



## Application Note AN-2

# AURATEK for Wall Mount Applications Revision

Revision 1: January 2003

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### Introduction

From the period of the Great Wall of China to today, walls have played an important role in several applications of outdoor perimeter security. These applications among others includes: correctional facilities, VIP residences, resort and condominium complexes, historical sites and zoos. To improve the level of security for these applications, modern unobtrusive electronic sensors need to be applied.

### General Requirements for Wall Applications

For today's wall applications, ENCLOSURE is an ideal sensor to increase the level of security provided by a wall. This is achieved by ENCLOSURE's ability to meet the following requirements:

**Contour Following** - the sensor cable is able to follow all the contours of a wall both horizontal and vertical so that there are no holes in the electronic detection capability on the wall.

**Unobtrusive** - for many of today's wall applications (e.g. correctional, VIP residences, condominium and resort complexes), ENCLOSURE is able to provide a high level of security without affecting the aesthetic appearance of the residence or complex.

**Covert** - the sensor cable is able to address aesthetic requirements and to increase the level of security by being covert. By being embedded in the brick or mortar, the sensor does not affect the physical appearance of the wall and it decreases the chance of tamper. Also, if required, the covert sensor increases the chance of capture because intruders are not aware they have been detected.

**No maintenance** - organizations employing ENCLOSURE as a wall sensor will realize cost savings over other sensors because there are no on-going maintenance costs.

**Not affected by the Operating Environment** - where a wall sensor is utilized, people do not want nuisance alarms being caused by the vibration and activities outside the wall (e.g. from passing vehicles). Also, they do not want the activities inside the wall activating an alarm. ENCLOSURE instills confidence in its users by not causing such nuisance alarms.

### Typical Wall Installations

- The maximum zone length is 30 m (100 feet) per zone.
- The typical zone width is 2.0 m (6.6 feet) diameter surrounding the sensor cable.
- The minimum bending radius for the detection cable could be as small as 5 cm (2"), however, 15 cm (6") is commonly recommended.

## Installation for Different Wall Structures

### a) Existing wall

The sensor cable can be held in place using the same commercial techniques used to run telephone or cable-TV type cables. Use plastic or metal clamps spaced every 3.0 m (10 feet) or as needed.

### b) New wall construction

If the sensor cable is embedded in fresh mortar or concrete during the construction of the wall, the system can function immediately to detect intruders. However, after allowing a suitable period for the mortar or concrete to dry, the sensitivity on the system should be readjusted.

### c) Reinforced Steel Wall

Walls that have long sections of reinforced steel (more than 1.0 m (3.3 feet) long) inside may reduce the maximum zone length slightly. Small pieces of metal strap have no affect.

### d) Walls with Different Elevations

Walls with different elevations are not a problem for ENCLOSURE . The sensor cable can run vertically as well as horizontally, provided the material surrounding the sensor cable is similar. For example, the sensor cable could share within the same zone section a concrete type wall, an air suspended section, and a roof section. It is not recommended to share within the same zone section, a concrete type wall with a buried or surface section.

## Impact of Wall Environment on ENCLOSURE

The sensor cable would be installed on the wall ideally 30 cm (12 inches) from the top to provide maximum detection around the perimeter. (See figure 1)

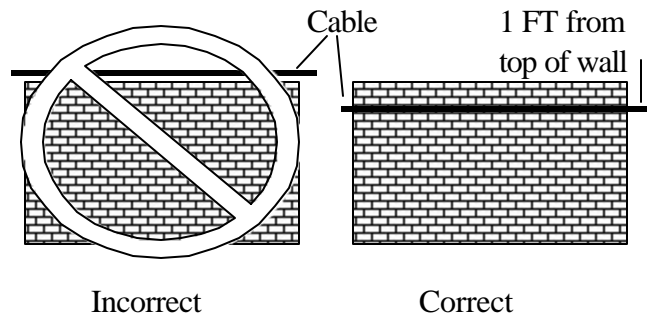


Fig. 1

The correct installation location for maximum detection.

### a) Gates and Doors

A section of non-detecting cable (triple shield cable) could be inserted across the gate or door to bridge the detection zone from both sides of the gate. (See Figure 2)

A separate detection zone could be buried across the gate or door areas to provide security for them.

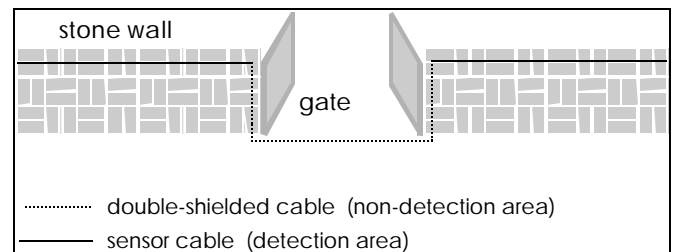


Fig. 2

This illustrates how a gate or door would typically be handled to bridge the detection zone across.

### b) Metal Objects On the Wall (e.g. Lamp-post)

A lamp-post is not a problem for ENCLOSURE and will not affect its ability to detect intruders, provided that the sensor is kept 20 cm (8 inches) from the base of the lamp-post.

### c) Decorative Iron on Top of Wall

This environment can be handled in the following different ways :

- The sensor cable can be mounted on the decorative iron using stand-offs. See Application Note #3 on Fence Application for more details.

- The sensor cable can be mounted on the interior side of the wall 20 cm (8 inches) from decorative iron.
- The sensor cable can be mounted on the exterior side of the wall 20 cm (8 inches) from the decorative iron. This application can be utilized only if the distances from outside activity (e.g. pedestrians and vehicles) are sufficient.

**d) Electrical (metal) Conduit in the Wall**

If there is metal conduit in the wall (e.g. to provide power to distributed lamp post) and if the conduit runs parallel to the sensor cable, a minimum distance of 20 cm (8 inches) should separate the conduit from the sensor cable. The sensor cable can cross the conduit at 90 degrees.

**e) Activity Outside the Wall**

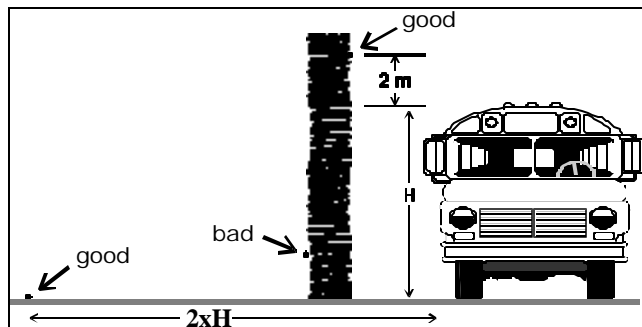


Fig. 3

*To minimize the impact of surrounding traffic, the sensor cable must be placed away from the traffic as shown.*

For wall application, both pedestrian and vehicle traffic outside the wall must be addressed.

Pedestrian or Vehicular traffic have no impact when:

- the sensor cable is mounted at a height of at least 2.0 m (6.6 feet) higher than the traffic’s highest moving object. (See Figure 3)
- the sensor cable is placed at a minimum distance equivalent to two times the height of the vehicle, especially if the sensor cable is placed on the surface or mounted at a height considerably

lower than the traffic’s highest object. (See Figure 2)

- the distance between the pedestrians and the sensor cable is larger than 3.0 m (10 feet).

A possible solution is to locate the Reference Antenna near the traffic in order to eliminate the potential nuisance alarms caused by the traffic. This process takes advantage of the signal processing capability that compensates for signal instability in the vicinity of the protected site. Consult the manufacturer for technical assistance on that regard.

**Interconnections**

**a) Processor Unit**

For wall application, the Processor Unit, can be mounted inside a building adjacent to the alarm panel or it can be mounted within the walled compound, outdoors in a weatherproof NEMA-4 box. The processor unit can be controlled from any location by using an RS-232 link and a computer (PC).

**b) Antenna**

**Passive mode** - The (reference) antenna should be mounted within the walled perimeter, on the highest point (e.g. on adjacent buildings). the (reference) antenna should be mounted within the protected perimeter. An existing antenna mast can be shared to host the reference antenna if it already exists. NOTE: Passive mode must be designed by the manufacturer.

**Active mode** - The (receiving/transmitting) antenna must have line of sight with its associated sensor cables. If the antenna is transmitting to the sensor cables, it should be located in the middle of the zone. If the sensor cable is transmitting to the antenna, the antenna should be located at 3/4 the length of the zone. In either case, a minimum setback distance of 15 m (50 feet) from the sensor cable is required. The minimum height of the antenna should be 5.0 m (17 feet).

## Conditions Specific to Wall Applications

- **Birds** - Birds are too small to generate an alarm even if they land on the cable.
- **Snow** - An accumulation of snow on a wall will not affect the system's performance.
- **Trees** - Branches from blowing trees hitting the cable will not cause an alarm. Large trees in close proximity to the wall will not cause a nuisance alarm during normal conditions. However, when combined with high winds and rain, it increases the noise level and decreases the probability of detection, since the system self-adjusts to account for these temporary instabilities.

## Conclusion

**ENCLOSURE** surpasses the general requirements of a wall sensor and is well suited for such applications.

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