

Acoustic Study and Good Practice Guidance Document on Street Performance Noise for Galway City 2015.



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1 INTRODUCTION

In February 2015, Galway City Council's Environment Section carried out a review on Busking and street performances in Galway City, which included submissions from a number of stakeholders. ICAN Acoustics were engaged by the Environment Section to examine matters pertaining to noise associated with typical street Busking activities within the inner pedestrianised zones of the City. Our study included comprehensive measurements throughout the city centre and the production of a 3D noise contour model of the noise climate. The noise contour model allowed us to examine the propagation of both Amplified and Unamplified Buskers and assisted with the review of Busker separation distances. It was used also to determine what could be potentially used as a method of deciding on an appropriate level of noise. The report also provides a number of noise control techniques and suggested operational methodologies which could be used to manage noise within the city. The report concludes with good practice guidance which could be applied to assist in the management of inner Busking noise city noise, without being overly restrictive, while maintaining the impromptu nature of street performances and Buskers.

1.1 The importance of Street Entertainment/Busking to Galway City.

Galway City is well established on a national and international level in the world of arts and culture. Famous for its festivals such as The Galway Arts Festival, the Galway Oyster Festival and the Galway Races, the City is immersed in a culture of arts, music, dance and street performances.

The centre of Galway City is alive with activity and movement created by shoppers, commuters and tourists. The busy streets present an ideal stage for those who are willing to perform in public while earning financial contributions from the passing public. Street Performances are wide and varied ranging from solo vocalists, to larger groups (during festive periods), mime artists, music groups and, on occasion, orchestras.

The streets are awash with a complete cacophony of sounds which include; conversing pedestrians, early morning truck/van noise, Street Performance music, persons voicing concern over various causes often with street petition tables, music noise breaking out of shops and occasional auditory alarms from shop security systems. The purpose of this study is to address and examine noise from Street Performances specifically, which will be loosely described as Busking.

Busking comes in a wide range of forms, which can include artists playing Unamplified instruments, or others using amplification for backing tracks to Amplified or Unamplified vocal performances. In some Street Performances, such as mime, there is no music at all as it is purely visual. In some cases, amplification is simply used to assist a person's voice for the purposes calling attention to a street performer to or theatrical display, which is common during the Galway Arts Festival.

Typically Street Performances are impromptu events for many; however there are a number of Buskers who appear to play regularly at specific locations. In some cases, some single locations are shared between a number of regular Buskers. Many Buskers operate on a seasonal basis, where they may be present for a festive period or during the summer months. Since all performances are outdoor they are greatly influenced by weather conditions and it would not be uncommon during heavy rain for street performances to cease.

In most cases however, when the weather is appropriate, Street Performers will want to maximise the time for which the passing public will be exposed to their performance, which in effect maximises the catchment area. With high powered battery powered electronic amplification now more affordable and readily available, some Street Performances can dominate and effectively sterilise a wider area resulting in passing pedestrians being exposed to a performance for a longer period of time and at a louder level. The consequence of this has resulted in Buskers who are Unamplified not being able to compete with those with amplification and in many cases promotes the use of pre-recorded material and backing tracks rather than fully live performances. Ever increasing Busking noise not only gives rise to problems for other Buskers, it also gives rise to noise complaints from retailers and other street users.

There are many elements to a performance which affect its impact, the quality of music, the type of music, its style and genre; however the volume level of street performance is what this study specifically addresses.

1.2 Street Noise in the absence of 'Busking/ Street Entertainment' Noise.

It is important to appreciate that streets also have an ambient noise climate in the absence of any contribution from Amplified or Unamplified performances. Users of the street engaged in conversation can collectively generate noise, which has to be overcome by Buskers. During early morning periods, pedestrianised streets are typically populated with delivery vehicles, which would generate noise from diesel powered refrigeration units, noise from delivery equipment and engine noise. It would be very unusual however for Buskers to attempt to perform in this environment coupled with the fact that footfall is at a minimum at these times.

Depending on the weather, the late morning, afternoon and evening periods would be most commonly used. Some Buskers operate at later times too, for example when the retailers have ceased their daily trading, performing in retail doorways which would normally not be available during trading hours.

It is important to realise also that the street noise climate can vary over a daytime period. For example, when the street is heavily pedestrianised the ambient noise climate is typically higher than a time when there is lower usage. In the evening and night periods however, footfall is considerably lower and consequently street noise will fall.

Table 1 below sets out measured ambient street noise levels (in the absence of Busking noise), where the dominant source of noise is that of pedestrian conversational noise.

Measurements recorded at these times during the absence of music from Buskers or Street Performers, indicate that the ambient noise levels range between 61~67dB(A) during the daytime period. This noise build-up exists in a partially enclosed space, where a street will typically have 2~4 storey high buildings either side of the street.

Location	File	Time	LAeq	LAF90	Description
Ref A	1	12:15pm	61.1dB	53.6dB	Conversational noise from pedestrians dominant, with some traffic noise. No Buskers active during this measurement.
Ref B	2	12:25pm	63.6dB	56.5dB	Pedestrian conversational noise dominant. No musicians active during this measurement.
Ref C	5	12:38pm	67.0dB	61.4dB	Pedestrian conversational noise and footfall dominant. No musicians active during this measurement. Other sources included noise from seagulls.
Ref D	7	12:55pm	67.1dB	61.5dB	Noise climate dominated by pedestrians (conversational noise).
Ref F	9	13:05pm	66.4dB	59.5dB	Noise climate dominated by conversing pedestrians. Other sources included traffic noise and some music was audible at a low level breaking out of a shop nearby.

Ref G	10	14:12pm	66.8dB	55.0dB	Noise climate dominated by conversing pedestrians, other sources included a hand pallet truck as well as traffic noise.
Ref H	12	14:31pm	60.6dB	57.0dB	Measured at music shop (next to Sonny's Bar) on High Street. No street music
Ref I	15	14:44	62.8dB	57.5dB	Measured on Upper Abbeygate Street. Consisted of conversational noise, seagulls.
Ref J	16	14:50	60.8dB	55.5dB	Consisted of conversational noise, seagulls and pedestrian street noise
Ref K	22	15:42	63.4dB	60.0dB	Conversational noise

Table 1: Ambient street noise measurements carried out on Monday the 15th of Dec 2015

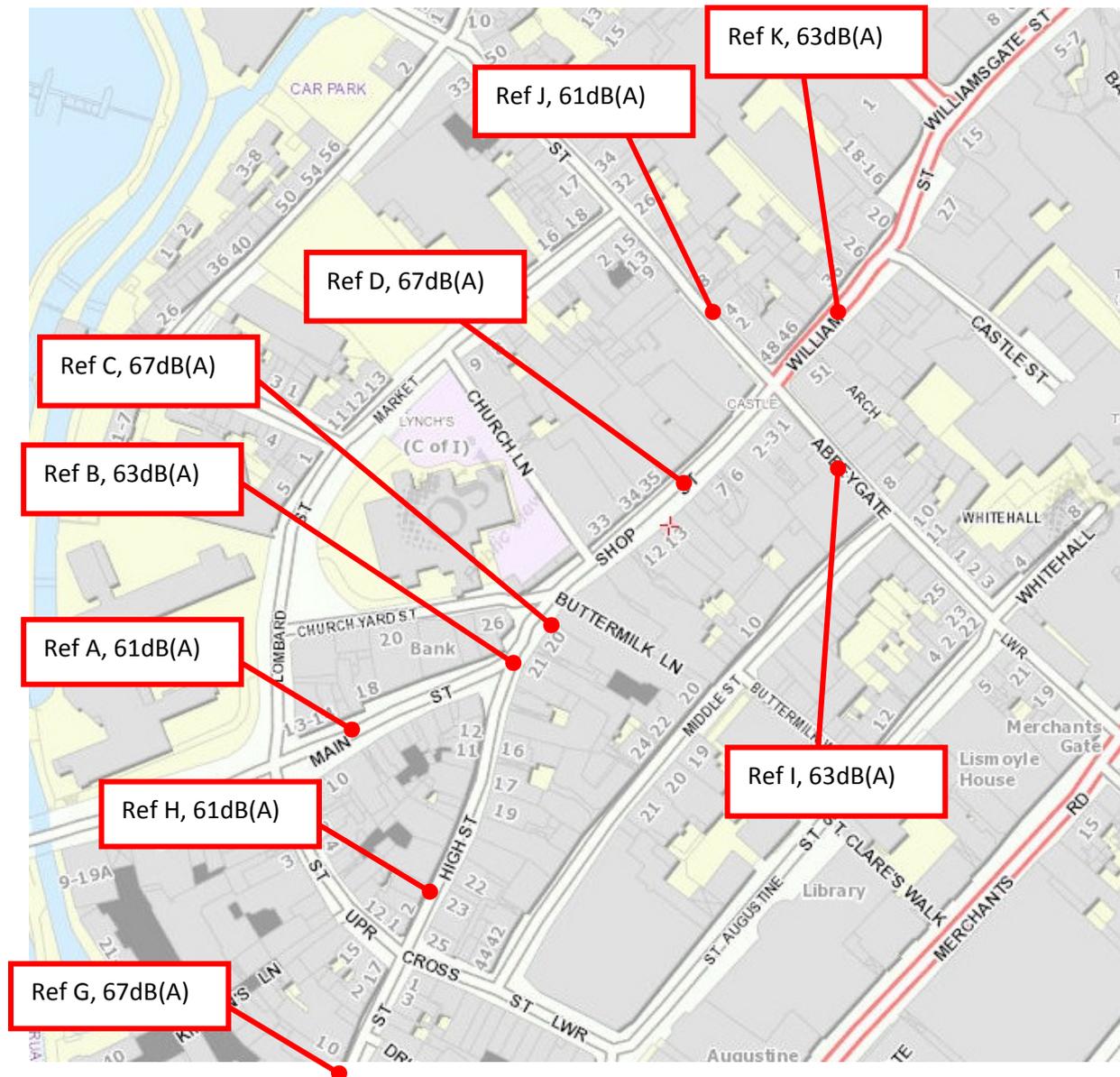


Figure 1: Showing locations where the ambient noise climate (without Busker/Street Performance noise) was measured on Monday the 17th of Dec 2014. Copyright Ordnance Survey Ireland. All rights reserved. 2014/14/CCMA/GalwayCityCouncil.

1.3 The problems associated with an unregulated Busking environment.

There is a wide range of electronic amplification/speaker systems available, many of which are battery powered and in some cases mains powered (where small portable petrol driven generators are used). Many Amplifier manufacturers have purposely developed for the Busking market a range of battery powered street performance amplification. For example the manufacturer " " has a battery powered range call 'Street Cube', designed specifically for this application. Each portable Amplifier (often used also as a practice Amplifier), provides battery powered electronic amplification with an integrated mixer (Mixer Amplifier) in some cases which allows the installation of multiple of inputs, such as microphones, guitar and electronic music players (for backing tracks).

There is a difficulty however with the current situation where an unregulated arrangement, whereby an act can simply bring equipment of any size and power to a street without any degree of control. This can give rise to a number of difficulties, which are set out below:

- Restricting performance types and variety of music available on street.
- Sterilise zones where Buskers/performers without amplification cannot compete.
- Result in potentially larger audiences with greater congregation, which could restrict street flow.
- Give rise to street user acoustic discomfort and interference with conversation.
- Give rise to disruption to mobile phone communication on the streets, for those on phone calls who may have to pause their conversation until they pass a loud Amplified source.
- Give rise to noise nuisance complaints from retailers.
- Potential of street users not being able to hear auditory warnings, such as reversing alarms or indeed engine noise by cash transit vans that can use the street at times when the street is in a pedestrianised mode of operation.
- Give rise to noise levels on street which could present some marginal risk to hearing, particularly in cases where as speaker could be pole mounted at ear level.

This is not an exhaustive list and only relates to matters pertaining to likely noise impacts.

2 Ambient Street Noise in the absence of Busking noise

Using noise measurements complied of conversational noise on the streets of Galway inner city, it was possible to generate a noise contour map of Galway City. All of these measurements were conducted in the absence of Busking noise on the street at the time of measurement.

2.1 William Street/Castle Street

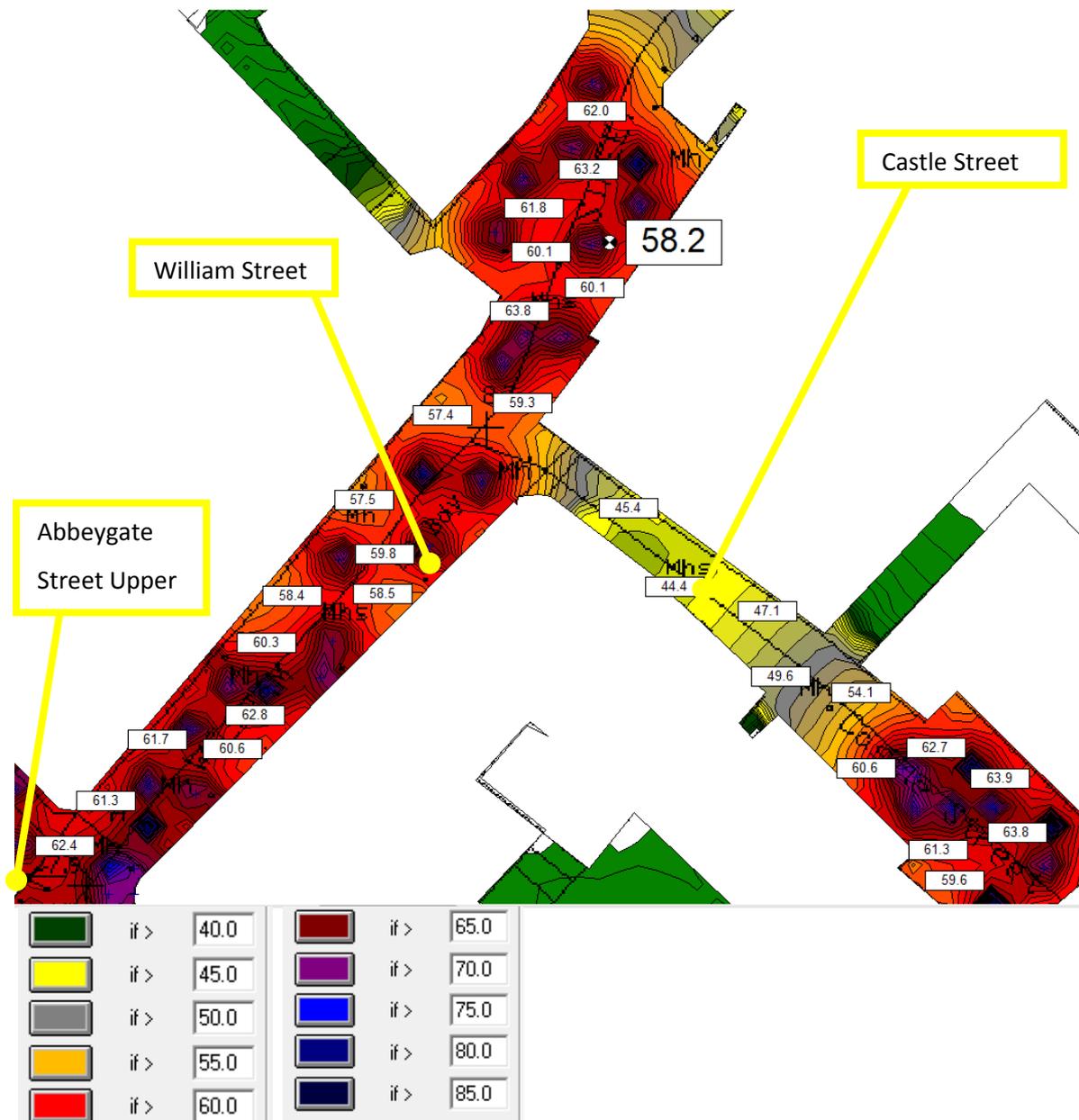


Figure 2: Showing William Street and Castle Street Galway (noise contours from conversational noise), Copyright Ordnance Survey Ireland. All rights reserved. 2014/14/CCMA/GalwayCityCouncil.

2.2 Shop Street and Abbeygate Street Lower

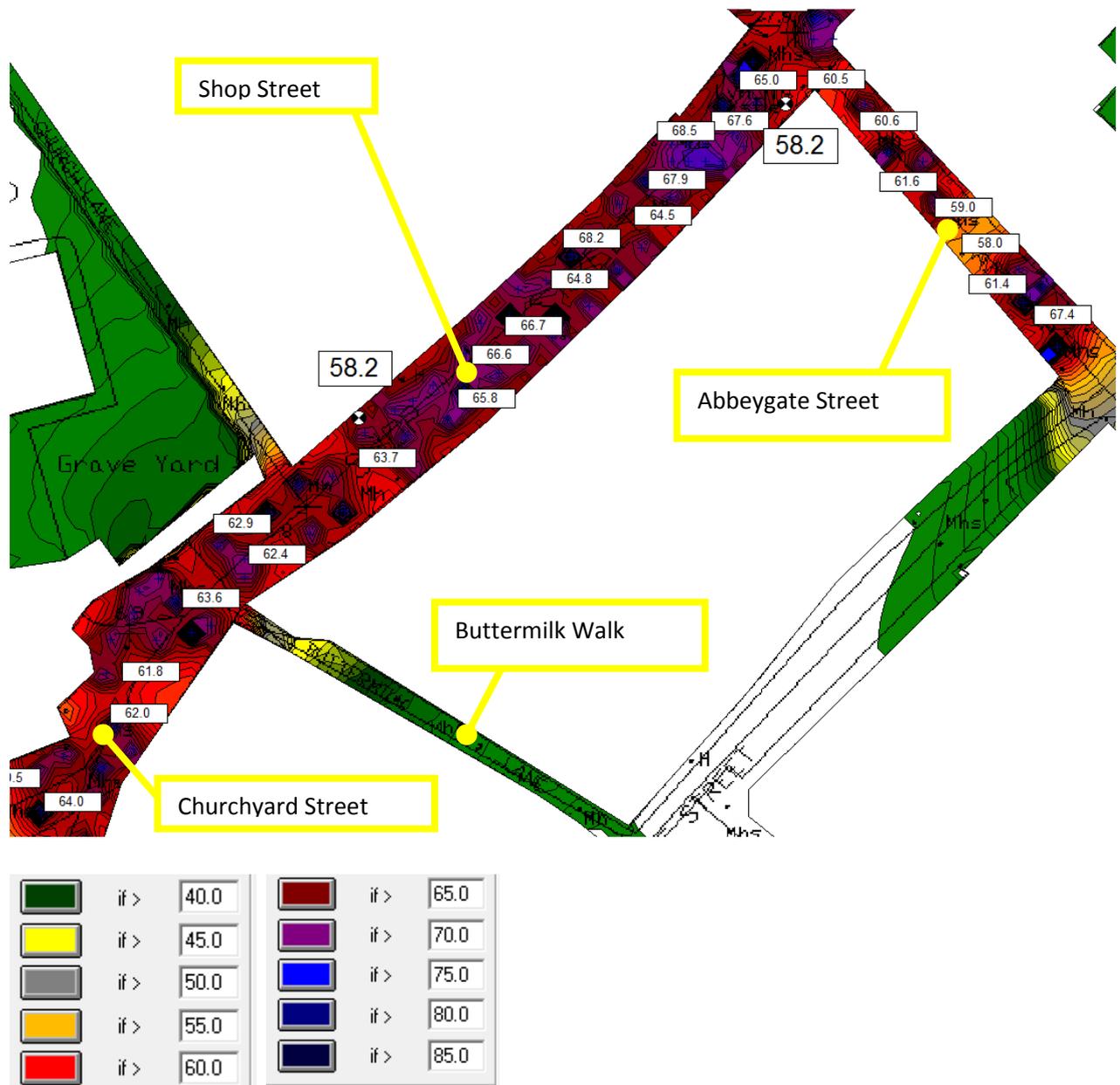


Figure 3: Showing Shop Street and Abbeygate Street Lower (noise contours from conversational noise), Copyright Ordnance Survey Ireland. All rights reserved. 2014/14/CCMA/GalwayCityCouncil.

2.3 High Street, Quay Street and Mainguard Street

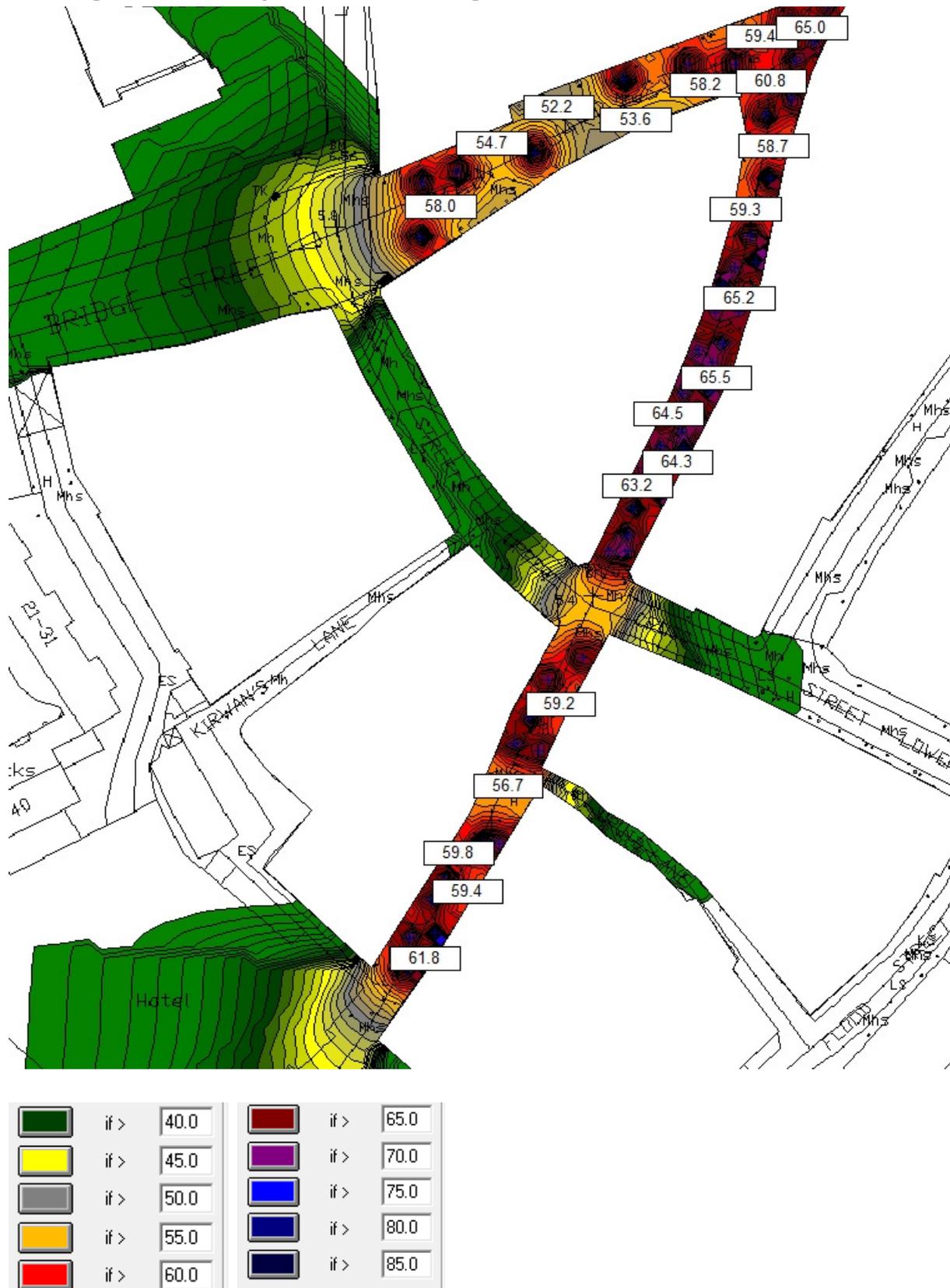


Figure 4: Showing High Street, Quay Street and Main Guard Street (noise contours from conversational noise), Copyright Ordnance Survey Ireland. All rights reserved. 2014/14/CCMA/GalwayCityCouncil.

3 Busking Noise in Isolation

The noise contour models below represent noise propagation from individual Busking locations modelled in isolation at various locations throughout the city. The noise contour models would be akin to the likely noise levels if the Buskers were on the street with no other noise sources. Using the data in gathered in the tables below, measured within the vicinity of each Busker/street performance, it was possible to use this data to prepare noise contour maps.

Busker Noise Measurements

Location	File	LAeq	Description
Buttermilk Walk	3	67.3dB	Ambient noise, when the Busker was not playing. Measurement included conversational noise and traffic noise.
Buttermilk Walk	4	71.6dB	Measured at a distance of 2.5m from the Busker. Instrument was a Recorder (woodwind)
	Specific noise	69.6dB	Recorder level at 2.5m

Table 2: Measurements conducted within the vicinity of an Unamplified Busker at Buttermilk Walk.

Location	File	LAeq	Description
Shop Street (at Easons)	7	67.1	Ambient noise climate dominated by pedestrian conversation.
Shop Street (at Easons)	4	75.5dB	Measured at a distance of 8m. Male Busker with small vocal Amplifier and a music source.
	Specific noise	74.8dB	at 8m from the source.

Table 3: Measurements conducted within the vicinity of an Amplified Busker on Shop Street.

Location	File	LAeq	Description
Shop Street (at Easons)	7	67.1	Ambient noise climate dominated by pedestrian conversation.
Opposite Lynch's Castle	4	82.0dB	Measured at a distance of 9m. Male singer with a very powerful voice with a loud backing track.
	Specific noise	81.8dB	at 9m from the source.

Table 4: Measurements conducted within the vicinity of an Amplified Busker on Shop Street.

Location	File	LAeq	Description
High Street	12	60.6	Measured at music shop next to Sonny's Bar on high street at a time then there was no music.
High Street	11	67.3	Unamplified, one vocalist, 1no. Banjo player and 1no Guitar. Measured at 6m from the source.
	Specific noise	66.3dB	At 6m from the source

Table 5: Measurements conducted within the vicinity of an Unamplified Busker on High Street.

Location	File	LAeq	Description
William Street	12	63.4	Conversational noise
William Street	17	81.1	Female vocalist with backing track through an Amplification unit at 12m
	Specific noise	81dB	At 12m from the source

Table 6: Measurements conducted within the vicinity of an Amplified Busker on William Street.

3.1 Williamstreet (Upper)

Source: One vocalist with an Amplifier/radio microphone and an iPod with a backing track.

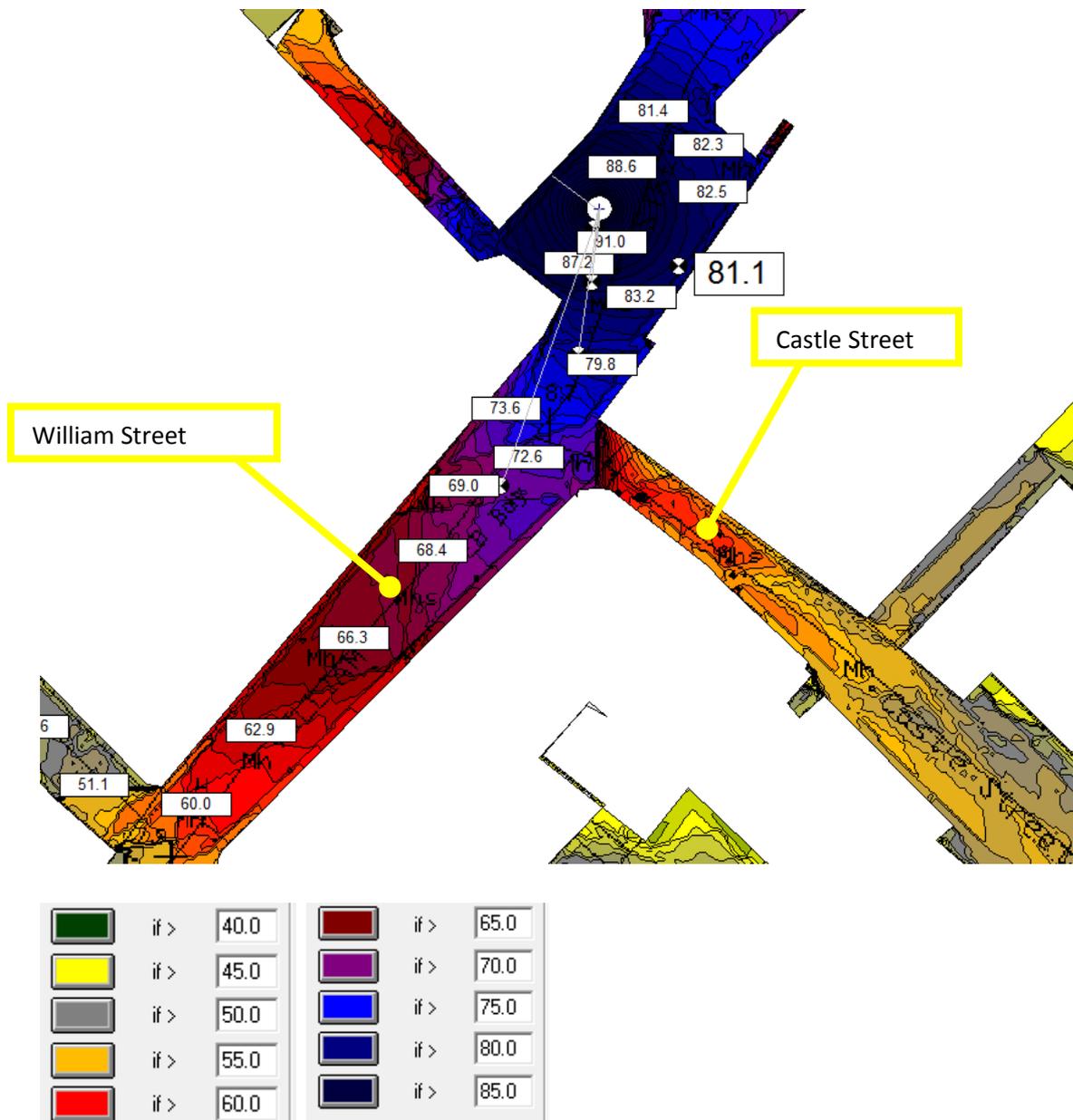


Figure 5: Showing noise propagation from a single Busking location (outside MO Flaherty Chemist). All rights reserved. 2014/14/CCMA/GalwayCityCouncil.

3.2 Castle Street Busking Location

Source: A street performer with a loud voice singing unassisted with an Amplified backing track.

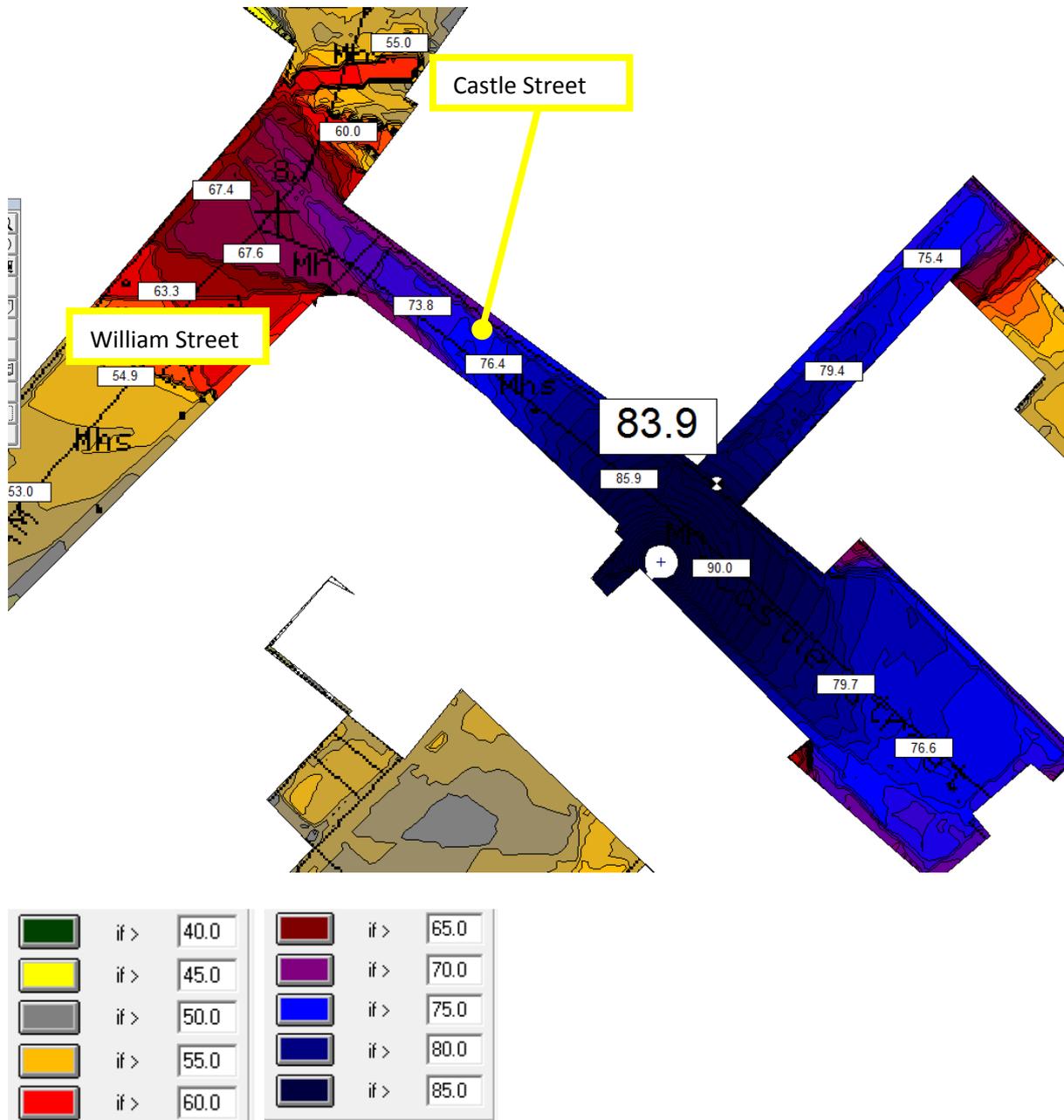


Figure 6: Showing noise propagation from a single Busking location (on Castle Street). All rights reserved. 2014/14/CCMA/GalwayCityCouncil.

3.3 Busking Location Shop Street (at Lynchs Castle), with Amplification.

Source: A street performer with a loud voice singing unassisted with an Amplified backing track.

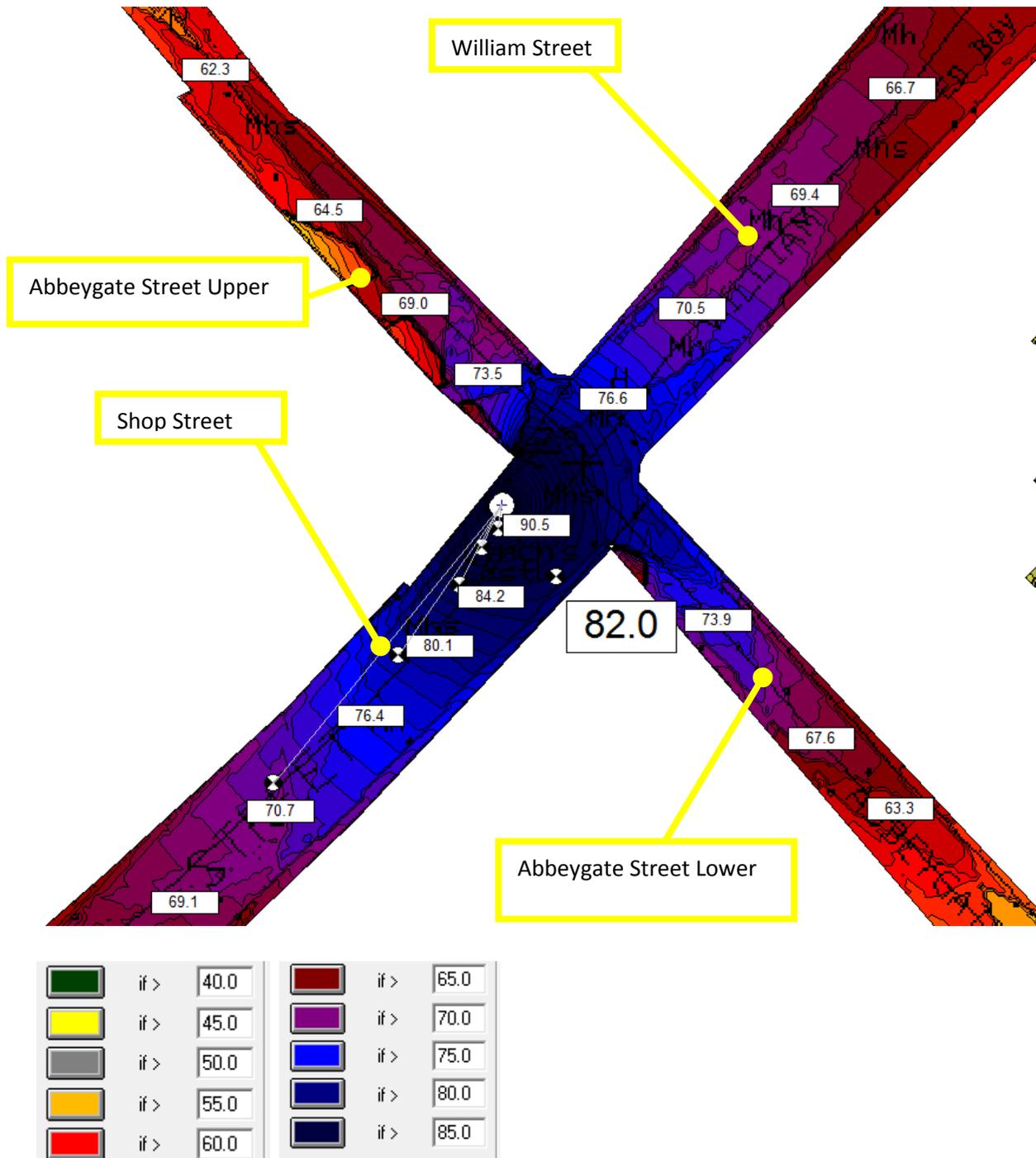


Figure 7: Showing noise propagation from an Amplified Busker on Shop Street. All rights reserved. 2014/14/CCMA/GalwayCityCouncil.

3.4 Busking Location Shop Street (Opposite Easons), with amplification.

Source: One vocalist with a small Amplifier/microphone and a drum.

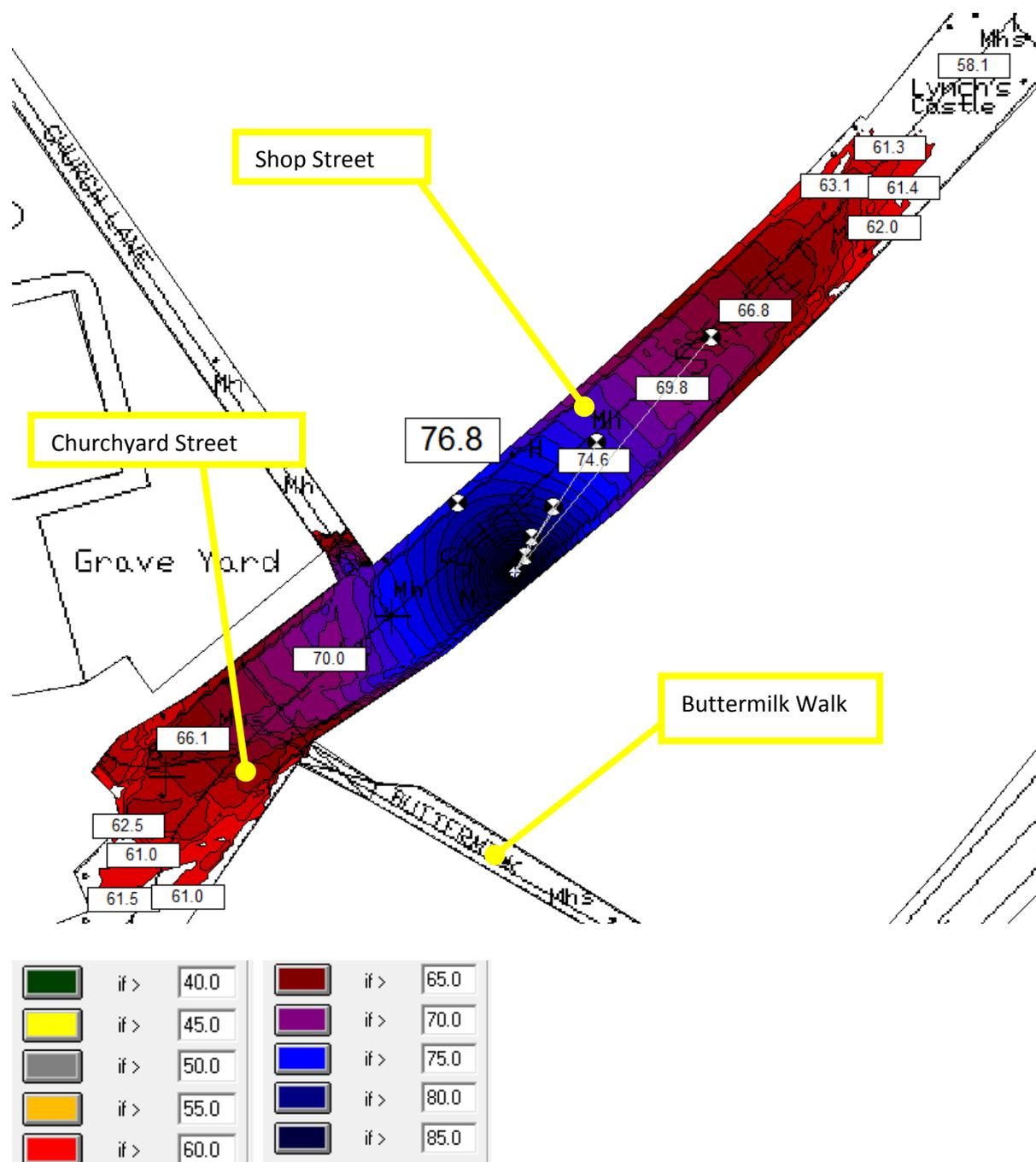


Figure 8: Showing noise propagation from a single Busking location (opposite Eason's Bookstore). All rights reserved. 2014/14/CCMA/GalwayCityCouncil.

3.5 Buttermilk Walk

Source: A street performer with a woodwind recorder with NO Amplification.

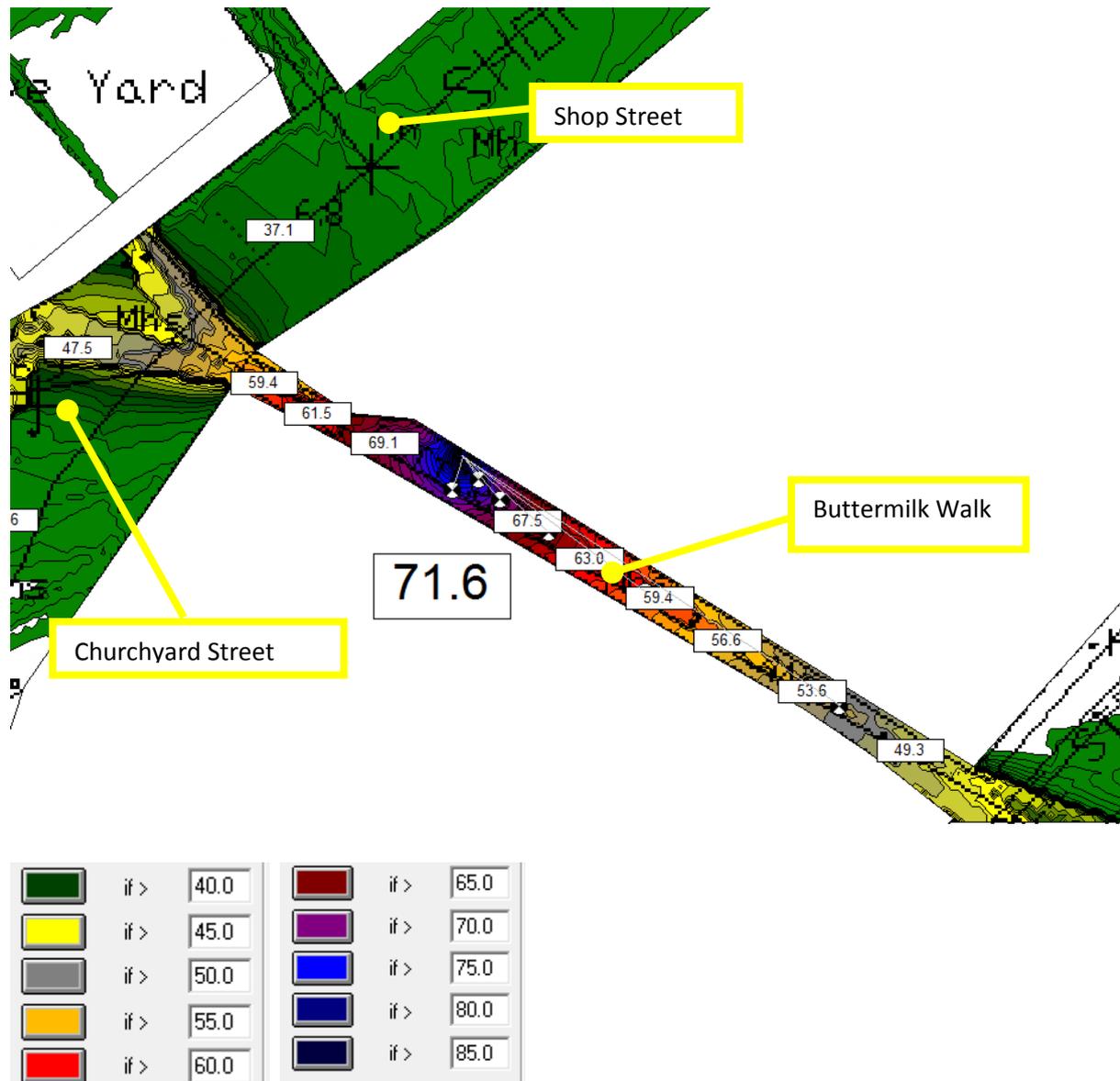


Figure 9: Showing noise propagation from a single Busking location on Buttermilk Walk (playing a recorder). All rights reserved. 2014/14/CCMA/GalwayCityCouncil.

3.6 Churchyard Street

Source: One musician with fiddle, one with guitar and an unAmplified vocalist.

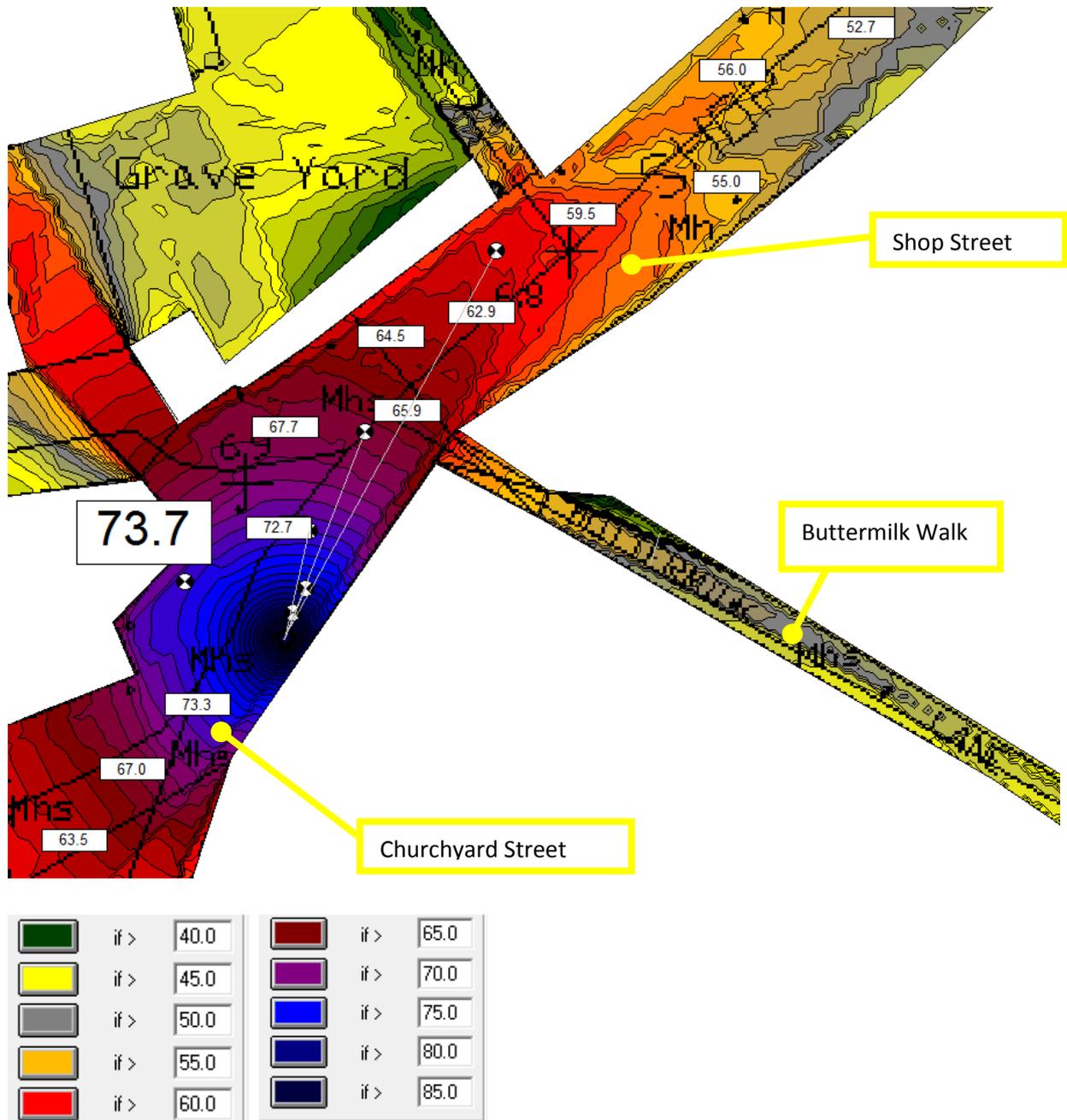


Figure 10: Showing noise propagation from one musician with fiddle, one with guitar and on Unamplified vocalist. All rights reserved. 2014/14/CCMA/GalwayCityCouncil.

3.7 High Street

Source: one vocalist, one banjo player and one guitar (No Amplification).

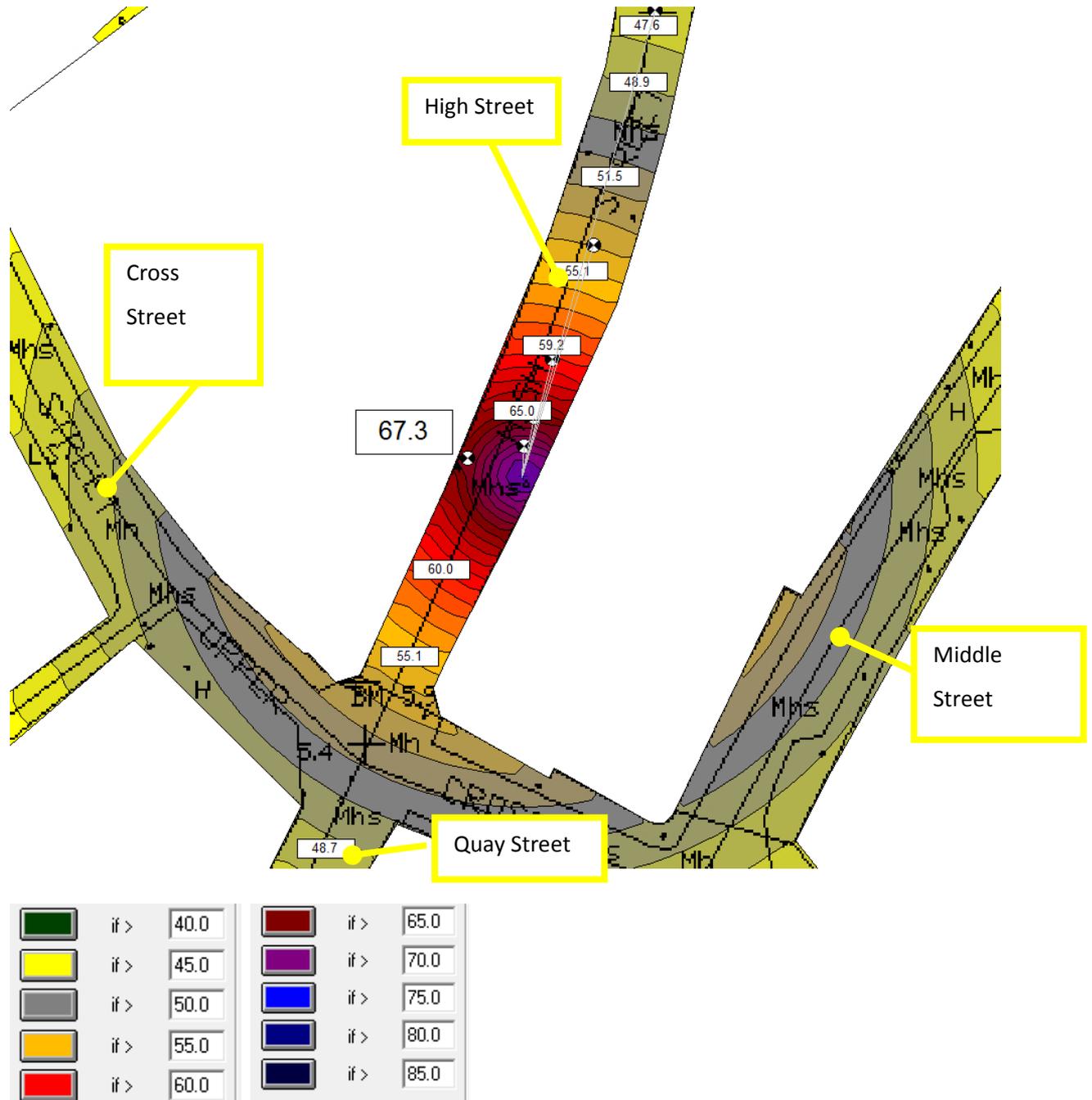


Figure 11: Showing noise propagation from a single Busking location on High Street (one vocalist, one banjo player and one guitar with No Amplification). All rights reserved. 2014/14/CCMA/GalwayCityCouncil.

4 Assessment of Busking noise in relation to the ambient noise climate.

Noise impact is typically assessed by examining its change or impact on an existing noise climate. Using quantitative methods we can predict typical noise climates on our streets in the absence of any noise from Busking or street entertainment activities.

Busker Location and measurement details.	SPL at 2m	SPL at 4m	SPL at 8m	SPL at 16	SPL at 32m
Shop Street opposite Eason's (Amplified), street width circa 12m	90.5dB(A)	84.5dB(A)	79.2dB(A)	73.7dB(A)	67.7dB
Buttermilk Walk flute player at (Unamplified), street width circa 3.2m (varying)	73.8dB(A)	67.3dB(A)	60.7dB(A)	54dB(A)	46.4dB(A)
William Street, Female vocalist with backing track (Amplified), street varying.	96dB(A)	90.3dB(A)	84dB(A)	79.3dB(A)	69.3dB(A)
Shop Street vocalist (Unmplified) with Amplified backing track at Lynch's Castle. Width circa 12m	94.5dB(A)	88.2dB(A)	82dB(A)	74.5dB(A)	67.5dB(A)
Churchyard Street (at Taffes Bar (Unamplified)	84.4dB(A)	78.8dB(A)	72.9dB(A)	67.4dB(A)	61.5dB(A)
Three musicians (Unamplified on High Street)	72.8dB(A)	67.0dB(A)	61dB(A)	54.9dB(A)	48.8dB(A)

Table 7: Showing the likely sound pressure level at distances from a Busker at various locations.

From Table 7 above we can see that noise falls at distance and at an approximate rate of 6~7dB per doubling of distance. Different street geometries can have an influence on the fall off over distance.

Table 1 above shows that ambient noise levels range between 61~67dB, LAeq which have been incorporated in Figure 12 below. While the character of ambient conversational street noise is different to that of music, it is useful to determine the location where Amplified music becomes comparable to the ambient noise climate. It is clearly evident as to why it is beneficial to the performer to have amplification in that it allows for greater coverage. For example, at times when pedestrian noise is high (on a typical Saturday), a Busker with electronic Amplification can be audible up to circa 32m either side of the performance area on a typical street. That same Busker, with the same Amplification turned to full volume could potentially increase the coverage to 60m either side of the performance space on the street.

A Busker performing at a time when ambient noise levels are high without Amplification would be audible for circa 3m to 8m either side of a performance location on a typical street, however when ambient noise is lower this could be increased to approximately 6m to 16m either side of the performance space.

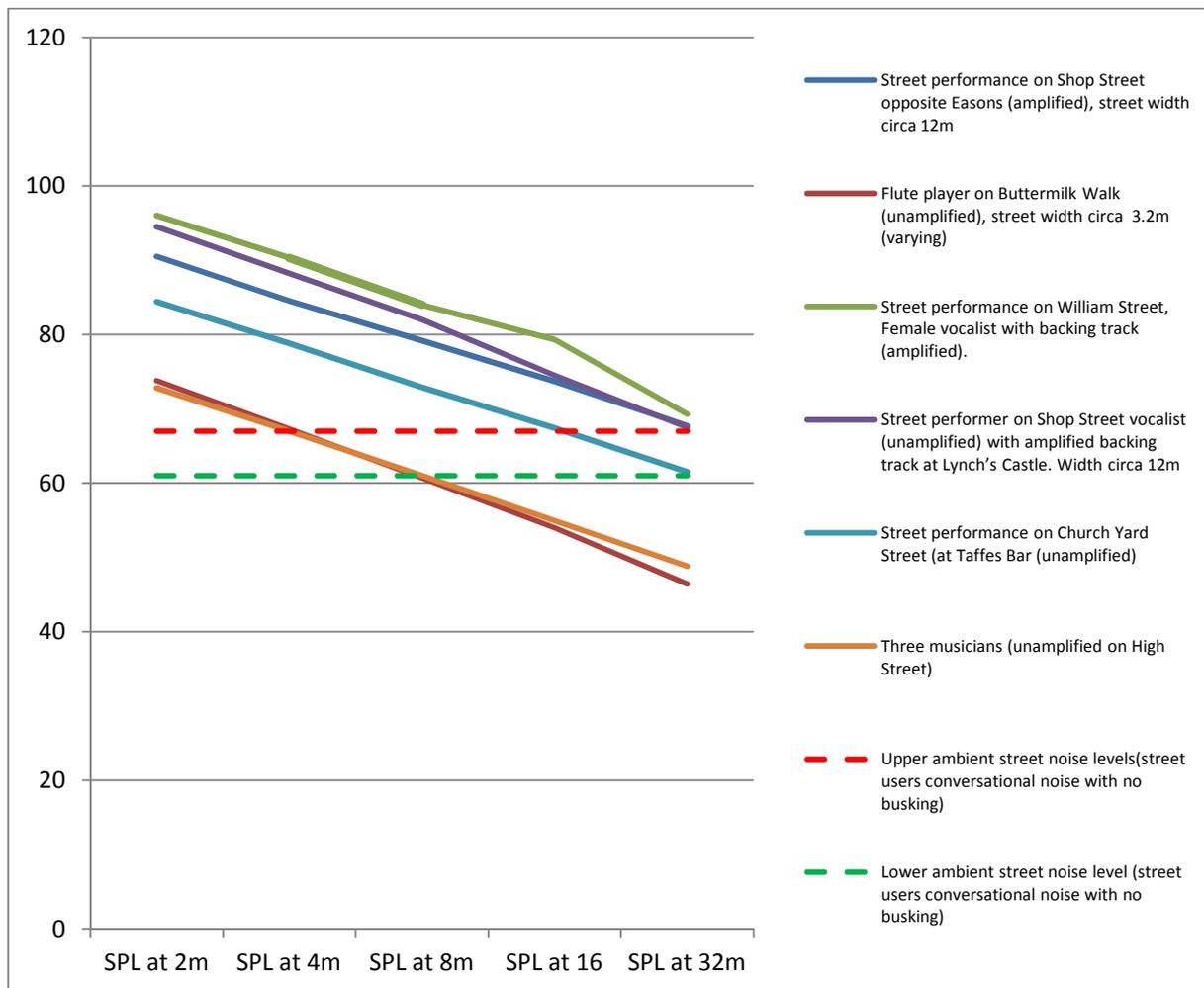


Figure 12: Showing Busking noise levels as they fall off over distance from the source, where Busking noise (Amplified or Unamplified) falls off at approximately 6~7dB per doubling of distance.

5 Amplification Systems

5.1 Music sources without electronic Amplification

It should be noted that there are many sources of noise/music that can very efficiently generate substantial noise levels, without any form of electronic Amplification. For example, a drum requires a minimal amount of effort to generate a substantial amount of noise. Additionally, there are many stringed, woodwind, brass and percussion instruments that are capable of generating substantial levels of noise without any Amplification.

5.2 Mains Generators used to power street Amplification/equipment

While there are a number of battery powered Amplification systems available on the market, it is noted that some Busking acts use small mains powered generators which are capable of running larger amplification, where high powered speakers are used. In figure 13 a typical setup using a portable generator is shown.

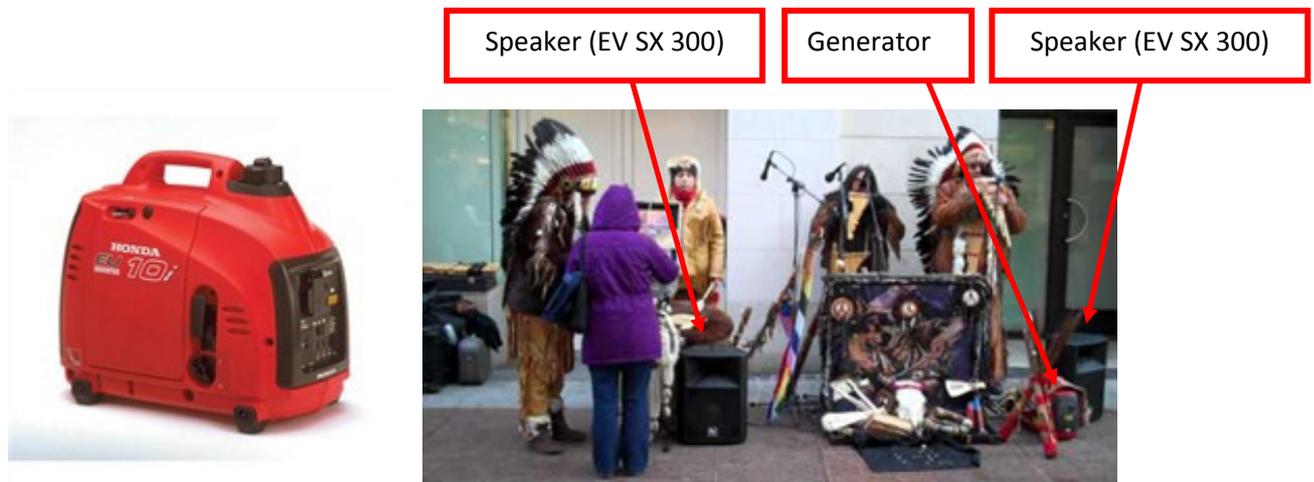


Figure 13: Photo on the left shows a portable mains powered generator, while the photo on the right shows a set up where 2no. 300 Watt speakers (EV SX300s) are used to amplify 4No. microphones and a backing track.

5.3 Battery powered portable Amplification

There are a host of battery powered Amplifiers and practice Amplifiers available on the market. It would appear that one commonly used unit is a 'Street Cube', which is described by its manufacturers as 'the ultimate amp for travelling musicians'. It measures 415mm x 295mm and 250mm deep and weighs 6kg. Its published maximum power is 50 watts. The unit's specification boasts three switch selectable modes of operation, full power at 50 Watts offering 5 hours of operation, 25 watts offering 10 hours of operation and an Economy mode at 10W offers 20 hours of operation. It would appear that the Roland Street Cube is a popular choice among many of the street musicians.

There are a host of alternative portable Amplification systems ranging in size, most of which provide a complete solution providing the end user with a speaker system, an Amplification system, an audio mixer and a docking station for an MP3 player/iPod and a battery module.

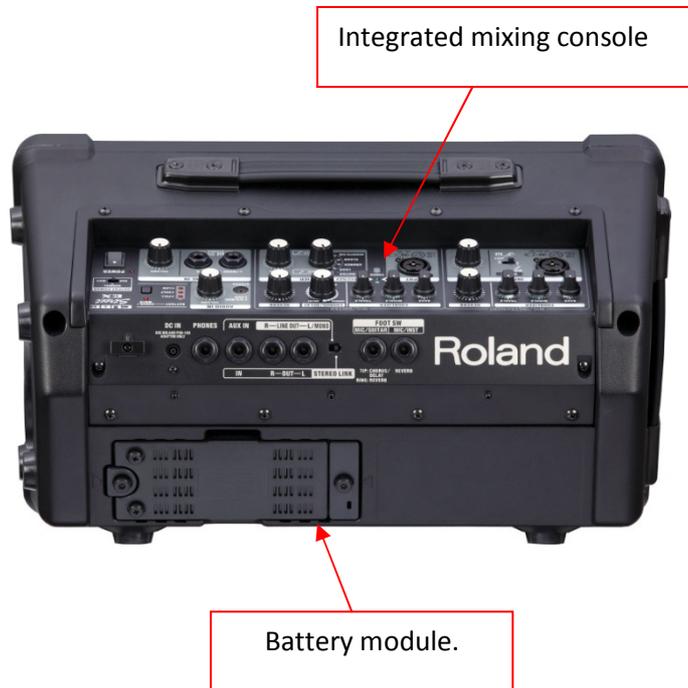


Figure 14: Battery powered Roland Street Cube in use (left) and the rear of a Roland street cube showing a comprehensive mixing console and a battery cover plate.

6 Good Practice Guidance

Steps on the control and management of noise

6.1 Historical Busker locations

Many of the existing Busking locations around Galway have evolved on an ad hoc basis. Locations outside disused shops are frequently used as shown in Figure 15 below. It is expected that Buskers choose these specific locations as they do not inhibit shop window viewing and door access at trading retail outlets.



Figure 15: A location outside a disused shop (left) and outside a historical doorway (right)

Other areas include locations which are set back from the main pedestrian circulation areas, as shown in Figure 16 below. Here shop windows or doorways are not being restricted and there is sufficient set back from circulation areas.



Figure 16: A location where shop windows and doorway use are still somewhat unrestricted.



Figure 17: A location at a junction between Churchyard Street, Mainguard Street and High Street (left) and a location on Shop Street outside Lynch’s Castle (non retail windows).

What is evident is that Buskers naturally gravitate to locations that are less likely to interfere with retailers or cause concern to retailers. Also it appears that locations are being selected which have substantial separation distances from one Busker to another. In the evening periods, when retail outlets are closed, then it is more common to see shop doorways being used, which provides further setback from the street and possibly shelter in some cases.

Noise contour modelling and measured ambient street levels allow us to determine suitable separation distances for Unamplified Buskers and Amplified Buskers.

Type of performance	High Ambient	Low Ambient
Unamplified	4m ~16m	8m~32m
Amplified Performances	32m +	64m +

Table 8: Table of data derived from noise contour model, which was validated through measurement, assessed against ambient noise levels.

Figure 18 below shows typical Busking locations which have been traditionally used. This is a non-exhaustive list, but it does represent locations which were witnessed during our survey work and inspections. It should be noted that these locations can change, for example in the event of a retail outlet being closed for a period of time; it may become a Busking location for the period of closure. It is evident that most Busking locations include approximately a 60m separation distance from one another however in some cases it can be as low 40m.

It is evident from the data in Table 8 above for performances at the locations shown in Figure 18 below, that the separation distances which are currently used would be adequate for Amplified separation. It should be noted however that although none of the Busker spaces shown in Figure 18 is likely to interfere with another, it is not being suggested that Buskers should set their amplification based on separation distances.

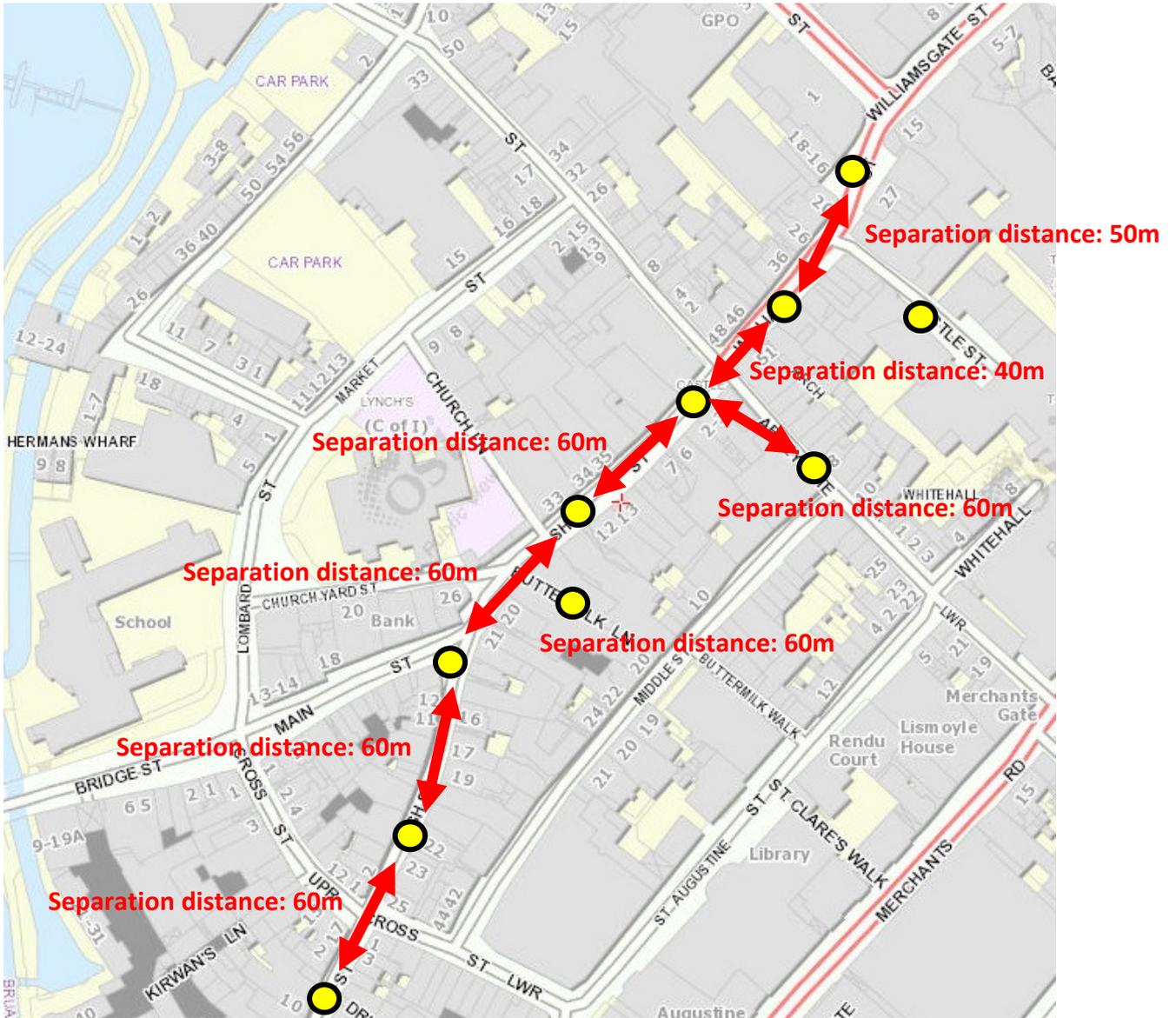


Figure 18: Showing commonly used Busking locations and the separation distances are quantified accordingly. Copyright Ordnance Survey Ireland. All rights reserved. 2014/14/CCMA/GalwayCityCouncil.

6.2 Rotation of Busking Locations

It is accepted that extended performances by a Busker in a particular location could give rise to complaints from persons or traders in that vicinity. In order to minimise the risk of disturbance, it is suggested that Busking locations rotate on a 90 minute basis, which should be self-managed by the Busking community. While this would ensure more variety in Busker's music at specific location, it has the added benefit of alternating Buskers who may be causing annoyance and disturbance. It is also widely accepted in the acoustics industry that acceptance of a noise source is greater when a listener knows when music source is likely to end.

6.3 Recommended Busking Times

Existing Bylaws should be adhered to and enforced where necessary. In the interests of protecting the inner city residential amenity, one should aim to minimise the potential effects on sleep disturbance. Residential occupancy has fallen considerably in the heart of the city centre relative to past times and many once residential units have been converted into commercial use or for storage purposes to service the shops below. However, there are still a number of residential properties within the vicinity of street performance areas.

6.4 Noise Sensitivity

Noise sensitivity can vary depending on specific circumstances. It should be acknowledged that for those living or working in the city centre Busking noise can become a source of intrusion and annoyance. In some extreme cases it is possible that this in turn could result in a noise nuisance complaint to the City Council.

To assist with the understanding of noise sensitivity, let us consider a fashion retail outlet with its own in-house Amplified loud music playing within the retail space. This retail space would certainly be less sensitive to the effects of Busking noise nearby due to the fact that the Busker may be inaudible or a minor source due to the noise inside their premises. If we consider a retail premises such as a book shop, then its noise climate would be typically low with quiet conditions required for concentration purposes. The effect of Amplified inbound noise from a Busker would have a greater impact on such an environment and the premises would be deemed to be more noise sensitive.

The retail building's façade can also impact greatly on its ability to control noise. Door types, size and arrangement can have an influence on break-in noise to a retail premises. A retail premises for example with a large permanently open door would have little resistance to inbound Busking noise/music, however retail outlets with closing doors have better resistance to inbound noise.

Some commercial premises may also have locations where patrons are seated outside the premises, however if Busking noise was at a comfortable level to allow conversation, it is expected that this would be acceptable. Music for example, if not excessively loud can bring atmosphere and character to the inner city which is generally welcomed by tourists and the general public alike.

Street users can also have varying sensitivity to noise. For example, a person using a cellular phone on the street is likely to be sensitive to Amplified music on the street and how it could impinge on a telephone conversation. Mobile phone usage is significant in the city centre and should be considered as a relatively noise sensitive activity.

General conversation is also a requirement for street users which can be adversely affected by noise and potentially noise from Busking activities. British Standard BS8233: 2014 sets out guidance values for maximum noise levels for speech communication. It should be noted that the guidance values are based on steady state noise and are not directly applicable to music noise; however they do show

how noise levels will impact on speech. So if we consider the ambient noise climate (in the absence of Busking noise) as being relatively steady on a busy shopping day, it is likely that two people conversing on a busy street would have to raise their voice even at a distance of 1m between the taker and listener.

Maximum steady noise levels for reliable speech communication

Distances between talker and listener m	Noise level dBA	
	Normal voice	Raised voice
1	57	62
2	51	56
4	45	50
8	39	44

Figure 19: Extract from BS8233:2014, Table 7.

It is apparent from our measurements of Busking music levels, that good speech communication would be very difficult in the vicinity of Buskers, particularly those using Amplifiers.

6.5 Amplification size and type restrictions

It is strongly advised that mains (220v) generators are not used (as shown in Figure 13 above) to power amplification or sound equipment at any time. Apart from street safety matters, it provides a platform for the use of amplification equipment which has more capacity than the requirements need for Busking purposes. A battery powered Amplifier should provide adequate Amplification for Busking activities.

A possible limitation could be to suggest that Amplification from a battery powered Amplifier should not exceed 50 watts. It should be noted also that 50 Watt Amplification systems operating near capacity are likely to give rise to distortion, so it is expected that most Buskers who see the importance of music quality (and the prevention of audio feedback), will adhere to keeping the Amplifier within operational ranges.

Amplification is not required in all cases either. It is often the case that a number of musicians can perform without Amplification successfully and effectively. Amplification does widen the variety of performances and allow performances with a generally low output to be heard. For example, in most cases a harpist would require some form of Amplification to overcome the ambient street noise and to claim a reasonable amount of street coverage.

In deciding the level at which an electronic Amplifier is set, then it should be set at the lowest level at which the performance is giving reasonable coverage in a particular situation, while striking a balance with other street users/retailers.

6.6 Limiting Levels

When considering a noise limiting level one needs to consider a number of factors such as determining an appropriate limiting level, the measurement location of that limiting, the duration of measurement and resources available to conduct such measurements in order to enforce noise level limits. There are numerous practical implications that would be both cost and resource restrictive to put in place by Galway City Council. Even if all of the necessary mechanisms were put in place with the purchase of additional instrumentation, training costs and calibration/ownership costs, it would be difficult to measure a street performer without the street performer ceasing or quickly reducing their noise levels in order to comply with the regulation.

It would appear to be more practical to seek an approach whereby the noise source (Amplification) is limited through Amplifier output size rather than controlling by way of a measurable noise level.

6.7 Subjective Busker Amplification settings

Measurements and noise contour modelling show that when we increase the level of electronic Busking instrumentation, the coverage area will increase correspondingly. While louder Busking acts will yield greater coverage areas, the increased level could well be uncomfortably high for those street users who stop to watch/listen.

It is proposed that the following subjective arrangement is used to decide on what might be an appropriate level. The noise contour maps show the extent at which Busking noise will be comparable with the lower ambient noise level of on the streets of circa 60dB(A). Using noise modelling software it is possible to determine that the music noise level will be comparable with the likely ambient at a distance of 35m either side of a Busking location. The difficulty however is that a Busker will claim that it is not possible for him/her to check this level while performing. It should not be difficult however with a little assistance and experimentation to determine a suitable setting.

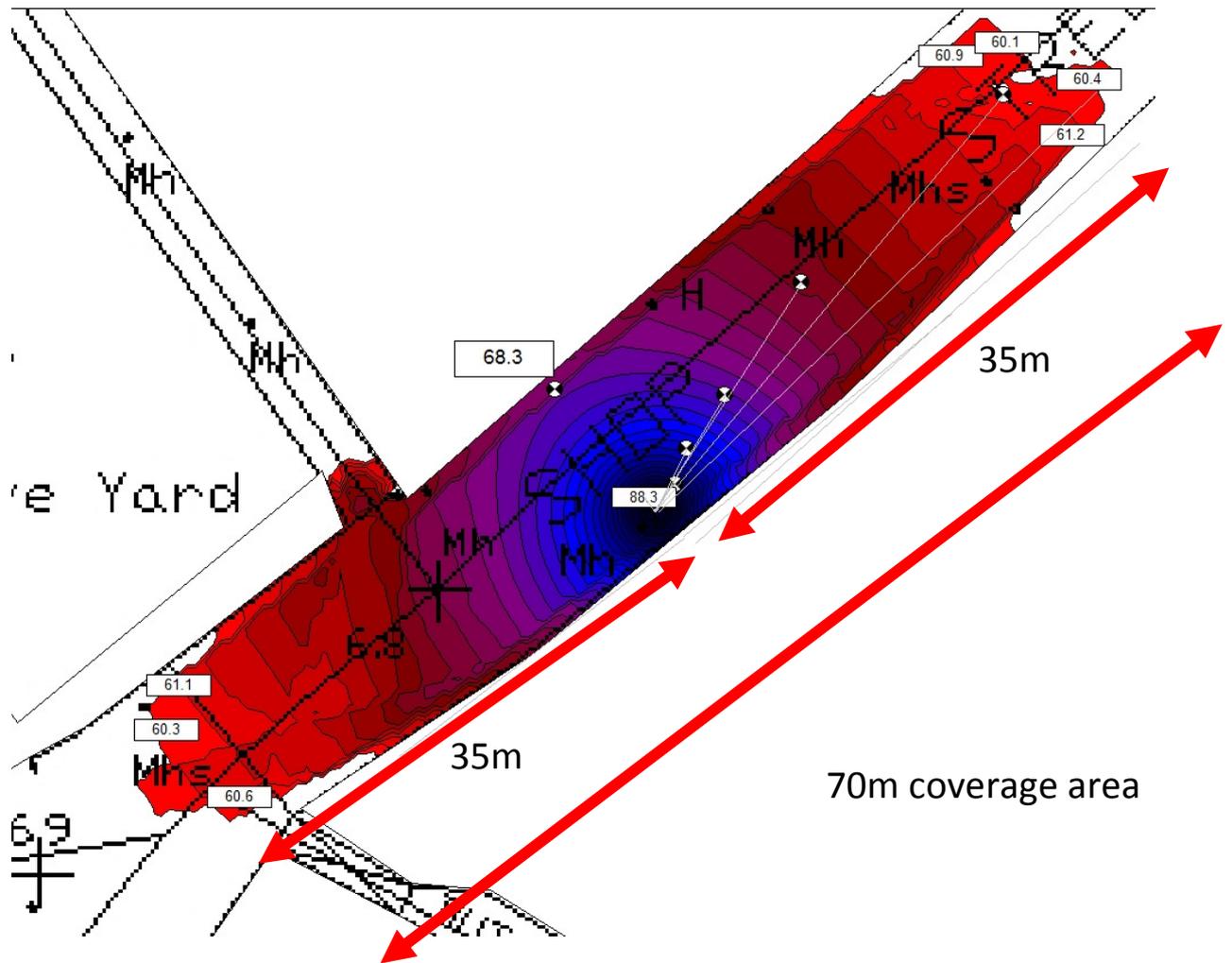


Figure 20: Shows a proposed coverage area of 70m (35m either side of a Busker), extended to a point where the Busking noise is comparable with that of the ambient street noise level of circa 60dB(A). It can be seen that the likely noise level at the facade directly opposite the Busker would be at a level of 68dB(A), which in effect should be a comfortable level for a listener at that location.

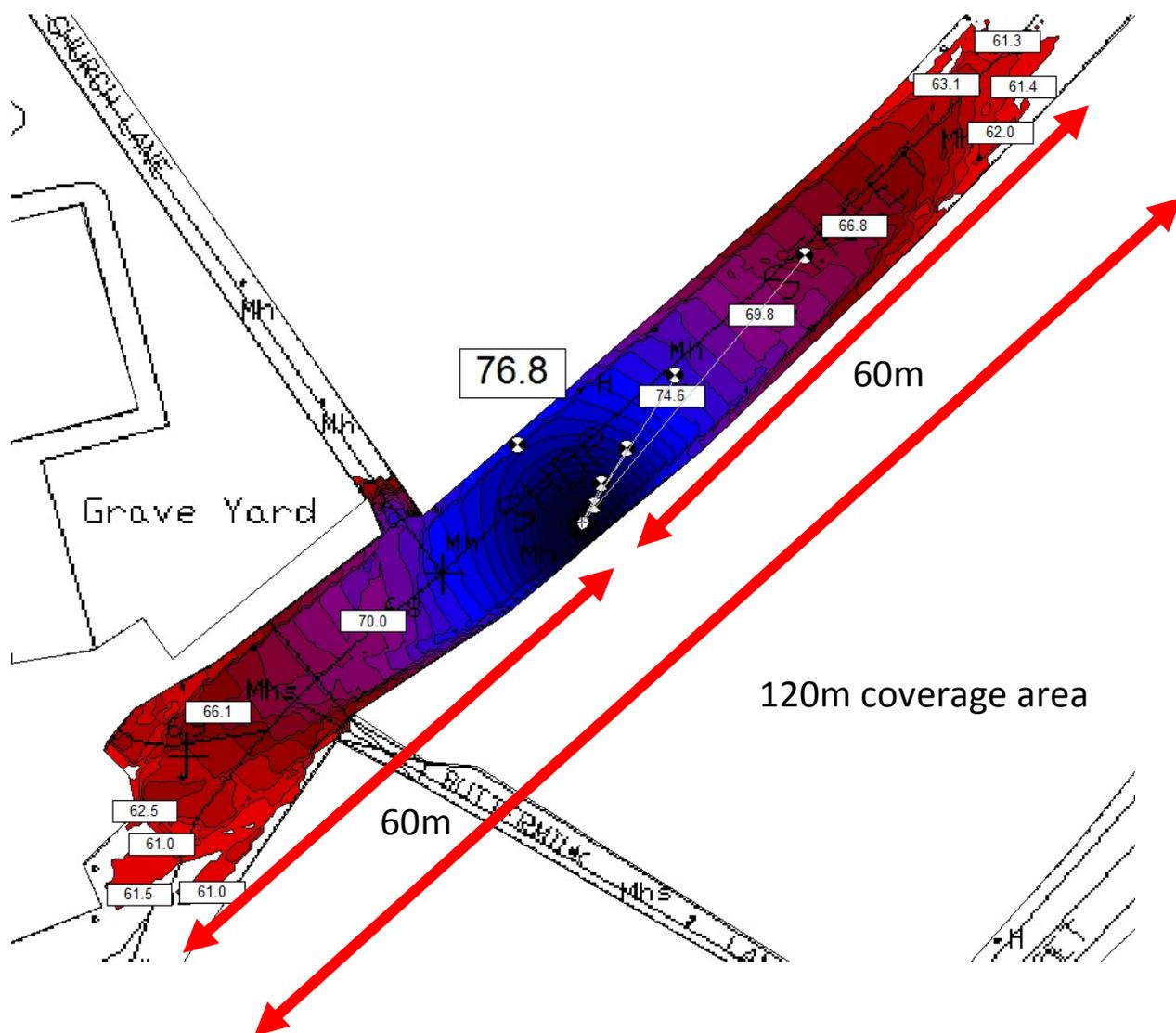


Figure 21: Shows a greater coverage area of 120m (60m either side of a Busker), extended to a point where the Busking noise is comparable with that of the ambient street noise level of circa 60dB(A).

The preferred scenario would be the arrangement shown in Figure 20 above where a 70m coverage area is considered (35m either side of a Busker). This would allow a reasonable coverage area while ensuring that noise levels in front of the Busker are not uncomfortably high for those who wish to stop and watch/listen to the performance.

Procedure for determining a suitable noise level:

1. An assistant to the Busker would stand 35m from the performer and subjectively sample the ambient street noise level.
2. The street performer would then be instructed to play at their desired level for a brief period (similar to a sound check).
3. The assistant to the Busker would make a judgement to determine if the level at 35m is at a comparable noise level with the ambient noise level.
4. By way of hand signals, the assistant would ask the Busker to increase or decrease the Amplification level.

This in effect would be comparable to imposing a 60dB(A) limit at a distance of 35m from the street performer. While a limit of 60dB(A) at 35m may elicit concern among the Busking community, it would be important to point out that a limit of 60dB(A) at 35m, results in considerably higher levels at closer range. In an effort to demonstrate this, a noise contour map showing the likely noise levels at varying distances has been produced below.

As a Busker is unlikely to have a facility to measure a distance of 35m it may be possible to provide a basic street map with 5m increments marked out on the streets used by Buskers. This would enable the Busker to first pick his location and then establish where the 35 metres distance from which he must check his levels. Alternatively traditional busking locations could be shown on a street map and the points shown where the 35meter converge area ends.

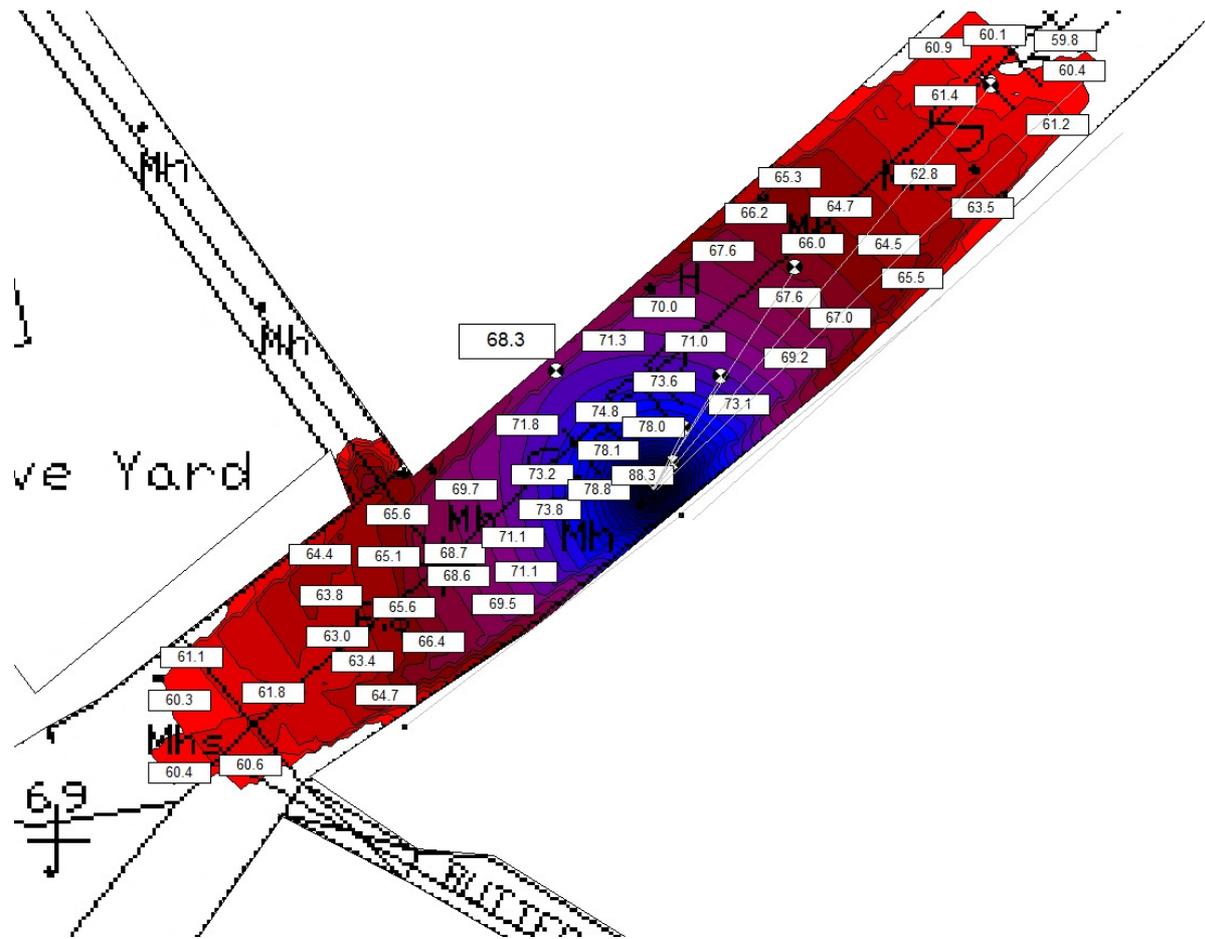


Figure 22: Shows likely noise levels (dB(A)) at varying distances from the Busker, with the extends of the noise contours at 60dB(A). It should be noted that at 1m from the source, the levels would be in the order of 83dB(A) which would be loud.

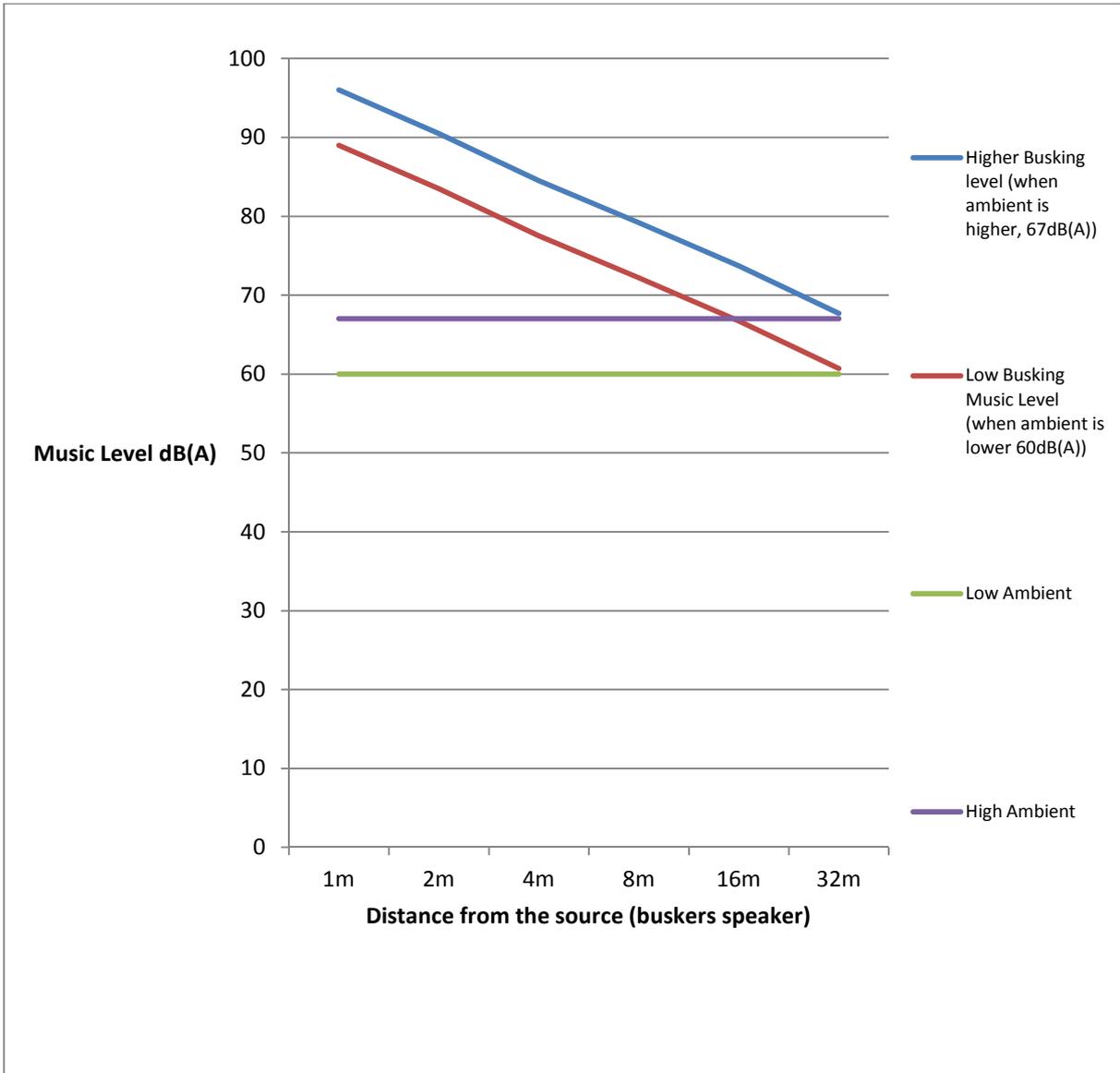


Figure 23: Shows the likely Busking noise levels as they fall over distance. It should be noted that during times when ambient street noise is higher (circa 67dB(A)), that Busking noise levels will need to be higher to be comparable in level with the ambient street noise level at 35m.

6.8 Public Health and Safety

High levels of noise always create the potential of generating noise induced hearing loss. The risk to hearing damage will depend on the level of noise and duration of noise exposure and it is considered that such risk would be very low for persons passing in the street or stopping to listen for a short period. However, in situations where audio speakers are mounted on pole stands, then the speakers can be at ear level and potentially closer to street user's ears. When we consider the scenario suggested in Figure 22, where Amplified music levels are in the order of 60dB at 35m, noise levels will be as high as 89dB(A) at 1m from the source, 83.5dB(A) at 2m from the source, 77.5dB(A) at 4m

from the source, 72.2dB(A) at 8m from the source and 67dB(A) at 16m from the source. During times when ambient street noise is likely to be higher, these levels could well be some 7dB higher again at their respective distances.

Audio speakers however which sit on the pavement consequently have greater separation distances between a street user's ear and the speaker at ground level. While ground level speakers would be a preferred option, they could give rise to a potential trip hazard, so great care should be taken in their placement to ensure a member of the public would not trip on such a speaker. Pole mounted speakers also present a considerable risk as they are top heavy and in many cases these tripods were designed for indoor use on level surfaces, not like the cobblelock on some of the streets surveyed.

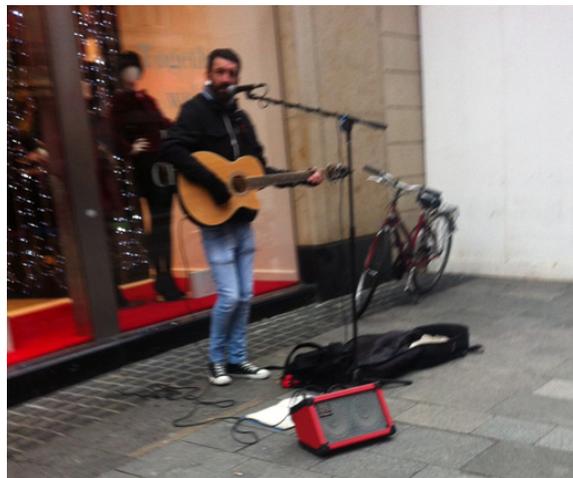


Figure 24: In some cases Buskers will place a microphone stand close to a pavement mounted Amplifier/speaker to minimise the risk of it becoming a trip hazard.

Whilst this report deals only with noise impact, the Council may wish to consider that all street performers carry out activities in a responsible and safe manner, carry out a risk assessment and should have public liability insurance cover.

6.9 Street Performance (Prohibited Periods) Bye-Laws 2011 (for Galway City)

At present Busking activities are controlled with regard to limited hours set down in the bye-law entitled 'Street Performance (Prohibited Periods) Bye-laws 2011' which are proposed under The Local Government Act, 2001 and regulations there under. An extract from this document appears below:

Bye Law 2001 Restrictions for Galway City.

Street Performance is prohibited between the hours of 22:00hrs pm and 09:00hrs during the months of November, December, January & February.

Street Performance is prohibited between the hours of hours of 23.00hrs and 09:00hrs during the months of March, April, May, June, July, August, September and October.

Table 9: Extract from the 'Street Performance (Prohibited Periods) Bye-laws 2011', with the modification of times to a 24 hour format.

It appears that these bylaws provide a mechanism to address scenarios whereby Buskers could give rise to sleep disturbance between the hours of 22:00hrs/23:00hrs and 09:00hrs. Due to the times associated with these bye-laws it is expected that Gardaí would be responsible for the enforcement of same.

6.10 New Dublin City Council Bye Laws

Recently Dublin City Council introduced new Bye Laws to deal with street performances which came into force on the 7th of April 2015. At this early stage it is impossible to tell how effective and enforceable these Bye Laws will prove to be. At first glance it may prove a problem to enforce the stated restriction on noise output by a Busker as the Bye Laws do not specify the distance from the source at which the noise is to be measured or indeed the duration of measurement.

6.11 Potential Busking/Street Performance Code of Practice

It is suggested that consideration would be given to the production of a Busking Code of Practice, which could be reviewed after the first six months. Some of the suggested practices in this code of practice would be consideration of the following:

- A requirement to rotate Busking locations every 90 minutes.
- To set Busking noise levels based on a subjective listening test which is carried out 35m from a performer, whereby levels are set based on the Amplified music level being comparable to that of the ambient noise level at 35m. A practical guide could be provided setting out the proposed methodology to be used to determine a suitable Amplification level.
- Prohibiting the use of mains powered generators on the street.
- Limiting Amplification to one 50 watt battery powered speaker at any one Busking location. In cases where a performance might include an electric guitar, a vocal microphone and perhaps a keyboard, then it would be necessary for the proposed 50 watt 'battery powered' speaker would require an integrated mixing console. Most modern battery powered Amplification systems have an integrated mixing console for this very purpose.

- The use of wet battery powered devices, such as car battery type arrangements should be prohibited for both street safety and the potential to drive high powered Amplification systems. All equipment should be restricted to dry battery products only.
- Recognition of the need for Amplification for instruments such as the harp, music for mime shows and for voice amplification for some street acts. Amplification should be set in accordance with the guidance described above.
- Procedure for dealing with complaints from the public, retail outlets and residents.

It is proposed that the Galway City Busking Code of Practice would be available as a download from the Galway City website or made available within the council offices.

7 Definitions

“Street Performance” means a musical, dramatic or other performance (including Busking), involving musical, and theatrical or circus performance skills including playing musical instruments, dancing, singing, clowning or juggling, pavement art, speeches, poetry, or doing other acts of a similar nature in public spaces.

“Busking” means a street performance for gratuities/donations from the public.

“Busker/s” A person or persons who for donation, sings, chants, plays a musical instrument, mimes, dances or otherwise entertains persons in public streets.

“Amplifier” an electronic device for increasing the amplitude or volume of sound

“Amplified” sound which has been projected through an Amplifier

“Amplification” the process of using an Amplifier

“Unamplified” performances which are acoustic and not increased in volume by the use of an Amplifier

“Microphone” an instrument that converts sound waves into an electric current, usually fed into an audio mixing device.

“Mixer Amplifier” a unit which has an audio mixing console which allows microphone levels to be mixed with audio backing tracks or similar, which is then fed into a Audio Amplifier.

“Speaker” a device which converts the output from an audio Amplifier into airborne noise in the surrounding environment.

8 Disclaimer

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