



The Site Security Design Guide

U.S. General Services Administration
Public Buildings Service



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**U.S. General Services Administration
Public Buildings Service
Office of the Chief Architect
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Foreword

Since the founding of our country, federal buildings, courthouses, customs houses, and border stations have served two crucial functions in the symbolism and operation of our government. They have the responsibility to express to our fellow citizens the stability and endurance of their government, while representing the openness and transparency that is vital to our democracy. This responsibility continues to motivate us today, even as we respond to changing security requirements that call for innovative physical solutions.

The U.S. General Services Administration (GSA) sees the evolving need for security as an opportunity—to achieve the best design, contribute to the sustainability of the environment, create a portfolio of buildings that will endure into the future, provide safe and productive federal workplaces, and improve the communities in which we work.

In meeting these responsibilities, we demonstrate how thoughtful security design can represent permanence and encourage citizen participation. Increased setbacks can become active public spaces, physical restraints can serve as seating areas or landscape features, and new amenities can both increase the safety of federal employees and integrate our public buildings into their neighborhoods.

This *Guide* establishes the principles, explores the various elements, and lays out the process that security professionals, designers, and project and facility managers should follow in designing site security at any federal project, be it large or small, at an existing facility or one not yet built.

The collaborative, multidisciplinary approach reflected in this *Guide* sets the standard for GSA, by defining a security philosophy that supports successful public building projects into the future.

David L. Winstead
Commissioner of the Public Buildings Service
U.S. General Services Administration



The most successful site security solutions create safe and welcoming places that improve the quality of the public realm.

Introduction

The mission of the U.S. General Services Administration (GSA) is to provide safe, productive, world-class workplaces for federal agencies and the public that they serve. These include several thousand facilities nationwide, encompassing federal office buildings, courthouses, border stations, and other building types where more than 1 million people work every day.

The inclusion of counterterrorism elements in the design and management of these federal facilities is of prime importance, while the fundamental need to provide high-quality workplaces remains. These workplaces extend beyond the front door and the curb; indeed, as a significant presence in neighborhoods across the country, the quality of the federal workplace derives from the economic, social, and environmental context in which our public buildings reside. Security must support this vital urban development role that the government plays in this setting.

The challenge is significant. Over the past several years, while many projects in both the public and private sectors have devoted substantial resources to security, protection often has come at the expense of the workplace and the surrounding environment, with no significant risk reduction. At times, security concerns have prompted design solutions that impede the public realm or have driven agencies to leave urban locations altogether. These approaches undermine community vitality and compromise the everyday life of a facility for fear of the unlikely event.

The struggle to incorporate security effectively has been instructive for all involved, however, and one point has become quite clear: In order to effectively reduce risk to life and property, without losing the places and environments we value, we must apply balanced approaches to every aspect of security—from the design,

construction, and operation of our buildings to the design, construction, and management of their sites and surroundings.

In this *Guide*, we focus on the latter realm—the ability of sites and their surroundings to contribute to effective risk reduction, while providing high-quality environments. Site security is not just an obligation, but an opportunity. This *Guide* emphasizes practices that enhance both the security of federal buildings and the quality of the public realm, at the levels of the street and the entire city.

GSA created this *Site Security Design Guide* to assist the designers, security experts, customers, and other decision-makers who are entrusted with developing security countermeasures at new and existing GSA facilities. The process described in this *Guide* leads to secure, well-designed site security solutions that complement and respect their context. This approach is applicable to nonfederal facilities as well. This *Guide* supplements—it does not replace—appropriate security criteria, analysis tools, and other GSA project planning guidance.

ABOUT THIS GUIDE

This *Guide* suggests principles, tools, and processes for implementing successful site security projects at buildings under GSA's care. It describes an innovative approach, as well as test cases of typical conditions found at GSA facilities. A broad group of internal and external stakeholders, including the Department of Homeland Security, the U.S. Marshals Service, the National Capital Planning Commission, nationally recognized private-sector designers, and such professional organizations as the American Institute of Architects and the American Society of Landscape Architects, contributed to the development of this *Guide*. It recommends working with a similarly wide range of stakeholders on these projects.

Recognizing that specific technical requirements will change over time, the *Guide* should be used in conjunction with the latest applicable security criteria and risk analyses. With these in hand, the *Guide's* four chapters provide a site security team with a principled starting point, sample solutions, and a proven process for balancing effective security with good urban design and efficient use of resources:

Chapter 1 (Vision and Hallmarks) lays out principles for effective site security design, noting the importance of a strategic, comprehensive, collaborative, and long-term approach to site security.

Chapter 2 (Guidelines for Elements and Innovation) develops these principles further by showing how they apply within six site “zones” common to most facilities. It highlights security elements—both familiar and innovative—and describes how to integrate them into various urban design contexts.

Chapter 3 (The Site Security Design Process) explains how a Project Team can bring together a sufficiently broad stakeholder group to assess a site's context, evaluate risk factors, and collaborate to develop design solutions, beginning at the earliest stages of project planning. This process corresponds to security projects of any size or budget.

Chapter 4 (Test Cases) applies the *Guide's* recommended tools and processes to several scenarios that span the range of expected site conditions. The specific design solutions and overall process of each test case provide strategies for implementation at a variety of facility types.

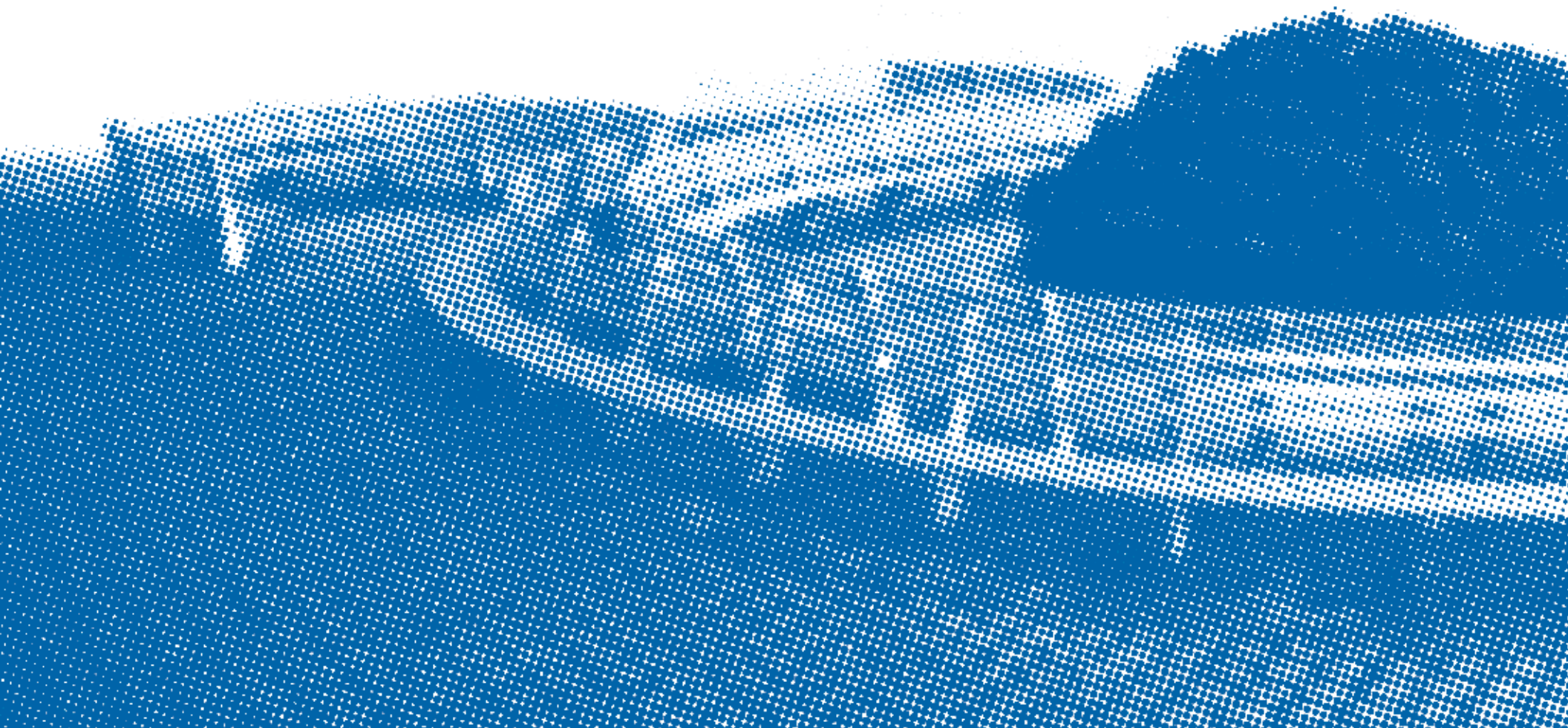
Just as risk changes over time, our understanding of risk grows, and more sophisticated countermeasures become available to us. Effective, integrated security requires constant creativity and persistence as we reassess and balance risk and apply new ideas to meet its challenges.

This *Guide* is intended to be a resource and inspiration throughout this important, ongoing process.

This Guide supplements the appropriate security criteria for a federal project. The Interagency Security Committee's ISC Security Design Criteria for New Federal Office Buildings and Major Modernization Projects: Parts I and II, the U.S. Marshals Service Judicial Security Systems: Requirements and Specifications, and the Department of Homeland Security's National Infrastructure Protection Plan are among the resources for determining project-specific security criteria.

Chapter 1
Vision and Hallmarks

1



Chapter 1

Vision and Hallmarks

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Vision and Hallmarks

INTRODUCTION

GSA demands great projects for its clients, and great projects must accomplish multiple goals. Where site security is concerned, measures must be integral to the workplace and designed to reduce risk, while enhancing the overall, everyday use of public buildings and public space.

The vast majority of these security countermeasures will never be called upon to thwart or mitigate an attack, thankfully; however, these same measures will have a profound impact, every single day, on the quality and attractiveness of the workplaces we provide for customers in our public buildings.

By carefully designing a site for its daily functions, incorporating security elements as seamlessly as possible, and allowing for adjustments in protection in response to varying levels of threat,

designers strike a successful balance, creating public buildings that attain both security and openness.

A successful process, allowing conscientious decision-making through collaboration and a thorough understanding of interrelated issues, is the foundation for achieving these goals. Any design project requires hundreds of decisions during planning, design, and construction. However, security issues can be especially complex and challenging to both designers and laypeople. At each stage, there are specific design and security challenges, such as the following:

- Determination of threats and vulnerabilities, which remain difficult to predict;
- Decisions about what to protect, which may be fraught with emotion; and
- Selection of countermeasures, which are often extremely expensive.

In light of this, some risks can be mitigated, whereas other risks must be accepted. In order to balance aesthetic goals with security requirements, consider both emotional and technical arguments, and address acute needs with available resources, successful site security design projects should adhere to four principles.

These are the hallmarks of a great project:

Few agencies have sufficient resources or justification to implement every possible security countermeasure for every conceivable scenario. Only by integrating security throughout the design process can the Project Team strike a responsible balance between consideration of risk, available resources, and appropriate mitigation measures.

Hallmarks of a Great Project

- | | |
|--|---|
| 1. Strategic Reduction of Risk | A strategic approach to reducing risk defines priorities; identifies correctable conditions; leverages resources to implement appropriate facility design, site design, and property management; and remains flexible to changing levels of threat. |
| 2. Comprehensive Site Design | A comprehensive design satisfies multifaceted site requirements to maximize functionality, aesthetics, and a total project value for its users and the community at large. |
| 3. Collaborative Participation | A collaborative, multidisciplinary team—comprising GSA and tenant agencies, security professionals, designers, and community representatives—can integrate diverse expertise to create innovative and effective solutions. |
| 4. Long-Term Development Strategy | A phased, incremental development strategy is invaluable for the successful implementation of security improvements over time, whether for a major project with multiyear execution or for multiple, small projects at one property. |

STRATEGIC REDUCTION OF RISK

“It is easy to say that no risk will be accepted, although this is impossible to deliver. Thinking strategically about risk reduction means reducing the most pressing and solvable risks, while accepting others. It means devoting scarce resources where they can do the most good and having the courage to avoid countermeasures that bring significant cost or design impacts without a realistic reduction in risk.”
—Supreme Court Justice Stephen Breyer, “The Importance of Openness in an Era of Security,” *Architectural Record*, January 2006

Got security envy? Security design elements have a way of popping up at buildings when neighboring properties install their own measures. However, countermeasures that are entirely appropriate based on the risk or potential loss identified for one property may not be appropriate for another. Project Teams must perform a careful, custom assessment to find the right countermeasures for their property.

A common understanding of risk reduction among Project Team members is as important to the success of a project as a responsible budget and demanding quality standards. GSA follows the *Inter-agency Security Committee (ISC) Design Criteria* to achieve a realistic approach to security risk assessment, based on analysis of potential threats—probability, vulnerability, and possible consequences.

Facility vulnerability should be addressed through a combination of the following approaches, to deter or mitigate loss from an attack while supporting everyday use of the site:

Facility design strategies, such as structural hardening, blast-resistant glazing, and space planning. Although not a focus of this *Guide*, facility modifications must be coordinated with and are dependent upon site design strategies.

Site design strategies, such as protecting standoff perimeters, controlling site access, and installing lighting for security and site surveillance. This approach is the focus of this *Guide*.

Operational measures, such as increasing surveillance with additional guards, cameras/closed-circuit television (CCTV), and recording devices. Operational measures apply to management of the facility, the site, and its surroundings.

Establishing realistic security strategies for a project involves recognizing the emotional nature of the subject and the fear that the threat of terrorism often can bring to the discussion. It is important to remember that a specific project cannot eliminate all risk, but may only mitigate it or shift it from one place to another.

A strategic approach to risk reduction involves the following factors:

Assessment of risk: What threats and vulnerabilities are most applicable to the specific property under discussion, rather than to the entire federal inventory?

Prioritization of risk: What risks represent the greatest vulnerability and can be reduced with countermeasures?

Acceptance of risk: What risks cannot be realistically reduced?

What risks are too remote to call for significant countermeasures?

Adoption of efficient and sensitive risk-reduction strategies:

What is the proper balance between reduction of risk and the everyday use of the site? What is the cost and benefit of each risk-reduction strategy?

This strategic approach lays the groundwork for any successful project. It directs the focus of scarce resources, addresses timing of implementation, and enables flexibility.

The ability to reduce risk varies with each project. Each team must develop an effective and realistic strategy for its unique project requirements, resources, and location. In some cases, construction of site security elements will be the best approach. In other cases, where there are few options for site security, hardening the building may be the only option. Some locations have limited opportunities for physical improvement, and a focus on operational changes may be the best strategy.

On most projects, mitigation of every known risk is not practical. Taking a strategic approach means identifying the most acute risks and devoting scarce resources accordingly. Team members must consider strategies that offer the most benefits, prioritize them, and develop implementation plans based on available resources.

COMPREHENSIVE SITE DESIGN

A comprehensive site design plan treats the site, the building, and the surrounding neighborhood as a single, integrated place. This ensures a consistent approach, whether the plan is implemented in one or many stages. The result is a thoughtful, holistic solution. Design and security team members must collaborate to develop and evaluate a number of plans and concepts before determining the combination of solutions that represents the best comprehensive site design.

Comprehensive design meets these objectives:

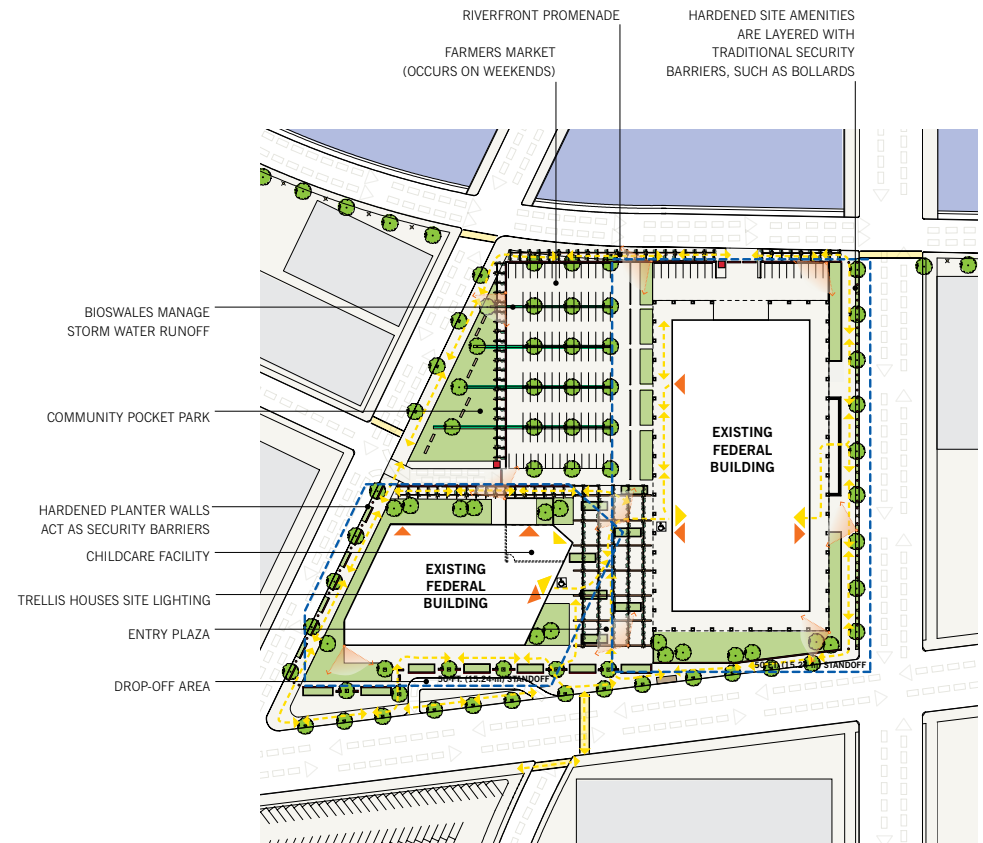
- **Develops an approach** for the entire property that enhances both security and daily use, creating a unified sense of place;
- **Creates a design palette and program** of security and site elements that are in harmony with the existing context and are appropriate to the site and its neighborhood;
- **Maximizes multipurpose features** that accomplish a security purpose and provide a visual and use amenity;
- **Offers windows of opportunity** to coordinate with public works, neighboring projects, and future GSA investment; and
- **Achieves wider goals for the property**, such as improving the quality of the workplace or enhancing wayfinding.

Site security measures differ from most building or structural security measures because they occur adjacent to or within areas that are highly visible and frequently used by the public. Poorly designed and executed projects diminish the quality of federal buildings and their public open space, impeding movement of pedestrians and vehicles and detracting from a neighborhood's character, commerce, and vitality.



Diagram 1: Comprehensive Site Design

Security solutions should incorporate multipurpose elements that complement the neighborhood context, create a unified vision, and establish a comprehensive design approach for the site. For example, in Diagram 1, planted drainage channels (“bioswales”) help reduce storm water runoff, prevent vehicle entry, and support a pocket park.



Site security elements must complement both one another and their existing context. A design palette, or “family” of elements, creates unity across the site as well as over time, should projects occur incrementally.

New thinking about security leads to unobtrusive solutions, such as signs and natural boulders that double as barriers and seating, or an Art in Architecture installation that animates a landscaped security wall.



With careful planning and design, it is possible to create significant improvements that enhance both form and function. These go beyond just solving security issues; they also upgrade the everyday activities and vitality of the site.

Design elements can serve double duty, satisfying security requirements and offering site amenities.



A project, therefore, should include design and security elements that are in harmony with the surrounding architectural and landscape context. A successful project commits to a common palette, or “family,” of design elements and materials to achieve its goals, even if it is implemented over a number of years.

A telling failure of early site security design efforts is the use of security elements that are completely out of character with the building, site, and neighborhood, or elements that significantly impede the ability of the public to find and reach the building.

Designers are now finding ways to employ multipurpose features that minimize the most risk for the least amount of money, while accomplishing multiple goals. Many site elements, for example, can be reinforced structurally to perform as part of a perimeter barrier that establishes standoff distances. These include benches, bus stops, streetlights, lampposts, retaining walls, fountains, planters, and plinth walls.

Lighting for security purposes can also creatively illuminate sidewalks, signage, entry paths, and entryways. In addition, plants selected and positioned to help screen hard security elements can provide shade, beauty, and seasonal color.

Beyond mastery of the specific elements, a comprehensive approach to the entire site provides a better understanding of opportunities for broader improvements afforded at each part of the site, such as new public spaces, public works improvements, and future facility expansion. These must be planned and addressed with partners both on and outside the design team.

COLLABORATIVE PARTICIPATION

Seasoned, multidisciplinary expertise is critical for fostering innovation. Well-informed Project Team members develop design strategies that successfully integrate security with architectural and site design and work well with ongoing operations and maintenance programs. Team members who are aware of the latest techniques can take advantage of opportunities to innovate and explore new concepts. Collaborative partnerships among these experienced professionals and project stakeholders are essential for success. Project Teams that achieve stated goals draw from many resources:

GSA, represented by the building manager and staff, building tenants, regional Project Teams, and national advisors, impacts all aspects of the project, from property to portfolio management; **Consultants and contractors**, such as architects, blast experts, and landscape architects, augment GSA teams with specialized expertise; and **Local stakeholders**, such as city planners, public works staff, and representatives of civic organizations, offer fresh insights on local conditions, current and future, and may also bring additional physical or operational resources to the solution.

GSA's Office of the Chief Architect (OCA), the Interagency Security Committee (ISC), the Federal Protective Service (FPS), and customer agency security professionals, including the U.S. Marshals Service (USMS), have broad expertise to contribute to the discussion. They also have access to the security and design tools and techniques that can help Project Teams collect the right information, analyze it appropriately, and make informed decisions for their projects.

GSA and customer agency associates, designers, and security professionals collaborate in order to

- Identify and determine which security risks and vulnerabilities should be addressed;
- Develop strategies to manage those risks and vulnerabilities; and
- Craft an efficient design solution that will balance the effectiveness of the solution, the budget, the physical characteristics of each location, and the needs of the tenants.

Large Project Teams representing specialized expertise from different disciplines and roles are typical. Few team members will be familiar with all aspects of the project. Therefore, a collaborative working environment is key, allowing team members to share expertise and work together to craft creative design solutions to technical requirements.

Every project is complex, requiring teams that can navigate federal processes and requirements, as well as satisfy the special needs of customer agencies and local communities—within tight budgets and time frames. Incorporating security requirements may add challenges to the project assignment, demanding specialized expertise and, often, incurring additional costs. Project managers should expect and require that specialty consultants and stakeholders actively contribute to planning and design meetings from the earliest project stages.

Savvy teams should make sure that they consider integrated security and design strategies early in the capital program delivery process, when budgets are set, and before finalizing design and construction funding requests. Indeed, collaboration beginning as early as the Feasibility Study and site selection phases will set the context for a successful project. GSA's *Site Selection Guide* and the ISC Security Design Criteria Implementation Checklist (see Chapter 3 for more information) can help with these tasks.

LONG-TERM DEVELOPMENT STRATEGY

A long-term development strategy is the result of a strategic approach to risk reduction, a comprehensive approach to the site, and a collaborative process. It is the framework that unifies all of these elements over time.

A long-term development strategy provides guidance throughout the life of the facility. Such a plan allows for quick, but confident, incremental actions over time and as resources become available, supporting the overall vision for the property, while remaining flexible enough to accommodate new facility needs or improved security technologies.

The best collaboration occurs early in the project, when security professionals, designers, and those with other relevant expertise sit down together to look at the problem.

If provisions for an integrated design and security strategy and a realistic budget are not in place early in the project, then the opportunities for creativity and innovation are severely restricted, if not lost entirely.

Project Team Roles and Responsibilities

ROLES

RESPONSIBILITIES

<p>Project Manager</p>		<ul style="list-style-type: none"> ■ Selects A/E and security professionals with sufficient expertise. ■ Sets realistic budgets and schedules. ■ Is practical about managing risk. ■ Supports collaboration. ■ Understands the opportunities and orchestrates the team to achieve a holistic vision. ■ Leads the team to innovative and successful solutions.
<p>Property Managers</p>		<ul style="list-style-type: none"> ■ Support a long-term development strategy and comprehensive site design. ■ Support long-term management and maintenance. ■ Advocate realistic and innovative solutions that serve the property and the neighborhood. ■ Share expertise on the detailed operation and everyday functionality of the building and site. ■ Keep an open relationship with community stakeholders.
<p>Other GSA Resources</p>	<ul style="list-style-type: none"> ■ Regional Historic Preservation Officers ■ Asset managers ■ Office of the Chief Architect (including Urban Development/Good Neighbor, First Impressions, and Art in Architecture programs) 	<ul style="list-style-type: none"> ■ Plan for adequate project budget and schedule. ■ Provide advice and best practices. ■ Support multifaceted, holistic strategies.
<p>Building Security Committee, Representing Tenant Agencies</p>		<ul style="list-style-type: none"> ■ Is well informed and realistic about risk management. ■ Prioritizes countermeasures. ■ Is practical, balances cost, and understands ability to reduce risk.
<p>Community Stakeholders</p>	<ul style="list-style-type: none"> ■ City planners, first responders, Department of Transportation (DOT), and Department of Public Works (DPW) ■ Downtown management organizations (including Business Improvement Districts), community organizations, and others ■ Regulatory Agencies ■ Neighboring property owners ■ State Historic Preservation Officer 	<ul style="list-style-type: none"> ■ Seek early and ongoing involvement. ■ Share knowledge of local plans and programs. ■ Leverage and identify local resources. ■ Are well informed and realistic about risk and possible/practical mitigation.
<p>Security Professionals</p>	<ul style="list-style-type: none"> ■ U.S. Marshals Service (USMS) ■ Federal Protective Service (FPS) ■ Security consultants on design teams ■ Security contractors on-site ■ Other security professionals 	<ul style="list-style-type: none"> ■ Assess vulnerabilities and prioritize countermeasures. ■ Support development of multifaceted and innovative solutions. ■ Collaborate with other stakeholders during analysis. ■ Balance impact with costs. ■ Seek and implement creative and flexible countermeasures.
<p>Designers and Planners (Architect, Landscape Architect, Planner, Urban Designer), Engineers (Civil, Structural, Geotechnical, Environmental), Archaeologist, Historic Preservationist</p>	<ul style="list-style-type: none"> ■ Design professionals at GSA (e.g., OCA, Regional experts) ■ Indefinite Delivery Indefinite Quantity (IDIQ) architecture/engineering (A/E) firms ■ Design Excellence selected firms 	<ul style="list-style-type: none"> ■ Work within a long-term development strategy. ■ Develop a strategic, multidimensional, and holistic site design. ■ Work closely with security professionals to create flexible alternatives and innovative solutions. ■ Support collaborative teamwork early in analysis. ■ Recommend sufficient, responsible budgets.

Successful capital projects with these long-term development strategies allow GSA to leverage the value of its assets across many years. Since federal properties are expected to have a long life of service, development actions must maximize federal resources, whether invested in the past, present, or future.

A long-term strategy helps to ensure that

The project stays on track over years of planning, construction, and maintenance actions;

Each team member understands and supports the long-term goals for the project; and

The federal investment is leveraged to make the most of opportunities and to achieve the team's holistic vision.

Every project, whether a major capital project or a minor renovation, should support the long-term development strategy. At the inception of each project, the long-term development strategy makes the team aware of the development history of the property and its location to ensure that their actions contribute to the ongoing success of the property and the surrounding neighborhood.

The team should call upon existing GSA master plans, other previous plans and studies, as well as local plans and programs, to ensure that a project satisfies security concerns, while offering broader, more holistic improvements for the site. Where no clear vision for improvement exists, the design team should help to fashion one, based on comprehensive site analysis.

CONCLUSION

By promoting thoughtful and thorough analysis, in concert with creative and collaborative design and responsible budgeting and planning, a project can achieve a successful balance between potential risk and available mitigation measures.

Done right, security projects can also bring positive changes beyond effective risk reduction. They can increase customer satisfaction and enhance their surroundings with broader improvements and amenities, such as new public space, a heightened sense of

ownership, and a more unified streetscape. **Security projects have a higher responsibility than just being unobtrusive. They should strive to improve the quality of their environment.**

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These security documents are updated frequently, and new standards are released regularly. **GSA's security Web site has the most up-to-date information (www.oca.gsa.gov)**. Because some of these materials are not available to the general public, Project Team members should contact OCA staff for access.

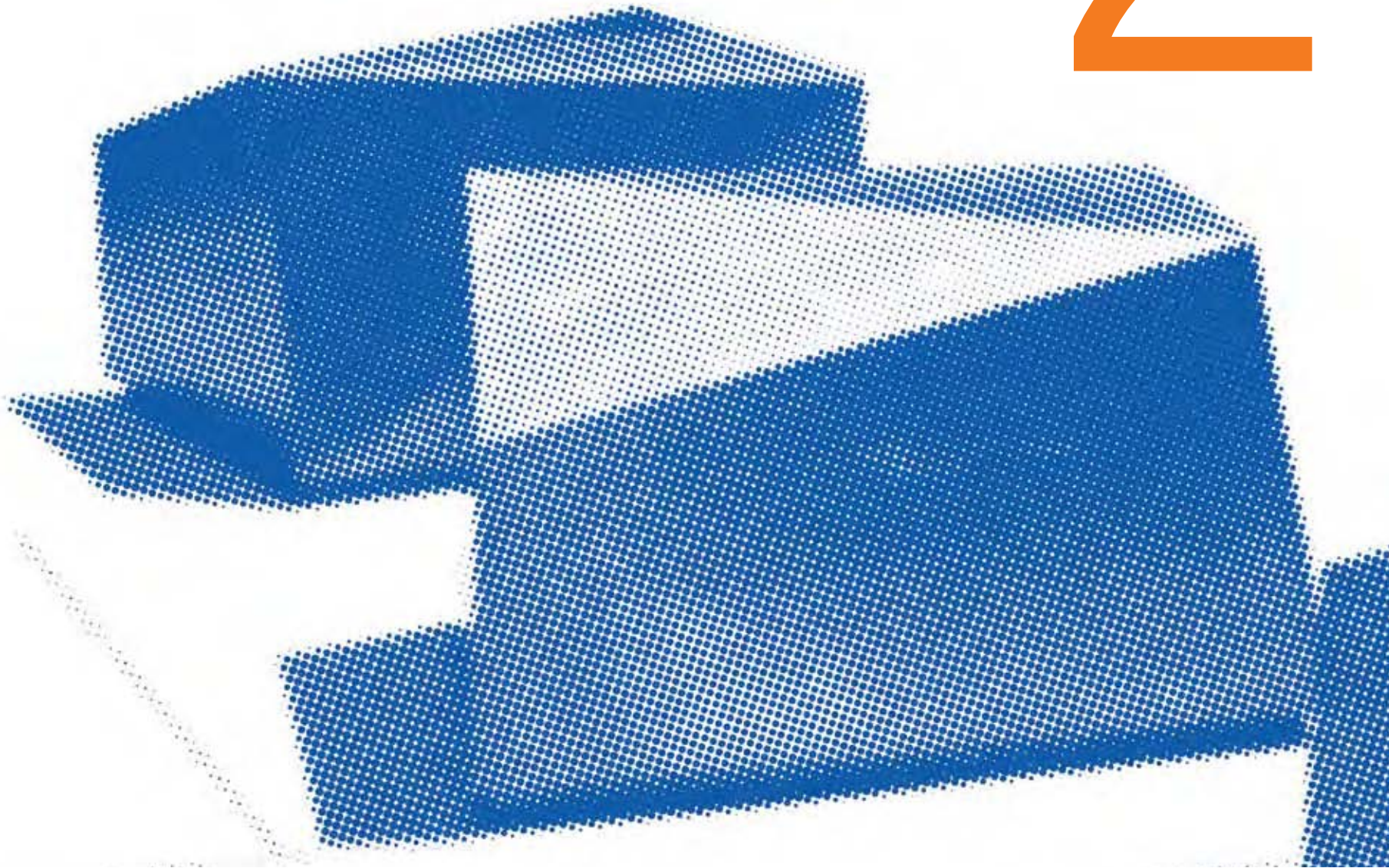
Project Teams must be aware of which of these criteria are pertinent to their particular design problem. Since all of the applicable references accommodate balanced, flexible decision-making, they should be used in conjunction with this *Site Security Design Guide* to develop custom solutions.

A comprehensive site approach achieves security goals, while creating welcoming, productive work environments. Although the specific context will change from one project to the next, the need to consider and support it does not.

Chapter 2

Guidelines for Elements and Innovation

2



Chapter 2

Guidelines for Elements and Innovation

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Guidelines for Elements and Innovation

INTRODUCTION

The previous chapter outlined key “hallmarks,” or principles, for meaningfully integrating site security into the design process in order to support larger goals. This chapter presents the key elements that form the building blocks for effective site security. Together, these chapters provide the concepts and elements necessary for successful site security design; the implementation steps will be discussed in Chapter 3.

GSA follows security standards, developed by the Interagency Security Committee (ISC), that outline required analysis and performance benchmarks for federal buildings. Under the ISC Security Design Criteria, agency or contractor security experts perform risk assessments, blast analyses, progressive collapse analyses, and other assessments to identify threats and calculate a building’s response to them.

Although some federal agencies have security standards that differ slightly from or supplement the ISC criteria, all federal criteria generally address the same types of threats and countermeasures. However, performance criteria may vary in their assumptions about potential threats and the required performance level of a building’s structure and façade.

ISC criteria focus on deterring and mitigating threats, including explosive packages or vehicles; preventing and expelling attacks stemming from chemicals or biological agents; and controlling access to and improving surveillance in and around the property. The site security elements described in this chapter are meant to prevent these threats from reaching the vulnerable areas of a facility.

The concept of site “zones” is introduced here as the framework for this discussion of individual element types. Each element is described in detail in relation to its corresponding site zone. Each section also highlights recent innovations and new technologies to help formulate an integrated, comprehensive, and cost-effective approach that supports the hallmarks of this *Guide*.

ZONES

By focusing on zones of the site, the design team can better understand context and how security elements and amenities in each zone contribute to the performance of elements in the others. This chapter presents a list of the particular elements found in each of six security zones, with guidelines for their use and best practices.

Security Zones

Zone 1	Neighborhood
Zone 2	Standoff Perimeter
Zone 3	Site Access and Parking
Zone 4	Site
Zone 5	Building Envelope
Zone 6	Management and Building Operations

This broader view can guide decision-makers through a strategic, comprehensive, collaborative, and long-term-focused design process. The site security zones, as illustrated in Diagram 2.1 follow the physical organization of a site from the outside (Zone 1) to the inside (Zone 6). Each zone offers opportunities to increase site security and enhance site appearance and function. In the first

zone, the team considers the site's context within its neighborhood. For successive zones, the team explores opportunities to protect the site by making adjustments to its perimeter, circulation, and program and concludes by recommending changes in space planning or security operations, to minimize vulnerabilities.

SUCCESSFUL SITE DESIGN

As Project Team members consider each zone during the site security design process, they must keep two crucial factors in mind:

Comprehensive approach. A long-term development strategy and a comprehensive site design should be developed early to provide sufficient funding (e.g., during the Feasibility Study for Prospectus-level projects) and guide the life of the project.

The team should integrate all aspects of the security requirements into the overall project requirements and design directives. Understanding all components that contribute to the plan is necessary to establish priorities and phased implementation if this becomes necessary.

Flexibility. Innovative design concepts should have the flexibility to respond to future changes in agency mission, operations, or budgets.

Since physical improvements have a longer usable life than initial planning assumptions, design solutions that are multifunctional and seamlessly integrated into the site and building are able to serve the facility efficiently over time, as needs change.

Best practice for site security design includes the selection of elements that support security functions in multiple ways, by providing the following:

Physical deterrence. Sites may include hardened perimeter elements that enforce the standoff zone, the distance between potential explosions and the building.

Psychological deterrence. Some sites are designed so that their security is very obvious and almost forbidding. For other sites, the team may choose a more subtle approach that does not call attention to the site as a potential target.

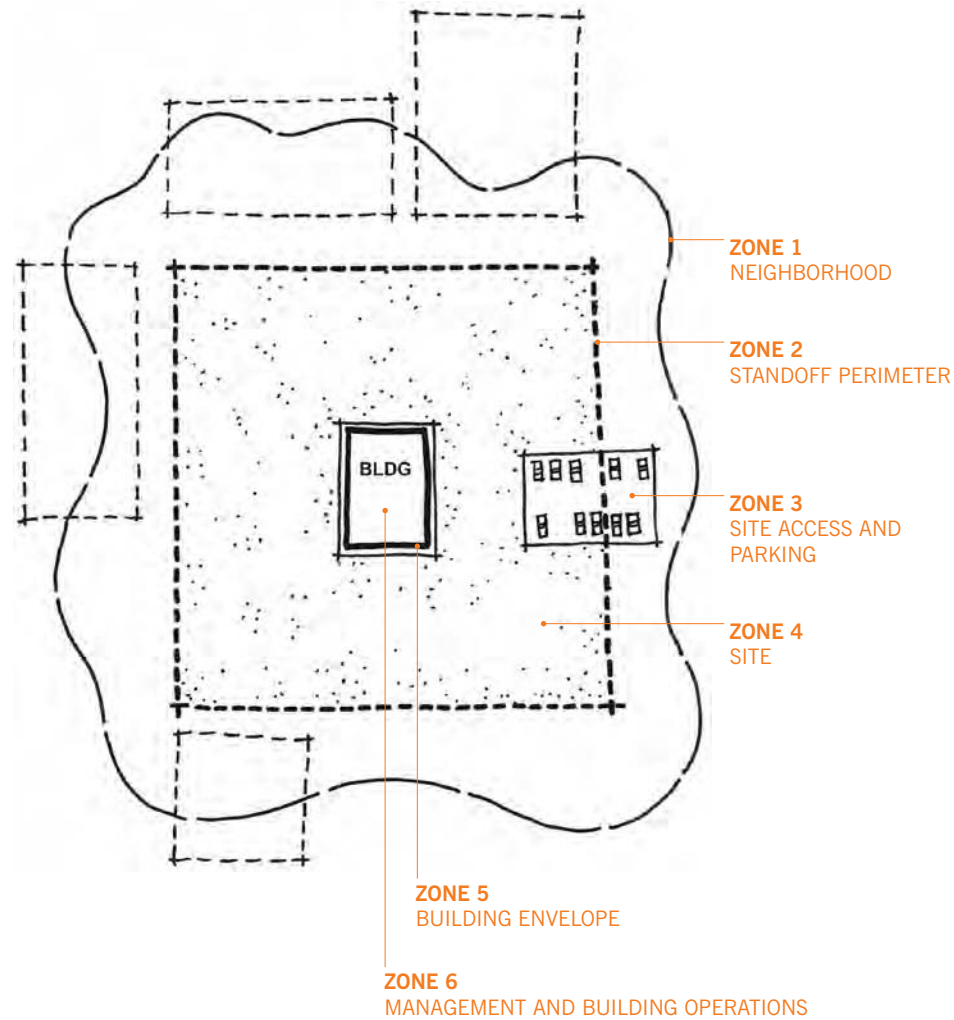
Clear expectations for use. Sites can be organized to indicate which types of activities are welcome and which are not.

Support for observation, surveillance, and inspection. Sight lines and vistas can be designed to provide natural opportunities for observation of those approaching the building, or to block views of sensitive areas.

Acceptance of allowable risk. If the Project Team determines that no reasonable means exist to significantly reduce a risk, the ISC criteria allow for acceptance of risk. Something can always be done, and the team has the ability to decide the extent of the chosen methods and actions.

Diagram 2.1: Site Security Zones

This diagram shows a general representation of the six security zones superimposed on a hypothetical site. The dimensions and area of each zone and arrangement of elements vary per project, based on site conditions and project scope.



The Interagency Security Committee (ISC) recognizes that federal buildings must connect with their communities in an open and accessible way. ISC promotes the philosophy that the multidisciplinary design team should take a realistic approach to the safety and security of federal office buildings. The team should consider urban design principles and cost-effectiveness, while acknowledging and accepting some risk.

Summary of Security Zones

ZONES

ELEMENTS/ACTIONS

ZONE 1 Neighborhood

This can be an area of one or more blocks surrounding a facility, depending on how the site is used. It may include streetscape, public spaces, parking lots, and other facilities that visitors frequent.

Opportunities: Site treatments include architectural, visual, and public-use cues. Neighborhood-based solutions, such as operational security and traffic guidance/control countermeasures, are also effective.

1. Coordinate with existing and proposed development plans, guidelines, and programs
2. Collaborate with other neighborhood security operations
3. Modify traffic conditions
4. Consider including public right-of-way in the standoff zone
5. Consider closing part or all of an existing street if necessary
6. Install temporary barriers for heightened levels of alert
7. Develop and coordinate personal safety programs

ZONE 2 Standoff Perimeter

A security perimeter keeps vehicle-borne explosives at a distance, thus reducing potential destruction and harm. Depending on the risk analysis, the perimeter may require secured or unsecured standoff.

Opportunities: Enhancements to the functionality and aesthetics of the site for the public, employees, and visitors are possible, while satisfying standoff needs.

1. Determine the level of protection needed, based on accepted risk
2. Ascertain the standoff zone location and dimensions
3. Establish a hardened perimeter where warranted, using
 - Bollards
 - Sculptural or seating barriers
 - Walls
 - Hardened street furniture
 - Fences
 - Topography
 - Dry moats
 - Collapsible surfaces
 - Water
 - Landscaping and plantings

ZONE 3 Site Access and Parking

Various elements and services provide and control access to a facility. This zone can include the inspection of both vehicles and visitors.

Opportunities: Satisfying security requirements can also promote effective access, natural surveillance, and increased convenience for those who use the facility.

1. Delineate drop-off and pick-up areas
2. Control site access by incorporating
 - Inspection areas
 - Retractable bollards
 - Gates
 - Guard booths
 - Sally ports
3. Monitor loading and service areas
4. Maintain clear access routes for first responders
5. Establish clear pedestrian circulation routes
6. Establish secure parking areas inside and outside the standoff perimeter
 - Garage parking
 - Surface parking
 - Wayfinding, lighting, and signage

ZONES

ELEMENTS/ACTIONS

ZONE 4 Site

Once within the security perimeter, the site zone may provide an additional layer of elements, or hardening, to assist in deterring or preventing the destruction of or harm to a facility. With a sufficiently hardened perimeter, the site zone's primary role would be to serve more as a welcoming public space, with amenities, programs, and activities that serve building tenants, visitors, and the larger community.

Opportunities: Site features, such as reflecting pools, benches, and security pavilions on the site and inside the standoff zone perimeter, may offer enhanced security, safety, and amenities.

1. Design site amenities, such as furnishings, planters, water features, lighting, and vegetation, to serve multiple purposes
2. Create usable space
3. Designate weather-protected space for queuing at entries
4. Design security pavilions and other freestanding buildings to blend with the site's architectural character

ZONE 5 Building Envelope

Control of heating, ventilation, and air-conditioning (HVAC) vents/air intakes; location and operation of entry and egress points; additional surveillance by security personnel or cameras; and lighting occur at the interface between site and building.

Opportunities: Security improvement may also increase everyday safety of the site.

1. Prevent access to vents/air intakes
2. Design emergency egress to allow easy evacuation from a facility
3. Place cameras and light fixtures to maximize visibility
4. Harden the building structure and envelope
5. Design orientation and massing of building to lessen impact of explosion

ZONE 6 Management and Building Operations

Building programs and layout can be modified to increase security, such as moving high-risk tenants to the interior of the facility. Additional security personnel can also be added to increase surveillance.

Opportunities: Modifications to space planning and building operations can reduce some risk, without changing the site itself.

1. Design for flexibility in building programming and space planning
2. Consider guards and alternative security operations when faced with site and cost constraints
3. Choose no mitigation and accept risk when it is neither practical nor plausible to harden site elements or the exterior of a facility

Zone 1

Neighborhood

Site design should always begin with an evaluation of the neighborhood in which the site is located. Designers and security experts must understand existing conditions, including urban fabric, infrastructure, and current uses; plans and programs for the area; potential risks; and opportunities for shared solutions with other facilities.

The federal government has a responsibility to adopt security measures that do not detract from the existing character of the neighborhood, but blend seamlessly and even improve the public realm, where possible. Moreover, the surrounding context provides opportunities to introduce off-site security elements with local partners.

When looking at this zone, design teams should consider the “opportunity costs” that various countermeasures may impose on a community.

Response to risk with road closures, repetitive hardened elements, or relatively large setback distances may be warranted in some cases, but these strategies do impose drastically on a neighborhood’s appearance and function. Likewise, lower-quality temporary solutions can undermine a neighborhood’s sense of community, promote a feeling of fear, and impede accessibility.

Instead, design teams should consider alternatives that mitigate the negative impacts of increased site security. A family, or common palette, of streetscape elements can seamlessly add to the security of an area, while contributing to the larger neighborhood context and integrating into, instead of cluttering, the public realm.

Where multiple federal buildings are located near each other, common or similar streetscape elements can make navigation between buildings easier and define their relationship to one another. Moreover, street closures can be minimized when project teams consider multi-building sites as a district, perhaps only closing one street between two buildings and developing this space to benefit the local neighborhood.

Likewise, while downtown federal buildings may provide the best location for a particular agency and the surrounding community, these sites often have limited ability to provide vehicular standoff distances. Instead of considering only street closures as a solution, Project Teams should evaluate how such sites could be treated more holistically, with the city as a partner in determining security measures.

Changes that can emerge from such partnerships may include modifying roadway conditions to prevent high-speed run up toward buildings, altering permitted hours of delivery, sharing lighting and camera operations, developing overlapping patrols by security guards, and including street parking as part of the security buffer around a federal building.

Neighborhood Elements/Actions

1. Coordinate with existing and proposed development plans, guidelines, and programs
2. Collaborate with other neighborhood security operations
3. Modify traffic conditions
4. Consider including public right-of-way in the standoff zone
5. Consider closing part or all of an existing street if necessary
6. Install temporary barriers for heightened levels of alert
7. Develop and coordinate personal safety programs

The aesthetics and composition of security features should respond to the existing rhythm of the neighborhood, reflecting its character and typologies. One size does not fit all. Well-chosen elements contribute to the success of a secure, coherent streetscape.

ELEMENTS AND EXAMPLES

1. Coordinate with existing and proposed development plans, guidelines, and programs

Every Project Team should work closely with local officials, community groups, and others to support existing and proposed plans, guidelines, and programs. Such collaborative efforts increase the success for the neighborhood overall, as well as each project. GSA has developed an excellent track record in this regard, and its Urban Development/Good Neighbor Program can provide guidance to Project Teams.

2. Collaborate with other neighborhood security operations

Just as other buildings and activities in the neighborhood have the potential to increase vulnerability, the opposite is also true. Each nearby building has resources that can benefit others across the neighborhood. The possibilities vary from a coordinated approach to traffic control to shared cameras and guard patrols. In these cases, agencies will typically create a Memorandum of Understanding/Memorandum of Agreement with partnering agencies to define the terms of a unified approach to security, coordinate the various players, and establish accountability.

3. Modify traffic conditions

Speed tables, curvilinear roadway alignment, medians, and other traffic calming devices can reduce the potential to defeat standoff barriers by managing the speed and movements of vehicles approaching the site. Roadway or driveway realignments can eliminate perpendicular approaches to a facility. And street modifications can limit the size and type of vehicles that may approach certain neighborhoods or specific streets by making passage physically impossible.

To help determine opportunities for these solutions, Project Teams should collaborate closely with local officials (including departments of transportation and public works) and employ vector analysis, a technique used to evaluate the angle of approach and potential vehicle size and speed that can threaten a facility. Vector analysis helps determine structural requirements for vehicular barriers and the value of adjustments to street alignments. By controlling



Off-site traffic calming strategies may eliminate the very possibility of high-speed, direct approach to a federal facility, thus reducing the need for robust, expensive countermeasures. For example, medians can divert traffic, and traffic circles can force slower speeds. Cooperation with local departments of transportation and public works is essential when planning such measures.



Vector analysis provides useful information about how street design can work in concert with physical barriers to prevent vehicles of a certain size and speed from reaching a site. Reducing the achievable size and speed allows the design team to be more flexible when selecting perimeter security measures. This technique is a key tool in determining a comprehensive site design and eliminating unnecessarily robust countermeasures.

a vehicle's speed and direction, and by determining exactly what each security measure must protect against, the number and size of physical countermeasures can be strategically reduced, as well as their associated cost and aesthetic impact.

4. Consider including public right-of-way in the standoff zone

Project Teams frequently incorporate public sidewalks within the standoff distance to increase this distance when there is inadequate depth within the building yard. Teams must carefully evaluate this strategy because it impacts both the character and functionality of the neighborhood zone by pushing security countermeasures into public space.

Negative impacts may include obstructing public space, restricting or altering pedestrian access and circulation, and changing the feel of the streetscape. Barriers and defensive elements placed in the public right-of-way frequently convey a feeling of fear and separation from the community. If countermeasures must be located on public property, they should blend with the existing neighborhood design and use patterns to protect without impinging on their surroundings.

On-street parking restrictions or sidewalk widening can also help achieve required standoff distances. However, Project Teams must discuss these strategies with city government and local

transportation and planning agencies to determine whether they are compatible with local transportation requirements.

Transportation studies may be necessary to determine whether any mitigation is required to lessen the impacts these solutions can have on neighborhood parking needs or traffic patterns. Great care must be taken not to impede pedestrian movement and public use along the sidewalk or into federal facilities. Security location and design should always seek to minimize adverse impacts to the public domain.

5. Consider closing part or all of an existing street if necessary

Lane closures are a common countermeasure, but one that has considerable impact on a community. At an existing building, Project Teams must carefully assess the impact that a lane or street closure will have on the overall neighborhood and local traffic conditions. With new projects requiring site acquisition, Project Teams must give substantial weight to the necessity of street closure when rating sites. A well-chosen site that precludes street closure also avoids the substantial negative costs associated with it.

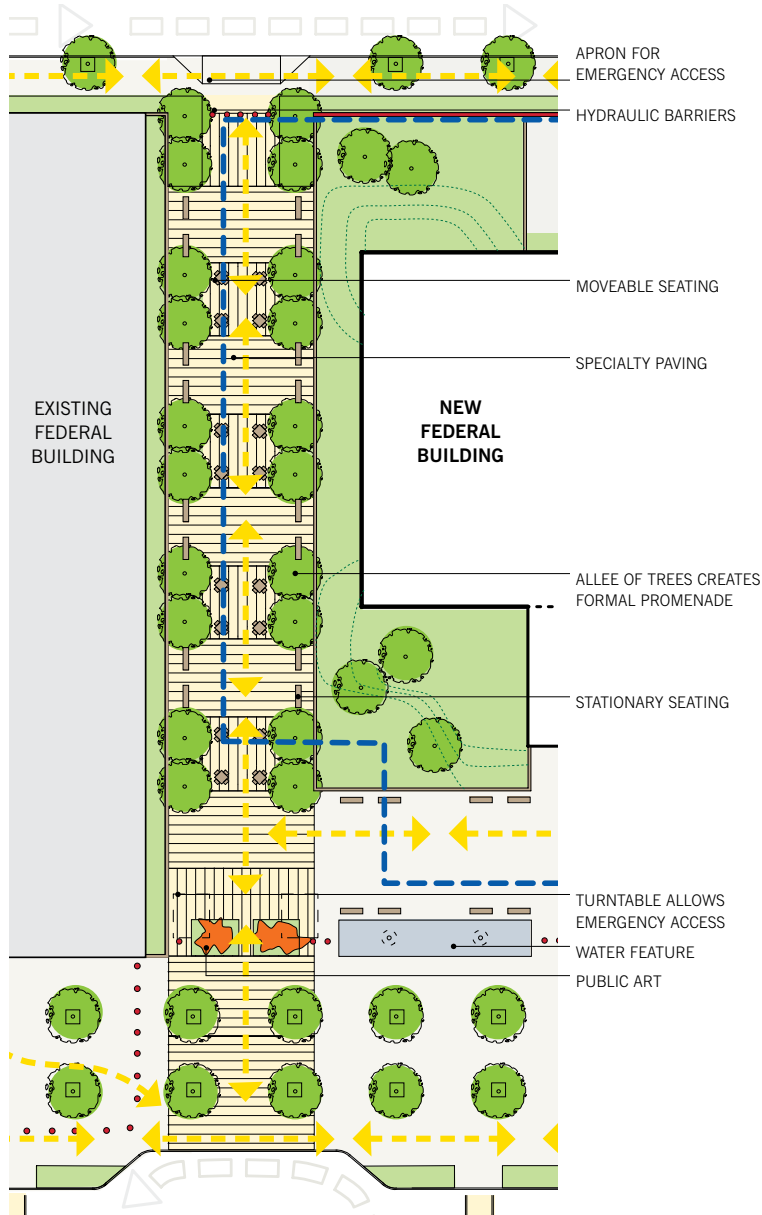
While closing streets and sidewalks may create adequate setbacks for one or more buildings, doing so may only reduce risk, not eliminate it, and the vitality and economic performance of the entire neighborhood may suffer. Rerouted traffic places new loads on nearby streets, businesses lose access to their customers, and

When risk is sufficient to require the closing of a public street, it is sufficient to require appropriate project investment to make that street closure work well with the neighborhood.



This public street, located between an existing courthouse and a new federal lease construction project, was closed to enhance perimeter security. Working with the city, the Project Team redeveloped the street into a public plaza. Both parties now are working together to manage programmed activities in the space, providing amenities to federal users and an adjacent retail district.

Diagram 2.2: Street Closure



The decision to permanently close a street should be made only after thorough analysis, and with a commitment to the cost and care needed to ensure that the neighborhood gains something functional from the closure, such as a new public space. Here, the street is converted to pedestrian use. It is lined with shade trees, provides a combination of stationary seating and moveable tables and chairs, and accommodates multiple activities. This investment is sufficient to meet security needs, while mitigating community impacts by providing new public space to serve both adjacent federal buildings and the neighborhood.

Off-site tradeoffs? Just as Project Teams understand the internal tradeoffs among countermeasures, risk, and cost, responsible design requires that they also consider the off-site tradeoffs associated with decisions. For example, most security experts would recommend against expensive countermeasures in a case where the gain in risk reduction would be minimal. But what about a similar case, such as a street closure, where the neighborhood, rather than the project, bears the cost of the countermeasure? These costs—including traffic, circulation, and aesthetic impacts—must be considered in the security decision-making process.

local governments often request compensation for lost parking meter revenue if parking lanes are closed.

Most local governments would have significant concerns about a road closure. Before implementing this approach, carefully consider whether an innovative combination of measures or a different site can prevent the closure of a street, while still mitigating the identified risk. If no alternative exists, Project Teams must minimize all negative impacts and commit to the cost and care needed to ensure that the neighborhood gains something substantial from the closure, such as a new public space (see Diagram 2.2). The Project Team should proceed only after early and effective collaboration with local stakeholders.

Strategies for responding to changing threat levels should be incorporated into the discussion from the beginning of the planning and design process.

In many cities, “temporary” security measures are still littering sidewalks and building entrances years after their placement. When installing temporary security measures, management and security staff should establish a plan for their use, maintenance, and removal, or their transition to long-term solutions.

6. Install temporary barriers for heightened levels of alert

During heightened levels of alert, federal agencies must respond based on the Homeland Security Advisory System (HSAS), the Department of Homeland Security’s color-coded alert system. Changes in the alert level may require quick action so that potential risks can be avoided. For example, at the urgent request of user agencies under heightened alert, GSA Property Managers must sometimes quickly install temporary barrier elements or enact other security procedures. Examples include temporarily closing public streets and sidewalks, increasing screening and inspection, or limiting access to parking.



Jersey barriers and temporary fencing invariably have negative visual impacts, which long-term use exacerbates (above). Customized barriers are less obtrusive, since they better complement their architectural context (far left), but no temporary barrier should become permanent. Project Teams must provide for their timely removal or upgrade and indicate these plans to building users (left).

To ensure that these temporary solutions are introduced thoughtfully, the Project Team should plan for their use and removal in the comprehensive site design. When these temporary measures are accounted for from the early stages of project planning, they can be implemented quickly and safely, with minimal impact on the site and surrounding neighborhood.

7. Develop and coordinate personal safety programs

While prevention of terrorist attacks may be the most demanding goal of site security design, personal crimes are far more likely to affect employees and visitors. Design and management strategies that support safety throughout the neighborhood may reduce the occurrence of personal crimes.

Such strategies include improved lighting of the site and its surroundings, increased surveillance and security patrols, and maximized public use of the site to provide “eyes on the street.” Each plays an important role in enhancing the daily security of employees and visitors. These responses require coordination with local partners, such as Business Improvement Districts and municipal police.

OPPORTUNITIES

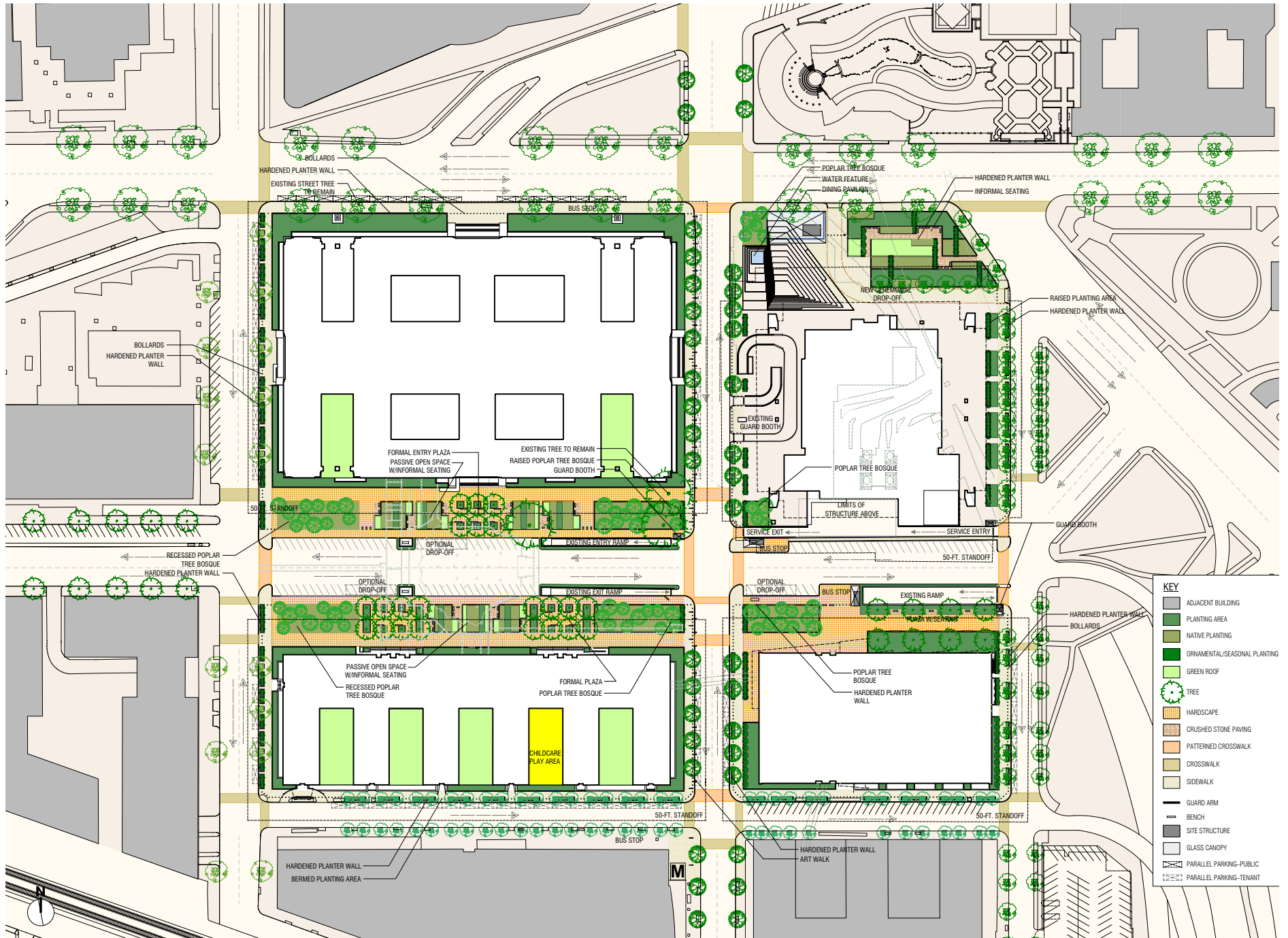
Looking outside the site for design and security solutions can be a powerful problem solver, but is an often over-looked opportunity. In urban locations, there is sometimes little room for on-site security improvements, but a significant potential for solutions that benefit both the federal government and local communities. Important partners in such efforts are local Business Improvement Districts (BIDs). Agencies can contract with local BIDs to provide increased security patrols around buildings and landscape maintenance, among other services. Such operational measures may be the best defense against risks where physical solutions are difficult to introduce, and have minimal negative impact upon their surroundings.



The full value of public use is realized not just in the vitality it contributes to a site, but also in the natural surveillance created by numerous “eyes on the street.” A clean, well-lighted place is one that citizens claim as their own, noticing—and reporting—unusual occurrences, thereby helping to prevent criminal activity.



The significant cost of frequent security patrols can be tempered by partnerships with local Business Improvement Districts (BIDs), an oft-overlooked opportunity. BIDs typically provide such services throughout a larger business area at a reasonable cost to property owners. Such precinct-wide efforts ensure a broader view of security, useful since many crimes do not begin and end at only one site.



Zone 2

Standoff Perimeter

The secured standoff zone protects buildings and their occupants against potential vehicle-borne explosives by creating a perimeter barrier capable of stopping vehicles at a specified distance from the building. The only way to determine this distance is to perform a blast analysis (for existing facilities) or a blast design (for new facilities) based on the risk assessment and the minimum stand-off required to meet the desired level of protection. Because blast impacts diminish with distance, barrier placement is an important consideration for reducing the damage to the building and its occupants from a potential explosion.

The best approach to designing the standoff perimeter is to consider the entire site comprehensively; that is, to achieve enhanced site design and urban design objectives while providing the needed security countermeasures. An integrated design and security strategy increases both safety and the overall quality of the facility. Part of this strategy is determining a site-specific design family that features a common style and materials appropriate for the project, offering diverse elements that relate. These include security elements, site amenities, and overall landscape design.

Different urban and site conditions call for variations in the location of the standoff perimeter (left). For example, it may be inappropriate to locate barriers along the curb of a street with major civic and historic significance, but less problematic to do so on an adjacent, minor street. For this reason, Project Teams must never consider one edge at a time. Comprehensive, long-term planning provides the holistic vision needed for a thoughtful design that meets all objectives.

As you consider where to locate the standoff perimeter, keep in mind that many existing facilities may not have adequate site area to provide the recommended standoff distance on all sides. For example, sites may have adequate standoff distance in the front yard, but much less depth available at the side or rear yard. Depending on adjacent uses and conditions, reduced standoff may be acceptable, or even unavoidable, for some portions of the property.

Standoff and Setback

- “Standoff” and “setback” are similar terms with distinct meanings. Standoff is the distance between a structure and a physical barrier designed to protect it, while setback refers to the distance between a structure requiring protection and another building, the curb, a vehicle, or another object, but not necessarily a hardened perimeter.
- “Secured” standoff indicates the use of a hardened deterrent or barrier to prevent vehicles of a certain size and speed from breaching the standoff perimeter.
- “Unsecured” standoff refers to deterrents and design approaches, such as on-street parking restrictions, that enhance security, but are not designed to stop a vehicle. The resultant solution may not prevent a breach of the perimeter, but will give the impression of increased security and observation and may deter parked vehicular attacks. Effective use of both strategies in concert can improve quality of life, reducing both the incidence and fear of crime.

When is it appropriate to use unsecured standoff? If it is physically impossible to provide recommended standoff distances, other methods can provide unsecured standoff, which may offer limited protection from vehicular attack. For example, access to adjacent curbs can be limited to government vehicles only. Or on-site parking can be restricted to permitted vehicles, making it more difficult for an unknown vehicle to access the unsecured standoff area.

The placement of the secured standoff line has significant cost implications, as well. Looking at Diagram 2.3, for example, the linear footage of the various perimeter options would vary by more than 100 linear feet—with direct cost impacts. Long-term risk reduction and site performance might be more important in this case, but these costs must be considered in every case.



Sensitivity to context is crucial when introducing new security elements, particularly where historic buildings are concerned. Existing building features and materials (top) should inform the design and placement of new security elements (bottom). A kit-of-parts approach can be useful in such cases, to facilitate consistent implementation over time.

Where sufficient space is available to achieve the desired standoff, the placement of hardened elements should maintain clear pedestrian circulation patterns and clear paths to entrances and exits, while minimizing off-site impacts. Where the recommended standoff cannot be achieved because of lack of space or subsurface conditions, decisions on standoff distances must be made based on risk mitigation. Alternatives often include hardened barriers at the building yard line, curb line, or some other predetermined boundary edge.

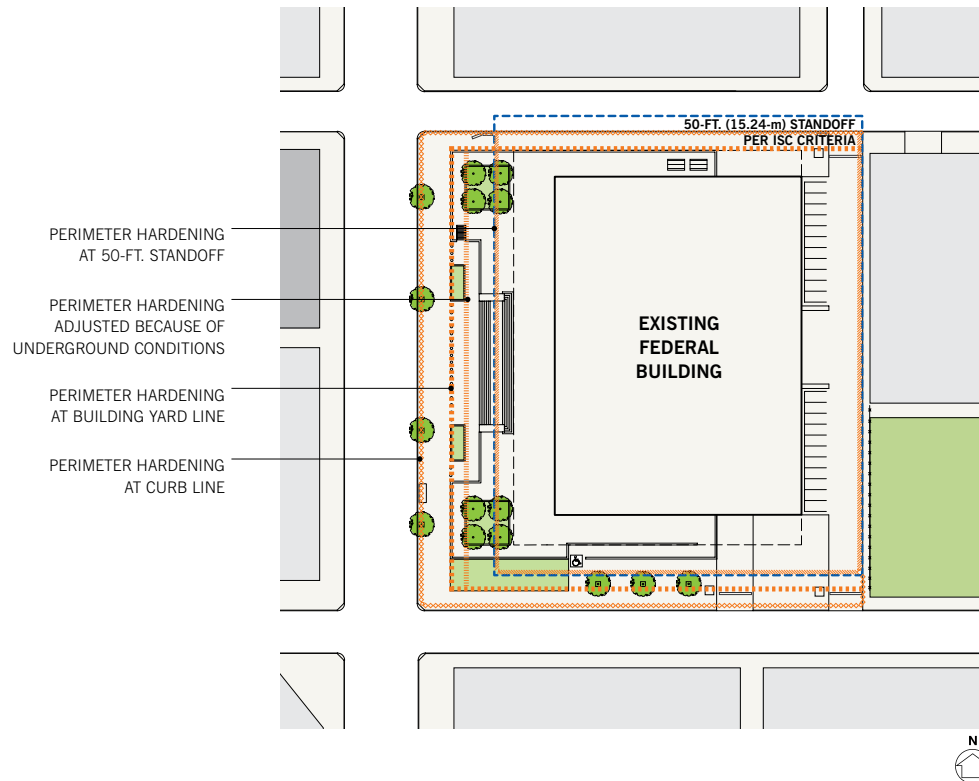
On-street parking sometimes falls within the standoff zone, especially in urban areas where space is limited. In some cases, it is necessary to remove, relocate, or restrict on-street parking to preserve a sufficient distance between the facility and its secured perimeter.

Diagram 2.3: Setback Options

In response to unique site constraints and opportunities, the standoff determined by a blast analysis may not be achievable on every side of a building. In determining the standoff perimeter on all sides of the site, one must balance risk mitigation with other impacts. The urban example shown here demonstrates various standoff options, including those that achieve the ISC-recommended standoff, alternatives that place hardening at the building and curb lines, as well as hardening that accommodates subsurface conditions, such as utilities.

Note the location of the desired 50-foot standoff on each side of the building. The standoff on the north perimeter is not achievable

without significantly altering the street—a major decision that should be made only after extensive consultation with local officials. On the west perimeter there is a smaller design decision to make, but with important cost and design implications: Should the hardened perimeter be placed at the curb, the yard line, at the 50-foot line (which would bisect the stairs), or closer to the building? Design teams must carefully analyze such decisions in terms of their impact on the entire site, including the balance between daily use and exceptional circumstances.



Teams should consider whether it makes sense to incur significant project costs or impose significant neighborhood impacts to expand a perimeter from 30 feet to 100 feet on one side, when other sides of the perimeter can only achieve 30 feet. It may be more appropriate to apply limited resources to hardening portions of the structure, adding surveillance, or reconfiguring the space within the building.

A perimeter barrier is not designed to control smaller explosive threats that may be carried by an individual. It is designed to stop vehicles with the capacity to carry much larger explosives. Within the perimeter barrier, there may be opportunities to deter or observe the approach of potential person-borne threats. The building entry and inspection security systems must be designed to facilitate such opportunities.

Standoff Perimeter Elements/Actions

1. Determine the level of protection needed, based on accepted risk
2. Ascertain the standoff zone location and dimensions
3. Establish a hardened perimeter, where warranted

ELEMENTS AND EXAMPLES

1. Determine the level of protection needed, based on accepted risk

The level of protection and the amount of standoff are facility and site specific. Under ISC criteria, most new or extensively modernized GSA buildings require a 50-foot standoff, depending on such factors as tenant operations, facility size, and location. For an existing building, the necessary standoff is determined by a blast analysis based on risk assessment and desired level of protection. The ideal amount of protection may be unattainable because of actual conditions, and the Project Team must mitigate or accept risk where optimum standoff cannot be achieved.

2. Ascertain the standoff zone location and dimensions

The achievable standoff distance is ascertained based on the risk assessment, blast analysis (for existing buildings), blast design (for new facilities), and a desired level of protection. It may vary on each side of a building, based on a number of factors: existing conditions and site elements, different levels of threat, the location and arrangement of key operations, and available space. When mitigation is not a viable option, the choice may be to accept the risk and improve the site for an appearance of greater security.

3. Establish a hardened perimeter, where warranted

Perimeter barriers are key countermeasures for site security because they effectively keep potential vehicle-borne explosions at a distance. In addition, they are easier to implement than retrofitting the building and its structural and glazing systems. Both the location and the structural design of the barriers are key performance considerations. The ISC criteria, risk assessment, and other analyses establish such barrier performance criteria. These standards specify the size and speed of vehicles a barrier must protect against, as well as the ideal standoff distance.

While the perimeter barrier concept is straightforward, the implementation seldom is, because of the complexities of site, context, and budget. After completing the risk assessment, if the team decides that one or more frontages call for hardened perimeters, then the team can establish the barriers with site or structural elements that have been specially engineered to stop a vehicle. Before barriers are installed, designers, structural engineers, blast consultants, and security professionals must collaborate to ensure that the countermeasures satisfy specific requirements.

Barrier options include retaining or plinth walls, cable fences, planters, benches, trash containers, lampposts, and bollards. Earth berms, steep slopes, moats, trenches, or thick plantings of trees may also be used as barriers if they satisfy the countermeasure requirements.

In all cases, Project Teams must remember that most barriers require a deep footing as part of their structural system. In urban areas, utility infrastructure beneath the sidewalks may restrict the location and feasibility of installing reinforced barriers.

Ideally, select a mix of barrier elements in harmony with specific site, architectural, or neighborhood conditions. Layering a variety of barrier elements can be more successful than implementing a monotonous row of any single element. Using vector analysis, the team can identify where the most robust perimeter hardening is needed and where other options are appropriate.

This section discusses the following perimeter barrier elements:

- Bollards
- Sculptural or seating barriers
- Walls
- Hardened street furniture
- Fences
- Topography
- Dry Moats
- Collapsible surfaces
- Water
- Landscaping and plantings



Decorative casings may improve the appearance of bollards, but designers must consider their resulting profile, as well as materials and colors. Without careful design, decorative casings add considerable girth (top left), resulting in overly bulky installations (middle left). Before final design, construction mock-ups can be helpful.



Be smart, but do not overthink it. Over the past few years, many site security plans included bollards, without sufficient forethought or need. On the other hand, the overriding desire to avoid the use of bollards can lead to the introduction of different, but arguably more obtrusive, elements, such as massive benches or oversized planters. A combination of elements that are less massive and more flexible may be more successful.

When designing the standoff perimeter, thoughtful placement of elements is as important a consideration as material selection. In some cases, positioning elements at the property line crowds site features and access (bottom left), so placement in the public right-of-way is more appropriate. More often, placement in the public right-of-way adds considerable functional and visual clutter (bottom middle). Where it does not introduce significant additional risk, placement in the building yard offers the most graceful solution (bottom right).

Things to Consider When Choosing Standoff Zone Barrier Elements

When the recommended countermeasure is standoff distance, the first response is often to install some bollards near the curb. A more complete analysis would first consider the following:

Establish the standoff zone limits.

Use these boundaries to determine where the barriers should and can be placed. Consider the particular vulnerabilities of the building. Rather than just installing a line of barriers at the edge, determine whether there is room to layer barriers across a broader zone.

Determine what site elements exist.

Various familiar elements might be placed at the location of the perimeter barrier, such as benches, lampposts, parking meters, signs, bus stops, and planters, to name a few. Consider how some or all of these elements can be reinforced so that they double as security barriers. In addition, be sure to allow sufficient room to open the door of a car parked near the curb and easy access to ramps, for persons with disabilities.

Check underground conditions.

Bollards and all hardened site elements are effective at stopping vehicles because they have underground structural systems. Are there any existing utilities (e.g., water, sewer, electric, communications), vaults, or basements that restrict the subgrade conditions? Is there adequate depth and space for the foundation?

Remember the “big picture.”

Once the general locations of the barriers and a list of the potential elements are known, begin to study their placement on the site. Instead of one long line of bollards, consider a mix of elements layered within the standoff zone. Study a number of possibilities. Here is a chance to create a site design that provides everyday benefits to federal employees and the public, not just a defense against an attack that may (hopefully) never occur.

Select a family of similar materials and styles.

When choosing bollards and other hardened site elements, as well as site furniture, be sensitive to the existing site's character. Elements can be composed of many materials, or custom designed to blend with overall site materials and architectural style. For instance, bollard design can incorporate an ornamental sleeve that adds texture or color to match other site elements. The selection should be consistent with the design and materials of the buildings, site, and neighborhood. Sleek aluminum bollards in front of a Beaux-Arts federal building will detract from the historic character of the building and its environs.

Consider the spacing between site elements.

No matter what types of elements are finally chosen, it is essential that their arrangement maintains the normal flow of pedestrian activity and allows for universal accessibility, while preventing uncontrolled vehicular access.

Bollards. A bollard is essentially a structural steel post or reinforced concrete casing solidly anchored into the ground, using a deep foundation. Bollards are capable of stopping a vehicle, restricting vehicular access, and protecting landscaped property. For decorative purposes, a casing is often added to give architectural character in terms of volume, shape, finish, and color.

Although bollards are a convenient and popular element for creating secure perimeters, they have some significant disadvantages when compared to other barrier elements. Often an afterthought or quick fix, with little or no design and architectural integration with the site, bollards are overused in today's landscape. Long lines of repeating bollards can be monotonous, unattractive, and visually obtrusive. Where possible, designers should consider hardening other required site elements, such as lampposts, walls, or benches, to perform double duty. These items can be layered with bollards, blending more efficiently into the existing landscape.

Retractable bollards can control authorized entry to a site. They operate hydraulically, electrically, pneumatically, or manually, but require higher levels of maintenance, including periodic inspection and testing of their mechanical and electrical systems. Both the quality and consistency of maintenance are important considerations when manual or motorized retractable bollards are part of an emergency access route. A faulty bollard could cause life-threatening delays in an emergency.

Look at the larger context and how the bollard will be used when choosing styles, placement, and installation methods. The treatment of the surface around the bollard will play an important role in its effectiveness and in how people will perceive the character of the bollard and the space it defines.

The ISC has not rated and tested individual bollard systems for their ability to withstand vehicular impact. Since designers and engineers must calculate the performance of various systems and recommend alternatives during design, this provides a great deal of flexibility.

The Department of State certifies bollards for use in its embassy and facility design, requiring that a bollard be certified to stop most vehicles completely, while retaining enough integrity to continue operation after impact (to deter a second attack). However, domestic installations for most federal properties do not need that level of performance.

Designers should avoid oversizing or overengineering bollards for the site conditions and protection levels. Such practices add unnecessary costs to the project and often detract from the aesthetics of the site. Here, vector analysis can play a fundamental role in reducing the required robustness of the element, while providing the same protection.

On some projects, designers may be able to create custom perimeter barriers that coordinate with building and public space design. Other projects may require premanufactured elements. In either case, Project Teams must select a style that is appropriate for their project.



Mounting surfaces play a fundamental role in how bollards “read.” Even high-quality bollard treatments won’t present well if surrounding surfaces are of inferior quality (far left). However, otherwise-austere bollard designs can work quite well when paired with appealing surface treatments (right three).

Sculptural barriers create visual interest by differing from, yet complementing, their context, while walls work best in concert with the surrounding landscape. Both can also double as attractive, comfortable seating options.



Jersey barriers are the concrete barriers frequently used in front of federal buildings. Often implemented as a temporary deterrent, they may also have a psychological effect, promoting a sense of fear. If permanently anchored and structurally engineered, Jersey barriers may function as a vehicle restraint, but they are not an acceptable substitute for bollards or other reinforced structural elements.

As a new, integrated vocabulary of security elements and installation methods develops, it becomes easier to incorporate the standoff zone into the fabric of the surrounding community context.

Sculptural or seating barriers. Hardened barriers can be constructed in many shapes and forms, while still functioning with bollard-like performance. When well designed, these can be attractive and provide a short-term place for sitting, leaning, or stopping. Natural rocks or boulders serve a similar purpose. Such barriers become sculptures and objects of interest, improving the streetscape while improving security.

Walls. Structurally reinforced walls can serve dual purposes. They are hardened perimeter elements that also function as retaining walls, seating, plaza edges, or an extension of a building's architecture.

In designing such walls, the Project Team's structural engineer must collaborate with other team members to ensure that the wall meets performance criteria, while providing an attractive amenity. Typically, walls should be integrated into the building yard at a height suitable for sitting or include an integrated bench at an appropriate seating height. So that they do not become monotonous, or restrict pedestrian access to the building yard, walls can be intermittent and interspersed with bollards or other elements, as appropriate. Walls higher than 20 inches, although effective, are likely to raise design and contextual issues and should be discussed with local stakeholders.



Hardened street furniture. Street furniture, including benches, lampposts, parking meters, bus stops, and signposts, among other elements, can be hardened in order to serve double duty as perimeter security countermeasures.

Planters are also commonly employed for this purpose. They can be designed to work in combination with furniture, such as benches, creating a pleasant seating area with interesting landscape features. However, planters also have limitations. First, planters should be secured in place to meet their performance requirements, taking into consideration any below-grade infrastructure. Second, planters come with a maintenance requirement and are only attractive when the plants within are well maintained. Avoid this element unless there is a commitment of manpower and budget to maintain it.

Hardened street furniture should be chosen and placed with the same care given to bollards or walls. Avoid repetitive use of hardened elements to ensure an attractive visual impact and a reasonable cost. In most cases, hardened street furniture is most effective in combination with other perimeter elements.

Fences. Fences can deter both people and vehicles from entering a site. Chosen with care, they can also serve as decorative elements to screen or visually alter the appearance of hardened perimeter elements.

Incorporating fences into perimeter security involves a variety of considerations, all dependent on the level of security required. These include the impact on the lines of sight to and from the facility, the incorporation of gates and entry points, and the selection of materials.

Fences should be used only in special situations because of their significant visual and symbolic impact; however, where they are necessary, fences should be made as unobtrusive as possible. Painting the fence fabric and structure black can minimize their visual impact, allowing employees and visitors to focus on the building, landscape, and other elements beyond the fence. Different types and heights of fences minimize their presence; selection should be based on site conditions, the risk protected against, the existence of topographical or natural barriers, and the likelihood of an attack.

Low, steel-cable fences are less obtrusive solutions that can also serve as vehicular crash barriers or augment other types of fencing. Such fences entail cables attached horizontally along the length of the fence at car bumper height, terminating at a metal eye bolt, which is sunk into a sturdy concrete cube buried underground. This reinforcement prevents a vehicle from breaking through the barrier. The design includes the expectation that the cable and fence material will move on impact, but not break. Consequently, the team must take this amount of deflection into consideration when placing the barrier. With this or any fence, Project Teams must be careful to account for subsurface conditions.

In high-security contexts, vibration detection can be applied to a fence to detect potential intruders. If someone attempts to climb the fence, or reaches through and snips the wire, an alarm is triggered. A key component of this surveillance method is the use of pole-mounted cameras, both fixed and moveable, so that security personnel may quickly see the source of any alarm. This system tends to be complex, sophisticated, and expensive.

Fences restrict visibility both into and out of a site and denote exclusion, so they must be used only where absolutely necessary. A fence should match its architectural context and maintain some degree of transparency to minimize such negative impacts.



The National Capital Planning Commission (NCPC) in Washington, DC, has developed a catalog that illustrates several examples of hardened streetscape objects. Some of the items have been tested to ensure satisfactory performance and are available from a number of vendors. The intent is to provide families of streetscape elements that work together to protect, while imbuing a site with a welcoming sense of place. For more detailed information, visit www.ncpc.gov.

The topography of a site can be shaped to direct or control blast away from at-risk structures. In many cases, earthworks may be less expensive than structural solutions if adequate land area is available. They are most effective on large sites with generous setbacks.



Topographic security solutions are among the least obtrusive, for they often appear to be simply part of the landscape design. Additionally, their adaptability means that they can function in almost any context. Subtly sloping tree lawns, playful earth berms, and variegated retaining walls are some of the many landscape treatments that both stop vehicular approach and enhance site design quality.

Topography. The topographic changes typical in many site design projects, such as shaping the site to ensure adequate drainage; protect trees; balance cut and fill; and provide suitable elevations for roadways, parking, and buildings, also present many opportunities to unobtrusively enhance security. Berms, steep slopes, ridges, depressions, and decorative landscape elements can all serve as perimeter barriers, preventing vehicular access, while varying the side edge. Such elements may provide seating or support programmed activities and blend into the topographic variation already typical at most sites.

When planning topographic changes, Project Teams should consider their impact upon sight lines and visibility. For example, elevated sites enhance surveillance and make vehicular approach difficult, but also make a building more conspicuous. Likewise, depressions in the landscape, such as drainage channels and ditches, block automobiles, while providing possible areas of concealment. These issues are hardly insurmountable; topography is an invaluable component of comprehensive security and, like other countermeasures, must be incorporated thoughtfully.



Dry moats. Sunken walkways and low ditches (with or without water) and walled ditches or ha-has (invisible from a distance) are all historic fortification strategies that designers may weave into today's innovative landscape security plans. These hidden standoff zone barriers protect a site and its inhabitants by preventing vehicular access, without disturbing or obstructing the site's aesthetic continuity.

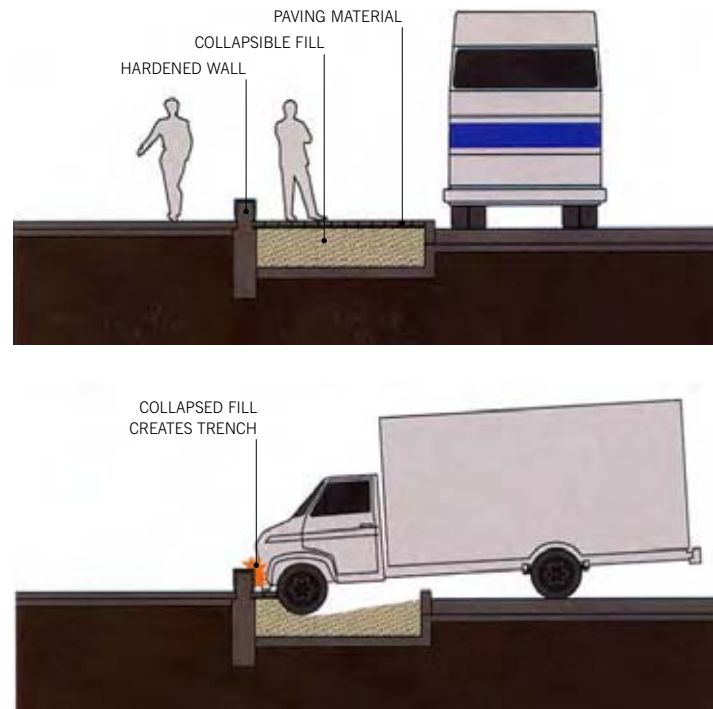
Collapsible surfaces. A modern take on the idea of hidden barriers, collapsible surface devices support crowds of pedestrians and even police horses, but not the weight of a vehicle. This technology adapts a unique concrete material originally designed to stop runaway planes. As an unwanted vehicle drives upon the collapsible area, the surface compresses. The compressed material slows the vehicle, while instantly lowering its angle of approach. A hardened subsurface wall integrated into the system stops the vehicle should its momentum carry it through the collapsible surface.

This technology can easily be integrated into an urban setting with minimal negative impact, particularly when a new or existing building has enough setback. At Battery Park City in New York, a security design firm applied this technology using a patented material. Since collapsible surfaces appear as conventional pavers—surface treatments include plantings and cobblestones—they need not impinge on the existing landscape. Moreover, because any vehicle entering a collapsible surface will sink, designers can shorten barrier walls or even bury them entirely underground where there is enough room.

Collapsible surface technology is relatively new, but tests have shown it to be an extremely effective solution. Other adaptations of the material, as in staircases designed to collapse under the weight of a vehicle, show promise.

Diagram 2.4: Collapsible Paving

Collapsible paving is one of the most promising new security countermeasures because it supports visually and physically open, pedestrian-friendly streetscapes. This technology consists of a concealed trench containing a patented collapsible fill covered by a specially designed paving material. The paving is indistinguishable from standard landscape finishes and will sustain the weight of pedestrians, but will collapse under the weight of vehicles, trapping them in the trench. In the diagram below, a crash-rated, hardened concrete wall that also functions as a bench forms the back of the collapsible sidewalk trench. The collapsible surface allows for a shorter, less obtrusive wall or even a wall buried entirely underground where there is sufficient setback distance. In order to prevent accidental driving on the collapsible surface, such as by delivery or utility trucks, designers may incorporate visual or physical cues, such as groundcover flower pots or benches.



In some cases, storm water basins may offer opportunities beyond management of runoff. They can support wildlife and appropriate vegetation, become an aesthetic amenity, function as security barriers, and possibly evolve into a sustainable site feature, filtering storm water for reuse on-site.

Water. Fountains, pools, and other decorative water features are suitable as countermeasures, but require additional structural components and regular maintenance. For instance, a water feature with a hardened wall around it can both provide protection from vehicles and create a landscape amenity. Natural water features, such as ponds, lakes, rivers, and streams, can also keep vehicles outside the standoff perimeter when they are carefully integrated into overall landscape design.



Water features are popular site amenities that lend themselves well to physical hardening. Such features can create variety along a standoff perimeter, as in a small pool with reinforced benches (top), or can form an entire hardened edge, made less obtrusive because of its active nature (bottom).



Storm water management areas, used for the detention and retention of site runoff, highlight the opportunity Project Teams have to improve the environmental performance of a building, while enhancing the effectiveness of standoff zones. Project Teams should consider how landscape features—such as vegetation and topography—designed to surpass storm water management regulations can also prevent vehicular approach.

Landscaping and plantings. Plants have long been used as tools in the arsenal of security design. Sharp-leaved, thorn-bearing plants and dense hedges create natural barriers and repel aggressors. They integrate well into landscapes and are relatively inexpensive. However, thick vegetation also has drawbacks. Dense plantings in close proximity to a building can screen illicit activity, and some ground cover, especially when more than 4 inches tall, may be used to conceal weapons. Project Teams must ensure that vegetation does not block important sight lines or create attractive hiding places.

Generally, plantings are most successful when used as part of a layered solution. Very dense vegetation may deter vehicular approach when combined with reinforced barriers and can screen other countermeasures. Trees, shrubs, and other plant materials create secure spaces that are also welcoming and attractive. Their type and arrangement should integrate smoothly with adjacent styles and materials. This is particularly important in historic districts, where landscape design may be a significant component of a building's historic fabric.

Existing landscape features are also an important consideration when adding new plantings. Mature trees are a valuable resource that should be protected, where possible, to maintain the integrity of the neighborhood. Additional plants or trees must be carefully selected to weave into the context and to relate to existing street tree systems. Native and drought-resistant plants should be considered to meet the project's sustainability goals.

Below ground, Project Teams employing vegetation must heed possible conflicts between plantings and underground utilities or barrier footings. As large plants and trees grow, their root systems can conflict with subsurface conditions, undermining both utilities

and the plants' health. Project Teams must perform a careful study of existing underground conditions before making decisions regarding planting areas. Arborists can provide essential information about the underground clearance specific species require.

Above ground, Project Teams must coordinate vegetation with security cameras, site lighting, and lines of sight to avoid areas of concealment. Security experts and designers should collaborate to create landscape designs in which plantings, light distribution, view corridors, and cameras all work together. Part of this coordinated solution is the continued maintenance of vegetation after planting, for a poorly maintained landscape detracts from both aesthetics and security. Overgrown shrubs and trees offer attractive hiding places and limit visibility. Such overgrowth can also hinder first responders from accessing the building and site quickly in the event of an emergency. Project Teams must establish a plan for care and maintenance as they design the site.



Specimen plants, native trees, and attractive shrubs help screen or soften security elements, while making unwanted passage more difficult. Thoughtfully chosen vegetation also contributes to sustainability goals and overall site appearance. However, each of these benefits depends upon frequent maintenance, so teams should establish a plan for care from the outset.

While dense plantings and trees may be effective vehicular barriers, they are not a 1:1 replacement for bollards or other hardened elements. They should be used together with hardened elements to create a comprehensive, integrated solution.

The “protective vegetation” tactic is only successful when plantings are well maintained. Although vegetative planters and berms enhance the appearance of a site and provide security, they require regular care and attention to ensure that they have adequate soil, moisture, and growing conditions. Regular trimming and arbor care are crucial to prevent vegetation from becoming overgrown and, thus, a potential hiding place.

Summary of Standoff Perimeter Barrier Elements

ELEMENT	ADVANTAGES	DISADVANTAGES	TIPS
Bollards	<ul style="list-style-type: none"> ■ Have proven performance ■ Are permeable for pedestrians ■ Are available in high- and low-cost options 	<ul style="list-style-type: none"> ■ Are overused ■ Sometimes are oversized ■ Are often installed at tight, urban locations where achieved setback does not significantly reduce risk ■ Require deep foundations that may conflict with underground utilities 	<ul style="list-style-type: none"> ■ Do not overspecify performance requirements ■ Use vector analysis to determine appropriate performance requirements for different areas of the site ■ Take aesthetic cues from building and neighborhood context ■ Do not rely on bollards exclusively; layer with other elements and create a varied edge
Sculptural or seating barriers	<ul style="list-style-type: none"> ■ Can double as informal seating ■ Are flexible ■ Create visual interest ■ Do not appear to be security 	<ul style="list-style-type: none"> ■ Require deep foundations that may conflict with underground utilities 	<ul style="list-style-type: none"> ■ Design the feature to harmonize with the character of the site (e.g., choice of materials, shapes, sizes)
Walls	<ul style="list-style-type: none"> ■ Can serve dual purpose as security and amenity ■ Can double as informal seating ■ Enable security to become part of the landscape and, therefore, unobtrusive 	<ul style="list-style-type: none"> ■ Require continuous deep foundations that may conflict with underground utilities ■ May impact lines of sight to and from a facility 	<ul style="list-style-type: none"> ■ Choose a design and materials that continue or accent the character of site architecture and other site amenities ■ Ensure that the design satisfies barrier requirements by collaborating with a structural engineer during team decision-making process ■ Mix with permeable barrier elements where access is needed (e.g., at entry points)
Hardened street furniture	<ul style="list-style-type: none"> ■ Can serve a dual purpose as security and amenity 	<ul style="list-style-type: none"> ■ Requires regular maintenance to be effective aesthetically ■ Is easy to overscale and overengineer 	<ul style="list-style-type: none"> ■ Develop a family of elements (e.g., bollards, benches, lighting) ■ Do not overuse ■ Avoid overdesigning and overengineering
Fences	<ul style="list-style-type: none"> ■ Can provide high levels of security ■ Are made of various materials to suit different styles and applications ■ Can deter individual intruders 	<ul style="list-style-type: none"> ■ May impact lines of sight to and from a facility ■ May weaken secure perimeter (e.g., at gates and entry points) ■ Create a closed-off appearance if too high, particularly in urban contexts 	<ul style="list-style-type: none"> ■ Choose different heights and types of materials for specific areas of the site, depending on the level of risk and likelihood of attack ■ Use in high-security sites where individual intruders, rather than vehicles, are a threat ■ Consider vigilant surveillance or patrols where fences are not appropriate
Topography	<ul style="list-style-type: none"> ■ Can limit access to site and serve as a perimeter barrier when shaped thoughtfully ■ Enables security to become part of the landscape and, therefore, unobtrusive 	<ul style="list-style-type: none"> ■ Can create areas of concealment 	<ul style="list-style-type: none"> ■ Consider sight lines and visibility carefully when designing the topography of a site to avoid creating areas of possible concealment
Dry moats	<ul style="list-style-type: none"> ■ Allow for elimination or reduction of walls or bollards ■ May be less visually intrusive 	<ul style="list-style-type: none"> ■ Require greater perimeter depth compared to hardened elements ■ Restrict pedestrian movement across site 	<ul style="list-style-type: none"> ■ Use in areas with sufficient setback ■ Combine with low walls, possibly designed as seats, where there is limited setback

ELEMENT	ADVANTAGES	DISADVANTAGES	TIPS
Collapsible surfaces	<ul style="list-style-type: none"> ■ Provide invisible barriers beneath usable space ■ Allow free circulation and uncluttered site ■ Extend perimeter into public sidewalks without negative impacts 	<ul style="list-style-type: none"> ■ May require greater perimeter setback depth, depending on site conditions or use of low walls ■ Requires that service vehicles (e.g., maintenance and landscaping trucks) avoid collapsible areas ■ May be insufficient to support temporary seating for special events 	<ul style="list-style-type: none"> ■ Incorporate low walls or low bollards to decrease required setback depth ■ Where setback is sufficient, eliminate use of aboveground walls ■ Coordinate placement with first responders
Water	<ul style="list-style-type: none"> ■ Can also serve as amenity (e.g., fountains, decorative pools, and other water features) ■ May help to achieve sustainability goals (e.g., retention basins) ■ Enables security to become part of the landscape and, therefore, unobtrusive 	<ul style="list-style-type: none"> ■ Requires regular maintenance ■ May become a drowning hazard 	<ul style="list-style-type: none"> ■ Coordinate placement of storm water management areas to enhance security topographically ■ Consider how natural water features, particularly on suburban sites, can be incorporated into comprehensive site security ■ Structurally harden features so that they provide unobtrusive protection against vehicles ■ Consider how fountain will look when not in operating season
Landscaping and plantings	<ul style="list-style-type: none"> ■ Can create natural, repellent barriers, while enhancing the beauty of the landscape ■ Can screen hardened elements to lessen their visual impact 	<ul style="list-style-type: none"> ■ Requires regular maintenance ■ May block sight lines ■ Can provide attractive hiding places ■ May conflict with underground utilities 	<ul style="list-style-type: none"> ■ Use plants as supplementary protection in concert with hardened barriers ■ Use to create a seamless aesthetic transition to surrounding neighborhood ■ Select low-maintenance, sustainable materials

INNOVATION

There are numerous new technologies and products currently under development that offer promising solutions for integrated site security. For example, designers have employed new techniques for anchoring bollards and other hardened elements where underground conditions limit available depth. These include shallow foundation systems and thin turntables that can spin barriers 180 degrees to allow approved vehicular passage. Both meet security requirements, while providing more flexible alternatives for the implementation of standoff countermeasures. Both also show the innovations that result when Project Teams shape their vision for security outside what has been done before, creating vital, safe sites and clever, inspiring solutions.

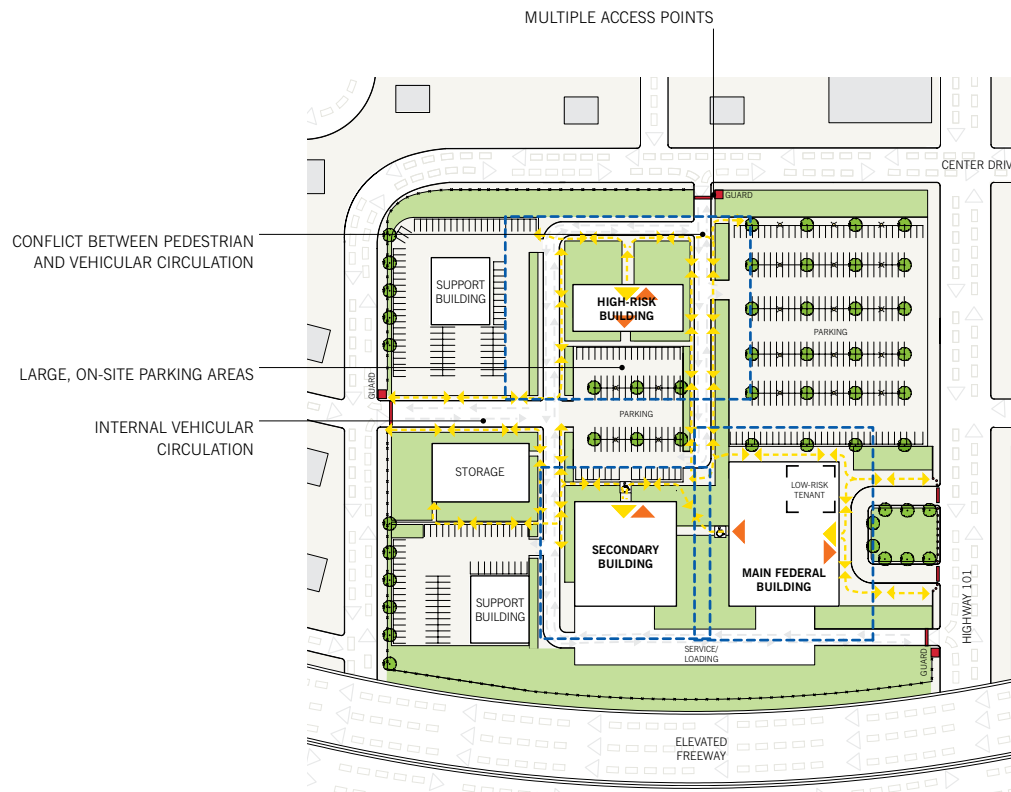
Shallow-mount perimeter systems, which require less than 18 inches of below-surface depth, provide the same performance as traditional barriers and offer greater flexibility in placement. Turntable systems are one such solution; they support a variety of surface treatments and accommodate occasional vehicular access where required.



Zone 3

Site Access and Parking

Topography, pedestrian and vehicular circulation routes, checkpoints and access points, vistas, sight lines, and signage all contribute to effective site access and circulation and, in turn, to the success of the standoff perimeter. Project Teams must design site access to minimize conflicts between pedestrians and vehicles, maximize efficient passage for both daily activity and emergency response, and retain control over who enters the site.



Site security in this zone keeps potential vehicle-delivered threats away from federal facilities wherever possible, while maintaining connections with public transportation systems. Successful strategies do this by controlling the movements and location of uninspected vehicles, whether passing by the site, dropping off or picking up passengers at the site, or entering the site.

With the design of on-site parking and access points, Project Teams can eliminate direct lines of approach, control vehicle speed, and reduce the necessity for robust barriers. In addition, the same systems that ensure security can also guide visitors and employees to their destinations (e.g., parking lots or building entries), with clear paths and appropriate wayfinding information. The following are some key strategies for achieving these objectives:

- **Maintain the integrity of the standoff zone.** Determine which vehicles are permitted to cross the perimeter barrier and where they are permitted to cross.
- **Ensure access for first responders.** Design site circulation to enable emergency vehicles to reach those in need, quickly and efficiently.
- **Provide adequate room for inspection.** Maintain access to public streets and sidewalks during stopping and queuing.
- **Include separate loading and service paths.** Ensure that other transportation paths do not intersect these areas.
- **Establish pedestrian circulation routes.** Maintain clear paths to and from the site, between buildings, and from parking areas to building entrances.

Diagram 2.5: Site Circulation

Clear circulation is always important, especially on a large site with multiple access points and internal vehicular circulation. This diagram shows the existing conditions on a site with large areas of on-site parking, an unclear hierarchy of routes, and multiple conflicts between pedestrian and vehicular traffic that create both security concerns and issues of personal safety. Test Case 4 in Chapter 4 illustrates a solution that addresses these conditions.

Site Access and Parking Elements/Actions

1. Delineate drop-off and pick-up areas
2. Control site access by incorporating
 - Inspection areas
 - Retractable bollards
 - Gates
 - Guard booths
 - Sally ports
3. Monitor loading and service areas
4. Maintain clear access routes for first responders
5. Establish clear pedestrian circulation routes
6. Establish secure parking areas inside and outside the standoff perimeter
 - Garage parking
 - Surface parking
 - Wayfinding, lighting, and signage

Perimeter elements must not block easy access to curbs by either pedestrians or wheelchair users (left). In high-traffic areas, designers should look for ways to position or stagger elements to meet security performance requirements, while allowing for comfortable circulation (right).



ELEMENTS AND EXAMPLES

1. Delineate drop-off and pick-up areas

Drop-off and pick-up areas should be outside the standoff perimeter and designed so pedestrians can move easily from their buses and cars to building entries. Care should be taken when installing barriers along public sidewalks and near curbs to ensure that there is adequate room for car doors to open and people to exit. Moreover, barriers must never obstruct ramps for persons with disabilities, including curb cuts at sidewalks, and must be spaced to allow wheelchairs to pass between repetitive elements, such as trees and bollards.

2. Control site access

To maintain the integrity of standoff, site security must keep uninspected vehicles outside perimeter barriers at all times, while ensuring access for approved vehicles. Controlled access points are key to this strategy; they allow entry onto the site where appropriate, yet maintain a secure perimeter. In addition to physical measures, Project Teams must plan for the operational aspects of site access. Policies should be in place to inspect all unauthorized vehicles before they reach garage and service entrances on-site, especially when parking is located underneath the building.

Inspection areas. A site must accommodate inspection and vehicle queuing without impeding public streets and sidewalks. Security and public use can coexist when Project Teams provide space outside the standoff zone for these activities. Such checkpoints and their operations should be inconspicuous, with limited visibility afforded to those outside the process.

Retractable bollards. Retractable bollards are reinforced barriers that retract into the ground, allowing the entry of emergency response vehicles or authorized visitors to the site. They provide clear lines of sight and pedestrian passage, but may appear monotonous if combined with regular bollards. Project Teams that specify retractable bollards must select proven technology that is both mechanically sound and able to withstand vehicular impact. The security functionality of this solution depends on its successful operation, so building managers must commit to consistent maintenance of the mechanical systems that operate the bollards.

Perimeter barriers near bus stops must allow sufficient room for the deployment of bus lifts for persons with disabilities. Otherwise, such passengers must disembark in the street, creating a potentially dangerous situation.

All controlled-access areas should be located outside public rights-of-way (streets and sidewalks) and must include space designated for vehicle queuing. Limit the number of vehicular entry points to facilitate access control. On an existing site, this can be achieved by closing or combining entry points.

Hydraulic plate barriers—operable “clamshell style” steel plates—are sometimes used in place of retractable bollards because they can be surface mounted and may be less expensive. While they may be appropriate for temporary or remote installations, they tend to be visually inappropriate for urban uses.

Underground conditions play a fundamental role in determining whether retractable bollards are the appropriate solution for access control. They require a significant amount of clear space underground to accommodate the foundation and to accept the retracted barrier. Teams should complete a thorough survey to determine the exact location of underground utilities before selecting and placing retractable barriers.

Gates. Gates function as entry control points for vehicles and pedestrians; among all elements composing a standoff perimeter, they are one of the most commonly breached. Thus, Project Teams must carefully design gates to allow entry, while providing

adequate security. A variety of products on the market are crash-rated to absorb the force of an oncoming vehicle. These include cantilevered sliding gates and vertical lift gates, for use where space is at a premium. When choosing a gate, take into account the building materials used in the facility and in the surrounding neighborhood. The gate should be as unobtrusive as possible and harmonize with the existing palette.

It is good practice to designate separate entry gates and different levels of security for personnel, visitors, and commercial traffic. Designated entrances also support automated entry, which is more efficient, alleviating delays and concentrating inspection and staffed security booths where they are most useful. Magnetic access card readers are one common choice in such situations; they are sturdy and reliable. They have largely replaced slot card readers, which are easily vandalized, and radio-controlled systems, which may jam. However, whenever automation is in place at site entry points, Project Teams must provide back-up systems, should a power outage occur.



Pop-up bollards can provide perimeter protection, while permitting controlled access for emergency or delivery vehicles (left). Although clamshell-style barriers are less costly and require shallower mounting depths, they are uniformly unattractive and, in most cases, should be avoided or screened where possible (right). A better option may be a turntable type system (see page 47).



Guard booths. Guarded entry, staffed by security personnel, involves a more hands-on approach to security. A guard station, or booth, provides a point of implementation for searches, identification, verification, and access control. However, this form of hands-on security has a price tag. Gates monitored with card access control are probably less secure than those with a staffed guard booth, but they generally have lower operating costs.

Often, guard booths are placed at entry points, especially in high-security situations. Security personnel inspect vehicles and pedestrians before they are allowed to enter. Entrances may be outfitted with a vehicular barrier that is recessed into the ground and activated with a hydraulic arm, or some other type of controllable barrier. If the security staff senses a problem, they can trigger the barrier, preventing the vehicle from driving onto the site. Because of safety concerns, vehicles and pedestrians generally should not share the same entrance. Overlapping circulation might put pedestrians at risk, and it is difficult to oversee both types of traffic simultaneously.

Guard booth design should reflect the same architectural character as the facility being guarded. Booths should be an extension of the building, harmonizing with the other site elements and the surrounding context, and should not obstruct or occupy public space. If possible, inspection areas should be sheltered to enable thorough, unhurried inspections during inclement weather.

Sally ports. A sally port, or small controlled space with front and rear entries, is used to restrict access to one person or vehicle at a time. This strategy provides a high degree of control, allows time to check credentials, and makes it difficult for intruders to pass into the protected area on the coattails of the person in front of them. This type of entry is usually reserved for high-security areas, such as prisoner transfer areas in courthouses.



Guard booths and other outbuildings should reflect the design of the structure they protect. Contextual solutions also may increase the safety of guards, for they can easily incorporate other site elements, such as hardened walls. A custom-designed guard booth is worth the additional investment it may require.

It may be beneficial to close certain entrances during off-peak hours to conserve staff resources. If this approach is taken, clear and visible signage must communicate when entrances are open to prevent confusion.

Summary of Access-Control Elements

ELEMENT	ADVANTAGES	DISADVANTAGES	TIPS
Inspection areas	<ul style="list-style-type: none"> Can accommodate queuing and inspection without impeding public streets and sidewalks when on-site, but outside standoff zone 	<ul style="list-style-type: none"> Require additional personnel and operating costs 	<ul style="list-style-type: none"> Limit visibility of the checkpoints and their operations by those outside the process
Retractable bollards	<ul style="list-style-type: none"> Are flexible in controlling access and emergency egress 	<ul style="list-style-type: none"> Require substantial, regular maintenance and can appear monotonous if combined with other bollards 	<ul style="list-style-type: none"> Ensure consistent, expert maintenance because mechanisms are sensitive
Gates	<ul style="list-style-type: none"> Allow for controlled access and inspection 	<ul style="list-style-type: none"> Require monitoring (either human or electronic) to prevent unwanted access 	<ul style="list-style-type: none"> Match style to context
Guard stations	<ul style="list-style-type: none"> Allow for live monitoring and inspection and on-the-spot, immediate action in the event of an emergency 	<ul style="list-style-type: none"> Require additional personnel and operating costs 	<ul style="list-style-type: none"> Match style to neighborhood or building architectural style and materials
Sally ports	<ul style="list-style-type: none"> Provide double-layered lockdown during inspection 	<ul style="list-style-type: none"> Increase the time needed to process people and vehicles Require ample space for queuing Are suitable only for low-traffic areas 	<ul style="list-style-type: none"> Site carefully to allow for queuing and visibility of approach

3. Monitor loading and service areas

Ideally, Project Teams should separate loading and service areas from other traffic flows, such as controlled parking and emergency response, to avoid circulation conflicts. This helps ensure that any individual who breaches security elsewhere will not also have access to service areas. Moreover, service and loading areas should be inconspicuous, both to reduce potential threats and to limit their impact on the surrounding community.

Loading and service areas need careful monitoring since the nature of delivery vehicles entails inherent risk. The design of these areas should allow sufficient space for inspection and queuing, including pull-over lanes where necessary.

4. Maintain clear access routes for first responders

When establishing the entry points and barriers that make up the standoff perimeter, it is essential to maintain access routes for first responders. Review and consider local emergency access/evacuation plans to ensure that first responders will be able to reach the site and the building easily, even if some entrances are obstructed.

5. Establish clear pedestrian circulation routes

Every site needs to accommodate pedestrian circulation, whether visitors arrive on foot or in a wheelchair, or from a vehicle drop-off point, a parking lot, a public sidewalk, or mass transit. Perimeter barriers, gates, and driveways must ensure that accessibility is not impaired in any way.



Where pedestrian circulation must be clearly denoted and controlled, it also should be attractively integrated with overall site features.

Pedestrian circulation should clearly guide visitors and those making deliveries to their destination and direct them away from areas where they are not permitted. Achieve legibility by defining clear pathways through the use of hardscape and landscape elements, well-designed signage, and good lighting.

6. Establish secure parking areas inside and outside the standoff perimeter

Due to the threat of vehicle-borne explosives, parking presents a special problem. None of the three common types of parking facilities—garage (underground or aboveground), surface lots, and on-street parking—is free of security issues. So parking areas must always be designed and operated to ensure the integrity of the standoff zone and to manage the movements of uninspected vehicles efficiently.

Parking within the standoff zone usually should be restricted to employees or permit holders, although high security may preclude this option as well. In some locations, inspection of every vehicle entering the site may be necessary; this is particularly true where internal or underground parking is concerned, since both present increased risks. Limited parking entries help decrease these risks, by easing both the inspection process and overall site surveillance, but should remain separate from service access.

When parking is outside the standoff perimeter but within the optimal setback area due to site conditions, parking must be restricted or redesigned, or Project Teams must accept little or no mitigation. If this occurs on a tight urban site with on-street parking or an adjacent surface lot, the situation may be improved by developing parking regulations in cooperation with local officials. Tenant-only street parking provides extra setback with less impact on the urban context, while respecting local transportation needs. Unscreened visitor parking should be kept at the farthest distance possible, without being inconvenient.

The personal safety afforded by a site is a very real priority, as important as protection against terrorist threats. Project Teams should plan all parking entries in relation to emergency and first response plans. Inspection areas should include adequate space for vehicle queuing, outside public rights-of-way and emergency access routes. Pedestrian circulation to and from parking areas—both on-site and off—should be well lit, well marked with signage, separated from driveways, and convenient for visitors and employees.

Garage parking. Although common in cities due to the high cost of land, garage or structured parking carries the highest security risk. Parking garages off-site, but nearby, may provide effective observation points or staging zones for potential attacks. Where such garages exist, Project Teams should consider partnering with local officials or neighbors to screen garage façades that face vulnerable facilities.

On-site garages for inspected or permitted vehicles reduce these risks. Unlike federal workspaces, parking garages are not subject to setback requirements and may be suitably placed on the lot line. Consider how such a structure can help lessen the negative impact of a significant standoff, particularly when attractively screened and combined with retail or food service on the ground floor. All garages should include common crime-prevention

Locate and design loading docks, garages, and service areas so that large vehicles do not have access to areas beneath buildings. If this is not possible, harden such areas against blast to limit damage to adjacent areas in the event of an explosion. In addition, allow sufficient egress for occupants in an emergency. For example, if a crisis occurs on a garage ramp, it should not block all access to or from the garage.

Though adjacent parking may make security design more complicated, measures to reduce threats can have the added benefit of enhancing otherwise dull infrastructure. For example, screening a parking garage both eliminates potentially dangerous vantage points and increases visual interest (top), while outleasing part of a large surface parking lot for a public use, such as a basketball court, increases natural surveillance, eliminates unwanted vehicular access, and blends a federal facility into its community (bottom).



Straight-line or perpendicular approaches should be avoided in parking areas to prevent vehicles from generating the speed necessary to penetrate a building or its defenses.

methods, such as CCTV, adequate lighting, active patrol by security personnel, and sufficient ventilation.

Surface parking. Surface parking requires large amounts of valuable space and is difficult to monitor. Furthermore, surface parking can add significantly to the amount of storm water runoff generated on-site, a negative environmental impact that requires additional land and expense to mitigate.

Where such parking lots are necessary, Project Teams should carefully consider how to mitigate these impacts. For example, if more land is available than is needed, the addition of a vital public space on a portion of the lot can help blend the site into the surrounding neighborhood, while increasing ground permeability.

Wayfinding, lighting, and signage. The design of all parking areas should enhance natural surveillance and offer clear pedestrian circulation from parking to facility. Maximized visibility across, into, and out of a parking facility is key to successful security and personal safety, especially in standalone, aboveground situations. If a security station is provided, it should be located in a visible, public place, with a clear view of all entry and exit activity.

Indoor and outdoor facilities should include adequate lighting and signage. Lighting is one of the more passive forms of security that can be incorporated as part of the physical design of the facility and its site. In parking garages, high ceilings and long-span construction, in combination with light cores (openings in the center of the structure) and open stairwells, create a feeling of openness and increase the effectiveness of light as a security feature.

The Illuminating Engineering Society of North America (IESNA) has set minimum illumination levels for parking facilities. Project Teams may need to adjust these minimum light levels to address the required protection level for their specific facility. Further guidance on this topic can be found in the ISC criteria.

INNOVATION

If possible, it is highly advantageous to design the access and circulation of a site in order to minimize the potential velocity of an approaching vehicle. Local partners, such as departments of transportation and public works, are key players in implementing off-site traffic calming measures, such as road realignments, raised crosswalks, and medians. These strategies help turn adjacent roadways into security elements, by preventing vehicles from achieving the speed necessary to breach protective barriers. This, in turn, can enable the use of less robust hardened elements at access points and elsewhere on-site.

Additionally, such calming measures (which also include high curbs, tree plantings, traffic circles, speed tables, and raised crosswalks) create a more pedestrian-friendly experience around a facility, making it easier for both employees and visitors to navigate the site and its surroundings. More sidewalk traffic means greater “eyes on the street” surveillance, while slower streets mean reduced liability. When these strategies are implemented, it is important that they do not impede access by first responder and other emergency vehicles, in the event of a crisis.



Off-site traffic control measures can moderate attainable vehicular speeds and angles of approach toward a secure perimeter. Developed through rigorous vector analysis, specially designed medians and traditional traffic calming devices, like speed bumps, reduce the force against which countermeasures must protect, enabling Project Teams to reconsider the robustness of site security elements.

Zone 4

Site

The proper design and effective use of the built environment can lead to both a reduction in the fear and incidence of crime and an improvement in quality of life. This is the approach known as Crime Prevention Through Environmental Design, or CPTED. A vast resource of literature exists detailing the principles and practices behind this strategy.

GSA's facilities standards require that new buildings and major renovation projects meet the sustainability certification requirements of the LEED (Leadership in Energy and Environmental Design) Green Building Rating System®, which include many factors that site design can contribute to, such as water quality, energy efficiency, and renewable materials.

While security measures are introduced to prevent events that hopefully will never occur, their design must accommodate on-site activities that take place every single day. These include simple navigation from the curb to the building, employee activities, and special events. Each contributes to the vitality of federal facilities and, in turn, enhances the quality of the workplace. Seeking a balance of security innovation and day-to-day practicality is fundamental in developing a successful site design.

This principle is especially important in Zone 4, since this area includes the majority of the usable site. In Zone 4, the threats addressed include individuals as well as vehicles. Here, a security project offers an opportunity to provide new amenities that increase building security, while making the site more attractive and vital.

SITE AND LANDSCAPE DESIGN FOR SECURITY AND SAFETY

Effective site planning and landscape design can create quality public spaces, while enhancing the security of the facility. Design elements that serve both purposes reduce the number of site components, as well as the overall cost of a site security design. The following site design principles contribute toward this end:

- **Organize site amenities** to encourage use, while selecting their type and arrangement in terms of the overall security goals for the site.
- **Provide clear sight lines** to and from entries and guard booths; screen high-security areas and other controlled-access zones.
- **Install lighting** that highlights design features, while providing needed light for pedestrian safety and security cameras.
- **Support the facility's occupant emergency plans** by developing level, open areas at egress points.

- **Establish circulation routes** that are clear and unimpeded, increasing the safety of building occupants and visitors.
- **Install adequate, clearly legible signs** to reduce confusion and assist visitors in finding their destinations.

SUSTAINABLE DESIGN

The built environment has a meaningful impact on the natural environment, the economy, and the health and productivity of those who interact with it. Environmentally sustainable materials and operations should be incorporated into site security designs whenever possible.

Many design solutions help achieve environmental goals on-site. For instance, retention basins can collect storm water for eventual reuse. Vegetation can reduce heat islands, while hardscapes can incorporate recycled materials. And, sensitive lighting design can minimize light pollution. In addition, hardening existing street furniture, walls, planters, and the building envelope recycles existing features for new purposes.

Design decisions can also impact broader sustainability, beyond the site itself, while aiding security. Connections to a variety of public transportation services close to the site and provision of transportation benefits to staff reduces traffic and vehicular presence in the city and on-site. Carefully orienting a building to take advantage of natural light, shading, and ventilation can be both cost-effective and energy efficient, while ensuring visibility and adding to the overall quality of the site.

Site Elements/Actions

1. Design site amenities, such as furnishings, planters, water features, lighting, and vegetation, to serve multiple purposes
2. Create usable space
3. Designate weather-protected space for queuing at entries
4. Design security pavilions and freestanding buildings to blend with the site's architectural character

ELEMENTS AND EXAMPLES

1. Design site amenities, such as furnishings, planters, water features, lighting, and vegetation, to serve multiple purposes

The furniture and fixtures typically found within a site can function as countermeasures with proper hardening, or can help de-emphasize hardened security measures. Existing or carefully selected trees, plants, streetlights, fountains, kiosks, bicycle racks, parking meters, trash containers, bus shelters, and benches are some of the many elements that can contribute to both safety and comfort.

Some of these furnishings, including kiosks, benches, and trash containers, can be designed to fit over an engineered core and foundation, much like a bollard, boosting their structural integrity. Sculpture and public art can also function as hardened security barriers. These commonplace elements, when reinforced, serve two purposes, reducing the need for other, more obtrusive, countermeasures. However, as with any structural element, an underground survey is necessary to determine whether there is available space for the foundations that such barriers require, and designers must be careful not to make them inappropriately large.

Fountains, ponds, pools, and other water features can also function as site security elements when designed to stop oncoming vehicles



and arranged to selectively prevent access. For example, tank traps—low ditches that prevent vehicular access—are often filled with water, providing both security and an attractive landscape element.

Of course, where the perimeter itself provides sufficient protection from vehicles, internal site features need not be hardened. Instead, they can serve primarily as amenities, helping to soften the appearance of the perimeter elements.

In many cases, it is best to combine these strategies, using conventional hardened elements in combination with traditional amenities that do not need to be hardened.

Lighting is also an important consideration in this zone—when hardened, lighting elements can double as barriers, and when properly configured, lighting can help detect and deter intruders and improve visibility. Multiple lamps of moderate power provide better coverage than a few powerful lamps, while reducing glare and pools of shadow. In addition, a multiple-lamp design creates redundancy, necessary if a bulb blows out or fails. Because many crimes and terrorist acts are committed in broad daylight, lighting must be combined with a comprehensive security strategy.

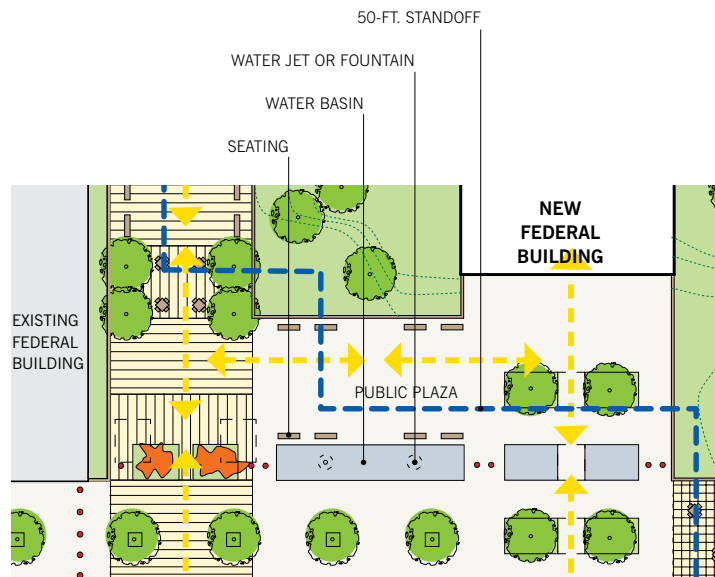


When used as part of a perimeter barrier system, street furniture may need to be bulkier than usual to obtain the structural integrity required to also function as a security barrier. Designers, engineers, and manufacturers must collaborate to develop innovative designs that provide necessary protection, while enhancing the streetscape and inviting use.

Inside the secure perimeter, Project Teams should maximize opportunities to create attractive, usable spaces. Plazas, parks, and other public areas provide amenities for building users and neighbors, while helping to integrate the perimeter with the site and its surroundings.

Diagram 2.6: Water Feature

A water feature can be a security element and serve as a focal point in a public plaza, as shown here. Water jets or fountains create visual interest and pleasant sounds that can drown out the noise of traffic on a dense urban site. In this example, the water feature acts as a moat that deters vehicular approach by capturing an oncoming vehicle in a recessed trench.



Reinforced water features enhance a site, while serving unobtrusively as standoff protection. Such features can function as moats or walls without making this purpose obvious.



Summary of Site Elements

ELEMENT	ADVANTAGES	DISADVANTAGES	TIPS
Furnishings	<ul style="list-style-type: none"> ■ Can double as security elements when appropriately hardened ■ Serve as everyday site amenities, which help to soften the appearance of perimeter security 	<ul style="list-style-type: none"> ■ Are often overengineered for security function; can be too heavy and “chunky” when designed as security elements 	<ul style="list-style-type: none"> ■ Create a palette, or family, of site furnishings that harmonize with other site elements and the surrounding neighborhood ■ Consider mixing conventional hardened elements at the perimeter with traditional amenities within the site to create variety and ease of use
Planters	<ul style="list-style-type: none"> ■ Add color and interest, softening hard lines and helping to blend security into the overall site design ■ Are available in a wide range of styles, to match buildings and landscape 	<ul style="list-style-type: none"> ■ Require regular maintenance ■ Are frequently too large, impeding sidewalk access and creating unattractive visual bulk 	<ul style="list-style-type: none"> ■ Establish available maintenance resources, including Business Improvement Districts and management staff, before incorporating planters
Water features	<ul style="list-style-type: none"> ■ Provide a barrier that also functions as a focal point or feature of interest ■ Enhance security without seeming obtrusive 	<ul style="list-style-type: none"> ■ Require regular maintenance ■ Require site conditions that can withstand the particular characteristics of water features 	<ul style="list-style-type: none"> ■ Design water features to blend with landscaping of the site ■ Integrate seating or landscaping into the hardened walls of water features so that their security aspects are less apparent
Lighting	<ul style="list-style-type: none"> ■ Adds an important layer to the security of a building and site, increasing visibility both for surveillance and for visitors ■ Provides security and adds interest by accentuating signage and landscape elements, serving a dual purpose ■ Serves as a physical barrier if hardened 	<ul style="list-style-type: none"> ■ Can lead to light pollution of the surrounding neighborhood (usually caused by overdesign) 	<ul style="list-style-type: none"> ■ Incorporate multiple lamps of moderate power for best coverage, while reducing glare and pools of shadow

Setbacks and Civic Responsibility: As the size of setbacks has grown, so has our responsibility to create attractive, usable spaces on this open land. Doing so requires sufficient planning and investment.

2. Create usable space

Site design should provide functional outdoor spaces that welcome use by federal employees, visitors, and the general public. Such spaces mitigate the impact of perimeter security and demonstrate the accessibility of the federal government. For a federal building to function as a public amenity with a clear sense of place and a strong civic presence, the site design team should consider the following:

Encourage public use. Activities that populate the site provide “eyes on the street,” increasing both security and personal safety through informal surveillance.

Provide public amenities, such as cafés, restaurants, and retail open to adjacent neighborhoods. While creating a sense of welcome, these minimize the impact of setbacks.

Activate street edges and underutilized areas of the site. Lively public spaces in otherwise neglected areas increase the safety of building occupants and visitors by making federal facilities less conspicuous.

Incorporate public art. Art commissions can beautify public spaces, while minimizing or augmenting security solutions.

Partner with community organizations. Collaborations with local stakeholders generate public events, lead to cooperative security strategies, and avert problems that arise from unilateral solutions.

Integrate the facility within its neighborhood context. A facility that is part of the neighborhood is less of an isolated target, benefits from the surveillance network of the city, and is an attractive place to work because of nearby amenities.

Public spaces should encourage both active and passive use. Some spaces are appropriate for programmed events, while others lend themselves to spontaneous sunning, eating lunch, or simply passing through. Each should be designed to match its intended use.

3. Designate weather-protected space for queuing at entries

With most facilities maintaining strict policies for inspection and access control, space for queuing pedestrians is a concern. Any exterior queuing areas should offer shade and protection from wind and inclement weather, particularly if the facility routinely has large groups waiting to enter. Natural vegetation or designed

elements, such as trellises and loggia, create comfortable waiting areas that also contribute to the quality of the site.

In addition, queuing areas should clearly articulate where visitors are to stand while waiting and should direct lines away from entries in case emergency access is necessary. Consider how a fast and efficient interior screening process can prevent large groups waiting outside a building from becoming potential targets.

4. Design security pavilions and freestanding buildings to blend with the site’s architectural character

Pavilions designed for security screening make it possible to detect person-delivered explosives outside the envelope of an existing building, increase space for queuing, and improve the flow of security, while freestanding buildings help create attractive, functional public spaces with shopping and dining options. Project Teams must always design security pavilions or freestanding buildings, such as kiosks, to relate to the style and context of the site and existing structures. Similar materials, appropriate scale, and familiar design cues help these structures integrate with their sites and improve their functionality. In some cases, such as at monumental historic buildings, pavilions and freestanding buildings may not be appropriate.

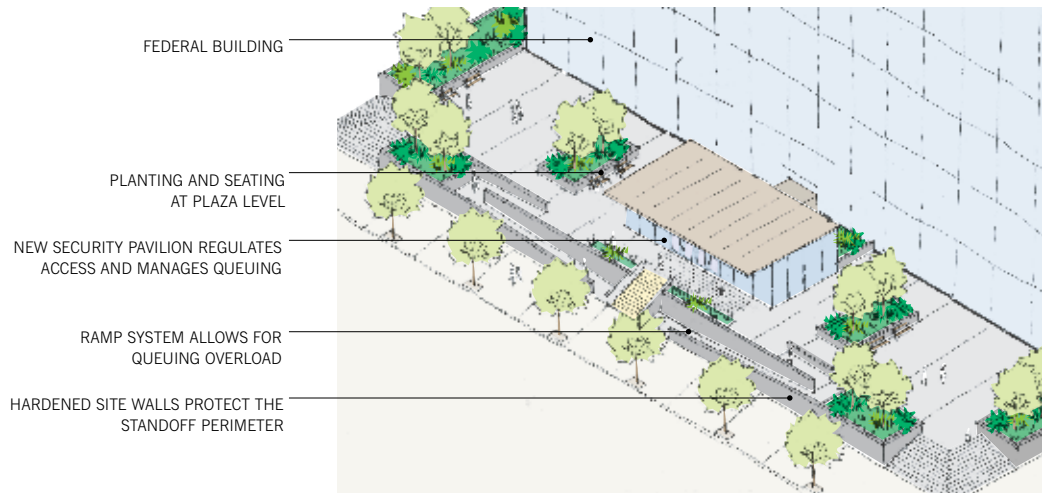


Diagram 2.7: Security Pavilion

Lobbies in older buildings often do not have adequate space to accommodate all of the equipment and queuing necessary for security screening. In addition, some lobbies may not be engineered to withstand the force of a package bomb. Here, security screening is relocated from the lobby to an exterior security pavilion, which protects the building against person-delivered explosives and manages queuing. The design of a security pavilion should always be considered in relation to the existing building's architecture, materials, and urban context.



Exterior security pavilions are an elegant solution where ground floor conditions make a facility vulnerable to progressive collapse. Such structures bring the security screening process out from under the building envelope. However, pavilions are not appropriate in all cases, especially where modifications to a façade would negatively impact the historic character of an existing building.





Standoff requirements may provide opportunities to introduce new uses, such as a freestanding restaurant (top), that turn larger building yards into an asset. Where setbacks are smaller but still significant, publicly accessible cafés and wrap-around retail at the building base, with interior structural hardening, help to bridge this distance and enliven otherwise blank walls (bottom).



INNOVATION

Providing high-quality amenities to federal building customers and visitors presents significant challenges in its own right—and federal security requirements compound these challenges. Recent innovations rise to these challenges by finding opportunities in the security constraints themselves. One promising strategy involves constructing new service or concessions buildings on the site, in the areas reserved for standoff from the main building.

Recent projects have used this strategy to incorporate retail and restaurant facilities into new courthouses, federal buildings, and lease construction projects. These may be freestanding buildings on the site or first floor edge uses that are open to the public. The program can be derived from a building's internal food service requirements or leased to private vendors.

This approach offers several advantages: Because the outbuildings are not federal workplaces, they generally do not warrant the same setbacks or hardened construction. Furthermore, they may be placed at the property line to help the entire property respond to its urban context. Because they are outside the security screening zone for the workplace, they are directly accessible to the public. In turn, this accessibility provides more flexibility for the program, enlivens adjacent public space, and increases the customer base, all resulting in more favorable service hours and products.

Security must be carefully considered. For example, incorporating a public use at the base of the main building requires structural hardening of its adjoining walls, although this is neither difficult nor costly in new construction. On the other hand, if a building is placed at the perimeter, its structure and fixtures can provide options for more subtle design of hardened perimeter elements at that portion of the site. In either case, this innovative approach is helping Project Teams meet security needs, while providing much more value to their customers and communities.

Zone 5

Building Envelope

Most security features of the building's envelope are handled through structural analysis and building hardening, which are beyond the scope of site security design. The main role of site security design is to keep explosive threats at the standoff perimeter. However, some aspects of the building envelope do relate to the principles of site security. These elements are described below.

Building Envelope Elements/Actions

1. Prevent access to vents/air intakes
2. Ensure accessibility at all entry and exit points
3. Design emergency egress to allow easy evacuation from a facility
4. Place cameras and light fixtures to maximize visibility
5. Harden the building structure and envelope
6. Design orientation and massing of building to lessen impact of explosion

ELEMENTS AND EXAMPLES

1. Prevent access to vents/air intakes

Separation of and protection for heating, ventilation, and air conditioning (HVAC) intakes are important parts of any security strategy. The HVAC system provides vital access to outside air; as a result, it is vulnerable to airborne security threats.

The ISC criteria specify requirements for placing air intakes to prevent the introduction of chemical or biological materials. In cases where this is impossible at existing buildings, Project Teams should consider installing site barriers to restrict access to these intakes. Examples of such protective barriers include walls, plantings,

and steep slopes. Approach this design issue with the same care regarding continuity of materials and relation to context as other security measures.

2. Ensure accessibility at all entry and exit points

Building entry points are critical both for everyday circulation and in case of emergency. Regular and emergency exits should be well marked and easily accessible. To maximize security, balance the number of entry points so they can be monitored easily and offer adequate access and egress. Where possible, consider combining public and employee entrances to conserve resources and staff. Likewise, consider electronic card readers, which provide employee access, while allowing security personnel to focus on other priorities.

It is important that all entrances and circulation through the site comply with the requirements of the Architectural Barriers Act Accessibility Standard (ABAAS). According to GSA's *Facilities Standards for the Public Buildings Service (P-100)*, "The Architectural Barriers Act Accessibility Standard (ABAAS) is mandatory for all GSA projects. The A/E is responsible for checking to see whether there are local accessibility requirements. If they exist, the most stringent requirements will prevail between local and ABAAS."

3. Design emergency egress to allow easy evacuation from a facility

When designing for security, it is important to keep in mind the requirements and circulation plans in place for emergency egress and first response. The occupant emergency plan and the site design should be compatible. Interior and exterior emergency routes should be clear and well marked, with comprehensive signage, to provide for quick response times. And, emergency egress doors should open onto level, unimpeded areas where occupants can safely and easily disperse away from a building. Considerations

Specifics related to the hardening of a building, reduction of blast impact, blast-resistant glazing, and HVAC filters are not addressed here. This Guide focuses only on features that relate to the site. See ISC criteria for details on building-specific countermeasures.

Use plants, walls, and other barriers to prevent access to HVAC vents/air intakes if they are less than 30 feet above grade.

Facilitate efficient screening and ease of entry by considering the location, number, and visibility of access points.



Various treatments mitigate the negative effects of a hardened façade, so a blank wall instead becomes an amenity for the building and its community. Some strategies include (clockwise from top left) designing “storefront windows” with exhibits, building a publicly accessible café with a hardened interior wall, treating the façade in a manner that creates visual interest, and providing a vertical water feature.



must also be made for persons with disabilities, allowing the most efficient means of egress in an emergency.

4. Place cameras and light fixtures to maximize visibility

Closed-circuit television (CCTV) should be specifically designed for the intended application, with appropriate technology, resolution, performance, and durability against vandals and weather.

Project Teams must coordinate camera locations with GSA, Department of Homeland Security (DHS), U.S. Marshals Service (USMS), and the Property Manager to minimize impacts on architectural aesthetics, while maximizing the cameras' range. Usually, a variety of locations will allow necessary flexibility. Camera installation should also correspond to overall site lighting, since different levels of light are required depending on the type of cameras installed.

Appropriate lighting throughout the site and along the building enables observation of suspicious activities at a great distance and can deter criminal and terrorist behavior. Well-planned lighting makes unusual behavior more conspicuous. In particular, entries and secure areas must be carefully illuminated to maximize visibility in these key places.

Vegetation and other landscape elements must not interfere with lighting fixtures. Additionally, excessive glare or shadows can detract from visibility. Use fixtures that provide both security and landscape lighting, illuminating trees, statuary, and fences, as well as entrances and circulation routes. Provide layers of light in an urban setting, from standard street lighting to pedestrian-scale fixtures to small-scale bollard lights and feature lighting.

5. Harden the building structure and envelope

At times, modification of the facility is the best strategy to reduce risk. Such alterations may change the requirements for site and perimeter countermeasures. While detailed modifications are outside the purview of this Guide, some typical options include hardening portions of the facility to reduce structural damage where the recommended standoff distance is not achievable and increasing the blast-resistant characteristics of doors, windows, and glazing.

Any hardening must be done in conjunction with analysis of the building performance based on the available standoff.

6. Design orientation and massing of building to lessen impact of explosion

In addition to standoff distance and building hardening, designers and blast experts should consider the placement, massing, and orientation of the building itself as a strategy to mitigate blast impacts due to the characteristics of explosive pressure waves. For example, oblique angles and low-rise construction components may help to mitigate blast risk on sites that cannot achieve the desired standoff.

INNOVATION

Thoughtful programming of the ground floor spaces in a federal building can help alleviate some risk factors, improving the security perimeter for the facility's federal customers. Carefully siting or relocating high-risk functions and reserving the ground floor for low-occupancy use can mitigate a certain amount of potential risk. If a building contains particularly high-risk areas, consider locating these within hardened walls inside the building itself, thus increasing achieved setback and buffer space between potential risk factors and the protected use.

Where possible, building entries should be limited to centralize security oversight and located to protect against forced entry. Accessible entries should be located as close as possible to the building's main entry.

Coordinate building hardening with the architect and blast engineer, according to pertinent security criteria.

Zone 6

Management and Building Operations

Consider building occupancy patterns (e.g., M-F 9am-5pm) when assessing risk and countermeasures.

In addition to preventative security design countermeasures, there are a variety of management actions that can help to secure a site and its users. While these may not have the physical presence of hardened barriers or topographic features, in many cases they play a considerable role in security design by proactively anticipating possible risks and removing those risks as much as possible. As Project Teams balance costs, aesthetic impacts, and any gains from traditional security measures, they should keep in mind the strategies listed in this section. Where site conditions and project budget resist any type of physical security countermeasures, these solutions and acceptance of inherent risk may be the only options.

Management and Building Operations Elements/Actions
1. Design for flexibility in building programming and space planning
2. Consider guards and alternative security operations when faced with site and cost constraints
3. Choose no mitigation and accept risk when it is neither practical nor plausible to harden site elements or the exterior of a facility

A regular foot patrol by security personnel helps establish security oversight on a human level. Guards can both meet and greet staff and visitors and learn to recognize unusual circumstances. Their physical presence helps maintain ownership of the site.

ELEMENTS AND EXAMPLES

- 1. Design for flexibility in building programming and space planning**
Reprogramming the location of activities within the facility by shifting high-risk functions to the interior of the site, off-site, or horizontally or vertically within the building can reduce negative impacts should an explosion compromise a facility's structure.

Some operations are more vulnerable than others. For example, a high-risk function should not necessarily occupy the most architecturally conspicuous portion of a facility. The ground floor

perimeter should be reserved for low-risk functions, such as concession services. On-site day care facilities should be carefully placed to maximize protection for young children. For more information, refer to the GSA publication *The Design of Childcare Facilities*.

Building programming and space planning should be flexible, accommodating inevitable change over the life of a facility and adjusting to varying levels of threat. Temporary programming can provide short-term public amenities in space emptied because of vulnerability.

- 2. Consider guards and alternative security operations when faced with site and cost constraints**

Building and security operations may be an effective way to detect, manage, and reduce risk, especially when site constraints and costs limit other possibilities. For instance, on tight urban sites that do not allow increased standoff, enhanced camera surveillance systems or increased frequency of patrols outside the building may be more realistic options. This security solution anticipates risks and relies on trained eyes when no physical solution is feasible.

Operational strategy is not a typical part of the project planning process. However, the Project Team must integrate this approach, as it forms an important part of any comprehensive site security strategy.

- 3. Choose no mitigation and accept risk when it is neither practical nor plausible to harden site elements or the exterior of a facility**

Risk can never be eliminated entirely. If the Project Team determines that a risk cannot be significantly reduced by any reasonable means, then the ISC criteria allow for acceptance of risk. The Project Team has the ability to decide what methods and actions to apply and to what extent.

INNOVATION

Operational measures are the most effective countermeasure if they lead to the discovery and prevention of an attack. Coordinating surveillance, reporting suspicious activity, and maintaining collective “eyes on the street” may deter attacks against a building, as well as personal crime in a neighborhood. Close collaboration among federal security personnel, local police, and neighborhood watch programs would seem to have obvious benefits, yet is practiced less often than it should be.

The more proactive approach is on display at one very busy Department of Defense facility in a tight urban neighborhood. Facility commanders hold regular meetings with both official and unofficial local security organizations, trade information about upcoming events, discuss potential concerns, and maintain quick reporting mechanisms for responding to suspicious activity. This type of coordination expands the capability of the commanders to identify and react to threats before they occur. On a smaller scale, this same innovation can bring similar value to non-defense-related federal properties.



Conclusion

These elements are the vocabulary of site security. The process for successfully introducing them is the subject of the next chapter. Project Teams that understand and implement both will create innovative site security designs that improve the daily life of employees and visitors as they ensure their security.

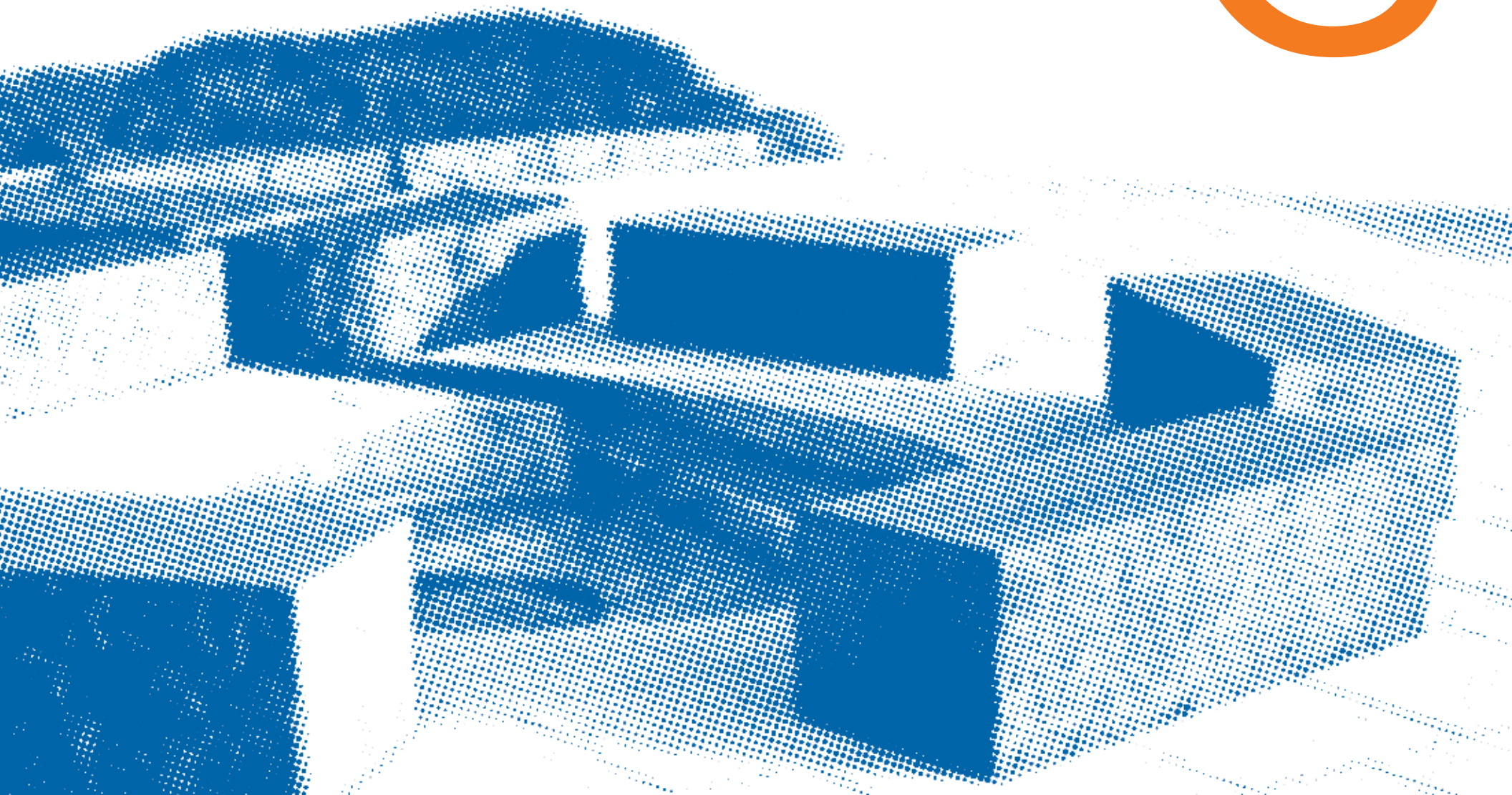


The elements of site security design are nuanced and complex. Their successful implementation depends on the extent to which Project Teams consider their use strategically, comprehensively, collaboratively, and over the long term. In the best projects, which enhance both safety and the quality of the public realm, mastery of these hallmarks is evident.



Chapter 3
The Site Security Design Process

3



Chapter 3

The Site Security Design Process

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The Site Security Design Process

INTRODUCTION

Successful site security design is particularly process dependent because countermeasures can be resource intensive, controversial, or ancillary to a project's original purpose. A careful and calculated process ensures that security concerns receive early and informed consideration and are integrated throughout planning, design, and construction. Such a process puts the Project Team in a strong position to achieve effective risk reduction while meeting budget, schedule, and public space design objectives.

Previous chapters discussed the underlying principles that guide every security design project and the elements and tools available to the designer. This chapter describes how to apply these principles and tools. A hypothetical test case illustrates the recommended process throughout the chapter.

This test case, “Building Renovation/Urban Location: Single Building,” involves typical issues and opportunities arising during the planned security renovation of a large mid-20th century era federal building, located on a compact downtown site, but the procedural steps addressing the conditions of this case are similar to any site security design project. Chapter 4 presents additional test cases of other federal building types.

The process discussion includes detailed descriptions of the unique nature of security decision-making, how security decisions fit into the capital funding process, the roles and responsibilities of Project Team members, and the principles that guide the entire site security design process.

Chapter 1 described the hallmarks that must form the foundation of a successful and well-balanced security project:

- **Strategic Reduction of Risk**
- **Comprehensive Site Design**
- **Collaborative Participation**
- **Long-Term Development Strategy**

At every stage of the process, team members are expected to consider identified risks, operational requirements, and local impacts, to balance safety with cost, aesthetics, public use, and accessibility. Although each person on the Project Team brings unique technical skills, perspectives, and interests to the table, everyone should understand each of the hallmarks and their role in achieving them.

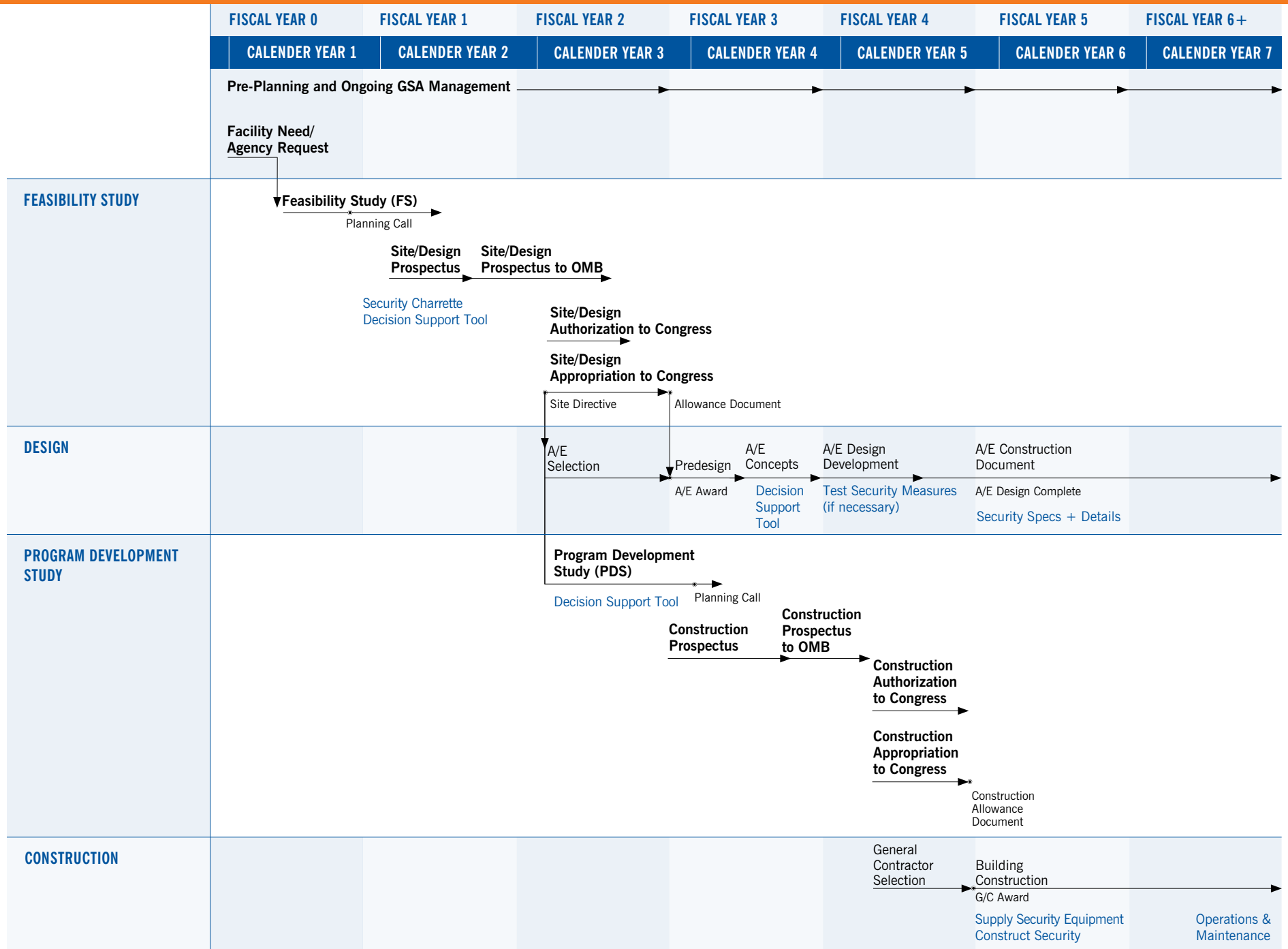
Creative problem solving—and successful projects—are the result when Project Team members share the responsibility to achieve each and every hallmark: when the blast expert understands how his or her recommendations affect comprehensive site design strategies, when the designer understands how his or her scheme supports long-term development of the area, and when the community stakeholder understands how his or her actions can support risk reduction at the federal facility.

OVERVIEW OF THE SITE SECURITY DESIGN PROCESS

Successful site security design comprises eight phases, each an important step toward a design that exceeds the hallmarks of a great project. These phases are summarized below:

- 1. Project Start** focuses on the roles and responsibilities of the Project Team, communication and information sharing, and the decision-making process. The team begins this stage with a sound understanding of the completed risk assessment and its outputs.
- 2. Multidisciplinary Assessment** involves the Project Team using the *zone approach* to assess existing conditions on-site, including security vulnerabilities, context, and design opportunities.
- 3. Site Concept Investigation** involves the Project Team developing, studying, and refining *multiple* alternative concepts for the entire site, in response to their findings from the Multidisciplinary Assessment. For large projects, the team may hold a peer review at this stage to help evaluate the alternatives.
- 4. Site Concept Selection** (Conceptual Strategy Plan) entails the Project Team forming a *single* alternative for the entire site, which comprises the best elements from the Site Concept Investigation. The team may hold a peer review in order to help select the site concept.
- 5. Design Studies for Project Areas** involve the Project Team performing more *detailed design work* on key elements of the Site Concept, whether or not the entire Site Concept is implemented in a single project. The Design Studies begin the detailed design work that produces the final design of the immediate project.
- 6. Final Concept Development** entails the Project Team developing a detailed Final Concept for the project that will proceed forward into construction. At this stage, as part of the Design Excellence process, the team makes its Final Concept presentation to the stakeholders.
- 7. Final Design and Construction Documents** involve the Project Team developing Site Concepts and Design Studies, culminating in the completion of construction documents. The Project Team conducts any testing of security measures at this time. Team members review final drawings and specifications to ensure that agreed-upon security elements are properly represented in the Final Design.
- 8. Project Completion and Operations** entails the Project Team remaining involved, as needed, to respond to unforeseen conditions during construction and to alter the project design if necessary. As the project is completed and put into use, building management and security operations must continually evaluate the function of the physical countermeasures over time and remain committed to the operational security measures that help to form the complete solution.

Exhibit 3.1: Capital Program Delivery Process



Phase 1

Project Start

It is important to lay a solid foundation for effective collaboration before the design starts. This step should begin with a sound understanding of team communication, roles and responsibilities, and the security decision process itself.

Key Points Within Phase 1: Project Start

- Coordinate site security design with the existing project development processes for large and small projects
- Consider previous building risk assessments and recommendations within the context of the present project and all objectives, including both security and design
- Carefully choose team members based on project needs and promote open channels of communication across specialties

SITE SECURITY AND PROJECT DEVELOPMENT

Developing site security within the context of GSA's project development process requires an understanding of the capital funding process, the design and construction process, and the security and risk assessment process (see Exhibit 3.1).

This chapter applies to large, Prospectus-level capital projects (i.e., projects that must be authorized by Congress), as well as smaller projects that are authorized and funded locally. Regardless of size, it is critical that all projects establish a comprehensive planning approach that views the site, the building, and the neighborhood as fundamental parts of an integrated fabric.

Large, Prospectus-Level Projects

Due to the federal funding process, large non-court projects work with design budgets, and court projects work with design and construction budgets, that the Project Team establishes in a **Feasibility Study** as early as two years before design begins. Construction budgets for non-court projects are later scoped as part of a **Program Development Study** (PDS), while courthouse construction budgets are sometimes adjusted through special studies. In either case, the construction budget typically is set two or more years before construction begins.

The budgeting stages can be considered as an expanding cycle. Each considers similar aspects, but the amount of analysis and specificity increases as the project gets closer to construction.

Smaller, Non-Prospectus-Level Projects

For smaller projects, on the other hand, GSA's Regional Offices can scope and fund a project rather quickly, as part of the annual renovation budgeting process. Unlike Prospectus-level projects, the construction budget for smaller projects is generally finalized after design is complete.

One distinction between large and small projects is the effort to ensure effective, multidisciplinary input into the design process. Because budget parameters for large projects are set years before design and construction begin, Project Teams must make special efforts to include in-house design and security expertise at the budgeting stage, even before designers are hired. At the other end of the spectrum, because small projects can be shaped and changed so quickly, the Project Team must be careful to ensure that multidisciplinary input occurs at the very beginning and is maintained throughout the project's development.

Site Security Design Process: Non-Prospectus-Level Project Timeline (9-15 months)



Site Security Design Process: Prospectus-Level Project Timeline (6-7 years)



Regardless of project size or budget, teams should consider aesthetic, functional, and security-related issues in the development process simultaneously. At a minimum, this comprehensiveness keeps security aligned with other project parameters.

There are quantitative reasons, as well. Security elements can represent a significant portion of a project's budget. Leveraging their functionality with other goals is necessary to maximize the investment in a facility. Additionally, funding realities may call for phased implementation of security and other improvements over several smaller projects, perhaps over several years. A flexible approach is necessary to ensure that each phase accomplishes some of the major goals outlined for a site. All changes to the site must be implemented as part of a larger vision that supports its desired use and overall attractiveness.

For detailed guidance on Prospectus-level project development and funding, see GSA's Project Planning Guide.

Designers on GSA projects must follow the standards dictated in GSA's Facility Standards for the Public Buildings Service (P-100). This document is updated regularly and contains detailed design provisions that impact many aspects of site security projects.

Past risk assessments are never the final word in a site security project. GSA seeks to accommodate all project goals, but retains the right to not implement a recommended countermeasure when doing so would have a significant adverse impact. Such decisions require close consultation with the Department of Homeland Security (DHS).

GSA DESIGN EXCELLENCE PROGRAM

Through the Design Excellence program, GSA produces quality public buildings that reflect the dignity of the federal government. Design Excellence emphasizes the following goals, which have a significant positive impact on the success of site security design projects, both large and small:

- Determine the best architect/engineer (A/E) selection for each project, maximize the potential for architectural design excellence, and provide peers of national renown to review project progression;
- Ensure compliance with project budget and schedule mandates and the analysis of critical building systems; and
- Support community development goals, effective sustainable design strategies, and current security standards.

The security and design needs of a project should be integrated into all Design Excellence activities, from selection of the A/E team through design charrettes and peer reviews, to achieve the highest-quality outcome.

RISK ASSESSMENTS AND SECURITY RECOMMENDATIONS

DHS's Federal Protective Service is responsible for conducting risk assessments of all federal buildings on a regular basis. DHS conducts its risk assessment based upon the actual or perceived **threat** to the building (the events that must be defended against), the **vulnerability** of that building (the susceptibility to the threat), the **consequences** if an event should occur, and the **probability** of that event based upon a variety of factors. Then, with stakeholder input, DHS provides a final report with recommended countermeasures.

Depending on the nature of the project, the detailed security analysis process may include representatives from the U.S. Marshals Service (for courthouses) and specialized security contractors to conduct more technical studies. GSA representatives and members of the Building Security Committee are also included in the process.

Since such important and influential security assessments are made before design begins, without reference to any information about the project, Project Teams should revisit such assessments in this phase and plan to update them in Phase 2: Multidisciplinary Assessment.

In doing so, Project Teams should remember that GSA reserves the right to not implement a recommended mandatory measure as per the *GSA/DHS Memorandum of Agreement, June 2006*. Such a decision would be made only after consultation with DHS and only after written notification to DHS of the final decision. The final authority in this case rests with the appropriate GSA Assistant Regional Administrator (ARA) for the Public Buildings Service. Ideally, and far more often, DHS and GSA can reach consensus regarding the appropriate countermeasure as part of an effective design process.

GSA has created a number of tools to help Project Teams navigate the tradeoffs inherent in site security design projects. The GSA Security Charrette (described in detail on page 85) is a new tool created to support the multidisciplinary approach envisioned in the ISC criteria. Recommended for initial use during the Feasibility Study, it can also culminate the Multidisciplinary Assessment phase. The ISC Implementation Checklist, the Decision Support Tool for

GSA Security Analysis Tools

GSA and its partner agencies have developed many tools and techniques to support better security for GSA buildings, as well as the expertise to apply these tools to GSA projects.

The following tools are available through GSA's Office of the Chief Architect to those involved with appropriate projects. The use of these tools requires the input of security consultants, including representatives from DHS's Federal Protective Service (FPS) and blast consultants.

ISC Security Charrette Guide

The ISC Security Charrette Guide is intended to assist GSA Project Managers and the Building Security Committee in planning and conducting a Security Charrette. It is intended to be of greatest assistance for the Feasibility Study phase, but is useful throughout the project development process.

ISC Security Design Criteria Implementation Checklist

This checklist assists GSA Project Managers in the implementation of the Interagency Security Committee (ISC) Security Design Criteria during the project planning and design phases of all new U.S. courthouses, new federal office buildings, and major modernization projects.

Decision Support Tool for the ISC Security Design Criteria (DST-ISC)

DST-ISC is a GSA computer program designed to aid decision-makers in the application of the ISC Security Design Criteria. The program contains questions on target attractiveness, collateral damage, and impact of loss, which it uses to determine the required Level of Protection of a facility. The **DST-ISC** encourages judgment calls and a strategic approach to risk reduction, including acceptance of some risk in light of tradeoffs. It is important to note that the **DST-ISC** does not replace or supersede the DHS-produced risk assessment, but is a tool by which GSA decision-makers can evaluate countermeasures.

Computer Modeling of Hazards and Impacts

GSA and its consultants employ a variety of proprietary computer programs to assist in security assessments and countermeasure analysis. Two of the most prominent for GSA projects are **WINGARD (WINdow Glazing Analysis Response & Design)** and **STANDGARD (STANDARD GSA Assessment Reporter & Database)**, which determine potential hazards from explosions and assess vulnerability.

Though sensitive information is a reality in site security projects, it should never pose a barrier to true collaboration. Most information designated “For Official Use Only” can be shared with project stakeholders. Indeed, such cooperation is essential where projects will significantly impact their surroundings.

The ISC Security Design Criteria Implementation Checklist (found in Table 2, Section 401000-A/E Selection Process of the ISC Security Design Criteria) is an excellent resource when developing a scope of work and selecting an A/E consultant. This tool is available from the Office of the Chief Architect.

the ISC Security Design Criteria (DST-ISC), and computer modeling tools are also available to support the process. The GSA Project Manager should become familiar with these tools and endorse their use by the Project Team.

COMMUNICATION AND INFORMATION SHARING

As asserted throughout this *Guide*, a collaborative process is fundamental to good decision-making. Of course, security experts, designers, and other stakeholders cannot provide meaningful input without comprehensive information sharing. Due to the sensitive nature of security assessments, however, this does not always happen.

While it may be inappropriate to share some sensitive security-related data with all parties, this should never get in the way of true collaboration. Information that is designated “Law Enforcement Sensitive,” for example, would be available only to those with the proper clearances. But on most federal projects, the information sufficient to weigh various alternatives would be designated “For Official Use Only (FOUO).” This information should be available to all of those involved in project decisions, including tenant agencies, consultants, and local officials.

In fact, the responsibility to share information with outside stakeholders increases where the envisioned countermeasures would have significant impacts on the surrounding neighborhood. For example, it is crucial to include outside stakeholders in discussions about setback distances, road closures, site amenities, and perimeter security. In these cases, sensitive building engineering studies or information about specific threats may be withheld, but the stakeholders must have enough information to understand the vulnerability that the team is addressing and the recommended countermeasures.

The GSA Project Manager must ensure that sensitive information is not released inappropriately, while supporting meaningful collaboration with effective information. This is necessary both to make good decisions and to gain buy-in on decisions that may be controversial.

TEAM ASSEMBLY AND RESPONSIBILITIES

Selecting the right team members and consultants based on a project’s scope of work and particular characteristics is key to a successful project. This requires some homework. Although the design community has focused attention on security for several years, there remains a relatively limited number of completed projects that illustrate best practices. As a result, most firms do not have the background needed to lead successful, well-balanced security projects. Project leaders must be selective to ensure that the chosen consultants possess the right expertise.

As shown in Project Start: Team Roles and Responsibilities, each team member brings a focused area of expertise to the project and accepts the corresponding responsibilities. Beyond the technical skills that each party contributes to the process, however, it is their participation in the rigorous, deliberative, design process *with each other* that yields the greatest value.

In order to deliver successful, holistic projects, each team member should share a sense of responsibility to meet each and every goal for the project. For example, blast experts should seek to provide a flexible range of alternatives that can support various site design concepts and daily use of the site. Designers should develop schemes that support a long-term vision for the site, beyond their immediate project. And local stakeholders who are responsible for neighborhood development should accept the need to reduce risk at the federal facility so that they can offer supportive solutions.

In light of this, it is important to remember that the *Guide’s* recommended security design process might be a new experience for most team members. Designers and local stakeholders are likely to have limited experience with federal security decision-making, while experienced security professionals may have limited experience making these decisions as part of a collaborative design process. For the Project Team leader, it is important to understand this and to lay out clear roles and responsibilities.

Project Start: Team Roles and Responsibilities

ROLES	PRIMARY RESPONSIBILITIES
DHS Security Experts	<ul style="list-style-type: none"> Conduct building risk assessments for all GSA buildings, on a cyclical basis, prior to Project Starts. Advise design teams on ISC criteria.
Security Consultants	<ul style="list-style-type: none"> Perform technical blast, glass fragmentation, and progressive collapse analysis to support risk assessments and analyses. Conduct modeling and special studies, as needed, to support design efforts. Provide technical expertise to prevent overscoping of countermeasures and unnecessary costs.
Building Security Committee (BSC)	<ul style="list-style-type: none"> Represents each agency in a federal building. Considers DHS risk assessments and has decision authority over “optional” countermeasures.
GSA Project Manager	<ul style="list-style-type: none"> Leads Feasibility Study and Program Development Study teams to set scope and budget for large projects. Leads the Project Team (both GSA staff and contractors) for design and construction phase work.
GSA Property Manager	<ul style="list-style-type: none"> Identifies general facility needs and functions, as well as maintenance and operations impacts of proposed countermeasures. Occasionally leads projects for small, temporary countermeasures.
GSA Subject Matter Experts (including Office of the Chief Architect staff)	<ul style="list-style-type: none"> Advise development of scope, project schedule, and budget. Provide design expertise prior to procurement of consultants.
Design Firms	<ul style="list-style-type: none"> Lead landscape, architectural, and urban design efforts to design effective, balanced countermeasures. Lead efforts to develop the Multidimensional Assessment and Site Concept Plan early in the design process.
Local Stakeholders	<ul style="list-style-type: none"> Identify neighborhood plans, opportunities, and concerns related to urban design and countermeasures. Provide desired or required support for some countermeasures.
All	<ul style="list-style-type: none"> Support the assessment and design evaluation. Review the construction documents. Collaborate and communicate.

At this point in the project, the team is small. It will expand over time as the project develops. Keeping a clear record of project decisions will minimize unnecessary repetition of work between phases and as participants come and go over the life of the project.

Phase 2

Multidisciplinary Assessment

The Multidisciplinary Assessment phase has the most significant, lasting impact on the overall success of a site security design. It lays the foundation for the entire project, including both security strategies and all other potential site improvements that are necessary to create a high-quality public space. The activities that compose the Multidisciplinary Assessment begin during the Feasibility Study and Program Development Study (PDS) stages.

This phase is the most fundamental in shaping a creative, comprehensive, balanced design solution. And, it is often the longest.

In this stage of a project, security experts complete their risk assessments as design experts and others complete their assessment of project opportunities and constraints. During this phase, all Project Team members frequently share and discuss their findings and progress both formally and informally.

This *Guide* emphasizes the importance of the Multidisciplinary Assessment because many types of expertise are required to fully understand existing conditions, constraints, and opportunities. Throughout this process, it is especially important that each team member shares the responsibility to meet all project goals, in all zones.

Key Points Within Phase 2: Multidisciplinary Assessment

- Analyze security vulnerabilities, site context, and opportunities throughout the entire site, using the *zone approach* to ensure a comprehensive view
- Assess security needs while heeding design opportunities, assess design needs while keeping in mind security opportunities; this is the foundation of the Multidisciplinary Assessment

COLLABORATIVE, COMPREHENSIVE APPROACH

The zone approach provides a common framework to assess existing conditions, including security vulnerabilities, site context, and opportunities. As described in Chapter 2, Project Teams consider each site in terms of six different zones (see Diagram 3.1), each of which plays a particular role in overall security design. Solutions that consider the importance of each zone can meet the required level of protection creatively and comprehensively. Team members should keep in mind that a successful site security solution never exists solely in one zone and must function across all zones.

With Prospectus-level projects, there may be a significant amount of time between when the information used for the Multidisciplinary Assessment is collected and the start of design. Meanwhile, risk assessments are performed on a cyclical basis, independent of capital improvements. Similarly, GSA portfolio evaluations, facility assessments, master plans, and other studies may be conducted independently of the site security project.

Project Teams must be vigilant to ensure that the information they use is complete and current. The benefits of previous assessments, whether of risk, facility condition, or other project aspects, should not be lost, but should be examined in the context of their purpose and date. All information should be assessed for current relevance as the project moves forward.

Team members on large projects should meet frequently during this stage to ensure adequate discussion across disciplines so that consultants are up to date and informed when they join the project and begin work. Project managers play an instrumental role in supporting such collaboration and sharing. Projects that fail to achieve

a comprehensive assessment risk incorrect scopes, insufficient budgets, and design solutions that lack imagination and innovation.

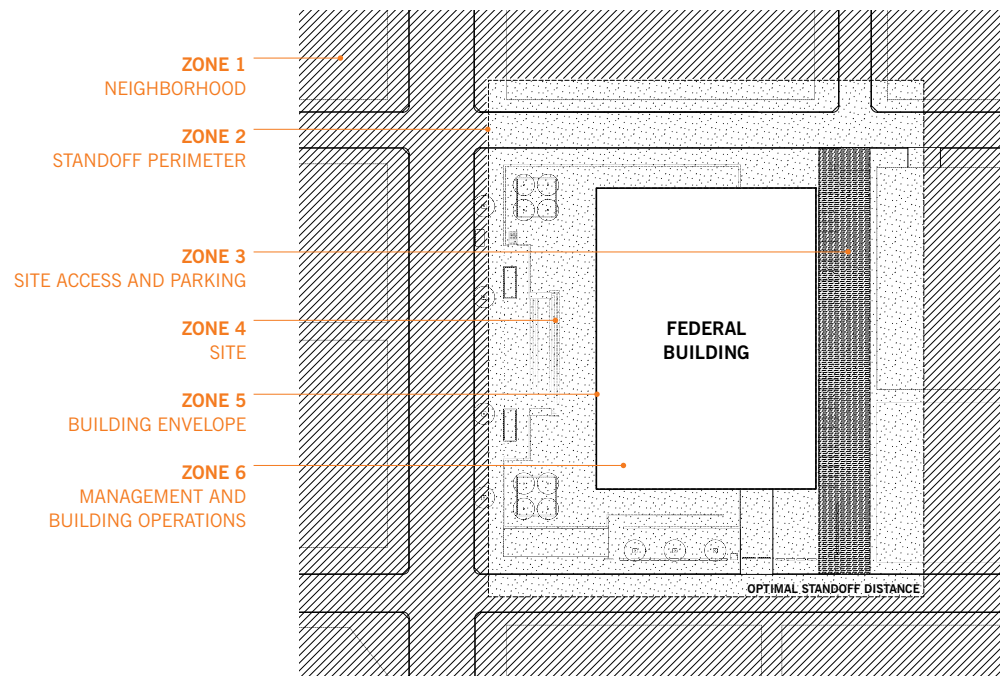
Smaller projects below Prospectus level may have an advantage in this regard. Their typically tight time frames ensure that the knowledge gained during a Multidimensional Assessment more easily stays with the project. Yet they present their own unique challenge to the goal of creating a comprehensively designed site.

Since this type of project typically deals with a smaller scope and, perhaps, a smaller portion of the site, Project Teams must ensure that the Multidimensional Assessment evaluates such a project in light of its impact on the entire site, and as one step toward a greater, holistic solution. Previous and future projects should build upon each other in an evolutionary way, developing a better facility according to a long-term vision. As Project Team members assess security and design, they must consider smaller projects as an integral part of a long-term development strategy.

Whatever a project's size, the Project Team must begin by looking at the many aspects that directly and indirectly impact overall design of site security. An example is shown in Diagram 3.2, in which the site's existing conditions are analyzed and documented graphically on a site plan. This information is shared among the team members. To aid in visualizing the example, photographs of buildings of a similar scale and architectural style have also been provided (see page 82).

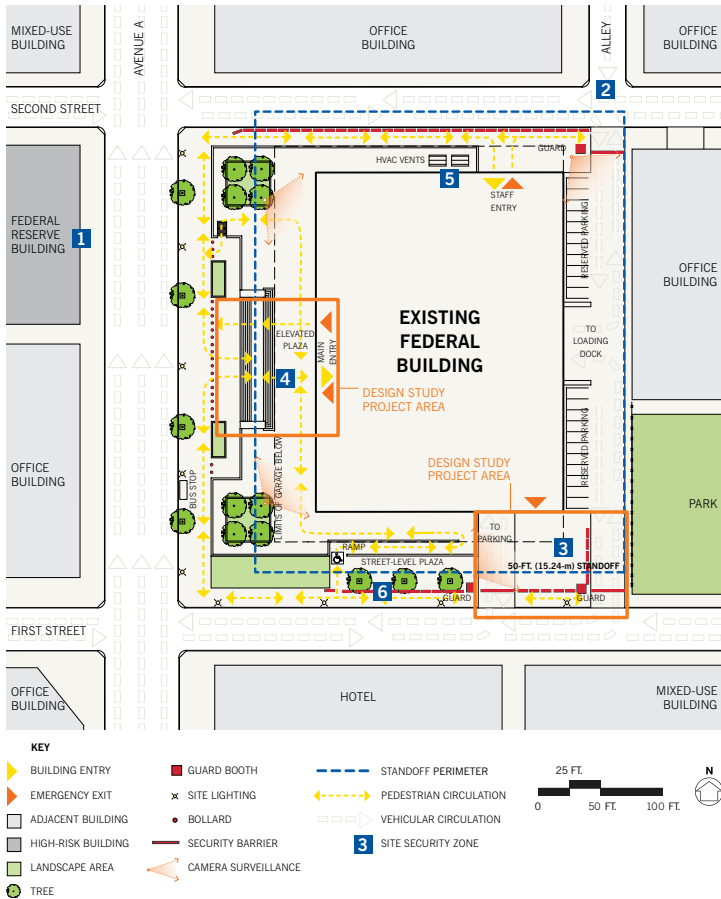
The activities in this phase include site visits, preparation and review of risk assessments, review of existing GSA studies and documents, and collection of information from other sources, as well as meetings with stakeholders to understand the broader opportunities and requirements for the project. This section provides a checklist to guide this assessment process (see page 87), plus a list of team roles and responsibilities (see page 89).

Diagram 3.1: Site Security Zones



Teams should use the zone approach discussed in Chapter 2 as a framework for the Multidisciplinary Assessment. Each zone may contribute to overall site security, while providing opportunities to enhance the site's function and appearance.

Diagram 3.2: Existing Conditions/Site Context Plan



Test Case Assumptions

- 1 The Federal Reserve building on Avenue A desires enhanced security because of the vulnerability of its lobby area.
- 2 An alley with one-way vehicular circulation dead-ends into the site, across from the north entry to the loading dock.
- 3 The loading dock and the underground parking garage servicing the building both have access from First Street.
- 4 The main entry to the building is not clearly delineated, and crowding occurs at the elevated plaza, as visitors wait to pass through security screening.
- 5 There are exposed HVAC vents/air intakes accessible from the elevated plaza.
- 6 During a heightened security alert, temporary barriers were placed on the street-level plaza and have not been removed or replaced with permanent security fixtures.

The building used to illustrate the site security design process in this chapter is an urban high-rise built between 1955 and 1975. Its site plan shows conditions typical to many federal buildings now undergoing site security planning. The building sits upon a plinth, with stairs leading from the sidewalk to a large plaza at the building's entry. Buildings of this era often have unattractive temporary barriers in place and large public plazas in need of general improvement.

The Project Team uses photos of existing conditions and an annotated site plan to document their initial site analysis.



RISK ASSESSMENT

A DHS physical security specialist performs the risk assessment and analyzes threats (actual or perceived), vulnerability of sites and buildings, consequences, and probability of occurrence. This risk assessment considers Design Basis Tactics and Levels of Protection in making recommendations for Design Criteria. Other stakeholders provide additional considerations and contribute to the definition of protective measures. The activities and the products of this process guide all subsequent site security design.

On some projects, especially smaller ones or modernization projects, a completed risk assessment may already be available; Project Teams should ensure that this assessment is current. For other projects, a new risk assessment is prepared or a completed risk assessment is updated. In every case, security experts in conjunction with the larger Project Team examine the risk assessment within the broader project context. In every case, the analysis of security issues must heed the latest ISC criteria.

There are three key outcomes of every DHS risk assessment:

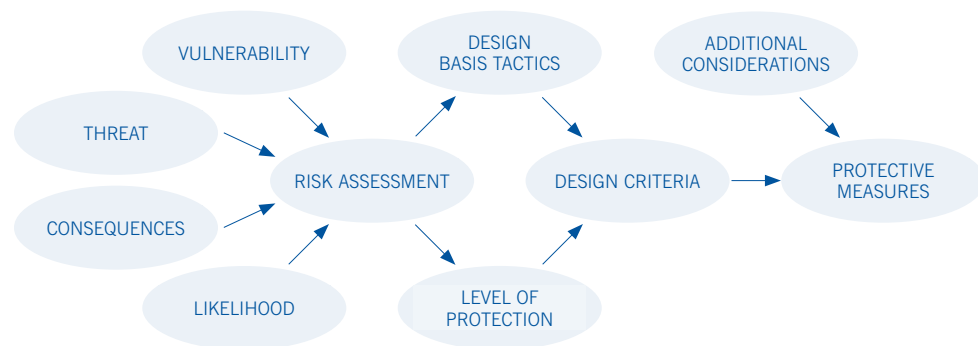
- 1. Design Basis Tactics** identify the specific acts and methods that the building and site's countermeasures must protect against and form the basis for the site security design. The ISC criteria define the specific Design Basis Tactics for a particular building, as part of the overall risk assessment. Typical Design Basis Tactics may include an explosion of a defined intensity at a defined distance from the facility (impacting the building's envelope and structural system) or a vehicle of a defined mass and speed that may be used to ram the facility (impacting the building's perimeter barrier system).
- 2. Level of Protection** defines the performance that each affected building system requires. These performance levels are defined as Minimum, Low, Medium, or High and pertain to all affected systems, including glass, structure, and other components. The required performance may vary from one system to another within the same building, based on the specifics of each building.

- 3. Design Criteria** define the design direction that emerges, based on inputs from the risk assessment, consideration of the Design Basis Tactics, and the required Level of Protection. These Design Criteria are very cursory and defined without consideration of other factors, such as cost, impacts on their surroundings, or creative alternatives. It is the responsibility of the design team to consider the Design Criteria, understand the Design Basis Tactics and Levels of Protection that shaped them, and provide effective and balanced design solutions that respond to them.

Teams must analyze all information through a multidisciplinary approach so that the interactions and impacts of various aspects of the project are well understood and addressed from the beginning. In past projects, separation of security specialists and designers during the assessment stages has resulted in less-than-ideal solutions, delays, or increased costs.

Diagram 3.3: ISC Security Decision-Making Process

This flow chart illustrates the main inputs and outputs in the security decision-making process, as outlined by the Interagency Security Committee. These outputs serve as the basis for additional analyses by the Project Team and the subsequent design of protective measures.



Risk assessments also include two types of recommendations for protective measures:

- **Optional Countermeasures.** Actions that the risk assessment designates as “optional” are those addressing low or moderate risks where the ISC does not establish minimum performance requirements. These can be approved or rejected at the discretion of the Building Security Committee (BSC), typically with each agency housed within the building casting one vote.
- **Mandatory Countermeasures.** Where the risk assessment identifies high-risk conditions that must be addressed, it defines “mandatory” countermeasures. The DHS inspector briefs the parties involved and offers a range of alternatives, where possible. The appropriate party, subject to funding availability, must take these recommended actions. To encourage resolution, DHS tracks the status of mandatory measures until they are complete.

Understanding the relation between Design Basis Tactics and protective countermeasures is crucial to creative problem solving. This is because design can be used not only to respond to the required Levels of Protection, but also to *modify* the Design Basis Tactics. In turn, this can open up new options to achieve the required performance.

For example, the Design Basis Tactics might assume that a vehicle of a certain size and speed has the potential to ram a perimeter barrier system. In response, the initial Design Criteria may recommend that the perimeter barrier be designed to allow *no penetration* into the site by that design basis vehicle. The design team could choose a perimeter barrier system to withstand a head-on strike by the design basis vehicle and ensure no penetration into the site. However, this response to the design basis vehicle’s mass and speed likely would require a very robust system, and site context, budget, or underlying conditions may make this solution undesirable for non-security reasons.

Alternately, the team may choose to design the site and its surroundings in such a way that addresses the underlying assumptions of the Design Basis Tactics and modifies the Design Criteria. The design could prevent the design basis vehicle from reaching the perimeter of the site or from reaching the design basis speed.

As a result, the perimeter barrier system could achieve the required performance level of the bollard system with a less robust construction. This more creative approach offers more design options with significant opportunities to improve cost, compatibility, and effectiveness.

The Security Charrette (described in detail on page 85) is an important step in developing such innovative solutions. This is a recently developed process that is intended to support the Multidisciplinary Approach envisioned in the ISC criteria. Some projects may warrant a standalone Security Charrette that is devoted solely to security issues and countermeasures. This standalone approach allows for candid discussion of the most sensitive security issues and for highly technical engineering problem solving, which may not be appropriate for the entire Project Team. For less complex projects and issues, or at later stages of design, the Security Charrette should be combined with a more comprehensive design workshop.

The Security Charrette initiates the kind of well-informed discussion and give and take needed to develop a good solution that balances all of the competing facets of a project.

The Security Charrette

The ISC criteria direct that security decision-making should be a multidisciplinary effort. The use of a Security Charrette, as part of the Multidisciplinary Assessment, is a technique to encourage collaboration.

A Security Charrette brings together the Project Team in a structured forum to develop reasonable, holistic, and conscientious security decisions. The Security Charrette is appropriate for projects of all sizes. At a minimum, it should first occur before a project budget is established (i.e., during the Feasibility Study for large projects). Charrettes may be repeated at other key stages in the project development, whenever important decisions arise. The typical Security Charrette is a full one-day event, but complex projects or issues may require more time.

In order to support a meaningful discussion of alternatives, the Charrette makes use of already completed technical studies and special tools. In addition to the DHS risk assessment, these may include other DHS analyses, blast and related studies provided by contractors, and GSA's **Decision Support Tool for the ISC Security Design Criteria (DST-ISC)**. During the Charrette, the Project Team considers study findings, reconciles differences, and begins to form an overall security strategy for the site.

If at the time of the Security Charrette the Project Team has not yet completed comprehensive design concepts, the findings from the Charrette should be thought of as general directives and performance requirements. Creative solutions and detailed alternatives analysis will occur during the Site Concept Investigation Phase. As suggested above, additional Security Charrettes may be held during this phase to aid in decision-making.

Regardless of the Security Charrette's timing, the discussion should include consideration of wider design issues and facility needs, beyond security alone. It should incorporate information from the design assessment, discussed later in this section, as much as possible.

This multidimensional aspect is what sets the Security Charrette apart from the initial risk assessment and is why it is important to include a broad range of participants. Among them should be the following representatives:

- GSA Project Manager
- GSA Property Manager
- GSA design resource (from OCA or GSA Regional Office)
- GSA Regional Historic Preservation Officer (when applicable)
- Design consultants (architect/landscape architect/engineer), if hired at this stage
- DHS representative
- Building Security Committee members
- Local law enforcement official
- Local fire/HazMat official
- Local building code official
- Local city and neighborhood planners
- Feasibility Study team members
- Security/safety consultants, specialists, and engineers (if not included on the Feasibility Study team), such as
 - Blast consultant
 - Security consultant
 - Cost estimator
 - Electronic security and communications specialist
 - Engineers: structural, mechanical, and electrical
 - Fire protection consultant
 - Chemical, biological, radiological (CBR) consultant
- Recorder/DST-ISC operator

DESIGN ASSESSMENT

Just as the security-focused aspects of the Multidisciplinary Assessment weigh the role of design, Project Teams must keep security functionality in mind as they assess the site's everyday use and the facility's relationship to its neighborhood.

In other words, though typically led by a design firm, the site and design components of the assessment receive input from the full Project Team and outside parties, including other federal agency partners, professional peers, security experts, and local officials. The team conducts a detailed site investigation of each zone to examine the full range of existing conditions and opportunities. They also review GSA P-100; ISC criteria; and other policies, guidance, and regulations and identify requirements relevant to the project.

The team researches potential site elements that may contribute to the security design or existing elements that can be enhanced or removed to achieve the desired level of security. They also look closely at neighborhood context, building styles, materials, and local plans so that security is well integrated into its surroundings. (See the Checklist for Site Security Design Issues on page 87.)

These early investigations identify opportunities for multifunctional security elements and site improvements that enhance both the use of the site and its security. For example, if the circulation routes into and out of the site are no longer sufficient to handle current traffic volumes, they might be rethought to achieve more efficient flow, while preventing direct vehicular approach. Or, plans for improved perimeter security measures might be advanced along with an effort to improve public space amenities.

In addition to identifying opportunities to advance security and urban design interests, the assessment must flesh out underlying conditions (such as subsurface characteristics) and other site constraints that will impact implementation.

At this stage, countermeasure decisions should still be “penciled in,” to allow flexibility and communication of internal and off-site tradeoffs as these initial ideas are shared with the entire Project

Team. This enables subsequent multidisciplinary discussion to focus on tentative ideas, with the understanding that they are still in flux and should change to best balance all goals for the site.

As various subteams complete each aspect of the Multidisciplinary Assessment, a workshop or series of meetings provide the setting for the entire Project Team to review all findings and discuss how these create opportunities and constraints for the project. These face-to-face meetings enable ideas to be developed, evaluated, and refined “live” with questions, explanations, and contributions from the full team. This discussion, with all parties at the same table cooperating, is the essential aspect of a successful Multidisciplinary Assessment phase. Its outcomes, which may be represented as in Diagram 3.4 (page 88), form the basis for concept design in Phase 3.

By the end of Multidisciplinary Assessment, all Project Team members have an understanding of both the security and design opportunities of the site, and these are inherently interwoven. The products of this phase, which carry forward into subsequent phases, include the following:

- Risk Assessment:
 - Design Basis Tactics
 - Level of Protection
 - Design Criteria
 - Operational and Mandatory Countermeasures
- Preliminary Budget, Including Security Line Items
- Project Schedule
- Analysis of Neighborhood Opportunities and Constraints
- Site Analysis Summarizing Opportunities and Constraints:
 - Utilities Plan
 - Transportation and Circulation Plans
 - Existing Topography, Vegetation, and Boundaries
- Analysis of Existing Building and Structures
- Program of Requirements for New Construction

During the Multidimensional Assessment, be sure to look at the site in relation to its neighborhood and the city as a whole.

GSA's guide to public spaces, Achieving Great Federal Public Spaces: A Property Manager's Guide, provides a comprehensive audit tool useful for site assessment at existing buildings.

Checklist for Site Security Design Issues

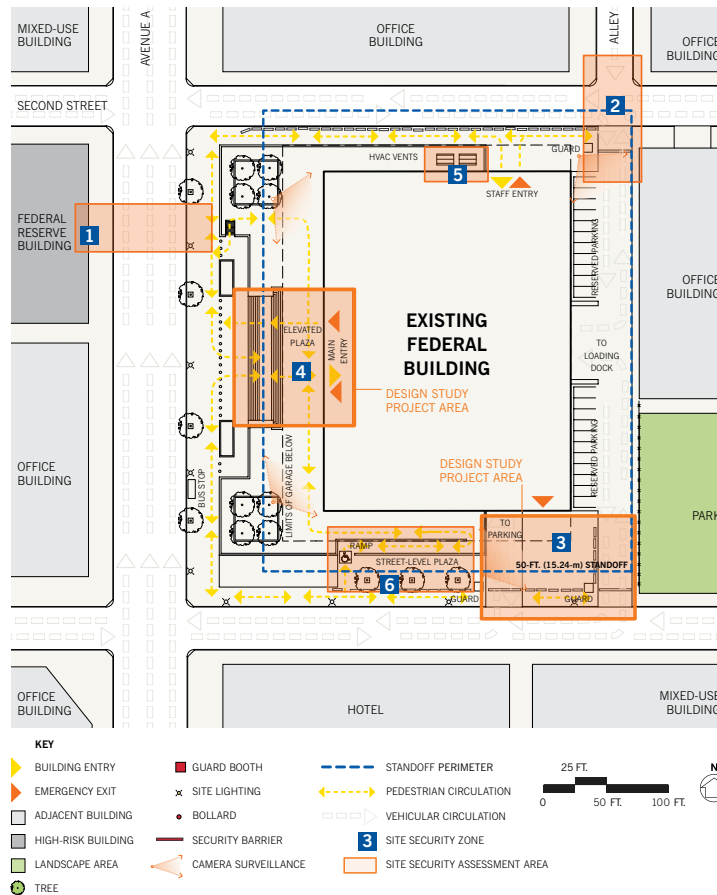
The following represents a typical list of design issues that are examined during the Multidisciplinary Assessment.

This list should be customized for each project:

Local Context	Regional Context Neighborhood Context Architectural and Landscape Context Local Planning Objectives: Land Use, Transportation, Parking, Regulatory Stakeholders Public Space Use and Improvement Opportunities for Public Space Links to Public Transportation Climate/Topography/Orientation Public Process/Input Future Planned Developments
Site	Historic Issues/Significance Circulation (pedestrian and vehicular; on and around site) Adjacent Building Programs and Configurations Existing Site Conditions/Use Underground Conditions/Utilities Existing Site Elements (e.g., parking meters, bus stops, light poles) Easements/Setbacks Access and Approach Vulnerability Environmental Conditions and Opportunities/Sustainability Site Remediation Requirements: NEPA (National Environmental Policy Act) and CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) Room for Growth/Expansion Provision Street Character/Features Vehicular Loading/Parking
Building	Historic Issues/Significance Existing Structural System (existing building) Building Mass/Program Requirements (new building) Lines of Sight Environmental Conditions and Opportunities/Sustainability Vehicular Loading/Parking

This example illustrates one way to represent the outcomes of Multidisciplinary Assessment so that all Project Team members understand the opportunities that security and design present to enhance both. While each project may use a different method of representation, any approach should articulate the characteristics of the site by zone and clearly define security design topics for further exploration. Here, the key issues to be addressed in the site security design are shared security surveillance; loading dock circulation; vulnerability of underground parking; building entry/queuing; HVAC protection; and perimeter security.

Diagram 3.4: Site Security Assessment Plan



Security and Site Design Topics

- 1 A neighboring building with similar security concerns offers an opportunity for partnership and sharing of security resources.
- 2 Direct run up to the entry point at the loading dock presents a risk; an unauthorized vehicle could accelerate to a speed sufficient to force entry.
- 3 When parking is located under a building, that entry point is vulnerable.
- 4 Unmanaged queuing causes congestion and confusion that can make security monitoring difficult and public space less safe.
- 5 Exposed HVAC vents or air intakes are vulnerable to airborne chemical, biological, or radiological attack.
- 6 The temporary barriers at the street-level plaza are not rated to prohibit vehicular approach and have negative off-site impacts on the streetscape and adjacent local businesses.

Multidisciplinary Assessment: Team Roles and Responsibilities

ROLES	RESPONSIBILITIES
Security Consultants	<ul style="list-style-type: none">■ Present building risk assessment to team■ Participate in Security Charrettes and other analyses (e.g., blast, vector)■ Establish Level of Protection (LOP)■ Work with designers; stay creative, flexible
Designers	<ul style="list-style-type: none">■ Review existing conditions■ Evaluate state-of-the-art, best practices■ Create site program■ Address sustainability, cultural, and historic issues■ Participate in Security Charrettes■ Collaborate closely with security consultants■ Remain flexible and explore a variety of alternatives
Building Security Committee (BSC)	<ul style="list-style-type: none">■ Reviews potential security threats with security experts and designers■ Represents tenant and provides feedback to tenant■ Approaches risk management with balance and creativity■ Defines appropriate risk management■ Looks at cost impacts and benefits to all participants
GSA Project Manager	<ul style="list-style-type: none">■ Plans participation■ Identifies issues and project requirements within schedule and budget
GSA Property Manager	<ul style="list-style-type: none">■ Represents operation and maintenance point of view■ Advocates for sufficient budget■ Recognizes broader opportunities for property■ Consults with GSA Regional Historic Preservation Officer■ Coordinates external design review
Local Stakeholders	<ul style="list-style-type: none">■ Provide local knowledge■ Assist with consensus building, through a comprehensive approach and interaction with the Project Team■ Bring additional physical or operational resources to the solution

Phase 3

Site Concept Investigation

The design process is an iterative cycle that posits and tests multiple concepts in order to develop the best approach. It must be dynamic and interactive to be successful.

Project Teams should always consider the costs and benefits of risk reduction as they review initial concepts.

Key Points Within Phase 3: Site Concept Investigation

- Develop multiple concepts that comprehensively address site-wide conditions, opportunities, and constraints identified in the Multidisciplinary Assessment phase
- Collaborate with project stakeholders and peers to examine these concepts, their ability to mitigate risk, and their impact on context

During the Site Concept Investigation, the team develops, studies, and refines multiple concepts that explore a variety of options for the site design in response to the Multidisciplinary Assessment. As in Diagrams 3.5–3.7, each concept shows different strategies to meet the diverse needs of GSA, tenant agencies, and local stakeholders.

Project Team members discuss these concepts, their impacts, and their costs with GSA representatives, the BSC, security experts, other stakeholders, and peer reviewers. As these strategies are evaluated, Project Team members refine the best pieces and parts into new concepts. Project Team members may reevaluate their approach to security a number of times. In doing so, the team develops the most efficient and cost-effective approach to meet the needs of the project. Though the concepts become more refined and specific, they remain dedicated to the original site design strategy.

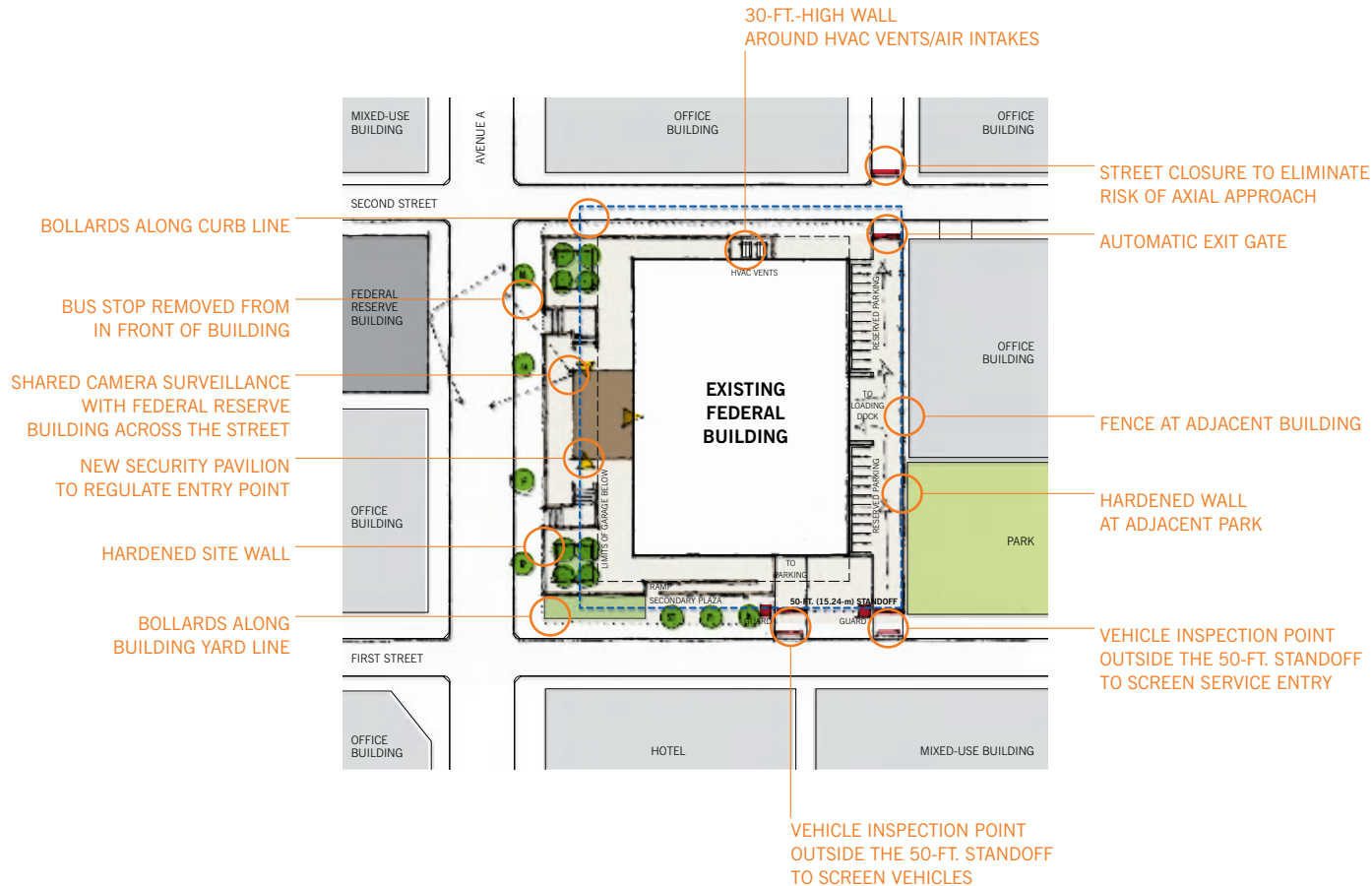
During this stage, fundamental strategies begin to take shape. For example, insufficient standoff distances may require significantly more hardening at a facility than would be required at a comparable facility where more standoff is available. It is important that

Project Teams discuss such matters and options with the blast and security consultants before and during concept development. Spending time and money at this stage can save millions later in the project.

The Project Team must continue to look at the site overall, to ensure that the final design supports comprehensive, long-term site goals. Even where the project itself consists only of a specific area within the site (e.g., a high-priority perimeter), the Project Team must continue to address all aspects of the site. The Project Team will focus on the specific project area only in the last phases of the site security design process, when designers prepare final design and construction documents.

Once the important elements and issues are captured, the design team moves into the next phase of design, incorporating the information gathered from the concept investigations into a single concept for the site.

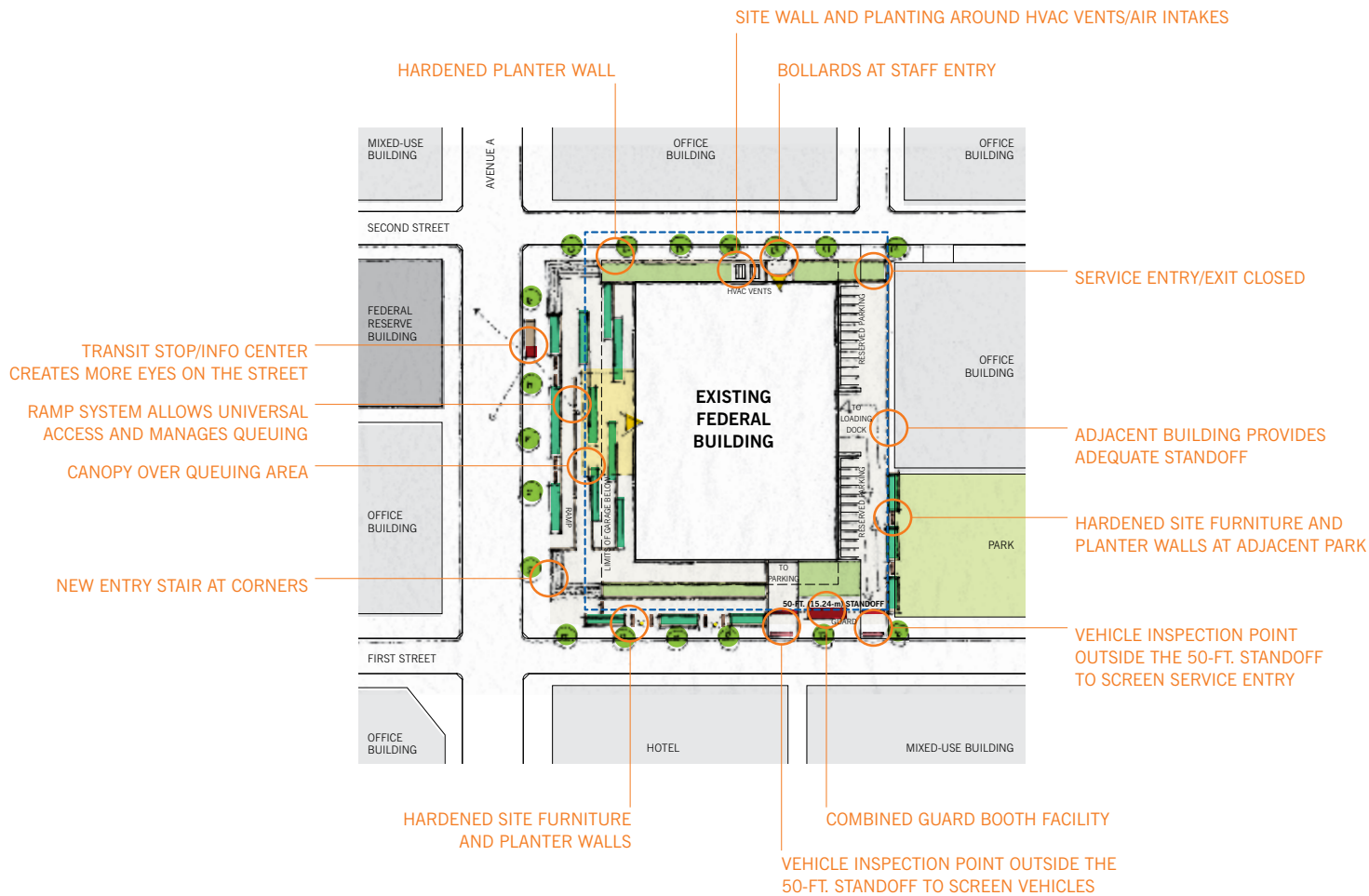
Diagram 3.5: Site Concept Investigation/Scheme 1



In Phase 3, the Project Team designs three concepts (pages 91–93) addressing the site and security needs of a single building in an urban location. Each scheme proposes different strategies, based on the Multidisciplinary Assessment. Stakeholders, team members, and peers review and revise these strategies, leading to a single concept in Phase 4.

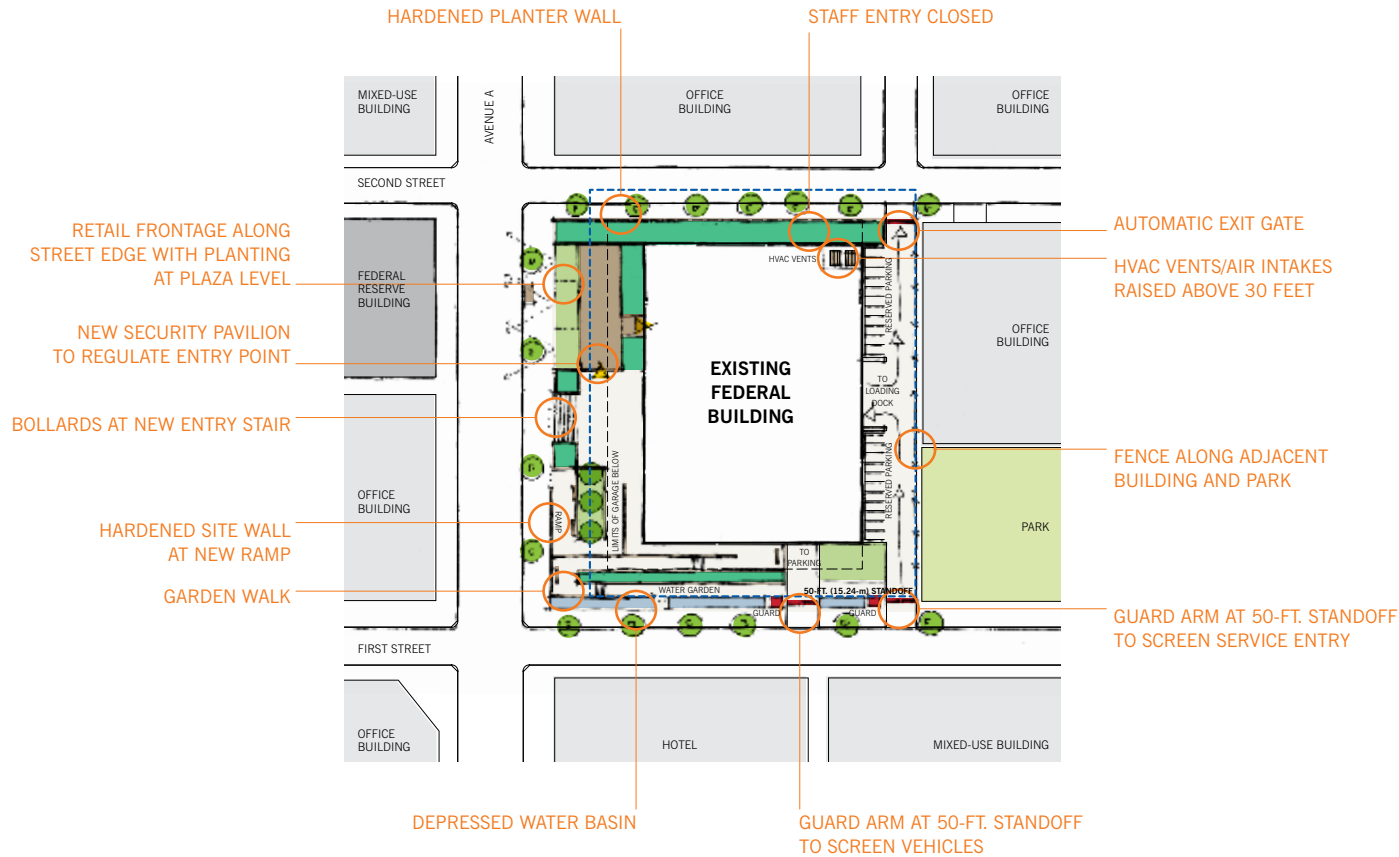
In the first scheme, the proposed security improvements concentrate on establishing a physical standoff barrier at the perimeter of the site. Bollards are suggested as a simple off-the-shelf solution. A site wall is proposed around HVAC vents/air intakes. This scheme also proposes a new security pavilion to regulate entry, provides a queuing area, and shares CCTV surveillance with the Federal Reserve building across Avenue A.

Diagram 3.6: Site Concept Investigation/Scheme 2



The second scheme utilizes security measures to improve the site's existing vehicular and pedestrian circulation. Physical standoff barriers are multifunctional, serving as site landscape amenities and pedestrian improvements. Structurally hardened existing planter walls visually integrate security measures with the site's landscape architecture. New stairs at the street corners eliminate the potential for a vehicle to climb the wide, central stair. A landscaped ramp system with a canopy cover for weather protection provides universal access and manages queuing in an orderly and pleasant manner. In addition, a combined guard booth facility oversees the entrances to both underground parking and the loading dock.

Diagram 3.7: Site Concept Investigation/Scheme 3



In the third scheme, a structure at both the street and plaza levels incorporates retail uses and a new security pavilion, while providing standoff. Retail at the edge of the site provides neighborhood amenities, such as shopping and food service, while reducing the impact on the streetscape of a security setback. The retail structure also includes CCTV to provide surveillance around the building. The security pavilion regulates access to the relocated main building entry. This scheme replaces temporary barriers with a water basin. This moat provides a secure perimeter, while acting as the centerpiece for a public water garden at the sidewalk-level plaza.

GSA's Design Excellence program includes peer review during the Site Concept Investigation phase of the project. This offers an excellent opportunity to explore alternatives and gather feedback on how to integrate security requirements with other project needs.

Site Concept Investigation: Team Roles and Responsibilities

ROLES	RESPONSIBILITIES
Security Consultants	<ul style="list-style-type: none"> ■ Critique concepts, introduce best practices, and provide information and research as needed
Designers	<ul style="list-style-type: none"> ■ Collaborate on solutions ■ Explore options (push the envelope) to find the best solution
Building Security Committee (BSC)	<ul style="list-style-type: none"> ■ Advocates creative and realistic solutions ■ Brings tenant point of view ■ Analyzes operational solutions to balance reduction of risk with cost ■ Reviews recommended changes
Project Manager	<ul style="list-style-type: none"> ■ Ensures that designers and security experts provide creative input ■ Organizes peer reviews to help develop a single, focused concept from the initial concepts
Other GSA Resources Center for Design Excellence (appropriate peers) Center for Historic Buildings	<ul style="list-style-type: none"> ■ Review project, as required, and provide critique to help develop single, focused concept from the initial concepts ■ Review project for Section 106 of the National Historic Preservation Act (NHPA) compliance
Stakeholders	<ul style="list-style-type: none"> ■ Participate in concept review

Phase 4

Site Concept Selection (Conceptual Strategy Plan)

This phase should proceed seamlessly from the previous phase. Here, the design team develops a *single* alternative for the entire site, which comprises the best elements from the Site Concept Investigation.

Key Points Within Phase 4: Site Concept Selection

- Combine best results from site concept investigations into a “hybrid” concept (a Conceptual Strategy Plan)
- Reach consensus on basic strategies for security countermeasures and site improvements
- Begin consideration of budget and phasing to bring the design into built form

The selected Site Concept should be a hybrid, balanced solution that incorporates and refines the most appropriate strategies and design elements from the many site concept studies (see Diagram 3.8). It should consider the entire site to ensure that solutions contribute to its overall improvement. In subsequent stages the Project Team will focus only on the specific project areas defined by the scope.

On smaller projects, the preferred concept can be chosen through informal peer reviews with GSA Regional experts and informed discussions among Project Team members. On larger projects, it is helpful to hold a formal peer review with design peers selected through GSA’s Design Excellence program. They can provide an informed critique and foster discussion of costs and benefits.

Although the Project Team will still refine the selected concept further after this phase, at this point the team should reach consensus on the appropriate balance between security, aesthetics, and functionality. In addition, the team must agree on the fundamental strategy with regard to risk, including consensus about risk acceptance.

Remember that risk can be mitigated and managed, but it can never be eliminated. Since it is not always possible to reduce risk through physical solutions alone, a successful Site Concept may depend on operational strategies, as well. These strategies should be considered an integral part of the risk management strategy and should also be agreed upon at this stage.

Site Concept Selection: Team Roles and Responsibilities

ROLE

All Team Members

RESPONSIBILITIES

- Collaborate to develop a Conceptual Strategy Plan
- Ensure that goals, requirements, and hallmarks (including comprehensive site design and long-term development strategy) are satisfied

Diagram 3.8: Conceptual Strategy Plan

The Project Team combines the most successful elements of the three site concept investigations in an overall Site Concept. In this case, the hybrid scheme balances security measures with site circulation improvements through the use of multifunctional landscape elements.

This concept reflects the specific expertise that each team member provided regarding the tradeoffs inherent in each strategy. The elements in the Site Concept achieve a balance of security, multifunctionality, and appropriateness to site and budget.

The site security design elements incorporated from the three conceptual design schemes comprise the following:

Zone 1: Operational improvements, including a partnership with the Federal Reserve building across Avenue A, provide shared CCTV surveillance.

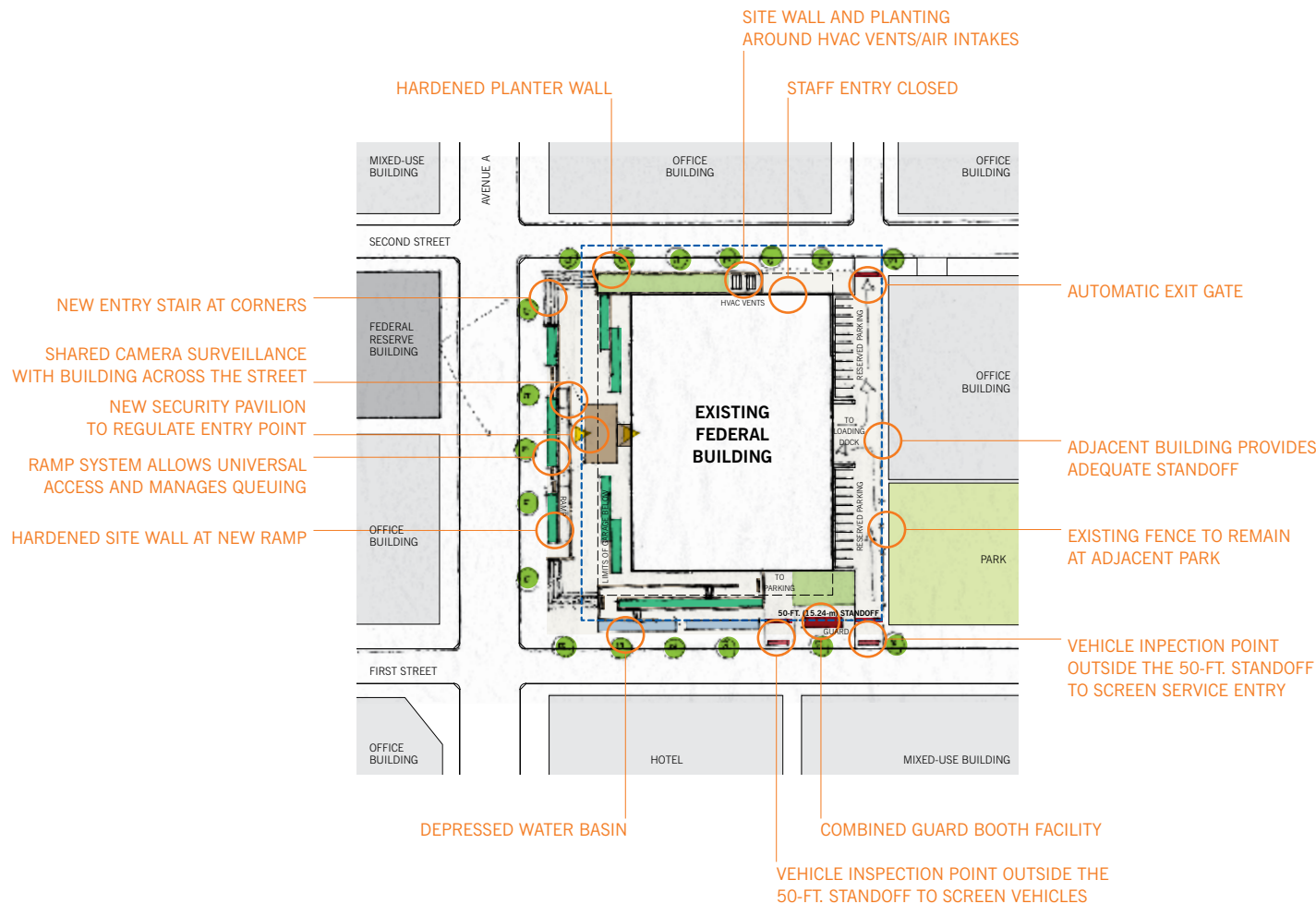
Zone 2: Structurally hardened planter walls provide increased protection from vehicles, while blending into the site's landscape architecture. Physical standoff barriers function as security elements, site amenities, and streetscape improvements.

Zone 3: A combined guard booth facility oversees the entrances to both underground parking and the loading dock simultaneously, reducing the number of required guards.

Zone 4: Existing, wide central stairs are divided and relocated to the street corners; a new axially located security pavilion regulates entry and facilitates queuing; and a landscaped ramp system provides universal access and allows queuing in an orderly and pleasant manner. In addition, a depressed water basin increases standoff, while providing a centerpiece for a public water garden.

Zone 5: Plantings, grates, and filters screen HVAC vents/air intakes, thereby restricting access.

Zone 6: A strategic plan is developed to replace temporary barriers that were placed in haste and have remained for years. The plan includes the removal and disposal of the temporary barriers and replacement with multifunctional barriers. The plan also establishes operations and maintenance requirements for future use of temporary barriers, if necessary.



Phase 5

Design Studies for Project Areas

After reaching agreement on the preferred Site Concept, the design team continues with more *detailed design work* on key elements of the Site Concept. These may involve the more complex or high-priority areas of the overall site. Also, in cases where the entire site concept will not be implemented in a single project, these Design Studies may begin the detailed design work that the team will carry through to final design as part of the immediate project.

Key Points Within Phase 5: Design Studies for Project Areas

- Perform a series of studies exploring different ways to achieve the goals of the Conceptual Strategy Plan
- Consider team expert input regarding the detailed approach for key areas
- Revisit budget and schedule goals and long-term maintenance and operations

Using perspective sketches and renderings, the Design Studies further explore the ideas generated by the Conceptual Strategy Plan (see pages 98–99). The designers must test the Conceptual Strategy Plan against real site constraints and unseen obstacles, such as utility lines or underground vaults, which prevent barriers from attaining the structural foundations necessary to act as effective deterrents. Project Team members may contact additional consultants, such as structural engineers, to confirm site survey information and test assumptions.

The team reviews the Design Studies together and concentrates on important design details, with the larger site goals in mind. For example, in the Site Concept there may be a proposed perimeter wall along a portion of the site. During this stage, the security experts may comment on the likely performance of the proposed wall's construction or anchoring. Urban designers or local officials

may advise on how the wall's details would impact neighborhood design goals.

Project designers provide a range of input on these issues and more, including material choices and information about cost and constructability. Ideally, as part of the discussion, security experts suggest alternatives that meet their performance requirements, while responding to the urban designers' concerns, and vice versa.

Larger strategy decisions are made during concept development in Phases 3 and 4, but this detailed design study phase is necessary to integrate countermeasures into the particular fabric of the site and its surroundings.

Design Studies for Project Areas: Team Roles and Responsibilities

ROLE	RESPONSIBILITIES
All Team Members	<ul style="list-style-type: none">■ Ensure that the design meets site security hallmarks■ Obtain consensus from all stakeholders on a realistic approach to budget, schedule, maintenance, and operations considerations

Project Area Design Studies: Zone 3

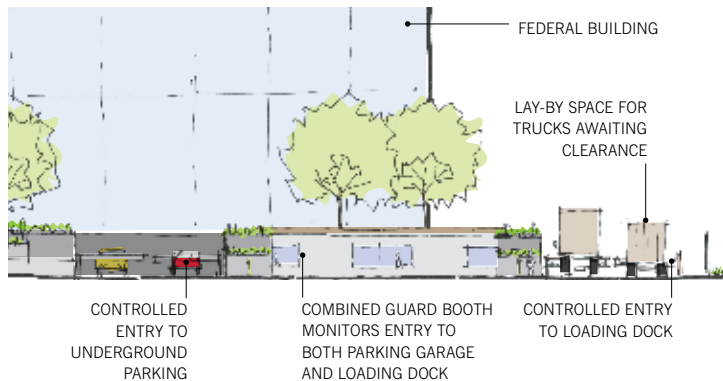
Security Design Problem

Regulation of vehicular access to the site requires a combination of security elements to stop and screen cars and trucks prior to passing inside the perimeter. Ideally, access to on-site parking should be separated from service access because the screening process is different for each. A tenant with daily access requires a lower level of screening than a delivery truck. Multiple entry points require high operational overhead in terms of facilities and staffing. When parking is located underneath the building, that entry point is particularly vulnerable. An explosive-laden vehicle could penetrate the standoff perimeter and gain access to areas beneath the building.

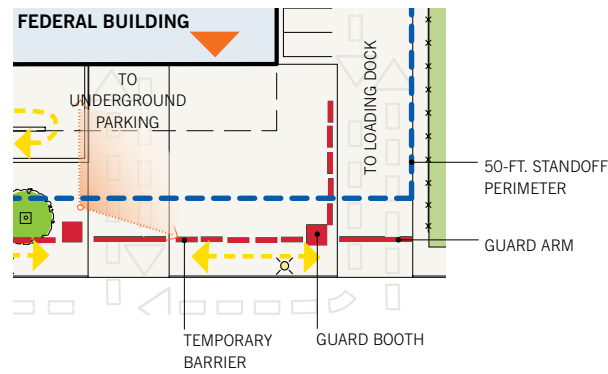
Proposed Security Design Solution

To reduce operational costs and consolidate security oversight, a shared guard booth regulates access to both the underground parking garage and the loading dock. Guard arms designed as vehicular barriers control entry prior to security screening. Hydraulic barriers prevent a vehicle from backing into the street in the event that it needs to be detained. If possible, vehicles should be stopped outside the 50-foot standoff perimeter for inspection. Due to the constraints of this site and the space required for a truck to pull off the street completely to avoid stopping traffic, the guard arm at the loading dock is located slightly within the standoff perimeter. A lay-by space enables trucks that are waiting for security clearance to pull to the side, allowing other vehicles to pass.

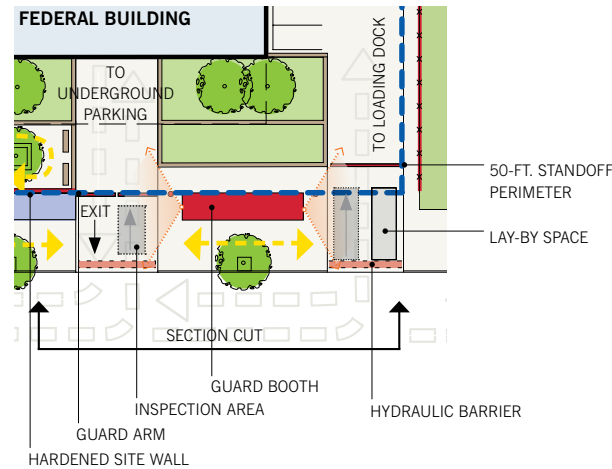
Elevation View



Existing Conditions Plan



Design Solution Plan



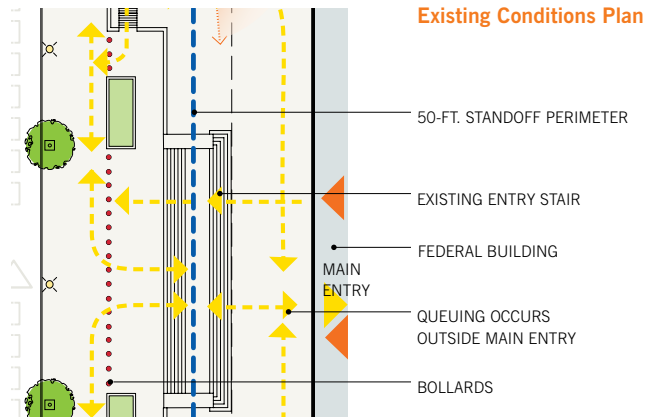
Zone 3: Site Access and Parking

The concept of combining three guard booths into one saves on operational and staffing costs, while centralizing security oversight. The placement of the guard booth supports clear views of all vehicles entering the loading dock, as well as the underground parking entrance off First Street.

Project Area Design Studies: Zone 4

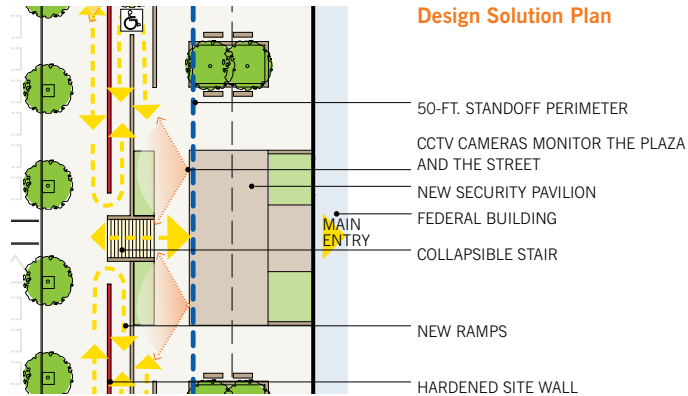
Security Design Problem

Existing buildings often have main building entries and lobbies that were not designed for current security processes and equipment and are difficult to reconfigure. A typical modernist building with a curtain wall façade may have multiple main doors and few visual cues to direct visitors to the appropriate entry for screening. This can cause confusion, especially if the building has a high degree of public use. Crowding may occur as visitors wait to be processed through the security checkpoint. If not properly controlled, queuing can create disorder and make security oversight more difficult.



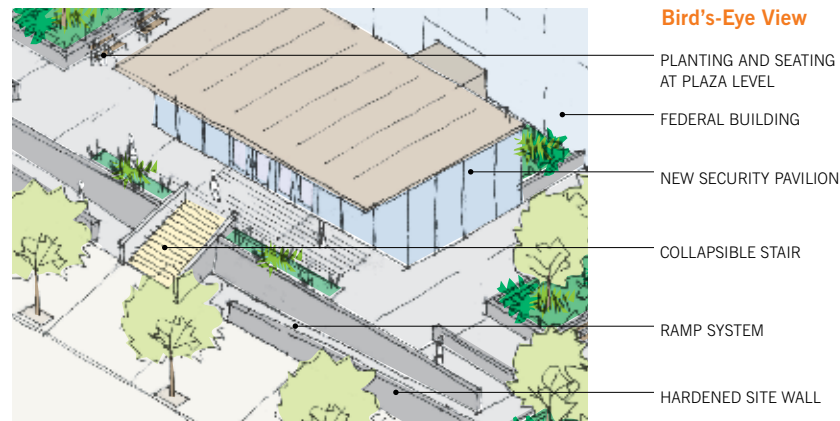
Proposed Security Design Solution

A security pavilion outside the main building provides the additional space required to accommodate the security equipment and guards needed to screen visitors prior to entry. The pavilion clearly delineates the “front door” to the building and provides cover for visitors waiting for entry. Due to the size of the pavilion, the elevated plaza is reconfigured. The main approach is rebuilt to incorporate a new collapsible stair and accessible ramps. The collapsible stair incorporates a compressible fill that supports pedestrian traffic, but will fail under the weight of a vehicle. A reinforced knee wall built into the stair prevents further approach. The ramps, which provide universal access, also offer additional area for queuing overflow. The walls alongside the ramps guide queues and offer room to sit and wait. The elevated plaza provides open space for casual seating and a large area for public programs or demonstrations.



Zone 4: Site

Hardened site walls and ramps create an invisible perimeter barrier and generous standoff distance. The ramps provide universal access to the main entry. The security pavilion on the plaza level offers a comfortable enclosed queuing area, while positioning visitor security inspection outside the building envelope (Zone 5). The centrally located pavilion complements the existing building’s design. Shade trees in hardened planters provide pleasant seating areas on the plaza.



Phase 6

Final Concept Development

At this stage, the team completes the detailed *final concept for the project* that proceeds forward into construction. Note that if the entire Site Concept from Phase 4 will not be implemented as part of the immediate project, this Final Concept Development may concentrate on only the portions of the project that will move forward into planned construction.

As part of GSA’s Design Excellence process, at the conclusion of this stage the team makes its final concept presentation to stakeholders.

Key Points Within Phase 6: Final Concept Development

- Complete Final Concept for planned project
- Develop implementation and phasing plan (if necessary)

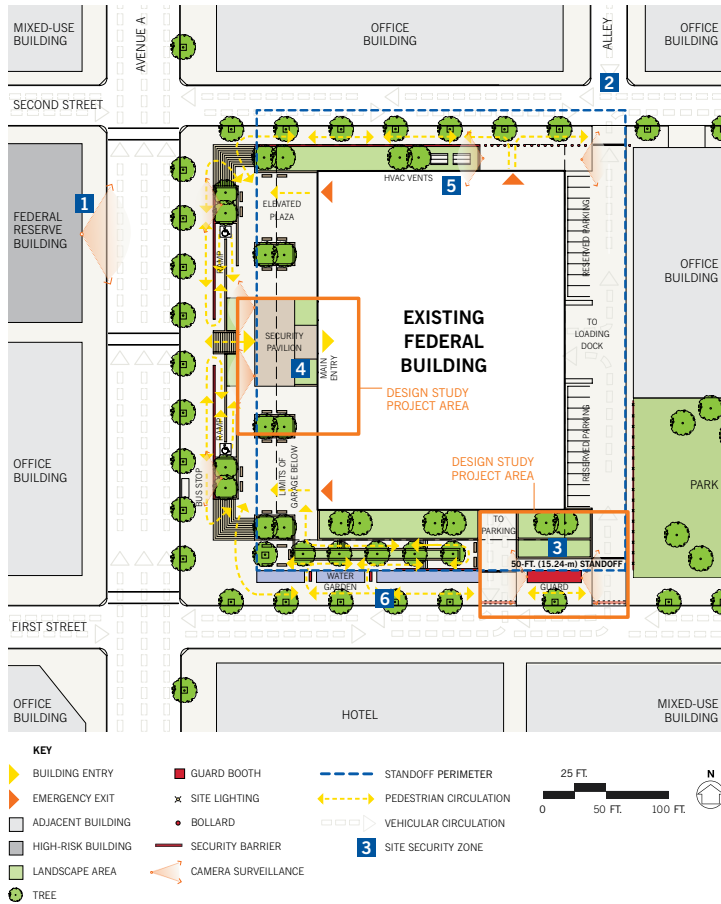
The team chooses the products, materials, and methods of implementation for the entire project scope, beyond the special areas that might have received more detailed design study in the previous phase. The Final Concept Plan should be true to the overall Site Concept (Conceptual Strategy Plan) from Phase 4 and responsive to the input received during the detailed Project Area Design Studies in Phase 5 (see Diagram 3.9).

If the project is to be implemented in phases, the timing must be finalized for the most efficient use of materials and labor. Similarly, if the project is a renovation of an existing building, the Project Team must analyze the logistics of working on and around an occupied building.

Final Concept Development: Team Roles and Responsibilities

ROLE	RESPONSIBILITIES
All Team Members	<ul style="list-style-type: none">■ Collaborate to develop Final Concept■ Finalize concept budgets■ Address issues of phasing (if necessary)

Diagram 3.9: Final Concept Plan



Security and Site Design Solutions

- 1** Cameras mounted on the façade of the Federal Reserve building monitor activity in front of the existing federal building, while cameras placed at key locations on the elevated plaza monitor activity along Avenue A to create shared surveillance of the street.
- 2** Traffic into the loading dock area is limited to entry from First Street, and an automatic security gate regulates egress onto Second Street. The risk of axial approach from the alley into the standoff perimeter is deemed negligible.
- 3** A sensitively designed guard booth efficiently controls access to both the garage and the loading dock and adds “eyes on the street” to the rear of the building, adjacent to the park.
- 4** A security pavilion at the plaza level creates space outside the existing federal building to screen visitors and manage queuing.
- 5** Planting areas, grates, and filters protect the HVAC vents/air intakes from unregulated access.
- 6** The temporary barriers are removed and replaced by security elements, such as site walls and a moat that is also a water garden at the street-level plaza. Multipurpose features minimize risk and improve the quality of public space.

After the site security design concepts have been examined in detail, the team refines, integrates, or redevelops the best concepts and creates a Final Concept Plan. The Final Concept Plan is a package of plans, sections, elevations, and details for the proposed design. The plan may be constructed in its entirety or divided into phases.

Key elements in the Final Concept Plan include surveillance cameras operated in conjunction with a neighboring federal building, a custom-designed guard booth, hardened site furniture, and a new security pavilion. The solution is integrated into the site and compatible with the building’s architecture.



Phase 7

Final Design and Construction Documents

After the team reaches consensus on the design studies, final concepts, and implementation strategies, the process moves into the Final Design and Construction Documents phase.

Key Points Within Phase 7: Final Design and Construction Documents

- Continue collaboration during this phase to ensure that the design and specifications stay consistent with concepts, materials, and budgets
- Coordinate site security elements with other aspects of the project

Project Teams must incorporate careful review at this phase to ensure that security design features are not inadvertently modified as the team finalizes the project details. Likewise, teams must ensure that significant site amenities or finishes are not stripped out of the project while fine-tuning the construction documents and budget.

In this *design-intensive* stage, designers play the lead role. Other team members play an important role in reviewing drawings and specifications to ensure that agreed-upon elements are properly represented in the Final Design.

The development of design and construction documents may not require as much team involvement as other phases of the project. This may make coordination more challenging, as not every team member is needed at every meeting.

Final Design and Construction Documents: Team Roles and Responsibilities

ROLE	RESPONSIBILITIES
All Team Members	<ul style="list-style-type: none"> ■ Collaborate to develop Final Design and Construction Documents ■ Ensure that all elements of the Final Concept are represented in Construction Documents ■ Finalize budgets and schedules to prepare for construction ■ Address issues of phasing (if necessary)

Phase 8

Project Completion and Operations

Once construction begins, the Project Team should stay involved, as needed, to respond to unforeseen conditions during construction and alter the project design to respond to such conditions. Moreover, as the project is completed and put into use, building management and security operations must continually evaluate the function of the physical countermeasures over time and remain committed to the operational security measures that help to form the complete solution.

Key Points Within Phase 8: Project Completion and Operations

- Collaborate to resolve last-minute concerns during construction
- Sustain commitment to security operations and maintenance after completion

Project Completion and Operations: Team Roles and Responsibilities

ROLE	RESPONSIBILITIES
All Team Members	<ul style="list-style-type: none"> ■ Collaborate to resolve any final issues ■ Maintain commitment to comprehensive site security plan throughout its working life

CONCLUSION

A successful site security design process carries a project from initial conception to final completion, incorporating the elements and hallmarks described in the *Guide* thus far. This integration is the subject of the following chapter, in which illustrative test cases portray successful implementation in five realistic scenarios.

Chapter 4
Test Cases

4



Chapter 4

Test Cases

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Test Cases

INTRODUCTION

The test cases illustrate site security improvements for hypothetical federal government buildings. They represent typical locations, common building types, and crucial site security design issues found within the GSA portfolio of federal buildings. Each test case is drawn from a number of real properties and projects, as well as nonexistent, but possible, conditions.

These test cases represent a broad array of site scenarios and solutions within the framework of the six site security zones (see Diagram 3.1, page 81). The most common issues may be illustrated in more than one test case. The structure of each test case clearly illustrates the recommended security design process outlined in Chapter 3. To streamline this *Guide*, each test case illustrates only one security design solution per zone. Of course, an actual project could have multiple security and design requirements per zone.

Process and Test Case Overview

PROCESS PHASE	TEST CASE COMPONENTS
Phase 1: Project Start	■ Introduction to Test Case
Phase 2: Multidisciplinary Assessment	■ Existing Conditions/Site Context Plan ■ Site Security Assessment Plan
Phase 3: Site Concept Investigation	
Phase 4: Site Concept Selection	■ Conceptual Strategy Plan
Phase 5: Design Studies for Project Areas	■ Project Area Design Studies
Phase 6: Final Concept Development	■ Final Concept Plan
Phase 7: Final Design and Construction Documents	
Phase 8: Project Completion and Operations	

Test cases are

- *Fictitious,*
- *Extensive, and*
- *Illustrative.*

TEST CASE STRUCTURE

Each test case contains diagrams and accompanying text that illustrate various phases of the site security design process:

1. Introduction

The introductory text lists general assumptions and existing conditions for each test case. Topics include urban and regional context, adjacent urban infrastructure and transportation systems, site circulation and parking, site constraints, a general description of building tenants and threat assessment level assignment, existing security features, description of issues, and opportunities and challenges unique to each hypothetical test case.

2. Existing Conditions/Site Context Plan

The Existing Conditions/Site Context Plan illustrates site conditions and such issues as neighboring buildings; transportation system adjacencies; building entries, exits, and service yards; pedestrian and vehicular circulation; parking; existing security elements; landscaping; and lighting. Supplementing this plan is a summary of Test Case Assumptions for each zone.

The Existing Conditions/Site Context Plan highlights two “design study project areas” that are illustrated in greater detail with plan diagrams and sketches in the fifth phase of each test case.

3. Site Security Assessment Plan

The Site Security Assessment Plan summarizes existing site conditions and indicates areas of risk, challenge, and opportunity. The accompanying text outlines the site security and design topics related to the plan.

4. Conceptual Strategy Plan

Following careful consideration of the Multidisciplinary Assessment, the team creates the Conceptual Strategy Plan. The Conceptual Strategy Plan represents the culmination of site concept investigations that test several design approaches to determine the best overall strategy. During the investigation process, the team revises,

reconsiders, and rejects various strategies, adopting the best features of each into a balanced overall plan that satisfies security issues, provides high-quality public space, and meets scope and budget requirements. At the end of this stage, the Project Team may decide to limit the design project to particular subsets of the site, based on risk prioritization, budget limitations, and phasing requirements.

5. Project Area Design Studies

The Project Area Design Studies present the project areas in further detail, using both plan diagrams and sketches of particular design elements to show existing conditions and proposed design solutions. The accompanying text describes the specific security design problems and provides the rationale behind the proposed design solutions. Not all aspects of a project will be examined at this level of detail before final concepts are established, but the most complex areas should receive this level of analysis.

6. Final Concept Plan

The Final Concept Plan develops the direction of the Conceptual Strategy Plan with careful attention to scale and detail. As the plan is prepared, the designer continues to pay attention to the existing context and the Multidisciplinary Assessment and works closely with the Project Team to develop a comprehensive and balanced design.

TEST CASE MATRIX

The Test Case Matrix (pages 108–109) summarizes site security issues, concerns, challenges, and opportunities that the test cases identify, analyze, and solve. These topics are organized by zone and may appear in the test cases within the descriptive text, in plan diagrams, or as part of Project Area Design Studies.

The project areas and topics listed in the Test Case Matrix are meant to illustrate effective approaches for similar situations. The examples do not represent an exhaustive list of issues for every project type, however, and site security design solutions should be unique to each site.



Site security design projects begin with the desire to transform existing conditions. Projects can successfully reduce risk and enhance the public realm when they are based upon meaningful security assessments, sensitivity to existing context and materials, and clear goals for desired site uses.

Overview of Test Case Topics

SITE SECURITY TOPIC	URBAN RENOVATION: SINGLE BUILDING	URBAN HISTORIC BUILDING	URBAN RENOVATION: MULTIPLE BUILDINGS	SUBURBAN CAMPUS RENOVATION	URBAN NEW CONSTRUCTION	COMMENTS
ZONE 1 Neighborhood						
Community Context	■	■	■	■	■	Community partnerships can connect the building and the site to its larger context and encourage public use.
Public Transportation	■	■	■		■	Proximity to local transportation lines should be capitalized upon.
High-Risk Adjacencies	■	■				Adjacent buildings within the optimal standoff distance should be evaluated for potential security risks.
Shared Security	■			■		Sharing security resources, such as guards or CCTV surveillance, with adjacent buildings enhances the safety of the neighborhood.
Traffic Calming				■		Traffic calming uses physical and operational methods to reduce vehicular speeds both for the safety of pedestrians and for the security of the site's perimeter.
Street Closure				■	■	The decision to vacate a street for security requirements has a serious impact on the building site and its surrounding urban environment.
ZONE 2 Standoff Perimeter						
Vehicular Standoff		■	■			Street parking regulations can help ensure that dangerous vehicles cannot park within the standoff on adjacent streets.
Vector Analysis	■		■			Vector analysis helps determine structural requirements for vehicular barriers based on angle of approach and potential vehicle size and speed.
Hardened Elements	■	■	■	■	■	Site elements such as street furniture, lighting fixtures, and planter walls can be structurally hardened to provide rated protection as an alternative to bollards.
Bollards		■	■			The selection and placement of bollards has an impact on the use of public space.
Berms				■	■	Planting areas can be graded to create raised landscape berms that serve as barriers; possible tradeoffs of visibility must be considered when using berms.
Moats	■				■	Moats are the opposite of berms. They are trenches or pits that deter approach by trapping vehicles before they reach a facility.
Collapsible Paving	■				■	Collapsible paving is a recent technology that is used to maintain openness, while providing protection from vehicular approach.
Temporary Barriers	■	■	■			If the use of temporary barriers is required, a plan for their removal and replacement must be included as part of the cost of their use.
Risk Acceptance	■	■				Careful analysis of the effectiveness of security measures relative to their cost and impact on public space may lead to risk acceptance in some cases.
ZONE 3 Site Access and Parking						
Guard Booths	■	■		■	■	Staffed guard booths typically regulate access to the site; their design should respond to the architecture of the building and neighborhood context.
Retractable Bollards					■	Retractable bollards are useful in situations where periodic vehicular access is necessary, for emergency vehicles, ceremonial motorcades, or other similar circumstances.
Automatic Gates	■					Automatic gates help regulate entry and exit and reduce the number of staffed guard points, which can be an expensive operational cost.
Multiple Vehicular Entries	■			■		Reducing the number of entry points and limiting entry to specific types of traffic can help regulate access to the site.
Vehicle Inspection Point	■					Inspection points such as sally ports allow vehicles to be screened before they enter the site; vehicle queuing is a concern with any type of screening and must be incorporated into the configuration of the inspection area.
Public Right-of-Way		■		■	■	When a public right-of-way falls within a building's standoff zone, mitigation of security risks must be carefully balanced with local transportation needs.
Loading Dock	■	■	■			Access to the loading dock should be separated from staff and visitor access.
Axial Approach	■		■			Avoid axial approaches where a vehicle can accelerate to a speed sufficient to force entry.
Emergency Access					■	Emergency access should be coordinated with local police and fire departments.
Internal Vehicular Circulation			■	■		Large sites often involve complex internal vehicular circulation, which must be coordinated with pedestrian circulation to avoid conflicts.
On-Site Parking	■		■	■	■	Parking areas on the site that fall within the building's required standoff may need to be restricted.
Off-Site Parking		■				Clear routes from off-site parking to building entries should be provided for the safety of staff and visitors.
Parking Garage				■		Secured parking structures may serve to protect the standoff perimeter, provided that they meet security criteria.

SITE SECURITY TOPIC	URBAN RENOVATION: SINGLE BUILDING	URBAN HISTORIC BUILDING	URBAN RENOVATION: MULTIPLE BUILDINGS	SUBURBAN CAMPUS RENOVATION	URBAN NEW CONSTRUCTION	COMMENTS
ZONE 4 Site						
Multiple Buildings			■	■		Multiple buildings sharing space on the same site may have different security needs, based on occupancy and degree of public use.
Gatherings/Demonstrations	■		■		■	Public spaces may serve as gathering points for large events or occasional assemblies.
Programmed Space	■		■	■	■	Public space that supports multiple activities will be fully occupied for more of the day, providing enhanced “eyes on the street.”
Security Pavilion	■				■	A security pavilion can be an effective retrofit for an older building that cannot accommodate security measures effectively because of its lobby configuration; it can also provide a secure entrance for a new building.
Queuing	■					Unmanaged queuing causes congestion and confusion.
Accessibility		■				Mandated accessibility must be incorporated into all security designs.
Wayfinding			■	■		Directional signage should address both everyday use and emergency situations.
Lighting		■	■	■		Site lighting increases the safety of pedestrian circulation, enhances visibility for security, and highlights architectural features.
Site Amenities	■	■	■	■	■	Site amenities can be hardened to act as security elements.
Water	■				■	Water can function as both a landscape feature and a security element.
ZONE 5 Building Envelope						
Multiple Building Entries	■	■	■			Multiple entry and exit points to a building present security risks and can confuse visitors.
Hardened Vestibule	■				■	A hardened vestibule creates a structurally secure space for screening visitors before allowing access to the main building.
Retail Frontage				■	■	Retail frontage on a facility’s first floor can act as a secure edge by providing a hardened buffer in front of the building envelope.
Exposed Structural Elements			■			Exposed structural elements are a security risk. With some structural systems, failure of even one structural member can lead to progressive collapse.
Vent/Air Intake Exposure	■					Exposed HVAC vents or air intakes are vulnerable to airborne chemical, biological, or radiological attacks.
Camera Surveillance	■	■	■			CCTV is an important component of site and building security.
ZONE 6 Management and Building Operations						
Guard Operation	■			■	■	Frequent guard patrol of the site is an effective way to establish an on-site security “presence.”
Space Planning		■	■	■	■	Relocating vulnerable or high-profile occupants may reduce the need for expensive security measures.
Childcare Facility			■			The location of a childcare facility should be determined relative to the risk factors of the building it serves.
Parking Restrictions		■	■		■	Parking restrictions that impact public rights-of-way should be coordinated with the local department of transportation.

Test Case 1

Building Renovation/Urban Location: Single Building

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Project Area Design Studies Project Area: Zone 4 Security Design Problem Proposed Security Design Solution	115
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INTRODUCTION

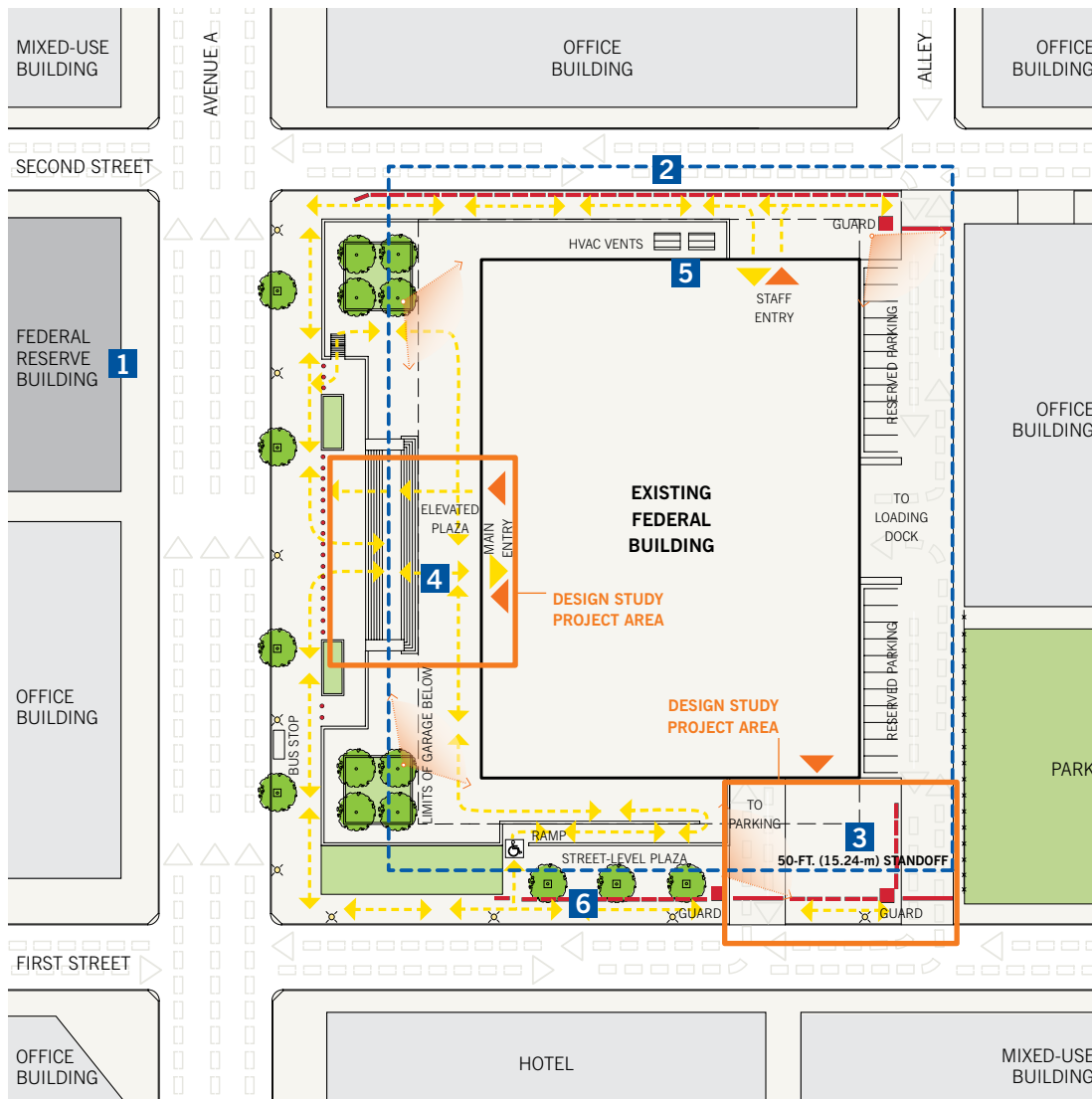
This test case, used to illustrate the site security design process in Chapter 3, appears here in abbreviated form.

It depicts a sole federal building occupying a block in an urban business district, located near the cultural core of a major metropolitan area. The high-rise building, built in the mid-20th century, sits on a plinth housing underground parking that is accessed from First Street and guarded by a staffed kiosk. The main building entry is not clearly delineated, thus creating confusion and crowding, as numerous visitors queue and wait in the plaza prior to security screening inside the building. HVAC vents/air intakes are located in an exposed location in an isolated corner of the elevated plaza. Temporary barriers, hastily installed throughout the site, have remained in place for years.

A loading dock and reserved surface parking area are located to the east side (rear) of the building, and staffed guard booths are positioned at both the First and Second Street entries. On the north side, an alley with one-way circulation aligns with access to the loading dock across Second Street.

The building received a medium ISC security rating, and the building's three tenant agencies have similar risk profiles. Although the Federal Reserve building across Avenue A is designated high risk, the surrounding buildings contain low-risk office space. The bus stop on Avenue A is the nearest public transportation stop to the building.

Test Case 1: Existing Conditions/Site Context Plan



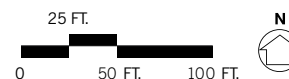
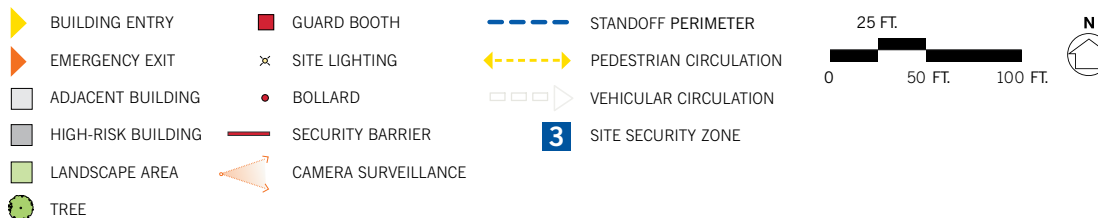
Test Case Assumptions

- 1 The Federal Reserve building on Avenue A desires enhanced security because of the vulnerability of its lobby area.
- 2 Temporary barriers have been placed at the curb line along the north side of the site, where there is insufficient standoff, and an alley allows direct approach into the loading dock.
- 3 The loading dock and the underground parking garage servicing the building both have access from First Street.
- 4 The main entry to the building is not clearly delineated, and crowding occurs at the elevated plaza, as visitors wait to pass through security screening.
- 5 There are exposed HVAC vents/air intakes accessible from the elevated plaza.
- 6 During a heightened security alert, temporary barriers were placed on the street-level plaza and have not been removed or replaced with permanent security fixtures.

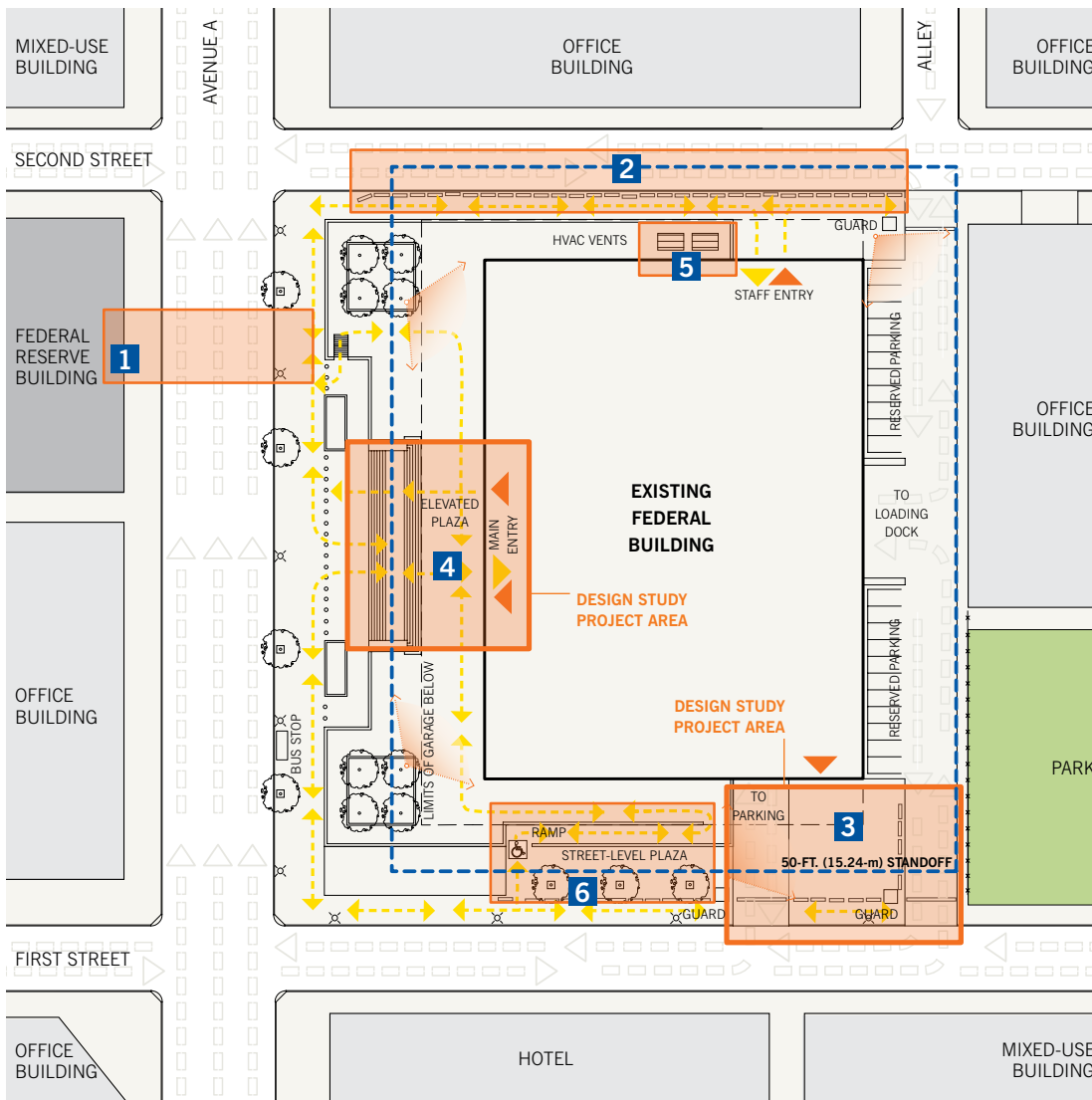
Typical conditions seen in buildings of this type include a plinth that separates the main entry from the sidewalk, a main entry plaza, and curtain wall façade construction.



KEY



Test Case 1: Site Security Assessment Plan



Security and Site Design Topics

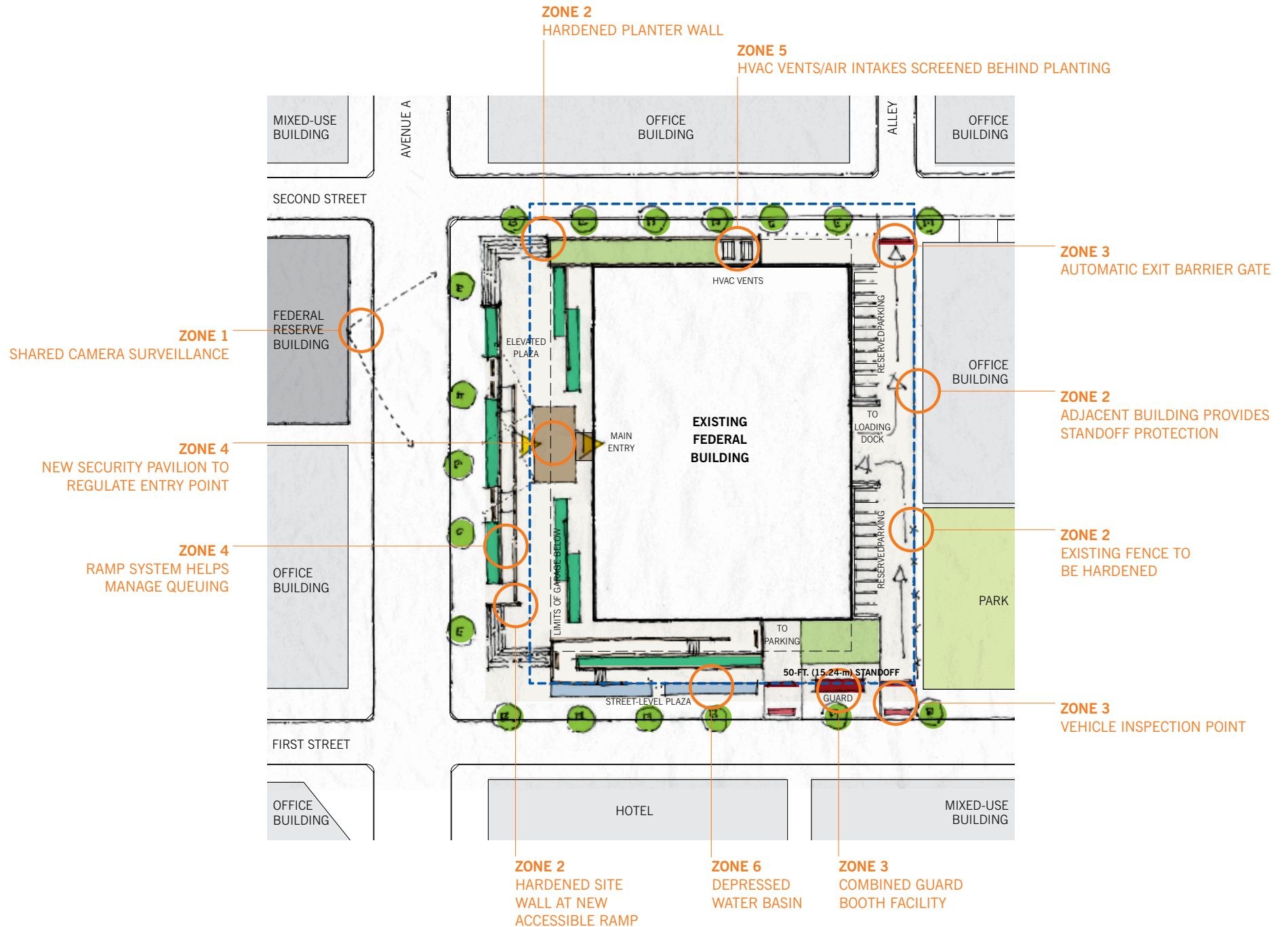
- 1** A neighboring building with similar security concerns offers an opportunity for partnership and sharing of security resources.
- 2** Vector analysis of the northern site edge suggests that the northwest corner of the site warrants the most robust perimeter hardening. The middle of the block cannot easily be approached at high speed, and the alley that dead-ends into the loading dock presents only negligible risk of vehicular approach.
- 3** When parking is located under a building, that entry point is vulnerable.
- 4** Unmanaged queuing causes congestion and confusion that can make security monitoring difficult and public space less safe.
- 5** Exposed HVAC vents/air intakes are vulnerable to airborne chemical, biological, or radiological attack.
- 6** The temporary barriers at the street-level plaza are not rated to prohibit vehicular approach and have negative off-site impacts on the streetscape and adjacent local businesses.

KEY

BUILDING ENTRY	GUARD BOOTH	STANDOFF PERIMETER
EMERGENCY EXIT	SITE LIGHTING	PEDESTRIAN CIRCULATION
ADJACENT BUILDING	BOLLARD	VEHICULAR CIRCULATION
HIGH-RISK BUILDING	SECURITY BARRIER	SITE SECURITY ZONE
LANDSCAPE AREA	CAMERA SURVEILLANCE	SITE SECURITY ASSESSMENT AREA
TREE		

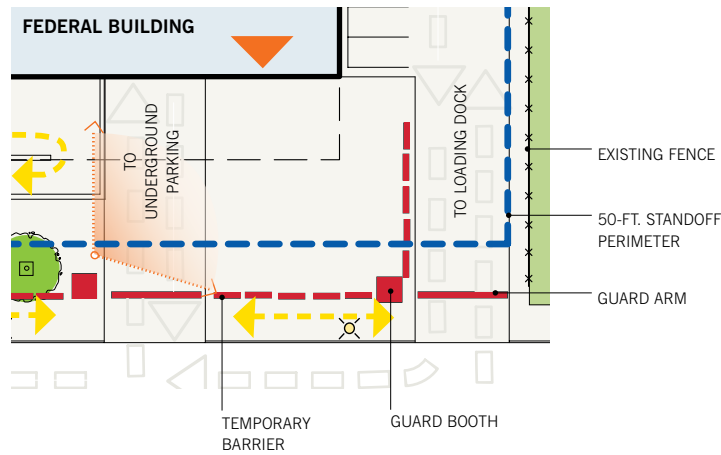


Test Case 1: Conceptual Strategy Plan

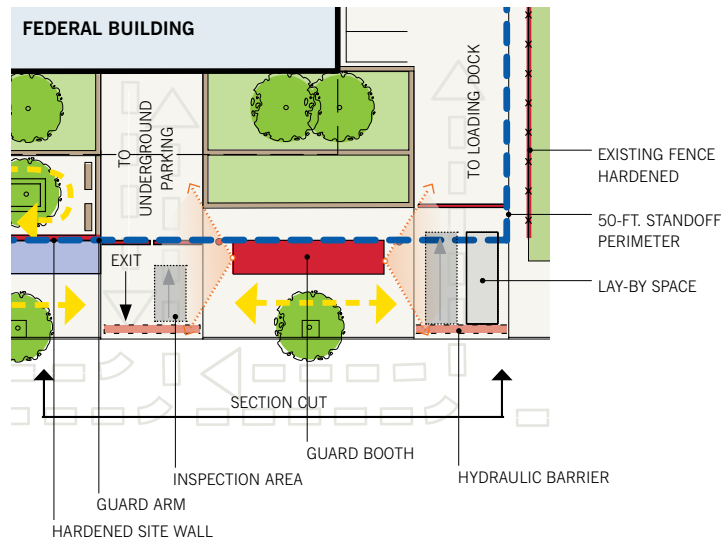


Project Area: Zone 3

Existing Conditions Plan



Design Solution Plan



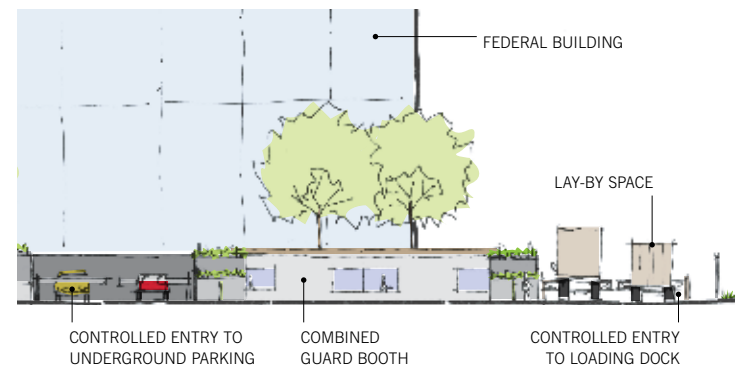
Security Design Problem

Regulation of vehicular access to the site requires a combination of security elements to stop and screen cars and trucks prior to passing inside the perimeter. Ideally, access to on-site parking should be separated from service access because the screening process is different for each. A tenant with daily access requires a lower level of screening than a delivery truck. Multiple entry points require high operational overhead in terms of facilities and staffing. When parking is located underneath the building, that entry point is particularly vulnerable. An explosive-laden vehicle could penetrate the standoff perimeter and gain access to areas beneath the building.

Proposed Security Design Solution

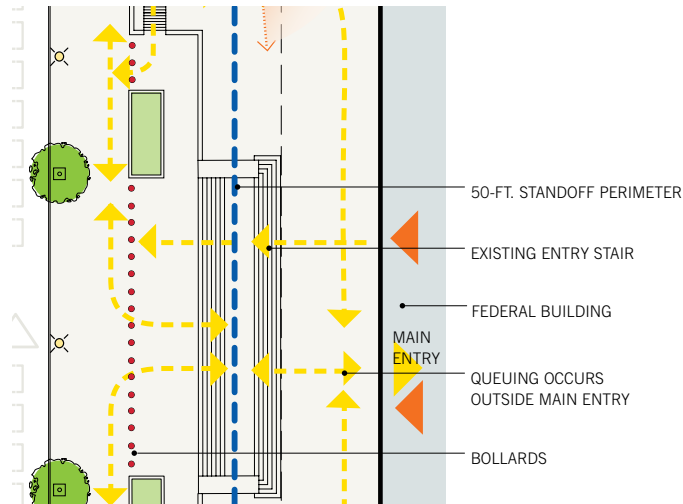
To reduce operational costs and consolidate security oversight, a shared guard booth regulates access to both the underground parking garage and the loading dock. Guard arms designed as vehicular barriers control entry prior to security screening. Hydraulic barriers prevent a vehicle from backing into the street in the event that it needs to be detained. If possible, vehicles should be stopped outside the 50-foot standoff perimeter for inspection. Due to the constraints of this site and the space required for a truck to pull off the street completely to avoid stopping traffic, the guard arm at the loading dock is located slightly within the standoff perimeter. A lay-by space enables trucks that are waiting for security clearance to pull to the side, allowing other vehicles to pass.

Elevation View

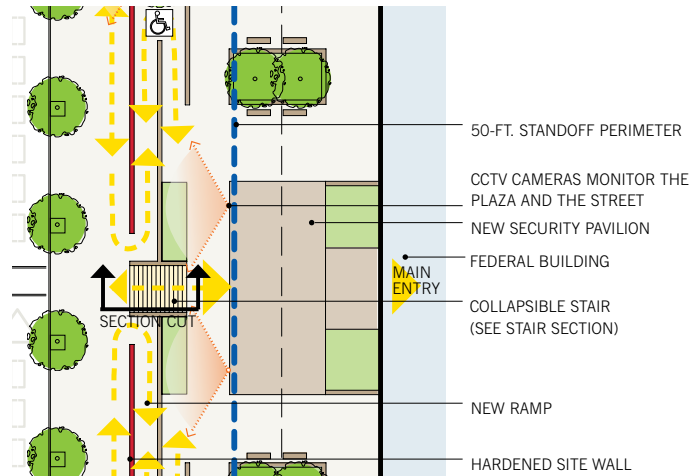


Project Area: Zone 4

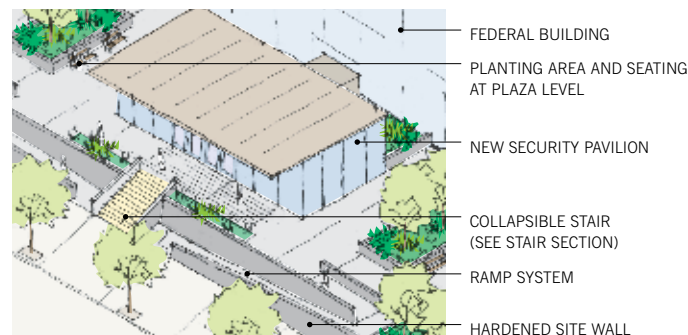
Existing Conditions Plan



Design Solution Plan



Bird's-Eye View



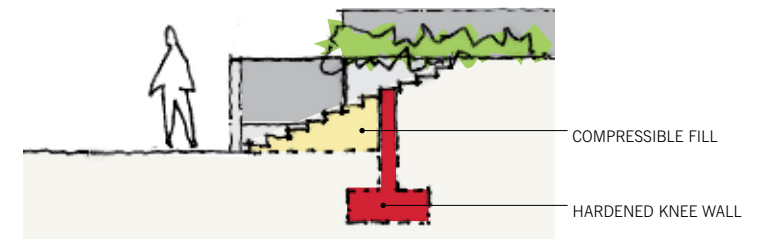
Security Design Problem

Existing buildings often have main building entries and lobbies that were not designed for current security processes and equipment and are difficult to reconfigure. A typical modernist building with a curtain wall façade may have multiple main doors and few visual cues to direct visitors to the appropriate entry for screening. This can cause confusion, especially if the building has a high degree of public use. Crowding may occur as visitors wait to be processed through the security checkpoint. If not properly controlled, queuing can create disorder and make security oversight more difficult.

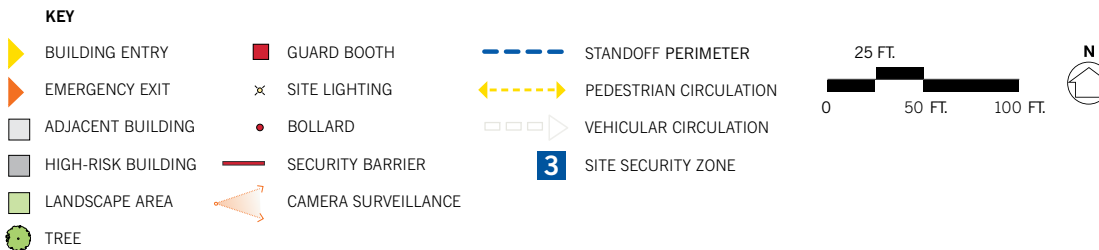
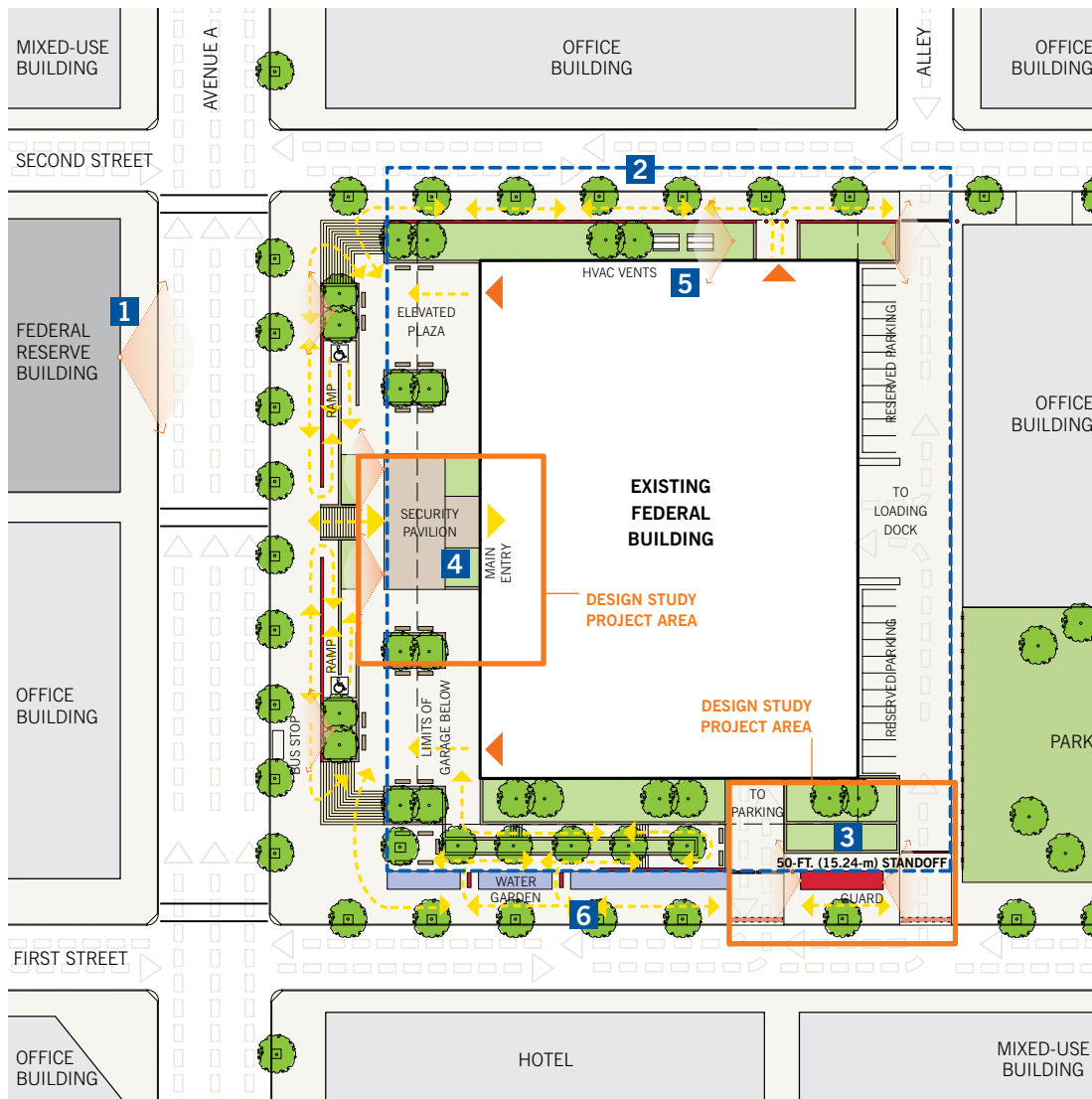
Proposed Security Design Solution

A security pavilion outside the main building provides the additional space required to accommodate the security equipment and guards needed to screen visitors prior to entry. The pavilion clearly delineates the “front door” to the building and provides cover for visitors waiting for entry. Due to the size of the pavilion, the elevated plaza is reconfigured. The main entry is rebuilt to incorporate a new collapsible stair and accessible ramps. The collapsible stair incorporates a compressible fill that supports pedestrian traffic, but will fail under the weight of a vehicle. A reinforced knee wall built into the stair prevents further approach. The ramps, which provide universal access, also offer additional area for queuing overflow. The walls alongside the ramps guide queues and offer room to sit and wait. The elevated plaza provides open space for casual seating and a large area for public programs or demonstrations.

Stair Section



Test Case 1: Final Concept Plan



Security and Site Design Solutions

- 1** Cameras mounted on the façade of the Federal Reserve building monitor activity in front of the existing federal building, while cameras placed at key locations on the elevated plaza monitor activity along Avenue A to create shared surveillance of the street.
- 2** Based on vector analysis, a hardened site wall provides protection from vehicles. The site wall varies in height according to risk; at mid-block, where high-speed approach is less possible, the wall is seat height. Traffic into the loading dock is limited to entry from First Street, and an automatic security gate regulates egress onto Second Street.
- 3** A vehicle checkpoint with shared guard facilities provides the room and equipment to adequately screen vehicles before they enter the site.
- 4** A security pavilion at the plaza level creates space outside the existing federal building to screen visitors and manage queuing.
- 5** Planting areas, grates, and filters protect the HVAC vents/air intakes from unregulated access.
- 6** The temporary barriers are removed and replaced by security elements, such as site walls and a moat that is also a water garden at the street-level plaza. Multipurpose features minimize risk and improve the quality of public space.

A new security entry pavilion can help organize queuing, while a new water feature improves both security and public space.





In improving security at existing buildings, Project Teams should envision potential improvements in terms of the entire site, the community, and broader neighborhood development efforts. The introduction of a security pavilion provides occasion to revisit the usability of adjacent public spaces, while new security walls present an opportunity to improve the landscape or commission a public artwork. Such comprehensiveness enhances the safety and quality of the workplace, while ensuring that the federal government is a good neighbor.



Test Case 2

Historic Building/Urban Location

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Project Area Design Studies Project Area: Zone 3 Security Design Problem Proposed Security Design Solution	123
Final Concept Plan Security and Site Design Solution	124

INTRODUCTION

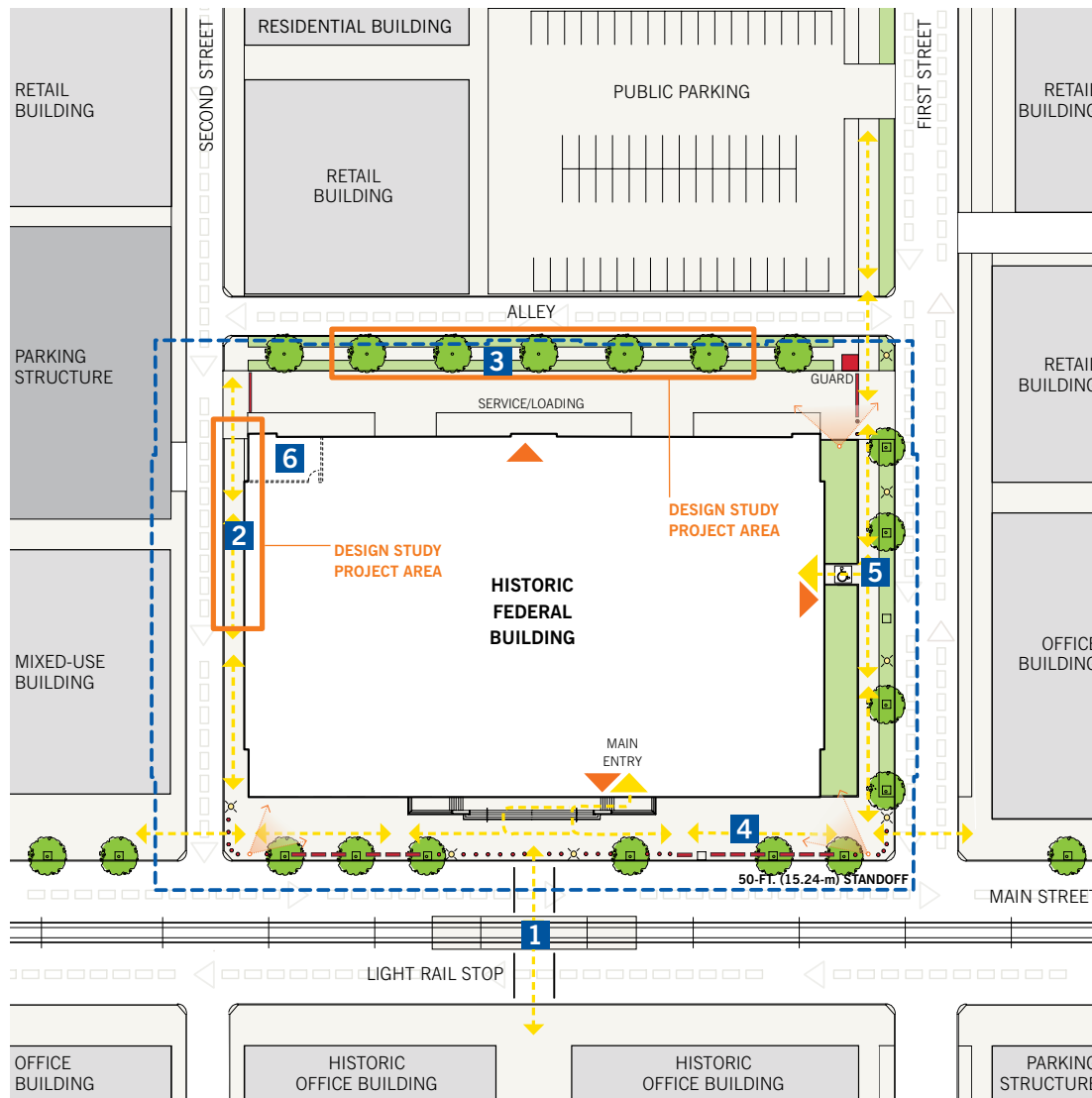
This test case presents an opportunity to augment security at a historic federal courthouse, recently added to the National Register of Historic Places, and to preserve and enhance the fabric of the historic district in a dense urban area. The historic building is constructed of thick masonry, which will resist a measurable degree of force. Remnants of the historic landscape, including large, healthy specimen trees, are intact around the site. A classic formal stairway from Main Street leads to the lobby. Unfortunately, this historic configuration does not easily accommodate the security-screening queue or inspection equipment. The recently added entry at First Street, for persons with disabilities, is neither up to code nor in keeping with the historic character of the site.

A light rail stop on Main Street is on direct axis with the building entrance and a historic pedestrian walkway across the street. Temporary barriers placed around the site are not consistent with the historic nature of the building or the district. The temporary barriers are not crash-rated to absorb the force of an oncoming vehicle.

Traffic studies conclude that the surrounding sidewalks should not be widened to increase standoff and that the heavily used public alley north of the courthouse should remain open. This creates control problems for the loading dock at the rear of the building.

This federal courthouse houses only court-related agencies and has a medium ISC security rating. Surrounding building uses are primarily low-risk office and retail. A private parking structure across narrow Second Street is considered a high-risk adjacency, particularly as the office of a high-profile federal occupant is located directly across the street. Many courthouse employees park in a public parking lot, accessed by a poorly lit sidewalk.

Test Case 2: Existing Conditions/Site Context Plan



Test Case Assumptions

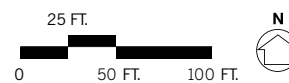
- 1 The historic federal building is located near a light rail transportation stop in a historic district. Key features are the historic light standards and street tree planting.
- 2 The sidewalks along Second Street cannot be widened to increase the standoff distance between the federal building and the adjacent parking structure, which presents a high risk.
- 3 There is a landscaped area between the loading dock and the alley north of the building, which is part of the public right-of-way.
- 4 There are no site amenities, such as outdoor seating or a bus shelter, serving tenants and visitors to the facility.
- 5 The ADA entry at the First Street side of the building is separated from the main building lobby.
- 6 The office of a high-profile occupant is located on the first floor of the northwest corner of the building, on the side of the building where the standoff is most compromised.

Rich architectural detailing, formal entry, and minimal setback are characteristics common to many urban historic federal buildings.

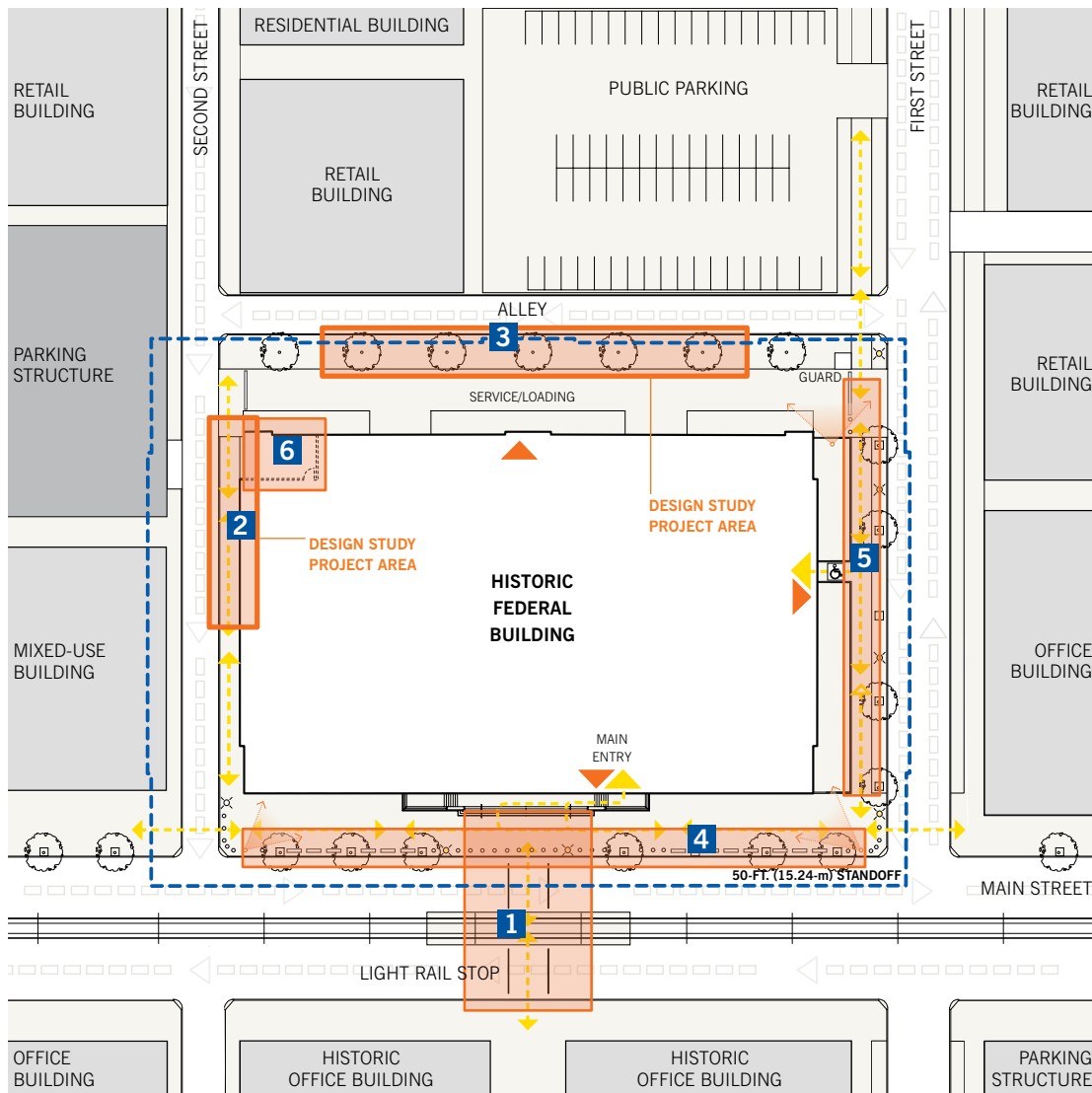


KEY

	BUILDING ENTRY		GUARD BOOTH		STANDOFF PERIMETER
	EMERGENCY EXIT		SITE LIGHTING		PEDESTRIAN CIRCULATION
	ADJACENT BUILDING		BOLLARD		VEHICULAR CIRCULATION
	HIGH-RISK BUILDING		SECURITY BARRIER		SITE SECURITY ZONE
	LANDSCAPE AREA		CAMERA SURVEILLANCE		
	TREE				



Test Case 2: Site Security Assessment Plan



Security and Site Design Topics

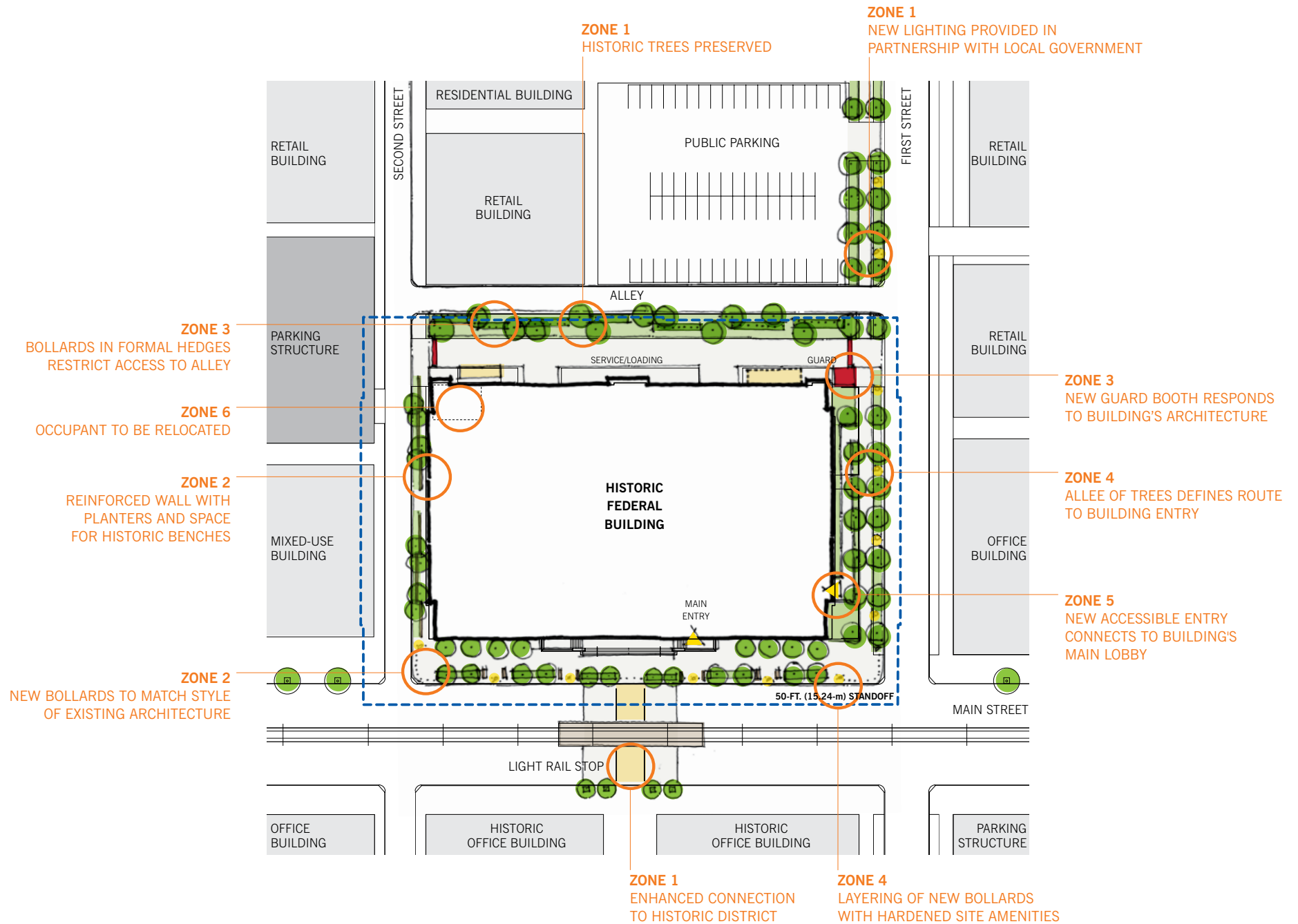
- 1** The proximity of the building to the light rail stop presents an opportunity to develop public space that can integrate the building into the urban fabric of the existing historic district.
- 2** The privately owned parking garage within the 50-foot standoff represents a high risk. The federal building may need additional hardening on the west side to mitigate vulnerability.
- 3** There is insufficient vehicular and pedestrian access control between the alley and the service/loading area. The mature trees and formal hedges in the median were part of the site's original historic landscape design.
- 4** The sidewalk along Main Street is littered with a mix of temporary and permanent barriers that are neither sufficiently anchored nor reinforced to stop a vehicle. They ignore the historic architecture of the building.
- 5** Accessible entries located away from the main entry require additional security screening and may not conform to the intent of accessibility laws or the principles of universal access.
- 6** The office at the northwest corner is highly visible from the street and vulnerable to threat from the adjacent high-risk building, as well as from traffic along Second Street, which falls within the 50-foot standoff zone.

KEY

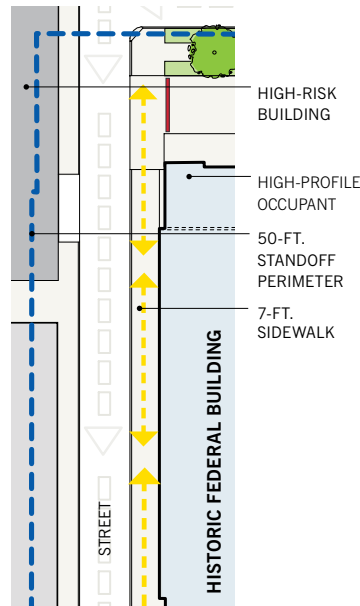
BUILDING ENTRY	GUARD BOOTH	STANDOFF PERIMETER
EMERGENCY EXIT	SITE LIGHTING	PEDESTRIAN CIRCULATION
ADJACENT BUILDING	BOLLARD	VEHICULAR CIRCULATION
HIGH-RISK BUILDING	SECURITY BARRIER	SITE SECURITY ZONE
LANDSCAPE AREA	CAMERA SURVEILLANCE	SITE SECURITY ASSESSMENT AREA
TREE		



Test Case 2: Conceptual Strategy Plan



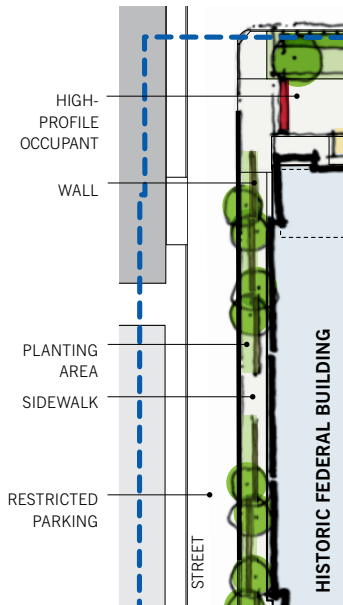
Existing Conditions Plan



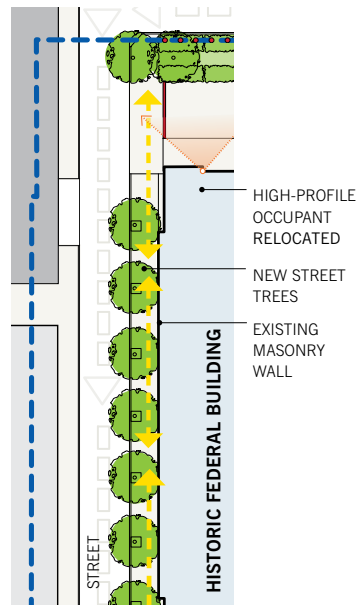
Security Design Problem

Current ISC standards for standoff distances can be impossible for a historic building in an urban location. Adjacent buildings within the standoff perimeter should be evaluated for potential security risks. For example, a privately owned parking garage within the 50-ft. standoff represents a higher risk than a retail building or a parking garage outside the standoff. Risk acceptance might be appropriate for a low-risk building, while mitigation measures such as sidewalk widening or the acquisition of adjacent properties might be necessary if the risk is deemed too high. In this case, the sidewalk may not be widened because of local transportation needs, so alternative solutions need to be explored.

Conceptual Strategy Investigation: Rejected



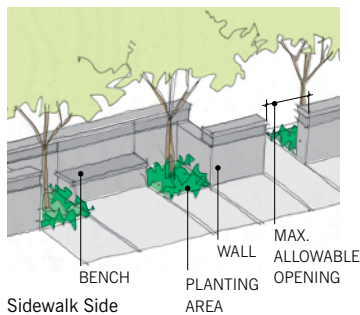
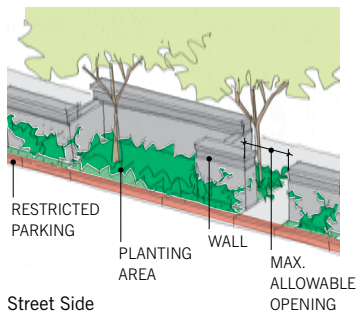
Design Solution Plan



Proposed Security Design Solution

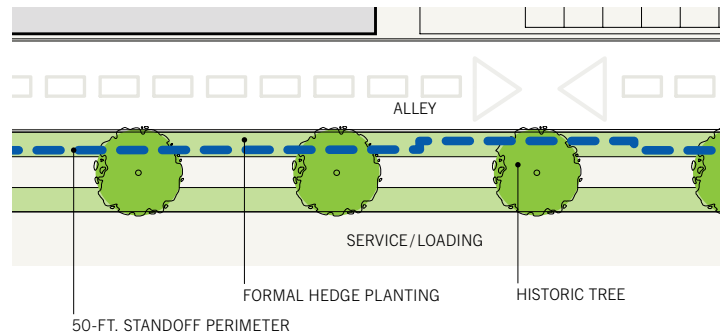
As a means of providing a hardened perimeter, the team investigates a staggered wall system with integrated seating and planting areas. Due to the spatial constraints of a dense urban site, however, this hardened wall element would provide only marginal protection. Also, given the thick masonry construction of the historic structure, the building itself resists a measurable degree of force.

The approach in this case is to accept the risk on this side of the building and not provide additional hardening. Operational measures are used to mitigate security concerns; for example, a high-profile occupant is relocated to a safer side of the building. Street parking is eliminated on both sides of the street within the 50-ft. standoff on the west side of the building.

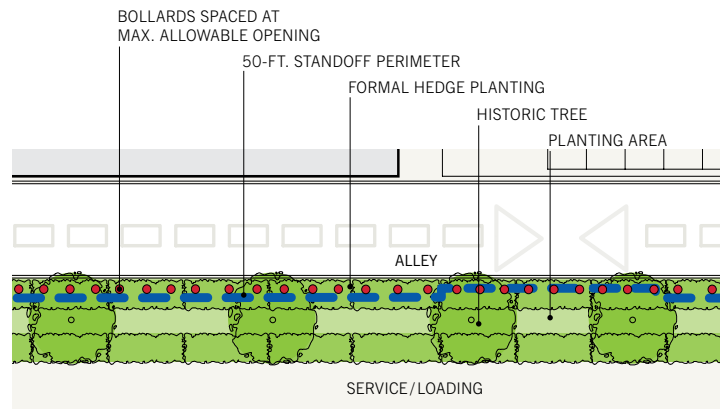


Project Area: Zone 3

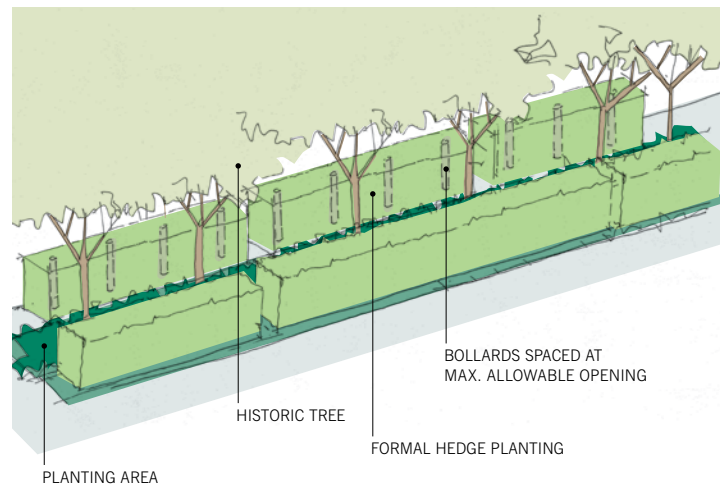
Existing Conditions Plan



Design Solution Plan



Bird's-Eye View



Security Design Problem

Alleys and service entries can present security issues with regard to public access. In some cases, an alley must be maintained as part of the public right-of-way. This can present significant risk, especially when the alley is in the required standoff. Both vehicular and pedestrian access to the building site through the public alley should be controlled and carefully monitored. Service entries should have limited access regulated by staffed guard booths, or automated security devices activated by key cards. The historic trees along the median present another issue when considering the implementation of security elements. The footing required to adequately anchor bollards or site walls can disrupt or destroy the root systems of mature trees if not placed properly. Underground conditions should be investigated and documented to understand possible impediments to effective security design.

Proposed Security Design Solution

Security hardening is added to the median between the alley and the service entry to prohibit vehicular approach from the alley. Bollards are combined with formal hedgerows in a staggered pattern to create a secure edge along the 50-ft. standoff perimeter that is aesthetically mitigated by ground cover and tree plantings. The planting serves to keep pedestrians from walking over the median into the service area. The historic trees are preserved by placing the bollards close to the curb line at the alley, where their footings are clear of the trees' root systems. The hedges originally designed for the site are removed and replaced with the same plant material to permit the installation of the bollards, while maintaining the historic design intent.

Alternately, the design team might have chosen to use low ground cover rather than hedges here. In cases where there is concern about concealed objects or sight lines, this approach may be more appropriate. Even without concealing the bollards, this method of greening the ground plane still would soften their visual impact.

Test Case 2: Final Concept Plan



Security and Site Design Solutions

- 1 An enhanced crosswalk emphasizes the pedestrian connection from the building's main entry to the light rail stop and the historic district beyond. New street amenities, such as benches and bicycle racks, heighten public use.
- 2 After careful study of reasonable options, risk acceptance is a better alternative than investing scarce resources on security measures that would not significantly mitigate risk.
- 3 The median between the alley and the service entry incorporates security measures that prohibit vehicular approach and regulate pedestrian access, while accommodating historic landscape elements.
- 4 A kit-of-parts consistent with the historic character of the building includes security elements that are also site amenities, such as a new bus shelter, lighting standards, and covered seating.
- 5 A new ADA entry near the building's main lobby integrates into the landscape area on the east side of the site.
- 6 The high-profile occupant is relocated to an office on the First Street side, where reinforced site walls and raised planting areas offer better protection.

Bollard and guard booth designs are based on material and style cues from existing features.





Site security at historic and other landmark buildings demands extra care, as their architectural, landscape, and urban design may contribute to their significance. Security elements must take cues from existing features in order to serve unobtrusively. At some sites, where a building is only a short distance from a public street, the introduction of physical countermeasures may provide little security enhancement, but considerable negative impact. Where this is the case, Project Teams should consider how operational measures, such as extra security patrols or interior space planning, might better serve the project's comprehensive goals.



Test Case 3

Building Renovation/Urban Location: Multiple Buildings

Existing Conditions/Site Context Plan 127

Test Case Assumptions

Site Security Assessment Plan 128

Security and Site Design Topics

Conceptual Strategy Plan 129

Project Area Design Studies Project Area: Zone 4 130

Security Design Problem

Proposed Security Design Solution

Project Area Design Studies Project Area: Zone 5 131

Security Design Problem

Proposed Security Design Solution

Final Concept Plan 132

Security and Site Design Solutions

INTRODUCTION

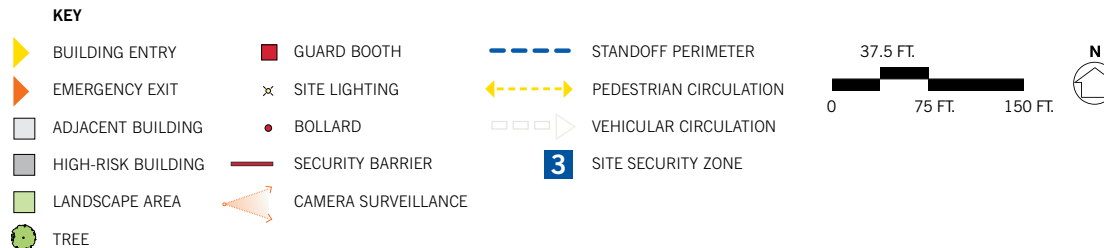
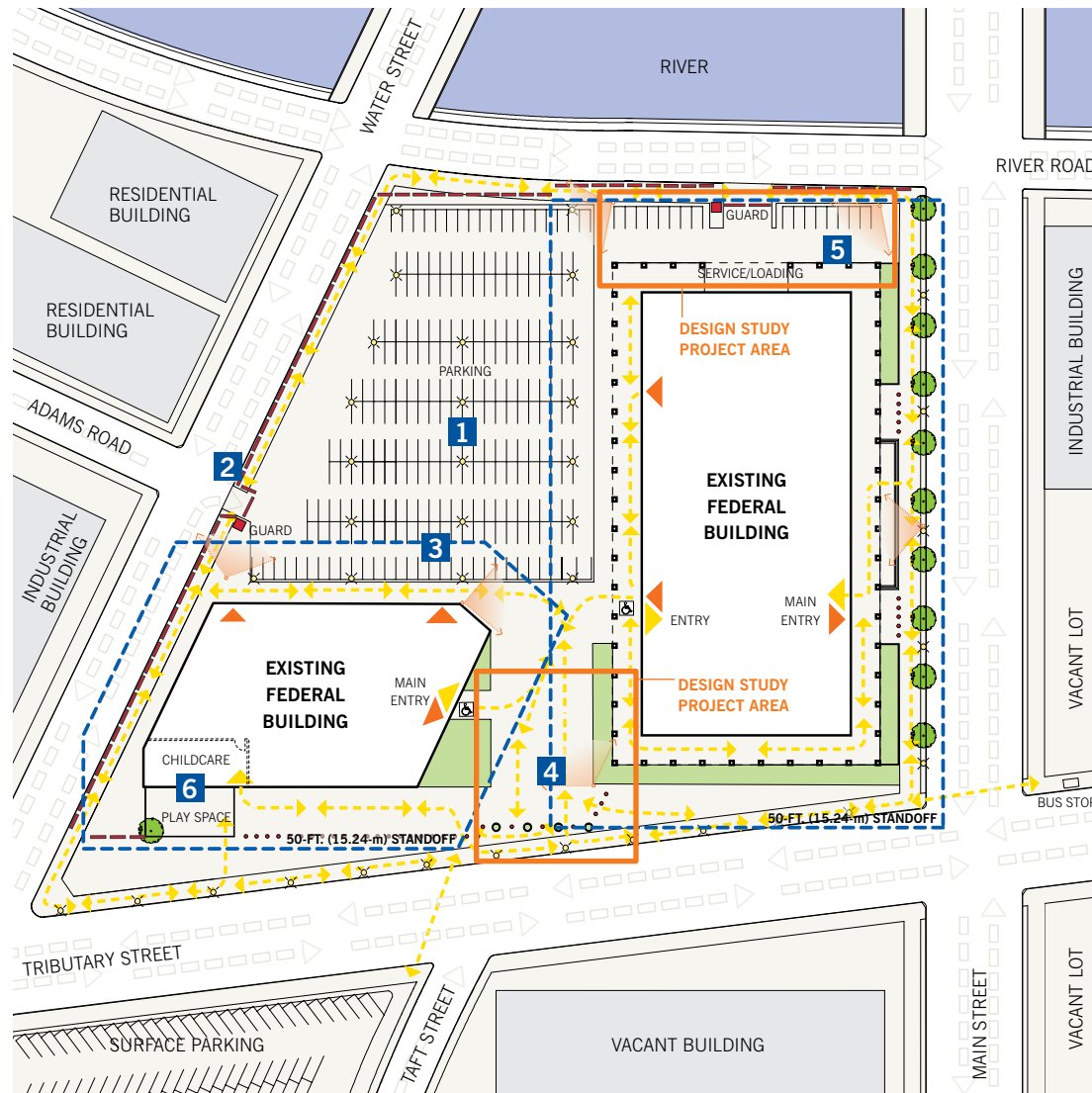
This test case describes two urban federal buildings that compose a small complex in a blighted downtown neighborhood. The federal buildings were designed and built in different eras in divergent architectural styles. The location of the buildings at the edges of the block and the fenced large surface parking lot in between disconnects the complex from the surrounding neighborhood.

The building on Tributary Street houses two tenant agencies of equal risk and has a medium ISC security rating. The childcare facility's outdoor play space near the corner of Water and Tributary Streets is within the 50-foot standoff, as is some of the surface parking. The building facing Main Street houses one tenant agency and received a high ISC security rating after risk assessment. The progressive collapse analysis identified structural vulnerabilities with the open colonnade that surrounds the building. The multiple entries to both buildings make adequate security oversight difficult. There are a lot of unsightly, mismatched, temporary and permanent standoff barriers placed throughout the site.

Although the risk assessment indicated that no adjacent buildings present a high risk, the building tenants have problems with neighborhood crime, including vandalism, theft of cars from the parking lot, and harassment. The lack of street activity accentuates the perception of the neighborhood as "dangerous." Local community groups are active in the fight for healthy communities. The city has begun a revitalization program focused on adaptively reusing the obsolete, industrial riverfront and piers to the north of the site to create a river walk with retail and residential uses.

Traffic studies indicate that the Water Street sidewalks can be widened to increase standoff if necessary.

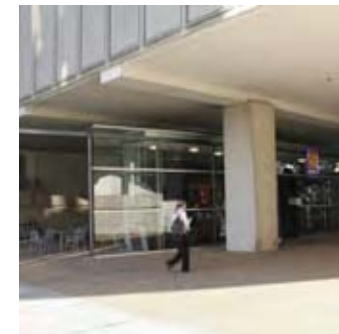
Test Case 3: Existing Conditions/Site Context



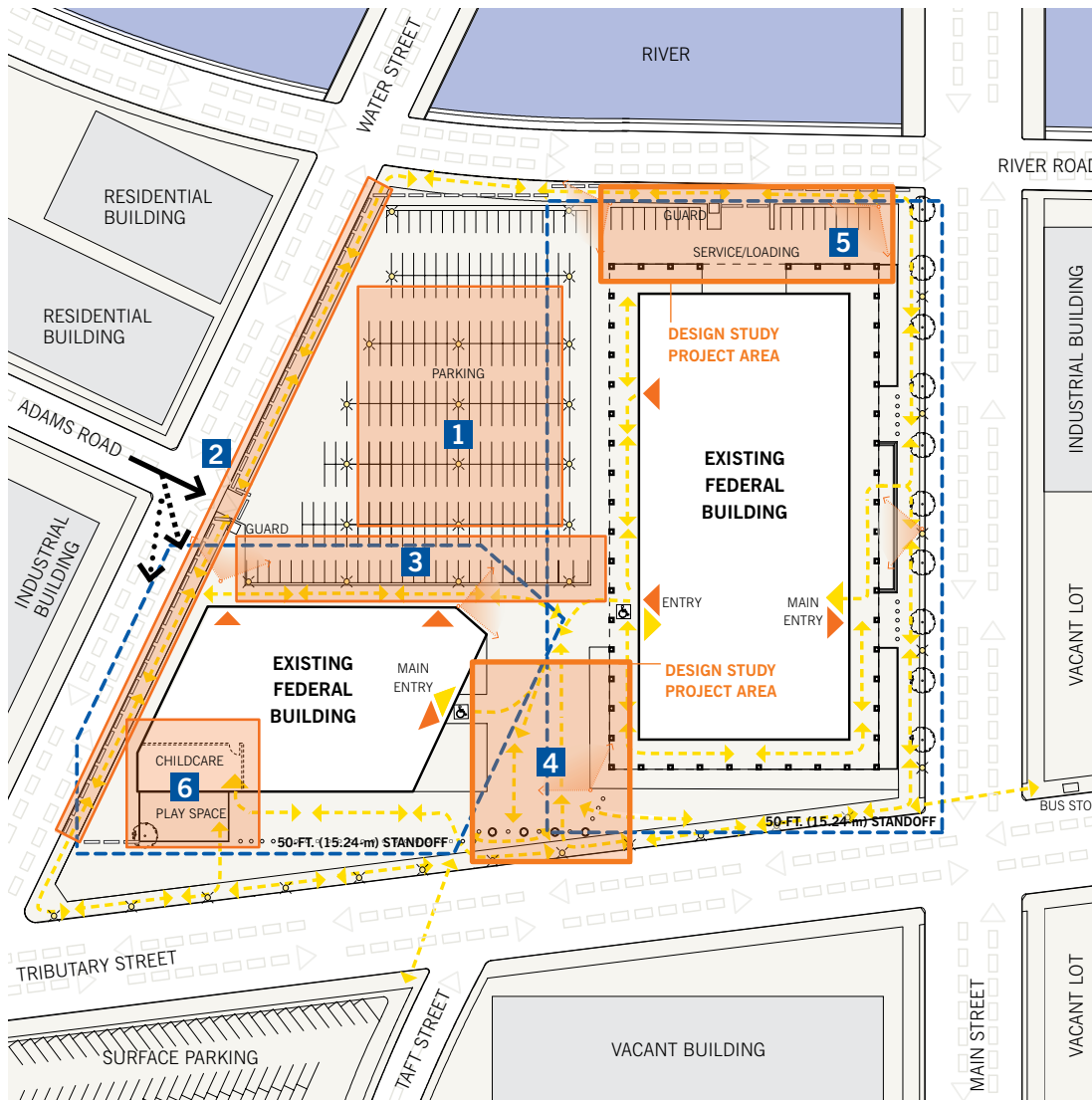
Test Case Assumptions

- 1 The large, on-site surface parking lot for staff and visitors to the two-building federal complex becomes a community farmers market during weekends.
- 2 Temporary barriers along the lengths of Water Street and River Road prohibit unauthorized vehicle entry into the parking lot.
- 3 Some of the parking spaces in the surface lot fall within the standoff zone of the existing federal buildings.
- 4 Because the two buildings were built at different times, their main entries are oriented to different parts of the site; an off-site bus stop is located to the east, across a busy street.
- 5 The building on the east side of the site has a colonnade, which allows pedestrians to circulate beneath the building's upper floors.
- 6 There is an on-site childcare facility with a separate public entry located off Tributary Street.

Existing conditions include a large site plan, a colonnade at one building that allows circulation under the upper floors, and required pedestrian and vehicular access.



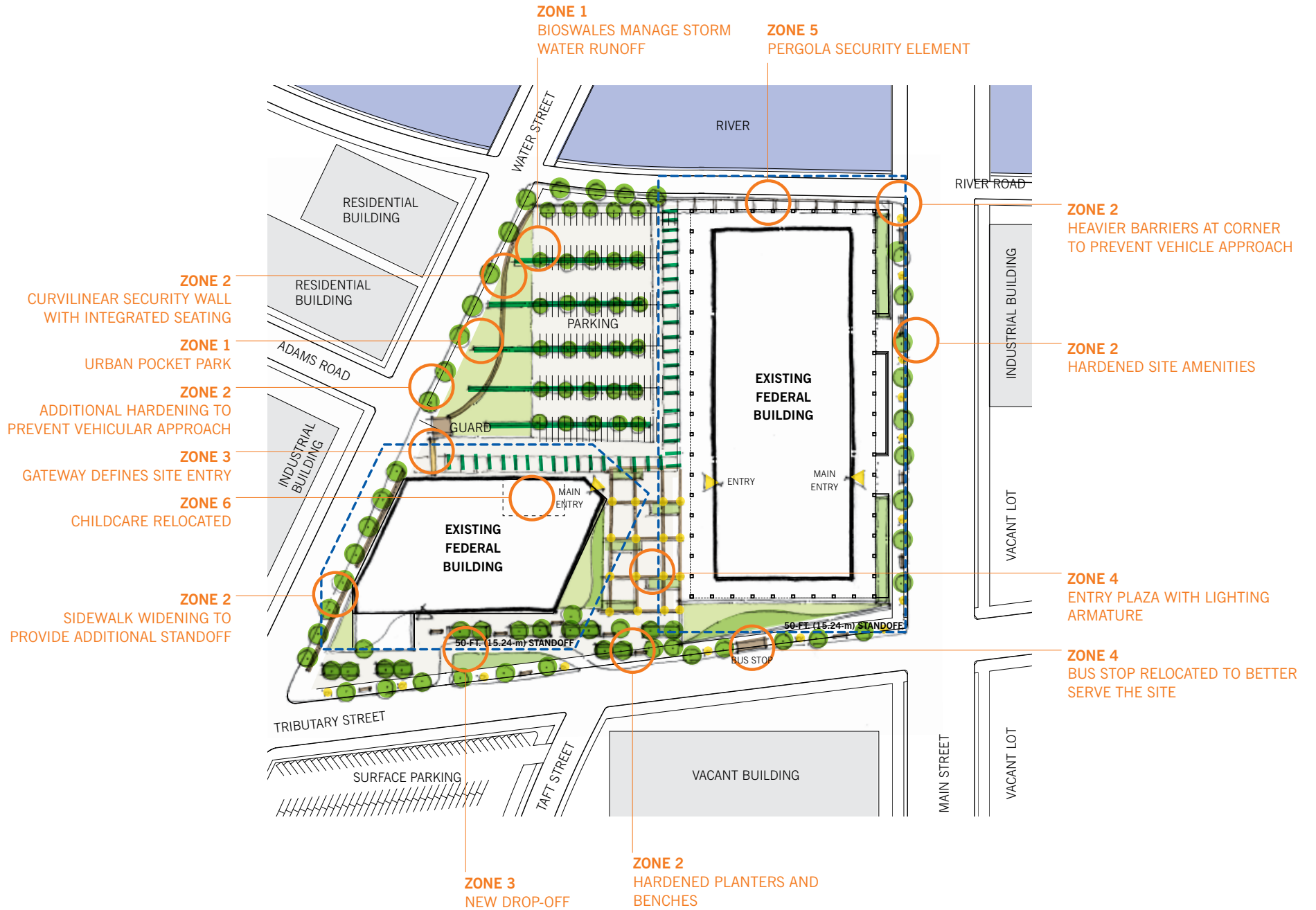
Test Case 3: Site Security Assessment Plan



Security and Site Design Topics

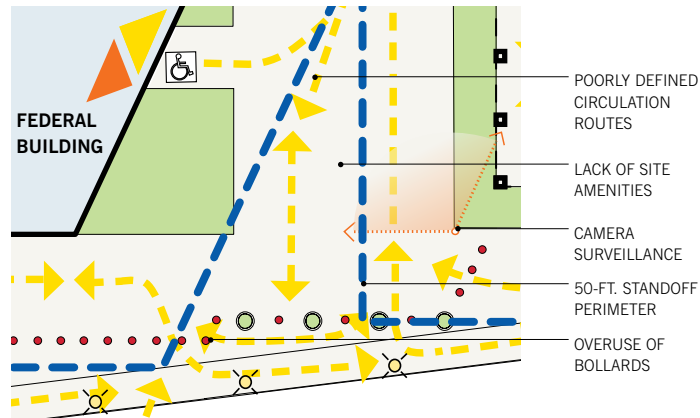
- 1** A site with federal buildings located at the edges of a large urban block may act as an island, cut off from the surrounding environment. Large areas of surface parking generate storm water runoff that must be managed, particularly when a natural water resource is nearby.
- 2** Perimeter locations with direct run-up access may expose the building to high-speed vehicular approach, while mid-block areas may preclude high-speed access. Temporary barriers would not provide sufficient vehicle stopping performance in either case.
- 3** Parking areas on the site that fall within the required standoff should be restricted to government vehicle parking only.
- 4** Multiple building entries around the perimeter of a large urban block can make navigation and circulation around the site difficult, especially when public transportation is located across a wide street and there are no wayfinding cues.
- 5** A building with a colonnade poses a security risk because of the vulnerability of exposed columns; if one column is undermined, then the entire building can fail because of progressive collapse.
- 6** When a childcare facility exists on-site, its location should be assessed relative to the risk factors of the buildings it serves.

Test Case 3: Conceptual Strategy Plan

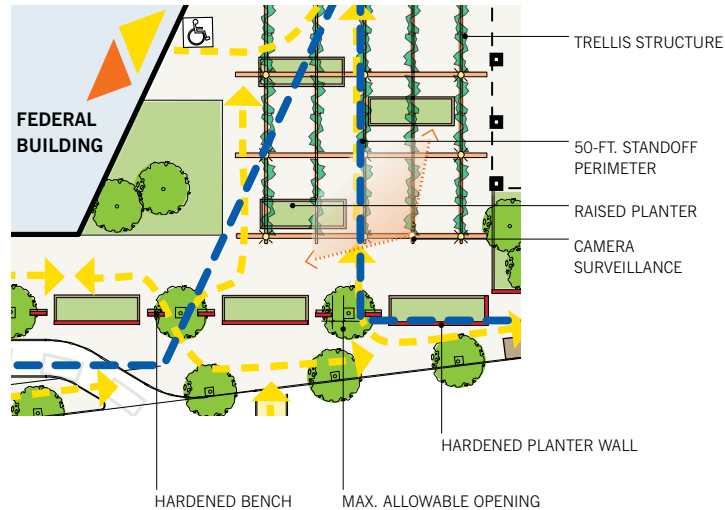


Project Area: Zone 4

Existing Conditions Plan



Design Solution Plan



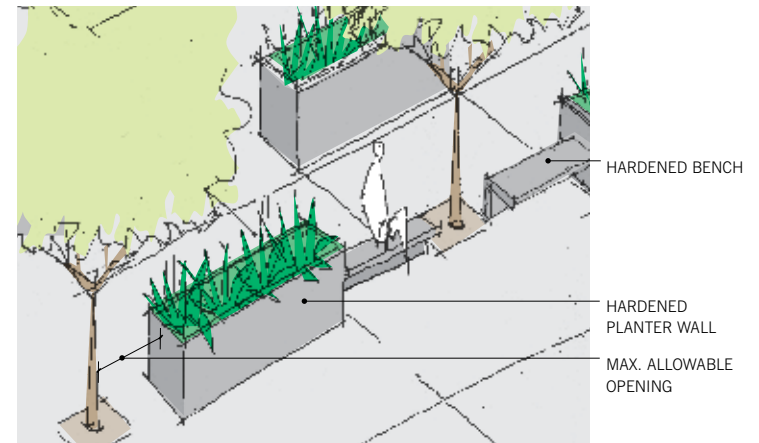
Security Design Problem

Multiple building entries around the perimeter of a large city block can make navigation around the site difficult and confusing. The lack of a central public space with common entries to the buildings decentralizes security oversight and increases the risk of blind spots. Repetition of a single obstruction, such as bollards, makes the site edge feel oppressive and unwelcoming. Traditional site amenities, for instance, benches, bus stops, light fixtures, and planting areas, can be hardened for use as security measures.

Proposed Security Design Solution

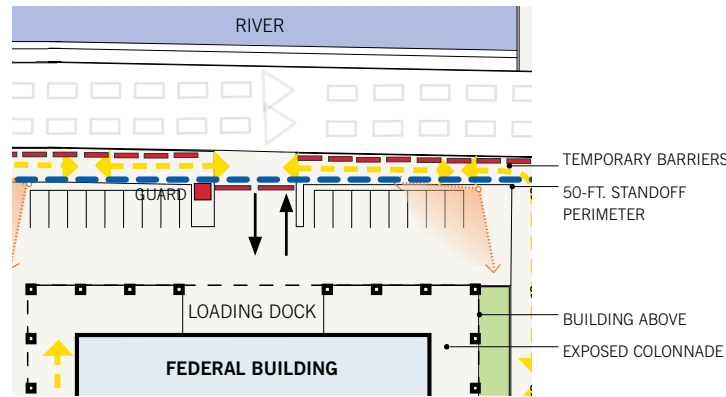
Moving the main entries to the two buildings centralizes all visitor circulation through the new entry plaza. The pergola houses site lighting to define the public space at night and provide clearly lit paths to the parking area and bus stop. Trees and staggered reinforced planters delineate the entry to a central public plaza. The raised planter element continues into the plaza, creating comfortably scaled outdoor rooms, while serving as barricades to prevent vehicular entry. Layered security elements provide the same security as bollards but are less obtrusive. Planters on the plaza interior that do not serve as barriers do not require hardening.

Bird's-Eye View

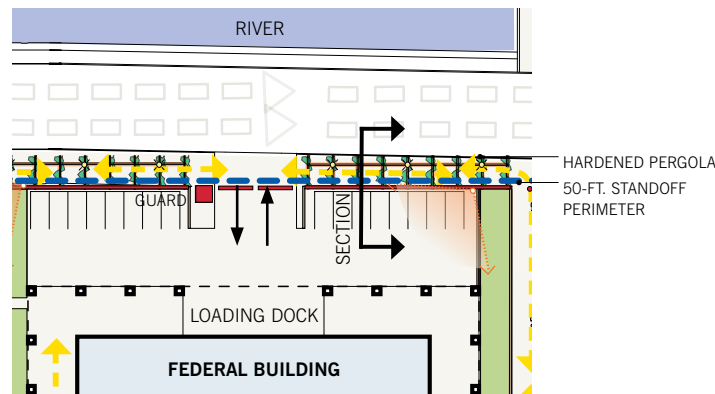


Project Area: Zone 5

Existing Conditions Plan



Design Solution Plan

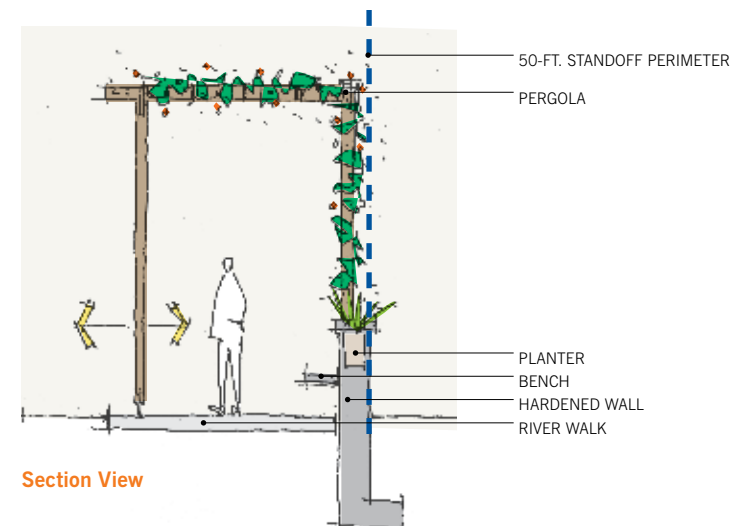


Security Design Problem

The exposed colonnade around the federal building on the east side of the site is a security concern because a blast could target a column and undermine the entire structure by triggering progressive collapse. A colonnade can be difficult to secure because the original design intent is to provide open circulation space around the building. In this case, the loading dock poses the most significant risk because it is a large open area that allows vehicular access near the first floor of the building.

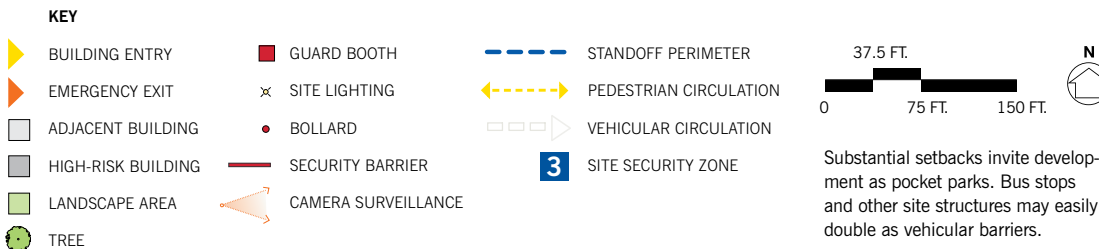
Proposed Security Design Solution

A hardened pergola guides pedestrian circulation, while providing a beautiful barrier between River Road and the loading dock. A hardened site wall, with integrated planting areas and seating, supports a light-framed structure that houses site lighting. Climbing vines decorate this pergola, which provides a continuous barrier to vehicular entry and creates a formal promenade along the riverfront. Although pedestrian access is not completely restricted, the nature of the structure and the provision of limited openings guides circulation through points with security oversight. Surveillance cameras could also be mounted on the pergola.



Section View

Test Case 3: Final Concept Plan



Security and Site Design Solutions

- 1** A new urban pocket park along the Water Street edge creates an opportunity for the community to better utilize the site throughout the week, while providing shaded seating areas that can be used when the farmers market meets. Bioswales, landscape elements designed to remove silt and pollution from surface runoff water, direct storm water from the parking lot to the park.
- 2** To increase standoff along Water Street, the sidewalk is widened and new parking restrictions are implemented. In response to vector analysis, robust perimeter barriers prevent approach from Adams Road, while less obtrusive hardened streetscape elements protect the middle of the block.
- 3** Tenant and visitor parking is removed from the buildings' standoff zones. Site walls and a pergola define and guide circulation.
- 4** Shifting the entries to the two buildings centralizes circulation through a new entry plaza. Moving the bus stop to the curb in front of the plaza brings public transportation directly to the site.
- 5** The pergola completely restricts vehicular access to the exposed building columns of the colonnade from the loading dock area and creates a pleasant promenade along the riverfront. Extra hardening at the corner accounts for increased possibility of vehicular approach.
- 6** The childcare facility and its associated outdoor play space are relocated to a safer location on the interior of the site.





Effective security must be more than meets the eye. Strategically placing the most robust elements only where analysis determines they are needed makes the most efficient use of the overall project budget and affords greater design flexibility throughout the site. Where security measures can be less robust, there is opportunity to make them appear instead as seating, shade, or other amenities.



Test Case 4

Campus Renovation/ Suburban Location

Existing Conditions/Site Context Plan 135

Test Case Assumptions

Site Security Assessment Plan 136

Security and Site Design Topics

Conceptual Strategy Plan 137

Project Area Design Studies Project Area: Zone 1 138

Security Design Problem

Proposed Security Design Solution

Project Area Design Studies Project Area: Zone 5 139

Security Design Problem

Proposed Security Design Solution

Final Concept Plan 140

Security and Site Design Solutions

INTRODUCTION

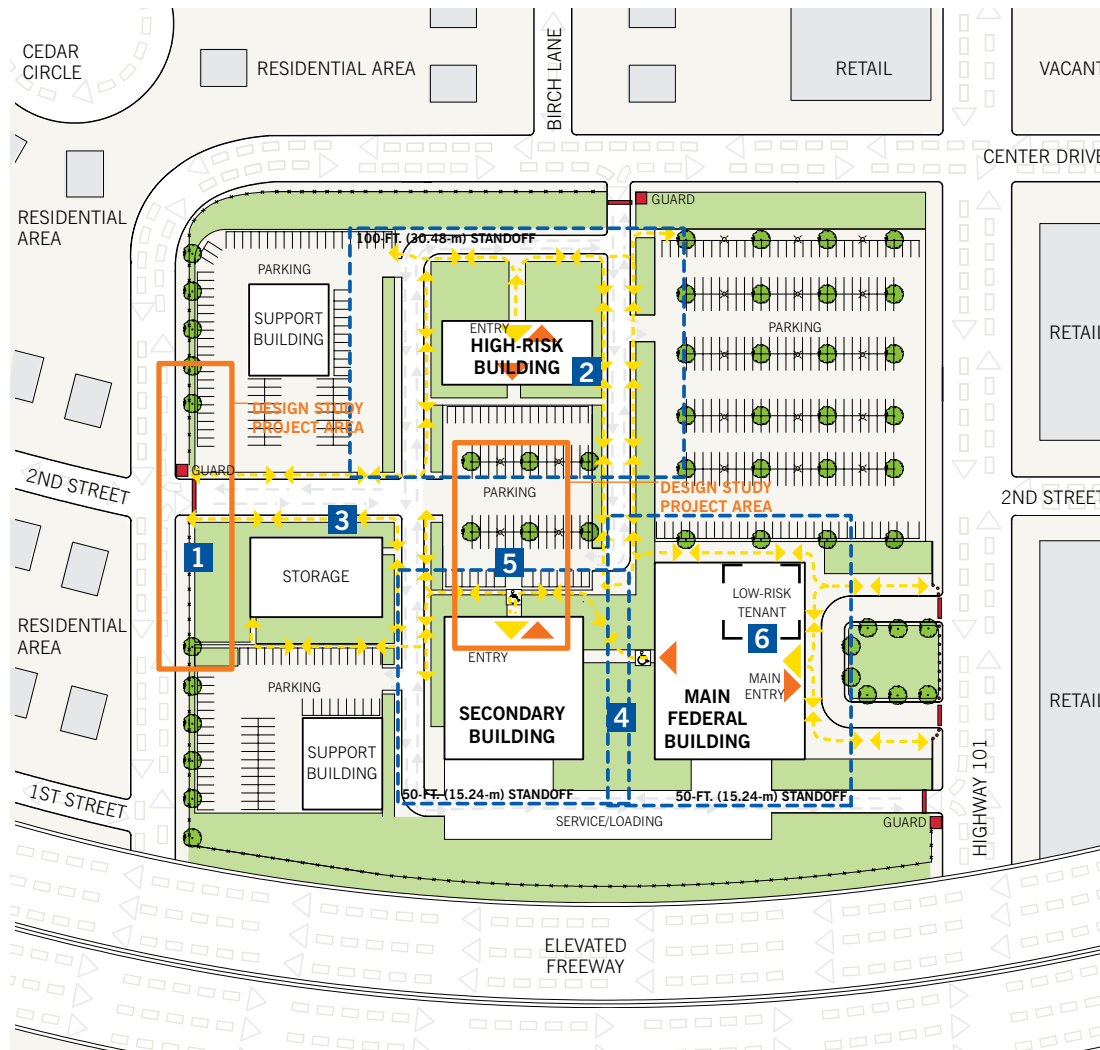
This federal complex comprises six buildings, with a similar architectural style, built during the same decade. There are three multistory office buildings, two support buildings, one storage building, and multiple surface parking areas. A chain link fence encloses the entire complex. Both of the support buildings are redundant for the campus, and the storage building is underutilized. There are no exterior public spaces programmed for building tenants to eat, sit, or participate in other outdoor activities.

The main federal building houses five tenant agencies: four with an ISC security rating of medium, and one with a low-risk rating. The secondary building contains multiple agencies, all rated medium. The high-risk building has a single tenant agency with a high ISC security rating. All occupied federal buildings are able to achieve a minimum standoff of 50 feet from the surrounding streets.

The perimeter chain link fence disconnects the majority of the complex from the surrounding residential neighborhood. There are multiple vehicular entries and large areas of poorly lit surface parking throughout the site, making it difficult for guards to monitor both vehicles and pedestrians. To further complicate matters, the vehicular and pedestrian circulation systems are not clear, and the few wayfinding signs are confusing.

During the initial development of the complex, a portion of Second Street from Center Drive to Highway 101 was closed. An elevated freeway borders the site to the south, and recently, a lively retail corridor has been developing to the east, across Highway 101.

Test Case 4: Existing Conditions/Site Context Plan



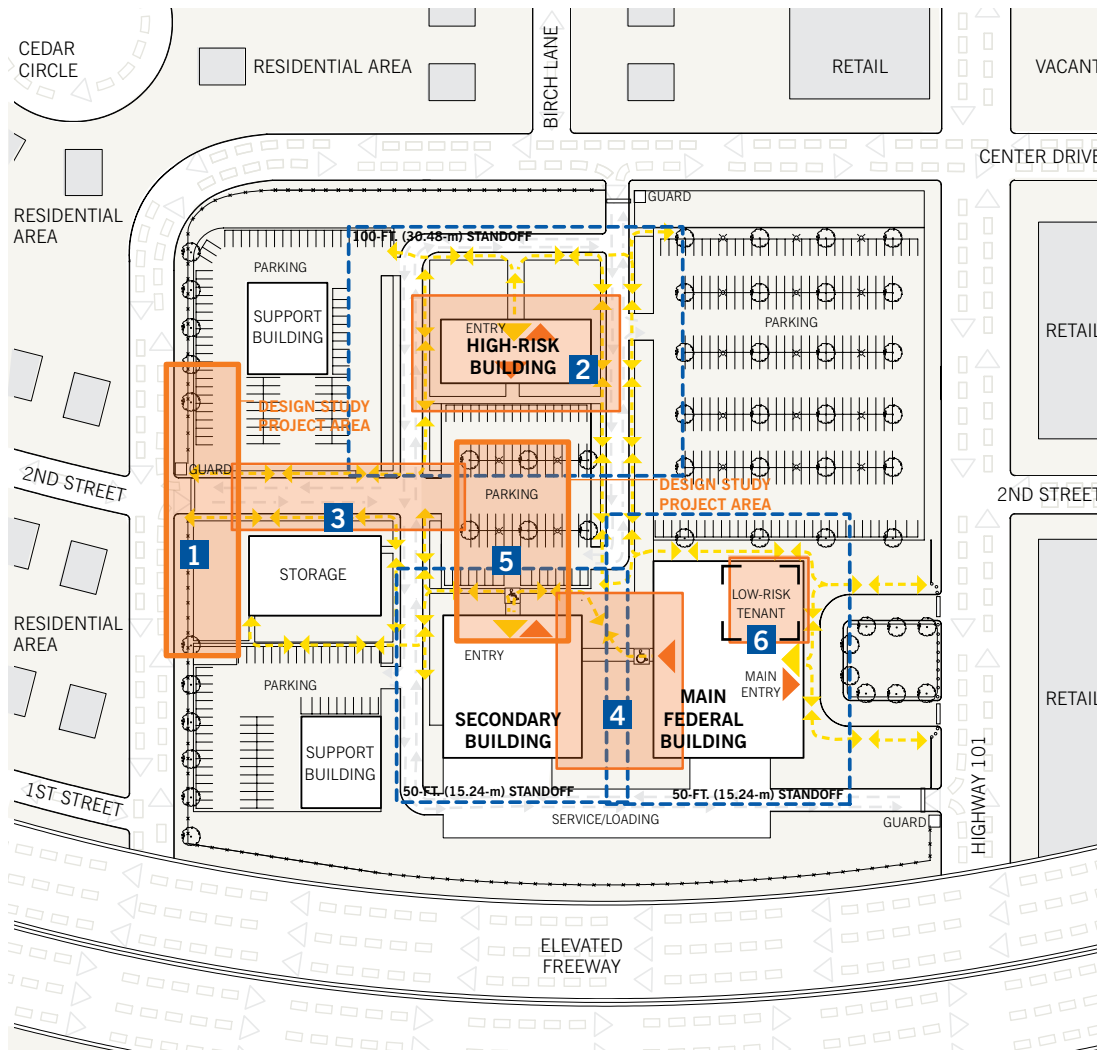
Test Case Assumptions

- 1 The site has an extensive perimeter and varying adjacent conditions and uses on each side, including residential neighborhoods. The northwest corner of the site is underutilized.
- 2 There are multiple tenants on-site with a mix of low, medium, and high ISC security ratings, requiring different minimum standoff perimeters.
- 3 The site has a confusing internal roadway system. There are three guarded vehicular entry points that require a high degree of staffing and operational support.
- 4 There are neither dedicated public spaces nor site amenities, such as benches, for the use of tenants and visitors.
- 5 There is no coordinated occupant emergency plan to guide building occupants to a safe area after they have exited their building in the event of an emergency.
- 6 The low-risk tenant in the main federal building has a high degree of direct interaction with the public.

Federal campuses frequently include large open spaces, low density, pedestrian walking paths, and surface parking lots.



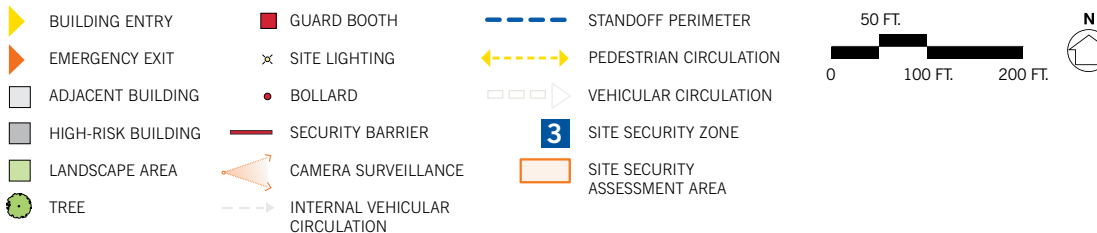
Test Case 4: Site Security Assessment Plan



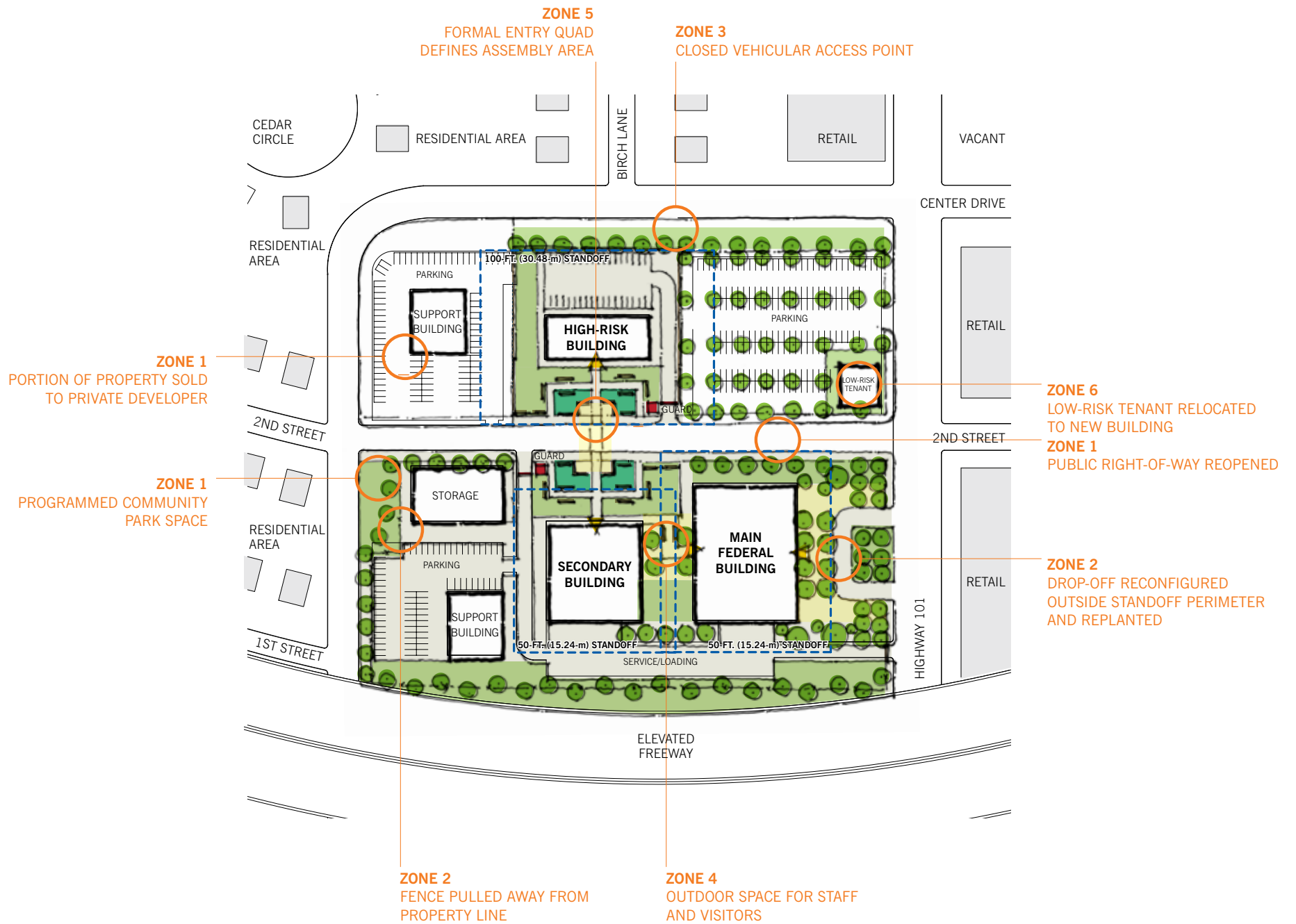
Security and Site Design Topics

- 1** To create more amenities in the neighborhood, a private developer is interested in developing a portion of the site in accordance with an agreement with the federal government. The local community would like to develop a neighborhood park.
- 2** The high-risk building needs a 100-foot standoff perimeter, per the ISC criteria.
- 3** A circulation system without a hierarchy of routes, as well as multiple building and parking entries, can confuse visitors and complicate security oversight.
- 4** Where several buildings share facilities isolated from the services of a surrounding neighborhood, public space should be provided for the comfort and convenience of tenants and visitors.
- 5** The federal complex should have an occupant emergency plan and unobstructed exits to ensure efficient egress. In an emergency, building occupants should know where to find an area of refuge to await further instruction and possible evacuation.
- 6** The needs of this low-risk but high-traffic tenant present challenges that should be addressed as part of overall building security.

KEY

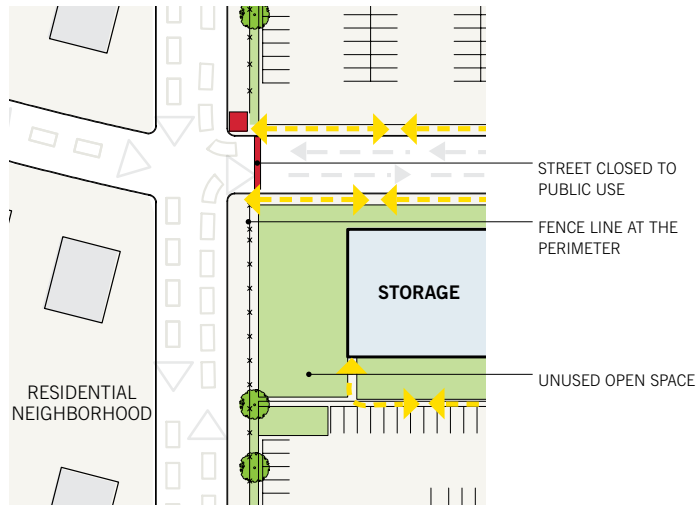


Test Case 4: Conceptual Strategy Plan

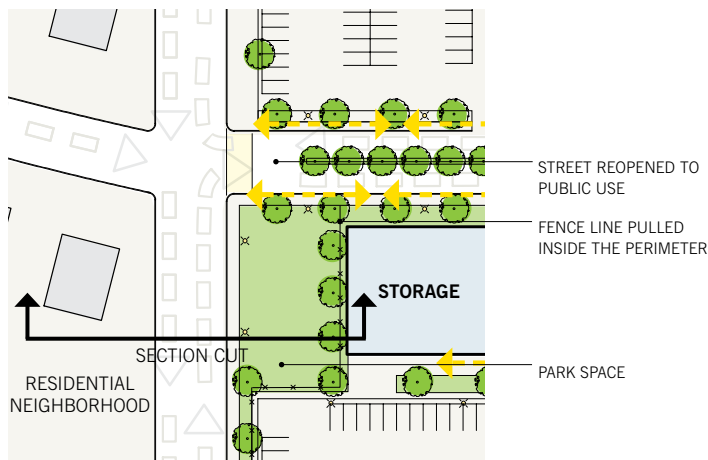


Project Area: Zone 1

Existing Conditions Plan



Design Solution Plan



Security Design Problem

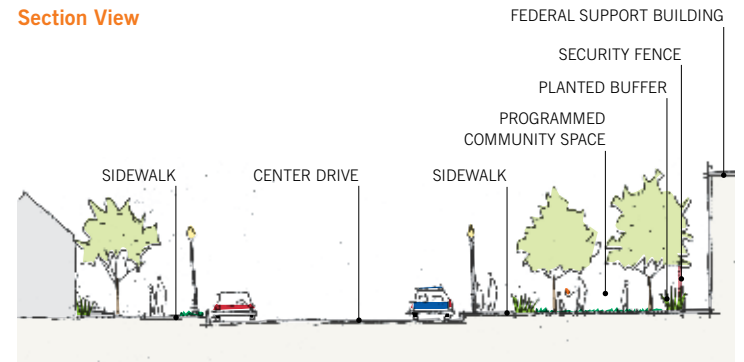
A long perimeter distance can be difficult and expensive to secure properly. At certain areas of the site, the perimeter fence also needs to serve as a vehicle barrier. If space is available, the fence need not run along the property line. Pulling the fence line back provides visual relief, as well as areas for trees and hedges, which can screen the fencing. Programmed activities in landscaped areas create lively outdoor space and bring more eyes to the neighborhood to discourage criminal activity.

Programmed uses may include park use or an exercise station for employees and nearby residents. The proximity of the parking lot may offer additional opportunities, for a weekend farmers market, art fair, or other public use.

Proposed Security Design Solution

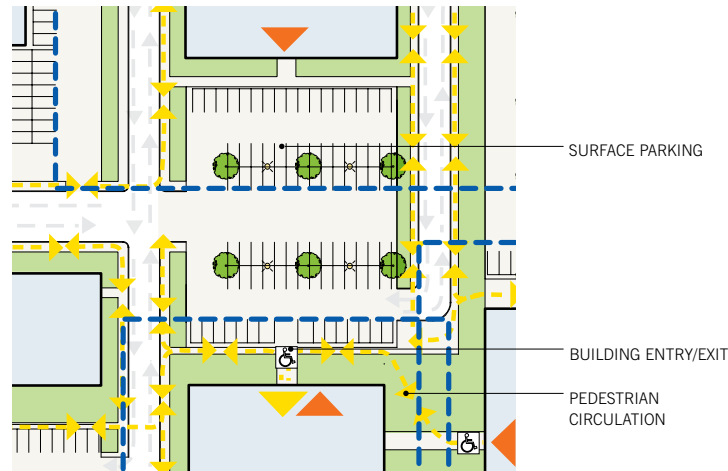
The campus perimeter has a wide landscape buffer in some areas. To activate the campus edge, the site security fence is pulled inside the property line, creating spaces large enough for a federal–community partnership to program as parks. Providing park space for the community contributes to positive public perception of the federal facility and better utilizes what would otherwise be a neglected and poorly monitored area of the site.

Section View

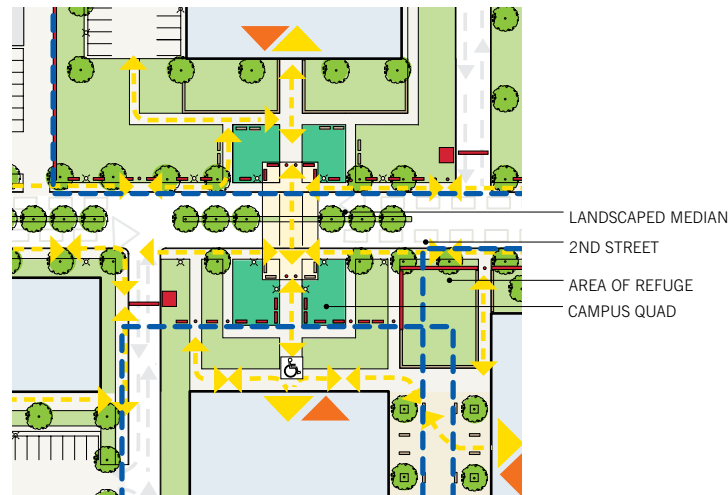


Project Area: Zone 5

Existing Conditions Plan



Design Solution Plan



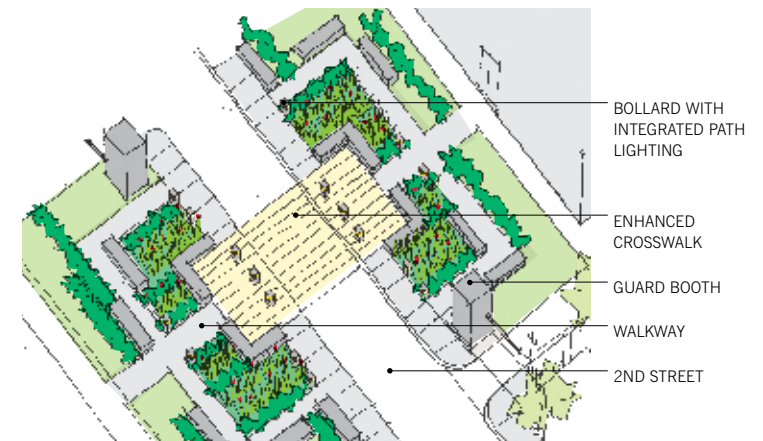
Security Design Problem

A large site with multiple buildings may be confusing to navigate, especially in the event of an emergency when one or more buildings need to be evacuated. Coordinating an occupant emergency plan for all of the buildings is crucial. Occupants must have clear exit routes and an area of refuge that they can find easily. The area of refuge should be open and level, with clear sight lines to and from building exits. If the entire site ever needs to be evacuated, the area of refuge will provide an assembly point from which to direct building occupants to safety.

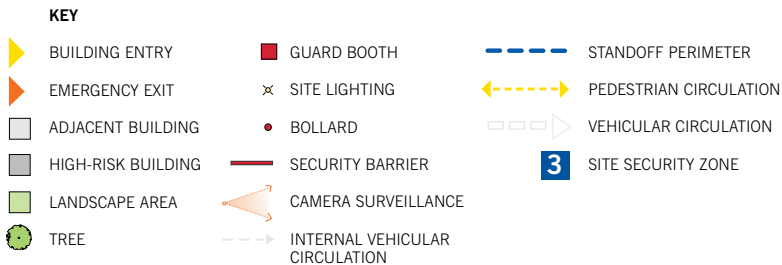
Proposed Security Design Solution

A formal entry/campus quadrangle (quad) is created perpendicular to Second Street, which is reopened to traffic. An enhanced pedestrian crosswalk provides safe crossing, and a landscaped median helps to slow traffic. The quad seating areas are placed along axial, garden-lined pedestrian paths. Clear signage and lighting lead visitors to and from their building. Reinforced site furniture along the paths establishes a perimeter, without requiring lines of bollards. The quad provides both site amenities and an area of refuge to be used in an emergency.

Bird's-Eye View



Test Case 4: Final Concept Plan



Central public spaces support casual and programmed use. Tenants with public contact may work best in a retail environment at the edge of a site.

Security and Site Design Solutions

- 1** Rather than attempting to fill extra space with new tenants, it is more cost-effective for the government to sell the property that it does not need. Extra space can be programmed as parks, in partnership with community organizations. Landscape berms are used to define the edge along the elevated freeway.
- 2** The high-risk tenant now has increased security. Perimeter walls establish the 100-foot standoff. A new controlled-access point serves a parking area dedicated to the tenants of the building.
- 3** Second Street is reopened to traffic, and the site's access points are located along this road. One of the two guard booths on the south block may be automated.
- 4** A nicely scaled exterior plaza, with room for outdoor dining and other events, is now available for use by staff and visitors.
- 5** A formal entry/campus quadrangle, central to the site, is visible from each building's exit points and provides ample room for assembly in an emergency.
- 6** The low-risk tenant occupies a new building at the edge of the campus that is easily accessible to the public. A retail structure and parking garage add new amenities to the developing retail corridor along Highway 101.





Suburban federal complexes often encompass enormous acreage and border low-density land uses, such as residential or commercial neighborhoods. These conditions offer improvement opportunities that differ from those of their urban counterparts. In fortifying the perimeter of a multi-building complex, for example, Project Teams may find opportunities to improve the sustainability of a site. Bioswales—sloped, vegetated channels that help clean surface runoff water—both mitigate the negative impact created by substantial paved areas in such complexes and offer the security benefits of a ditch or moat. Land along the perimeter of a site provides opportunities for public use space, including small parks or sports fields.



Test Case 5

New Construction/Urban Location

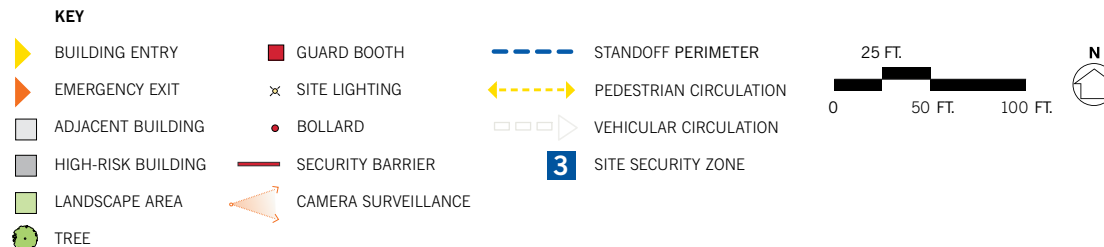
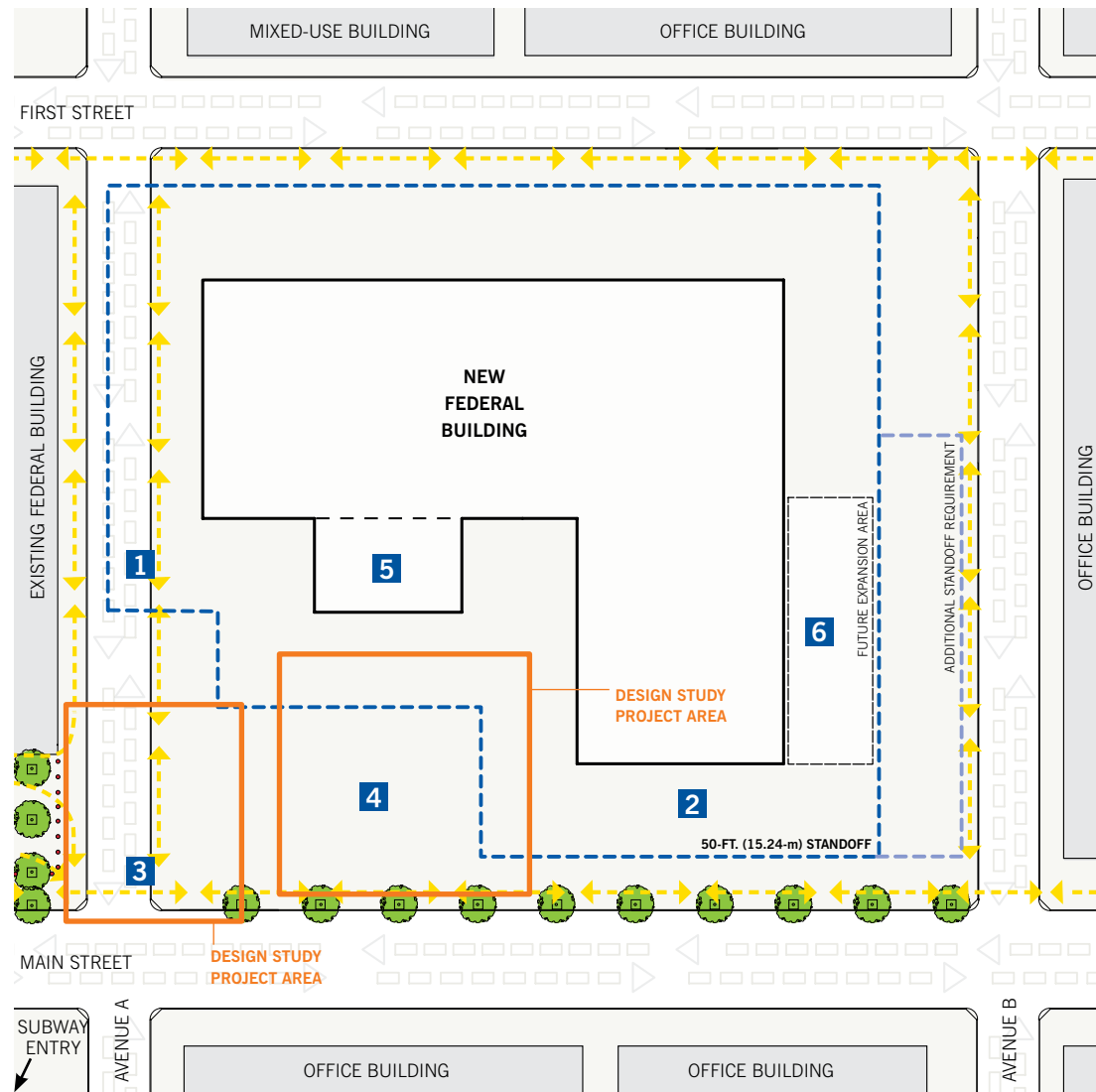
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INTRODUCTION

This test case illustrates how a new construction project can integrate security features into its overall design from the earliest planning stages, beginning in the Feasibility Study phase. During site selection, the team considers alternatives for building orientation, vehicular and pedestrian circulation, and parking in relation to such security requirements as standoff distances. For example, traffic on Avenue A between the existing federal building and the proposed new building poses a potential security risk. But closing this street may have a negative impact on traffic movement, an issue the Project Team must consider carefully.

The new federal courthouse planned for this site has a medium ISC security rating. Locating the new building close to the adjacent existing federal building to share a common standoff zone creates a larger buildable site area, while providing opportunities for shared site amenities and security features. The Project Team must provide sufficient area within the standoff zone for a possible 30-year expansion. And, since the subway station most federal workers will use is located along Avenue A just south of Main Street, the city and the Project Team would like to enhance this commonly used pedestrian path.

Test Case 5: Existing Conditions/Site Context Plan



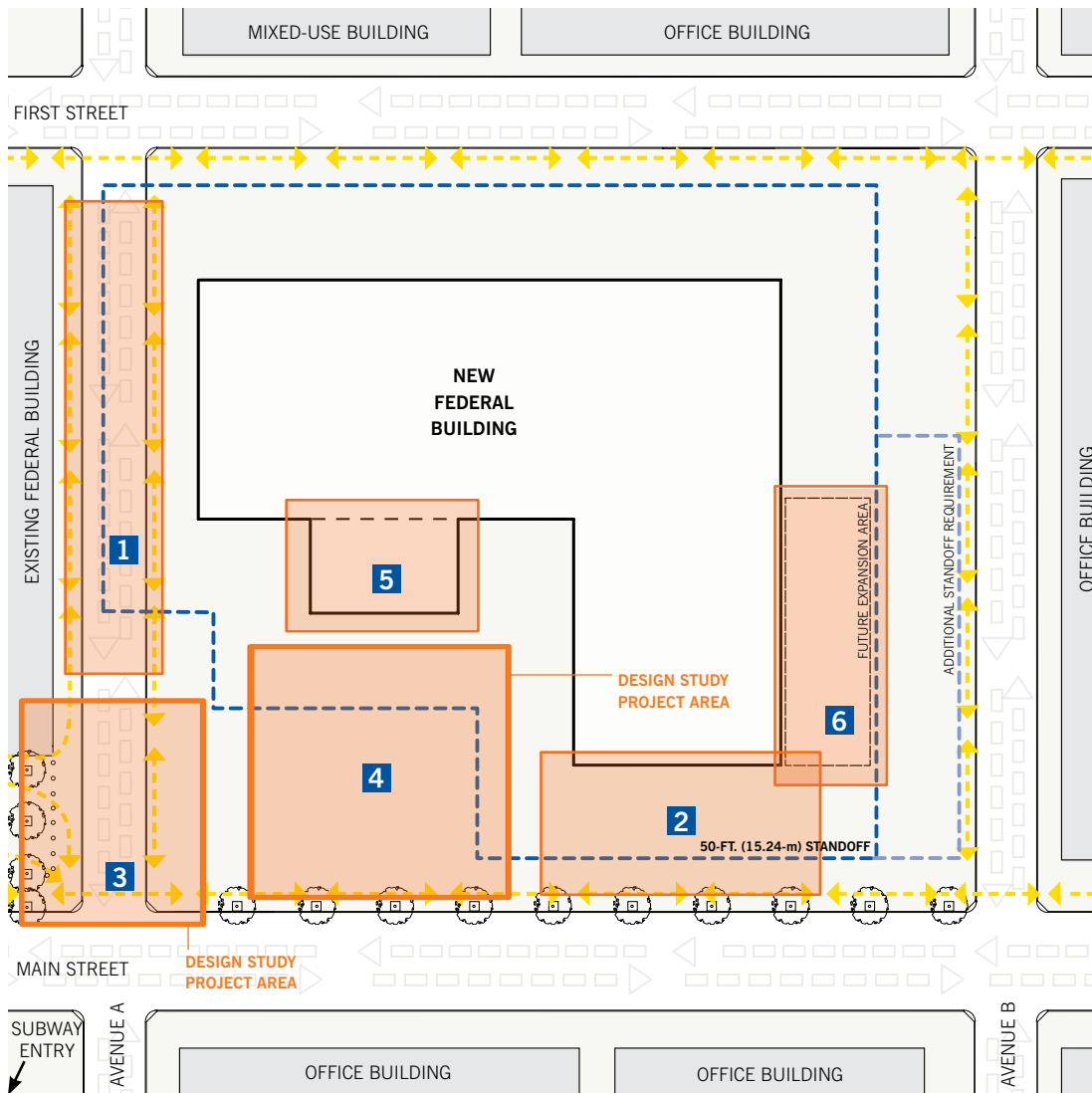
Test case assumptions

- 1** There is an existing federal building across Avenue A from the site. The street between the two federal buildings falls within the likely standoff area of the new federal building.
- 2** The maximum available standoff differs on each side of the building, but the minimum of 50 feet (per ISC criteria) is a starting place for determining the location of perimeter barriers.
- 3** As the site design is developed, provisions should be included for first responder vehicles, which may need direct access to all sides of the building in an emergency.
- 4** Security measures are to be integrated into the design of a multipurpose public space.
- 5** The design of the new federal building includes a hardened lobby vestibule to screen visitors prior to entry into the main building.
- 6** A square footage allowance has been provided for 30-year expansion, to accommodate future building needs. The site must provide enough space for the additional standoff requirement in the event that there is an addition to the building.

Many new federal facilities include security screening outside the main building envelope and massing and detailing in a contemporary architectural language.



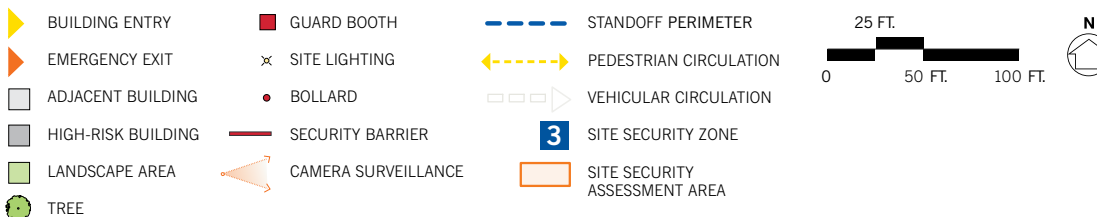
Test Case 5: Site Security Assessment Plan



Security and Site Design Topics

- 1 Through discussions with the city, the Project Team found that traffic volumes on Avenue A were low, and it may be appropriate to request street closure. This would enable the building footprint to move closer to the west property line, in keeping with the surrounding urban fabric.
- 2 On a dense urban site, maintaining a hardened perimeter at the required minimum standoff may interrupt the street edge. The team should look for opportunities to minimize unnecessary standoff and design usable space where possible.
- 3 Emergency access should be coordinated with the appropriate agencies at the earliest stages of site design.
- 4 A multipurpose public space that supports activity can enliven the site and allow room for public use and queuing.
- 5 The site layout should correspond with the building's lobby vestibule to balance all required security and facility operations needs with clear pedestrian circulation.
- 6 The 30-year expansion zone may be temporarily programmed until the site is further developed.

KEY

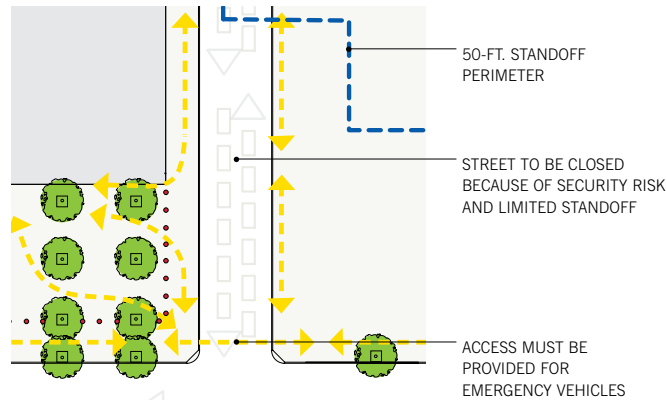


Test Case 5: Conceptual Strategy Plan

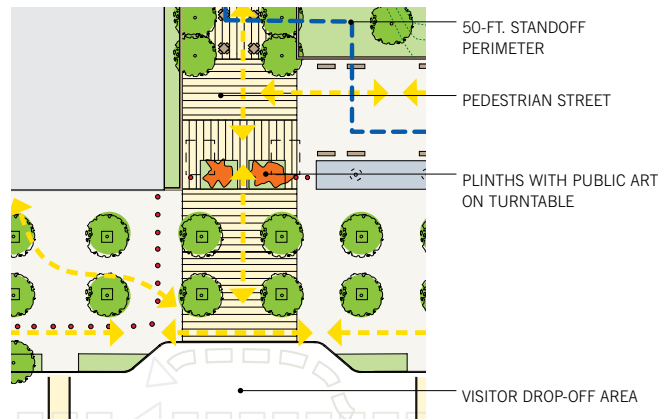


Project Area: Zone 3

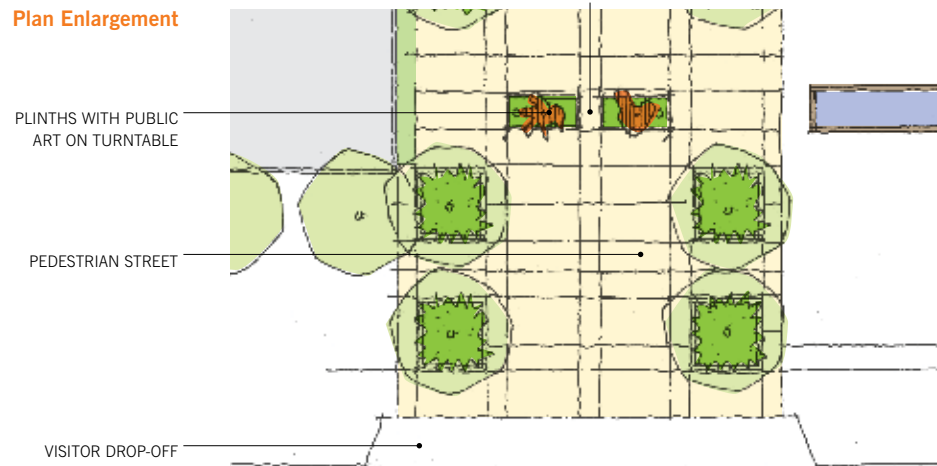
Existing Conditions Plan



Design Solution Plan



Plan Enlargement



Security Design Problem

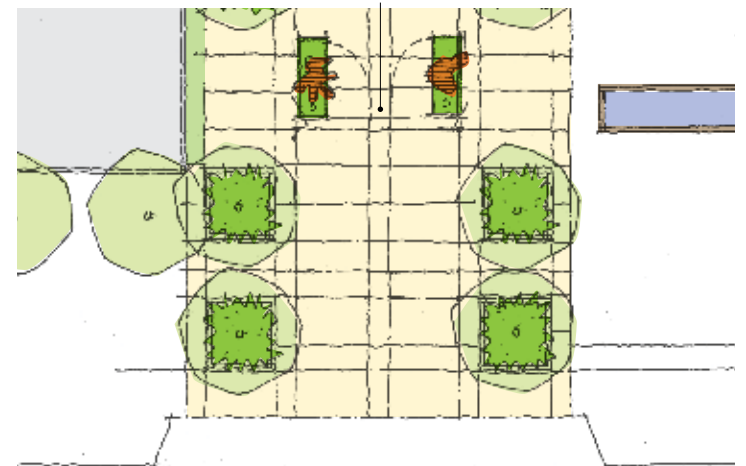
When a street is vacated for security purposes, significant investment is required to justify the impact to the surrounding urban environment. Practical issues, such as emergency vehicle access, must also be considered. The security elements needed to secure the standoff perimeter must allow first responders to quickly and easily access the site, if needed. Security elements should be multifunctional.

Proposed Security Design Solution

The permanently vacated street between the existing federal building and the new federal building is developed as a pedestrian public space that links the plazas of the two buildings. Special paving, planter plinths, a variety of seating areas, and an allee of canopy trees define the new pedestrian street. Turntables at the entry to the pedestrian space from the Main Street plaza secure the standoff perimeter and provide a base for public art pieces. The turntables may be rotated to allow vehicular access in the event of an emergency. On the opposite end, at First Street, an apron allows access for emergency vehicles, while retractable bollards protect the standoff (not shown here.)

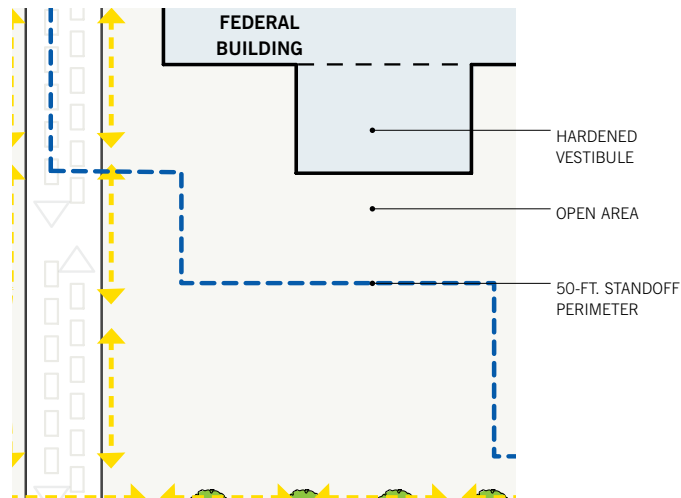
CLOSED POSITION

OPEN POSITION

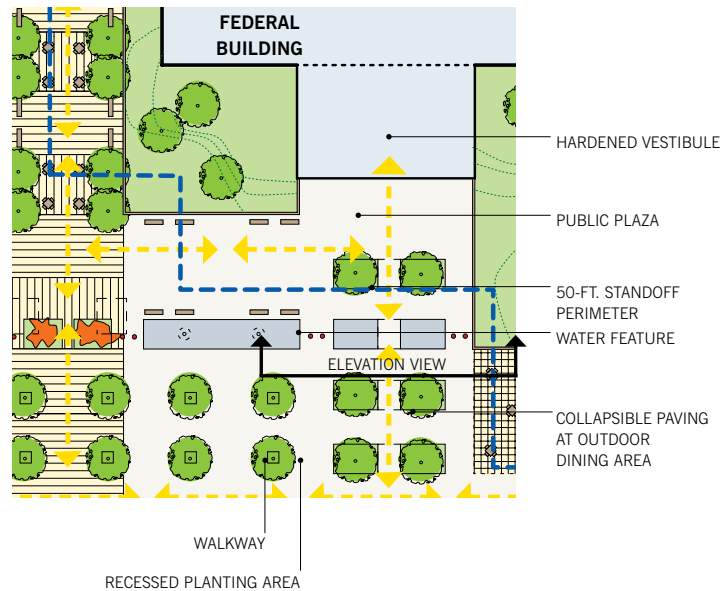


Project Area: Zone 4

Existing Conditions Plan



Design Solution Plan



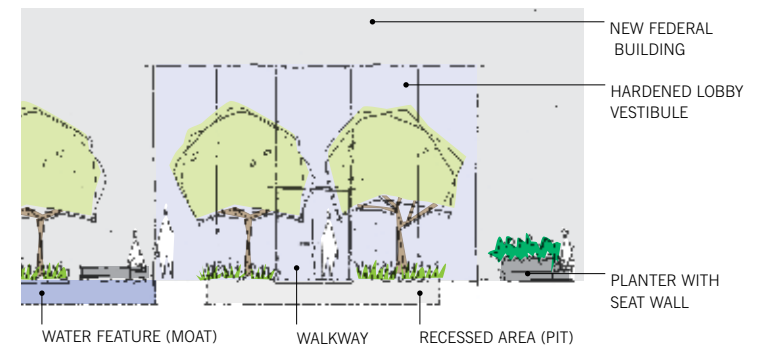
Security Design Problem

A multipurpose public space programmed for special functions activates the site, allows room for safe public demonstration, and manages queuing. Protecting this open space without overuse of security elements can be challenging. Public space surrounded by bollards or Jersey barriers can seem forbidding to pedestrians and discourage public use. It is critical to strike a balance between effective security design and quality public space to ensure the safety of users and foster activity.

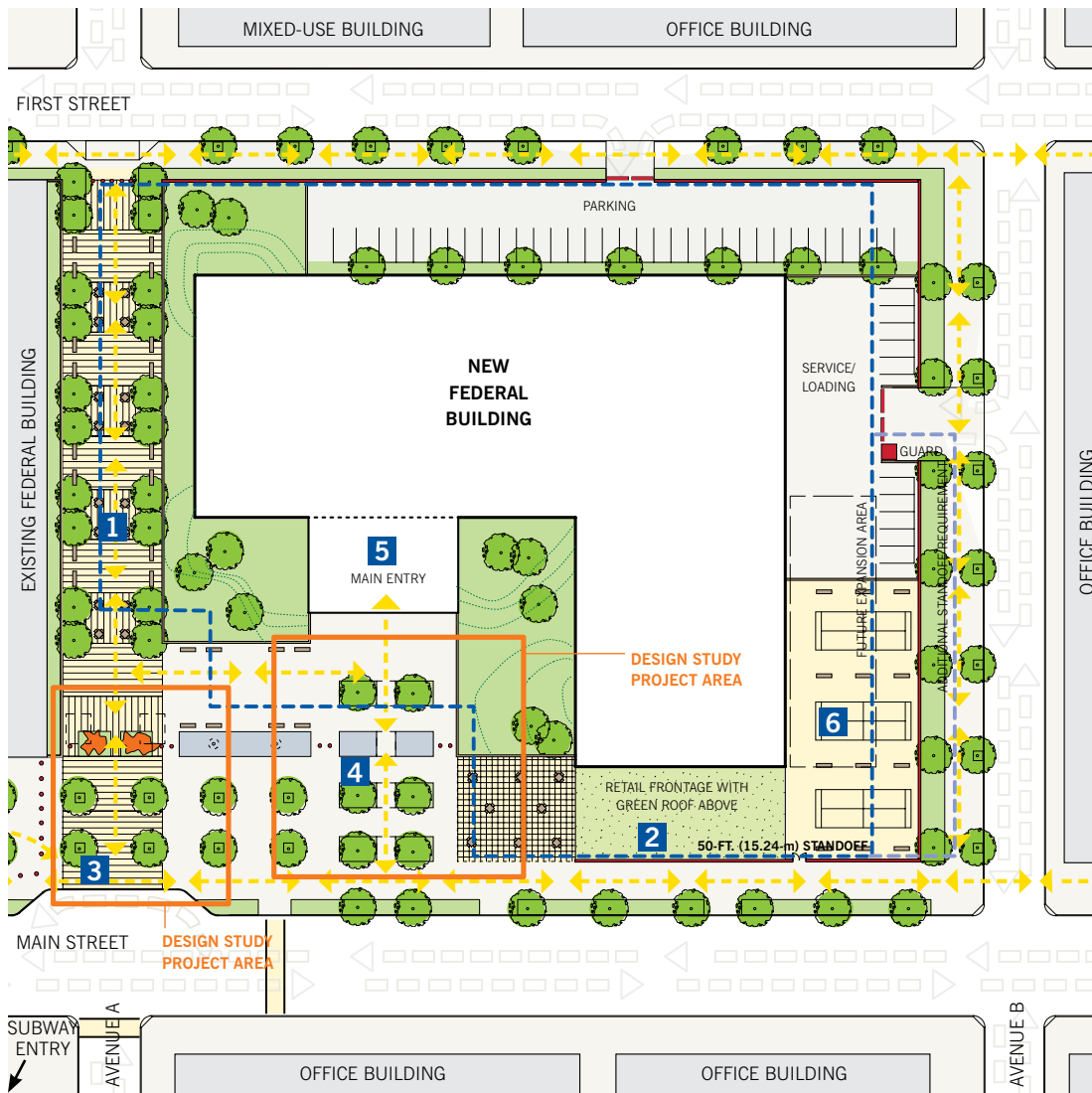
Proposed Security Design Solution

The landscape elements that define the space also protect the building and the public space. A mix of reinforced site walls, planting, recessed areas that serve as pits or moats, and collapsible paving prevent vehicular approach, while maintaining openness. Collapsible paving and other modern technologies are usually easiest to incorporate into new construction, when they can be designed in conjunction with existing underground utilities. The quality of public space is greatly improved when measures are unobtrusive.

Elevation View



Test Case 5: Final Concept Plan



Security and Site Design Solutions

- 1 The permanently vacated street between the existing federal building and the new federal building becomes a pedestrian public space. Permanent and temporary seating creates an amenity for users of the site.
- 2 Retail frontage protects the standoff along Main Street; the storefronts provide a physical barrier, while activating the street edge and encouraging public use.
- 3 Moveable plinths on hinged turntables restrict vehicular access to the pedestrian street. In an emergency, the plinths rotate to allow emergency vehicles into a dedicated fire lane.
- 4 A public plaza provides both passive and programmed open space. Security elements integrated into landscape features maintain openness and connect the site to its context.
- 5 The site's landscape and security elements and hardened vestibule create secure public space, protect the building, and manage the entry process.
- 6 Land set aside for future expansion is temporarily programmed with sports courts, which require minimal investment yet provide recreation for both the site's tenants and the neighborhood.

Sculptural bollards can function as public art, while carefully designed berms prevent vehicle entry even as they blend into a site's topography.





Though new buildings in urban locations must meet the most stringent security criteria, they also offer the greatest opportunities for innovative site security design. Such projects demand consideration of security from the earliest stages of site selection, with a long-term vision of what site security can be. When done well, these projects retain and enhance the positive urban presence of the federal government. As setbacks become lively urban spaces and the new public squares of today, the federal facilities they protect become important, contributing members of their communities. In short, constraints demand creativity, and creativity advances site security in all dimensions.



Acknowledgements

Creating a guide to site security design requires at least as much collaboration as security design itself and entails similar complexity. So it is with immense gratitude that we thank the consultants, designers, security experts, and government employees who have helped craft this document over the past two years. Special thanks must go to our consultant team, who worked closely with us to bring together text, image, and graphic organization so that our message was clear. Mary Ann Lasch, Heather Modzelewski, and Elizabeth Riordan at Gensler; Jennifer Cosgrove, Samantha Harris, and Mark Rios at Rios Clementi Hale Studios; and Hyun Auh and Emanuela Frigerio at C&G Partners were all instrumental in making this project possible. Hinman Consulting Engineers and the staff at Carol R. Johnson Associates contributed as members of the consulting team at various stages.

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Though the *Site Security Design Guide* is intended to convey a timeless philosophy—that strategic reduction of risk, comprehensive site design, collaborative participation, and a long-term development strategy are hallmarks of successful site security design—we realize that ultimately this is a living document. So our last thank you goes to those who will use this *Guide* and move it forward, with innovative design and security concepts that demonstrate ever better solutions in the spirit of these hallmarks.

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