



# PRINCE WILLIAM COUNTY

## 2025 Prince William County Hazardous Materials Hazards and Risk Assessment Document

**FOR PUBLIC RELEASE**

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## **INTRODUCTION**

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Prince William County, strategically located within the National Capital Region, confronts a multifaceted hazardous materials (HAZMAT) landscape. The county's extensive transportation networks, encompassing major highways, pipelines, railways, proximity to significant waterways, and aviation facilitate the daily transit of substantial quantities of hazardous materials. Additionally, the presence of numerous fixed facilities storing hazardous substances, coupled with the rising adoption of electric vehicles (EVs) and associated lithium-ion battery risks, further complicates the HAZMAT profile. Compounding these challenges is the persistent threat of chemical, biological, radiological, nuclear, and explosive (CBRNE) incidents, including terrorism-related activities, given the county's proximity to Washington, D.C. This comprehensive assessment delves into the various dimensions of HAZMAT risks within Prince William County, analyzing transportation-related hazards, fixed facility vulnerabilities, emerging threats from EV proliferation, and the overarching CBRNE/terrorism concerns.

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## **OVER THE ROAD TRANSPORTATION**

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Prince William County's Road network is a central artery for hazardous materials movement, making transportation-related incidents the highest risk category for HAZMAT response. The county is a primary transit corridor for commercial trucking, with I-95, I-66, and U.S. Route 1 facilitating the daily movement of 15.4 million vehicles, including 544,880 commercial trucks. An estimated 5-10% of these trucks transport hazardous materials, equating to between 27,244 and 54,488 hazardous materials shipments each day (Virginia Department of Transportation, 2023). The county's proximity to Washington, D.C., and its role as a distribution hub further amplifies the risk of transportation-related incidents involving flammable, toxic, and reactive substances. Hazardous materials transported through Prince William County include petroleum products, compressed gases, corrosives, and flammable liquids. The most frequently transported substances include liquefied petroleum gas, gasoline, sulfuric acid, and sodium hydroxide. These materials, if released in an accident, present risks ranging from fire and explosion hazards to environmental contamination and human health effects. Given the high traffic density along I-95, which is among the busiest corridors on the East Coast, the potential for multi-vehicle collisions involving hazardous cargo remains a significant concern. Incident data highlights the growing risk associated with hazardous materials transport. In 2019, roadway-related hazardous materials incidents accounted for 37% of all HAZMAT responses in Prince William County. By 2021, this had increased to 51%, reflecting national trends of rising hazardous materials transport volumes (Prince William County Hazardous Materials Program Office, 2024). Another emerging concern is the rise in electric vehicles (EVs) and the unique risks posed by lithium-ion battery fires following vehicle collisions. Thermal runaway fire events have the potential to rekindle after extinguishment, and the reaction may continue for many days causing additional concerns. This risk is more fire suppression than HAZMAT; however, the HAZMAT program will continue to support this increased and emerging risk.

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**PIPELINE HAZARDS**

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Prince William County is a critical transit point for multiple high-capacity fuel and natural gas pipelines that supply energy to the Mid-Atlantic and East Coast regions. The Colonial Pipeline, Kinder Morgan Plantation Pipeline, and Williams Transco Pipeline collectively transport millions of gallons of refined petroleum products and natural gas daily. These pipelines are key to sustaining regional energy demands, but their presence introduces significant risks, including leaks, ruptures, and potential explosions. The Colonial Pipeline, the largest refined petroleum pipeline in the United States, transports up to 3 million barrels per day of gasoline, diesel, and jet fuel (Colonial Pipeline Company, 2024; U.S. Energy Information Administration, 2016). A disruption to this pipeline, such as the 2021 cyberattack that led to fuel shortages across the East Coast, demonstrates the pipeline's importance and its vulnerability to security threats. The Kinder Morgan Plantation Pipeline, running along the eastern section of Prince William County, carries approximately 700,000 barrels per day of petroleum products, with a delivery point at Cockpit Point, a designated storage and distribution area (Kinder Morgan, 2024). The Williams Transco Pipeline is one of the nation's most critical natural gas pipelines, moving 19.3 billion cubic feet per day, supplying over 20% of the country's natural gas consumption (Williams Companies, Inc., 2025). Pipeline incidents in the county remain infrequent, but their potential severity is substantial. Nationally, pipeline failures have resulted in large-scale fires, explosions, and widespread environmental contamination. According to the Pipeline and Hazardous Materials Safety Administration (PHMSA), pipeline incidents involving hazardous liquid releases have led to over \$10 billion in damages since 2003, with a rising trend in failures due to corrosion, excavation damage, and mechanical failures (Pipeline and Hazardous Materials Safety Administration, 2024). While pipeline incidents remain infrequent, the risk remains. Many of these pipelines run adjacent to high-population areas, increasing the potential consequences of a rupture. Colonial Pipeline is adjacent to Patriot High School and runs through highly populated areas in the Sudley Road Area. A pipeline failure in these zones could necessitate mass evacuations, extensive fire suppression efforts, and long-term environmental remediation. Security concerns surrounding pipeline infrastructure have also gained attention in recent years. In addition to cyberattacks like the one that targeted Colonial Pipeline, unauthorized excavation, vandalism, and intentional sabotage present ongoing risks. PHMSA mandates strict security and operational safety protocols, but enforcement challenges persist, particularly in regions where infrastructure is exposed.

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**RAIL TRANSPORTATION HAZARDS**

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Prince William County is traversed by two major freight rail lines: CSX Transportation and Norfolk Southern Railway (NS). These railroads serve as primary carriers of hazardous materials, moving bulk commodities such as petroleum products, liquefied gases, corrosives, and industrial chemicals. The county's rail corridors run through densely populated areas, increasing the potential for mass exposure incidents in the event of derailments, leaks, or spills. Annual rail shipment data reveals that approximately 29,527 hazardous materials shipments move through the county on CSX rail lines, while Norfolk Southern transports an estimated 17,912 hazardous materials shipments per year (CSX Transportation, 2024; Norfolk Southern Railway, 2024). These figures underscore the

85 significant volume of potentially dangerous cargo moving through urban and suburban  
86 communities, requiring robust monitoring and emergency preparedness measures. Rail-  
87 related HAZMAT incidents are less frequent than road transportation incidents, but their  
88 potential consequences are significantly higher due to the volumes carried, and the number  
89 of loads involved. Large-scale derailments, railcar punctures, or hazardous material spills  
90 can lead to mass evacuations, environmental contamination, and prolonged infrastructure  
91 disruptions. One major area of concern is the CSX rail line that runs parallel to I-95, which  
92 passes through high-density residential and commercial areas. A derailment involving highly  
93 flammable or toxic substances in these areas could overwhelm emergency response  
94 resources and pose a severe public health risk. Similarly, Norfolk Southern's line through  
95 Manassas and Haymarket presents unique risks due to its proximity to critical infrastructure  
96 and population centers. Security concerns regarding rail transportation also persist. Given  
97 that hazardous materials shipments move through a major metropolitan corridor, the  
98 potential for deliberate sabotage or terrorism targeting railcars carrying toxic or flammable  
99 substances remains a low-frequency but high-consequence risk. Federal Rail Security  
100 Directives require continuous monitoring of high-risk shipments, but ensuring full  
101 compliance remains a challenge due to the volume of cargo moving through the region.

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#### 102 **AVIATION HAZARDS**

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103 Prince William County is directly impacted by aviation hazards due to its proximity to  
104 Washington Dulles International Airport (KIAD) and Manassas Regional Airport (KHEF), as  
105 well as air traffic passing through its airspace. The county experiences a high volume of  
106 commercial and general aviation operations, with KIAD averaging 1,134 daily flight  
107 operations (Federal Aviation Administration, 2024) and KHEF managing approximately 240  
108 daily flights (Manassas Regional Airport Council, 2023). Given the nature of these  
109 operations, aviation-related hazardous materials (HAZMAT) incidents, though less frequent  
110 than road or pipeline incidents, pose a unique set of risks requiring specialized response  
111 capabilities. The greatest aviation-related hazardous materials risk stems from fuel storage  
112 and transport. Jet fuel, including Jet A and Jet A-1, presents a significant fire hazard in the  
113 event of an aircraft crash or fuel transfer mishap. A fully loaded Boeing 747 can carry up to  
114 57,283 gallons of fuel, while an Airbus A380 has a capacity of over 84,000 gallons. Spills  
115 during refueling or emergency landings can result in rapid fire spread, requiring large-scale  
116 foam suppression efforts and environmental containment measures. While there have been  
117 no major aircraft crashes in Prince William County in recent years, historical incidents  
118 nationwide have demonstrated the potential consequences of aviation-related  
119 emergencies. The proposed introduction of commercial passenger services at Manassas  
120 Regional Airport (KHEF) necessitates continued preparedness for aviation-related incidents  
121 involving smaller regional aircraft, including the Boeing 737, Bombardier CRJ series, Embraer  
122 E-Jet and ERJ families, ATR 42/72, De Havilland Canada Dash 8 series, and various models  
123 within the Airbus A320 family (Manassas Regional Airport Council, 2023)

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#### 124 **WATERWAY HAZARDS**

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125 Prince William County is not a major maritime hub, but its proximity to the Potomac River  
126 and local waterways presents hazardous materials risks. Key concerns include spills from  
127 transportation incidents near water crossings, pipeline leaks, and industrial facility releases.

128 Protecting waterways is essential as the county grows. The Potomac River, forming the  
129 county's eastern boundary, supports fuel barges, private watercraft, and limited commercial  
130 transport (U.S. Army Corps of Engineers, 2024; Interstate Commission on the Potomac River  
131 Basin, 2024; National Oceanic and Atmospheric Administration, 2024; U.S. Coast Guard,  
132 2024). Hazards primarily stem from road, rail, and pipeline incidents, as well as materials  
133 stored at nearby fixed facilities. Stormwater runoff and industrial discharge further  
134 contribute to contamination risks. Facilities handling petroleum, solvents, and chemicals  
135 must comply with EPA and Virginia DEQ regulations to prevent uncontrolled releases.  
136 Although no major waterway incidents have occurred recently, risks remain. Continued  
137 interagency collaboration, response planning, and mitigation investments are critical to  
138 protecting county water resources.

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### 139 **FIXED FACILITY HAZARDS**

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140 Prince William County receives annual Tier II hazardous chemical inventory reports as  
141 required under the Emergency Planning and Community Right-to-Know Act (EPCRA). These  
142 reports, submitted to the HAZMAT Office, provide critical data on hazardous chemicals  
143 stored at facilities throughout the county. The information supports emergency response  
144 planning, risk assessment, and regulatory compliance efforts by ensuring first responders  
145 and emergency planners have visibility into potential chemical hazards. Prince William  
146 County contains over 150 facilities that report hazardous chemical inventories exceeding  
147 10,000 pounds, with many handling Extremely Hazardous Substances (EHS) as classified by  
148 the Environmental Protection Agency (EPA). These facilities vary from industrial  
149 manufacturing plants to distribution centers, water treatment plants, and commercial  
150 storage facilities that rely on hazardous materials in their operations. The county's growing  
151 commercial/industrial footprint and continued expansion of data centers present additional  
152 risks that must be carefully managed. (Prince William County Hazardous Materials Office,  
153 *Tier II Chemical Inventory Reports 2024*) High-risk chemical storage facilities include sites  
154 handling anhydrous ammonia, chlorine, sulfur dioxide, hydrofluoric acid, and quantities of  
155 sulfuric acid. Anhydrous ammonia, used primarily in refrigeration, poses a significant  
156 inhalation hazard, with even small leaks capable of causing severe respiratory injuries and  
157 fatalities. Several food distribution warehouses and the Prince William Ice Zone store  
158 ammonia in amounts exceeding planning requirements, requiring detailed emergency  
159 planning in compliance with EPA's Risk Management Program (RMP) and EPCRA. The  
160 county's HAZMAT Office plays a critical role in reviewing these reports and ensuring  
161 emergency response agencies are equipped with the necessary information to address  
162 potential hazards at these facilities. Petroleum and fuel storage facilities also contribute  
163 to the county's fixed facility HAZMAT risk. Bulk storage facilities such as the Partner bulk  
164 terminal (formerly Sunoco) on Balls Ford Road and other facilities store large quantities of  
165 diesel, gasoline, and jet fuel. These facilities must adhere to Spill Prevention, Control, and  
166 Countermeasure (SPCC) regulations, as even minor leaks or spills could contaminate local  
167 waterways and groundwater sources. The presence of these storage sites increases the  
168 potential for large-scale fires and explosions, particularly in the event of equipment failures,  
169 natural disasters, or deliberate sabotage. An emerging challenge in fixed facility hazards is  
170 the expansion of data centers, which now form a key component of the county's industrial  
171 sector. Data centers store large amounts of lead-acid (sulfuric acid) and lithium-ion

172 batteries in uninterruptible power supply (UPS) systems, as well as thousands of gallons of  
173 diesel fuel for backup generators. (Prince William County Hazardous Materials Office, *Tier II*  
174 *Chemical Inventory Reports*) These facilities are not traditionally classified as high-risk  
175 HAZMAT sites, but the increasing scale of energy storage on-site has significantly expanded  
176 their risk profile. Thermal runaway events in lithium-ion batteries can result in toxic gas  
177 releases and fires that are extremely difficult to extinguish.

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## 178 **CBRNE/TERRORISM EVENTS**

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179 CBRNE/Terrorism hazards remain a low-frequency but high-consequence risk, requiring  
180 continuous monitoring, coordination, and emergency preparedness. The deliberate use of  
181 chemical, biological, radiological, nuclear, or explosive materials in acts of terrorism or  
182 criminal activity presents a serious threat. Chemical Threats - The intentional release of toxic  
183 industrial chemicals (TICs) or weaponized agents can cause mass casualties, infrastructure  
184 damage, and long-term contamination. Substances such as chlorine, ammonia, and sulfur  
185 dioxide—readily available in industrial and transportation sectors—could be weaponized in  
186 targeted attacks. Biological Threats - The use of biological agents in terrorist attacks, such  
187 as anthrax or ricin, remains a serious concern. The 2001 anthrax mail attacks underscored  
188 the disruptive and lethal potential of biological terrorism, prompting enhanced surveillance,  
189 rapid testing, and containment protocols (Federal Bureau of Investigation, 2025b; Centers  
190 for Disease Control and Prevention, 2025). Biological threats can be targeted at humans,  
191 animals, or agriculture, each with its own consequences. Radiological and Nuclear Threats  
192 Radiological terrorism threats include the potential use of a radiological dispersal device  
193 (RDD), or "dirty bomb," to contaminate large areas. The county's participation in the Securing  
194 the Cities (STC) program enhances radiation detection capabilities, allowing law  
195 enforcement and HAZMAT to detect and intercept illicit radiological materials before they  
196 can be used in an attack (U.S. Department of Homeland Security, 2024a). Although an  
197 Improvised Nuclear Device (IND) event remains highly unlikely, the catastrophic  
198 consequences of such an attack necessitate continued intelligence monitoring and  
199 response planning. Federal and regional initiatives, including radiation detection networks  
200 and interdiction programs, support prevention and rapid mitigation strategies in the event of  
201 a nuclear terrorism threat. Explosive Threats - Terrorist use of improvised explosive devices  
202 (IEDs), vehicle-borne explosives, and repurposed industrial chemicals remains a credible  
203 threat in high-density locations and critical infrastructure sites. The Virginia State Police  
204 Bomb Squad based in Northern Virginia will be the lead on all explosive incidents, with the  
205 HAZMAT program in a support role.

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## 206 **CRIMINAL ACTIVITY AND ENVIRONMENTAL CRIMES**

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207 Criminal activities involving hazardous materials, including illicit drug production,  
208 environmental crimes, and illegal dumping, pose risks to Prince William County. These  
209 incidents threaten public health, contaminate resources, and require specialized HAZMAT  
210 response. Illicit Drug Risks One-pot methamphetamine labs and fentanyl production create  
211 explosion hazards and toxic exposure risks for first responders. Even small amounts of  
212 fentanyl can be lethal through inhalation or skin contact. Emergency personnel carry  
213 naloxone (Narcan) and follow strict PPE and decontamination protocols. Incidents like the  
214 April 2017 Stream Walk Lane, illegal dumping case highlight the risks of criminal and

215 improper disposal of hazardous materials. Law Enforcement and Fire Marshal Collaboration  
216 - The HAZMAT Program supports law enforcement in investigating hazardous materials  
217 crimes, responding to drug labs, and assisting with environmental violations. Coordinated  
218 efforts enhance enforcement and public safety. The HAZMAT Program also supports law  
219 enforcement for CBRNE preparedness.

## 220 **SUMMARY**

221 Prince William County faces a complex and evolving hazardous materials landscape,  
222 requiring a strategic and adaptable approach to risk management. The daily transportation  
223 of hazardous materials, the presence of high-risk industrial facilities, and emerging threats—  
224 such as energy storage system incidents and the continued threat of terrorism-related  
225 hazardous materials concerns—demand continuous assessment and preparedness.

226 This Comprehensive Hazardous Materials Threat and Risk Assessment was developed to  
227 provide a clear understanding of the hazards impacting the community and to guide  
228 strategic planning efforts. The HAZMAT Program integrates operations across logistics,  
229 training, emergency management, regulatory compliance, and incident response to ensure  
230 a coordinated and effective approach to hazardous materials preparedness and mitigation.

231 This risk-based framework strengthens equipment readiness, enhances responder training,  
232 reinforces public safety initiatives, and supports regulatory oversight. By aligning our strategy  
233 with national standards and best practices, we continue to build the capabilities of the  
234 HAZMAT Response Team and operational personnel at all levels. Our focus remains on  
235 proactively identifying and addressing hazardous materials risks through planning,  
236 interagency collaboration, and response readiness.

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### 238 **Priority Areas of Concern**

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240 The potential for severe consequences from hazardous materials or CBRNE/Terrorist events  
241 must not be overlooked. Continuous preparedness is essential to safeguarding the  
242 community. The following areas represent our greatest concerns, categorized by their  
243 relative level of risk. Strengthening capabilities in these areas ensures that all hazardous  
244 materials incidents—regardless of size or complexity—are managed effectively:

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246 **Severe Risk:** Transportation-Related HAZMAT Incidents

247 **High Risk:** CBRNE Incidents, Terrorism and WMD Incidents

248 **Moderate Risk:** Industrial/Commercial Facility HAZMAT Incidents

249 **Emerging Risk:** Electric vehicle and energy storage systems. (moderate)

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251 This framework will guide ongoing improvements to response capabilities, ensuring an  
252 adaptive and effective HAZMAT program that meets the evolving needs of Prince William  
253 County.

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## Appendix A References

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## Appendix B - Definitions

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407  
408 **BLEVE** - Boiling Liquid Expanding Vapor Explosion occurs when a pressurized liquid reaches  
409 its boiling point due to external heat, causing a rapid phase transition to vapor. This results  
410 in a violent explosion, often involving flammable liquids such as propane, butane, or  
411 liquefied petroleum gas. The extreme pressure buildup can rupture containers, creating  
412 blast waves, fireballs, and hazardous projectiles.

413  
414 **CBRNE** - Chemical, Biological, Radiological, Nuclear, and Explosive incidents involve  
415 hazardous agents that can cause mass casualties, environmental damage, or infrastructure  
416 destruction. These threats can be accidental, like industrial chemical spills, or intentional,  
417 such as terrorist attacks. CBRNE response requires specialized equipment, protective  
418 measures, and interagency coordination.

419  
420 **CHE** - Continuing Hazardous Materials Education refers to the regularly scheduled training  
421 sessions designed to maintain and advance the operational readiness of the hazardous  
422 materials response team. Conducted six times per year to accommodate all three shifts,  
423 each CHE cycle typically spans three days. These trainings are coordinated by the Station  
424 506 Captains, with strategic oversight and support provided by the HAZMAT Battalion Chief  
425 to ensure consistency, relevance, and alignment with program priorities.

426  
427 **Cold Zone** - The safe area outside the immediate hazard zone where responders, incident  
428 command, and support personnel operate without requiring personal protective equipment  
429 (PPE). The cold zone is used for staging, medical care, logistics, and public information  
430 activities.

431  
432 **Decontamination (DECON)** - The removal or neutralization of hazardous substances from  
433 people, equipment, or environments to prevent contamination spread. Decontamination  
434 can involve physical removal (washing, scrubbing), chemical neutralization, or isolation of  
435 contaminated materials. In hazardous materials response, decontamination is critical for  
436 protecting both responders and the public.

437  
438 **Emergency Planning and Community Right-to-Know Act (EPCRA)** - A federal law enacted  
439 in 1986 requiring industries to report hazardous chemical inventories and emergency  
440 response plans to local and state authorities. EPCRA ensures that communities, first  
441 responders, and regulatory agencies are informed about hazardous substances stored in  
442 their jurisdictions. Facilities handling Extremely Hazardous Substances (EHS) above  
443 threshold quantities must comply with EPCRA reporting requirements.

444  
445 **Emergency Response Guidebook (ERG)** - A quick-reference manual designed for first  
446 responders to identify and manage hazardous materials incidents in the initial phase of an  
447 emergency. The ERG provides guidelines for isolation distances, personal protective  
448 measures, and recommended response actions based on chemical classification. It is  
449 widely used by fire departments, law enforcement, and emergency management agencies.

450

451 **Energy Storage System** - A technology used to store energy, commonly in the form of  
452 lithium-ion, lead-acid, or flow batteries, to provide backup power for facilities, grid  
453 stabilization, or electric vehicles. These systems pose fire and explosion risks, particularly  
454 due to thermal runaway events, which can lead to rapid heat generation, off-gassing of toxic  
455 fumes, and prolonged fire hazards.

456  
457 **Extremely Hazardous Substances (EHS)** - A list of chemicals regulated by the  
458 Environmental Protection Agency (EPA) due to their high toxicity, flammability, or  
459 environmental persistence. Facilities storing EHS chemicals above their Threshold Planning  
460 Quantities (TPQ) must develop emergency response plans in coordination with Local  
461 Emergency Planning Committees (LEPCs).

462  
463 **HAZCONNECT** - A hazardous materials data management system designed to support  
464 incident pre-planning, emergency response coordination, and regulatory compliance. It  
465 allows agencies to store, track, and analyze hazardous materials information, ensuring that  
466 first responders up to date access to critical data when managing incidents.

467  
468 **Hazardous Materials or HAZMAT** - Any substance that poses a risk to human health,  
469 property, or the environment due to its chemical, physical, or biological properties. HAZMAT  
470 incidents can involve flammable, corrosive, toxic, radioactive, or reactive substances,  
471 requiring specialized handling and response.

472  
473 **Hazardous Materials Technician** - A specially trained responder capable of identifying,  
474 containing, and mitigating hazardous materials releases. Unlike First Responder Operations  
475 Level personnel, Hazardous Materials Technicians take offensive actions, such as plugging  
476 leaks, performing chemical analysis, and conducting decontamination operations.

477  
478 **Hot Zone** - The immediate danger area around a hazardous materials release, where  
479 exposure to toxic, flammable, or radioactive substances is highest. Entry into the hot zone is  
480 strictly limited to trained personnel wearing appropriate PPE and respiratory protection.

481  
482 **Incident Command System (ICS)** - A standardized framework for managing emergencies,  
483 ensuring coordinated response between multiple agencies. ICS establishes clear  
484 leadership, operational roles, and communication protocols, enabling efficient  
485 management of incidents ranging from routine fires to large-scale hazardous materials  
486 releases.

487  
488 **LEPC** - Local Emergency Planning Committee, a community-based organization responsible  
489 for hazardous materials emergency planning. LEPCs include representatives from fire  
490 departments, law enforcement, public health agencies, industry, and community  
491 organizations, ensuring that local risks are identified, and response plans are developed.

492  
493 **Liquefied Petroleum Gas (LPG)** - A flammable hydrocarbon gas mixture, including propane  
494 and butane, that is stored under pressure as a liquid. LPG is widely used for heating, cooking,

495 and as a fuel source for vehicles and industrial equipment. If released, LPG can form  
496 explosive vapor clouds and cause asphyxiation in confined spaces.

497  
498 **Mass Decontamination** - The rapid decontamination of large numbers of people exposed  
499 to hazardous substances, often using water showers, soap solutions, or specialized  
500 decontaminants. Mass decontamination is essential during chemical spills, biological  
501 incidents, and radiological contamination events to prevent widespread health effects.

502  
503 **Mutual Aid Agreement** - A formal agreement between emergency response agencies to  
504 provide assistance during large-scale incidents. Mutual aid agreements enable neighboring  
505 jurisdictions to share personnel, equipment, and expertise when responding to hazardous  
506 materials incidents, wildfires, or mass casualty events.

507  
508 **NFPA 470** - The National Fire Protection Association (NFPA) standard governing hazardous  
509 materials response, competency requirements, and operational procedures. NFPA 470  
510 consolidates previous NFPA standards (1072, 472, and 473), ensuring that responders are  
511 trained to safely manage hazardous materials and weapons of mass destruction (WMD)  
512 incidents.

513  
514 **First Responder Operations Level** - A training level for personnel who take defensive  
515 actions at hazardous materials incidents. Operations-level responders do not perform direct  
516 hazard mitigation but focus on isolating the scene, protecting the public, and performing  
517 basic decontamination.

518  
519 **PHMSA** - Pipeline and Hazardous Materials Safety Administration, a federal agency under  
520 the U.S. Department of Transportation (DOT) responsible for regulating pipeline safety and  
521 hazardous materials transportation. PHMSA oversees pipeline integrity, emergency  
522 preparedness, and enforcement actions for hazardous materials carriers.

523  
524 **Placarding** - The use of standardized signs on vehicles and containers transporting  
525 hazardous materials, required under DOT regulations. Placards display hazard class, UN  
526 identification numbers, and handling precautions, helping first responders quickly assess  
527 risks during an incident.

528  
529 **PRND** - Preventive Radiological/Nuclear Detection, a security program focused on detecting  
530 and preventing the illicit use of radioactive materials. PRND supports radiation monitoring,  
531 law enforcement interdiction, and emergency response coordination to counter radiological  
532 terrorism threats.

533  
534 **Radiological Dispersal Device (RDD)** - Commonly known as a "dirty bomb", an RDD is a  
535 weapon that combines conventional explosives with radioactive materials to contaminate  
536 an area. While an RDD does not create a nuclear explosion, it poses long-term health risks  
537 and environmental contamination hazards.

538

539 **Refrigerated Liquid Gas** - A gas that is stored at extremely low temperatures to maintain its  
540 liquid state, such as liquid nitrogen, liquid oxygen, or liquefied natural gas (LNG). These  
541 substances pose cryogenic hazards, including severe cold burns and rapid vapor expansion  
542 risks.

543  
544 **Securing the Cities (STC)** - A federal program under the Department of Homeland Security  
545 (DHS) aimed at enhancing radiological and nuclear threat detection in high-risk urban areas.  
546 STC provides equipment, training, and intelligence-sharing networks to improve  
547 counterterrorism efforts.

548  
549 **Spill Prevention, Control, and Countermeasure (SPCC)** - A regulatory framework under  
550 the EPA requiring facilities to prevent oil spills and implement containment strategies to  
551 protect water sources and the environment. SPCC applies to facilities with large-scale fuel  
552 or chemical storage.

553  
554 **Tier II Reporting** - A hazardous materials inventory reporting requirement under EPCRA,  
555 requiring facilities storing chemicals above threshold quantities to submit annual reports to  
556 local fire departments, LEPCs, and emergency management agencies.

557  
558 **Toxic Industrial Chemical (TIC)** - A hazardous chemical commonly used in industrial  
559 processes, which can become a public safety threat if released accidentally or used  
560 maliciously in chemical attacks. TICs include ammonia, chlorine, and hydrogen fluoride.

561  
562 **UASI** - Urban Area Security Initiative, a DHS grant program that enhances local emergency  
563 preparedness for terrorist threats and CBRNE incidents. UASI funding supports equipment  
564 purchases, specialized training, and intelligence-sharing networks.

565  
566 **Warm Zone** - The area surrounding the hot zone where decontamination occurs, and  
567 personnel prepare for entry. The warm zone acts as a buffer between the hazardous  
568 environment and the cold zone, ensuring controlled contamination management.

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## APPENDIX C -TRANSPORTATION DATA/DISCUSSION

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### Prince William County 2023 Traffic Analysis:

1. Total Daily Traffic (All Vehicles):
  - **15,401,217** vehicles pass through Prince William County daily.
2. Estimated Daily Commercial Truck Traffic:
  - **544,880** commercial trucks traverse PWC daily, based on the AADT data and vehicle classification percentages.
3. Estimated Daily Hazardous Materials Shipments:
  - Low Estimate (5% of trucks): **~27,244** hazardous materials shipments per day.
  - High Estimate (10% of trucks): **~54,488** hazardous materials shipments per day.

These estimates highlight the significant volume of potential hazardous materials moving through PWC, especially via major corridors. These figures should help inform hazard analysis, response planning, and resource allocation for the HAZMAT team.

The Annual Average Daily Traffic (AADT) data used for this analysis was sourced from the Virginia Department of Transportation (VDOT). AADT represents the total volume of vehicle traffic on a highway or road for a year, divided by 365 days, providing a daily average.

This dataset includes traffic counts for major highways, secondary roads, and key intersections in Prince William County, along with vehicle classification data that helps estimate commercial truck volumes and potential hazardous materials shipments.

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## APPENDIX D - PRINCE WILLIAM COUNTY AVIATION DATA/DISCUSSION

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Based on official data from the Federal Aviation Administration (FAA) and the Metropolitan Washington Airports Authority (MWAA), here are the average daily flight operations for both Washington Dulles International Airport (KIAD) and Manassas Regional Airport (KHEF):

### Washington Dulles International Airport (KIAD):

- Average Daily Operations: According to the FAA's Air Traffic Activity System (ATADS) for Calendar Year 2023, IAD had an average daily capacity of approximately 1,134 operations.

### Manassas Regional Airport (KHEF):

- Average Daily Operations: According to the FAA's Air Traffic Activity System (ATADS) for Calendar Year 2023, HEF ranked 110th among 527 busiest general aviation airports in the United States, based on itinerant general aviation traffic. This averages approximately 240 flights a day as of 2024.

### Why Aviation Data:

612 While Manassas Regional Airport (KHEF) is located within PWC, Washington Dulles  
613 International Airport (KIAD), though situated in neighboring Loudoun and Fairfax counties,  
614 has flight operations that significantly impact PWC airspace.

615  
616 KIAD serves as a major international hub, with numerous flight paths traversing PWC during  
617 approach and departure phases.

618  
619 Understanding the fuel capacities of aircraft commonly operating in the region provides  
620 insight into the scale of potential risks. Below is a summary of typical fuel capacities for  
621 selected aircraft:

622

Aircraft Type	~ Maximum Fuel Capacity (Gallons)
Boeing 747	57283
Airbus A380	84535
Airbus A340	56533
Boeing 737	6874
Boeing 767	23979
Bombardier CRJ-900	7822
Boeing 757	11489
Gulfstream G650	4980

623

624 **APPENDIX E - WATERWAYS DATA/DISCUSSION**

625 While the Potomac River is not a major commercial shipping route compared to other U.S.  
626 rivers, it still supports a range of activities that could involve the movement of goods. These  
627 activities include recreational boating, fishing, and limited commercial transport.

628  
629 Although data on commercial vessel traffic is limited, the HAZMAT program recognizes the  
630 need to be prepared for potential hazardous materials incidents and spills affecting local  
631 waterways.

632  
633 The primary risk to the waterways of Prince William County stems not from direct waterborne  
634 transport of hazardous materials but from fixed facilities, pipelines, rail lines, and over-the-  
635 road transportation routes located near or crossing waterways. Incidents involving these  
636 sources—such as spills, derailments, or accidents—pose significant threats to water quality  
637 and aquatic ecosystems

638 **APPENDIX F - PIPELINES DATA/DISCUSSION**

639 Prince William County (PWC), Virginia, hosts a network of significant pipelines that play a  
640 crucial role in transporting petroleum products and natural gas to meet regional energy  
641 demands. Understanding the layout and function of these pipelines is essential for hazard  
642 assessment and emergency preparedness.

643 Major Petroleum Pipelines:

- 644 • Colonial Pipeline: This major pipeline traverses the west-central portion of PWC,  
645 transporting refined petroleum products from the Gulf Coast to the Northeast. It  
646 supplies approximately 45% of the fuel consumed on the East Coast.
- 647 ○ Capacity and Structure: The Colonial Pipeline is the largest refined petroleum  
648 products pipeline in the United States, spanning over 5,500 miles from  
649 Houston, Texas, to the New York Harbor. It has a capacity to transport  
650 approximately 3 million barrels (126 million gallons) of fuel per day, delivering  
651 products such as gasoline, diesel, heating oil, and jet fuel. (~4 million  
652 gallon/hour at peak capacity)
- 653 • Kinder Morgan Plantation Pipeline: Running along the eastern edge of PWC, parallel  
654 to the CSX rail line, this pipeline delivers approximately 700,000 barrels per day of  
655 gasoline, jet fuel, diesel, and biodiesel with a delivery point at Cockpit Point in PWC.  
656 (~1.2 million gallons per hour at peak capacity)

657 Natural Gas Pipelines:

- 658 • Williams Transco Pipeline: This extensive pipeline system delivers natural gas from  
659 the Gulf Coast to the Northeast, passing through PWC. The growing energy demand,  
660 particularly from the expanding data center industry in Virginia, has prompted  
661 considerations for expanding this pipeline's capacity to ensure a reliable natural gas  
662 supply.
- 663 ○ Capacity and Structure: The Transcontinental Gas Pipeline (Transco),  
664 operated by Williams, is a vast natural gas pipeline system extending  
665 approximately 10,200 miles from South Texas to New York City. As of January  
666 2025, following recent expansions, Transco's system-design capacity has  
667 increased to 19.9 million dekatherms per day, transporting about 20% of the  
668 natural gas produced in the United States.
- 669 ○ Conversion of 19.9 million Dekatherms per Day:
  - 670 ▪ Cubic Feet of Natural Gas ~19.3 billion cubic feet/day
  - 671 ▪ Gallons of Gasoline Equivalent ~141.3 million gallons/day
  - 672 ▪ BTUs (British Thermal Units) ~19.9 trillion BTUs/day
- 673 • Local Distribution Networks: Columbia Gas of Virginia and Washington Gas Light  
674 Company operate substantial natural gas distribution systems within PWC, supplying  
675 residential and commercial customers. In recent years, significant investments have  
676 been made to modernize and enhance these networks, ensuring safe and reliable  
677 service.

678 **APPENDIX G– RAIL TRANSPORTATION DATA/HAZARDS DATA/DISCUSSION**

679 Prince William County (PWC), Virginia, is traversed by two major freight rail lines operated by  
680 CSX Transportation and Norfolk Southern Railway (NS). These railroads are integral to the  
681 movement of goods, including hazardous materials, through the region.

682 CSX Rail:

- 683 • The CSX rail line runs parallel to Interstate 95, passing through densely populated  
684 areas such as Woodbridge and Dumfries. This corridor is a vital artery for freight,  
685 facilitating the transport of various commodities.
- 686 • Approximate Annual Shipments of Hazardous Materials: 29,527

687 Norfolk and Southern Rail (NS):

- 688
- 689 • The NS rail line traverses the City of Manassas and serves the Haymarket area,  
690 impacting both residential and commercial zones. The Manassas Rail Yard, operated  
691 by NS within the city limits, functions as a hub for local freight management.
  - 692 • Approximate Annual Shipment of Hazardous Materials: 17,912

692 Combined Top Ten Hazards:

- 693 • An analysis of commodity flow data provided by CSX and NS, conducted by the PWC  
694 Hazardous Materials Coordinator, has identified the top ten hazardous materials  
695 transported through the county. These materials, ranked by their associated risks,  
696 and ranked through volume and risk comparison, with some less hazardous  
697 materials ranking higher due to the volume transported:
  - 698 1. Sulfur, Molten
  - 699 2. Petroleum Gases, Liquefied
  - 700 3. Alcohols, N.O.S.
  - 701 4. Phosphoric Acid Solutions
  - 702 5. Chlorine
  - 703 6. Sodium Hydroxide Solutions
  - 704 7. Ammonium Nitrate
  - 705 8. Hydrogen Fluoride
  - 706 9. Lithium-Ion Batteries
  - 707 10. Phenol, Molten

708 Rail Transportation presents various hazards, including flammability, toxicity, corrosiveness,  
709 and environmental risks. The proximity of rail lines to populated areas heightens the  
710 potential impact of any incidents involving these materials.

711 It must also be noted that volumes of materials in these shipments can be very large, some  
712 rail containers can carry over 30,000 gallons per liquid rail car, and other types of containers  
713 can range widely.

714 The presence of critical intersections where rail lines cross major roadways, such as the  
715 Prince William Parkway and Interstate 95, further amplifies exposure risks. Additionally,  
716 several rail segments run adjacent to the Potomac River and its tributaries, posing potential  
717 threats to waterways in the event of spills or derailments.

718 Due to security concerns, CSX and NS Rail provide detailed commodity information to public  
719 safety as controlled information that is operationally sensitive and by agreement cannot be  
720 released publicly. Detailed data must be requested through the carrier.

721

## APPENDIX H - FIXED FACILITIES DATA/DISCUSSION

722 There are currently over 150 fixed facilities in Prince William County that report chemical  
723 inventories exceeding 10,000 lbs. It is likely that many more facilities, either unaware of their  
724 responsibilities under the Emergency Planning and Community Right to Know Act (EPCRA)  
725 or not yet identified, have yet to report their chemical inventories. Additionally,  
726 approximately [number] fixed facilities report the presence of Extremely Hazardous  
727 Substances (EHS)chemicals that the EPA identifies as particularly dangerous due to their  
728 toxicity, flammability, or other hazardous properties. These chemicals require reporting at  
729 lower quantities than the 10,000 lb. threshold, as determined by the Threshold Planning  
730 Quantities (TPQ) set by EPA. Facilities that handle EHS chemicals above their TPQs must  
731 work with the Local Emergency Planning Committee (LEPC) to ensure emergency plans are  
732 in place and include them in the county's Hazardous Materials Response Plan (currently  
733 under revision). The majority of these facilities rely on sulfuric acid, primarily used in  
734 batteries, which has a TPQ of 1,000 lbs. While EPCRA requires planning for facilities using  
735 hazardous chemicals, the regulations were originally written for bulk storage, not for  
736 facilities that use smaller quantities, such as those with multiple battery backup systems.  
737 Furthermore, as lithium-based batteries replace lead-acid batteries in some settings, the  
738 hazards associated with these systems are not currently covered under EPCRA. The HAZMAT  
739 Office has identified the following facilities as higher-risk due to the types of products they  
740 store, which meet the EHS planning requirements:

- 742 • Micron Technology – Multiple EHS chemicals
- 743 • US Foods – Anhydrous Ammonia (~4,000 lbs.)
- 744 • Martin Brower – Anhydrous Ammonia (~10,000 lbs.)
- 745 • McClane Food Service – Anhydrous Ammonia (~10,000 lbs.)
- 746 • Prince William Ice Zone – Anhydrous Ammonia (~10,000 lbs.)
- 747 • Manassas Water Treatment Plant – Sulfur Dioxide
- 748 • Marine Corps Base Quantico Water Treatment Plant – Chlorine, Sulfur Dioxide
- 749 • Virginia Concrete – Gainesville – Sulfuric Acid (bulk)
- 750 • Virginia Concrete – Woodbridge – Sulfuric Acid (bulk)

751 In addition, more than 50 other facilities store sulfuric acid in batteries, which are subject to  
752 planning requirements but are considered a lower priority compared to facilities with bulk  
753 storage and higher-hazard chemicals.

754 The following list is a representative sample of chemicals stored across Prince William  
755 County, compiled from multiple Tier II chemical inventory reports:

756

Chemical Name	General Hazard
42% Propylene Glycol In Water	Environmental Hazard
Acetic Acid	Corrosive, Flammable Liquid
Aluminum Chloride	Corrosive
Aluminum Oxide	Corrosive
Ammonia (Anhydrous)	Flammable Gas, Corrosive
Ammonium Fluoride	Corrosive, Toxic
Ammonium Hydroxide	Corrosive

<b>Chemical Name</b>	<b>General Hazard</b>
Amorphous Silica	Irritant, Environmental Hazard
Antifreeze/Coolant	Environmental Hazard
Aqueous Film-Forming Foam (AFFF)	Unclassified
Argon, Refrigerated Liquid	Gas Under Pressure
Arsine	Flammable Gas, Acute Toxicity
Asphalt Cement, All Grades	Combustible
Aviation Gasoline	Flammable Liquid
Batteries - Lead - Acid	Corrosive
Battery Acid (As Sulfuric Acid)	Corrosive
Battery, Nickel-Cadmium	Corrosive
Boron Trichloride	Corrosive
Butane	Flammable Gas
Calcium Carbonate	Water Reactive
Calcium Chloride, Anhydrous	Water Reacitve
Calcium Hydroxide	Corrosive, Water Reactive
Calcium Hypochlorite	Oxidizer
Calcium Oxide	Water Reactive
Carbon Dioxide	Gas Under Pressure
Chlorine	Gas Under Pressure, Acute Toxicity, Corrosive
Coal Fly Ash	Corrosive
Copper Sulfate	Corrosive
Degreaser - Solvent Based	Combustible Liquid
Diesel Exhaust Fluid	Corrosive
Diesel Fuel	Flammable Liquid
Distillates (Petroleum)	Flammable Liquid
Ethanol	Flammable Liquid
Ethylene Glycol	Environmental Hazard
Ferric Chloride, Solution	Corrosive
Fertilizer, Commercial Blend	Unclassified
Fuel Oil	Combustible Liquid
Gasoline	Flammable Liquid
Helium, Compressed	Gas Under Pressure
Hydrochloric Acid	Corrosive
Hydrofluoric Acid	Corrosive, Acute Toxicity
Hydrogen Chloride	Gas Under Pressure, Corrosive
Hydrogen Peroxide 30%	Oxidizer, Corrosive
Isopropyl Alcohol	Flammable Liquid, Eye Irritant
JP-8	Flammable Liquid
Kerosene	Flammable Liquid
Lead	Toxic
Liquid Nitrogen	Gas Under Pressure
Liquid Oxygen	Gas Under Pressure, Oxidizer

Chemical Name	General Hazard
Lithium Ion Batteries	Flammable Solid
Methanol	Flammable Liquid, Acute Toxicity
Mineral Oil	Combustible Liquid
Nickel Cadmium Batteries	Not Classified
Nitric Acid	Corrosive, Oxidizer
Nitrogen	Gas Under Pressure
Oxygen	Gas Under Pressure, Oxidizer
Phosphoric Acid	Corrosive
Potassium Cyanide	Acute Toxicity
Potassium Hydroxide	Corrosive
Propane	Flammable Gas
Refrigerant R-134A	Gas Under Pressure
Refrigerant R-22	Gas Under Pressure
Sodium Hydroxide	Corrosive
Sodium Hypochlorite	Corrosive, Environmental Hazard
Sulfuric Acid	Corrosive
Tungsten Hexafluoride	Corrosive
Urea	Corrosive
Used Oil	Combustible Liquid
Sulfur Dioxide	Acute Toxicity, Corrosive

757 The highlighted chemicals, particularly those in green, represent some of the highest  
758 hazards in the community, with hydrofluoric acid being the most critical due to its extreme  
759 toxicity upon exposure. Micron Technology is among the facilities that utilize many of these  
760 hazardous chemicals, though it is considered a moderate risk due to the robust controls in  
761 place for chemical handling and the presence of an onsite emergency response team.  
762 However, the HAZMAT Coordinator considers the highest risk fixed facilities in Prince William  
763 County to be those using Anhydrous Ammonia for refrigeration, owing to the compound's  
764 significant toxicity and flammability. Other chemicals of concern include sulfur dioxide,  
765 chlorine, and hydrofluoric acid, all of which are included on the EHS list due to their  
766 dangerous properties. The HAZMAT program has already conducted specialized training in  
767 ammonia response, and these facilities are in full compliance with planning operations to  
768 mitigate the associated risks.

769 **Non-EHS Target Facilities:** In addition to the EHS facilities which are identified under federal  
770 planning guidance, there are additional facilities that are recognized

771

772 Ergon Asphalt Partners – 18001 Cockpit Point Road, Dumfries

- 773 • Hydrochloric Acid – 50,000 lbs.
- 774 • Asphalt Products – Over 10,0000 lbs.
- 775 • Various solvents – 100,000 lbs.
- 776 • Fuel Oil/Heat Transfer Oil – 200,000 lbs.

777 Energy Transfer and Marketing Terminals – Formerly Sunoco Terminal

- 778 • Gasoline - ~80 million lbs. (~13 million gallons (6.15))

- 779 • Butane - ~260,000 lbs.
- 780 • Ethanol – 5.7 million lbs. (~870,000 gallons (6))
- 781 • Diesel Fuel ~72.3 million lbs. (~10.2 million gallons (7.1))

782

783 American Type Culture Collection (ATCC) – University Blvd

- 784 • Thousands of biological specimens in the repository.
- 785 • Participants and stores specimen under the CDC Select Agent Program.
- 786 • Large Volume of liquid nitrogen
- 787 • Large volume of carbon dioxide

788

789 These facilities were designated as target facilities due to their unique roles. One facility  
 790 handles large volumes of biological specimens of interest, maintaining robust safety and  
 791 security systems while actively collaborating with Fire and Rescue through regular training  
 792 and joint exercises.

793

794 The facilities that store large volumes of flammable and combustible liquids require even  
 795 more rigorous planning than standard EHS facilities. In the event of a major fire, large-scale  
 796 foam firefighting operations would be necessary for effective suppression. While these  
 797 facilities also have strong safety and security measures that keep overall risk low, the  
 798 potential consequences of an incident make them target hazards, reinforcing the need for  
 799 proactive planning, specialized resources, and coordinated response strategies.

800

801 **APPENDIX I - INCIDENT RESPONSE DATA/DISCUSSION**

802 The following data represents HAZMAT incident reports in Prince William County (PWC) for  
 803 2019, 2020, and 2021. These years were selected as a representative sample due to the  
 804 confirmed validity and consistency of reporting during these periods. The data is broken  
 805 down by year and categorized by incident type and DOT hazard class. Additionally, we have  
 806 included data on inside gas leaks, outside gas leaks, and carbon monoxide (CO) incidents,  
 807 even when the HAZMAT team was not directly involved. These incidents are still classified as  
 808 hazardous materials responses due to the nature of the events and the use of atmospheric  
 809 monitoring devices, which are maintained under the HAZMAT program. It is also important  
 810 to recognize that all operational personnel within the Fire and Rescue System (FRS) operate  
 811 at the Hazardous Materials First Responder Operations Level. This underscores that  
 812 hazardous materials response is not limited to the designated HAZMAT team—rather, it is an  
 813 inherent aspect of emergency response across the entire system.

814

815 **2019 HAZMAT Incident Reports: Total - 93**

816

817 **2019 HAZMAT Reports by DOT Hazard Class**

DOT Hazard Class	Count	Percentage
Class 1 - Explosives	0	0%
Class 2 - Gases	18	19%
Class 3 - Flammable Liquids	46	49%

Class 4 - Flammable Solids	1	1%
Class 5 - Oxidizers	0	0%
Class 6 - Toxic & Infectious Substances	5	5%
Class 7 - Radioactive Materials	0	0%
Class 8 - Corrosive Substances	10	11%
Class 9 - Miscellaneous Hazardous Materials	13	14%

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**2019 HAZMAT Reports by Location Type**

Incident Type	Count	Percentage
Commercial	17	18%
Fixed Facility	1	1%
Government	10	11%
Public Area	3	3%
Residential	28	30%
Transportation	34	37%

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**2020 HAZMAT Incident Reports: Total - 49**

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**2020 HAZMAT Reports by DOT Hazard Class**

DOT Hazard Class	Count	Percentage
Class 1 - Explosives	0	0%
Class 2 - Gases	4	8%
Class 3 - Flammable Liquids	32	65%
Class 4 - Flammable Solids	0	0%
Class 5 - Oxidizers	0	0%
Class 6 - Toxic & Infectious Substances	3	6%
Class 7 - Radioactive Materials	0	0%
Class 8 - Corrosive Substances	1	2%
Class 9 - Miscellaneous Hazardous Materials	9	18%

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**2020 HAZMAT Reports by Location Type**

Incident Type	Count	Percentage
Commercial	9	18%
Fixed Facility	0	0%
Government	3	6%
Public Area	6	12%
Residential	9	18%
Transportation	22	45%

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**2021 HAZMAT Incident Reports: Total 99**

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**2021 HAZMAT Reports by DOT Hazard Class**

DOT Hazard Class	Count	Percentage
Class 1 - Explosives	2	2%
Class 2 - Gases	23	23%
Class 3 - Flammable Liquids	47	47%
Class 4 - Flammable Solids	0	0%
Class 5 - Oxidizers	0	0%
Class 6 - Toxic & Infectious Substances	4	4%
Class 7 - Radioactive Materials	3	3%
Class 8 - Corrosive Substances	5	5%
Class 9 - Miscellaneous Hazardous Materials	15	15%

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### 2021 HAZMAT Reports by Location Type

Incident Type	Count	Percentage
Commercial	15	15%
Fixed Facility	1	1%
Government Locations	2	2%
Public Areas	7	7%
Residential	24	24%
Transportation	50	51%

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### Analysis

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The data from 2019 to 2021 highlights key trends in hazardous materials incidents within Prince William County. These incidents are categorized by DOT hazard class and location type, offering insights into the risks associated with hazardous materials across different environments.

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### Overall Trends

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- Incident Volume Fluctuations: The total number of HAZMAT incidents varied over the three years. The highest number was recorded in 2021 (99 incidents), followed by 2019 (93 incidents). In 2020, there was a notable drop to 49 incidents, likely influenced by external factors such as reduced transportation and industrial activity during the COVID-19 pandemic.
- Predominance of Flammable Liquids: Across all three years, Class 3 - Flammable Liquids consistently represented the highest percentage of incidents, accounting for 47-65% of all reported cases. This suggests a continued risk of incidents involving fuels, solvents, or other combustible liquids.
- Increasing Reports of Gas-Related Incidents: Class 2 - Gases incidents increased notably in 2021 (23%) compared to 2019 (19%) and 2020 (8%). This could indicate a rise in natural gas leaks, or other hazardous gas-related emergencies.
- Emerging Radioactive Material Reports: In 2021, there were three reported incidents involving radioactive materials (3%), whereas none were recorded in 2019 or 2020. This may reflect improved detection, or an increase in actual events.

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### Location-Based Observations

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#### Transportation-Related Incidents:

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- The highest proportion of incidents occurred in transportation settings, increasing from 37% (2019) to 45% (2020) and peaking at 51% (2021).
  - This trend suggests that road, rail, and pipeline transport remain significant sources of hazardous materials risks, particularly given Prince William County’s role as a transit corridor.

862 Residential Incidents:

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- Residential HAZMAT incidents accounted for 30% in 2019, 18% in 2020, and 24% in 2021.
  - This aligns with the presence of household hazardous materials such as propane, fuel storage, and chemical-based incidents.

868 Fixed Facility Incidents:

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- Extremely low occurrence, with only one reported fixed facility incident in both 2019 and 2021 and none in 2020.
  - This suggests strong safety and compliance measures at industrial and commercial storage facilities.

873 Key Takeaways

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- The most common hazardous materials incidents involve flammable liquids and gases, indicating a strong need for continued focus on these hazard classes in responder training.
  - The decline in incidents in 2020 may be linked to reduced activity during the pandemic, while the rebound in 2021 suggests a return to normal operational risks.
  - The increase in radioactive materials incidents in 2021, though still low, warrants continued monitoring.
  - The consistent presence of transportation-related HAZMAT incidents reinforces the importance of emergency preparedness along major transit routes.

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883 **APPENDIX J - TERRORISM, WMD, CBRNE**

884 PWC faces a range of terrorism-related risks, particularly concerning Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE) threats, as well as Weapons of Mass Destruction (WMD). The county’s proximity to the nation’s capital and its extensive transportation networks—including major highways like I-95, I-66, and U.S. Route 1, as well as key rail lines—significantly heightens the potential for CBRNE incidents. The presence of various commercial facilities and the transportation of hazardous materials further amplify these risks.

891 **September 11, 2001: Response and Regional Impact**

892 On September 11, 2001, at 9:37 a.m., American Airlines Flight 77 crashed into the Pentagon. As a regional mutual aid partner, Prince William County Fire and Rescue and Police were requested to support the response. This attack required extensive fire suppression, Emergency Medical Services (EMS), and Hazardous Materials (HAZMAT) resources. Although not all responding units were from PWC, the scale of the incident demanded significant mutual aid resources, fundamentally altering national emergency response protocols. In the aftermath of September 11, considerable efforts were made to enhance, integrate, and coordinate regional emergency management. Prince William County

900 committed to establishing a Type I HAZMAT Team, capable of handling complex hazardous  
901 materials incidents and large-scale emergencies.

### 902 **Anthrax Attacks and Biological Response Preparedness**

903 The 2001 anthrax attacks further demonstrated the region’s vulnerability to bioterrorism.  
904 While Washington, D.C., was the primary target, PWC faced indirect impacts due to its  
905 proximity. The attacks, which resulted in five deaths and 17 infections nationwide, prompted  
906 widespread concern and led local authorities to reassess their emergency preparedness  
907 strategies. PWC’s Hazardous Materials Program responded to hundreds of “white powder”  
908 incidents in the aftermath of the anthrax scare, leading to the development of specific  
909 guidelines for biological responses. Through grants the HAZMAT Program invested in  
910 specialized equipment, including Polymerase Chain Reaction (PCR) analysis tools, enabling  
911 the rapid identification of biological agents in the field.

### 912 **Pre-9/11 Preparedness and Federal Collaboration**

913 Even before the September 11 attacks, PWC was heavily involved in efforts to strengthen  
914 community preparedness for terrorist and CBRNE events. The county collaborated with the  
915 Department of Justice’s Office of Domestic Preparedness (ODP), a predecessor to several  
916 Department of Homeland Security (DHS) programs, to enhance local response capabilities.  
917 These early initiatives laid the groundwork for the region’s modern counterterrorism  
918 strategies.

### 919 **The Beltway Sniper Attacks: Highlighting Community Vulnerability**

920 While not a CBRNE or WMD incident, the Beltway Sniper Attacks in October 2002  
921 underscored the persistent threat of terrorism and the dangers posed by lone-wolf actors.  
922 John Allen Muhammad and Lee Boyd Malvo carried out a series of coordinated shootings  
923 across the Washington, D.C., metropolitan area, including PWC. On October 9, 2002, Dean  
924 Harold Meyers was fatally shot while refueling his vehicle at a gas station on Sudley Road in  
925 Prince William County. This incident heightened local fears and emphasized the  
926 community’s vulnerability to acts of domestic terrorism. The subsequent trial for Meyers’  
927 murder was held in PWC, leading to Muhammad’s conviction and eventual execution.

### 928 **Material Support to Terrorist Organizations**

929 PWC has also been linked to cases where residents have provided material support to  
930 terrorist groups:

- 931 • Ali Shukri Amin: In 2015, this 17-year-old from Manassas pleaded guilty to conspiring  
932 to provide material support to the Islamic State of Iraq and Syria (ISIS). Amin used  
933 social media platforms to offer guidance and encouragement to ISIS supporters,  
934 including instructions on using Bitcoin to finance the organization. He also facilitated  
935 the travel of Reza Niknejad, another PWC resident, to join ISIS in Syria.
- 936 • Jubair Ahmad: A resident of Woodbridge, Ahmad was arrested in 2011 for providing  
937 material support to Lashkar-e-Tayyiba, a U.S.-designated foreign terrorist  
938 organization, by creating propaganda videos to promote the group’s cause.

939 These incidents highlight that, while PWC is not typically a primary focal point for terrorist  
940 activities, it has served as a base of operations for individuals intent on supporting or  
941 engaging in terrorism.

### 942 **Regional Collaboration, Threat Detection and Operational Readiness**

943 PWC actively participates in the Metropolitan Washington Council of Governments (COG),  
944 a regional body that promotes collaborative emergency preparedness efforts across the  
945 National Capital Region. COG provides a critical framework for mutual aid coordination,  
946 information sharing, and regional planning for large-scale incidents, including terrorism and  
947 CBRNE events. The county is also part of the Urban Area Security Initiative (UASI), a federal  
948 grant program under DHS that enhances the capabilities of high-threat urban areas to  
949 prevent and respond to acts of terrorism. Through UASI, PWC has secured funding for  
950 specialized equipment, training, and personnel to bolster its counterterrorism efforts.  
951 Additionally, Prince William County participates in the Securing the Cities (STC) program,  
952 managed by DHS's Countering Weapons of Mass Destruction (CWMD) Office. The STC  
953 program focuses on building and sustaining a regional radiological and nuclear detection  
954 network to detect and interdict illicit radioactive materials before they can be used in  
955 attacks.

956 • Proactive Radiological Detection: PWC's involvement in the STC program has led to  
957 notable successes, including the location of an "orphaned source" suspected to  
958 have originated from a stolen soil density meter. This highlights the program's  
959 effectiveness in identifying unauthorized radiological materials and preventing their  
960 potential misuse.

961 • Preventive Radiological/Nuclear Detection (PRND): The PRND framework within the  
962 STC program equips PWC with the tools and protocols to detect and respond to  
963 radiological threats, such as Radiological Dispersal Devices (RDDs), Radiological  
964 Exposure Devices (REDs), and Improvised Nuclear Devices (INDs).

965 The Prince William County HAZMAT program has responded to numerous suspicious  
966 incidents, many of which have shaped the development of its current capabilities. The  
967 program is intentionally designed to be prepared for worst-case scenarios, such as CBRNE  
968 attacks. This foundational approach ensures that the system remains flexible and capable  
969 of responding to incidents of varying complexity and severity, from minor chemical spills to  
970 full-scale WMD events.

## 971 **APPENDIX K - RISK RANKING DATA/DISCUSSION**

972 In evaluating hazardous materials (HAZMAT) risks in Prince William County (PWC), a data-  
973 driven approach has been applied to rank risks based on their frequency and potential  
974 impact. This assessment focuses on transportation-related incidents, CBRNE (Chemical,  
975 Biological, Radiological, Nuclear, and Explosives) events, terrorism and weapons of mass  
976 destruction (WMD) threats, and hazards originating from industrial and commercial  
977 facilities. The ranking is designed to provide a direct, data-centered overview of the current  
978 risk landscape without discussing mitigation or preparedness strategies.

### 979 **Transportation-Related HAZMAT Incidents – Highest Risk**

980 Transportation-related HAZMAT incidents represent the most significant and frequent risk in  
981 Prince William County. The constant movement of hazardous materials along major  
982 pipelines, air highways and rail lines increases the likelihood of incidents involving spills,  
983 fires, or chemical releases. Critical corridors such as I-95 and I-66, along with CSX, Norfolk  
984 Southern rail lines, and numerous pipelines serve as primary transportation routes for  
985 hazardous commodities. The CSX line runs parallel to I-95 through densely populated areas,

986 further increasing the risk of mass impact in the event of a derailment or spill. Similarly, the  
987 Norfolk and Southern line bisects Prince William County traversing through the City of  
988 Manassas is a high impact zone as well. Data from the Pipeline and Hazardous Materials  
989 Safety Administration (PHMSA) consistently shows that transportation incidents are the  
990 most common source of HAZMAT emergencies nationally. This aligns with observed trends  
991 in PWC, where the high volume of daily traffic, combined with key chokepoints at I-95  
992 intersections and the Norfolk Southern rail yard in Manassas, contributes to elevated  
993 exposure. The combination of high traffic density, aging infrastructure in some areas, and  
994 the proximity of major transportation corridors to population centers cements  
995 transportation-related HAZMAT incidents as the primary threat to public safety and  
996 environmental health in PWC.

### 997 **CBRNE, Terrorism and WMD Events**

998 CBRNE, Terrorism and WMD incidents are categorized as low-frequency but high-impact  
999 events. While Prince William County is not considered a primary target, its integration into  
1000 the National Capital Region’s infrastructure increases its vulnerability as a transit point or  
1001 secondary target. The region’s transportation network, public venues, and critical  
1002 infrastructure present opportunities for malicious actors to exploit. The potential use of  
1003 chemical, biological, radiological, nuclear, or explosive devices within or near PWC could  
1004 result in catastrophic consequences. Although historical data shows a low occurrence of  
1005 such incidents within the county, regional threat assessments recognize the strategic value  
1006 of targeting transportation corridors or high-traffic locations. The complexity of WMD  
1007 incidents, combined with the potential for mass casualties, widespread disruption, and  
1008 psychological impact, elevates their overall risk ranking. While the probability remains lower  
1009 than other hazards, the consequences of even a single event place terrorism and WMD  
1010 incidents as a high-priority concern in the county’s risk framework.

### 1011 **Industrial/Commercial Facility HAZMAT Incidents**

1012 PWC has a relatively low concentration of large industrial facilities; however, numerous  
1013 commercial operations store and utilize hazardous materials that present localized risks.  
1014 Facilities such as bulk storage depots, ammonia refrigeration warehouses, and bio- research  
1015 laboratories and other laboratories that house chemicals with the potential for severe health  
1016 and environmental impacts if released. The fixed nature of these facilities allows for greater  
1017 regulatory oversight and risk mitigation compared to transportation incidents. However, their  
1018 proximity to residential and commercial areas increases the potential for community  
1019 exposure during an incident. Chemicals such as hydrogen fluoride, ammonia, chlorine, and  
1020 sulfuric acid are among the highest hazards in inventory due to their toxicity, corrosiveness,  
1021 and potential for off-site migration if released. While incidents at industrial/commercial  
1022 facilities are less frequent than transportation-related events, their impact can be  
1023 significant, particularly if they occur near densely populated areas or critical infrastructure.  
1024 This positions industrial/commercial facilities as a moderate risk, requiring continuous  
1025 monitoring and inventory assessment.

### 1026 **Risk Ranking Summary**

1027 Based on the evaluation of incident likelihood and potential impact, the following risk  
1028 ranking reflects the primary threats within Prince William County:

- 1029 • **Transportation-Related HAZMAT Incidents — Highest Risk**

- 1030 • **CBRNE Incidents — Significant Risk**
  - 1031 • **Terrorism and WMD Incidents — High Risk**
  - 1032 • **Industrial/Commercial Facility HAZMAT Incidents — Moderate Risk**
- 1033 This ranking aligns with observed trends and known vulnerabilities in PWC. Transportation  
1034 remains the highest risk due to incident frequency and the complexity of response  
1035 operations. CBRNE and WMD incidents, while less common, carry catastrophic potential  
1036 and require ongoing attention. Industrial/commercial facilities, though presenting localized  
1037 risks, are generally lower in frequency and impact compared to other hazard categories.