



**HANDOUT 2.2: CRITICAL INFRASTRUCTURE CATEGORIES**

**Purpose:** To define each category of critical infrastructure and present examples, potential threats and vulnerabilities, and planning considerations

Critical Infrastructure Category	Examples of Critical Infrastructure	Threats and Vulnerabilities	Planning Considerations
<p><b>Chemical:</b> an integral component of a nation’s economy, converting various raw materials into diverse products, many of which are critical to the health and well-being of a nation’s citizenry, security, and economy.</p>	<ul style="list-style-type: none"> <li>▪ Resources                             <ul style="list-style-type: none"> <li>• Chemical plants</li> </ul> </li> <li>▪ Services                             <ul style="list-style-type: none"> <li>• Distribution services</li> </ul> </li> <li>▪ Products</li> <li>▪ Facilities</li> </ul>	<ul style="list-style-type: none"> <li>▪ The threats vary because various facilities use, manufacture, store, transport, or deliver chemicals. This ranges from petrochemical plants to pharmaceutical manufacturers</li> <li>▪ Cyberthreat, insider threats, and potential assassinations of industry leader are all possible threats</li> </ul>	<ul style="list-style-type: none"> <li>▪ Disruption of delivery for goods and services</li> <li>▪ Effect on the performance of functions critical to a nation’s economic or governmental security</li> <li>▪ Dependency on private sector suppliers and vendors for goods and services</li> <li>▪ Difficulty in mandating that suppliers maintain a contingency plan to mitigate supply interruptions</li> <li>▪ Cyberthreat, insider threat, and potential assassination of industry leaders</li> </ul>
<p><b>Commercial facilities:</b> includes facilities that operate under the principle of open public access, meaning that the public may move</p>	<p>A wide range of assets represents the commercial facilities sector:</p> <ul style="list-style-type: none"> <li>▪ Hotels</li> <li>▪ Commercial office buildings</li> </ul>	<p>Cyberthreat, insider threat, negative effect on the national economy, and potential loss of life.</p>	<ul style="list-style-type: none"> <li>▪ Alternative locations for displaced residents</li> <li>▪ Emergency services response and recovery</li> <li>▪ Over capacity of medical treatment facilities for</li> </ul>

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<p>freely through these facilities without the deterrent of highly visible security barriers. This sector has a dominant influence on a nation's economy.</p>	<ul style="list-style-type: none"> <li>▪ Convention centers</li> <li>▪ Stadiums</li> <li>▪ Theme parks</li> <li>▪ Residential buildings</li> <li>▪ Shopping centers</li> <li>▪ Other sites where large numbers of people gather to pursue business activities, conduct personal commercial transactions, or enjoy recreational pastimes</li> </ul>		<p>mass injuries</p> <ul style="list-style-type: none"> <li>▪ Alternate street planning for traffic rerouting</li> </ul>
<p><b>Communications:</b> comprised of communications equipment, processes, and human capital to support processing, storages, and transmission of information.</p>	<ul style="list-style-type: none"> <li>▪ Telephone switching stations</li> <li>▪ Computers</li> <li>▪ Television stations</li> <li>▪ Radio stations</li> <li>▪ Communication towers</li> <li>▪ Power sources</li> </ul>	<p>Without the ability to communicate widespread loss of emergency services and other critical services would occur.</p> <ul style="list-style-type: none"> <li>▪ The communication sector is directly connected to other vital sectors, an attack on communications infrastructure could result in additional catastrophic issues for other critical infrastructure like power grids. Vulnerabilities include:                             <ul style="list-style-type: none"> <li>• Intentional cable cuts</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Termination of a communication asset</li> <li>▪ Long-term disruption of service</li> <li>▪ Effect on other critical infrastructures</li> <li>▪ Loss of emergency and other critical services</li> </ul>

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		<ul style="list-style-type: none"> <li>• Cyberthreat</li> <li>• Insider threats</li> </ul>	
<p><b>Critical manufacturing:</b> an integral component of a nation’s economy, contributing greatly to the gross domestic product and employing tens of thousands of a nation’s workers</p>	<ul style="list-style-type: none"> <li>▪ Iron and steel mills</li> <li>▪ Machine manufacturing</li> <li>▪ Transportation manufacturing</li> <li>▪ Pharmaceuticals</li> <li>▪ Freight rail car shipments</li> <li>▪ Waterborne shipments</li> </ul>	<ul style="list-style-type: none"> <li>▪ Direct attacks</li> <li>▪ Cyberthreat</li> </ul>	<ul style="list-style-type: none"> <li>▪ Alternate sources for transportation</li> <li>▪ Alternate sources for products</li> </ul>
<p><b>Dams:</b> a vital and beneficial part of a nation’s infrastructure and continuously provides a wide range of economic, environmental, and social benefits, including hydroelectric power, river navigation, water supply, wildlife habitat, waste management, flood control, and recreation</p>	<ul style="list-style-type: none"> <li>▪ Dam projects</li> <li>▪ Navigation locks</li> <li>▪ Levees</li> <li>▪ Hurricane barriers</li> <li>▪ Mine tailings and other industrial waste</li> </ul>	<ul style="list-style-type: none"> <li>▪ Natural disasters</li> <li>▪ Structural issues</li> <li>▪ Physical or cyber attacks</li> </ul>	<p>Potential risks in the event of asset failures significant destruction:</p> <ul style="list-style-type: none"> <li>▪ Massive property damage</li> <li>▪ Alternate sources of replacement for long-term effects</li> </ul>

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<p><b>Defense industrial base:</b> consists of government and private sector organizations that can support military operations directly:</p> <ul style="list-style-type: none"> <li>▪ Perform research and development</li> <li>▪ Design, manufacture, and integrate systems</li> <li>▪ Maintain depots and service military weapon systems, subsystems, components, subcomponents, or parts</li> </ul> <p>All of these are intended to satisfy a nation’s military national defense requirements</p>	<ul style="list-style-type: none"> <li>▪ Manufacturing facilities for defense supplies</li> <li>▪ Manufacturing facility for airplanes</li> <li>▪ Research and development centers for weapons</li> </ul>	<ul style="list-style-type: none"> <li>▪ Direct Attacks</li> <li>▪ Insider threat</li> <li>▪ Cyberthreat</li> </ul>	<ul style="list-style-type: none"> <li>▪ Loss of life</li> <li>▪ Decrease in military protection</li> <li>▪ Terrorist attack due to Cyberthreat, insider threat, and direct attacks on government buildings and supporting infrastructure, such as water, power, and electric</li> </ul>
<p><b>Emergency services:</b> medical, police, fire, and rescue systems, including their associated personnel, who respond to</p>	<ul style="list-style-type: none"> <li>▪ Hospitals</li> <li>▪ First responder locations</li> <li>▪ Shelters</li> </ul>	<p>Emergency infrastructure are primarily vulnerable to direct terrorist attacks aimed at:</p> <ul style="list-style-type: none"> <li>▪ Emergency response service buildings, such as police and fire stations</li> </ul>	<p>Protecting hospitals, clinics, and public health systems</p> <ul style="list-style-type: none"> <li>▪ Physical damage to facilities or disruption of operations could affect the</li> </ul>

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emergency situations		<ul style="list-style-type: none"> <li>▪ The destruction of vital public safety communication systems towers</li> <li>▪ The destruction of hospitals</li> </ul>	<p>ability to respond</p> <ul style="list-style-type: none"> <li>▪ Secondary contamination will significantly decrease the ability to respond to a crisis</li> <li>▪ Direct terrorist attacks on:                             <ul style="list-style-type: none"> <li>• Emergency response service buildings</li> <li>• Vital public safety communication systems towers</li> <li>• Hospitals and other medical facilities</li> </ul> </li> </ul>
<p><b>Energy:</b> resources needed to maintain daily functional operations throughout the country</p>	<ul style="list-style-type: none"> <li>▪ Substations</li> <li>▪ Lines</li> <li>▪ Generators                             <ul style="list-style-type: none"> <li>• Dams</li> <li>• Nuclear power plants</li> <li>• Backup systems</li> </ul> </li> <li>▪ Refineries</li> <li>▪ Storage</li> <li>▪ Delivery systems</li> </ul>	<p>Cyberthreat, insider threat, and destruction of power transmission lines through direct attack</p>	<ul style="list-style-type: none"> <li>▪ Widespread and long-term disruption of power</li> <li>▪ Effect on economy and national defense (critical)</li> <li>▪ Impact on those responsible for response and recovery</li> </ul>

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<p><b>Financial services:</b> retail and commercial organizations, investment institutions, reserve systems, associated operational organizations, and support activities necessary for monetary transactions and exchanges</p>	<ul style="list-style-type: none"> <li>▪ Computer systems</li> <li>▪ Money supply and distribution</li> </ul>	<p>Cyberthreat, insider threat, and direct attacks on the financial systems support infrastructure such as power and electric are a few examples of how the banking and finance sector is vulnerable to terrorist attack.</p>	<p>Ensure the ability to:</p> <ul style="list-style-type: none"> <li>▪ Conduct financial transactions using data processing applications</li> <li>▪ Maintain direct access to the financial markets and clients</li> <li>▪ Maintain the country’s currency in significant amounts to ensure public confidence</li> </ul>

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<p><b>Food and agriculture:</b> almost entirely under private ownership and includes farms; facilities for manufacturing, processing, storage and distribution; restaurants and retailers.</p>	<ul style="list-style-type: none"> <li>▪ Farms</li> <li>▪ Livestock</li> <li>▪ Manufacturing</li> <li>▪ Distribution</li> <li>▪ Storage</li> </ul>	<ul style="list-style-type: none"> <li>▪ Attacks and contaminations on the food and agriculture sector could result in severe animal, plant, public health, and economic consequences.</li> <li>▪ Securing this sector presents unique challenges because food and agriculture systems are extensive, open, interconnected, and diverse, with complex structures.</li> <li>▪ The time required for detection and identification of attacks and contaminations can be lengthy and complex.</li> <li>▪ This sector has critical dependencies on many other sectors including water, transportation, energy, banking and financial services, chemical, and dams.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Protection from biological contamination</li> <li>▪ Disruption of supply</li> </ul>
<p><b>Government facilities:</b> is the critical element</p>	<ul style="list-style-type: none"> <li>▪ Military installations at all levels</li> <li>▪ Courthouses</li> </ul>	<p>Government infrastructure is vulnerable to terrorist attack due to cyberthreat, insider</p>	<p>A primary goal for the government sector is to be able to function effectively</p>

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<p>of a nation’s economic and public security; therefore, protection against potential terrorist attacks is of utmost importance.</p>	<ul style="list-style-type: none"> <li>▪ Law enforcement locations</li> <li>▪ Services</li> </ul>	<p>threat, and direct attacks on government buildings and supporting infrastructure, such as water, power, and electric.</p> <p>Other threats may include assassinations of senior executive leaders in an effort to overthrow the government.</p>	<p>during and after a major terrorist attack.</p> <ul style="list-style-type: none"> <li>▪ If a mass casualty event resulted in the death of senior or critical government employees or power failures across a wide array of government facilities, the government’s ability to continue operations would be reduced.</li> </ul>
<p><b>Health care and public health:</b> the systems, networks, services, facilities, functions, and roles needed to prevent disease and disability, treat patients, foster public health, and respond to public health emergencies.</p>	<ul style="list-style-type: none"> <li>▪ Direct health care facilities</li> <li>▪ Medical materials</li> <li>▪ Pharmaceuticals, laboratories, blood banks</li> </ul>	<p>This sector:</p> <ul style="list-style-type: none"> <li>▪ Spans all levels of government and the private sector</li> <li>▪ Relies on services provided by other sectors(water, transportation, communication, information technology) to maintain operations and overlaps with emergency services in many cases</li> </ul>	<ul style="list-style-type: none"> <li>▪ Maintain the ability to provide essential health services during and after disasters or disruptions in the availability of supplies or supporting services (water, power).</li> <li>▪ Protect the sector’s workforce from the harmful consequences that may compromise their health and safety and limit their ability to carry out their responsibilities.</li> <li>▪ Mitigate the risks to the sector’s physical assets and cyber assets that could limit health services.</li> </ul>

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<p><b>Information technology:</b> systems enable a nation’s economic activity, which is essential to maintaining homeland and national security.</p>	<ul style="list-style-type: none"> <li>▪ Hardware</li> <li>▪ Software</li> <li>▪ Networks</li> </ul>	<p>Many other critical infrastructure sectors rely on the information technology sector for products and services, including the reliable operation of networks and systems, and the movement and storage of critical data.</p>	<ul style="list-style-type: none"> <li>▪ Collaboration of public and private sector partners support efforts to prevent, prepare for, protect against, mitigate, respond to, and recover from events that threaten, disrupt, or cripple IT functions.</li> </ul>
<p><b>Nuclear reactors, materials, and waste:</b> owns, oversees, and operates commercial nuclear power reactors that provide power.</p>	<ul style="list-style-type: none"> <li>▪ Nuclear power plants</li> <li>▪ Non-power nuclear reactors used for research, testing, and training</li> <li>▪ Manufacturers of nuclear reactors or components</li> <li>▪ Radioactive materials used primarily in medical, industrial, and academic settings</li> <li>▪ Nuclear fuel cycle facilities</li> <li>▪ Decommissioned nuclear power reactors</li> <li>▪ Transportation, storage, and disposal of nuclear and radioactive waste</li> </ul>	<p>This sector is interdependent with chemical, energy, health care and public health, and transportation sectors.</p>	<ul style="list-style-type: none"> <li>▪ Widespread and long-term disruption of power</li> <li>▪ Effect on economy and national defense (critical)</li> <li>▪ Impact on those responsible for response and recovery</li> <li>▪ Cyberthreat, insider threat, and destruction of power transmission lines through direct attack</li> </ul>

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<p><b>Transportation:</b> an expansive, open, and accessible set of interconnected systems of airways, roads, tracks, terminals, and conveyances that provide services essential to our way of life.</p>	<ul style="list-style-type: none"> <li>▪ Highways</li> <li>▪ Railways</li> <li>▪ Bus terminals</li> <li>▪ Airports</li> <li>▪ Waterways and marine ports</li> <li>▪ Storage area of fleet                             <ul style="list-style-type: none"> <li>• Airplanes</li> <li>• Trains and subways</li> <li>• Buses</li> <li>• Ships</li> </ul> </li> </ul>	<p>The sheer size and capacity of the sector, which moves, distributes, and delivers billions of passengers and millions of tons of goods each year, makes it a highly attractive target for terrorists:</p> <ul style="list-style-type: none"> <li>• Direct attack, hijacking, introduction of biological and chemical contaminates into mass transit systems</li> <li>• Destruction of key roadways throughout the country as well as central transportation areas (airports, train stations, shipyards)</li> </ul>	<p>Country’s ability to effectively and efficiently transport people, goods, and services throughout the region</p> <ul style="list-style-type: none"> <li>▪ Disruption can stall the economic base:                             <ul style="list-style-type: none"> <li>• People unable to go to work via roadways and mass transit</li> </ul> </li> <li>▪ Failure to deliver basic survival items (food, water, medical)</li> </ul>
<p><b>Water and wastewater:</b> consists of collection, distribution, and treatment systems that provide water for a variety of purposes and needs: household, agricultural, municipal, and industrial.</p>	<ul style="list-style-type: none"> <li>▪ Delivery system</li> <li>▪ Storage</li> <li>▪ Sewage treatment plant</li> </ul>	<p>Water infrastructure is vulnerable to terrorist attack through:</p> <ul style="list-style-type: none"> <li>▪ The introduction of biological and chemical contaminates into the water system</li> <li>▪ The destruction of fresh water supplies</li> </ul>	<p>Terrorist attacks on:</p> <ul style="list-style-type: none"> <li>▪ Operating or distribution systems</li> <li>▪ Power and telecommunications systems</li> <li>▪ Electronic control systems</li> <li>▪ Reservoirs and pumping stations</li> </ul> <p>Two vital components to maintain:</p> <ul style="list-style-type: none"> <li>▪ Ability to provide fresh</li> </ul>

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			water <ul style="list-style-type: none"> <li>▪ Waste water collection and treatment</li> </ul> Major public health and safety concern: Inadequate supply of clean water can result in wide-spread disease, long-term illness, and death

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