

# **NOISE MANAGEMENT BY LAW**

## 1. Contents

- 1.1 Definition of Noise
- 1.2. Physical Properties of Sound
- 1.3. Different Types of Sound
- 1.4. The Cost of Noise
- 1.5. Typical Everyday Noise Levels
- 1.6. Noise and Its Impact on Health
- 1.7. Noise Prevention
- 1.8. Minimising Noise
- 1.9. Measuring Noise

Noise Control Program that is designed to regulate, measure and manage disturbing noise aspects that occur or may have the potential to occur in all residential, commercial and industrial areas of the City of Cape Town.

### **The services rendered by this program extends to the following:-**

Requesting and evaluation of Noise Management Plans.  
Requesting and evaluation of Noise Assessment Reports.  
Evaluation and approval of Noise Exemption Applications for special and planned events.  
Evaluates Environmental Impact Assessments and scrutinises building plans in terms of the potential noise impact. as a preventative measure certain design conditions may be imposed in order to minimise the impact of the potential source of noise.  
Investigate noise complaints & concerns relating to disturbing noise aspects.  
Conduct Independent Noise Measurements.

**This service does not include the investigation and monitoring of noise complaints regarding "Barking Dogs", which is to be referred to the City of Cape Town's Law Enforcement section.**

### **1.1 Definition of Noise**

Noise can be defined as "unwanted sound", and an audible acoustic energy that adversely affects the physiological and/or psychological well-being of people, or which disturbs or impairs the convenience or peace of any person. We can generalize by saying that sound becomes unwanted when it:-

- 1.1 (a) Hinders speech communication.
- 1.1 (b) Impedes the thinking process.
- 1.1 (c) Interferes with concentration.
- 1.1 (d) Obstructs activities (work or leisure).
- 1.1 (e) Presents a health risk due to hearing damage.

It is important to remember that whether a given sound is "noise" depends on the listener or hearer. The driver playing loud rock music on their car radio hears no noise, but the person in the traffic behind them hears nothing but noise.

DEFINITIONS OF DISTURBING NOISE AND A NOISE NUISANCE	
Disturbing Noise	Noise Nuisance
Means a noise level that exceeds the ambient sound level measured continuously at the same measuring point by 7 dBA or more.	Means any sound, which disturbs or impairs or may disturb or impair the convenience or peace of any person.
Ambient sound level means the reading on an integrating impulse sound level meter taken in the absence of any alleged disturbing noise....	(SABS 0103) ambient noise:- The totally encompassing sound in a given time, and usually composed of sound from many sources, both near and far.
Noise level means the reading... taken at a measuring point in the presence of any alleged disturbing noise at the end of a total period of at least ten minutes after such meter was put into operation, and, if the alleged disturbing noise has a discernable pitch, for example, a whistle, buzz, drone or music, to which 5 dBA is added.	(SABS 0103) residual noise:- The ambient noise that remains at a given position in a given situation when one or more specific noises are suppressed. Specific noise:- A component of the ambient noise which can be specifically identified by acoustical means and which may be associated with a specific source.

## **1.2 PHYSICAL PROPERTIES OF SOUND**

Sound is the result of pressure changes in the air, caused by vibration or turbulence. The "loudness" of these pressure changes is stated in terms of sound level, and the rapidity with which these changes occur is the sound frequency.

Sound level is expressed in decibels (dB). To hear sounds, air pressure changes must be very rapid. Changes must complete a cycle at least 20 times per second and not more than 20 000 times a second. The rate at which these cycles repeat is called the frequency of the sound and is measured in Hertz (Hz). One Hertz is equal to one cycle per second.

## **1.3 DIFFERENT TYPES OF SOUND**

Continuous sounds: - are sounds that have little or no variation over a duration of time.

Varying sounds: - are sounds that have differing maximum levels over a duration of time.

Intermittent sounds: - are sounds that are interspersed with quiet periods.

Impulsive sounds: - are sounds that are characterized by relatively high sound levels over a very short duration of time.

Mainly the duration and level of the noise determine the effects of noise. Long lasting, high level sounds are the most disturbing and damaging to hearing and generally the most annoying. Duration of sounds is also important, in that intermittent sounds appear to be less damaging to hearing than continuous sounds because of the ear's ability to regenerate during the quiet periods. However, intermittent and impulsive sounds tend to be more annoying because of their unpredictability

## **1.4 THE COST OF NOISE**

Economic interest has always dominated noise control, but we now have to weigh this against other likely costs such as: -

- (a) Loss of earnings
- (b) Loss of productivity
- (c) Burden on the health services and the criminal justice system
- (d) Increasing violence
- (e) Human misery
- (f) Social anger
- (g) Loss of quality of life that noise causes.

## **1.5 MYTHS ABOUT NOISE**

*"You can get used to it"*

You never do, even while asleep, your body reacts to it as a warning signal.

*"It's my right to make a noise"*

Noise hurts and you have no right to hurt others.

*"Noise has to be loud to be annoying"*

A dripping tap or the dull "thump thump" of amplified music can cause extreme stress.

TYPICAL EVERYDAY NOISE LEVELS		
DECIBELS (dB)	COMMON SOUNDS	PERCEPTION
10 dB - 30dB	Whisper or a quiet conversation	Barely audible
30dB - 50dB	Rainfall, quiet office, refrigerator or a computer	Heard faintly
50db - 60db	Dishwasher, normal conversation or a radio	Moderate level
60dB - 70dB	Hairdryer, heavy traffic or a ringing phone	Moderate to loud
70db - 80dB	Noisy office or an alarm clock	Loud
80dB - 90dB	Electric razor, lawnmower or an vacuum cleaner	Loud to very loud
90dB - 100dB	Chain saw, air compressor or a jackhammer	Very loud
100dB - 110dB	Rock concert, power saw or a hifi on full	Extremely loud
110dB - 120dB	Jet take off, nightclub or thunder	Extremely loud to painful
120dB - 130dB	Shotgun	Painful

## **1.6 NOISE AND ITS IMPACT ON HEALTH**

The recognition of the noise as a serious health hazard as opposed to a nuisance is a recent development and the health effects of the hazardous noise exposure are now considered to be an increasingly important environmental health problem.

Problems related to noise include hearing loss, stress, interference with communication, sleep loss, effects on performance and behavior, inability to enjoy one's property or leisure time, and a general reduction in the quality of life and opportunities for tranquility.

### **1.6.1 (a) Hearing Impairment and Loss**

For most people, a life time's continuous exposure to an environmental average noise level of 70 dB will not cause hearing impairment, but any continuous level above 70 dB will adversely affect one's hearing ability. An adult persons ear can tolerate an occasional noise level of up to 140 dB, but this is not recommended over a

prolonged time period. Noise induced hearing impairment is the most common irreversible (and preventable) occupational hazard worldwide.

### **1.6.1(b) Interference with Communication**

Noise can mask important sounds and disrupt communication between individuals in a variety of settings. This process can cause anything from a slight irritation to a serious safety hazard involving an accident or even a fatality because of the failure to hear the warning sounds of imminent danger. Noise can disrupt face-to-face conversation, the enjoyment of radio and television in the home. It can also disrupt effective communication between teachers and pupils in schools, and can cause vocal strain and fatigue in those who need to communicate in spite of the noise. Noise also disturbs relaxation time and masks speech, television and music.

### **1.6.1 (c) Loss of Sleep**

Noise is one of the most common forms of sleep disturbance, and sleep disturbance is a critical component of noise related annoyance. Noise can cause the sleeper to awaken repeatedly and to report poor sleep quality the next day, but noise can also produce reactions of which the individual is unaware. These reactions include changes from heavier to lighter stages of sleep, increases in body movements during the night, changes in heart rate, and mood changes and this all leads to a diminished work performance or productivity.

### **1.6.1(d) Effects on Performance and Behaviour**

Impulsive or sudden loud sounds can produce a startle response that one does not completely grow accustomed to with repeated, predictable exposures. Simple tasks remain unaffected at noise levels as high as 115dB, while more complex tasks are interrupted at much lower noise levels. Frequency and tempo of noise also play a role. High frequency sound is more disruptive than low frequency sound, and intermittent noise can affect performance more adversely than continuous noise of similar energy. It seems that noise can have an even greater effect on the individual after than during exposure. The most common after effect appearing is the reduced tolerance for frustration and the reduction in willingness to persist in trying to solve complex problems.

Noise has a significant impact on the quality of life, and is a health problem in accordance with the World Health Organization's (WHO) definition of health. WHO's definition of health includes total physical and mental well being, as well as the absence of disease. Therefore, noise must be recognized as a major threat to human well being. The effects of noise are seldom catastrophic, and are often only temporary, but adverse effects can be cumulative with prolonged exposure. There is also some evidence that it can adversely affect general health in the same manner as stress. More often than not, noise is a nuisance or an annoyance.

## **1.7 NOISE PREVENTION**

Noise can be controlled during one of the following stages or combination of stages: -

- (a) Control at source
- (b) Control in the transmission path
- (c) Control at the receiver

### **1.7.1 Other control methods: -**

#### **(a) Zoning**

Zoning ensures the correct siting of factories, industries and residential areas to reduce noise pollution to the minimum.

#### **(b) Noise barriers**

Noise buffers in the form of sand, covered with grass, may be considered as a means of protecting communities from unacceptable noise levels. These barriers need to be large enough to make them effective.

#### **(c) Transportation control**

Noise pollution from aircraft is controlled through the zoning of airfields away from residential areas. Road noise can be controlled by setting maximum noise levels for each class of motor vehicle, and through information such as traffic flow, speed, light/heavy traffic mix, etc.

#### **(d) Education**

Communities should be educated on the negative effect of noise on their physical, mental and social life. Before development projects commence, potential sources of noise pollution associated with the project should be identified and discussed with the community.

#### **(e) Legislation**

Legislation should for the effective prevention of noise from the various sources of noise pollution.

Legislation providing for noise control includes:-

- (i) Environment Conservation Act, which provides noise regulations.
- (ii) Road Traffic Act controlling noise levels related to road traffic.
- (iii) The Aviation Act to prevent nuisance in relation to air navigation or aircraft related issues.
- (iv) Occupational Safety Act which ensures the safety of persons in the workplace.

#### **(f) Town Planning**

Proper town planning will ensure that impact assessments for noise are carried out before any development projects are undertaken.

### **(g) Time limit to control noise**

Bylaws make provision for limiting noise emanating from events such as parties, e.g. by setting specific time limits when the noise must cease.

## **1.8 WHAT YOU CAN DO TO MINIMISE NOISE**

To prevent noise in the neighborhood, a community member shall :

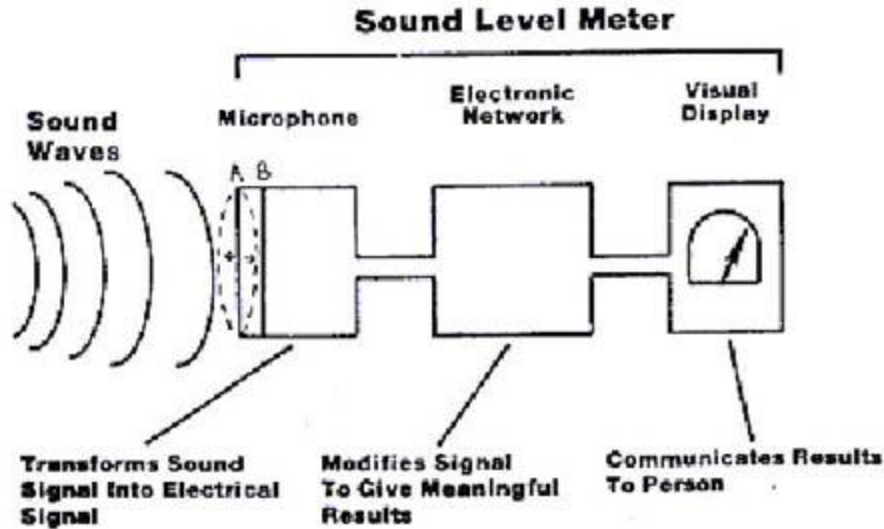
- (a) Keep the level of hifi's; TV's, radio's and tape players at a level where they cannot be heard from the street, and always keep the bass level turned as low as possible.
- (b) Avoid hosting "home parties" as it is difficult to get guest to cooperate when they have been drinking, rather hire a hall or restaurant.
- (c) not hoot when meeting or leaving family or friends, and don't slam car doors or rev engines at night.
- (d) not leave dogs alone for long periods; rather have a friend or neighbour check on them.
- (e) not let his/her dogs bark. If they do, attend to the cause immediately, and keep them inside at night.
- (f) not carry out DIY jobs after 21H00 or before 10H00 on weekends, and if possible never on Sundays.
- (g) ensure that there is another "key holder" for car and home alarms.
- (h) make sure that your swimming pool pump and other home equipment is operating silently or acoustically confine the noise.
- (i) Keep noise levels down after 22H00 and before 07H00.

## **1.9 MEASURING NOISE**

The instrument for measuring noise is the basic sound level meter or the integrated sound level meter. Sound meters are designed to measure sounds that the human ear would detect. The ear does not hear very high or low frequencies as well as it can hear middle frequency sounds. Sound meters use special filters to mimic the ear's performance.

### **1.9.1 The sound level meter**





This device performs three basic operations: -

- (a) First, it uses a microphone to convert the energy in the sound into an electrical signal. When a sound wave hits the microphone, it causes a diaphragm.
- (b) To vibrate, thereby producing electronic signals, which are proportional to the sound pressure causing the vibration.
- (c) Thirdly, this electronic network then conditions the signal to provide meaningful results transmitted through a visual display.

### **1.9.2 Rule of thumb when measuring noise levels**

- (a) The noise source being measured should be at least 10 dB above the background (ambient) noise.
- (b) Keep the sound level meter as far away from any large reflecting surfaces as you are from the source that you are measuring.
- (c) All measurements are to be made with the microphone at least 3 feet above the ground.
- (d) Under the decibel scale, when the sound level increases by 3 dB, the actual sound energy doubles. This means that half of the sound energy must be eliminated to reduce the sound level by 3 dB. Most people would barely notice a 3 dB change, but a 6 dB change would be clearly noticeable, while a 10 dB increase would be perceived by the ear as double the loudness.
- (e) The difference between the ear's perception and the amount of sound energy actually produced is critically important. It means that 90% of a given sound energy must be eliminated before most people will judge a sound half as loud.

### **1.10 APPROVAL OF POLICY**

The policy shall be implemented after approval by council.

**Approval**

**MR TG MAGABANE**

**DATE OF APPROVAL COUNCIL / COUNCIL RESOLUTION NO**