Unit I-B
Building Design for Homeland Security

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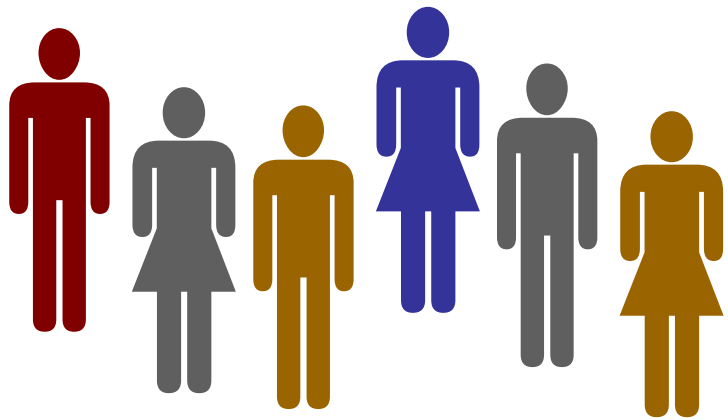
Student Introductions

Name

Affiliation

Area of Concentration

Course Expectations



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Purpose of Course and FEMA 426 Manual

Provide guidance to building sciences community

Decision-makers determine which threats and mitigation measures

Information

- Not mandatory
- Not applicable to all buildings
- Not applicable when it interferes with other hazards

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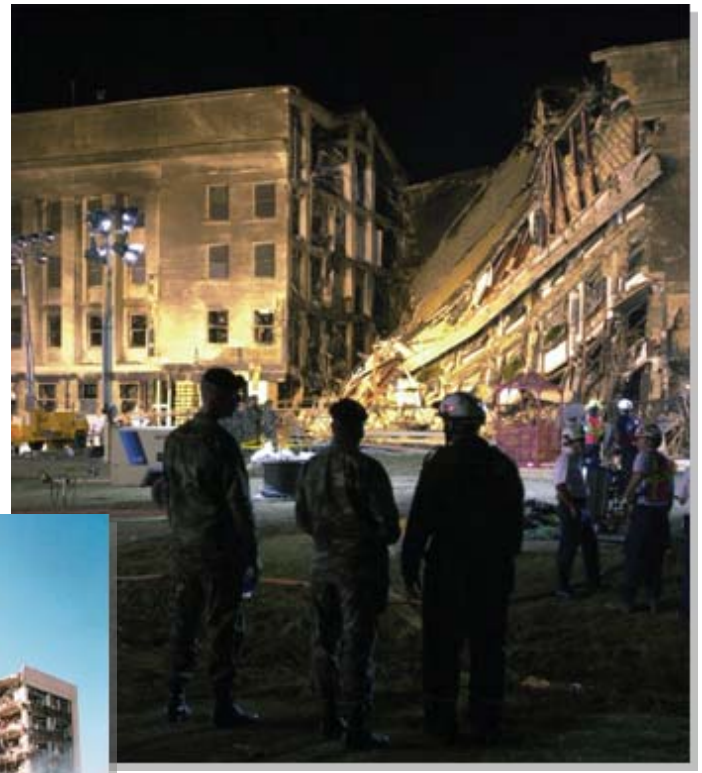
Course Goal

To enhance student understanding of the measures and technology available to reduce risk from terrorist attack.



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U.S. AIR FORCE

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Course Objectives

Students will be able to:

1. **Explain** the basic components of the assessment methodology.
2. **Appreciate** the different assessment methodology approaches that can be used.
3. **Perform** an assessment for a building by identifying and prioritizing assets, threats, and vulnerabilities and calculating relative risk.

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Course Objectives

4. **Identify** available mitigation measures applicable to the site and building envelope.
5. **Understand** the technology limitations and application details of mitigation measures for terrorist tactics and technological accidents.
6. **Perform** an assessment for a given building by identifying vulnerabilities using the Building Vulnerability Assessment Checklist in FEMA 426.

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Course Objectives

7. **Select** applicable mitigation measures and prioritize them based upon the final assessment risk values.
8. **Appreciate** that designing a building to mitigate terrorist attacks can create conflicts with other design requirements.

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Course Overview – Day 1

Unit I-B – Introduction and Course Overview
Unit II – Asset Value Assessment
Unit III – Threat / Hazard Assessment
Unit IV – Vulnerability Assessment
Unit V – Risk Assessment / Risk Management

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Course Overview – Day 2

Unit VI – FEMA 452 Risk Assessment Database
Unit VII – Explosive Blast
Unit VIII – Chemical, Biological, and Radiological (CBR) Measures
Exam and Exam Review
Unit IX-B – Site and Layout Design Guidance

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Course Overview – Day 3

Unit X – Building Design Guidance
Unit XI – Electronic Security Systems
Unit XII-B – Finalization of Case Study Results
Unit XIII – Course Wrap-up

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Course Materials

FEMA Publication 426

Reference Manual
to Mitigate Potential Terrorist Attacks Against Buildings

FEMA Publication 452

Risk Assessment: A How-To Guide to Mitigate Potential Terrorist Threats Against Buildings

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FEMA 426 Reference Manual

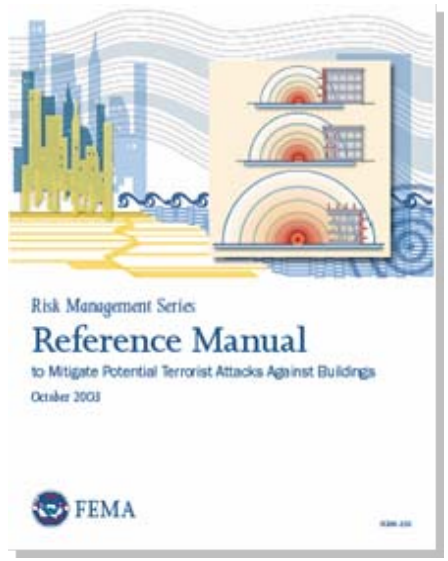
Chapter 1 – Asset Value, Threat / Hazard, Vulnerability, and Risk

Chapter 2 – Site and Layout Design Guidance

Chapter 3 – Building Design Guidance

Chapter 4 – Explosive Blast

Chapter 5 – CBR Measures



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FEMA 426 Reference Manual

Appendix A – Acronyms

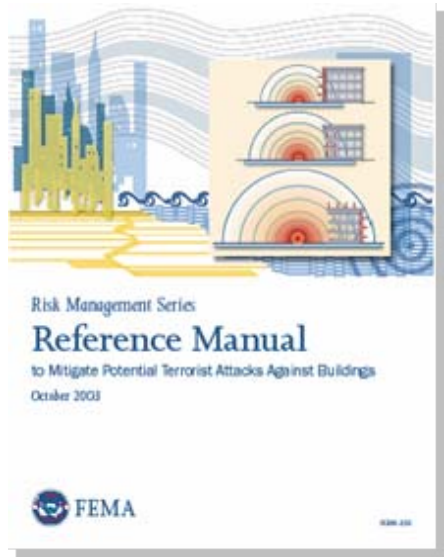
Appendix B – General Glossary

Appendix C – CBR Glossary

Appendix D – Electronic Security Systems

Appendix E – Bibliography

Appendix F – Associations and Organizations



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FEMA 452 Risk Assessment How-To

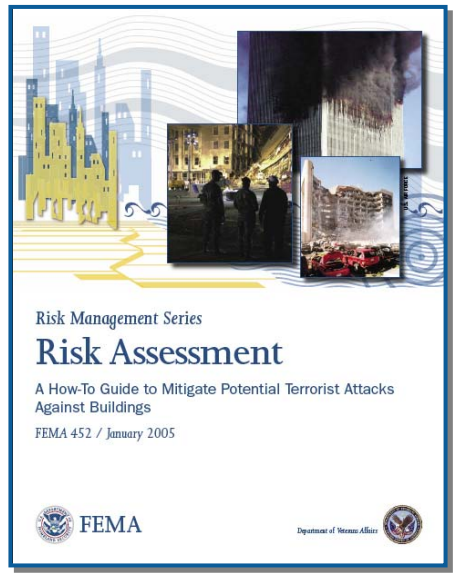
Step 1 – Threat Identification and Rating

Step 2 – Asset Value Assessment

Step 3 – Vulnerability Assessment

Step 4 – Risk Assessment

Step 5 – Consider Mitigation Options



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FEMA 452 Risk Assessment How-To

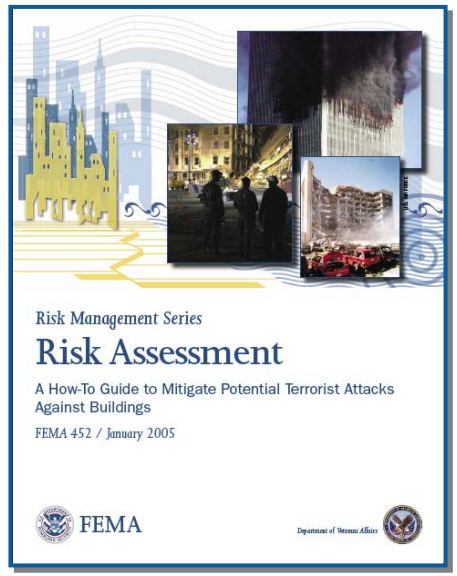
Appendix A – Building Vulnerability Assessment Checklist

Appendix B1 – Risk Management Database: Assessor's User Guide

Appendix B2 – Risk Management Database: Database Administrator's User Guide

Appendix B3 – Risk Management Database: Manager's User Guide

Appendix C – Acronyms and Abbreviations



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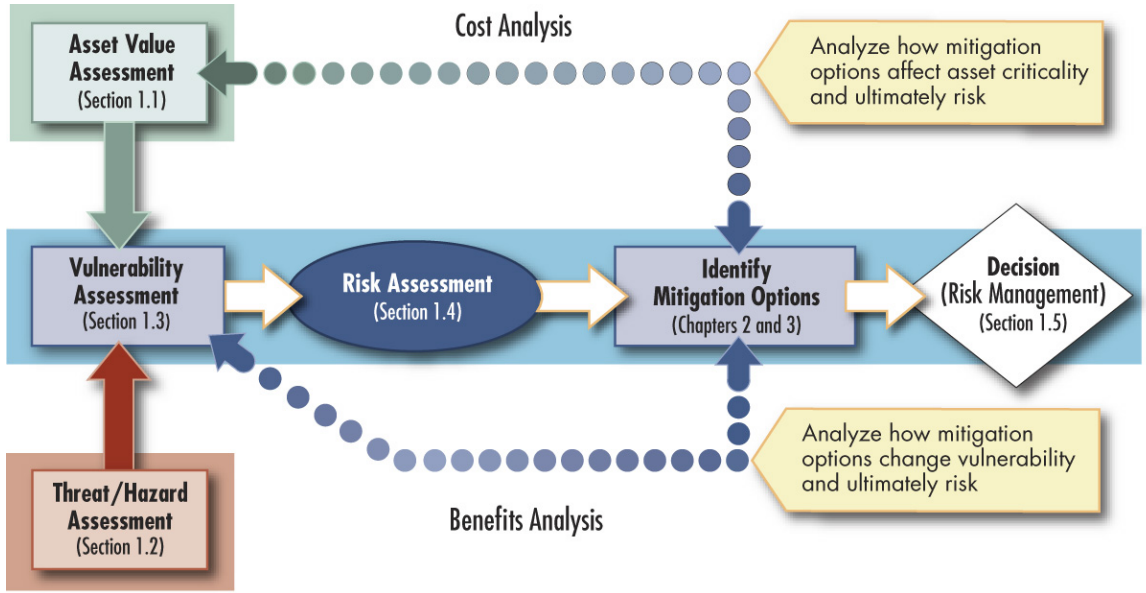
FEMA 426 – Chapter 1

- Asset Value Assessment
- Threat/Hazard Assessment
- Vulnerability Assessment
- Risk Assessment
- Risk Management
- Building Vulnerability Assessment Checklist

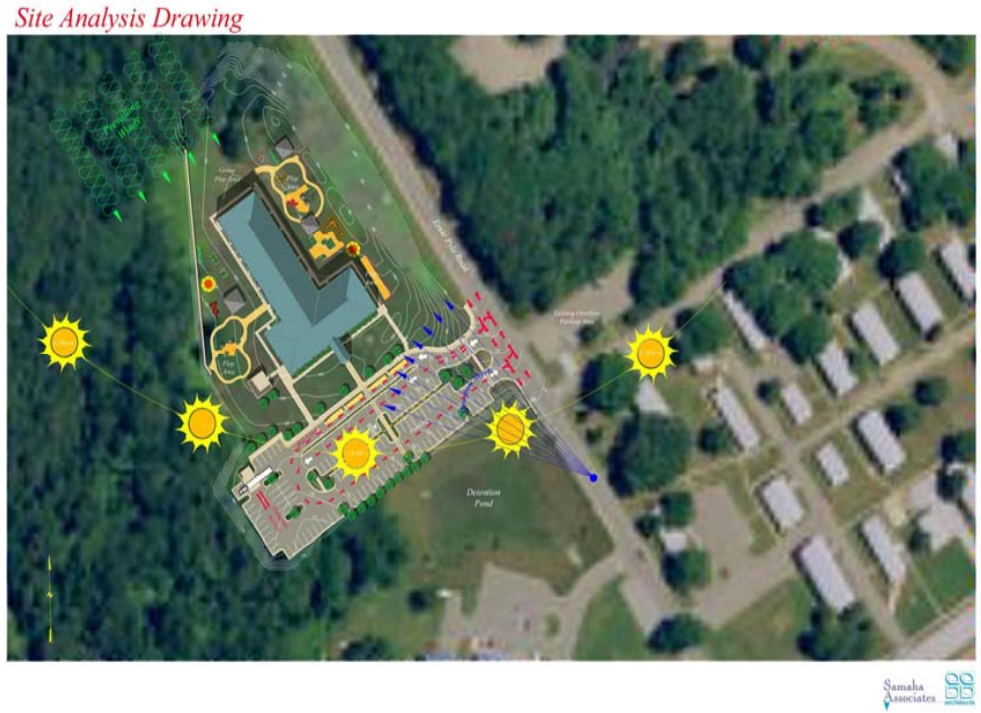


FEMA 426, Figure 1-3: The Assessment Process Model, p. 1-5

FEMA 426 – Chapter 2

Site and Layout Design

- Layout Design
- Siting
- Entry Control/Vehicle Access
- Signage
- Parking
- Loading Docks
- Physical Security Lighting
- Site Utilities



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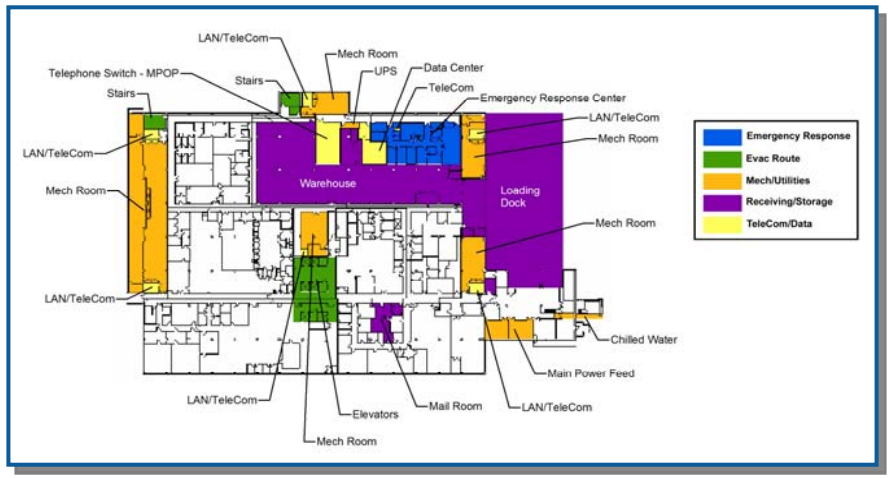
FEMA 426 – Chapter 3

Building Design Guidance

- Architectural
- Building Structural and Nonstructural Considerations
- Building Envelope considerations
- Other Building Design Issues
- Building Mitigation Measures



FEMA 426, Figure 1-10: Non-Redundant Critical Functions Collocated Near Loading Dock, p. 1-41

FEMA 426 – Chapter 4

Explosive Blast

- Building Damage
- Blast Effects and Predictions
- Stand-off Distance
- Progressive Collapse

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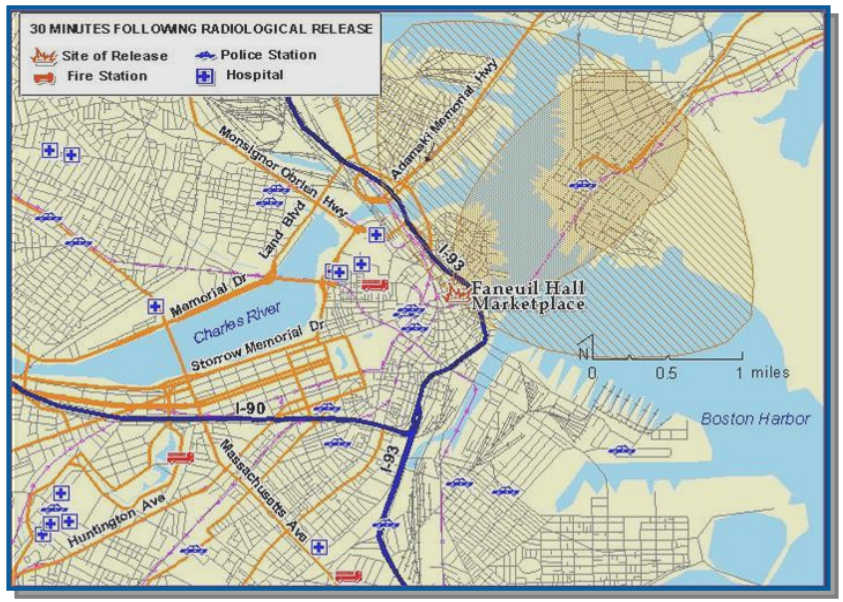
FEMA 426 – Chapter 5

CBR Measures

- Evacuation
- Sheltering in Place
- Personal Protective Equipment
- Filtering and Pressurization
- Exhausting and Purging



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Summary

FEMA 426 is intended for building sciences professionals.

Manmade hazards risk assessments use a "Design Basis Threat."

Site and building systems and infrastructure protection are provided by layers of defense.

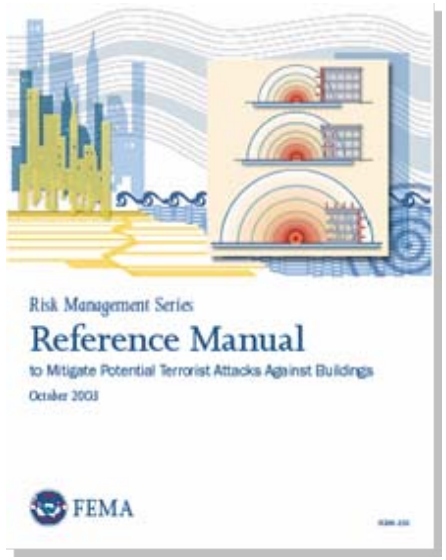
Multiple mitigation options and techniques.

Use cost-effective multihazard analysis and design.

Case Study Activities

In small group settings, apply concepts introduced in the course.

Become conversant with contents and organization of FEMA 426.



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Unit I-B Case Study Activity

HazardCorp Building Urban Case Study Overview

Requirements

Briefly review Case Study materials.

As a group, complete the worksheet.

Use only the Case Study data to answer worksheet questions.

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HAZARDCORP BUILDING (HZC)

Case Study

Urban Office Rental Property occupied by:

- Building Owner (Building Management)
- Tenants:
  - Retail (Restaurant, Shops)
  - Government (Federal, State, Local)
  - Banking
  - Financial
  - Insurance

HazardCorp Building

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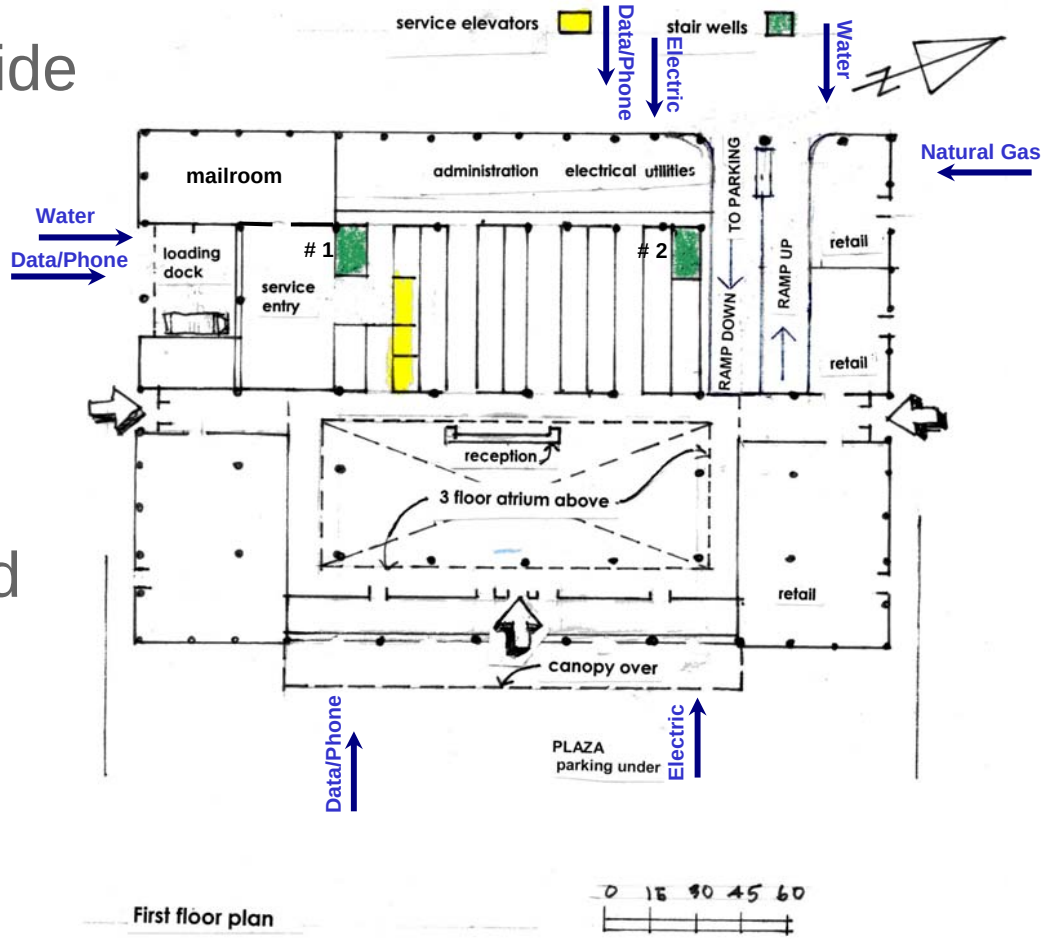
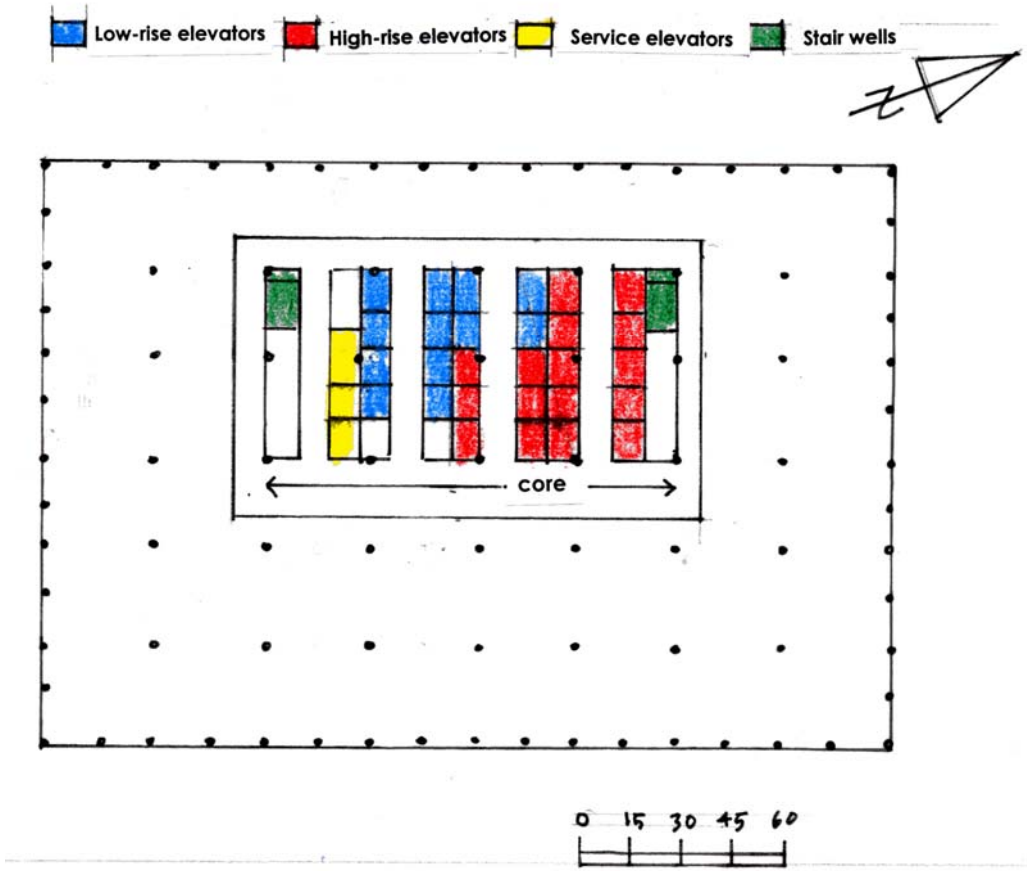
Building Data

- 50-story building completed in 1987
- Loading dock on SW side
- Retail on lower level
- 8,000 occupants
- 1,000 visitors
- 3 levels of underground parking



Upper Level Floor Plan



Typical upper level floor plan 9/13/05

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Aerial Overview

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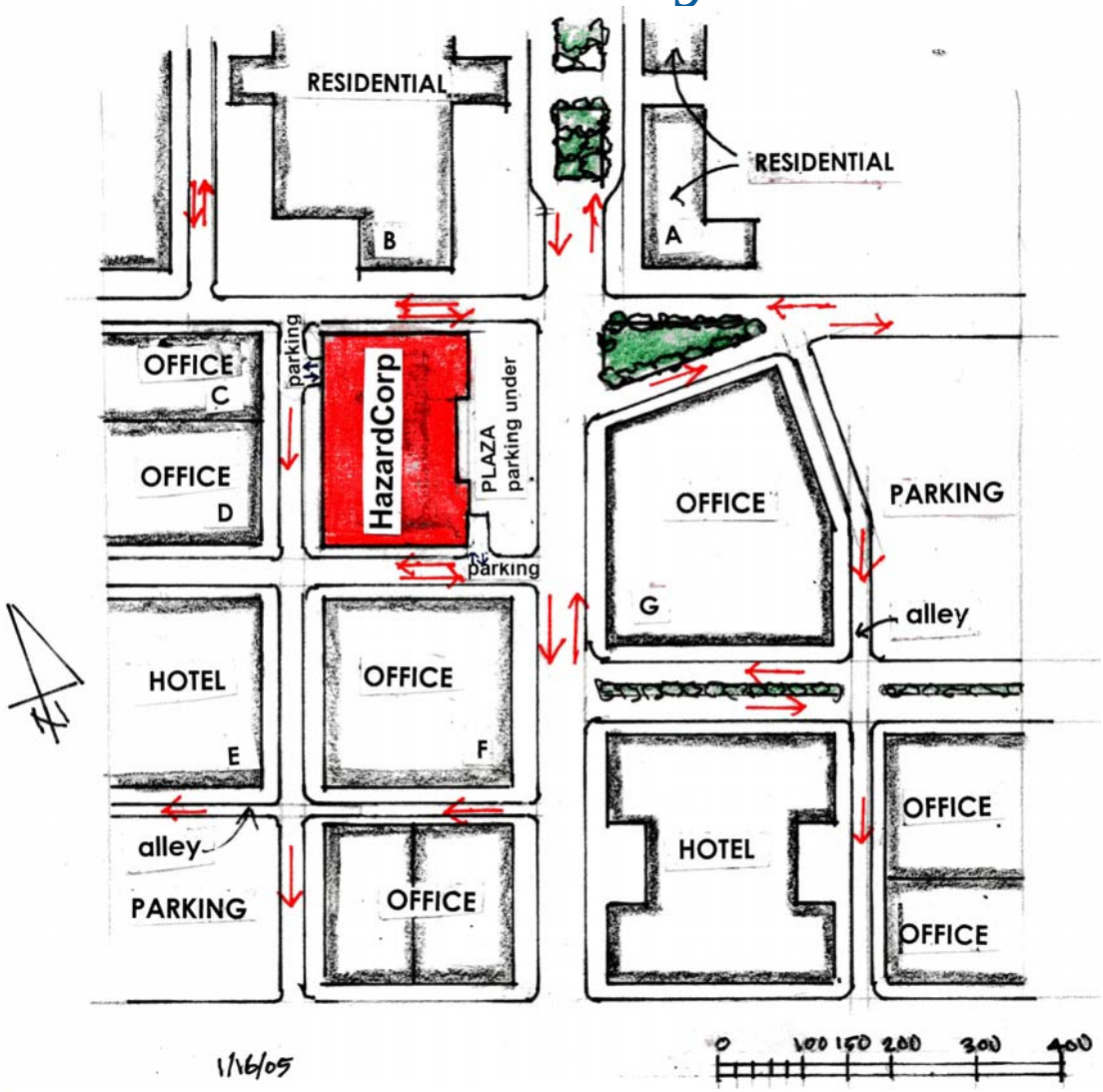
HAZARDCORP Site Layout



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HAZARDCORP Neighbors

- A and B: 14 - 26-story residential condominiums, constructed 2001-2005.
- C: 10-story office, constructed 1925
- D: 10-story office, constructed 1934
- E: 14-story hotel, constructed 1935
- F: 20-story office, constructed 1970
- G: 20-story office, constructed 1994

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HAZARDCORP Occupancy

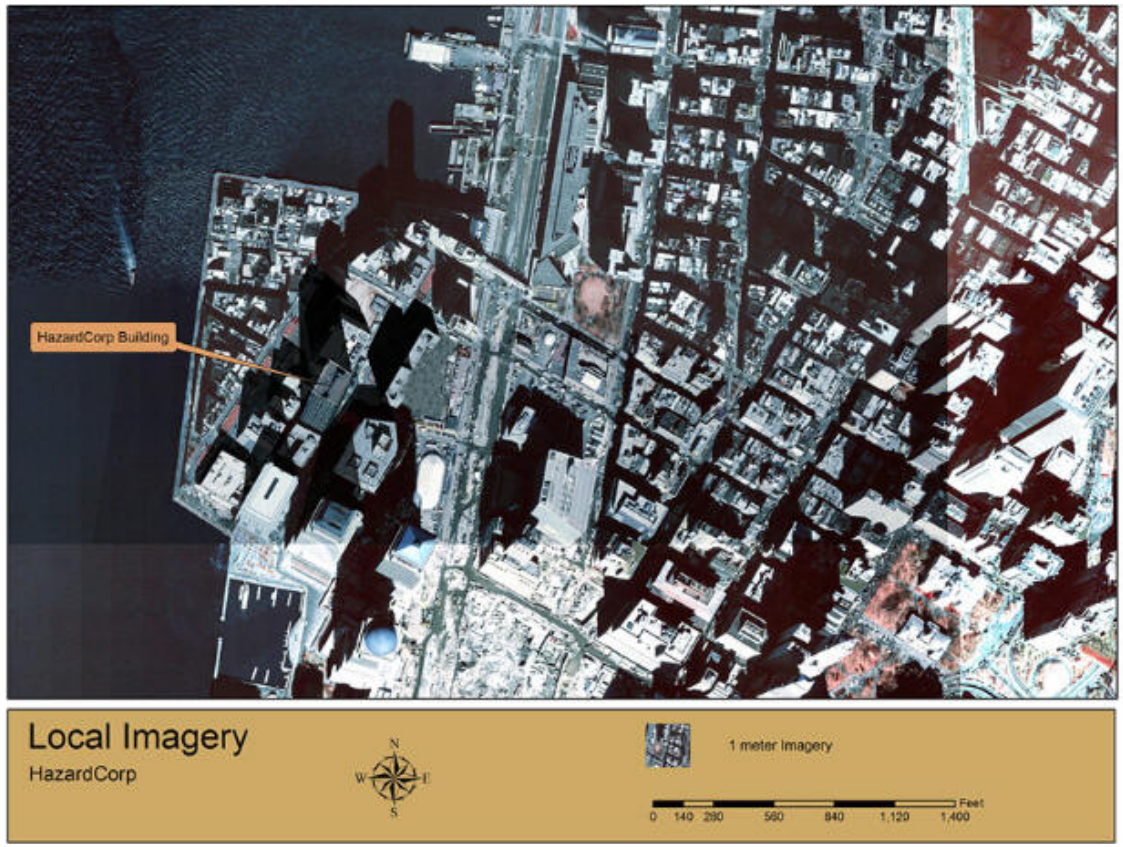
FLOOR	TENANT OCCUPANCY
49-50	Mechanical Floors
31-48	National financial services company
29-30	Bank offices
27-28	Federal government offices (IRS, DOD, CIA)
26	Mechanical room
25	Office of Emergency Management
23-24	Financial service company
20-22	Insurance company
19	State Employment Commission
15-18	Vacant
14	Financial management company
8-13	Federal government offices (SEC, Secret Service)
6-7	Bank offices
4-5	Storage, switch gear, generators, transformers
3	Open to first floor lobby, rentable meeting space, building management
2	Open to first floor lobby, rentable meeting space
1	Lobby, retail, fuel storage, switchgear, building administration, loading dock
UG1	Parking
UG2	Parking
UG3	Parking

Threat Analysis

Terrorist Threat

Intelligence Threat

Criminal Threat



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Hazard Analysis

HazMat

- Facilities
- Highway
- Rail
- Maritime

Liquid Fuels

Chemicals

Air Traffic

Natural Hazards

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Emergency Response

- Police
- Fire
- EMT
- HazMat
- Hospitals

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Design Basis Threat

Explosive Blast: Car Bomb approximately 500 lb TNT equivalent. Truck Bomb approximately 5,000 lb TNT equivalent (Murrah Federal Building class weapon)

Chemical: Large quantity gasoline spill and toxic plume from the upwind petroleum tank farm or large quantity chlorine release from the upwind chemical storage tank farm. Small quantity (tanker truck and rail car size) spills of HazMat materials (chlorine).

Biological: Anthrax delivered by mail or in packages, smallpox distributed by spray mechanism mounted on truck or aircraft in metropolitan area

Radiological: Small "dirty" bomb detonation within the 10-mile radius of the HazardCorp building

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Design Basis Threat

Criminal Activity/Armed Attack: High powered rifle (sniper attack) or handgun shooting (direct assault on individuals).

Cyber Attack: Focus on IT and building systems infrastructure (SCADA, alarms, etc.) accessible via Internet access

Levels of Protection and Layers of Defense

Levels of Protection for Buildings

- GSA Interagency Security Criteria Level IV Building
- DoD Primary Gathering Building

Elements of the Layers of Defense Strategy

- Deter
- Detect
- Deny
- Devalue

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Summary

FEMA Publication 426

Reference Manual
to Mitigate Potential Terrorist Attacks Against Buildings

FEMA Publication 452

Risk Assessment: A How-To Guide to Mitigate Potential Terrorist Threats Against Buildings

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Unit I-B Case Study Activity

Introduction and Overview

Background

Emphasis:

- Refamiliarize yourself with Appendix B Case Study and answer general questions
- Get acquainted with FEMA 426

Requirements

Refer to Case Study, and independently answer worksheet questions

Confer with team members on answers to normalize team information

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