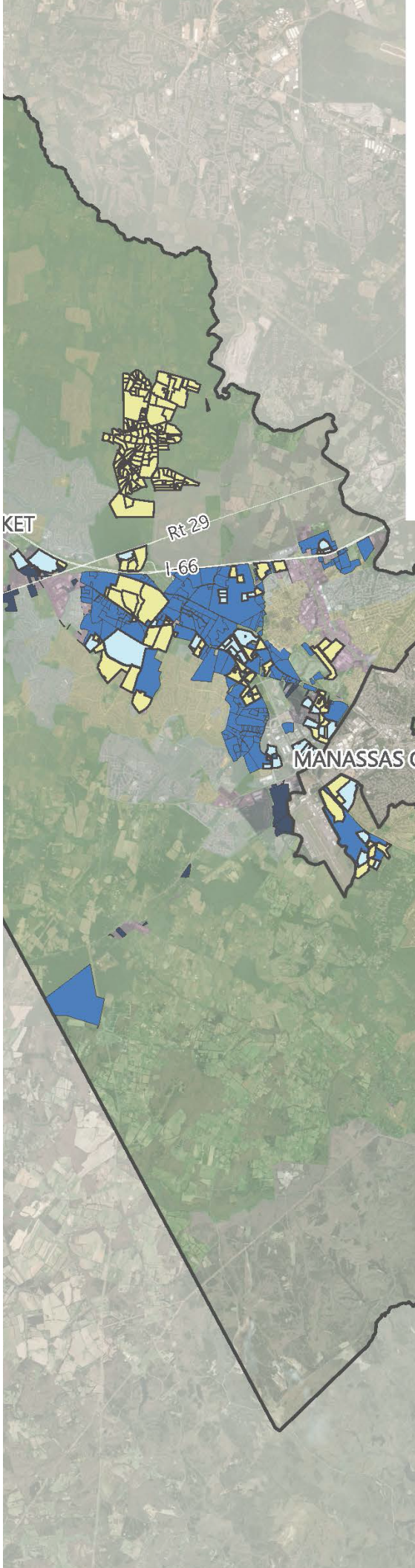
Statutory Framework Review & Peer Research Summary

Data Centers DCSM & Zoning Ordinance Update Project

DRAFT 9.20.2024



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Section 1 | Introduction and Methodology

Background & Context

Prince William County has emerged as a prominent hub in the global data center industry, leveraging its advantageous location, conducive business environment, and advanced infrastructure to become one of the leading regions for data center development worldwide. This surge in data center establishments has been driven by the County's strategic proximity to major metropolitan areas, its competitive tax incentives, and its well-developed utility and transportation networks. As a result, Prince William County now boasts one of the highest concentrations of data centers globally.

However, this rapid growth has brought with it a range of unforeseen impacts on the local community and environment. The influx of data centers has led to significant changes in land use, infrastructure demands, and community dynamics. With data centers occupying large tracts of land and requiring substantial resources, there have been both positive and challenging consequences that warrant thorough examination.

Analysis Overview

To address these issues and provide a comprehensive understanding of the current landscape, this report offers an in-depth analysis of key regulatory documents and practices that shape data center development in Prince William County. The analysis includes:

- **Virginia Statutes:** A review of Dillon's Rule governance, and state-level regulations that influence data center operations and regulation of development within Virginia. This includes locality zoning requirements, environmental regulations, and other relevant state policies.
- **County Zoning Ordinance (Chapter 32):** A detailed evaluation of the specific zoning regulations that govern where and how data centers can be established in Prince William County. This chapter outlines zoning requirements, restrictions, and design standards for data center projects.
- **County's Design and Construction Manual (DCSM):** An examination of the design and

construction standards imposed by the County to ensure that data centers meet local aesthetic, safety, and environmental standards. This manual includes requirements on infrastructure, landscaping, environmental and transportation systems.

» **2023-2024 Rezoning Cases and Proffers:** A detailed look at recent rezoning applications and proffer agreements related to data centers. This section will assess how developers and the County have negotiated conditions to address community impacts and infrastructure needs. It's worth noting that these cases are reviewed against guidance from the Comprehensive and Strategic Plans, and the team did not review these policy documents in full for this report.

In addition to reviewing local and state-level documents, the consulting team has undertaken a comprehensive analysis of development codes from a wide range of jurisdictions. This research includes a comparative study of data center regulations across 20 jurisdictions within Virginia and in other states and countries. By examining these diverse regulatory approaches, the report aims to offer valuable insights into current practices that could guide future policy and planning in Prince William County.

Beyond code analysis, the team has conducted interviews via email and video conference with various key staff members. These discussions have explored the impacts and challenges faced by other communities in relation to data center development and the strategies they have employed to address these issues.

Through this comprehensive analysis, the report seeks to offer a nuanced understanding of the complexities surrounding data center development, including its regulatory framework, community impact, and potential future policies. It is intended to support informed decision-making and strategic planning as the County continues to navigate the evolving landscape of data center growth.

Methodology

The methodology employed for researching data center regulations across various jurisdictions involved a comprehensive approach that combined code research, email correspondence, and video conference interviews. The research was structured into three tiers based on the level of interaction and data collection required for each jurisdiction. The following outlines the methodology used, including details on each tier and the specific topics covered during the research process.

RESEARCH TIERS AND JURISDICTIONS

The research was organized into three tiers, each representing a different level of engagement with the jurisdictions. The tiers were as follows:

Tier 1: Code Research

Method: Detailed examination of zoning ordinances. This involved reviewing zoning ordinances and related documents to extract relevant information on data center and/or industrial regulations.

Jurisdictions:

» Montgomery County, MD
» Salt Lake County, UT
» Irving, TX
» Denver, CO
» Maricopa County, AZ
» Middlesex County, NJ
» Hillsboro, OR

Tier 2: Code Research + Email Correspondence

Method: In addition to code research, email correspondence was used to seek additional information for insights and context and clarify aspects of data center regulations.

Jurisdictions:

» Tower Hamlets, London, UK
» Slough, UK

- Frankfurt, Germany
- Amsterdam, Netherlands
- Virginia Beach, VA
- Stafford County, VA
- Fairfax County, VA
- Culpeper County, VA

Tier 3: Code Research + Video Conference Interviews

Method: Video conference interviews were conducted to gather detailed insights and firsthand experiences from jurisdictional representatives. These interviews complemented the code research by providing deeper context and understanding of regulatory practices.

Jurisdictions:

- Elk Grove Village, IL
- Chandler, AZ
- Cobb County, GA
- Loudoun County, VA
- Warrenton, VA
- Fauquier County, VA

CODE RESEARCH AND ANALYSIS

The code research process involved several key steps: automated data collection, manual accuracy checks, supplemental research and direct engagement.

Automated Data Collection using ChatGPT: The consulting team utilized ChatGPT to maximize research efficiency in this phase of the project, by locating specific code sections and text related to data centers and industrial development within zoning ordinances. First, the team crafted specific queries to extract all relevant information from ChatGPT related to data centers within each code, focusing on various aspects of zoning and development regulations. The team uploaded development codes from each jurisdiction into ChatGPT to facilitate the extraction of pertinent information and isolate findings to that document.

The research included the following list of topics:

- Definitions
- Data Center Siting
- Separation Distances
- Lot Coverage/Open Space
- Building Height
- Architectural Standards
- Screening/Landscaping/Buffers/Fencing
- Floor Area Ratio
- Mechanical Equipment
- Setbacks
- Construction Traffic
- Erosion and Sediment Control
- Water/Power
- Parking

Manual Verification: A member of the team manually verified the information extracted by ChatGPT to confirm accuracy and completeness. This involved cross-referencing the official zoning ordinance and any additional regulatory documents to confirm the data was correct.

Supplementary Research: Our team conducted further research to ensure no critical regulatory elements were missed. This included reviewing supplementary materials and industry reports related to data center regulations.

Direct Engagement: For jurisdictions in Tier 2, team members sent emails to request additional information and clarifications. The team made efforts to contact relevant personnel within each jurisdiction.

For jurisdictions in Tier 3, the team conducted video conferences with key staff members to discuss data center regulations in more detail.

Our team covered the following topics during these interviews:

- Protection of Residential Uses/Incompatible Development

- » "Wins" or Lessons Learned in Data Center Development
- » Energy Sources
- » Water Usage
- » Specific Challenges Related to Data Center Development

CONTACT EFFORTS AND RESPONSES

Despite attempts to engage with all communities in Tiers 2 and 3, responses were limited. The table on the following page outlines the team's efforts to contact each jurisdiction and the corresponding responses.

The combined approach of automated data extraction, manual verification, and direct engagement provided a robust framework for researching data center regulations across various jurisdictions. Although response rates from some jurisdictions were limited, our research methodology provided a representative overview of common practices and regulations among peer communities.

Contact Efforts and Responses for Tier 2 and Tier 3 Communities

Tier 2 Community	Contact Attempt / Response
Tower Hamlets, London, UK	Contacted twice via email; no response
Slough, UK	Contacted twice via email; no response
Frankfurt, Germany	Contacted twice via email; no response
Amsterdam, Netherlands	Contacted twice via email; no response
Virginia Beach, VA	Contacted via email; left voicemail; no response
Stafford County, VA	Response received via email
Fairfax County, VA	Video conference with Deputy Zoning Administrator
Culpeper County, VA	Video conference with Principal Planner
Tier 2 Community	**Contact Attempt / Response**
Elk Grove Village, IL	Video conference with Deputy Director of Community Development
Chandler, AZ	Video conference with Zoning Administrator
Cobb County, GA	Contacted twice via email; no response
Loudoun County, VA	Contacted twice with email; left message with staff member; no response
Warrenton, VA	Advised not to participate due to ongoing litigation
Fauquier County, VA	Video conference with Chief of Planning

Section 2 | State Statues Overview

Dillon's Rule and Local Powers

The Commonwealth of Virginia operates under Dillon's Rule. This means that the powers granted to local governments are only those that have been specifically authorized by the General Assembly. Dillon's Rule also provides that local governing bodies have powers that are implied by those that have been specifically authorized as well as those powers that are essential to the locality's purposes. There is a two-step process that is used when applying Dillon's Rule. The first step is to determine whether a local government has been authorized to exercise a particular power. If they have been so authorized, it then needs to be determined whether they have exercised that power properly.

Powers granted to local governing bodies are outlined in Title 15.2 of the Code of Virginia. While there are no statutes that expressly reference data centers other than those relating to assessment of real property and taxes, Title 15.2 does provide the authority for other methods that may be used to regulate data center development. These regulations are summarized in the table below and are organized by topic area.

Section	Text Summary
CONDITIONAL ZONING	
§ 15.2-975	States that localities authorized to accept cash proffers may also issue bonds to finance improvements contained in their construction improvement program(s).
§ 15.2-2296	Grants local governments the authority to use conditional zoning as a regulatory tool.

Section	Text Summary
§ 15.2-2297	Gives provisions for extent of voluntary proffers in conditional zoning.
CULTURAL / HISTORIC RESOURCES	
§ 15.2-2306	Grants localities the authority to adopt ordinances regulating historic landmarks, buildings, or structures that have an important historic, architectural, archaeological, or cultural interest.
DECOMMISSIONING (SOLAR)	
§ 15.2-2241.2	States that, as part of the approval process, a local government shall require the applicant to enter into a written agreement to decommission solar energy equipment upon the terms and conditions stated in the Code section.
ECONOMIC DEVELOPMENT	
§ 15.2-1232.2	Allows localities to establish economic revitalization zones.
§ 15.2-2413.13	Sets forth the manner in which a prospective business may file a business improvement and recruitment district plan with a locality.
§ 15.2-2413.14	Allows localities to form a business improvement and recruitment district upon submission of a written petition by a majority of the business owners in the proposed district.
§ 15.2-2413.15	States the process local governments must follow upon submission of a petition to form a business improvement and recruitment district.
§ 15.2-2413.17	Gives a list of subjects that localities may regulate in ordinances written when establishing a business improvement and recruitment district.
ENVIRONMENTAL ASSESSMENTS	
§ 15.2-2242	States that a subdivision ordinance may include provisions for requiring Phase I and Phase II environmental site assessments.
§ 15.2-2286	Lists the provisions that are permitted in zoning ordinances when requiring environmental site assessments.
FEES	
§ 15.2-2243	States that local governments may include a provision in their subdivision ordinance to charge applicants the pro rata share of the cost of providing necessary sewerage, water, and drainage facilities located outside the property limits of the applicant's land.
§ 15.2-2319	Grants local governments the authority to assess and impose impact fees on new development to pay for all or a part of the cost of road improvements that would benefit said development.
§ 15.2-2320	States that localities shall delineate one or more impact fee service areas within their comprehensive plans.
§ 15.2-2321	States that localities need to conduct a road improvements need assessment and adopt a road improvements plan prior to adopting a system of impact fees.

Section	Text Summary
§ 15.2-2322	Allows localities to adopt an ordinance establishing a system of impact fees following the adoption of a road improvement program.
§ 15.2-2323	States that the amount of impact fees to be imposed on a development must be determined before or at the time of subdivision/site plan approval.
§ 15.2-2324	States that the dedication, contribution, or construction of transportation improvements by the developer shall be credited against any impact fees imposed on their project.
§ 15.2-2325	Says localities must update the road improvements need assessment at least once every two years.
§ 15.2-2326	Localities must establish a separate road improvement account for the impact fee service area.
§ 15.2-2327	Impact fees shall be refunded if the project is not completed within a reasonable period of time, not to exceed fifteen years.
GENERAL POWERS	
§ 15.2-1117	Grants localities the authority to regulate the light, ventilation, sanitation, and use and occupancy of buildings.
LANDSCAPING	
§ 15.2-961.3	Allows localities to adopt ordinances regulating the planting and replacement of trees during the development process, provided that the ordinance(s) aligns with this Code section.
§ 15.2-4403	Grants localities the authority to protect and enhance agricultural and forestal lands as an important economic and environmental resource.
§ 15.2-4405	Grants participating localities the authority to create agricultural, forestal, or agricultural and forestal districts of local significance.
§ 15.2-4406	States that any ordinance adopted by a local government that creates or renews an agricultural, forestal, or agricultural and forestal district must include several specific provisions listed in this Section.
STORMWATER	
§ 15.2-2114	Allows localities to establish a utility or charge service fees to support a local stormwater management program.
§ 15.2-2245.1	States that localities shall not require the removal of trees to create storm-water management ponds if certain requirements listed in this Section are met.
§ 62.1-44.15:27	Says that if a locality operates a regulated municipal separate storm sewer (MS4) or that administers a Virginia Erosion & Stormwater Management Program (VESMP), they shall create an ordinance establishing a VESMP that must include several specific provisions outlined in this Section.

Section	Text Summary
STREETS / TRAFFIC	
§ 15.2-2022	States that certain counties may regulate the tracking of mud and debris upon highways within their boundaries.
§ 15.2-2028	Grants localities the authority to regulate the operation of vehicles and the movement of vehicular and pedestrian travel.
ZONING REGULATIONS	
§ 15.2-2280	Permits localities to organize their jurisdiction into zoning districts and to regulate: (1) the use of land, buildings, and structures; (2) the size, height, area, etc. of structures; (3) the areas/dimensions of land, water, and air space occupied by buildings and structures; and (4) the excavation or mining of soil.
§ 15.2-2283	Outlines the general purposes of zoning ordinances.
§ 15.2-2315	States that if this article of the statutes requires higher standards than what is required by a local ordinance enacted pursuant to this article, the local ordinance will control.
§ 15.2-2316.2	Allows governing bodies to establish procedures for the transfer of development rights within their jurisdiction.

Data Centers and Virginia Building Code

The Virginia Uniform Statewide Building Code (USBC) provides a comprehensive regulatory framework governing the design, construction, and renovation of buildings across the state. It establishes minimum standards to safeguard public safety, health, and welfare, addressing critical aspects such as structural integrity, fire protection, accessibility, energy efficiency, and mechanical systems.

While local governments in Virginia cannot amend the USBC itself, they can impose additional requirements on buildings through separate processes. This means localities can enforce extra measures related to building practices, as long as these do not conflict with the USBC's provisions. For instance, a locality might implement a noise ordinance requiring mufflers on generators or mandate that mechanical equipment be placed in specific locations or screened, thereby addressing local concerns without altering the core building code.

The following table outlines regulations in the USBC which are of particular interest in regards to data center development.

Topic	Relevant Building Code Standards
Fire Safety Systems	The building code requires that data centers provide clear and unobstructed access for fire department personnel. This includes proper signage and access routes that enable quick entry in an emergency.
Electrical/Plumbing	Data centers typically need redundant power systems to ensure continuous operation. The building code requires that backup generators and uninterruptible power supplies (UPS) be installed and maintained to provide power during outages. These systems must be designed to handle the entire load of the data center.
	While data centers primarily focus on electrical systems, plumbing is also important, particularly for cooling systems. The building code requires that any water supply and drainage systems used for cooling (such as chilled water systems) be installed and maintained to prevent leaks and ensure efficient operation.
	Data centers often use water-based cooling systems to manage the heat generated by equipment. The code mandates proper installation of these systems, including backflow prevention devices to protect the locality's water supply from contamination.
Energy Efficiency	Data centers are required to adhere to stringent energy performance standards to minimize energy consumption. This includes implementing high-efficiency HVAC systems, lighting, and other energy-intensive equipment. Data centers must also comply with energy codes that mandate specific performance metrics and efficiency ratings for equipment.
	The building code encourages the integration of renewable energy sources. Data centers can incorporate solar panels, wind turbines, or other renewable technologies to reduce reliance on non-renewable energy sources and lower their carbon footprint.

Topic	Relevant Building Code Standards
Sustainable Materials/ Construction	The code promotes the use of sustainable and environmentally friendly building materials. For data centers, this means choosing materials that have a lower environmental impact, such as those with recycled content or low emissions.
	Sustainable building practices include proper waste management during construction. Data centers must follow guidelines for recycling and disposing of construction and demolition waste responsibly.
Water Efficiency	Data centers must incorporate water-efficient fixtures and systems. Although water usage in data centers is often related to cooling systems, the building code requires practices that reduce water consumption and manage stormwater runoff effectively.
	Sustainable building standards encourage the use of water-efficient cooling systems. Data centers are expected to use technologies that minimize water use and manage wastewater responsibly.
Environmental Quality	The code emphasizes the importance of indoor air quality. For data centers, this involves ensuring that ventilation systems are designed to maintain a healthy indoor environment for maintenance personnel, as well as optimizing the air quality in relation to cooling systems.
	Although data centers rely heavily on artificial lighting, the code encourages the use of energy-efficient lighting solutions. Data centers should implement lighting controls and fixtures that reduce energy consumption.
Certification/ Compliance	Data centers can pursue certifications such as LEED (Leadership in Energy and Environmental Design) to demonstrate compliance with green building standards. The building code supports these certifications by providing guidelines that align with their requirements.
	Ongoing monitoring and reporting of energy and water use are required to ensure that data centers adhere to green building standards and achieve their sustainability goals.
On-site Energy	The code requires that data centers meet specific energy efficiency standards to minimize energy consumption. This includes measures related to HVAC systems, lighting, and overall building envelope performance.
	Virginia's code encourages or mandates the integration of renewable energy sources, such as solar panels, especially for large-scale facilities like data centers. This can help offset the significant energy consumption typical of data centers.
	Data centers must implement energy management practices, which could involve advanced monitoring systems to track and optimize energy use, ensuring that the facility operates efficiently.
	Data centers are required to comply with local regulations and codes, which may involve periodic reporting on energy usage and efficiency measures taken.

Topic	Relevant Building Code Standards
Mechanical Equipment	Data centers require robust cooling systems to manage the heat generated by high-density server racks and other equipment. The building code mandates that these systems be designed to provide adequate cooling capacity, maintain proper temperature and humidity levels, and operate efficiently. This often includes the installation of precision cooling units and, in some cases, chillers or cooling towers.
	Proper ventilation is critical in data centers to ensure the effective dissipation of heat and to maintain air quality. The code requires that ventilation systems be designed to handle the specific load conditions of data centers and to ensure that cooling and airflow are evenly distributed throughout the facility.
	The code emphasizes the importance of energy-efficient HVAC systems. Data centers must use high-efficiency equipment, including energy-efficient fans, compressors, and pumps, to reduce overall energy consumption and operational costs.
	The code stipulates that mechanical systems be properly designed and sized to meet the demands of the data center. This involves calculating the heat load, airflow requirements, and ensuring that all equipment is capable of handling the data center's operational needs.
	Mechanical equipment must be accessible for maintenance and repair. The building code requires that adequate space be provided around HVAC systems and other mechanical equipment to facilitate servicing and ensure safe operation.
	Data centers often operate 24/7, so noise control is important. The code includes provisions for minimizing noise from mechanical systems to reduce disturbances both within the data center and in adjacent areas.
	The building code requires that mechanical systems be integrated with other building systems, such as fire alarms and building management systems. This integration helps in monitoring performance, managing energy use, and ensuring that emergency protocols are followed.
	Data centers must monitor the performance of their mechanical systems to ensure they are operating efficiently and effectively. The code supports this by requiring regular inspections and maintenance to keep systems running at optimal levels.
	The building code promotes the use of energy management systems to track and control energy consumption in mechanical systems. Data centers are encouraged to implement advanced controls and monitoring to enhance efficiency and reduce energy usage.

Section 3 | Prince William County Regulatory Context

Overview

The Zoning Ordinance (ZO) and the Design and Construction Standards Manual (DCSM) are the key documents governing development in Prince William County. Together, they enforce the County's Comprehensive Plan and cover a wide range of zoning and development issues as authorized by the Virginia General Assembly. This includes, but is not limited to, conditional zoning, transportation, land use, and the design of buildings and structures.

The ZO specifically regulates data centers by defining terms, setting siting requirements, and establishing use standards such as architectural guidelines, screening, and buffering. Notably, the ZO includes the Data Center Opportunity Zone Overlay District. In this district, data centers are permitted by-right, streamlining the approval process compared to other districts where they might be subject to special use reviews. Additionally, the overlay district offers benefits like an increased floor area ratio for data centers.

The ZO also delineates development regulations for conventional zoning districts, covering aspects such as building height, setbacks, and lot coverage.

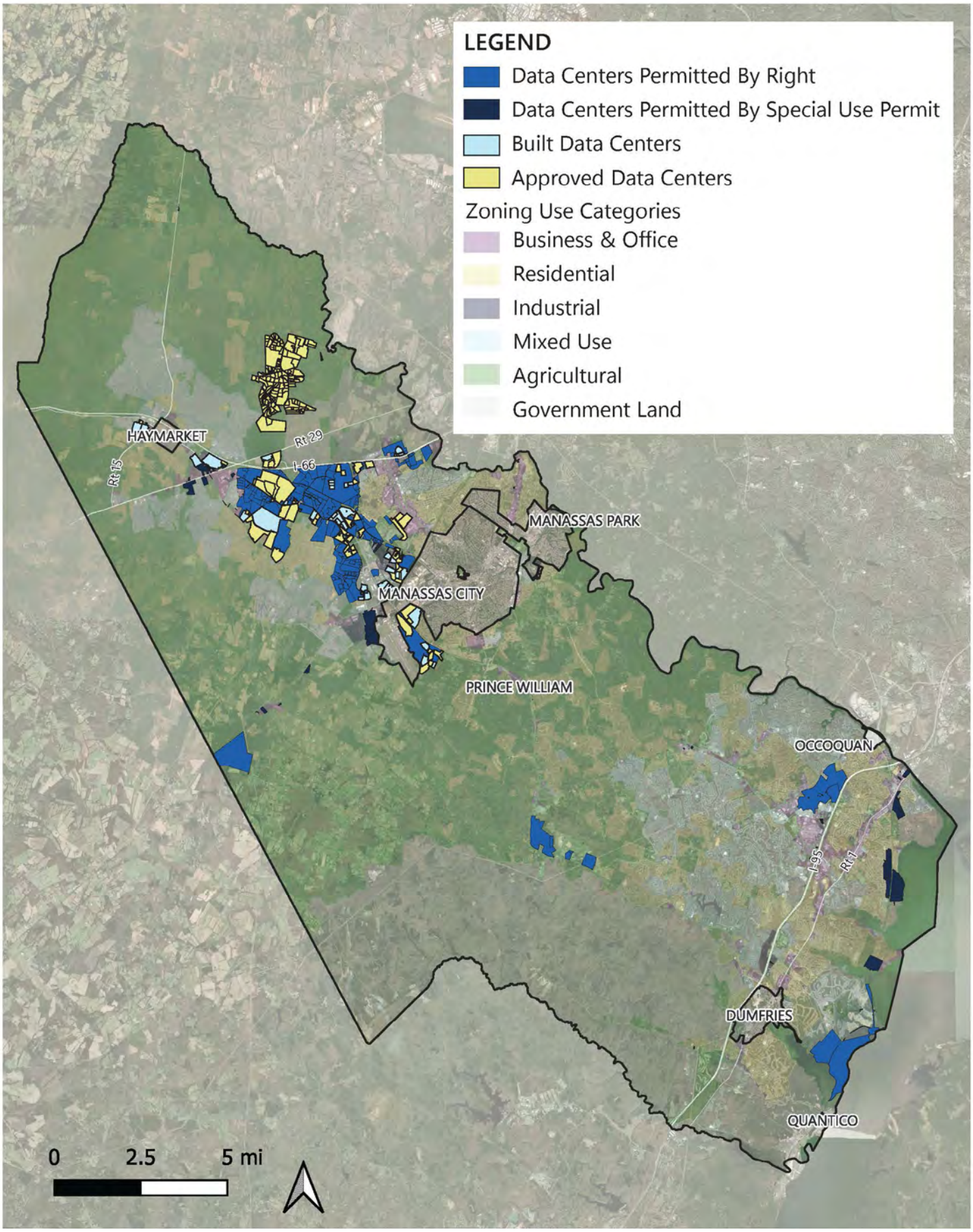
The DCSM complements the ZO by providing detailed standards for infrastructure and site design. It encompasses regulations related to landscaping, fire safety systems, water supply, sanitary sewer systems, transportation, environmental systems, parks, schools, and the Highway Corridor Overlay District.

For a comprehensive overview of the regulations pertinent to data center development, please refer to the following table, which consolidates the relevant provisions from both the ZO and DCSM.

Zoning Ordinance & DCSM Summary of Regulations

DEFINITION

"Data Center shall mean a use involving a building/premise in which the majority of the use is occupied by computers and/or telecom-


LEGEND
Data Centers Permitted By Right
Data Centers Permitted By Special Use Permit
Built Data Centers
Approved Data Centers
Zoning Use Categories
Business & Office
Residential
Industrial
Mixed Use
Agricultural
Government Land
HAYMARKET
Rt 29
I-66
Rt 15
MANASSAS PARK
MANASSAS CITY
PRINCE WILLIAM
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munications and related equipment, including supporting equipment, where information is processed, transferred and/or stored."

DATA CENTER SITING

The map on the previous pages show parcels where data centers are currently permitted in Prince William County, either by-right or through special use permit. Additionally, the map identifies parcels that already have a data center built or approved.

Within the Data Center Opportunity Zone Overlay District, data centers are permitted by-right in the following zoning districts:

- Office Low-Rise (O(L))
- Office High-Rise (O(H))
- Office Mid-Rise (O(M))
- Office/Flex (O(F))
- Heavy Industrial (M-1)
- Light Industrial (M-2)
- Industrial/Transportation (M/T)
- In designated office or industrial land bays in PBD (Planned Business District) and PMD (Planned Mixed Use District) districts.

Outside of the Data Center Opportunity Zone Overlay District data centers require a special use permit in the districts noted above.

The following maps show where data centers are currently permitted in Prince William County, either by-right or through special use permit and identifies parcels that already have a data center built or approved.

Data centers shall be prohibited in agricultural, residential, PMR, B-2, B-3 and V districts.

Electric Substations may be located in any zoning district within the Data Center Opportunity Zone Overlay District, subject to the public facility review requirements of the Code of Virginia, § 15.2-2232 and this chapter. Electric substations may be permitted by Special Use Permit within any zoning district outside of the Data Center Opportunity Zone Overlay District.

School sites should be located near the centers of projected student populations and located adjacent to compatible sites and uses including but not limited to parks and recreation facilities, day care centers, commuter parking, etc. Sites should be separated from industrial and commercial facilities, pollution, heavily traveled roadways, and other hazards.

Land considered undesirable or unsuitable for general construction or park development includes stream valleys, storm drainage areas, areas with an excessively high water table, excessively steep slope twenty five percent (25%) or greater, areas encumbered by major utility lines, or generally unsuited for foundation support or development.

Land to be provided as park or recreation sites should be centrally located to equally serve the entire subdivision or the section of the subdivision submitted for County approval. Play areas and tot lots should be within easy walking distance of the residents to be served and located where there are no dangerous areas or physical barriers, i.e., roads, railways, power lines, or unprotected waterways.

Lot Coverage

Zoning District	Max. Lot Coverage %	Min. Open Space %
O(L)	80	20
O(H)	80	20
O(M)	80	20
O(F)	80	20
M-1	85	15
M-2	80	20
M/T	85	15

BUILDING HEIGHT

Within the zoning districts where data centers may be allowed either by-right or as a special use, height maximums vary from 45 feet to 100 feet. However, the Board of County Supervisors may

approve a structure with a greater height through a proffered rezoning or special use permit application.

Maximum Building Height

Zoning District	Max. Building Height
O(L)	45′
O(H)	100′
O(M)	70′
O(F)	45′
M-1	75′
M-2	60′
M/T	75′
PBD/PMD	100′

The Board of County Supervisors may, by approval of a proffered rezoning or a Special Use Permit application, approve a structure with a height greater than any specific limitation, subject to the following standards:

a. For a rezoning application, the maximum height shall be specifically proffered by the applicant and accepted by the Board of County Supervisors; for a Special Use Permit application, the maximum height shall be made a condition of approval of the application; and

b. The Board of County Supervisors shall be satisfied that approval of a proffer or Special Use Permit is a more appropriate course than a rezoning to a classification permitting the height requested; and

c. The Board of County Supervisors shall be satisfied that the proposed height shall not have a substantial adverse impact on the light and air of adjacent and nearby properties; and

d. The County Fire Marshal has certified in writing that the proposed building or other structure can be properly protected, and will not endanger improvements on adjacent properties, in case of fire; and

e. All other requirements of this chapter for a conditional rezoning or Special Use Permit have been met; and

f. The proposal shall not constitute a hazard to aerial navigation. Where the Board of County Supervisors believes a proposal may be such a hazard, the proposal shall not be approved unless the Federal Aviation Administration certifies in writing that the proposal does not constitute a hazard to aerial navigation.

ARCHITECTURAL REQUIREMENTS

Principal building façades shall include all building façades that face adjacent major arterials or interstates. When a building has more than one principal façade, such principal building façades shall be consistent in terms of design, materials, details, and treatment.

Principal building façades shall avoid the use of undifferentiated surfaces by including at least two of the following design elements:

- change in building height;
- building step-backs or recesses;
- fenestration;
- change in building material, pattern, texture, color; or
- use of accent materials

Building façades facing County registered historic site Manassas Battlefield Park.

- Building façades facing Manassas Battlefield Park, that are visible from viewshed anchors as identified in the Manassas Battlefields Viewshed Preservation Study, shall be non-reflective and dark green or dark brown in color. The Planning Director may approve other colors provided the colors are demonstrated to be earth tones that will help the building façade blend into the tree line.

SCREENING

Mechanical Equipment.

In order to minimize visibility from adjacent roads and adjacent properties, ground level and roof top mechanical equipment shall be screened

from major arterials, interstates and abutting residentially zoned or planned properties. This screening may be provided by a principal building or existing vegetation that will remain on the property or is within a landscaping/buffer easement on an adjacent property. Mechanical equipment not screened by a principal building or existing vegetation shall be screened by a visually solid fence, screen wall or panel, parapet wall, or other visually solid screen that shall be constructed of materials compatible with those used in the exterior construction of the principal building. Notwithstanding the requirements of this section, mechanical equipment located in a manner found to have no adverse impact on adjacent roads and adjacent properties, as determined by the Planning Director, shall not be required to be screened.

When screening of certain on-site functions (e.g., loading, dumpsters, trash collection, outside storage areas, maintenance areas and equipment, mechanical equipment, etc.) is required by the Zoning Ordinance, the following screening options shall be used, depending on the type of function being screened:

- A minimum six (6) foot high opaque fence or wall, the height of the fence or wall shall be no lower than the functions/items being screened. An appropriate gate shall be provided, if applicable.
- A three (3) foot high berm with plantings of six (6) feet high evergreen screening is provided.
- For mechanical and similar equipment, any architectural element compatible with the building is acceptable, as long as it covers the view of the equipment.
- The site functions listed above shall be oriented on the site so as to be as inconspicuous as possible, and shall be screened from all public streets and adjoining properties.

Substations.

Substations shall be screened from adjacent major roads or residentially zoned/planned properties as follows:

- Ten-foot-tall opaque fencing facing residentially zoned/planned properties.
- All other buffering and landscaping requirements of the DCSM shall still apply.

FLOOR AREA RATIO (FAR)

Data Centers are permitted an increased FAR, within the Data Center Opportunity Zone Overlay District, up to 1.0 FAR provided all other development standards (excluding FAR limitations) for the underlying district are met.

Data centers outside of the Data Center Opportunity Zone Overlay District may request an increase in FAR through a special use permit process, as described and allowed in Section 32-400.04 of the Zoning Ordinance.

FAR by Zoning District

Zoning District	Max. FAR
O(L)	0.35
O(H)	1.25
O(M)	0.65
O(F)	0.5
M-1	0.5
M-2	0.5
M/T	0.75

Changes to FAR.

The Board of County Supervisors may approve a FAR higher than that permitted by-right by specifically proffered rezoning or Special Use Permit. In those districts where minimum FARs are specified, the Board may approve a FAR lower than that permitted by-right by proffered rezoning or Special Use Permit. When approved as part of a rezoning, the maximum (or minimum) FAR shall be specifically proffered; when approved by Special

Use Permit, the maximum (or minimum) FAR shall be made a condition of the permit. Matters to be considered by the Board of County Supervisors in evaluating such application shall include, but not be limited to, increased buffering and landscaping, unique design features that improve visual impact or minimize shadow (such as stepped building design); general compatibility with surrounding uses; compatibility with surrounding structures (architecturally, materials used, etc); environmental protection or enhancement on-site; public amenities on-site; off-site transportation improvements; fire and health safety design features (beyond those required by law), or any other design improvement which promotes the health, safety, and general welfare of the workers at the site and the citizens of the County.

SETBACKS

Unless the provisions of this chapter operate to impose a greater standard, any structure above 45 feet in height, excluding telecommunications facilities as defined by this chapter, shall be set back a minimum of 20 feet plus two feet for each foot in height above 45 feet from any property line that abuts a residential or agricultural district, and shall be set back a minimum of 20 feet plus one foot for every foot in height above 45 feet from all other property lines, provided that this requirement shall not apply to the O(H) and O(M) Districts except when and only to the extent specifically referenced. The Board of County Supervisors may modify this setback provision as a part of the approval of the rezoning or Special Use Permit, provided any minimum setbacks and yards required elsewhere in the chapter shall be met. Setback requirements for telecommunications facilities as defined herein are contained in part 240 of this chapter.

Parking and loading spaces setbacks.
Except for developments in the V, village district and residential dwellings in the agricultural and residential districts, data center development shall meet the following minimum setback requirements: (a) Ten feet from any street right-of-way. (b) Ten feet from all other property lines, except: (i) where required buffer areas require a greater setback; or (ii) where proposed property lines are created around existing or new buildings shown on an approved site plan; or (iii) where a parking lot of a development in the commercial, office, industrial district or on public or institutional facilities abuts the parking lot of another development in a commercial, office, or industrial district or other public or institutional facilities if provisions of applicable section 32-250.82.2 and section 32-400.25.6 of this chapter are satisfied. (c) Interior driveways shall be subject to the setbacks in subsection (a) and (b). Entrances and exits shall be subject to the setbacks in subsection (b).

Setbacks table

Zoning District	Front Setback (From street ROW)	Side/Rear Setbacks
O(L)	20 ft.	25 ft. (when abutting agricultural or residential district)
O(H)	20 ft.	25 ft. (when abutting agricultural or residential district)
O(M)	20 ft.	25 ft. (when abutting agricultural or residential district)
O(F)	20 ft.	25 ft. (when abutting agricultural or residential district)
M-1	20 ft.	20 ft. (when abutting commercial or office district)
		50 ft. (when abutting agricultural or residential district)
M-2	20 ft.	20 ft. (when abutting commercial or office district)
		50 ft. (when abutting agricultural or residential district)
M/T	20 ft.	20 ft. (when abutting commercial or office district)
		50 ft. (when abutting agricultural or residential district)

LANDSCAPING/BUFFERS/FENCING

Buffering & Screening.

A buffer yard is required in order to screen the data center from adjacent residentially zoned or planned properties. In lieu of the buffer yard requirement in DCSM Section 800, any side/rear yard abutting property that is not planned or developed with commercial or industrial uses shall include a buffer yard required plantings installed on an earthen berm that has a minimum height of six (6) feet and a slope not steeper than 2:1, planted to a type C DCSM buffer standard. The buffer yard plantings shall be installed in accordance with the requirements of the DCSM. Notwithstanding the requirements of this section, use of natural topography and preservation of existing vegetation, supplemented by new vegetation, if needed, or on the outside of a six foot tall solid fence, may be substituted for the above requirements when found by the Planning Director to provide visual screening from adjacent land uses at the density, depth, and height equivalent to the buffer yard with earthen berm.

- Type C Buffer Area Width and Plant Requirements: 50' wide, 320 plants per 100 feet of ROW or property line.

Fencing of the property is permitted, provided that fencing along public or private streets is not chain-link, with or without slatted inserts, and does not include barbed wire or other similarly visibly intrusive deterrence device. Chain-link fencing or barbed wire fencing are prohibited along public or private street frontages. This fencing allowance does not relieve a property owner from complying with all fire and access code requirements. The Planning Director may allow for alternative compliance with this requirement, provided the applicant demonstrates that the fencing visibility is reduced, through the use of landscaping and other methods to reduce visibility.

Required Tree Canopy Cover at Ten Year Maturity.

- Commercial, Industrial, and institutional developments: 10% of area of site

Changes to Buffering & Screening.

Minimal utility crossings may be included within a buffer area upon approval of the Director of Public Works, as long as comparable performance standards are maintained. Landscaping with shrubs, ornamental grasses and perennials may be permitted in utility easements. However, planting of trees in utility easements is not allowed, unless specifically approved by the agency controlling the easement.

For areas within a MXD (mixed use district) and that abut with parcels that are not part of a MXD, buffer areas between proposed uses should be reviewed on a case by case basis and may be modified through Administrative approval by the Planning Director with consultation of the Public Works Director.

Where the buffer width will allow, a berm may be substituted for thirty percent (30%) of the plant unit requirement. The berm should be graded to appear smooth, rounded and naturalistic. The berm shall be a minimum of four (4) feet higher than the elevation of the adjacent ground. Its slope shall not exceed three-to-one (3:1), except in unusual situations where a two-to-one (2:1) slope would be allowed with special ground cover. In such instance where the reduction in plant units applies, at least fifty percent (50%) of the plant unit requirement shall be evergreen trees and shrubs.

A six (6) foot tall opaque fence (board-on-board, masonry, or similar material) or wall may be substituted for thirty percent (30%) of the plant unit requirement. For non-residential lots of three acres or less, a 6-foot-tall board on board, solid masonry fence/wall, or equivalent barrier may be substituted for 50% of the plant unit required by the Design and Construction Standards Manual.

When existing woodland is located within the entire minimum buffer area, preservation of the woodland shall be allowed to substitute for the required plant material, provided that:

- The woodland meets the minimum size requirement of Table 8-5, and

» The visual screen provided by the woodland meets the intent of this code.

If a developing property with a nonresidential use is adjoining a vacant property zoned or planned residential, the full buffer width, as identified in Table 8-1, shall be provided. If the vacant property is zoned and planned nonresidential and a buffer would be required, the buffer may be reduced to the next lower category. However, at a minimum, Buffer A shall be provided.

When a wall or a solid fence is used for landscaping/buffering purposes, plantings should be provided on both sides of the fence to soften its visual impact and to deter access for graffiti vandals. Suggested plantings to restrict access to walls susceptible to graffiti vandalism: barberry or pyracantha to block access to the wall; ivy or other plantings to cover the wall. Use of vine type plantings should depend on the type of material used for the wall, as some building materials can be damaged by the plants.

FIRE SAFETY SYSTEMS

The content included in this section of the Code involves (site related) Fire Safety System components including fire lanes, emergency access, fire lines, access to the building, fire hydrants, water supply and fire flow requirements. State Building fire code requirements are not specifically restated.

» Planning and Design

» Additional/Conditional Fire Protection Measures

WATER SUPPLY SYSTEMS

The purpose of this section of the Code is to address the minimum requirements for design and construction of water systems, as supplemented by the Prince William Water Utility Standards Manual (PWW – USM). Subsections to specifically review when considering revisions:

» On-site private wells

SANITARY SEWER SYSTEMS

The purpose of this section of the Code is to address the minimum requirements for design and construction of public sanitary sewer systems and on-site sewage disposal systems, as supplemented by the Prince William Water Utility Standards Manual (PWW – USM). Subsections to specifically review when considering revisions:

» Private On-site sewage disposal systems

TRANSPORTATION SYSTEMS

The content included in this section of the Code relates to public access and safety minimum standards for the design and construction of streets, roadways, access, parking, lighting and pedestrian improvements. Reference is also made to the provisions of VDOT and AASHTO standards and specifications. Subsections to specifically review when considering revisions:

» Traffic Impact Analysis (TIA)

» Setbacks

ENVIRONMENTAL SYSTEMS

The content included in this section of the Code includes design and construction standards for storm drainage, grading, stormwater management, floodplains, Chesapeake Bay preservation areas, erosion and sediment control and geotechnical soil testing. Subsections to specifically review when considering revisions:

» General Policy for BMP and Storm Water Quality

» Erosion and Sediment Control Policy

Legislative Review Process

Public bodies have several legislative tools at their disposal, including comprehensive plan amendments, zoning text amendments, zoning map amendments, special exceptions, and special use permits. In Prince William County, these critical land use decisions are made exclusively by the Board of County Supervisors (BOCS). These decisions are designed to balance individual interests with the broader public goals of health,

safety, and welfare, and are presumed to be correct, reasonable and constitutionally sound. Consequently, the BOCS wields considerable discretion in these matters.

While the Planning Commission can review applications and offer recommendations to the BOCS, it does so in an advisory capacity and does not possess official legislative authority. According to Title 15.2 of the Virginia Statutes, localities have the authority to accept cash and other voluntary proffers, as well as to employ conditional zoning.

The consulting team was provided with six rezoning applications for data centers that were approved in the last two years by County Staff and conducted a comparative analysis of the approved proffers. The tables below include the list of applications reviewed and a summary the common proffer language included in the approvals for these applications.

Case Number	Project Name
REZ2024-00006	Mid-County Industrial Park
REZ2022-00036	Compass Data Centers Prince William County Campus 1
REZ2022-00032	Digital Gateway North
REZ-2022-00033	Digital Gateway South
REZ2023-00026	Stoneview
REZ2022-00022	Devlin Technology Park

USES

- Lists of permitted and prohibited uses are included either by reference to the Zoning Ordinance, or specifically listed.

BUILDING/SITE DESIGN

- Increased architectural standards are typically included in the proffer statements. This may include utilizing a higher amount of design elements than the minimum required by ordinance, or a minimum percentage of fenestration on certain facades.
- Size limitations on electric substations
- Building height and rooftop mechanical equipment height.
- Lot coverage and open space amounts; Floor Area Ratios
- Enhanced erosion and sediment control during construction
- Waivers of setbacks
- Separation distances from residences and/or schools

PROTECTION OF CULTURAL/NATURAL RESOURCES

- Provide protection of any archaeological and cultural resources, cemeteries, remains during construction
- Tree preservation and wildlife corridor preservation
- Archaeological surveys provided

LANDSCAPING/BUFFERS/SCREENING

- Screening of mechanical equipment and specification and increased landscaping in terms of quantity and type
- Enclosure types for substations
- Enhanced recreational facilities, such as multi-use trails
- Requirements and waivers of certain buffers
- Required tree canopy coverage
- Landscaping maintenance plan

INFRASTRUCTURE

- Limitation of wells, private septic systems and public water and sewer are specified
- Phasing of roadway networks and transportation improvements
- Planned right-of-way dedications

WATER/STORMWATER

- Enhanced stormwater management facilities.

» Limitations on type of water use for data center cooling.

» Pollutants and flammable substances shall not be discharged into the stormwater system, sanitary sewer, ground, or surface water unless approved.

SUSTAINABILITY/ENERGY

» As a condition of the first final site plan approval, the applicant will determine is site and/or building sustainability measures are appropriate.

» Sustainable building/site design practices for portions of buildings and site to promote energy efficiency.

» Commitment to run data center on 25% renewable energy.

NOISE

» Noise levels are limited to ranges between 55 – 79 dBA depending on location .

» Substations are specifically not subject to noise levels in proffers.

» Sound study which provides mitigation recommendations.

» Sound barrier construction.

» Hours of outdoor construction activities are limited based on day of the week.

NOTICING

» Written information and meetings regarding the use and construction of the use will be provided to local stakeholder groups.

» Blasting schedule provided to local neighborhoods, homeowner's associations and schools.

» Construction phasing, truck routing, and off-site debris mitigation plans are prepared and distributed to local stakeholder groups.

CASH PROFFERS

» Monetary contributions for water quality monitoring, drainage improvements, stream restoration projects, fire and rescue, forestland conservation projects, and transportation projects.

The Comprehensive Plan

Comprehensive planning helps communities plan proactively rather than reactively. A comprehensive plan establishes a framework to guide public and private decisions about future growth, preservation, and change within a municipality or county over a twenty to thirty-year timeframe. Comprehensive plans typically have a broad scope, addressing a wide range of topics that are of concern to the entire community, and they outline multiple goals and policies to be implemented over a long time period.

Section § 15.2-2223 of the Virginia Code requires local governments to adopt a comprehensive plan. The plan needs to be general in nature, and, together with any maps, charts, and descriptive information, should show the locality's long-range recommendations for the general development of the territory. Per Section § 15.2-2223.B.1 of the Code, comprehensive plans must include a transportation plan as well.

The Land Use chapter of the Prince William County 2040 Comprehensive Plan encourages data center development in industrial zoning areas. For example, the Gainesville Activity Center Land Use Plan supports data center development in Industrial T-4, while the County Register Historic Site (CRHS) associated with the Thomasson Barn provides an opportunity for data centers in the Industrial T-3 area along Hornbaker Road and Godwin Drive. However, Land Use Policy 12.3 does encourage the County to provide enough lands for industrial uses not to include data centers, and the Industrial Long-Range Land Use classification states that data centers are discouraged in Industrial T-2.

Section 4 | Peer Communities Research

Overview

Our research into data center regulations across peer jurisdictions involved a three-tiered approach combining code analysis, email correspondence, and video interviews. Tier 1 focused on code research, Tier 2 added email correspondence, and Tier 3 included video conferences.

Research topics covered a variety of topics including data center definitions, trends, siting, separation and screening, architectural standards and building design, as well as any relevant sustainability, power and water usage regulations. While response rates varied, our methodology provided a comprehensive overview of common practices and regulations among peer communities.

Please note that some jurisdictions we researched are in the process of updating their data center regulations or have recently updated their regulations and final ordinances were not available at the time of the drafting of this report (such as in the case of Fairfax, VA). These localities are marked with an asterisk.

Findings

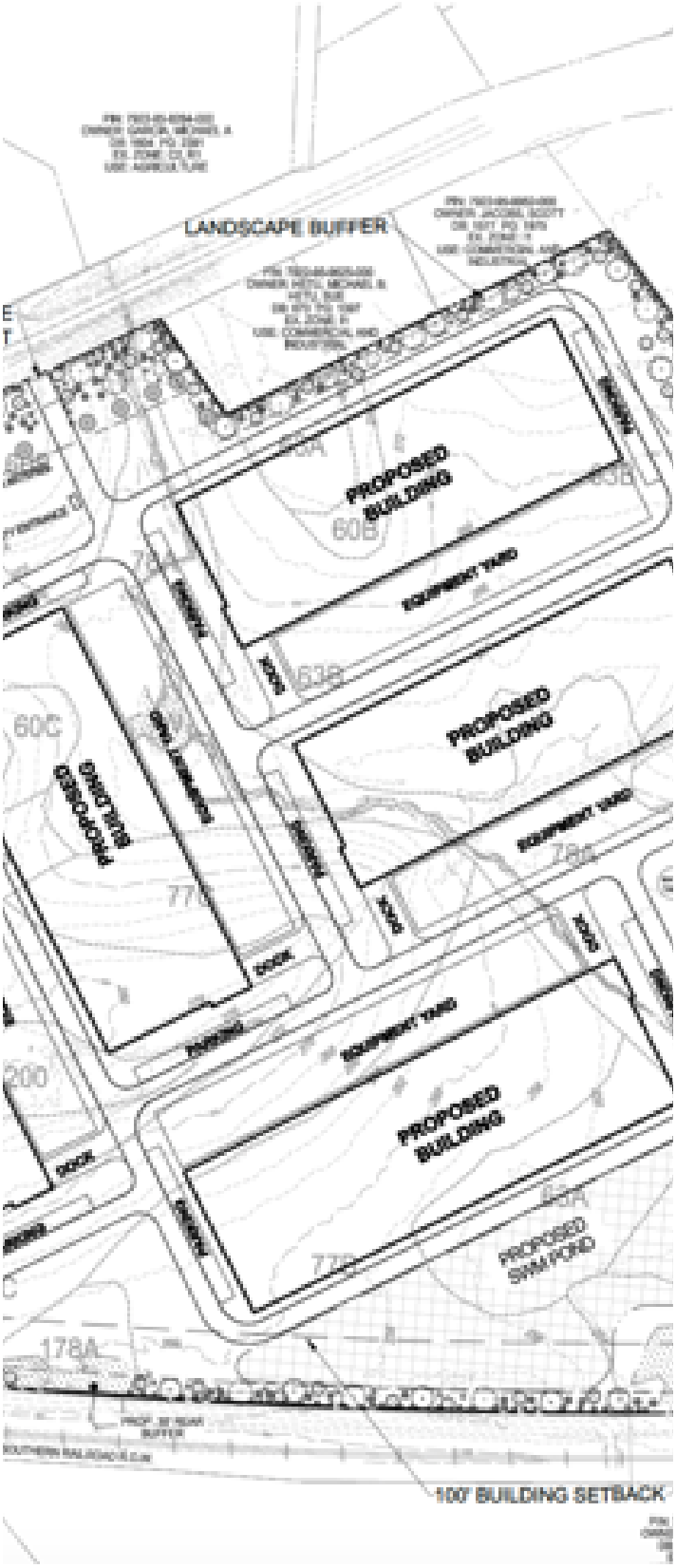
This section highlights some of the most interesting and relevant data center regulations from our team's peer communities research. While not an exhaustive list of regulations and policies, this section provides a summary of examples of regulations, standards and potential approaches from other localities that could be applicable or relevant for Prince William County.

For a more comprehensive overview of our peer research, please refer to the appendix.

**Note, we are still drafting the appendix, which will include a compilation of tables on each topic that we researched.*

Equinix Data Center, Amsterdam, Netherlands.

Fauquier County, Virginia



Topic
DATA CENTER SITING
POWER
SUSTAINABILITY
BUILDING DESIGN

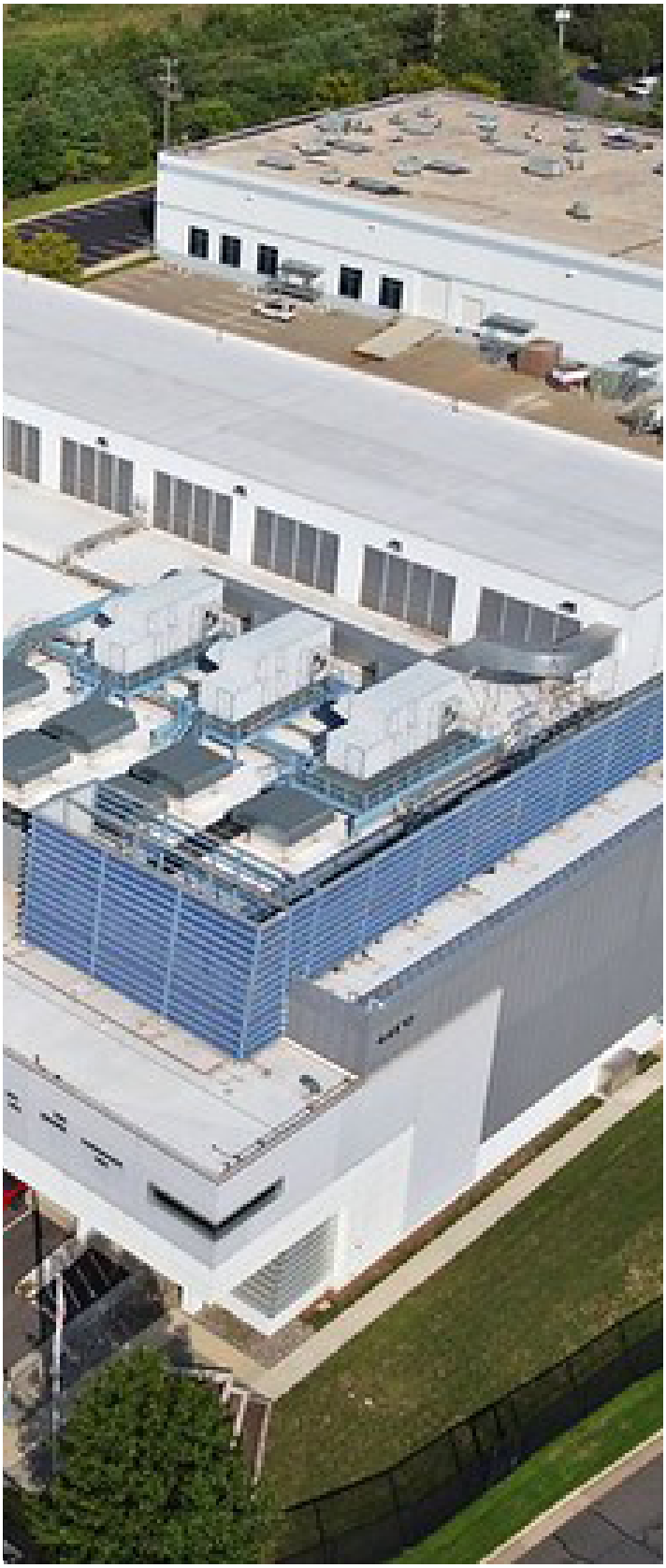
Regulation
Data centers are only considered for development in two zoning districts: Business Park (BP) and Planned Commercial Industrial District (PCID). If the facility will use recycled water, it is a permitted use, if not, it's a special exception use.
Data centers should not be located contiguous to land zoned residential, or planned for a park, school or medical care facility.
100' setback for property lines where a new industrial use is proposed next to an existing residential use.
Petroleum products, diesel fuel and other potentially hazardous materials should be stored a safe distance from any public or private water source, waterbodies, wetlands, and stormwater management facilities.
All new power lines, including transmission or substation feedlines are required to be placed underground.
Rezoning applications are highly encouraged to clearly demonstrate, to the greatest extent possible, how electricity will be provided to accommodate the project's development, and how the project's overall power demand relates to the overall regional network.
This should include any on or off-site need for a new substation, expansion of an existing substation, switching station, and/or any other electrical infrastructure.
Rezoning applications should commit, through a voluntary proffer, to a maximum electrical load/ demand for the entire development.
On-site solar and geothermal energy and other renewable sources are encouraged to be utilized to meet a portion of the development's energy requirements.
Data Centers are encouraged to commit to a Power Usage Effectiveness (PUE) ratio of 1.5 or less and proffer such commitment.
Buildings should be oriented to take advantage of passive cooling and daylight opportunities.
Innovative technologies which reduce power consumption should be incorporated into the project's design.
Heat generated by Data Center operations should be trapped and reused to the maximum extent possible.
Buildings should incorporate heat reflective roofing.
Sustainable building materials should be used.
Generators which incorporate advanced emission control technologies and meet the EPA's Tier 4 emission standards are strongly encouraged.
Building heights shall not be increased above the 45-foot maximum unless the Applicant can demonstrate that proposed height is compatible with the surrounding development and that it will not have an adverse impact on adjacent and nearby properties (Visual Impact Analysis is required).

Warrenton, Virginia*

Topic
DATA CENTER SITING
MECHANICAL EQUIPMENT
BUILDING DESIGN
LANDSCAPING
WATER/POWER

Regulation
Data centers are only considered for development as a special use in the Industrial district.
Mechanical equipment shall be completely screened through the use of walls, fences or evergreen vegetation so that no part of the mechanical equipment can be seen from adjoining properties or right-of-ways.
All generators shall be equipped with mufflers to reduce emissions and noise.
The maximum building height is 35 feet', however, Town Council may approve building heights greater than 35 feet during the review of the Special Use Permit.
Buildings must be setback one (1) additional foot (horizontally) from the required setback line for each additional one (1) foot (vertically) greater than 35 feet. Building heights shall be in conformance with the Comprehensive Plan.
The data center building shall be setback a minimum of one-hundred (100) feet from property lines.
In addition to the landscape planting requirements of Article 8 of the Zoning Ordinance, any portion of the data center (including equipment) visible from a park or adjoining/across the street from a residential district shall be screened by vegetation consisting of a double staggered row of evergreen trees planted 15 feet on center. A minimum 3 foot berm planted with a double staggered row of evergreen shrubs planted 10 feet on center may be used in place of the double staggered row of evergreen trees required above.
Buffer Yard: Industrial uses from residential and recreational uses: Fifty (50) feet wide plus one (1) foot for each foot of building height over thirty-five (35) feet.; Double staggered row of evergreen trees planted fifteen (15) feet on center, or a double staggered row of evergreen shrubs planted ten (10) feet on center, forming a dense, continuous visual screen at least six (6) feet in height within one (1) year of planting or a fence or wall or earthen berm, with a minimum six (6) foot height, with evergreen trees interspersed every twenty-five (25) feet along the side of the wall facing the residential use
The data center shall utilize recycled water or air chillers, in conjunction with using recycled water, for cooling purposes. Potable water shall not be used for cooling.
All electric service lines from the substation to the data center shall be placed underground.

Loudoun County, Virginia*



Topic
DATA CENTER SITING
SETBACKS AND BUILDING MASSING WHEN ADJACENT TO RESIDENTIAl
POWER
BUILDING DESIGN
MECHANICAL EQUIPMENT

Regulation
Currently permitted in three zoning districts (IP, GI, MR-HI), and special exceptions in three districts (PD-RDP, CLI, OP).
In the process of amending their zoning ordinance to change all permitted districts to special exceptions. There will be no districts where data centers are permitted.
Parking must be setback at least 50 feet from the common property line, provided existing forest and other natural screening exists within 50 feet of the lot line, and such forest and screening remains undisturbed or enhanced; or, if no forest or natural screening exists, berms are provided at least 10 feet in height constructed to a maximum 2:1 slope on either side of the crown edge, and 10-foot-tall fencing and plantings are placed on top of the berm
Structures must be setback at least 200 feet from the common property line;
If a building is located within 400 feet measured from the property line adjacent to residential property, any building façade facing the adjacent property must include a change in building height at a minimum interval no less frequent than every 150 horizontal linear feet or no less frequent than 3 times the average height of the building; and the building envelope must provide a step- back of no less than 15 feet from the building wall at a height point that begins at the top of the second story of the building or 40 feet, whichever of the two is lower.
For data centers, site-specific energy storage facilities must not exceed 30% of the gross floor area of the use; otherwise, the use is subject to the requirements for utility scale energy storage facilities.
The energy storage facility must be located within the principal building or within a permitted accessory building. Alternately, the energy storage facility may be located on the roof of the principal building when fully screened from public view.
Energy Storage Facility Container Size. Containers housing energy storage equipment are limited to 900 square feet in size.
Building heights shall not be increased above the 45-foot maximum unless the Applicant can demonstrate that proposed height is compatible with the surrounding development and that it will not have an adverse impact on adjacent and nearby properties (Visual Impact Analysis is required).
Data Center Mechanical Equipment must be shown on any proposed Site Plan and must be fully screened on all sides. Such visually solid screen must be constructed with a design, materials, details, and treatment compatible with those used on the nearest Principal Façade of a building;
Ground mounted Data Center Mechanical Equipment must be separated from adjacent property that has existing residential development, an approved CDP or plat or plan showing residential development, or Zoning District permitting residential uses, by a principal building, or is otherwise not permitted adjacent to residential property.
Ground mounted Data Center Mechanical Equipment must not be located in any required front yard.

Chandler, Arizona

Topic
DATA CENTER SITING
BUILDING DESIGN
MECHANICAL EQUIPMENT

Regulation
Data centers are not permitted to operate in the City of Chandler unless explicitly approved as part of a Planned Area Development zoning district. Data centers that are ancillary to another primary use are permitted if they a) occupy no more than ten (10) percent of the building footprint, b) are used to serve the enterprise functions of the on-site property owner and are not used to lease data storage and processing services to third parties, and c) are not housed in a separate stand-alone structure on the parcel.
All uses permitted within a Planned Area Development (PAD) zoning designation shall be identified at the time of zoning approval, and be set forth in the ordinance and/or Preliminary Development Plan approved by the Mayor and Council.
Architectural style is not prescribed; the design, however, shall convey a high degree of quality commensurate with the neighborhood and as prescribed in the Chandler General Plan. A standard building design for some other location, climate, environment or set of circumstances may not necessarily fit in a given location in Chandler and shall be modified to be harmonious with the immediate environment and meet the intent set forth in this paragraph.
Building mass: Large building facades are deemed inconsistent with the low-key small-town character of Chandler and are discouraged.
Mechanical equipment screening: All mechanical equipment and appurtenances shall be concealed and/or screened from view in their entirety as an integral part of the building in one (1) of the following manners, and subject to approval by the Zoning Administrator; » Parapets are acceptable for screening, provided the height shall be equal to, or higher than, the highest point on the mechanical equipment; or » Screening of mechanical equipment shall be constructed of similar materials and painted colors similar to the building, and so arranged that the screening is perceived to be an integral part of the building mass.
All mechanical equipment and appurtenances shall be indicated and shown on building sections and elevations indicating dimensions of equipment and screening.

Chandler, Arizona (continued)

Topic
LANDSCAPE/BUFFERS/SCREENING
WATER

Regulation

Landscape Buffer areas for dissimilar land uses:

- A six-foot masonry wall reflecting the design, material and/or color of the primary structures within the project, excluding approved gated openings;
- and evergreen trees a minimum of seven (7) feet in height; twelve (12) feet in height if abutting existing or planned residential development, planted at a maximum spacing of twenty (20) feet on center and shrubs planted at a rate of four (4) per twenty (20) lineal feet.

Additional requirements for new non-residential water users of nine thousand (9,000) gallons or more per day.

New non-residential water users who have an estimated annual use which averages nine thousand (9,000) gallons per day or more (excluding turf related facilities) are required to submit a "water use plan" sealed by an Arizona registered architect or engineer that it complies with this section as a condition of issuance of a building permit. The "water use plan" shall contain at least the following:

- A description of any available water conservation training programs offered to employees;
- Whether alternative water sources will be used (i.e., effluent, poor quality groundwater or other non-groundwater sources);
- Operating levels of total dissolved solids (TDS) or conductivity for cooling towers and total cooling capacity;
- Whether the user will use the best available conservation technologies in accordance with existing process uses (i.e., re-circulating systems for process water, alternative dust control methods, automatic shut-down devices to eliminate continual running water);
- Any plans for the reuse of wastewater or process water at the facility; and
- Type of landscaping and irrigation system.

Elk Grove Village, Illinois

Topic
DATA CENTER SITING
BUILDING DESIGN
AMENITIES

Regulation
Data centers are permitted in I-1, I-2 and Innovation and Technology Center (ITC) districts. They become a special use in these districts if 100′ height or more is requested within 1,000 feet of residential zoning.
One specific example of a data center located within a residential area: Residents were heavily involved in the planning process. Specific site elements included: 250′ setback, 6′ berm, rock wall and landscaping, residential drainage program around property. Resulted in no public opposition at public hearing.
For I-1 and I-2 zoning: Building height is limited to 45′/2 stories if site is within 200′ of residential zoning, 60′/6 stories if site is between 200′ – 1,000′ from residential zoning, and 100′ if site is more than 1,000′ from residential zoning.wThe maximum building height for ITC is 375′/25 stories.
Docks for Data Centers: In considering whether a loading space reduction may be granted, the Zoning Administrator shall consider comparable loading space utilization data provided by the applicant, circumstances unique to the business function of the use, future reuse of the facility, and comparable loading space utilization data otherwise collected by the Village.
Zoning code intentionally allows for flexibility since there are lots of unknowns around power sources.
Site amenities such as ponds, fountains, statuary, plazas and outdoor areas for gathering, walking paths and similar attractions shall be incorporated into the development of all sites.

Culpeper County, Virginia*

Topic
DATA CENTER SITING
BUILDING DESIGN

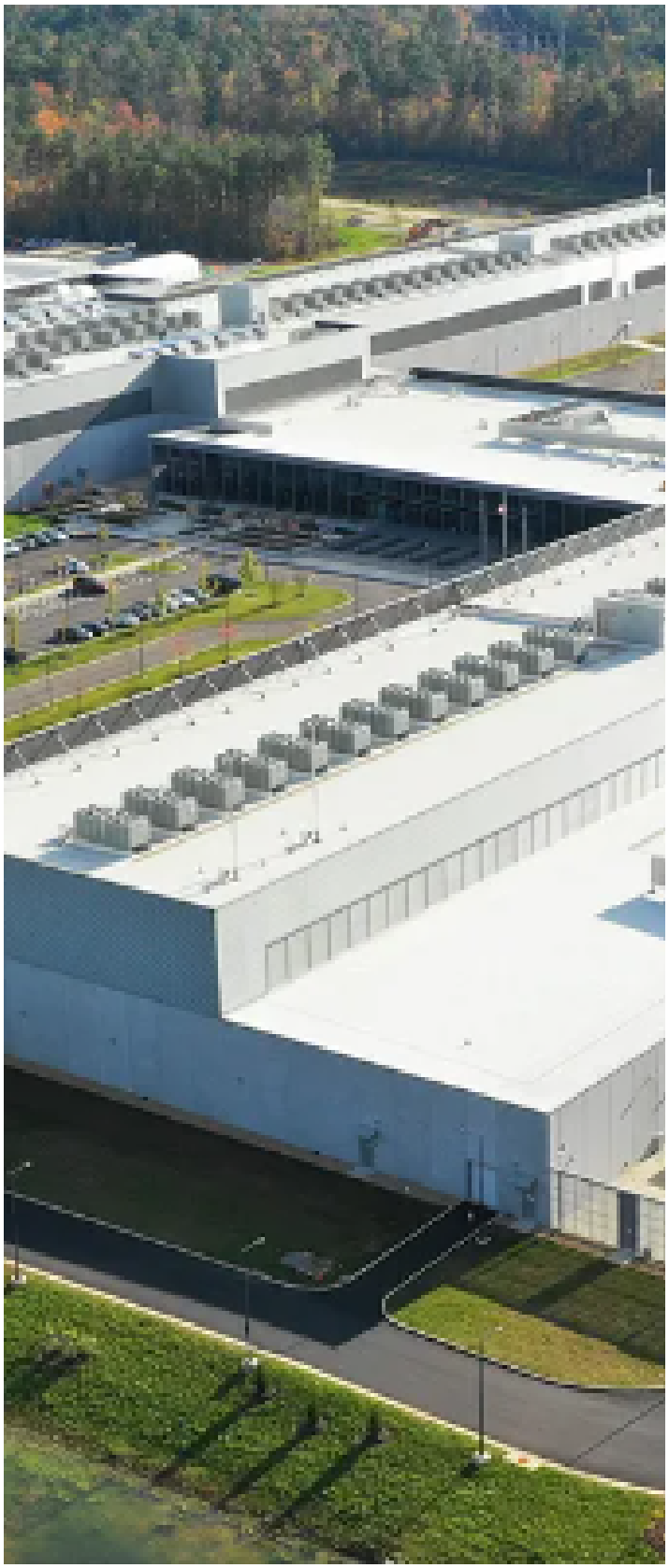
Cobb County, Georgia

Topic
DATA CENTER SITING
MECHANICAL EQUIPMENT
BUILDING DESIGN

Regulation
Data Centers are permitted by-right in industrial and heavy industrial zoning districts; Conditional Use Permit review is required if they need their own substation.
CUP Process allows other impacts to be discussed and reviewed through public process.
Comprehensive Plan requires data centers are located no more than 0.5 miles from existing electrical transmission corridors or other suitable electrical sources.
County protects against speculative rezonings by proffering out certain uses, typically applications are not approved without details of use.
Building height maximum of 45' with the ability to increase to 75' if the site is in the Technology Zone; must go through an architectural review process.

Regulation
Data centers are not specifically mentioned in this code, however, similar uses are required to be located a minimum of 500 feet from any school property and 200 feet from any residential property.
When abutting any residential property line, heating and air conditioning units shall not be located within any required buffers (min. 20').
No ground-based heating and air conditioning unit shall exceed 35 feet in height.
Maximum height of 4 stories/70 feet.

Henrico County, Virginia



Topic
DATA CENTER SITING
BUILDING DESIGN

Regulation

Data Centers are permitted by-right in O-1, O-2, O-3, O/S, B-1, B-2, B-3, M-1, M-2, M-3, Highway Edge Overlay and as a part of a master plan in LI-PD.

- If a data center is small enough that all HVAC and other mechanical systems are within an enclosed building, it is treated as an office use and allowed in all districts above.
- Large data centers requiring external HVAC and other mechanical systems (including emergency power generators and other emergency power supply equipment) are classified as an industrial use and are only allowed in the industrial districts.

For non-residential uses, including data centers, proposed adjacent to residential uses, the county zoning ordinance includes standards for "neighborhood compatibility." Such standards provide a proper transition from and ensure compatibility between single-family detached dwellings in residentially zoned districts and more intense forms of development. Applicable standards for data centers include:

- For a site with multiple buildings, building containing the lowest intensity of use must be located nearest the adjacent single-family residential lots.
- Nonresidential development must be oriented to face similar forms of development on adjacent lots, rather than toward single-family residential lots.
- Loading, service, fuel storage, and mechanical equipment areas must be located away from single-family residential lots to the maximum extent possible and screened from view.
- Required open space must be located between the proposed development and the single-family residential lots.
- Building heights within 75' feet and 150' feet from adjacent residential property lines, must not exceed 45' and 55' feet, respectively.

Fairfax County, Virginia*

Topic
DATA CENTER SITING
BUILDING DESIGN

Amsterdam, Netherlands

Topic
DATA CENTER SITING
POWER

Regulation
Data Centers are permitted by-right in C-3 and C-4 up to 40,000 sq. ft; 1-2, I-3 up to 80,000 sq. ft.; I-4 – I-6 is limited by district height of 75' and FAR of 0.5; special exception is required for larger size or increase in height/FAR in any listed district; permitted in PRC, PDC, PTC if shown on development plan.
Data center buildings must be at least 200 feet from the lot line of an adjacent or abutting residential district or property. Equipment such as back-up generators must be 300 feet from the lot line of residential property or separated from the lot line of a residential district or residential property by the data center building. Lesser distances may be allowed with special exception approval.
Data centers must be at least one mile from a Metro station.
Main entrance features, façade variations, and other architectural elements are required to enhance the visual appeal of these industrial buildings.
All equipment must be enclosed or screened by a wall or similar barrier to reduce visual and noise impacts
Height maximums range from 40' to 120' based on zoning district.

Regulation
Data centers are currently limited to the industrial zones of the City. There's a two-phase policy being put into place which will increase regulations on data centers, and limit siting further.
Fines are imposed on data centers that fail to implement power management protocols on their servers, particularly the requirement to switch off idle servers to conserve energy.

Stafford County, Virginia

Topic
DATA CENTER SITING
USE SEPARATION
MECHANICAL EQUIPMENT
WATER
POWER

Regulation
Data Centers are permitted by-right in M-2 and Integrated Corporate and Technology Park Overlay Districts (ICTP)
Within the M-2 district, all uses conducted within 500' of any A-2, R-1, R-2, R-3 or R-4 district shall be conducted within enclosed buildings.
Data Center facilities are encourage to be located on sites with established and/or preserved vegetative and/or forested buffers of enough depth or density to effectively screen the facility. A viewshed analysis should be submitted for developments adjacent to non-industrial or non-commercial properties, public roadways and cultural/historic resources to demonstrate that the proposed buffers sufficiently screen the use.
All primary structures must be set back at least 200' from any property line abutting non commercial or industrial zoned properties.
Avoid locating on sites with active agriculture, high levels of biodiversity, threatened and endangered species habitat, and large tracts of mature forests. Consideration should be given for connectivity of forested corridors and/or stream buffers to permit wildlife passage.
Applicants are encouraged to seek certification through programs that help corporate landholders demonstrate a long-term commitment to managing quality habitat for wildlife, conservation education and community outreach initiatives.
When in close proximity to passive and active parks and conservation properties, enhanced setbacks and buffers should be considered. A minimum one-mile buffer zone should be considered from the boundary lines of Crow's Nest Natural Area Preserve.
All mechanical equipment, both on ground and roof-mounted equipment, shall be attenuated through sound mitigation measures including, but not limited to, sound muffling materials.
Facilities should utilize water reuse systems or closed-loop systems for cooling. Should public water and sewer utilities not be available, private wells and septic drainfields may be used for facility bathrooms and kitchens.
The County is working with the data center developers to develop a water service agreement that would require them to construct a reuse water system to limit potable water demands for cooling.
Ensure the electrical grid can support power demands of the end user without negatively impacting the supply of power to the surrounding community. » Encourage use of onsite renewable energy to reduce project demand on electrical grid » Encourage energy efficiency in building and/or campus design (i.e. LEED certification) » Encourage underground placement of new private power transmission lines

Tower Hamlets, London, United Kingd

Topic
DATA CENTER SITING
CONSTRUCTION
SUSTAINABILITY

om

Regulation
Development is required to use the most appropriate, layout, orientation, design and use of buildings to minimize noise and vibration impacts, identify/outline mitigating measures to manage noise and vibration from new development, including during the construction phase, separate noise-sensitive development from existing operational noise, and provide a noise assessment where noise-generating development or noise-sensitive development is proposed.
Where new noise-sensitive land uses are proposed in proximity to existing noise-generating uses, development is required to robustly demonstrate how conflict with existing uses will be avoided, through mitigation measures.
Development is required to demonstrate that the level of noise emitted from any new heating or ventilation plant will be below the background level by at least 10dBA.
During construction, major development is required to: comply with the non-road mobile machinery low emission zone requirements, minimize levels of noise, vibration, artificial light, odor, air quality, fumes or dust pollution; consider the routing, timing and frequency of heavy goods vehicle movements to reduce their impact on vulnerable road users, local amenity and congestion; use, where available, construction and/or freight consolidation centres, and consider the impact of construction on the water supply, flood risk and drainage and implement suitable mitigation measures where required.
Major development must consider the cumulative impact of other major development occurring in the vicinity on levels of noise, vibration, artificial light, odour, air quality, fumes or dust pollution, and plan timings of works, delivery timings and routes and location of equipment accordingly to reduce this cumulative impact.
Development is required to employ the highest standards of sustainable construction, including: Sustainable construction methods, such as the use of sustainably sourced and recycled materials, and the use of demolished material from the development site, where practicable, in order to minimize the transportation of waste and reduce carbon dioxide emissions.
Development is required to maximize energy efficiency based on the following standards: a. All new non-residential development over 500 square meters floor space (gross) are expected to meet or exceed BREEAM ‘excellent’ rating
Major residential and major non-residential development will be required to submit an energy assessment. The energy assessment should demonstrate how the development has been designed in accordance with the energy hierarchy and how it will: maximize energy efficiency, outline the feasibility of low nitrogen dioxide decentralized energy, and seek to provide up to 20% reduction of carbon dioxide emissions through on-site renewable energy generation.

Section 5 | Conclusions & Next Steps

Early Considerations for Prince William County

The team has conducted a thorough review of state code and local ordinances, policies, and legislative approvals related to data center development in Prince William County. In addition, the team has analyzed the requirements and policies of several peer communities who are currently experiencing data center development. This work has allowed the team to begin to identify areas where Prince William County's regulations governing data center development could be enhanced and updated.

The following page outlines potential areas for improvement related to data center development in Prince William County. These are initial considerations that will be further refined and developed into proposed updates to the Zoning Ordinance and Design and Construction Standards Manual through engagement with County staff, the Data Center Ordinance Advisory Group (DCOAG), local stakeholders, and residents of Prince William County.

As the team continue its work, the list of topics will evolve into more specific and detailed language that can be incorporated into the Zoning Ordinance and Design and Construction Standards Manual.

At the conclusion of this work, our team along with County staff will present a draft ordinance and DCSM amendment to the Planning Commission and Board of County Supervisors. These bodies will have the opportunity to consider the proposed changes and decide how to incorporate them into the County's regulatory documents.

Overall, the goal is to develop recommended updates to the Zoning Ordinance and DCSM that effectively balance the economic benefits of data center development with the need to protect the quality of life of Prince William County's residents and its natural, cultural, and historic resources.

Early Considerations for Updates to the ZO and DCSM

Topic	Potential Updates or Changes
Allowable Uses	Reassess which zoning districts classify data centers as permitted, special, or prohibited uses to confirm appropriate alignment with land use goals.
Definition	Refine the definition of "data center"; consider exclusions for facilities such as substations and alternative power sources and separate classifications based on power and water usage.
Separation and Buffers	Enhance requirements for setbacks, separation distances, screening, and landscaping, particularly when data centers are near residential, agricultural, or protected areas like schools, parks, and cultural resources. Include considerations for substations and mechanical equipment in these revisions.
Architectural Standards	Strengthen architectural requirements for data centers and require 3D renderings for review; consider requirements for breaking up large facades and security fencing design standards; data center designs can resemble office buildings, particularly within office zoning districts.
Water Supply	Consider requirements associated with water usage, such as use of recycled or non-potable water, closed loop systems, pretreatment of effluent and submission of a water usage plan for review.
Power and Energy	Consider requirements that new transmission lines be installed underground; confirm that a portion of the facility's energy needs is sourced from renewable energy; and consider implementing a Power Usage Effectiveness (PUE) ratio to assess energy efficiency.
Site layout / building configuration	Consider changes to site layout requirements and evaluate requirements for open space, impervious surfaces, viewshed impacts, and locations for utilities, generators and associated equipment.
Bulk and Massing	Consider linking bulk, height, and massing of data center buildings to their proximity to residential areas and the architectural design of the facility, inclusive of requirements for rooftop mechanical equipment.
Substations and Generators	Enhance the review process for substations and generators, including their locations on site, screening, emissions, and noise.
Noise	Incorporate requirements for specific modifications to reduce noise from mechanical equipment, such as installing mufflers on generators to mitigate noise and emissions, and requirements for monitoring.
Construction Impact Mitigation	Consider regulations specific to construction truck routing, phasing, off-site hauling and disposal to address negative impacts related to construction activity.

Section 6 | Appendix

Overview

The Appendix provides a more comprehensive catalog of the regulations compiled by the consulting team from the three tiers of peer research. This section offers a deeper dive into the regulations and standards from the localities researched for this report to serve as a supplement to the findings of the report.

Please note that the following tables only include regulations from jurisdictions that have adopted regulations addressing the each topic. These lists are presented in no particular order, except the regulations from Prince William County are listed first in each table.

Equinix Data Center, Amsterdam.

Definitions

Jurisdiction	Definition
Prince William County, VA	Data Center shall mean a use involving a building/premise in which the majority of the use is occupied by computers and/or telecommunications and related equipment, including supporting equipment, where information is processed, transferred and/or stored.
Stafford County, VA	A facility where the principal use is the storage, management, processing, and/or transmission of digital data, and containing one or more large-scale computer systems and/or related equipment. Such facility or use typically may include but is not limited to air handlers, water cooling and storage facilities, utility substations and infrastructure, back-up power generation, fire suppression systems, and/or enhanced security systems, any of which may require additional approvals or conditional use permits, as applicable.
Fairfax County, VA	A facility containing one or more large-scale computer systems used for data storage and processing for off-site users. Typical supporting equipment includes back-up batteries and power generators, cooling units, fire suppression systems, and enhanced security features.
Henrico County, VA	A facility containing one or more large-scale computer systems used for data storage and processing for off-site users. Typical supporting equipment includes back-up batteries and power generators, cooling units, fire suppression systems, and enhanced security features. A data center typically has few on-site employees.
Elk Grove Village, IL	A facility primarily used for the storage, management, processing and transmission of digital data including related office areas through the use of support equipment such as servers, networks and other similar computer-based components.
Chandler, AZ	A facility or portion of a facility housing networked computer systems and telecommunications equipment used for remote storage, processing, and distribution of data.
Loudoun County, VA	Data Center: An establishment engaging in the storage, management, processing, and/or transmission of digital data, and housing computer and/or network equipment, systems, servers, appliances and other associated components related to digital data operations. Data Center Mechanical Equipment: On-site exterior machines used to sustain and/or provide energy for the operations of a Data Center."
Warrenton, VA	A facility containing one or more large-scale computer systems used for data storage and processing for off-site users. Typical supporting equipment includes back-up batteries and power generators, electric substations, cooling units, fire suppression systems, and enhanced security features.

Siting Requirements

Jurisdiction	Siting Requirements
Prince William County	Within the Data Center Opportunity Zone Overlay District, data centers are permitted by-right in the following zoning districts: » O(L) – Office Low-Rise » O(H) – Office High-Rise » O(M) – Office Mid-Rise » O(F) – Office/Flex » M-1 – Heavy Industrial » M-2 – Light Industrial » M/T – Industrial/Transportation In designated office or industrial land bays in PBD (Planned Business District) and PMD (Planned Mixed Use District) districts. Outside of the Data Center Opportunity Zone Overlay District data centers require a special use permit in the districts noted above. Prohibited Districts: Data centers shall be prohibited in agricultural, residential, PMR, B-2, B-3 and V districts.
Montgomery County, MD	allowed within IL (Industrial Light) and IM (Industrial Moderate) zones
Hillsboro, OR	Permitted by-right as an accessory uses where industrial services and manufacturing are the primary uses, I-G district
Amsterdam, NE	Industrial areas; the city only allows for moderate growth and concentration of data centers until 2030 with 550 megavolt amperes (in addition to some data centers for which environmental permit applications have already been submitted).5 No additional space for data centers is available in Haarlemmermeer after 2030 (except for some specific locations).These conditions relate to the spatial quality and landscape integration, energy use and sustainability of the data centers
Stafford County, VA	Permitted: M-2, ICTP (Integrated Corporate and Technology Park Overlay)
Fairfax County, VA	"By-right: C-3,c-4 up to 40,000 sf; SE required for larger size or increase in height/FAR I-2,I-3 up to 80,000 sf; SE required for larger size or increase in height/FAR I-4 now has a size limit I-5,I-6 limited by district height of 75' and FAR of 0.5; SE required for increase in height or FAR PRC,PDC, PTC if shown on development plan Limits on the size of by-right data centers are retained where they previously applied and now the I-4 District has a size limit as well. Larger developments require special exception approval, except in the I-5 and I-6 Zoning Districts"

Jurisdiction	Siting Requirements
Henrico County, VA	Permitted by-right: O-1, O-2, O-3, O/S, B-1, B-2, B-3, M-1, M-2, M-3, Highway Edge Overlay, Allowed as a part of master plan: LI-PD "
Culpeper County, VA	Data processing and computing, secure messaging services and customer support is a permitted use in Light Industry - Industrial Park and Industrial (HI)
Elk Grove Village, IL	Permitted in: ITC (Innovation and Technology Center); I-1; I-2; Special use if requesting 100' height within 1,000 feet of residential zoning.
Chandler, AZ	Data centers are not permitted to operate in the City of Chandler unless explicitly approved as part of a Planned Area Development zoning district. Data centers that are ancillary to another primary use are permitted if they a) occupy no more than ten (10) percent of the building footprint, b) are used to serve the enterprise functions of the on-site property owner and are not used to lease data storage and processing services to third parties, and c) are not housed in a separate stand-alone structure on the parcel.
Loudoun County, VA	"Permitted: IP, GI, MR-HI Special Exception: Planned Development - Research and Development Park, Commercial Light Industry, OP **In the process of amending the zoning ordinance to change all permitted districts to special exception. There will be no districts where data centers are permitted."
Warrenton, VA	Special Use Permit: Industrial district
Fauquier County, VA	"Permitted: BP in service district; PCID (using recycled water for cooling and with all new power lines, including transmission or substation feedlines, placed underground) Special Exception Use: BP; PCID (not using recycled water for cooling and with all new power lines, including transmission or substation feedlines, placed underground)"

Separation, Buffering, Landscaping, and Screening

Jurisdiction	Separation/Buffering/Landscaping/Screening Requirement
Prince William County	Buffer Area Width and Plant Requirements: Type A: 15 feet; 110 plants per 100 feet of ROW or property line Type B: 30 feet; 180 plants per 100 feet of ROW or property line Type C: 50 feet; 320 plants per 100 feet of ROW or property line Type D: case by case (min. 15 feet); based on approval width fence or berm may be substituted for 30% of buffer width
Montgomery County, MD	A 200-ft buffer between operations and any lot line and a min. 300-ft separation from streams, floodplains, or wetlands.
Stafford County, VA	All primary structures shall be set back at least one hundred (100) feet from any property line abutting non-commercial or non-industrial zoned properties for sites located within the urban services area, and at least two hundred (200) feet from any property line abutting non-commercial or non-industrial zoned properties for other sites.
Fairfax County, VA	Data center buildings must be at least 200 feet from the lot line of an adjacent or abutting residential district or property. Equipment such as back-up generators must be 300 feet from the lot line of residential property. Data centers must be at least one mile from a Metro station.
Elk Grove Village, IL	» 50 feet separation requirement when data center abuts residential district; height requirements change based on distance to residential zoning districts. » When abutting areas zoned for residential use, an opaque screen along all lot lines adjacent to residential use is required. Fences shall be black wrought iron or similar design as approved by the Zoning Administrator.
Cobb County, GA	Data centers shall not be located closer than 500 feet to any school property. Data centers shall not be located closer than 200 feet to any residential property line. Any property within an office & industrial district which abuts a residentially zoned property shall have a minimum 20-foot landscaped screening buffer. Required buffers may be included within required setbacks; Landscape buffers are subject to review and approval by the county arborist or county landscape architect and buffer should provide a 100 percent visual barrier to a height of six feet within two years of planting.

Jurisdiction	Separation/Buffering/Landscaping/Screening Requirement
Loudoun County, VA	The following requirements apply when a proposed Data Center is to be located on a property adjacent to property with existing or approved residential, or Zoning District permitting residential, including when separated by a principal arterial or lesser designated roadway: » Parking must be setback at least 50 feet from the property line, provided existing forest and other natural screening exists within 50 feet of the lot line, if no forest or natural screening exists, berms are provided at least 10 feet in height constructed and 10-foot-tall fencing and plantings are placed on top of the berm; » Structures must be setback at least 200 feet from the common property line; » Building Step-Back. If a building is located within 400 feet from the property line adjacent to property with residential, the building envelope must provide a step- back of no less than 15 feet from the building wall at a height point that begins at the top of the second story of the building or 40 feet, whichever of the two is lower.
Warrenton, VA	» Industrial uses, including associated parking lots and storage areas, shall provide a buffer yard where they are adjacent to residential and recreational uses. » Buffer Yard: Industrial uses from residential and recreational uses: Fifty (50) feet wide plus one foot for each foot of building height over thirty-five (35) feet.; » Double staggered row of evergreen trees planted fifteen (15) feet on center, or a double staggered row of evergreen shrubs planted ten (10) feet on center, forming a dense, continuous visual screen at least six (6) feet in height within one (1) year of planting or A fence or wall or earthen berm, with a minimum six (6) foot height, with evergreen trees interspersed every twenty-five (25) feet along the side of the wall facing the residential use. » In addition to industrial screening requirements, any portion of the data center (including equipment) visible from a park or adjoining/across the street from a residential district shall be screened by vegetation consisting of a double staggered row of evergreen trees planted 15 feet on center. A minimum 3 foot berm planted with a double staggered row of evergreen shrubs planted 10 feet on center may be used in place of the double staggered row of evergreen trees required above. » No buffer yard shall be required to comprise more than fifteen (15) percent of the gross area of the subject property

Jurisdiction	Separation/Buffering/Landscaping/Screening Requirement
Salt Lake County, UT	20 foot wide buffer required between nonresidential & residential containing a min. of 1 tree for every 25 feet.
Maricopa County, AZ	» Solid masonry, concrete or earthen product at least 6 ft tall required along any side/rear property line adjacent to any rural or residential zoning. » Any part of site not used for buildings, etc. must be landscaped and maintained.
Middlesex County, NJ	30 foot wide buffer is required between industrial uses and residential zones. Barbed wire/similar fences permitted as long as not in front yard and barbed wire must be above 6 feet high.
Hillsboro, OR	Industrial properties abutting residential zones must maintain a dense evergreen buffer at least 7 feet high. Buffer must be 20 feet wide. Setbacks increased to 75 feet when adjacent to residential zoning.
Virginia Beach, VA	When a zoning lot within an I-1 Industrial District adjoins a residential or apartment district without an intervening street, alley or body of water over twenty-five (25) feet in width, a twenty-five-foot minimum yard shall be required along all lot lines adjoining the residential or apartment district. Category II buffer: 25' wide, 5-6' height at planting, 20' height at maturity,
Montgomery County, MD	» If an industrial property abuts agricultural or residential zones, the perimeter planting area must be at least 30' wide, with a min. 6' high fence, wall, or berm, and two canopy trees per 100'. » A 50-ft buffer is required between industrial properties and railroad or utility ROWs, nonresidential public use properties, and if the property abuts a limited-access freeway, a parkway, or similar infrastructure.

Jurisdiction	Separation/Buffering/Landscaping/Screening Requirement
Stafford County, VA	Within the M-2 district, all uses conducted within five hundred (500) feet of any A-2, R-1, R-2, R-3 or R-4 district shall be conducted within enclosed buildings. Storage may be permitted outdoors, but shall be effectively screened by a wall, hedge, berm, fence, or landscaping, or a combination thereof, so that such outdoor storage will not be visible from a public right-of-way or property zoned other than M-1 or M-2. For sites abutting or across a road from non-industrial or non-commercial zoned properties, a vegetated buffer shall be required consisting of a landscaped strip at least fifty (50) feet wide. The site shall be enclosed with security fencing at least seven (7) feet in height, include an appropriate anti-climbing device, and shall be secured with gates. Security fencing shall be installed interior to any required buffer.
Henrico County VA	The following areas must be screened by the principal buildings on the site, or architecturally integrated building elements, or opaque walls or fences: ground-mounted and rooftop utility and mechanical equipment, including HVAC units, electric, water, and gas meters, junction and accessory boxes, transformers, generators, and accessory solar energy equipment, but not including wall-mounted equipment Commercial and Industrial uses 15,000 sf of less adjacent to A/R zoning: transitional buffer 25-35 Commercial and Industrial uses greater than 15,000 sf adjacent to A/R zoning: transitional buffer 50 » Buffer 25: 25 feet wide, 4 large and 2 small deciduous or evergreen trees and 16 shrubs per 100 linear feet » Buffer 35: 35 feet wide, 5 large and 2.5 small deciduous or evergreen trees and 19 shrubs per 100 linear feet » Buffer 50: 50 feet wide, 7 large and 4 small deciduous or evergreen trees and 24 shrubs per 100 linear feet » Brick or architectural block wall: 6-10 feet, reduces minimum buffer by 12-20', reduces plant quantity by 30-50% » Opaque fence of approved design and materials: 6 feet, reduces minimum buffer by 12 feet, reduces plant quantity by 30% » Evergreen plantings in an unbroken strip at maturity: 6 planted, 10 at maturity, reduces minimum buffer by 8', reduces plant quantity by 30%.

Jurisdiction	Separation/Buffering/Landscaping/Screening Requirement
Culpeper County, VA	» When required, screening shall consist of new plantings, existing vegetation, an opaque masonry wall or wooden fence, or combination thereof, to the reasonable satisfaction of the Approving Authority. Where only vegetation is provided, a planting strip of not less than twenty feet in width shall be provided. » Where new plantings are to be installed, they shall consist of (i) two rows of evergreen trees planted ten feet on center and staggered, or (ii) a berm not exceeding a slope of 2:1 with two rows of evergreen shrubs planted twenty feet on center and staggered. » Alternate methods of vegetative screening may be approved by the Approving Authority as follows: one large shade tree, one medium shade tree and one evergreen tree, per 500 square feet of area, and one shrub per 50 square feet of area. » Where a wall or fence is provided, it shall be a minimum of six feet in height and evergreen plantings shall be required at approximately ten-foot intervals along the side of any such wall or fence facing a public street or the use for which the screening shall benefit.
Chandler, AZ	Landscape buffer areas/dissimilar land uses: » A six-foot masonry wall reflecting the design, material and/or color of the primary structures within the project, excluding approved gated openings; and » Evergreen trees a minimum of seven (7) feet in height; twelve (12) feet in height if abutting existing or planned residential development, planted at a maximum spacing of twenty (20) feet on center and shrubs planted at a rate of four (4) per twenty (20) lineal feet. Landscape buffer areas/dissimilar land uses: » A six-foot masonry wall reflecting the design, material and/or color of the primary structures within the project, excluding approved gated openings; and » Evergreen trees a minimum of seven (7) feet in height; twelve (12) feet in height if abutting existing or planned residential development, planted at a maximum spacing of twenty (20) feet on center and shrubs planted at a rate of four (4) per twenty (20) lineal feet.

Bulk & Massing

Jurisdiction	Bulk & Massing Requirements
Prince William County, VA	The maximum lot coverage for Office and M-2 districts is 80% with a minimum open space of 20%. For the M/T and M-1 districts, the maximum lot coverage is 85% with a minimum open space of 15%. Maximum building heights range from 45 feet - 100 feet, however additional height may be added by Special Use Permit or Rezoning applications. The maximum FAR ranges from 0.35 - 1.25 by zoning district, however the Data Center Opportunity Zone Overlay District allows a FAR of 1.0. The Board of County Supervisors may approve a FAR higher than that permitted by right by specifically proffered rezoning or Special Use Permit.
Montgomery County, MD	Maximum uilding height ranges from 25 feet - 120 feet and the maximum FAR ranges from 0.25 - 2.5.
Salt Lake County, UT	The maximum lot coverage is 80%, and maximum height is 35 feet for industrial districts.
Irving, TX	The maximum building height is 50 feet.
Denver, CO	The maximum lot coverage is 50%, and the maximum height ranges from 45 feet - 110 feet, with no height limitations in general industrial zoning. The maximum FAR is 2.0.
Maricopa County, AZ	The maximum lot coverage is 60%, and the maximum height is 40 feet.
Middlesex County, NJ	The maximum lot coverage is 50% when located on aquifer outcrop or recharge areas, and the maximum height is 35 feet.
Hillsboro, OR	The maximum lot coverage is 50% with a maximum height of 45 feet. However, high-profile buildings may be allowed up to 150 feet, but if they are locatedwithin 100 feet of a residential district, the height is reduced to 45 feet, with further reductions of 1 ft for every 2 ft less than than 100 ft setback.
Virginia Beach, VA	When an industrial zoning district is adjacent to a residential district, the maximum height is 35 feet. The maximum height varies from 35 - 120 feet for the different apartment zoning districts. The maximum FAR for industrial uses is 2.5.
Stafford County, VA	A minimum of 30% open space is required for sites outside of the urban services area. Height maximums where data centers may be permitted range from 65 to 80 feet. The maximum FAR is 1.0.

Jurisdiction	Bulk & Massing Requirements
Fairfax County, VA	"The maximum size of a data center varies by zoning district, in C-3 and C-4 data centers up to 40,000 sq. ft. are permitted, and 80,000 sq. ft. in 1-2 and I-3. Maximum heights range from 40 feet - 120 feet depending on zoning district. 10%-20% minimum landscaped open space is required. The maximum FAR varies from 0.25 to 1.0 depending on district.
Henrico County, VA	Maximum lot coverages range from 60% - 90% and maximum heights range from 45 feet - 200 feet depending on zoning district.
Culpeper County, VA	Maximum lot coverages range from 50% - 75% depending on zoning district. The maximum height is 75 feet and the maximum FAR ranges from 0.5 - 1.0.
Elk Grove Village, IL	"Maximum lot coverage is 50% for the ITC district, and 80% for I-1 and I-2 districts. If the site has I-1 or I-2 zoning and is within 200 feet of residential zoning, the maximum height is 45 feet or 2 stories. The maximum increases to 60 feet or 6 stories within 1,000 feet of residential, and 100 feet if over 1,000 feet from residential zoning. The maximum height for ITC is 375 feet or 25 stories. The FAR for I-1 and I-2 ranges from 0.8 - 2.0, and is 0.5 for each floor for the ITC district.
Chandler, AZ	Bulk and Massing of data centers is determined through the Planned Area Development (PAD) process, and based on the quality of the proposal.
Cobb County, GA	Maximum lot coverage for industrial districts is 80%, with a maximum height ranging from 52 - 70 feet or four stories.
Loudoun County, VA	Maximum lot coverage ranges from 0.40 - 0.55, with a maximum height of 45 feet - 100 feet. The maximum FAR ranges from 0.4-2.0.
Warrenton, VA	The maximum lot coverage is 75%, with a maximum height of 35 feet.
Fauquier County, VA	The maximum lot coverage is 50% with a maximum height of 45 feet However, if the applicant can demonstrate that the proposed height is compatible with no adverse impacts through a viseal impact analysis, it may be increased.

Mechanical Equipment

Jurisdiction	Mechanical Equipment Requirements
Prince William County	Ground level and roof top mechanical equipment shall be screened from major arterials, interstates and abutting residentially zoned or planned properties. This screening may be provided by a principal building or existing vegetation to remain or is within a landscaping/buffer easement on an adjacent property. Mechanical equipment not screened by a principal building or existing vegetation shall be screened by a visually solid fence, wall or panel compatible with the principal building. Mechanical equipment found to have no adverse impact on adjacent roads or properties shall not be required to be screened. Substations. Substations shall be screened from adjacent major roads or residentially zoned/planned properties with a 10 feet tall opaque fence and all other buffering and landscaping requirements.
Salt Lake County, UT	Mechanical Equipment must be screened by plants, solid opaque fencing, berms, or a combination of the above.
Irving, TX	Must be screened by solid masonry wall at minimum height of the highest element of the equipment. Finished in a color similar to the building façade.
Denver, CO	Rooftop mechanical equipment screened from ground level view. Materials should be similar to that of the main building façade.
Maricopa County, AZ	Rooftop equipment must be screened to the height of the tallest equipment or integrated into the building design. Ground equipment must be enclosed by a solid screen wall at least 6 feet high.
Hillsboro, OR	Roof-mounted equipment must be screened from street-level view with materials compatible with building design and must be placed behind parapets.
Stafford County, VA	All mechanical equipment, both on ground and roof-mounted equipment, shall be attenuated through sound mitigation measures including, but not limited to, sound muffling materials.

Jurisdiction	Mechanical Equipment Requirements
Fairfax County, VA	All equipment must be enclosed or screened by a wall or similar barrier to reduce visual and noise impacts
Henrico County, VA	For data centers in all districts except the M-1, M-2, and M-3 districts, all equipment necessary for cooling, ventilating, or otherwise operating the facility must be contained within an enclosed building where the use is located. This includes emergency power generators and other emergency power supply equipment. Mechanical equipment must be screened by the principal buildings on the site, or architecturally integrated building elements, or opaque walls or fences of approved design and materials compatible with the principal buildings."
Culpeper County, VA	Rooftop mechanical equipment are required to be screened by exterior architectural material of the same type as the building. All utility or mechanical equipment not entirely within a screened service area shall have a natural evergreen planting screen provided. In lieu of such screening, utility or mechanical equipment may be shielded from view by any structure architecturally compatible with an adjacent building.
Elk Grove Village, IL	All ground mounted equipment shall be screened by fencing, berms, plantings, screen wall or any combination, to sufficiently obscure such equipment from view from all adjacent streets and residentially zoned property.
Chandler, AZ	All mechanical equipment shall be screened from view in their entirety as an integral part of the building by parapets, or screening of similar materials as the primary building to appear as part of the structure. All mechanical equipment must be shown on building sections and elevations submitted to the City.
Cobb County, GA	Heating and air conditioning units shall not be located within any required buffers when abutting residential land and shall be at least 5 feet from side and rear property lines when abutting nonresidential zoning districts. No ground-based heating and air conditioning units shall exceed 35feet in height.
Loudoun County, VA	All ground level and roof top equipment must be shown on the site plan and screened on all sides with a visually solid screen compatible with those of the principal building. Screening may incorporate perforated surfaces for ventilation. Ground mounted mechanical equipment must be separated from adjacent residential zoning by a principal building, and is prohibited in front yards. Additionall there are no screening requirements when the property is adjacent to industrially zoned property.

Jurisdiction	Mechanical Equipment Requirements
Warrenton, VA	Mechanical equipment shall be completely screened through the use of walls, fences or evergreen vegetation so that no part of the mechanical equipment can be seen from adjoining properties or right-of-ways. All generators shall be equipped with mufflers to reduce emissions and noise.
Fauquier County, VA	Ground and/or rooftop mounted mechanical equipment and on-site substations should be screened from roadways and adjacent residentially zoned or planned properties. The screening preference is the principal building, if not feasible, the design should include a solid fence, wall or panel and be compatible with the design of the principal building. Mechanical equipment should be located and screened in a manner which provides appropriate noise attenuation.

Architectural Standards

Jurisdiction	Architectural Requirements
Prince William County	Principal building façades shall include all building façades that face adjacent major arterials or interstates. When a building has more than one principal façade, such principal building façades shall be consistent in terms of design, materials, details, and treatment. Principal building façades shall avoid the use of undifferentiated surfaces by including at least two of the following design elements: change in building height, building step-backs or recesses, fenestration, change in building material, pattern, texture, color; or use of accent materials.
Hillsboro, OR	Permitted exterior materials include brick, natural stone, concrete masonry units, and metal. Glass is allowed as an accent material, wood is acceptable for soffits, overhangs, & entrance canopies. Buildings must incorporate features such as cornices, pilasters, belt courses, ornamental masonry, bays, etc.
Fairfax County, VA	Main entrance features, façade variations, and other architectural elements are required to enhance the visual appeal of data center buildings.
Chandler, AZ	Architectural style is not prescribed, however the design shall convey a high degree of quality commensurate with the neighborhood and consistent with the Chandler General Plan. Large building facades are deemed inconsistent with the low-key small-town character of Chandler and are discouraged.
Loudoun County, VA	Data center principal façades must incorporate fenestration and a change in design elements no less frequent than every 150 horizontal feet or 3 times the average height of the building.Multiple principal facades must be consistent in terms of design, materials, details, and treatment. Each principal facade must include 30% fenestration and meet the fenestration coverage requirements. Main entrance features must include projection or recession from the main building plane, and incorporate plantings a minimum of 50% of the facade length.
Warrenton, VA	Building facades shall include at least two of the following design elements: change in building height, building step-backs or recesses, fenestration (25% minimum), change in building material, pattern, texture, or color, and use of accent materials.

Jurisdiction	Architectural Requirements
Fauquier County, VA	Buildings should be sited and oriented to minimize visual impacts from public streets and adjacent non-industrial uses and oriented towards the public street. Loading dock, ground equipment and other storage areas should not be viewable from important viewsheds, street frontages and open spaces, and developments with multiple buildings should orient service areas to face each other. Where feasible, buildings should be oriented to take advantage of passive cooling and daylighting opportunities. Multi-building developments should include a variety of building sizes masses, and appearances. Reduce the perceived scale of buildings by visually breaking down the large massing of typical buildings. Changes in horizontal plane are recommended to occur every 150 to 200 feet. All facades should include at least one change in horizontal plane. Building step-backs, projections, recesses or architectural elements should have a minimum depth of 4 feet to create shadow lines and variations in the façade. 4.Variation at the ground plan can be utilized to create transition in scale and mass as viewed from public streets. Fenestration should be used to avoid monolithic appearances and to be congruent with adjacent uses. Transparency shall be provided on faces of the building that face public roads. Primary building facades should use a neutral color palette. It is recommended that a minimum of 50% of the entrance elevation; 35% of any street facing façade and 20% of all other elevations shall include: brick, concrete (both precast and cast-in-place), metal panels or anodized aluminum, glazing systems. All metal panels should be fully engineered, architectural quality systems.

Water Usage

Jurisdiction	Water Usage
Prince William County, VA	No requirement
Chandler, AZ	Data centers are not permitted to use reclaimed water for their facilities. Additionally, new non-residential water users who have an estimated annual use which averages nine thousand (9,000) gallons per day or more are required to submit a "water use plan" sealed by an Arizona registered architect or engineer that it complies with this section as a condition of issuance of a building permit. The plan will contain among other requirements, whether alternative water sources will be used, operation levels of total dissolved solids or conductivity for cooling towners and total cooling capacity, whether the best available conservation technilogy will be used (re-circulating systems for process water, etc), and any plans for the reuse of wastewater or process water at the facility
Warrenton, VA	Data centers are required to utilize recycled water or air chillers, in conjunction with using recycled water, for cooling purposes. Potable water shall not be used for cooling.
Fauquier County, VA	Applicants shall demonstrate and commit to meeting the County’s recycled water requirement, demonstrate adequacy of water for firefighting situations (without impacting local private wells or public water sources). Construction activities, including any required blasting, should not impact the public water supply.

Power / Energy Usage

Jurisdiction	Power / Energy Usage Requirements
Prince William County, VA	No requirement
London, UK (Tower Hamlets)	All new non-residential development over 500 square metres floorspace (gross) are expected to meet or exceed BREEAM 'excellent' rating. Major residential and major non-residential development will be required to submit an energy assessment. Minor nonresidential development will be strongly encouraged to prepare an assessment. The assessment should demonstrate how the development will maximize energy efficiency, the feasibility of low nitrogen dioxide dencentralized energy and seek to provide up to 20% carbon dioxide emissions reduction through on-site renewable energy sources.
Amsterdam, NE	Fines are imposed on data centers that fail to implement power management protocols on their servers, particularly the need to switch off idle servers to conserve energy.
Loudoun County, VA	For data centers, site-specific energy storage facilities must not exceed 30% of the gross floor area of the use. The energy storage facility must be located within the principal building or within a permitted accessory building. Alternately, the energy storage facility may be located on the roof of the principal building when fully screened from public view. All energy storage facility components and associated equipment must have required working space clearances, and electrical circuitry must be within weatherproof enclosures marked with the environmental rating suitable for the type of exposure in compliance with NFPA 70 - National Electrical Code. Energy Storage Facility Container Size. Containers housing energy storage equipment are limited to 900 square feet in size.

Jurisdiction	Power / Energy Usage Requirements
Warrenton, VA	All electric service lines from the substation to the data center shall be placed underground. The facility shall provide access to Town and County emergency services staff at all times.
Fauquier County, VA	Data Centers should be where existing infrastructure exists to support the development and should be located no further than 1 mile from an existing electric transmission line, with all new lines being placed underground. On-site solar and geothermal energy as well as other renewable sources are encouraged to be utilized to meet a portion of the development's energy requirements. Data Centers are encouraged to commit to a Power Usage Effectiveness (PUE) ratio of 1.5 or less and proffer such commitment. Buildings should be oriented to take advantage of passive cooling and daylight opportunities. Innovative technologies which reduce power consumption should be incorporated into the project's design. Heat generated by Data Center operations should be trapped and reused to the maximum extent possible. Rezoning applications are highly encouraged to clearly demonstrate, to the greatest extent possible, how electricity will be provided to accommodate the project's development, and how the project's overall power demand relates to the overall regional network. This should include any on or off-site need for a new substation, expansion of an existing substation, switching station, and/or any other electrical infrastructure. Rezoning applications should commit, through a voluntary proffer, to a maximum electrical load/demand for the entire development. Site Plan applications shall clearly demonstrate how electricity will be provided to accommodate the project's development.