Recommendations for Additions to the Critical Data Infrastructure (CDI) Ordinance

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Recently there has been substantial information published concerning localized environmental problems and area-wide societal impacts due to the concentration of large datacenters installed in Northern Virginia and Arizona communities. Frederick County policies such as preparing the county for extreme weather events caused by climate change, reducing the county's carbon footprint, and maintaining mandated air and water quality standards should be invoked when welcoming large-scale datacenters. CDIs are heavy users of power and water as well as are both direct and indirect emitters of high levels of greenhouse gasses (GHG).

Datacenters require huge amounts of electric power for their operation. The projected Quantum Frederick power demand at full buildout is 1250 MW or the equivalent power of a large nuclear power plant. Additional datacenters built on newly rezoned land will require hundreds more megawatts. Transmission lines suspended from huge towers will need to bring the power from generators outside Frederick County.

We believe that data centers are inevitable in the County and provide a plus for the economy through collected funds for badly needed infrastructure, schools/education, and social services. Hence, we support the development of these centers with appropriate safeguards in place to protect residents, existing private and public properties, and the natural environment that defines Frederick.

Based on our current knowledge concerning potential constraints on electric grid capacity and the time required to build new large generating plants and major transmission lines, we believe the County will need to determine the number of large CDI facilities that can be accommodated while satisfying the growing need for more electric power in Frederick County. We note that the county is already prioritizing the electrification of transportation and buildings.

An additional, vitally important complication is the recent announcement by PJM[2] that the large number of large power plant retirements and power load increases during the past few years has created the possibility of widespread electricity shortages during high-demand periods. In Virginia, datacenter operators have already requested an exception to the Clean Air Act to run high-GHG-emitting diesel generators during high-load days, not just during complete grid outages, jeopardizing air quality, increasing emissions, and substantially exacerbating noise for residents.

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[2] PJM is the organization responsible for managing the supply of almost all the electricity used in Maryland, DC, and 12 other states, and for operating the high-voltage transmission grid that transports that electricity from the generating plants to the large number of local distribution utilities (e.g., Potomac Edison) that transport power via lower-voltage lines the rest of the way to each individual electricity user in their defined service territories.

Frederick County is now faced with the consequences of this new phenomenon. How to manage residential growth combined with the electric power and water requirements of datacenters? How to avoid subjecting the population to power interruptions and even prolonged blackouts and resulting health threats from frequent and/or lengthy operation of emergency diesel generators? It must be noted that both the datacenters and the largest expansion of home building will be concentrated in the southern portion of the County. The County will face many challenges to maintain its air and water quality and to ensure sufficient power is available throughout the County.

Moreover, this power supply cannot be interrupted to maintain the operation of the banks of computer servers within the datacenters. When a power interruption occurs, banks of diesel generators must activate to meet the power requirement. These diesel generators produce highly polluting exhaust which collectively creates smog as well as increasing CO2 emissions that now govern our local to global heat and precipitation extremes. Smog contains concentrations of toxic gases that with the direct effects of elevated CO2 on heat and air quality can cause severe respiratory illnesses. Moreover, efforts to control climate change, a county commitment within the last year, means that fossil fuel power plants are no longer desirable to fill the shortfall in available power.

An additional problem arises because the County Noise Ordinance makes no attempt to prevent the "avalanche of potentially deafening noise[3]" that will occur when every one of the multitude of emergency generators located at all the datacenters located in and near the QL property begin operating if a power outage simultaneously occurs at all of them. This event is highly unlikely, but each datacenter has decided that it is sufficiently likely that they need to invest a great deal of money to prevent datacenter shutdown. The ordinance does not even require the datacenter to estimate the magnitude of the "loudness" of the noise at off-site location where children and infants may be when it occurs at full force with zero warning.

Stormwater management and maintaining a sufficient water supply are currently addressed within Public Works and OSER within the County. However, stormwater management is directed through the state's MDE using regulations established prior to the new climate of extremes we now face and hence are inadequate for the huge center masses and impervious areas of each site. The intense, frequent precipitation events now common to Frederick County easily overcome shallow, lined stormwater ponds mandated by MDE for our karst geology, thereby discharging as highly erosional point sources into our floodplains and streams.

County droughts are common in our past as well, threatening wells of neighborhoods surrounding the massive centers so designing appropriate flow paths for recharge from center areas is important to the livelihood of nearby farming residents. In addition, projected water demand for cooling datacenter computer equipment Quantum MD is currently 5 million gallons a day (mgd) of non-potable water with the coolant water returned to the county facility for treatment. Back-up storage (5 days) should be mandated to alleviate any drought-induced water shortages for the new centers. Whether the 5 mgd is sufficient for all datacenters for the area is a

[3] The noise level is likely to create incurable deafness in children and infants who are exposed to it.

serious concern and should be addressed in any future data center legislation. Frederick County must now promulgate new regulations to meet these challenges.

The first Priority: Withhold further permitting until the Current CDI Ordinance and the Noise Ordinance are revised.

The Site Plan for the first of four datacenters by Aligned Data Centers was narrowly approved by the Planning Commission on May 10, 2023. This was with substantial reservations from some Commissioners. They expressed the wish that the County Council quickly revise the existing ordinance to expand criteria to include sustainable actions on the new datacenter construction.

We believe the review of the next phase of the application should not go forward until the CDI Ordinance has been revised ensuring that the environmental-protection omissions that occurred at datacenter construction in Northern Virginia are not repeated here. We can learn from of the power-constrained electricity demand brought on by high-density CDI facilities and competing requirements for electricity-use by other existing power customers, preventing other new projects from moving forward.[4]

To facilitate a balanced approach, we are suggesting the following additions to the CDI Ordinance:

1-19-11.100 DEFINITIONS.

Electrical Emergency: An occurrence in which the datacenter is not receiving power from the electric grid due to a fault of the utility system or datacenter electrical equipment. To provide electricity to critical functions, emergency power from generators could be supplied in microgrids composed of on-site solar collectors and batteries. Diesel generators may only be used during electrical emergencies when on-site renewable power is depleted. Additionally, renewable power systems may be employed at any time to reduce emissions.

Emergency Generation Equipment: Solar-, battery, or microgrid powered generators as a priority, diesel generators as a secondary option.

p. 5, B (4)

Add, “Screening should be large native trees and shrubs if space accommodates their use, with long-term maintenance and care guaranteed through watering. Replacement with mature plants must occur within 90 days should screening plants perish.”

[4] The very real possibility that a widespread electricity shortage will occur in Maryland, DC, ad Northern Virginia should be taken seriously. To avoid the possibility of County Government officials being accused of failing to proceed cautiously, the CDI Regulation document should require applicants to submit a statement from PJM confirming that the power required by the applicant can delivered without impairing PJM’s ability to deliver the power required to satisfy resident, public and private property, commercial enterprises, and industry as well as data centers in future peak power demand in Frederick City and County.

B (5) Change “Architectural Committee” to “Engineering and Architectural Committee” or “CDI Review Committee” to be clear that more than architecture is under consideration.

B (6) i. [MAY BE MORE APPROPRIATE ON Section D. Performance Standards]

To prevent stormwater runoff onto adjacent privately owned non-center properties, 100 ft riparian buffers of native trees and shrubs should be placed between any digital center and those properties. The buffers must be maintained with living plants and should flooding of adjacent properties occur, centers will expand the buffers with additional width and plantings to prevent stormwater penetration into adjoining properties. [Current I and j become j and k, respectively]. Any damage to an adjacent property must be covered by data center ownership.

B (7) Parking areas should be screened with native trees and shrubs so as to be invisible from adjacent properties. Parking areas should be covered, and solar panels and arrays installed, maintained, and connected to center battery storage units (microgrid) as a partial emergency energy supply during external electric transmission failure. Require preservation of existing trees as well as reforestation of 10% of the site footprint to further mitigate GHG emissions. Require that site lighting design minimizes light pollution (i.e., light the ground, not the sky). A heat-island analysis should be performed and submitted for review.

Add B (11) or insert as B (10) and change current B (10) to B (11)

Water Management - Datacenters shall:

a. Construct and maintain water, other liquid or similar coolant, or air supplies for routine operations of center digital computing, including use of greywater for water-cooled center installations.
    1. For water cooled centers, contracted supplies of greywater from center-constructed sealed pipelines from County facilities must be established to provide sufficient coolant for all daily operations. Using sealed pipelines, greywater must be returned to the County facilities for treatment and re-supply to the center with all expense for supply and treatment met by center ownership, including funding for any future increase in needed capacity or treatment at the facility.
    2. For water cooled centers, centers must build and maintain water (greywater, stormwater) storage facilities that can provide 5 days of coolant for center operations.
b. For centers cooling digital infrastructure with other coolants, 5 days of coolant storage must be maintained at all times. If the coolant is toxic, costs for treatment of the coolant is the responsibility of center ownership and will only be assumed by the County with center ownership funding for treatment. Should a spill or unexpected discharge occur on site, centers must within 24 h notify the County and MDE and bring in appropriate licensed hazard treatment companies and staff to collect and remove the toxic material. Following removal, monthly shallow (3’) and deeper (15’) groundwater testing at the site and within 0.1 miles of the spill should be conducted until no contaminants are detected, with all costs assumed by center ownership. If contaminants are detected >0.1 miles from the spill, monthly groundwater monitoring should be expanded from the spill area to a distance where

no contaminant is found. Stormwater collection and discharge is under MDE regulation with the following additions:

1. All discharges from MDE-mandated lined stormwater ponds must be diffused on entering the local riparian buffer, floodplain, or creek; point source discharge into these areas is not permitted.
2. On passage of new MDE regulations on stormwater discharge for the new climate, all centers will upgrade previously built stormwater management structures to comply with the new technology with all costs assumed by center ownership.

c. Should water supplies from wells in adjacent private properties no longer provide contaminant-free or pre-center water volumes following center construction, center ownership will cover costs of new wells and water supplies sufficient to meet existing needs of the impacted property.

d. D (1) b. In addition to measuring sound pressure from one source of generation, the cumulative maximum sound pressure levels permitted from all sources measured within an adjacent property line, shall be determined by testing and reported during the permitting process.

e. D(4) Center ownership must establish an escrow account equal to 20% of the site's assessed value for 1) upgrades to County water treatment capacities or contaminants derived from data center operations, 2) fiscal resources adequate to replace water supplies (wells, delivery) for neighbors whose wells no longer provide water or are contaminated with data center products, and 3) end-of-life site restoration, with funds dedicated to center pad removal, building demolition and disposal, liquid and solid excavation and disposal, and any other site treatment to return the area to its pre-digital center condition.

f. Due to datacenter's huge block structures and extensive impervious campuses, stormwater runoff is a major threat to surrounding land, wells, and adjacent properties. Sufficient safeguards to protect erosion of buffers, floodplains, and streams from pipe discharges from required lined stormwater ponds shall be constructed prior to operation.

g. The drilling of any wells at the site should either be prohibited or else be tightly regulated and routinely monitored by the County to ensure that the output from nearby existing wells will not be adversely affected.

h. Should water supplies from wells in adjacent private properties no longer provide water following CDI construction, or become contaminated from operations, CDI ownership will cover costs of new wells and water supplies sufficient to meet existing needs of the impacted property.

i. Long-term site practices

    1. For centers located in a county watershed, long term monitoring program, funded by datacenter corporations will be established. Baseline sampling will begin prior to datacenter construction with a minimum of two stations above and below datacenter areas. Replicate water and sediment samples will be collected using standard EPA protocols and include quantitative assessments of total suspended solids (TSS), total nitrogen (TN), total phosphorus (TP), temperature, dissolved oxygen (DO), chlorophyll *a*, phycobilins, and any coolant compounds identified.

2. Algae and macrophyte areal coverage of the bottoms of flowing waters will be assessed using photographic documentation of plant material in cross-stream transects. Grab samples of flowing waters and bottom plant material will be returned to the laboratory for taxonomic identification of taxa to the lowest practical level. Data from stations above and below a center location or area will be compared using appropriate statistical techniques with annual reports prepared for distribution to the Engineering and Architectural Review Committee and county staff and officials to inform possible recommendations of discharge alternatives.

3. Each datacenter corporation shall establish an escrow account or other similar fiscal reserve for site restoration to conditions prior to datacenter construction.

j. No datacenter may store, bury, or discharge datacenter generated waste on site. Any solid, liquid or liquid-transported materials must be captured and removed by a licensed contractor for treatment at a registered location.

E. **Electrical Power Supply– Datacenters shall:**

a. Include in each datacenter's 20-year power contract a percentage of renewable power (wind and solar). Percentages of renewable power should be negotiated to increase over time as more renewable power becomes available on the PJM system. Each CDI facility shall submit power contracts guaranteeing adequate power supply prior to obtaining permits to operate.

b. To reduce the volume of additional greenhouse gas (GHG) emissions resulting from high electricity usage at the site (both that supplied from the power grid and that supplied by onsite fuel-burning generators), require that: 1) at least 10% of this annual usage be supplied from solar collectors (located both on the roof(s) of building(s) at the site and at off-site locations), and 2) on-site battery storage systems be used to provide at least 25% of backup power generation[5]

c. To protect the viewshed, any new or additional transmission lines crossing through the Sugarloaf Treasured Landscape area should be installed underground.

d. To offset emissions caused by diesel generator testing and running chillers and cooling fans continuously, employ greenhouse gas reducing measures such as solar collectors above employee parking lots, installing charging stations for employee cars, funding parkland or conservation measures such as community solar or other initiatives as may be suggested by Frederick County Division of Energy and Environment (DEE).

e. Ensure that all diesel fuel containers and fuel-transfer piping have design features that prevent any fuel leakage into the soil in the event of possible earthquakes or impact

[5] Batteries have three significant advantages over diesel-fueled engine-generators~~:~~ -- they are: a) are much quieter, b) more efficient because they will be charged by solar generation during the day and the electric grid at other times, c) pay their way over time by providing ancillary services to the grid (e.g., helping to both provide power and maintain grid frequency very close to 60 Hz.) and d) batteries are faster at quick start than diesel or gas generators.

from debris projectiles created by tornadoes or the high winds produced by hurricanes, which are likely to occur in Frederick County in coming years.

f. Specify the use of diesel generations for emergencies only when the power grid or on-site microgrid are not able to provide the required electrical power.
g. Specify limits on the amount of CO2 emissions allowed per CDI within quarterly or monthly timeframes, including emissions during periodic diesel generator testing.
h. Specify a limit with regard to on-site fuel storage volume.
i. Each CDI facility shall have procedures and protocols for mitigating fuel spills.