



County of Fairfax, Virginia

MEMORANDUM

DATE: June 14, 2023

TO: Fairfax County Board of Supervisors

FROM: Larry Zaragoza, DEnv, Chair *Larry Zaragoza*
Environmental Quality Advisory Council (EQAC)

SUBJECT: Recommendations for the Siting of Data Centers

While Northern Virginia's data center boom has provided jurisdictions a local tax windfall, many data centers pose significant impacts on energy consumption, water, noise, and other areas. The review and updating of the Zoning Ordinance and associated ordinances provide an opportunity for Fairfax County to exert leadership in addressing concerns and examining whether and where data center siting is appropriate. This memorandum provides recommendations to both address concerns with data centers and the environmental impacts the county should consider in policies to manage data center siting. We hope that these comments will be helpful to in reviewing requirements for data center siting.

EQAC believes that, should there be a desire to have data centers in Fairfax County, that the county should dictate redesign guidelines to mitigate community concerns. EQAC recommends that data center siting decisions be contingent upon satisfying incorporation of mitigation measure to reduce impacts to the community.

The attached table includes concerns, mitigation options, data center perspectives, and EQAC recommendations. EQAC 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 in streamlining data center siting decisions:

- EQAC recommends that the siting of data centers should be limited to areas designated for data center development and consider providing offsite infrastructure, such as: fiber pathways, substations, enhanced access to water and sewer, grey water, biogas or green power generation.
- While some data centers are providing renewable energy to power their operations, we understand many data centers are not providing renewable energy to power their operations and the high use of electricity could easily threaten our ability to achieve

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carbon neutrality goals. As such, EQAC recommends that data centers be required to provide green/renewable energy to power their operations.

- Given the significant water consumption of water by data centers, EQAC recommends that evaporative cooling be prohibited for data centers, especially new data centers, unless a regional water-supply study indicates the cumulative water demands of data centers does not endanger the regional water supply.
- Given the concern for water consumption by data centers, EQAC also recommends the Board of Supervisors convey to the Fairfax County Water Authority its desire that wholesale water customers outside of Fairfax County not be permitted use such water for data evaporative center cooling.

The types of conditions recommended for the siting of data centers should ideally be provided across the state. In the absence of adoption of statewide adoption of the recommendations, various jurisdictions that seek to site data centers within their jurisdiction will be at a competitive disadvantage with other jurisdictions that may not include these conditions. As such, the protection of the environment and resident interests may require some county incentives to attract data centers to the county. 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).

Because meeting the expectations of the county will increase the cost of data centers, the county should expect data centers to seek concessions from the county (so that the county will be competitive with other jurisdictions).

Many of the community and environmental concerns can be addressed with an adequate permitting process that addresses the concerns associated with data centers. Some company leaders that own data centers have made commitments to be carbon neutral and sometimes water neutral in the future. Moreover, some data centers have purchased green energy to power their operations and taken other steps to better the community and the environment. Other local government organizations have established ordinances and processes to limit the siting of data centers to specific areas and provide other controls so that many of the concerns that are of concern in Fairfax County can be addressed.

In summary, EQAC recommends that the county establish responsible standards for data centers that protect the environment and communities. Given that technology evolves with time (e.g., cooling technologies that employ water), these standards should be reviewed at least every five years. The standards for data centers should be clear and consistently implemented. You, the Board, has the ability to undertake a Special Exception Review whenever you deem appropriate, but we would recommend that Special Exception Reviews be kept to a minimum.

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, address environmental concerns and assist data center owners in determining if they want to be located in Fairfax County. In crafting these recommendations, 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 that are both feasible and that data centers are more likely to accept.

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

Attachment: Examples to Mitigate the Impact of Data Centers

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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 db 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 operating decibel levels, such as 30 db, and impact perimeter as a building permit condition. Provide screening and standoff guidelines. Noise levels to be met 24/7.
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.	Virginia Department of Environmental Quality 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. Tier 2 diesel generators near residential areas should be prohibited.
Green Energy	Data center appetite for green power competes with public/private sector objectives to meet carbon neutrality. Renewable power generation	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,	Require 100% of power from renewable sources. Encourage agreements with energy providers to highlight compliance with Virginia law on siting solar farms that impact more

	introducing its own stigma on communities.		nuclear in a bid to replace carbon-based fuels.	than 50 acres of forest or 10 acres of prime agricultural land.
Cooling	The high water consumption of data centers that use evaporative cooling could threaten the region’s water supply. 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.	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%	Given the high water consumption and concentration of salts and minerals, prohibit the use of evaporative cooling unless it is clear that their water use will not threaten the regional water supply, from either availability or impacting salt/mineral levels.

	Also, water 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 attractive is a challenge.	Establish setback and landscaping metrics on the height of proposed structures. Promote LEED design, encourage variations in façade.
Infill	As the digital revolution progresses, we expect data centers will be increasingly urban, and reuse of various current uses, such as gas stations, parking lots and strip malls.	Infill data center development will likely be challenging to mitigate because there may be little space to provide distance buffers and the building height needed to make a center viable in that location may pose a conflict with the skyline of the area.	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.	Data centers, especially hyperscale data centers should be sited in cluster, not infill development.
Infrastructure	Data centers require transfer substations, fiber cables, reliable electricity, which may include backup generators, and other	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.	Co-locating data centers will reduce the impacts to neighbors. The high cost of land may require that multi story buildings to make

	needs. Because 24-foot floors are needed, reuse of existing buildings may not be feasible.			construction of data centers competitive with other counties.
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