
CHAPTER THREE

GUIDELINES ON PERIMETER SECURITY

When sufficiently far from a building, effective perimeter security measures can significantly reduce explosive blast effects. This chapter addresses the type of analysis that owners of Medium and High Tier buildings should conduct to achieve such a result. It also surveys the circumstances in which certain perimeter security measures, including the establishment of hard or soft perimeters, may be appropriate. Because perimeter security measures may implicate levels of pedestrian service and complicate access for disabled persons, the recommendations presented in this chapter must be balanced with the realities of urban living. Nevertheless, when considering perimeter security solutions, building owners should be mindful that the best way to minimize the impact of an attack is to keep the threat away from a building.

Generally, owners of Medium and High Tier buildings should seek to maximize the amount of protected standoff surrounding a structure. However, available standoff in dense urban areas generally does not exceed the width of a sidewalk; moreover, this distance is only guaranteed if the building is protected with a hard anti-ram perimeter. In New York City, zoning resolutions setting street-to-wall requirements significantly limit the amount of standoff available to certain buildings.¹ In such circumstances, the NYPD recommends that building owners consult with professionals about the possibility of applying for waivers, variances, or exemptions to allow appropriate protective design measures. When such exceptions are unavailable, or when protected standoff is insufficient, protective security design methods are crucial for achieving blast protection for key structural and facade elements.

Box 5: Structures that Abut Waterways

Owners of High Tier buildings that abut waterways should institute protective security design measures that account for the unique threats associated with such structures. Although the U.S. Coast Guard has certain regulatory authority to create security zones in special circumstances, security zones are only appropriate in the most extreme cases. Therefore, the NYPD recommends that owners of High Tier buildings limit the use of exposed structural elements on the waterfront side of the site, and apply the same analysis to waterways as they would to roadways adjacent to buildings. Additionally, owners of High Tier buildings that abut waterways should provide for the ability to actively monitor potential threats from the waterfront exposure and set up physical barriers preventing unauthorized access from the water.

Vehicle Threat Vector Analysis

Vehicle threat vector analysis evaluates a building’s vulnerability to a moving VBIED attack in light of surrounding street geometries, including the alignment and curvature of surrounding roads. Ultimately, the analysis identifies unobstructed vehicle approaches to buildings and determines the effectiveness of anti-ram perimeter protection measures.²

A VBIED is most likely to penetrate a building’s perimeter while moving at high speed along a straight approach that is perpendicular to a target; such an approach may allow a vehicle to achieve a velocity sufficient to overcome obstacles. For example, the 1983 VBIED attack against the U.S. Marine Corps Barracks at the Beirut International Airport in Lebanon caused significant casualties because the vehicle carrying the explosive device took a straight approach to the target. According to witnesses, the truck used in the attack was moving westward along a wire barricade on the camp’s perimeter when it made an abrupt right turn northward and crashed through wire obstacles. The truck cleared a variety of other obstacles and crashed into the entrance to the barracks. The driver detonated the explosive, producing a blast that was estimated to have a more than 12,000-pound TNT-equivalent yield.³

The NYPD recommends that owners of High Tier buildings conduct vehicle threat vector analyses – assuming realistic traffic scenarios – to determine vulnerabilities and develop solutions to mitigate associated threats. Ultimately, the purpose of such

an analysis is to identify approach vectors and maximum attainable speeds in a VBIED attack and to use this information to design or select hostile vehicle mitigation measures.⁴

Hard Perimeter

A hard perimeter is composed of an uninterrupted ring of anti-ram barriers, generally in the form of rated bollards, which prevents vehicles traveling at prescribed speeds from penetrating a building's available standoff. The NYPD recommends that owners of new High Tier buildings incorporate hard perimeters into their design plans. Depending on the circumstances, it may also be appropriate for owners of existing High Tier buildings to install hard perimeters.



K-rated bollards create a hard perimeter.

Figure 4: Department of State Impact Rating for Barriers

| Rating | Speed | Vehicle Weight |
|--------|--------|----------------|
| K4 | 30 mph | 15,000 lbs |
| K8 | 40 mph | 15,000 lbs |
| K12 | 50 mph | 15,000 lbs |

The Department of State has established standards for rating physical security barriers based on their performance, generally in live crash tests. For a perimeter to be considered a hard perimeter, Department of State-rated barriers must be installed around the building to protect against threats from vehicular intrusion. A Department of State-certified barrier receives one of three K-level ratings (K4, K8, or K12) depending on its ability to successfully stop a vehicle with certain associated kinetic energy levels.⁵ Kinetic energy levels vary with vehicle weight and speed at impact, assuming the vehicle takes a perpendicular approach, as described in Figure 4.⁶ The NYPD recommends that owners of High Tier buildings use a site-specific vehicle threat vector analysis to determine requisite K-ratings and design of active and passive barriers.

Box 6: New York City Revocable Consent Process

A revocable consent grants the right to construct, use, and maintain certain structures, such as security barriers, on City streets and sidewalks. This consent generally expires after 10 years and is renewable. However, the City retains the right to revoke such consent at any time.

To obtain a revocable consent, an applicant must first submit a petition form, a business certificate, site plans, and site photographs to the New York City Department of Transportation (DOT) for review by a group of city agencies, including the NYPD, the FDNY, the Department of Buildings, the Department of City Planning (DCP), and the Design Commission. The applicant must also seek approval from agencies that maintain subsurface structures near the proposed security device(s), such as the New York City Department of Environmental Protection and the Metropolitan Transportation Authority (MTA).

If DCP determines that a proposed installation would have land-use impacts, the application is also subject to the Uniform Land Use Review Procedure, under which the application is reviewed by the appropriate community board, the Borough President, the City Planning Commission, the City Council, and the Mayor. Structures proposed within a designated New York City Historic District or adjacent to a designated New York City landmark require the approval of the New York City Landmarks Preservation Commission.

The review covers many factors, including: pedestrian access and movement, emergency access and egress, the presence of sub-grade utilities and structures, and handicap accessibility. Overall, the approval process weighs the potential intrusion into public space against the type of threat against the building, its value, and the increase in building protection attributable to barrier installation.

After all necessary approvals are obtained, DOT holds a public hearing. If no issues arise at the hearing or during the subsequent 10-day comment period, DOT prepares a revocable consent agreement that is sent to the applicant for signature. Once executed, the agreement is subject to the additional approval of the Mayor.

Reference: New York City Department of Transportation, “Permits/Franchises: Franchises, Concessions & Consents,” <http://www.nyc.gov/html/dot/html/permits/revconif.shtml>.

New York City regulations mandate that barriers on sidewalks leave a clear path of the greater of eight feet or 50 percent of the sidewalk.⁷ With respect to bollards, the NYPD recommends four feet of clear spacing, bollard sleeve to bollard sleeve.⁸ In



Khobar Towers, Dhahran, Saudi Arabia 1996

general, New York City recommends that bollards measure between 30 and 36 inches in height. Although the installation of physical security barriers on private property usually does not require official approval, placement of such barriers on City property requires the execution of a revocable consent agreement. This process is outlined in Box 6.

The NYPD discourages the use of surface barriers like unpinned jersey barriers or concrete planters as permanent solutions for High Tier buildings. Such barriers do not constitute hard perimeters, and can impede emergency access by first responders and emergency egress by building occupants. Jersey barriers and concrete planters may also become hazardous in the event of an explosion that is powerful enough to cause fragmentation because shattered pieces of concrete can turn into harmful projectiles. For example, on June 25, 1996, an explosion caused extensive secondary blast effects damage at the Khobar Towers in Dhahran, Saudi Arabia. Standoff of approximately 80 feet separated the building's facade from its parking lot, where the bomb was detonated; and a row of jersey barriers stood adjacent to a chain link fence, separating the facility from the parking lot. Accounts indicate that the explosive force of the bomb, which was reported to have a 20,000-pound TNT-equivalent yield, shattered the jersey barriers, sending fragments directly into the facade of the building. The incident significantly damaged the first four floors and ultimately led to facade failure.⁹

Soft Perimeter

Soft perimeters are composed of unrated bollards and common streetscape elements, which serve as obstacles for vehicles attempting to target a building. The NYPD recommends that owners of Medium Tier buildings install soft perimeter solutions to create unsecured standoff without obstructing pedestrian traffic or emergency access. Although soft perimeters are less effective than hard perimeters at defending against terrorist attacks involving VBIEDs, they present a relatively cost-effective means of creating a static defense in an aesthetically appealing way.

Whenever possible, soft perimeter elements should be secured or reinforced so that they do not become harmful projectiles in the event of an explosion powerful enough to cause fragmentation.¹⁰ Additionally, although parked vehicles are not permanent fixtures, and are therefore not independently sufficient to create a soft perimeter, they can provide an extra several feet of standoff between a building's facade and a potential VBIED, based on the width of the vehicles.

Because common streetscape elements are not designed to serve as anti-ram barriers, they may be overwhelmed either by an approaching vehicle with sufficient velocity and weight, or by multiple vehicles attempting to clear a path for an explosive-based payload. For this reason, the NYPD encourages owners of Medium Tier buildings to consider developing hybrid security perimeters, which employ hard perimeter barriers at particularly vulnerable approaches and locations, such as building entrances.

Regardless of the type of physical security barrier solution a building owner decides to implement, the NYPD recommends that owners of Medium and High Tier buildings use current roadway designs and other traffic-calming measures to minimize potential vehicle velocity, to the extent possible.¹¹

