



County of Fairfax, Virginia

MEMORANDUM

DATE: Month Day, 2023

TO: Board of Supervisors

FROM: Larry Zaragoza, DEnv, Chair
Environmental Quality Advisory Council

SUBJECT: Recommendations for the Siting of Data Centers

Northern Virginia's data center boom has provided jurisdictions a low impact¹ tax windfall, but community concerns are growing. The review and updating of zMOD and associated ordinances provide an opportunity for Fairfax County to exert leadership in addressing resident concerns while facilitating the smart growth of data centers, where appropriate. This memorandum provides recommendations to both address concerns with data centers and to encourage data center developers to locate in Fairfax County.

EQAC believes that, should there be a desire to have data centers in Fairfax County, that the County should dictate reasonable design guidelines to mitigate community concerns. For this reason, EQAC recommends that data center siting decisions not be by right, which is allowed in a permitted zone as long as the planned development meets County/State standards, but rather contingent upon satisfying incorporation of mitigation measure to reduce impacts to the community.

The attached table includes EQAC recommendations, which are provided in the last column of the table. EQAC also recognizes that these mitigation measures may cost the data centers more to implement. Given the importance of community concerns, EQAC recommends that the County make approval of siting decisions contingent upon implementing recommended mitigation measures. EQAC recommends that the County adopt the following requirements for streamlining data center siting decisions:

1. The County should encourage clustered data center development into specific areas by providing offsite infrastructure, such as: fiber pathways, substations, enhanced access to water and sewer, grey water, biogas, or green power generation.
2. Since certain design enhancement will increase the cost of data centers, for those developers willing to incorporate design elements that mitigate community impact, the County might provide: density up to 1.0 FAR, height limits of 100', fast track approval

¹ Growth that does not require wider roads, more schools, hospitals.

process, two tiered tax valuations that delineate between long term real estate improvements and short term mechanical and electrical plant improvements, or even Tax Increment Financing (TIF).

If the County wishes to attract data centers to Fairfax County, EQAC expects that County provided incentives may be necessary. We recognize that such incentives will result in costs to the County, but it is our expectation that would be more than compensated by the taxes generated by the data center(s).

In addition, EQAC is encouraged by the prospects of using green hydrogen instead of diesel fuel for onsite power generation. However, the current technology used to convert hydrogen from water or natural gas does not produce sufficient excess power to support data centers of the scale currently under construction in Northern Virginia. However, there are promising advancements in conversion technology which would resolve that conundrum. Should such a system prove to be viable, the use of hydrogen for power generation would be strongly preferred over natural gas or other fossil fuels for backup power generation and other energy needs of data centers because there would be no carbon footprint.

EQAC further recognizes that County incentives will result in costs to the County, but it is our expectation that would be more than compensated by the taxes generated by the data center. EQAC also believes that siting data centers in urbanized areas is preferable to the use of greenfields, especially prime agricultural lands and productive forests. Thus, EQAC believes that there is significant value in addressing the impacts to the community. If the County wants data centers, then EQAC believe that the County should require data centers meet noise standards, provide green energy to power operations, and manage water to avoid negative impacts on drinking water aquifers, like the Occoquan.

EQAC appreciates that approving the siting of data centers in the County is likely to be controversial, but we also believe that the recommendations provided in this memo will improve the quality of life for residents, reduce environmental impacts and make the County more attractive to data center developers. We have consulted with Mr. James Coakley, Senior Managing Director of Next Tier HD, who has successfully developed many leading-edge data centers and knows the industry well to formulate recommendations to improve the likelihood that data centers will seek to locate in Fairfax County.

cc: Rachel Flynn, Deputy County Executive
John Morrill, Acting Director, Office of Environmental and Energy Coordination
Tracy Strunk, Director, Department of Planning and Development
Christopher Herrington, Director, Department of Public Works and Environmental Services (DPWES)
Bill Hicks, Director, Land Development Services (LDS)
Matthew Hansen, Director, Site Development and Inspections Division, LDS
EQAC

Topic	Concern	Mitigation Option	Data Center Perspective	EQAC Recommends
Noise	Diesel generators produce periodic noise and cooling towers and fans generate constant noise.	Establish a baseline decibel limit and performance circumference, (i.e., 30 dbi at 90 feet) and mandate developers to design to meet those performance guidelines	Operators may need to muffle and/or enclose generators to comply, or switch to alternative fuels, i.e. natural gas or hydrogen, or deploy low profile gas turbines or fuel cells instead. The mechanical equipment that is not already designed for sound attenuation should be screened as well, or isolated away from residential pockets.	Establish reasonable operating decibel levels and impact perimeter as a building permit condition. Provide screening and standoff guidelines.
Pollution	Diesel backup generators emit VOCs, NOx, and diesel particulates.	Natural gas for backup generators has less noise, no diesel particulates, and lower VOC/NOx emissions, hydrogen has neither.	DEQ already has attainment guidelines that limit emissions from generators, but few incentives for employing alternative fuels.	Provide incentives to deploy equipment that produces less VOC/NOx emissions than required by existing standards.
Green Energy	Data center appetite for green power competes with public/private sector objectives to meet carbon neutrality. Renewable power generation introducing its own stigma on communities	Green power demand and government incentives are accelerating a pivot away from carbon-based fuels while lowering cost of power.	Data center operators are deploying higher efficiency cooling and electrical power storage and generation equipment, micro grids and testing alternative power sources, i.e. hydrogen, nuclear in a bid to replace carbon based fuels.	Mandate data center operators who have not adopted carbon neutral policies to source 100% of their power from renewable sources. Encourage agreements with energy providers to highlight compliance with Virginia law on siting solar

				farms that impact more than 50 acres of forest or 10 acres of prime agricultural land.
Cooling	Increasing freshwater salinization trends can negatively impact streams, lakes, and other water bodies that support aquatic life as well as drinking water supplies. While no direct link between increasing salinity from data centers and increasing salinity levels has been established, managing salt from all sources will be important to protective drinking water aquifers, especially the Occoquan. Older evaporative cooling plants utilized high concentrations of salts as biocides, which had the potential to elevate saline levels in local reservoirs. Water	Avoid salt-based biocides or reduce concentration before releasing to service authority. Deploy less water dependent cooling alternatives (i.e., adiabatic cooling, or air-based DX (cooling) units).	Since 2010, Data center design avoided water centric cooling by locating in latitudes that offered more ambient cooling. The move away from waterside cooling accelerated as demand increased in Arizona, Texas and California. The newer designs require fewer chemical additives while reducing water demand by up to 95%	Require older data centers to pretreat water prior to releasing to service authority. Provide access to grey water. Reduce taxes on equipment proven to save water Because some applications may require evaporative cooling, new data centers should be subject to restrictions if they are unable or unwilling to deploy alternative technologies.

	demand from aquifers is lowering hydrostatic pressure along Eastern seaboard which is allowing sea levels to infiltrate aquifers as well.			
Aesthetics	The spike in land values has forced data centers to grow vertically, which increases their visibility. Designs are typically windowless, tilt up structures with limited aesthetics	Developers can either introduce articulated facades to soften appearances, or screen buildings with berms and landscaping.	Developers are already employing setbacks for security purposes, but few are adequately screening campuses. The design approach of making a 100' tall cement box beautiful is a challenge that many are addressing for marketing purposes, but rarely for neighborhood acceptance.	Establish setback and landscaping metrics on the height of proposed structures. Promote LEED design, encourage variations in façade.
Infill	As the digital revolution progresses, data centers will need to be increasingly urban, and various urban improvements, such as gas stations, parking lots and strip malls will lose relevance to digitization.	These “edge” data centers will be approximately 100,000 sf and can be sited on former gas stations, or sited within a surrounding development similar to how parking lots are wrapped inside a multistory residential development.	As land becomes scarce, and demand pushes closer to population, developers will pursue infill opportunities. There are already urban alternatives that have worked, but zoning and building regulations have yet to anticipate how to best introduce these buildings into inner urban clusters.	Grant height relief for infill urban locations, encourage redevelopment on obsolete improvements, elevate noise mitigation standards, collaborate on the introduction of micro grids or clean power generation in lieu of diesel fired generator.

Infrastructure	Data centers stand out and do not fit with the character of neighborhoods.	Screening with trees may help but data centers look different.	Data centers require transformer substations, fiber cables, electricity, and other needs so that co-locating facilities is helpful. Because 24-foot floors are needed, reuse of existing buildings may not be feasible.	Co-locating data centers will reduce the impacts to neighbors. The high cost of land may require that multi story buildings if the County wants to attract data centers.
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