

STAFF ANALYSIS

Data Center Regulation

REVIEW OF CURRENT REGULATIONS AND PROPOSED COMPREHENSIVE PLAN AND ZONING ORDINANCE UPDATES

HENRICO COUNTY PLANNING COMMISSION AND BOARD OF SUPERVISORS MAY 15, 2025

Prepared by:

HENRICO COUNTY PLANNING DEPARTMENT May 1, 2025

Introduction

Data centers are facilities that "host computer systems and their associated components to store, process, manage, and distribute large amounts of data"¹. These facilities can vary in scale, from servers located on-site to meet business requirements, to "hyperscale" sites that serve new data demands related to the use of artificial intelligence and cloud storage. The purpose of this paper is to examine those larger-scale facilities that are most likely to impact adjacent communities, rather than accessory data centers that generally have minimal impacts.

The Commonwealth of Virginia has become a popular location for the construction of data centers, primarily due to the availability of four undersea cables. This infrastructure is present in Henrico County, along with comprehensive water and sewer services, sufficient electrical capacity, and high-quality transportation access. These features have created an inviting environment for the development of data centers, with the county hosting 37 data centers of varying sizes. The majority of the larger facilities, such as QTS and Meta's, are located in the White Oak Technology Park. With recent rezoning approvals and plan of development applications, it is anticipated that the demand for these data services will grow within White Oak Technology Park as well as other industrial areas of the county. As the number of data centers has grown, both in Virginia and Henrico County, concerns over their impact on communities has risen.

The map below shows data centers in Henrico.



¹ https://www.nexcess.net/blog/types-of-data-centers/

Benefits of Data Center Development

Data centers involve substantial investments in real property improvements and machinery such as servers, which results in significant revenues for Henrico County. Data centers are also the backbone of the technology infrastructure that serves the larger economy. Additionally, the extensive requirements for new buildings lead to the creation of large numbers of construction jobs during the development of each site. For this reason, data centers were considered a target industry by the Henrico Economic Development Authority for several years, and the Board of Supervisors took steps to reduce certain tax rates to attract data center investment in the county.

The revenue from data center development has supported the establishment of the county's affordable housing trust². This funding allows additional access to homeownership opportunities for county residents and is one byproduct of the county's investment in infrastructure that supports data center development in White Oak Technology Park. Other initiatives supported by data center development include Solar Access Henrico, which is funded through commitments made as part of a data center rezoning approval.

The county's location along major telecommunication cables allows the recruitment of multiple data centers located on larger parcels, thereby minimizing negative impacts on the surrounding residents. The focus on White Oak Technology Park and other properties in the immediate vicinity, along with the county's zoning ordinance requirements, has allowed the growth of data centers and the resulting revenue while ensuring minimal direct impact to existing residents in the area. Recently, however, concerns have been raised regarding the number and scale of data centers under development, and it may be time to reconsider the zoning regulations.

Potential Impacts of Data Centers

Data centers provide services that are vital to the information technology needs of today's economy and can provide increased local revenues, with minimal impacts on demands for services such as public safety and schools. However, as evidenced in Henrico and elsewhere, there are concerns regarding data centers and their potential impacts on the surrounding communities. These concerns include energy use, water use, appearance, air quality, and noise. While local regulations and development standards can mitigate some of these community concerns, many issues can only be addressed through state or federal regulation, particularly in regards to energy consumption and air quality, which are monitored regionally.

² https://henrico.gov/news/2024/05/henrico-to-create-trust-to-enhance-access-to-affordable-homeownership/

Energy Use-

Data centers consumed about 4.4% of total electricity in the United States in 2023 and are projected to increase to approximately 6.7 to 12% by 2028³. In Virginia, it is estimated that data centers consume more than 25% of Virginia's energy⁴. When compared to commercial office buildings, data centers consume 10 to 50 times the amount of energy per floor space and a single data center can consume the same amount of energy as 50,000 homes⁵. The Joint Legislative Audit and Review Commission (JLARC) also estimated in their 2024 report to the Governor and General Assembly 'Data Centers in Virginia' that the unconstrained demand from data centers could add between \$14 to \$37 to all Virginians' monthly electricity bill by 2040⁶.

Water Use-

Previously, data centers used between 3-5 million gallons of water per day to cool their equipment, the same amount as a city with a population between 30,000 to 50,000 people⁷. Additionally, it is estimated that nearly 20% of data centers in the United States rely upon watersheds that are under moderate to high stress from droughts or other factors⁸. With advancements in technology, the draw on water resources has decreased. Information provided by the Henrico County Department of Public Utilities (DPU) indicates data centers in the county use approximately 0.5 to 1 million gallons per day (MGD) of water, out of 30-40 MGD used daily in the county. Henrico DPU has also noted the county will have the capacity to provide up to 130 MGD after the full completion of the Cobbs Creek Reservoir, and that data center development has not impacted utility rates or other infrastructure costs at this time.

<u>Noise-</u>

Data centers have the potential to produce a humming noise between 55 to 85 decibels⁹, the equivalent sound range of a household refrigerator and city traffic, respectively¹⁰. This noise is primarily caused by the internal server equipment and cooling system. Data centers also require backup power options, which may include diesel generators. For a small data center, less than 5,000 square feet, two to five generators may be required¹¹. In Virginia, the average data center site has 54 generators, although this number can vary based on the specific site¹².

³ https://www.energy.gov/articles/doe-releases-new-report-evaluating-increase-electricity-demand-data-centers

⁴ https://environmentamerica.org/virginia/articles/data-centers-could-derail-virginias-clean-energy-

progress/#:~:text=incredibly%20energy%2Dintensive.-

[,]Data%20centers%20already%20consume%20more%20than%2025%25%20of%20Virginia's%20electricity,data%20centers%20up%20even%20more.

 $^{^{5}\} https://computing.mit.edu/news/the-staggering-ecological-impacts-of-computation-and-the-cloud/$

⁶ https://jlarc.virginia.gov/landing-2024-data-centers-in-virginia.asp

⁷ https://www.nbcnews.com/tech/internet/drought-stricken-communities-push-back-against-data-centers-n1271344

⁸ https://www.npr.org/2022/08/30/1119938708/data-centers-backbone-of-the-digital-economy-face-water-scarcity-and-climate-

ris#:~:text=change%20exacerbates%20drought.-,

⁹ https://medium.com/clean-integration/designing-a-quiet-data-center-109f75526527

¹⁰ https://ehs.yale.edu/sites/default/files/files/decibel-level-chart.pdf

¹¹ https://www.techtarget.com/searchdatacenter/tip/Understanding-the-impact-of-data-center-noise-pollution

¹² https://jlarc.virginia.gov/pdfs/reports/Rpt598-2.pdf

This is less of an issue in the B-3 and O-3 zoned properties, as all equipment is required to be located within an enclosed building; however, it can pose intermittent impact on surrounding uses. Potential mitigation strategies include immersion cooling and liquid cooling which could reduce the need for fans in the cooling of data center equipment and improve heat dissipation efficiency¹³. Other strategies include requiring a noise study to be conducted to demonstrate whether the proposed data center complies with the locality's noise ordinance and limitations on the usage of diesel generators.

Air Quality-

Maintaining constant service of data center equipment at all times is a primary goal of such operations. Service loss during power outages can disrupt those using the data, which can have significant impacts on users such as hospitals and public safety agencies. To ensure operations continue, most data centers use on-site generators as a backup power source. JLARC examined impacts from such generators as part of their data center analysis, and found that these generators, while potentially harmful if run continually, are "a relatively small contributor to regional air pollution¹⁴." They additionally note that Virginia Department of Environmental Quality (DEQ) regulations set limits on when such generators can be run and for how long, and they have the authority to increase protections as needed.

Appearance-

Due to their mass and height, the appearance of data centers can cause potential impacts on adjacent uses such as residential communities. Screening, distance requirements, height limitations, and changes to the building facade can help mitigate potential impacts between data centers and adjacent uses.



Some localities have required that data centers comply with additional design guidelines to create breaks in the building facade through windows and doors. Additionally, to help mitigate potential impacts, some localities have included in their Zonina Ordinance distance requirements between data centers and existing residential developments, schools, and other uses as well as additional screening for exterior building equipment.

Example of a data center adjacent to an existing residential community in Prince William County, VA $^{\rm 15}.$

¹³ https://cc-techgroup.com/data-center-

noise/#:~:text=Immersion%20cooling%20and%20liquid%20cooling,also%20improve%20heat%20dissipation%20efficiency.

¹⁴ https://jlarc.virginia.gov/landing-2024-data-centers-in-virginia.asp

¹⁵ https://cardinalnews.org/2025/03/17/northern-virginia-has-more-data-centers-than-anywhere-else-in-the-world-heres-its-advicefor-southside/

Preliminary Impact Analysis-

To understand the potential impact of these various concerns in Henrico, the Planning Department performed an analysis of vacant industrially zoned parcels that were at least 15 acres in size to identify locations where large-scale data centers could be developed by-right in the county. Parcels with an improvement value of less than \$100,000 were also included. The locations of these sites are shown on the map 'Vacant Industrial Parcel Analysis'. As shown, there are many locations where data centers may be developed by-right in the county, including locations adjacent to existing residential developments.



In addition to industrial parcels, staff identified the locations of business-zoned parcels where data centers could be developed by-right if certain conditions are met, which are shown on the map, *'Henrico County Zoning'*, This map highlights parcels zoned Business District, Office District, and O/S Office/Service District where data centers are an allowed principal use. Because these zoning districts are typically located closer to residential development or are focused on serving the commercial needs of residents, it is appropriate to consider whether data centers should be permitted as the primary use in these areas. The map below shows the location of these various zoning classifications throughout the county.



Many of the parcels identified on the map above contain substantial improvements or are too small to accommodate large-scale data centers. To refine this review and identify if there are locations of business- or office-zoned properties where larger data centers could be located as a permitted use, an analysis was conducted for these properties similar to that performed for industrial sites. The map below identifies properties zoned for business, office, or office/service that are vacant (or with minimal improvements) that are at least 15 acres in size. These properties are those most likely to be available for data center development. As shown on the map, there are few properties in the county meeting these criteria, indicating there are minimal threats from such sites. However, because data center development can generally support higher purchase prices, redevelopment of other commercial sites should not be discounted.



History of Regulation

Henrico County

Before the 2021 rewrite of the county's zoning ordinance, data centers were not a listed use. Instead, they were classified as an office or warehouse use for zoning purposes. As a result, small data centers were developed in numerous locations throughout the county, mostly as accessory uses to large office buildings. Under the 2021 zoning ordinance, data centers are listed as a specific use type and are allowed as a principal use in all of the Office, Business and Industrial districts. Except for the Industrial districts, all equipment necessary for cooling, ventilating, or operation of the facility must be housed in an enclosed building where the use is located. This provision was intended to separate large-scale data centers, with their potential negative impacts, from smaller operations that are accessory to an office building or other use. While people often think of data centers as large buildings or campuses, the reality can be quite different. Smaller data centers, known as enterprise or onsite data centers, are operated by a company to support its own storage and computing needs¹⁶. If a data center is small enough to

¹⁶ https://www.nexcess.net/blog/types-of-data-centers/

incorporate all the mechanical equipment indoors, it should not have substantial off-site impacts. The Henrico County Administration Building, for example, has a small data center located within the Information Technology Department which is an accessory to the principal use as a government office.

During the review of large-scale data centers other ordinance standards, such as transitional buffer and neighborhood compatibility requirements, typically require extensive buffers at the perimeter of the data center sites when adjacent to residential or agricultural zoning. These standards have historically proved sufficient to minimize direct impacts on adjacent properties, as the county is unaware of significant complaints regarding facilities currently operating in areas such as White Oak Technology Park.

Other Jurisdictions

In researching data center development in Virginia, several localities' zoning ordinances and comprehensive plans were reviewed to determine if guidance could be provided by regulations adopted elsewhere. Below are several comparable localities and the details of how they define data center development, as well as use-specific limitations where appropriate.

Chesterfield County

Chesterfield County allows data centers by-right in three of their zoning districts: General Business District (C-5 District); General Industrial District (I-2 District) and the Heavy Industrial District (I-3 District). They are allowed in three additional districts with conditions: Community Business District (C-3 District), Regional Business District (C-4 District) and the Light Industrial District (I-1 District). Specifically, the conditions limit any outside utility infrastructure to a maximum of one generator, which may not exceed the greater of 200 square feet, or one percent of the gross floor area of the principal use; and the generator must be screened. Finally, data centers are allowed as a conditional use in the Agricultural District (A-1 District). Chesterfield defines data centers as:

Data Center: A facility used primarily for the storage, management, processing, and transmission of digital data, which houses computer and/or network equipment, systems, servers, appliances and other associated components related to digital data operations. A facility may also include air handlers, power generators, water cooling and storage facilities, utility substations, and other associated utility infrastructure to support the operations.

Data Services Office: A facility used primarily for the storage, management, processing, and transmission of digital data which is stored in a cloud and is accessible by a wide range of systems and devices. Such facility does not have outside air handlers, power generators, water cooling, storage facilities, utility substations and other outside utility infrastructure to support the operation.

Fairfax County

Fairfax County allows data centers in some commercial and industrial districts. Certain commercial districts, similar to our business districts, allow them by-right up to 40,000 square feet of gross floor area. Large data centers require the approval of a special exception. The same is true in most of their industrial districts; however, the by-right size limit is higher at 80,000 square feet of gross floor area, except in the most intensive industrial districts, I-5 and I-6, where there is no size limit. Fairfax defines data centers as:

Data Center Definition: 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.

Data centers are also subject to certain regulations as follows:

Screening-

- Cooling, ventilating and other equipment used to operate the facility, including generators, must be fully enclosed unless the Planning Director determines it is not mechanically feasible.
- Where not mechanically feasible, this equipment must be screened by a wall or similar barrier.
- If located on the ground, such equipment must be screened from view from abutting lots and street rights-of-way by a solid wall or building.

Distance requirements-

- Data center buildings must be located at least 200 feet from the lot line of any property zoned residential or used for residential purposes.
- Any equipment located on the ground that is used for cooling, ventilating or otherwise operating the facility, including power generation, must either be located at least 300 feet from the lot line of a residential district or property with a residential use, or separated from such property by the principal data center building.
- Distance requirements from residential districts and uses may be reduced by special exception. These requests should include items like changes in building height or other design techniques to provide variation in building mass as viewed from the nearby residential district.

Noise study-

• A noise study is required to demonstrate the data center will comply with the Fairfax County Noise Ordinance.

Architectural features-

• Where allowed by-right, certain architectural features are required, such as changes in building façade materials and the use of doors, windows or faux windows to break up the building expanse.

Loudoun County

Loudoun County recently amended its zoning ordinance to remove data centers as a byright use, requiring approval of a special exception by the Board of Supervisors. Plans of development for data center development that had been accepted prior to the Board's action were vested or "grandfathered" under the previous provisions of the Loudoun zoning ordinance. This enhanced typical standards, where approved plans of development are considered vested, but where plans that had merely been submitted would not have been. In addition to several design standards, Loudoun County requires a 200-foot setback for data center buildings, with the parking lots serving them to meet a 50-foot setback requirement. Loudoun defines data centers as:

Data Center Definition: 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.

Prince William County

Prince William County has a Data Center Opportunity Zone Overlay District that encompasses several of their office and industrial zoning districts. Within the overlay district, data centers are permitted by right in office and industrial zoning districts. Outside the overlay district, data centers are allowed by special use permit, with the exception of agricultural, residential and certain other districts where they are not permitted. Prince William County defines data centers as:

Computer and Network Services shall mean a use involving a building/premise in which a majority of the use is occupied by people and staff engaged in activities related to work that is focused on supporting computers and/or telecommunications and related equipment where information is processed, transferred and/or stored. This includes satellite dish facilities, internet service providers, network operations centers and web teleconferencing facilities, but shall not include a Data Center.

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.

Recommendations

This paper identifies benefits as well as several potential impacts from the development of data centers in Henrico County. While the construction and operation of data centers in Henrico has avoided impacts that have occurred in other jurisdictions due to their location, parcel size, and development requirements, it is anticipated that impacts could increase as new data centers are proposed and available sites become scarce. The identification of land most suitable for the development of larger data center facilities, as well as the evaluation of current ordinance requirements and comprehensive plan guidance, is important in ensuring residents are not negatively affected by this future development. Several possible ordinance and comprehensive plan amendments are discussed below. Consideration of these amendments could assist in reducing the potential for the impacts noted above.

Comprehensive Plan Amendment

The Technology Boulevard Special Focus Area would establish a specific vision and goals for the area containing the largest concentration of data center development in the county. The Special Focus Area Map should be amended to reflect the geographic boundaries of the study area as presented in this document. A specific vision and goals for the special focus area are proposed below.

Additionally, objectives and development guidelines for data centers throughout the county should be established and adopted as part of the 2026 Comprehensive Plan. These guidelines could be used in the evaluation of data center proposals outside of the Technology Boulevard Special Focus Area.

The general boundaries of the Technology Boulevard Special Focus Area would include the White Oak Technology Park and abutting properties south of I-64 zoned for industrial uses, which would include slightly less than 80 parcels totaling approximately 3,100 acres. In addition to updating the Special Focus Area Map, consideration could be given to amending the Future Land Use Map to reflect the recommendation for Planned Industry throughout the entire Technology Boulevard Special Focus Area. Once established, future data center development in the county should largely be limited to properties within the special focus area.

The map shown below shows the proposed Technology Boulevard Special Focus Area and encompasses parcels located within and abutting White Oak Technology Park.



The following are potential Vision, goals, objectives and guidelines to be added to the 2026 Comprehensive Plan.

Technology Boulevard Special Focus Area

Vision

The Technology Boulevard Special Focus Area is suitable for the development of data center uses, a defined targeted industry, while preserving key environmental resources, preserving cultural resources, and respecting surrounding residential development. The special focus area builds on the existing character of the White Oak Technology Park. New data center development in the special focus area should be constructed in a manner consistent with the existing high-quality development along Technology Boulevard and respecting the surrounding area. The large parcels within the special focus area provide additional areas for buffering, setbacks, and other mitigating features, and future development should incorporate these design standards into their plans. Where they exist, smaller parcels should be combined to support shared access, coordinated design and a planned layout.

Goals

One of the driving forces behind this Special Focus Area is the need to create an environment that capitalizes on the area's prime location and suitable infrastructure while also balancing the County's goals to respect existing development and encourage economic development to support the County's tax base. This ultimately promotes new uses serving the greater community to locate within the Technology Boulevard Special Focus Area and contributes to the continued growth of the county as a whole.

The focus area will have:

Goal 1: A focus on respecting existing residential development.

Goal 2: A vibrant industrial park with uses which support the tax base of the County in a manner allowing benefits to transfer to existing and future residents.

Goal 3: Adequate utilities provided prior to or in conjunction with new development.

Goal 4: Shared access for uses developed in a coordinated plan spanning large parcels to maximize areas for screening along roadways and adjacent to existing development.

Goal 5: Coordinated provision of pedestrian and bicycle facilities to serve new industrial development while connecting to surrounding areas and a countywide network.

Countywide Data Center Development Guidelines

Objectives

The following objectives will guide the county in review of data center development proposals throughout the county.

The county will:

Objective 1: Encourage large site planned industrial development which provides shared access to existing and future transportation networks. This includes enhanced pedestrian and other non-vehicular connections across collector roads, both major and minor, and connecting with the surrounding neighborhoods.

Objective 2: Examine the potential for the interpretation of cultural resources in addition to their preservation.

Objective 3: Enhance buffering along major roadways and along shared borders with existing residential development. Buffers could consist of both vegetative materials and earthen berms where appropriate.

Objective 4: Discourage major development near environmentally sensitive areas. This would include increased buffers to enhance the separation of both buildings and accessory uses from potential impacts.

Objective 5: Consider the use of environmentally friendly development strategies, such as the use of solar power generation, enhanced building efficiency requirements, and increased use of native species plantings.

Objective 6: Require the completion of noise studies prior to both the start of construction and the issuance of a certificate of occupancy.

Objective 7: Examine potential zoning ordinance amendments to restrict by right data center development outside the focus area.

Objective 8: Encourage the continued development of public pedestrian and bicycle facilities.

Objective 9: Encourage non-County controlled utilities to provide and maintain adequate services prior to or in coordination with new development.

Development Guidelines

In order to implement the Plan's vision for data center development, the following development guidelines are recommended. These guidelines will help ensure that the new industrial development is consistent with the quality of previous construction, while providing protection to the surrounding existing and future residential areas. The guidelines include general concepts and recommendations specifically oriented toward pedestrian travel, architecture, site design, open space, and residential properties.

1. Principal building façades. Principal building façades are any building façade that faces an adjacent public roadway. When a building has more than one principal façade, all principal building façades should be consistent in terms of design,

materials, details, and treatment. Principal building façades associated with new construction should meet the following standards:

- a. Principal building façades should avoid the use of undifferentiated surfaces by including at least two of the following design elements:
 - 1. change in building height;
 - 2. building step-backs or recesses;
 - 3. fenestration;
 - 4. change in building material, pattern, texture, color; or
 - 5. use of accent materials.
- 2. Screening of mechanical equipment. To minimize transmission of sound and visibility from adjacent roads and adjacent properties with residential uses, ground level and roof top mechanical equipment should be screened from public roadways, residentially zoned properties, adjacent properties with existing residential uses, or properties with a residential future land use recommendation. This screening may be provided by a principal building. Mechanical equipment not screened by a principal building should be screened by a screen wall or panel, parapet wall, or other visually solid screen which should be constructed of materials compatible with those used in the exterior construction of the principal building.
- 3. Buffers. A buffer of at least 100 feet to include vegetation equivalent to a TB50 should be utilized to screen the data center from adjacent residentially zoned properties, properties with a residential future land use recommendation, or adjacent properties with existing residential uses. The use of natural topography and preservation of existing vegetation should be the primary methods of buffering, but where that is not sufficient it could be supplemented by new vegetation or an earthen berm.
- 4. Fencing. Fencing of the property is permitted, provided that fencing along public or private streets should not be chain-link, with or without slatted inserts, and does not include barbed wire or other similarly visibly intrusive deterrence device. Fencing should also be located on one side of buffers and should not disrupt existing vegetation.
- 5. Substations. Substations should be screened from adjacent major roads or residentially zoned properties, adjacent properties with existing residential uses, or properties with a residential future land use designation through the use of opaque fencing and landscaped buffers.
- 6. Noise Studies. Prior to site plan approval, a noise study should be submitted. In addition, prior to issuance of a certificate of occupancy, a post-construction noise study should also be conducted to demonstrate to the Planning Director's satisfaction that the operation complies with any conditions or other legal requirements for the property.
- 7. Recommended setbacks. Any data center building should be located at least 200 feet from the lot line of adjacent residentially zoned properties, properties with a residential future land use recommendation or adjacent properties with existing residential uses.

Zoning Ordinance Amendments and Potential Overlay District

The Comprehensive Plan is the first step to delineate and direct the appropriate guidelines for data centers; however, based on the location and impacts of data center development, additional tools such as zoning ordinance amendments, should be considered to ensure these standards are applied throughout the county.

As noted above, Henrico County currently allows data centers as a principal use permitted by right in all Office, Business and Industrial districts, provided that, in office and business districts, mechanical equipment must be inside the building. Large-scale data centers, which require outdoor generators and other mechanical equipment, are allowed only in the Industrial districts. Given the significant impact of data centers on a community, including nearby residences, the County could consider taking steps to provide for greater oversight of future data centers and to minimize their impact on nearby residents.

Amendments should be targeted to address concerns raised regarding large-scale data center developments, rather than the accessory data centers that have demonstrated their ability to coexist with a variety of neighboring uses. These small, internal data centers should continue to be permitted by right as an accessory use in our Office, Business and Industrial Districts. Large, hyperscale data centers that can take up hundreds of thousands of square feet should be treated differently. For example, Phase 1 of Meta's data center was approved for 1,000,000 square feet of floor area and a similar facility closer to a residential community would have substantially different impacts than an accessory data center. For this reason, amendments could be adopted to clarify the distinction between data centers as a principal or accessory use.

Zoning Ordinance Amendments

To address these various aspects of data center development, consideration should be given to revising the zoning ordinance to better define data centers as a principal and accessory use, using the potential language and regulations described below.

Data Center

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.

Data Center as an Accessory Use

Definition:

A facility containing computer systems used for data storage and processing that is accessory to an office or industrial use on the same or adjacent premises.

Potential Overlay District and Provisional Use Permit Requirements.

For data centers as a principal use, consideration should be given to amending the ordinance to limit the location where such facilities are allowed by right. To be consistent with the recommended amendments to the 2026 Comprehensive Plan noted above, an overlay district could be established to encourage the focus of data center development to areas within the Technology Boulevard Special Focus Area, where many of our major data centers currently exist. Data centers could continue to be permitted by right within this overlay district, subject to conditions designed to minimize their impact, while those outside the overlay could require additional approvals such as a provisional use permit (PUP). This plan could allow the existing data centers in the special focus area to remain conforming with the zoning ordinance, while providing the additional protections recommended by this analysis and being consistent with actions taken by other localities in the recent past. As discussed above, Loudoun County recently amended their zoning ordinance to require a special exception for any new data center, while Prince William County requires one for any data center outside a special overlay district.

Henrico County could require a provisional use permit for any data center outside of the overlay district or if the data center is over a certain size. For data centers requiring approval of a provisional use permit, the design guidelines included in the proposed comprehensive plan amendment could be used to evaluate proposed developments. Use-specific standards, such as those listed below, could also be included in the zoning ordinance.

Data Center Use-Specific Standards:

- 1. All equipment necessary for cooling, ventilating, or otherwise operating the facility must be contained within an enclosed building or screened by opaque walls to minimize transmission of sound. This includes emergency power generators and other emergency power supply equipment.
- 2. Testing and maintenance of generators for a data center must be conducted only Monday-Friday between 10:00 am and 4:00 pm. This does not include the operation of generators during an emergency power outage.
- 3. A data center must be served by public water and sewer. Any water cooling must use a closed-loop or recycled water system.

Accessory Data Center Use-Specific Standards:

- 1. The accessory data center and the office or industrial use to which it is accessory must be located be on the same or adjacent premises.
- 2. All equipment necessary for operating the data center must be contained within an enclosed building or screened by opaque walls. This includes equipment for cooling and ventilating, as well as emergency power generators and other emergency power supply equipment.

Recommended Actions

As identified in this document, there are potential impacts from data centers on existing residents of Henrico County if additional regulatory steps are not taken. Possible solutions to mitigate those impacts have been recommended as part of this study. The Department of Planning recommends the Planning Commission and Board of Supervisors amend the Vision 2026 Comprehensive Plan and Zoning Ordinance to incorporate these guidelines and standards.