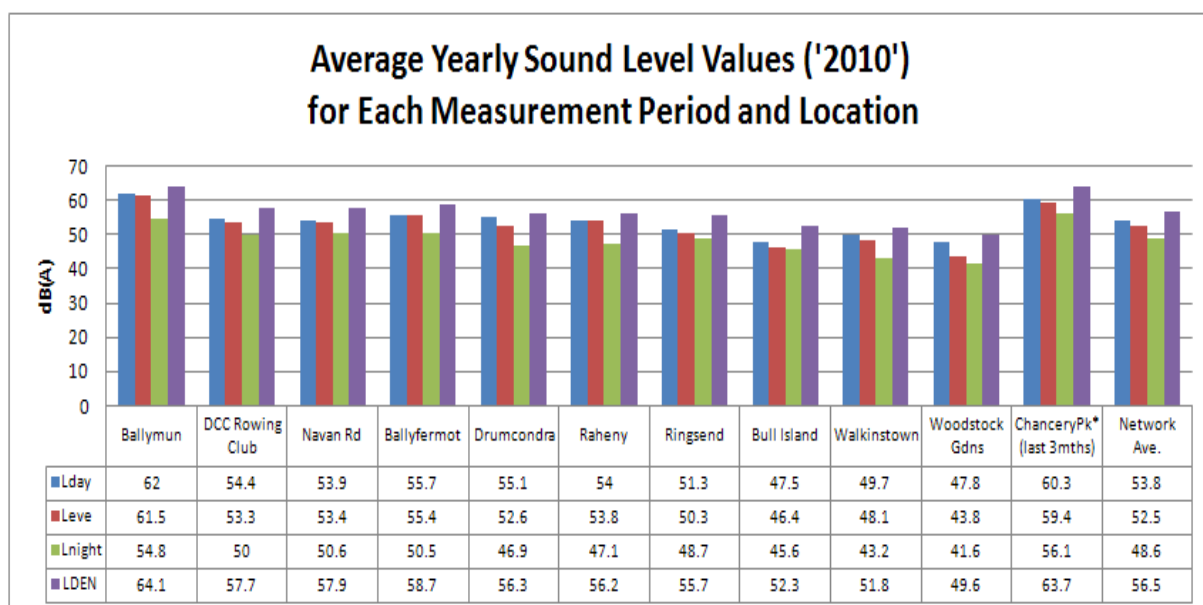


Fig.4



Measurement Results

The ambient sound monitoring network measures all sound from all sources thus giving an indication of the amount of sound the general population is exposed to from the hustle and bustle of daily life. Although alluded to previously, it is worth stating again that 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 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 L_{den} and L_{night} , in this respect, describe the exposure situation. (Dr. Wolfgang Babisch, Expert Panel on Noise, EEA).

It is now apparent from the three years of continuous measurements that traffic is one of the dominant sound sources at most sites. Hourly sound values 'shadow' traffic volumes as they vary throughout the day. As already mentioned, weather also has an important influence on sound measurements. The drop in sound levels towards the end of 2010 was due to snow falls(Fig. 6), whilst the higher sound levels over the same period in 2011 were due to rain and wind - 'On October 23rd/24th, a slow moving frontal depression resulted in high rainfall totals, mainly in the east and southeast, attributing to Autumn 2011's relatively wet conditions. A third to nearly a half of the monthly rainfall in the east was recorded during this event' -Met

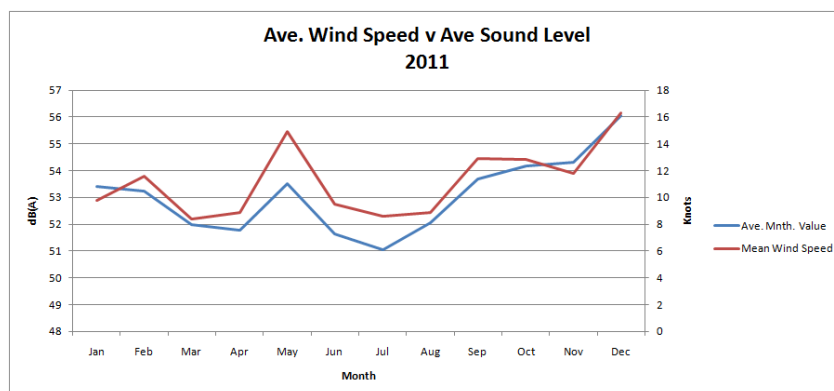


Fig.8

Office. There is a striking similarity between the average monthly wind speeds and average monthly sound levels for 2011 - see Fig. 8. The increase in overall sound levels in 2011, particularly at some exposed locations, is thought to be due to the increase mean wind speeds. Mean wind speeds were above normal for 2011(Met office). Also, there were 81 days with gale gust in 2011 against 32 days in 2010.

Figure 6 illustrates a comparison of the networks daily L_{den} values between 2009, 2010 and 2011.

Comparison of the Network L_{den} over the past three years shows 2011 values more in line with 2009 rather than 2010. On an individual site by site comparison, all sites, except Chancery Park, show an increase in sound levels, with the largest increase at Bull Island and Walkinstown. At these sites sound values increased by an average 4.5 and 3.9 decibels respectively on 2010 figures.

Again this year, Ballymun is the site with the highest Lden values, followed by the new site at Chancery Park – a City Centre location.

Difference between 2011 and 2010 values

(Minus values in dB(A), indicate a decrease on 2010)

Fig. 5

As can be seen from *figure 5*, the Network average difference between the Lden values for years 2010 and 2011 is approximately two decibel. The extent of this increase would not be noticeable to the general public. And again it is not conclusive that this could lead to increase nuisance or annoyance as it is more likely due to weather conditions. Generally a three decibel reduction/increase would just barely be noticed.

The Bull Island site displays the largest increase in sound levels. From the shape of the 'Average Daily' charts it could be inferred that the sound sources at this site are non anthropogenic in nature.

	Lday	Leve	Lnight	LDEN
Ballymun	0.8	0.4	0.5	0.6
DCC Rowing Club	1.7	1.5	1.3	1.6
Navan Rd	1.3	1.2	1.6	1.6
Ballyfermot	2.4	2	2	2.2
Drumcondra	0.5	0.2	0.7	0.6
Raheny	2.8	2.7	2.6	2.8
Ringsend	1.7	0.5	-0.8	0.5
Bull Island	4.5	3.1	3.3	4.5
Walkinstown	4.6	3.7	3	3.9
Woodstock Gdns	0	2.1	2	1.7
ChanceryPk	-1.1	-1	-1.1	-1
Network Ave.	1.7	1.5	1.4	2

Walkinstown shows the next highest increase. It is though that pipe laying operations and road works close to the monitoring site may have influenced sound levels for a significant portion of the year.

Chancery Park was the only site to indicate a decrease in sound levels. It is thought this is due to the availability of a full year's monitoring results as opposed to the last 3 months of 2010 upon which that year's annual figures were based.

Variation of Sound Levels

The site 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 day sound levels (along with traffic levels) start rising at 6 a.m. After approximately 9 a.m. sounds levels at most sites, level off until 9pm when they start to fall. It is interesting to note as with previous years, early Saturday and Sunday morning sound levels are higher than the same periods

during the week. The peak sound levels on weekend mornings arise between ten and eleven a.m. It is thought these differences are due to different social activities at these times with less traffic on the road on late Saturday and Sunday mornings and more traffic coming from late night social events early Saturday and

Sunday mornings. There was no apparent difference between the days of the week in relation to which had the highest sound levels as opposed to last year where Tuesday, Wednesday and Thursdays, were similarly highest. The average lowest sound levels are recorded on Sundays. The top three sites with the lowest daytime sound values were Woodstock Gardens, Bull Island and Ringsend. The top three sites with the highest daytime sound values were Ballymun, Chancery St. and Ballyfermot – the same as last year. The sites with the lowest night time sound values were Woodstock Gardens, Walkinstown and Bull Island. The sites with the highest night time sound values were, Ballymun, Chancery Park and Navan Road.

The Monthly Charts to the rear of this report present a detailed view of how average daily sound levels change from day to day and month to month. In 2011, the Network's highest average

monthly sound levels were experienced at most stations in October, November and December. In 2010 September and February were the months with the highest average sound levels

Fig.7

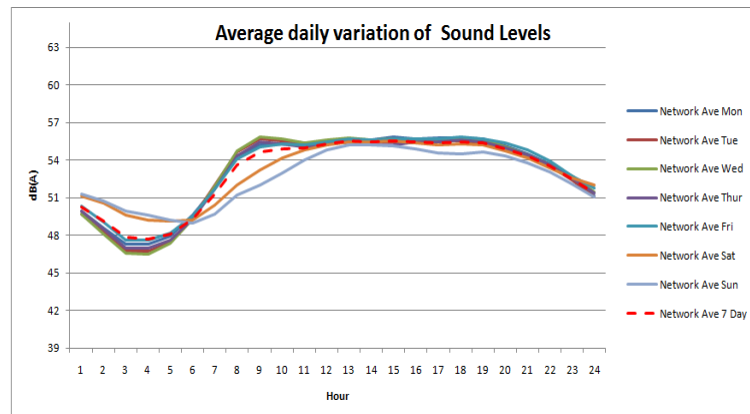
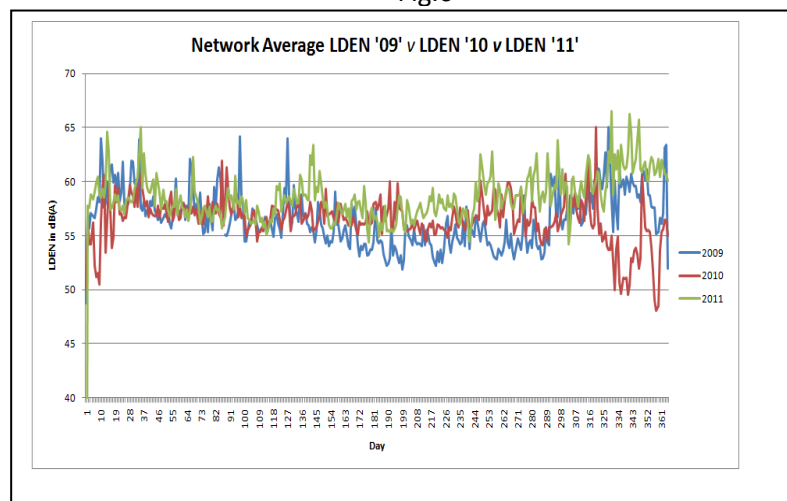
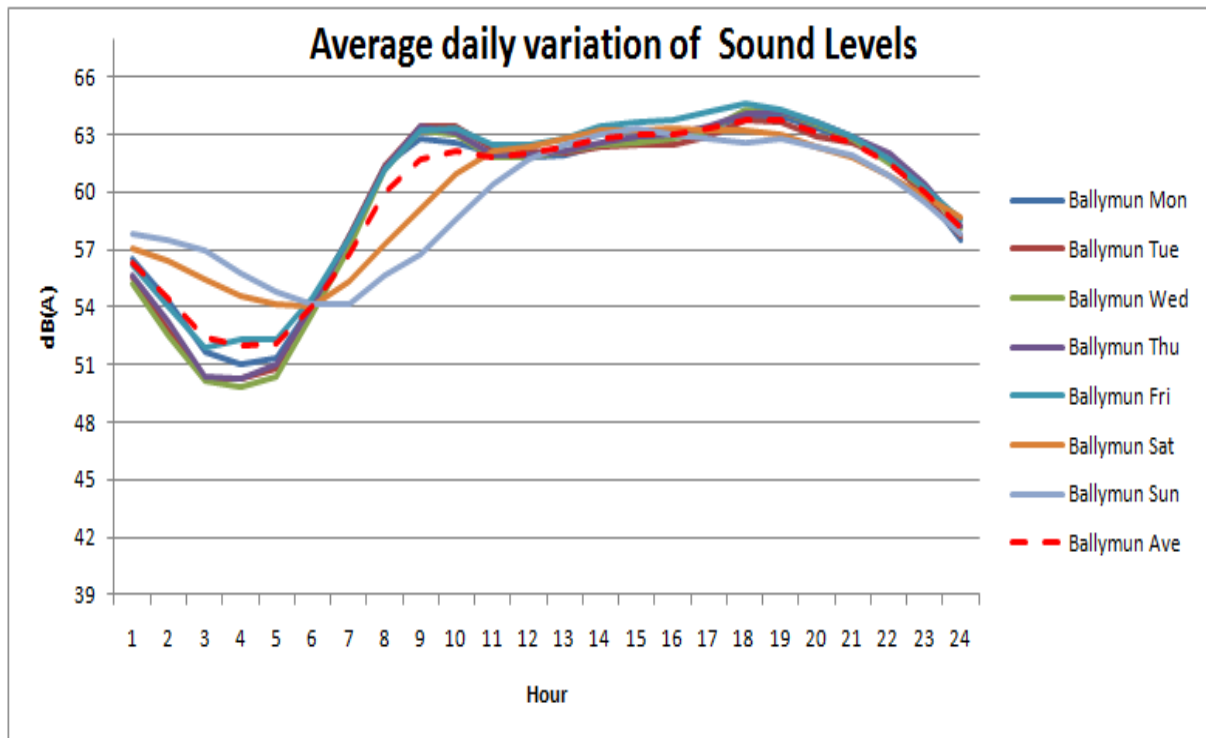


Fig.6

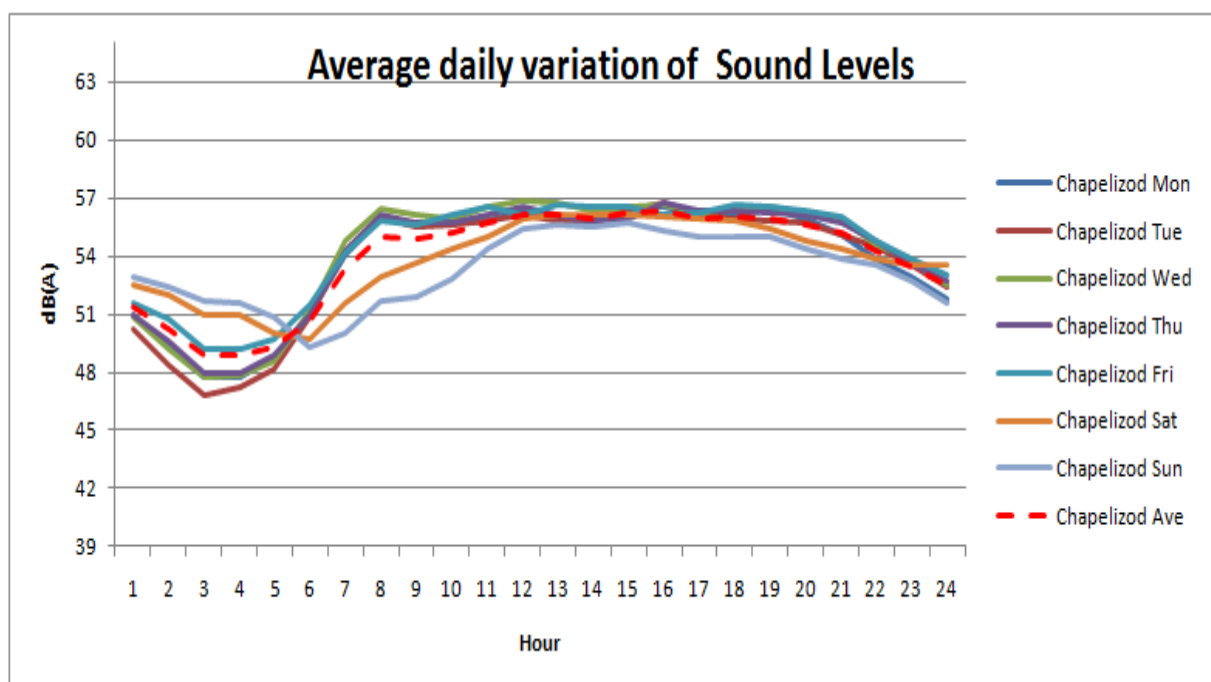


Average Daily Summary Charts

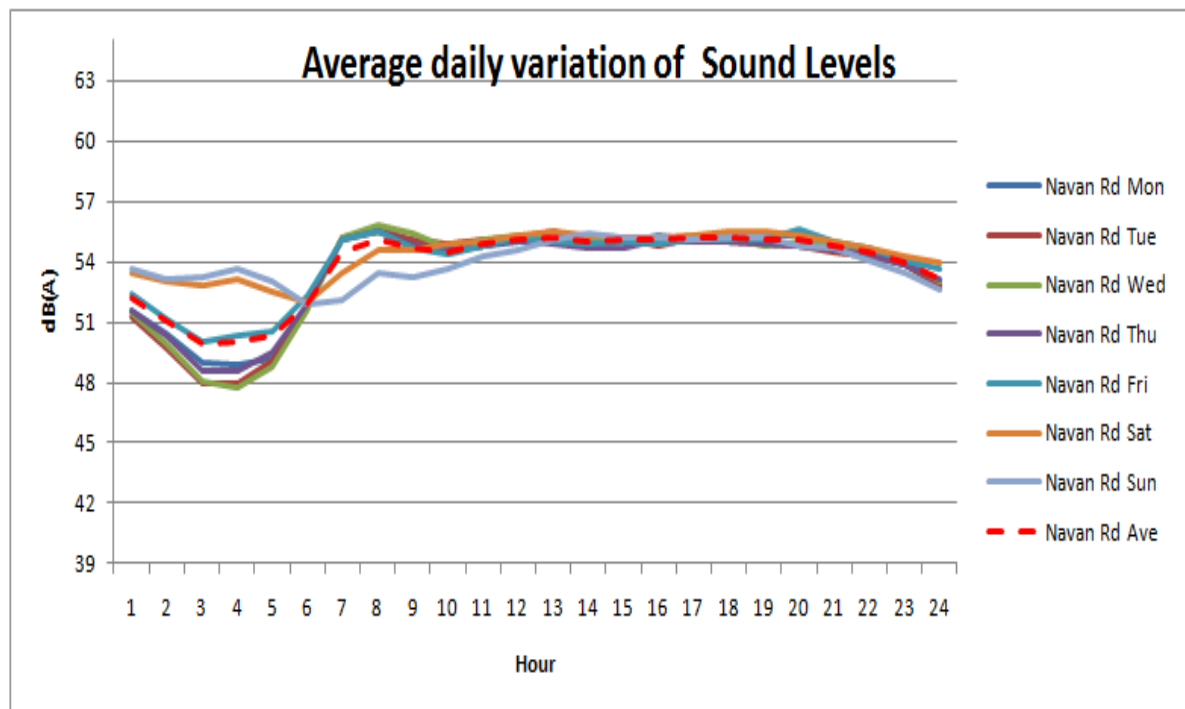
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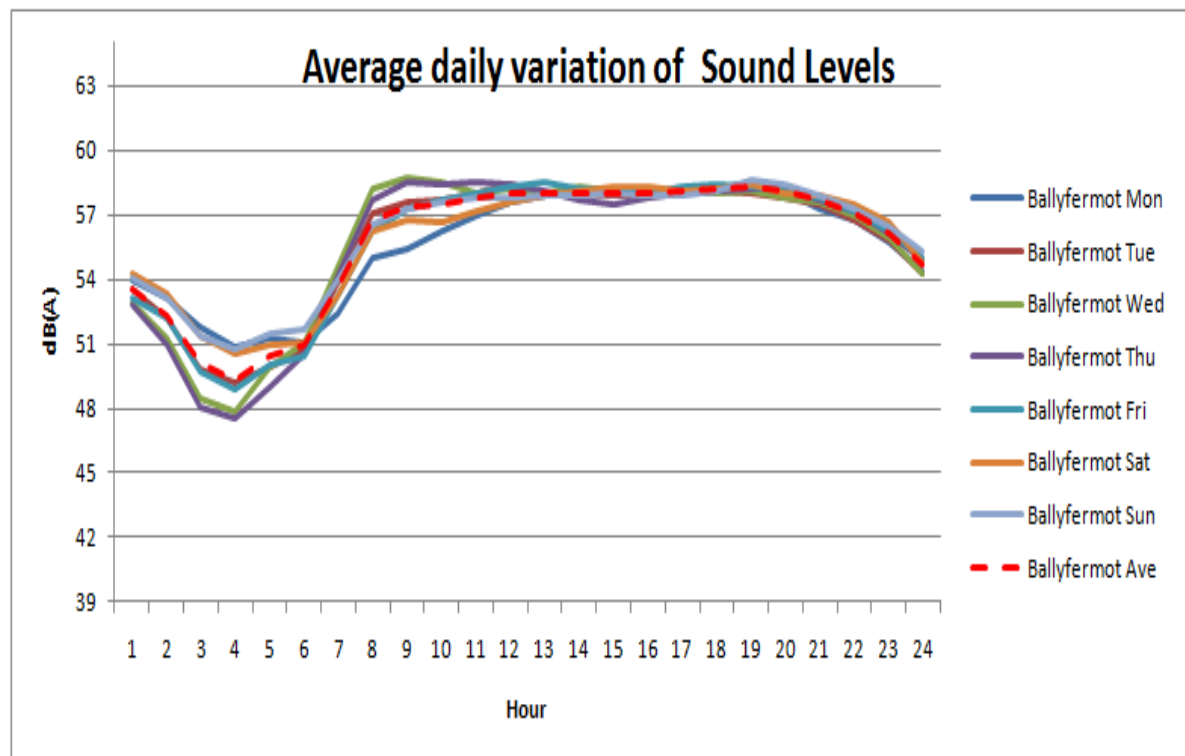
CHAPELIZOD



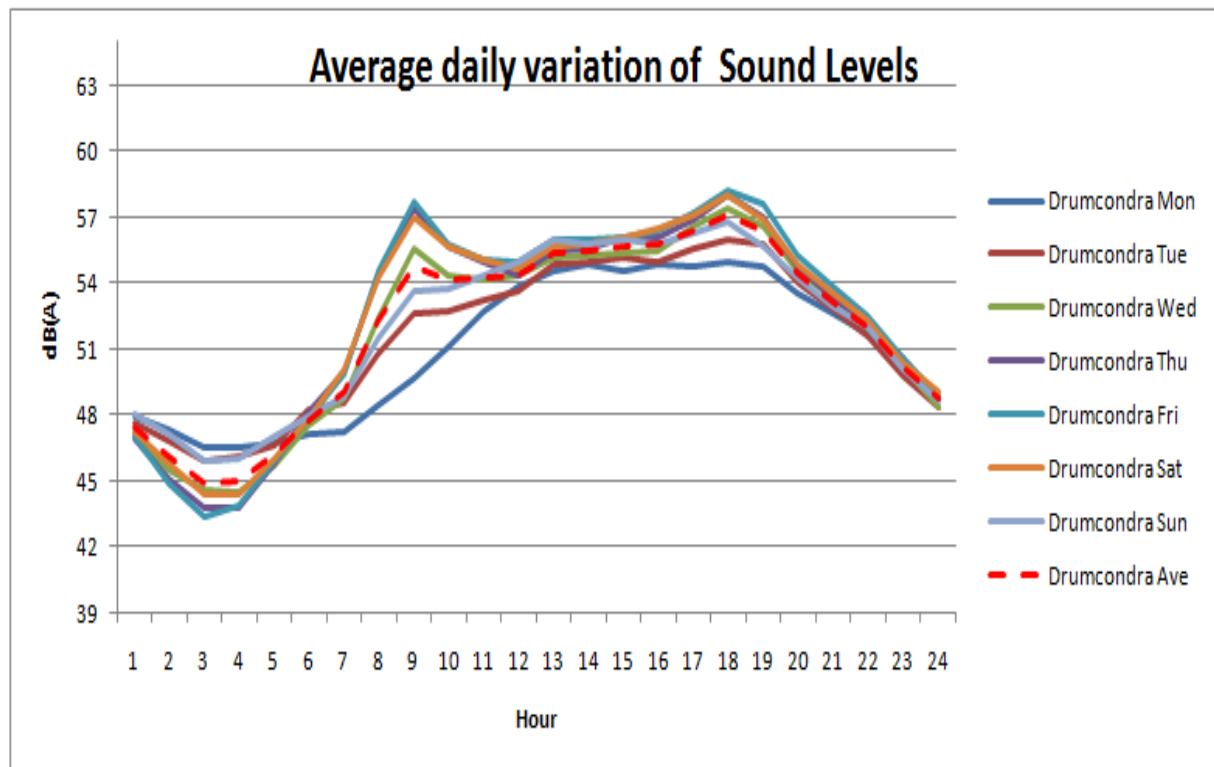
NAVAN RD.



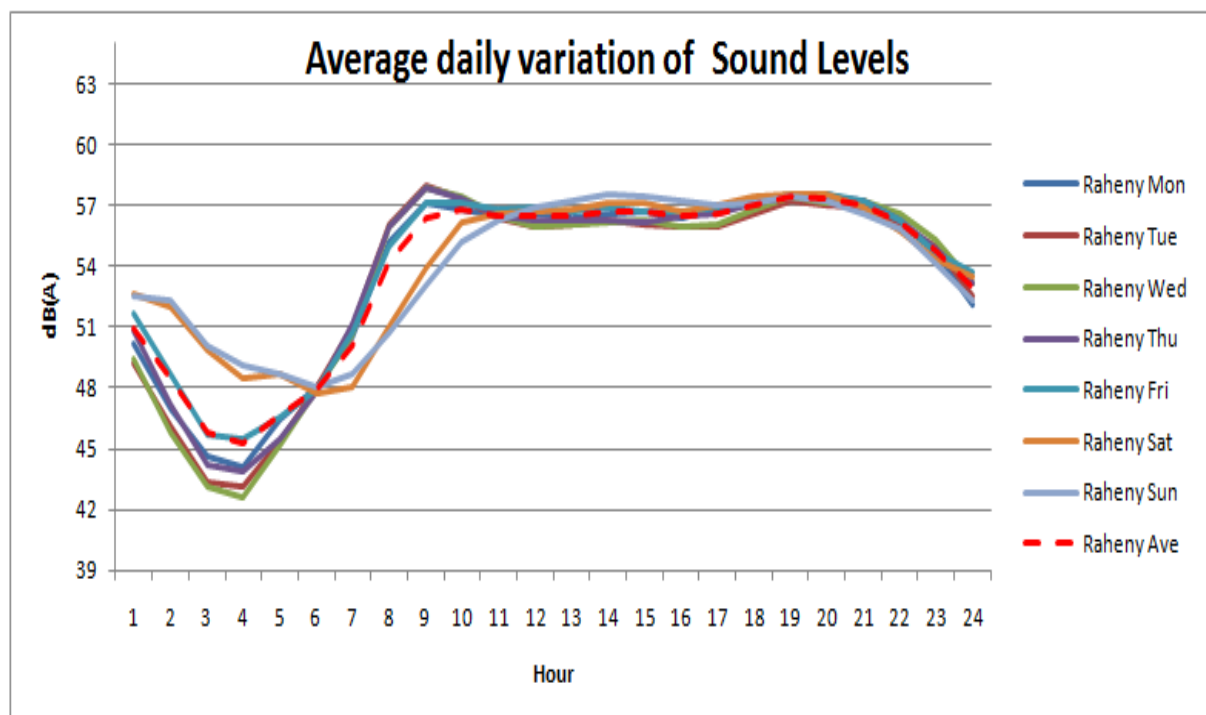
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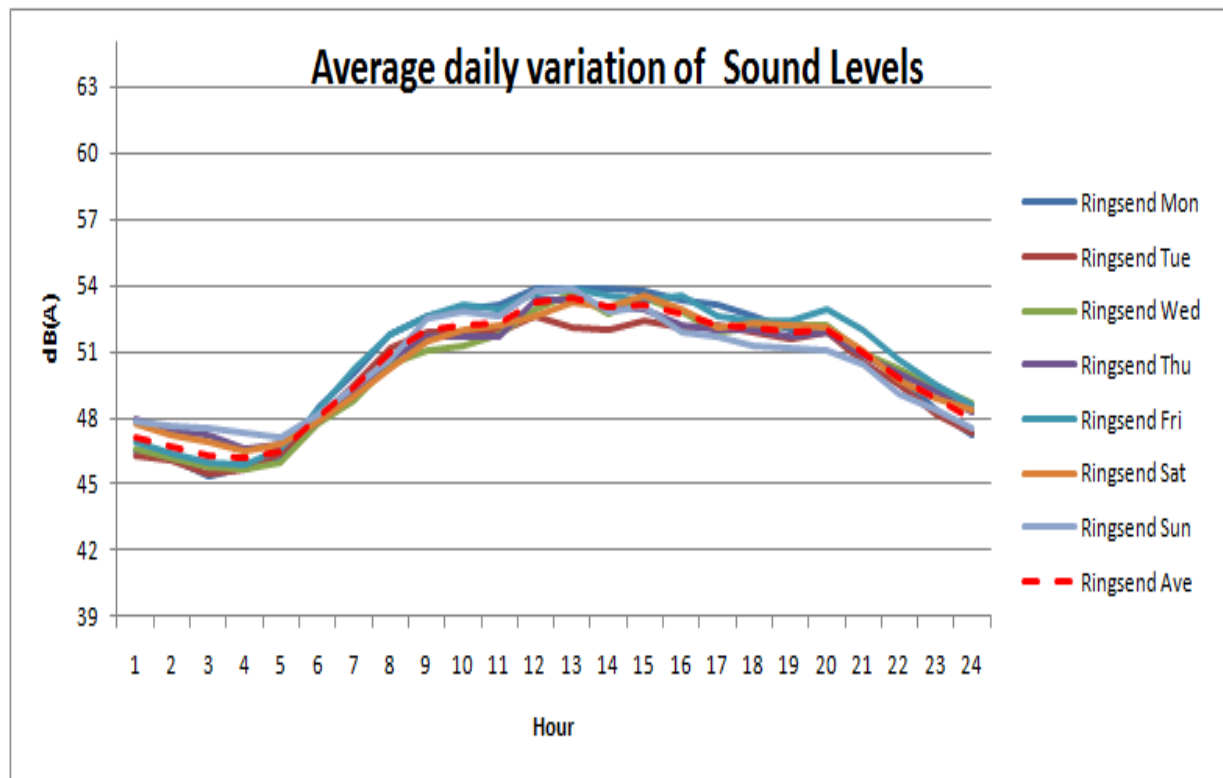
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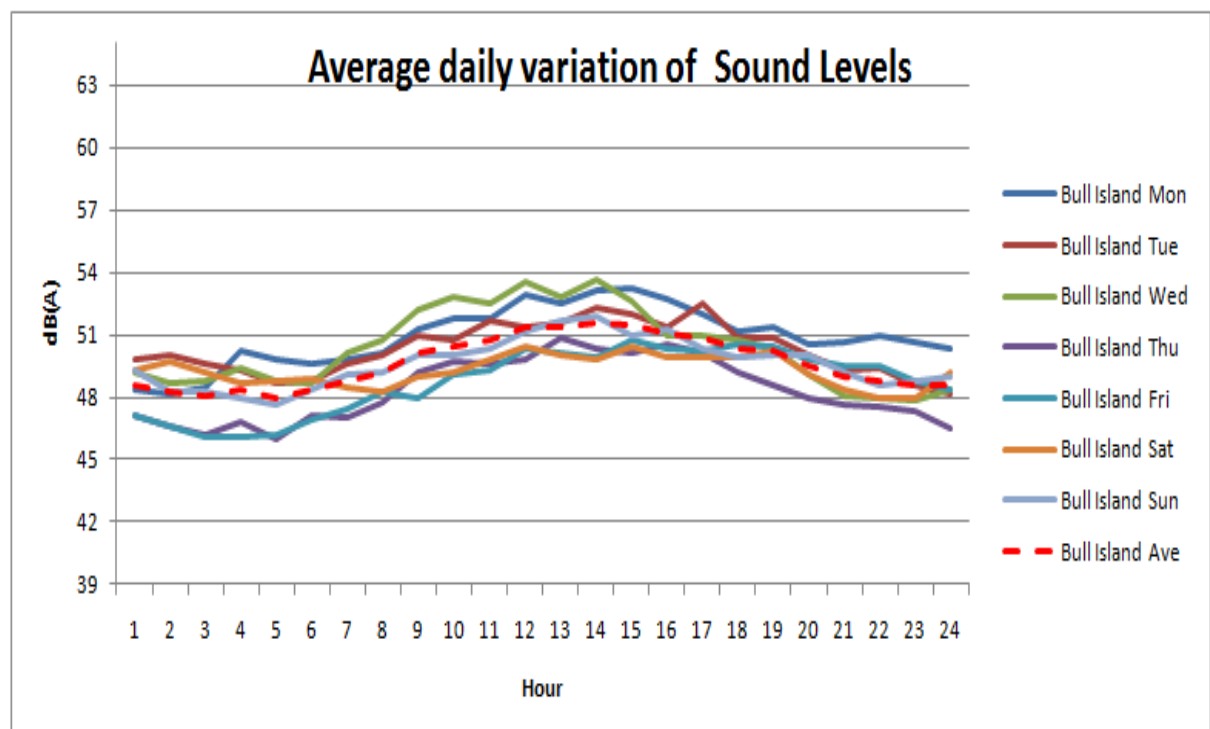
RAHENY



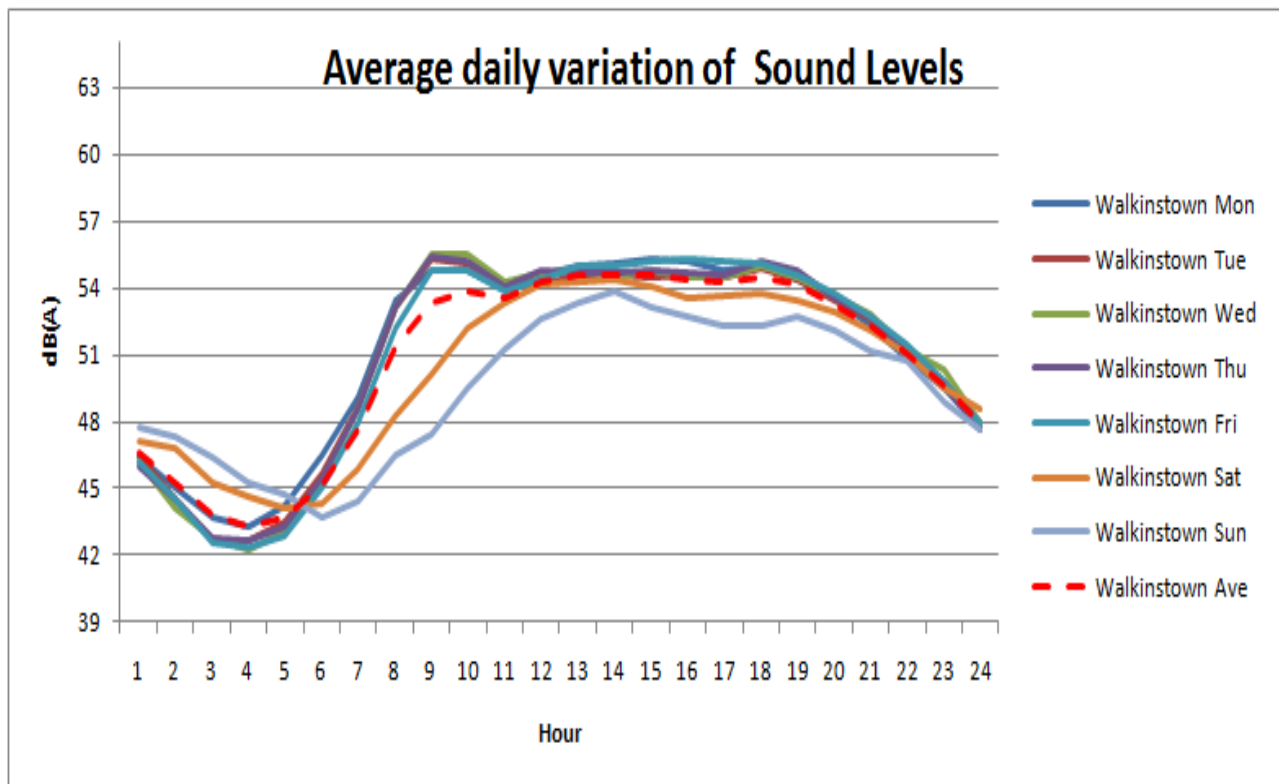
RINGSEND



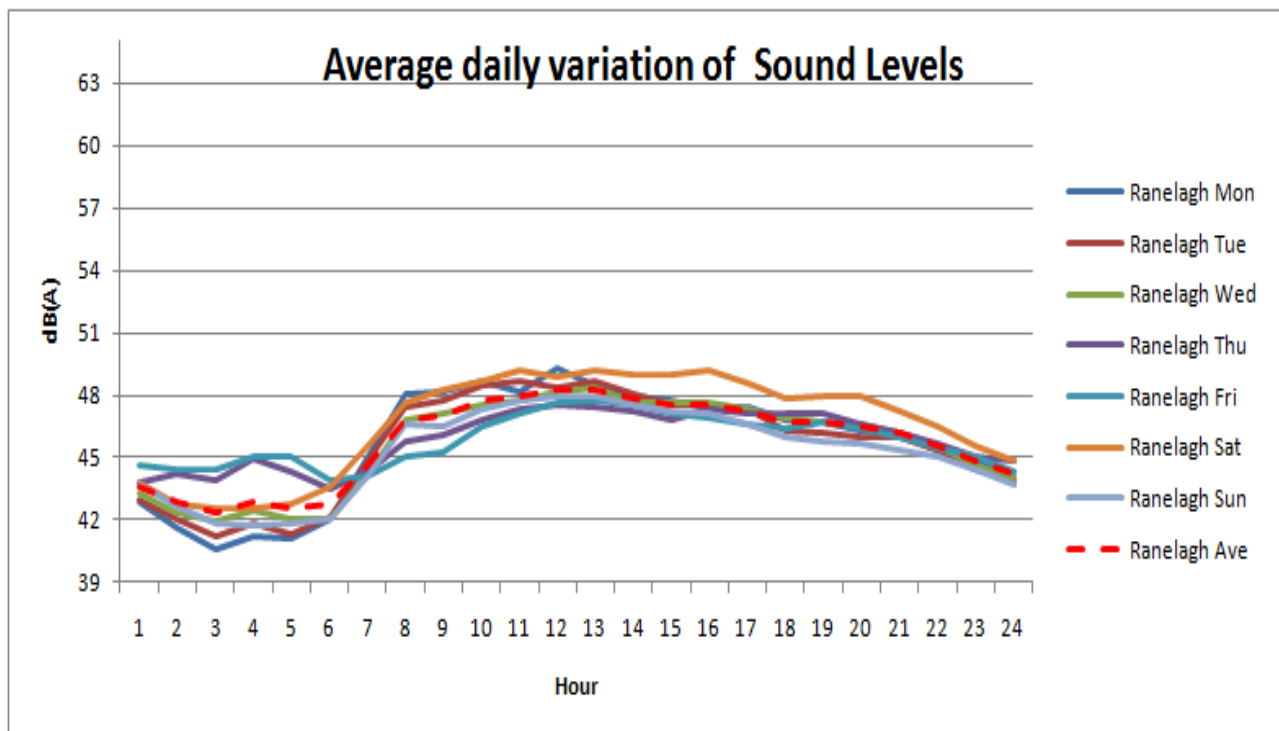
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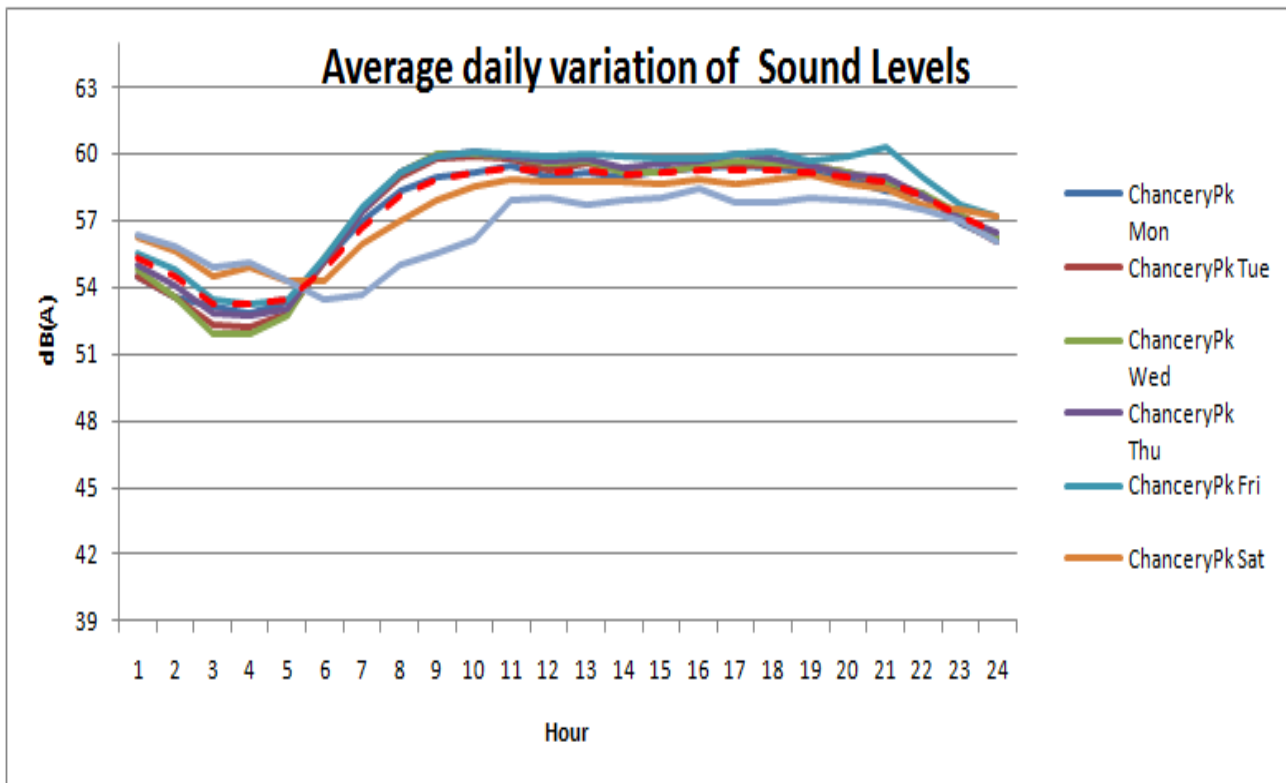
WALKINSTOWN



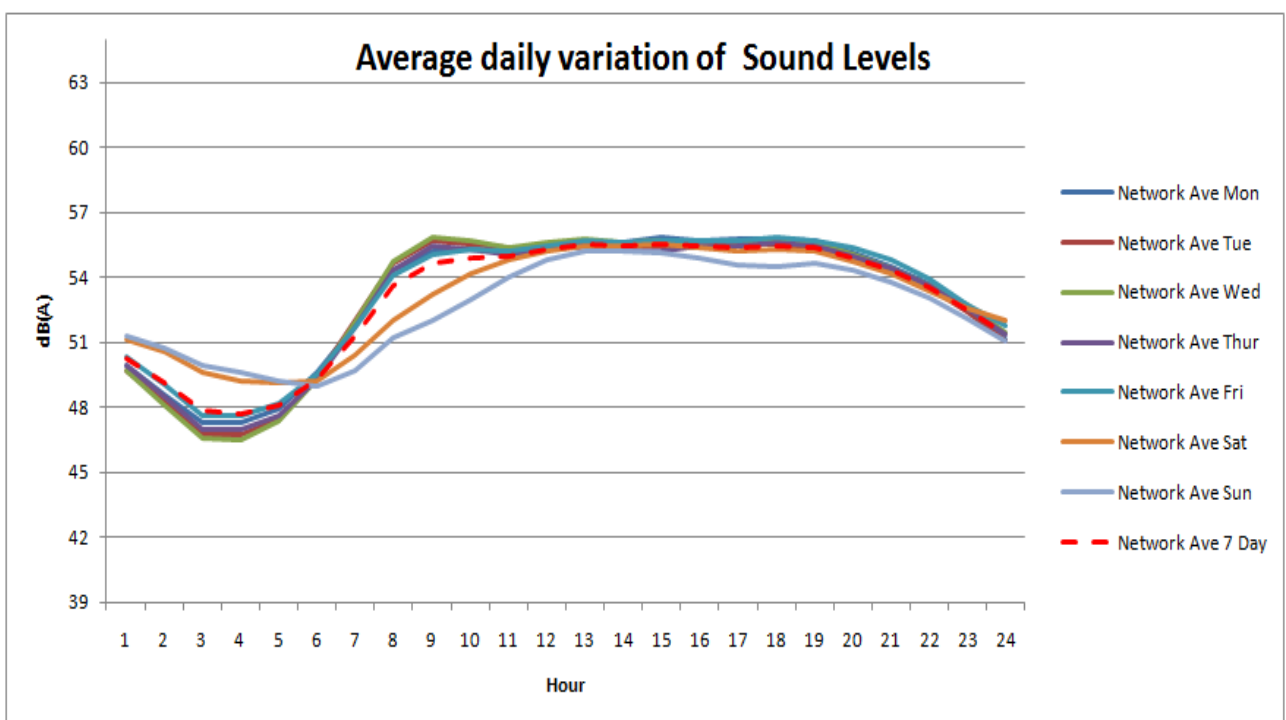
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CHANCERY PARK



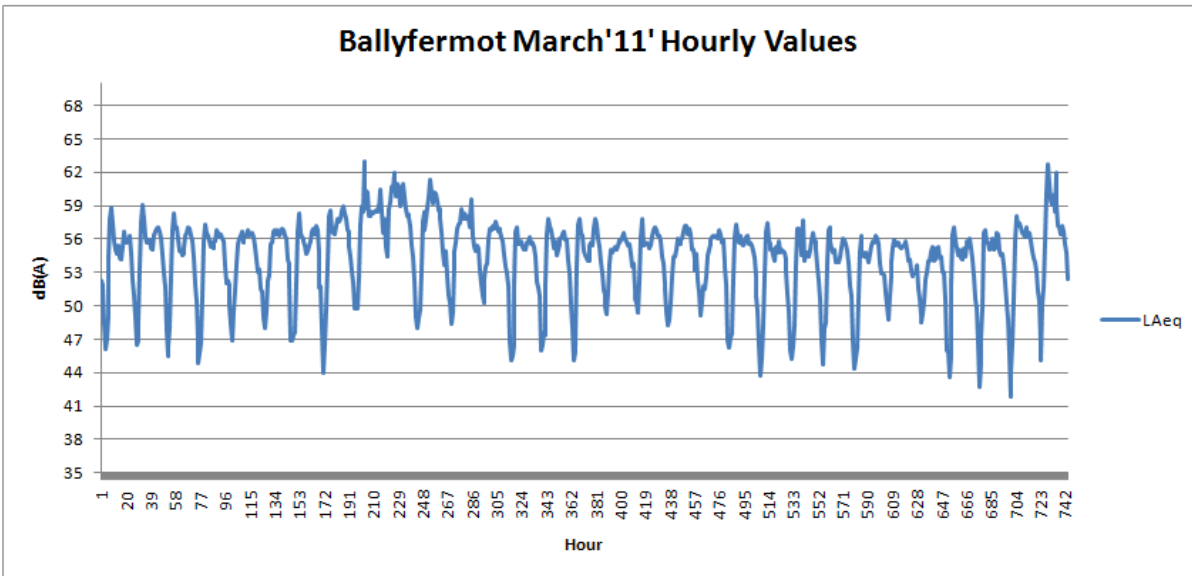
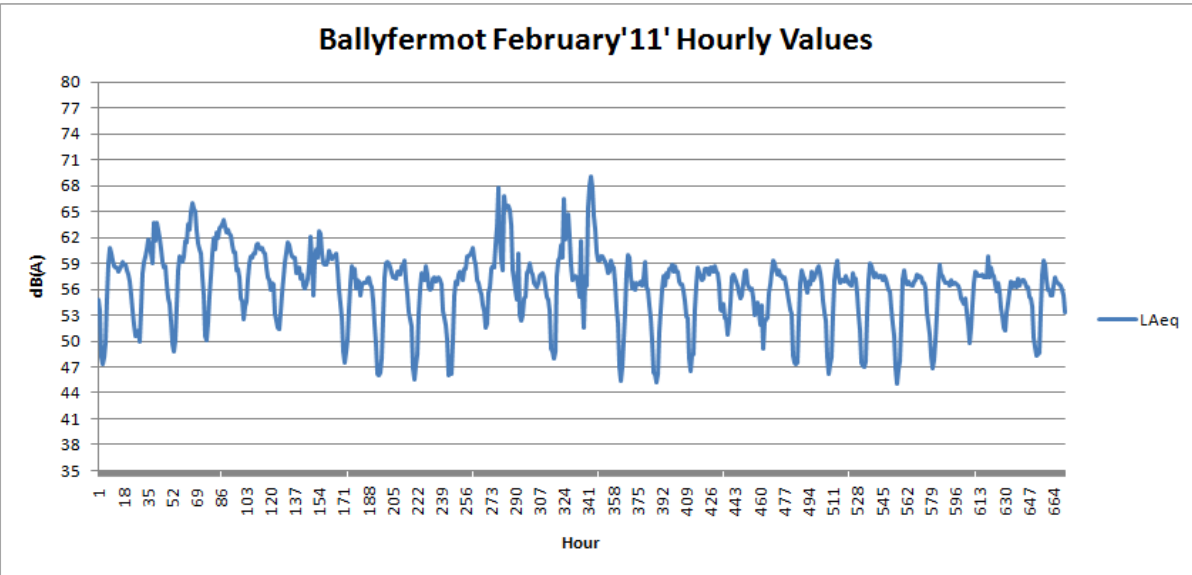
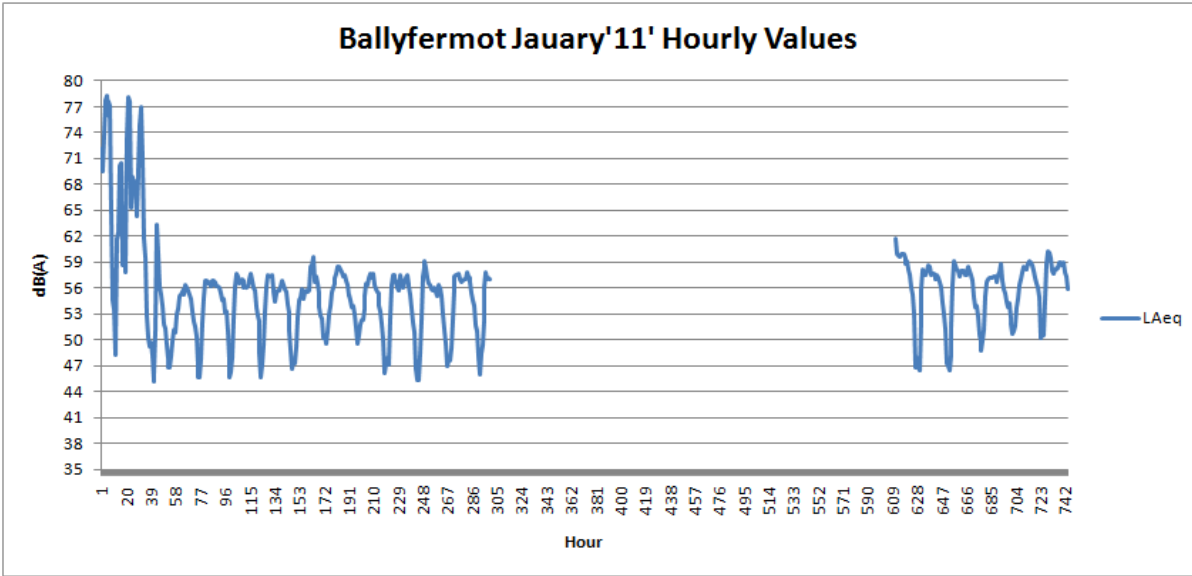
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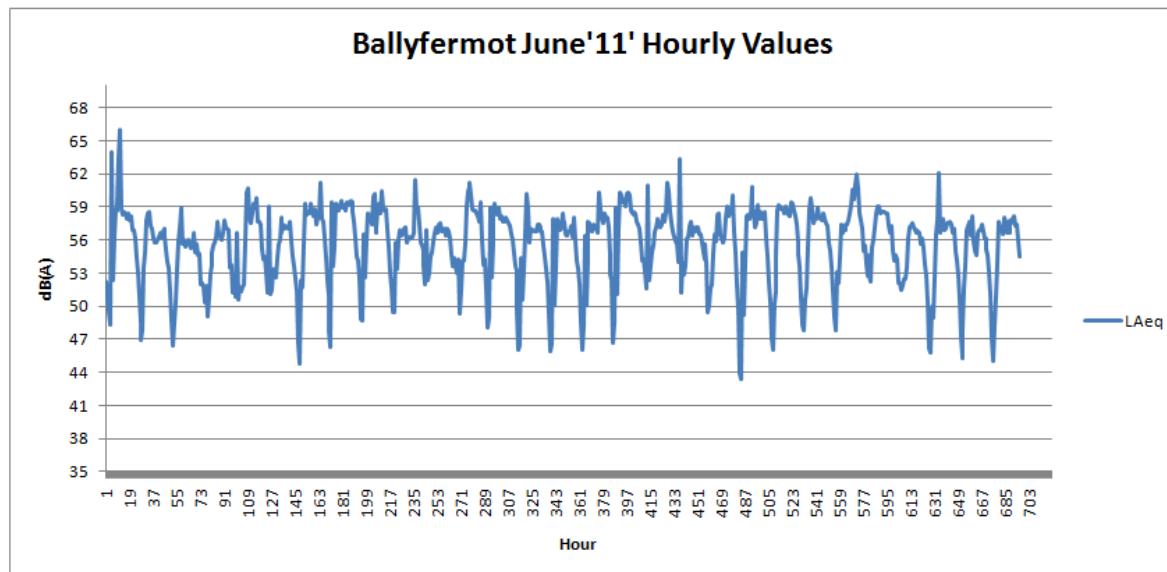
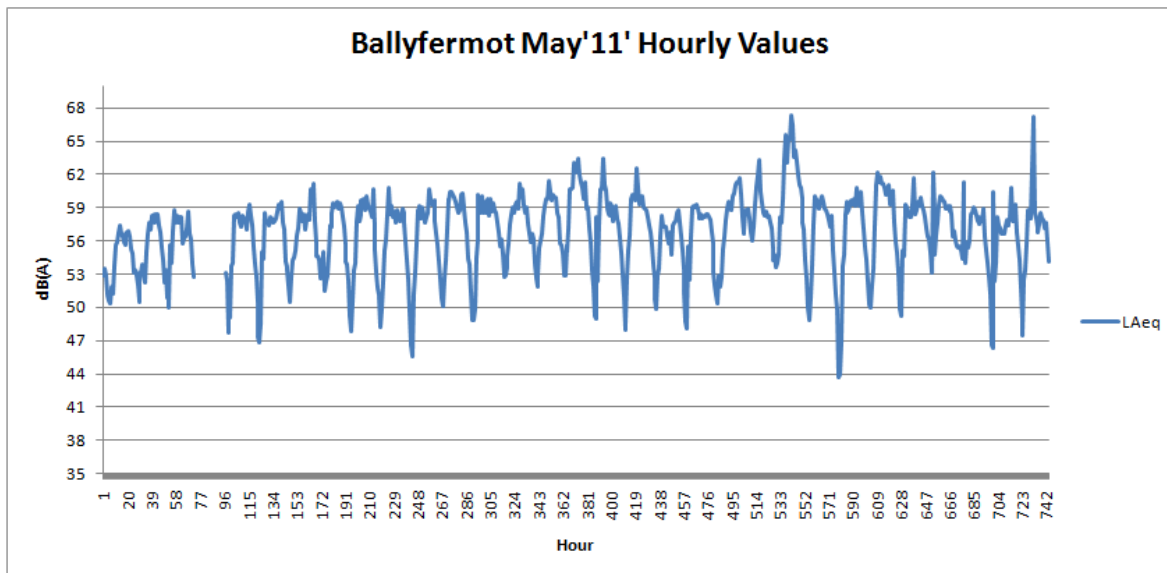
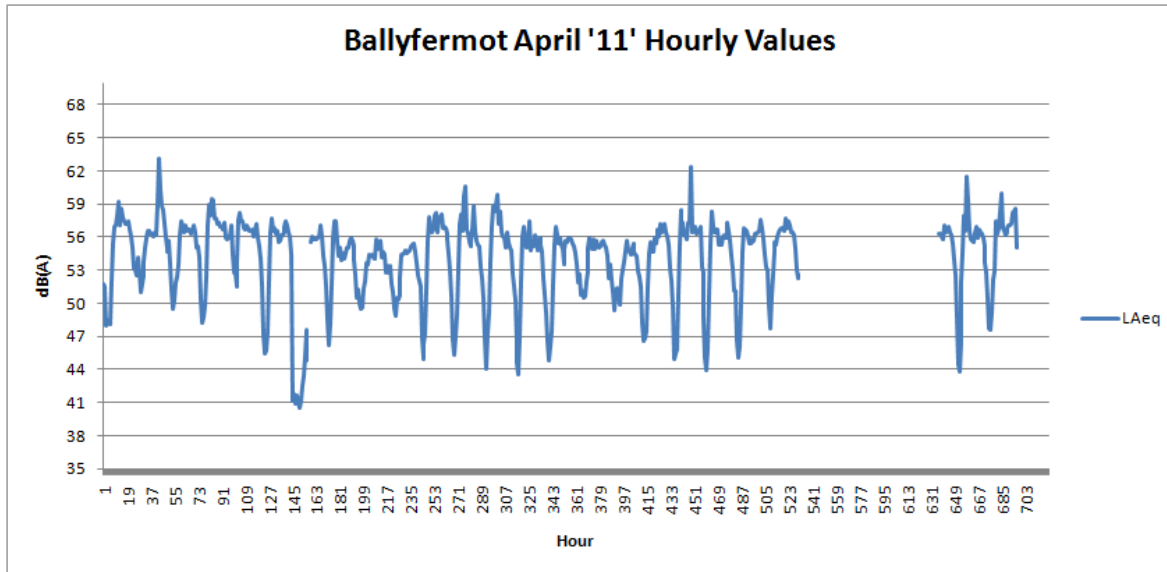


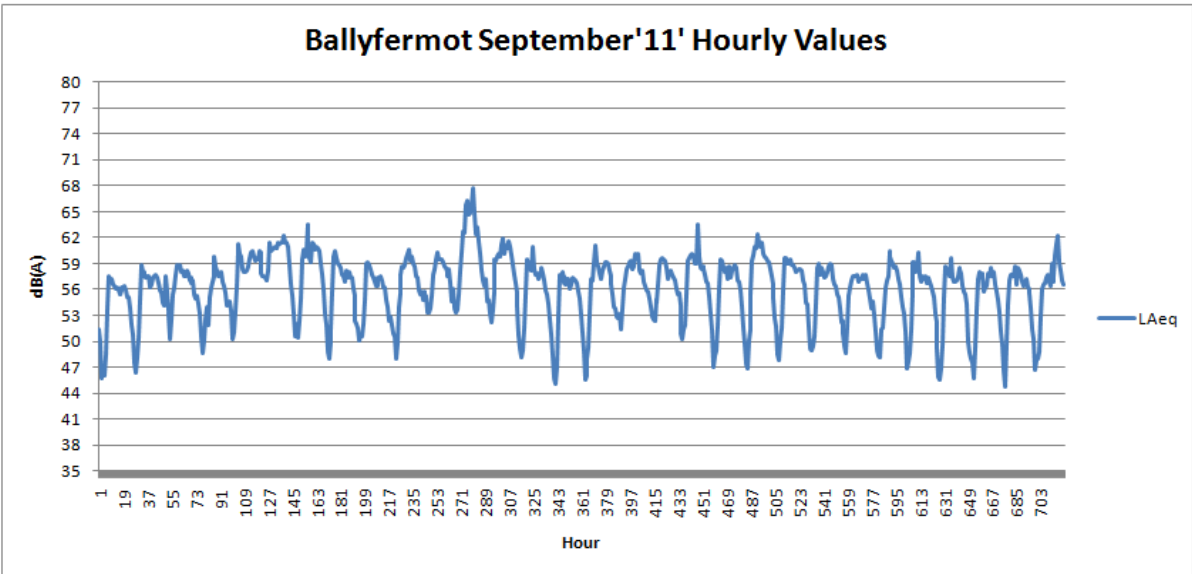
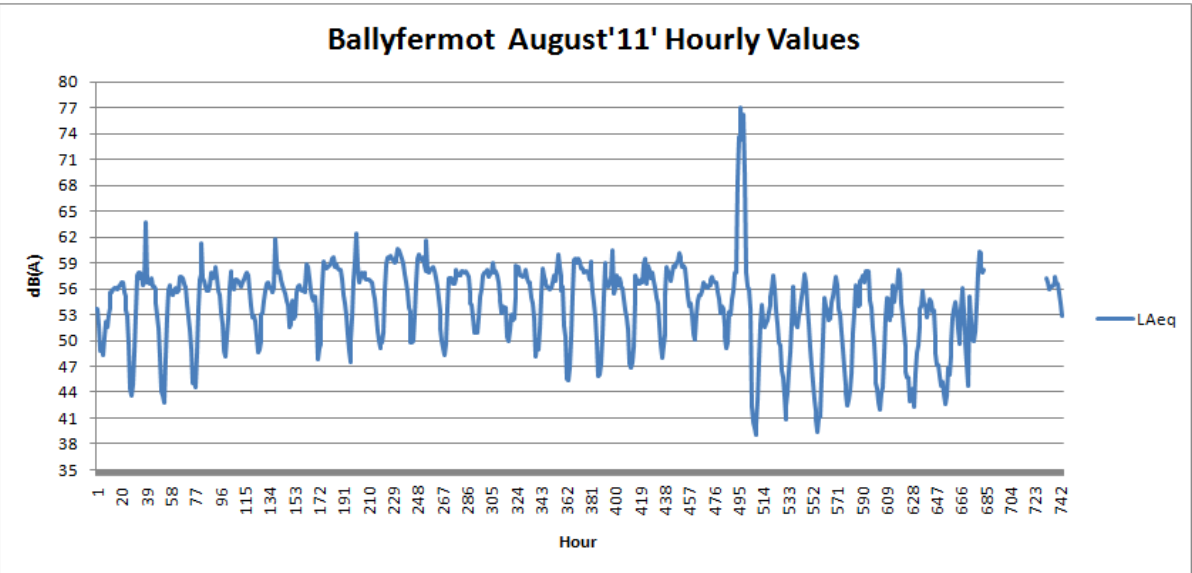
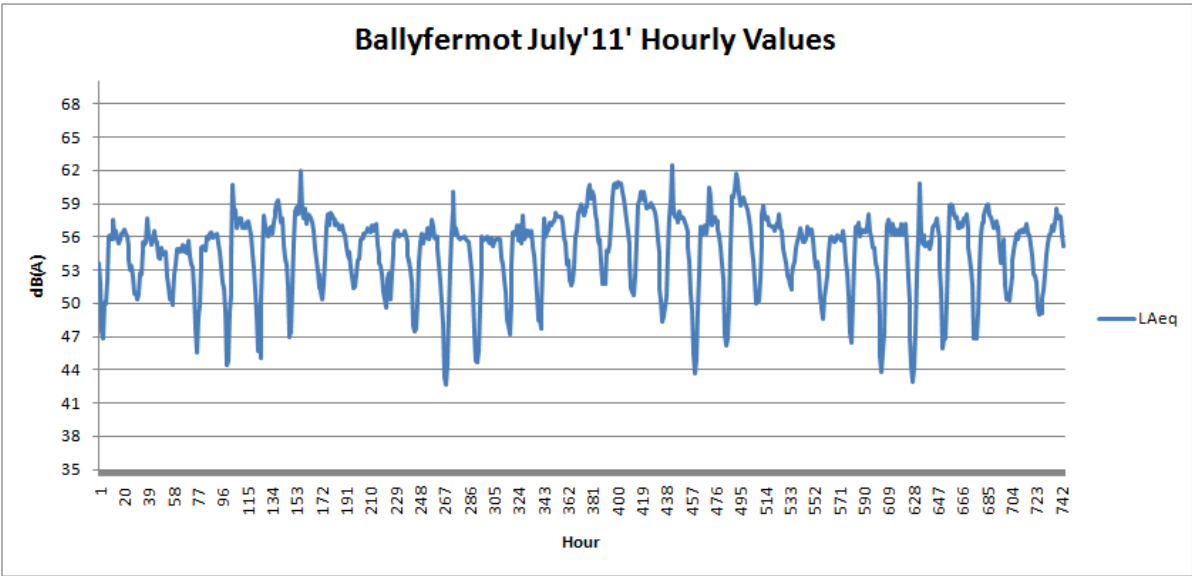
Monthly Summary Charts

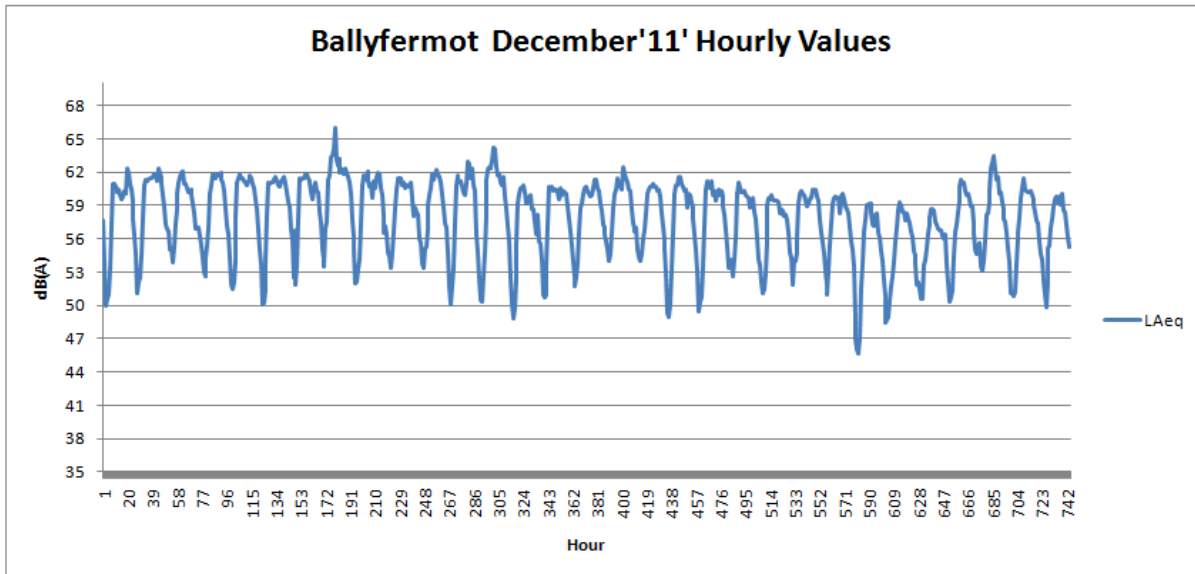
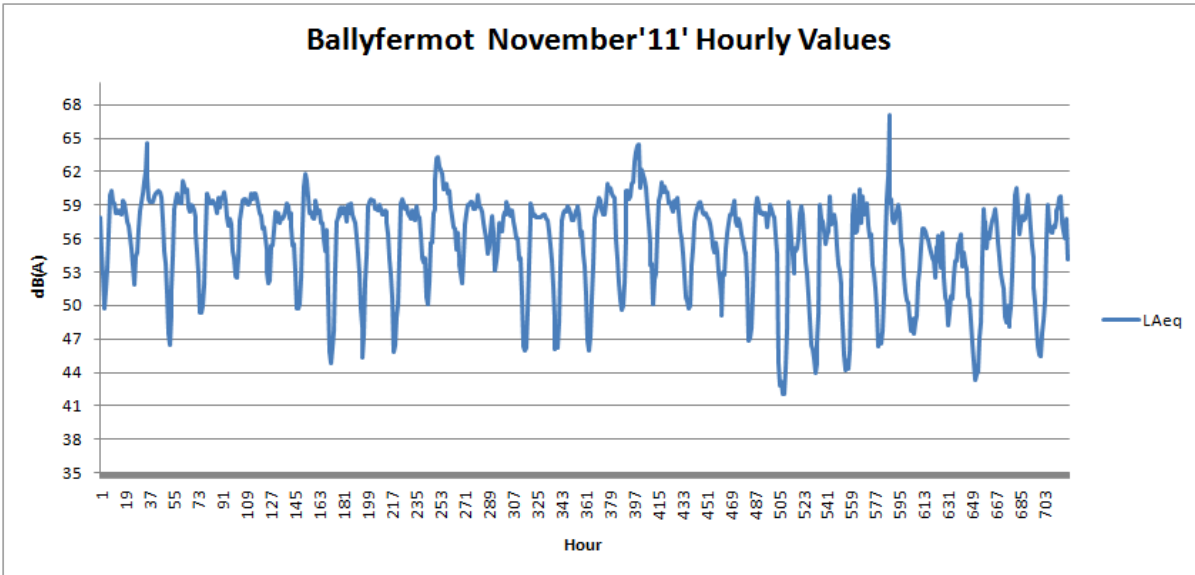
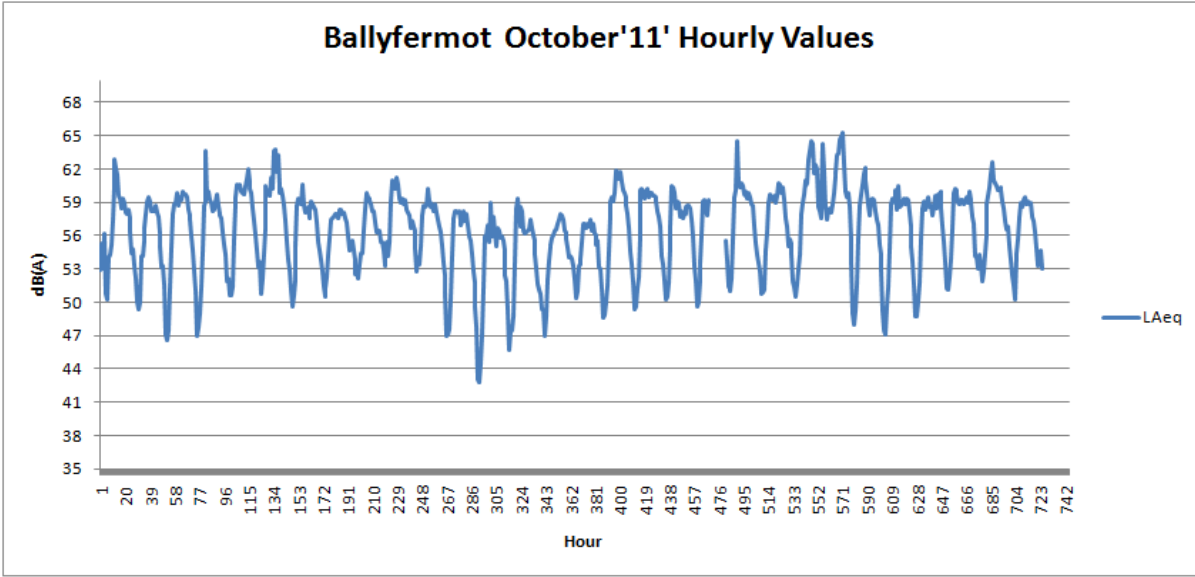
BALLYFERMOT CIVIC CENTRE
BALLYFERMOT ROAD
DUBLIN 10





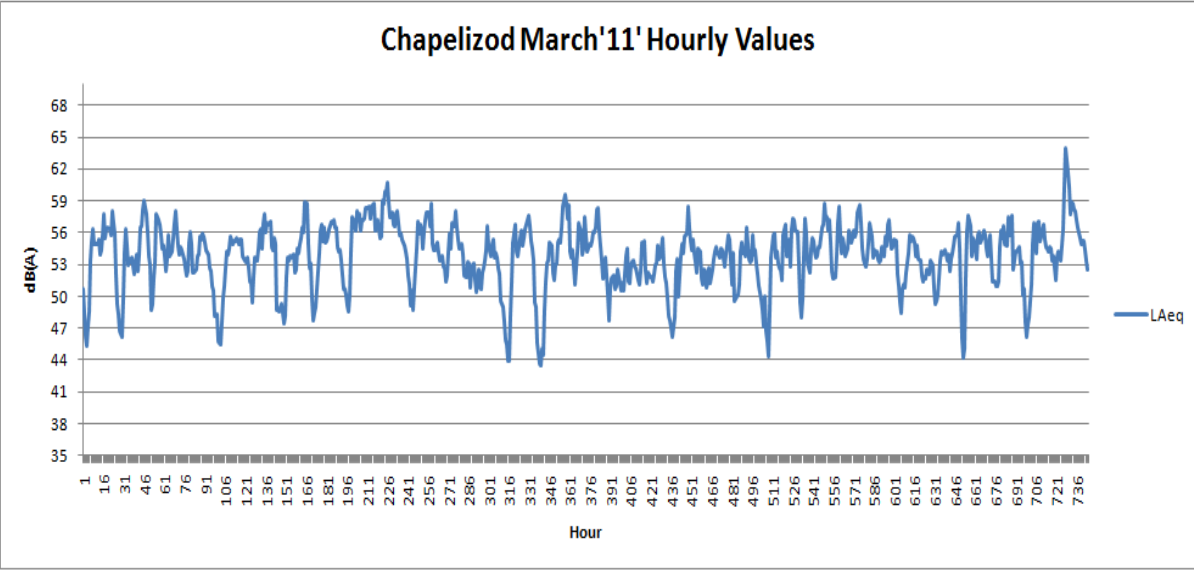
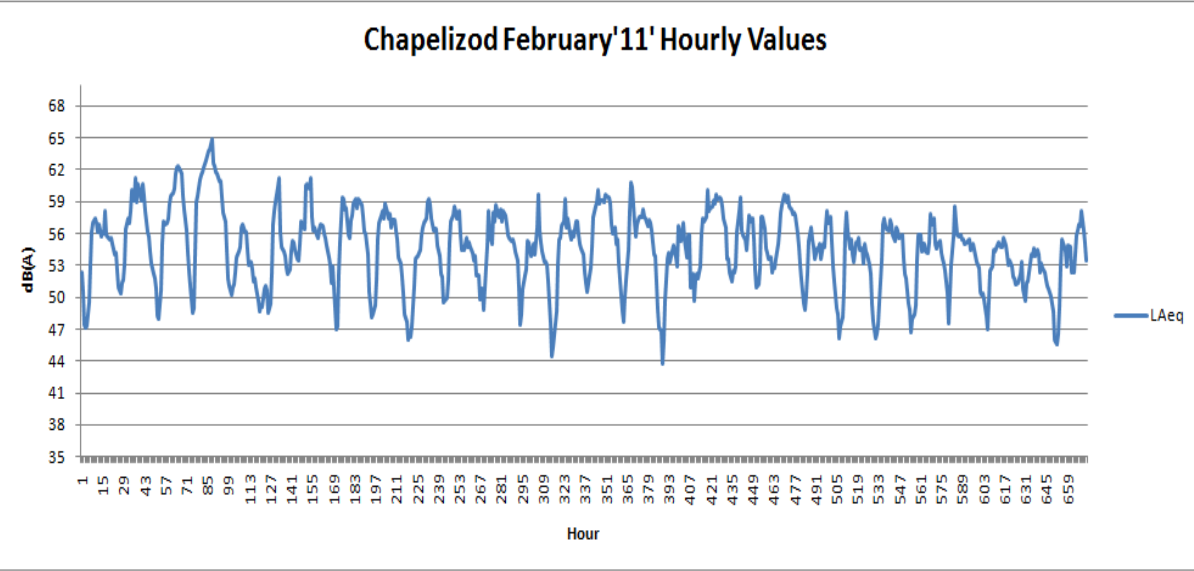
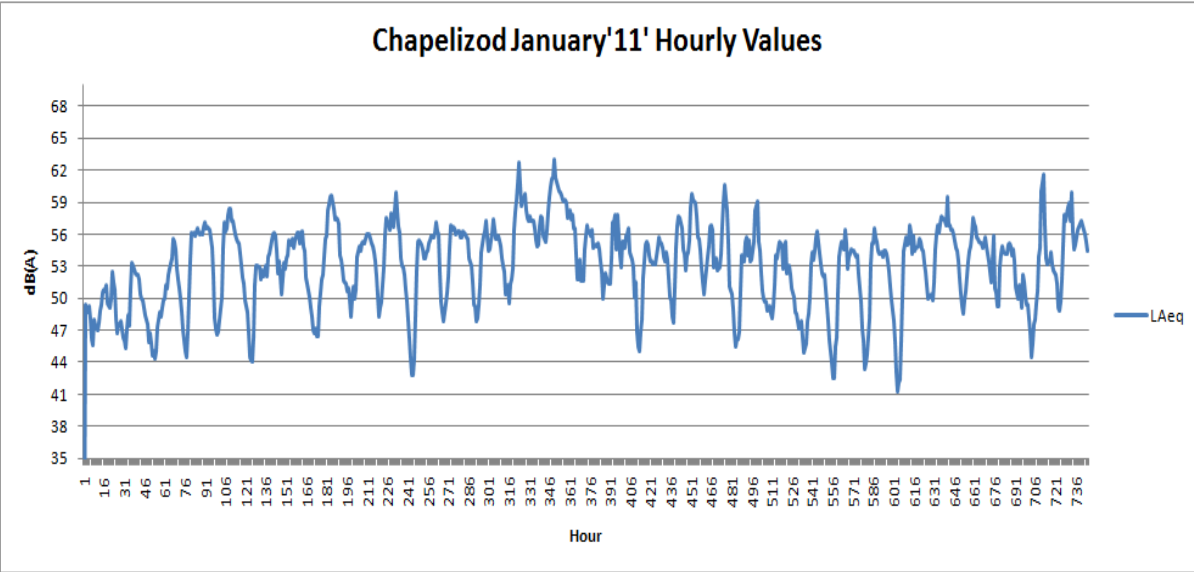


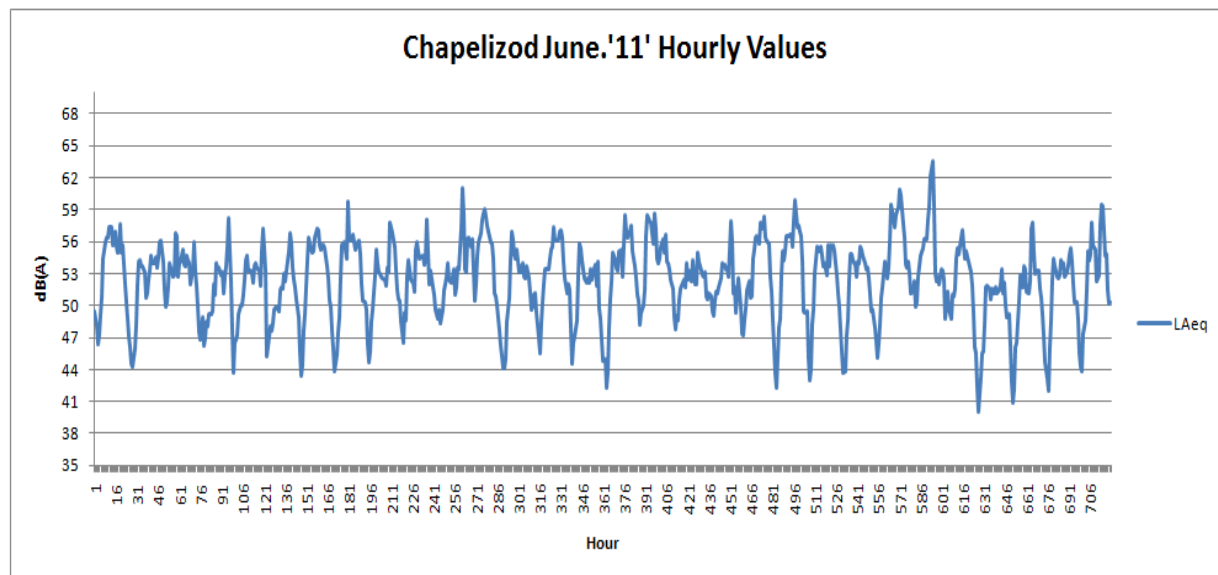
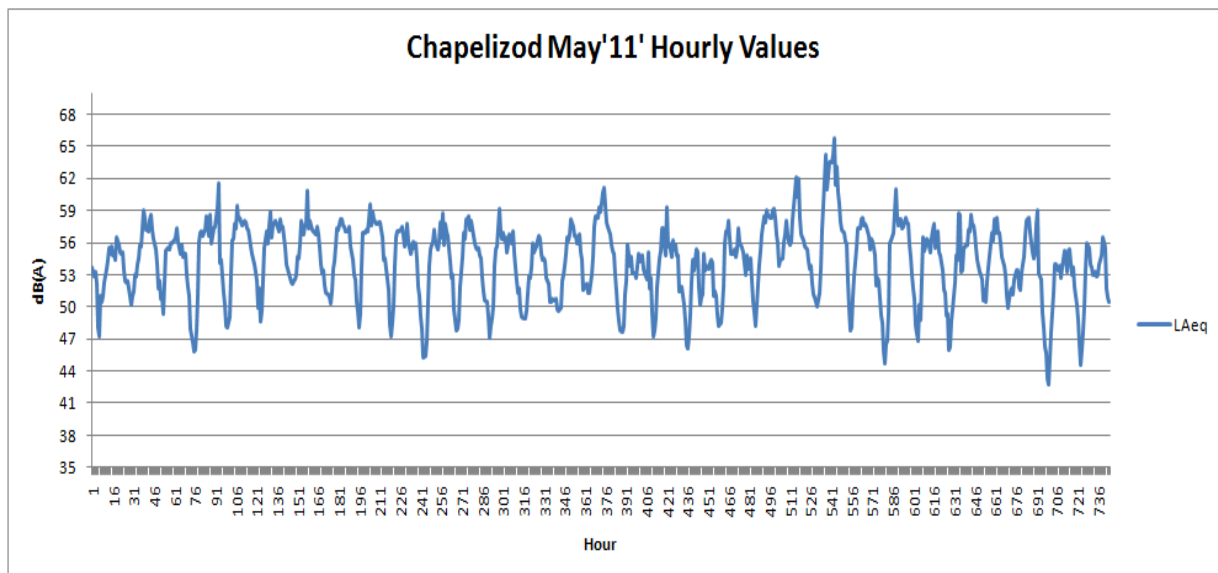
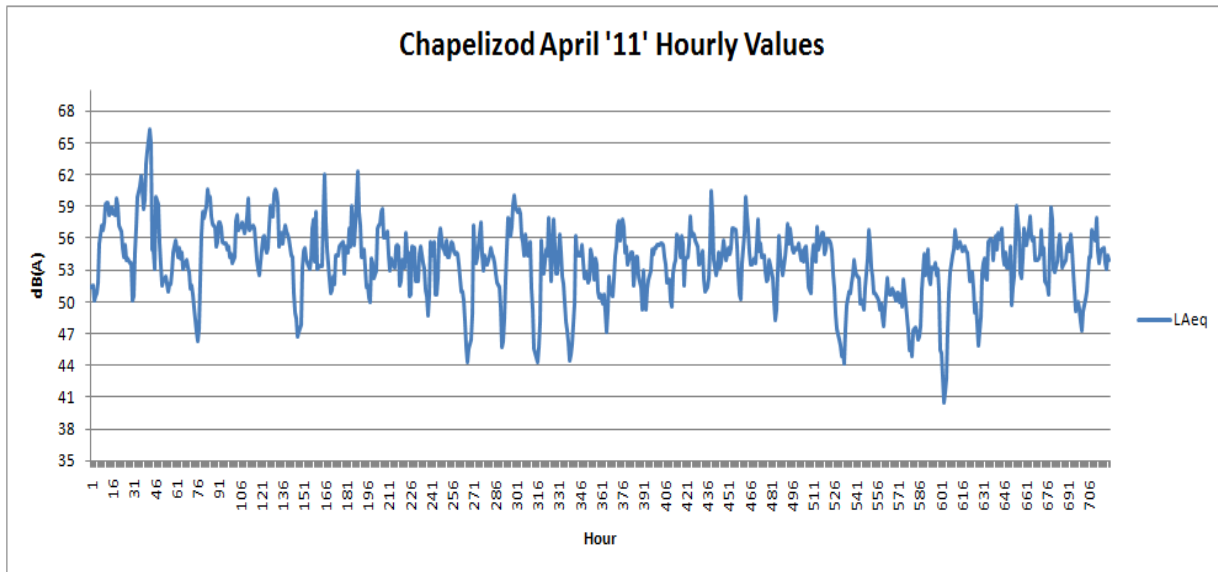




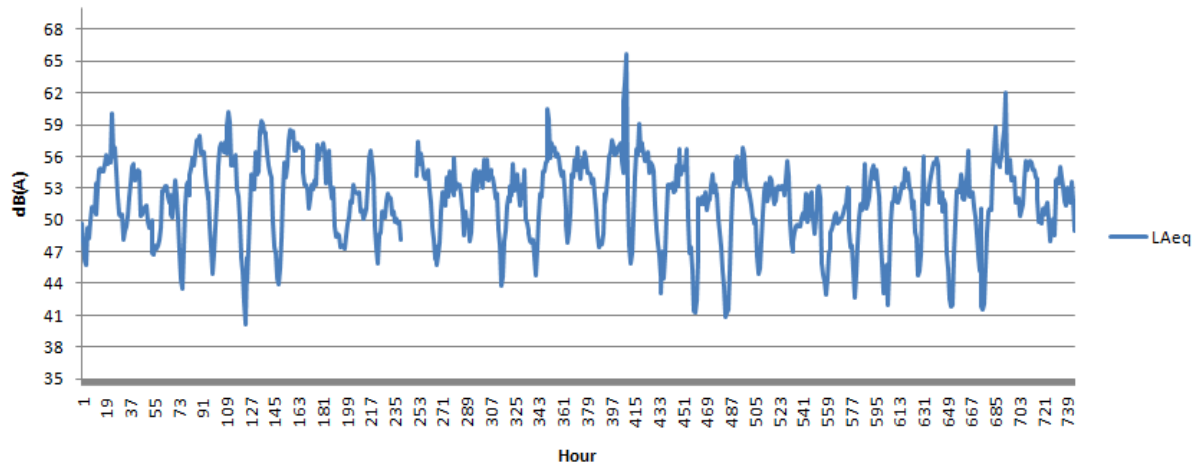
DUBLIN CITY COUNCIL ROWING CLUB
CHAPELIZOD ROAD
DUBLIN 8



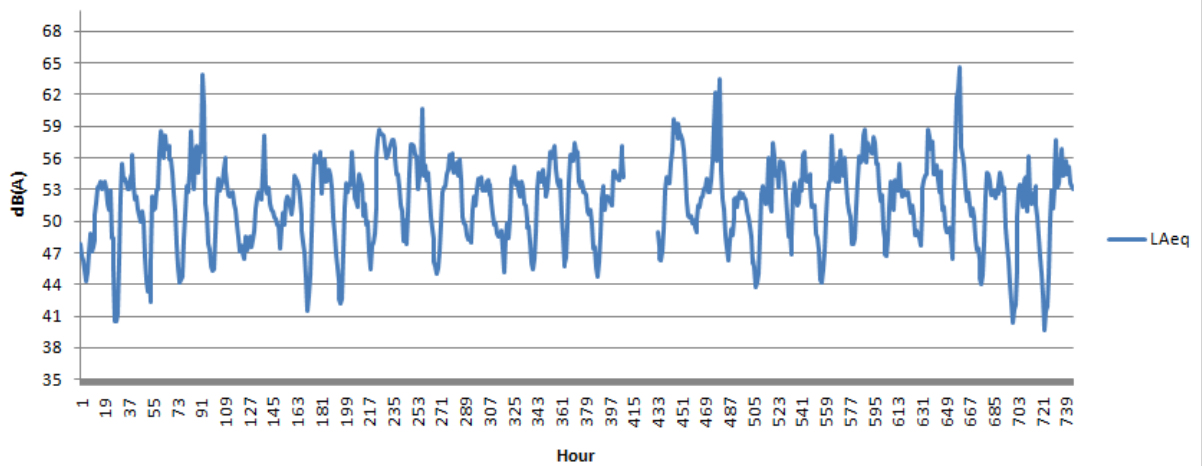




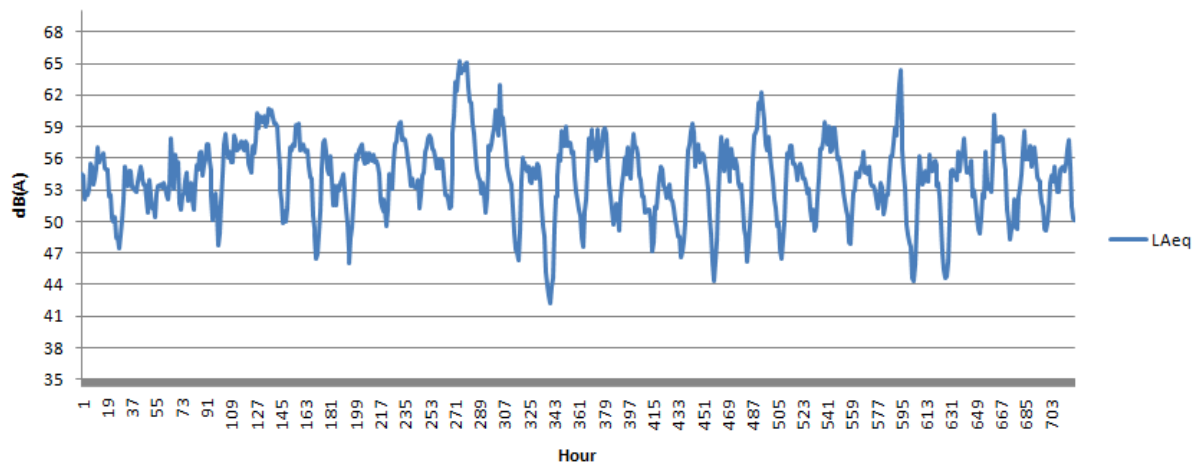
Chapelizod July'11' Hourly Values



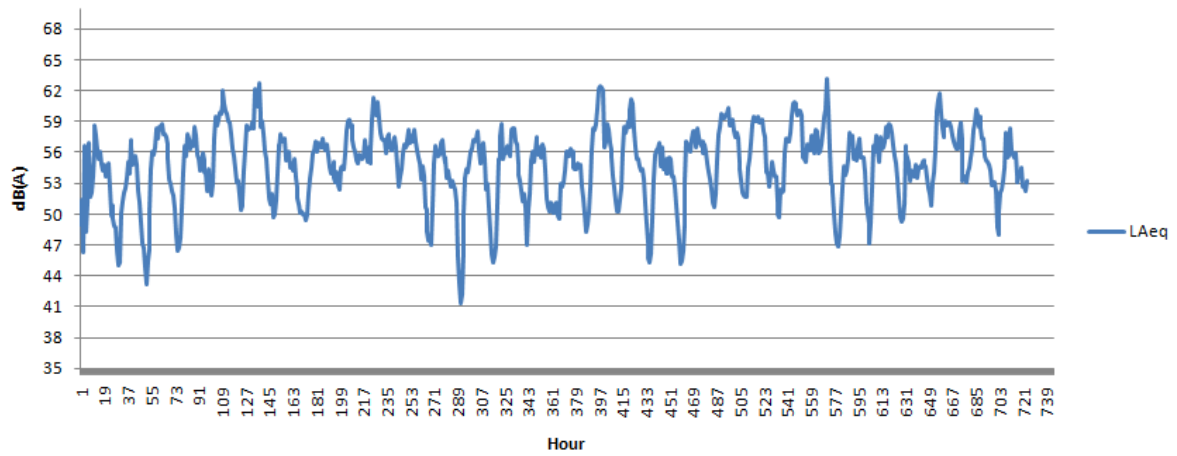
Chapelizod August'11' Hourly Values



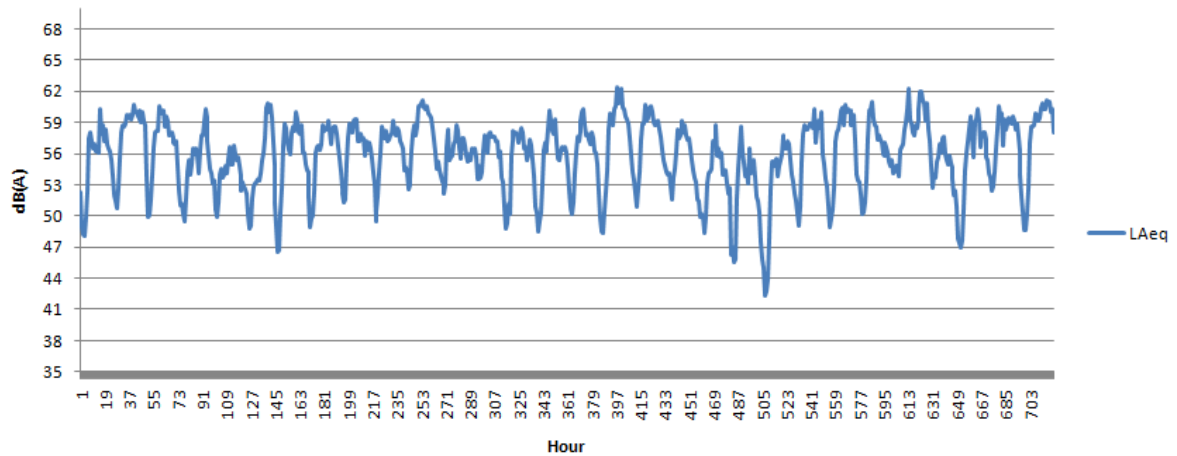
Chapelizod September'11' Hourly Values



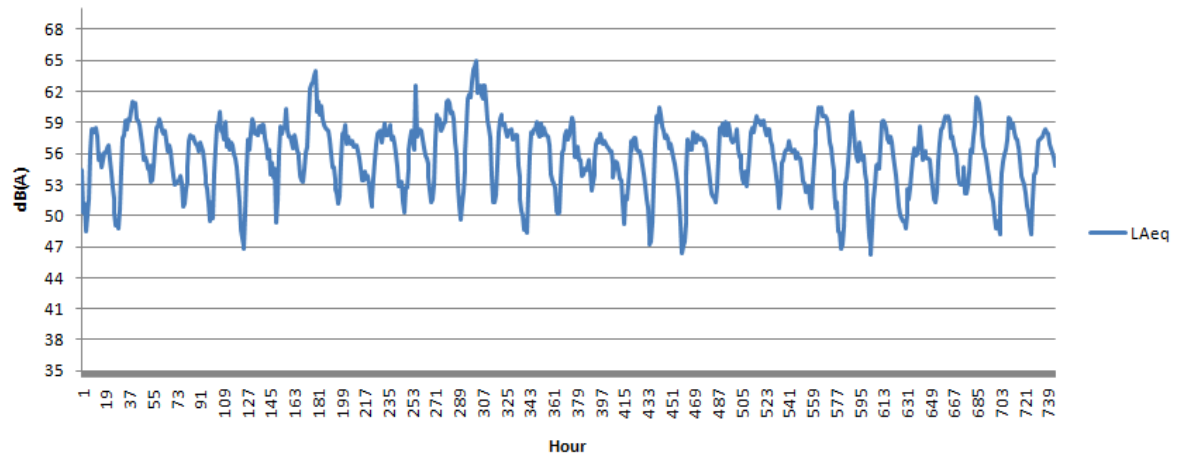
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Chapelizod November'11' Hourly Values



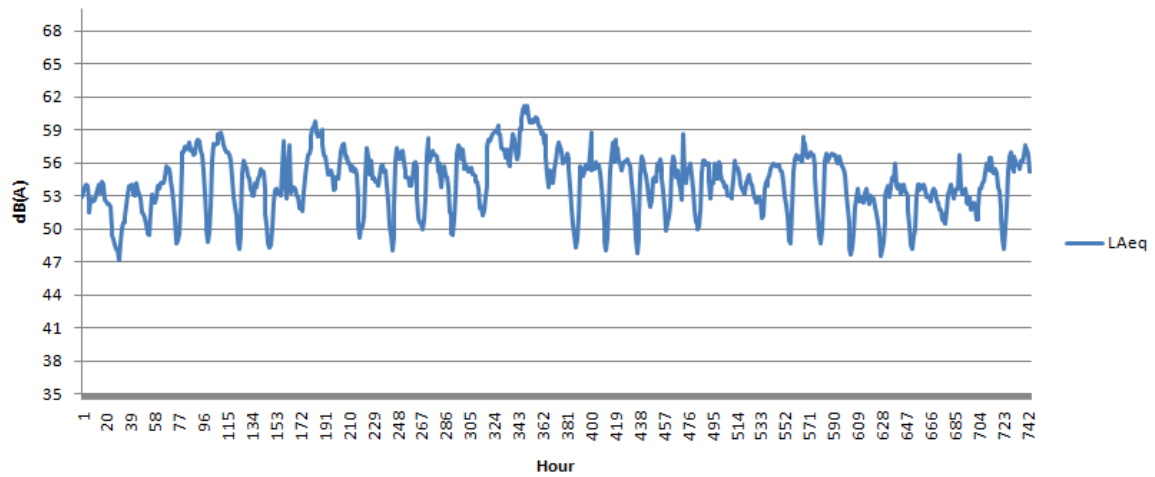
Chapelizod December'11' Hourly Values



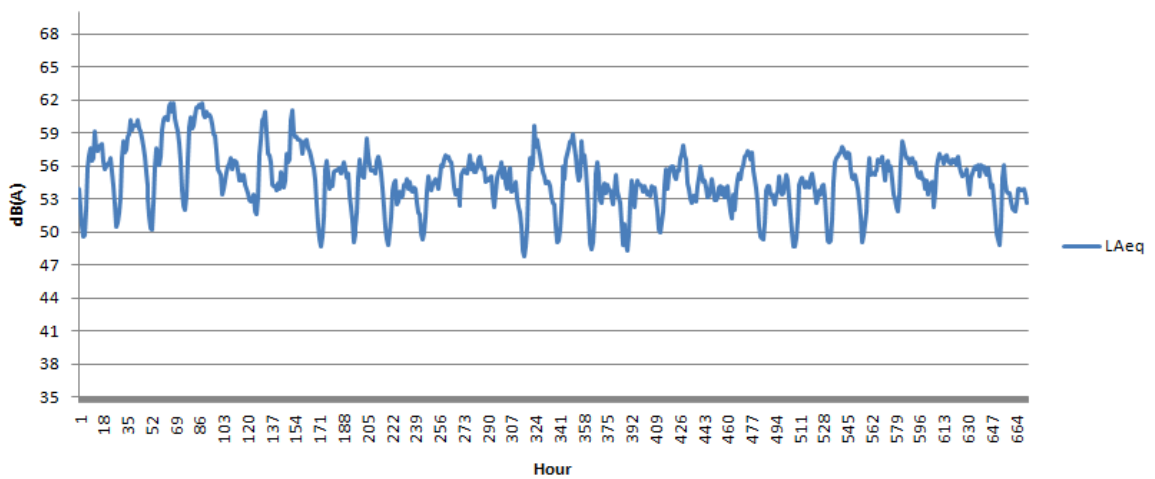
**ASHTOWN GROVE
NAVAN ROAD
DUBLIN 7**



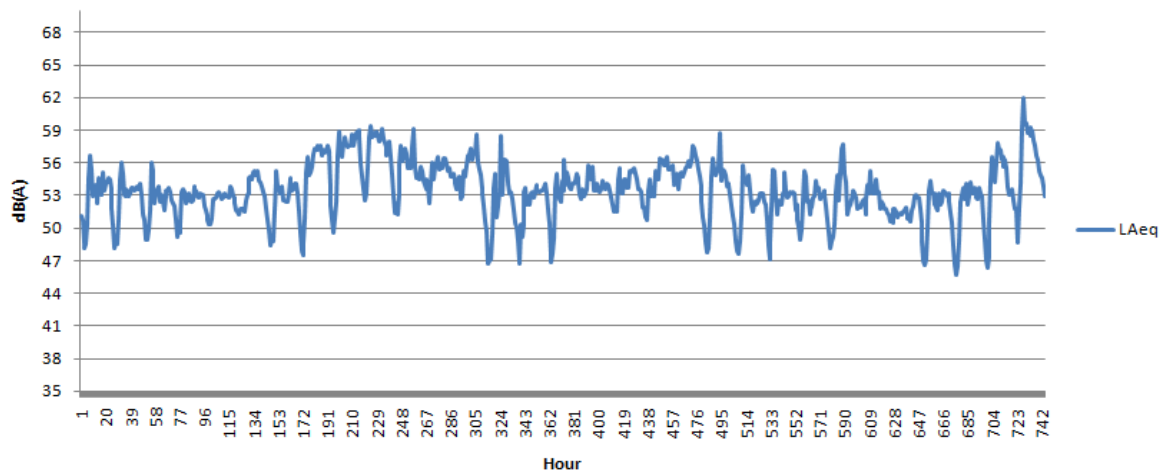
Navan Rd. January'11' Hourly Values



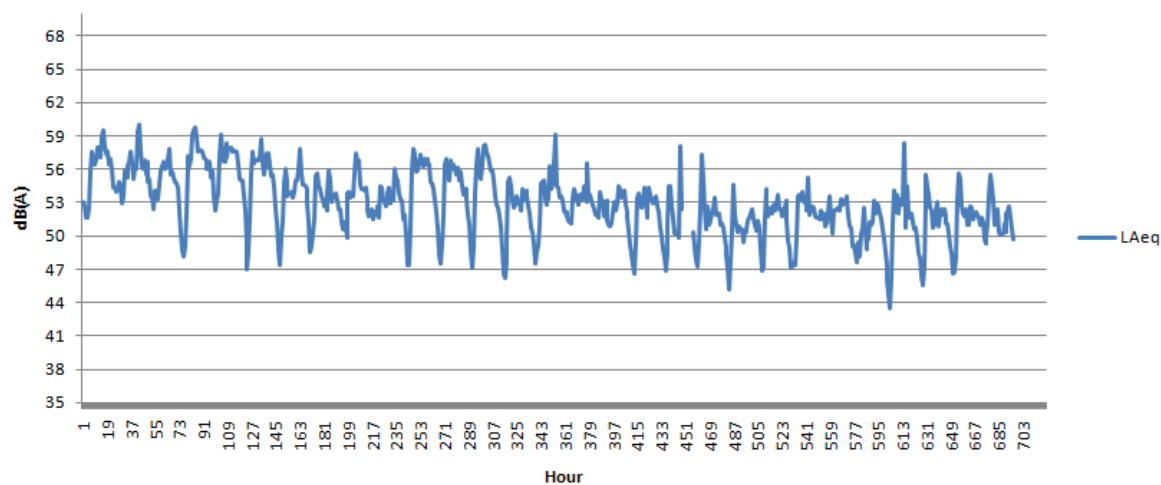
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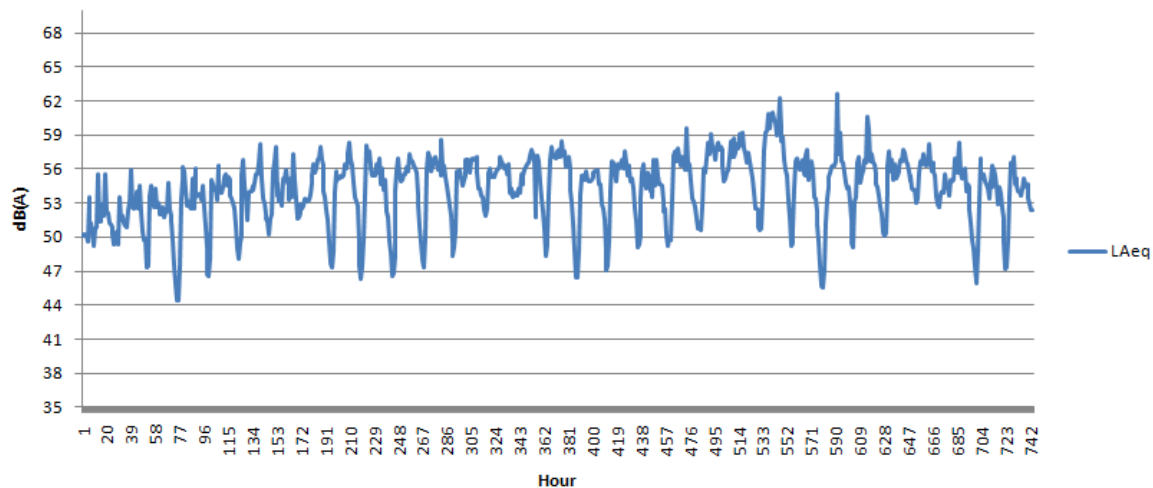
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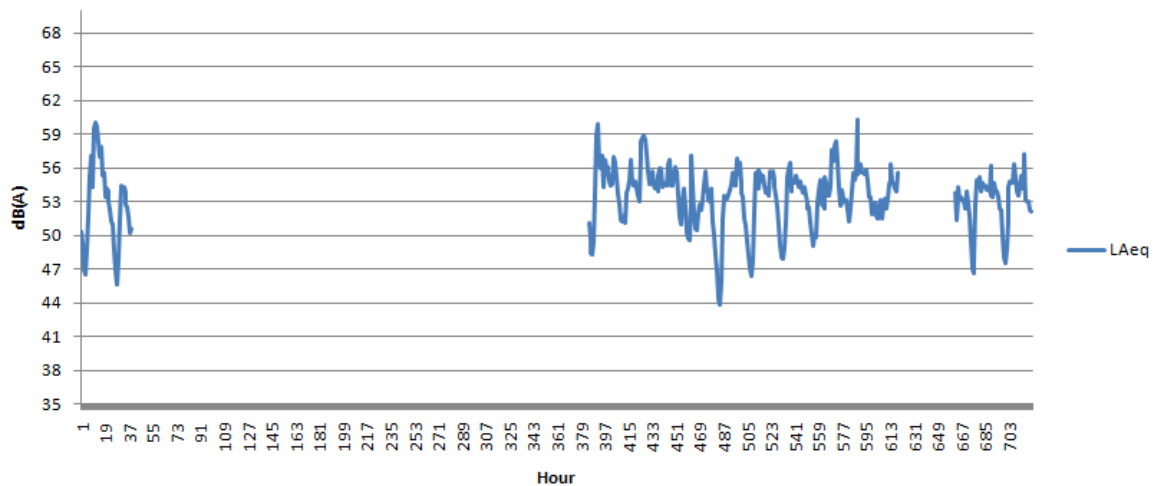
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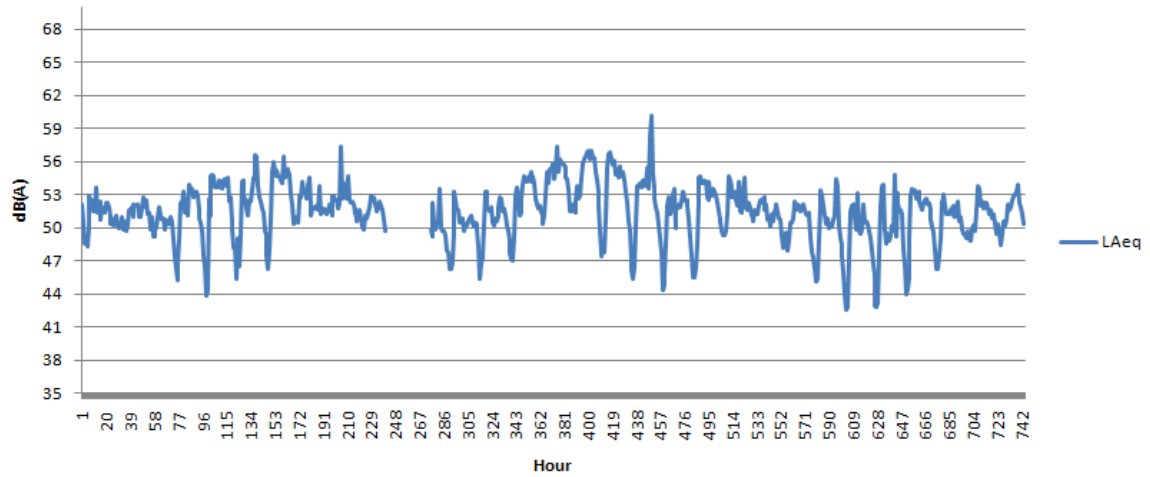
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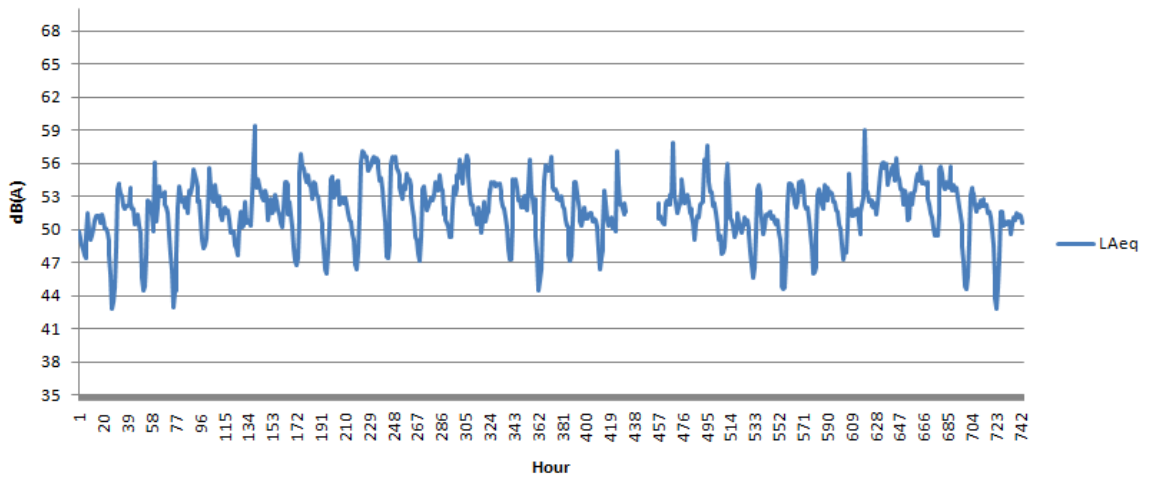
Navan Rd. June '11' Hourly Values



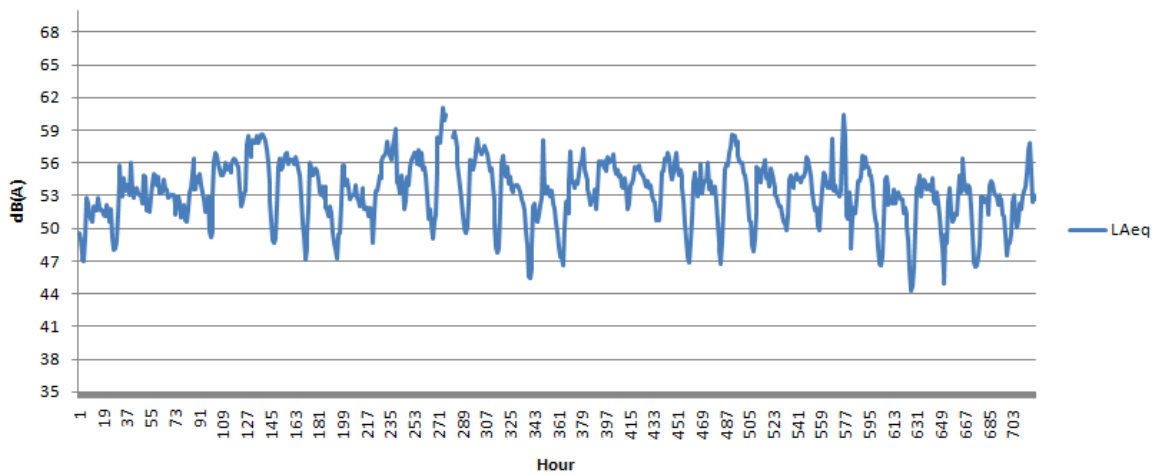
Navan Rd. July'11' Hourly Values

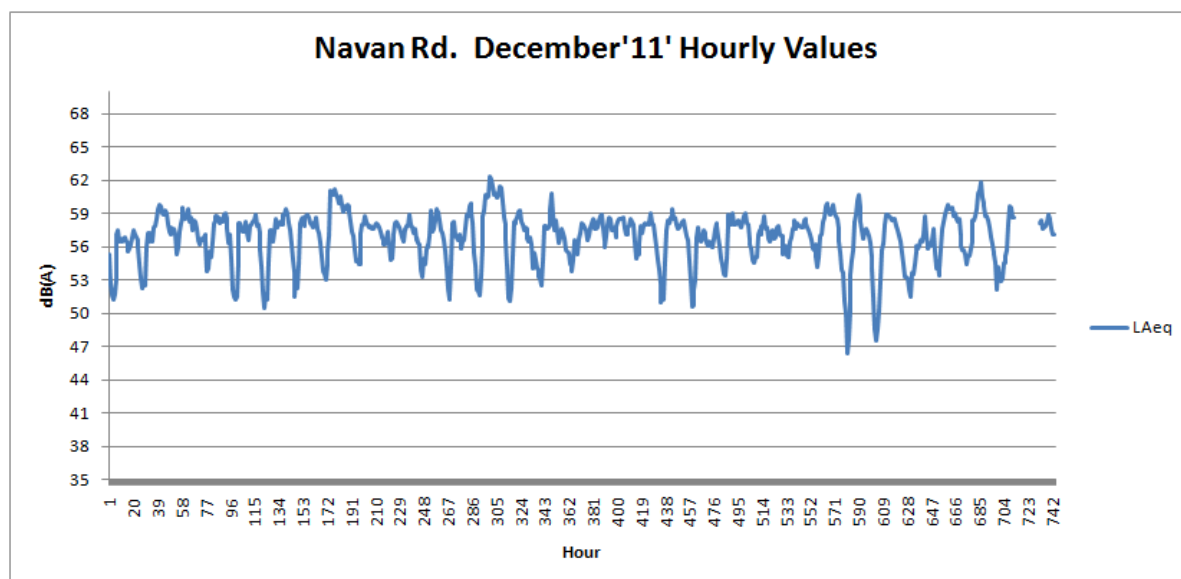
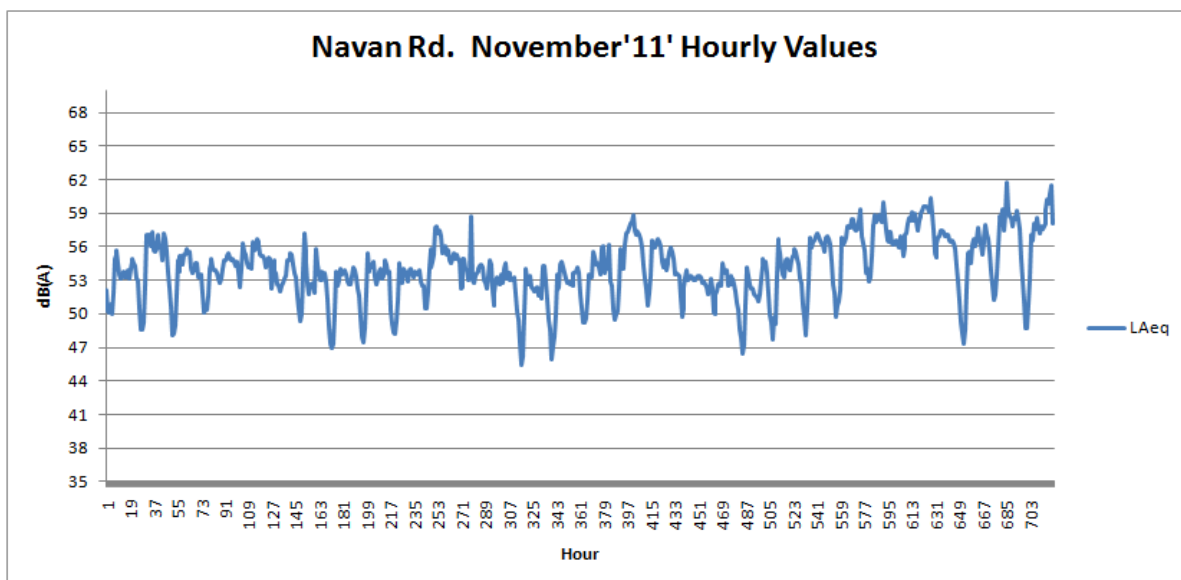
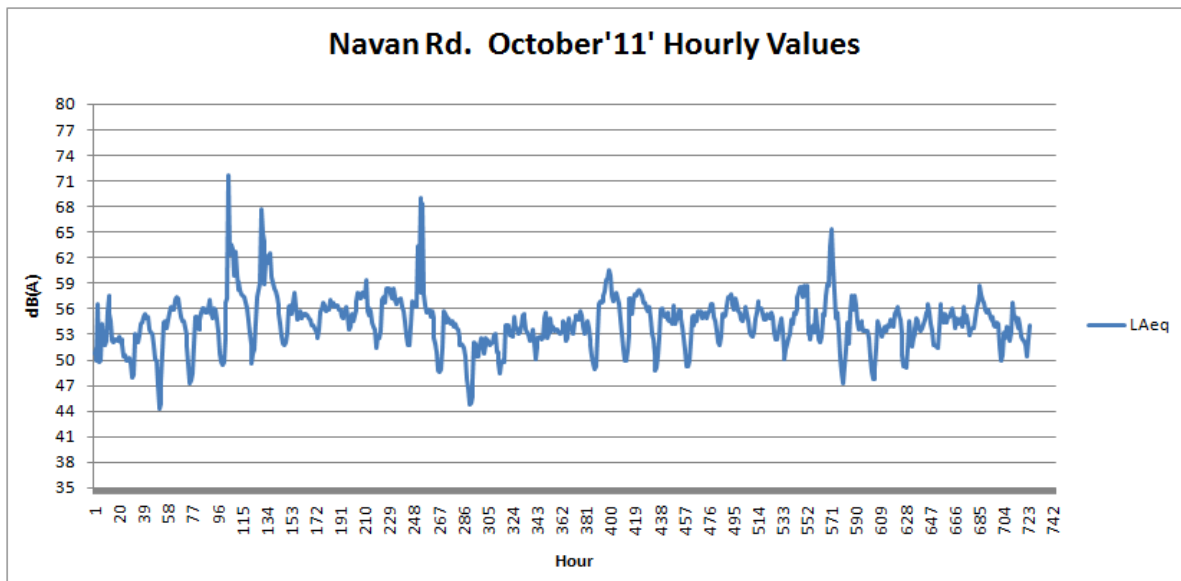


Navan Rd. August'11' Hourly Values

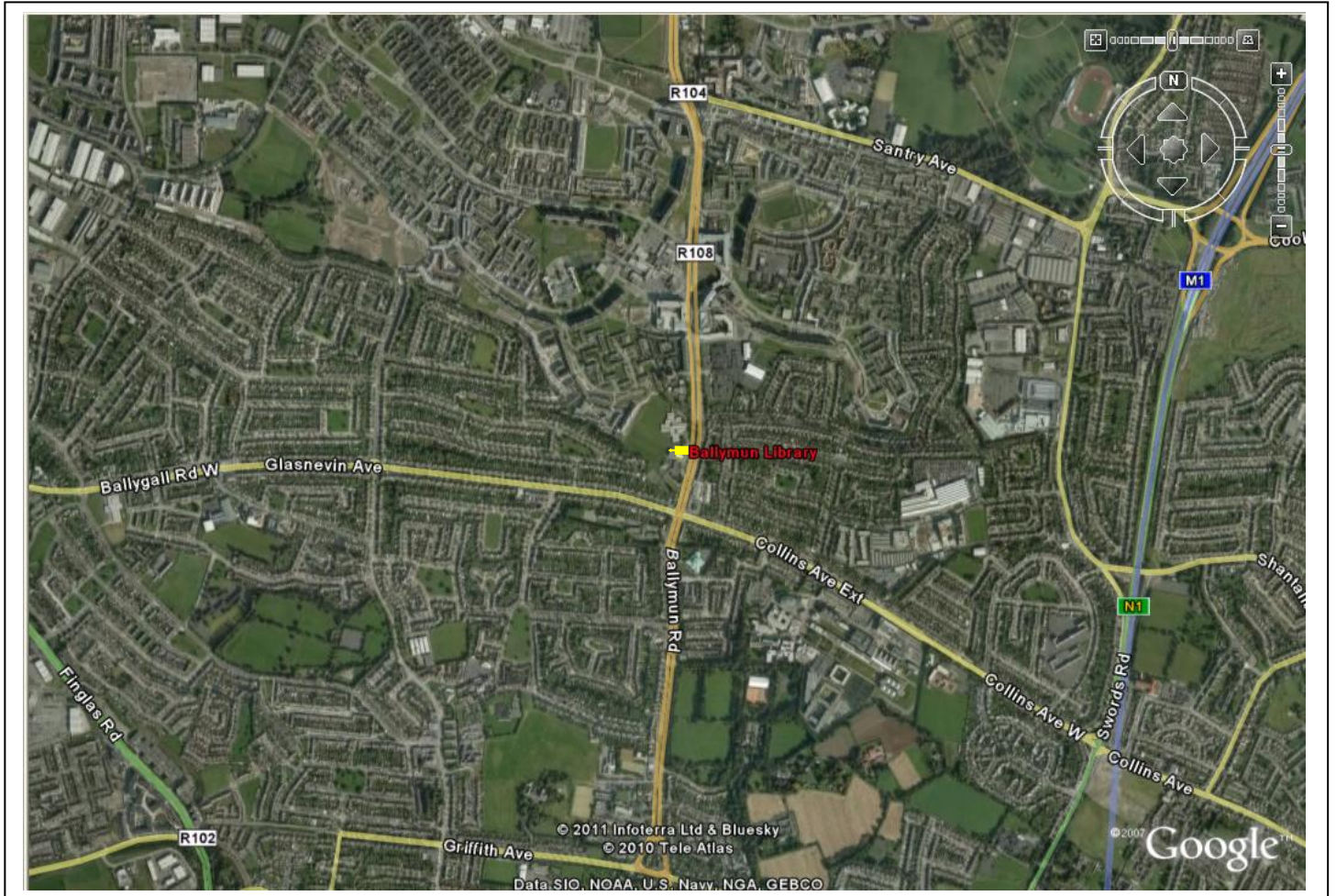


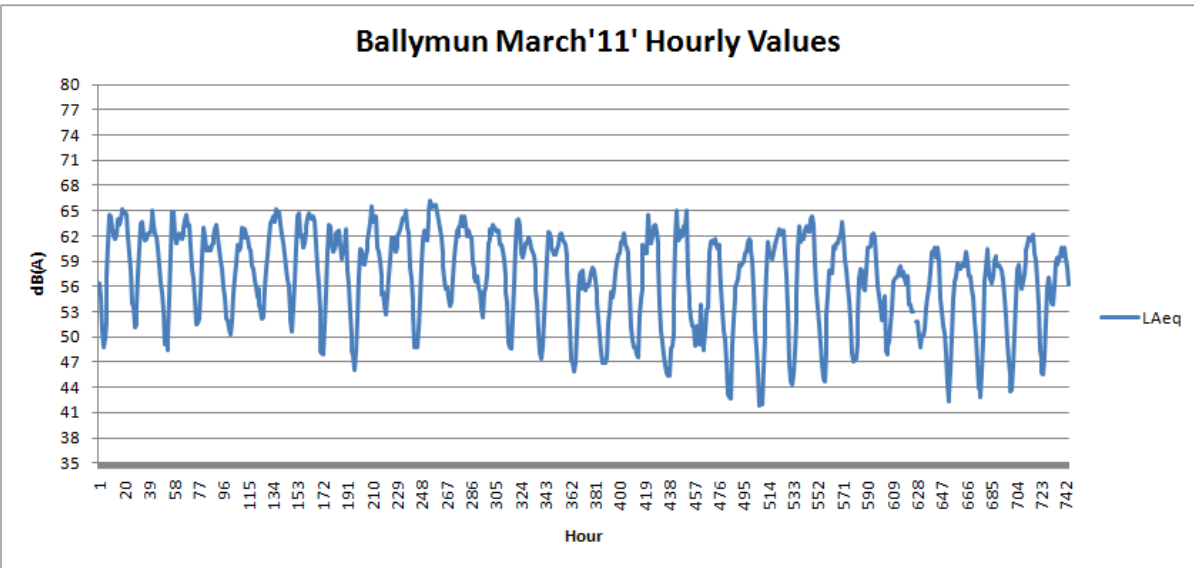
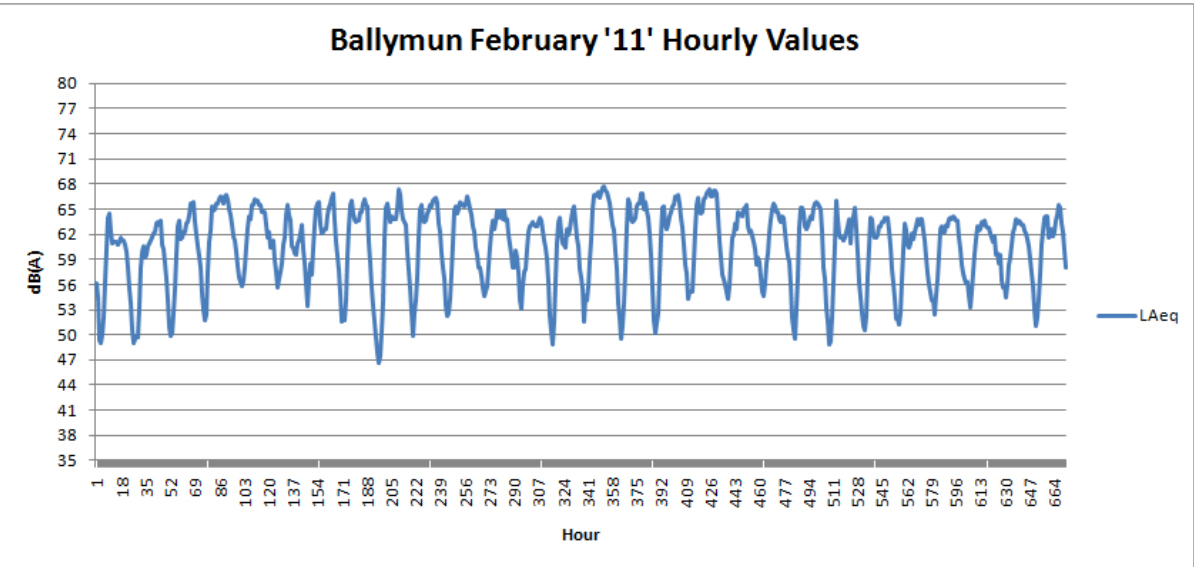
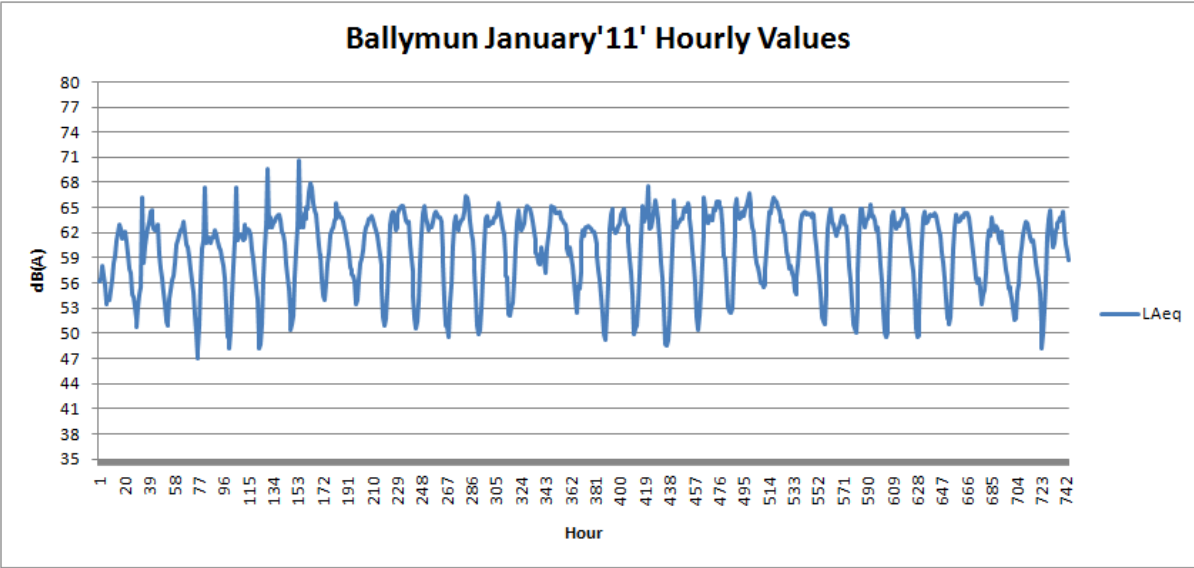
Navan Rd. September'11' Hourly Values

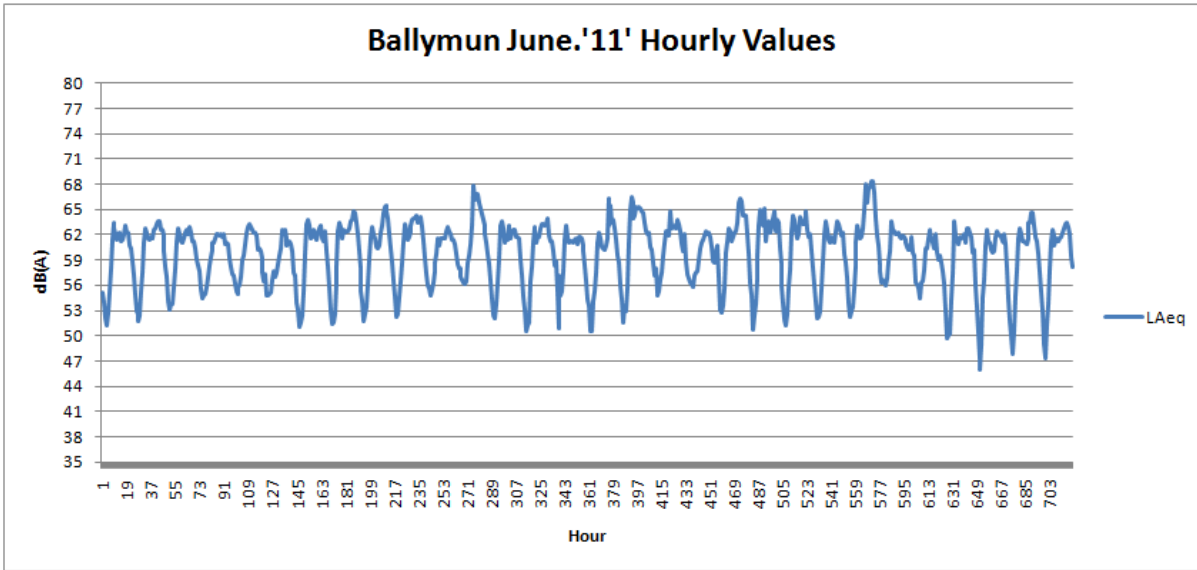
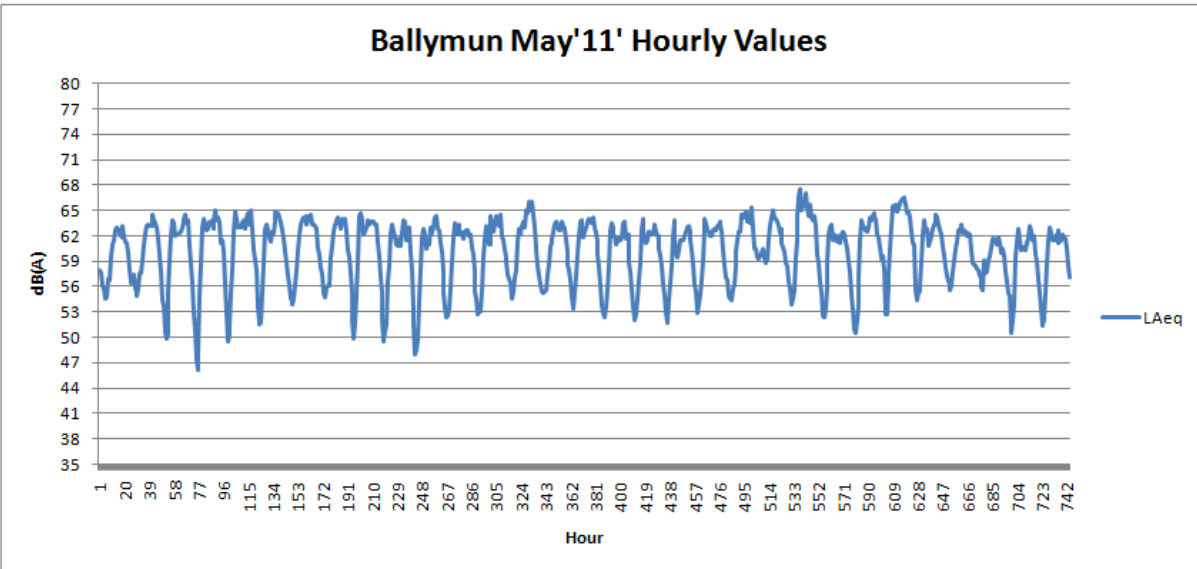
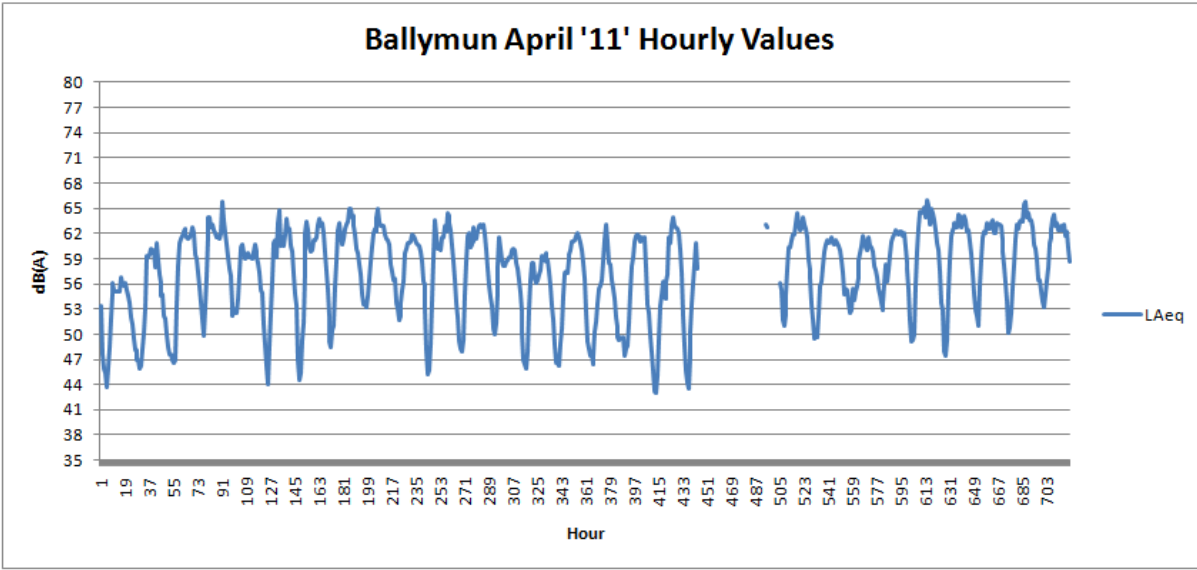


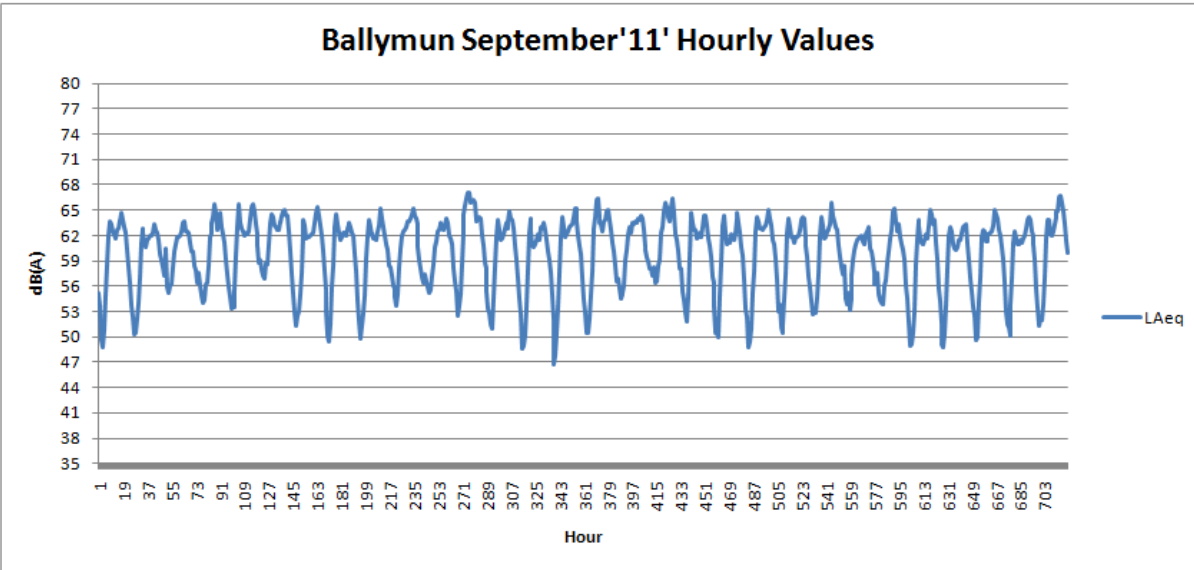
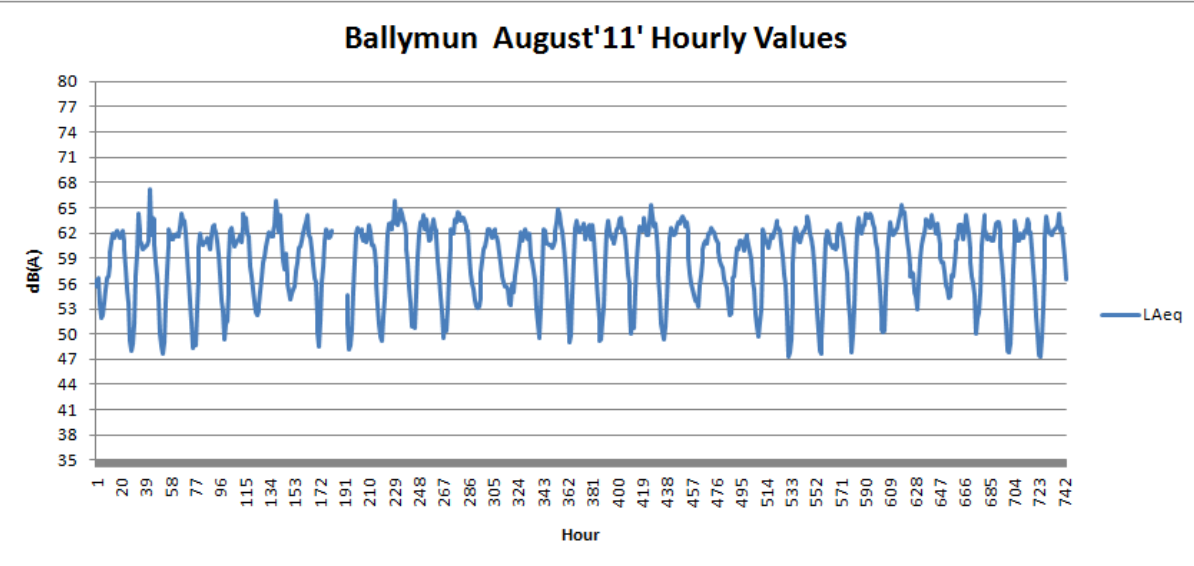
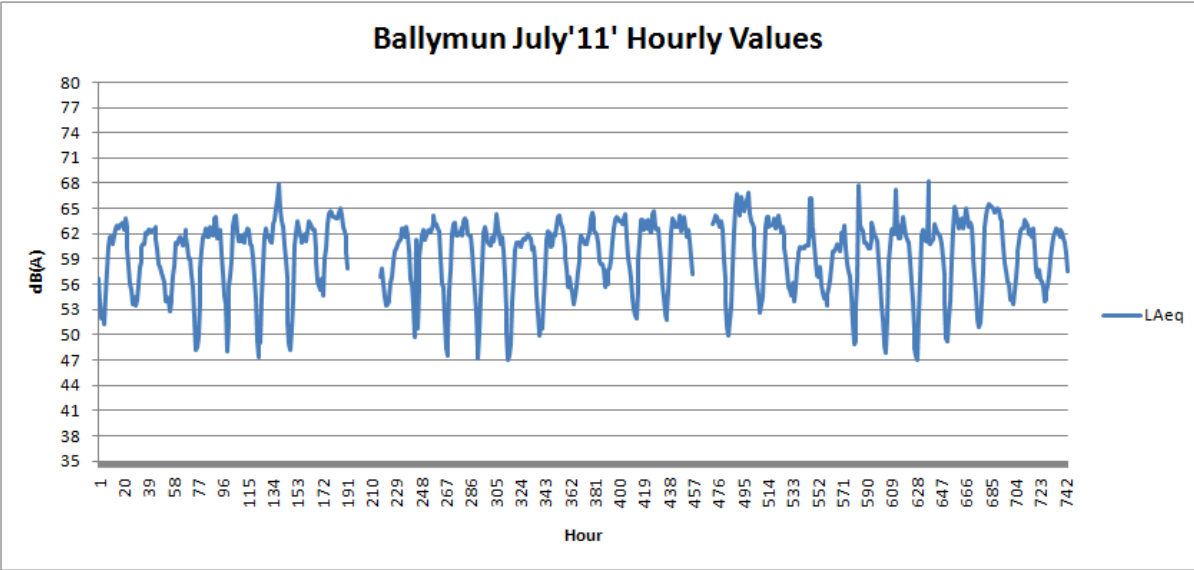


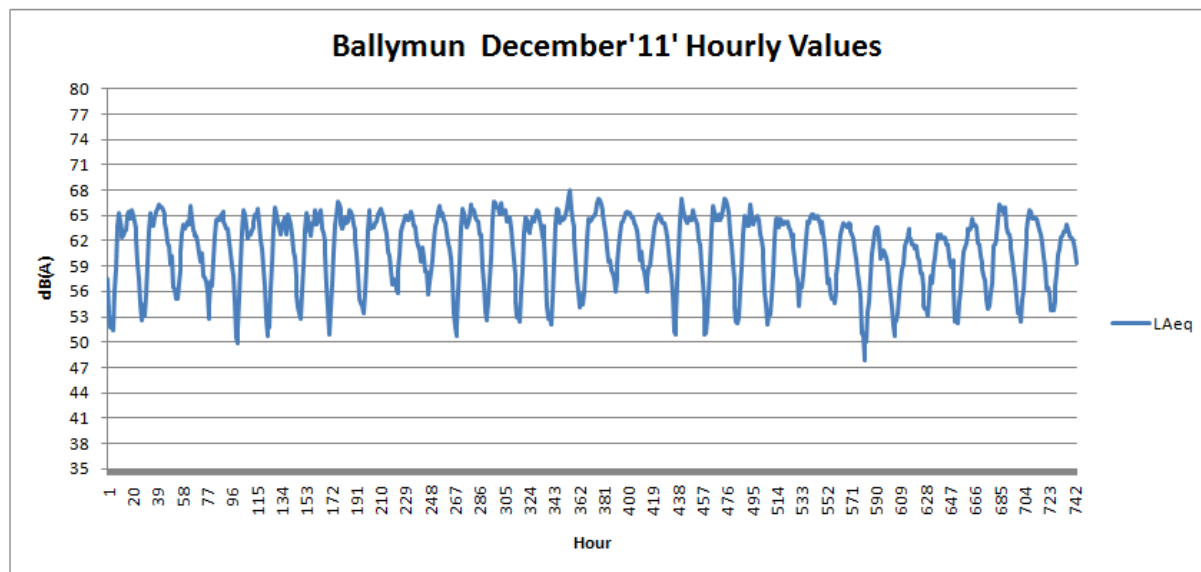
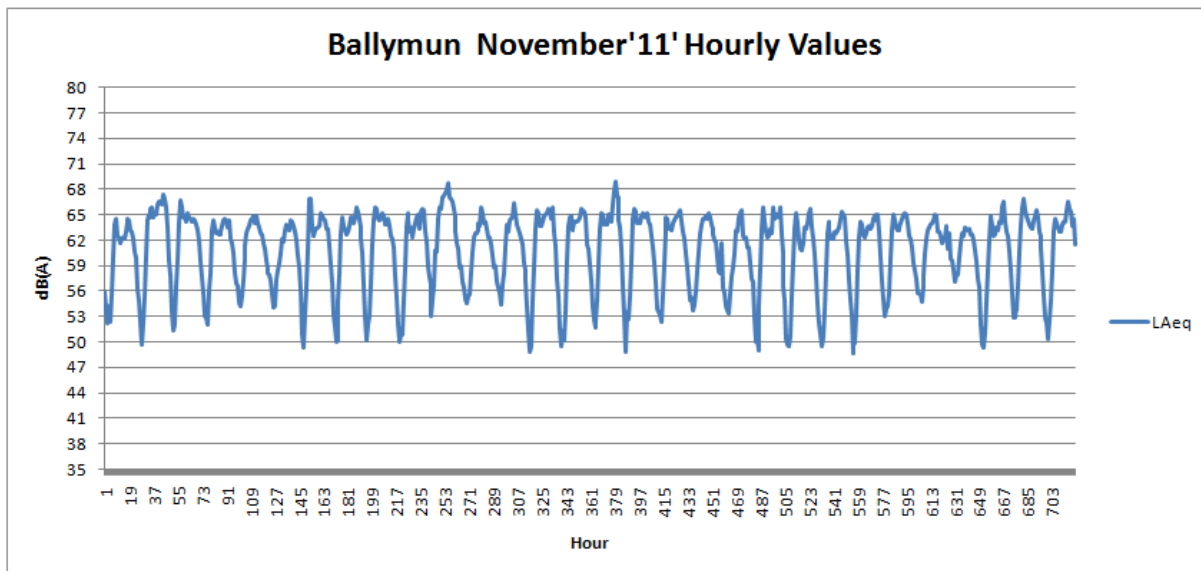
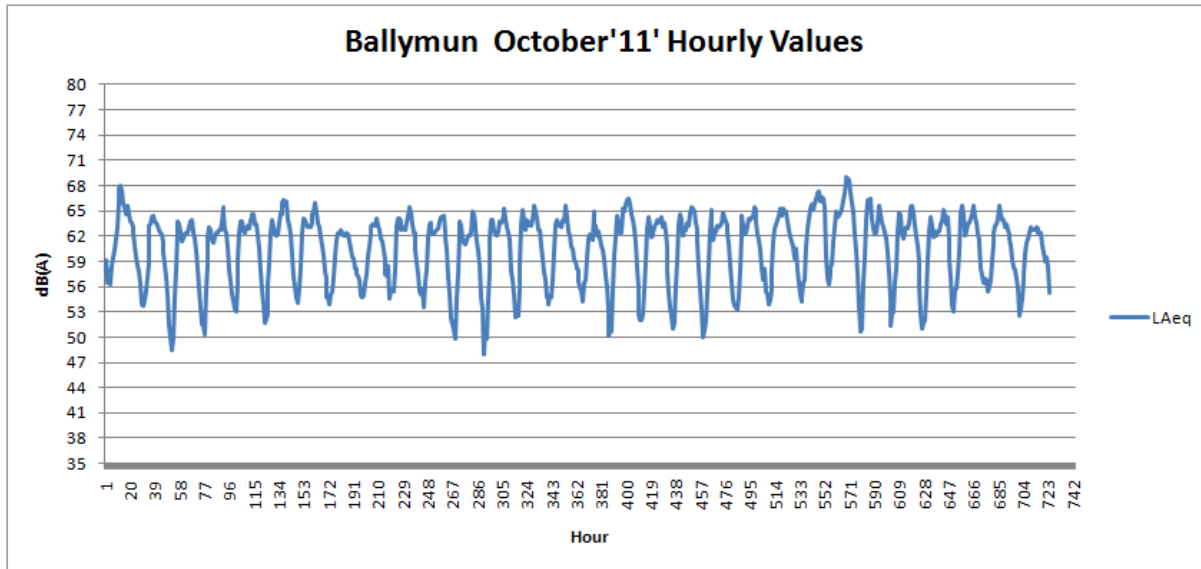
BALLYMUN LIBRARY
BALLYMUN ROAD
DUBLIN 11



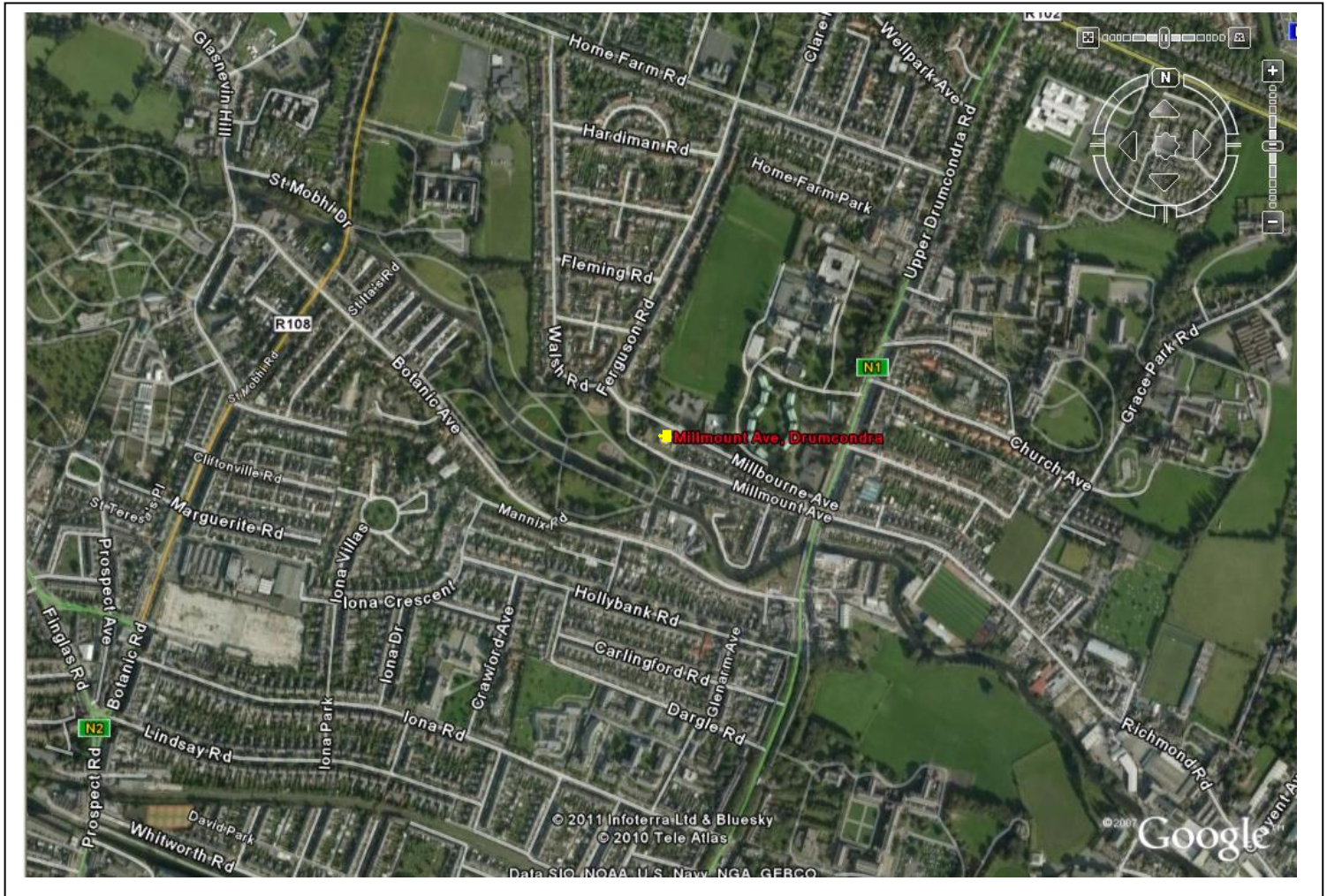




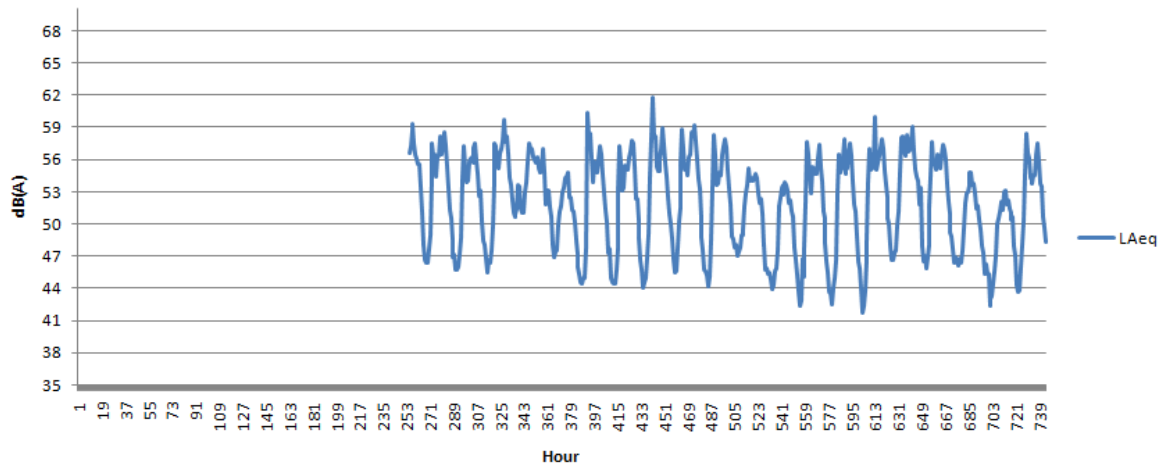




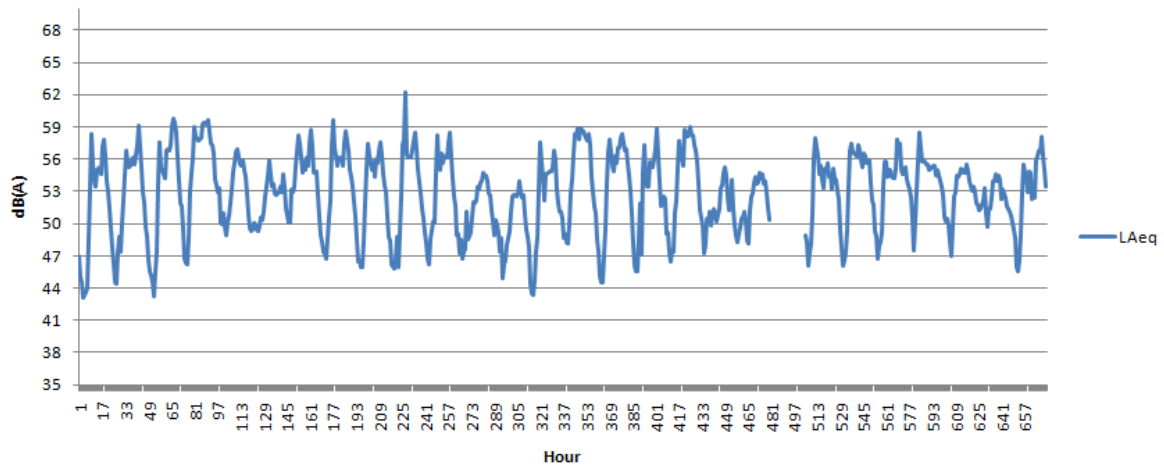
DRUMCONDRA LIBRARY
MILLMOUNT AVENUE
DUBLIN 9



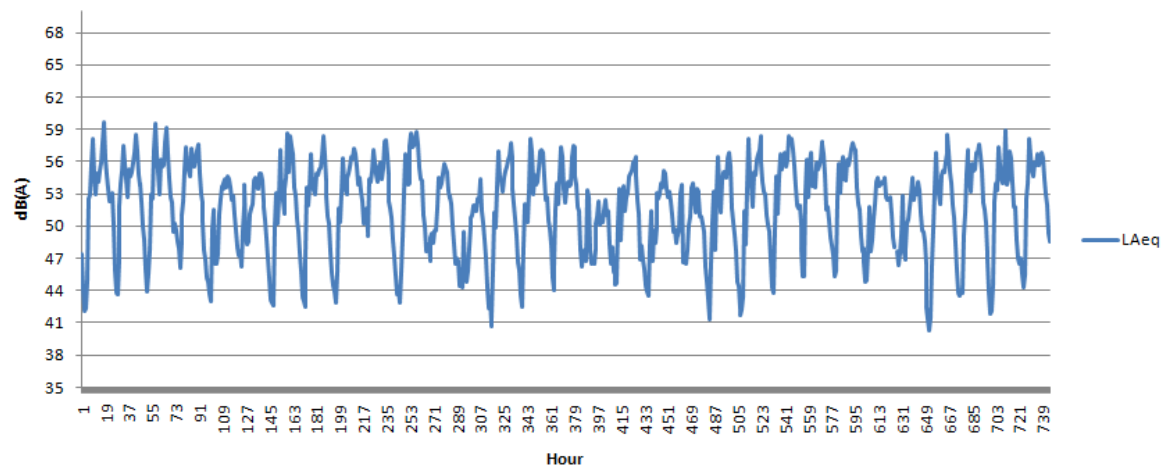
Drumcondra January'11' Hourly Values



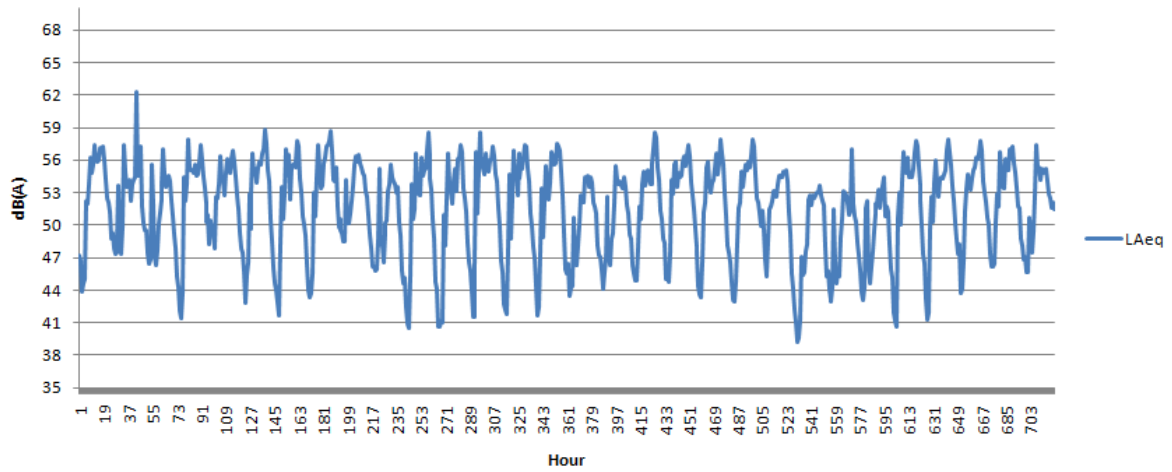
Drumcondra February'11' Hourly Values



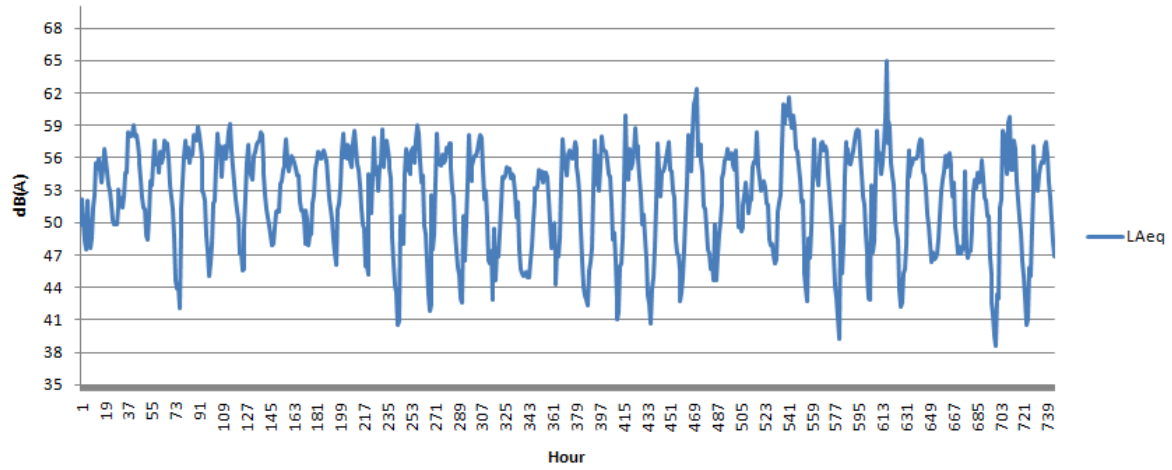
Drumcondra March'11' Hourly Values



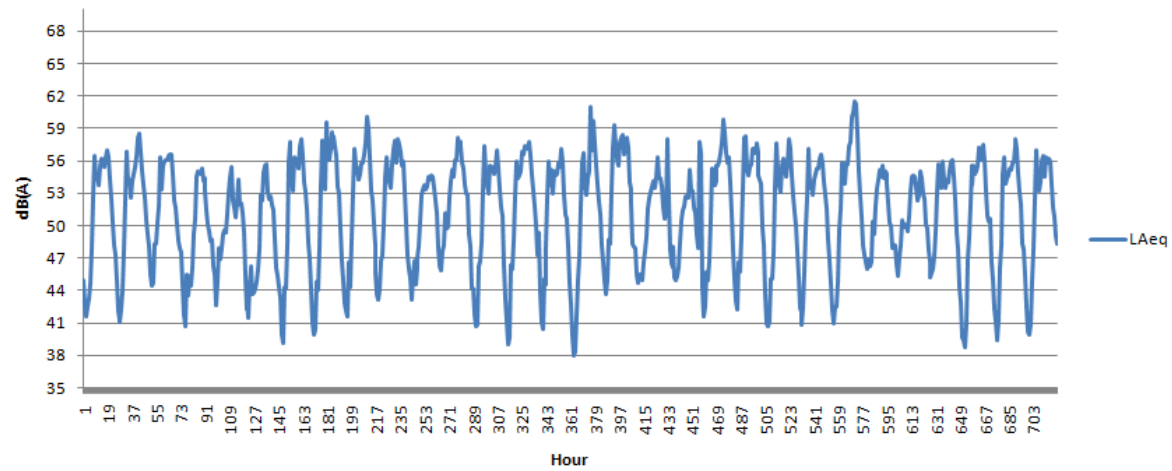
Drumcondra April '11' Hourly Values

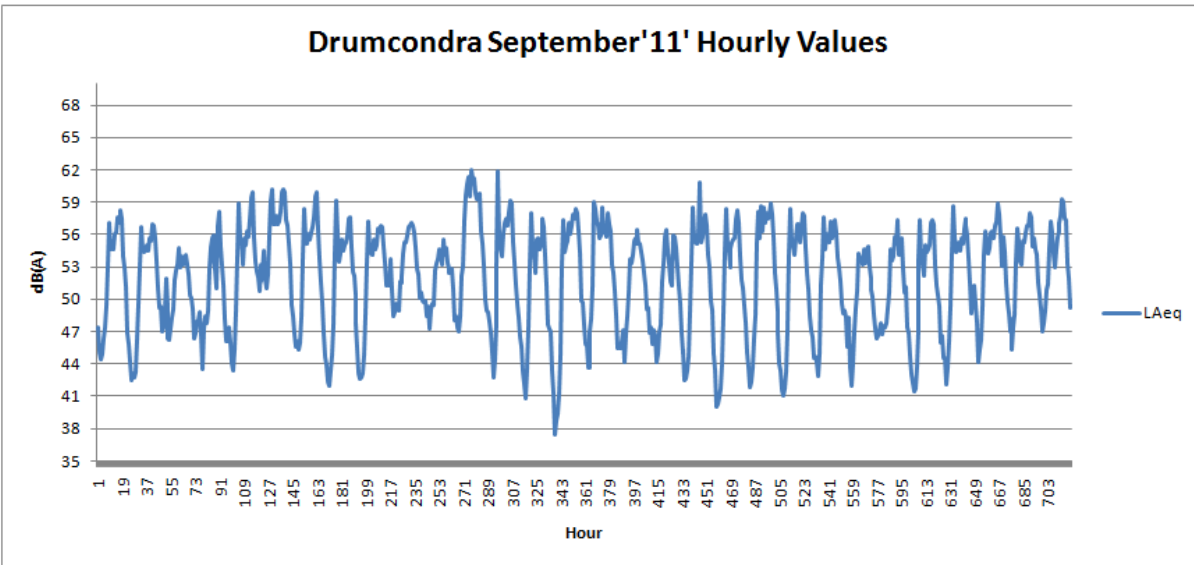
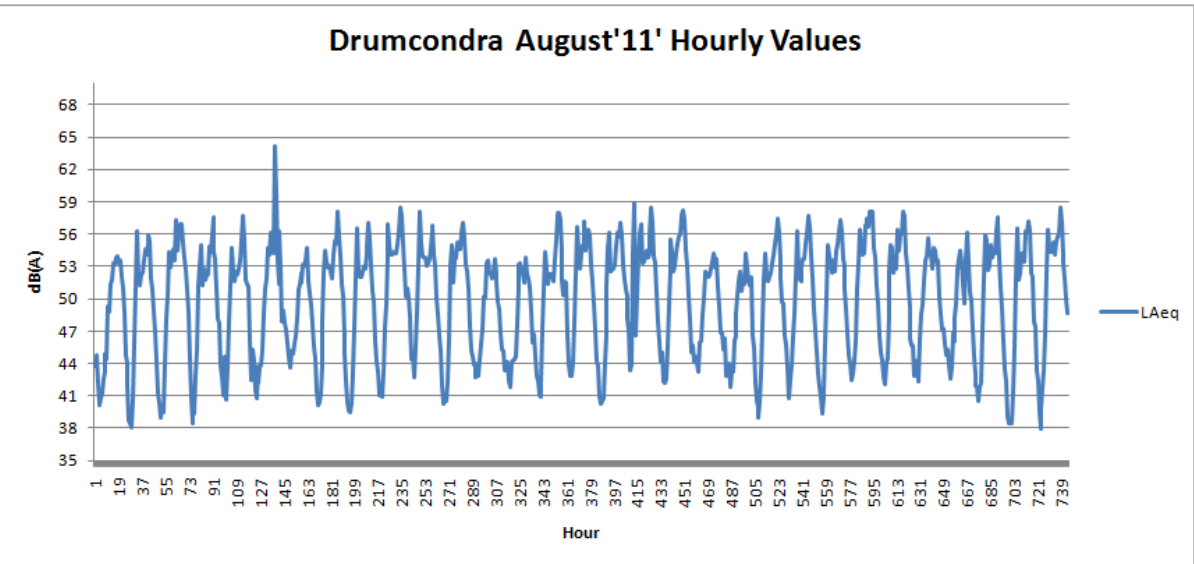
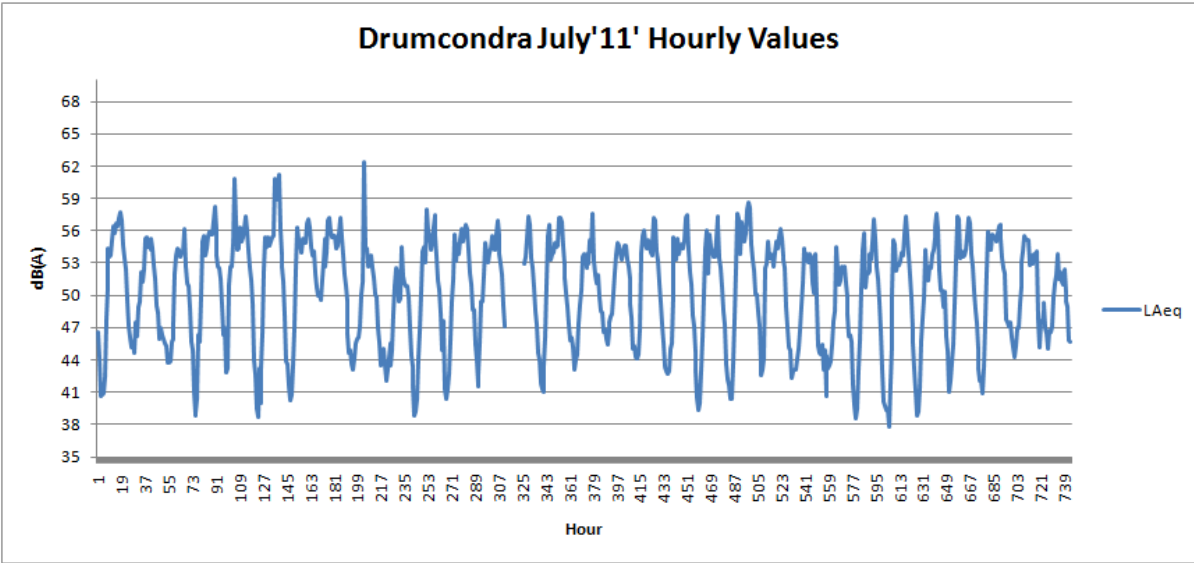


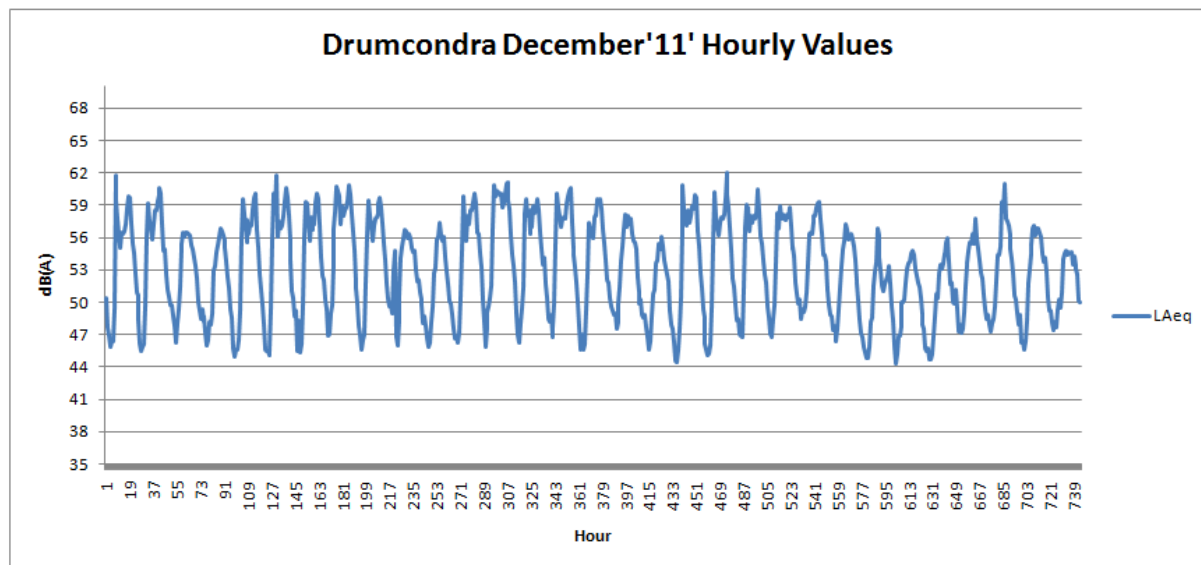
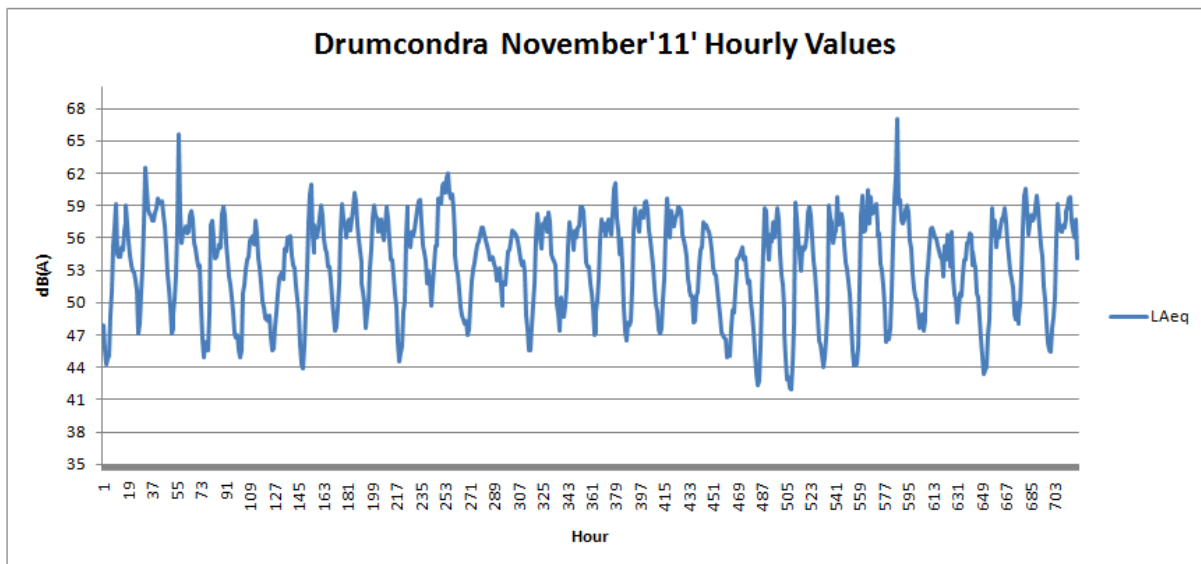
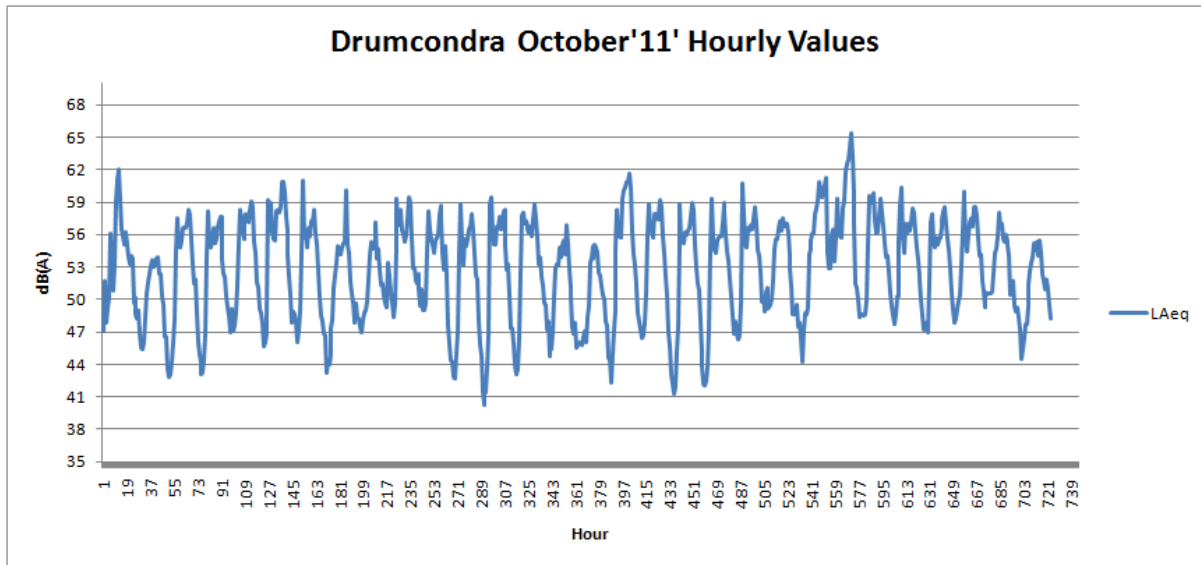
Drumcondra May '11' Hourly Values



Drumcondra June.'11' Hourly Values

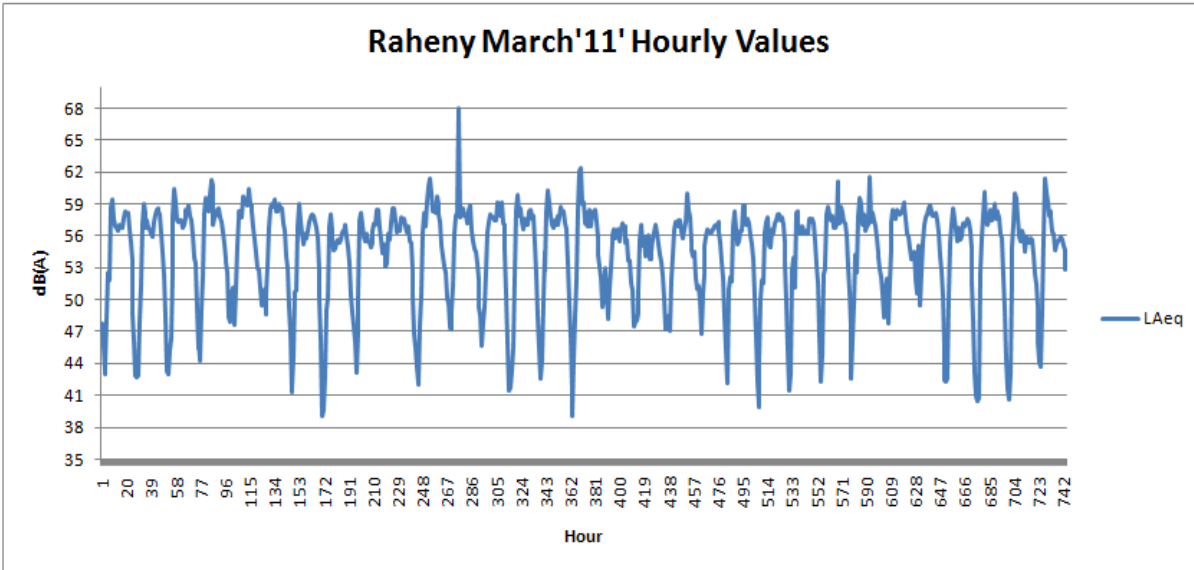
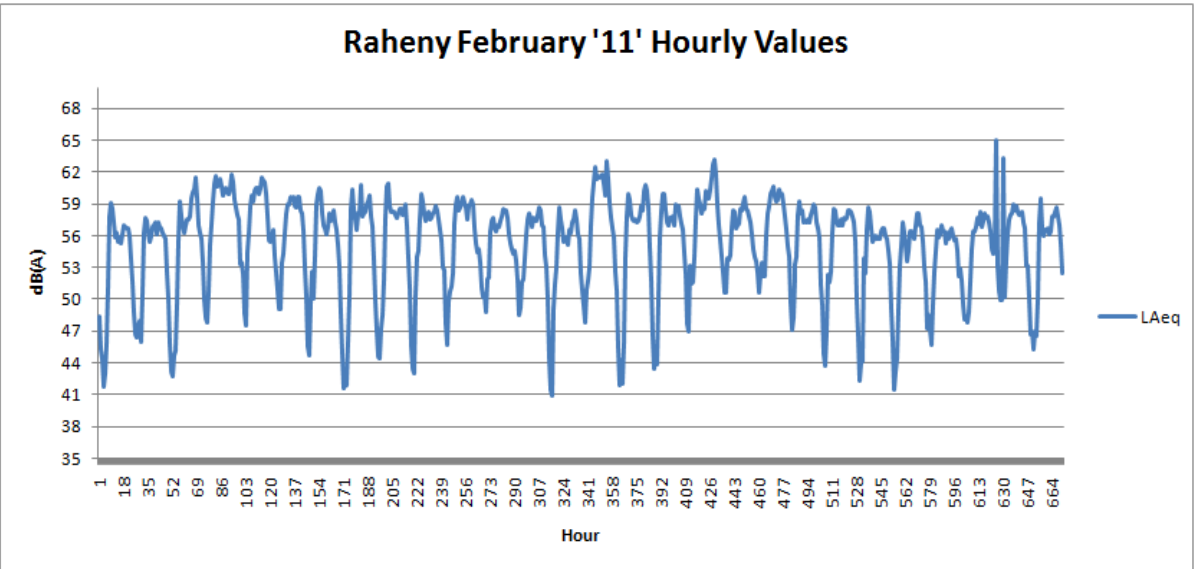
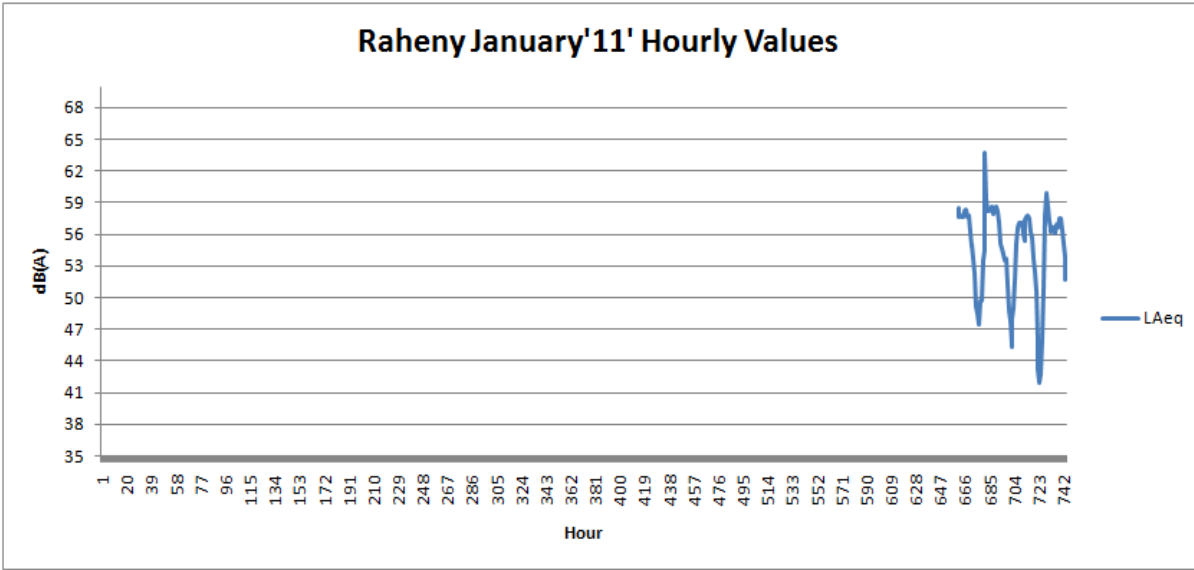


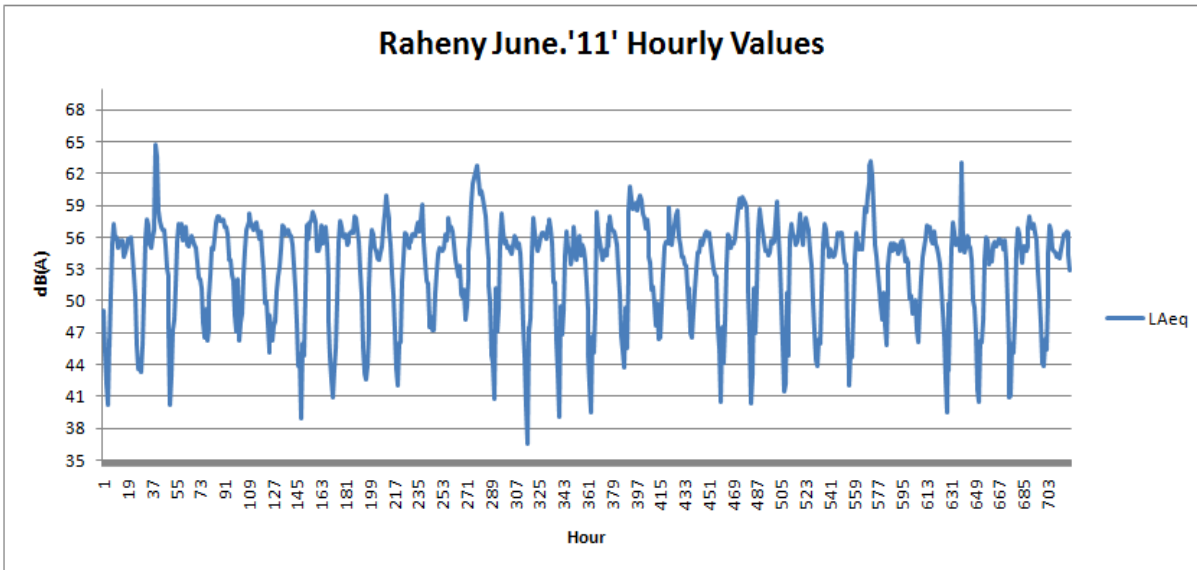
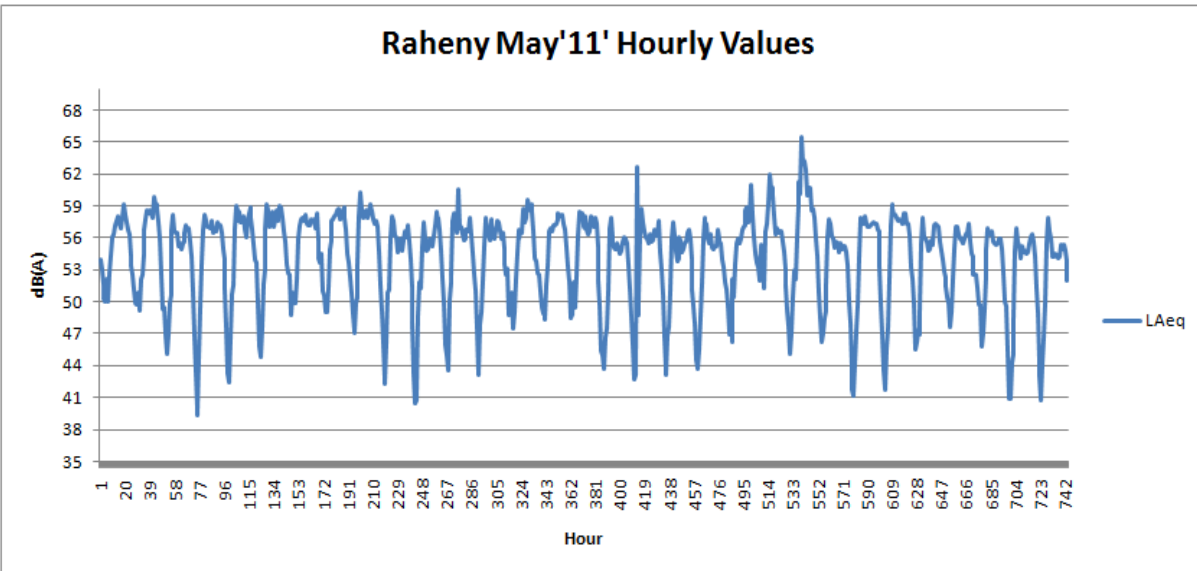
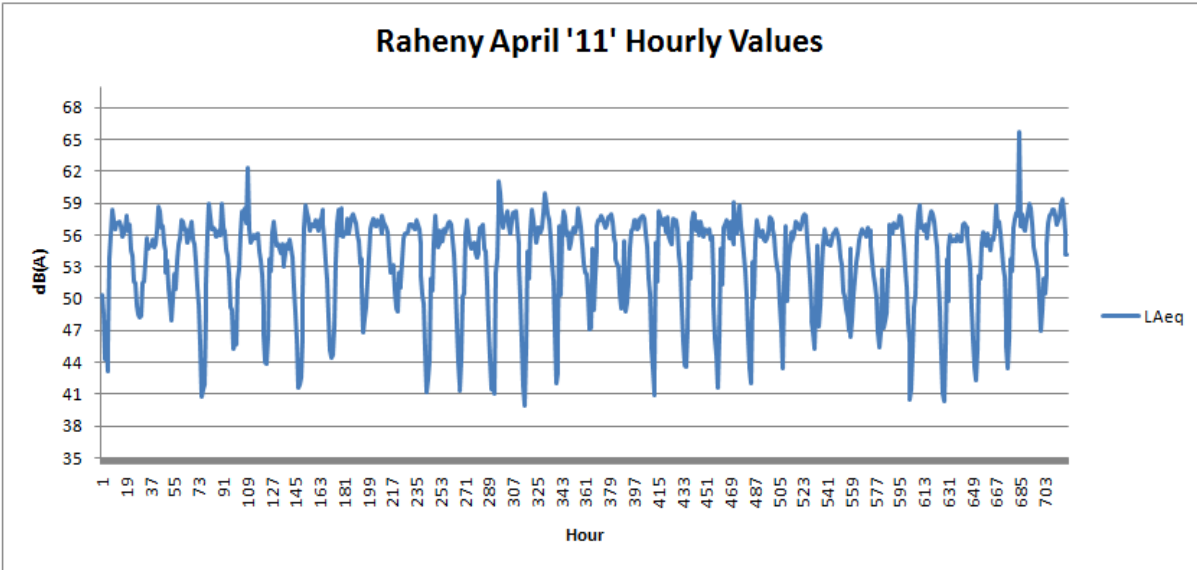


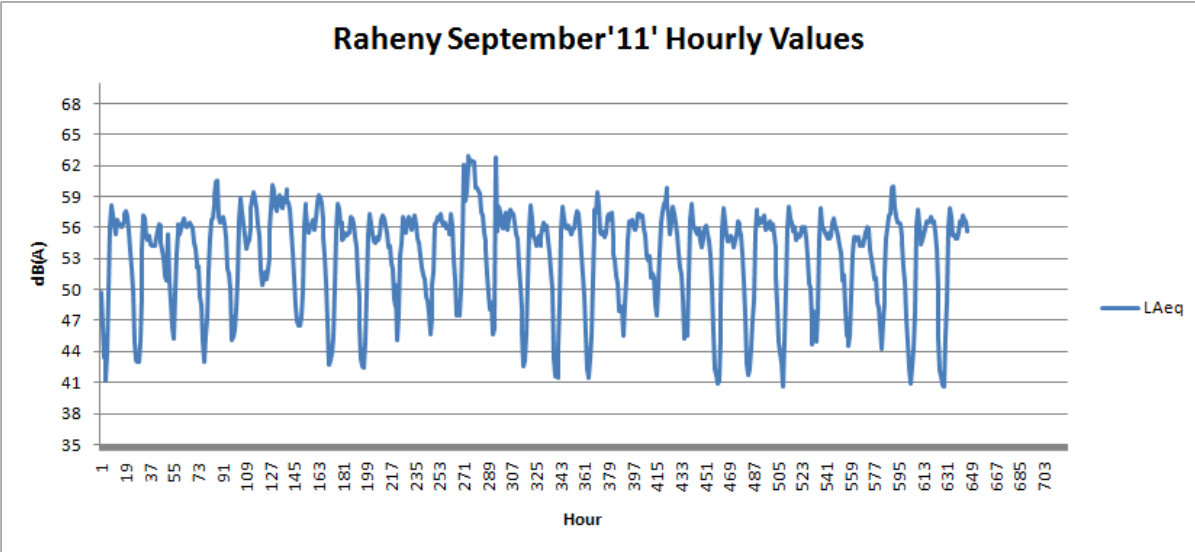
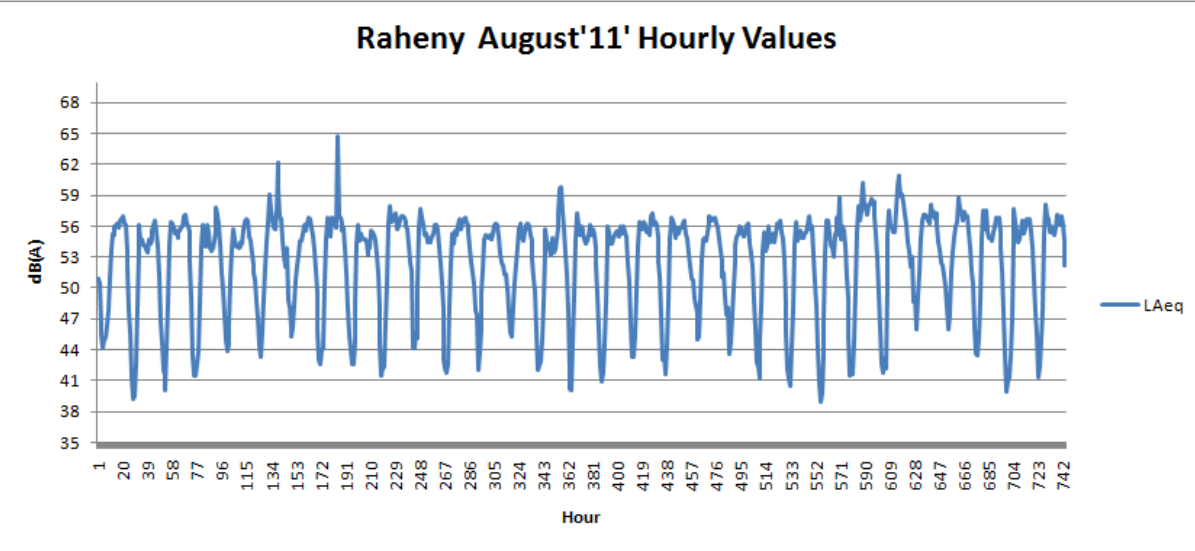
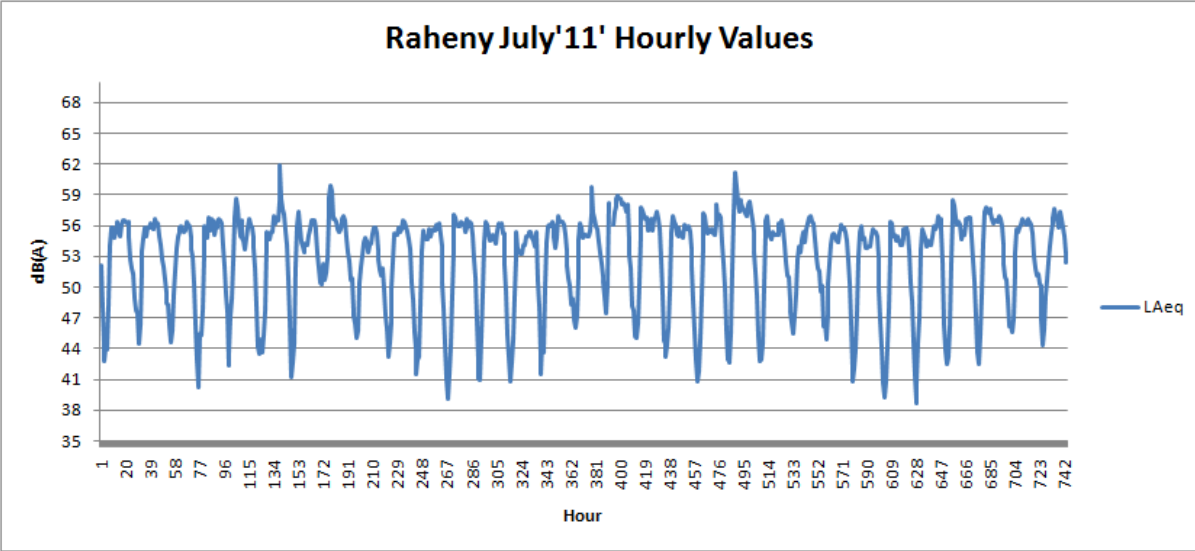


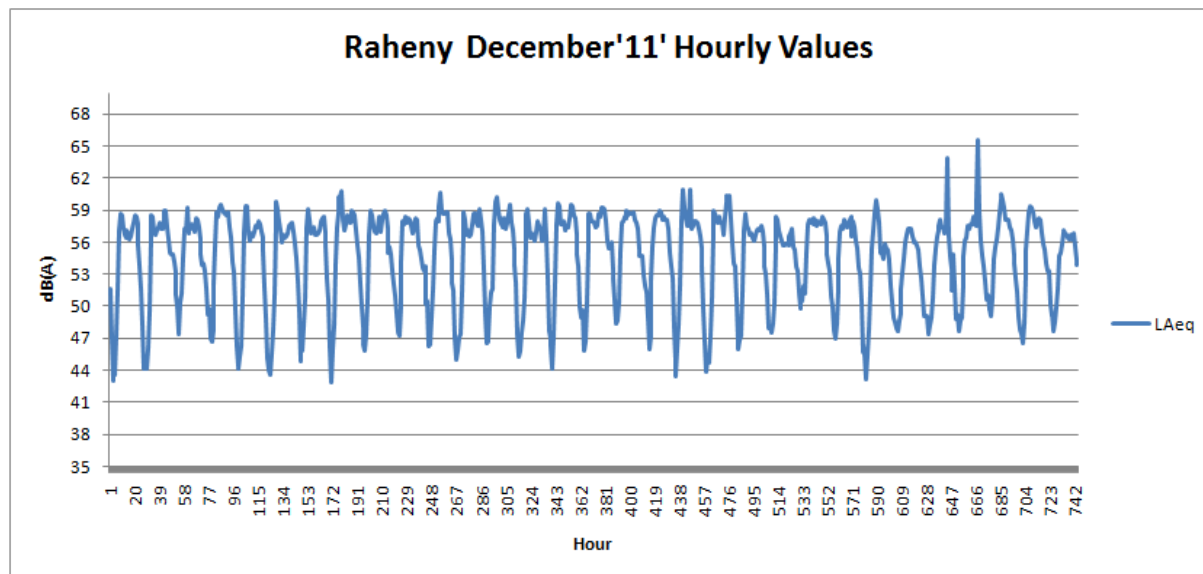
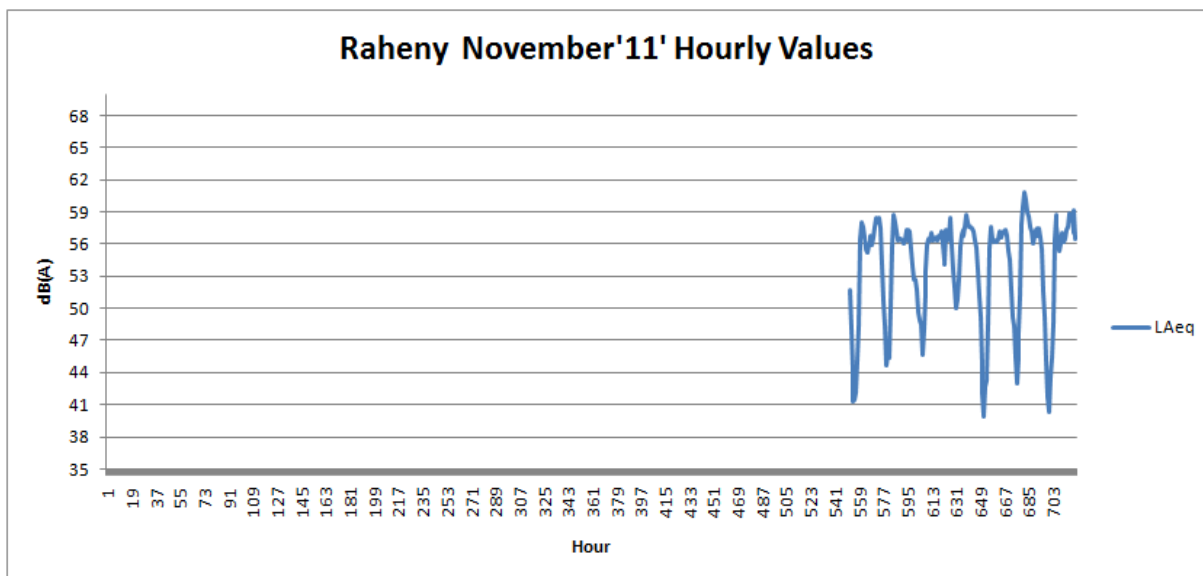
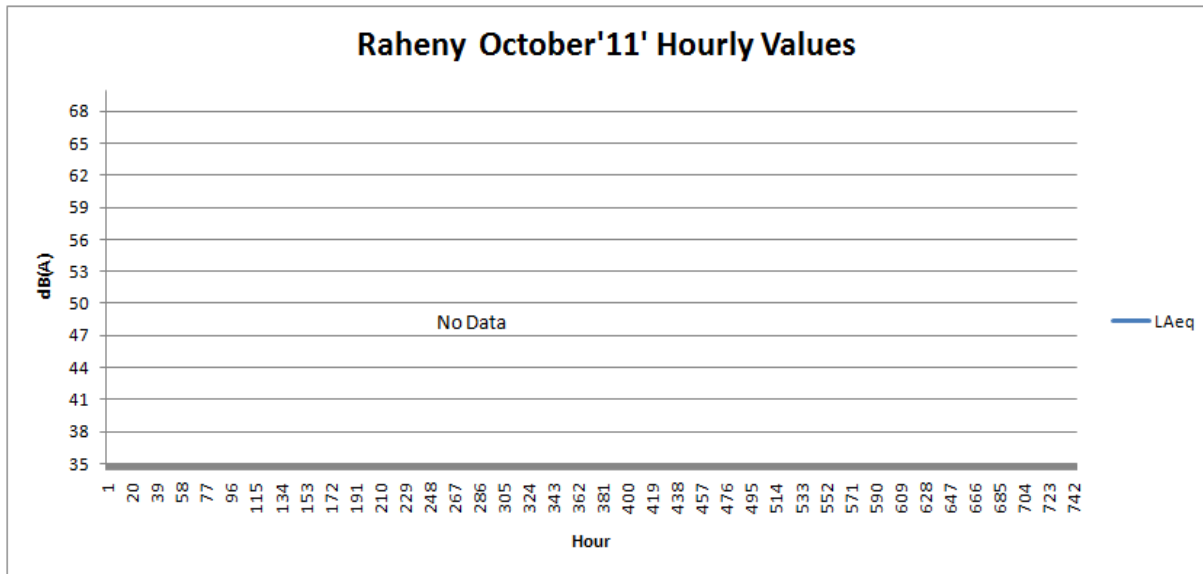
RAHENY LIBRARY
HOWTH ROAD
DUBLIN 5



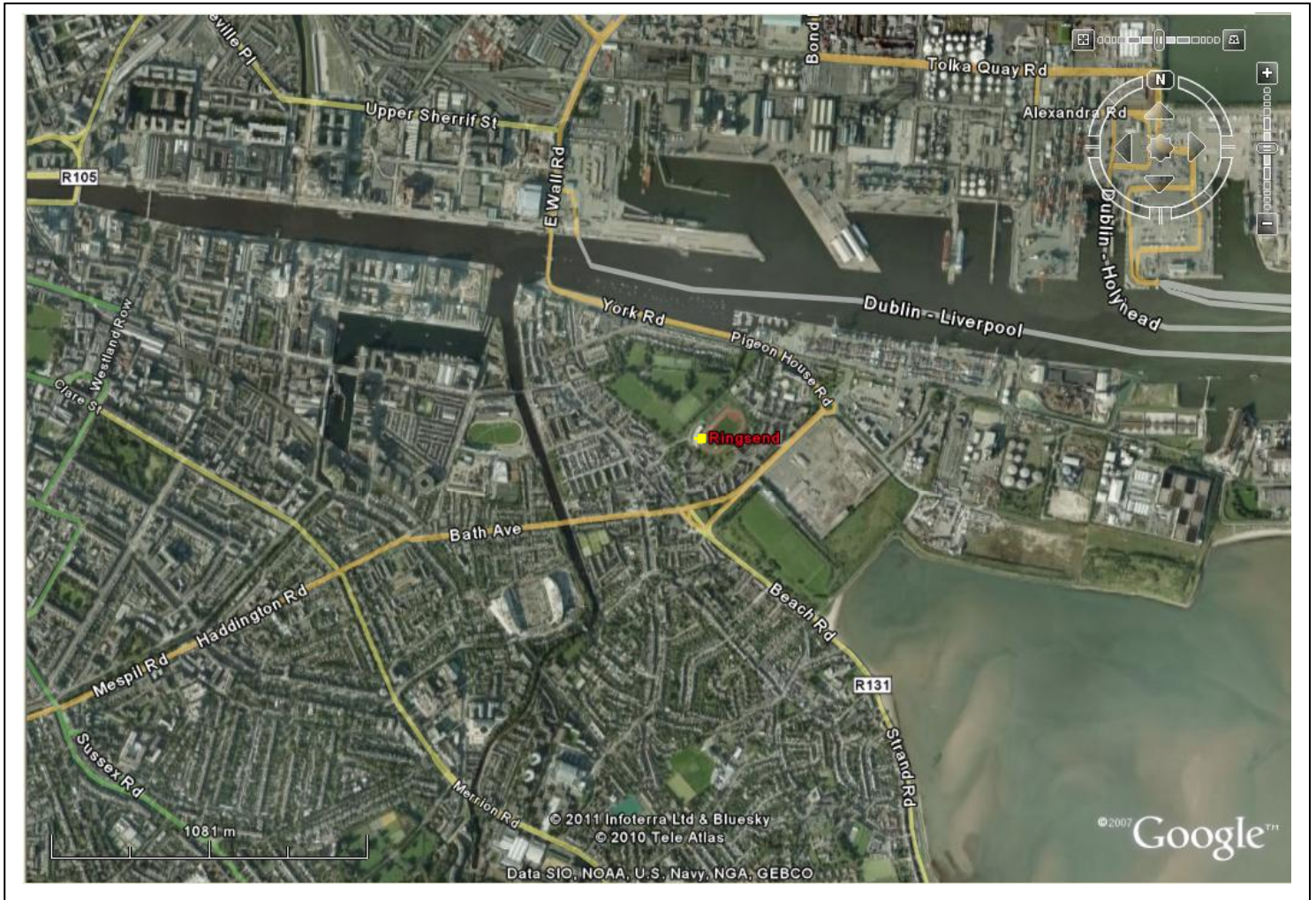


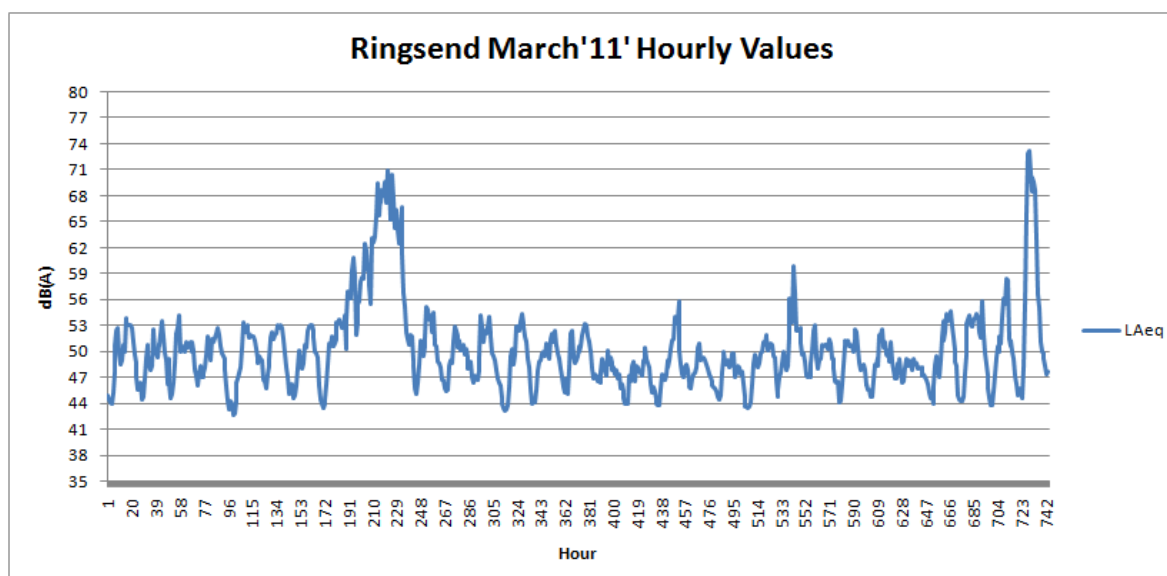
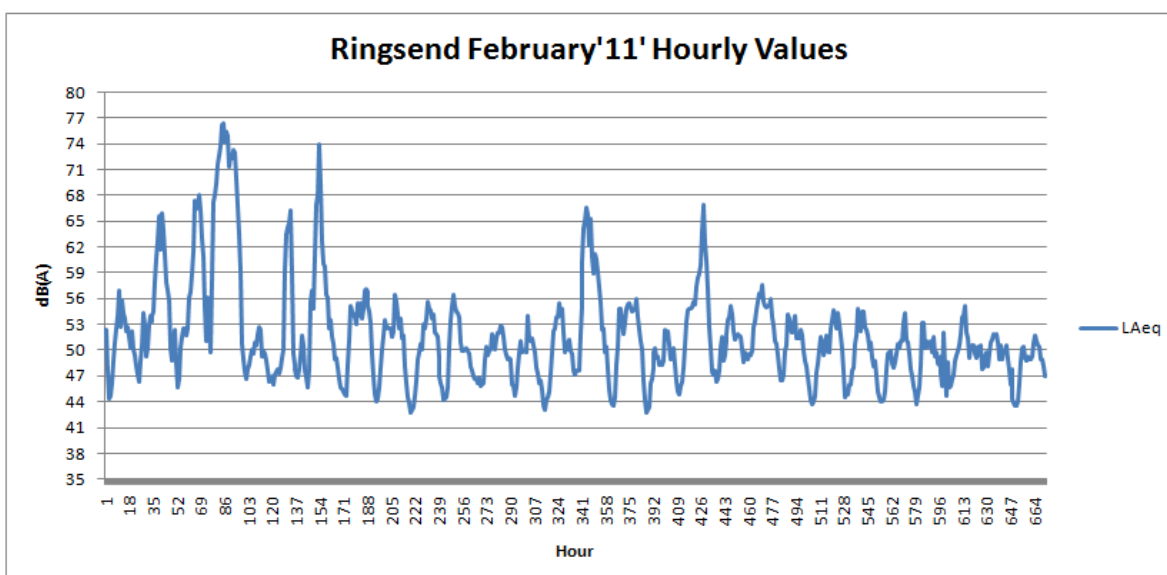
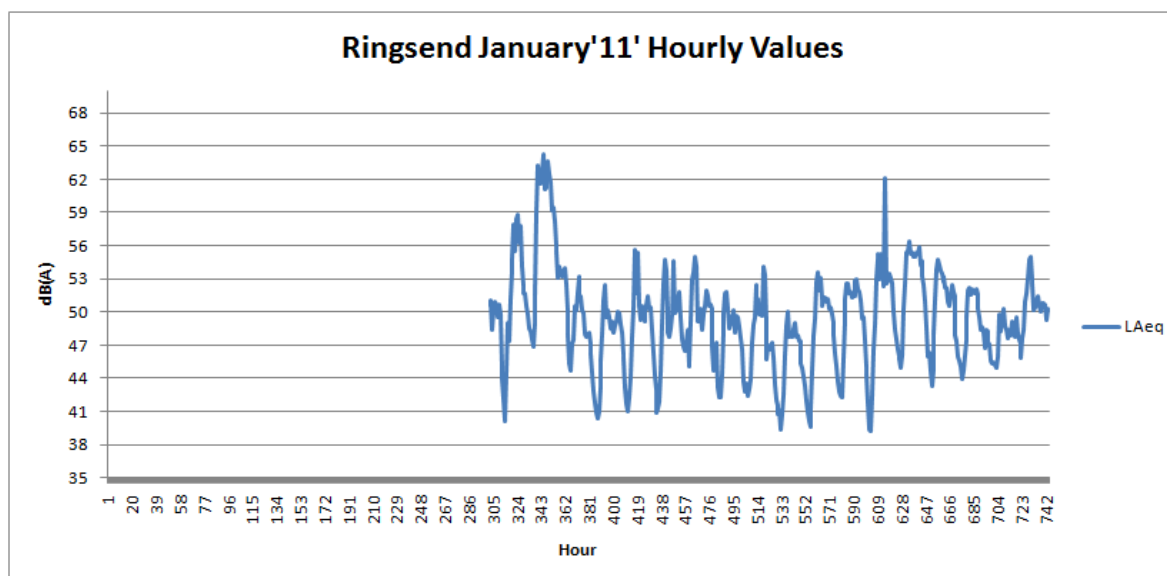


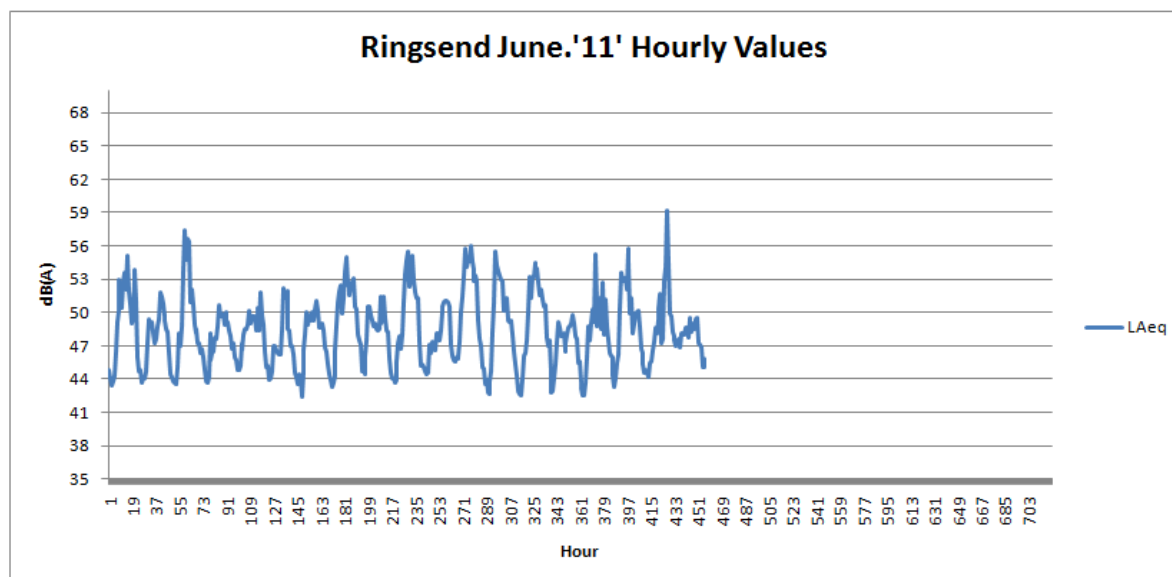
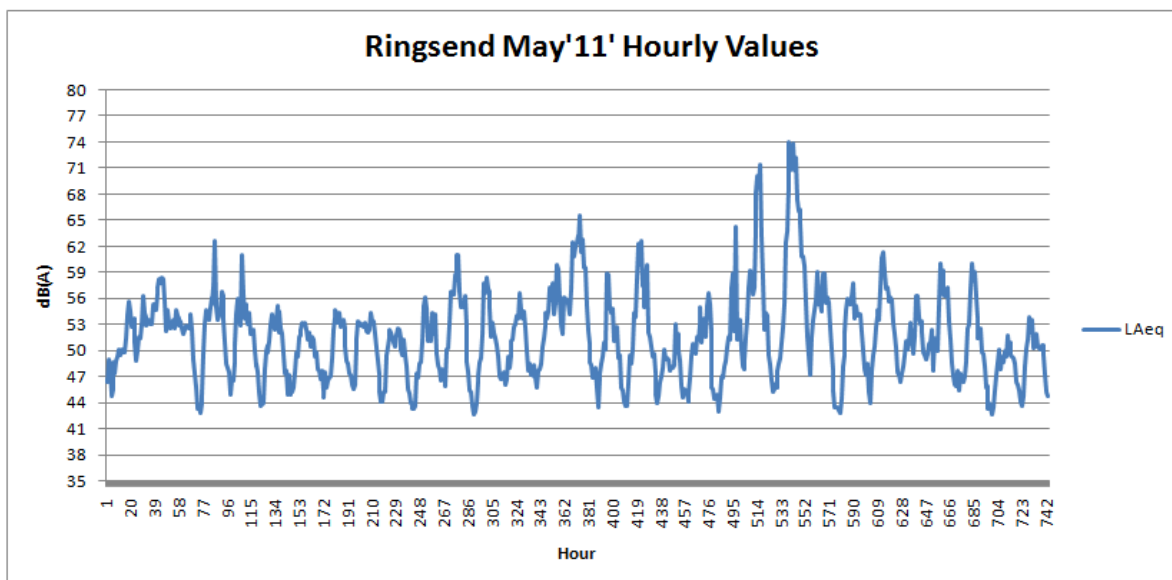
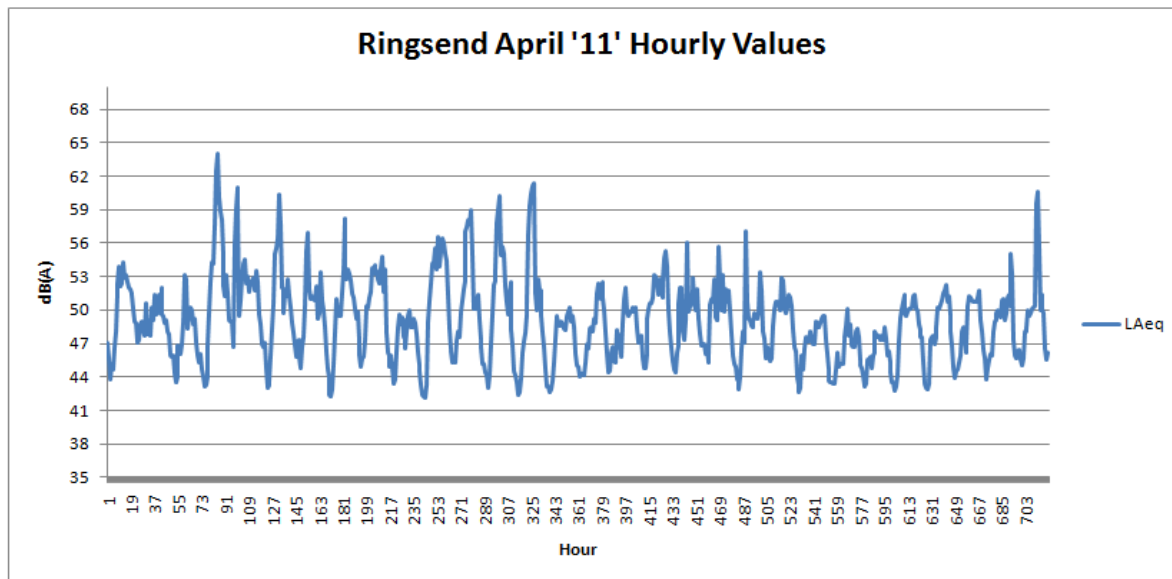


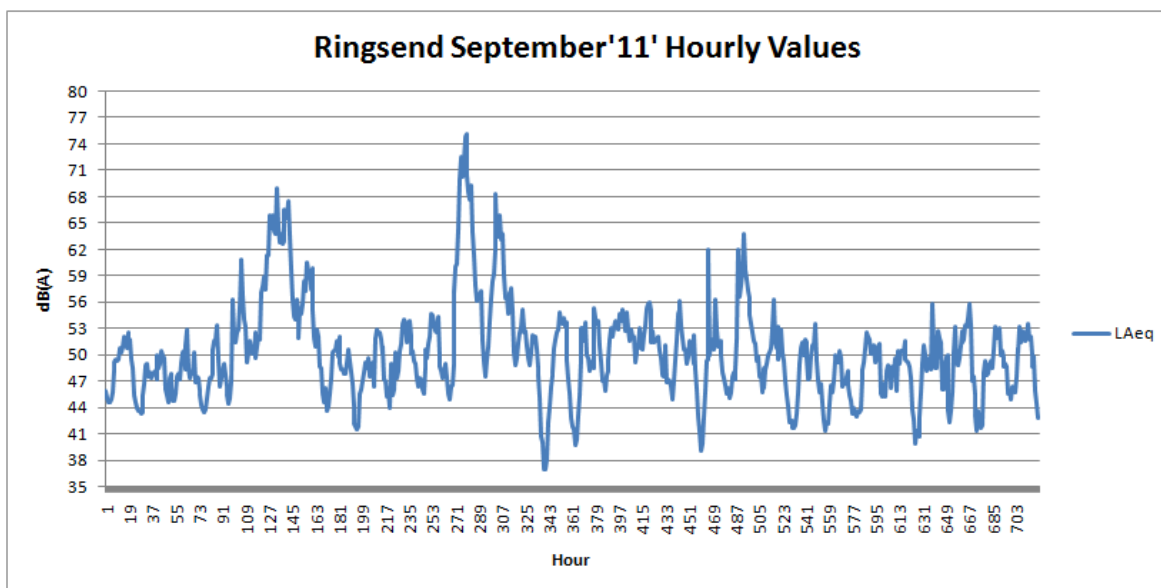
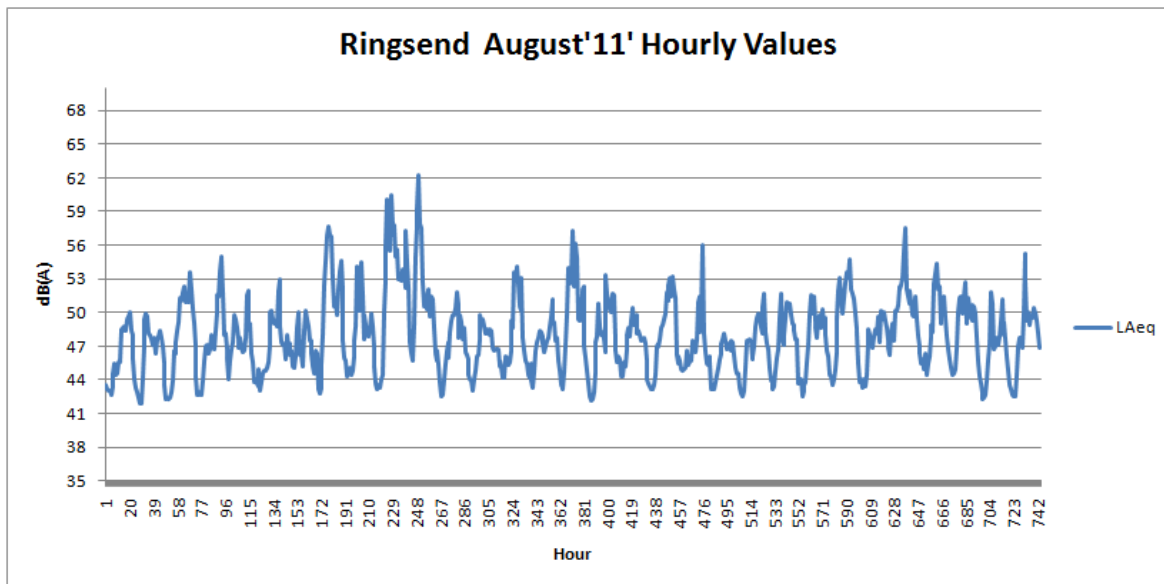
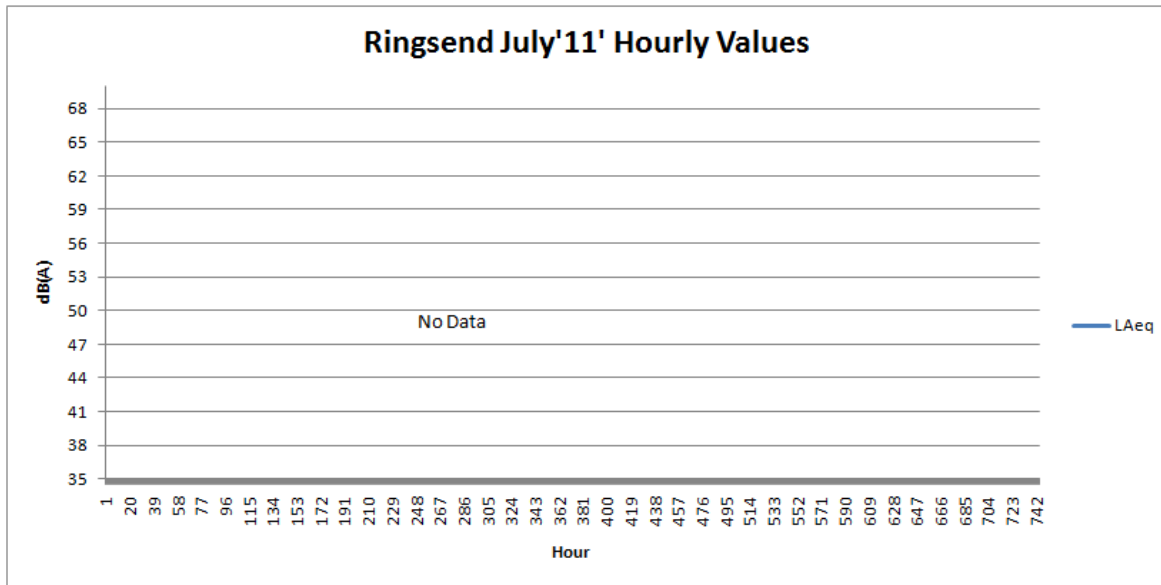


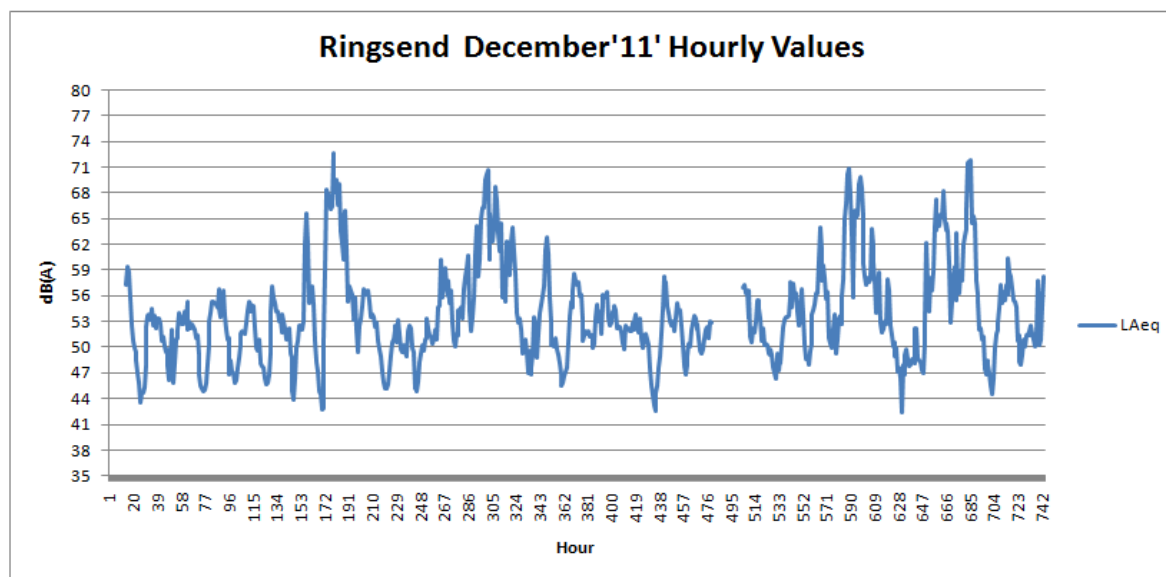
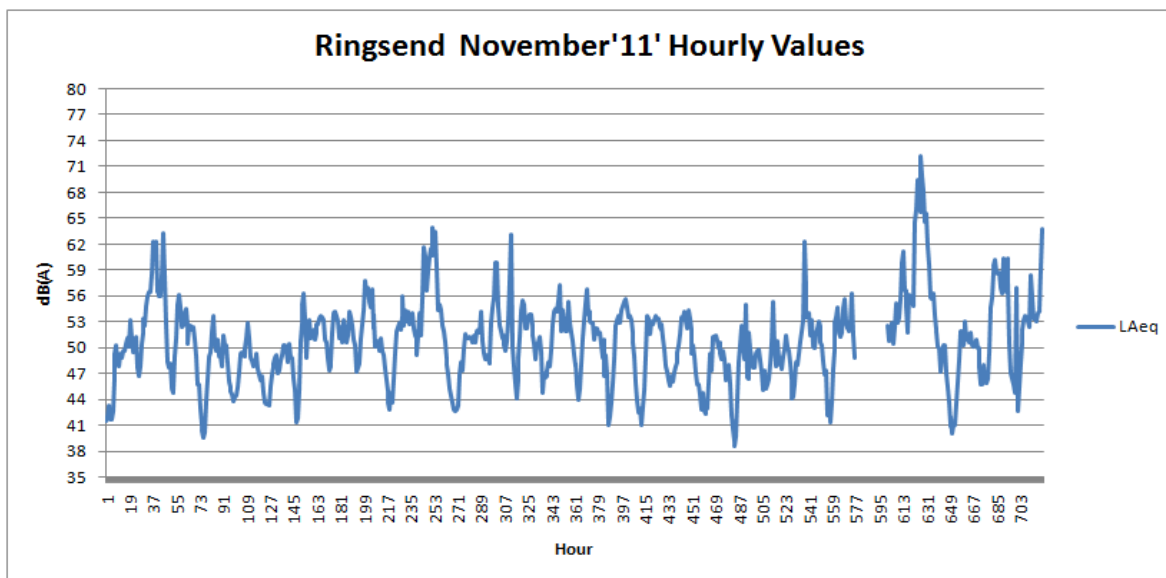
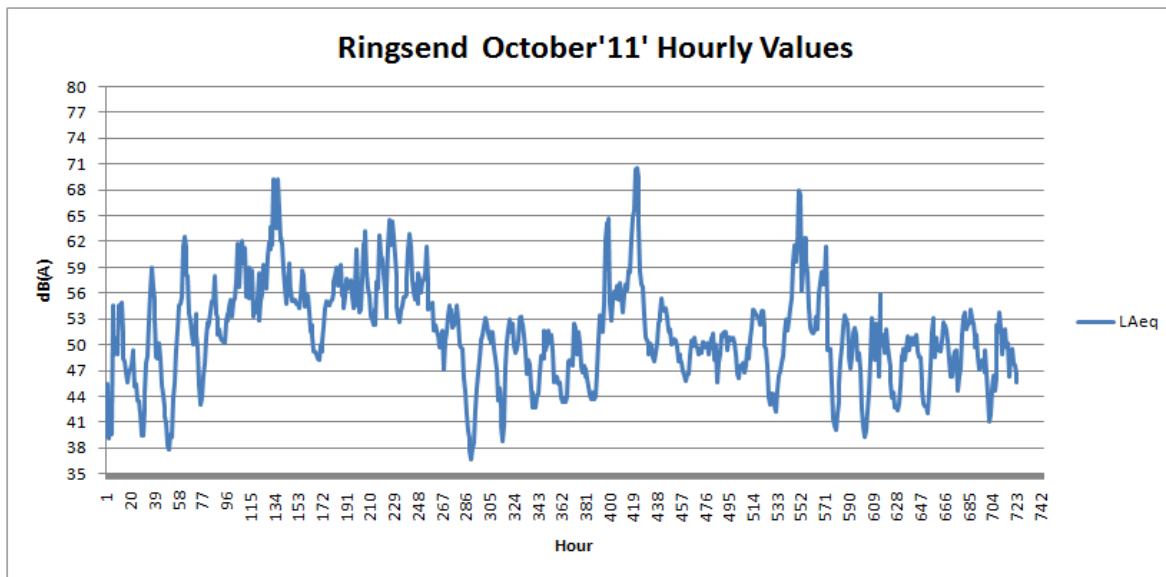
IRISHTOWN SPORTS CENTRE
RINGSEND
DUBLIN 4





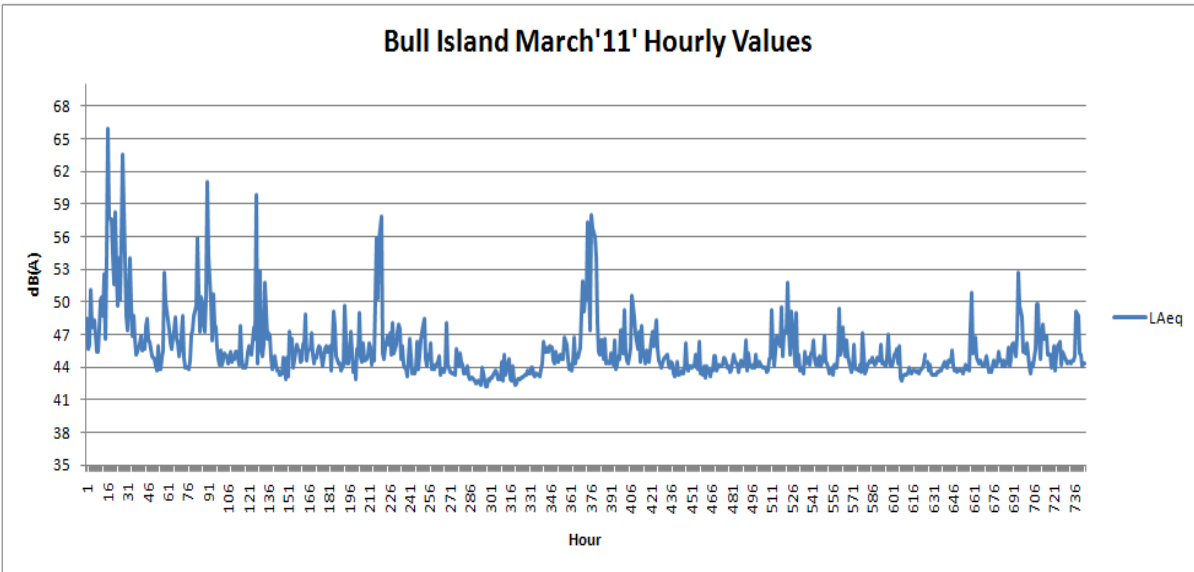
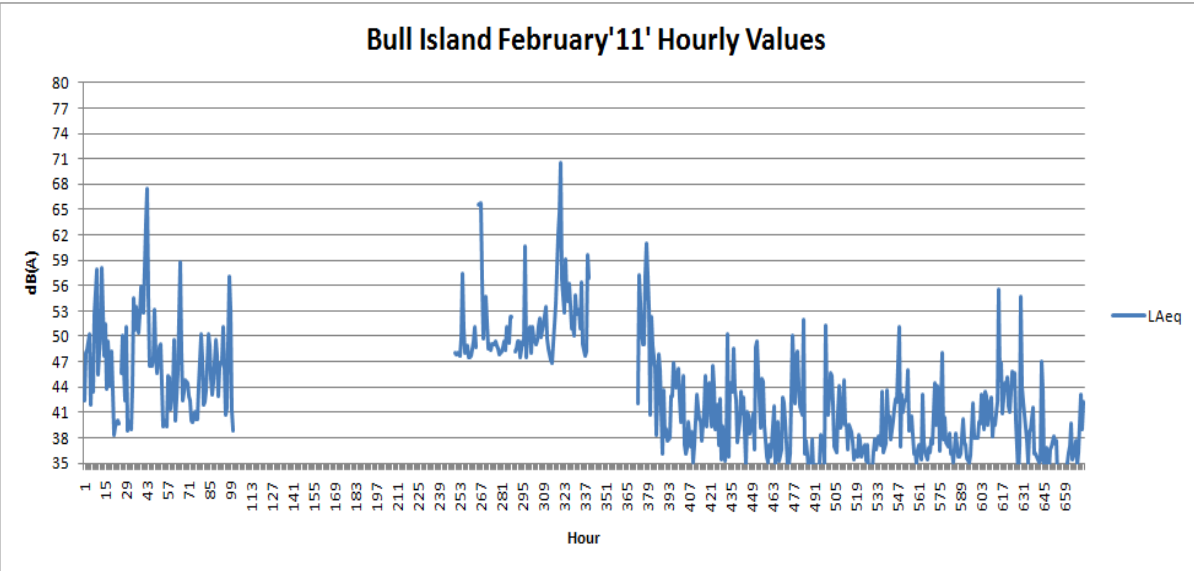
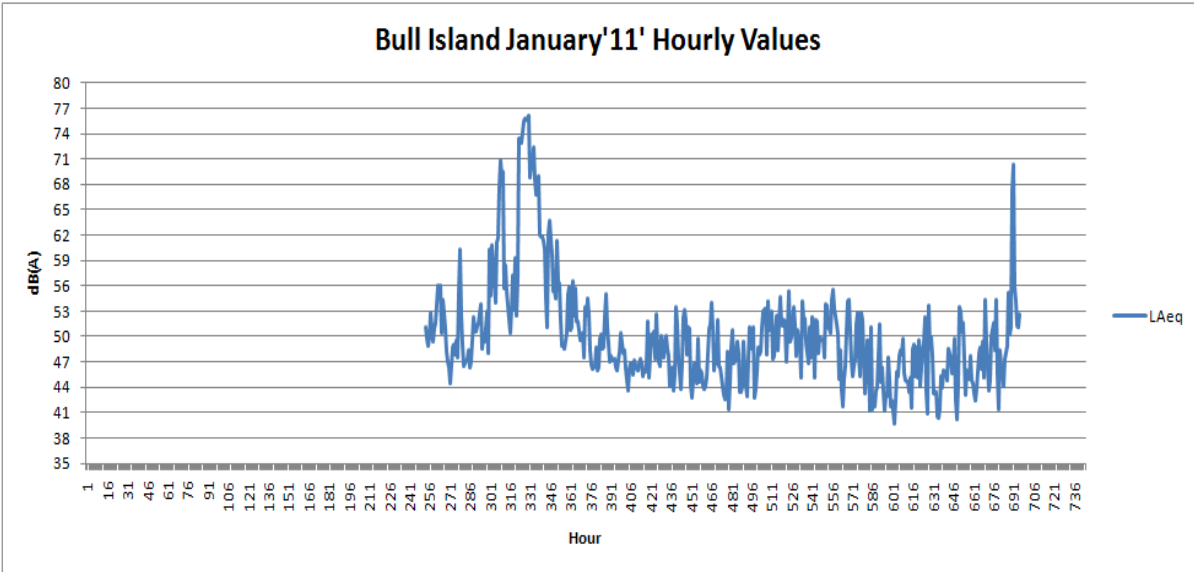


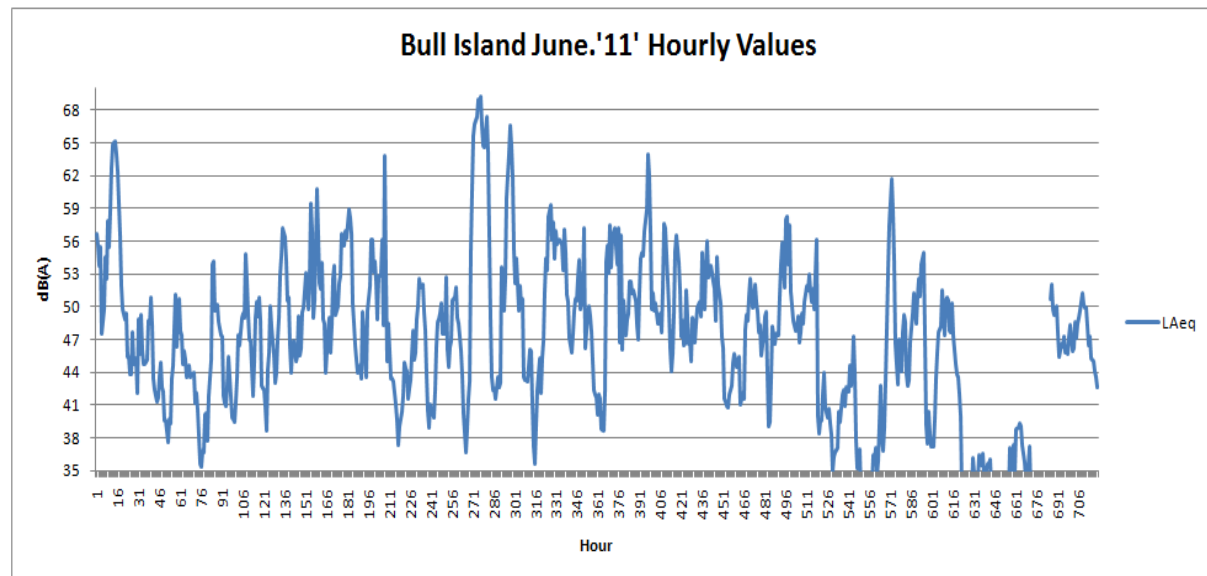
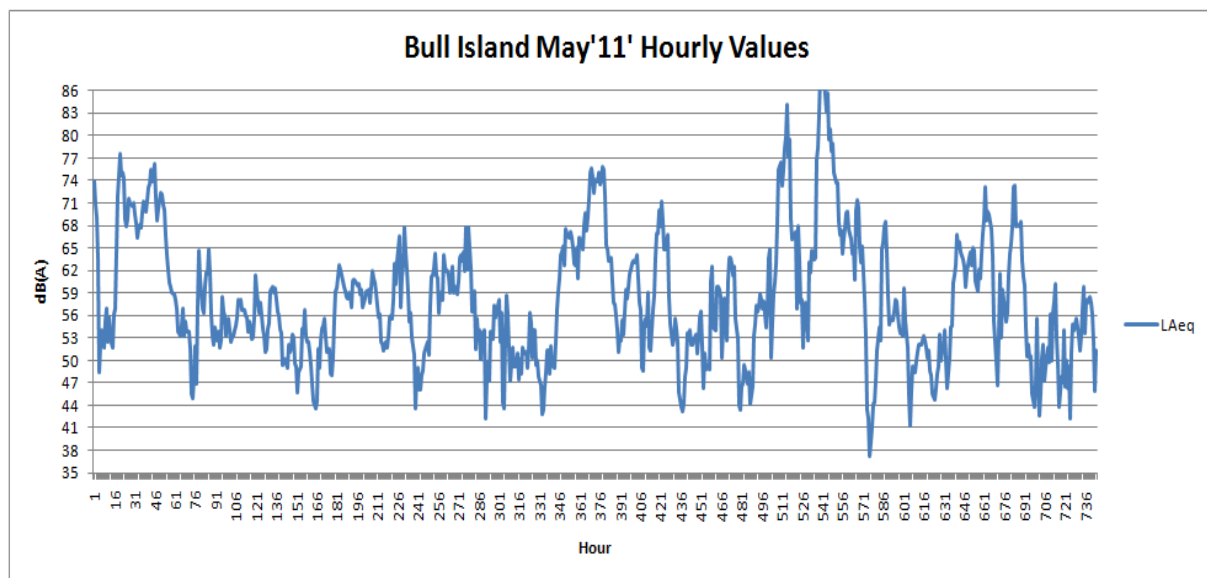
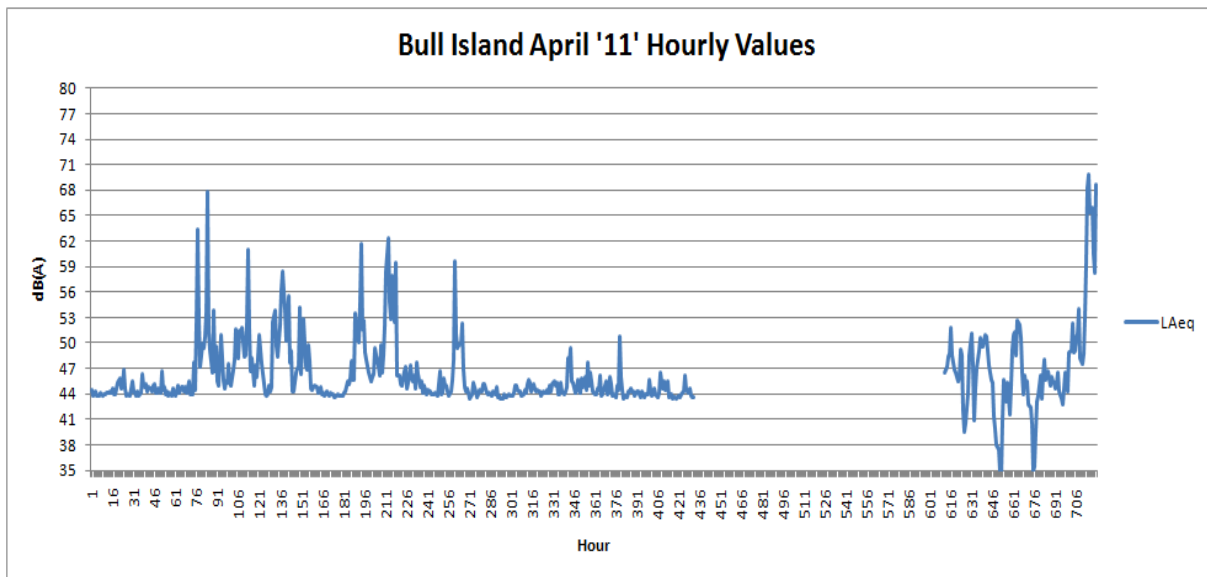


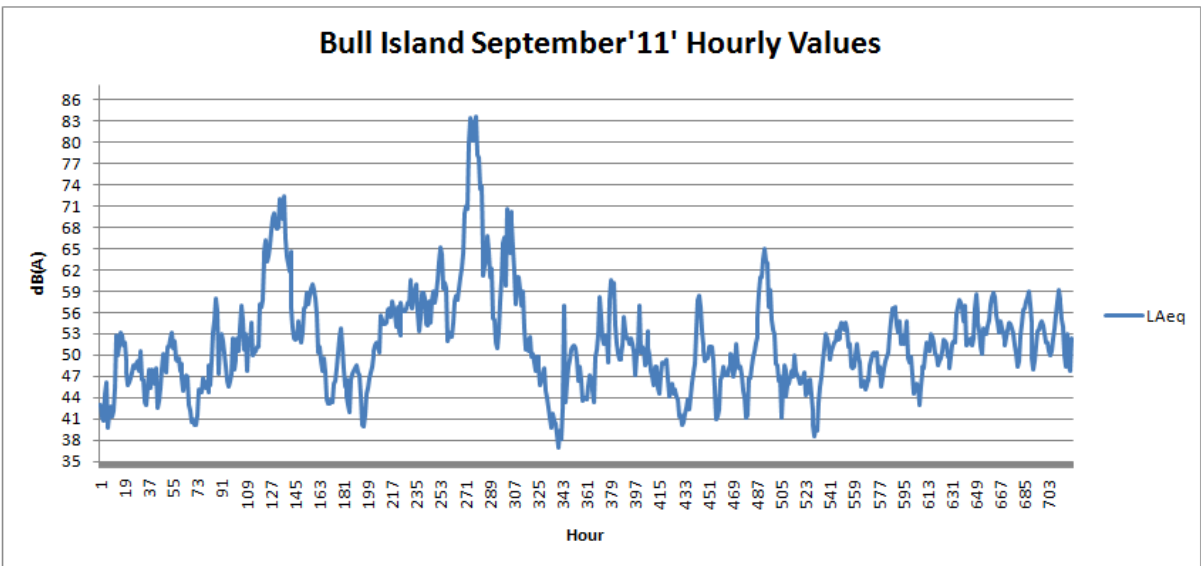
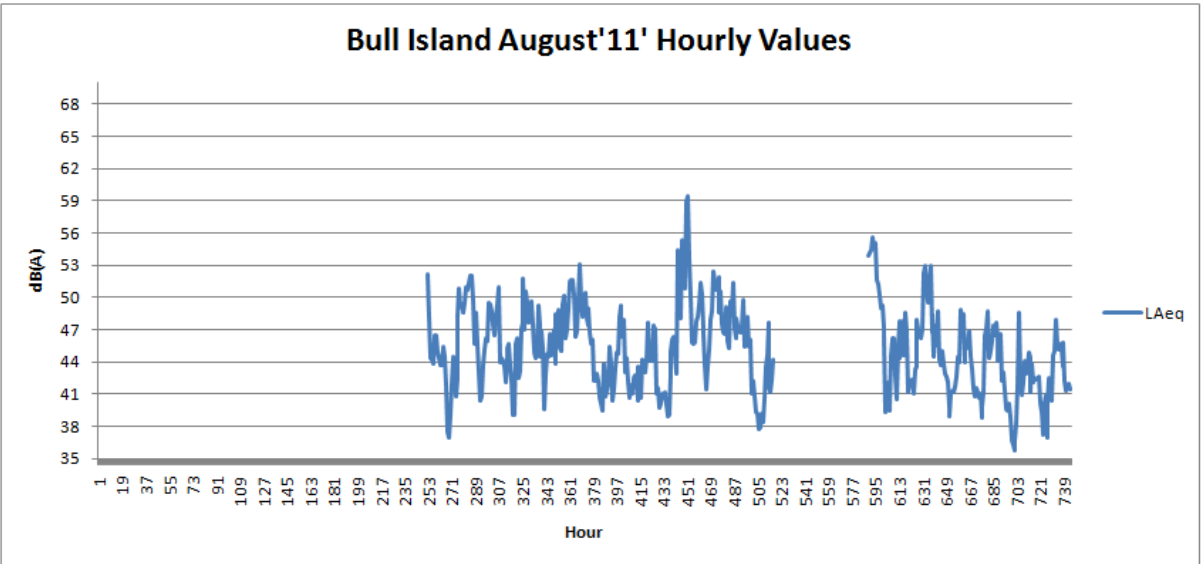
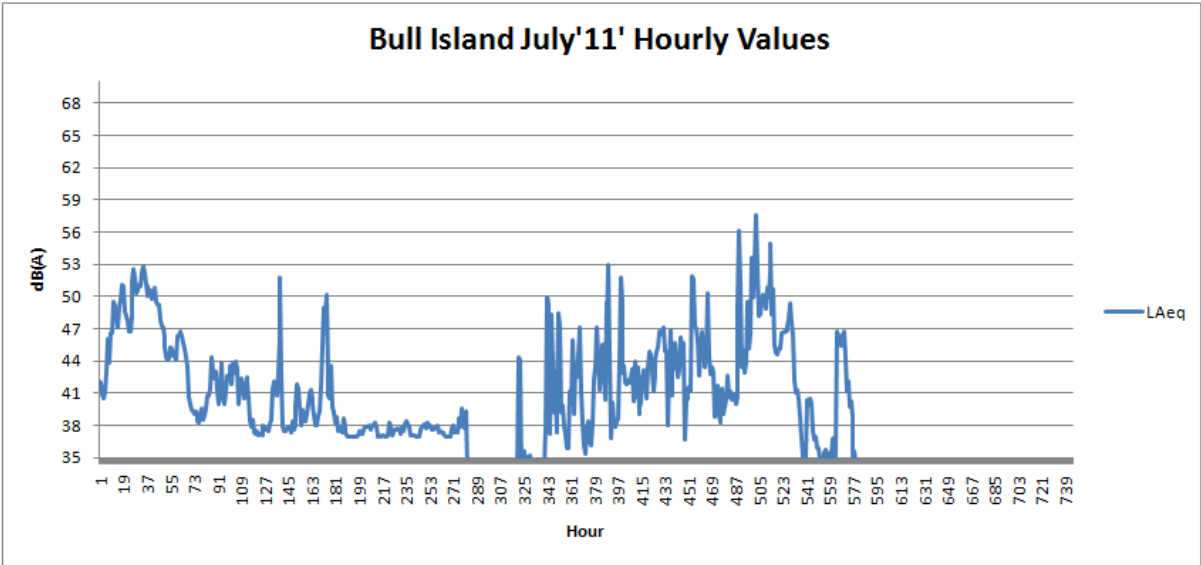


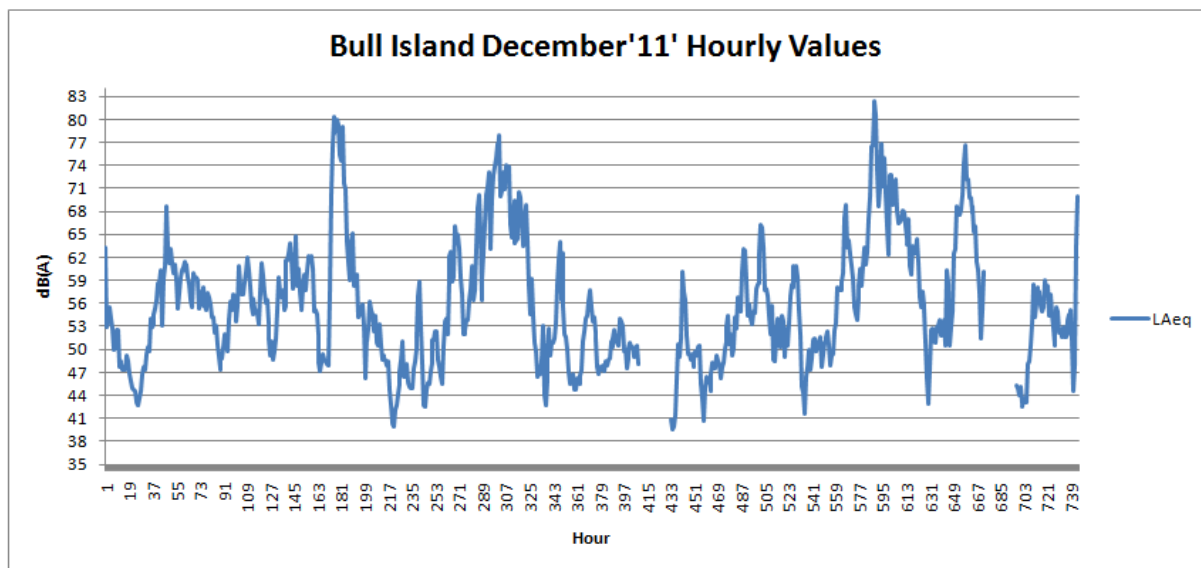
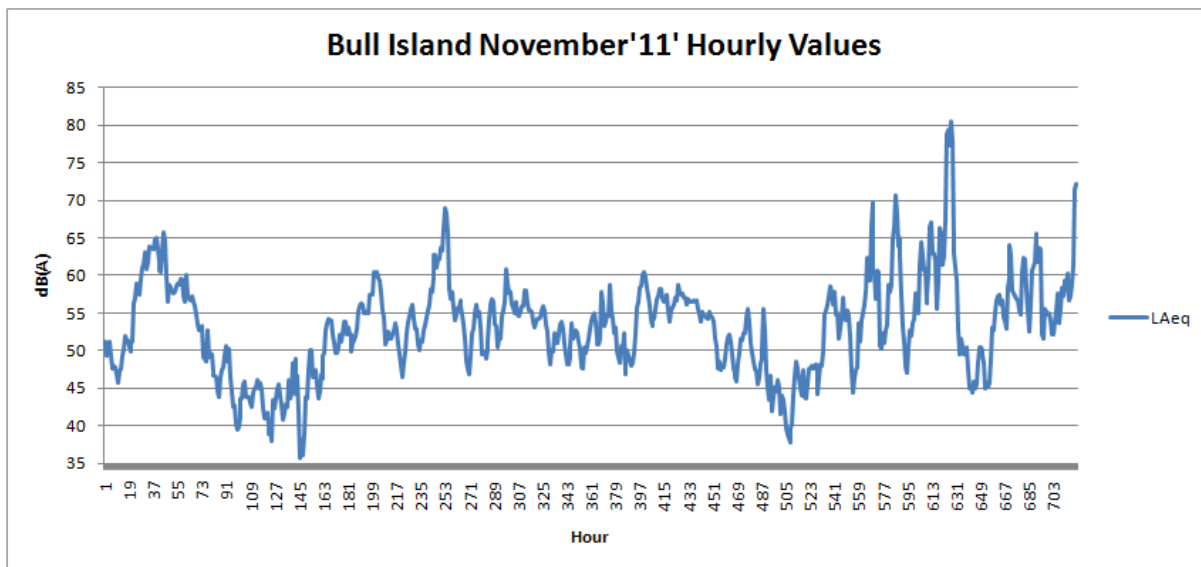
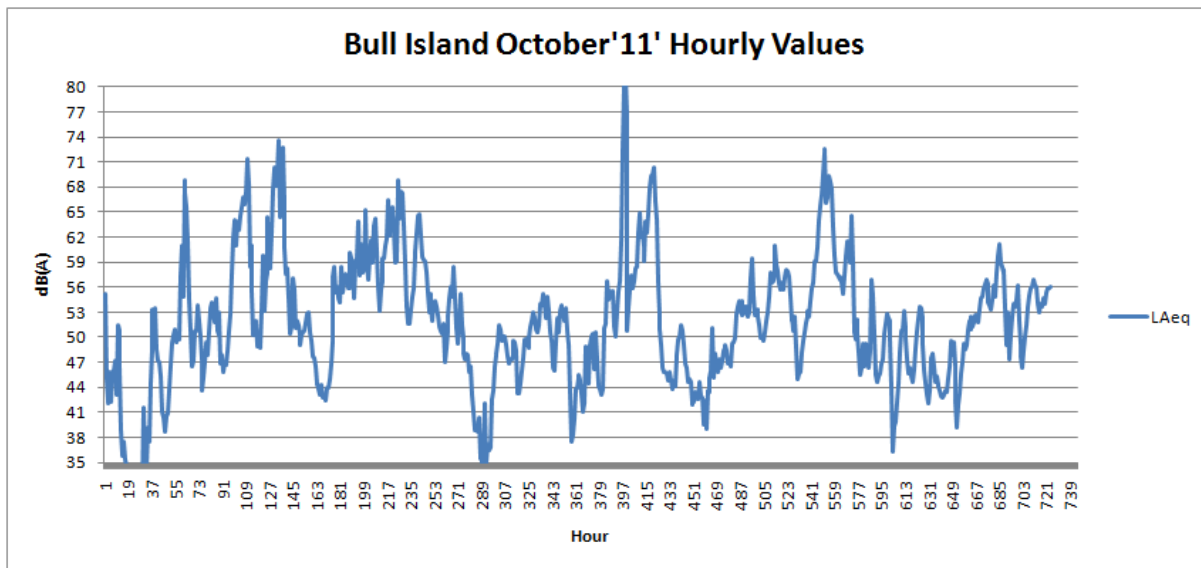
BULL ISLAND INTERPRETATIVE CENTRE
BULL ISLAND
DUBLIN 3





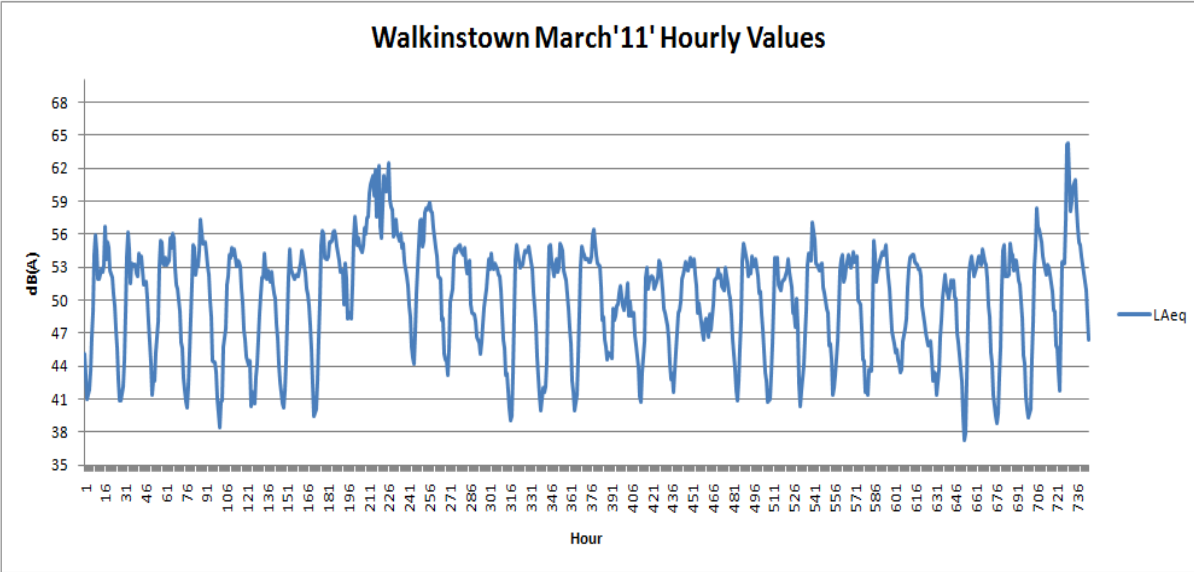
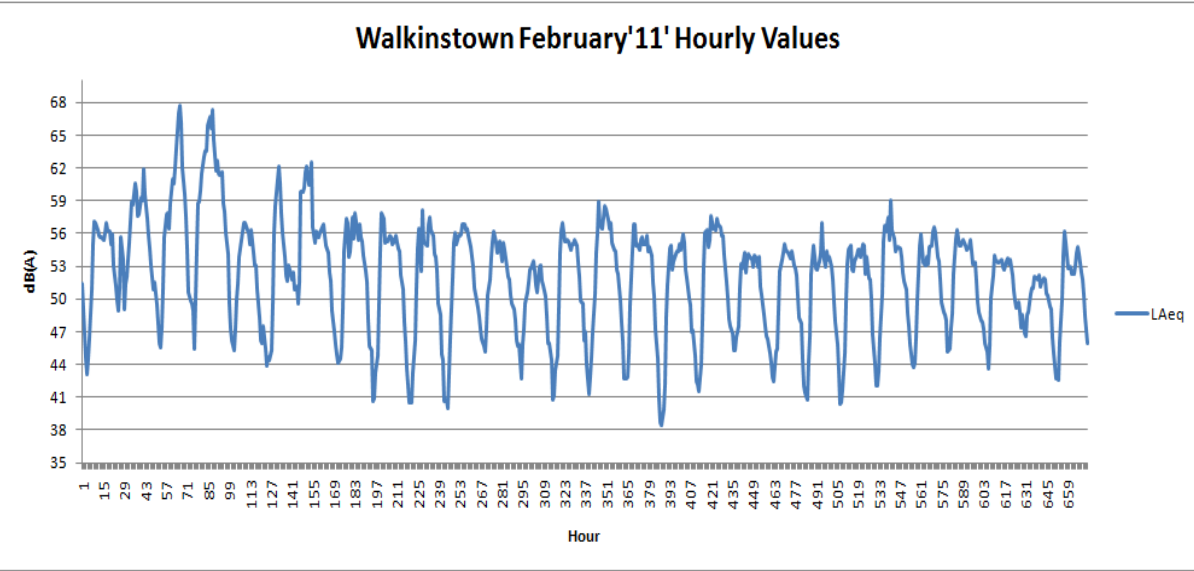
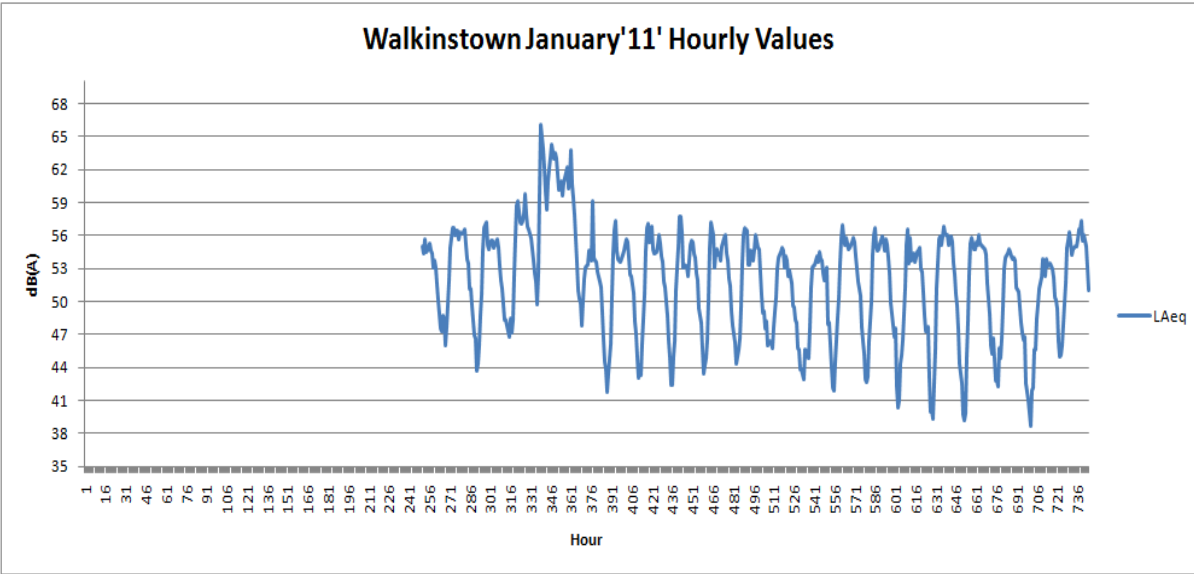




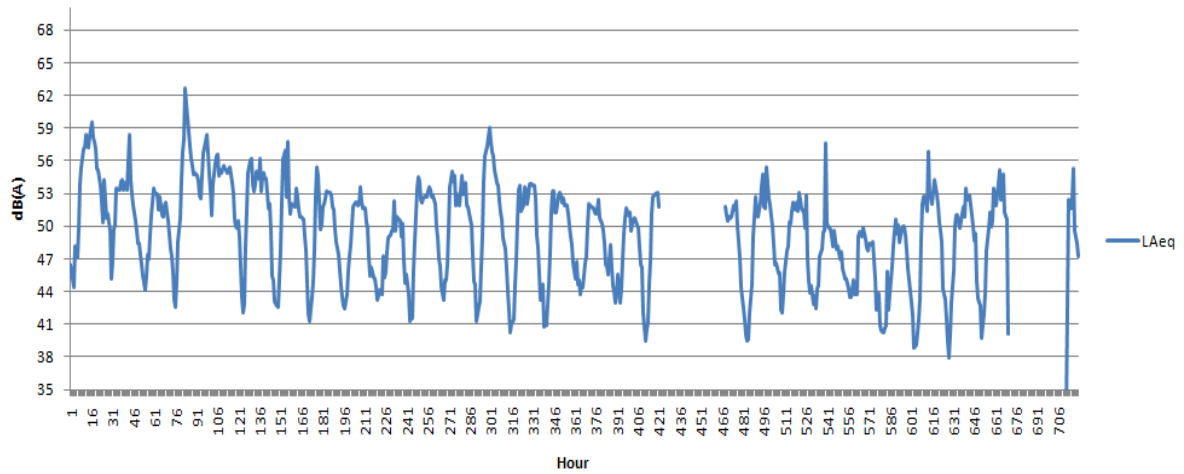


WALKINSTOWN LIBRARY
PERCY FRENCH ROAD
DUBLIN 12

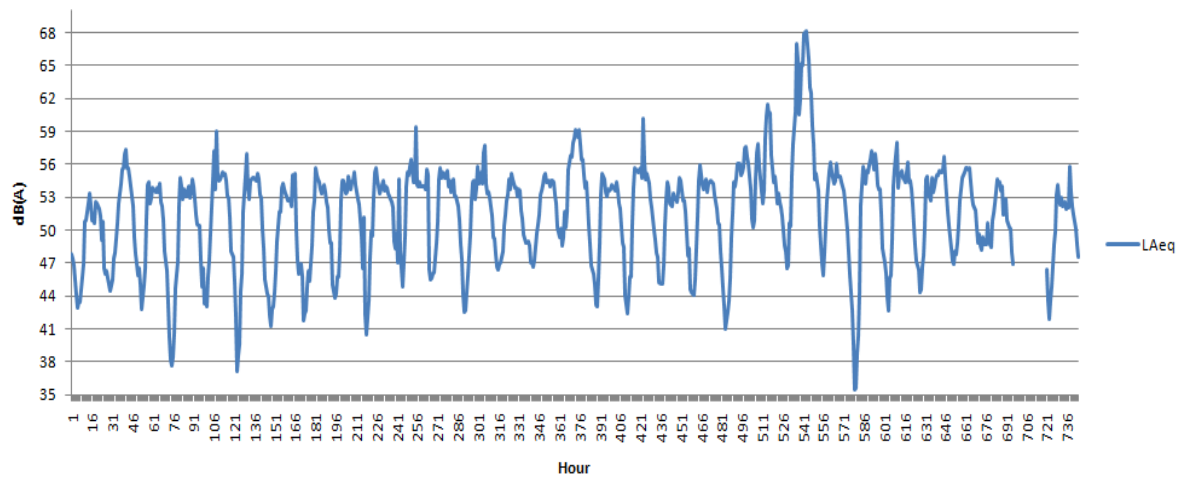




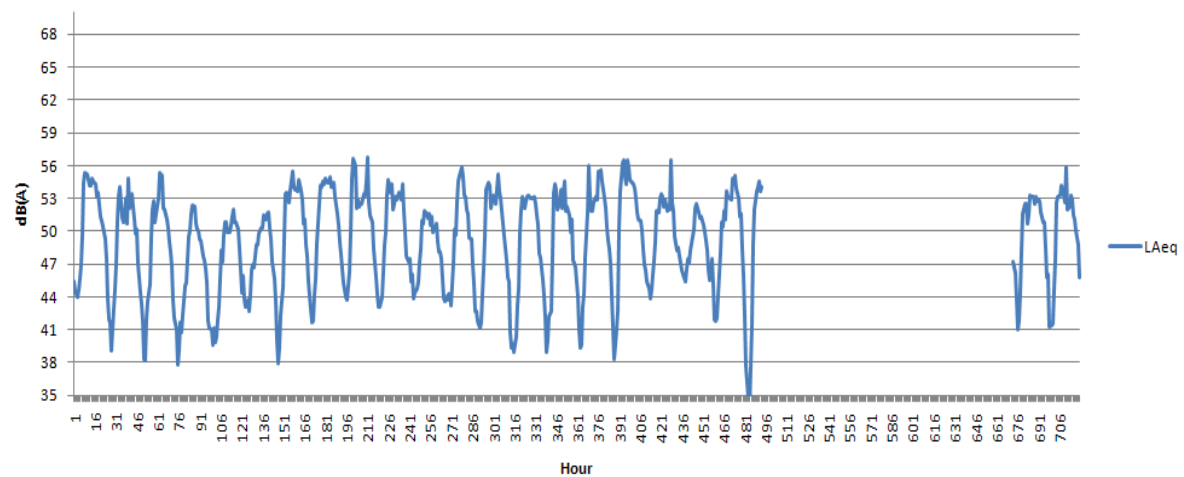
Walkinstown April '11' Hourly Values



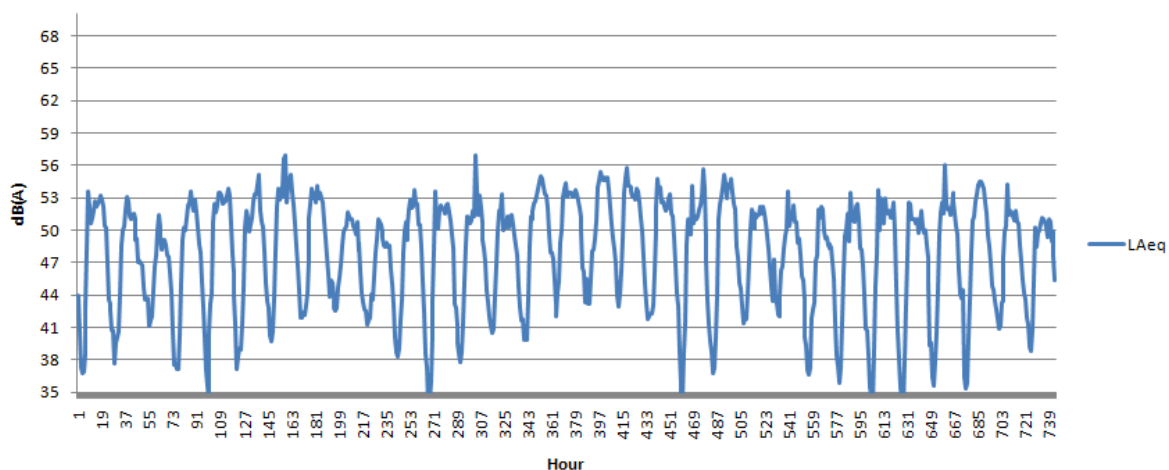
Walkinstown May '11' Hourly Values



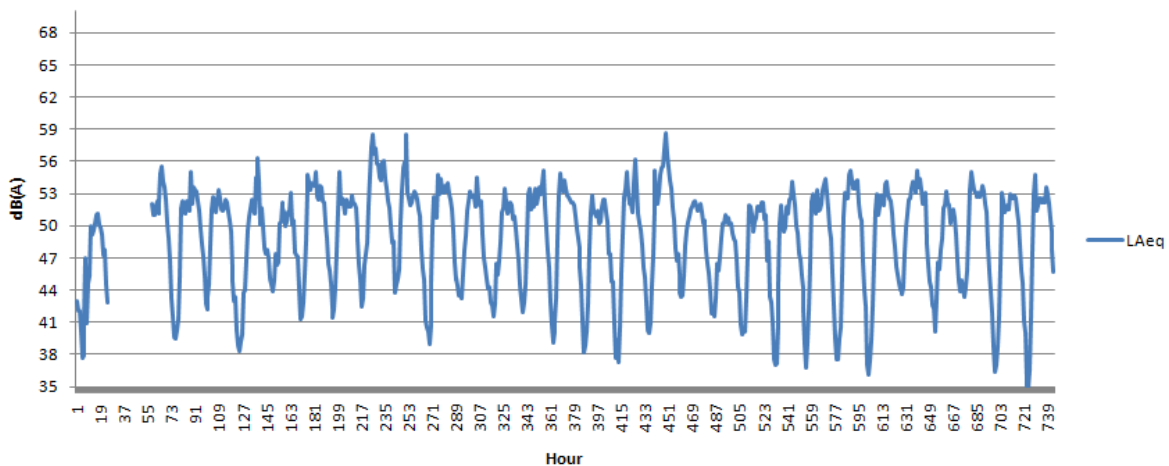
Walkinstown June. '11' Hourly Values



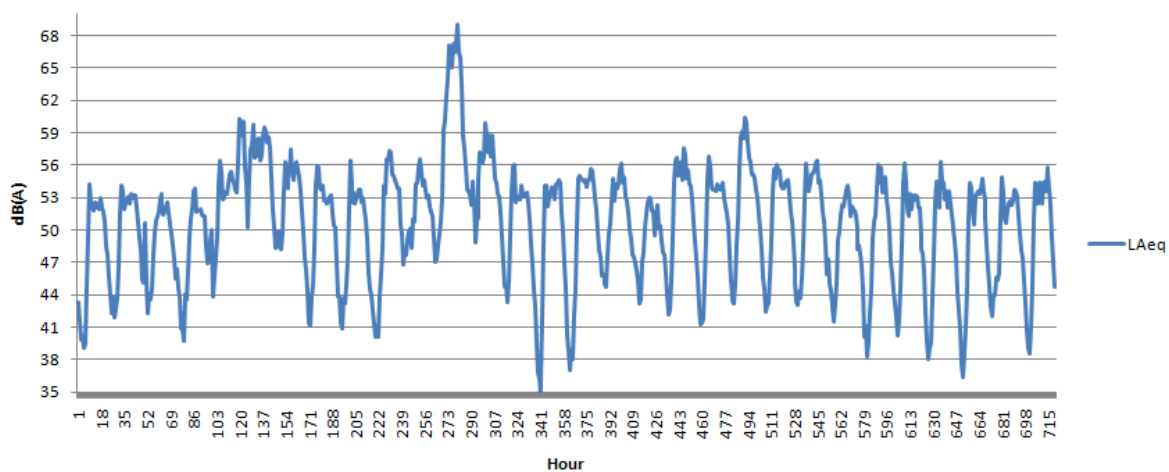
Walkinstown July'11' Hourly Values

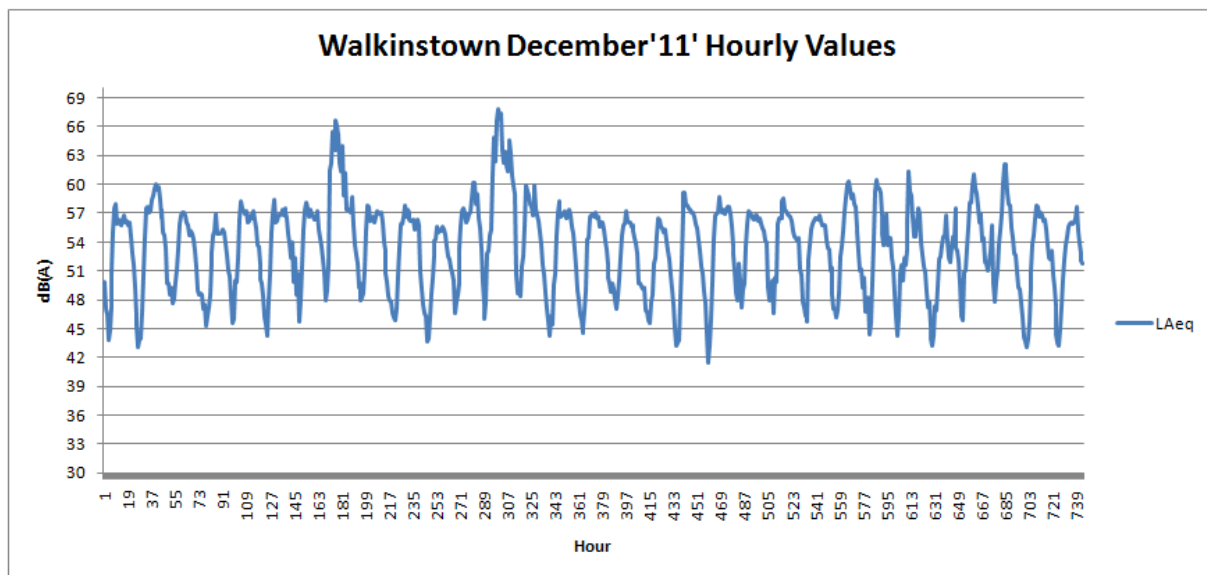
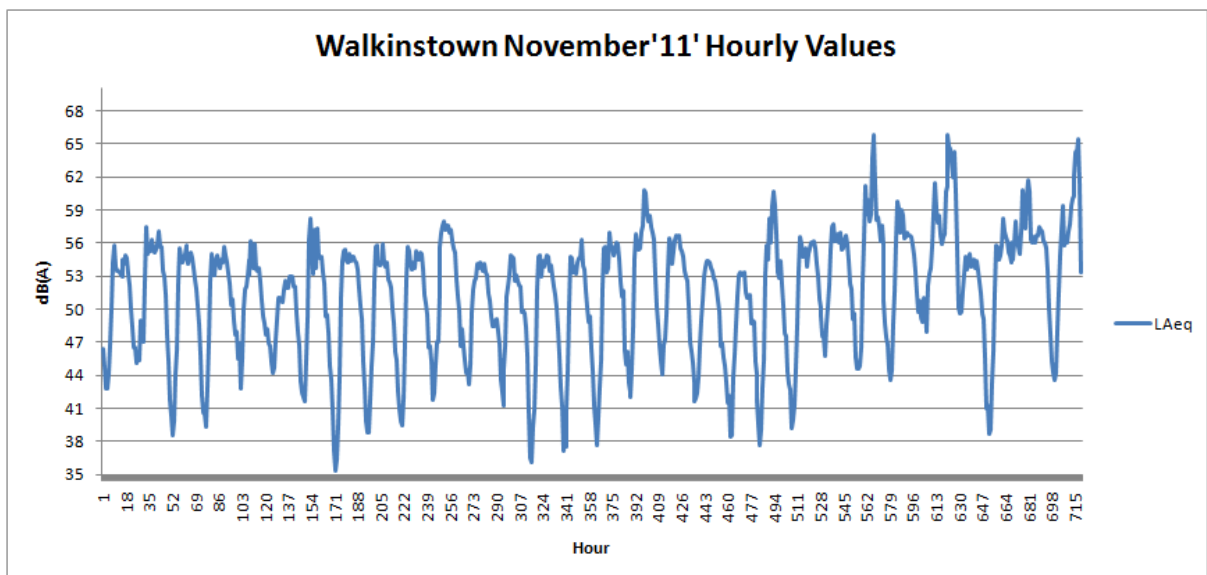
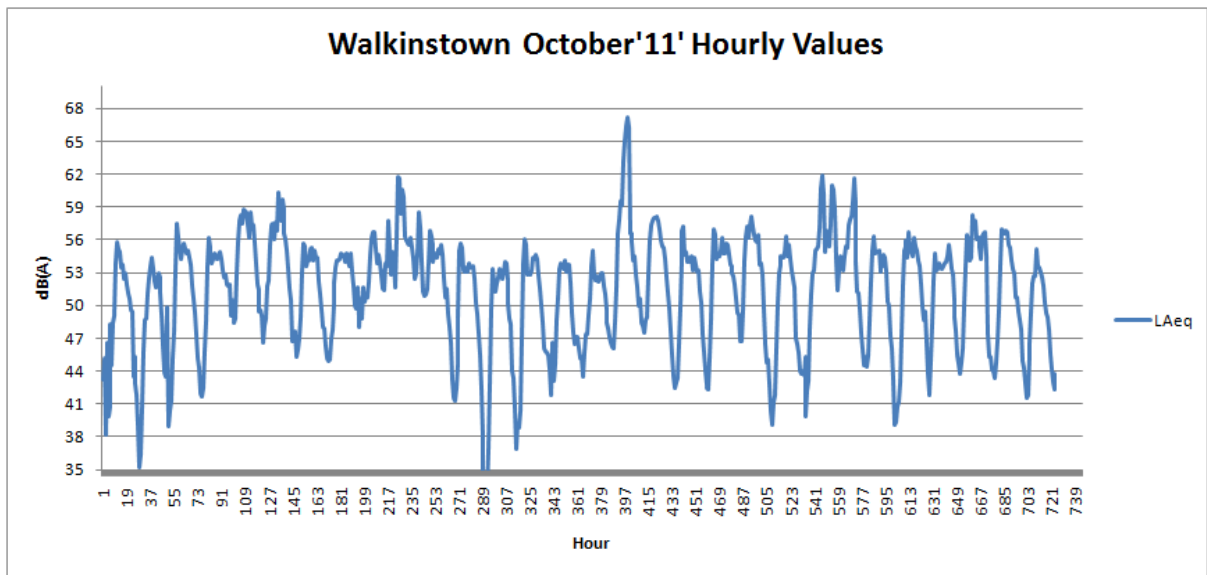


Walkinstown August'11' Hourly Values

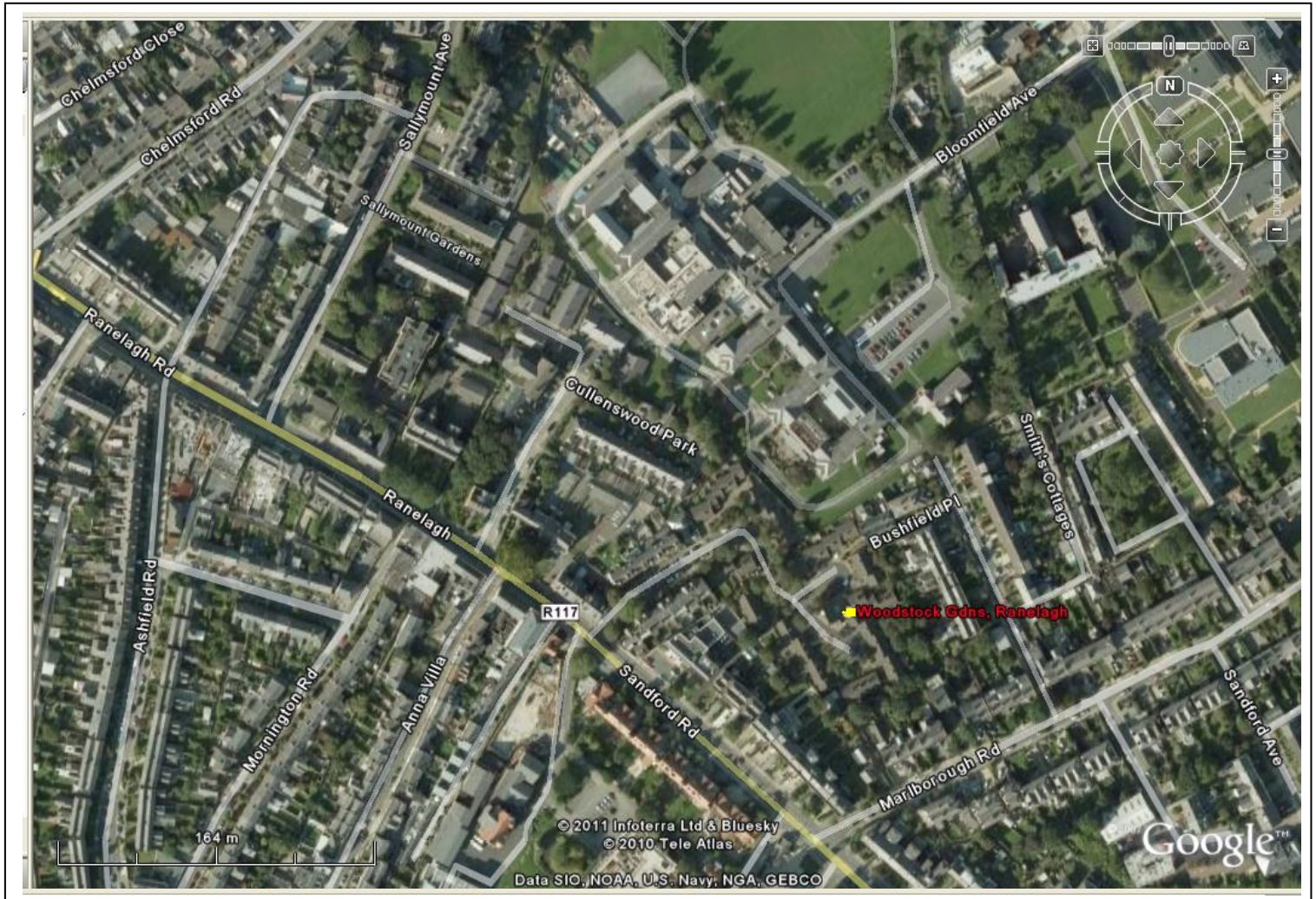


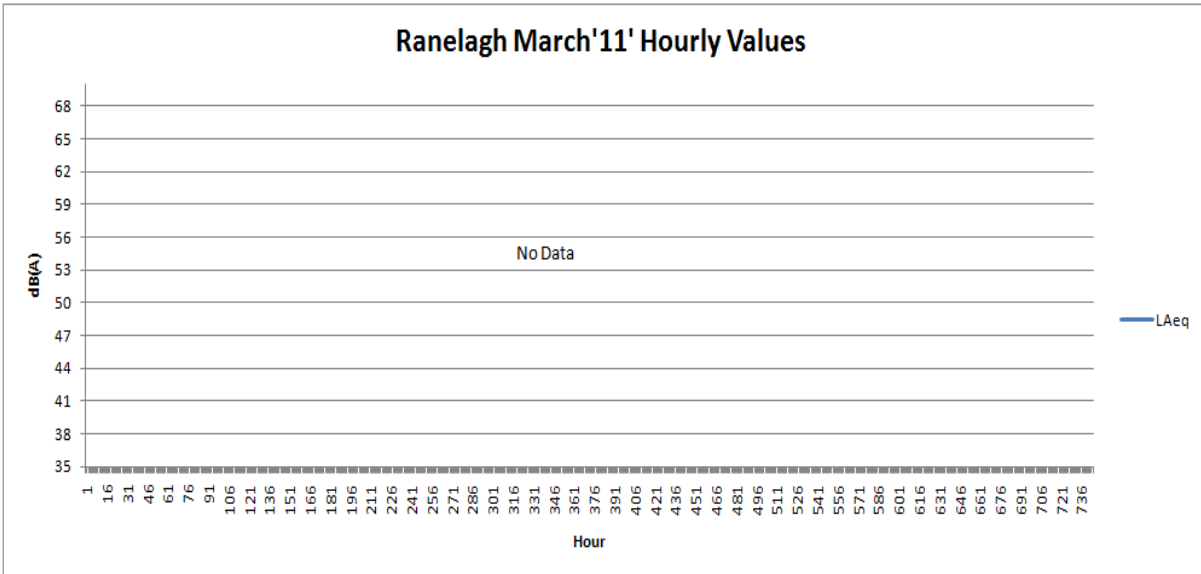
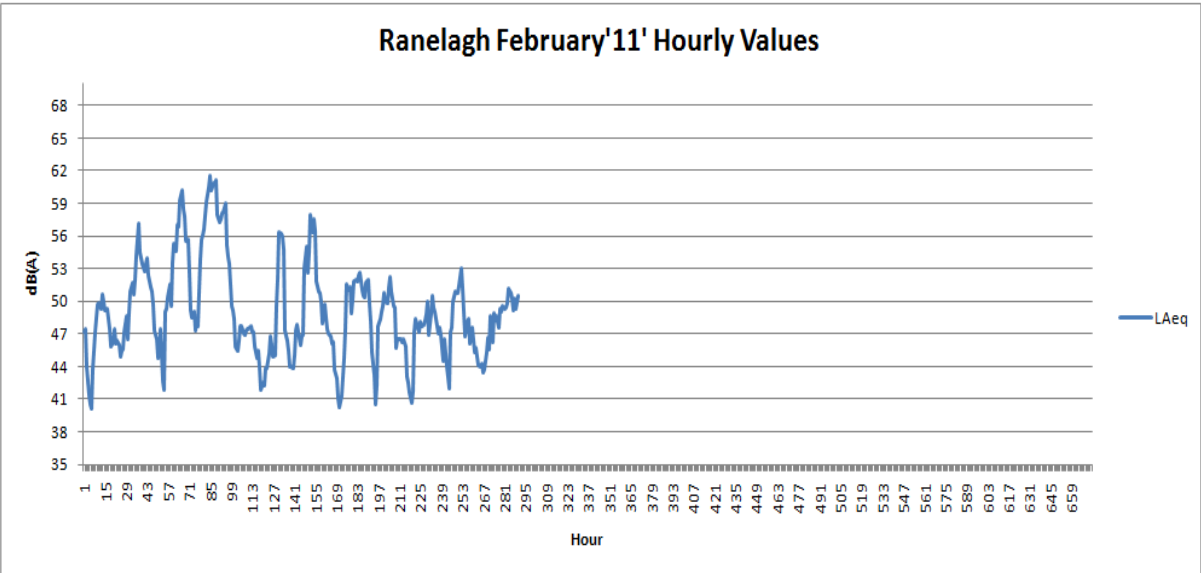
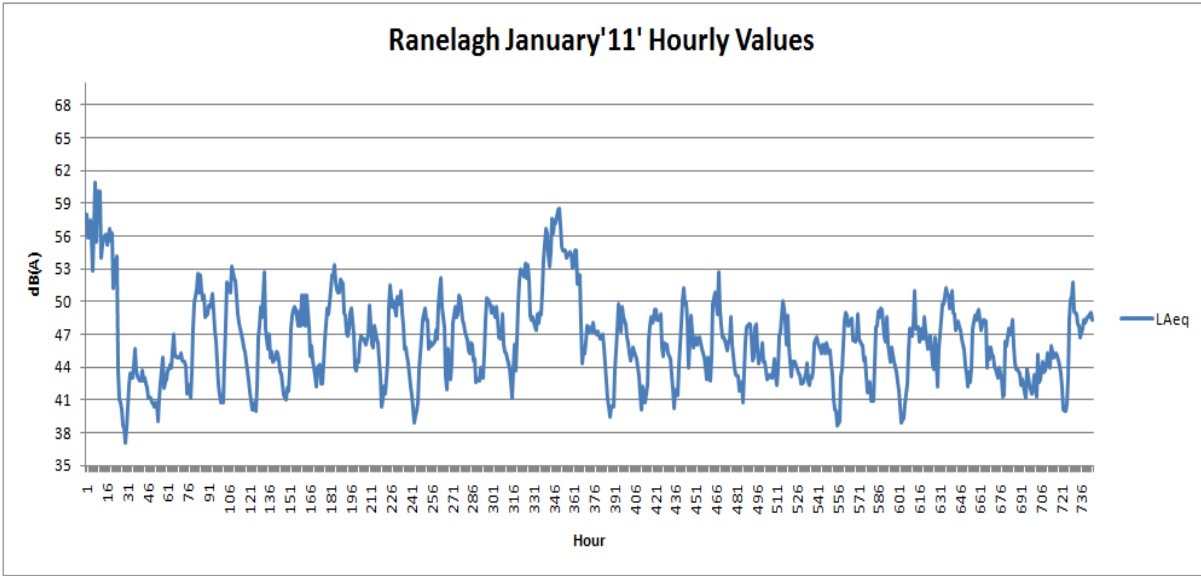
Walkinstown September'11' Hourly Values

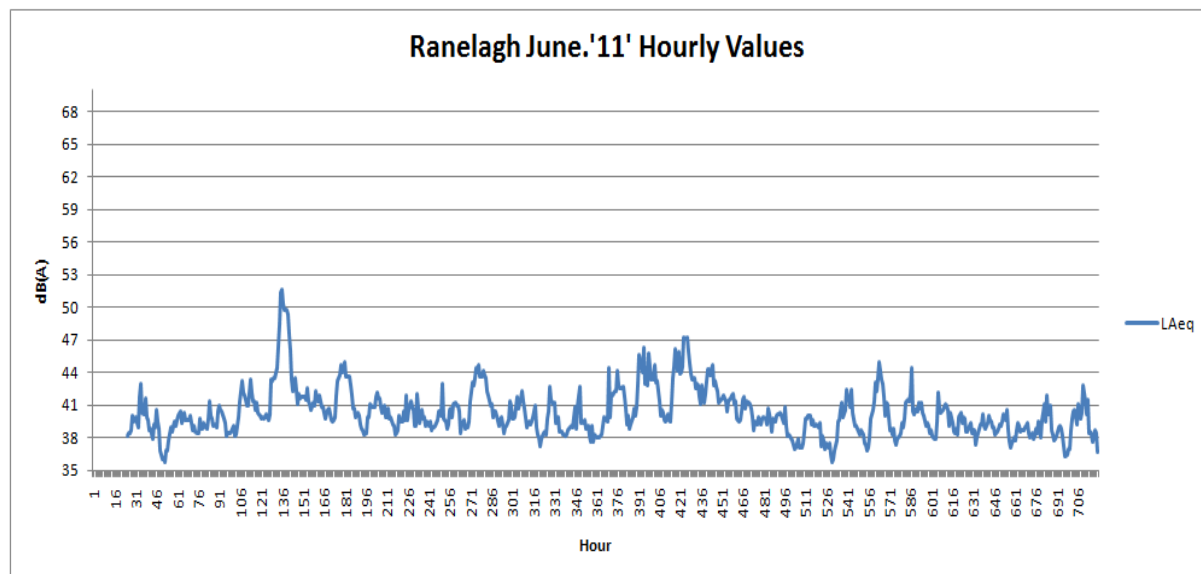
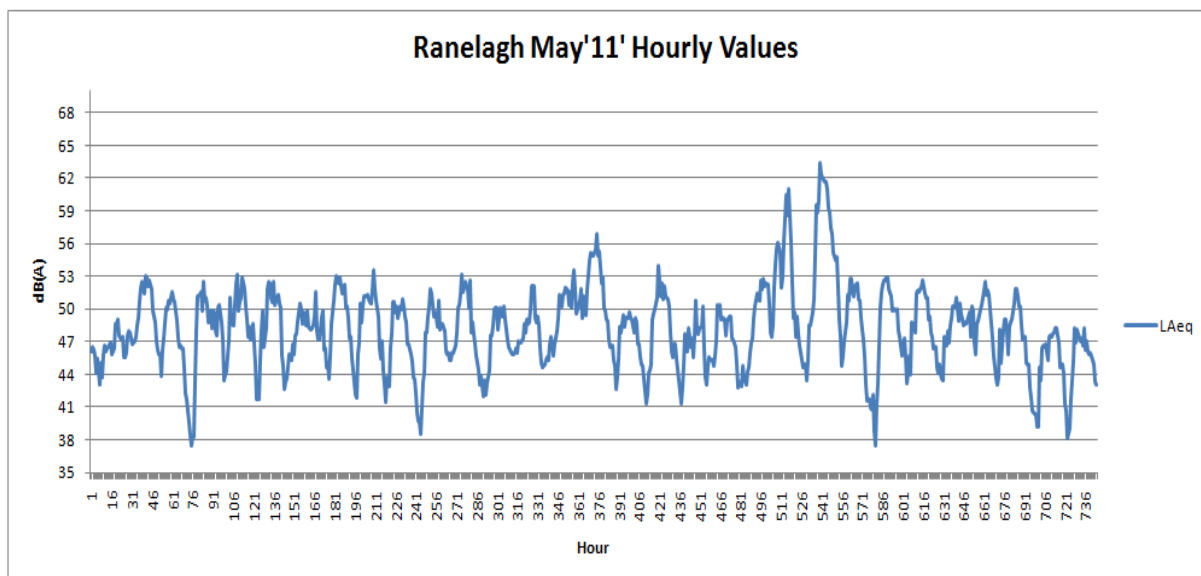
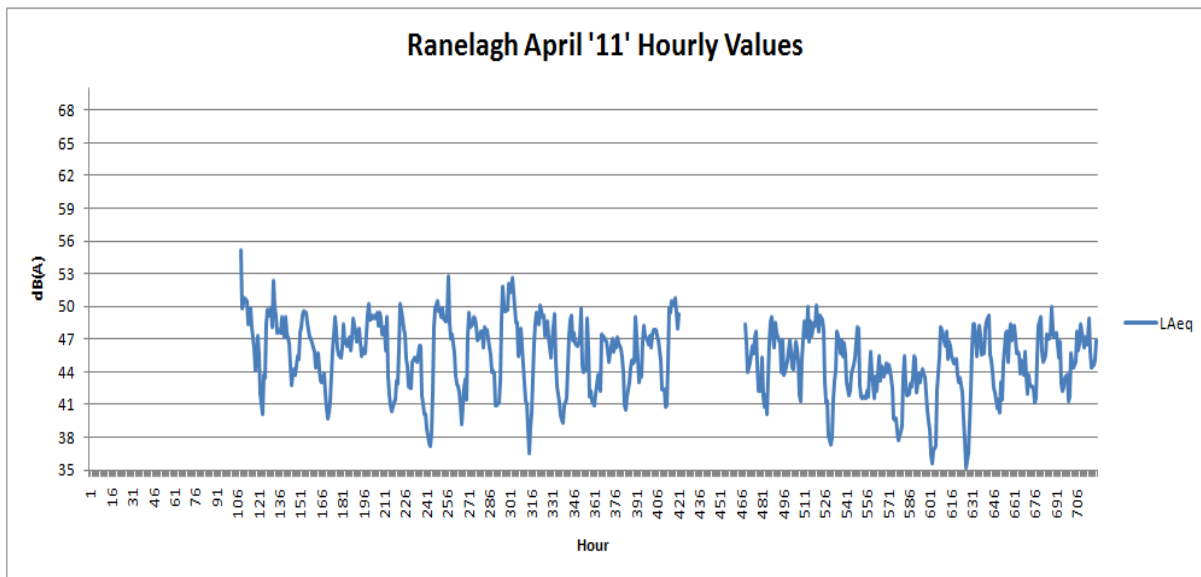




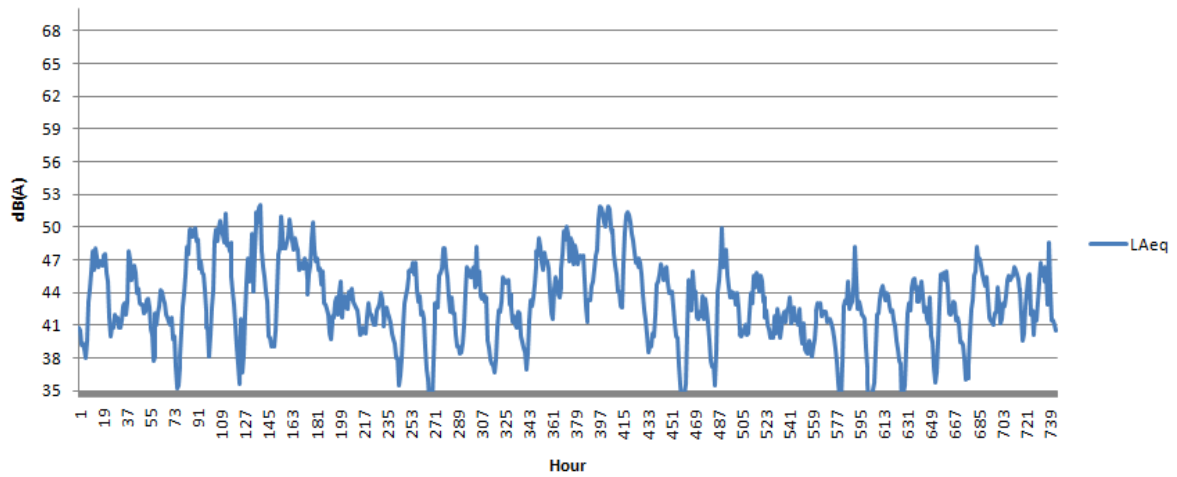
WOODSTOCK STOCK GARDENS
RANELAGH
DUBLIN 6



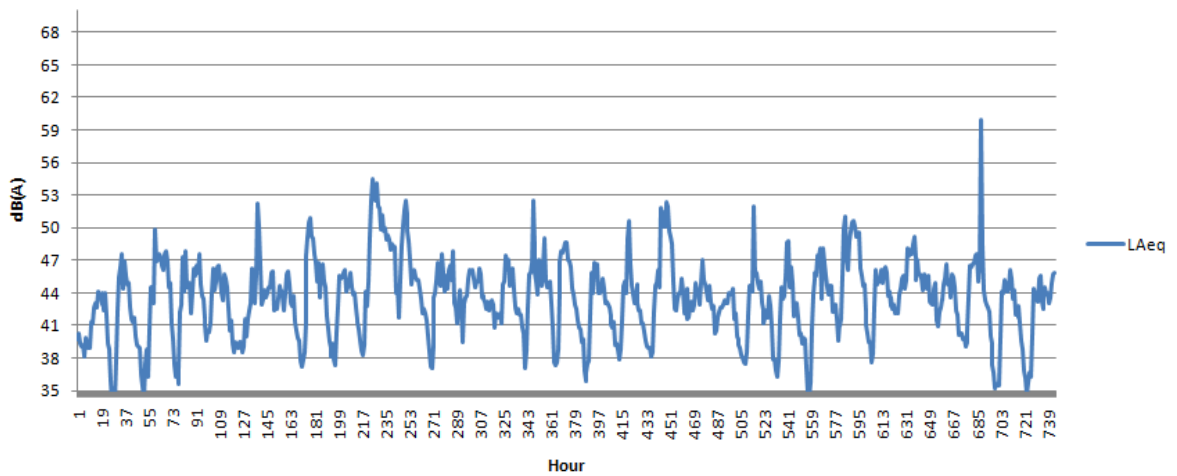




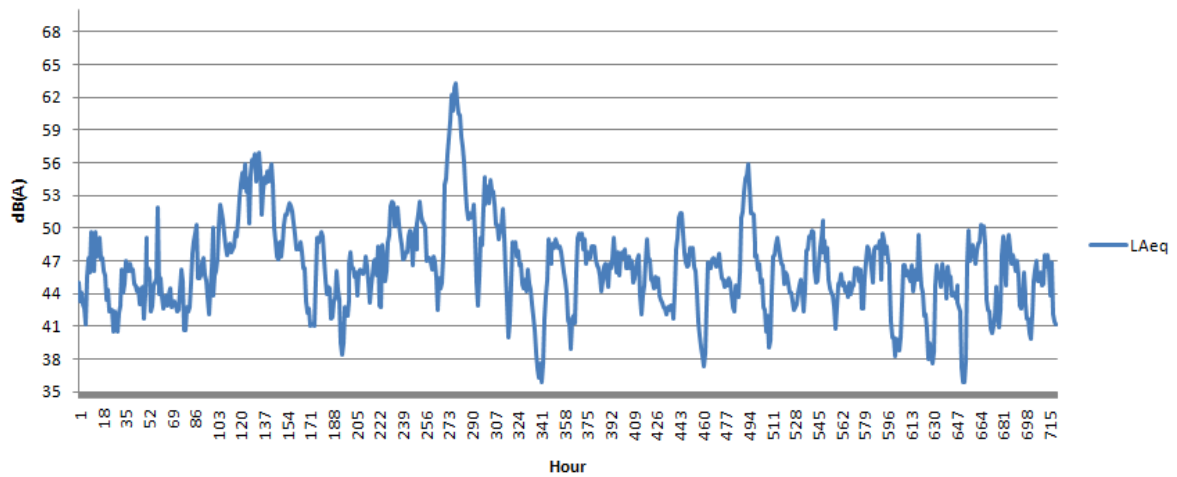
Ranelagh July'11' Hourly Values



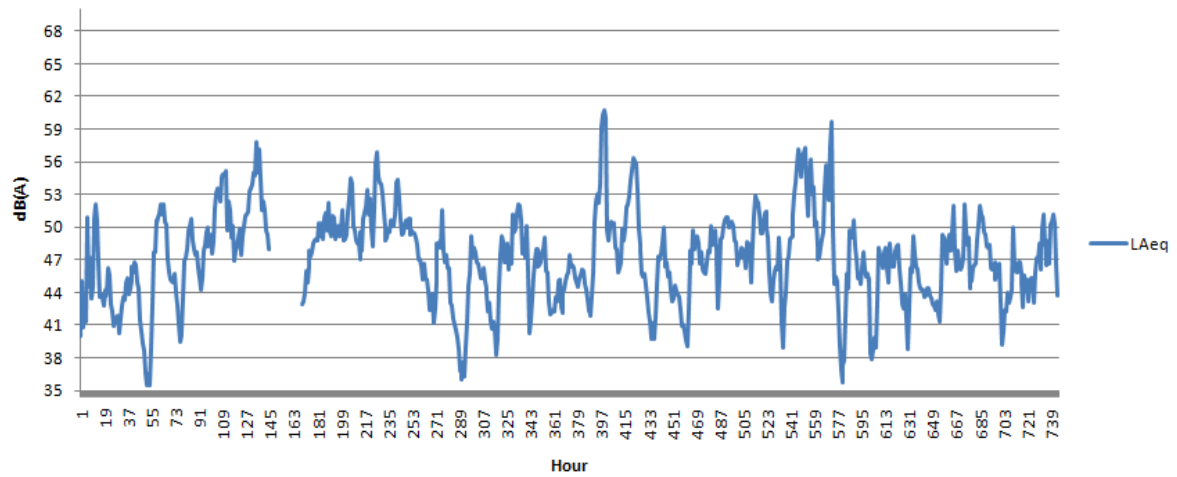
Ranelagh August'11' Hourly Values



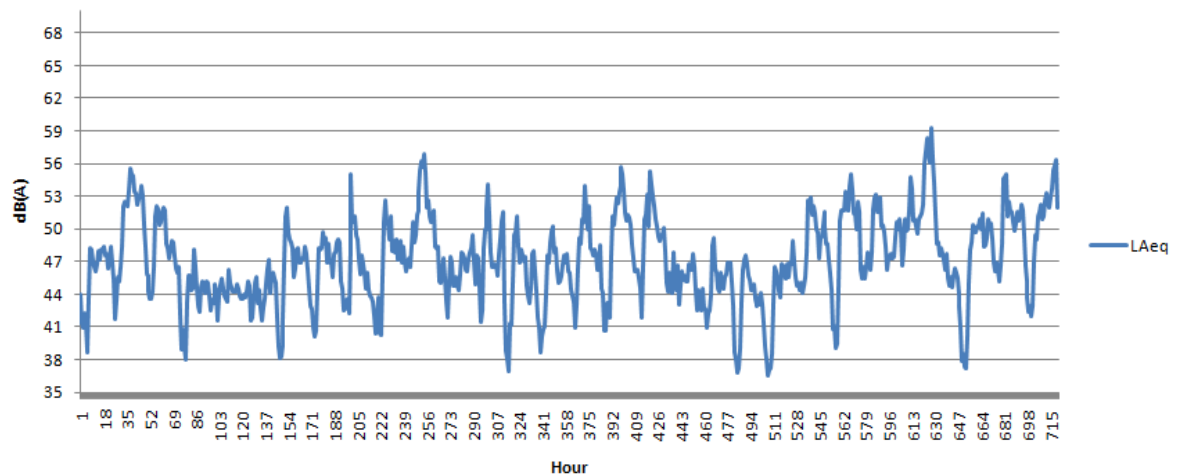
Ranelagh September'11' Hourly Values



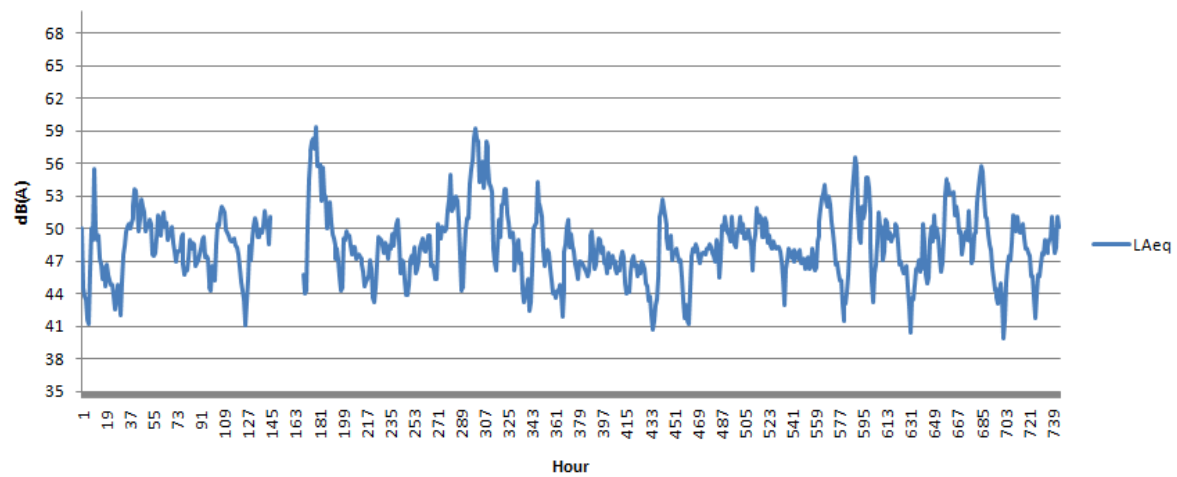
Ranelagh October'11' Hourly Values



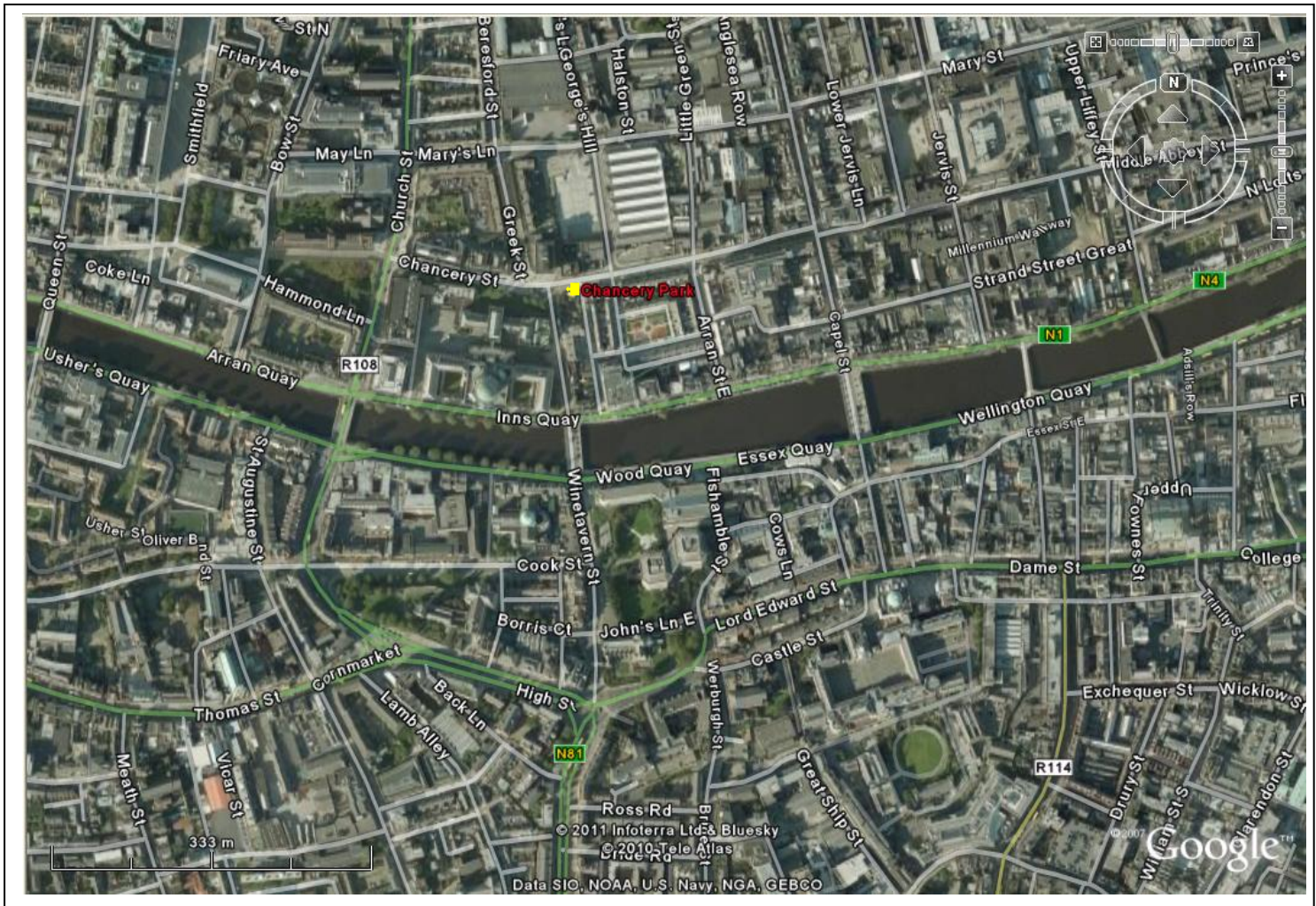
Ranelagh November'11' Hourly Values

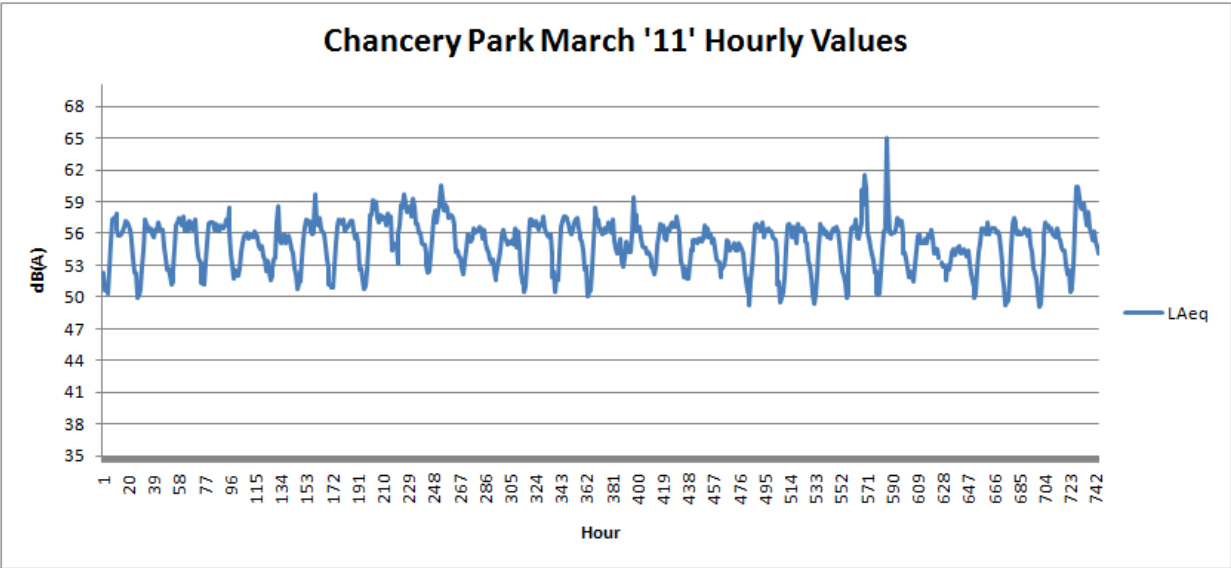
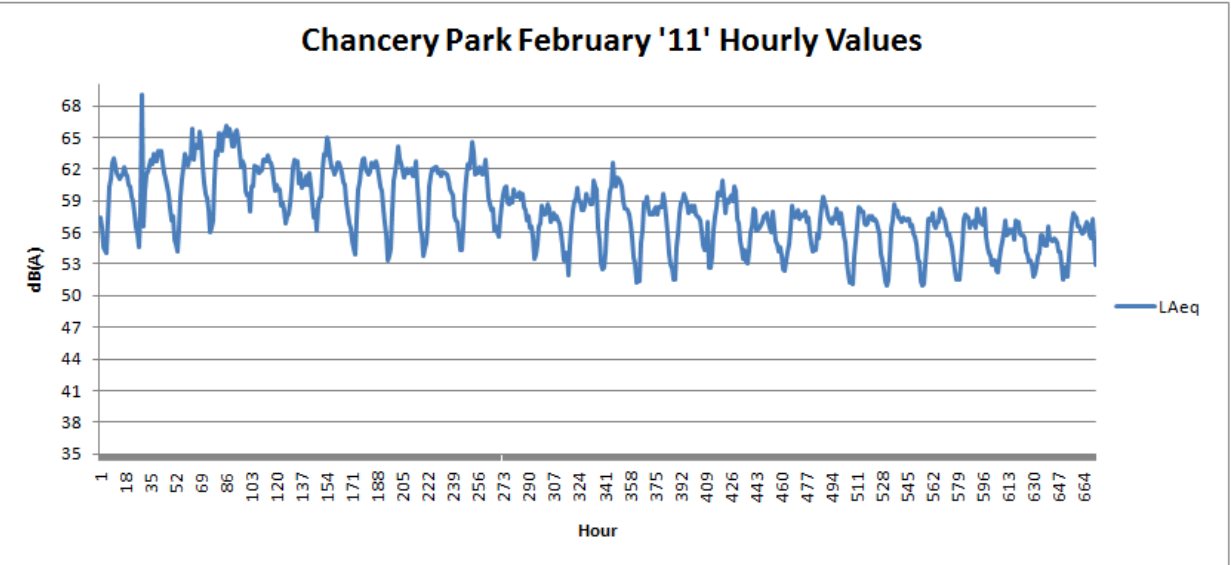
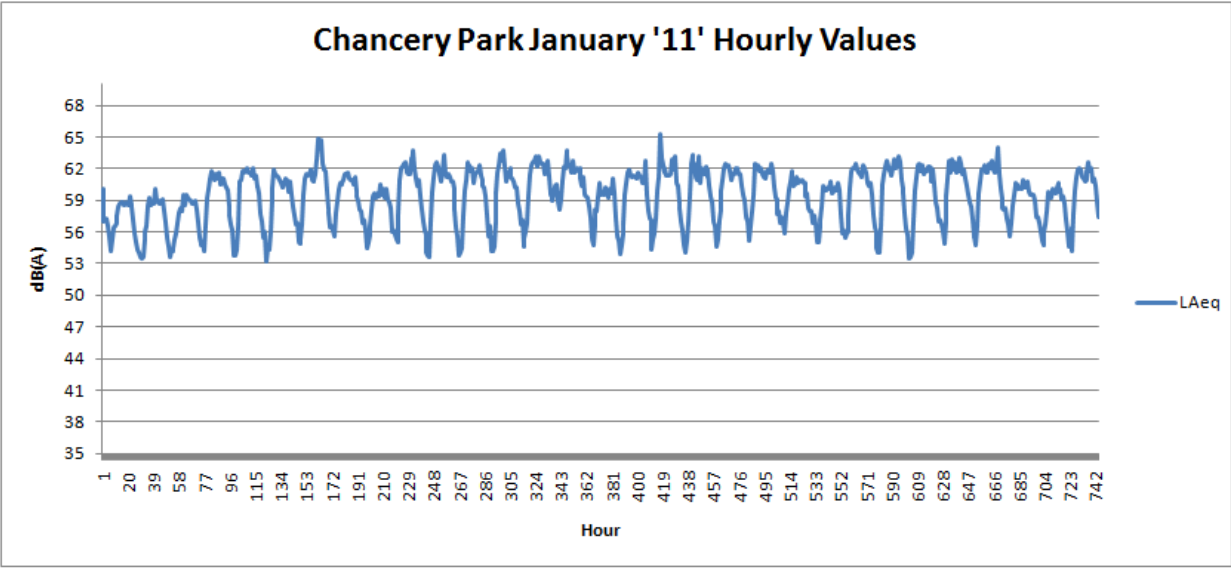


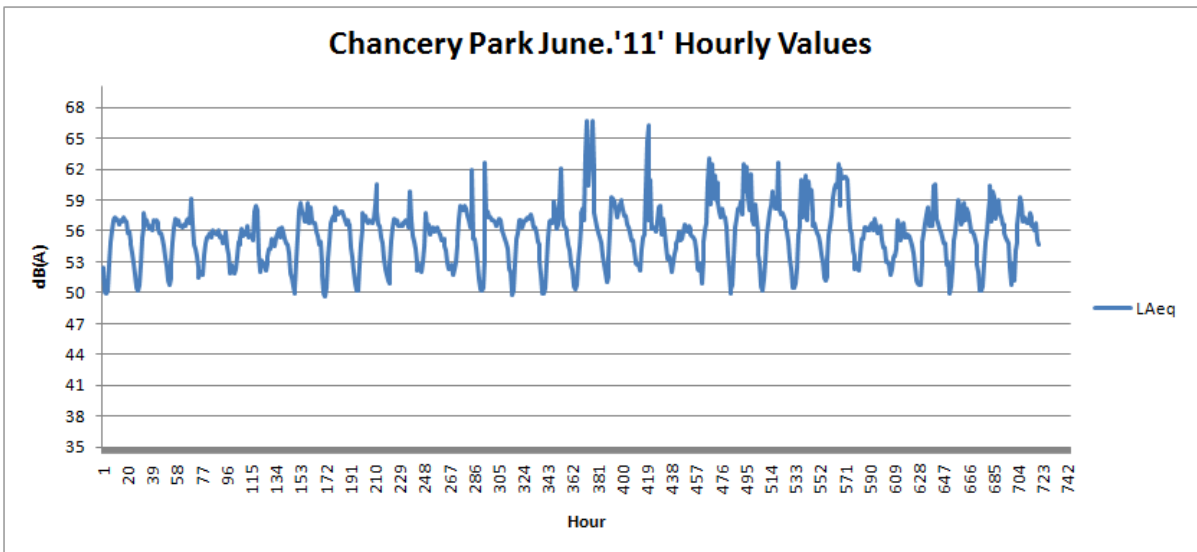
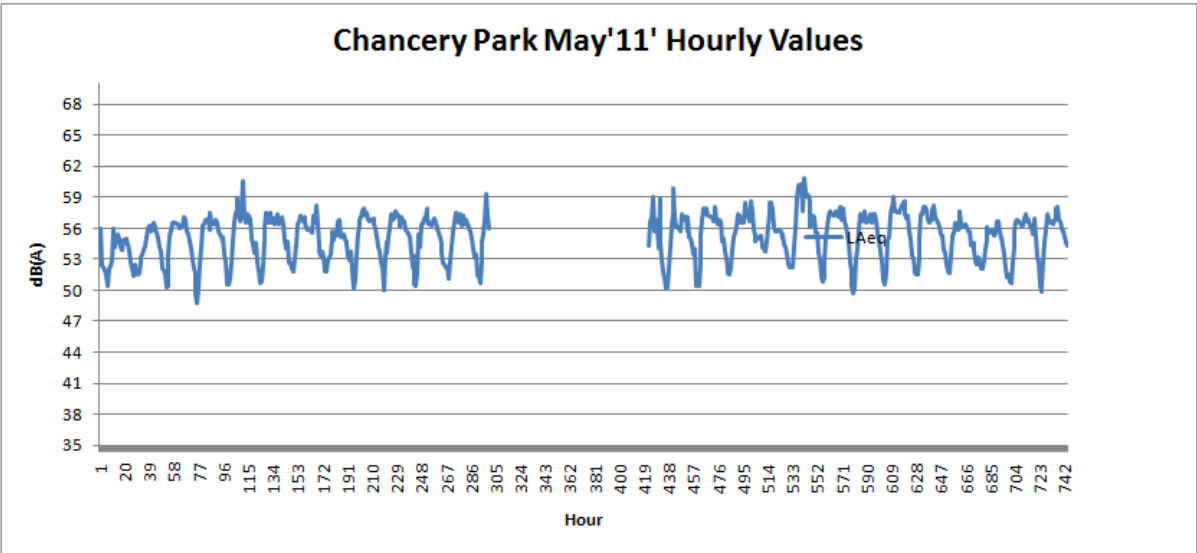
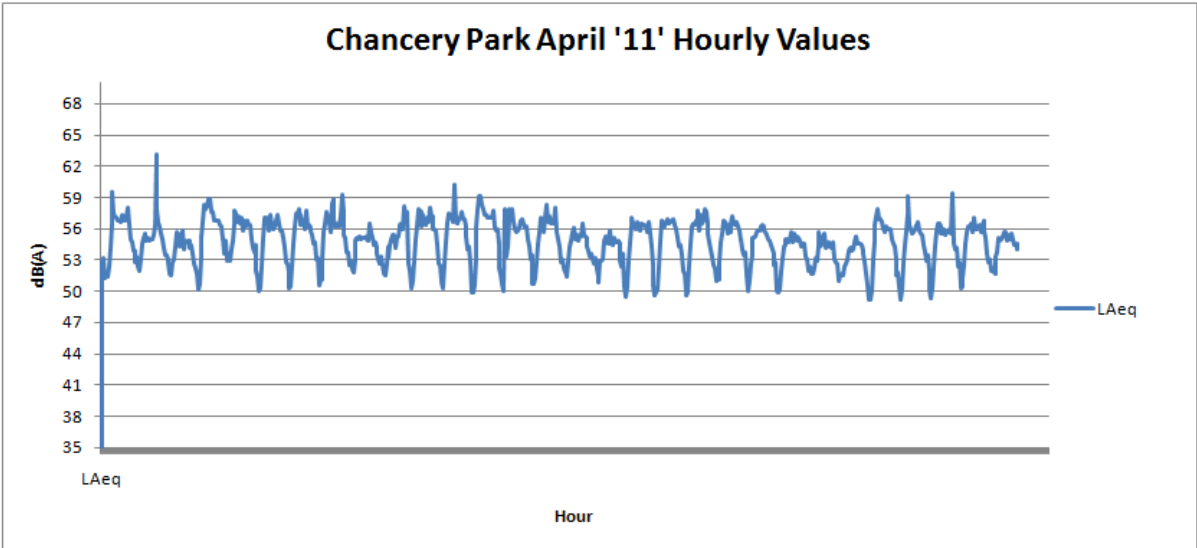
Ranelagh December'11' Hourly Values

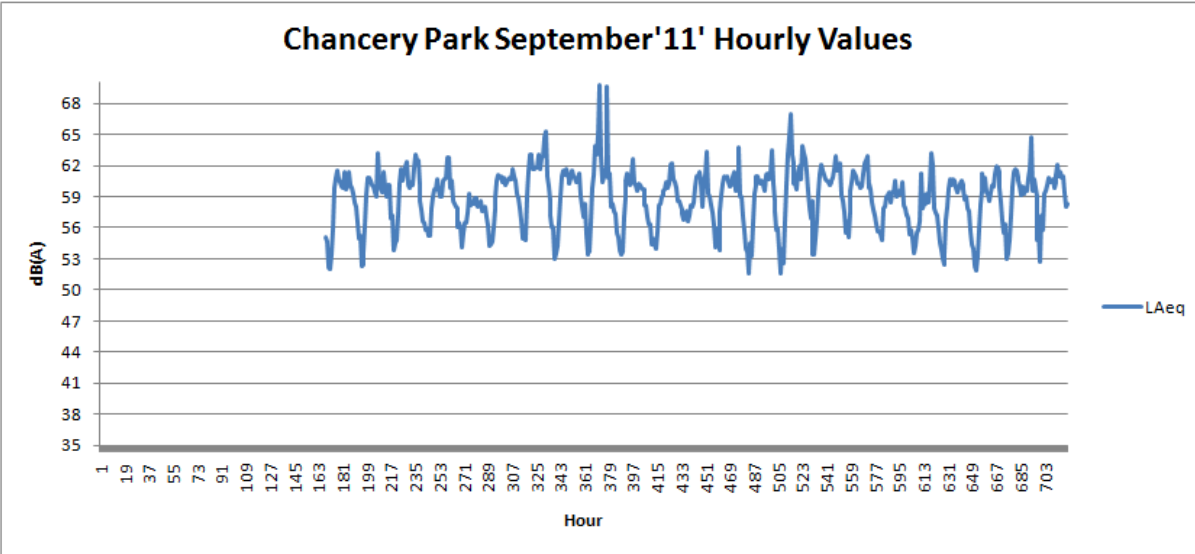
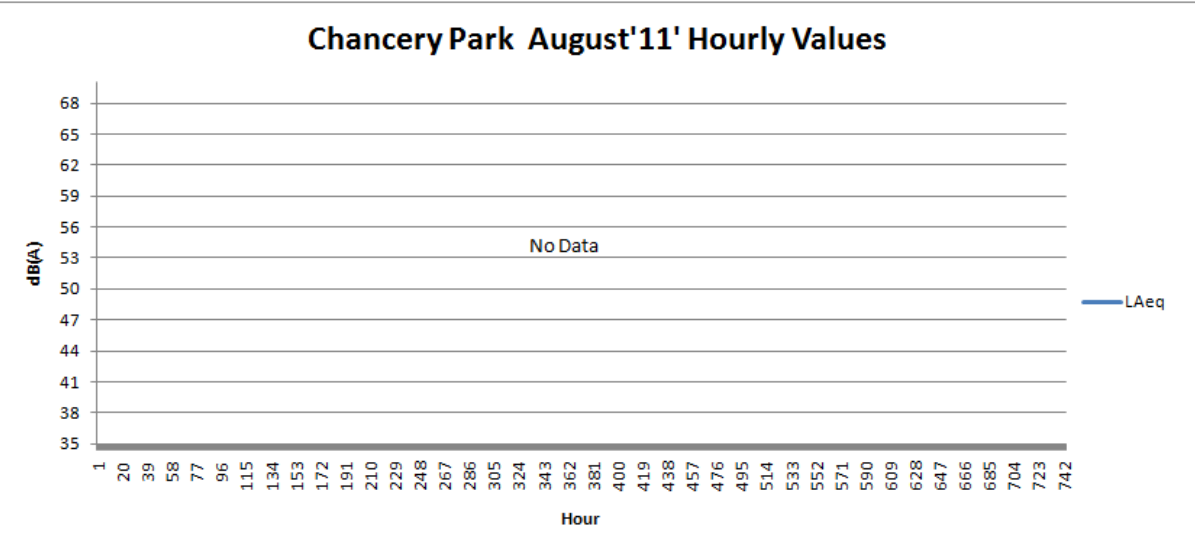
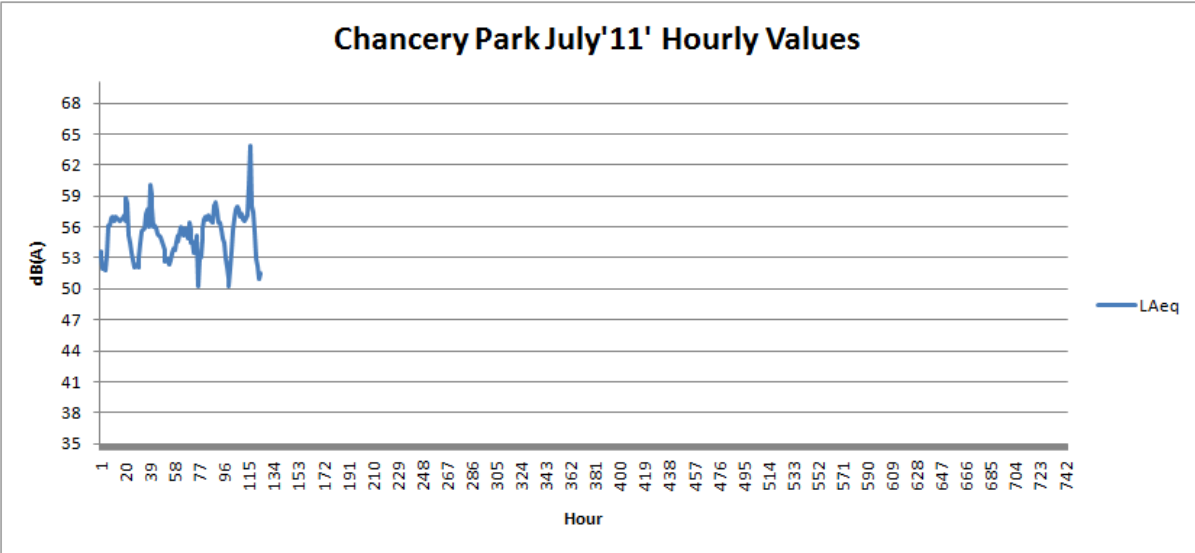


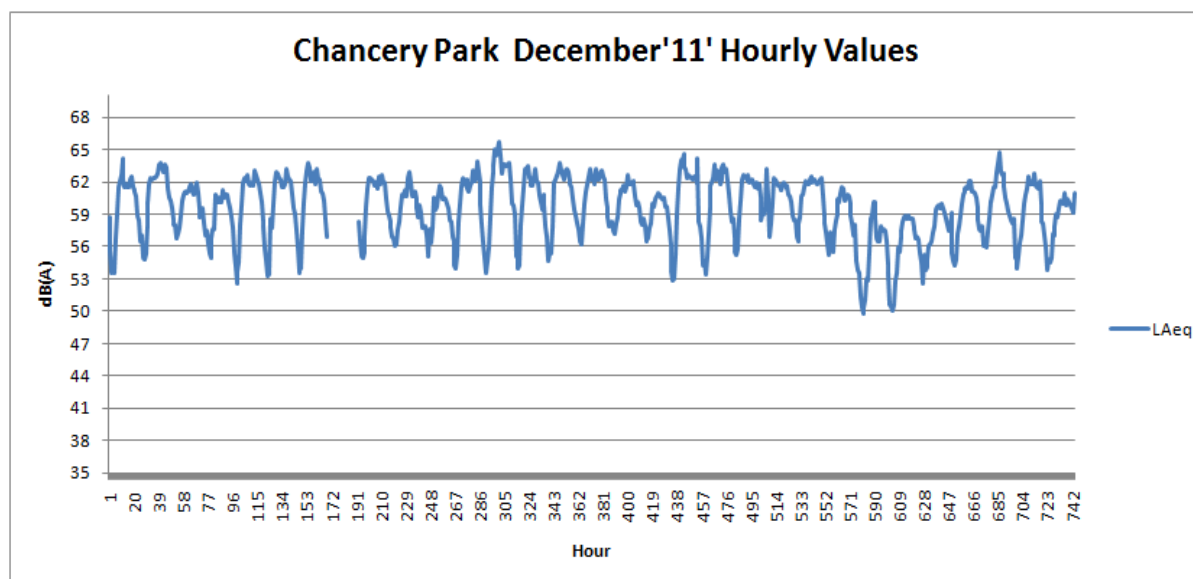
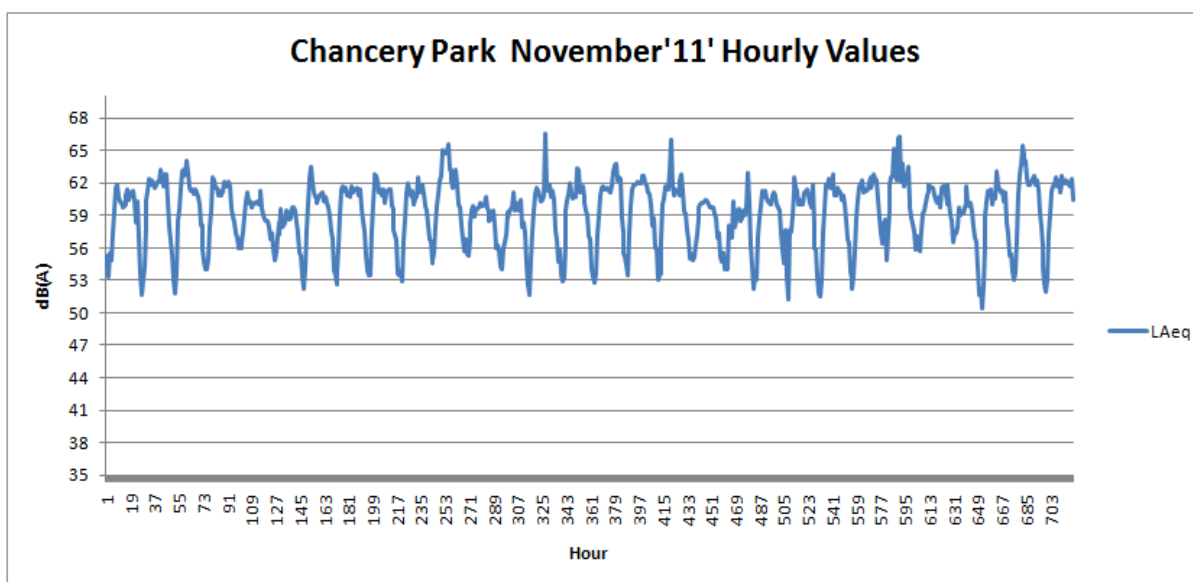
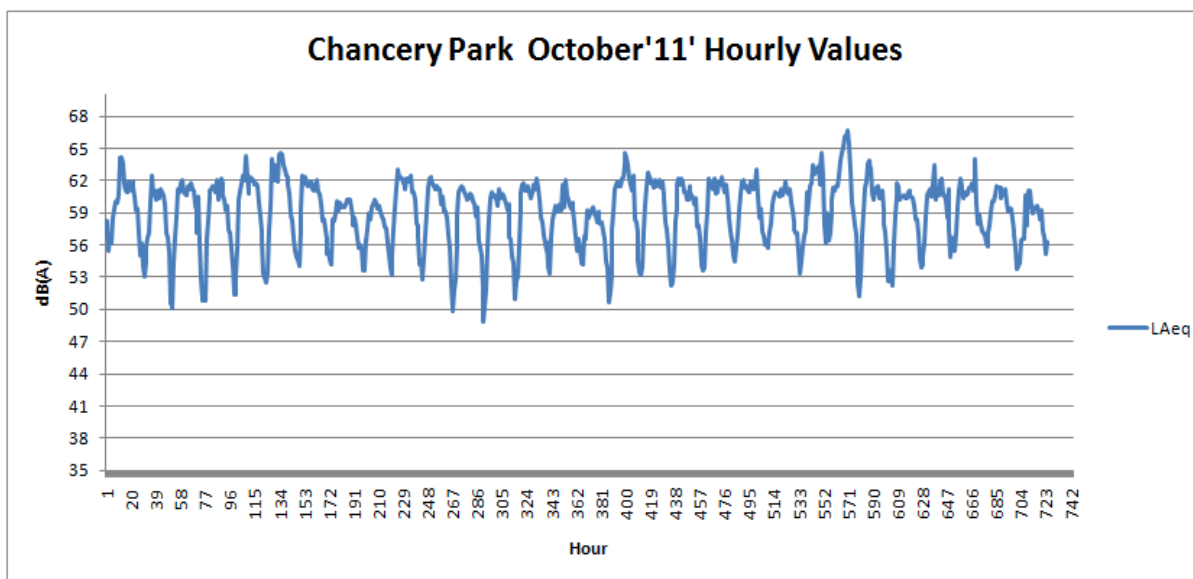
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