Task 4: Prepare Outline Version of Potential Additions or Changes to DCSM/Zoning Ordinance

The outline below includes a set of recommended updates to Prince William County's Zoning Ordinance and DCSM for data center development. These recommendations focus on minimizing impacts on sensitive zones and nearby neighborhoods, encouraging environmentally responsible practices, and establishing clear and transparent requirements for developers and the broader community.

The recommended changes prioritize protecting adjacent residential areas and enhancing the public-facing aesthetics of these facilities, ensuring the buildings are appropriately setback from residential areas and are designed to complement the surrounding office and industrial uses, where visible. At the same time, the strategy seeks to balance efficient development processes with thoughtful regulation, ensuring the County remains attractive to investors while prioritizing long-term community well-being, protection of its residential neighborhoods, and sustainable resource management.

Definition

A clear definition of data centers enables the County to better regulate these facilities as technology continues to evolve, allowing for review of accessory components that are essential for data center operation such as substations. This approach means that the County would be able to request detailed site layouts with applications for data centers, fostering thoughtful designs that aligns with zoning requirements and architectural standards while also helping mitigate potential conflicts with neighboring uses early in the planning process.

However, redefining data centers could present impacts to the County, potentially requiring a re-evaluation of existing permits and adding to the administrative burden. For the data center industry, stricter requirements resulting from this new definition could lead to higher compliance costs, requiring more upfront site and design work, prior to receiving preliminary approvals.

Existing Regulations	Proposed Regulations
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.	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 air handlers, water cooling and storage facilities, utility substations and infrastructure, back-up power generation, fire suppression systems, and/or enhanced security systems. Alternative power generation and other supplemental equipment may require additional approvals or special use permits, as applicable.
N/A	Provide new definition for alternative power generation: A system or facility that produces energy from other energy sources, including but not limited

	to nuclear and natural gas. This definition encompasses all structures, equipment, and technologies used to harness these energy sources for the purpose of generating electricity or thermal energy. Such facilities may require special use approval to be utilized in certain zoning districts and may be subject to certain safety parameters.

Separation and Buffers

The proposed changes to separation and buffer regulations aim to protect residential neighborhoods, parks, schools, and environmentally sensitive areas from potential impacts from data centers. These amendments will provide a physical separation that limits light pollution, noise, and visual impacts. In addition, the updated buffer requirements align with broader goals of sustainable and compatible land uses by separating these uses from water sources.

However, the new regulations may present challenges for both the data center industry and the County. Developers could face limitations on available land and increased construction costs, potentially making projects in the County less financially attractive when compared with other areas. For the community, while the new requirements may enhance environmental quality and limit impacts to residential areas, they could also limit economic opportunities for the County if developers seek jurisdictions with less strict regulations, potentially impacting investment in public services or increasing utility rates.

Existing Regulations	Proposed Regulations
School sites should be separated from industrial and commercial facilities, pollution, heavily traveled roadways, and other hazards.	Add language that data center properties shall be located at least 500 feet from the property line of any current or planned park or school sites.
Stream valleys, storm drainage areas, areas with a high water table, areas with excessively steep slopes, and areas encumbered by major utility lines are undesirable or unsuitable for general construction or park development. Playgrounds should be located where there are no dangerous areas or physical barriers.	A data center structure shall be located at least 100 feet from any floodplain, wetland, excessively steep slope, or perennial water body.
Minimal utility crossings can be included within a buffer area with the approval of the Public Works director.	Minimal utility crossings may be included within a landscape buffer area upon approval of the director of Public Works, as long as comparable performance standards are maintained. Any required crossings of buffer yards shall be designed to minimize impacts to the buffer yard.
In Office zoning districts, setbacks are as follows: 20' from ROW; 25' from side/rear property lines when abutting an agricultural or residential districts; In Industrial zoning districts, setbacks are as follows: 20' from ROW;	Increase front setbacks for all data center sites, and provide rear and side setbacks for other non-residential uses: 1. All data centers shall be set back at least 30 feet from any street right-of-way.

50' from side/rear property lines when abutting an agricultural or residential district.	2. All data centers shall be set back at least 15 feet from the side or rear of a lot when abutting another non-residential use.
	Data center buildings shall be located at least 200 feet from any residentially or agriculturally-zoned property or any property planned residential or agricultural. Substations and all mechanical equipment must be located at least 300 feet from any residentially or agriculturally-zoned property or any property planned residential or agricultural.

Architectural Standards

The goal of the proposed changes to architectural standards is to maintain security and privacy for data centers as well as the promotion of aesthetic harmony between data centers and adjacent uses. The regulations seek to minimize the visual impacts of data centers and foster visual interest through varied building design. This approach will create more pedestrian oriented and visually appealing buildings that are more similar in character to other office buildings.

These changes could lead to improved public perception of data centers and could increase the likelihood of future repurposing of data center buildings as an office or comparable use after a data center is decommissioned. However, these changes could increase construction costs and design complexity for operators, as they may require additional architectural design, more expensive building materials, and more intricate site layouts. The requirement to incorporate more windows into data center buildings could reduce the energy efficiency of buildings and increase operating costs. For the County, imposing additional architectural requirements could increase the complexity of the site plan and permit review processes, leading to administrative burdens and potential resistance from applicants.

Existing Regulations	Proposed Regulations
Allows for existing vegetation and the principle buildings to be used as screening. Allows for "Visually solid" screens. Only requires screening from major arterials, interstates, and abutting residentially zoned or planned properties.	Screening of all external mechanical equipment shall be required to be provided by opaque walls. Roof equipment shall be screened by parapets. All ground mounted mechanical equipment, including electric substations, shall be separated from adjacent residential or agricultural properties by a principal building or a minimum of 300 feet from any residentially or agriculturally-zoned property or any property planned residential or agricultural.
N/A	Buildings shall incorporate heat reflective roofing.
Fencing along streets cannot be chain link or barbed wire.	Fencing of the property is permitted, provided that fencing along public or private streets, or adjacent to residentially zoned property is not chain-link, with or without slatted inserts, and does not include barbed wire or other similarly

	visibly intrusive deterrence device. All fencing shall be a minimum of eight feet in height and shall be installed interior to any buffer. This fencing allowance does not relieve a property owner from complying with all fire and access code requirements.
Principal building facades shall include 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. For buildings with more than one principal facade, each principal facade shall be consistent in terms of design, materials, details, and treatment.	Principal building facades shall include all building facades that are visible from a public right-of-way. When a building has more than one principal facade, such principal building facades shall be consistent in terms of design, materials, details, and treatment. Principal building facades associated with new construction shall meet the following standards: 1. Principal building facades shall avoid the use of undifferentiated surfaces by including the following design elements: a. Change in building height; b. Building step-backs or recesses; c. Change in building material, pattern, texture, or color; or d. Use of accent materials. 2. Fenestration shall comprise at least 30% of the total surface coverage area of all principal facades. Fenestration shall be separated and distributed evenly vertically and horizontally across all principal facades.

Water Supply

One objective could be for the Prince William Board of County Supervisors to request Prince William Water (PWW) and UOSA to undertake a "Study" to extend reuse water to data center developments throughout the County, with requirements for data center (DC) developers to "participate" in the study and "obligate" offsite improvements, extensions and connection where water is proposed to be used for cooling equipment. This approach requires by-in from PWW, UOSA Boards as well as data center developers to share in the cost of the development of this alternative water source.

Other considerations may include requirements for onsite storage, treatment and reuse requirements of potable water sources for DC developments (303.11and 305.06). Currently there is no standard or ordinance associated with the development of a re-use water system, onsite storage or treatment of potable water in the County Code, zoning ordinance or DCSM. PWW and/or UOSA may have undertaken inhouse investigations into the cost and feasibility of this type of system, but the results and feasibility are not well publicized and the cost of infrastructure, environmental impacts, land acquisition, and construction may be exorbitant, outweighing the feasibility of a re-use water system alternative to potable water resources.

While Section 300 Water Systems of the DCSM and the Prince William Water Utility Standards Manual (PWW – USM) address the minimum requirements for the design and construction of water systems, we should consider adding a restriction under Subsections 401.01B and 450.00 Onsite

Private Wells, that DC developments are prohibited from using available groundwater resources; onsite and offsite water wells, to avoid depletion and contamination of groundwater resources.

This prohibition may also extend to the use of private wells for geothermal cooling systems, until such time as new technologies for geothermal cooling systems have proven to be a useful alternative to water cooling systems, without risking the contamination of our groundwater resources.

Subsections 501.01B and 550.00 Private Onsite Sewage Disposal Systems, could include a clause to prohibit the use of private onsite sewage disposal systems to serve DC developments *(even though it is unlikely DC developments would utilize onsite sewage disposal systems)* in the rural areas of the County.

Existing Regulations	Proposed Regulations
Private wells are allowed in developments located in the rural area.	Prohibit the use of onsite private water well systems to service data center developments.
	Consider requesting PWW and UOSA to undertake a "Study" to develop and extend a "re-use" water system for use by data centers throughout the County, requiring data centers to "participate" in the study and "obligate" offsite improvements, extensions and connections to be paid for by the DC developments.
Geothermal well systems	Consider restrictions on use of private groundwater wells to service geothermal cooling systems for data centers.
Water Use Study	Consider new requirements for all data center developments (and large scale water users) to submit a Water Usage Study for review and acceptance by Prince William Water prior to rezoning or site plan approval; identifying level of demand, maximum daily usage projections, best practices and water management strategies, cooling system design, potable vs non-potable water sources, recirculation and reuse, onsite pretreatment of effluent and water usage effectiveness.
	Considerations for onsite storage, treatment and re-use requirements of potable water sources for DC developments.
Onsite Sewage Disposal System	Prohibit the use of private onsite sewage disposal systems to service data centers.
N/A	Any potentially hazardous materials shall be stored at least 50' from any water source or water body, wetland, or stormwater facility. These storage areas are required to be shown during development process.
N/A	Require use of recycled water or air chillers for cooling where possible. Require as part of the water study to show impacts of potable water usage on local water supply.

Power/Energy

Power and energy usage are a huge factor in data center development. Data centers across the world today use roughly 1-1.5% of the total energy consumption of the world. As such, reasonable concern occurs over the use of energy within data centers and whether they are efficient and effective with the energy supply are commonplace. This section will review changes to standards for that energy usage, using research conducted on peer communities' regulations and our own research regarding best practices. There will be several impacts associated with this topic, namely lengthening review time and requirements, increasing the costs to develop these facilities, and increasing the knowledge needed by staff to review new data centers. However, the benefits of having a more secure grid and water supply, more environmentally conscious data centers, and better communities for the residents surrounding them outweigh these possible risks.

Existing Regulations	Proposed Regulations
N/A	All new power lines including distribution lines and substation and transmission feeder lines shall be placed underground.
N/A	Encourage the use of renewable energy. Allow for exemptions from height restrictions and maximum impervious coverage requirements specifically for renewable energy facilities.
N/A	Encourage commitment to a PUE (Power Usage Effectiveness, essentially a measure of how efficiently a data center uses its energy) of 1.5 or less.
	Require buildings to meet the standards of the LEED Certification (standard administered by US Green Building Council).

Site Layout and Building Configuration

The new requirements are designed to limit visual and noise impacts of data on communities surrounding data centers while at the same time promoting sustainability and aesthetics. This approach could result in a quieter, more visually appealing built environment.

For data center developers, these changes could reduce buildable land on appropriately zoned properties and limit developers' flexibility in site layout and design, potentially leading to increased costs and logistical challenges. These changes also risk slowing economic growth and limiting job creation, and as developers may be less inclined to locate data centers in the County. In addition, the County could face complications in the approval process, increasing regulatory burdens for data center projects. Developers may also need to allocate more resources to comply with the new requirements, impacting budgets and timelines.

Existing Regulations	Proposed Regulations
N/A	Mechanical equipment shall be oriented internal to the site, away from rights-of-way and/or adjacent residential properties.

	Screening of all external mechanical equipment shall be required to be provided by opaque walls. Roof equipment shall be screened by parapets. All ground mounted mechanical equipment, including electric substations, shall be separated from adjacent residential or agricultural properties by a principal building or a minimum of 300 feet from any residentially or agriculturally-zoned property or any property planned residential or agricultural.
Currently, depending on the district, 15-20% open space is required for data center developments. For commercial, industrial, and institutional developments 10% of the site is required to have tree canopy cover at 10-year maturity.	The current required open space percentage of a site shall be landscaped with 100% tree canopy at 10-year maturity. Tree canopy planting must be consistent with DCSM Section 802. The Director of Planning or designee may approve alternative compliance requests which meet the intent of this regulation. This may include changes to landscape layout, provided recreational amenities, or other environmentally positive proposals.
Data centers within the overlay district are allowed to have a greater Floor Area Ratio (FAR) than that of the underlying zoning district (up to 1.0 FAR) as long as all other requirements of the underlying district are met. Data centers outside the overlay may request an increase in FAR with a special use permit.	Remove Floor Area Ratio (FAR) as a development requirement.
N/A	Require detailed site plan, elevations and 3D renderings showing all buildings, infrastructure and mechanical equipment at the time of rezoning request or SUP review.

Bulk and Massing

The proposed changes address the visual and environmental impacts of data centers on nearby residential areas and other sensitive land uses. Requiring that maximum height be based on a data center's proximity to residential zoning helps to ensure that data centers are more compatible with neighboring properties.

However, these new height regulations may cause some existing structures to become nonconforming, which can be burdensome for data center operators when buildings require modifications and for staff tasked with future permit review and enforcement. For the data center industry, the more restrictive height requirements might impact development options and reduce the capacity of properties in the DCOZOD.

Existing Regulations	Proposed Regulations
The Board of County Supervisors may approve a greater maximum height for structures if the following standards are met: 1. Maximum height must be proffered by the applicant for a rezoning application and made a condition of approval for a Special Use Permit application; 2. The proposed height is more appropriate than rezoning to a different district where that height is permitted; 3. The proposed height won't have an adverse impact on nearby properties; 4. The Fire Marshal has certified that the proposed building can still be protected; 5. All other application/approval requirements have been met; 6. The proposed building won't be hazardous for aerial navigation.	Require data center developments to meet the maximum height limitations included within the Zoning Ordinance.
Maximum building heights range from 45 – 75 feet.	The maximum height for a data center building shall be linked to its proximity to residential and agricultural zoning. For example, within 400' of residential and agricultural zoning, the lowest height maximum is required, between 400' and 1000' a higher height maximum is allowed, and the highest height maximum is permitted for developments over 1,000' from residential or agricultural zoning.
N/A	A visual impact analysis is required for data center developments meeting the following criteria: 1. any height measured above 45' building height 2. within 500' of residential zoning districts, cultural, historical or natural resources identified by PWC. The analysis shall demonstrate project siting and proposed mitigation, if necessary, so that the facility minimizes impact on the visual character of the County. The applicant shall provide accurate, to scale, photographic simulations showing the relationship of the facility and its associated amenities and development to its surroundings. The photographic simulations must show such views of all structures from locations such as property lines and roadways, as deemed necessary by the County to assess the visual impact of the facility.

	Additionally, a statement regarding any site and viewshed impacts, including direct and indirect impacts to national or state forests and grasslands, national or state parks, County parks, wildlife management areas, conservation easements, recreational areas, or any known historical or cultural resources is required. Wetlands, rivers and streams, and floodplains must be inventoried, delineated, and mapped to provide baseline data for the evaluation of the current proposal. The inventory and mapping of floodplain shall not be construed to allow development within regulatory flood plain areas.

Substations and Generators

The proposed changes focus on minimizing the visual and noise impacts of substations and generators, enhancing compatibility with surrounding areas and addressing community concerns. Enclosing cooling units and generators will help reduce noise pollution and improve data center aesthetics, allowing facilities to better integrate with surrounding residential and commercial zones. Noise attenuation measures and visual barriers could lead to fewer complaints, fostering stronger relationships between data center operators and the community.

Nevertheless, these requirements may increase construction and operational costs for developers who may face restrictions on site layouts and higher costs for retrofitting or expanding existing facilities. The added costs and logistical challenges may lead some developers to consider alternate locations or delay new projects.

Existing Regulations	Proposed Regulations
Mechanical equipment must be screened from major arterials, interstates, and abutting residentially zoned/planned properties. Screening can be either a principal building or existing vegetation. If neither of those methods of screening or used, mechanical equipment must be screened by an opaque fence, screen wall or panel, or parapet wall that is made of materials similar with those used for the principal building. If mechanical equipment is found not to have an adverse impact on adjacent roads and properties, it doesn't need to be screened.	In order to minimize visibility from adjacent roads and adjacent properties, ground-level and rooftop 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. Mechanical equipment not screened by a principal building shall be located a minimum of 300 feet from any residentially or agriculturally zoned property and screened by an opaque wall or parapet wall, or other visually solid screen that shall be constructed with materials compatible with those used in the exterior construction of the building. Screening for rooftop mechanical equipment shall match that used in the exterior construction of the principal building. 1. Rooftop mechanical equipment shall be limited to and inclusive of the maximum height of the principal building.

	2. Ground-level mechanical equipment shall not be located in any required yard or required open space and located a minimum of 300 feet from any residential or agricultural property. 3. Screening of ground-level mechanical equipment shall be required to be at a minimum the height of the equipment.
Substations have to be screened from adjacent major roads (with the buffering and landscaping requirements of the DSCM) and from adjacent residentially zoned/planned properties (by a 10' tall opaque fence).	All mechanical equipment, both on ground and roof-mounted equipment, to include substations, shall be attenuated through sound mitigation measures.
N/A	All generators shall be equipped with mufflers to mitigate noise.

Construction

Section 600: Transportation Systems of the DCSM 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.

The requirements for a Traffic Impact Analysis (TIA) in the DCSM are set well below those required by state and VDOT codes, and data center developments typically generate less traffic from the development than industrial uses. Under Subsections 602.01 Traffic Impact Analysis (TIA), inclusive of 603.01 and 620.00, consider a requirement for data center developments to include construction and truck traffic analysis in their TIAs, when a TIA is required for the proposed development. This restriction would be beneficial to understand the impacts to roadways and existing intersections and turn lanes from construction vehicles associated with the data center development, would require DC developers to project construction vehicle trips, hauling and disposal routes and understand limitations of and impacts to existing roadways within the development area. Construction vehicle trips could also be understated or undetermined during the site development plan approval process, and likely not require offsite improvements or limit improvements to the site entrance(s).

Time-of-day restrictions for construction vehicles are already included in the Code. Consider reducing PM time before 10 PM and adding construction vehicle (hauling and disposal truck) restrictions after dark and require a Construction Truck Routing plan (including roadway routes, hours of operation, temporary pull-off areas, disposal sites, etc.) in conjunction with the site plan approval process.

Section 700: Environmental Systems of the Code includes design and construction standards for storm drainage, grading, stormwater management, floodplains, Chesapeake Bay preservation areas, erosion and sediment control and grading permits.

Subsection 750.03 Permits could include a provision that all data center and industrial development projects/owners submit a stormwater, erosion control and pollution prevention plan, including posting conservation escrows, and secure a grading permit for all temporary offsite hauling and disposal sites disturbing in excess of 2500 sf, *regardless of agricultural status*, prior to onsite and offsite grading activities. Tie this to Section 600 of the DCSM and the Zoning Ordinance and/or proffers to include the requirements for a construction truck routing plan and time of day restrictions.

In summary, the DCSM includes strict and relative design and construction standards that guide all development and reflect the local and state initiatives for sustainable development. Energy, water and sanitary sewer system design and development is guided by state and federal guidelines and operate under separate entities from Prince William County and therefore not subject to County guidelines and restrictions. Other relevant sections of the Code concerning noise, building and parking setbacks, buffering, screening and the Data Center Overlay District are discussed in further detail by other members of the team and included herein by reference.

Existing Regulations	Proposed Regulations
Traffic Impact Analysis	Requirement for data centers to include construction and truck traffic analysis in their TIAs
Erosion and Sediment Control General Policy	Expand 750.02C to include a provision that all data center projects/owners submit a stormwater, erosion control and pollution prevention plan; including posting conservation escrows and securing a grading permit for all temporary offsite hauling and disposal sites disturbing in excess of 2500 sf, regardless of agricultural status, prior to onsite and offsite grading activities.
N/A	Amend 750.01 A to include offsite borrow and disposal sites located in the Agricultural zoning district.
Erosion and Sediment Control Submission Requirements	Amend 750.01 A or add subsection 750.01 E to include that all erosion and sediment control plans submitted for offsite borrow and disposal sites used in conjunction with data center developments must consider reducing PM time before 10 PM and adding construction vehicle (hauling and disposal trucks) restrictions after dark and require a Construction Truck Routing plan (including roadway routes, hours of operation, temporary pull-off areas, disposal sites, etc.) in combination with the site plan approval.

Decommissioning/Electronic Waste

Planning is important in everything, especially at the end of a project's usefulness. What happens to a site and what is inside of it after it has ceased being what it has been is an important question that needs to be addressed ahead of time. As such, site decommissioning is important, even for data centers. While their use and expansion in today's world seem timeless and inevitable, the future cannot be predicted. These facilities are full of technology and potentially hazardous materials that would need to be dealt with if the site were no longer a data center. Using research into best practices, this section suggests steps to take during the development phase that look all the way to the end of the data center. This would include additional costs and review, as well as some additional staff expertise all for a plan that could never actually come to be, but the forward-looking approach and the way it can ensure the environmental security of the site long term is worth additional consideration.

Requiring compliance with Virginia Department of Environmental Quality (DEQ) standards addresses the significant e-waste generated by data centers. This requirement helps protect public health, prevents environmental contamination, and aligns data center operations with DEQ's goals. While ensuring safe disposal could increase operational costs and administrative burdens for data centers, the long-term benefits include a healthier environment and a positive impact on community well-being.

Existing Regulations	Proposed Regulations
N/A	Require a decommissioning plan be submitted during site plan review and reviewed by Prince William County's Public Works department to show how this site after it has ceased use will be returned to a neutral state, that is one that can be easily taken over by similar uses. Hazardous materials would need to be cleaned up and disposed of properly according to DEQ standards. E-Waste would need to be cleaned up according to DEQ standards.
N/A	All electronics recycling and disposal shall be done in accordance with the Virginia Department of Environmental Quality guidance and mandatory regulations concerning e-waste for businesses.