

AGENDA
JAMES CITY COUNTY BOARD OF SUPERVISORS
REGULAR MEETING
COUNTY GOVERNMENT CENTER BOARD ROOM
101 MOUNTS BAY ROAD, WILLIAMSBURG, VA 23185
September 9, 2025
5:00 PM

A. CALL TO ORDER

B. ROLL CALL

C. MOMENT OF SILENCE

D. PLEDGE OF ALLEGIANCE

E. PRESENTATIONS

1. VACo Achievement Awards Presentation - Dean Lynch, Executive Director, VACo

F. PUBLIC COMMENT

G. CONSENT CALENDAR

1. Dedication of the Streets in Section 2B of the Landfall at Jamestown Subdivision

H. PUBLIC HEARING(S)

1. ORD-24-0002. Amendments to the Zoning Ordinance Regarding Data Centers
2. ORD-25-0003. Amendments to the Zoning Ordinance Regarding Pedestrian and Bicycle Accommodations
3. An ordinance to amend and re-ordain various provisions of Chapter 3, Animal Laws.
4. SUP-25-0004. 4622 Rochambeau Drive Evolution House Group Home
5. Farming Lease with Riverside Farm, Inc.

I. BOARD CONSIDERATION(S)

J. BOARD REQUESTS AND DIRECTIVES

K. REPORTS OF THE COUNTY ADMINISTRATOR

L. CLOSED SESSION

1. Consideration of a personnel matter, the appointment of individuals to County Boards and/or Commissions, pursuant to Section 2.2-3711(A)(1) of the Code of Virginia
 - a. Appointment - Williamsburg Regional Library Board of Trustees
 - b. Appointment - Virginia Peninsula Community College Board

2. Discussion or consideration of the acquisition of real property for a public purpose, or of the disposition of publicly held real property, where discussion in an open meeting would adversely affect the bargaining position or negotiating strategy of the public body; specifically, a parcel of real property situated in the Berkeley District along Jamestown Road, pursuant to Section 2.2-3711 (A)(3) of the Code of Virginia
3. Discussion of the award of a public contract involving the expenditure of public funds, and discussion of the terms or scope of such contract, where discussion in an open session would adversely affect the bargaining position or negotiating strategy of the public body, pursuant to Section 2.2-3711(A)(29) of the Code of Virginia, and pertaining to the contract for the joint operation of schools between the County and the City of Williamsburg.
4. Certification of Closed Session

M. ADJOURNMENT

1. Adjourn until 1 pm on September 23, 2025 for the Business Meeting

MEMORANDUM

DATE: September 9, 2025

TO: The Board of Supervisors

FROM: Toni E. Small, Director of Stormwater and Resource Protection Division

SUBJECT: Dedication of the Streets in Section 2 of the Landfall at Jamestown Subdivision

Attached is a revised resolution requesting acceptance of the streets in Section 2 of the Landfall at Jamestown Subdivision which are proposed as public rights-of-way into the State Secondary Highway System. The streets proposed for acceptance are William Tankard Drive and Edward Harrington Road. The previous resolution had an error on the reference code and is a SSR acceptance not a SSAR acceptance. The streets have been inspected and approved by representatives of the Virginia Department of Transportation (VDOT) as meeting the minimum requirements for secondary roadways.

VDOT's Subdivision Street Requirements (SSR), effective January 2005, outline processes on how streets are designed, constructed, and officially accepted for maintenance as part of the Secondary System of State Highways. Upon the satisfactory completion of construction of streets, VDOT advises and coordinates with the local governing body of the street's readiness for acceptance through the use of VDOT's Form AM-4.3. As part of the initial acceptance process, the County Board of Supervisors must request, by resolution, that VDOT accept the street for maintenance as part of the Secondary System of State Highways. Administrative procedures outlined in the 2005 Subdivision Street Requirements §§ 33.2-705 lists criteria for street acceptance and what information is required on the local resolution. Once the resolution is approved, the signed Form AM-4.3 and the resolution are then returned to VDOT. VDOT then officially notifies the locality of the street's acceptance into the Secondary System of State Highways and the effective date of such action. This notification serves as the start of VDOT maintenance responsibility. As part of the process, the County will hold an appropriate amount of subdivision or public improvement surety for the roadway, as required by local Ordinances, until the acceptance process is complete. Also, within 30 days of the local governing body's request (resolution), VDOT requires a maintenance surety to be posted by the developer to guarantee performance of the street for one year from the date of acceptance.

Staff recommends the adoption of the attached resolution.

TES/ap
DedStSec2Lndfll-mem

Attachment

RESOLUTION

DEDICATION OF THE STREETS IN SECTION 2B OF THE

LANDFALL AT JAMESTOWN SUBDIVISION

WHEREAS, the streets described on the attached Virginia Department of Transportation (VDOT) Form AM-4.3 for Section 2B of the Landfall at Jamestown Subdivision, fully incorporated herein by reference, are shown on plats recorded in the Clerk's Office of the Circuit Court of James City County, Virginia; and

WHEREAS, the Residency Administrator for VDOT advised the Board that the streets meet the Subdivision Street Requirements (SSR) of VDOT; and

WHEREAS, the County and VDOT entered into an agreement on July 1, 1994, for comprehensive stormwater detention, which applies to this request for addition; and

NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of James City County, Virginia, hereby requests VDOT to add the streets described in the attached VDOT Form AM-4.3 for Section 2B of the Landfall at Jamestown Subdivision to the Secondary System of State Highways, pursuant to § 33.2-705 of the Code of Virginia and VDOT's SSR.

BE IT FURTHER RESOLVED that the Board guarantees clear and unrestricted rights-of-way as described and any necessary easements for cuts, fills, and drainage.

BE IT FURTHER RESOLVED that a certified copy of this resolution be forwarded to the Residency Administrator for VDOT.

James O. Icenhour
Chair, Board of Supervisors

ATTEST:

		VOTES			
		<u>AYE</u>	<u>NAY</u>	<u>ABSTAIN</u>	<u>ABSENT</u>
	NULL	_____	_____	_____	_____
	HIPPLE	_____	_____	_____	_____
_____ Teresa J. Saeed	MCGLENNON	_____	_____	_____	_____
Deputy Clerk to the Board	ICENHOUR	_____	_____	_____	_____
	LARSON	_____	_____	_____	_____

Adopted by the Board of Supervisors of James City County, Virginia, this 9th day of September, 2025.

MEMORANDUM

DATE: September 9, 2025

TO: The Board of Supervisors

FROM: Christy H. Parrish, Zoning Administrator

SUBJECT: ORD-24-0002. Amendments to the Zoning Ordinance Regarding Data Centers

At its meeting on March 11, 2025, the Board of Supervisors (the “Board”) adopted an Initiating Resolution to consider an amendment to the James City County Zoning Ordinance (the “Ordinance”) to address data processing centers (“Data Centers”) in certain districts (Attachment No. 4). As stated in the adopted Initiating Resolution, the Planning Commission was directed to forward its recommendation to the Board before September 2025.

Background

Data Centers are facilities which store, manage, and process digital data. Data Centers usually are large warehouse buildings that house computers, network equipment systems, servers, appliances, and other components related to the operation of digital data. As technology evolves with artificial intelligence or generative AI (“AI”), the demand for data storage is heightened. Examples of AI that use large amounts of data are applications such as [ChatGPT](#), [Google Gemini](#), [Apple Intelligence](#), and [Microsoft CoPilot](#).

Data Centers are not defined in the Ordinance and are permitted by-right in the M-1, Limited Business/Industrial; M-2, General Industrial; MU, Mixed Use; and EO, Economic Opportunity Districts. Additionally, the RT, Research and Technology District permits Data Centers as an accessory use; however, there is no land in the County currently zoned RT. Furthermore, Data Centers are considered warehouses for the storage of computing machines and their related hardware and are exempt from *Section 24-11(a)(2) Special use permit requirements for certain commercial uses, exemptions* of the Zoning Ordinance, and does not require a special use permit.

Data Center Impacts

Data Centers produce a variety of impacts, both positive and negative. Positive impacts include, but are not limited to, additional tax revenue, low traffic generation, and no demand on schools. The Joint Legislative Audit and Review Commission⁽¹⁾ reports:

- *Data centers provide positive benefits to Virginia’s economy mostly because of the industry’s substantial capital investment.*
- *Data centers employ fewer employees than some other industries, but data center jobs tend to be high paying.*
- *Localities with Data Centers can collect substantial tax revenues from the industry, primarily from business personal property and real property (real estate) taxes.*

¹ JLACR - Joint Legislative Audit & Review Commission - Report on Data Centers
<https://jlarc.virginia.gov/landing-2024-data-centers-in-virginia.asp#:~:text=Overall%2C%20the%20data%20center%20industry,materials%20for%20data%20center%20construction.>

Negative impacts include, but are not limited to, visual impacts, energy consumption, water consumption, noise, waste, and air emissions.

Visual

The size of Data Center buildings can range from several thousand to hundreds of thousands of square feet and may resemble generic industrial warehouse buildings. These buildings are usually one or two stories and can range between 60-70 feet in height. It is important to note that the current Zoning Ordinance limits the height of buildings, including any rooftop mechanical equipment, in non-residential districts to 60 feet unless a waiver is granted by the Board of Supervisors. The buildings have flat roofs to accommodate the compressors needed for the cooling systems. Security fencing and exterior lighting to secure the building may also be a visual factor. As with any generic industrial warehouse building, creating a building design to complement the surrounding community and screening of these overlarge buildings can often be challenging.

Energy Consumption

Data Centers consume large amounts of electricity. The Department of Energy estimates that Data Centers used approximately 4.4% of the total U.S. electricity in 2023 and it is expected to use between 6.7% to 12% of the total U.S. electricity by 2028⁽²⁾. The online publication *Data Center Knowledge* reports that small Data Centers (5,000-20,000 square feet) usually consume 1-5 MW of power, and larger or hyperscale Data Centers (100,000 to several million square feet) can consume 20 MW to over 100 MW of power. The Joint Legislative Audit and Review Commission⁽³⁾ reports that the Data Center industry presents additional financial risks to electric utilities and their customers because of the sheer size of the industry's energy demand.

Water Consumption

Data Centers use either air- or water-based cooling systems to keep the servers and equipment cool when in operation. Air cooling systems draw more energy and use less water while water-based cooling systems use more water and less energy. Water-based cooling systems primarily use potable water to prevent corrosion and/or damage to the servers and equipment. Water consumption for a cooling system varies due to the type of technology being used and the outdoor or seasonal temperatures. Prince William County reports that the average daily water usage for a single building Data Center is about 18,000 gallons per day while the maximum daily consumption is about 88,000 gallons per day. For comparison, an average four-person household uses 360 gallons per day.

Air Quality

Data Centers rely on large generators for power backup. Diesel-fueled generators emit air pollutants including nitrogen oxide and carbon monoxide. The Virginia Department of Environmental Quality requires an approved air permit for all backup generators and limits the allowable emissions, and they are required to be monitored to help protect air quality⁽⁴⁾.

² U.S. Department of Energy - DOE Releases New Report Evaluating Increase in Electricity Demand from Data Centers; December 20, 2024 <https://www.energy.gov/articles/doe-releases-new-report-evaluating-increase-electricity-demand-data-centers>.

³ JLACR - Joint Legislative Audit & Review Commission - Report on Data Centers <https://jlarc.virginia.gov/landing-2024-data-centers-in-virginia.asp#:~:text=Overall%2C%20the%20data%20center%20industry,materials%20for%20data%20center%20construction>.

⁴ Virginia Department of Environmental Quality - Data Center Air Permit Guidelines <https://www.deq.virginia.gov/home/showpublisheddocument/27424/638730560921170000>.

Noise

Data Centers produce continuous noise. The noise is generated from the cooling systems (fans and chillers), electrical transmission lines, generators, and other equipment. This noise is typically a constant humming or buzzing sound. The amount of noise generated from Data Centers depends on size, location, distance to property lines, and time of day.

Waste

Data Centers produce e-waste. E-waste consists of discarded old servers, storage devices, network switches, etc. that contain hazardous materials such as lead, mercury, and other chemicals. It is imperative that e-waste is disposed of properly to reduce potential environmental and health risks.

Regulations in Other Localities

Data Center regulations vary among localities ranging from creating an overlay district to allowing them by-right or by requiring a Special Use Permit (SUP) or special exceptions. Established performance standards may be included in Ordinances as well. Other localities have, or are in the process of, creating a Data Center Policy to address siting criteria, site design, building design, utilities, and public outreach. The following are some examples:

Note: There are approximately 300 Data Centers scattered across Loudoun County, Fairfax County, and Prince William County.

Fairfax County

- Permits Data Centers that are less than 40,000 square feet of gross floor area by-right in two commercial districts.
- Permits Data Centers that are less than 80,000 square feet of gross floor area by-right in four industrial districts.
- Data Centers exceeding the size thresholds noted above require a special exception.
- All Data Centers are subject to performance standards which address screening, noise, and building design.

Prince William County

- Created a Data Center Opportunity Overlay District which includes several office and industrial areas. Data Centers are permitted by-right in this Overlay District and must comply with performance standards.
- Data Centers require an SUP in other districts except agricultural and residential districts, which do not permit them.

Loudoun County

- Requires a special exception in the General Industry, Industrial Park, and Mineral resources/Heavy Industry Districts.
- Planners are working on establishing a policy guidance document and use-specific zoning standards for Data Centers and utility substations to address concerns related to land use, compatibility, aesthetics, infrastructure, and natural and environmental resources.

Albermarle County

- Data Centers up to and including 40,000 square feet of gross floor area are permitted by-right in industrial districts.
- Data Centers larger than 80,000 square feet require an SUP in industrial districts.
- Requires an SUP in commercial districts.

- Adopted supplementary regulations requiring that Data Centers be served by public water and sewer, and cooling systems that must be either closed-loop or recycled water systems, and generators.

York County

- Permits Data Centers as a specially permitted use in the Economic Opportunity, Limited Industrial, and General Industrial Districts.
- Requires certain performance standards to be met which include:
 - Requiring a letter from the electric utility of sufficient proximity and availability to substation and transmission lines;
 - Requiring a letter from the water purveyor to indicate sufficient capacity to serve the proposed Data Center and to require water conservation methods (rainwater harvesting, water recycling, etc.);
 - Setback of 200 feet from all property lines and 500 feet from any residential dwelling;
 - Noise standards;
 - Architectural standards; and
 - Addressing fire and life safety guidelines.

Proposed Changes

Uses listed in each Zoning District of the James City County Code are either permitted by-right or permitted by SUP. The SUP process allows the Planning Commission and the Board to consider whether a proposed establishment will adversely affect the health, safety, or welfare of persons residing or working on the premises or in the neighborhood; will impair the character of the district or adjacent districts; will be incompatible with the Comprehensive Plan of James City County; will likely reduce or impair the value of buildings or property in surrounding areas; and whether such establishment or use will be in substantial accordance with the general purpose and objectives of the Ordinance.

Based on the Initiating Resolution (copy attached), recommended changes to the existing Zoning Ordinance will be heard by the Board in September 2025.

Staff presented materials to the Policy Committee at its June 12, 2025, meeting, which included (1) defining Data Center; (2) remove data processing center as a permitted use from the M-1, Limited Business/Industrial; M-2, General Industrial; MU, Mixed Use; and EO, Economic Opportunity Districts; (3) consideration of adding Data Centers as a permitted use only when adhering to certain criteria and performance standards in the M-2, General Industrial District; and (4) consideration of adding Data Centers as a specially permitted use in the EO, Economic Opportunity District.

After discussion, the Policy Committee voted 4-1 to recommend the following proposed changes to the Planning Commission:

- Addition of a new definition for Data Center to Section 24-2, Definitions.
- Removal of data processing center as a permitted use from the M-1, Limited Business/Industrial; M-2, General Industrial; MU, Mixed Use; and EO, Economic Opportunity Districts.
- Addition of Data Centers as a specially permitted use in the M-2, General Industrial; and EO, Economic Opportunity Districts.
- Recommendation that the Board of Supervisors direct staff to develop a comprehensive Board policy for Data Center facilities to identify best practices with regard to policies and regulations.

The Policy Committee discussed concerns that Data Centers serve large corporations located elsewhere and not directly to the local community and generate unknown electrical consumption and demands on Dominion Energy, and therefore, the Committee would like to encourage Data Centers to incorporate edge computing which brings data processing and storage closer to the systems that generate the data.

Planning Commission Changes and Recommendation

Staff presented the proposed Ordinance recommended by the Policy Committee to the Planning Commission at its July 2, 2025, meeting. Upon discussion, the Commissioners decided to exclude Data Centers in the EO, Economic Opportunity District as these areas in this district and the areas designated on the Comprehensive Plan as Economic Opportunity were in close proximity to established residential areas and that the use was not consistent with the intent of the district.

The Planning Commission voted 6-1 to recommend the following proposed changes to the Board of Supervisors:

Approval of an Ordinance to:

- Add the proposed definition for Data Centers to Section 24-2, Definitions.
- Remove data processing center as a permitted use from the M-1, Limited Business/Industrial; M-2, General Industrial; MU, Mixed Use; and EO, Economic Opportunity Districts.
- Add Data Centers as a specially permitted use in the M-2, General Industrial District.
- Recommendation that the Board direct staff to develop a comprehensive Board policy for Data Center facilities to identify best practices with regard to policies and regulations.

Recommendation

Staff has updated the draft Ordinance to reflect the Planning Commission's changes and included a list of suggested best practices for Data Centers to be considered for a Board policy (Attachment No. 3) if directed.

Staff recommends that the Board of Supervisors approve the attached draft Ordinance and direct staff to develop a comprehensive Board policy for Data Center facilities to identify best practices with regard to policies and regulations for a future meeting.

CHP/ap

ORD24-2AmdDataCtrs-mem

Attachments:

1. Ordinance (Strikethrough Version)
2. Ordinance (Clean Version)
3. Suggested Best Practice for Data Centers
4. Initiating Resolution
5. James City County Zoning Maps
6. Locality Data Center Comparison
7. Joint Legislative Audit and Review Commission - Report on Data Centers
8. Citizen Correspondence

ORDINANCE NO. _____

AN ORDINANCE TO AMEND AND REORDAIN CHAPTER 24, ZONING, OF THE CODE OF THE COUNTY OF JAMES CITY, VIRGINIA, BY AMENDING ARTICLE I, IN GENERAL, SECTION 24-2, DEFINITIONS; AND BY AMENDING ARTICLE V, DISTRICTS, DIVISION 11, LIMITED BUSINESS/INDUSTRIAL DISTRICT, M-1, SECTION 24-411, USE LIST; DIVISION 12, GENERAL INDUSTRIAL DISTRICT, M-2, SECTION 24-436 USE LIST; DIVISION 15, MIXED USE DISTRICT, MU, SECTION 24-518 USE LIST; AND DIVISION 17, ECONOMIC OPPORTUNITY DISTRICT, EO, SECTION 24-536.4 USE LIST.

BE IT ORDAINED by the Board of Supervisors of the County of James City, Virginia, that Chapter 24, Zoning, is hereby amended and reordained by amending Article I, In General, Section 24-2, Definitions; and by amending Article V, Districts, Division 11, Limited Business/Industrial District, M-1, Section 24-411, Use list; Division 12, General Industrial District, M-2, Section 24-436 Use list; Division 15, Mixed Use District, MU, Section 24-518, Use list; and Division 17, Economic Opportunity District, EO, Section 24-536.4 Use list.

ARTICLE I. IN GENERAL

Sec. 24-2. Definitions.

Data center. An establishment or facility used for the storage, management, processing, and transmission of digital data, which may include the housing of computer and/or network equipment systems, servers, appliances, and other associated equipment or components related to digital data operation. Supporting equipment may include, but not limited to, back-up batteries and power generators, air handlers, water cooling and storage facilities, utility substation, and other associated utility infrastructure to support operation. This definition does not include server rooms or information technology infrastructure that is accessory to the principal use of the site. Further, this definition does not include an establishment or facility used to mine cryptocurrency.

Division 11. Limited Business/Industrial District, M-1

Sec. 24-411. Use list.

Reference section 24-11 for special use permit requirements for certain commercial uses and exemptions.

In the Limited Business/Industrial District, M-1, buildings to be erected or land to be used shall be for one or more of the following or similar uses:

Use Category	Use List	Permitted Uses	Specially Permitted Uses
Commercial Uses	Data processing centers	P	

Division 12. General Industrial District, M-2

Sec. 24-436. Use list.

Reference section 24-11 for special use permit requirements for certain commercial uses and exemptions.

In the General Industrial District, M-2, buildings to be erected or land to be used shall be for one or more of the following or similar uses:

Use Category	Use List	Permitted Uses	Specially Permitted Uses
Commercial Uses	Data processing centers	P	
Industrial Uses	<u>Data centers</u>		<u>SUP</u>

Division 15. Mixed Use District, MU

Sec. 24-418. Use list.

In the mixed use districts, all structures to be erected or land to be used shall be for one or more of the following uses:

Use Category	Use List	Permitted Uses	Specially Permitted Uses
Commercial Uses	Data processing centers	P	

Division 17. Economic Opportunity District, EO

Sec. 24-536.4. Use list.

In economic opportunity districts, all structures to be erected or land to be used shall be for one or more of the following uses:

Use Category	Use List	Permitted Uses	Specially Permitted Uses
Commercial Uses	Data processing centers	P	

James O. Icenhour, Jr.
Chair, Board of Supervisors

ATTEST:

Teresa J. Saeed
Deputy Clerk to the Board

HIPPLE
NULL
LARSON
MCGLENNON
ICENHOUR

VOTES

AYE NAY ABSTAIN ABSENT

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_____	_____	_____	_____

Adopted by the Board of Supervisors of James City County, Virginia, this 9th day of
September, 2025.

ORD24-2AmdDataCtrs-ord

ORDINANCE NO. _____

AN ORDINANCE TO AMEND AND REORDAIN CHAPTER 24, ZONING, OF THE CODE OF THE COUNTY OF JAMES CITY, VIRGINIA, BY AMENDING ARTICLE I, IN GENERAL, SECTION 24-2, DEFINITIONS; AND BY AMENDING ARTICLE V, DISTRICTS, DIVISION 11, LIMITED BUSINESS/INDUSTRIAL DISTRICT, M-1, SECTION 24-411, USE LIST; DIVISION 12, GENERAL INDUSTRIAL DISTRICT, M-2, SECTION 24-436, USE LIST; DIVISION 15, MIXED USE DISTRICT, MU, SECTION 24-518, USE LIST; AND DIVISION 17, ECONOMIC OPPORTUNITY DISTRICT, EO, SECTION 24-536.4, USE LIST.

BE IT ORDAINED by the Board of Supervisors of the County of James City, Virginia, that Chapter 24, Zoning, is hereby amended and reordained by amending Article I, In General, Section 24-2, Definitions; and by amending Article V, Districts, Division 11, Limited Business/Industrial District, M-1, Section 24-411, Use list; Division 12, General Industrial District, M-2, Section 24-436, Use list; Division 15, Mixed Use District, MU, Section 24-518, Use list; and Division 17, Economic Opportunity District, EO, Section 24-536.4, Use list.

ARTICLE I. IN GENERAL

Sec. 24-2. Definitions.

Data center. An establishment or facility used for the storage, management, processing, and transmission of digital data, which may include the housing of computer and/or network equipment systems, servers, appliances, and other associated equipment or components related to digital data operation. Supporting equipment may include, but not limited to, back-up batteries and power generators, air handlers, water cooling and storage facilities, utility substation, and other associated utility infrastructure to support operation. This definition does not include server rooms or information technology infrastructure that is accessory to the principal use of the site. Further, this definition does not include an establishment or facility used to mine cryptocurrency.

Division 12. General Industrial District, M-2

Sec. 24-436. Use list.

Reference section 24-11 for special use permit requirements for certain commercial uses and exemptions.

In the General Industrial District, M-2, buildings to be erected or land to be used shall be for one or more of the following or similar uses:

Use Category	Use List	Permitted Uses	Specially Permitted Uses
Industrial Uses	Data centers		SUP

Suggested Best Practices for Data Centers

Data center applicants will be expected to demonstrate that the location, size and height of buildings, structures, walls and fences and the nature and extent of screening, buffering and landscaping are such that the data center use will not hinder or discourage the appropriate development and/or use of adjacent or nearby land and/or buildings or impair the value thereof.

- **Size:** Individual buildings may not exceed 80,000 square feet of gross floor area.
- **Setback:** All structures and associate ancillary equipment shall be located more than 500 feet from any existing dwelling or residentially zoned property line at the time of construction.
- **Electrical Demands:** A letter from the electric utility purveyor indicating sufficient proximity and availability to a substation and transmission lines to serve the proposed Data Center shall be submitted to the Director of Planning. Any new utilities for the Data Center shall be placed underground as required in Section 24-200. The closest point of any data center should be located within two miles of an existing transmission line within the County or an adjoining locality. Any generation lead lines or electrical lines to connect noncontiguous portions of a facility and/or leading to a facility's substation or point of interconnection should be located underground. For the purpose of this policy, the recommended distances shall be measured from the building wall of the data center. Applications for data centers should identify existing electric distribution or transmission infrastructure that may need to be upgraded for the facility.
- **Water Source and Demands:** Data Centers shall be connected to a public water system. The use of wells for water supply is prohibited. A letter from the public water purveyor indicating sufficient capacity to serve the proposed Data Center shall be submitted to the Director of Planning.
- **Noise:** All equipment used for cooling and backup generators shall be contained within an enclosed building or shall be attenuated through sound mitigation measures including, but not limited to, sound muffling materials and shall be screened by a wall or a similar barrier approved by the Director of Planning. Generator testing shall be limited to weekdays between 8 a.m. and 5 p.m.
- **Fencing:** All fencing shall be black vinyl coated and shall be limited to 8 feet in height unless otherwise approved by the Director of Planning. Barbed wire fences are not permitted.
- **Building Design:** Primary building facades shall have a neutral color palette, incorporate overhangs and variation in massing and scale, and shall be approved by the Director of Planning.
- **Screening:** All components of the Data Center shall be screened from any public right-of-way and adjacent properties with a minimum 50-foot-wide vegetated buffer internal to the property lines. Existing vegetation shall be retained to the greatest extent possible and supplemented as necessary with additional native plantings to meet the requirements of Section 24-96 of the County Code, except that the required evergreen tree and shrub mixture shall be increased from at least 35% to at least 45%. An inventory of existing vegetation in the buffer areas shall be provided in the site plan for the purpose of verifying the quantity of existing vegetation.
- **Emergency Management Plan:** Prior to final approval of any site plan, an Emergency Management Plan shall be prepared and approved by the County Fire Chief and County Police Chief or their designees to address situations that may require response from James

Suggested Best Practices for Data Centers

City County public safety personnel, including, without limitation, fire safety and emergency response personnel.

- **Storage of Equipment:** Damaged or outdated equipment, such as, but not limited to computer servers, storage devices, network switches, etc. that contain hazardous materials such as lead, mercury, and other chemicals, shall not be stored on-site unless they are within a fully enclosed hazardous material and chemical storage container that meets Occupational Safety and Health Administration and Environmental Protection Agency standards, as determined by the County Fire Chief or designee. The location of such storage container, if used, shall be shown on the approved site plan. Should such a storage container not be used or available, a written plan shall be provided on how damaged equipment will be stored or processed such that hazardous materials will not come into contact with any soil or groundwater or surface water. Such a plan shall be subject to the approval of the Director of the Stormwater and Resource Protection Division prior to final site plan approval.
- **Decommissioning Plan:** Prior to final site plan of the facility, a Decommissioning Plan (the "DP") shall be submitted to the Director of Planning or designee for review and approval. The DP shall outline the process for the disposal of equipment, such as, but not limited to computer servers, storage devices, network switches, etc. that contain hazardous materials such as lead, mercury, and other chemicals in accordance with environmental regulations. To ensure sufficient funds are available to the County to conduct the DP, a surety in an amount sufficient for decommissioning the Facility shall be posted with James City County in a form acceptable to the County Attorney. The decommissioning agreement shall be executed prior to approval of a site plan for the Facility.
- **Economic Returns:** Data Centers should provide for economic returns beyond those which could otherwise be anticipated for a given property.

RESOLUTION

INITIATION OF CONSIDERATION OF AMENDMENTS TO THE ZONING ORDINANCE

TO ADDRESS DATA PROCESSING CENTERS

WHEREAS, the Code of Virginia § 15.2-2286 and County Code Section 24-13 permit the Board of Supervisors of James City County, Virginia (the "Board"), to, by resolution, initiate amendments to the regulations of the Zoning Ordinance that the Board finds to be prudent; and

WHEREAS, the Board is of the opinion that the public necessity, general welfare, and good zoning practice warrant the consideration of amendments to the Zoning Ordinance.

NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of James City County, Virginia, does hereby initiate amendment of the James City County Code, Chapter 24, Zoning, to consider possible amendments to address data processing centers in certain districts. The Planning Commission shall hold at least one public hearing on the consideration of amendments to said Zoning Ordinances and shall forward its recommendation to the Board of Supervisors in accordance with the law before September 2025.



James O. Icenhour, Jr.
Chair, Board of Supervisors

ATTEST:



Teresa J. Saeed
Deputy Clerk to the Board

HIPPLE
NULL
LARSON
MCGLENNON
ICENHOUR

VOTES

AYE NAY ABSTAIN ABSENT

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☒	☐	☐	☐
☒	☐	☐	☐
☒	☐	☐	☐

Adopted by the Board of Supervisors of James City County, Virginia, this 11th day of March, 2025.

IntConsZOADDataCtr-res



James City County

Zoning

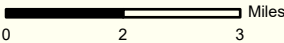
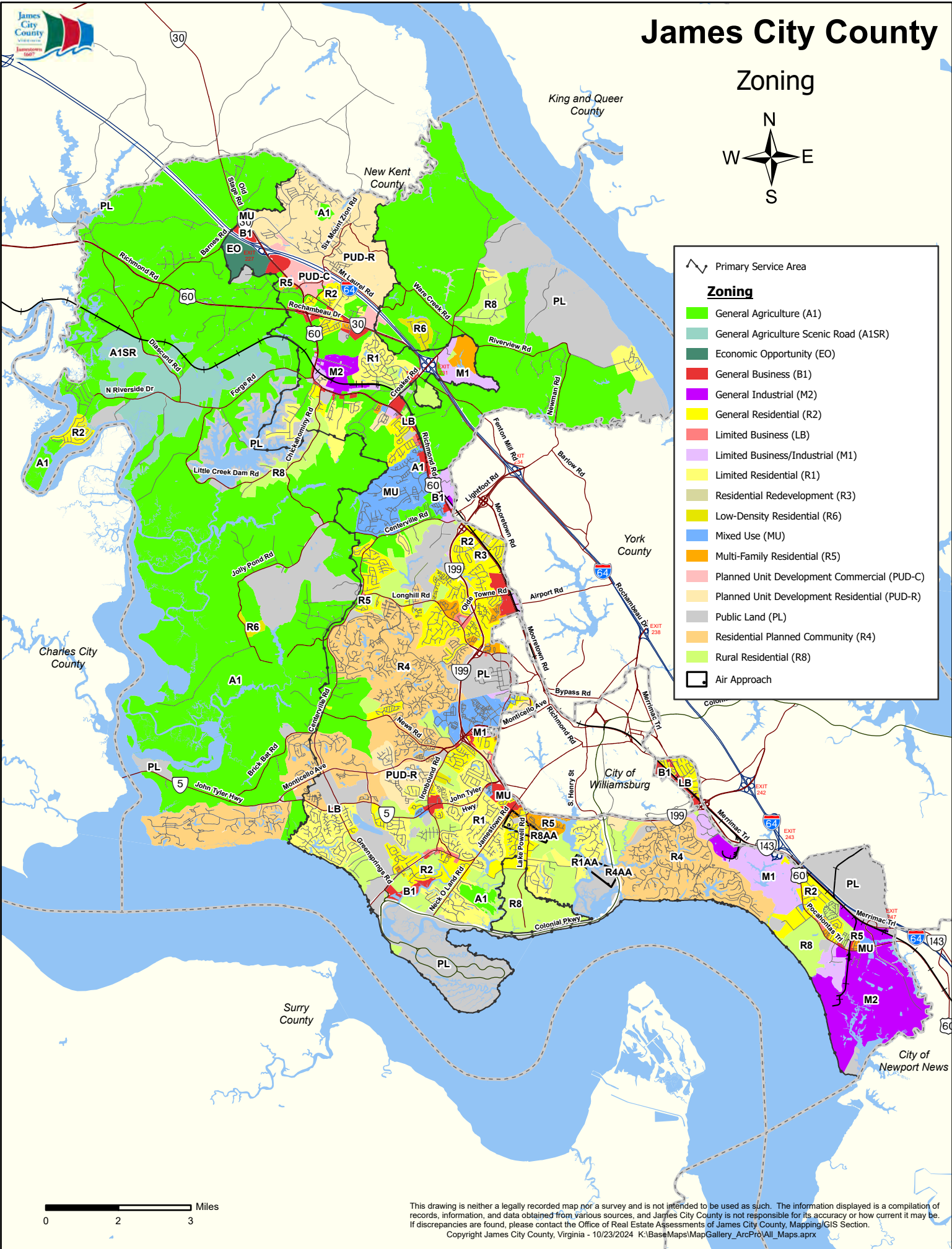


Primary Service Area

Zoning

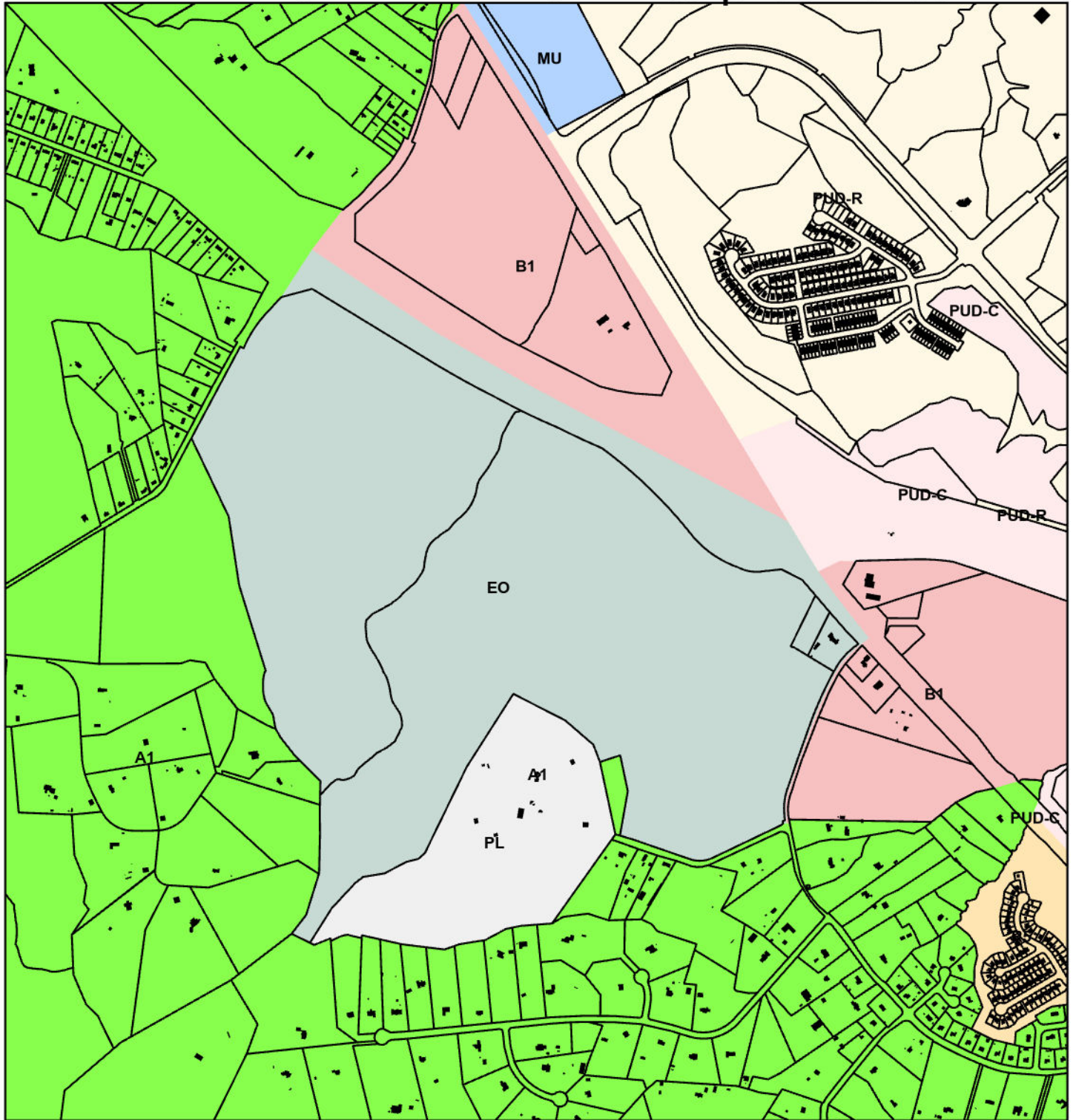
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- Economic Opportunity (EO)
- General Business (B1)
- General Industrial (M2)
- General Residential (R2)
- Limited Business (LB)
- Limited Business/Industrial (M1)
- Limited Residential (R1)
- Residential Redevelopment (R3)
- Low-Density Residential (R6)
- Mixed Use (MU)
- Multi-Family Residential (R5)
- Planned Unit Development Commercial (PUD-C)
- Planned Unit Development Residential (PUD-R)
- Public Land (PL)
- Residential Planned Community (R4)
- Rural Residential (R8)

Air Approach



This drawing is neither a legally recorded map nor a survey and is not intended to be used as such. The information displayed is a compilation of records, information, and data obtained from various sources, and James City County is not responsible for its accuracy or how current it may be. If discrepancies are found, please contact the Office of Real Estate Assessments of James City County, Mapping/GIS Section.
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Existing Property Zoned EO, Economic Opportunity Hazelwood Farms - Enterprise Center



Legend

Parcels

Building

Feature

Building

Zoning

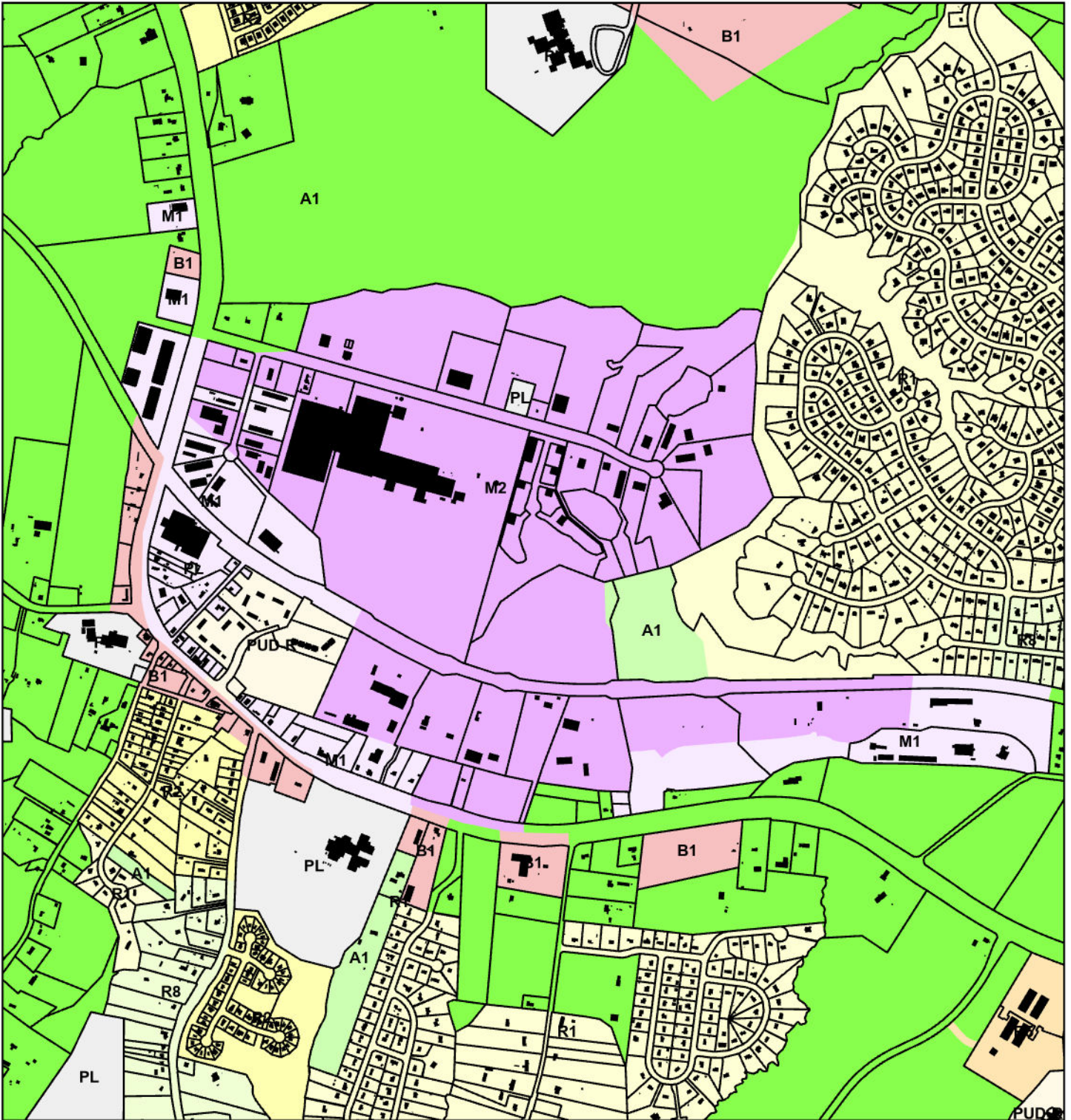
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- Economic Opportunity (EO)
- General Business (B1)
- General Industrial (M2)

- General Residential (R2)
- Limited Business (LB)
- Limited Business/Industrial (M1)
- Limited Residential (R1)
- Residential Redevelopment (R3)

- Low-Density Residential (R6)
- Mixed Use (MU)
- Multi-Family Residential (R5)
- Planned Unit Development Commercial (PUD-C)

- Planned Unit Development Residential (PUD-R)
- Public Land (PL)
- Residential Planned Community (R4)
- Rural Residential (R8)

Existing Property Zoned M-2, General Industrial Hankins Industrial Park Area



Legend

□ Parcels
 Building
 Feature
 ■ Building

Zoning

■ General Agriculture (A1)
 ■ Economic Opportunity (EO)
 ■ General Business (B1)
 ■ General Industrial (M2)

■ General Residential (R2)
 ■ Limited Business (LB)
 ■ Limited Business/Industrial (M1)
 ■ Limited Residential (R1)
 ■ Residential Redevelopment (R3)

■ Low-Density Residential (R6)
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■ Planned Unit Development Residential (PUD-R)
 ■ Public Land (PL)
 ■ Residential Planned Community (R4)
 ■ Rural Residential (R8)

 Parcels
Building
Feature
 Building

- General Agriculture (A1)
- Economic Opportunity (EO)
- General Business (B1)
- General Industrial (M2)

- | | | | | | |
|---|--------------------------------------|---|---|---|--|
|  | General Residential (R2) |  | Low-Density Residential (R6) |  | Planned Unit Development Residential (PUD-R) |
|  | Limited Business (LB) |  | Mixed Use (MU) |  | Public Land (PL) |
|  | Limited Business/
Industrial (M1) |  | Multi-Family Residential (R5) |  | Residential Planned Community (R4) |
|  | Limited Residential (R1) |  | Planned Unit Development Commercial (PUD-C) |  | Rural Residential (R8) |
|  | Residential Redevelopment (R3) | | | | |

Existing Property Zoned M-2, General Industrial Anheuser Busch



Legend

Parcels

Building

Feature

Building

Zoning

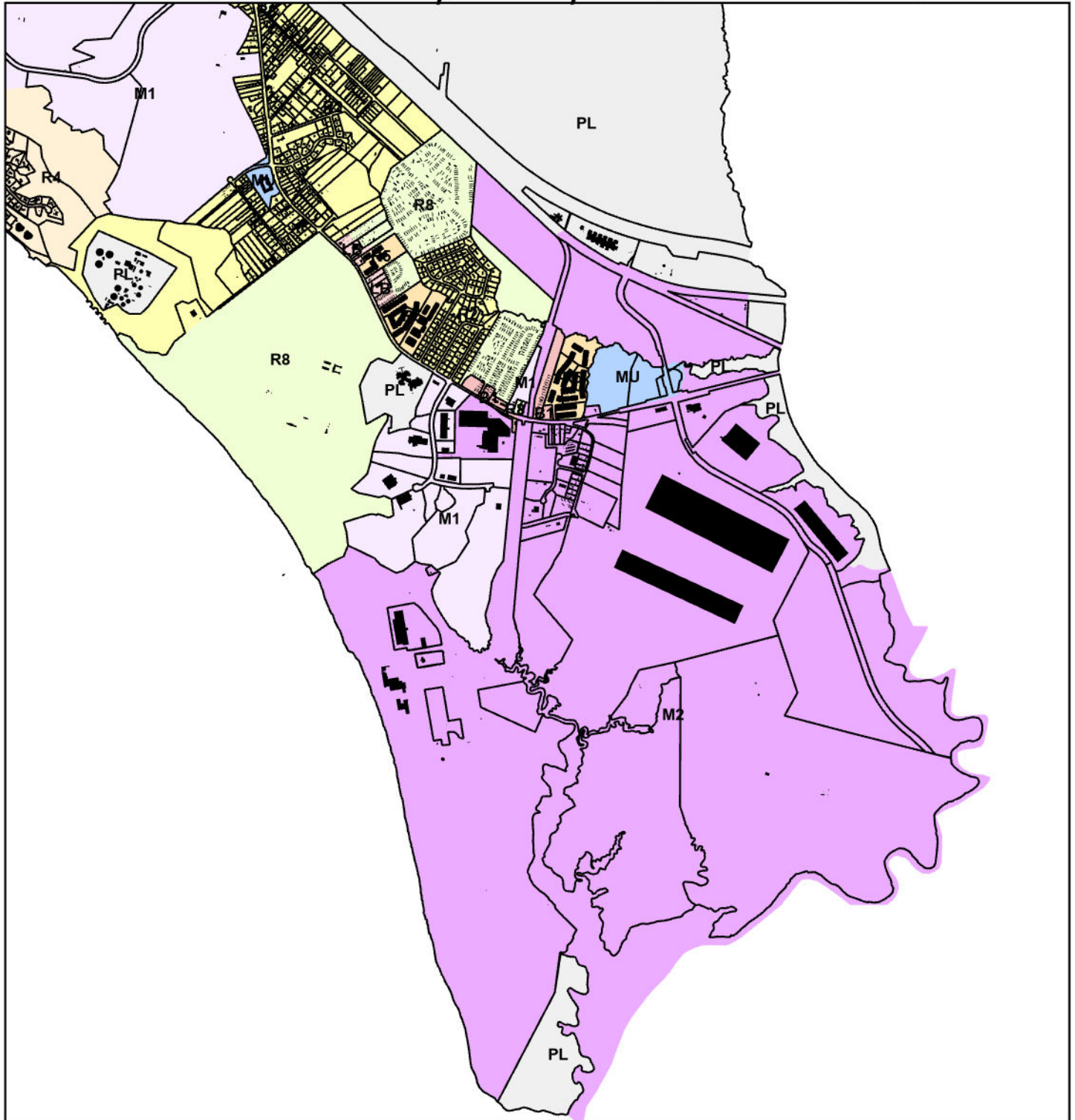
- General Agriculture (A1)
- Economic Opportunity (EO)
- General Business (B1)
- General Industrial (M2)

- General Residential (R2)
- Limited Business (LB)
- Limited Business/Industrial (M1)
- Limited Residential (R1)
- Residential Redevelopment (R3)

- Low-Density Residential (R6)
- Mixed Use (MU)
- Multi-Family Residential (R5)
- Planned Unit Development Commercial (PUD-C)

- Planned Unit Development Residential (PUD-R)
- Public Land (PL)
- Residential Planned Community (R4)
- Rural Residential (R8)

Existing Property Zoned M-2, General Industrial James River CC; BASF; Greenmount Areas



Legend

Parcels

Building

Feature

Building

Zoning

General Agriculture (A1)
Economic Opportunity (EO)
General Business (B1)
General Industrial (M2)

General Residential (R2)
Limited Business (LB)
Limited Business/Industrial (M1)
Limited Residential (R1)
Residential Redevelopment (R3)

Low-Density Residential (R6)
Mixed Use (MU)
Multi-Family Residential (R5)
Planned Unit Development Commercial (PUD-C)

Planned Unit Development Residential (PUD-R)
Public Land (PL)
Residential Planned Community (R4)
Rural Residential (R8)

Jurisdiction	Existing Regulations	Notes
James City County	Currently, Data Centers are not defined in the Ordinance and are permitted by rights in the M-1, Limited Business/Industrial; PUD, Planned Unit Development; MU, Mixed Use; and EO, Economic Opportunity Districts. Additionally, the RT, Research and Technology District list Data Centers as an accessory use.	Under Review
Chesterfield County	Conditional use permit within the Agriculture district; permitted by right within C5, I-2 and I-3; and permitted with *restrictions in I-1, C3, and C4. Restrictions include: a) outside associated utility infrastructure is limited to a maximum of one generator; b) outside generator area does not exceed the greater of 200 square feet or 1 percent of the gross floor area of the principal use; and c) outside generator is screened.	
Fairfax County	Permits data centers in certain commercial and industrial districts but are limited in size. A special exception is required for any data center over a certain size. Performance standards developed.	
Fauquier county	Allowed in Business Park and Planned Commercial Industrial District by right if the facility will use recycled water and is 50,000 square feet or less. Special exception if over 50,000 sq ft.	Adopted Policy
Hanover County	By right in all business and industrial districts except B1.	
Harrisonburg (City)	Requires special use permit in their M-1 zoning district.	
Henrico County	By-right in office, office/service, business, and industrial districts. HVAC/generators must be inside except in industrial districts. Must comply with setbacks, buffers, screening requirements similar to other industrial building uses.	Ordinance revision under consideration: (1) consideration of a proposed Comprehensive Plan amendment to establish a special focus area; (2) creation of an overlay district; and (3) remove data centers from commercial uses (office) and update use list to permit use in certain districts. (Planning Commission and BOS held a joint public hearing on May 15, 2025, but deferred action and directed staff to eliminate the overlay district and to require all data centers to obtain a conditional use permit.

Jurisdiction	Existing Regulations	Notes
King George County	Requires special exception in General Commercial , Light Industrial & Industrial	Shall be connected to public or community water and may not use commercial wells. Mechanical infrastructure shall be within an enclosed and screened structure. Generator testing is limited to 8 am to 5 pm. No data center shall be built until evidence has been given as part of the application that the owner has been approved by the utility company. Principal façade requirements, maximum floor area requirements and transitional buffer requirements.
Loudoun County	Requires special exception in General Industry, Industrial Park, and Mineral resources / Heavy Industry Districts. (updated in 2025)	Phase 2 will focus on establishing policy guidance and use-specific zoning standards for data centers and utility substations to address concerns related to land use, compatibility, aesthetics, infrastructure and natural and environmental resources. Phase 2 is expected to take approximately 14 months to complete. Revisions to other maps, policies and text will be included as needed within the Comprehensive Plan and the Zoning Ordinance for consistency.
Louisa County	Conditional use permit within the Technology Overlay District. (updated August 2024)	
Prince William County	Data centers are a permitted use in a number of zoning districts in Prince William County. Within the Data Center Opportunity Zone Overlay District, data centers are permitted by right in office and industrial districts [in the O(L), O(H), O(M), O(F), M-1, M-2, and M/T zoning districts] and in designated office or industrial land bays in the PBD and PMD district. Outside of the Data Center Opportunity Zone Overlay District, data centers are permitted subject to special use permit approval in commercial, office, industrial districts, and mixed-use districts. Data centers are prohibited in agricultural, residential, PMR, B-2, B-3, and V districts.	Currently in the process of utilizing a consultant to revise their zoning regulations relating to data centers.
Stafford County	Permits data centers by right in M-2 Heavy Industrial and Integrated Corporate and Technology Park Overlay with special regulations.	
Warrenton. Town	Data Centers as a Permissible Use within the Industrial District	ZO text amendment in process to remove data centers as a permitted or specially permitted use.

<u>Jurisdiction</u>		<u>Existing Regulations</u>		<u>Notes</u>
York County		Data centers are not explicitly listed in the current zoning ordinance.		Allow data centers as a specially permitted use in the Economic Opportunity, Limited Industrial and General Industrial Districts, and requires performance standards which include a) requiring letter from electric utility of sufficient proximity and availability to substation and transmission lines; b) requiring a letter from the water purveyor to indicate sufficient capacity to serve the proposed data center and to require water conservation methods (rainwater harvesting, water recycling, etc.); c) Setback of 200 ft from all property lines and 500 ft from any residential dwelling; d) Noise standards; e) architectural standards; and f) addressing Fire and life safety guidelines.

Report to the Governor and the General Assembly of Virginia

Data Centers in Virginia

2024



Joint Legislative Audit and Review Commission

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Summary: Data Centers in Virginia

WHAT WE FOUND

Data centers provide positive economic benefits to Virginia's economy, mostly during their initial construction

Data centers provide positive benefits to Virginia's economy mostly because of the industry's substantial capital investment. The primary benefit comes from the initial construction of data centers. Most construction spending likely remains in the state economy because much of it goes to Virginia-based businesses providing construction materials and services.

Data centers employ fewer employees than some other industries, but data center jobs tend to be high paying. Several data center representatives indicated that a typical 250,000-square-foot data center may have approximately 50 full-time workers, about half of which are contract workers. Data center construction supports a substantially larger number of workers. Construction of an individual data center building usually takes about 12 to 18 months, and data center representatives indicated that, at the height of construction, approximately 1,500 workers are on site from various construction-related industries.

Overall, the data center industry is estimated to contribute 74,000 jobs, \$5.5 billion in labor income, and \$9.1 billion in GDP to Virginia's economy annually. Most of these economic benefits derive from the construction phase rather than data centers' ongoing operations. The economic benefits from the industry are concentrated in Northern Virginia, where most data centers are located, but other regions of the state also benefit because data centers are also located there, or they are home to businesses that provide materials for data center construction.

Data centers can generate substantial local tax revenues for localities that have them

Localities with data centers can collect substantial tax revenues from the industry, primarily from business personal property and real property (real estate) taxes. The amount of local data center revenue depends on several factors, such as the size of a locality's data center market and local tax rates. Some localities have greatly reduced their business personal property tax rates for computer equipment to try to attract data centers, but this also reduces the revenue they can collect from the industry. For the

WHY WE DID THIS STUDY

In 2023, the Joint Legislative Audit and Review Commission directed staff to review the impacts of the data center industry in Virginia.

ABOUT DATA CENTERS

Data centers are specialized facilities that manage, process, and share large amounts of data. They enable the digital services that people rely on daily, including websites, electronic applications, and cloud-based platforms, such as email and media streaming. Northern Virginia is the largest data center market in the world, constituting 13 percent of all reported data center operational capacity globally and 25 percent of capacity in the Americas. Multiple factors have contributed to Northern Virginia's market prominence, including a strong fiber network, supply of reliable cheap energy, available land, proximity to major national customers, and the creation of a state data center tax incentive. The data center industry is growing rapidly in Virginia, both in established markets and newer ones. Significant new market growth is expected in counties outside of Northern Virginia and along the I-95 corridor to Central Virginia.

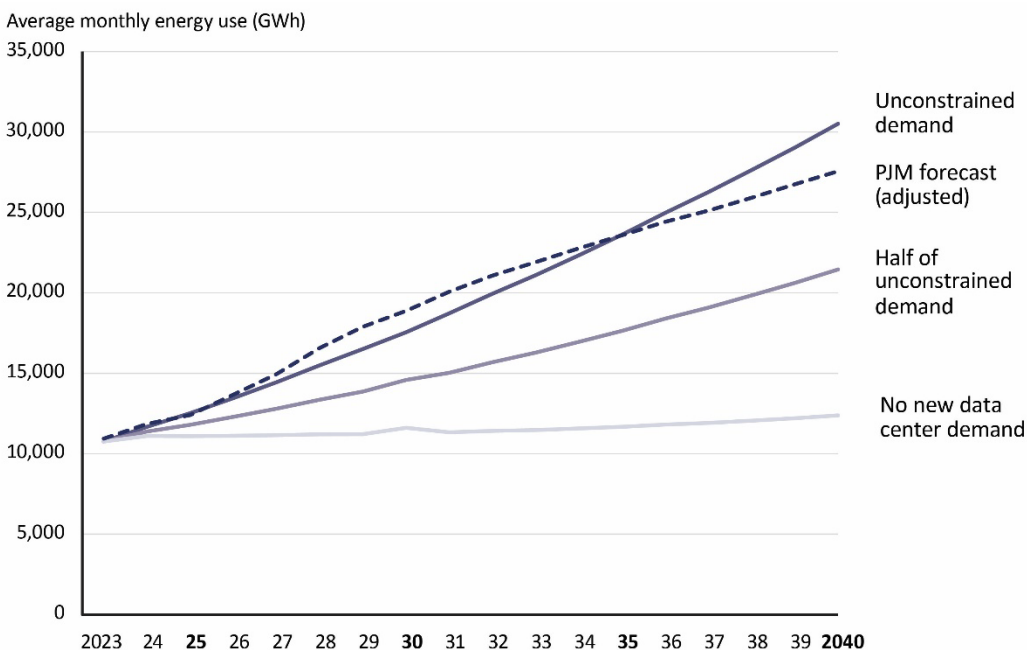
five localities with relatively mature data center markets, data center revenue ranged from less than 1 percent to 31 percent of total local revenue.

Localities in economically distressed areas of the state could benefit from data centers through increased local tax revenue, but these localities could have difficulty attracting the industry. Access to power and large, flat areas of land are key requirements for data centers, but are not available in some distressed areas, particularly in Southwest Virginia. Many distressed localities are also in rural areas that are away from data center customers and population centers, which makes it harder for them to attract the industry. However, these localities may be able to compete for data centers running certain artificial intelligence (AI) workloads, such as training. These localities could potentially become more attractive to the industry if they are able to proactively develop industrial sites suitable to data centers.

Data center industry is forecast to drive immense increase in energy demand

Modern data centers consume substantially more energy than other types of commercial or industrial operations. Consequently, the data center industry boom in Virginia has substantially driven up energy demand in the state, and demand is forecast to continue growing for the foreseeable future. The state's energy demand was essentially flat from 2006 to 2020 because, even though population increased, it was offset by energy efficiency improvements. However, an independent forecast commissioned by JLARC shows that unconstrained demand for power in Virginia would double within the next 10 years, with the data center industry being the main driver. JLARC's independent forecast largely matches the most recent forecast by PJM, which is the regional organization that coordinates generation and transmission operations for Virginia and several other eastern and midwestern states.

Data center demand would drive immense increase in energy needs in Virginia, based on JLARC's independent forecast and other forecasts



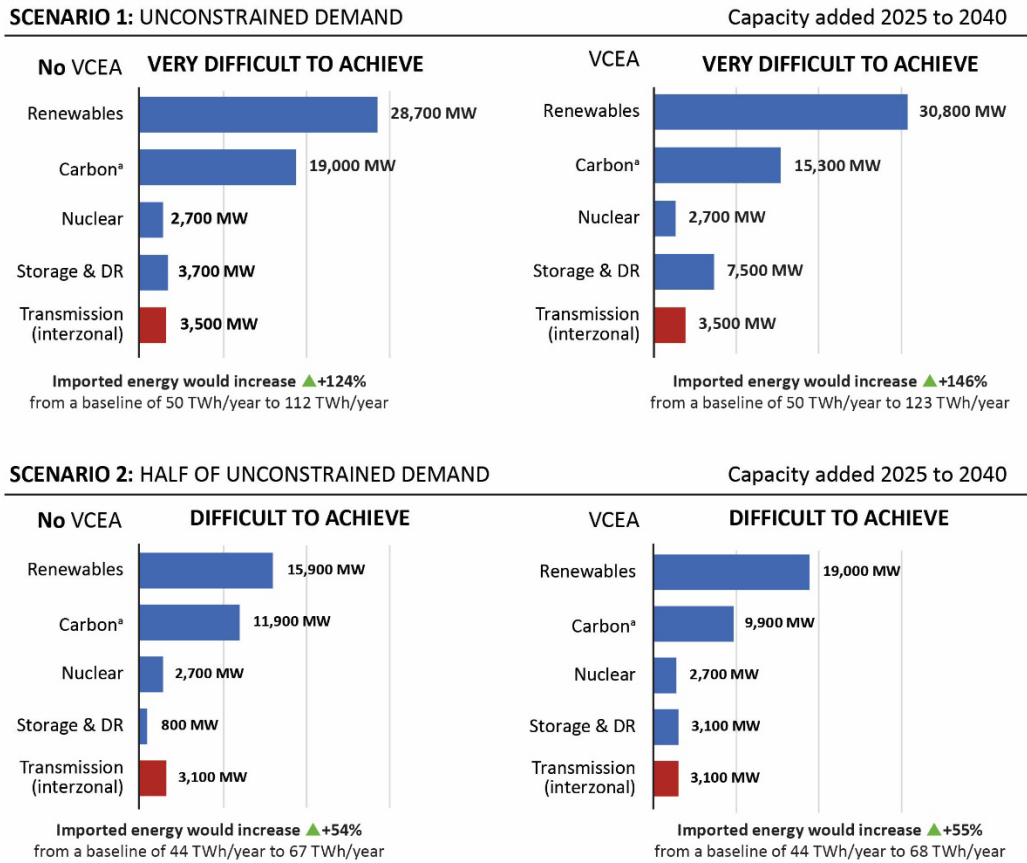
SOURCE: JLARC staff consultant analysis.

NOTE: A detailed note is provided for this figure in Chapter 3.

Building enough infrastructure for unconstrained data center demand will be very difficult and meeting half that demand is still difficult

An independent model of the energy grid commissioned by JLARC staff found that a substantial amount of new power generation and transmission infrastructure will be needed in Virginia to meet unconstrained energy demand or even half of unconstrained demand. Building enough infrastructure to meet unconstrained energy demand will be very difficult to achieve, with or without meeting the Virginia Clean Economy Act (VCEA) requirements (Scenario 1, figure). New solar facilities, wind generation, natural gas plants, and increased transmission capacity would all be required to meet unconstrained demand, and the number of projects needed would be very difficult to achieve. For example, new solar facilities would have to be added at twice the annual rate they were added in 2024, and the amount of new wind generation needed would exceed the potential capabilities of all offshore wind sites that have so far been secured for future development. Large natural gas plants would also need to be added at an equal or faster rate than the busiest build period for these facilities (2012 to 2018), depending on VCEA compliance.

Estimated generation mix needed to meet demand scenarios, with and without meeting VCEA requirements



SOURCE: E3 grid modeling analysis.

NOTE: A detailed note is provided for this figure in Chapter 3.

^aCarbon includes natural gas, coal, and oil. Biomass facilities are counted as renewable resources, per the VCEA.

However, starting in 2045, E3's grid model assumes natural gas plants would be converted to hydrogen fuel in each scenario when VCEA requirements are met.

Building enough infrastructure to meet half of unconstrained energy demand would also be difficult (Scenario 2 above). If VCEA requirements were not considered, the biggest challenge would be building new natural gas plants. New gas would need to be added at the rate of about one large 1,500 MW plant every two years for 15 consecutive years, equal to the busiest period of the last decade (2012 to 2018). If it is assumed that VCEA requirements would be met, the biggest challenges would be building enough wind, battery storage, and natural gas peaker plants. Wind generation needs would be the same as the unconstrained demand scenario. The amount of new battery storage would be several times the small amount currently in place in Virginia and a significant number of new natural gas peaker plants would have to be constructed. Both Scenarios 1 and 2 would rely on energy from as yet unproven nuclear technologies.

The state could encourage or require data centers to take actions to help address their energy impacts by promoting development of renewable energy generation, participating in demand response programs, and managing energy efficiency. However, these actions would have only a marginal impact on decreasing data center energy demand.

Existing electric utility requirements and processes help limit risks associated with system capacity and reliability

Data centers' projected energy demand increases have raised concerns about whether enough infrastructure can be built to keep pace. Currently, PJM attempts to protect regional grid reliability by requiring utilities to secure sufficient generation capacity plus a reserve margin, and the state requires utilities to develop plans that describe how generation capacity needs will be met. However, individual electric utility planning does not guarantee that the generation resources needed for the whole PJM region will be built because regional generation is not centrally planned. This is less of a concern with transmission because PJM and utility transmission owners centrally identify the impact large loads are expected to have, and how those loads can be brought on safely without causing transmission reliability problems.

If utilities are unable to build enough new infrastructure to keep pace with demand, one of the main ways they can protect grid reliability is by delaying the addition of new large load customers until there is adequate generation and transmission capacity. Utilities appear to be able to delay large load additions for transmission-related concerns, but it is less clear if they are allowed to delay adding new load because of generation concerns.

Data centers are currently paying their full cost of service, but growing energy demand is likely to increase other customers' costs

JLARC staff commissioned an independent study of electric utility cost recoveries under current rate structures to see if the data center industry is paying its share of current costs. The study found that current rates appropriately allocate costs to the customers responsible for incurring them, including data center customers.

However, data centers' increased energy demand will likely increase system costs for all customers, including non-data center customers, for several reasons. A large amount of new generation and transmission will need to be built that would not otherwise be built, creating fixed costs that utilities will need to recover. It will be difficult to supply enough energy to keep pace with growing data center demand, so energy prices are likely to increase for all customers. Finally, if utilities are more reliant on importing power, they may not always be able to secure lower-cost power and will be more susceptible to spikes in energy market prices. A typical residential customer of Dominion Energy could experience generation- and transmission-related costs increasing by an estimated \$14 to \$37 monthly in constant (or real) dollars by 2040 (independent of inflation). Establishing a separate data center customer class, changing cost allocations,

and adjusting utility rates more frequently could help insulate non-data center customers from statewide cost increases.

Data centers create additional financial risks to electric utilities and their customers

The data center industry presents additional financial risks to electric utilities and their customers because of the sheer size of the industry's energy demand. One risk is that utilities will build more generation and transmission infrastructure than is needed if forecast demand does not materialize, or several large data centers close. This could strand utilities with infrastructure costs that would have to be recouped from their existing customer base. Another risk is particular to electric co-ops, which are not-for-profit companies that are owned by their member customers. If a data center customer delayed, disputed, or failed to pay an energy generation bill and the co-op was unable to recoup these costs from the customer, they would ultimately have to be paid by all other co-op members. A large enough bill could potentially result in a co-op defaulting and going bankrupt.

Another risk relates to data center participation in the state's retail choice program, which allows data centers and other large load customers to purchase generation through third parties rather than through their incumbent electric utility. This also has the potential to shift generation costs to other customers if enough data centers "leave" their incumbent utility for retail choice.

Data center backup generators emit pollutants, but their use is minimal, and existing regulations largely curb adverse impacts

To ensure constant operations in the event of a power outage, nearly all data centers maintain diesel generators on-site for backup power. Diesel generators emit several harmful air pollutants, such as nitrogen oxides, carbon monoxide, and particulate matter. To limit potential emissions from backup generators, the Virginia Department of Environmental Quality (DEQ) permits limit when they can be run, how long they can be run, and the maximum annual emissions each permitted site is allowed. Nearly all current data centers use "Tier 2" diesel generators, which DEQ allows to run only in emergencies or as part of routine maintenance testing.

Data center generators are run mostly only for maintenance, and most data center operators interviewed by JLARC staff reported experiencing zero to two minor outages per site in the last two years, with nearly all outages lasting only a few hours. Consequently, data centers' diesel generators are a relatively small contributor to regional air pollution—in Northern Virginia, they make up less than 4 percent of regional emissions of nitrogen oxides and 0.1 percent or less of carbon monoxide and particulate matter emissions. While they make up only a small part of regional emissions, DEQ is conducting further study to ensure no harmful impacts occur locally. If the study detects any local air quality impacts, DEQ has the authority to increase protections as needed.

Data center water use is currently sustainable, but use is growing and could be better managed

Data centers require industrial-scale cooling, which is sometimes dependent on water, to manage the heat generated by their computing equipment. Most data centers use about the same amount of water or less as an average large office building, although a few require substantially more, and some require less than a typical household. The amount of water a data center uses depends on its size, computing density, and type of cooling system.

Most data centers receive their water from local water utilities, which make withdrawals from Virginia's water sources (rivers, groundwater). DEQ regulates water withdrawals, including requiring permits for large-scale withdrawals, to protect future water availability and environmental sustainability. However, while DEQ is responsible for ensuring water sustainability, there is less oversight over how available water should be shared across various uses in a locality. Virginia as a whole is relatively water rich, but water is more limited for some localities that do not have access to large amounts of surface water and are in groundwater management areas.

Localities have allowed data centers to be built near neighborhoods, but some localities are taking steps to minimize residential impacts

The industrial scale of data centers makes them largely incompatible with residential uses. One-third of data centers are currently located near residential areas, and industry trends make future residential impacts more likely.

Inadequate local planning and zoning have allowed some data centers to be located near residential areas, which sometimes causes impacts on those residents. In some cases, this occurred because local zoning ordinances did not consider data centers to be an industrial use. In addition, some localities have zoned industrial areas next to residential areas, even though land use principles state that industrial uses and residential uses should not be zoned next to each other. Local elected officials have also granted data centers exceptions that led to adverse residential impacts, such as approving rezonings that would allow data centers next to sensitive locations.

In response to increased residential opposition, some localities have taken steps to minimize the residential impacts of data centers. The three Virginia localities with the largest data center markets have taken or are considering changes to zoning ordinances to better manage future data center development, and several localities considering their first data center projects are proactively implementing planning and zoning changes to promote appropriate industry development. The effectiveness of local efforts to minimize residential impacts ultimately depends on the decisions of local elected officials when considering more restrictive zoning ordinances or individual special permit or rezoning requests.

Data center noise near residential areas presents unique challenges, and some localities are unsure about their authority to address it

The constant nature of data center noise has sometimes been a problem when data centers are located near residential areas. Data centers emit low-frequency noise that is not loud enough to damage nearby residents' hearing and rarely loud enough to violate noise ordinances. However, some nearby residents report that the constant noise generated by some data centers affects their well-being. Although noise has been a problem for some data centers, a large majority of data centers do not generate noise complaints because of their location or design.

Localities traditionally use noise ordinances to address noise concerns, but those typically target excessively loud noise from short-term sources, such as parties and barking dogs, and carry a low maximum civil penalty of \$500. Noise restrictions for data centers could be more effective if included in zoning ordinances instead, but some localities were uncertain whether they have the authority to establish these restrictions in such ordinances. Zoning ordinances that establish maximum allowable sound levels for both new and existing data centers would allow localities to better account for the low-frequency noise data centers emit, prescribe a better process for measuring potential noise violations, and impose more effective penalties for addressing any violations.

Some data center companies are conducting sound modeling studies *before* building data centers, but not all Virginia localities currently require this, and some were unsure whether they had the authority to do so.

Changes to the state's data center sales tax exemption could address some policy concerns related to the industry

Since 2010, Virginia has offered an exemption to the state's retail sales and use tax to attract large-scale data centers. The exemption allows data centers and their tenants to purchase computers and other equipment, such as servers, network infrastructure, cooling equipment, and generators, without paying sales tax. Because data centers are capital intensive, the exemption is valuable to the industry (providing \$928 million in tax savings in FY23), and about 90 percent of the industry uses the exemption. Data center companies report the exemption is an important factor when deciding where to locate and expand, and most of the other states that Virginia competes with for new data center developments have similar exemptions.

Because the data center exemption is a valuable incentive and used by most of the industry, it could be used to incentivize data centers to take actions to address many of the issues discussed throughout this report. There are a range of changes that could be made to the exemption, depending on the General Assembly's policy objectives.

Extend the exemption to maintain industry growth — If the General Assembly wishes to maintain data center industry growth in Virginia and the associated economic and local tax revenue benefits, it could extend the exemption. The exemption is scheduled to expire in 2035, and data center representatives unanimously reported

that expiration of the exemption would negatively affect the state's ability to attract new data centers and keep existing ones. Data center companies typically consider the cost of ownership over a 15- to 20-year period when making location decisions, so to influence future site selection decisions, an extension would need to be in place well before 2035.

Allow the exemption to expire to reduce industry growth and associated energy impacts — If the General Assembly wishes to slow the data center industry's growth in Virginia because it determines that energy impacts, including increasing costs to residential and other customers, outweigh the industry's economic benefits, it could allow the exemption to expire in 2035. While the General Assembly could allow the exemption to expire only in certain regions, like Northern Virginia, that approach would be less effective in reducing overall growth in energy demand because significant growth is occurring in several counties outside of Northern Virginia and is expected to continue.

Change the exemption to balance industry growth and energy impacts — Rather than choosing between economic benefits or reduced energy impacts, the exemption could be changed to try to balance these competing impacts. The General Assembly could allow the full exemption to expire in 2035 (or end it before then) and apply a partial sales tax exemption until 2050. A partial exemption would also better align the economic benefits the state receives with the value of the exemption. Most economic benefits occur during construction, and switching to a partial exemption in 2035 would reduce the value of the exemption in later years when the economic impacts of current and planned data centers could be expected to slow. A partial exemption could also generate more tax revenue for the state.

Use the exemption to address other policy concerns related to the data center industry — If the General Assembly extends the exemption, even as a partial exemption, there are several additional options the General Assembly could implement to address concerns in specific policy areas. The exemption could be modified to address energy, natural resource, historic resource, and residential impacts.

WHAT WE RECOMMEND

This report includes multiple policy options for the General Assembly to consider depending on its policy goals for the data center industry in Virginia. The report also includes several recommendations. The following recommendations include only those highlighted in the report summary. The complete list of recommendations and options is available on page xi.

Legislative action

- Clarify that electric utilities have the authority to delay, but not deny, service to customers when the addition of customer load cannot be supported;

- Direct Dominion Energy to develop a plan for addressing the risk of infrastructure costs being stranded with existing customers, and file that plan with the State Corporation Commission;
- Expressly authorize local governments to require and consider water use estimates for proposed data center developments;
- Expressly authorize local governments to require sound modeling studies for proposed data center developments; and
- Expressly authorize local governments to establish and enforce maximum allowable sound levels for operational data center facilities using alternative low frequency metrics and zoning ordinances.

Executive action

- The Virginia Economic Development Partnership should clarify that grants under the Virginia Business Ready Sites Program can be used for potential data center sites.

Recommendations and Policy Options: Data Centers in Virginia

JLARC staff typically make recommendations to address findings during reviews. Staff also sometimes propose policy options rather than recommendations. The three most common reasons staff propose policy options rather than recommendations are: (1) the action proposed is a policy judgment best made by the General Assembly or other elected officials, (2) the evidence indicates that addressing a report finding is not necessarily required, but doing so could be beneficial, or (3) there are multiple ways in which a report finding could be addressed and there is insufficient evidence of a single best way to address the finding.

Recommendations

RECOMMENDATION 1

The Virginia Economic Development Partnership should clarify in site characterization and development guidelines that potential data center sites are eligible for grants under the Virginia Business Ready Sites Program. (Chapter 2)

RECOMMENDATION 2

The General Assembly may wish to consider amending the Code of Virginia to clarify that electric utilities have the authority to delay, but not deny, service to customers when the addition of customer load cannot be supported by the transmission system or available generation capacity. (Chapter 3)

RECOMMENDATION 3

The General Assembly may wish to consider amending the Code of Virginia to expand the Accelerated Renewable Buyers program, which allows large customers of energy utilities to claim credit for purchases of solar and wind *energy* to offset certain utility charges, to also allow customers to claim partial credit for purchases of *capacity* from battery energy storage systems based on the current PJM electric load carrying capacity rating. (Chapter 3)

RECOMMENDATION 4

The General Assembly may wish to consider amending the Code of Virginia to require that utilities establish a demand response program for large data center customers and to require that these customers participate in the program. (Chapter 3)

RECOMMENDATION 5

The General Assembly may wish to consider amending the Code of Virginia to direct Dominion Energy to develop a plan for addressing the risk of generation and transmission infrastructure costs being stranded with existing customers and file that plan with the State Corporation Commission as part of its biennial rate review filing or as a separate filing. (Chapter 4)

RECOMMENDATION 6

The General Assembly may wish to consider amending the Code of Virginia to expressly authorize local governments to (i) require proposed data center developments to submit water use estimates and (ii) consider water use when making rezoning and special use permit decisions related to data center development. (Chapter 5)

RECOMMENDATION 7

The General Assembly may wish to consider amending the Code of Virginia to expressly authorize local governments to require sound modeling studies for data center development projects prior to project approval. (Chapter 6)

RECOMMENDATION 8

The General Assembly may wish to consider amending the Code of Virginia to expressly authorize local governments to establish and enforce maximum allowable sound levels for data center facilities, including (i) using alternative low frequency noise metrics and (ii) setting noise rules and enforcement mechanisms in their zoning ordinances, separate from existing noise ordinances. (Chapter 6)

Policy Options to Consider

POLICY OPTION 1

The General Assembly could consider amending the Code of Virginia to require that, as a condition of receiving the sales tax exemption, data center companies meet and certify to an energy management standard, such as the International Organization for Standardization's 50001 standard for energy management. (Chapter 3)

POLICY OPTION 2

The General Assembly could consider amending the Code of Virginia to allow electric cooperatives to create for-profit subsidiary companies that could fulfill their legal obligation to provide energy services (retail sales) to customers with load capacity of over 90 MW. (Chapter 4)

POLICY OPTION 3

The General Assembly could consider amending the Code of Virginia to require that electric utilities establish caps on participation in retail choice that protect ratepayers from undue costs, and that such caps be approved by the State Corporation Commission through a formal case process. (Chapter 4)

POLICY OPTION 4

The General Assembly could amend the Code of Virginia to require that, as a condition of receiving the data center sales and use tax exemption, all new data center developments in the Northern Virginia Ozone Nonattainment Area use only Tier 4 generators, Tier 2 generators with selective catalytic reduction systems, or generators with equivalent or lower emission rates. (Chapter 5)

POLICY OPTION 5

The General Assembly could amend the Code of Virginia to require that, as a condition of receiving the sales and use tax exemption, data center companies meet and certify to an environmental management standard, such as the International Organization for Standardization's 14001 standard for Environmental Management Systems. (Chapter 5)

POLICY OPTION 6

The General Assembly could amend the Code of Virginia to require that, as a condition for receiving the sales and use tax exemption, data center companies conduct a Phase I historic resource study of a proposed development site, as well as a viewshed analysis when a proposed site is located within a certain distance of a registered historic site, and report the study findings to the appropriate locality prior to development. (Chapter 5)

POLICY OPTION 7

The General Assembly could amend the Code of Virginia to require that, as a condition for receiving the sales and use tax exemption, data center companies conduct a sound modeling study prior to the development of a proposed data center that is to be located within a certain distance of a residential development or area zoned for residential development and provide the study findings to the appropriate locality. (Chapter 6)

POLICY OPTION 8

The General Assembly could amend the Code of Virginia to extend the expiration date for the state's sales and use tax exemption for data centers from 2035 to 2050. (Chapter 7)

POLICY OPTION 9

The General Assembly could allow the sales and use tax exemption for data centers to expire in 2035. (Chapter 7)

POLICY OPTION 10

The General Assembly could amend the Code of Virginia to extend a partial sales and use tax exemption for data centers from 2035 to 2050. (Chapter 7)

1 Overview of the Data Center Industry

In 2023, the Joint Legislative Audit and Review Commission (JLARC) directed its staff to review the impacts of the data center industry in Virginia. Specifically, staff were directed to assess the impact of the industry on state and local revenue; Virginia's energy demand and supply; natural, historic, and cultural resources; and local residents. Staff were also directed to forecast future growth of the industry in Virginia and determine (i) how any economic benefits could be more widely distributed and (ii) if Virginia's data center tax exemption could be improved. (See Appendix A for the study resolution.)

To complete this study, JLARC staff conducted over 250 interviews with more than 150 different stakeholders, including local residents and stakeholder groups; data center companies and developers; state and local officials; electric and water utility companies; and subject-matter experts. Staff analyzed water usage and air quality and emissions data, as well as capital expenditure, employment, and tax benefit data from users of the data center tax exemption. Staff also reviewed state and local land use regulations and conducted case reviews of local data center-related zoning and permitting requests. (See Appendix B for more information on methods used for this study.)

JLARC staff contracted with two consultants as part of this study. Faculty from the Weldon Cooper Center for Public Service at the University of Virginia (Weldon Cooper Center) developed an economic impact analysis of Virginia's data center industry and an independent energy demand forecast for Virginia and its utilities. Consulting firm Energy + Environmental Economics (E3) modeled how data center growth was likely to affect future generation and transmission needs, carbon emissions, and utility costs, including how costs could be passed on to ratepayers. E3 also made additional refinements to the Weldon Cooper Center energy demand forecast.

Data centers are key hubs of the world's digital infrastructure

Data centers are specialized facilities that manage, process, and share large amounts of data. They enable the digital services that people rely on daily, including websites, electronic applications, and cloud-based platforms such as email and media streaming. These services are also critical to businesses and organizations, for example, allowing businesses to make secure transactions electronically or conduct complex computing tasks using artificial intelligence (AI). Given their essential role in daily life, business, and the economy, data centers have become a critical part of the world's digital infrastructure (sidebar).

Digital infrastructure encompasses the systems and technologies needed for the internet, online services, and other digital activities to function. This includes networks (e.g., fiber, switches), hardware (e.g., computers, servers), software (e.g., operating systems, applications), data centers, and the personnel who manage and maintain these components.

Megawatts are units used to measure power, equivalent to one million watts. Megawatts measure the amount of energy produced or consumed at any instant, rather than total over time. A different unit of measure is used to measure the amount of energy produced or consumed over a given time period. For example, megawatt-hours describe the number of megawatts produced or consumed during an hour.

For context, a Virginia town of 10,000 people uses approximately 10 megawatts.

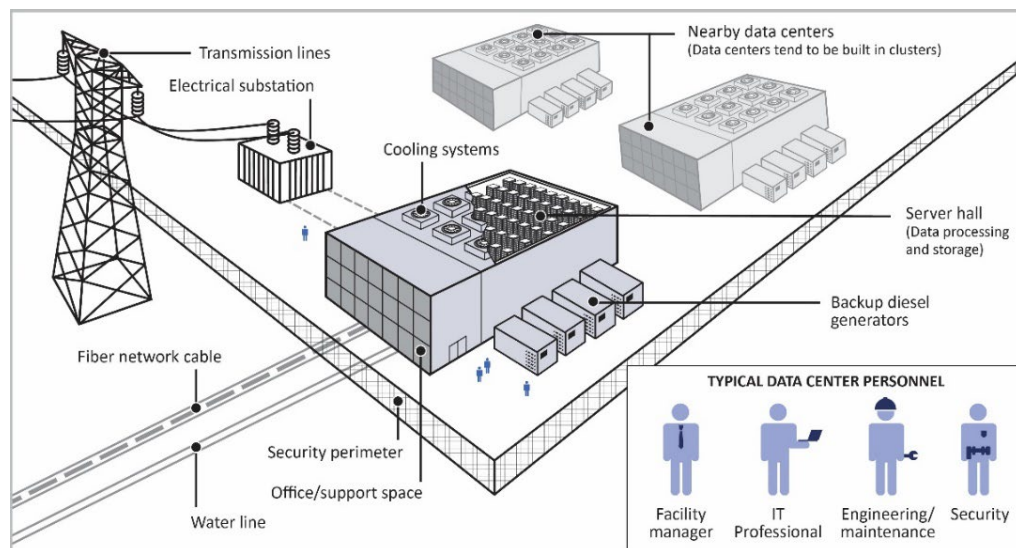
A typical, modern data center is a large industrial building filled with computing equipment, including servers, storage drives, and network hardware. Externally, these buildings often resemble warehouses or distribution centers. Data centers can vary greatly in size, ranging from smaller facilities with a few thousand square feet to large, multi-story buildings exceeding one million square feet. Data centers are often located on campuses alongside other facilities or other data centers operated by the same company. In addition, many data centers have physical security measures, such as floodlights, fencing, and access controls, to protect the facility and its data.

Data centers require large amounts of electricity to operate. This energy powers the computing equipment inside, as well as cooling equipment that prevents the computing equipment and building from overheating. The amount of electricity needed for a data center varies based on its size, the density and type of computing equipment, and the cooling system used. A small data center can require five to 20 megawatts of power, while a larger data center can require 100 or more megawatts (sidebar). Given the amount of electricity needed for operations, data centers often have power lines and substations connecting them directly to nearby high-voltage transmission lines. All data centers also have backup generators on-site to ensure continuity of operations if their primary power supply fails.

Data centers are operated and maintained by a skilled workforce, including technicians, electricians, and network engineers. Data centers also generally have security personnel.

Figure 1-1 illustrates the infrastructure, equipment, and personnel found in and around a typical, modern data center.

FIGURE 1-1
Common infrastructure, equipment, and personnel at a typical data center



SOURCE: JLARC staff.

NOTE: Illustrative example. Data centers may have different equipment, e.g., based on their cooling system.

There are various types of data centers, ranging from traditional enterprise and colocation facilities to newer hyperscale operations.

- Enterprise data centers are private facilities owned and operated by a single company, designed specifically to meet that company's IT and data storage needs. These are generally non-technology companies, such as banks, insurance firms, and credit card companies, that rely heavily on secure, in-house data processing and storage. Enterprise data centers are generally located on-site, such as within a corporate campus or integrated into a larger office building. Enterprise data centers are a shrinking segment of the data center market as companies increasingly rely on the cloud for their computing needs.
- Colocation data centers are facilities owned and operated by a company that leases physical space within their data center to other companies and organizations. These tenants, which include smaller technology companies, online retailers, and government agencies, house their computer equipment within their leased space and have their own staff who maintain and upgrade this equipment. Tenants rely on the data center owner to provide all other services such as power, cooling, and physical security. Colocation data centers generally serve multiple tenants—often upwards of 20 or more—which allows these companies to benefit from economies of scale.
- Hyperscale data centers are purpose-built facilities designed to serve the world's major technology companies (e.g., Amazon Web Services [AWS], Google, Meta, Microsoft), often known as “hyperscalers.” These are the largest data centers with the largest operational capacity and power requirements (sidebar). Hyperscale data centers can either be owned and operated by the hyperscaler company or by a third-party that leases the facility to the hyperscaler. In some cases, the third party that owns the data center also provides services such as power, cooling, and security, while in others the hyperscaler manages all building operations. Hyperscale data centers are a growing segment of the data center market.

Operational capacity—also called “capacity”—refers to the amount of power a data center needs to operate. This includes all the power needed to run the computing equipment, cooling systems, and other building operations. Capacity is often used to describe the size of a data center. For the purposes of this chapter, capacity is measured in megawatts.

The time it takes for data to travel from one point to another, such as from a data center to the end user, is called “**latency**.” Low latency indicates data is traveling more quickly; high latency indicates there is a longer delay. Many factors affect latency, most notably the geographic distance between the data center and user. Some tasks—such as financial transactions—are more “latency sensitive” than others, meaning they require as low latency as possible.

Data center industry is growing rapidly, driven by a combination of established and emerging trends

The data center industry spans markets around the world, clustering in locations that provide access to land, energy, and fiber, and are business friendly, politically stable, and at low risk from natural disasters. Many data center markets are located near key population, business, and government centers because they are close to their customers and end users. Being in proximity to customers reduces the time it takes for data to travel between the data center and the customer, ensuring fast processing, which can be critical for certain business operations, such as financial transactions (sidebar).

It also reduces time for end users to access data, which, for example, reduces buffering times and increases picture quality when streaming media.

The data center industry is dominated by a few large participants. In the U.S., four hyperscaler companies—AWS, Google, Meta, and Microsoft—are responsible for much of the data center industry. These companies operate their own hyperscale data centers, lease other hyperscale data centers, and can also be customers within traditional colocation data centers.

Data center industry is growing rapidly worldwide

The data center industry is growing worldwide, with many data centers under construction or in development. Market reports and trade literature indicate the industry has grown significantly over the past decade, with an especially rapid growth rate in recent years, particularly in the Americas. For example, a 2024 report from the real estate firm Cushman & Wakefield estimates 44,600 megawatts of data center capacity is in development worldwide. More than half (55 percent) of this capacity is in the Americas region, 30 percent is in the Asia-Pacific region, and the remaining 15 percent is in the Europe, Middle East, and Africa (EMEA) region. When completed, this growth would double existing capacity across the EMEA markets and more than double existing capacity in the Americas and Asia-Pacific markets.

The industry is growing both in terms of the number of data centers under construction as well as the size and scale of those data centers. More data centers are being built, and many of the new data centers under construction are larger and have more operational capacity. For example, the capacity of a typical data center has increased from requiring only a few megawatts of power to more than 100 megawatts.

There has also been a recent shift toward companies building data center *campuses*, rather than individual data centers, to serve the needs of hyperscalers. Such campuses can be made up of multiple parcels of land and house several data centers owned by the same entity. Collectively, the operational capacity of these campuses can reach hundreds of megawatts, and in some cases, exceed one gigawatt (i.e., 1,000 megawatts). Companies are increasingly developing data center campuses, rather than individual facilities, to consolidate operations, improve efficiency, and more easily expand capacity in response to growing demand.

Industry expected to grow for foreseeable future, though factors could shift where growth occurs

The data center industry is expected to keep growing, driven by demand for digital services, such as e-commerce, media streaming, and cloud-based applications. This trend accelerated during the COVID-19 pandemic as more people and businesses relied on these services and is expected to continue. As the economy becomes increasingly digitized, more consumers use digital services, and the number of internet-

connected devices rises, the need for data storage, processing, and network capacity will continue to grow.

The recent emergence of AI is another significant driver of data center growth. AI applications, such as machine learning and data analytics, require immense computing power and storage to process large amounts of data. As businesses increasingly adopt AI tools, and AI is integrated into commercial applications, the demand for data centers to support these technologies has surged and is expected to continue to grow.

AI also has the potential to reshape how and where the data center industry grows. For example, some AI workloads, such as large language model training, are not latency sensitive, allowing data centers housing these tasks to be located farther from established data center markets. Additionally, AI workloads are often much larger than typical data center demands, requiring larger facilities with more computing capacity and more power needs (sidebar).

Market constraints could also shift where the industry grows. Key factors, such as power availability, land price and availability, local opposition, and regulatory environments, are constraining the industry, especially in established markets. As these constraints grow, some markets may become less attractive for development, driving data center growth toward other locations.

AI workloads typically require more power than traditional data center tasks because they use more energy-intensive hardware. The servers conducting AI tasks often include graphics processing units (GPUs) alongside central processing units (CPUs), because GPUs are better suited to running large, simultaneous data processes required for AI applications. Since GPUs consume more power than CPUs, AI tasks are generally more energy demanding.

Northern Virginia has the largest data center market in the world, and the state's industry is growing

There are approximately 150 data center sites in Virginia, which collectively house around 340 data center buildings. These sites vary in size, ranging from a single 2,400-square-foot data center building to a campus of seven buildings that total more than 3 million square feet. In total, Virginia has over 63 million square feet of data center space on 7,200 acres of land (sidebar).

Virginia data center sites also vary in size in terms of operational capacity. The smallest sites require only about one megawatt of power, while some larger campuses are estimated to need 200 or more megawatts and are still growing. In total, Virginia data center sites use approximately 5,050 megawatts of power (sidebar). (This is based on the 2024 peak load forecast by Dominion Energy and Mecklenburg, Northern Virginia, and Rappahannock electric cooperatives in August 2023.)

For context, **Pocahontas State Park—the largest in Virginia—covers 7,600 acres.** The entire state park system spans a total of 75,900 acres.

Virginia's data center industry is mostly concentrated in Northern Virginia, with other small clusters near Richmond and Mecklenburg

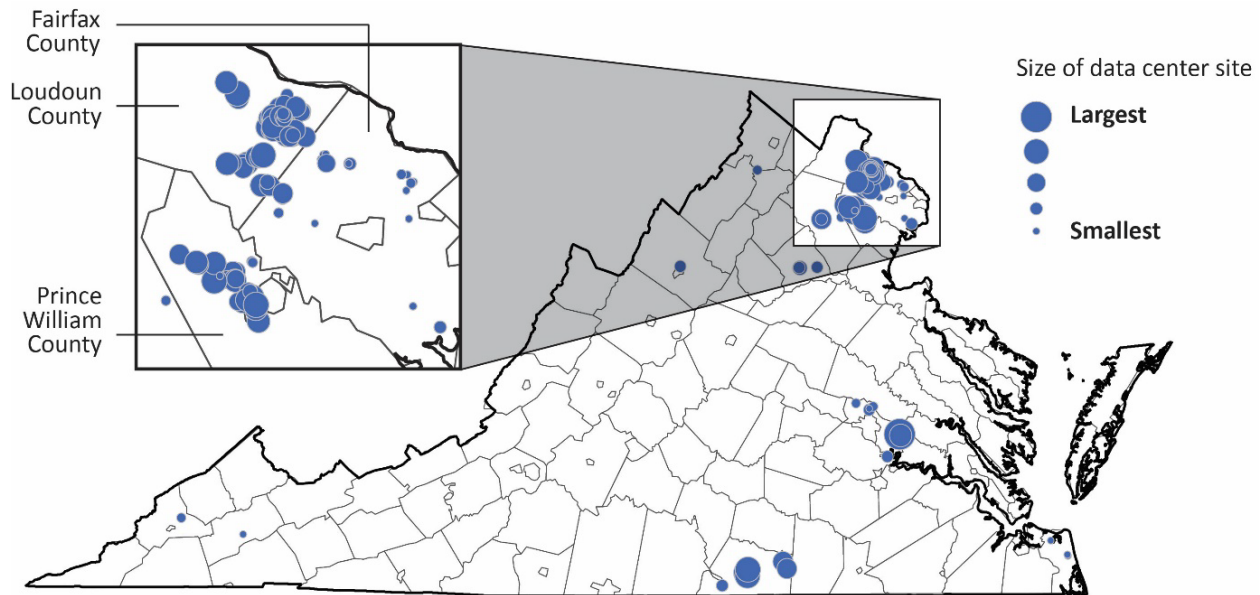
Data centers are located across the state, but 80 percent of Virginia's data center industry is concentrated in three Northern Virginia localities: Loudoun, Prince William, and Fairfax (Figure 1-2). Loudoun County alone accounts for approximately half of the state's data center industry in terms of number of sites, building square footage, and estimated energy usage. The eastern part of the county north of Dulles

Data centers' power usage in Virginia—about 5,050 megawatts—is roughly **equivalent to the electricity needs of 2 million Virginia households** (about 60 percent of households in the state).

International Airport has become known as “Data Center Alley” because of its high concentration of data centers. The remaining 20 percent of Virginia’s data center sites are in 11 other localities, with the most notable clusters in the Richmond region and Mecklenburg County.

FIGURE 1-2

Most of Virginia’s data center industry is concentrated in Northern Virginia



SOURCE: JLARC analysis of Virginia Department of Environmental Quality data and county property real estate records.

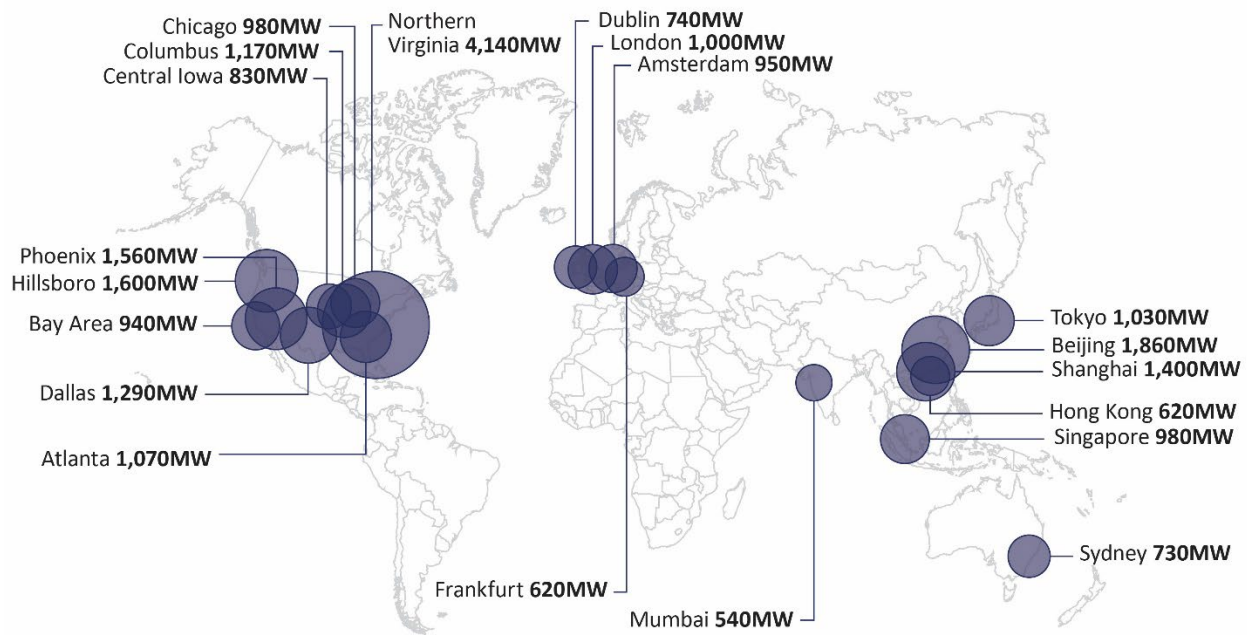
NOTE: Map shows one dot per data center site, which may include multiple data center buildings. Size of each site represented by size of dot, as measured by the maximum capacity (in terms of megawatts) the site is permitted to backup via diesel generators. This capacity is larger than the current operational capacity because it (i) accounts for the site's full build-out potential, which many sites have not yet reached, and (ii) includes allowances for redundancy. Data center operators report 0 to 25 percent of backup capacity is typically for redundancy.

Northern Virginia is the largest data center market in the world because of multiple factors

Northern Virginia has the highest concentration of data centers in the world and is recognized as the world’s premier data center market. The exact size of the Northern Virginia data center market (in terms of the number of sites and energy demand) varies based on the sources used; however, every source indicates Northern Virginia is the global leader. According to data reported by Cushman & Wakefield, in terms of megawatts, the Northern Virginia market is more than twice the size of the next largest market in the world, Beijing, and nearly three times the size of the next largest market in the U.S., located in and around Hillsboro, Oregon (Figure 1-3). The Northern Virginia market constitutes 13 percent of all reported data center operational capacity globally and 25 percent of capacity in the Americas region.

FIGURE 1-3

Virginia has the most operational capacity of all global markets



SOURCE: JLARC analysis of Cushman & Wakefield 2024 Global Data Center Market Comparison.

NOTE: Reflects market size in terms of operational capacity as measured by megawatts. Shows 20 largest markets. "Northern Virginia" refers to an estimate of data center capacity in the traditional Northern Virginia market consisting of Fairfax, Loudoun, and Prince William counties and Manassas. The Cushman & Wakefield report also includes an estimated 560 megawatts of capacity in Culpeper and Fauquier counties and the Richmond metropolitan region.

Multiple factors have contributed to Northern Virginia's market prominence. The region's role in the early stages of the internet's development gave it a head start as a key data center hub. In the mid-20th century, early data processing companies contracting with government agencies and high-technology government labs were drawn to the region given its proximity to their federal government customers. The establishment of an internet exchange point in the 1990s further attracted major telecommunications and early internet companies to the region.

As the internet grew, a strong fiber network, supply of reliable cheap energy, and available land encouraged more data centers to locate in the region. Data centers were also drawn to the region given its proximity to major national customers, including most notably the federal government, government contractors, and technology firms that held an enormous amount of government and other data. With the rapid growth of the internet in the 2000s, it became advantageous for data centers to cluster near each other so they could share information more quickly. The high concentration of data centers also led to a burgeoning ecosystem of industry professionals, real estate developers, construction companies, and tradespeople with expertise in data centers, which continues to make the region attractive today.

The creation of a state data center tax incentive has also been a key factor in the industry's development in Northern Virginia, as well as the state more broadly. In 2010, Virginia adopted a sales and use tax exemption that exempted data centers from paying retail sales tax on computer and related equipment purchases, and the General Assembly has since expanded the exemption. (See Chapter 2 for more information about the sales and use tax exemption and its impact.)

Data center industry is growing rapidly in Virginia, both in established markets and newer ones

The data center industry is growing rapidly in Virginia. Since 2020, data center *space* in Virginia has more than doubled, with over a quarter of the state's existing data center square footage built in 2022 and 2023. Additional square footage has been built in 2024. A 2024 Cushman & Wakefield report underscores this trend, noting there is a record amount of data center *capacity* in development in the state. This includes 1,500 megawatts under construction and 2,900 megawatts in earlier stages of development. When this development is complete, it will nearly double the size of data center capacity in Virginia.

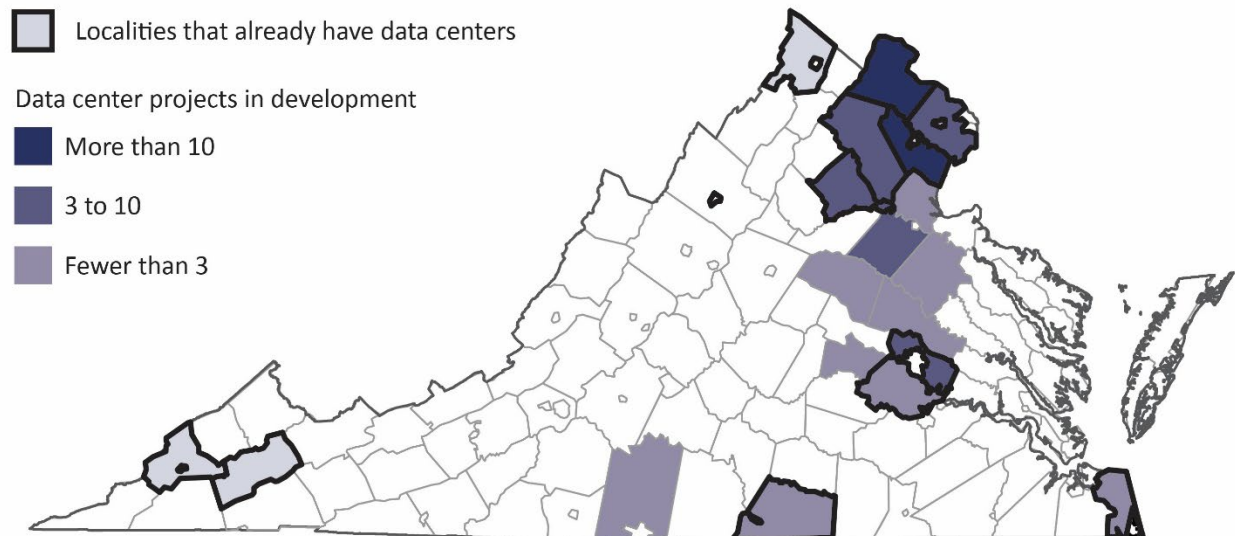
As of September 2024, there are at least 70 new known data center sites under active development across the state. These projects are at various stages of the development process, with more than half having received full local government approval and/or are under construction. The remaining projects are at earlier stages, such as awaiting local rezoning or approval.

Much of the data center development is occurring in the established markets of Northern Virginia, the Richmond region, and Mecklenburg County. Within these existing markets, the majority of growth continues to be in Loudoun and Prince William counties, with Prince William County being the fastest-growing locality (Figure 1-4). The growth in these markets is driven by data center developers and companies building at new sites as well as expanding existing campuses.

The data center industry is also growing in new Virginia markets, most notably in counties outside of the established Northern Virginia market and along the I-95 corridor (Figure 1-4). For example, seven localities without any data centers have recently approved new campuses or have applications pending. According to stakeholders, data center development is moving into these new markets as land availability and local regulatory environments become more challenging in Northern Virginia. Additionally, AWS is leading development into localities along I-95 as part of its agreement with the state to invest \$35 billion in data centers in new Virginia locations by 2040.

FIGURE 1-4

Data center industry still growing in established markets, but development starting to spread into new areas, such as along I-95



SOURCE: JLARC summary analysis as of September 2024.

NOTE: "In development" includes projects that are under construction, permitted, and/or have been approved through local rezoning or other approval processes (if applicable).

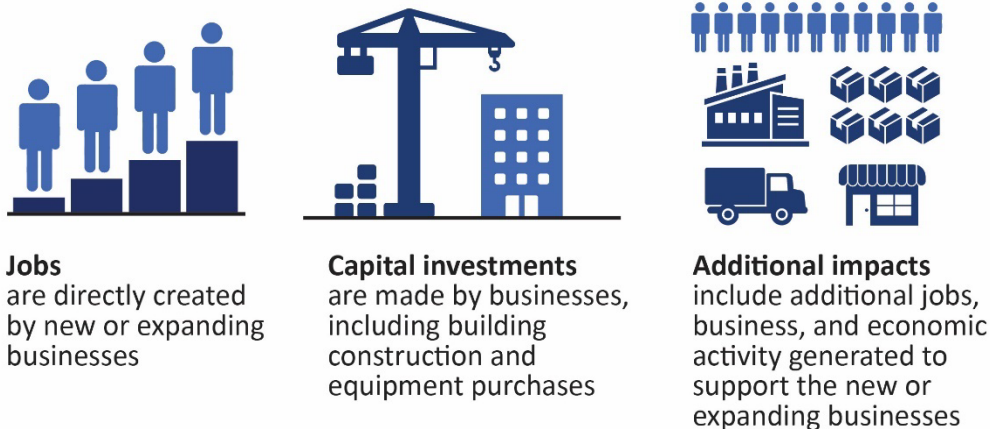
2 Economic and Fiscal Impacts

States strive to build and maintain a strong and diverse economy. A strong economy benefits the state by increasing the wealth of its citizens, helping its businesses succeed, and generating tax revenues to support state and local government operations. Tax revenues help pay for essential services like roads, schools, and public safety.

Virginia looks to improve its economy by attracting new businesses and having existing businesses expand their operations. Businesses benefit the economy directly by creating new jobs and making capital investments, such as constructing new buildings and purchasing vehicles and equipment. Business activities have many additional impacts that further economic growth, such as creating additional jobs at in-state suppliers and in the service industries that support the original business and its employees (Figure 2-1).

FIGURE 2-1

Businesses create jobs and capital investment and have additional impacts that benefit the state economy



SOURCE: JLARC staff analysis.

Data center industry provides positive economic benefits to state

State and local economic development agencies view data centers as an attractive industry. Data center companies are some of the largest and most well-resourced technology companies in the world. Though data centers directly employ relatively fewer employees than some industries, data center jobs tend to be higher paying, so jobs

Tradeable sector includes businesses that compete or export goods and services outside of where they are located. They have larger economic impacts because they bring in new revenue from outside the state instead of simply reallocating existing economic activity.

An employment multiplier is an estimate of the number of additional jobs created in the economy to support each job created directly by an industry.

have a higher economic impact. Data centers also meet other characteristics of a high impact industry: they are in a tradable industry sector and have a high employment multiplier (sidebar). Data centers—like manufacturers, steel producers, and transportation industries—are also capital intensive. Their facilities are enormous and require multibillion-dollar outlays for construction and equipment, which can provide substantial tax revenue for local governments and a comparatively smaller amount of tax revenue for the state (for the portion that is not tax-exempt).

The data center industry provides secondary economic benefits to the state as well. The clustering of data centers in a region, like Northern Virginia, can have “knock on” economic effects by indirectly attracting other related technology businesses, which help create a well-trained, regional IT workforce. This clustering of data centers, related businesses, and skilled workers can further improve the region’s attractiveness to additional businesses in the technology sector and other sectors.

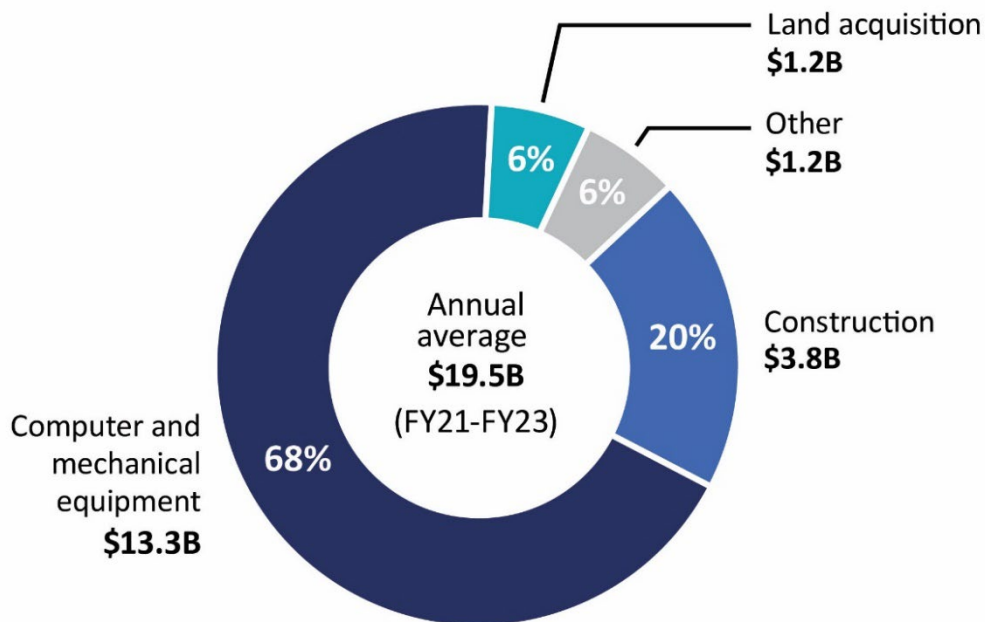
Data center capital investment is substantial, although only a portion of it benefits Virginia’s economy

Capital investment in Virginia data centers is substantial, exceeding \$24 billion in FY23, and primarily consists of equipment purchases from Virginia-based and out-of-state companies. Data center investment represented 84 percent of the total capital investment across all economic development projects announced by the Virginia Economic Development Partnership (VEDP) between FY22 and FY24. However, like capital investments made by other industries, only a portion of data center capital investment benefits the Virginia economy. The primary benefit to Virginia’s economy is related to data center construction, which comprises about 20 percent of total data center capital investment (Figure 2-2). Most construction spending likely remains in the state economy because much of it goes to Virginia-based businesses performing key construction services such as clearing and grading sites, erecting steel frames, installing high-voltage electrical equipment, installing industrial-scale cooling systems, and running miles of cable, conduit, and piping. Materials used in data center construction are often also sourced from Virginia businesses throughout the state.

The largest portion of data center capital investment is for IT and mechanical equipment (68 percent), and most of this spending occurs with out-of-state companies. Computer servers are the biggest equipment expense and, because there are no major computer server manufacturers in Virginia, are sourced from outside the state or the country. Some other equipment used in data centers is sourced in Virginia. For example, Virginia has suppliers of electrical and cooling equipment, raised-access floors and hot/cold aisle containment systems, and fiber infrastructure. These suppliers have recently located or expanded operations in Virginia because of the state’s large data center market. Even so, a substantial amount of non-computer equipment still likely comes from out-of-state, such as the diesel generators data centers use for backup power.

FIGURE 2-2

Primary benefit of data center capital investment to Virginia's economy is from construction, which comprises 20 percent of data centers' capital investment



SOURCE: JLARC staff and Weldon Cooper Center analysis of data center capital investment between FY21 and FY23 reported to VEDP.

Data center industry supports relatively small operations workforce and sizable construction workforce, both with average or above average wages

Data centers typically employ a small number of workers for data center operations, relative to their facility size. For example, several data center representatives indicated that a typical 250,000-square-foot data center may have approximately 50 full-time workers (one employee per 5,000 square feet versus one employee per 650 square feet for some distribution centers). About half of these workers are likely direct employees of the data center company (or for colocation data centers, direct employees of the tenant). These workers include facility managers, engineers, data technicians, and facility maintenance staff. The other half are contract workers, including electricians, pipefitters, and security personnel who work full-time at the facility (sidebar).

Data center direct employees and contract workers accounted for, by JLARC staff estimates, over 8,000 full-time jobs in FY23. A data center may add new jobs each year as new facilities begin and expand operations. In FY23, data centers added more than 800 new full-time jobs.

Data center construction, however, supports a substantially larger number of workers than data center operations. Construction of an individual data center building usually

Data centers require constant ongoing maintenance of electrical and cooling systems. Data centers have hundreds of electrical and mechanical components that must be replaced as they break down over time. Additionally, these systems can also be upgraded or configurations changed as computer equipment is upgraded and replaced.

takes about 12 to 18 months, and it can take five or more years to fully build out a campus. Data center representatives indicated that, at the height of construction, approximately 1,500 workers are on site building a facility and installing electrical and cooling systems and include occupations such as

- site developers and surveyors,
- equipment operators for land clearing and leveling,
- workers to erect steel building frames and concrete walls,
- electricians installing cabling, equipment, and generators, and
- pipefitters and HVAC technicians installing piping and cooling equipment.

Both data center operations and construction workers earn average or above average wages, contributing to the economic benefit of the industry. On average, data center employees and contractors earn about \$100,000 per year, varying based on job role and area of the state. Many construction-related jobs do not require a college degree but are also relatively high-paying. For example, the starting salary for electricians is approximately \$24 per hour, and a “journeyman” (fully trained) electrician can make approximately \$56 per hour. These wages translate to \$50,000 and \$116,000 in annual wages, respectively, but the actual annual wages are likely higher because these workers often work over 40 hours per week and can earn overtime pay.

The growth of Virginia’s data center industry has contributed to the expansion of the state’s trades and construction industry. A representative from a construction supplier and contractor indicated that the data center industry is the largest construction sector right now, and data center projects are about one-third to one-half of their current projects and nearly two-thirds of their backlog. A representative of an electrical workers union in Northern Virginia indicated that, because of demand from the growing data center industry, their apprenticeship program has grown from 300 apprentices per training course to 500 in the last several years and could grow larger. A benefit of this growth is that many workers are able to stay in-state and move to another data center construction job after a project is complete, rather than moving to another state to find work.

JLARC’s independent economic impact analysis was performed by staff from the Weldon Cooper Center. The analysis was conducted using economic modeling software developed by IMPLAN. The model uses an industry standard methodology but does not account for the cost of some potential externalities, such as health and environmental costs associated with increased carbon emissions, that may be associated with the industry’s large energy demands. See Appendix D for additional details.

Data center industry has added thousands of jobs and several billion dollars to state’s economy, mostly from construction

The data center industry benefits the Virginia economy because of the additional jobs and personal income created and the value it adds to the Virginia economy (i.e., Virginia gross domestic product or GDP). JLARC staff commissioned an independent economic impact analysis of the data center industry in Virginia (sidebar). The analysis estimated that the data center industry provides approximately 74,000 jobs, \$5.5 billion in labor income, and \$9.1 billion in Virginia GDP overall to the state economy annually, based on average spending by the industry between FY21 and FY23 (Table 2-1). These estimates are just over 1 percent of total statewide employment, income, and Virginia GDP during the last three years. Most of the economic benefits have been in

the Northern Virginia region, but other regions where data centers are located or under construction, or that have businesses that otherwise support the industry, also benefited (Figure 2-3).

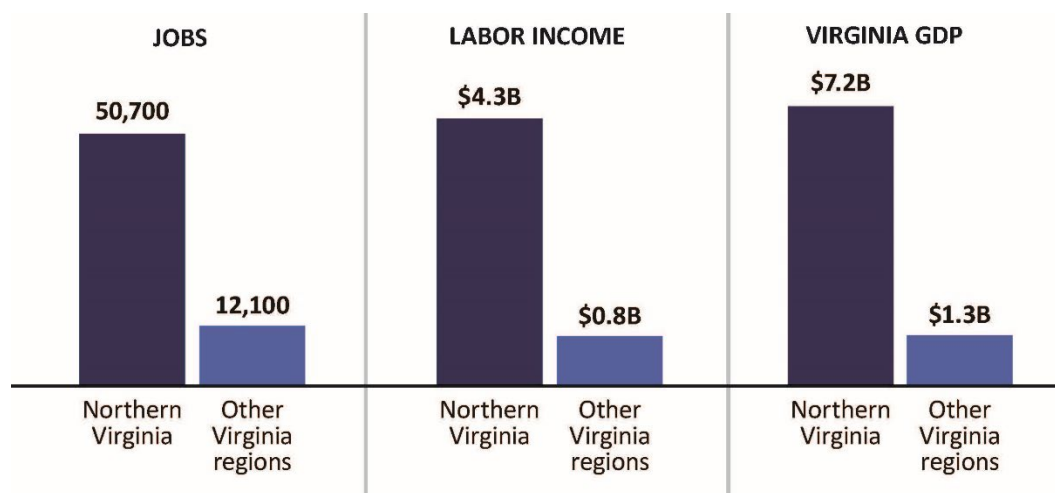
TABLE 2-1
Data center industry has positive economic benefits on Virginia

Economic impact	Annual average based on data center capital investment and related operation spending		
	Construction phase	Operations phase	Total impact
Jobs	59,000 jobs (35,000 direct)	15,000 jobs (4,400 direct)	74,000 jobs (39,400 direct)
Labor income	\$4.3 B (\$2.6 B direct)	\$1.2 B (\$0.4 B direct)	\$5.5 B (\$3.1 B direct)
Virginia GDP	\$6.4 B (\$3.3 B direct)	\$2.7 B (\$1.1 B direct)	\$9.1 B (\$4.4 B direct)

SOURCE: Weldon Cooper Center economic impact analysis of the data center industry impacts, based on data center spending between FY21 and FY23 reported to VEDP, adjusted to account for non-exempt data centers. Numbers may not sum because of rounding.

NOTE: Direct operations jobs include only data center employees and exclude contractors that work full time at data centers. Total impact includes direct impacts plus indirect and induced impacts. Average data center economic impacts presented here likely underestimate the impacts in more recent years given the growth of the industry.

FIGURE 2-3
Economic impact from data centers is concentrated in Northern Virginia



SOURCE: Weldon Cooper Center economic analysis of the annual data center industry impacts, based on data center spending between FY21 and FY23 reported to VEDP, adjusted to account for non-exempt data centers.

NOTE: Totals for Northern Virginia and other Virginia regions do not sum to statewide totals shown in Table 2-1 because the analysis does not account for impacts from activity in Northern Virginia occurring in other Virginia regions and vice versa.

Much of the data center industry's economic benefits in Virginia derive from capital spending during the construction phase rather than spending during ongoing operations (Table 2-1). Annual average spending during the construction phase is estimated

to be more than three times annual operation spending, according to prior research. Data centers were estimated to contribute 59,000 jobs annually during the construction phase, accounting for 80 percent of total annual jobs resulting from data centers. This estimate includes 35,000 direct jobs, most of which were construction workers (28,000), although some were IT-related workers manufacturing and installing equipment (7,000). Another 24,000 jobs were estimated to be in supporting sectors, such as materials suppliers, and “induced jobs” in businesses that benefit from worker spending, such as restaurants and retail. The data center construction phase also accounted for most of the annual increase in total labor income (80 percent) and total Virginia GDP (70 percent) from data centers. Appendix D provides additional technical details on these and other analysis outcomes.

Because most of data centers’ economic benefits are from construction, continued growth of the data center industry would be needed in Virginia to maintain the same level of economic impact. Current trends suggest continued growth is likely to happen, at least for the near future. Virginia’s data center market is expected to double in the next few years based on the data center capacity currently under construction and in the early development stages.

Data centers generate substantial local tax revenues for localities that have them

Business personal property taxes are levied by local governments on the value of property, such as furniture, fixtures, computer equipment, machinery, tools, and heavy equipment within their locality. State law allows a locality to tax certain classes of personal property at lower rates, including computer equipment for data processing.

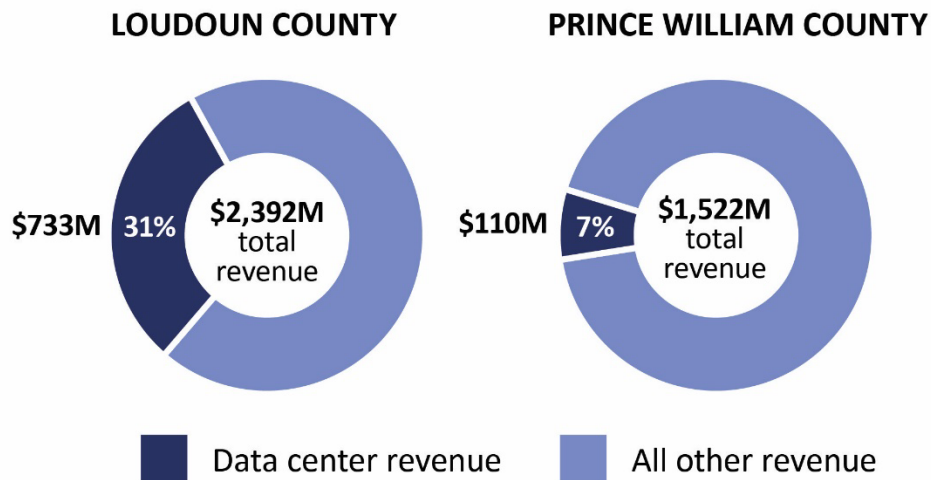
Real property (or real estate) taxes are levied by a local government on land and improvements in their locality.

Local governments with data centers in their jurisdictions can collect substantial tax revenues from the industry. Data centers pay different types of local taxes, but the primary ones are business personal property and real property (real estate) taxes (sidebar). The business property tax, in particular, can generate substantial revenue. A single data center typically has business personal property valued in the millions, a large portion of which is computer equipment that is typically replaced every five years.

Although data center tax revenues can be substantial, the industry’s share of local revenue varies. For the five localities with relatively mature data center markets (Loudoun, Prince William, Mecklenburg, Henrico, and Fairfax), data center revenue ranged from less than 1 percent to 31 percent of total local revenue. The amounts collected and percentage of local revenues vary substantially because of differences in the size and maturity of the data center markets, locality sizes and tax bases, and local tax rates and depreciation schedules. Loudoun and Prince William have the largest and most mature markets, and data center revenue accounted for 31 percent and 7 percent, respectively, of total local tax revenue (Figure 2-4). Loudoun collects substantially more revenue from data centers primarily because its data center market size is three times larger than Prince William’s. Revenue estimates are not provided for all of these localities to protect taxpayer confidentiality.

FIGURE 2-4

Data center tax revenue can be substantial for local governments (FY23)



SOURCE: JLARC staff analysis of revenue collections from localities and the APA Local Government Comparative Report, FY23.

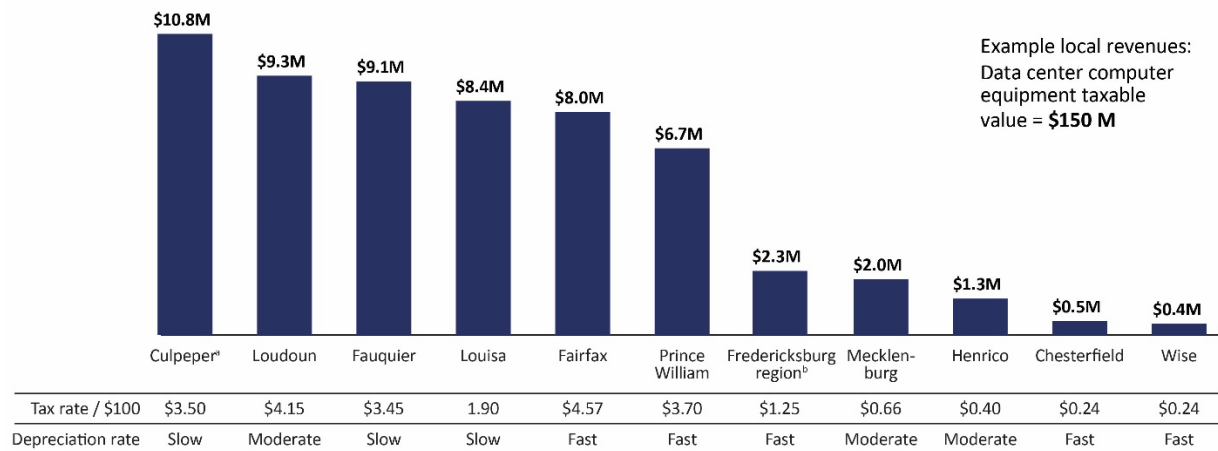
Tax rates also significantly affect the amount of revenue a locality can generate from data center developments. Some localities have greatly reduced their business personal property tax rates for computer equipment to try to attract the industry and, therefore, collect far less revenue than other localities with a higher tax rate would collect for a comparable project. For example, assuming a data center with \$150 million in taxable computer equipment, counties could collect from \$10.8 million to \$0.4 million over a five-year period (after accounting for different tax rates and depreciation schedules) (Figure 2-5).

Even with the variation in tax revenue collections, local government staff from the five counties with the greatest data center presence indicated that data center revenue has benefited their locality. Local government staff indicated data center revenue has allowed their locality to

- lower real estate tax rates (Loudoun and Prince William),
- develop an affordable housing trust fund (Henrico County),
- establish revenue stabilization or reserve funds (Loudoun and Prince William), and
- construct new schools (Mecklenburg).

FIGURE 2-5

Some localities would collect far less revenue over a five-year period than others for the same data center development



SOURCE: JLARC staff analysis of locality property tax rates and depreciation schedules for computer equipment.

NOTE: Tax rate is the business personal property tax rate in 2024 for computer equipment. Amounts exclude real property taxes. Amounts are based on a data center with \$150 million in equipment. Data center equipment is typically replaced every five years, which resets the depreciation schedule used to calculate the decline in value of equipment each year after its purchase.

^a Culpeper provides a local tax rebate for data centers that invest at least \$10 million and hire at least 10 new employees in the Culpeper Technology Zone, and therefore may reduce this amount for qualifying data centers. ^b Fredericksburg Region includes the City of Fredericksburg, Caroline County, King George County, Spotsylvania County, and Stafford County.

In addition to the revenue the industry generates, local government staff reported that data centers are an attractive industry because they impose minimal direct costs on the provision of government services compared with other industries. Data centers employ relatively few employees in comparison with other industries like manufacturing and logistics. Industries with more employees place greater demand on local roads, school systems, and other services.

Localities in distressed areas have difficulty attracting data centers

Data center developments could benefit localities in economically distressed areas of the state through increased local revenue. However, localities in these areas face several challenges in attracting data centers. To be considered, a locality likely needs to have 230kV transmission lines (the preferred voltage for modern data center campuses) and large and flat properties close to those transmission lines. These requirements could prevent many counties in distressed areas, particularly in Southwest Virginia, from being considered.

Localities in economically distressed areas that are away from population centers can also only compete for certain types of data centers. They cannot compete for data centers that need to be close to customers or require low latency, such as cloud computing and colocation facilities. However, they may be able to compete for data centers

running artificial intelligence (AI) workloads, such as training models, which do not need to be near populated areas and may not require low latency. AI is expected to drive a lot of future industry growth and presents an opportunity for more remote localities.

The state could improve the competitiveness of localities in distressed areas by helping them identify, prepare, and market industrial sites that are attractive to the data center industry. Data center companies prefer to move fast once a site has been identified, so available land should have access to roads and other utilities (water, sewer) that allow construction to begin soon after selection. Company representatives said industrial sites that are shovel-ready could be particularly attractive. The primary reason Mecklenburg was successful in attracting Microsoft was because the county had already identified a site suitable for data center development when Microsoft was looking for potential Virginia locations.

The Virginia Business Ready Sites Program, which is administered by VEDP, can be used for this purpose. The program identifies and assesses the readiness of potential industrial sites and provides site characterization and development grants to local governments and regional authorities. The program is intended to develop sites to attract large employers, such as manufacturers, but it can be used to identify and develop sites for which data centers would be a “best use” and would generate a positive return on investment for the state. For example, a 150-acre site that has limited road and rail infrastructure but is located close to 230kV transmission lines might be best used as a data center instead of a manufacturing plant. To help localities in distressed areas compete for data centers, VEDP should clarify that potential data center sites can be included in VEDP’s site listings and are eligible for Virginia Business Ready Sites Program grants.

RECOMMENDATION 1

The Virginia Economic Development Partnership should clarify in site characterization and development guidelines that potential data center sites are eligible for grants under the Virginia Business Ready Sites Program.

The state made changes to its data center sales tax exemption, discussed in the next section, several years ago to try to attract data centers to distressed areas of the state (sidebar). However, very few data centers have qualified for the exemption under the changes, so the changes alone may not be sufficient to overcome other challenges to attract data centers to these areas.

The 2020 General Assembly **lowered the eligibility requirements** for the data center exemption in distressed areas of the state to 10 jobs and capital investment of \$75 million to encourage growth in these areas.

State's data center exemption encourages industry growth and has moderate economic benefits

Virginia, like other states, uses incentives and other strategies to try to attract specific industries that can create new economic activity. The goal of targeting specific industries is to establish industry clusters or ecosystems.

Since 2010, Virginia has offered a retail sales and use tax exemption to attract large-scale data centers. The exemption allows qualifying data centers and their tenants to purchase computers and other equipment without paying the state sales tax on the following items, namely

- computer equipment such as servers, mainframes, network infrastructure, and data storage hardware; and
- other equipment such as cabling, switches, cooling equipment, generators, monitoring systems, and similar items used to operate exempt equipment.

This report includes higher **estimates of the tax revenue impact of the data center exemption** than was reported in prior years. Data centers using the exemption are now required to report to the Virginia Economic Development Partnership their annual eligible exemption expenditures and tax benefits.

The statewide retail sales and use tax includes a 4.3 percent state share, a 1 percent local option share, and additional 0.7 percent to 1.7 percent regional share, depending on the region. In addition to collecting revenue from the local option, localities tax data center property in other ways, as described in this chapter.

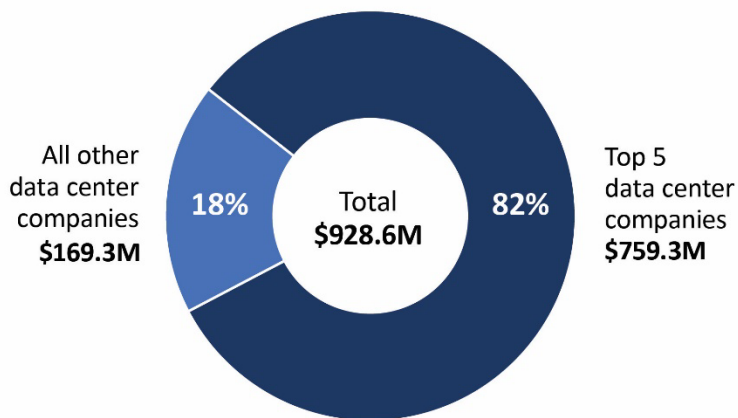
Exemption provides qualifying data center companies with substantial tax reductions

Data center owners and their tenants, which can include a wide range of businesses in sectors like technology, health care, financial institutions, and retail, can claim the data center sales and use tax exemption if they meet eligibility requirements. To qualify, data centers must create a minimum of 50 jobs paying at least 150 percent of the prevailing annual average wage in the locality where the data center is located and make a \$150 million capital investment. As noted above, the minimum thresholds are lower for distressed areas. Data centers and tenants reported saving \$928.6 million in sales taxes in FY23 because of the exemption, including state, local, and regional portions of the tax (sidebar). The state portion of the exempted amount was an estimated \$683 million, making it by far the state's largest economic development incentive, with the next closest incentive valued at \$74 million.

Although approximately 30 data center companies (and their tenants, for colocation data centers) claim the exemption, most of the tax savings accrue to a small number of companies (Figure 2-6). Even so, the median savings for a data center company using the exemption was \$5.4 million in FY23, and all but six companies saved \$1 million or more.

FIGURE 2-6

Most of the tax savings from data center exemption go to only a few data center companies (FY23)



SOURCE: JLARC staff analysis of data center exemption information reported to VEDP.

NOTE: For colocation data centers, the tax savings is attributed to the data center owner rather than the individual tenant, because the data center owner is the “holder” of the MOU and the reporting entity.

Exemption likely affects data center location and expansion decisions

Data center companies consider several factors when determining where to locate, and state sales tax exemptions are regularly ranked among their top factors. The other top site selection factors are access to power, available land, workforce quality, customer needs, business-friendly regulatory climate, and utility and other costs. While it is impossible to precisely determine the exemption’s importance in data centers’ location decisions, representatives from data center companies indicated the exemption was a key consideration because it greatly reduces their costs.

Data center companies view the exemption as important because their industry is capital intensive, and the exemption provides substantial savings on those investments. If a typical modern 250,000-square-foot data center costs \$250 million to \$325 million to build and equip, the exemption would provide an initial benefit of about \$9 million to \$15.5 million in savings (depending on the locality). Companies also save on subsequent equipment purchases, usually made every five years when data centers replace and upgrade their computer equipment. For colocation data centers, the exemption is also important for meeting customer needs, because it provides savings to tenants who purchase their own equipment.

Virginia is competing for data centers with other states that have similar exemptions

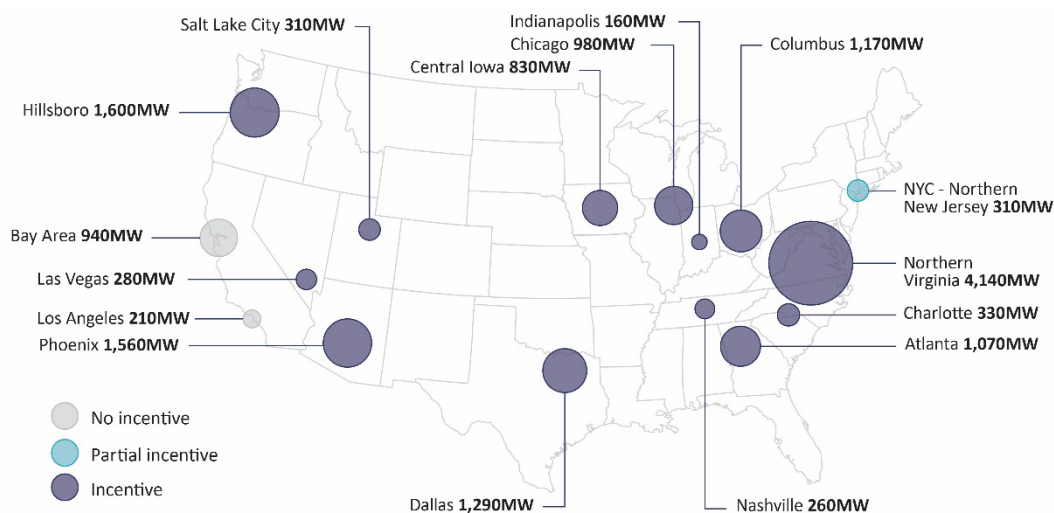
Since the late 2000s, states have increased their efforts to attract data centers, primarily by adopting sales tax exemptions. In 2008, Virginia became the seventh state to adopt a sales tax exemption. (The initial exemption applied to very few localities and is no longer in effect, but a statewide exemption was adopted in 2010.) Today, the majority

of states either have a sales tax exemption for data centers (34) or do not have a sales tax (4). All states bordering Virginia provide a sales tax exemption to data centers. (See Appendix E for a map of states with a data center sales tax exemption.)

Virginia competes with other states for new data center developments, especially states that also have primary markets. Most other primary markets are located in states with exemptions, with the exceptions being markets in California and the New Jersey portion of the New York-northern New Jersey market (Figure 2-7). These two markets have a relatively small data center presence considering their proximity to major population centers, the California market's proximity to high tech firms in Silicon Valley, and the New Jersey market's proximity to the U.S. financial center in New York City.

FIGURE 2-7

All primary data center markets in the U.S. have exemptions, except for California and northern New Jersey markets, which are relatively small



SOURCE: JLARC staff analysis of Cushman & Wakefield 2024 Global Data Center Market Comparison.

NOTE: Oregon (Hillsboro market) does not have a sales tax (which has similar effect of the exemption). "Northern Virginia" refers to an estimate of data center capacity in the traditional Northern Virginia market consisting of Fairfax, Loudoun, and Prince William counties and Manassas. The Cushman & Wakefield report also includes an estimated 560 megawatts of capacity in Culpeper and Fauquier counties and the Richmond metropolitan region.

Data center exemption has moderate economic benefits and return in revenue to the state compared with other incentives

The data center exemption has moderate economic benefits and moderate return in revenue to the state compared with Virginia's other economic development incentives. (See *Data Center and Manufacturing Incentives*, JLARC, 2019.) It is rated as moderate because it is similar to the economic benefits and return in revenue for the average incentive (Table 2-2). Like most economic development incentives, the data center exemption does not pay for itself when considering just the state portion of the exemption cost and the state return in revenue.

TABLE 2-2

Data center exemption has moderate benefits compared with other incentives

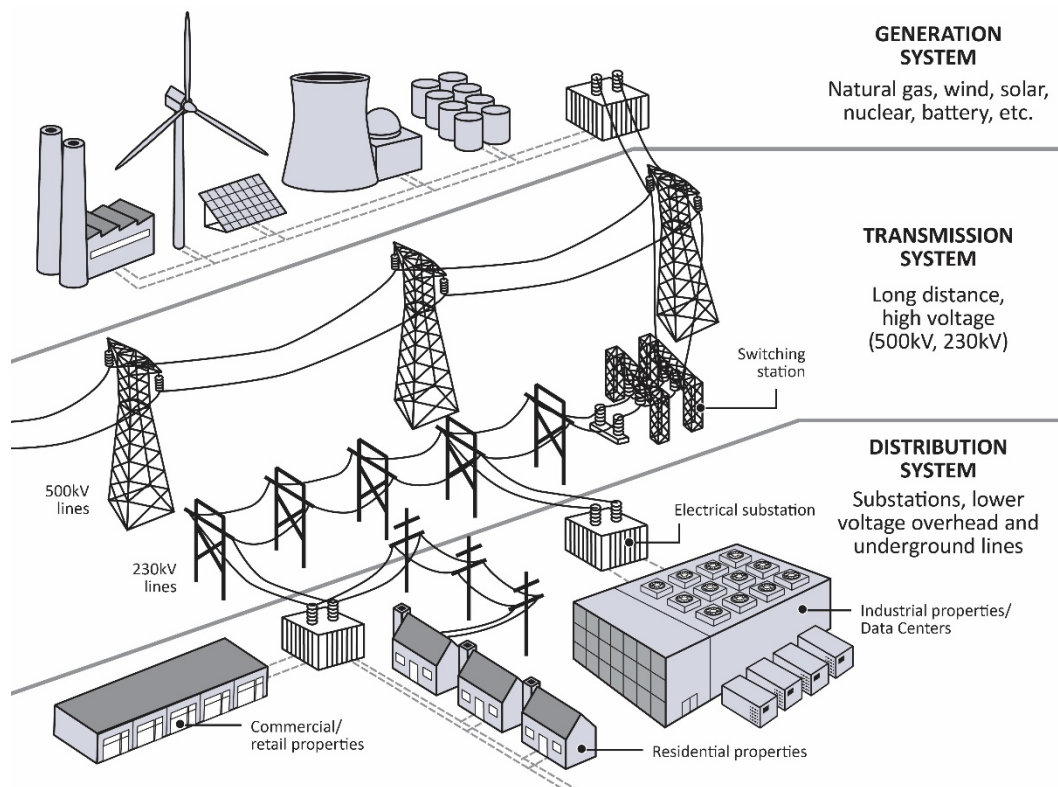
	Annual average	
	Data center exemption	Average Virginia incentive
Economic impact per \$1 million spent on the exemption		
Jobs added	84 jobs	58 jobs
Income added	\$6 M	\$5 M
Virginia GDP increase	\$10 M	\$9 M
Impact on state revenue per \$1 spent on the exemption		
Return in revenue per \$1 spent	48¢	41¢

SOURCE: *Economic Development Incentives 2024*, JLARC 2024.

3 Energy Impacts

Virginia's power grid is part of the North American Eastern Interconnection, a massive energy infrastructure network that provides electricity to most states and several Canadian provinces east of the Rocky Mountains. The grid comprises three key interconnected systems: generation, transmission, and distribution (Figure 3-1). Power generation in Virginia has historically come from a few large carbon fuel and nuclear plants, but is increasingly coming from renewable sources like solar and wind. The transmission system moves power in bulk over long distances from where it is generated to the area where it is consumed. Power is then reduced to lower voltages and provided to homes, businesses, and other consumers through the distribution system.

FIGURE 3-1
Power grid is a complex network of generation, transmission, and distribution systems



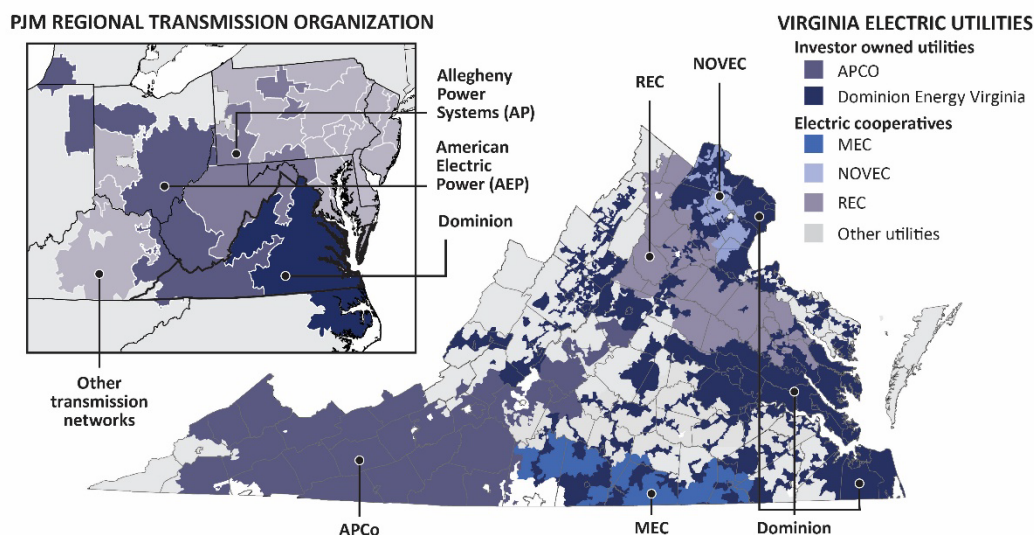
SOURCE: JLARC staff.

Within the eastern power grid, Virginia is part of the PJM regional transmission organization (Figure 3-2). PJM is a not-for-profit organization that coordinates generation and transmission operations and operates as a wholesale power market for its members, including utilities, independent power generators, and other energy companies. Within Virginia's section of PJM, the two main power utilities are Dominion and American Electric Power (AEP), which operate much of the generation and most of the transmission that serve the state. Dominion and AEP (under its subsidiary Appalachian Power Company, or APCO) are also the distribution utilities for much of the state. However, a significant portion of the state is served by 13 distribution cooperatives (the "co-ops"). Most co-ops purchase their power through another generation and transmission utility, the Old Dominion Electric Cooperative (ODEC), which operates or partially owns a few power plants, and contracts for additional power, in and outside of Virginia. The largest distribution co-op, the Northern Virginia Electric Cooperative (NOVEC), purchases its own generation and operates one power plant.

Virginia's power utilities are subject to state and federal laws and are regulated by the State Corporation Commission (SCC) and the Federal Energy Regulatory Commission (FERC). One of SCC's key functions is to approve new generation and transmission projects. See Appendix F for more discussion of generation and transmission projects' potential impacts and how regulators and utilities try to minimize those impacts.

FIGURE 3-2

Virginia is part of PJM and relies on transmission and distribution utilities



SOURCE: PJM and SCC maps.

NOTE: MEC = Mecklenburg Electric Cooperative. REC = Rappahannock Electric Cooperative. Additional cooperatives that are not named above include A&N, BARC, Craig-Botetourt, Community, Central Virginia, Northern Neck, Powell Valley, Prince George, Southside, and Shenandoah Valley. There are also several small municipal power utilities, and the investor-owned Eastern Kentucky Power Company serves a small portion of Southwest Virginia.

Data center industry is driving immense increase in energy demand and will require enormous new infrastructure investments

Modern data centers consume substantially more energy than other types of commercial or industrial operations. For example, one of the smaller data centers recently constructed in Virginia can draw up to 18 MW of power (sidebar). This is roughly equivalent to a mid-sized automobile assembly plant, 60 large commercial office buildings, or 4,500 homes. The largest new data centers can draw from 100 to over 200 MW each, which is more than most industrial consumers. Some planned data center campuses are expected to consume well over 1,000 MW, once fully built out, which is more than the 950 MW generation capacity of the state's largest nuclear reactor.

To evaluate the potential energy impacts of the data center industry, JLARC staff commissioned an independent forecast of *unconstrained* power demand growth in Virginia, based on historical data trends. The unconstrained forecast shows what demand would be before accounting for constraints like the ability to build enough energy infrastructure to meet demand. JLARC staff also commissioned an independent grid model to project what future generation and transmission infrastructure would be needed to meet (1) unconstrained demand and (2) half of unconstrained demand. The grid model also estimated infrastructure needs if there was no new data center demand, so that the effects of data center growth could be separated from other effects on the grid. The demand forecast was developed by staff from the Weldon Cooper Center for Public Service at the University of Virginia, and the grid model was developed by energy consultant Energy + Environmental Economics (E3). See Appendix B for additional details.

Data center power demand is typically measured in megawatts (MW). A watt measures the amount of energy produced or consumed at any instant, and a megawatt is equal to 1 million watts. For example, a 100 MW data center can consume up to 100 MW of energy at a given point in time. Energy consumption over time is typically measured in kilowatt-hours (KWh) or megawatt-hours (MWh).

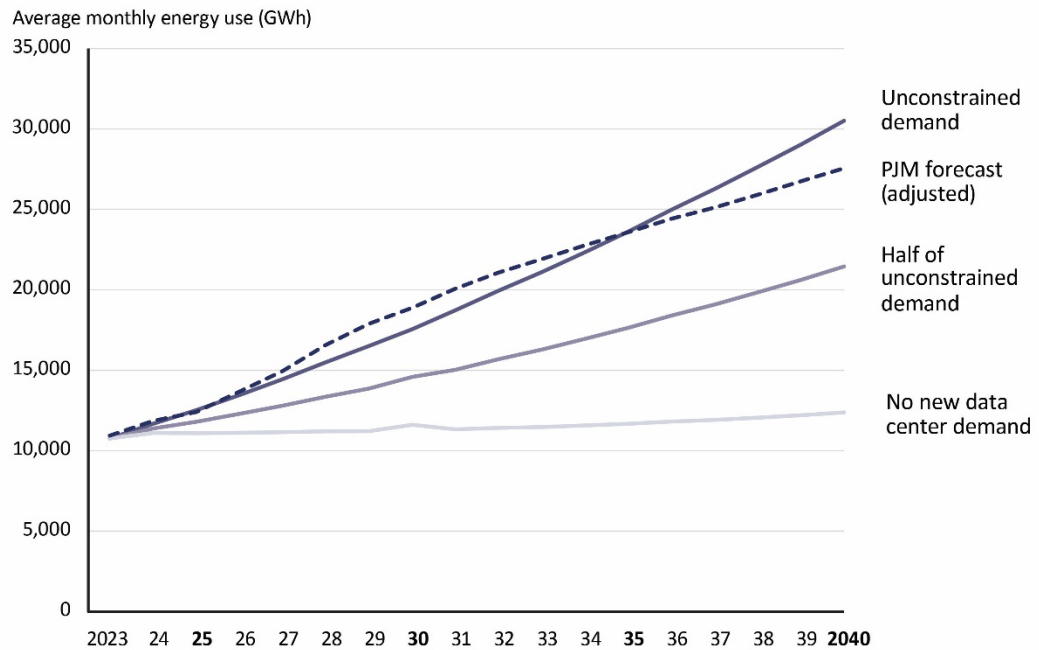
Data center industry is forecast to drive immense increase in energy demand

The data center industry boom in Virginia has substantially driven up energy demand, and demand is forecast to continue growing for the foreseeable future. The state's energy demand was essentially flat from 2006 to 2020 because, even though the population increased, improvements in energy efficiency offset that increase. However, by 2024, PJM forecast an unprecedented 5.5 percent year-over-year growth in the Dominion transmission zone, mainly because of increasing data center demand.

JLARC's independent forecast shows that unconstrained demand for power in Virginia is expected to double within the next 10 years, driven primarily by the data center industry's growth (Figure 3-3). Almost all of the demand growth is expected to occur in the Dominion transmission zone, which covers the Northern and Central Virginia regions, where most new data centers are being built. JLARC's forecast largely matched the most recent PJM forecast.

FIGURE 3-3

Data center demand would drive immense increase in energy demand in Virginia, based on JLARC's independent forecast and other forecasts



SOURCE: JLARC staff consultant analysis.

NOTE: Forecast is for Virginia. PJM forecast is the 2024 forecast for the Dominion transmission zone adjusted upward to account for APCO; this adjustment had no effect on the trendline shown and was done so that the forecasts could be more easily compared. JLARC's independent forecast was developed using actual, historical energy use and employed advanced statistical methods to project use going forward. While JLARC's forecast was checked against the data reported by utilities on future data center load requests, that data was not used to formulate the forecast.

The first five years of JLARC's unconstrained demand forecast are in line with the new data center load additions that are expected, based on existing utility service and data center construction agreements, data center projects that have been announced, and national energy research conducted by Lawrence Berkeley National Laboratory and the Electric Power Research Institute.

New generation and transmission infrastructure will need to be built to help address data center demand

JLARC's grid model found that a substantial amount of new generation and transmission infrastructure would need to be built in Virginia to meet unconstrained demand, or even half of unconstrained demand, and most of the new infrastructure needs would be attributable to the growing data center industry (Table 3-1). For each of the demand scenarios, the model considered the most feasible and economical approaches to meeting infrastructure needs with and without the requirements of the Virginia Clean Economy Act (VCEA). The modeling was done using industry standard approaches and tools for electric utility and state energy planning purposes. It is based

on current state and federal laws and regulations. Some costs, such as the social cost of carbon, were not explicitly included in the model.

VCEA was enacted in 2020 to drive investment in renewable resources and requires the phaseout of carbon-emitting generation in the state by 2050. (See Appendix G.) VCEA requires that an increasingly larger share of the energy sold by the investor-owned utilities, Dominion and APCO, to their retail customers come from renewable and in-state generation sources. While this results in slightly more generation being built in-state than would otherwise occur, it has little effect on new transmission infrastructure needs and could increase the amount of energy that is imported from out of state. VCEA's effects on renewable and in-state generation are not as pronounced as might be expected because the requirements for utilities to sell energy from these sources do not apply to the co-ops, and a majority of projected data center growth (~60 percent) is expected to occur in co-op service territories. See Appendix H for additional details on generation capacity and energy sources expected under each scenario.

TABLE 3-1

Addressing demand from data centers would require substantial investment in new in-state generation resources and transmission by 2040

			Change from 2025 to 2040			
			Scenario 1: Unconstrained demand		Scenario 2: Half unconstrained demand	
	Current system		No VCEA	VCEA	No VCEA	VCEA
Generation resources (in-state)	36,000 MW capacity	Net increase	+54,100 MW	+56,300 MW	+31,200 MW	+34,700 MW
		<i>Data center share</i>	+35,600	+34,300	+12,800	+12,700
Transmission (interzonal)	8,700 MW capacity	Net increase	+3,500 MW	+3,500 MW	+3,100 MW	+3,100 MW
		<i>Data center share</i>	+3,500	+3,500	+3,100	+3,100
Imported energy (net)	38 TWh annual energy ^a	Net increase	+62 TWh	+73 TWh	+24 TWh	+24 TWh
		<i>Data center share</i>	+79 ^b	+92 ^b	+41 ^b	+43 ^b

SOURCE: E3 grid modeling analysis. Current system capacity and energy are derived from Energy Exemplar PLEXOS database.

NOTE: Generation is in-state nameplate capacity that would need to be built, which can be significantly higher than the amount of energy produced by a resource over a year (e.g., Virginia solar facilities produce at around 25 percent of nameplate capacity). The model predicts new generation capacity would still be built even without data center growth, because the grid is expected to shift to cheaper renewable energy sources and construction of more in-state generation to reduce reliance on imports. Transmission shows only current and additional interzonal capacity needed for power exchange between the Dominion transmission zone and neighboring zones. It does not show transmission capacity or additions *within* the Dominion transmission zone.

^a TWh=terawatt hours. TWh are used to measure large amounts of energy consumed over time. One TWh = 1,000,000 MWh.

^b Data center share of imported energy is larger than the net increase because, without data center demand, imported energy would decline. For example, under Scenario 1 (no VCEA), energy imports would decrease -17 TWh from 2025 to 2040 without data center demand. +79 TWh data center share - 17 TWh = net increase of +62 TWh.

Building enough infrastructure to meet growing data center demand will be difficult under both forecast scenarios

Historically, utilities and other PJM members have kept up with demand by building enough new generation resources and transmission to meet demand. Utilities have been able to do this because demand has increased slowly or been relatively flat over the past several decades, but the expected increase in demand from data centers will far outpace previous energy demand growth. If utilities are unable to build enough new generation and transmission to keep pace with forecast data center demand, there are two likely outcomes: (1) they will delay the retirement of older fossil fuel plants, and less economical plants, to the extent allowed by state and federal law, and (2) they will delay the addition of new large load customers, mainly data centers, until there is adequate transmission and generation capacity to serve them. On the demand side, data centers will seek out markets where demand can be met and pursue ways of contracting for and generating their own power. While it is possible that enough infrastructure could be built to meet growing data center demand in Virginia, it would be difficult to accomplish.

VCEA financially penalizes utilities that do not comply with renewables requirements by levying deficiency payments, but in practice, utilities may choose to pay those deficiency payments if it is more economical or feasible than securing new renewable generation. Statute directs any deficiency payments collected to be used in support of job training, energy efficiency, and renewable energy programs. The costs of deficiency payments are recovered from utility customers.

It could be especially challenging to meet demand while also fully meeting VCEA renewable requirements. Dominion's 2024 integrated resource plan indicates that it expects to meet VCEA renewable requirements for most, but not all, years between now and 2040 and expects to pay deficiency payments in some years (sidebar). In addition, in its previous 2023 plan, Dominion indicated it did not expect to meet VCEA requirements to retire carbon emitting assets that take effect in 2045. The previous plan stated: "Due to an increasing load forecast, and the need for dispatchable [i.e., easily scalable] generation, the [modeled planning scenarios] show additional natural gas-fired resources and preservation of existing carbon-emitting units beyond [the 2045] statutory retirement deadlines established in the VCEA." The revised 2024 plan does not comment on this and does not project out past 2040.

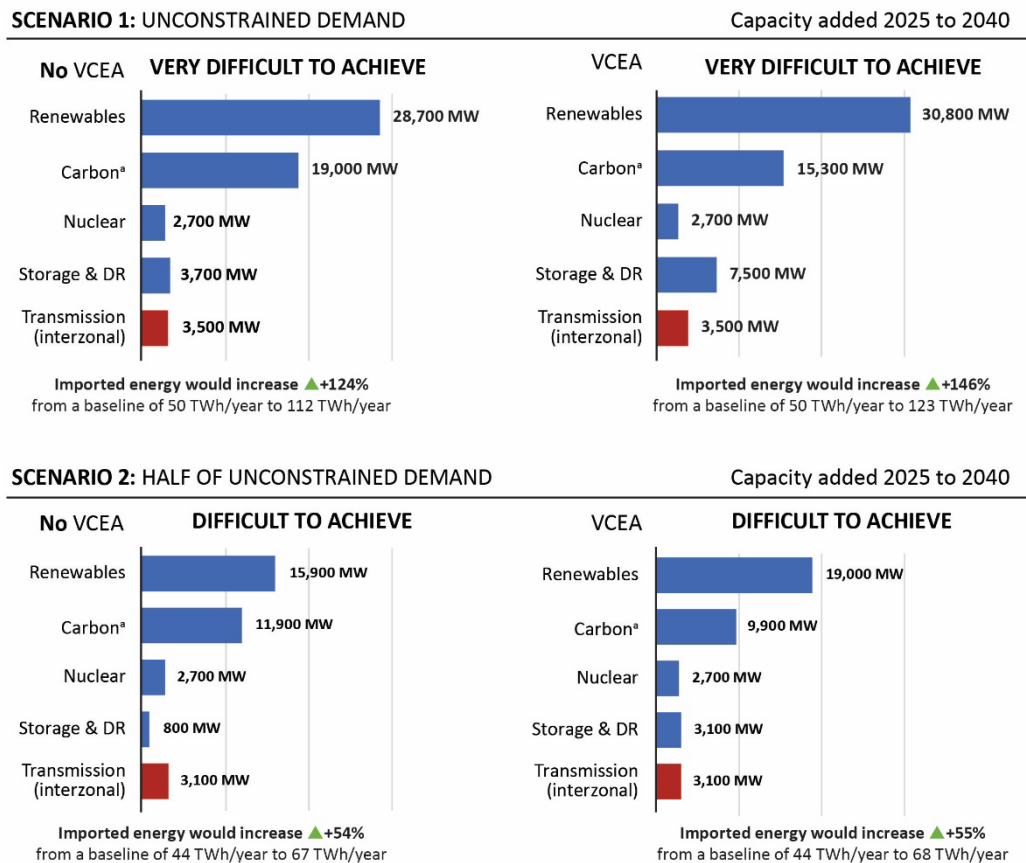
Building enough infrastructure to meet *unconstrained* energy demand will be very difficult, with or without meeting VCEA requirements (Scenario 1)

It will be very difficult to build new generation and transmission in Virginia fast enough to match unconstrained demand by 2040 (Scenario 1) and would require a massive and sustained build-out of new renewable, carbon, nuclear, and storage facilities (Figure 3-5). Build rates would have to greatly outpace what has been accomplished historically. Solar facilities would have to be added at about twice the annual rate they were added in 2024, and the amount of new wind generation needed (8,800 MW) would exceed the potential capabilities of all offshore wind sites that have so far been secured for future development (7,400 MW). New natural gas plants would have to be added at a rate of one large 1,500 MW plant almost every year (without meeting

VCEA requirements) or almost every 1.5 years (meeting VCEA requirements) for 15 consecutive years, which would be faster than the rate they were added during the busiest build period of the last decade in the state. Additional pipeline capacity may also need to be added to serve such a substantial increase in natural gas generation, which would create additional challenges. The unconstrained demand scenario would also require building more nuclear generation, presumably using new technologies.

FIGURE 3-4

Estimated generation mix needed to meet demand scenarios, with and without meeting VCEA requirements



SOURCE: E3 grid modeling analysis.

NOTE: The generation and transmission solutions generated by the model are tested to ensure they would produce a reliable system. Generation capacity is given in *nameplate* capacity, which can be significantly higher than the amount of power that can actually be expected after accounting for resource intermittency and downtime (firm capacity). The model predicts only interzonal transmission needed between PJM zones, but additional transmission would need to be built within the Dominion transmission zone. DR is demand response resources, which refer to customers who can reduce energy use during peak load events or add energy back on to the grid. The figure does not show what would need to be built if there were no new data center demand (Scenario 3). Under this scenario, the grid would be able to transition to a more renewable-based system with relatively less difficulty.

^aCarbon includes natural gas, coal, and oil. Biomass facilities are counted as renewable resources, per the VCEA. However, starting in 2045, E3's grid model assumes natural gas plants would be converted to hydrogen fuel in each scenario when VCEA requirements are met.

To meet transmission needs, the state would have to increase interzonal capacity to the Dominion transmission zone by approximately 40 percent and construct additional transmission within the zone. Many of the new transmission lines would need to be built in densely populated regions of the state with limited options for siting new infrastructure. (Figure 3-4 shows only new interzonal transmission.)

In addition to building new in-state generation and transmission, the state would need to more than double the amount of energy imported from out of state. Consequently, Virginia would be reliant on additional generation being built at a rapid pace in other states in the PJM region and would need these other states to build sufficient generation capacity to serve Virginia's needs as well as their own.

Building enough infrastructure to meet only *half of unconstrained* energy demand will be difficult (Scenario 2)

It would likely still be difficult to build enough new generation and transmission to meet half of unconstrained demand by 2040 (Scenario 2). Meeting demand would also require a sustained build-out of new renewable, carbon, nuclear, and storage facilities. Solar facilities would have to be added at a rate of 650 to 700 MW per year, which is substantial but lower than the 1,000 MW expected to be added in 2024. New nuclear generation would also be needed.

If VCEA requirements are not considered, the biggest challenge would be building new natural gas plants. New gas would need to be added at the rate of about one large 1,500 MW plant every two years for 15 consecutive years, which would be about the same rate Dominion added these types of plants during its busiest period of the last decade (2012 to 2018).

If it is assumed VCEA requirements are met, the biggest challenges would be building enough wind, battery storage, and natural gas “peaker” plants (sidebar). Wind generation needs would exceed the potential capabilities of all secured offshore wind sites in Virginia. The amount of new battery storage needed would be several times the small amount of existing battery storage in Virginia but would be equivalent to what has already been installed in Texas and about half of California's installed capacity. A significant number of new natural gas “peaker” plants would also be needed to help balance intermittent generation from renewables.

Transmission needs would remain substantial under the half of unconstrained demand scenarios, especially in and around the Northern Virginia region, and building enough transmission capacity within a 15-year timeframe could be even more difficult than building enough generation. The amount of energy the state would need to import would increase by over 50 percent.

“Peaker” plants are 50 MW to 150 MW facilities used intermittently to supplement other types of generation when there is not sufficient energy to meet demand. Historically, they have mostly operated at times when cooling and heating needs are the highest among households. However, as more solar and wind generation is incorporated into the grid, they can be used to provide energy when these renewables are not producing (alongside battery storage).

New infrastructure projects face several challenges that make a rapid increase in construction difficult to achieve

Under the most favorable circumstances, it takes five or more years to develop and build new generation facilities, limiting how fast they can be added to the grid. New generation projects face several challenges that could keep them from being built, including community opposition (especially to solar and natural gas projects), long lead times to procure equipment, workforce constraints, and state and federal laws that limit what new carbon-emitting generation facilities can be built. PJM data shows that only a small percentage of projects that submit applications are ever actually built (sidebar).

A significant portion of new generation would need to come from solar projects, which could face challenges acquiring enough land. Generally, a solar facility in Virginia needs five to 10 acres to produce one MW of power. Assuming an average need of 7.5 acres per MW, and the scenarios modeled above, JLRARC staff estimated that Virginia will have about 57,000 acres of land devoted to utility-scale solar by 2025, and new projects could require from 73,000 to 165,000 additional acres by 2040, depending on the demand scenario. Utilities and independent generators could face significant challenges in acquiring and gaining local approval for this much additional land, given the resistance solar projects have already encountered in some Virginia communities.

Small modular nuclear reactors have been identified as a potential future generation source. However, none have been successfully built in the United States, only a few exist worldwide, and this technology has not yet been proven to be a viable utility generation source. They also have high upfront costs that pose a barrier to their commercial viability, and some communities may oppose them being built nearby. Other promising, emerging technologies that have not yet proven to be commercially viable at a utility scale are hydrogen generation, long duration battery storage, and floating offshore wind.

Utilities also face challenges completing the many major transmission projects that will be needed to connect generation to data center markets, including the numerous new and dispersed renewable generation facilities that are expected to be built. For example, PJM's goal is to have \$3.5 billion in Virginia transmission projects that were proposed in December 2023 for Virginia, mostly to serve data center demand, to be in service by June 2027. This 3.5-year timeline is possibly unrealistic considering that major new transmission projects often take five to seven years to complete.

PJM must study and improve the addition of most new utility-scale generation to the grid.

PJM's approval process became overwhelmed by small-scale renewable projects in 2022, which led to a two-year pause in approvals while PJM reformed its process. This pause may have affected the number of projects that have been built in recent years, but project success rates were already low before the pause (29 percent in 2018).

Demand growth raises concerns about system capacity and reliability, but existing utility requirements and processes limit risks

Federal Energy Regulatory Commission (FERC) oversees the nation's electrical grid.

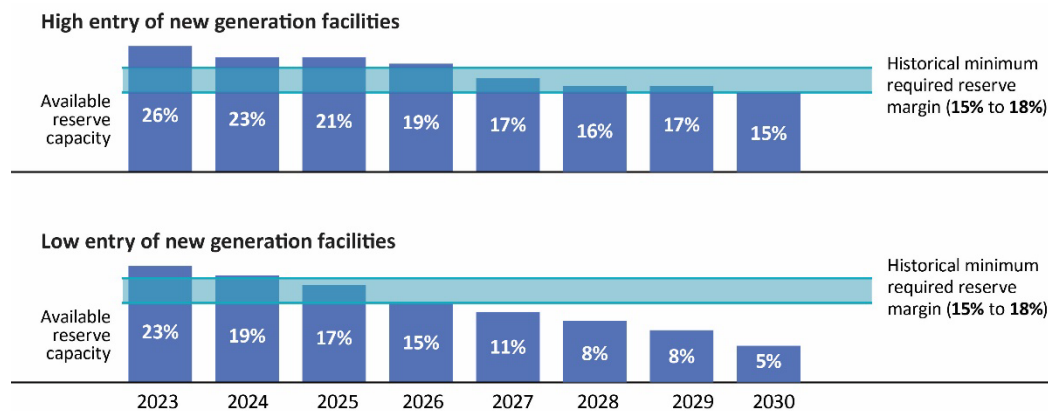
North American Electrical Reliability Corporation (NERC) sets reliability standards for the grid.

Electrical utilities in Virginia have an obligation to serve any customer within their service territory, but they are not required to provide service immediately upon request. Their foremost responsibility is to ensure the reliability of the power grid before adding any new, large customers like data centers. Federal and international bodies oversee transmission organizations and utilities and set reliability standards that PJM and Virginia utilities must follow (sidebar). The state also sets its own requirements for utilities, which SCC is responsible for enforcing. These requirements and processes are intended to identify future reliability problems and ensure they are resolved before the grid is affected.

Generation capacity concerns are partially addressed through PJM requirements and utility planning processes, but risks remain

PJM protects grid reliability by requiring utilities to secure enough generation capacity to meet the next three years of projected customer demand, plus a reserve margin to account for peak load (i.e., high energy use) events like hot summer days. The regional PJM grid appears to have sufficient generation capacity to meet current demand without causing any system reliability concerns. However, PJM estimates the grid could run out of needed reserve capacity by 2030, even under optimistic assumptions for adding new generation (Figure 3-5). If utilities are not able to secure enough capacity to meet projected demand, they would have to delay adding new load or shed existing load to meet capacity requirements and maintain system reliability.

Although PJM sets minimum capacity requirements for utilities, there is some uncertainty in whether regional generation will be sufficient because it is not centrally planned. PJM does not plan for and identify specific generation projects that are needed (like it does for transmission), cannot direct new generation to be built, does not own or operate any generation sources (like a utility), and cannot stop a utility or independent operator from retiring an existing generation facility (although it can offer “reliability must run” payments to keep a facility open in the short term). Virginia cannot address these structural issues because PJM is federally regulated, not state regulated. PJM is aware of generation capacity concerns and is working to try and address them.

FIGURE 3-5**PJM projects available generating capacity could decline below reserve levels within a few years**

SOURCE: JLARC staff analysis of PJM data and reports.

NOTE: PJM's reserve capacity projections were prepared in February 2023, using its 2023 demand forecast. PJM has since revised its demand forecast upward and in August projected a potential 1,663 MW shortfall in total capacity by 2029/2030.

At the state level, utilities protect grid reliability by planning to meet their own generation needs and PJM capacity requirements. Dominion and APCO—Virginia's two investor-owned utilities—are required to develop integrated resource plans that describe how they will meet capacity needs and submit them to SCC as part of a litigated proceeding. SCC holds public hearings to review the plans and gain perspectives from the utility, SCC staff, and other stakeholders, such as environmental groups and business interests. Despite disagreements over utility plans (sidebar), this process ensures the state's largest utilities plan to meet future generation needs and that these plans are scrutinized by regulators and stakeholders. Virginia co-ops also plan for their future generation needs, although the process is not as formal or subject to the same scrutiny. Most co-ops plan to purchase energy for data center customers from the PJM market rather than building generation to serve data center energy needs.

Individual utility planning does not guarantee that the generation resources needed for the whole PJM region will be built, which contributes to uncertainty about the sufficiency of future capacity. Both investor-owned utilities and co-ops plan to fulfill some future share of their energy demand with energy imported from elsewhere in the PJM market and, as discussed above, there is some uncertainty in whether regional generation will be sufficient to meet that demand. Growing demand from the data center industry in other states, such as the growing Chicago and Ohio markets, could limit how much energy is available to be imported by Virginia utilities.

Stakeholders sometimes contest whether the integrated resource plans developed by utilities provide the best generation solutions for meeting future demand, or whether proposals conform to state law. For example, SCC staff recommended that Dominion's most recent 2023 plan be denied over VCEA compliance concerns, and the plan was not approved by the Commission.

Transmission reliability concerns appear to be effectively addressed through existing PJM and utility planning processes

PJM evaluates the overall transmission system through its annual Regional Transmission Expansion Plan (RTEP). Under the RTEP process, both PJM and transmission owners assess the potential impacts of expected changes in demand and generation to see if and where standards violations or other reliability concerns could occur. They then solicit or propose system improvements, such as new transmission substations and lines, to address identified problems.

PJM and utility transmission owners centrally identify the impacts large loads are expected to have, and how those loads can be brought on safely without causing transmission reliability problems. At the project level, transmission owners like Dominion are required to study how the addition of a proposed data center (or any other large load) would affect the transmission system. These interconnection studies determine if the existing transmission system is sufficient to handle the load or if upgrades are needed to avoid violations of national reliability standards, such as excessive voltage incidents or outages. At the system level, both PJM and transmission owners must review the expected cumulative impact of demand growth on the transmission system, from proposed data centers and all other sources, and identify needed improvements (sidebar). Utilities cannot add new large loads to the grid, including from data centers, until identified transmission improvements are made. For example, if a new transmission line is needed for proposed data centers in Northern Virginia, utilities cannot add new data center loads until that line is operational.

Transmission planning processes appear to be working properly to protect reliability. In 2022, Dominion paused adding new data center loads in Loudoun County for three months as it worked to resolve regional transmission constraints. Since then, Dominion has incrementally added new data center loads in Loudoun to ensure new additions do not compromise the reliability of the transmission system. The utility expects the constraints that limit new load additions will not be fully resolved until 2025. Similarly, in July 2024, Dominion sent a letter to customers informing them that future large load additions to any part of the Dominion transmission zone are expected to take 12 to 36 months longer than they have previously taken so that the utility can appropriately plan for and connect the “record pace” of new load requests to the transmission system.

State could clarify that utilities can delay the addition of new, large loads if necessary to protect grid reliability

If utilities are unable to build enough new infrastructure to keep pace with energy demand, one of the main ways they can protect grid reliability is by delaying the addition of new large load customers until there is adequate generation and transmission capacity. Utilities appear to have the authority to delay large load additions for transmission-related concerns because this has already been done without legal objections. It is less clear if utilities are allowed to delay adding new load because of generation concerns. For example, representatives from one co-op utility indicated they did not believe they had the authority to provide less load than requested or delay new load additions for capacity, costs, or other reasons. The state could explicitly give utilities the authority to delay additions of new large loads if it is necessary to maintain grid reliability and avoid exceeding available generation or transmission capacity constraints.

RECOMMENDATION 2

The General Assembly may wish to consider amending the Code of Virginia to clarify that electric utilities have the authority to delay, but not deny, service to customers when the addition of customer load cannot be supported by the transmission system or available generation capacity.

Some stakeholders have asserted that the state should have a process for determining *whether* demand from large load data center customers should be met, not just *how* it should be met. In theory, the state could require evaluation of large load requests and allow requests to be denied through the existing SCC case process. However, this would be a shift in the historical U.S. electric utility paradigm and could be subject to legal challenges.

State could encourage or require data centers to take actions to help address their energy impacts, but actions would have marginal impact on demand

Virginia's growing data center industry is projected to greatly increase energy demand and will require construction of new generation and transmission infrastructure beyond what would have otherwise been built. Although regulators and utilities have requirements and processes in place to manage risks to grid reliability, new infrastructure projects can put VCEA renewable energy goals at risk, affect local communities and natural and historic resources (Appendix F), and affect customers' utility rates (Chapter 4). Data center companies could help address their energy impacts by

- promoting development of renewable energy generation,
- participating in demand response programs, and
- managing energy efficiency.

Many data center companies are already taking some of these steps, and the state could encourage or require further action. Data center companies are also exploring options for generating their own power, but it is unclear if this would address their impacts on the main power grid (Appendix I).

While these actions could have a marginal effect on data centers' energy impacts, they will not substantially reduce their energy demand or the challenges posed by growing demand.

Data centers could adopt more effective strategies for promoting renewable energy, but these would not lower their energy demand

Data center companies—including the four hyperscaler companies that account for a vast majority of the industry in Virginia—have carbon neutral policy goals that encourage investment in new, renewable generation. Some companies also directly invest

in renewable energy projects in the PJM region and the development of new technologies, like small modular nuclear reactors. The scale of industry efforts is not easily quantifiable, so it is uncertain how much these efforts could help offset the industry's growing demand in Virginia.

Virginia's data center industry could be encouraged to further support investment in renewable energy and a reliable, decarbonized grid within the PJM region. The state already partially encourages this through VCEA's Accelerated Renewable Buyers program. Under the program, large customers with loads over 25 MW, which includes most data centers, can get credit for their purchases of renewable wind and solar energy made in the PJM region. Those credits go to offset what a utility charges customers for the utility's renewable generation projects, providing a financial incentive to participate. The program could be expanded to include utility-scale battery energy storage systems. Battery storage is needed because it can store and provide energy during periods when intermittent solar and wind generation is not producing power. Although battery storage systems do not count as net new generation, providing a financial incentive to invest in these resources is beneficial because of their importance in balancing loads from renewables. Any credit for using battery storage should be a partial credit per MW, based on capacity provided rather than energy consumed, and account for electric load carrying capacity (ELCC). ELCC is essentially a measure of the system energy contributions a given type of resource provides, and PJM assigns and regularly revises ELCC ratings. Currently four-hour battery storage has an ELCC rating of 59 percent for 2025/20026, meaning that a partial credit of 59 percent could be allowed for each MW of capacity purchased from battery storage resources.

RECOMMENDATION 3

The General Assembly may wish to consider amending the Code of Virginia to expand the Accelerated Renewable Buyers program, which allows large customers of energy utilities to claim credit for purchases of solar and wind *energy* to offset certain utility charges, to also allow customers to claim partial credit for purchases of *capacity* from battery energy storage systems based on the current PJM electric load carrying capacity rating.

The program could be further expanded in the future to include other renewable or non-carbon energy sources, such as hydrogen generation and small modular reactors. This could help bring more generation resources online to serve growing data center demand but would not reduce energy demand.

Demand response programs could have a more meaningful impact on energy consumption

Under demand response programs, utility customers agree to reduce their power use or send power back to the grid during peak load events. This reduces the need for

additional generation and transmission to meet peak loads, and customers benefit by not getting billed higher peak load energy prices. Demand response programs are an effective way to reduce the need for new generation and transmission. As data centers become an increasingly large share of Virginia's base energy load, their participation in demand response programs could reduce the need for new infrastructure.

Data center companies in Virginia do not currently participate in demand response programs. Company representatives indicated that they have little flexibility to decrease energy use during peak load events because energy use is driven by computing activity, and computing activity is driven by customer and end user demand. From a business perspective, data center companies have strong incentives to keep facilities fully operational to meet their customer and end-user computing needs, and these typically outweigh financial incentives offered by voluntary utility demand response programs.

Despite limitations, there appear to be several viable ways that data center companies could participate in demand response programs. These include options for reducing demand during peak load events and adding energy to the grid during such events to offset a portion of their demand. Companies could

- shift some computing activity to other facilities outside of the region during peak load events,
- make operational adjustments that temporarily reduce energy use within the facility, such as small temperature adjustments for short periods, or
- install more environmentally friendly backup generators that are permitted to operate in non-emergency situations (sidebar), which could range from all generators at a facility to a subset of the generators used, or
- host battery storage systems that could serve as both a general utility and a demand response resource.

JLARC's consultant modeled the energy impact if data centers participated in demand response programs by using battery storage or backup generators to reduce or offset the equivalent of 10 percent of their load in a peak load emergency. The model found data centers could provide 2,000 to 2,400 MW of capacity value to the grid, which would slightly reduce the need for new in-state generation and transmission. A key consideration is that these demand response capabilities would have to be in place before new generation is added to have maximum effect.

Without state direction, most data center companies appear unlikely to participate in demand response programs. The state should not require a specific demand response method because different approaches may be more or less feasible for different companies. Instead, the state could direct utilities to implement a demand response program for large data center customers, such as any customer over 25 MW, and require these customers to participate in the program. This requirement could be phased in

Most data centers backup generation' comes from Tier 2 diesel generators, which cannot and should not be used as a demand response resource because of their emissions (nitrogen oxides, carbon monoxide, and particulate matter). Natural gas and Tier 4 diesel generators have lower emissions and can be used for demand response under state and federal law. Backup generation is discussed more in Chapter 5.

gradually to give companies time to work with utilities on demand response solutions and participation levels (e.g., MW or percentage of load a customer will commit) that are feasible for all parties. The requirement could be initially limited to investor-owned utilities and later expanded to include co-ops.

RECOMMENDATION 4

The General Assembly may wish to consider amending the Code of Virginia to require that utilities establish a demand response program for large data center customers and to require that these customers participate in the program.

Improving data center efficiency makes better use of energy but is likely to have only a marginal impact on demand

Data centers can improve energy efficiency in two primary ways. First, they can use newer and more efficient computer chips; computing activity ultimately drives almost all energy use in a data center. Second, they can improve the efficiency of their building systems, especially the cooling systems that account for most of the remaining energy use.

To promote energy efficiency, the state could encourage data center companies to meet an energy management standard, such as the International Organization for Standardization's (ISO) 50001. ISO 50001 requires organizations to set improvement goals, continually measure and evaluate outcomes, and revise policies to better achieve energy goals. An energy management standard can be fairly applied to all companies regardless of their business model. It is also preferable to requiring green building standards, such as Leadership in Energy and Environmental Design (LEED) building standards. Building standards could be required for new construction but may be unreasonable to retroactively apply to existing facilities.

The state could encourage data centers to adopt an energy management standard by making the state's sales and use tax exemption contingent on adoption. Many data center companies already set energy efficiency goals and policies, and a well-designed state incentive would complement these efforts and encourage other companies to adopt similar goals and policies.

POLICY OPTION 1

The General Assembly could consider amending the Code of Virginia to require that, as a condition of receiving the sales tax exemption, data center companies meet and certify to an energy management standard, such as the International Organization for Standardization's 50001 standard for energy management.

Recent legislation proposed requiring data centers to meet a specific Power Usage Effectiveness (PUE) ratio. The efficiency of cooling and other building systems in data centers is commonly measured using a PUE ratio. However, PUE does not indicate a

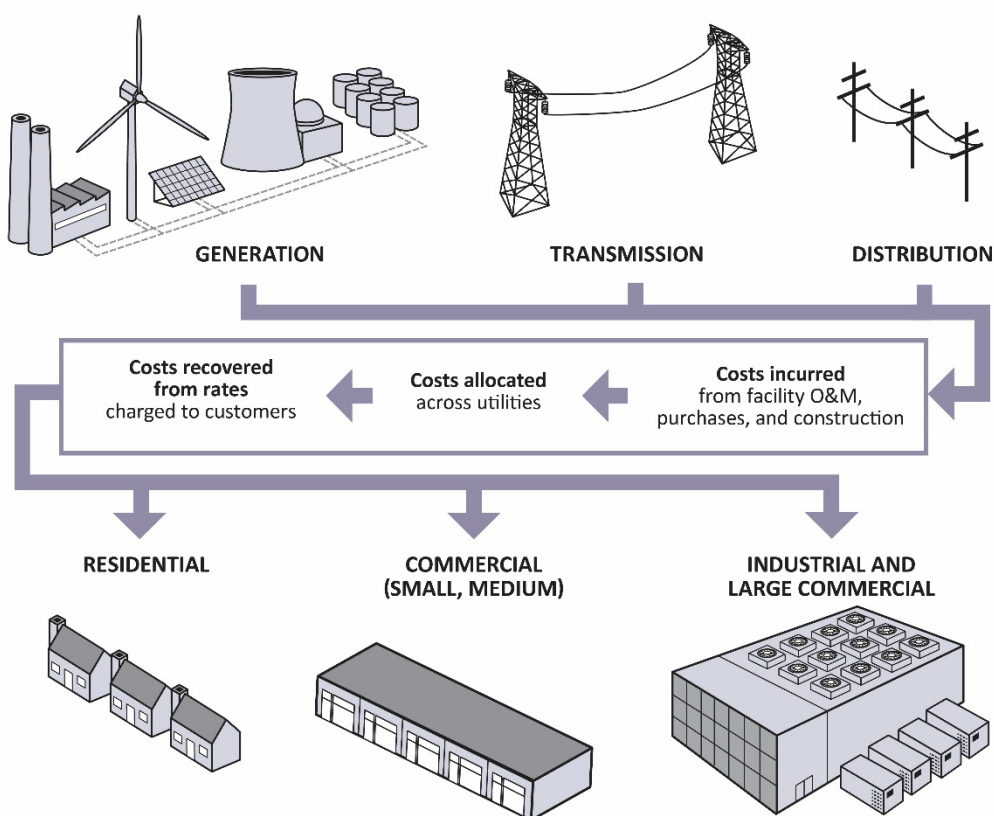
data center's overall energy efficiency; it measures only the efficiency of cooling and other building systems that support facility operations. The data center industry has a strong market incentive to be energy efficient because energy is one of their largest operating costs. Requiring a specific and narrow requirement, like meeting a specific PUE ratio, could have unintended consequences, and could not be as widely applied as the ISO 5001. (See Appendix J for additional information on PUE.)

Energy efficiency in general is an important goal for the data center industry, but efficiency improvements are unlikely to reduce the industry's overall energy demand. Currently, the data center industry is growing fast, demand for energy exceeds the available supply, and companies want to maximize the value of their multimillion-dollar assets. Consequently, any energy saved from efficiency gains is likely to be used to perform more computing activity. One company representative noted "at the end of the day, a 200 MW data center is going to be a 200 MW data center."

4 Energy Costs

Utilities incur costs to build, operate, and maintain the energy grid and provide power to customers. These costs are ultimately recouped through rates charged to customers (Figure 4-1). The main principle underlying utility rates is that the rates charged to different types of customers should recover costs that are approximately equal to the costs of serving those customers.

FIGURE 4-1
Utilities recover costs through rates charged to customers



SOURCE: JLARC staff analysis.

Utilities group their customers into classes of similar users, based on their cost of service. While the exact customer classes vary slightly among utilities, they generally fall into three groupings:

- residential customers,
- small to medium commercial customers, and

- industrial and other large commercial customers.

Within each customer class, customers are charged three categories of rates: generation, transmission, and distribution rates. Each rate is intended to recover costs related to that part of the system. For example, generation rates recover costs associated with operating power plants, constructing new plants, purchasing energy, and securing generation capacity from third parties. Transmission rates recover the cost of building and maintaining transmission lines. Distribution rates recover costs of building and maintaining substations, street-level powerlines, and other infrastructure needed to serve end-use customers. Utility rates sometimes include “riders” or “rate adjustment clauses” specifically intended to capture the cost of new infrastructure (e.g., a generation plant) or a specific initiative (e.g., grid modernization). Some costs can also be directly assigned to customers.

The State Corporation Commission (SCC) regularly reviews and approves utility rates to ensure they are reasonable. For example, SCC reviews Dominion’s rates every one to two years, depending on the rate type. SCC reviews consider if a utility is over- or under-collecting costs by customer class and whether any changes are needed to address any allocation issues. In making its determinations, SCC examines cost of service studies and other information presented by the utility and sometimes performs its own independent analysis. SCC’s responsibilities are established in state law.

Data centers are currently paying full cost of service

JLARC’s cost recovery study was performed by energy consultant E3. See Appendix B for additional details.

JLARC staff commissioned an independent study of utility cost recoveries under current rate structures to see if the data center industry is paying for its current costs (sidebar). The study focused on rates charged by Dominion, the Northern Virginia Electric Cooperative, and the Mecklenburg Electric Cooperative (the co-ops) because most existing data centers are located in their service territories. The study found that current rates appropriately allocate costs to the classes and customers responsible for incurring them, including data center customers. For example, the consultant’s independently derived cost allocations for Dominion closely match the ones that the utility uses to set its rates, with only a few small differences for residential and large customer rates (Table 4-1). This finding is corroborated by SCC reviews of utility cost recoveries, especially its biennial reviews of Dominion’s rates.

Utilities try to ensure data center customers pay the costs they incur in several ways. Dominion groups data centers into the same class with similar industrial and large commercial customers, charges rates based on energy and system use, and ensures recovery of costs associated with any new distribution infrastructure for data centers through contractually required minimum payments. Co-ops essentially treat data centers as their own customer class, charge rates based on energy and system use, and directly assign distribution costs for data centers to each specific customer. Co-ops take additional steps to separate the energy sources they use for data centers from the sources they use to serve the rest of co-op customers.

TABLE 4-1
Consultant's independent cost allocations closely match allocations Dominion uses to set customer rates

Customer class	Generation-related costs		Transmission-related costs	
	Independent consultant allocation	Dominion allocation	Independent consultant allocation	Dominion allocation
Residential	40%	41%	53%	55%
GS-1 (small non-residential)	5%	5%	5%	5%
GS-2 (intermediate)	14%	14%	12%	12%
GS-3 (large, secondary voltage)	15%	15%	12%	11%
GS-4 (large, primary voltage, includes most data centers)	26%	26%	18%	16%
Total	100%	100%	100%	100%

SOURCE: E3 analysis and Dominion rate schedules. Numbers may not sum because of rounding.

NOTE: GS = General Service. Table does not show churches or outdoor lighting customer classes because <1%.

Growing energy demand from data centers is likely to increase other customers' costs

Utility rates recover the cost of operating and maintaining the current system and any new infrastructure that must be built. Even though current rate structures appropriately allocate costs across customers, data centers' increased demand will likely increase system costs for all customers, including non-data center customers. This is because current utility rate structures are not designed to account for sudden, large cost increases from the construction of new infrastructure to serve a relatively small number of very large customers.

JLARC's consultant modeled the potential cost impacts of data center demand resulting from increased infrastructure needs. The model estimated costs under the two demand growth scenarios from Chapter 3: (1) unconstrained demand and (2) half of unconstrained demand, both with and without VCEA compliance. For this exercise, the model focused on cost and rate impacts in the Dominion transmission zone where most data centers are expected to be located (sidebar).

Generation and transmission costs are expected to increase from growing data center demand and will likely affect non-data center customers

Utility costs are likely to increase from the fixed costs of new infrastructure that will need to be built to address data center demand and the increase in prices as energy supply becomes constrained. Costs for the Dominion transmission zone could increase by an estimated \$16 billion to \$18 billion by 2040 under the unconstrained demand scenario, depending on if VCEA requirements are met. Costs could increase by \$8.5 billion to \$10 billion under the half of unconstrained demand scenario. In both

Dominion transmission zone includes the Northern, Central, and Tidewater regions of Virginia. These regions include Dominion's *distribution* service territory and the *distribution* territories of most of the state's electric cooperatives. See Chapter 3 for a map of the zone.

scenarios, most of the projected cost increases are attributable to growing data center demand. Costs do not reflect the full up-front capital costs of building new generation and transmission infrastructure, because these costs are amortized and collected from customers over a period of 20 to 40 years. Instead, they reflect the share of capital costs that would need to be recovered from customers each year, plus operating costs and energy purchases.

Building enough generation and transmission infrastructure to meet data center energy demand would be difficult because it requires constructing enormous amounts of new infrastructure. In addition, unconstrained demand scenarios would require building infrastructure faster than has been historically possible. See Chapter 3 for additional details.

Because generation and transmission costs are passed on to customers based on their actual usage, a substantial share of these costs would be recovered from the growing data center industry. However, a share of cost increases would be borne by other customers in three ways. First, a large amount of new generation and transmission would need to be built that would not otherwise be built, creating fixed costs that utilities would recover over the next several decades. A portion of these costs would be paid by non-data center customers. Second, because it would be difficult to provide enough energy supply to keep pace with growing data center demand, energy prices would increase for all customers (sidebar). Third, if utilities are more reliant on importing power to meet demand, they may not always be able to secure lower-cost power and would be more susceptible to spikes in energy market prices. These higher overall costs are likely to affect all customers, proportional to their energy use.

Distribution cost increases are likely to be assigned mostly to data centers and not other customers

Data center loads are typically so large that they are not served from the regular distribution system and are instead connected directly to transmission lines from a substation that serves one or a few data center customers. Consequently, the main distribution costs that data centers incur are for building and maintaining these substations.

Utility rate structures appear to effectively insulate other customers from paying for distribution costs associated with data centers. Dominion recovers data center distribution costs by charging them its standard industrial and large commercial customer class rates, but it also contractually requires data centers to make minimum payments that fully recover the cost of the distribution substations built to serve them. In addition, Dominion charges data center customers directly for any “surplus” equipment (e.g., redundant connections requested by the customer). Co-ops require data centers to directly pay all costs associated with new substations as they are constructed.

There is one way that growing demand from data centers could indirectly increase distribution costs for other customers. As data center demand grows, some transmission lines could be upgraded to higher voltages to meet demand. For example, an existing 115kV transmission line could be upgraded to a 230kV line. This can require distribution-side upgrades to *all* existing substations connecting to the high voltage line, including those that serve and are paid for by non-data center customers. The cost impacts of potential substation upgrades are uncertain because they cannot easily be modeled across the system.

Residential customers could experience cost increases that current utility and regulatory rate reviews cannot fully address

Utilities recover costs, including any future cost increases, through rates charged to customers. Rates are regularly reviewed by utilities, SCC, and the Federal Energy Regulatory Commission (FERC) to ensure costs are being properly assigned to customers (sidebar). Rate reviews ensure that system costs are being allocated in a way that best reflects which customers are responsible for incurring costs. For example, in 2019, Dominion received FERC approval to revise how transmission costs are allocated to utilities within its transmission zone, which effectively assigned a greater share of costs to large customers and reduced residential transmission costs by about 10 percent. While current rate structures will assign a larger portion of costs to data centers over time, rates are not designed to isolate other customers from cost increases driven by the expected system-transforming increase in data center demand.

Utilities regularly review their rates as required by state and federal laws.

SCC reviews and approves changes to generation, transmission, and distribution rates charged by utilities serving Virginia customers, such as Dominion and the co-ops.

FERC reviews and approves changes to how transmission costs are allocated to PJM and how transmission operators allocate cost to utilities.

Residential rates are likely to increase because of costs associated with growing data center demand

JLARC's consultant modeled how residential rates for Dominion customers might be affected by growing demand, assuming utilities and regulators use current practices to regularly reallocate costs. Dominion was chosen because of its large size and concentration of data centers. Residential rate changes were a key focus because they show how Virginia households could be affected and are indicative of how other customers, such as businesses, might be impacted.

Using the consultant's analysis, JLARC staff estimated that a typical residential customer with monthly consumption of 1,000 kWh could experience generation- and transmission-related costs increasing by an estimated \$33 per month by 2040 under the unconstrained demand scenario. Factoring in VCEA requirements would increase monthly costs by four dollars. However, building enough infrastructure to meet unconstrained demand would be very difficult. Under the half of unconstrained demand scenario, which is still difficult to achieve, the total cost is estimated to increase by around \$14 per month (Table 4-2), whether or not VCEA compliance is assumed.

The rate changes shown here represent the share of generation and transmission rate increases that could be attributed to growing data center demand. Dominion's total residential bill projections, from its integrated resource plan, show much larger overall increases than the numbers reported here. Dominion's projections apply to the whole residential customer bill and include several costs that are not captured in JLARC's analysis, such as distribution costs and the cost of some additional transmission and generation projects that may not be solely attributable to data centers. Dominion's residential bill projections are also in nominal dollars that have been adjusted upward using an inflation assumption, whereas JLARC's are held in constant

(or real) 2024 dollars to show the real growth of costs that consumers will experience, independent of inflation. Dominion used a demand forecast that is similar to JLARC's unconstrained demand forecast and substantially higher than the half of unconstrained demand forecast.

TABLE 4-2

Generation- and transmission-related costs for residential customers would increase by 2040 because of data center demand (Dominion example)

	Projected increase in generation & transmission charges (not including distribution charges & some transmission costs; 2024 constant dollars)	
	2030	2040
Typical monthly residential generation and transmission charges (2023)	\$90	\$90
Scenario 1: Unconstrained demand		
- VCEA (very difficult to achieve)	+\$23	+\$37
- No VCEA (very difficult to achieve)	+\$22	+\$33
Scenario 2: Half unconstrained demand		
VCEA (difficult to achieve)	+\$7	+\$14
No VCEA (difficult to achieve)	+\$6	+\$14

SOURCE: JLARC staff analysis of E3 model results and Dominion 2024 integrated resource plan.

NOTE: Typical monthly residential charges are the sum of the amount billed to Dominion residential customers assuming typical use of 1,000 kWh. Does not include potential increases in distribution and several other charges that customers typically pay for. Does not capture the cost of the many intrazonal transmission projects that would be needed or generation projects that are not attributable to data center demand.

Utilities could help insulate customers from systemwide cost increases with new data center customer class and rate-setting approaches

Historically, adding new customers to the energy grid, even large load customers like manufacturers, has not increased costs for other customers because additions have been gradual, and the existing system has had enough capacity to serve them. However, addressing the needs of the fast-growing data center industry, even if only half of unconstrained demand is met, would require increasing generation capacity by 80-to-90 percent and transmission capacity 36 percent by 2040. Current utility rate structures are not designed to account for sudden, large cost increases from new infrastructure construction to serve a relatively small number of very large customers. New approaches would be needed to isolate residential and other customers from cost increases.

Establishing a separate data center customer class is a first step utilities could take to help insulate residential and other customers from the energy cost impacts of the industry. Utilities already have the authority to create separate rate classes with SCC approval. Creating a separate data center customer class would allow costs to be more closely allocated to data centers and provide utilities with more flexibility over how to charge rates. Co-ops essentially treat data centers as their own customer class already,

so this change would only affect Dominion, which groups data centers with other industrial and large commercial customers. The General Assembly could require Dominion to establish a separate data center customer class, although historically the legislature has not set such detailed requirements in statute.

Establishing a separate data center customer class alone would not fully insulate other customers from cost impacts. Utilities, with SCC approval, would also need to establish new cost allocation methodologies that assign a greater share of generation and transmission fixed costs to the new data center customer class. For example, they could design rate structures that *directly* assign some fixed generation or transmission costs to a new data center customer class, or an increased share of those costs to the new class.

Rates may also need to be adjusted more frequently to insulate other customers from data center-driven costs. Currently, rate adjustments occur only every one to two years and can over or underestimate actual cost growth. For example, under Dominion's current biennial rate review, generation costs are reallocated and rates are adjusted every two years, based on forecast energy demand. While forecasts expect data center demand to increase, accurately forecasting the industry's rapid growth is challenging because of the many factors that can affect demand in a given year. Consequently, new rates may not fully account for shifts in how costs are being incurred across customer classes in the years in between biennial reviews. For example, if the company allocates 55 percent of costs to residential customers, but rapidly growing data center demand results in residential customers only being responsible for 52 percent of costs during the biennium, the costs recovered from residential customers could be higher than the costs they incur. This could also potentially work in the other direction, with residential customers being undercharged if costs are under-allocated based on forecasts.

Utility cost allocation and rate design are complex and highly technical, and the practicality and legality of any changes require detailed analysis to be fully understood. For this reason, utilities and SCC are in the best position to address future cost concerns through cost allocation and rate design changes. SCC is proactively looking into cost concerns from the data center industry and has scheduled a technical conference for December 2024 to explore the effects of the increasing number of data centers and other large-load customers on Virginia's utilities, ratepayers, and power grid. The conference will provide participants an opportunity to identify ways to address the cost concerns noted here and throughout this chapter.

Even if new customer classes and rate-setting methodologies are established, it may not be possible to isolate any customers from the cost impacts of higher energy prices (discussed above). In addition, energy prices in Virginia could still be affected by data center demand even if data center growth is slowed in the state, because industry growth could shift to other states in the PJM region, increasing energy prices throughout the region.

Data center growth creates additional financial risks to utilities and their customers

The growth of the data center industry presents several additional, but so far unrealized, financial risks to utilities and their customers. These risks largely result from the sheer size of the data center industry's energy demand relative to all other customers. These risks exist with the current size of the data center industry and will increase as the industry grows. Utilities have several mechanisms they use to manage financial risks from large data center customers, from planning processes to contracts, but these may not always be sufficient to mitigate the risks posed by the industry.

Data center demand could drive generation and transmission infrastructure to be overbuilt, stranding costs with existing customers

One of the main risks posed by the data center industry's rapid growth is that utilities will build more energy infrastructure than is needed if forecast demand does not materialize as expected, or one or more large data centers close. Overbuilding could strand utilities with infrastructure costs that would have to be recouped from their broader customer base. This would drive up costs for all customers, including residential and other non-data center customers. The overbuilding risk is mostly associated with generation and transmission, not distribution (sidebar). It is also more of a concern for Dominion than the co-ops, because Dominion builds generation to meet all customer needs and is responsible for transmission, whereas co-ops *purchase* most energy for their data center customers and are not directly responsible for transmission.

Distribution could be overbuilt but is less of a risk because most of these costs are fully recovered from data centers directly or through contractual minimum payment requirements.

Generation could be overbuilt if a substantial portion of the expected data center demand does not materialize, or if there is a decrease in that demand overtime. As a result, non-data center customers would pay a larger share of the fixed costs for this new generation. While it does not currently appear likely that supply will exceed demand, there is some risk because much of the data center industry is concentrated in a small number of companies. Therefore, business decisions at one company could have a substantial effect on overall demand. For example, if one of the major hyperscaler companies decided not to pursue development of new artificial intelligence (AI) products or has a line of AI products that fails to be commercially viable, then energy demand from that company could decrease substantially.

On the transmission side, there are three types of transmission lines to consider: (1) “backbone” lines that bring power into a region, (2) regional lines that move power to distribution points within the region, and (3) short extension lines that move power from main lines to serve a single distribution point, including extension lines that might be built to serve one or a few data center customers. Because transmission lines serve specific regions and distribution points, they are more at risk of being overbuilt if regional or individual customer demand does not materialize or decreases over time.

Utilities attempt to avoid overbuilding transmission and otherwise ensure costs are recovered. Dominion indicated it tries to avoid overbuilding by making transmission upgrades only as needed to meet the metered load expected from customers. For example, even if data center customers in an area have requested 2,000 MW of capacity, Dominion will only build new transmission to serve 1,000 MW if that is the forecasted metered load. One co-op utility indicated that it contractually requires data center customers to reimburse the utility for any penalties from transmission providers that may be incurred if a data center project is canceled. However, while utility actions reduce the risk of transmission costs being stranded with other customers, they do not eliminate this risk. For example, transmission costs can take up to several decades to recoup, and if a data center ceases operation before then, or it never uses the amount of energy it expected to, costs will be recovered from other customers.

Utilities could take additional steps to reduce the risk of generation and transmission costs being stranded with customers.

- Utilities could obtain contractual agreements from data centers customers to provide minimum payments that ensure the costs of major generation and transmission buildouts are not stranded with other customers. For example, AEP Ohio has proposed requiring any data center with over 25 MW of capacity to pay for at least 85 percent of the energy they expect to need, even if they use less, for at least 12 years.
- Utilities could directly assign some or all costs of smaller projects, such as transmission line extensions, to the customers or customer class for whom the line is primarily being built to serve. For example, if a two-mile transmission extension is primarily being built to serve a data center development, some or all of the project's costs could be assigned to that customer.

The state should direct Dominion to develop a plan for addressing the risk of generation and transmission infrastructure costs being stranded with existing customers. (Dominion is currently the only transmission-owning utility in the state expected to experience rapid demand growth.) The plan could adopt one or more of the approaches described above, or other approaches the utility identifies as more practical and effective. The plan could be included as part of Dominion's biennial rate review filing with SCC, or as a separate filing.

RECOMMENDATION 5

The General Assembly may wish to consider amending the Code of Virginia to direct Dominion Energy to develop a plan for addressing the risk of generation and transmission infrastructure costs being stranded with existing customers and file that plan with the State Corporation Commission as part of its biennial rate review filing or as a separate filing.

Data centers pose particular cost and financial solvency risks to electric co-ops and their customers

Virginia's electric co-ops are not-for-profit companies that are essentially owned by their member customers. Their main purpose is to provide members with reliable power at low costs. Co-ops are much smaller than the state's investor-owned, for-profit utilities—Dominion and APCO—and do not have the same financial resources or reserves as these companies.

An increasing share of data center growth is expected to occur in co-op service territories, and co-ops are statutorily obligated to serve these customers. Based on the half of unconstrained demand forecast, the industry could account for 80 percent or more of annual energy sales in three Virginia co-ops by 2030. This growth creates unique challenges for the co-ops, which must find ways to insulate themselves and other customers from the cost and financial solvency risks associated with taking on a small number of extremely large data center customers.

The main risk co-ops identified is that a data center could potentially delay, dispute, or fail to pay its energy generation bill. Co-ops purchase energy from PJM energy markets and then sell that energy to their data center customers. A weekly data center energy bill can be extremely large under normal circumstances and can be magnified by price spikes from peak load events. For example, one co-op estimated the weekly energy bill for 4,000 MW of power at data center sites expected to soon be built in its service territory could be \$20 million to \$40 million and could range upward of \$100 million under the energy price spikes that were seen in a major winter storm in 2022. PJM bills weekly, and if one or more data center customers dispute or otherwise do not pay on time, a co-op would have to cover its energy costs until they can be recouped. If the co-op was unable to recoup costs from one or more of its data center customers, the costs would ultimately have to be paid by all other co-op members, and a large enough bill could result in the co-op defaulting and going bankrupt.

Some co-ops said they were sufficiently addressing risks through their contracts with data centers, as allowed under current state law. Namely, these co-ops said the contracts allowed them to:

- perform credit checks when establishing service,
- require more frequent weekly payments for energy use, which aligns with PJM's weekly billing cycle, so they do not have to float co-op funds to pay data center bills,
- require upfront payment of deposits and pledges of collateral based on what the co-op expects it would need to cover unpaid data center bills until further action, such as terminating service, can be taken, and
- terminate service for failure to pay.

Other co-ops said they did not believe that the existing contractual and legal tools available were sufficient to fully cover all potential financial risks, especially considering

data centers could soon account for the vast majority of their energy costs. They noted that current termination of service notification and dispute time periods could allow unpaid bills to continue increasing for several weeks (sidebar). They also said it can be challenging to get data center companies to agree to some contractual terms, such as committing to large collateral obligations designed to cover a large peak load event. These contractual and legal issues could be addressed at the SCC technical conference in December.

One co-op indicated that, even with additional contractual protections, they were still at risk if a data center company failed to meet its contractual obligations, such as if the company itself were unable to provide agreed upon payments. To address this, the co-op attempted to get SCC approval to create for-profit subsidiary companies to serve data center customers. Under this arrangement, if a data center did not pay its bills, only the subsidiary company would be affected, and the business continuity of the co-op would be assured. SCC acknowledged the risks the co-op had identified, but did not grant the request because it did not believe it had the legal authority to allow a co-op to serve customers through a separate for-profit legal entity, among other factors. The General Assembly could amend the Code of Virginia to expressly allow co-ops to create for-profit subsidiaries to serve data centers and other large load customers. The customer size could be set at 90 MW to match the statutory threshold that already exists for the retail choice program (discussed in the next section).

State law allows utilities to **terminate service after 10 days** of advance notice. However, customers can dispute billing issues that might lead to service termination, and co-ops indicated that **dispute resolution can take as long as 30 to 60 days**.

POLICY OPTION 2

The General Assembly could consider amending the Code of Virginia to allow electric cooperatives to create for-profit subsidiary companies that could fulfill their legal obligation to provide energy services (retail sales) to customers with load capacity of over 90 MW.

Data center company participation in retail choice program could shift generation costs to other customers

In Virginia, most customers are obligated to purchase generation through their incumbent utility. For example, a customer in Dominion's service territory must purchase power from Dominion. The one major exception is that large load customers, including most data centers, are allowed to participate in retail choice, which allows them to purchase energy through a provider of their choice (sidebar). The goal of the program is to encourage competition and lower energy prices for industrial and other large commercial customers.

Customers qualify for retail choice if they (a) exceed 5 MW and account for less than 1 percent of the utility's peak load, or (b) exceed 90 MW. The restriction that a customer cannot account more than 1 percent of the utility's load was intended to prevent customers from leaving the utility for retail choice if it could have negative cost impacts on the utility's remaining customers. The 90 MW exception was reportedly added to allow one particular industrial customer to participate in the program. At that time,

The current retail choice program was established in 2007 when Virginia's energy sector became re-regulated. Under the program, a qualifying customer can enter into an agreement to receive power from a third-party competitive service provider, which can purchase energy from the PJM market or enter into power purchase agreements with independent generators in or outside of Virginia to provide power to the customer.

very few customers exceeded the 90 MW threshold. Today, many existing data centers, and virtually all planned future ones, exceed 90 MW and are eligible to participate in retail choice.

Now that data centers make up a substantial and growing share of energy use in the state, retail choice creates two financial risks to utilities and their customers.

- Utilities are required to build or secure enough generation to meet all customer demands. If a customer leaves the utility for retail choice, the fixed cost of any recently built generation is divided among the remaining customers. For example, the costs of constructing Dominion's recent Brunswick and Greenville power stations are paid for by all of its customers. If a substantial portion of data centers leave for retail choice, a greater share of those fixed costs will be allocated to remaining customers. The risk for this potential dynamic will be compounded in upcoming years because a lot of new generation is planned to be built to serve growing data center demand.
- Utilities also indicated that, because they are legally obligated to serve any customer in their territory as a provider of last resort, they must plan for the capacity needs of current and future customers. If utilities plan and build infrastructure to serve future data center customers, and some of those customers at some point leave for retail choice, the utility will incur costs for customers who are no longer actively paying generation bills.

It is difficult to model the cost impacts of data center customers shifting to retail choice, because it is unclear how many might pursue this option. However, utilities report that only a small number of data center customers are currently participating in retail choice, so there is the potential for many more to enter the program, especially as the industry grows. Dominion estimated that if all currently eligible customers chose to participate in retail choice, including non-data center customers, the cost-shift to other customers could exceed \$600 million annually (a \$150 per year cost impact for a typical residential customer). That figure is likely to grow substantially as data centers make up an increasing share of the customer base.

Before returning to their incumbent utility, a **retail choice customer must provide advance written notice of five years.**

However, statute allows the customer to return earlier by seeking an exemption from SCC if its energy supplier "has failed to perform, or has anticipatorily breached its duty to perform, or otherwise is about to fail to perform," and the customer is unable to obtain service at reasonable rates from an alternative supplier.

JLARC staff identified several ways the state could manage the financial risks of retail choice to residential and other customers. The General Assembly could direct utilities to determine an overall cap on retail choice participation for their customers, such as a total amount of the utility's customer load that could be obtained through retail choice and require SCC to review and approve the caps. This would provide an avenue for utilities and customers to present their cases and give SCC authority to decide what is appropriate. Other alternatives to this approach include requiring exit fees for customers leaving for retail choice or directing utilities to continue directly charging them for fixed generation costs (i.e., making these "non-bypassable" charges). In addition, the General Assembly should leave in place the existing legal requirement that any customer participating in retail choice must notify the utility five years before returning (sidebar). Requiring advance notice of at least several years is important so that utilities

can appropriately plan for system needs, secure needed capacity, and protect other customers from rate fluctuations.

POLICY OPTION 3

The General Assembly could consider amending the Code of Virginia to require that electric utilities establish caps on participation in retail choice that protect ratepayers from undue costs, and that such caps be approved by the State Corporation Commission through a formal case process.

Data center companies could soon have access to utility market-based pricing options that largely achieve the same goal as retail choice without shifting costs to other customers. Currently, co-ops already provide all their data center customers with market-based energy prices. Dominion has also established a small market-based rates pilot program and recently filed an application with SCC to make the program permanent and widely available to customers. Market-based rates provide customers with potentially lower energy pricing that is similar to what they could expect to obtain through retail choice, but they remain a utility generation customer and therefore continue to help pay for fixed generation costs (instead of having these costs passed on to other customers).

5 Natural and Historic Resource Impacts

Virginia has abundant natural and historic resources, which provide economic, environmental, cultural, and educational benefits to the state. The value of these resources has long been recognized by the federal, state, and local governments. Governments have established regulatory systems intended to protect these resources and reduce the impacts that land development and other human activity have on them. The extent of natural and historic resource protections varies by resource type, with some regulatory systems providing stronger protection than others (Table 5-1). Natural and historic resource protections apply to data center operations and developments just as they apply to other commercial and industrial operations and developments (sidebar).

Data center energy demand, and its related impacts on Virginia's natural and historic resources, is discussed in Chapter 3 and related appendixes.

TABLE 5-1
Federal, state, and local regulations protect natural and historic resources from commercial and industrial operations and developments, such as data centers

	Regulatory protections			Brief overview
	Federal	State	Local	
Air resources				
Pollutant emissions*	●	●	○	Federal and state governments regulate harmful emissions and concentrations
Water resources				
Water withdrawals*	○	●	○	State sets and enforces water withdrawal limits and conditions
Wastewater discharges*	●	●	○	Federal and state governments regulate harmful discharge contents
Stormwater runoff*	●	●	◐	Federal, state, and some local governments regulate runoff rate and quality
Wetland and stream disturbances*	●	●	◐	Federal, state, and some local governments require impact mitigation
Land resources				
Conservation	◐	◐	◐	All government levels set aside lands for conservation, but few regulations, outside voluntary programs, protect private lands
Electronic waste				
Disposal	◐	◐	◐	No regulations require reuse or recycling, but some disposal limitations exist
Historic resources				
Preservation	◐	◐	◐	Federal, state, and some local governments regulate impacts in specific circumstances

SOURCE: JLARC staff summary of federal, state, and local regulations, staff interviews, reports, and websites.

NOTE: ● = stronger mandatory protections, ◐ = partial mandatory protections, ○ = no mandatory protections. * indicates that permits are required for potentially sizeable impacts. The responsibility or authority for a given government level to regulate impacts varies by resource.

Data center backup generators emit pollutants, but their use is minimal, and existing regulations largely curb adverse impacts

To ensure constant operations in the event of a power outage, data centers maintain on-site backup power. Data centers report that providing uninterrupted operations is extremely important to their customers, which can include banks and hospitals, who expect no outages or downtime. In Virginia, nearly all data centers use diesel generators for backup power (Figure 5-1). On average, each data center site has 54 permitted generators, but the number and electrical capacity of these generators vary widely depending on the number of data center buildings at a site, overall power and redundancy needs, and the sizes of generators used (typically one to three megawatts per unit). In total, the industry has approximately 8,000 permitted generators throughout the state.

FIGURE 5-1

Data centers rely on diesel generators for power in the event of an outage



SOURCE: JLARC photo of diesel generators at a data center in Virginia.

The federal Clean Air Act requires the U.S. Environmental Protection Agency to set **National Ambient Air Quality Standards**.

These standards identify safe concentration thresholds for six pollutants—including ozone (which nitrogen oxides may form), carbon monoxide, and particulate matter—based on scientific evidence.

Diesel generators emit several harmful pollutants, so their commercial use is regulated by state and federal agencies. The main emissions are nitrogen oxides, carbon monoxide, and particulate matter. When highly concentrated in the air, these emissions can have adverse effects on public health and the environment. Exposure to high concentrations of diesel generator emissions can affect human cardiovascular, respiratory, and central nervous systems. Nitrogen oxides, which diesel generators emit in much larger quantities than other pollutants, can contribute to ground-level ozone pollution (including smog) and acid rain.

To prevent harmful concentrations, Virginia's Department of Environmental Quality (DEQ) is required by federal and state law to regulate sizeable emissions of these pollutants and enforce National Ambient Air Quality Standards (sidebar). DEQ requires

diesel generators used by data centers to be permitted, primarily because of their nitrogen oxides emissions (sidebar). Moreover, DEQ monitors air quality and creates plans to maintain or attain National Ambient Air Quality Standards across the state. For instance, Northern Virginia has historically struggled to meet the standard for ozone, to which nitrogen oxides can contribute, so DEQ has stricter policies for nitrogen oxides emissions in that region.

Data center backup generators are rarely run for prolonged periods, and emissions are unlikely to adversely affect regional air quality

Data center operators aim to have backup generator capacity for days-long outages, but in practice, the generators are rarely run for prolonged periods. Most operators reported experiencing zero to two minor outages per site in the last two years, with nearly all outages being between one and five hours long. Otherwise, generators are typically run only for limited amounts of time as part of routine maintenance (sidebar). For example, in 2023, the industry's actual emissions were only 7 percent of what permits allowed, with most emissions coming from maintenance testing.

On a regional level, data center emissions from diesel generators have grown substantially in recent years, but they remain a relatively small contributor to regional air pollution. Since 2015, nitrogen oxides emissions from data center diesel generators have more than doubled, carbon monoxide emissions have tripled, and particulate matter emissions are five times larger. However, these emissions make up a small part of overall emissions in the region. Based on National Emissions Inventory data, in Northern Virginia, where most data centers are concentrated, data center emissions make up less than 4 percent of regional nitrogen oxides emissions and 0.1 percent or less of regional carbon monoxide and particulate matter emissions. Overall, air quality in Northern Virginia has improved during the same time that the industry has grown, as reductions in car and other emissions have been greater than data center emission growth.

While emissions from data centers' diesel generators make up a small part of *regional* emissions, understanding whether they have adverse *local* impacts is more difficult. Because the data center industry's large clusters of diesel generators are unique, local air quality impacts are harder to assess. Diesel generators' intermittent use makes their impacts difficult to model, and no other type of development uses nearly as many generators on one site as a data center development. Additionally, air quality monitoring occurs regionally and does not effectively capture localized effects. While DEQ staff believe that data centers' intermittent use and low emissions levels are unlikely to cause adverse impacts, the agency has recently launched a three-year study that will directly monitor data center generator emissions in Northern Virginia to more fully understand their air quality impacts. If the study detects any local air quality impacts, DEQ has the authority to increase protections as needed.

DEQ permits are required for any new development that may annually emit over 40 tons of nitrogen oxides, 100 tons of carbon monoxide, or 10–25 tons of particulate matter, depending on the particulate matter size. Data centers using diesel generators usually meet the criterion for nitrogen oxides, but not for the other pollutants.

Data center operators indicated that **maintenance testing** typically involves a short (10–30 minute) monthly test and one long (one- to four-hour) annual test. Testing of generators is staggered across a site on an individual or group basis.

Federal and state regulations limit potential emissions from backup generators, even under worst-case scenarios

The U.S. Environmental Protection Agency has established **generator tiers** based on emission rates, or the amount of a pollutant emitted by a source over a given amount of time. Data centers could use generators that are considered Tier 2 or Tier 4.

DEQ permits limit when data center generators can be run, how long they can be run, and the maximum annual emissions each permitted site is allowed. Nearly all current data centers use “Tier 2” diesel generators, which are only permitted to run in emergencies or as part of routine maintenance testing (sidebar). This restriction prevents data centers from running their generators for any other reason. Permits are issued per data center site, rather than per building or generator, and cap the total emissions allowed per site. For example, a data center campus would not be allowed to run its generators indefinitely, even in an emergency, because it would likely reach its emissions limits within a few days. Because outages are rare, data centers do not often approach their emission limits. (For information on data center generator fuel choice, see Appendix K.)

In the event of a prolonged outage that affects one or more Northern Virginia counties, any affected data centers could reach their emission maximum within a few days and potentially affect regional air quality. For example, under a worst-case scenario where all data centers in Northern Virginia reach their maximum allowed emissions, data centers would emit over 9,000 tons of nitrogen oxides in the region. That is equal to about half of what has typically been emitted annually in Northern Virginia by all sources. Such a large-scale outage could potentially result in violation of air quality standards and contribute to regional air quality issues. However, the extent of any impact would depend on weather patterns and contributions from other emissions. Such large-scale outages are rare, and air quality levels would return to normal after the event is over.

General Assembly could incentivize use of generators with lower emission rates to reduce risk of local and regional impacts during prolonged power outages

To reduce the risk of air quality impacts from data centers during a prolonged outage, the state could incentivize the industry to adopt technologies that reduce potentially harmful emissions. “Tier 4” diesel generators are designed to emit significantly less nitrogen oxides and particulate matter than the “Tier 2” generators most data centers use. Alternatively, Tier 2 generators can be equipped with selective catalytic reduction systems (SCRs). Both technologies can significantly reduce emissions of nitrogen oxides and particulate matter—reportedly by up to 90 percent—over long run times. Some newer data centers in Virginia use SCRs on their generators, and only one uses Tier 4 generators.

Without state incentives, data center companies are unlikely to change their backup power choices. Tier 4 generators and SCRs are more costly, and data center companies have expressed concerns about the extra complexity and the current availability of Tier 4 generators to meet campuswide and statewide backup power needs. The state

could encourage adoption of these technologies by requiring new data centers in the Northern Virginia Ozone Nonattainment Area to use Tier 4 or SCR-equipped Tier 2 generators to be eligible for the state's sales and use tax exemption (sidebar). This requirement could be phased in over time to account for data centers that have already ordered generators or otherwise made investments that would not comply with this requirement.

The Northern Virginia Ozone Nonattainment Area includes Arlington, Fairfax, Loudoun, and Prince William counties and the cities of Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park.

POLICY OPTION 4

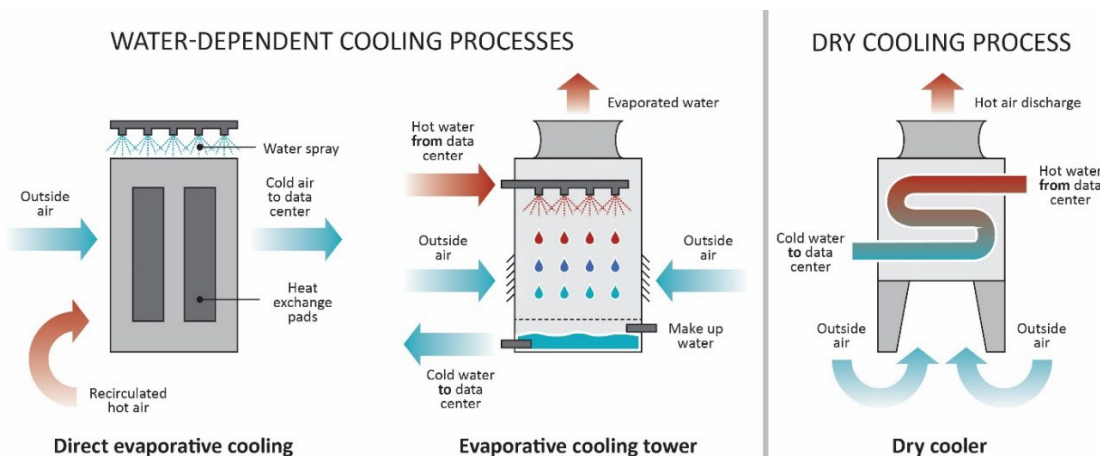
The General Assembly could amend the Code of Virginia to require that, as a condition of receiving the data center sales and use tax exemption, all new data center developments in the Northern Virginia Ozone Nonattainment Area use only Tier 4 generators, Tier 2 generators with selective catalytic reduction systems, or generators with equivalent or lower emission rates.

Data center water use is currently sustainable, but use is growing and could be better managed

Data center water use varies depending on the data center's size, computing density, and type of cooling system. Data centers require industrial-scale cooling to manage the heat generated by their computing equipment. Some cooling systems use water evaporation, and these systems typically require regular water refills to operate (Figure 5-2). Other cooling systems recirculate all or most of their water, similar to a radiator, and use relatively little water. Some data centers use a combination of cooling processes, including processes that do not require any water.

FIGURE 5-2

Evaporative cooling processes require more water than dry cooling processes



SOURCE: JLARC synthesis of interviews, government reports, and research literature.

NOTE: Depicted examples are generalizations and do not include all data center cooling processes and equipment.

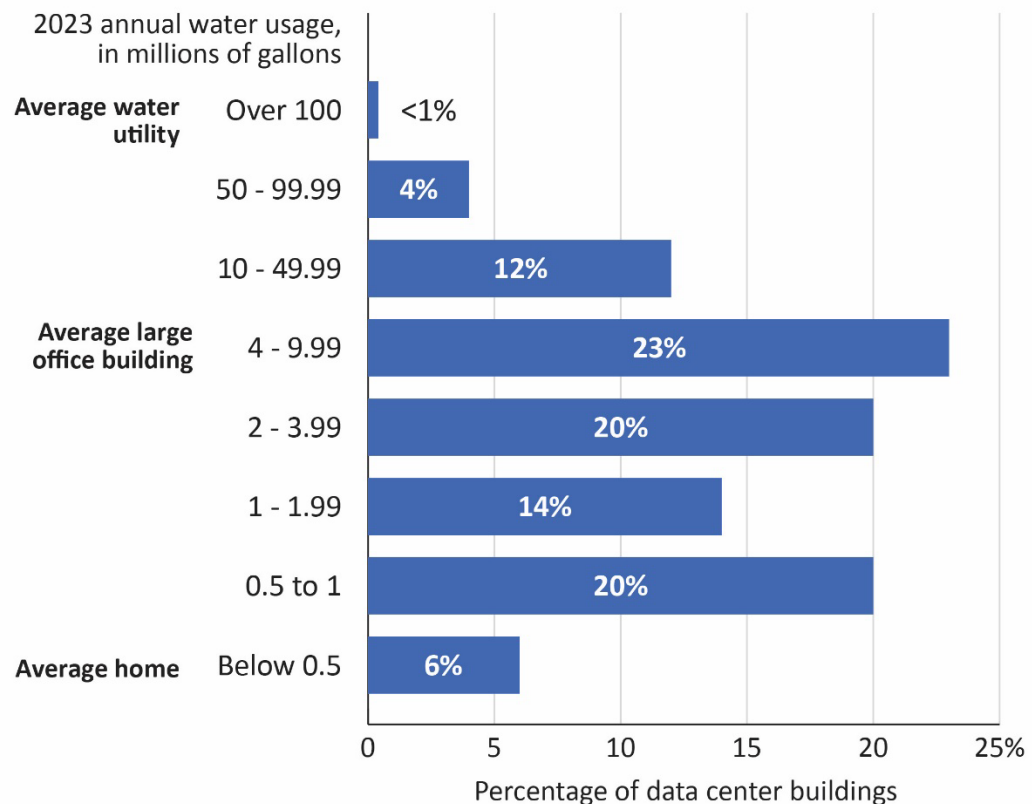
While some data centers use substantial amounts of water, most use similar or less than other large commercial and industrial water users

For comparison, the state's largest industrial water user in 2023 used about 36.5 billion gallons of water annually.

Based on available data, most data centers use about the same amount of water (or less) as an average large office building (6.7 million gallons per year), although a few require substantially more, and some require less than a typical household (Figure 5-3). In 2023, 11 data center buildings each used over 50 million gallons, including one building that used 243 million gallons (10 percent of the industry's total use) (sidebar).

FIGURE 5-3

Annual data center building water use varied widely, but most used the same amount of water as an average large office building or less (2023)



Reclaimed water is wastewater that is treated, often to a non-potable standard, and re-used, such as for irrigation and industrial purposes. It reduces the need for additional water withdrawals, diverts wastewater from entering water sources, and reduces demand on potable water systems.

SOURCE: JLARC staff analysis of data provided by water utilities serving Fairfax, Henrico, Loudoun, Mecklenburg, and Prince William counties and the Town of Wise. Average uses are based on federal and state water use statistics.

NOTE: Data was not available for all data centers in Virginia but was for the large majority. Water use is on a per building, not per campus, basis. Annual usage for some data center buildings is approximate because of data constraints.

Cumulatively, data centers use a small share of statewide water withdrawals and a moderate share of some region's water withdrawals. In 2023, the data center industry used an estimated 2.1 billion gallons of water, with just over a third coming from reclaimed water instead of new withdrawals (sidebar). Data center water use accounted for less than 0.5 percent of total state withdrawals.

The industry's impact was also limited regionally. Most data centers are served by water utilities, and industry use made up from 0.2 to 21 percent of water use, after excluding reclaimed water use, at the six water utilities JLARC staff reviewed. Data centers were typically one of these water utilities' larger customers, but a data center was the single largest customer for only two utilities.

State regulates water withdrawals to ensure future water availability and to protect water ecology

To protect future water availability and environmental sustainability, DEQ regulates withdrawals from Virginia's water sources, including requiring permits for large-scale withdrawals (sidebar). Withdrawals can reduce the amount of water that is available for future use if it is withdrawn faster than it is naturally replaced. Additionally, they may affect aquatic flora and fauna, such as by reducing available habitat. Most data centers receive their water from local water utilities, which make the withdrawals. In these cases, DEQ ensures that data centers' water use is sustainable through permitting the utility's withdrawals. Only two data centers have their own DEQ withdrawal permits, and any data centers that do make their own withdrawals are subject to the same regulations as water utilities.

To determine appropriate water withdrawal allowances, DEQ performs scientific modeling that evaluates water withdrawal impacts on future water availability and aquatic flora and fauna in that water source. Permits specify withdrawal limits and set other conditions, such as requiring the permit holder to limit withdrawals during droughts. If a requested withdrawal amount would exceed sustainable levels, DEQ would issue a permit only for a sustainable amount or add conditions to the permit that ensure sustainability. Permits must be renewed at least every 15 years, at which time DEQ reruns the water model with updated water source condition data. If growing data center demand prompted a water utility to seek a larger withdrawal than their permit currently allows, the requested permit withdrawal allowance increase would also have to be modeled by DEQ.

Data center water needs are likely to increase as the industry grows, and state and local governments could help ensure limited water resources are used effectively

While DEQ is responsible for ensuring that permitted water withdrawals are sustainable for the water source, there is less oversight over how available water should be shared across various uses. While the state as a whole is relatively water rich, water is a limited resource for some Virginia localities, such as those that do not have access to major rivers or other surface waters and are in groundwater management areas. Additionally, when local water use demand exceeds current permit or infrastructure thresholds, utilities may need to expend significant resources to meet the additional demand (sidebar). Therefore, localities should fully consider their allocation of available water. For instance, when reviewing a potential new development that may use a

Withdrawal permits are required for withdrawals above 10,000 gallons per day from non-tidal surface waters, two million gallons per day from tidal surface waters, and 300,000 gallons per month from groundwaters in a groundwater management area. There are some exceptions for users that pre-date these regulations. Withdrawals that do not require permits may still require annual reporting.

Some water utilities that serve or will soon serve data centers have recently expanded their permits and/or infrastructure. For instance, five have requested new or larger withdrawal permits, though these expansions are not fully attributable to data centers. Water utility staff shared that data centers pay their fair share for any additional infrastructure they require.

large amount of water, a locality should consider whether the project could affect the locality's ability to meet future residential demand or pursue other types of economic development.

State could clarify localities' authority to request potential water use information from proposed developments

While any large water user has the potential to affect local water availability, water use information may be particularly helpful for zoning decisions for data center developments. Data centers can use a relatively large range of water amounts compared with other land uses. Some companies will continue to build data centers that use water for cooling, and potentially larger amounts of water as cooling needs increase. While others are moving away from water, the industry's net water use is expected to increase. In addition, because the industry is growing rapidly and typically grows in clusters, data center water use in a given locality can grow suddenly.

Localities have general statutory authority to consider water resources in their land use planning, but state law is not clear on localities' ability to require a proposed data center development to provide a water use estimate or to consider water use in their rezoning and special use permit decisions. (Rezoning and special use permits are discussed more in Chapter 6.) In interviews, local planning staff, government attorneys, and a local elected official conveyed different understandings of the law or reported being uncertain whether a locality could consider water use estimates when evaluating data center development projects. This information could be helpful for assessing a development's potential impacts, but data center developers can be reluctant to share this information because of proprietary concerns. State law should clarify localities' authority to require this information from data center developers and consider water usage in their rezoning and special use permit decisions. This clarification could potentially be extended to other development types, such as other developments with the potential to use large amounts of water.

RECOMMENDATION 6

The General Assembly may wish to consider amending the Code of Virginia to expressly authorize local governments to (i) require proposed data center developments to submit water use estimates and (ii) consider water use when making rezoning and special use permit decisions related to data center development.

Additionally, if local planning officials have this information, they should consult with their local water utility—prior to approving data center developments—on the impact these developments could have on the utility or future water availability. In some data center approvals, this information was not shared between parties. Doing so could help to ensure water use impacts are fully understood prior to approving the development.

Increasing use of reclaimed water may help reduce impacts on water resources

Some utilities offer reclaimed water systems for their customers, and using reclaimed water instead of potable water for cooling, including evaporative cooling, is generally a best practice for data centers. Reclaimed water can reduce a development's impact on water resources because it does not require additional water withdrawals and can decrease wastewater discharges. DEQ currently permits only two water utilities, including Loudoun Water, to provide reclaimed water for evaporative cooling uses.

Reclaimed systems may not be viable or available in all localities, but utilities that serve data centers should consider the option. Smaller utilities may not create enough wastewater for a reclaimed system that could sustain data center operations. Moreover, financial considerations may also limit reclaimed water use, as reclaimed systems have high capital costs. However, because of the potential benefits for water availability, utilities that serve data centers—and other large water customers—should consider the viability of using reclaimed water systems, as well as potential opportunities for data center companies to help with upfront costs.

Some stakeholders, including a data center company and several water utilities, indicated that Virginia's reclaimed water system regulations for evaporative cooling use are difficult to meet or confusing. DEQ indicated that regulatory changes, such as explicitly listing minimum standards for reclaim water use in data center evaporative cooling processes or reducing some treatment and monitoring conditions, could potentially address concerns while maintaining necessary safeguards but would require further review. DEQ is already scheduled to conclude an internal review of these regulations by September 2026 as part of its quadrennial review process, but DEQ could start this review now so that any eventual changes could be implemented a year earlier. Any potential changes DEQ identifies would need to be implemented through the standard regulatory process—including a Notice of Intended Regulatory Action and public comment period.

Data center construction has similar land and water impacts to other large developments, and state and local regulation mitigate most effects

The development of land for industrial, commercial, or residential uses, particularly “greenfield” developments, can affect Virginia's land and water resources (sidebar). Depending on the characteristics of the site being developed, the construction process may change land characteristics and uses, modify stormwater runoff patterns, and/or disturb wetlands and other waterways (Table 5-2). Such impacts can degrade air and water quality, destroy wildlife habitat, and increase flooding and erosion risks.

A development's ability to mitigate its potential impacts depends on the site, development type, and the resource. A development can mitigate overall potential impacts on these resources in three ways:

“Greenfield” development occurs on land that has not previously been developed. In contrast, redevelopment occurs on the site of a former development. A redevelopment is less likely to impact land and water resources, as any potential impacts likely already occurred during the previous development.

State-managed databases, such as the Department of Conservation and Recreation's **Natural Heritage database**, identify on-site resources that may be impacted by development.

- **avoiding** direct impacts to the maximum extent practicable, such as not constructing a building on forested land,
- **minimizing** impacts to the maximum extent practicable, such as using a retaining wall to minimize impacts to an adjacent waterway, or
- **compensating** for any impacts that do occur, such as offsetting impacts to a wetland by restoring or constructing that same type of resource elsewhere.

TABLE 5-2

Constructing new developments can result in loss of undeveloped and agricultural lands, create stormwater runoff risks, and potentially disturb wetlands

	Land resource loss	Stormwater changes	Wetland disturbances
Development action	Undeveloped and agricultural lands may be developed for industrial, commercial, residential, or other uses.	Impervious surfaces may be created to support buildings and ancillary developments.	Wetlands (including streams and other waterways) may be drained, filled, or encroached upon to maximize developable area.
Potential impact	Forests, agricultural lands, and other green spaces are lost.	Less rainwater is absorbed into the ground, increasing stormwater runoff.	Wetland areas are destroyed, diverted, or otherwise disturbed.
Effect without mitigation	Air, water, and soil quality degradation, loss of habitat, and lower agricultural production occur.	Increased flooding and erosion, water pollution, and slower groundwater recharge occur.	Water source degradation, loss of habitat, and increased flooding and erosion occur.
Effect with mitigation	Losses are avoided, minimized, or offset by preserving, creating, or restoring lands elsewhere. ^a	Predevelopment runoff rate and quality are maintained, minimizing adverse impacts.	Disturbances are avoided, minimized, or offset by funding or implementing wetland creation or restoration. ^a

SOURCE: JLARC synthesis of interviews, government reports, and other information.

NOTE: ^aOffsetting impacts can be difficult and require significant time and space, particularly for replacing lost undeveloped and agricultural lands.

Some regions have seen substantial data center growth, but their construction impacts are similar to other large developments

Data center development has construction impacts that are similar to other large-scale developments' impacts. While comprehensive information on data centers' impacts to natural resources is not tracked, the vast majority of their development is greenfield development—although some redevelopment is also occurring.

The development pressures from data centers on undeveloped and agricultural lands statewide are not more than other fast-growing developments in Virginia. For example, the total land area of currently operating data centers is equal to about 1.4 percent of the farmland lost in Virginia between 2017 and 2022. According to land conservation experts, the current primary threat to undeveloped and agricultural lands is solar energy developments.

On a regional level, however, the share of undeveloped and agricultural land development in Northern Virginia attributable to data centers has been substantial. JLARC staff estimated that the data center industry accounted for between 20 and 30 percent of land development in Loudoun and Prince William counties from 2013 to 2021, and the amount of data center development has already increased 50 percent since then. However, these are some of Virginia's fastest-growing counties, which means that some portion of land developed for data centers likely would have been developed for other uses, such as housing, mixed-use commercial space, or distribution centers.

Data center developments have similar impacts on stormwater and wetlands as other large-scale developments, such as warehouses or shopping centers. The magnitude and significance of impacts depend on site characteristics as much as the development itself (sidebar). Therefore, impacts may be the same whether a site is developed for a data center or another land use.

State and federal regulations require mitigation of stormwater and wetlands impacts, but land conservation is at local discretion

Federal and state regulations require stormwater management and wetland permits for sizeable impacts, regardless of development type. Stormwater permits for individual developments are usually administered by DEQ or the locality, and wetland permits are typically jointly issued by the U.S. Army Corps of Engineers and DEQ. Most data center developments require a stormwater permit because of their size, but only those that affect a wetland or other waterway require a wetland permit (which is the same for all types of development).

Stormwater management permits require developments to manage their stormwater runoff to meet water quality and quantity requirements to minimize impacts. For instance, a development would be required to install a stormwater management system, such as an on-site stormwater pond, to slow and filter its runoff. Data centers create a relatively large amount of impervious surface, and stormwater permits require management that is proportional to the addition of impervious surface and land cover changes. Some impacts may still occur even if all permit requirements are met, such as less water being absorbed into the ground or water source temperature increases, but these same impacts can occur from any developments that create large impervious surfaces or change land cover, such as a warehouse or shopping center.

Wetland permits require developments to avoid and minimize impacts to wetlands and other waterways to the maximum extent practicable and to compensate for any remaining significant impacts. Because data centers require large building footprints, they may be relatively less able to avoid or minimize impacts. However, any significant impacts that do occur require proportionate compensation, which ensures losses are replaced to the extent possible through the preservation, restoration, or creation of that resource elsewhere.

In Virginia, federal and state regulations do not require mitigation of impacts to undeveloped and agricultural lands. Localities have full discretion through their zoning laws

Magnitude of impact depends on the change to the environment, not the development itself. For example, a small green-field development may create more impervious surface than a large redevelopment.

Impact significance depends on the resource that is affected. For example, a given amount of water pollution may have a larger effect in a small river than a big river.

to determine how lands that are not protected from development can be used. While localities can require, negotiate, or accept offers to conserve a portion of the existing natural landscape as part of a development, data center developments generally use most of land that is practicable and allowed to be developed. Because undeveloped and agricultural lands are difficult to replace, the primary mitigation method to protect them is to avoid or minimize development on these lands. The state could consider imposing land use restrictions to prevent or minimize the land impacts from data center development, but this would be a profound change in the state's involvement in local land use decisions, and, currently, there does not appear to be a basis for distinguishing data centers from other large developments in considering such restrictions.

State could require data centers to meet environmental management standard to receive tax exemption

The ISO 14001 standard for Environmental Management Systems is one of the most used environmental management frameworks in the world. The U.S. Environmental Protection Agency believes it helps organizations to systematically identify and reduce their environmental impacts.

Required minimum standards for specific resources could have unintended consequences, including: 1) not being viable for all data center companies, who have different operational systems and preferences, 2) not ultimately improving sustainability, such as water restrictions leading to more energy-intensive cooling, or 3) not being adaptable as the data center industry evolves, such as if new technologies shift the industry's environmental impacts.

Even though federal and state regulations already limit most negative natural resource impacts of data centers, the state could encourage them to meet an environmental management standard because of their large and growing presence. Environmental management standards, such as the International Organization for Standardization's (ISO) 14001 standard, require companies to proactively review and reduce their impacts to natural resources (sidebar).

Environmental management standards do not set required minimum standards but involve continuous improvement in operational sustainability. Required minimum standards may not be viable for all data center companies and may not be wholistically sustainable (sidebar). Environmental management standards call for companies to evaluate all of their environmental impacts and set and pursue sustainability goals. This process is repeated every few years and encourages a wholistic approach to sustainability. For instance, ISO 14001 seeks to promote organizational improvement in air emissions, water use, water discharge, waste generation, and energy consumption—all of which have been raised as concerns about data centers. (For more information on data center water discharges and waste generation, see Appendix K. For more information on data center energy impacts, see Chapter 3.)

The state could encourage adoption of an environmental management standard by making the state's sales and use tax exemption for both new and existing data centers contingent on adoption. Many data center companies already set sustainability goals and policies, and a well-designed state requirement would encourage other companies to adopt similar goals and policies. At least four other states—Arizona, Illinois, Iowa, and Washington—require data centers to meet a sustainability standard as a condition of their state data center tax incentive program.

POLICY OPTION 5

The General Assembly could amend the Code of Virginia to require that, as a condition of receiving the sales and use tax exemption, data center companies meet and certify to an environmental management standard, such as the International Organization for Standardization's 14001 standard for Environmental Management Systems.

Data center impacts on historic resources are similar to other developments, but current protections could be strengthened

Developments have the potential to negatively affect historic resources, both during and after construction. Historic resources can include sites (e.g., battlefields and cemeteries), structures (e.g., buildings), and objects (e.g., artifacts) (Figure 5-4). Impacts can vary substantially depending on the type of development being proposed, the significance of the historic resources affected, and how those resources will be affected. In many cases, a development will not adversely affect historic resources because there is nothing historically significant on the development site or located nearby.

FIGURE 5-4
Virginia has a wide range of historic resources



SOURCE: Image courtesy of the Virginia Department of Historic Resources (cropped by JLARC).

Data center developments can affect historic resources in the same ways as other large developments

Some data center developments have affected state historic resources. For instance, two data center developments have relocated or damaged cemeteries, and several have been located on historic sites, including a turn of the 19th-century residential site, a historic African American horse showground, and part of a Civil War battlefield. Additionally, several approved but not yet built data center developments have raised concerns of viewshed impacts on historic battlefields around the Northern Virginia region. Like with other development types, the total number and extent of data centers' impacts on historic resources are unknown as not all of these resources—or impacts to them—have been identified and catalogued.

Preservation experts consider data centers' impacts and risk of impact to be similar to those of other large-scale developments. Data centers have less flexibility than some other developments, like housing, to avoid building on parts of the property where resources might be located. Data center developments also require extensive grading, which can destroy buried structures and objects, and tall data center buildings are more likely to have viewshed impacts on nearby resources. However, other large-scale developments, like warehouses and shopping centers, can have the same impact. The rapid growth of data center development increases the likelihood that historic resources will be disturbed by these developments, but the same is true of other commercial and residential construction growth.

Pre-development studies help promote mitigation of impacts to historic resources

Various methods may be used to **mitigate impacts to historic resources**. For instance, developments may avoid or minimize impacts by moving building locations or lowering building heights. If historic resources cannot be avoided, they may be excavated and relocated, studied and documented before their destruction, and/or commemorated with signage. The appropriate strategy can depend on the resource, development type, and the site.

Before site development begins, sites can be studied to identify any potentially significant historic resources and determine mitigation strategies if impacts were to occur. Developers can hire experts or third parties to perform "Phase I" historic resource studies, which could include background research, physical inspection, and remote sensing, to identify historic resources that may be affected by a new development. If a Phase I study finds historic resources, Phase II historic resource studies can determine their significance and, if needed, develop mitigation approaches (sidebar). When needed, Phase III historic resource studies involve carrying out mitigation approaches, such as excavating and relocating a resource or documenting a resource. Once historic resources have been identified, developers can additionally perform viewshed analyses to determine whether a new development would be visible to these resources, potentially affecting their significance.

Phase I historic resource studies and viewshed analyses are relatively inexpensive pre-development tools. Some data center companies reported that they conduct Phase I studies for some or all of their data center developments, and several have conducted and shared viewshed analyses as part of the local zoning approval process. Studies can ultimately save developers time and money by preventing delays or the need for design changes from unexpected discoveries after developments have been approved.

Few legal or regulatory protections exist to protect historic resources, but pre-development studies could be more strongly encouraged

While there are many layers of federal, state, and local protections for natural resources, fewer protections exist for historic resources. For private developments, federal regulations require that historic resource impacts need to be considered—studied and potentially mitigated—only if a wetland or other federal permit is required. State law only requires additional Virginia Department of Historic Resources (DHR) oversight of private developments when human remains need to be removed.

Local regulation of historic resources varies by jurisdiction, depending on local capabilities and priorities. All localities have the authority to restrict development around

historic resources through their zoning ordinances, but some are better able to identify these resources than others. For instance, Loudoun requires Phase I historic resource studies for all non-residential developments and has a county archeologist who evaluates study results and makes recommendations to planning staff if additional action is needed. Most localities do not require pre-development studies and do not have an archeologist on staff. Moreover, when development and historic resource preservation goals conflict, it is up to local elected officials to make zoning decisions.

To ensure that potential impacts to historic resources are identified, the state could encourage Phase I historic resource studies for all new data center developments, as well as viewshed analyses for new developments within a certain distance of a registered historic site. To do this, the state could make eligibility for the sales and use tax exemption contingent on this work being performed for any new data center developments. For example, the state could require that, for any data center that begins construction in 2026 or later, the data center company perform a Phase I study (along with a viewshed analysis, if applicable) before the facility is constructed to be eligible for the exemption. Data center developers would pay for the study and report findings to localities, which would determine if any further action is required.

POLICY OPTION 6

The General Assembly could amend the Code of Virginia to require that, as a condition for receiving the sales and use tax exemption, data center companies conduct a Phase I historic resource study of a proposed development site, as well as a viewshed analysis when a proposed site is located within a certain distance of a registered historic site, and report the study findings to the appropriate locality prior to development.

Some localities may not currently have the time, expertise, or resources to review the Phase I historic resource study submissions. DHR could offer grants for localities to hire consultants or have staff available for consultation, but this would require additional funding or staff to implement. Alternatively, localities would have the option to require data centers to pay for a consultant hired by the locality to perform the review.

Some historic resource preservation experts stated that, while they would appreciate greater protections around historic resources, establishing mitigation requirements at the state level may not allow for site-specific characteristics or local preferences. For instance, prohibiting data center development near historic resources statewide, as was proposed during the 2024 legislative session, may be broader than needed—as impacts do not occur every time a development is on or near a historic resource—or could prove too restrictive given the abundance of historic resources in Virginia.

6 Local Residential Impacts

Local governments are responsible for managing land development in their jurisdictions for different residential, commercial, agricultural, and industrial uses. Localities manage development through planning and zoning to ensure developments conform with state and local laws and are grouped with appropriate types of development.

On the planning side, state law requires localities to create and update long-term comprehensive plans to support “coordinated” and “harmonious” development. These plans provide a strategic vision for development in the county but, while important for guiding local decisions, do not set any legal boundaries.

On the zoning side, localities pass zoning ordinances that set legal restrictions on development. Zoning ordinances establish conceptual *zones* (e.g., rural residential, light industrial), which have their own sets of rules and requirements for new development. For each zone, the ordinance lists *uses* that are allowed. Uses can allow different types of business operations (e.g., data center, brewery), different types of residential construction (e.g., townhouse, single-family house), and other distinct uses. Additionally, zoning ordinances can impose minimum requirements on specific uses or zones, such as maximum heights or mandatory setbacks from property lines.

Within a zone, a use can be allowed by right, allowed by special permit, or prohibited. If a use is prohibited in a zone, then a developer can seek to have the parcel rezoned to allow the use.

- **By right** uses are allowed within a zone without any special approval by the locality. For example, if data center development is a by-right use, a developer can build a data center in the zone without seeking special approval from the locality. Localities cannot require data center developers to do anything not already established in the zoning ordinance. For example, a locality could not require a by-right data center to be set back farther from nearby property lines than the ordinance already dictates.
- **Special permit** uses are allowed if approved by the locality’s elected officials, e.g., a county’s board of supervisors (unless they delegate this authority to the local board of zoning appeals), often following a public hearing. As part of the special permit process, the locality can make approval conditional on additional restrictions to mitigate negative impacts, such as bigger property line setbacks or lower building heights.

- **Rezoning** changes the conceptual zone a parcel falls under and therefore its allowed uses. Rezoning requests require a public hearing and approval from elected officials. Like with special permits, the locality can consider the developer's willingness to conform to additional restrictions or actions as a condition of rezoning approval.

Growing number of data centers are being built close to residential areas, causing residential impacts

This chapter focuses on data centers' impacts on residential areas. While minimizing impacts on **other sensitive uses** such as schools and parks is important, concerns of negative impacts in Virginia have primarily come from residential areas.

Land use planning principles state that neighboring property uses should be compatible with one another. These principles generally dictate that industrial uses should be far from residential and other sensitive uses because they are often incompatible (sidebar). Residential neighborhoods are generally expected to be safe, quiet, and pleasant places to live, whereas industrial facilities are often large, unsightly, and potentially noisy. For example, Loudoun County ordinances state that "industrial uses [...] are incompatible with residential uses due to the prevalence of outdoor storage and emissions of noise, odor, and vibrations."

Data centers are industrial facilities that are largely incompatible with residential uses

The industrial scale of data centers makes them largely incompatible with residential uses. A modern data center site includes one or more large, industrial buildings, similar in size and appearance to a new distribution center or a manufacturing facility, which is an abrupt contrast to a residential home.

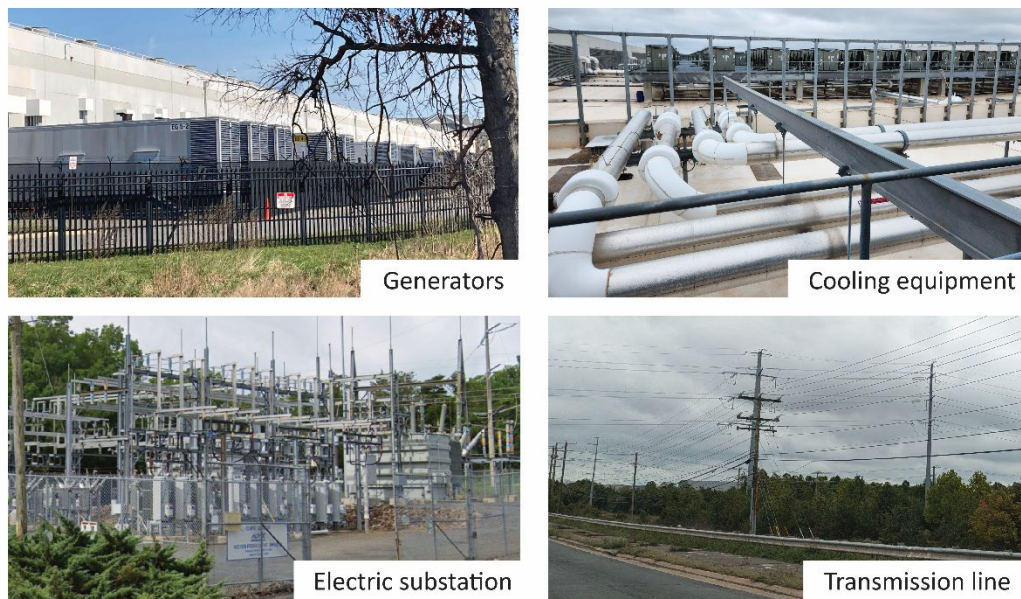
Other components of data center sites are also industrial in character and unsightly to residents who live close by (sidebar) (Figure 6-1). Trailer-sized generators (a median of 35 per site) are often lined up beside the data center building or housed in large generator sheds. Industrial-scale cooling equipment, such as chillers or water towers, often sit on the roof or outside the main building. Many data center sites are encompassed by security fences and deploy bright security lighting. Data centers also require industrial-scale electrical infrastructure. Sites will often include one or more electrical substations on or adjacent to the site, and some require above ground transmission lines extending from nearby main lines.

Resident descriptions of nearby data centers include:

- "a giant monolith in the wrong place"
 - "a prison"
-

FIGURE 6-1

Data center buildings and sites have industrial characteristics and infrastructure



SOURCE: JLARC staff photos and Google Earth.

Homeowners in residential areas close to data centers frequently express concern that having industrial sites nearby will decrease their property values. While it is certainly possible that nearby data centers have affected the resale value of homes, there is not yet evidence of this relationship. In interviews with representatives of neighborhoods opposed to nearby data centers and other informed individuals (sidebar), almost none observed a decline in property value or change in speed of home sales. One commonly cited explanation was that the tight housing market in Northern Virginia decreases buyers' selectiveness and so proximity to data centers has not yet had a noticeable effect on property values.

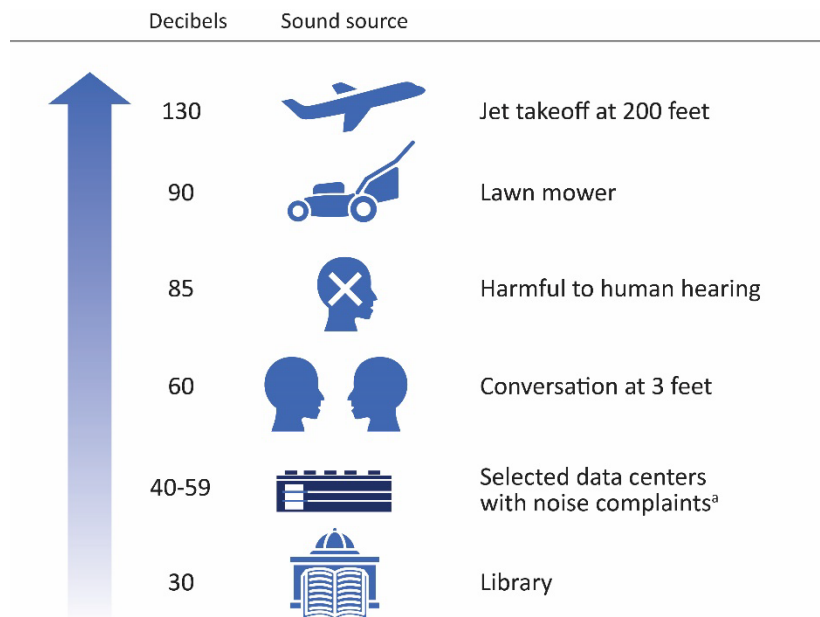
To assess data centers' impacts on property value, JLARC interviewed representatives of neighborhoods opposed to data centers proposed or recently constructed nearby, local stakeholder groups, county assessor's offices, and a local real estate agent association.

Some nearby residents report that constant noise from data centers affects their well-being

The constant nature of data center noise has been a reported problem when data centers are located near residential areas. Whether data center noise can be heard past the facility's property line depends on its design and its type of cooling system, which can cause noise. In addition, local geography and surrounding buildings can affect how sound travels.

While some data centers have been noisy enough to cause complaints, the noise is not loud enough to damage nearby residents' hearing and rarely loud enough to violate noise ordinances (Figure 6-2). Data center noise that has prompted resident complaints ranges from an estimated 40 to 59 decibels (per JLARC's review of noise measurements of selected data centers that have prompted complaints by residents). This

sound level is typically below the 55 or 60 decibel limit that Loudoun, Prince William, and Fairfax allow in their ordinances for residential areas. Rather than the volume of the noise, it's data centers' constant noise that some residents consider problematic. Data center noise is described as a constant “drone” or “hum,” similar to house air conditioning systems but magnified to an industrial scale. The noise can sometimes be heard both in and outside of nearby residences.

FIGURE 6-2**Data center sound is noticeable but quieter than many common sounds**

SOURCE: JLARC review of Occupational Safety and Health Administration, U.S. Centers for Disease Control and Prevention, and Federal Aviation Administration websites, and analysis of complaint data from Fairfax and Loudoun.

NOTE: The units are A-weighted decibels. ^a Encompasses measurements at locations where local staff recently measured data center noise using A-weighted decibels. Measurements are a response to complaints, so they are not representative of all data centers. Measurements indicate total sound, not the isolated amount from data centers.

Residents who have reported that data center noise is a problem have indicated that it has adversely affected their well-being. JLARC staff spoke with residents who live near data centers that have been the subject of noise complaints to learn how the noise affects them. Some residents described physical symptoms such as migraines from the facilities' constant noise. Others said that they experience health problems caused by disrupted sleep, and some residents described an inability to concentrate on tasks. A common theme was poorer quality of life, with some residents avoiding their decks and yards because the sound is louder outdoors.

Data centers are not required to reduce their noise if they are not violating local ordinances, which has made it difficult to address noise concerns. Some neighborhoods have attempted to address concerns through the county and engagement with data center companies. Residents of the Great Oak neighborhood in Prince William reported noise to county police from a nearby data center in May 2022, and as of

October 2024, the issue had not been fully addressed by the data center owner to all residents' satisfaction. Residents of the Brook Haven neighborhood in Loudoun contacted the county in 2021 about noise concerns, and the data center completed an attempted solution in November 2023. In both cases, residents observed reductions in noise from the nearby facilities but emphasized it took time and repeated communications from residents to prompt action.

Data center construction sites can be especially disruptive to nearby residential areas

Because of data centers' size and scale, their construction takes a long time and is disruptive to residential areas. Construction activities typically include clearing trees, grading land, laying foundations, erecting buildings, and installing equipment. While these activities are not unique to data centers, the impacts on residents are especially large because of the projects' scope. Each building takes about 12 to 18 months to construct, and with the industry moving toward developing data center campuses, work on additional buildings often begins as soon as one is completed. Therefore, a large site could take as long as seven years to fully complete. This work requires thousands of workers on site and substantial truck deliveries of materials.

Some residents report they have been negatively affected by data centers' construction. Their concerns include loud construction noises and vehicle traffic. For example, one neighborhood's main access road was damaged by frequent use of heavy vehicles, which reportedly sometimes blocked school buses and emergency vehicles.

One-third of data centers are near residential areas, and industry trends make future residential impacts more likely

The majority of data centers are appropriately located in industrial or commercial areas and are not close to residential uses. Over 60 percent are more than 500 feet from residential-zoned properties (as measured from property line to property line, meaning the actual facility and residences are even farther apart) (sidebar). The farther away a data center is from residential areas, the less likely it is to affect nearby residents.

A minority of data centers have generated noise complaints. At least 15 data centers (10 percent of operational data center sites) appear to have generated noise that nearby residents regard as problematic, according to resident groups and government records.

However, the number of data centers being built near residential areas is increasing. Almost one-third (29 percent) of operational data center properties in Virginia are within 200 feet of residentially zoned properties. Currently, there are several data centers being constructed adjacent to single-family homes, townhouses, and apartment complexes. Several recently approved data centers in Loudoun and Prince William will be built on land adjacent to neighborhoods, including at least two proposed developments where the property also abuts an elementary school (Figure 6-3). Other

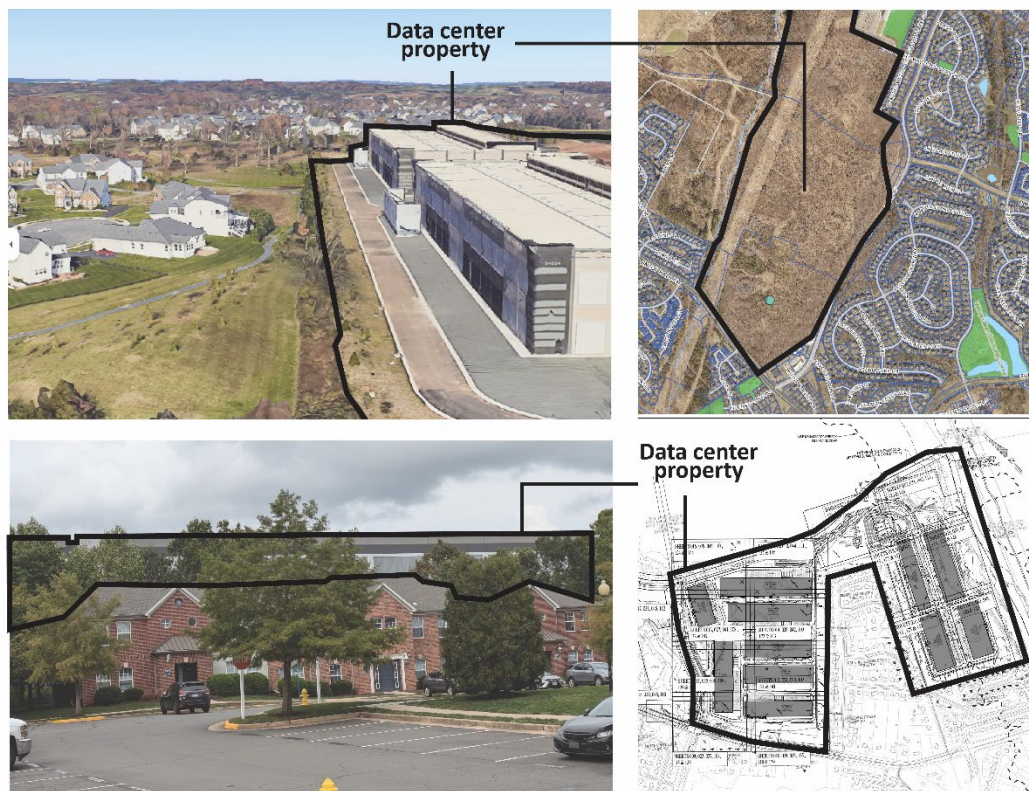
Analysis of the proximity of data center properties to residential zoning used data from eight localities that account for nearly all (93 percent) data centers in Virginia. (See Appendix B.)

counties—such as Fairfax, Stafford, and Henrico—have also received proposals for data centers close to residential areas.

Trends in real estate availability and facility design increase the likelihood of future residential impacts. As the industry’s footprint in Northern Virginia grows, the amount of land ideal for data center development is decreasing, and developers are more likely to consider locations closer to residential and other sensitive areas. Additionally, the typical data center building is becoming taller, larger, and more power-intensive, which has the potential to make their industrial characteristics more pronounced and, depending on the design, could generate more noise.

FIGURE 6-3

Some recently built or approved data centers are close to residential areas



SOURCE: JLARC site visits, Google Earth, and locality websites.

NOTE: In order, the pictures depict: (1) existing data center from the Loudoun Meadows neighborhood of Loudoun, (2) land approved for Devlin Technology Park in Prince William, (3) an existing data center next to the Regency neighborhood in Prince William, and (4) a proposed site plan for property that was rezoned to allow data centers around the Amberleigh Station neighborhood in Prince William.

Localities have allowed data centers near neighborhoods, sometimes without sufficient mitigation of impacts

Appropriate local planning and zoning decisions can reduce the risk of data center developments affecting residents. Localities need to proactively update their planning and zoning to manage data center development, because the industry is rapidly changing. As recently as 10 years ago, data centers were much smaller facilities that were similar in size and appearance to commercial office buildings. Local ordinances that continue to treat data centers as non-industrial commercial uses, which are often allowed next to residential areas, are outdated and can affect residents.

Localities need to consider which areas are appropriate for data center development, classify data centers as industrial uses in zoning ordinances, ensure data centers are not too close to residential zones, and include requirements to mitigate any potential negative impacts from data centers, such as building setbacks and height restrictions. In addition, local elected officials should adequately consider potential residential impacts when considering special permit and rezoning requests.

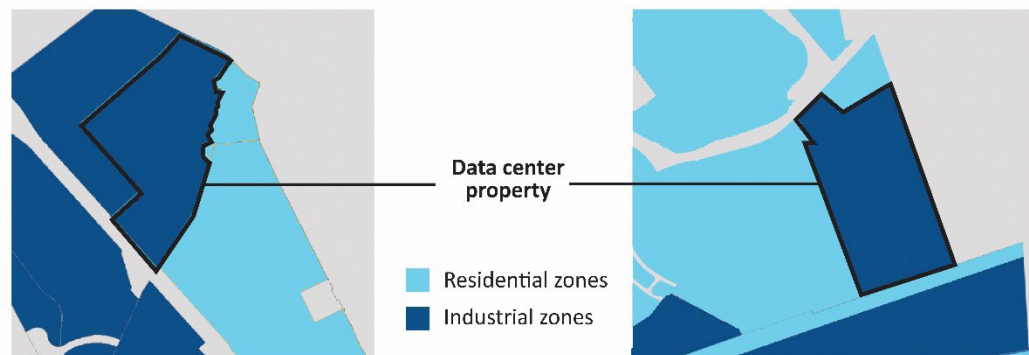
Inadequate planning and zoning have allowed data centers near residential areas

Data centers have sometimes been built too close to residential and other sensitive areas because local zoning ordinances did not consider them to be an industrial use. For example, until 2021, Fairfax considered a data center to be a telecommunications facility, which allowed data centers to be built in areas zoned for residential and office uses. Loudoun originally treated data centers as an office use and continues to allow by-right data center development in areas zoned for office uses in some parts of the county.

In addition, some localities have zoned industrial areas next to residential areas on their zoning maps, even though land use principles state that industrial uses are ideally separated from residential uses by buffers, such as commercial zones. For example, the Great Oak neighborhood in Prince William and the Bren Mar neighborhood in Fairfax are directly adjacent to industrial zones (Figure 6-4). This has allowed data center development by right despite being close to residences. The likelihood of residences being close to data centers has also increased because of some local decisions to rezone land to residential despite being in primarily industrial areas. If zoning maps are not reviewed and updated, more data centers are likely to be built closer to residential areas.

FIGURE 6-4

Some industrial zones border residential zones, allowing by-right data centers too close to residential zones



SOURCE: JLARC review of Prince William and Fairfax geographical informational systems and planning staff reports.
NOTE: The first picture depicts an existing data center near the Great Oak neighborhood of Prince William. The second picture identifies a planned data center near the Bren Mar neighborhood of Fairfax County. Grey coloring indicates a zone that is (1) neither residential nor industrial or (2) within another locality. “Zones” refers to the official zoning classification in local ordinances.

Zoning ordinances often include requirements intended to mitigate negative impacts from businesses, but these requirements are not always sufficient. Required building height limits and property line setbacks are fundamental ways to reduce a development’s impacts. For example, the property on the right side of Figure 6-4 was zoned industrial and is only subject to a setback of at least 40 feet (although the developer is voluntarily planning a larger setback). This zoning would have allowed a new data center to be built close to the property lines of two adjacent townhouse complexes. Landscaping and architectural requirements are other ways to mitigate data center impacts, but their value is limited. Newly planted trees take decades to grow, and the size and proximity of a nearby data center matters more to residents than its architecture.

Some localities’ elected officials have granted data centers exceptions to requirements designed to reduce residential impacts

Local officials in Virginia have sometimes approved data center requests to build in locations that prompt resident opposition or are likely to cause impacts. These elected officials are responsible for reviewing applications for special permits and rezonings and ensuring they are compatible with the locality’s long-term comprehensive plan (or amending the long-term plan). While there is no objective way to assess if officials made the “right” decision in approving a given project, there are cases where elected officials’ decisions have led to impacts on residents or contradicted development strategies laid out in long-term plans. For example,

- Elected officials have approved property rezonings that allow data centers next to sensitive locations. Prince William approved rezoning from mixed residential to industrial for the Devlin Technology Park (second in Figure 6-3), which is adjacent to a school and about 80 feet from residential zoning.

- Elected officials have approved data center requests in areas that are not suitable, according to the locality’s long-term comprehensive plan. In Loudoun, the board of supervisors approved the True North development even though staff recommended denial because the county’s “transitional” long-term plan classification for the site does not support data centers (sidebar).
- Elected officials have exempted individual data centers from local requirements intended to mitigate negative impacts on residents. For example, Loudoun’s board of supervisors allowed Aligned Energy’s Relocation Drive project to exceed the zone’s maximum height and square footage, despite staff recommending against the exemption because of nearby residential areas.

Local planning staff can recommend denial for several reasons. Sometimes staff may recommend denial because they believe more information from the developer is needed before a decision should be made. Other times staff may recommend denial because the proposed use is not compatible with the proposed site or there are not sufficient mitigations planned to adequately protect nearby residents.

Some localities have taken steps to minimize residential impacts, though success of these efforts rests with elected officials

Residents’ opposition to data centers has grown in recent years, especially in Loudoun and Prince William. While data center projects rarely generated citizen opposition in the past, it is now more common for individuals and organized groups to speak against data center proposals at local planning commission and board of supervisor meetings. Some grassroots groups have been created to fight specific proposals for new data centers, joined by existing organizations such as regional environmental groups. These local groups often also advocate for more government restrictions on allowable locations for data centers.

Opposition to data center proposals has also emerged outside of the main Northern Virginia markets. For example, local groups contested recent proposals in Henrico County and the Town of Warrenton. However, some locations such as Mecklenburg have not encountered significant resident opposition.

Several Virginia localities are making or considering zoning ordinance changes to reduce the risk of residential impacts

Most of the Virginia localities with sizable data center markets have taken or are considering steps to better manage future data center development. Since 2019, elected officials in the three localities with the most data centers (Loudoun, Prince William, and Fairfax) have taken some steps to address residential concerns (Appendix L). For example,

- All three localities have increased the requirements for data centers to improve their appearance or reduce their visibility, for example, increasing setback requirements, requiring specific design standards for the building façade, or screening external mechanical equipment.

- Loudoun and Fairfax have reduced the number of zones allowing data centers by right.
- All three localities have taken steps to address noise, such as requiring sound studies for new projects, requiring proactive sound measuring for existing data centers, and eliminating a partial exemption in the local noise ordinance for nighttime noise from businesses (including data centers).
- All three localities recently initiated studies of their data center policies to better manage development. Fairfax's study concluded with elected officials amending their ordinances in fall 2024. Loudoun and Prince William are reviewing potential changes to their long-term comprehensive plans as part of their studies and tentatively plan to vote on study proposals in 2025.

In several of the Virginia localities that are considering or expecting their first data center projects, elected officials have proactively implemented planning and zoning changes to promote appropriate industry development. The goals of these changes are to avoid the types of residential impacts that have occurred in established data center markets. For example, in 2023, Stafford County added data center principles to its comprehensive plan, prohibited data centers in several commercial and light industrial zones, and established industry-specific standards. Culpeper County also coordinated amending its comprehensive plan and zoning ordinance relevant to data centers. Culpeper allows data centers in multiple industrial zones but provides tax incentives to encourage development in a newly designated Technology Zone with more stringent design requirements.

Localities generally have adequate expertise to make data center decisions

For the most part, local government staff possess sufficient expertise to support the review and approval of data center projects. Data centers are one of many types of development that local planning, permitting, and other staff evaluate. Evaluating whether a data center project is in an allowable location, has appropriate setbacks and building height, or is proposing effective landscape screening is similar to evaluating other large commercial or industrial developments. The one exception is noise, a topic where staff from several localities would like more expertise. For example, planning staff from a locality with data center experience are uncertain whether their recently revised ordinances are the right way to prevent data center noise impacts.

Data center applications can be challenging, however, for smaller counties with less experience with the industry, given the complexity, size, and scale of data center projects. These localities have addressed challenges by reaching out to staff in other localities with more industry experience and by contracting for tasks where their expertise may be lacking, such as assessing economic impacts. For some functions, such as reviews of stormwater management plans, the Department of Environmental Quality

may perform the review instead of the locality. Larger counties have sometimes used consultants as well, such as Prince William for a noise study.

Effectiveness of local efforts to minimize residential impacts ultimately depends on elected officials

The effectiveness of local efforts to minimize the residential impacts from data center development ultimately depends on elected officials. Local staff can propose well-designed zoning ordinance changes and provide sound advice on whether a special permit or rezoning request should be approved based on local development standards and the locality's comprehensive plan, but elected officials make the final decisions. As described above, elected officials in Fairfax, Loudoun, and Prince William have recently taken actions to minimize residential impacts of data centers, and several localities considering data center projects are taking actions proactively. While these actions do not guarantee elected officials will always make the "right" decisions to address impacts, they do indicate that elected officials are actively responding to residents' concerns.

State intervention does not appear warranted, but localities should consider using key practices in data center ordinances and decisions

Land use decisions are traditionally a local responsibility in Virginia, because they directly affect local residents. Land use decisions are also very site specific, and local governments are better positioned than the state to evaluate what is appropriate for a given site.

Nature of data center impacts does not appear to merit state intervention, and localities appear to be taking needed actions

Although some stakeholders have advocated for greater state involvement in land use decisions, there is not currently a compelling reason for a state role in setting local requirements for data centers or intervening in local approval decisions. State intervention should be considered only if local policies are causing significant threats to residents' health and safety or other significant harm, but that is not the case with data centers.

Furthermore, only a minority of data centers in Virginia have been reported to impose negative impacts on residents. While some localities have allowed data centers to be built in areas incompatible with residential uses, those localities now appear to be taking actions to avoid future impacts by reviewing and changing local zoning ordinances. Other localities that have not experienced negative impacts on residents yet appear to be taking proactive action to minimize impacts.

Localities should implement several practices to minimize residential impacts

Localities should implement several practices to protect residents and ensure data center development proceeds appropriately and with minimal impacts. Namely, localities should:

- classify data centers as an industrial use in their zoning ordinances;
- review the locations of zones allowing data centers by right, and adjust the zoning map if needed, considering proximity to residential areas;
- ensure that minimum requirements in the zoning ordinance adequately mitigate negative impacts on residential or other sensitive areas (e.g., setbacks, building heights), and add requirements specific to data centers as needed;
- identify optimal areas for data center development in the locality, including locations that are suitable from the county's perspective (e.g., far from residential areas) as well as the industry's perspective (e.g., large parcels, access to transmission);
- reduce the likelihood of noisy data centers (including through limiting allowable locations and requiring sound modeling) and prohibit the constant low-frequency noise of data centers from reaching residential areas; and
- require commitments from data centers making zoning requests to sufficiently mitigate negative impacts on any nearby residential areas.

Localities can take steps to mitigate data center noise, but some are unsure of authority to do so

Although only a few data centers have caused impacts to residential areas, noise is reported to be one of the most disruptive problems for residents, and data center noise concerns can be difficult to resolve. Noise impacts can be reduced by siting data centers away from residential areas and by modeling data centers' potential noise impact before they are built. Localities also need to be able to address noise that occurs after data centers are operational.

Noise concerns can be reduced by modeling data center sound impacts before a data center is built

In addition to having zoning ordinances that prevent data centers from being located close to residential areas, localities should require sound modeling for data centers proposed close to residential areas. Sound modeling predicts the sound a facility will generate once operational and provides an opportunity for building designers to assess the need for, and effectiveness of, sound reduction strategies. Localities could review study results to determine if any further action, such as sound barrier construction, should be required before approving a development project.

Sound modeling studies can also be used to establish the baseline level of noise already occurring around the proposed data center site, which can later be used to determine whether a data center has contributed to noise in the area. Many data center companies are now doing sound modeling studies for all or some of their projects, and companies explained that sound modeling prior to construction is worthwhile because reducing noise after a building is operational can be difficult and expensive.

Some localities were unsure whether Virginia law allows them to require sound modeling studies. Given this uncertainty, the Code of Virginia should be amended to clarify that local governments have the authority to require sound modeling studies by data center developers and to review and consider the results in their land use decisions.

RECOMMENDATION 7

The General Assembly may wish to consider amending the Code of Virginia to expressly authorize local governments to require sound modeling studies for data center development projects prior to project approval.

The state could incentivize sound modeling by making eligibility for the sales and use tax exemption contingent on this work being performed for any new data center developments proposed near residential areas. For example, the General Assembly could amend the law to require any data center company with a data center that is proposed to be constructed in 2026 or later near a residential area or area zoned for residential development perform a sound modeling study and provide the results to the appropriate locality in order to qualify for the exemption.

POLICY OPTION 7

The General Assembly could amend the Code of Virginia to require that, as a condition for receiving the sales and use tax exemption, data center companies conduct a sound modeling study prior to the development of a proposed data center that is to be located within a certain distance of a residential development or area zoned for residential development and provide the study findings to the appropriate locality.

Localities also need the ability to address noise issues that occur once a data center is operational

Localities also need to be able to address data centers' noise once they are operational, but local ordinances have been largely ineffective at addressing data center noise concerns. Most local noise limits are defined using "A-weighted" decibels (sidebar). This metric is designed to target excessively loud noise from sources such as parties and barking dogs. The lower frequency noise data centers emit is not fully captured in "A-weighted" decibels. Therefore, data center noise rarely exceeds the allowable limits set in ordinances, despite the constancy of the sound being problematic for residents. To effectively address data center sounds that cause resident complaints, localities could

"Decibels" are a pure unit of measurement of sound's volume. When measuring sound, different modifications can be used to account for various frequencies. For example, "A-weighted" decibels prioritize frequencies perceived loudest by humans and therefore reduce particularly low frequencies. "C-weighted" decibel measurements account more for low frequencies.

develop a supplemental noise limit defined using a metric that better accounts for low frequency sounds, such as “C-weighted” decibels.

Another challenge is that most localities address excessive noise in *noise ordinances*, and state law limits civil penalties for noise ordinance violations to \$500 after the first offense. Stakeholders have expressed concern that this small penalty is not sufficient to affect the behavior of the large companies that own data centers. Addressing noise limits through localities’ *zoning ordinances* would allow localities to better address data center noise. For example, the zoning ordinance could prescribe a process for measuring potential noise violations and penalties for not addressing them.

Some localities were unsure whether state law allows them to (i) establish maximum sound levels in alternative low frequency sound metrics and (ii) set noise rules and enforcement mechanisms in their zoning ordinances. The state should clarify that local governments have the authority to use these approaches to address data center noise.

RECOMMENDATION 8

The General Assembly may wish to consider amending the Code of Virginia to expressly authorize local governments to establish and enforce maximum allowable sound levels for data center facilities, including (i) using alternative low frequency noise metrics and (ii) setting noise rules and enforcement mechanisms in their zoning ordinances, separate from existing noise ordinances.

7 Potential Changes to Data Center Sales Tax Exemption to Address Policy Concerns

Virginia's data center retail sales and use tax exemption is a valuable incentive to data centers (providing \$928 million in savings in FY23), and about 90 percent of the industry (as measured by megawatts of power) uses the exemption. The General Assembly could therefore use the exemption to incentivize the industry to take actions that help address many of the concerns discussed throughout this report.

If consideration is given to amending the exemption, two factors should be considered. The exemption was adopted primarily to attract data centers to Virginia for economic development purposes, so any changes to advance other policy goals could make it a less effective economic development tool. The exemption is also consistent with tax policy principles that generally exempt businesses' production-related inputs (in this case computer and related equipment) and therefore provides equitable tax treatment with other capital-intensive industries that have business input exemptions.

Exemption changes could encourage continued data center growth, reduced energy demand, or a balance of these priorities

The data center industry provides positive economic benefits to Virginia (Chapter 2). However, a primary concern about the growing industry is the immense increase in energy demand it will require (Chapter 3), which could increase costs to other customers (Chapter 4). The state could consider changes to the exemption to maintain data center industry growth, reduce energy demand by reducing industry growth, or attempt to balance these two competing priorities.

Extending the exemption could help Virginia maintain industry growth and associated economic and local tax revenue benefits

The data center industry provides moderate economic benefits to Virginia and can provide localities that have them with substantial tax revenues. While economic benefits are concentrated in Northern Virginia, other regions of the state also benefit. For example, data center construction benefits equipment manufacturers and material suppliers in Tidewater, Southwest, and Southside Virginia. While historically only a few localities have benefited from data center tax revenues, the industry is rapidly growing. Data center projects are under development in at least 15 localities, most of which did not previously have data centers. Therefore, from an economic development perspective, the state may want to continue attracting the industry and maintain Virginia's position as a top global data center market.

The state's data center sales tax exemption is scheduled to expire in 2035, and data center representatives unanimously reported that expiration of the exemption would have a negative impact on the state's ability to attract new data centers and keep existing ones. Some companies indicated the expiration date could start to affect site selection and expansion decisions made in the next few years, because companies typically consider the costs of data center ownership over a 15- to 20-year period when making location decisions. Companies indicated that, without the exemption, the total cost of data center ownership and operation would significantly increase. Virginia is currently competing for new data center development with several other primary U.S. markets, almost all of which have data center exemptions. Without an exemption, data center representatives indicated any new development in Virginia would be limited to only what is "absolutely necessary," and development would likely shift to other markets.

The 2023 General Assembly passed a **special data center sales tax exemption extension to 2040 or 2050** for companies that create 1,000 or 2,500 jobs (100 of which must meet above average wage requirements) and make a capital investment of at least \$35 billion or \$100 billion, respectively. So far, this extension applies to only one data center company, but several others may be interested in qualifying for this extension.

To help Virginia remain competitive, the state could extend the exemption's expiration date. To influence future site selection decisions, an extension would need to be in place well before 2035. A reasonable new expiration year would be 2050, which would match the special extension that has already been created for companies that meet certain additional criteria (sidebar). The exemption should continue to have an expiration date, because this is considered an effective practice to ensure periodic scrutiny of its need and effectiveness.

POLICY OPTION 8

The General Assembly could amend the Code of Virginia to extend the expiration date for the state's sales and use tax exemption for data centers from 2035 to 2050.

Extending the expiration date for the exemption, without making any other changes to it, would not address one structural issue with the exemption. Most of the economic benefits of the exemption occur during data center construction, but the exemption provides companies with substantial tax benefits in subsequent years after economic benefits have declined.

Allowing the exemption to expire could help reduce industry growth and associated energy demand

Virginia's utilities have historically been able to keep up with energy demand, but even if data center energy use grows at only half the forecasted rate, the state will need to make enormous investments in energy infrastructure. While data centers will incur much of the cost of new infrastructure investments, energy rates for all users are likely to increase. Growing energy demand could also make it more difficult for the state to meet goals set forth in the Virginia Clean Economy Act.

If the General Assembly wishes to slow down the data center industry's growth in Virginia because it determines that energy concerns outweigh the industry's economic benefits, it could allow the sales tax exemption to expire in 2035. While it is difficult to gauge the exact effect this would have, it is likely industry growth would slow and

could eventually stop or even contract. If the industry contracts, it would reduce the need for future generation and transmission infrastructure but would actually increase energy costs paid by other ratepayers, who would have to share a larger portion of current systemwide costs. While the state could allow the exemption to expire only in certain localities or regions, like Northern Virginia, that approach would be less effective in reducing overall growth in energy demand. Industry growth is occurring in several counties outside of the Northern Virginia region and is expected to continue, so allowing the exemption to expire in Northern Virginia while extending it elsewhere would not address the energy impacts where much of the future industry growth is likely to occur (sidebar).

If the General Assembly allowed the exemption to expire in 2035, it would need to determine how to treat the large subset of data centers that will likely qualify for the special 2040 or 2050 extension. This extension currently pertains only to Amazon Web Services, but other companies may be interested in developing agreements to use the extension. Disallowing Amazon Web Services from using the extension would likely affect its custom performance grant agreement with the state to develop multiple data center facilities throughout Virginia, which was negotiated under the assumption the company would receive the extension, and could be subject to legal challenges.

Outside of the Northern Virginia planning district, data center projects are currently under development in the counties of Caroline, Chesterfield, Culpeper, Fauquier, Hanover, Henrico, Louisa, Mecklenburg, Pittsylvania, Powhatan, Spotsylvania, and Stafford. Dominion Energy expects the Stafford area to “become another super large market” like Loudoun and Prince William counties.

POLICY OPTION 9

The General Assembly could allow the sales and use tax exemption for data centers to expire in 2035.

Exemption could be changed to balance industry growth with energy impacts

By either extending the exemption or allowing it to expire, the state would be choosing either economic benefits or reduced energy impacts. An alternative approach is to try and balance these competing objectives. The state could do this by allowing the *full* exemption to expire in 2035 (or ending it before then) and applying a *partial* tax exemption to 2050.

The size of a partial exemption could depend on whether the state wants to emphasize economic benefits or reduced energy impacts. For example, under the current exemption, qualifying companies are exempt from paying the full 4.3 percent state share of the retail sales and use tax and local and regional portions (sidebar). Focusing on the state share, a partial exemption could require qualifying companies to pay a 1 percent sales tax, which would keep much of the exemption’s value intact and would likely remain somewhat effective at promoting industry growth (but would do less to reduce energy use). Alternatively, qualifying companies could be required to pay a higher 3 percent sales tax, which would likely be less effective at promoting industry growth and so would reduce future energy use more. By choosing a higher partial tax rate, the state could risk losing some of its existing data centers, particularly in Northern

The statewide retail sales and use tax includes a 4.3 percent state share, a 1 percent local option share, and an additional 0.7 percent to 1.7 percent regional share, depending on the region.

Virginia, although this risk may be diminished by the region's many attributes that make it so attractive to the industry.

The state would need to determine if the partial exemption would apply to data centers that qualify for the existing special 2040 or 2050 extension. This extension currently pertains only to Amazon Web Services, but other companies may be interested in developing agreements to use the extension. To be most effective at addressing energy impacts, and to maintain a level playing field for competitors, the same or a similar partial exemption could also be applied to these data centers.

POLICY OPTION 10

The General Assembly could amend the Code of Virginia to extend a partial sales and use tax exemption for data centers from 2035 to 2050.

A partial exemption would also better align the economic benefits the state receives with the exemption's value. Most economic benefits occur during construction, and switching to a partial exemption in 2035 would reduce the value of the exemption in later years when the economic impacts of current and planned data centers could be expected to slow. A partial exemption would also generate more revenue for the state. For example, a 1 percent partial sales tax would have generated approximately \$160 million in state tax revenue in FY23.

Exemption changes could address other policy concerns related to the data center industry

Virginia's sales tax exemption currently requires...

50 new jobs located at the data center, associated with operations or maintenance.

Jobs pay at least 150% of the prevailing annual average wage of the locality where the data center is located.

\$150 million in capital investment.

Requirements are lower for data centers in economically distressed localities (10 jobs and \$75 million capital investment).

If the decision is made to extend the exemption, this report provides several options the General Assembly could enact to modify it and address concerns in specific policy areas (Table 7-1). These policy options would add new requirements, in addition to the existing requirements, for data centers to be eligible to receive the exemption (sidebar). These options could be phased in gradually to give data center companies enough time to implement them, and the General Assembly could decide to enact some but not others.

The General Assembly will need to determine its primary policy goals for the industry to determine whether to add new requirements to the exemption. If some or all of these policy options were adopted, it would likely make the exemption harder to use and more complex to administer. Alternatively, the General Assembly could pass legislation *requiring* the industry to take these actions, regardless of whether they qualify for the exemption, but this approach could lead to some data centers choosing to either shut down or operate in violation of the law.

The policy options in Table 7-1 would require changes to the Memoranda of Understanding (MOUs) all data center companies are required to enter into with the Virginia Economic Development Partnership (VEDP) to receive the exemption. Current law allows all of a company's data centers in a specific locality to collectively qualify for

the exemption. Therefore, the company reports data to VEDP for all of its data centers in each locality where it operates rather than by each individual data center. Policy options that apply only to new data centers might require changing MOUs to apply to each individual data center or to have addenda to the MOUs that identify the individual eligible data centers. VEDP would need to determine exactly how MOUs would need to be restructured.

VEDP would also need to determine the evidence data center companies would need to provide to qualify for the exemption, which would likely add to the complexity of administering the exemption. For example, companies could be required to provide appropriate documentation before a new data center becomes operational to qualify for the exemption. Alternatively, companies could be allowed to self-certify under the condition that documentation must be provided if requested by VEDP or Virginia Tax. VEDP would need to develop guidelines for how to implement any new compliance requirements and set forth new terms in the MOUs.

TABLE 7-1

General Assembly could modify the sales tax exemption to address energy, natural resource, historic resource, and residential impacts

Change	Issue Addressed	Policy option
Options that could apply to <i>all</i> Virginia data center operations		
Implement ISO-50001 Energy Management standard or equivalent	Energy impacts and costs	1
Implement ISO-14001 Environmental Management Systems standard or equivalent	Natural resource impacts	5
Options that could apply to <i>new</i> data centers built after a certain date		
No Tier 2 diesel generators in Northern Virginia Ozone Non-Attainment area without SCR systems	Natural resource impacts	4
Phase 1 historic resources study required, viewshed study required if near registered historic site	Historic resource impacts	6
Sound modeling (noise) study required	Residential impacts	8

SOURCE: JLARC staff analysis.

NOTE: ISO = International Organization for Standardization. SCR = Selective Catalytic Reduction systems that reduce emissions of nitrogen oxides, a major contributor to smog-forming ozone, and other harmful emissions.

Appendix A: Study resolution

Resolution of the Joint Legislative Audit and Review Commission directing staff to review data centers

Authorized by the Commission on December 11, 2023

WHEREAS, there has been substantial growth in the data center industry in Virginia, particularly Northern Virginia which has the largest concentration of data centers in the world, Southern Virginia, the Greater Fredericksburg region, and the Greater Richmond region; and

WHEREAS, growth in the data center industry is expected to continue with increasing demand from deployment of advanced and innovative technologies used by individuals, business of all sizes across all industries, government agencies, and other organizations that require the digital infrastructure that data centers provide; and

WHEREAS, data centers can bring economic benefits to localities because they can create significant economic activity during construction, they can increase property tax revenue for local governments without placing high demands on government services like schools, and the clustering of data centers can make a region more attractive to other high tech businesses and help support ecosystems of vendors, service providers, and suppliers; and

WHEREAS, concerns exist over data centers because they require large amounts of energy, which can affect the broader energy market; they may have impacts on natural, historical, and cultural resources; and some citizens have expressed opposition to having data centers located near residential areas due to concerns over issues such as noise and the adverse visual impact; and

WHEREAS, the data center sales tax exemption is Virginia's largest economic development incentive, and JLARC conducted an in-depth review of the exemption in 2019; now, therefore, be it

RESOLVED by the Joint Legislative Audit and Review Commission that staff be directed to review the overall impacts of the data center industry in Virginia and state and local policies regarding the industry. In conducting its study staff shall (i) research recent and expected trends in factors impacting data center industry growth and forecast future growth of Virginia's data center industry, taking into account how various factors may affect these projections; (ii) assess impacts of the data center industry on Virginia's natural resources, as well as historic and cultural resources, and identify potential technologies that could reduce their impacts on these resources; (iii) assess the impacts of the data center industry on current and forecasted energy demand and supply in Virginia, including how data centers will likely affect future energy infrastructure needs, energy rates paid by customer classes and whether cost allocation methods ensure no single customer class is unreasonably subsidized by other customer classes, and the state's ability to transition from fossil fuels to renewable energy sources; (iv) estimate the impact of the data center industry on local revenue and assess how local tax policies may affect data centers; (v) identify how data centers may impact local residents, including concerns such as noise pollution, decreasing property values, and

the adverse visual impact; (vi) identify considerations around the construction and siting of data centers, and review how zoning and regulatory restrictions and requirements can affect data center deployment; (vii) identify guidance and assistance state agencies could provide to local governments for use in making decisions about the location and expansion of data centers; (viii) assess whether more geographically diverse data center industry growth would provide greater economic benefits to the Commonwealth, and if so, identify obstacles to attracting data centers to other areas, particularly economically distressed or rural regions of the state, and policy changes that could increase geographic diversity, such as changes in electricity policy, tax policy, and broadband infrastructure policy; (ix) compare Virginia's competitiveness in attracting data centers with other states; and (x) determine if Virginia's data center tax exemption could be improved, including whether the exemption could be better targeted, the level of benefit is appropriate given the cost, or other changes should be considered.

JLARC may make recommendations as necessary and may review other issues as warranted.

All agencies of the Commonwealth, including the Virginia Department of Energy, the Virginia Department of Environmental Quality, the State Corporation Commission, the Virginia Economic Development Partnership Authority, the Virginia Department of Taxation, and Virginia local governments shall provide assistance, information, and data to JLARC for this study, upon request. JLARC may use consultants as necessary to complete the study. JLARC staff shall have access to all information in the possession of agencies pursuant to § 30-59 and § 30-69 of the Code of Virginia. No provision of the Code of Virginia shall be interpreted as limiting or restricting the access of JLARC staff to information pursuant to its statutory authority.

Appendix B: Research activities and methods

Key research activities performed by JLARC staff for this study included:

- structured interviews with local residents and stakeholder groups, data center companies and developers, state and local officials, electric and water utility companies, and subject-matter experts;
- contracts with consultants to produce an independent energy demand forecast for Virginia and its utilities, and model how future data center growth in Virginia is likely to impact energy supply, demand, emissions, and cost;
- site visits to data centers and nearby communities;
- development of inventories of (i) operational and (ii) planned data centers;
- economic impact analysis of the data center industry (see Appendix D);
- data collection and analysis, including on data center water usage, emissions, capital expenditures, employment and tax benefits amongst users of the data center tax exemption, and data center proximity to residential areas;
- review of state and local laws, ordinances, reports, and policies relevant to energy, natural and historic resources, land use, and noise;
- review of research literature relevant to data centers, energy, natural and historic resources, and noise; and
- review of other documents, literature, and media sources.

Structured interviews

Structured interviews were a key research method for this report. JLARC staff conducted over 250 interviews with 165 different stakeholders.

Residents and stakeholder groups

JLARC staff conducted interviews with nearly 20 local residents and resident stakeholder groups, such as neighborhood associations, including those in Fairfax, Fauquier, Henrico, Loudoun, and Prince William counties. These interviews focused on the impact of data centers on local residents and communities, such as viewshed and noise issues.

JLARC staff also conducted roughly 20 interviews with state and regional stakeholders groups, including those that represent data center companies, electric cooperatives, construction tradespeople, land conservation and preservation, battlefield preservation, sustainability and the environment, and local and tribal interests. Staff interviewed the American Battlefield Trust, Clean Virginia, Cultural Heritage Partners, Data Center Coalition, Friends of the Rappahannock, Northern Virginia Technology Council, Preservation Virginia, Sierra Club, Southern Environmental Law Center, Virginia Association of Counties, Virginia Association of Soil and Water Conservation Districts, Virginia Chapter of the American Planning Association, Virginia Clinicians for Climate Action, Council of Virginia Archaeologists, Virginia Data Center Reform Coalition, Virginia Farm Bureau Federation, and Virginia, and Maryland & Delaware Association of Electric Cooperatives. Staff also interviewed

representatives of the Pamunkey tribe. These interviews covered a range of topics related to the impact of data centers.

Data center companies and developers

JLARC staff conducted nearly 40 interviews with 12 data center companies and developers. These companies operate colocation and hyperscale data centers in Virginia and include industry leaders. These interviews covered a range of topics, including their data center operations in Virginia, the economic impact of data centers, data center site selection, energy issues and sustainability, and the impact of data centers on natural and historic resources, local planning, and community impacts.

State agency staff

JLARC staff conducted more than 30 interviews with state agency staff, including staff from the Virginia Department of Environmental Quality (DEQ), State Corporation Commission, Virginia Economic Development Partnership, Virginia Department of Taxation, Virginia Department of Conservation and Recreation, Virginia Department of Historic Resources, Virginia Department of Forestry, Virginia Department of Agriculture and Consumer Services, Virginia Department of Energy, Virginia Department of Housing and Community Development, and Virginia Department of General Services. These interviews covered a range of topics related to the impact of data centers, including energy issues, issues related to natural and historic resources, and economic development.

Local government staff

JLARC staff conducted more than 50 interviews with local government staff and elected officials in Caroline, Chesterfield, Culpeper, Fairfax, Fauquier, Frederick, Henrico, Loudoun, Mecklenburg, Prince William, Stafford, and Wise counties, and the town of Warrenton. These interviews covered a range of topics, including planning and zoning, economic development, environmental services, public works, historic resources, and local tax and revenue impacts.

Federal government staff

JLARC staff conducted interviews with staff at the U.S. Army Corps of Engineers, U.S. Department of Agriculture, and U.S. Environmental Protection Agency. These interviews generally focused on the impact of data centers on natural resources.

Electric companies and cooperatives in Virginia and Virginia's regional transmission organization

JLARC staff conducted more than 20 interviews with electric companies and cooperatives in Virginia, including Dominion Energy, Appalachian Power Company, and the Central Virginia, Mecklenburg, Old Dominion, Northern Virginia, and Rappahannock electric cooperatives. These interviews focused on the impact of data centers on energy demand, supply, and rates. Interviews with Dominion Energy also focused on energy transmission and generation issues.

JLARC staff also interviewed the PJM regional transmission organization, which serves Virginia. These interviews focused on energy transmission and generation in the region, as well as the impact of data centers on energy demand and supply.

Water utilities

JLARC staff conducted 15 interviews with local water utilities, including those in Caroline, Fairfax, Fauquier, Henrico, Loudoun, Mecklenburg, Prince William, Stafford, and Wise counties. These interviews focused on the impact of data centers on water utilities, planning, and availability.

Subject-matter experts

JLARC staff conducted more than 25 interviews with subject-matter experts across a range of topics related to data centers. These experts included researchers at the Cooling Technologies Research Center at Purdue University, Lawrence Berkeley National Laboratory, National Renewable Energy Laboratory, Occoquan Watershed Monitoring Laboratory, and Rutgers Noise Technical Assistance Center; experts at engineering, law, and real estate firms with experience working with data centers; and leading data center construction materials and equipment manufacturers, such as a steel fabricator and generator manufacturer.

Contracts with consultants

JLARC contracted with faculty from the Weldon Cooper Center for Public Service at the University of Virginia (Weldon Cooper Center) to develop an independent energy demand forecast for Virginia and its utilities. JLARC also contracted with consulting firm Energy + Environmental Economics (E3) to model how data center growth in Virginia is likely to affect future generation and transmission needs and whether the associated costs of system changes could be passed on to residential ratepayers. E3's work was divided into two projects: (1) grid modeling and (2) cost of service and rate impacts.

Additionally, JLARC contracted with Terance Rephann and Joao Ferreira, regional economists at the Weldon Cooper Center, to assist in the economic impact analysis. The methods used for the economic impact analysis are described in Appendix D.

Weldon Cooper Center energy demand forecast

WCC was contracted to develop an independent energy demand forecast for Virginia that accounts for the expected growth of the data center industry. WCC collected data on historical retail energy sales for Dominion Energy, Appalachian Power Company (APCO), and utilities serving the rest of Virginia. WCC collected additional data on retail energy sales to *data center* customers for the utilities that currently serve most of the Virginia data center industry: Dominion, Northern Virginia Electric Cooperative (NOVEC), and Mecklenburg Electric Cooperative (MEC). WCC also collected data on metered load forecasts for data center customers in the Rappahannock Electric Cooperative (REC). REC does not currently have any operational data center customers, but a substantial number of new, large data center campuses are planned to be built in REC's distribution service territory.

Using historical energy sales data, WCC applied advanced statistical methods to develop an *unconstrained energy demand* forecast for Virginia. The unconstrained demand forecast shows what demand would be before accounting for constraints like the ability to build enough energy infrastructure to meet demand. WCC also developed a forecast for *half of unconstrained demand* to provide a lower-growth scenario for analysis purposes. Finally, WCC developed a *no new data center demand* forecast so that the effects of the industry on energy demand could be isolated for analysis purposes. WCC's forecast

made several projections, including baseload demand growth from all non-data center customers, demand growth from data center customers, and demand growth from electric vehicles. Additional details on the data and statistical methods used to develop the forecast are detailed in WCC’s final report to JLARC staff.

WCC’s forecasts cover the period from 2025 to 2050, because VCEA requires carbon emitting generation owned by Dominion and APCO to be retired by 2045 and for the utilities to have all energy from non-carbon emitting sources by 2045 (Dominion) or 2050 (APCO). However, because forecasts become more speculative the farther out they go, this report shows energy demand forecasts up to 2040. The energy demand forecasts for later years are detailed in WCC’s final report to JLARC staff.

One of the limitations of the WCC forecasts is that historical data does not fully capture some of the trends that are likely to drive future data center growth, such as how artificial intelligence (AI) will be developed and deployed. However, the unconstrained demand forecast is within the bounds of what can be expected in the next five-plus years based on the electric service and construction agreements that utilities report having in place with data center customers. It is important to note that because forecasts were developed using actual, historical energy sales, they are not subject to distortion by speculative capacity requests from developers or data center companies.

Energy + Environmental Economics grid modeling (project 1)

E3 developed a model of the regional PJM generation and transmission grid. E3 then converted the WCC *energy* demand forecasts into *peak load* demand forecasts that estimate the highest overall power demand that would be placed on the grid each year, under different scenarios. The peak load forecast considered daily and seasonal energy use trends and weather patterns. E3 then modeled three main demand scenarios. For each of the demand scenarios, the model considered the most feasible and economical approaches to meeting infrastructure needs with and without the requirements of the Virginia Clean Economy Act (VCEA).

- Scenario 1: unconstrained demand, with and without VCEA. E3 also modeled variations where unconstrained demand and VCEA requirements could be met by using high levels of nuclear and renewable generation or by better regional coordination across PJM.
- Scenario 2: half of unconstrained demand, with and without VCEA.
- Scenario 3: no new data center demand, with and without VCEA.

E3’s modeling used industry standard approaches and tools used for electric utility and state energy planning purposes. The model applied constraints on the amounts of infrastructure that could be built by 2030 using historical build rates, relaxed those constraints for 2035, and removed most constraints for 2040 and following years. Modeling was based on state and federal laws and regulations in place in 2024. For VCEA scenarios, the model followed the “letter of the law” and assumed that certain requirements—such as the Renewable Portfolio Standards and associated Renewable Energy Certificate requirements for investor-owned utilities—would not apply to electric cooperatives. This assumption has a significant impact because a majority of future data center growth is expected to occur in the electric cooperatives’ distribution service territories. Societal costs, such as the social cost of carbon, were not explicitly included in the model. Additional details on the exact methods and assumptions used to develop the model are detailed in E3’s final report to JLARC staff.

For each scenario, the model predicted the mix of generation and transmission capacity that would be needed to meet demand, the resulting mix of generation energy sources (including energy imports), and their associated emissions. Outcomes were developed for the Dominion transmission zone, Virginia, and the PJM region. The model also predicted system costs for the Dominion transmission zone, where most data center growth is expected to occur. Each scenario outcome was tested to ensure that the system being built would be functional and meet industry standard reliability requirements.

E3's grid modeling covers the period from 2025 to 2050 because VCEA requires all carbon emitting generation owned by Dominion and APCO to be retired by 2045 and for the utilities to have all energy from non-carbon emitting sources by 2045 (Dominion) or 2050 (APCO). However, because energy demand forecasts and generation options become more speculative in further out years, this report only shows model results up to 2040. The model's results for later years are detailed in E3's final report to JLARC staff.

Energy + Environmental Economics cost of service and rate impact analysis (project 2)

For the cost-of-service analysis, E3 examined how costs were being incurred and allocated to different customer classes under the rate structures in place at Dominion Energy, NOVEC, and MEC. The purpose of this analysis was to determine if the current rate structures were wholly recovering costs from the customers who are incurring those costs. E3's cost-of-service analysis was done using industry standard approaches and tools for electric utility planning purposes. Additional details on the exact methods and assumptions used in this analysis are detailed in E3's final report to JLARC staff.

For the rate impacts analysis, E3 focused on how changing demand could affect generation and transmission costs for residential ratepayers in Dominion's distribution service territory. Dominion was chosen because of its large size and concentration of data centers. Residential rate changes were a key focus because they show how Virginia households could be affected by growing data center demand and are indicative of how other customers, such as businesses, might be affected.

E3's analysis of rate impacts followed three steps. First, E3 estimated total costs that would be attributable to the Dominion transmission zone, under the different energy demand scenarios discussed above, using its grid model. Second, for the Dominion distribution service territory, E3 estimated how costs would be allocated to residential customers, assuming that the company regularly reallocated costs to its different customer classes using current state- and federally approved allocation methodologies. Third, E3 translated these costs into the incremental cost per kilowatt-hour that would be passed on to residential ratepayers.

E3's rate impact analysis was limited to generation and transmission cost increases that could be attributed to growing data center demand. The analysis captures the cost of transmission needed to increase capacity into the Dominion transmission zone (interzonal transmission) and to interconnect with new generation sources. A significant portion of potential future transmission costs, associated with transmission projects *within* the Dominion transmission zone (intrazonal transmission), were not captured because these projects and their costs cannot easily be predicted. The analysis did not consider potential changes to distribution rates because most increases in distribution costs from the data center industry are effectively allocated to and recovered from these customers. E3's analysis also did not consider how Dominion's allowable profit margin would factor into rate impacts.

JLARC staff converted E3's rate impact data to show how a typical residential customer, using 1,000 kilowatt-hours of energy per month, could be affected. JLARC staff's conversion included an adjustment to account for Dominion's allowable profit margin but did not incorporate several other costs that affect the total residential bill. Consequently, Dominion's total residential bill projections, from its integrated resource plan, show much larger overall increases than the numbers presented in this report. Dominion's projections apply to the whole residential bill and include several costs that are not captured in JLARC's analysis, such as distribution costs and the cost of some additional transmission and generation projects that may not be solely attributable to data centers. Dominion's residential bill projections are also in nominal dollars that have been adjusted upward using an inflation assumption whereas JLARC's are held in constant (or real) 2024 dollars to show the real growth of costs that consumers will experience, independent of inflation. The demand forecast that Dominion uses in its rate projections is similar to the WCC unconstrained demand forecast but substantially higher than the half of unconstrained demand forecast.

Site visits

JLARC staff conducted site visits to two operational data centers in Virginia, including one in Loudoun and one in Henrico. Staff conducted these site visits to better understand how data centers are designed and operated. For example, staff observed the data halls, power and cooling systems, and backup generators, and listened to noise levels throughout the facilities. Staff also spoke with a variety of personnel at the data centers, including facility operations managers and operational and maintenance staff.

Additionally, JLARC conducted multiple site visits to observe areas with data center development and neighborhoods with nearby data centers. Two of these site visits were led by stakeholder groups with extensive participation in local zoning processes and studies of data centers. JLARC visited eight neighborhoods close to operational data centers or data centers in various stages of development. At all but one of those locations, JLARC staff spoke with residents about their perspectives on the data centers. Additionally, JLARC visited a commonly used trail adjacent to a data center and visited land within Manassas National Battlefield next to property rezoned for a data center.

Data center inventories

JLARC staff developed an inventory of the operational data centers in Virginia. This inventory was used to map the presence of the industry in Virginia. The inventory was based on data provided by DEQ listing data center sites with active air emissions permits (which all Virginia data centers have for their diesel generators). This data was as of August 2024. Staff used the address field in this data to search county real estate assessment records, using these records to (i) confirm the address was associated with a data center and (ii) identify the size of the site (in terms of acres), the number of buildings on the site, when they were built, and their size (in terms of square feet). In a few instances, county records did not list the size of the building. In these instances, JLARC staff estimated the size of the building(s) on the site based on the total capacity (megawatts) of the generators permitted by DEQ.

Staff cross-referenced this information where possible, using publicly available information from data center company websites, the Existing and Proposed Data Centers map developed by the Piedmont

Environmental Council, and other websites that track the data center industry, such as Datacenter-Hawk. From this cross-referencing, JLARC staff identified a few sites that appeared to be data centers but were not associated with a DEQ permit. In these instances, JLARC staff estimated the capacity of the site (megawatts) based on the size of the building(s) listed on the site's real estate assessment record.

JLARC staff also developed a list of data center sites currently under construction, planned, or proposed in Virginia. This information was used to assess where data center growth is expected to occur in the state. To develop this inventory, staff monitored media articles announcing new and proposed data center development, such as those published by Data Center Dynamics and local news outlets. Staff also identified information about proposed data center sites by reviewing local data center-related zoning and permitting requests.

Data collection and analysis

Local data center tax revenue

JLARC staff calculated the proportion of local revenue that comes from data centers by collecting data center tax revenue from localities and comparing it to their total local revenue reported in the Auditor of Public Accounts' Comparative Report of Local Government Revenues and Expenditures for FY23.

Data center generator permit, emissions, and violations data

DEQ provided JLARC staff air permit data for Virginia data centers (who were identified by DEQ), including data center permitted generator numbers and energy capacities, maximum allowed annual emissions, and actual emissions from 2015–2023. Additionally, JLARC staff used DEQ annual point source emission data, enforcement action data (including notices or violations and any charges assessed), and National Emissions Inventory data for Northern Virginia in 2017 and 2020.

JLARC staff created summary statistics of data center permit information (such as generator numbers and maximum allowed emission) and actual emissions and examined trends across time, regions, and localities. Using a map generated through JLARC's data center inventory, JLARC staff also examined clusters of data centers and cumulative local emissions from data centers.

To understand how data center emissions compare to other industries and contribute to overall emissions, JLARC staff compared data center emission and violation data to that of other Virginia air permit holder groups from 2015–2023. Additionally, JLARC staff estimated the current and potential portion of Northern Virginia air emissions resulting from data centers using 2020 National Emissions Inventory data.

Data center water use

JLARC staff received 2023 data center water usage information from water utilities serving Fairfax, Henrico, Loudoun, Mecklenburg, and Prince William counties as well as the town of Wise. Usage was typically reported for anonymous, individual data center buildings. However, one utility shared combined data for all of their data centers buildings, and one shared all water meter data for data center companies but did not combine use by building. (Some data centers have multiple water lines.) Reclaim

water use amounts were identified in the data. Two utilities shared annual usage data; three shared monthly usage data; and one shared daily usage data. Five utilities were able to share some amount of information related to data center water use trends since 2019 or later. All utilities shared their total annual customer base water usage for 2023.

JLARC staff used this data to calculate individual and cumulative data center water usage amounts, including the portion of a local utility's water that goes to data centers. JLARC also examined data center water usage seasonal trends and trends in recent years. JLARC analyzed data center water usage relative to other industries and water users in Virginia based on DEQ's 2023 Annual Water Resources reports; non-agricultural, non-public utility withdrawal data shared by DEQ; and the U.S. Energy Information Administration's 2012 Commercial Buildings Energy Consumption Survey water use statistics.

Land conversion due to data centers

JLARC estimates of land conversion due to data centers are based on data center development land area summary statistics calculated in JLARC's data center inventory. These land area amounts were compared to statewide and locality natural land losses recorded in the U.S. Department of Agriculture's 2022 Census of Agriculture state-level data and the federal Multi-Resolution Land Characteristics Consortium's National Land Cover Database Enhanced Visualization and Analysis tool.

Proximity of data centers to residential zones

JLARC staff analyzed the distance between operational Virginia data center sites and residential zoning. This analysis was limited to eight localities that account for the vast majority (93 percent) of data center sites in the state. JLARC measured the distance between each operational data center site and the nearest residential zoning using the interactive maps on localities' websites. This measurement indicates the distance between property lines, but the distance between data center buildings and homes is greater because data center buildings tend to be located away from the property line. JLARC staff captured the smallest distance to residential zoning across the multiple parcels that comprise a single data center site. JLARC focused on residential zoning because the zoning classification reflects uses of a property permissible under current local ordinances. However, this approach sometimes *overstates* the distance between a data center site and residences in situations where land is zoned residential but contains no homes. The reverse is also true; this approach sometimes *understates* the distance between data center sites and residences in situations where land contains homes but is not zoned residential. JLARC summarized the proportion of data center sites very close to residential zoning (defined as within 200 feet, which is approximately half the length of a football field) and somewhat close to residential zoning (defined as within 500 feet, which is approximately 1 ½ times the length of a football field) (Table B-1).

JLARC also analyzed the change over time in the proportion of data center sites near residential zoning. For each data center site in the analysis, JLARC identified whether the site existed in 2015 using annual DEQ data about air emission permits, which Virginia data center sites have for their diesel generators. For the group of data center sites with any generators reported to DEQ in 2015, JLARC calculated the proportion within 200 and 500 feet of residential zoning. JLARC then compared those

proportions to the proportions of all data center sites within those specified distances to examine whether data center proximity to residential zoning has increased over time.

TABLE B-1
Proportion of data center sites near residential zoning varies by Virginia locality

Locality	Proportion of data center sites within specified distance of residential zoning		Total data center sites
	200 feet	500 feet	
Loudoun	24%	34%	71
Prince William	21%	21%	24
Fairfax	55%	70%	20
Henrico	38%	38%	8
Chesterfield, Culpeper, Fauquier, Virginia Beach ^a	25%	38%	8
Total	29%	37%	131

SOURCE: JLARC analysis of localities' interactive map websites and JLARC inventory of operational data centers.

NOTE: Six data center sites were excluded from the analysis because data on proximity to residential zoning was not available or reliable.

^a These four localities are combined because the number of data center sites in each locality is very small.

Document and research literature review

JLARC staff reviewed numerous documents and literature pertaining to data centers, such as:

- Virginia state laws, regulations, and policies relevant to energy, natural and historic resources, land use, and noise;
- studies, reports, data, and other information on data center market size and forecasting data center industry growth;
- reports, presentations, and regulatory filings from Dominion Energy, electric cooperatives, and the PJM regional transmission organization, including those related to energy load, load forecasts, and transmission, generation, and distribution projects;
- research literature and stakeholder reports on natural and historic resources; data center backup power and cooling technologies; and data center, other land use, and technology impacts on natural and historic resources;
- federal, state, and local government reports, assessments, webpages, and other documents on natural and historic resources, data center, other land use, and technology impacts on these resources, land use best practices;
- local comprehensive plans, ordinances, and policies relevant to land use and noise;
- local government presentations and reports relating to data centers including documents prepared by staff, consultants, and workgroups;
- summaries of local approaches to data center regulation and recommended practices;
- documents and journal articles describing the science of sound waves, sound modeling processes, ways to reduce sound levels, and government approaches to regulating sound; and
- local, national, and international news media coverage of the data center industry.

Review of local ordinances and specific data center requests

JLARC staff conducted an in-depth examination of the way nine localities in Virginia govern data centers. The review included localities with the most existing data centers in Virginia (Loudoun, Prince William, Fairfax, Henrico, Mecklenburg), as well as several localities that have recently approved their first data centers (Caroline, Fauquier, Stafford, Warrenton). JLARC staff searched for ordinances specific to data centers, as well as other ordinances applicable to data centers due to their location or use category. The review focused on local rules regarding density (e.g., height, lot coverage), architecture (e.g., building materials), site layout (e.g., building setbacks), landscaping, and equipment screening. When specific to data centers, local rules related to environmental, water use or cooling systems, and electricity infrastructure were also identified.

Additionally, JLARC reviewed staff reports for 19 specific data center requests to local elected officials. These reports provided elected officials with information about requests for rezonings, special permits, and exceptions to local ordinances. JLARC staff reviewed reports from Caroline, Fairfax, Henrico, Loudoun, and Prince William counties and the town of Warrenton. The purpose of reviewing these staff reports included learning about the types of potential positive and negative impacts from data centers, the types of conditions beyond minimum requirements that developers committed to, the standards against which local staff evaluated data centers, the frequency of data center development that was not by right, and the alignment between staff recommendations and the decision of elected officials.

Appendix C: Agency responses

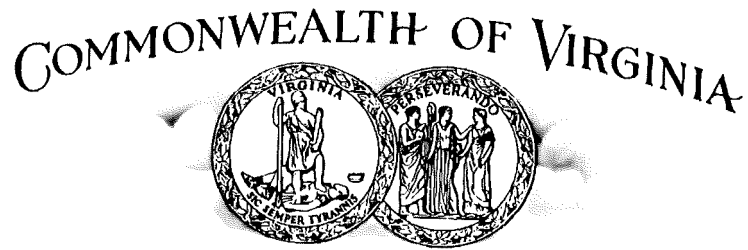
As part of an extensive validation process, the state agencies and other entities that are subject to a JLARC assessment are given the opportunity to comment on an exposure draft of the report. JLARC staff sent relevant portions of the exposure draft to the State Corporation Commission (SCC), Virginia Economic Development Partnership (VEDP), Virginia Department of Environmental Quality, Virginia Department of Historic Resources, Dominion Energy, Northern Virginia Electric Cooperative, and Rappahannock Electric Cooperative.

Appropriate corrections resulting from technical and substantive comments are incorporated in this version of the report. This appendix includes response letters from SCC and VEDP.

JEHMAL T. HUDSON
COMMISSIONER

SAMUEL T. TOWELL
COMMISSIONER

KELSEY A. BAGOT
COMMISSIONER



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STATE CORPORATION COMMISSION

November 22, 2024

Mr. Hal E. Greer, Director
Joint Legislative Audit and Review Commission (JLARC)
919 East Main Street, Suite 2101
Richmond, VA 23219

Dear Mr. Greer:

The State Corporation Commission appreciates the opportunity to review the draft of relevant portions¹ of the JLARC report, *Data Centers in Virginia* provided to Staff on November 13, 2024. The Commission Staff provided its high level feedback to JLARC Staff during a meeting held on Friday, November 22, 2024.

Please let us know if we may be of further assistance.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Jehmal T. Hudson", is written over a horizontal line.

Jehmal T. Hudson
Chairman, State Corporation Commission

¹ Sections 3 and 4, and Appendices F, G, I, and J.

November 21, 2024

Mr. Hal E. Greer, Director
Joint Legislative Audit & Review Commission
919 East Main Street, Suite 2101
Richmond, VA 23219

Re: VEDP response to the draft JLARC report, *Data Centers in Virginia*

Dear Mr. Greer:

Thank you for providing an opportunity for us to review relevant sections of chapters 1, 2 and 7 of the Joint Legislative Audit & Review Commission's (JLARC's) draft report, *Data Centers in Virginia*.

The content we reviewed provides a helpful overview of the data center industry and its importance to the Commonwealth. As the report highlights, data centers are key hubs of the world's digital infrastructure, and their concentration in Virginia has helped establish the Commonwealth as a global tech hub. We particularly appreciate your meticulous survey of the data center industry's presence in Virginia, which accounts for over 63 million square feet of data center space across 150 sites and directly employs more than 8,000 people, in addition to supporting tens of thousands of additional jobs.

Since your last comprehensive review of the industry in 2019, the geographic distribution of data centers across Virginia has changed considerably. Although many of the legacy assets are still concentrated in Northern Virginia, the industry has become an important opportunity for the entire Commonwealth. This expansion, particularly into rural areas, has been facilitated by technologies such as Artificial Intelligence, which are less constrained by latency requirements compared to other applications. Reflecting this trend, seven localities that previously lacked data centers have either approved new campuses or have pending applications, including several rural and "distressed" areas. VEDP's current project pipeline suggests that the spread of data centers across more localities is expected to continue, provided that Virginia continues to offer a competitive sales and use tax exemption.

Your report also demonstrates the significant and far-reaching impact of the data center industry. Notably, the analysis estimates that the data center industry supports an impressive 74,000 jobs, \$5.5 billion in labor income, and \$9.1 billion in Virginia GDP overall to the state economy annually. In particular, we appreciate that your report shines a spotlight on the significant knock-on effects of the industry that extend to virtually every corner of the Commonwealth.

VEDP strongly agrees with the report's finding that the sales and use tax exemption has been an important part of the industry's growth and continues to drive site selection and expansion

Mr. Hal E. Greer
November 21, 2024
Page 2 of 2

decisions. VEDP has responsibility for administering, in cooperation with the Department of Taxation, this important program on behalf of the Commonwealth and is pleased to see that new data collected by VEDP is serving to strengthen transparency. Your analysis adeptly leverages this data to demonstrate the significant state and local tax revenues generated by the industry.

This valuable report comes at a critical juncture for the data center industry. Coming on the heels of significant growth in recent years, the industry is expected to see continued, strong growth driven by demand for digital services and the emergence of new technologies, like Artificial Intelligence. These trends raise important questions about the implications of this growth.

Your report underlines various considerations that legislators will need to balance as they think about the future of the state's support for the data center industry. You correctly point out that sustaining the growth of the industry and its critical contribution to Virginia's economy will require action on the current 2035 sunset of the data center sales and use tax exemption. Allowing the existing exemption to sunset would result in development shifting to competing markets, and those effects are likely already beginning to be felt given the long timeframes the industry uses to analyze their investments.

Nonetheless, VEDP recognizes that balancing competing interests may prompt legislators to seek out a new paradigm for support that navigates a challenging middle ground. The report is helpful in providing a number of different policy options for them to consider. In the context of thinking about these different options, we strongly agree with the report's warning that saddling an incentive program with competing policy priorities is not sound economic development practice. Furthermore, VEDP would caution against any action that could constitute a legal or moral failure to deliver on commitments to companies that have chosen to invest in Virginia and have entered into performance agreements or memoranda of understanding with the Commonwealth. This could expose the Commonwealth to legal risks and seriously undermine our credibility with prospective investors in the future.

As always, we appreciate the professionalism and engagement of JLARC staff during the project and compliment your team on its insightful analysis and reporting.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jason El Koubi', with a stylized flourish at the end.

Jason El Koubi
President & CEO

Appendix D: Economic impact modeling of the data center industry

Weldon Cooper Center staff conducted economic impact analyses of Virginia’s data center industry using IMPLAN (Impact analysis for PLANning) software. IMPLAN has been used in many economic impact studies and is one of the most common tools used in economic impact analysis. Models here were built using 2022 IMPLAN Pro data released in November 2023 that utilizes a 546-sector IMPLAN sector scheme (IMPLAN® model. n.d.). Tables were customized for Virginia and two of its regions using the software.

Input-output analysis using the model produces industry-specific multipliers that indicate how economic activity in one sector of the economy affects the overall state or regional economy. For this study, we were interested in how changes in the data center industry affect the state and regional economy. Outcome variables examined include total employment, state GDP, and labor income.

For estimating the impact of the industry net of the state data center exemption, the opportunity cost of state funds was accounted for by increasing government spending, equivalent to the exemption amount.

Analysis included customization of IMPLAN sector for data centers to better reflect nature of the industry

Tracking the size and growth of the data center industry is challenging because of the absence of a specific industrial classification in government statistics. Data center activity often appears merged with the primary business operations of their parent firms, making their identification difficult¹.

The North American Industrial Classification System (NAICS) code 518210—Data Processing, Hosting, and Related Services—is typically used as a proxy for data centers, but this approach introduces what is usually referred to as “aggregation bias,” as this category encompasses various unrelated activities that have a far higher representation in the sector than only data centers. For instance, an analysis of Virginia’s 2016 employment data for that sector (518210) reveals that only 15 percent of the total employment in the sector was data center employment, with other data centers, cloud computing, and cybersecurity-related support services making up perhaps 2–5 percent more. Indeed, most employment in this sector involves other IT services, such as document scanning and software development, particularly in federal IT contracting in Northern Virginia. (See *Data Centers and Manufacturing Incentives*, JLARC 2019).

Data center employment is also dispersed across other industries. An examination showed that only 41 percent of data center jobs were classified under data processing, hosting, and related services. Significant portions were found in sectors like “wired telecommunications carriers” (30 percent), “telecommunications resellers” (10 percent), and “all other telecommunications carriers” (4 percent). This analysis excluded many enterprise data centers and colocated firms, whose employment is often reported under other business functions, further complicating efforts to track the industry accurately.

The IMPLAN sector for data centers that corresponds to the 518210 NAICS code for data centers is “436 - Data processing, hosting, and related services.” However, using this sector introduces significant bias, as data centers represent only a small portion of its total activity. More importantly, the

expenditure patterns of this IMPLAN sector do not reflect the specific characteristics of data center operations. Because of this, there is a substantial mismatch between the commodity demand and value-added characteristics of the IMPLAN sector 436 and what we know of data center expenditure patterns. For instance, in 2020, IMPLAN data showed that less than 1 percent of gross output is spent on “electricity transmission and distribution” (0.68 percent) and water, sewage, and other systems (0.02 percent) even though data center industry reports estimate that electricity alone accounts for 40 percent of data center operating expendituresⁱⁱ. Data center representatives also estimated energy accounts for about 40 percent of their operating costs during structured interviews. Similarly, employee compensation is overestimated in the IMPLAN model, accounting for 24 percent of output compared with 15 percent in industry-specific studies. This may lead to an inflation of induced economic impacts by overstating the income distributed to households.

In income distribution, little is known about other aspects of data center value added that are important for estimating activity impact, such as profit generation, distribution, and taxes paid. Indeed, data centers have the potential to contribute to local economies through tax payments, which are then reinvested via local government spending. However, IMPLAN’s tax estimation methodology is quite generic and may not accurately reflect county- and state-level tax structures and exemptions. Therefore, modeling alternative tax scenarios with more realistic assumptions can help better estimate the local economic impacts of data centers.

The reliance on conventional and standardized IMPLAN sectors, particularly when key inputs are significantly misrepresented, leads to biased results in economic impact studies. Best practices in economic analysis suggest customizing expenditure patterns to more accurately reflect the unique characteristics of data center operations. Therefore, the expenditure patterns for IMPLAN sector 436 regarding electricity were increased to 40 percent and employee compensation was reduced to 15 percent. Sensitivity analysis was performed to see how changing these percentages affected results. For operational impacts, for example, customizing the IMPLAN sector to include 40 percent of electricity consumption lowers the employment multiplier for data center operations approximately 20 percent.

Analysis includes two modeling phases

This analysis was split into two phases, the construction phase (capital spending for initial development of the data center) and the operations phase (ongoing) to help policymakers better understand the industry’s short-term and long-term impacts. The construction phase corresponds to the initial years of data center development and what must be put in place before a data center “works.” The operations phase accounts for the impact of all the expenditures after the data center opens independent of whether they are considered capital or operational expenditures in their budget.

Construction phase

Information collected by VEDP from data centers using the exemption was used to determine amounts of capital spending by data centers to include in the analysis (Table D-1). The percentages of spending by capital spending category are consistent with other researchⁱⁱⁱ.

TABLE D-1
Initial capital spending of data centers using the exemption (by year)

Year	Land acquisition	Building and site improvements	Exempt equipment or software	Other
2021	\$865 M	\$3,927 M	\$14,333 M	\$940 M
2022	1,030	2,264	9,614	1,615
2023	1,689	5,309	16,009	1,002
Total	\$3,585 M	\$11,501 M	\$39,957 M	\$3,557 M
%	6.1%	19.6%	68.2%	6.1%

SOURCE: VEDP.

The VEDP data includes only data centers that benefited from the tax exemption. These data centers correspond to 92 percent of the data center activity in Virginia, according to DEQ records and JLARC staff analysis of locality real estate records to obtain data center square footage. Statewide, 8 percent of data centers were not included in those numbers. By region, it is estimated that only 5.45 percent of the data centers in Northern Virginia are nonexempt (94.55 percent are exempt) and 21 percent in other regions of Virginia are nonexempt. Capital spending was increased to account for the nonexempt data centers, and this new amount was assumed to be the direct impact of the industry (Table D-2).

TABLE D-2
Initial capital spending of data centers using the exemption (by region)

Year	Land acquisition	Building and site improvements	Exempt equipment or software	Other
Northern Virginia	\$3,316 M	\$10,638 M	\$36,955 M	\$3,290 M
Other regions	632	2,027	7,041	627
Virginia total	\$3,948 M	\$12,664 M	\$43,997 M	\$3,917 M

SOURCE: Weldon Cooper Center.

However, not all of this spending affects Virginia's economy, and a critical assumption of economic impact analysis is the share of capital expenditures that are generated locally. Land acquisition is not traditionally included in impact models since this represents a monetary flow or transfer of funds that will not necessarily translate into a shock in local production. The acquisition of computer and related IT equipment is not necessarily done locally, so it should be assumed that part of this equipment comes from outside the region. This is even more true as we examine smaller geographical areas that might not include the entities associated with wholesale, transportation, and production of this type of equipment. Only building and site improvements (construction) should be included as local production. To estimate the indirect impacts, the model included 100 percent of the building and site improvements as construction (specifically IMPLAN industry sector "51 – construction of new manufacturing structures") and 25 percent of the exempt equipment and software expenditures.

The assumptions described above were used to generate indirect and induced impacts of data center capital investment in Virginia, according to average annual capital investment between FY21 and FY23

(Table D-3). Impact estimates were also produced for Northern Virginia and other regions of the state. Analysis of the results indicates that most of the impacts are construction-related (for example 80 percent of the direct employment is construction-related) rather than from manufacturing and installation of IT equipment.

TABLE D-3

Impacts of initial capital investment in Virginia and by region, annual average FY21–FY23

Impact	Employment	Labor income	Virginia GDP	Total output
Statewide				
Direct	35,110	\$2,646.6 M	\$3,342.1 M	\$7,887.7 M
Indirect	9,945	843.8	1,504.2	2,806.8
Induced	13,992	791.9	1,570.9	2,596.8
Total	59,047	\$4,282.4 M	\$6,417.2 M	\$13,291.3 M
Northern Virginia				
Direct	27,703	\$2,368.5 M	\$2,957.6 M	\$6,625.6 M
Indirect	5,577	585.4	1,30.1	1,733.3
Induced	7,510	490.3	963.7	1,488.2
Total	40,790	\$3,444.2 M	\$4,951.4 M	\$9,847.0 M
Other regions of the state				
Direct	5,761	\$406.5 M	\$517.0 M	\$1,262.5 M
Indirect	1,584	116.6	212.5	418.0
Induced	2,106	107.3	219.6	373.4
Total	9,451	\$630.4 M	\$949.2 M	\$2,053.9 M

SOURCE: Weldon Cooper Center economic impact analysis using IMPLAN.

The statewide results do not match the sum of the results for Northern Virginia and other regions of Virginia because, for the sake of simplicity, a multi-regional input-output model was not used. Data center investment in other regions of the state affects Northern Virginia, and vice versa, but they are not accounted for because the model accounts for the impacts in one region only.

Operation phase

As explained above, to accurately describe the impacts of the ongoing operation, the model was customized to include a better perspective of energy and labor costs. For this analysis, the model assumed that 40 percent of operational expenditures are associated with electricity consumption, and that 15 percent of the industry spending was direct labor costs.

Several adjustments were made to VEDP employment information collected from data centers. The employment information VEDP collected from data centers was used to estimate data center direct employment, statewide, in Northern Virginia, and in other Virginia regions. This number was adjusted in several ways. First, the employment number was reduced by half because the VEDP information on employment tends to boost the number of jobs as data centers can account for the jobs associated with contractors or the employees of contractors in addition to data center employees. In input-output

terminology, this is an indirect impact of the industry. Several data center representatives stated that 50 percent of their jobs were associated with third-party hiring and the other 50 percent with direct jobs. Because the jobs reported by VEDP were all full time (or full-time equivalents), a factor was applied to transform these jobs to full-time and part-time employment as required by the model. Like for capital spending, employment was increased to account for the nonexempt data centers. This new amount was assumed to be the direct impact of the industry (Table D-4).

TABLE D-4
Model was adjusted to incorporate data center operating characteristics

Region	Employment	Labor income	Total output
Northern Virginia	3,426	\$357.4 M	\$2,382.7 M
Other regions of Virginia	947	62.0	413.1
Virginia statewide	4,373	\$419.4 M	\$2,795.8 M

SOURCE: Weldon Cooper.

The results obtained for the impacts of ongoing operation for Virginia are far less than the impacts of capital spending (Table D-5). For example, total employment impacts from a year of data center operations are estimated to be 14,817 jobs compared with total employment impacts of 59,047 jobs for a year of initial capital spending.

TABLE D-5
Impacts of data center operations in Virginia and by region, annual average FY21–FY23

Impact	Employment	Labor income	Virginia GDP	Total output
Statewide				
Direct	4,373	\$419.4 M	\$1,051.1 M	\$2,795.8 M
Indirect	6,615	552.2	1,217.8	2,188.1
Induced	3,830	216.8	430.2	711.1
Total	14,817	\$1,188.4 M	\$2,699.0 M	\$5,695.0 M
Northern Virginia				
Direct	3,426	\$357.4 M	\$956.2 M	\$2,382.8 M
Indirect	4,333	441.8	963.9	1,552.5
Induced	1,966	128.4	252.5	389.9
Total	9,725	\$927.6 M	\$2,172.5 M	\$4,325.1 M
Other regions of the state				
Direct	947	\$62.0 M	\$116.5 M	\$413.1 M
Indirect	1,106	78.3	185.6	356.9
Induced	556	28.3	58.0	98.6
Total	2,609	\$168.6 M	\$360.0 M	\$868.5 M

SOURCE: Weldon Cooper Center economic impact analysis using IMPLAN.

Data center industry impact

Mostly because of the impact associated with initial capital expenditures, data centers in Virginia generate 73,864 jobs per year, corresponding to almost \$5,471 million of labor income, \$9,166 million of Virginia GDP, and an increase in output of \$18,986 million (Table D-6).

TABLE D-6

Summary of initial capital spending and operations impact statewide, annual average FY21–FY23

Impact	Employment	Labor income	Virginia GDP	Total output
Direct	39,483	\$3,066 M	\$4,393 M	\$10,684 M
Indirect	16,560	1,396	2,722	4,995
Induced	17,822	1,009	2,001	3,308
Total	73,864	\$5,471 M	\$9,116 M	\$18,986 M

SOURCE: Weldon Cooper Center economic impact analysis using IMPLAN.

Another aspect is that the state government could also opt to spend the exemption money on alternative sources. The alternative scenario was modeled to estimate impacts if the state would use the annual average exemption amount between FY21 and FY23 (\$573 million per year) in alternative expenditures (Table D-7). These impacts were used to determine the impact of the industry accounting for the cost of the exemption. Accounting for this alternative use of the exemption amount (or opportunity cost), reduces additional jobs by about 5,000 (to 69,000 additional jobs on net) and reduces additional income and Virginia GDP by \$0.4 billion and \$0.5 billion, respectively, which are a small fraction of their total impacts (Table D-6).

TABLE D-7

Impacts to the state if the exemption amount was used instead for alternative government expenditures, annual average FY21–FY23

Impact	Employment	Labor income	Virginia GDP	Total output
Direct	3,534	\$277.4 M	\$359.1 M	\$448.0 M
Indirect	403	27.7	48.3	88.5
Induced	1,197	67.8	134.5	222.4
	5,134	\$372.9 M	\$542.0 M	\$758.9 M

SOURCE: Weldon Cooper Center economic impact analysis using IMPLAN.

ⁱ Byrne, David, Carol Corrado, and Daniel E. Sichel. 2018. The rise of cloud computing: Minding your p's, q's and k's. NBER Working Paper 25188.

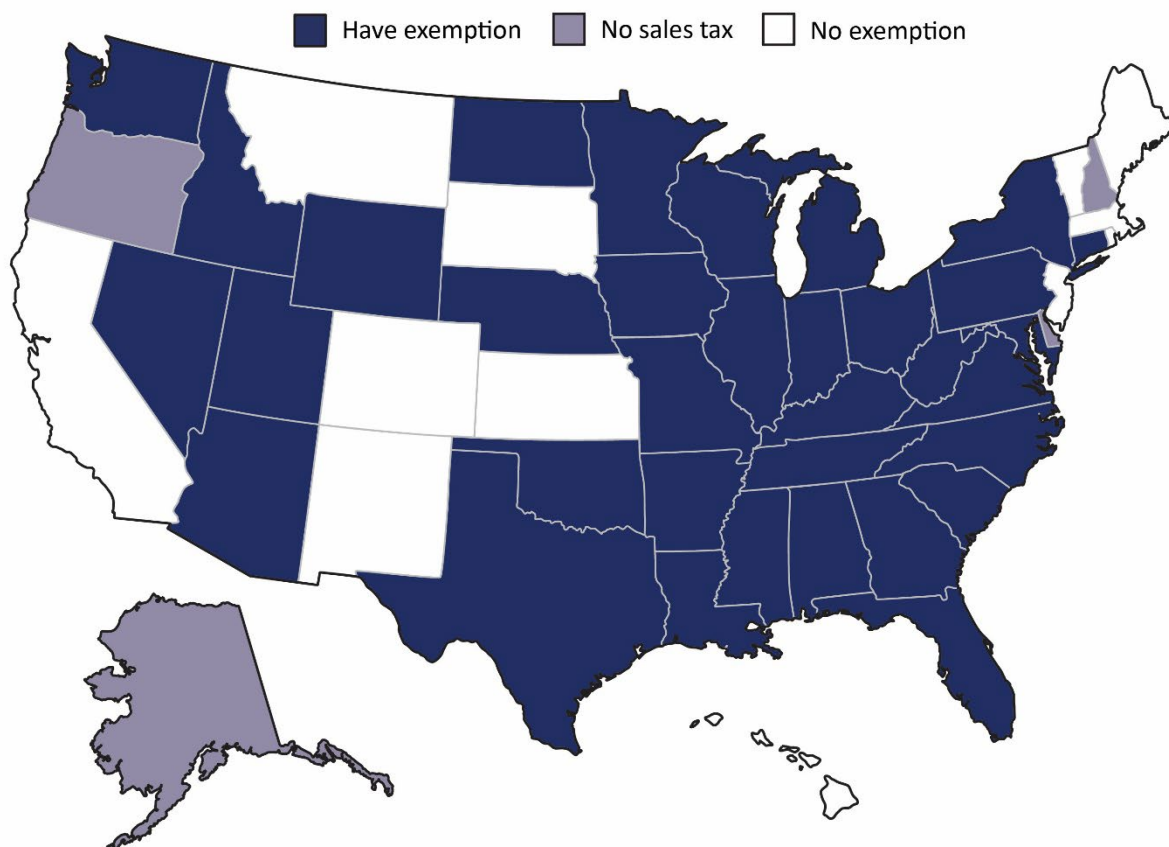
ⁱⁱ Day, Tim and Nam D. Pham. 2017. *Data centers: Jobs and opportunities in communities nationwide*. U.S. Chamber of Commerce Technology Engagement Center.

ⁱⁱⁱ Day, Tim and Nam D. Pham. 2017. *Data centers: Jobs and opportunities in communities nationwide*. U.S. Chamber of Commerce Technology Engagement Center.

Appendix E: States with data center sales tax exemptions

Most states either have a sales tax exemption for data centers (34) or do not have a sales tax (Figure E-1). All states bordering Virginia provide a sales tax exemption to data centers.

FIGURE E-1
Nearly all states offer a sales tax exemption for data centers (2024)



SOURCE: State Tax Notes and JLARC staff review of state websites.

Appendix F: Energy infrastructure project impacts and regulation

Construction of new generation and transmission infrastructure can affect the communities and environments where they are built. The extent of any impacts will vary substantially for generation and transmission projects. State and local governments regulate these projects, through review and approval processes. Regulatory processes seek to minimize negative impacts but do not necessarily avoid them altogether. Utilities can implement several grid enhancing technologies to help reduce the need for major new generation and transmission projects, but this does not eliminate the need for new projects.

Construction of new generation and transmission infrastructure can have environmental impacts and is often opposed by local communities

On the generation side, a significant portion of new generation is expected to be solar, and solar facilities have large land demands that can have widespread impacts. For example, a modest 100 MW solar facility would require about 5,000 to 1,000 acres of land in Virginia. (The rule of thumb is that five to 10 acres of solar can generate up to 1 MW of power.) Because of the large land demands, most solar facilities are built in rural areas. Constructing solar facilities typically involves clearing forest land or converting agricultural land to this use, which can have several environmental impacts from habitat loss to affecting stormwater runoff.

Some communities in rural Virginia have been increasingly opposed to new solar facilities, with several counties placing restrictions on solar development or outright denying projects. Community opponents site environmental concerns, impacts on local agriculture, and the effects of solar facilities' industrial appearance on the rural character of their counties. Opponents also often assert that solar facilities do not offer significant economic or other benefits to their communities.

The extent to which a solar project affects the environment and generates community opposition depends on the project. For example, a project that involves clearing 5,000 acres of forest land with multiple streams would have a more substantial environmental impact than a project that is installed on 2,000 acres of fallow pastureland. Similarly, a development located near a residential area or that is visible from the surrounding area could generate more community opposition than one that is hidden from view.

On the transmission side, new transmission lines can fragment forest habitats, create water quality risks at stream and wetland crossings, and reduce scenic quality of nearby historic and recreational resources. Communities are sometimes opposed to new or expanded transmission lines for these reasons. Communities also sometimes oppose new transmission lines because of their undesirable appearance, effect on the use of private properties that are under or adjacent to the lines, effect on the value of nearby properties, and health concerns.

Similar to the generation side, the potential environmental and community impacts of a transmission project can vary greatly from one project to the next. Generally, a "green field" project that involves acquisition of new right-of-way and construction of transmission lines where none currently exist is going to have the highest impact. A project where new lines are built in or adjacent to an existing

transmission line will be less impactful, and a project where an existing line is “wrecked and rebuilt” would be the least impactful.

State and local regulation is intended to minimize the impacts of new generation and transmission projects on communities and the environment

Construction of major new generation and transmission facilities is regulated by the state to minimize impacts. Many of these projects are approved by the SCC through a formal case process to determine if a Certificate of Public Convenience and Necessity (CPCN) should be granted. The SCC considers several factors before approving a project and granting a CPCN. These factors include the potential impacts of the project on property owners, the environment, and cultural and historic resources (Table F-1). While these impacts may not be completely avoided, the process encourages the selection of projects and options that best minimize impacts without placing large cost burdens on ratepayers.

Smaller renewable generation projects (<150 MW) can be reviewed and approved by the Department of Environmental Quality through a separate “Permit by Rule” process. While this is not a litigated case process like an SCC approval, projects are reviewed to ensure they conform with the state’s requirements.

Localities have some authority over generation projects and transmission and distribution substations but minimal authority over transmission lines. Generation facilities and substations are subject to the same types of local zoning processes as other land uses. Local zoning ordinances specify which zoning districts allow them, whether they require a special permit from elected officials, and whether any design standards (such as landscaping) apply. Additionally, state law requires local reviews of certain entities—including substations—before development to evaluate their alignment with the local comprehensive plan. For transmission lines, CPCN approval deems the transmission line to be in compliance with local comprehensive plans and ordinances. In effect, this means localities do not have any direct authority over most transmission line project approvals or routes. (Although localities can play a role in approving 138 kilovolt transmission lines, which exist in a few parts of the state.)

Solar and similar projects are required to attempt to coordinate an agreement with their host locality. State law requires applicants for solar or energy storage projects to notify localities of their intent to develop and to meet with the locality to negotiate a “siting agreement.” This siting agreement can include conditions such as mitigating negative impacts, and if created, must receive a public hearing. However, there is no requirement for this process to culminate in a siting agreement. Failure to achieve a siting agreement does not prevent a developer from initiating the usual local zoning processes for new developments.

Localities do not have approval authority over transmission line projects but can participate in SCC cases either as respondents or public witnesses. As a public witness, a locality can submit written comments, or local representatives can provide comments in person at commission hearings. As a respondent, a locality becomes a participant in the case and can take several additional actions, such as filing for discovery (e.g., to obtain copies of utility analysis or documents supporting the application for a project), filing briefs, providing expert witnesses, and participating in cross examination of

witnesses (e.g., utility staff). No matter which approach is followed, the SCC is required to hear and weigh all evidence equally.

TABLE F-1
Criteria that the SCC must evaluate before approving a project and granting a CPCN

Criteria that must be met

- Is not against the public interest ^a
- Will have no material adverse effect on system reliability
- Will have no material adverse effect on rates
- For transmission projects,
 - a. the line is needed, ^b
 - b. proposed method of installation is justified, ^b
 - c. will avoid or minimize adverse impact on (a) scenic assets, (b) historic and cultural resources, (c) the environment, and (d) human health and safety, and
 - d. why existing rights-of-way cannot adequately serve the need (presumably only applies when an expanded or new right-of-way acquisition is being requested as part of the project)

Criteria that must be considered

- Environmental impacts
- Human health and safety impacts
- Historical and cultural resource impacts
- Economic impacts, including job creation
- Improvement to service reliability
- Environmental justice considerations

Criteria that are considered, if requested

- Conformance with local comprehensive plans (locality must request) ^c
 - Costs, economic benefits, and effect on construction timeline of undergrounding transmission lines (locality must request)
-

SOURCE: The Code of Virginia § 2.2-235, § 56-265.2, § 56-580, and § 56-46.1.

NOTE: SCC regulations provide additional information on what must be submitted to meet requirements and details what must be provided for transmission projects. SCC guidance also includes a planning and design attachment that provides detailed guidelines to applicants on how to ensure facilities protect natural and historic resources. SCC guidance provides additional information on when a transmission project requires a CPCN, based on specific characteristics. SCC guidance notes that certain transmission projects, such as reconductoring, do not require a CPCN.

^a This is a general criterion that can be interpreted as the cumulation of all the other criteria weighed against each other. The Code declares some projects meet this goal—such as small renewable generation projects and projects in VCEA—and so do not require SCC to make a determination.

^b Based on applicant's load flow modeling, contingency analysis, and presented reliability needs.

^c Localities are explicitly granted right to present evidence that shows existing corridors, as designated in the comprehensive plan, can serve the identified need.

Localities also have three additional authorities under Code. First, localities can request that the SCC consider the costs, economic benefits, and effects on construction timelines of undergrounding transmission lines. Second, localities can establish transmission corridors in their comprehensive plans and provide evidence that new lines should be within those corridors, but it appears this latter

authority has been rarely (if ever) used. Third, localities can establish special tax districts that pay for the additional costs of undergrounding transmission lines, although it appears this authority has never been used.

Some stakeholders have said that local governments should have more authority to determine transmission routes and, especially, when transmission lines should be buried underground. While this would make transmission projects more responsive to local needs, undergrounding transmission lines is substantially more expensive and those added costs are currently spread across all utility ratepayers. Any changes to give localities more authority to require undergrounding of transmission lines would need to be accompanied by a change in how costs are allocated to prevent local government decisions from affecting rates paid by customers who do not benefit from undergrounding projects.

Utilities can use grid enhancing technologies to help reduce the need for new generation and transmission infrastructure

Utilities use grid enhancing technologies (GETs), such as reconductoring existing transmission lines, to increase capacity of the transmission system and more effectively use existing generation. For example, Dominion reports that it uses advanced conductors for all its 230 kV reconductor and new build projects, which can increase line capacity by 50 percent. Dominion reported adding or replacing 800 miles of line with advanced conductors as of the end of 2023. Dominion also reports deploying and piloting several other GETs to improve system stability and efficiency. Utilities have an economic incentive to deploy GETs so that they can provide enough transmission capacity to serve fast-growing demand.

SCC staff indicated that, before approving a new transmission line project, they consider whether a quicker and lower-cost approach, such as reconductoring, could be used instead. Staff make this determination by looking at the project proposal, the state need, and whether reconductoring will address the need. SCC staff carry out their own power flow studies and verify thermal issues, voltage issues, and generator deliverability (if applicable).

Appendix G: Virginia Clean Economy Act

The Virginia Clean Economy Act (VCEA) was enacted in 2020 and was intended to drive investment in renewable resources and phase out carbon-emitting generation in the state by 2050. VCEA was passed when energy demand in Virginia was projected to remain relatively flat. Now that demand is growing, largely because of data centers, it will be more challenging to meet these goals than originally contemplated.

The main way VCEA intends to decarbonize generation is by requiring an increasing share of energy sold by Dominion and APCO to come from renewable sources. The share of generation from renewables—the Renewable Portfolio Standard (RPS) requirement—increases each year until it reaches 100 percent (Table G-1). The utilities can meet the RPS requirement by directly building and claiming credit for new renewable generation facilities (mainly solar and wind) and entering into power purchasing agreements with third parties that operate renewable facilities. Utilities receive Renewable Energy Certificates (RECs) for energy from these sources, which are then credited toward their RPS requirement. Utilities can also purchase RECs from the PJM market and use purchased RECs to offset energy produced through carbon generation. Starting in 2025, 75 percent of Dominion’s RECs must be from in-state generation sources. VCEA financially penalizes utilities that do not comply with in-state renewables requirements by levying deficiency payments, but in practice utilities may choose to pay those deficiency payments if it is more economical or feasible than securing new renewable generation. The cost of deficiency payments is recovered from utility customers. VCEA sets aside nuclear power as a third category of generation, which in effect can be used to reduce the total amount of renewable energy required.

TABLE G-1

VCEA requires growing share of energy sold in Virginia to come from renewable generation sources, with full decarbonization by 2050

	Percentage of total power sold required to come from renewables (excluding nuclear)	
	Dominion	APCO
2021 (year one)	14%	6%
2025	26	14
2030	41	30
2035	59	45
2040	79	65
2045	100	80
2050	-	100%

SOURCE: The Code of Virginia § 56-585.5.

NOTE: Percentages are the RPS program requirements for selected years; statute sets a percentage for every year. Nuclear power is excluded from the RPS calculation. For example, if one-third of Dominion power is nuclear, then the RPS percentage applies only to the remaining two-thirds of power that is not nuclear. Renewable energy is credited toward meeting RPS requirements through the purchase and retirement of Renewable Energy Certificates (RECs). RECs can be used to offset carbon emissions.

The VCEA's RPS requirements, and their associated REC requirements, do not apply to electric co-operatives (co-ops). This has significant implications because a majority of future energy demand growth is expected to occur in the co-ops' service territories, where many new data center campuses are expected to be built. (This is based on JLARC's consultant forecasts, and is corroborated with utility forecasts, utility construction and service agreements, and JLARC staff's review of data center projects that are actively under development). Unlike Dominion and APCO, state law allows co-ops to secure energy to meet their growing demand from non-renewable and out-of-state generation sources.

VCEA directs the Virginia Air Pollution Control Board to develop regulations to gradually reduce carbon emissions. VCEA states the board "may establish, implement, and manage an auction program" or "utilize an existing multistate trading system" to achieve this purpose. Initially the state entered into the Regional Greenhouse Gas Initiative (RGGI) to reduce carbon emissions. The state has since withdrawn from RGGI, although the legality of that withdrawal is being challenged in court. A recent state circuit court decision ruled that the regulatory actions the state took to remove Virginia from RGGI were unlawful, but this decision could be appealed to a higher court.

Finally, VCEA requires carbon-emitting generation in Virginia owned by Dominion and APCO to be retired by 2045. However, VCEA allows these utilities to continue operating carbon-emitting generation plants in Virginia past 2045 if taking the plant off-line "would threaten the reliability or security of electric service to customers." Utility decisions to keep plants operating past 2045 must be approved by SCC.

VCEA also has a presumption against the SCC approving new carbon-emitting generation plants, which applies to investor-owned utilities and co-ops. However, new carbon-emitting plants can be built if SCC determines they are needed to address threats to the reliability or security of electric service to the utility's customers.

Appendix H: Grid modeling generation capacity and energy source results

JLARC staff commissioned Energy + Environmental Economics (E3) to develop an independent grid model and project the future generation and transmission infrastructure that would be needed to meet three different demand scenarios. For each of the demand scenarios, the model considered the most feasible and economical approaches to meeting infrastructure needs with and without the requirements of the Virginia Clean Economy Act (VCEA).

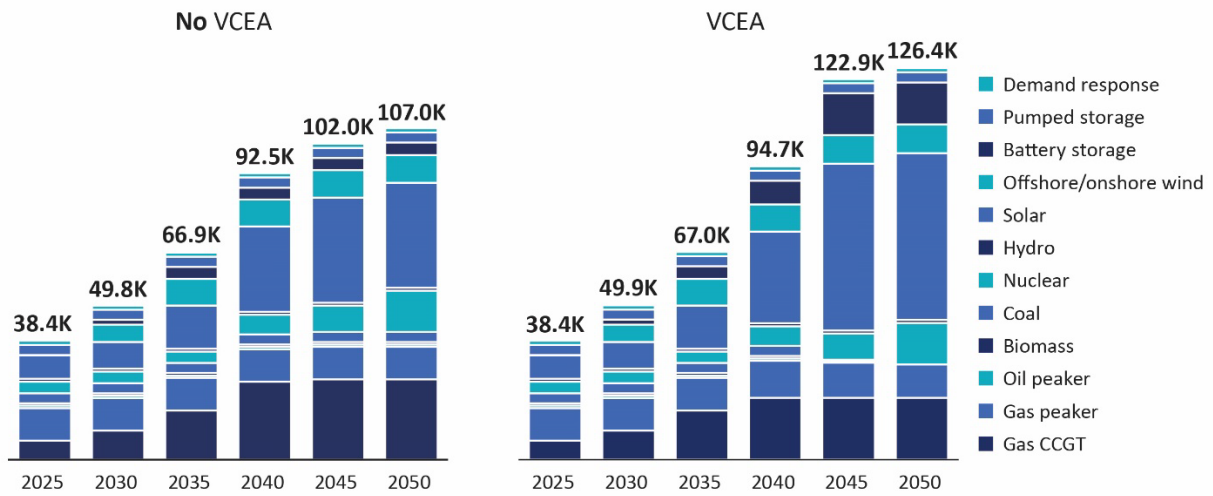
- Scenario 1: unconstrained demand, with and without VCEA. E3 also modeled variations where unconstrained demand and VCEA requirements could be met by using high levels of nuclear and renewable generation or by better regional coordination across PJM (not shown in this report).
- Scenario 2: half of unconstrained demand, with and without VCEA.
- Scenario 3: no new data center demand, with and without VCEA.

This appendix provides E3's grid modeling Virginia-level results for the (a) in-state generation capacity that would be needed to meet each demand scenario, by type of generation source and (b) the amount of energy that would be used from each type of generation source. Generation capacity is given in megawatts (MW) of nameplate capacity that would be needed, which can be significantly higher than the firm amount of capacity available from a resource. For example, Virginia solar facilities produce around 25 percent of nameplate capacity. Generation energy is given in annual tera-watt hours (TWh) of energy used. E3's grid model assumes natural gas plants would be converted to hydrogen fuel in each scenario when VCEA compliance is assumed, starting in 2045. The model assumes that new nuclear generation will not be available until 2035. For additional discussion of E3's grid modeling methodology, see Appendix B.

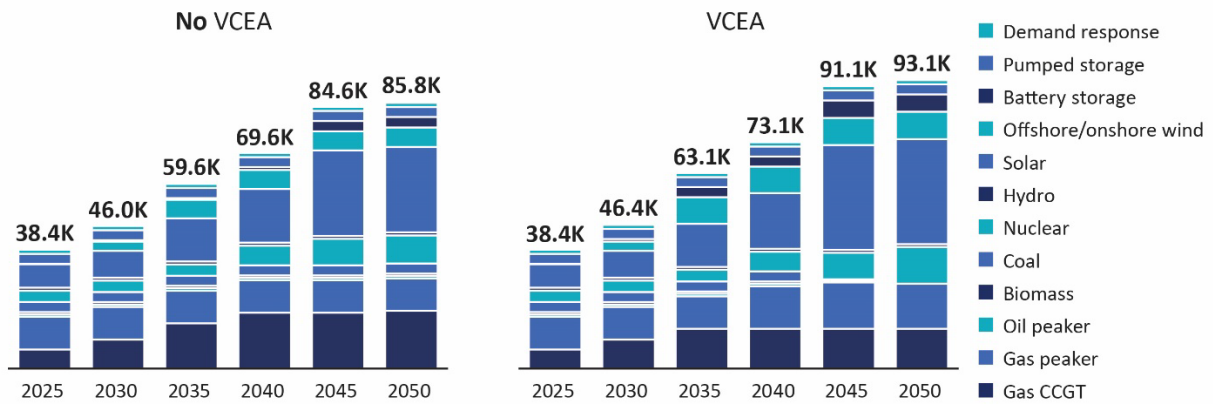
Results begin on next page.

FIGURE H-1
Generation capacity required 2025 to 2050

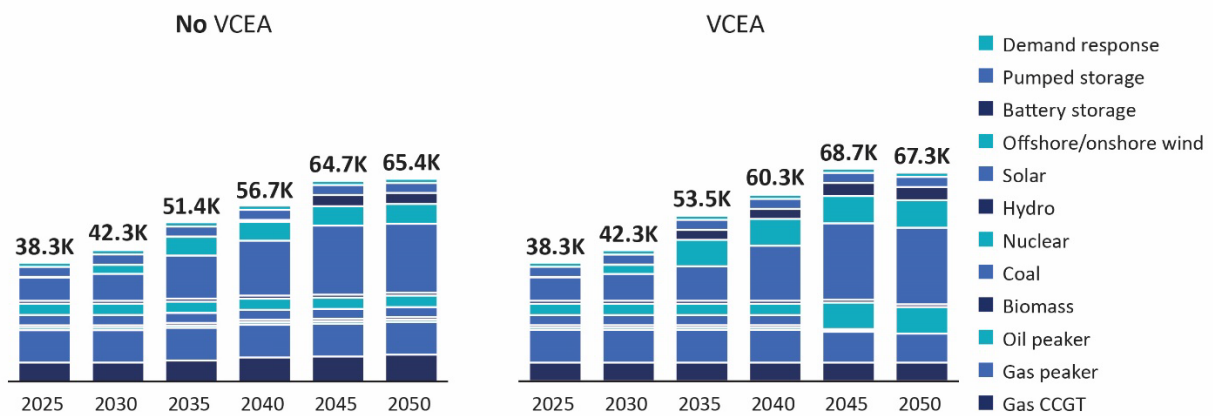
SCENARIO 1: UNCONSTRAINED DEMAND (IN MW)



SCENARIO 2: HALF OF UNCONSTRAINED DEMAND (IN MW)



SCENARIO 3: NO NEW DATA CENTER DEMAND (IN MW)



SOURCE: E3 grid modeling analysis.

NOTE: Capacity shown is nameplate capacity.

TABLE H-1

Generation capacity required 2025 to 2050, Scenario 1: Unconstrained demand (MW)

No VCEA

Resource	2025	2030	2035	2040	2045	2050
Gas CCGT	6,141	9,391	15,891	25,149	25,937	25,937
Gas peaker	10,499	10,499	10,499	10,499	10,499	10,499
Oil peaker	813	813	813	813	813	813
Biomass	765	765	765	765	765	765
Coal	3,230	3,230	3,230	3,230	3,230	3,230
Nuclear	3,708	3,708	3,708	6,388	8,532	13,356
Hydro	929	929	929	929	929	929
Solar	7,596	8,673	13,939	27,503	33,880	33,880
Offshore/onshore wind	-	5,580	8,656	8,756	8,856	8,956
Battery storage	116	1,608	3,835	3,835	4,008	4,008
Pumped storage	3,241	3,241	3,241	3,241	3,241	3,241
Demand response	1,354	1,354	1,354	1,354	1,354	1,354
Total	38,393	49,792	66,861	92,462	102,043	106,967

VCEA

Resource	2025	2030	2035	2040	2045	2050
Gas CCGT	6,141	9,391	15,891	19,945	19,945	19,945
Gas peaker	10,499	10,499	10,499	11,976	11,342	10,863
Oil peaker	813	813	813	813	316	-
Biomass	765	765	765	765	15	-
Coal	3,230	3,230	3,230	3,230	630	-
Nuclear	3,708	3,708	3,708	6,388	8,532	13,356
Hydro	929	929	929	929	929	929
Solar	7,596	8,673	13,939	29,622	53,880	53,880
Offshore/onshore wind	-	5,580	8,656	8,756	9,216	9,316
Battery storage	116	1,667	4,014	7,645	13,511	13,511
Pumped storage	3,241	3,241	3,241	3,241	3,241	3,241
Demand response	1,354	1,354	1,354	1,354	1,354	1,354
Total	38,393	49,851	67,040	94,665	122,911	126,394

SOURCE: E3 grid modeling analysis.

NOTE: Capacity shown is nameplate capacity.

TABLE H-2

Generation capacity required 2025 to 2050, Scenario 2: Half of unconstrained demand (MW)

No VCEA

Resource	2025	2030	2035	2040	2045	2050
Gas CCGT	6,141	9,391	14,626	18,021	18,021	18,605
Gas peaker	10,499	10,499	10,499	10,499	10,499	10,499
Oil peaker	813	813	813	813	813	813
Biomass	765	765	765	765	765	765
Coal	3,230	3,230	3,230	3,230	3,230	3,230
Nuclear	3,708	3,708	3,708	6,388	8,532	9,119
Hydro	929	929	929	929	929	929
Solar	7,596	8,673	13,939	17,340	27,589	27,589
Offshore/onshore wind	-	2,940	6,016	6,116	6,216	6,316
Battery storage	116	494	494	892	3,375	3,375
Pumped storage	3,241	3,241	3,241	3,241	3,241	3,241
Demand response	1,354	1,354	1,354	1,354	1,354	1,354
Total	38,393	46,038	59,615	69,589	84,565	85,835

VCEA

Resource	2025	2030	2035	2040	2045	2050
Gas CCGT	6,141	9,391	12,856	12,856	12,856	12,856
Gas Peaker	10,499	10,499	10,499	13,709	15,013	14,534
Oil Peaker	813	813	813	813	316	-
Biomass	765	765	765	765	15	-
Coal	3,230	3,230	3,230	3,230	630	-
Nuclear	3,708	3,708	3,708	6,388	8,532	11,854
Hydro	929	929	929	929	929	929
Solar	7,596	8,673	13,939	17,883	33,880	33,880
Offshore/onshore Wind	-	2,940	8,576	8,676	8,776	8,876
Battery Storage	116	878	3,216	3,231	5,590	5,590
Pumped Storage	3,241	3,241	3,241	3,241	3,241	3,241
Demand Response	1,354	1,354	1,354	1,354	1,354	1,354
Total	38,393	46,422	63,126	73,075	91,132	93,114

SOURCE: E3 grid modeling analysis.

NOTE: Capacity shown is nameplate capacity.

TABLE H-3

Generation capacity required 2025 to 2050, Scenario 3: No new data center demand (MW)

No VCEA

Resource	2025	2030	2035	2040	2045	2050
Gas CCGT	6,042	6,042	6,759	7,728	8,016	8,642
Gas peaker	10,499	10,499	10,499	10,499	10,499	10,499
Oil peaker	813	813	813	813	813	813
Biomass	765	765	765	765	765	765
Coal	3,230	3,230	3,230	3,230	3,230	3,230
Nuclear	3,708	3,708	3,708	3,708	3,708	3,708
Hydro	929	929	929	929	929	929
Solar	7,596	8,673	13,939	17,733	22,340	22,340
Offshore/onshore wind	-	2,940	6,016	6,116	6,216	6,316
Battery storage	116	116	116	609	3,583	3,583
Pumped storage	3,241	3,241	3,241	3,241	3,241	3,241
Demand response	1,354	1,354	1,354	1,354	1,354	1,354
Total	38,293	42,310	51,369	56,725	64,695	65,421

VCEA

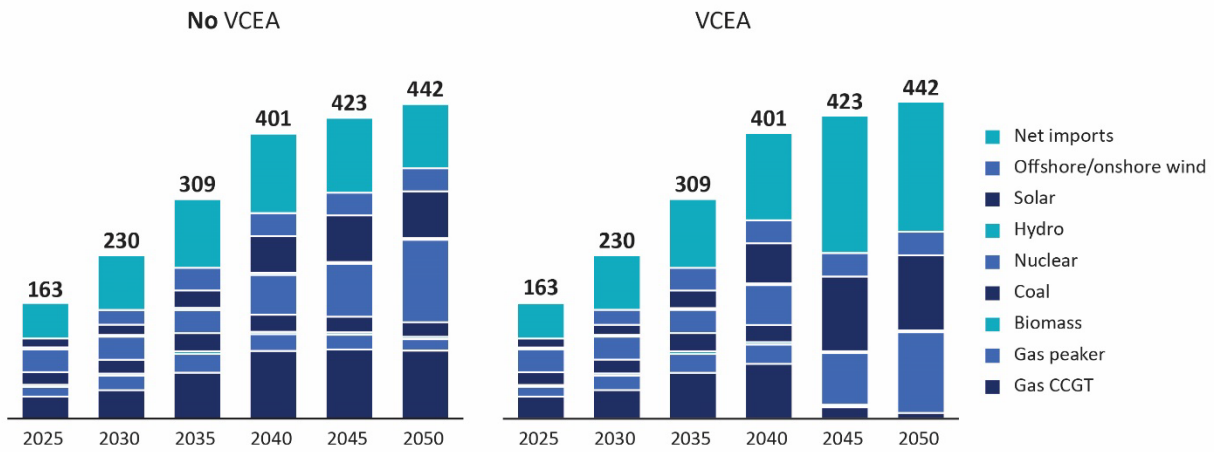
Resource	2025	2030	2035	2040	2045	2050
Gas CCGT	6,042	6,042	6,042	6,042	6,042	6,042
Gas peaker	10,499	10,499	10,499	10,499	9,865	9,386
Oil peaker	813	813	813	813	316	-
Biomass	765	765	765	765	15	-
Coal	3,230	3,230	3,230	3,230	630	-
Nuclear	3,708	3,708	3,708	3,708	8,532	8,532
Hydro	929	929	929	929	929	929
Solar	7,596	8,673	11,092	17,783	24,669	24,669
Offshore/onshore wind	-	2,940	8,576	8,676	8,776	8,876
Battery storage	116	116	3,216	3,216	4,313	4,313
Pumped storage	3,241	3,241	3,241	3,241	3,241	3,241
Demand response	1,354	1,354	1,354	1,354	1,354	1,354
Total	38,293	42,310	53,465	60,256	68,682	67,341

SOURCE: E3 grid modeling analysis.

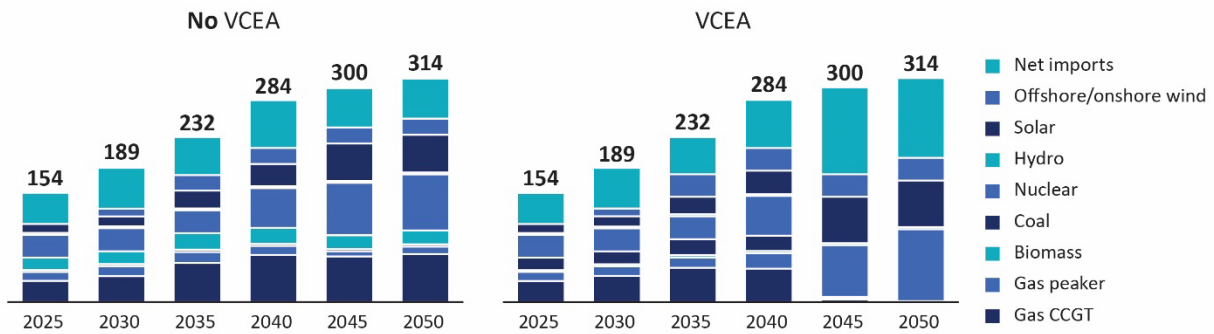
NOTE: Capacity shown is nameplate capacity.

FIGURE H-2
Energy sources 2025 to 2050

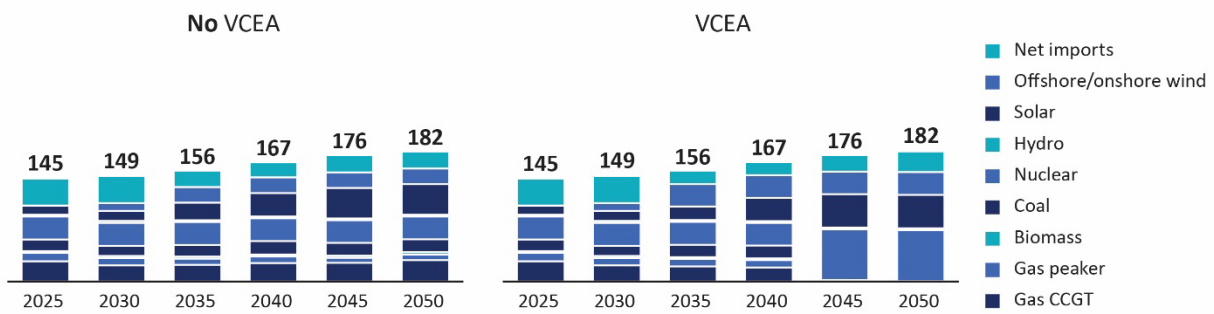
SCENARIO 1: UNCONSTRAINED DEMAND (IN TWH)



SCENARIO 2: HALF OF UNCONSTRAINED DEMAND (IN TWH)



SCENARIO 3: NO NEW DATA CENTER DEMAND (IN TWH)



SOURCE: E3 grid modeling analysis.

TABLE H-4

Energy sources 2025 to 2050, Scenario 1: Unconstrained demand (TWh)

No VCEA

Resource	2025	2030	2035	2040	2045	2050
Gas CCGT	31	40	65	96	98	96
Gas peaker	14	20	27	23	21	16
Oil peaker	-	-	-	-	-	-
Biomass	3	3	3	3	3	3
Coal	18	19	26	24	22	21
Nuclear	32	32	32	56	74	116
Hydro	3	3	3	3	3	3
Solar	13	14	25	52	66	66
Offshore/onshore wind	-	21	32	32	32	33
Battery storage	(0)	(0)	(0)	(0)	(1)	(1)
Pumped storage	(0)	(0)	(0)	(0)	(0)	(0)
DR	0	0	0	0	0	0
Net Imports	50	77	97	112	105	90
Total	163	230	309	401	423	442

VCEA

Resource	2025	2030	2035	2040	2045	2050
Gas CCGT	31	40	65	77	16	8
Gas peaker	14	20	27	27	1	-
Oil peaker	-	-	-	-	-	-
Biomass	3	3	3	3	0	-
Coal	18	19	26	24	2	-
Nuclear	32	32	32	56	73	114
Hydro	3	3	3	3	3	3
Solar	13	14	25	57	105	106
Offshore/onshore wind	-	21	32	32	33	33
Battery storage	(0)	(0)	(0)	(1)	(2)	(1)
Pumped storage	(0)	(0)	(0)	(1)	(3)	(3)
DR	0	0	0	0	0	0
Net imports	50	77	97	123	194	183
Total	163	230	309	401	423	442

SOURCE: E3 grid modeling analysis.

TABLE H-5

Energy sources 2025 to 2050, Scenario 2: Half of unconstrained demand (TWh)

No VCEA

Resource	2025	2030	2035	2040	2045	2050
Gas CCGT	30	37	55	66	64	67
Gas peaker	13	14	15	13	7	11
Oil peaker	-	-	-	-	-	-
Biomass	3	3	3	3	3	3
Coal	17	18	23	22	19	20
Nuclear	32	32	32	56	74	79
Hydro	3	3	3	3	3	3
Solar	13	14	25	32	53	53
Offshore/onshore wind	-	11	22	22	23	23
Battery storage	(0)	(0)	(0)	(0)	(1)	(1)
Pumped storage	(0)	(0)	(0)	(0)	(1)	(1)
DR	0	0	0	0	0	0
Net imports	44	57	54	67	56	56
Total	154	189	232	284	300	314

VCEA

Resource	2025	2030	2035	2040	2045	2050
Gas CCGT	30	37	48	47	4	2
Gas peaker	13	14	15	22	1	-
Oil peaker	-	-	-	-	-	-
Biomass	3	3	3	3	0	-
Coal	17	18	23	22	3	-
Nuclear	32	32	32	56	73	101
Hydro	3	3	3	3	3	3
Solar	13	14	25	33	66	66
Offshore/onshore wind	-	11	32	32	32	32
Battery storage	(0)	(0)	(0)	(0)	(1)	(1)
Pumped storage	(0)	(0)	(0)	(0)	(1)	(1)
DR	0	0	0	0	0	0
Net imports	44	58	53	68	123	112
Total	154	189	232	284	300	314

SOURCE: E3 grid modeling analysis.

TABLE H-6

Energy sources 2025 to 2050, Scenario 3: No new data center demand (TWh)

No VCEA

Resource	2025	2030	2035	2040	2045	2050
Gas CCGT	29	23	23	26	26	30
Gas peaker	11	10	9	10	7	8
Oil peaker	-	-	-	-	-	-
Biomass	3	3	3	3	3	3
Coal	16	14	16	19	18	18
Nuclear	32	32	32	32	32	32
Hydro	3	3	3	3	3	3
Solar	13	14	25	33	43	43
Offshore/onshore wind	-	11	22	22	22	22
Battery storage	-	(0)	(0)	(0)	(1)	(1)
Pumped storage	(0)	(0)	(0)	(0)	(1)	(1)
DR	0	0	0	0	0	0
Net imports	38	38	23	21	24	24
Total	145	149	156	167	176	182

VCEA

Resource	2025	2030	2035	2040	2045	2050
Gas CCGT	29	23	21	20	0	0
Gas peaker	11	10	11	10	0	0
Oil peaker	-	-	-	-	-	-
Biomass	3	3	3	3	0	-
Coal	16	14	17	18	2	-
Nuclear	32	32	32	32	71	72
Hydro	3	3	3	3	3	3
Solar	13	14	19	33	47	47
Offshore/onshore wind	-	11	32	32	32	32
Battery storage	-	(0)	(0)	(0)	(1)	(1)
Pumped storage	(0)	(0)	(0)	(0)	(1)	(1)
DR	0	0	0	0	0	0
Net imports	38	38	19	19	23	29
Total	145	149	156	167	176	182

SOURCE: E3 grid modeling analysis.

Appendix I: Data center on-site generation

Instead of relying on utilities, many data center companies are looking at ways to generate their own power using on-site power generation. On-site generation can take a variety of forms, including utility-owned generation on or adjacent to a data center site, “behind the meter” generation that is owned by the data center, or a “microgrid” where the site operates its own generation and may not be connected to the larger grid. Of the current technologies available, only natural gas appears viable for on-site generation, and it can be deployed only close to pipeline infrastructure that has sufficient capacity to serve generation needs. Other technologies, such as small modular nuclear reactors, are being actively pursued by the industry as a potential future power source, but most stakeholders believe these will not realistically be available until 2035.

On-site generation is most likely to be used at new data center sites, where they can be incorporated into the site design. It appears unlikely existing sites, especially those that are fully built out, could be switched to on-site generation because of space constraints and financial considerations. Additionally, data center companies may have regulatory and public relation challenges trying to place some technologies, such as nuclear reactors, in suburban localities like Loudoun and Prince William.

On-site generation could help solve data center companies’ power problems, but they may not substantially reduce generation and transmission infrastructure needs. Several data center companies indicated that they were pursuing on-site generation as a primary power source but planned to rely on the main grid for backup. Because electric utilities have an obligation to serve all customers in their service territory, they would still need to build the infrastructure necessary to provide power to these sites, even if they are only serving in a backup capacity.

On-site generation could also shift new infrastructure costs to other customers, because infrastructure costs are recaptured through utility billings, and a data center using an on-site generation would not be regularly billed for services. It is possible that utilities could reach agreements with data center companies to provide reduced or non-firm levels of service if only serving in a backup capacity, which would reduce the need for additional utility infrastructure and cost impacts on other customers. However, it is not clear whether data centers would enter into such agreements. State law could be changed to address the potential issue of stranded costs from data centers that use on-site generation, but as of today, this is not occurring and only one data center site in Virginia appears to actively rely on on-site generation for a substantial share of its energy needs.

Appendix J: Power usage effectiveness (PUE) ratios

The efficiency of cooling and other building systems in data centers is commonly measured using a Power Usage Effectiveness (PUE) ratio. For example, a PUE of 1.3 indicates that 1.0 of energy is used for computing activity, and 0.3 is used for all other building systems. A PUE of 1.0 would indicate perfect efficiency, where all energy is used for computing activity, and none is used for any other purpose. Importantly, PUE does not measure how energy efficient a data center's computing is, because energy used for computing is always set equal to 1.0. Consequently, a lower PUE does not indicate if a data center is energy efficient as a whole. PUE only measures the efficiency of cooling and other building systems that support facility operations.

The data center industry has a strong market incentive to be energy efficient because energy is one of data centers' largest operating costs. Data centers regularly upgrade their computing equipment to take advantage of newer, more powerful and energy-efficient computer chips. Computer chips' performance per watt has improved annually for decades. Data centers have also made big efficiency gains with their building systems. As recently as 10 years ago, PUEs of 1.9 or above were common across smaller enterprise and colocation data centers. With the consolidation of the industry into large hyperscale facilities, large companies now report fleetwide average PUEs of 1.1 to 1.4. However, some companies may continue to have less efficient building systems because there are also strong market incentives to avoid changes that could disrupt operations, such as installing more efficient cooling systems.

At least one European country, Germany, has passed legislation requiring data centers to achieve lower PUE in the near future (1.2 to 1.3, depending on when the data center was constructed), and similar legislation has been proposed in Virginia. A PUE requirement could have two unintended consequences: (1) it could encourage more water use by the industry, because water-dependent cooling uses less energy, and could make it harder for companies that use dry cooling systems to comply, and (2) companies that operate colocation data centers may be less able to comply because they do not control operational decisions that can affect PUE calculations, such as how much computing space tenants use. A PUE requirement for existing data centers would also create fairness issues, because companies that have chosen to use cooling systems that are more water efficient but less energy efficient may be unable to comply with the requirement, solely based on the type of cooling they chose before a PUE requirement was established.

Appendix K: Additional natural resource considerations

Additional concerns about data center operations' impacts on natural resources, including their wastewater discharges, disposal of electronic waste, and diesel fuel carbon footprint, have also been raised. While significant adverse impacts to Virginia's natural resources may not occur from these, an environmental management standard, such as ISO 14001, could encourage data centers to reduce their impacts where possible. (See Chapter 5 for more information on environmental management standards.)

Because of existing regulations, data center wastewater discharges do not appear to pose ecological harms

Data centers that use water in their cooling systems typically discharge only a small portion of it, but when discharges do occur, the discharges may contain relatively large concentrations of salts, other dissolved solids, and chemical additives. Some stakeholders expressed concern that data centers and/or wastewater treatment plants do not filter out the salts and any other chemicals before discharging the water to a Virginia surface water source, contributing to the degradation of water quality.

Federal and state wastewater regulations appear to protect against these risks. DEQ requires permits for wastewater discharges from utilities and other large dischargers. These permits set limitations on the contents of discharges and require water quality monitoring to ensure that discharges do not degrade water sources. Some data centers have their own discharge permits, but most send their discharges to a wastewater utility. In either case, the permit holder must ensure any wastewater is appropriately treated before discharging it into a water source. If a wastewater utility is not capable of adequately treating discharge from a data center customer, the utility can require the data center to pretreat its discharges.

Some stakeholders were concerned that existing wastewater regulations were not sufficient to protect water resources, but any potential shortcomings would be true for other development types, so data center-specific standards are not necessary. However, a certification to ISO 14001, which requires companies to meet all environmental regulations, may encourage additional voluntary commitments from data centers to reduce any wastewater impacts.

Electronic waste faces little regulation, but existing practices divert some servers from landfills

Data centers are packed full of thousands of servers, and these servers are replaced every three to five years. Servers can contain rare and toxic materials. The process to procure these materials for use in servers can be environmentally harmful, as can improper disposal of the toxic materials. The reuse or recycling of servers and server parts can minimize environmental impacts.

Data centers, like other businesses, are not required by federal or state law to reuse or recycle electronic waste, but existing practices divert some servers from Virginia landfills. Many data center companies have sustainability goals related to electronic waste, including reusing, recycling, or donating old servers or old server parts. Additionally, not all local waste management services and landfills in Virginia

accept commercial waste and/or electronic waste, which would force data centers to seek other alternatives to dispose of their old servers.

Requiring data centers to meet an environmental management standard, such as ISO 14001, would require data centers to consider any environmental impacts caused by their waste generation. This could complement existing practices and discourage disposal of data center servers in Virginia landfills, if, and where, it does occur.

Few data centers currently use diesel fuel alternatives because of supply limitations

Use of diesel fuel—the fuel commonly found in data centers’ backup generators—leads to greenhouse gas emissions. Data center operators are interested in expanding the data center industry’s use of alternative fuels, such as hydrotreated vegetable oil (HVO), to lower data centers’ carbon footprints. These alternatives can be used in most existing diesel generators. However, while these fuel alternatives are available for and used by data centers in Europe and California, the East Coast does not have a supply chain for these fuels. This makes it more expensive and logistically challenging for Virginia data centers to use these fuel alternatives.

Some data center companies are making efforts to expand the use of alternative fuels. For instance, some have requested DEQ permit approval to use HVO in their generators—as DEQ approval of fuel choice is needed as part of emission regulations—and the industry has reached out to the Virginia Economic Development Partnership about exploring ways to attract the fuel alternative industry to Virginia to increase local availability. While a requirement to use a fuel alternative may not currently be feasible, an ISO 14001 requirement could further encourage industry efforts to review and seek opportunities to limit their carbon footprints where possible.

Appendix L: Data center planning and zoning changes in Fairfax, Loudoun, and Prince William

In recent years, the three Virginia localities with the most data centers have revised their approaches to regulating the industry and initiated studies to consider additional changes. Sites in Loudoun, Prince William, and Fairfax account for 80 percent of data centers in the state. Since 2019, all three localities have adopted changes to their ordinances or other policies relating to data centers. For example, all three localities added minimum requirements for data centers to their zoning ordinances. Additionally, all three localities began official studies of their data center policies, with Loudoun and Prince William planning votes in 2026 by their boards of supervisors in response to study findings. Table L-1 summarizes key changes by Fairfax, Loudoun, and Prince William related to data center planning and zoning processes since 2019.

TABLE L-1
Fairfax, Loudoun, and Prince William have updated data center policies since 2019

Locality	Planning and zoning actions
Fairfax	Comprehensive zoning update with changes specific to data centers (effective 7/1/2021) - Recognized data centers as distinct use instead of being considered a type of telecommunications facility - Prohibited data centers in residential and certain commercial zones; requires special permit in certain commercial and industrial zones if exceeds specified size - Established county's first design standard specific to data centers: requiring enclosure of equipment in certain zones Data center study (initiated 5/9/23) - Process included public meetings and stakeholder interviews - Produced two staff reports and a consultant report Zoning changes (effective 9/11/24) Board of Supervisors considered study's recommendations and implemented several rules to better manage data center development - Prohibited data centers in additional zone; converted several zones from allowing data centers by right to allowing by special permit; expanded requirement for special permit if exceeding specified size to another industrial zone - Required 200 feet between data center building and residential property; required 300 feet (or a building) between equipment and residential property - Required 1 mile between data center and Metro station - Required sound studies at two stages of new projects - Required several architectural standards (e.g., façade differentiation) of by right development, with more flexibility but the same goals for special permit developments
Loudoun	Rewrite of comprehensive plan (adopted 6/20/2019) Items for priority future action included performance standards for data centers Series of meetings about data center policies by legislative committee (2022) Initiated to review county staff research and develop process for considering changes to data center policies Comprehensive zoning update includes changes specific to data centers (effective 12/13/2023) ^a Goal to align zoning ordinances relevant to data centers with comprehensive plan

- Converted two zones from allowing data centers by right to allowing by special permit; permitted data center in an additional industrial zone
- Expanded applicability of data center standards (e.g., façade architecture, screening of mechanical equipment) from four zones to all locations
- Created standards for data centers regardless of location including windows, main entrance features, loading bay location, and proactive sound measuring
- Created standards for data centers adjacent to residential areas including separation of mechanical equipment, minimum 200-foot setback between buildings and property border, parking setbacks, time limits on generator testing, and acoustic barriers around mechanical equipment

Study of potential changes to comprehensive plan and zoning ordinances for data centers and substations (initiated 2/6/2024)

- First phase focusing on appropriate locations for data centers per the comprehensive plan and zoning ordinance, expected to conclude early 2025
- Second phase to focus on policies and zoning ordinances to implement data center standards (e.g., aesthetics, natural resources), expected to conclude 2026

Prince William

Additional standards required in data center overlay district (adopted 6/18/2019)

- Created requirements for data centers in the data center overlay district, including for building façade and fence design, screening mechanical equipment and substations near residential areas and certain roads, and buffer yards of data centers near residential areas
- To encourage data center development in the overlay, increased density allowed by right within the overlay
- Adjusted borders of data center overlay on map

Comprehensive review of data center overlay (initiated 3/2/2021)

- Scope included zoning ordinance, comprehensive plan, and other formal county policies
- Products included reports by county's economic development office and two consultants regarding data center industry trends, appropriate land in Prince William, and recommended standards for development
- Process included public meetings and stakeholder interviews

Data center ordinance advisory workgroup (created 2/28/2023)

Responsible for continuing review of county's data center policies. Draft timeline includes Board of Supervisors vote on noise ordinance amendments in spring 2025 and vote on policy changes relevant to other topics later in 2025.

Expanded noise ordinance applicability to data centers (adopted 2/28/2023)

- Limited exemption for nighttime cooling systems to residential homes
- Originally planned to sunset in a year but extended to provide time to "assess the noise impacts associated with data centers"

SOURCE: JLARC review of local ordinances, review of planning and zoning department documents, and interviews with local staff.

NOTE: Table describes significant changes since 2019 and is not a summary of current ordinances. Table focuses on planning and zoning processes and excludes changes to economic development and tax policy. Table excludes requirements limited to particular projects (e.g., rezoning commitments). "Special permit" is used for consistency, but the terminology for this process depends on the locality.

^a Updates do not apply to certain parts of the county, which are administered under an older zoning ordinance.



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919 East Main Street Suite 2101 Richmond, VA 23219

Christy Parrish

From: Ally Stoeger <ajstoeger@gmail.com>
Sent: Tuesday, July 1, 2025 11:32 PM
To: Christy Parrish
Subject: [External]Additional Info for July 2 Meeting
Attachments: Zoning Ordinance .docx

Hi Christy,

I apologize for not sending you my thoughts and comments sooner. I hope you find this info helpful.

Please let me know if you have any questions.

Ally Stoeger

703-999-9279

Information for July 2, 2025 meeting

--In the memorandum that discusses positives and negatives, one of the negatives not mentioned is how divisive and disruptive to the community data center proposals are.

Landowners selling to data centers are typically offered multiples higher for their properties which makes them passionate about the sale. Meanwhile their neighbors will be expected to deal with huge amounts of heavy construction truck traffic and heavy construction machinery noise and pollution for 2 or 3 years.

Residents in Bristow (Prince William County) have been suffering for years from construction lights and noise of a Google campus being built that averages 900 feet away or more. Data center construction started at 6:30 am and ended at 10 pm, with a slightly lighter weekend schedule. Neighbors report incessant construction noise, diesel exhaust from heavy machinery, substantial dust and airborne particles. These are people who have not been able to enjoy their homes for two or more years and add to that the anxiety of potential data center mechanical noise issues once the data centers are built and operational.

And it isn't just Prince William County where there are lawsuits against developers and/or the Board of County Supervisors due to data center approvals. Fauquier County has also had at least one data center lawsuit and a very ugly divisive situation surrounding a controversial approval of a data center.

SUP: Every controversial data center campus approved in Prince William County came via an SUP. Inside the Data Center Opportunity Overlay district, after 2020, developers used SUP's (even though it was a by-right area) to get taller buildings. Outside the Overlay they used SUP's for the controversial campuses near homes, schools, and Manassas National Battlefield Park. All were approved because by the time residents realized what was happening, Planning Officials and Supervisors had been approached, donations were made, non-disclosure agreements signed. Requiring SUP's vs. not requiring SUP's is helpful -- but unfortunately did not stop the tide in Prince William County.

In order to protect the residents of the community it is crucial to not permit non-disclosure agreements and to make a commitment to transparency.

Data Center Size: In approximately 2013, the town of Haymarket gave approval to a very small data center. It was an OK location for a small data center. The problem was that this

one small data center location did not have the power availability it needed. To get enough power there, Dominion Energy stated they needed to run about a mile of 100-foot-tall towers – either through the center of the town of Haymarket (which had been trying to become a quaint type street) or through other residential areas. Ultimately most of the towers were run along I-66 and because of a costly citizens lawsuit –which barely won on a technicality – *a few* of the towers that would have run through Haymarket, would be buried. This is a **rare** concession by Dominion Energy. The rest of these 100-foot towers became an ugly prominent feature as you approached Gainesville and Haymarket. And it all started with one small data center.

Once there were more transmission towers, more data center developers submitted proposals because of the newly available energy. We had very informed residents, professionally knowledgeable about electrical power, state at every single one of these SUP proposals that there was not enough power in those lines for all those campuses. Dominion Energy reps said it would be OK *without explaining how it was possible*. Of course, now there is meeting after meeting about how many more 120-foot transmission towers will be running through Prince William County neighborhoods.

Visual:

When the data center industry states that a building will be 70 feet tall, typically that does not include the 15 – 20 feet of rooftop HVAC units and screening walls for that. Therefore, a “70-foot building” is effectively 85 to 90 feet. Also, our experience has been that developers will always ask for more in their SUP – and they usually get it because they will then offer a higher building as “compromise” for removing or changing something else that is even more objectionable.

Air Quality: In addition to NO and CO₂ from diesel generators, diesel **particulates** are of great concern especially for children. The particulates lodge in the small blood vessels of lungs and are a risk for asthma and cancer. I would not necessarily count on DEQ protection – DEQ was ready to make exemptions in 2023. Those exemptions were scaled back when residents turned out in large numbers to oppose this exemption. But that only reduced the exemptions DEQ asked for but did not eliminate them. So, I would not place bets on DEQ aligning with residents vs. the data center industry. Only about 5 - 10% of the data centers that have been approved in Virginia are built and operational. There will be more strain in the electrical grid in the years to come than in the past. DEQ exemptions might become a routine necessity because it is impossible for data centers to shut down without creating havoc. If something has to give it will be reduced air quality standards to avoid brownouts at data centers. <https://viriniamercury.com/briefs/departments-of-environmental-quality-revises-air-pollution-exception-for-data-centers/>

Noise: I would strongly recommend an ***independent*** baseline Noise study prior to a data center being built; independent analysis of expected noise levels; and an independent noise study after the data center is operational. And then noise levels should be checked annually as a data center may increase number of computers over time. This is a costly endeavor that must be considered to protect the public.

Please emphasize to Planning Commissioners and the Board that even noise well below the threshold of what most people consider loud is a problem when it is a constant monotonal mechanical hum.. A constant mechanical noise can create psychological stress (anxiety, depression, memory and learning problems) and physical stress to the cardiovascular system. Studies have shown that persistent noise while you are sleeping can cause cardiovascular stress even if you are not bothered by the noise. The brain can shut off visual stimuli by closing your eyes, but the brain cannot shut off auditory noise. Even better-quality windows or ear plugs have not been effective in blocking data center noise in communities with data center noise problems. In fact, communities with data center noise problems frequently report noise is louder at night.

York County - it was stated that letters from state energy and county water resources would state whether they can handle a data center development. Our experience has been that Dominion Energy always says yes. Only after the projects are approved will they tell you how many more substations, transmission lines and towers will be needed. There are now 200-foot transmission towers being recommended by PJM because of the data center industry – Dominion Energy never mentioned that when they agreeably stated that each incremental data center campus “would not be a problem.”

MEMORANDUM

DATE: September 9, 2025

TO: The Board of Supervisors

FROM: Liz Parman, Deputy County Attorney

SUBJECT: Zoning Ordinance Section 24-35, Pedestrian and Bicycle Accommodations

Executive Summary

The County Attorney's Office recommends amending James City County Zoning Ordinance Section 24-35 to be consistent with constitutional law regarding government takings and exactions.

I. Background

James City County Zoning Ordinance (the "Zoning Ordinance") Section 24-35 requires pedestrian and bicycle accommodations along all public roads as shown on the Pedestrian Accommodation Master Plan and the Regional Bikeways Plan *for all projects requiring site plan or major subdivision review*. The current code does allow developers to request Exceptions to the requirement, under certain conditions, and certain types of development are exempt from this code requirement. However, when construction of sidewalks and bike lanes are required, and such accommodations are to be publicly maintained, developers must dedicate property for such accommodations and construct the required sidewalks and bikeways to Virginia Department of Transportation ("VDOT") specifications. Zoning Ordinance Section 24-35 was adopted in 1990 and subsequently amended in 2000, 2011, and 2018. The most recent 2018 legislative action amended this section to include bicycle accommodations. Recent land use applications have raised potential problems with the application of Section 24-35 when the proposed project's impacts do not relate to the need for a bicycle or pedestrian lane.

II. Essential Nexus and Rough Proportionality

When a local government requires the dedication of property as a condition of a development permit, the locality must consider whether there is an "essential nexus" or a direct connection between the impacts created by a development and the required dedication of property. *See Nollan v. California Coastal Commission*, 483 U.S. 825 (1987). If there is such a nexus, the next question is whether the exaction is "roughly proportional" to the impacts created by the development. *See Dolan v. City of Tigard*, 512 U.S. 374 (1994). The County must make an individualized determination that the required dedication is related both in nature and extent to the impact of the Project. If these two elements have not been sufficiently established, then the required dedication of land in exchange for the permit constitutes a taking under the Fifth and Fourteenth Amendments of the United States (U.S.) Constitution. *Koontz v. St. Johns River Water Mgmt. Dist.*, 570 U.S. 595 (2013). A locality overreaches when it imposes a condition requiring exaction of land from a developer that is not rationally related to and is not roughly proportional to the impacts of a development. *Board of Supervisors of Albemarle County v. Route 29, LLC*, 301 Va. 134 (2022).

III. Proposed Action

The County Attorney's Office recommends amending Zoning Ordinance Section 24-35 to align with the law surrounding takings and exactions. The draft Ordinance includes three additional exemptions under subsection (c) stating that Exemptions to this section (Section 24-35) may be granted by the planning director or designee if:

- (6) The development is for outdoor operations and/or outdoor storage. This exemption shall not apply to outdoor venues for sports, entertainment, or retail; or*
- (7) There is not an existing sidewalk within one mile of the development along the road the bicycle and pedestrian facility is proposed; or*
- (8) The development is more than 500 feet from the road.*

These exemptions will allow the planning director discretion to exempt those projects for outdoor operations or outdoor storage, such as a parking lot or outdoor storage facility; developments where there is no existing sidewalk within a mile; and developments that are more than 500 feet from the road. Allowing exemptions for these types of projects will prevent the County from requiring conditions that are not rationally related or roughly proportional to the proposed development.

LP/ap

ZO24-35PedBic-mem

Attachment

RESOLUTION

INITIATION OF AMENDMENTS TO ZONING ORDINANCE SECTION 24-35

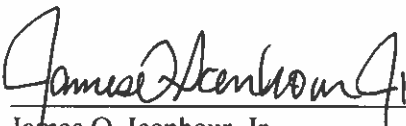
WHEREAS, Virginia Code Section 15.2-2286 and County Code Section 24-13 permit the Board of Supervisors of James City County, Virginia (the "Board"), to, by motion, initiate amendments to the regulations of the Zoning Ordinance included in County Code Chapter 24 (the "Zoning Ordinance"); and

WHEREAS, Zoning Ordinance Section 24-35 currently requires developers to dedicate property and install pedestrian and bicycle accommodations along all public roads as shown on the Pedestrian Accommodation Master Plan and the Regional Bikeways Plan for all projects requiring site plan or major subdivision review; and

WHEREAS, the Board is of the opinion that County Code Section 24-35 should be amended to better align with the law regarding government takings and exactions; and

WHEREAS, the Board is of the opinion that the public necessity, convenience, general welfare, or good zoning practice warrant the amendments to Section 24-35 the Zoning Ordinance.

NOW, THEREFORE, BE IT RESOLVED, that the Board of Supervisors of James City County, Virginia, does hereby, by motion, initiate amendments to Section 24-35 of the Zoning Ordinance.


James O. Icenhour, Jr.
Chair, Board of Supervisors

ATTEST:


Teresa J. Saeed
Deputy Clerk to the Board

	VOTES			
	<u>AYE</u>	<u>NAY</u>	<u>ABSTAIN</u>	<u>ABSENT</u>
HIPPLE	☒	☐	☐	☒
NULL	☒	☐	☐	☐
LARSON	☒	☐	☐	☐
MCGLENNON	☒	☐	☐	☐
ICENHOUR	☒	☐	☐	☐

Adopted by the Board of Supervisors of James City County, Virginia, this 28th day of January, 2025.

IntAmdZOSec24-35-res

ORDINANCE NO. _____

AN ORDINANCE TO AMEND AND REORDAIN CHAPTER 24, ZONING, OF THE CODE OF THE COUNTY OF JAMES CITY, VIRGINIA, BY AMENDING ARTICLE II, SPECIAL REGULATIONS, DIVISION 1, IN GENERAL, SECTION 24-35, PEDESTRIAN AND BICYCLE ACCOMMODATIONS.

BE IT ORDAINED by the Board of Supervisors of the County of James City, Virginia, that Chapter 24, Zoning, is hereby amended and reordained by amending Article II, Special Regulations, Division 1, In General, Section 24-35, Pedestrian and bicycle accommodations.

CHAPTER 24. ZONING

ARTICLE II. SPECIAL REGULATIONS

DIVISION 1. IN GENERAL

Sec. 24-35. Pedestrian and bicycle accommodations.

- (a) Pedestrian and bicycle accommodations shall be required for all projects requiring site plan or major subdivision review in accordance with the following:
 - (1) Pedestrian and bicycle accommodations shall be required for the subject property(ies) along all public roads as shown on the pedestrian accommodation master plan and the regional bikeways plan. In addition to corridors identified on the pedestrian accommodation master plan, sidewalks shall be required along at least one side of all roads built within a community character area sidewalk inclusion zone as specified on the pedestrian accommodation master plan.
 - (2) *Internal public streets.* Pedestrian accommodation internal to a residential, commercial, office or industrial development with public streets shall be required pursuant to the Secondary Street Acceptance Requirements found in 24VAC30-92, as amended.
 - (3) *Internal private streets.*
 - a. Pedestrian accommodation internal to a residential, commercial, or office development with private streets shall be required on at least one side of all internal streets.
 - b. For development designated by the Comprehensive Plan as mixed use; moderate density residential; or the residential, commercial, and office sections of an economic opportunity area, pedestrian accommodations shall be required on both sides of the private streets.
 - c. Sidewalks on private streets shall not be required internal to industrial parks or industrial sections of areas designated economic opportunity on the Comprehensive Plan.
 - d. The planning director or designee may approve alternative locations for pedestrian accommodations that are found to have equivalent connectivity as providing sidewalks along the roads internal to the development, such as paved connections between or from cul-de-sacs to other pedestrian accommodations.

- (4) *Interconnectivity internal to a parcel.* Pedestrian accommodations shall be required between parking areas, buildings, and public areas for residential, commercial, and office development sites. Pedestrian accommodation internal to a development shall link with any existing or master planned pedestrian accommodation along an abutting road external to the development and any existing public transit stops. Development within industrial parks and industrial sections of the economic opportunity zone shall be required to meet applicable Americans with Disabilities Act (ADA) connectivity standards.
 - (5) *Interconnectivity between parcels.* Pedestrian and bicycle accommodations shall be required between residential developments and adjoining schools, park, or recreational facilities as determined by the planning director or designee. The property owner shall provide a connection internal to the development to the property line with the adjoining facility. This criterion may be waived by the planning director or designee if the owner of the contiguous parcel objects to a connection or if a significant obstruction exists (such as wetlands, slopes exceeding 25 percent gradient and guardrails) that would make a connection impracticable.
- (b) Construction standards: Pedestrian and bicycle accommodations required by section 24-35(a) shall be built in accordance with the following construction standards:
- (1) If accommodations are to be publicly maintained, the accommodations shall be built to VDOT standards and located within VDOT right-of-way. If sufficient VDOT right-of-way does not exist, such needed right-of-way shall be dedicated prior to final plan or plat approval.
 - (2) The accommodations shall be shown on the final plat and/or site plan.
 - (3) If accommodations are to be privately maintained, they shall meet the following requirements:
 - a. Sidewalks shall be paved and a minimum of five feet in width and be built to VDOT construction standards;
 - b. Multi-use paths shall be paved and a minimum of eight feet in width and shall be built to paved trail standards in the Parks and Recreation Greenways Master Plan;
 - c. All pedestrian accommodations shall meet the requirements of the ADA's Accessibility Guidelines;
 - d. Width criteria for private accommodations may be reduced with approval by the planning director or designee if a significant obstruction exists (such as wetlands, slopes exceeding 25 percent gradient and guardrails) that would make a connection impracticable.
- (c) Exemptions: Exemptions to this section may be granted by the planning director or designee if:
- (1) A proposed temporary structure(s) will not be erected for more than six months; or
 - (2) A proposed addition to an existing structure is less than 1,000 square feet or no changes to the building footprint are proposed; or
 - (3) The development is located within an office park with private streets in existence prior to November 22, 2011 and providing pedestrian accommodations along the frontage of the development site would not result in a safe and continuous connection to an existing or planned pedestrian accommodation or public transit stop; or
 - (4) Land disturbance on the project area is less than 2,500 square feet; or

- (5) The site plan submittal is for a project associated with an existing individual multi-family dwelling unit; or
 - (6) The development is for outdoor operations and/or outdoor storage. This exemption shall not apply to outdoor venues for sports, entertainment, or retail; or
 - (7) There is not an existing sidewalk within one mile of the development along the road the bicycle and pedestrian facility is proposed; or
 - (8) The development is more than 500 feet from the road.
- (d) Exceptions: Exceptions to this section may be granted by the planning director or designee if:
- (1) A pedestrian or bicycle accommodation is otherwise required by this section and would be substantially damaged or need to be replaced as a result of a fully engineered roadway construction project implemented by the county or VDOT. The planning director or designee may request dedication of sufficient right-of-way for pedestrian or bicycle accommodations related to the road project in lieu of construction of the pedestrian or bicycle requirement. The requirement to dedicate right-of-way shall be based on existing right-of-way, the design of the engineered project, and additional right-of-way that is needed; or
 - (2) In circumstances where topographical conditions make construction of pedestrian or bicycle accommodations impractical, the planning director or designee may approve an alternative alignment that is accessible by the public that differs from the pedestrian accommodation master plan. The alternative alignment shall link with adjacent pedestrian accommodations; or
 - (3) Pedestrian or bicycle accommodations are shown on a master plan or corridor plan approved by the board of supervisors that differs from the pedestrian accommodation master plan or the regional bikeways plan.

If an exception is granted for (d)(1) or (d)(2) above, the applicant shall be required to pay into the pedestrian or bicycle accommodation construction and maintenance fund in an amount determined by the county engineer or designee. The amount shall be based on:

- a. Projected engineering costs;
 - b. Projected material costs;
 - c. Projected labor and mobilization costs;
 - d. Current topographical conditions of the site; and
 - e. Linear feet of road frontage.
- (e) Appeals. In the event the planning director disapproves plans of this section or recommends conditions or modifications which are unacceptable to the applicant, the applicant may appeal the decision to the development review committee who shall forward a recommendation to the planning commission.

James O. Icenhour, Jr.
Chair, Board of Supervisors

ATTEST:

Teresa J. Saeed
Deputy Clerk to the Board

HIPPLE
NULL
LARSON
MCGLENNON
ICENHOUR

VOTES

<u>AYE</u>	<u>NAY</u>	<u>ABSTAIN</u>	<u>ABSENT</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Adopted by the Board of Supervisors of James City County, Virginia, this 9th day of
September, 2025.

ZO24-35PedBic-ord

ORDINANCE NO. _____

AN ORDINANCE TO AMEND AND REORDAIN CHAPTER 24, ZONING, OF THE CODE OF THE COUNTY OF JAMES CITY, VIRGINIA, BY AMENDING ARTICLE II, SPECIAL REGULATIONS, DIVISION 1, IN GENERAL, SECTION 24-35, PEDESTRIAN AND BICYCLE ACCOMMODATIONS.

BE IT ORDAINED by the Board of Supervisors of the County of James City, Virginia, that Chapter 24, Zoning, is hereby amended and reordained by amending Article II, Special Regulations, Division 1, In General, Section 24-35, Pedestrian and bicycle accommodations.

CHAPTER 24. ZONING

ARTICLE II. SPECIAL REGULATIONS

DIVISION 1. IN GENERAL

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 - (2) *Internal public streets.* Pedestrian accommodation internal to a residential, commercial, office or industrial development with public streets shall be required pursuant to the Secondary Street Acceptance Requirements found in 24VAC30-92, as amended.
 - (3) *Internal private streets.*
 - a. Pedestrian accommodation internal to a residential, commercial, or office development with private streets shall be required on at least one side of all internal streets.
 - b. For development designated by the Comprehensive Plan as mixed use; moderate density residential; or the residential, commercial, and office sections of an economic opportunity area, pedestrian accommodations shall be required on both sides of the private streets.
 - c. Sidewalks on private streets shall not be required internal to industrial parks or industrial sections of areas designated economic opportunity on the Comprehensive Plan.
 - d. The planning director or designee may approve alternative locations for pedestrian accommodations that are found to have equivalent connectivity as providing sidewalks along the roads internal to the development, such as paved connections between or from cul-de-sacs to other pedestrian accommodations.

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 - (5) *Interconnectivity between parcels.* Pedestrian and bicycle accommodations shall be required between residential developments and adjoining schools, park, or recreational facilities as determined by the planning director or designee. The property owner shall provide a connection internal to the development to the property line with the adjoining facility. This criterion may be waived by the planning director or designee if the owner of the contiguous parcel objects to a connection or if a significant obstruction exists (such as wetlands, slopes exceeding 25 percent gradient and guardrails) that would make a connection impracticable.
- (b) Construction standards: Pedestrian and bicycle accommodations required by section 24-35(a) shall be built in accordance with the following construction standards:
- (1) If accommodations are to be publicly maintained, the accommodations shall be built to VDOT standards and located within VDOT right-of-way. If sufficient VDOT right-of-way does not exist, such needed right-of-way shall be dedicated prior to final plan or plat approval.
 - (2) The accommodations shall be shown on the final plat and/or site plan.
 - (3) If accommodations are to be privately maintained, they shall meet the following requirements:
 - a. Sidewalks shall be paved and a minimum of five feet in width and be built to VDOT construction standards;
 - b. Multi-use paths shall be paved and a minimum of eight feet in width and shall be built to paved trail standards in the Parks and Recreation Greenways Master Plan;
 - c. All pedestrian accommodations shall meet the requirements of the ADA's Accessibility Guidelines;
 - d. Width criteria for private accommodations may be reduced with approval by the planning director or designee if a significant obstruction exists (such as wetlands, slopes exceeding 25 percent gradient and guardrails) that would make a connection impracticable.
- (c) Exemptions: Exemptions to this section may be granted by the planning director or designee if:
- (1) A proposed temporary structure(s) will not be erected for more than six months; or
 - (2) A proposed addition to an existing structure is less than 1,000 square feet or no changes to the building footprint are proposed; or
 - (3) The development is located within an office park with private streets in existence prior to November 22, 2011 and providing pedestrian accommodations along the frontage of the development site would not result in a safe and continuous connection to an existing or planned pedestrian accommodation or public transit stop; or
 - (4) Land disturbance on the project area is less than 2,500 square feet; or

- (5) The site plan submittal is for a project associated with an existing individual multi-family dwelling unit; or
 - (6) The development is for outdoor operations and/or outdoor storage. This exemption shall not apply to outdoor venues for sports, entertainment, or retail; or
 - (7) There is not an existing sidewalk within one mile of the development along the road the bicycle and pedestrian facility is proposed; or
 - (8) The development is more than 500 feet from the road.
- (d) Exceptions: Exceptions to this section may be granted by the planning director or designee if:
- (1) A pedestrian or bicycle accommodation is otherwise required by this section and would be substantially damaged or need to be replaced as a result of a fully engineered roadway construction project implemented by the county or VDOT. The planning director or designee may request dedication of sufficient right-of-way for pedestrian or bicycle accommodations related to the road project in lieu of construction of the pedestrian or bicycle requirement. The requirement to dedicate right-of-way shall be based on existing right-of-way, the design of the engineered project, and additional right-of-way that is needed; or
 - (2) In circumstances where topographical conditions make construction of pedestrian or bicycle accommodations impractical, the planning director or designee may approve an alternative alignment that is accessible by the public that differs from the pedestrian accommodation master plan. The alternative alignment shall link with adjacent pedestrian accommodations; or
 - (3) Pedestrian or bicycle accommodations are shown on a master plan or corridor plan approved by the board of supervisors that differs from the pedestrian accommodation master plan or the regional bikeways plan.

If an exception is granted for (d)(1) or (d)(2) above, the applicant shall be required to pay into the pedestrian or bicycle accommodation construction and maintenance fund in an amount determined by the county engineer or designee. The amount shall be based on:

- a. Projected engineering costs;
 - b. Projected material costs;
 - c. Projected labor and mobilization costs;
 - d. Current topographical conditions of the site; and
 - e. Linear feet of road frontage.
- (e) Appeals. In the event the planning director disapproves plans of this section or recommends conditions or modifications which are unacceptable to the applicant, the applicant may appeal the decision to the development review committee who shall forward a recommendation to the planning commission.

MEMORANDUM

DATE: September 9, 2025

TO: The Board of Supervisors

FROM: Jennifer D. Tomes, Treasurer

SUBJECT: Chapter 3, Article II, Division 2 Code Updates - Board Adoption

The Treasurer's Office has been working in conjunction with the James City County Financial and Management Services Department in order to update James City County local Ordinance provisions related to the issuance of dog licenses. The most notable update includes changing from requiring dog owners to renew their licenses on an annual basis to issuing one-time licenses that are valid for the lifetime of the dog. Staff believe by changing to a lifetime license James City County residents will find it easier to comply with James City County Ordinances relating to dog licenses.

Staff recommends adoption of the attached resolution.

JDT/ap
Ch3Div2Licenses-mem

Attachments:

1. Ordinance Draft
2. Ordinance Final

ORDINANCE NO. _____

AN ORDINANCE TO AMEND AND REORDAIN CHAPTER 3, ANIMAL LAWS, OF THE CODE OF THE COUNTY OF JAMES CITY, VIRGINIA, BY AMENDING ARTICLE II, DOGS, DIVISION 2, LICENSES, SECTION 3-30, UNLICENSED DOGS PROHIBITED; SECTION 3-31, DOG LICENSES; SECTION 3-32, DISPOSITION OF FUNDS; SECTION 3-33, VETERINARIANS TO PROVIDE TREASURER WITH RABIES CERTIFICATE INFORMATION; CIVIL PENALTY; SECTION 3-34, EVIDENCE SHOWING INOCULATION FOR RABIES PREREQUISITE TO OBTAINING DOG OR CAT LICENSE; SECTION 3-35, DISPLAY OF LICENSE AND RECEIPT; SECTION 3-36, DUPLICATE LICENSE TAGS; SECTION 3-37, ANNUAL FEE IMPOSED ON DOGS AND KENNELS; SECTION 3-38, DOG LICENSE FEE; EXEMPTION FOR CERTAIN DOGS; SECTION 3-39, PRESUMPTION FOR DOG NOT WEARING COLLAR.

BE IT ORDAINED by the Board of Supervisors of the County of James City, Virginia, that Chapter 3, Animal Laws, is hereby amended and reordained by amending Article II, Dogs, Division 2, Licenses, Section 3-30, Unlicensed dogs prohibited; Section 3-31, Dog licenses; Section 3-32, Disposition of funds; Section 3-33, Veterinarians to provide treasurer with rabies certificate information; civil penalty; Section 3-34, Evidence showing inoculation for rabies prerequisite to obtaining dog or cat license; Section 3-35, Display of license and receipt; Section 3-36, Duplicate license tags; Section 3-37, Annual fee imposed on dogs and kennels; Section 3-38, Dog license fee; exemption for certain dogs; Section 3-39, Presumption for dog not wearing collar.

Chapter 3. Animal Laws

Article II. Dogs

Division 2. Licenses

Sec. 3-30. Unlicensed dogs prohibited.

It shall be unlawful for any person to own a dog four months old or older in the county unless the dog is licensed and has a valid rabies vaccination, as required by the provisions of this ~~article~~ chapter.

Sec. 3-31. Dog licenses.

- (a) Required; application. Not later than 30 days after a dog has reached the age of four months or 30 days after a dog is obtained, Every owner of a dog over the age of four months dog owners who reside within the boundary limits of the county owned, possessed, or kept in the county shall obtain a dog license by making an oral or written application with the county treasurer or his designee.
- (b) License fee and vaccination certificate. Each application shall be accompanied by the amount of the license fee and current certificate of vaccination ~~as required by this chapter~~ or satisfactory evidence that such certificate has been obtained.

- (c) Authority of treasurer, issuance of license receipt. The treasurer, or his designee, shall only have authority to license dogs of resident owners who reside within the boundary limits of the county and may require information to this effect from any applicant. Upon receipt of the License fee and proper application and a valid rabies vaccination certificate, the treasurer or his designee shall issue a license. ~~The treasurer, or his designee receipt for the amount on which, he~~ shall record the name and address of the owner, the date of payment, ~~the year for which issued,~~ the serial number of the tag, ~~whether male or female, whether spayed or neutered, or whether a kennel,~~ and deliver the metal license tags or plates provided for herein. The tag shall be stamped or otherwise permanently marked to show the name of the county and bear a serial number or other identifying information as may be prescribed by the board of supervisors.
- (d) Retention of information; ~~treasurer to destroy unsold tags.~~ The information thus received shall be retained by the treasurer, open to public inspection during the period for which such license is valid. ~~All unsold tags shall be recorded and the unissued tags destroyed by the treasurer at the end of each calendar year.~~
- ~~(e) False statements. It shall be unlawful for any person to make a false statement verbally or on an application in order to secure a dog license to which he is not entitled.~~

Sec. 3-32. Disposition of funds.

- (a) The county treasurer shall keep record ~~all money collected for dog license fees pursuant to section 3-31 in a separate account from all other funds collected for dog license fees in a separate account from all other funds collected by the treasurer, to be used by the county by him, pursuant to this section in accordance with Code of Va., § 3.2-6534 and Code of Va., § 3.2-6535. The county shall use the dog license funds for the following purposes:~~
- ~~(1) The salary and expenses of the animal control officer and necessary staff;~~
 - ~~(2) The care and maintenance of a public animal shelter;~~
 - ~~(3) The maintenance of a rabies control program;~~
 - ~~(4) Payments as a bounty to any person neutering or spaying a dog up to the amount of one year of the license fee as provided in section 3-31;~~
 - ~~(5) Payments for compensation as provided in section 3-24; and~~
 - ~~(6) Efforts to promote sterilization of dogs and cats.~~
- ~~(b) Any part or all of any surplus remaining in such account on December 31 of any year may be transferred into the general fund of the county.~~

Sec. 3-33. Veterinarians to provide treasurer with rabies certificate information; civil penalty.

Each veterinarian who vaccinates a dog against rabies or directs a veterinary technician in his employ to vaccinate a dog against rabies shall provide the owner a copy of the rabies vaccination certificate. The veterinarian shall forward within 45 days a copy of the rabies vaccination certificate or the information contained in such certificate to the treasurer of the locality in which the vaccination occurs.

The rabies vaccination certificate shall include at a minimum the signature of the veterinarian, the animal owner's name and address, the species of the animal, the sex, the age, the primary color, the primary breed, ~~the secondary breed,~~ whether or not the animal is spayed or neutered, the vaccination number, and the vaccination expiration date. The rabies vaccination certificate shall indicate the locality in which the animal resides.

It shall be the responsibility of the owner of each vaccinated animal that is not already licensed to ~~apply for a license~~ obtain a county license for the vaccinated dog. If the treasurer determines, from review of the rabies vaccination information provided by veterinarians, that the owner of an ~~unlicensed~~ a dog has failed to apply for a license within 90 days of the date of vaccination, the treasurer shall transmit ~~an application a notification~~ to the owner ~~and request the owner to submit a completed application and pay the appropriate fee requesting payment for the license~~. Upon receipt of ~~the completed application and the~~ payment of the license fee, the treasurer or other agent charged with the duty of issuing the dog licenses shall issue a license receipt and a permanent tag.

The treasurer shall remit any rabies vaccination certificate received for any animal owned by an individual residing in another locality to the local treasurer for the appropriate locality.

Any veterinarian that willfully fails to provide the treasurer with a copy of the rabies vaccination certificate or the information contained in such certificate shall be subject to a civil penalty of \$10.00 per certificate. Monies raised pursuant to this subsection shall be placed in the county's general fund for the purpose of animal control activities including, but not limited to, spay or neuter programs.

Sec. 3-34. Evidence showing inoculation for rabies prerequisite to obtaining dog ~~or cat~~ license.

No license tag shall be issued for any dog unless there is presented to the treasurer or his designee satisfactory evidence that such dog has ~~been inoculated or vaccinated~~ a current vaccination against rabies by a currently licensed veterinarian or currently licensed veterinary technician who was under the immediate and direct supervision of a licensed veterinarian on the premises.

Sec. 3-35. Display of license ~~and receipt~~.

~~Dog license receipts shall be carefully preserved by licensees and exhibited promptly upon request for inspection by the animal control officer or other officer of the county. The animal control officer or other duly appointed officers may check such receipts door-to-door at any time during the license year.~~ Dog license tags shall be securely fastened to a substantial collar by the owner or custodian and worn by such dog. It shall be unlawful for the owner to permit any licensed dog four months old or older to run or roam at large at any time without a license tag. The owner of the dog may remove the collar and license tag required by this section when (i) the dog is engaged in lawful hunting, (ii) the dog is competing in a dog show, (iii) the dog has a skin condition which would be exacerbated by the wearing of a collar, (iv) the dog is confined; or (v) the dog is under the immediate control of its owner.

Sec. 3-36. Duplicate license tags.

If a dog license tag is lost, destroyed or stolen, the owner or custodian shall at once apply to the county treasurer, or his designee, for a duplicate license tag, presenting ~~the original license receipt~~ a valid rabies certification. Upon affidavit of the owner before the county treasurer, or his designee, that the original license tag has been lost, destroyed, or stolen, the treasurer shall verify the valid rabies certification is recorded and issue a duplicate license tag which shall be immediately affixed to the collar of the dog by its owner. ~~The treasurer, or his designee, shall endorse the number of the duplicate license tag and the date of issuance on the face of the original license receipt.~~ The fee for a duplicate tag for any dog shall be \$1.00.

Sec. 3-37. ~~Annual f~~ Fee imposed on dogs and kennels.

There is hereby imposed ~~an annual dog~~ a license fee of \$15.00, valid for the life of the dog, upon ~~all dog kennels and~~ all dogs over the age of four months which are owned, possessed or kept in the county, ~~as follows:~~

- ~~(1) Male, female dogs\$8.00~~
- ~~(2) Spayed/neutered dogs5.00~~
- ~~(3) Kennel for up to ten dogs15.00~~
- ~~(4) Kennel for up to 20 dogs25.00~~
- ~~(5) Kennel for up to 30 dogs35.00~~
- ~~(6) Kennel more than 30 dogs50.00~~
- ~~(7) Duplicate for lost, destroyed or stolen tags1.00~~

It shall be unlawful for any person to conceal or harbor any dog on which any required license fee has not been paid.

Any person with an un-expired annual dog license issued prior to the effective date of this ordinance may trade the un-expired annual dog license for a lifetime dog license. No renewal fee will be required for these licenses.

Sec. 3-38. Dog license fee; exemption for certain dogs.

- (a) The license tax as prescribed in this chapter is due not later than 30 days after a dog has reached the age of four months, or not later than 30 days after an owner acquires a dog four months of age or older, ~~and each year thereafter.~~
- ~~(b) Any kennel license tax prescribed pursuant to this chapter shall be due on January 1 and not later than January 31 of each year.~~
- (be) No license tax shall be levied on any dog that is trained and serves as a guide dog for a blind person, that is trained and serves as a hearing dog for a deaf or hearing impaired person or that is trained and serves as a service dog for a mobility-impaired or otherwise disabled person.

As used in this section, “hearing dog” means a dog trained to alert its owner by touch to sounds of danger and sounds to which the owner should respond and “service dog” means a dog trained to do work or perform tasks for the benefit of a mobility-impaired or otherwise disabled person. The work or tasks performed by a service dog shall be directly related to the individual's disability or disorder. Examples of work or tasks include providing nonviolent protection or rescue work, pulling a wheelchair, assisting an individual during a seizure, alerting an individual to the presence of allergens, retrieving items, carrying items, providing physical support and assistance with balance and stability, and preventing or interrupting impulsive or destructive behaviors. The provision of emotional support, well-being, comfort, or companionship shall not constitute work or tasks for the purposes of this definition.

Sec. 3-39. Presumption for dog not wearing collar displaying license.

Any dog not wearing a collar bearing a valid license tag shall prima facie be deemed to be unlicensed, and in any proceedings under this chapter the burden of proof of the fact that such dog has been licensed, or is otherwise not required to bear a tag at the time, shall be on the owner of the dog. Violations of the vaccination requirements of this section shall be handled in accordance with Article III of this Chapter. Any dog owner failing to pay any license tax required by this section later than 30 days after a dog has reached the age of four months or 30 days after a dog is obtained by an owner who resides within the county shall be guilty of a Class 4 misdemeanor. In addition, the court may order confiscation and the proper disposition of the dog.

James O. Icenhour, Jr.
Chair, Board of Supervisors

ATTEST:

Teresa J. Saeed
Deputy Clerk to the Board

HIPPLE
NULL
LARSON
MCGLENNON
ICENHOUR

VOTES

AYE NAY ABSTAIN ABSENT

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Adopted by the Board of Supervisors of James City County, Virginia, this 9th day of
September, 2025.

Ch3Div2Licenses-ord

ORDINANCE NO. _____

AN ORDINANCE TO AMEND AND REORDAIN CHAPTER 3, ANIMAL LAWS, OF THE CODE OF THE COUNTY OF JAMES CITY, VIRGINIA, BY AMENDING ARTICLE II, DOGS, DIVISION 2, LICENSES, SECTION 3-30, UNLICENSED DOGS PROHIBITED; SECTION 3-31, DOG LICENSES; SECTION 3-32, DISPOSITION OF FUNDS; SECTION 3-33, VETERINARIANS TO PROVIDE TREASURER WITH RABIES CERTIFICATE INFORMATION; CIVIL PENALTY; SECTION 3-34, EVIDENCE SHOWING INOCULATION FOR RABIES PREREQUISITE TO OBTAINING DOG; SECTION 3-35, DISPLAY OF LICENSE AND RECEIPT; SECTION 3-36, DUPLICATE LICENSE TAGS; SECTION 3-37, FEE IMPOSED ON DOGS; SECTION 3-38, DOG LICENSE FEE; EXEMPTION FOR CERTAIN DOGS; SECTION 3-39, PRESUMPTION FOR DOG NOT DISPLAYING LICENSE.

BE IT ORDAINED by the Board of Supervisors of the County of James City, Virginia, that Chapter 3, Animal Laws, is hereby amended and reordained by amending Article II, Dogs, Division 2, Licenses, Section 3-30, Unlicensed dogs prohibited; Section 3-31, Dog licenses; Section 3-32, Disposition of funds; Section 3-33, Veterinarians to provide treasurer with rabies certificate information; civil penalty; Section 3-34, Evidence showing inoculation for rabies prerequisite to obtaining dog license; Section 3-35, Display of license and receipt; Section 3-36, Duplicate license tags; Section 3-37, Fee imposed on dogs; Section 3-38, Dog license fee; exemption for certain dogs; Section 3-39, Presumption for dog not displaying license.

Chapter 3. Animal Laws

Article II. Dogs

Division 2. Licenses

Sec. 3-30. Unlicensed dogs prohibited.

It shall be unlawful for any person to own a dog four months old or older in the county unless the dog is licensed and has a valid rabies vaccination, as required by the provisions of this chapter.

Sec. 3-31. Dog licenses.

- (a) Required; application. Not later than 30 days after a dog has reached the age of four months or 30 days after a dog is obtained, dog owners who reside within the boundary limits of the county shall obtain a dog license by making an oral or written application with the county treasurer or his designee.
- (b) License fee and vaccination certificate. Each application shall be accompanied by the amount of the license fee and current certificate of vaccination or satisfactory evidence that such certificate has been obtained.

- (c) Authority of treasurer, issuance of license receipt. The treasurer, or his designee, shall only have authority to license dogs of resident owners who reside within the boundary limits of the county and may require information to this effect from any applicant. Upon receipt of the License fee and a valid rabies vaccination certificate, the treasurer or his designee shall issue a license. The treasurer, or his designee shall record the name of the owner, the date of payment, the serial number of the tag, and deliver the metal license tags or plates provided for herein. The tag shall be stamped or otherwise permanently marked to show the name of the county and bear a serial number or other identifying information as may be prescribed by the board of supervisors.
- (d) Retention of information. The information thus received shall be retained by the treasurer, open to public inspection during the period for which such license is valid.

Sec. 3-32. Disposition of funds.

The county treasurer shall record all funds collected for dog license fees in a separate account from all other funds collected by the treasurer, to be used by the county pursuant to this section in accordance with Code of Va., § 3.2-6534 and Code of Va., § 3.2-6535.

Sec. 3-33. Veterinarians to provide treasurer with rabies certificate information; civil penalty.

Each veterinarian who vaccinates a dog against rabies or directs a veterinary technician in his employ to vaccinate a dog against rabies shall provide the owner a copy of the rabies vaccination certificate. The veterinarian shall forward within 45 days a copy of the rabies vaccination certificate or the information contained in such certificate to the treasurer of the locality in which the vaccination occurs.

The rabies vaccination certificate shall include at a minimum the signature of the veterinarian, the animal owner's name and address, the species of the animal, the sex, the age, the primary color, the primary breed, whether or not the animal is spayed or neutered, the vaccination number, and the vaccination expiration date. The rabies vaccination certificate shall indicate the locality in which the animal resides.

It shall be the responsibility of the owner of each vaccinated animal that is not already licensed to obtain a county license for the vaccinated dog. If the treasurer determines, from review of the rabies vaccination information provided by veterinarians, that the owner of a dog has failed to apply for a license within 90 days of the date of vaccination, the treasurer shall transmit a notification to the owner requesting payment for the license. Upon receipt of the payment of the license fee, the treasurer or other agent charged with the duty of issuing the dog licenses shall issue a license receipt and a permanent tag.

The treasurer shall remit any rabies vaccination certificate received for any animal owned by an individual residing in another locality to the local treasurer for the appropriate locality.

Any veterinarian that willfully fails to provide the treasurer with a copy of the rabies vaccination certificate or the information contained in such certificate shall be subject to a civil penalty of \$10.00 per certificate. Monies raised pursuant to this subsection shall be placed in the county's general fund for the purpose of animal control activities including, but not limited to, spay or neuter programs.

Sec. 3-34. Evidence showing inoculation for rabies prerequisite to obtaining dog license.

No license tag shall be issued for any dog unless there is presented to the treasurer or his designee satisfactory evidence that such dog has a current vaccination against rabies by a currently licensed veterinarian or currently licensed veterinary technician who was under the immediate and direct supervision of a licensed veterinarian on the premises.

Sec. 3-35. Display of license.

Dog license tags shall be securely fastened to a substantial collar by the owner or custodian and worn by such dog. It shall be unlawful for the owner to permit any licensed dog four months old or older to run or roam at large at any time without a license tag. The owner of the dog may remove the collar and license tag required by this section when (i) the dog is engaged in lawful hunting, (ii) the dog is competing in a dog show, (iii) the dog has a skin condition which would be exacerbated by the wearing of a collar, (iv) the dog is confined; or (v) the dog is under the immediate control of its owner.

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If a dog license tag is lost, destroyed or stolen, the owner or custodian shall at once apply to the county treasurer, or his designee, for a duplicate license tag, presenting a valid rabies certification. Upon affidavit of the owner before the county treasurer, or his designee, that the original license tag has been lost, destroyed, or stolen, the treasurer shall verify the valid rabies certification is recorded and issue a duplicate license tag which shall be immediately affixed to the collar of the dog by its owner. The fee for a duplicate tag for any dog shall be \$1.00.

Sec. 3-37. Fee imposed on dogs.

There is hereby imposed a license fee of \$15.00, valid for the life of the dog, upon all dogs over the age of four months which are owned, possessed or kept in the county.

It shall be unlawful for any person to conceal or harbor any dog on which any required license fee has not been paid.

Any person with an un-expired annual dog license issued prior to the effective date of this ordinance may trade the un-expired annual dog license for a lifetime dog license. No renewal fee will be required for these licenses.

Sec. 3-38. Dog license fee; exemption for certain dogs.

- (a) The license tax as prescribed in this chapter is due not later than 30 days after a dog has reached the age of four months, or not later than 30 days after an owner acquires a dog four months of age or older.
- (b) No license tax shall be levied on any dog that is trained and serves as a guide dog for a blind person, that is trained and serves as a hearing dog for a deaf or hearing impaired person or that is trained and serves as a service dog for a mobility-impaired or otherwise disabled person.

As used in this section, "hearing dog" means a dog trained to alert its owner by touch to sounds of danger and sounds to which the owner should respond and "service dog" means a dog trained to do work or perform tasks for the benefit of a mobility-impaired or otherwise disabled person. The work or tasks performed by a service dog shall be directly related to the individual's disability or disorder. Examples of work or tasks include providing nonviolent protection or rescue work, pulling a wheelchair, assisting an individual during a seizure, alerting an individual to the presence of allergens, retrieving items, carrying items, providing physical support and assistance with balance and stability, and preventing or interrupting impulsive or destructive behaviors. The provision of emotional support, well-being, comfort, or companionship shall not constitute work or tasks for the purposes of this definition.

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Any dog not wearing a collar bearing a valid license tag shall prima facie be deemed to be unlicensed, and in any proceedings under this chapter the burden of proof of the fact that such dog has been licensed, or is otherwise not required to bear a tag at the time, shall be on the owner of the dog. Violations of the vaccination requirements of this section shall be handled in accordance with Article III of this Chapter. Any dog owner failing to pay any license tax required by this section later than 30 days after a dog has reached the age of four months or 30 days after a dog is obtained by an owner who resides within the county shall be guilty of a Class 4 misdemeanor. In addition, the court may order confiscation and the proper disposition of the dog.

Ch3Div2Licenses-ord-final

**SPECIAL USE PERMIT-25-0004. 4622 Rochambeau Drive Evolution House Group Home
Staff Report for the September 9, 2025, Board of Supervisor Public Hearing**

SUMMARY FACTS

Applicants: Mr. Greg Davis and Mr. Benming Zhang of
Kaufman & Canoles, P.C.

Landowner: Mai Homes LLC

Proposal: To allow a group home or residential
facility for nine or more adults.

Location: 4622 Rochambeau Drive

Tax Map/Parcel No.: 1430300010B

Property Acreage: ± 1.2 acres

Zoning: A-1, General Agricultural

Comprehensive Plan: Rural Lands

Primary Service Area: Outside

Staff Contact: Terry Costello, Senior Open Space Planner

PUBLIC HEARING DATES

Planning Commission: July 2, 2025, 6:00 p.m.

Board of Supervisors: September 9, 2025, 5:00 p.m.

FACTORS FAVORABLE

1. There is adequate off-street parking.
2. The applicants have acknowledged that, should this application be approved, they will obtain the proper permits through the County and Virginia Department of Health (VDH).
3. There will be trained staff on-site at all times during operation of the group home.
4. The proposed group home provides a needed service for individuals seeking to reintegrate into the community after suffering from an addiction disorder.
5. Impacts: See Impact Analysis on Pages 5-6.
6. See Comprehensive Plan Analysis on Page 7.

FACTORS UNFAVORABLE

1. Staff does not identify any unfavorable factors.
2. Impacts: See Impact Analysis on Pages 5-6.

PLANNING COMMISSION RECOMMENDATION

At its July 2, 2025, Regular Meeting, the Planning Commission recommended approval of this application with staff-proposed conditions by a vote of 6-0.

This staff report is prepared by the James City County Planning Division to provide information to the Planning Commission and Board of Supervisors to assist them in making a recommendation on this application. It may be useful to members of the general public interested in this application.

**SPECIAL USE PERMIT-25-0004. 4622 Rochambeau Drive Evolution House Group Home
Staff Report for the September 9, 2025, Board of Supervisor Public Hearing**

PROPOSED CHANGES MADE SINCE THE PLANNING COMMISSION MEETING

There are no proposed changes made since the Planning Commission meeting.

SUMMARY STAFF RECOMMENDATION

Per the Impact Analysis noted below, staff finds the proposed use will not negatively impact surrounding property nor is it expected to negatively impact Levels of Service (LOS) for roads or other public services. Per the Comprehensive Plan analysis noted below, staff finds that the proposed use fills a housing need within the County. Staff, therefore, recommends the Board of Supervisors approve of this application with the proposed conditions (Attachment No. 1).

PROJECT DESCRIPTION

Mr. Greg Davis and Mr. Benming Zhang of Kaufman & Canoles, P.C., have applied on behalf of Mr. Jeffrey Carver and Mr. Ryan Whatley of Evolution House, LLC, for a Special Use Permit (SUP) to allow a group home or residential facility for nine or more adults within the A-1, General Agricultural Zoning District at 4622 Rochambeau Drive (James City County Real Estate Tax Map Parcel No. 1430300010B).

Group homes are defined in the Zoning Ordinance as “*A residential facility in which individuals with mental illness, mental retardation or developmental disabilities reside with one or more resident counselors or other staff persons, and which is licensed by the Department of Behavioral Health and Development Services. Mental illness and developmental disability shall not include current illegal use of or addiction to a controlled substance as provided for in the Code of Virginia.*”

The Code of Virginia and the Federal Fair Housing Act (FHA) prohibit discrimination in housing based upon a person’s disability. Individuals recovering from an addiction are considered to be disabled under the FHA, and therefore, the Zoning Ordinance recognizes when eight or fewer of these recovering individuals are living together within a home, they are permitted by-right similarly to a single-family home. In the A-1 Zoning District, when nine or more individuals are residing in one of these residential facilities, an SUP is required.

The Evolution House group home use is located at the subject property and is currently in operation within the existing single-family home. In 1990, the property was approved to operate as a medical clinic as part of SUP-41-90. In 2019, Mr. Carver and Mr. Whatley applied for a change of use permit to allow for the operation of a group home, rather than the doctor’s office. During review of that permit, Mr. Carver and Mr. Whatley revised their application to indicate that they would operate with eight or fewer people living at the house in order to be permitted by-right.

Zoning staff became aware that the property was operating with more than eight individuals living at the group home in the fall of 2023. Since that point, staff has worked with the operators to bring the use into conformance. Currently, the operators are maintaining eight or fewer individuals at the property, in conformance with the Zoning Ordinance, while going through the SUP process for the desired additional capacity. The applicants have worked with the Building Official, Fire Marshal, and the VDH to understand the steps needed to bring into conformance already completed renovations and make necessary additional improvements within the home to ensure life safety codes and sewer capacity for the operation are met.

This staff report is prepared by the James City County Planning Division to provide information to the Planning Commission and Board of Supervisors to assist them in making a recommendation on this application. It may be useful to members of the general public interested in this application.

SPECIAL USE PERMIT-25-0004. 4622 Rochambeau Drive Evolution House Group Home
Staff Report for the September 9, 2025, Board of Supervisor Public Hearing

The proposal includes housing up to 16 individuals at a time, who would not typically have personal vehicles while living there. Employees would always be on-site to ensure compliance with rules put in place by the group home and provide support to the residents. No active drug or alcohol use would be permitted on-site. The applicants indicated that drug testing occurs randomly at least three times per week and can be performed any time if there is a reason to suspect a lapse.

Building and Sewer Capacity

The applicants have been coordinating with the Building Official, the Fire Marshal, the VDH, and the Zoning Administrator to navigate how to bring the existing structure and septic system into compliance with the building code, fire safety, septic regulations, and the Zoning Ordinance. The applicants requested that they not be required to proceed with the improvements, citing cost concerns, until verifying that the proposed use is permitted by the Zoning Ordinance. Condition Nos. 2 and 3 require that necessary approvals be obtained within 12 months of SUP approval and that maximum occupancy be based on the lesser of the various capacity limitations, respectively.

Parking and Traffic

A Traffic Impact Analysis is not warranted for this facility, and there is an existing improved parking lot from when the property operated as a doctor's office. Staff finds that there is adequate parking within that existing area.

Life Safety and Security

The required Virginia Department of Behavioral Health and Developmental Services (DBHDS) license requires policies and practices which ensure life safety in the building, including training for staff, evacuation plans, and posted information within the building. DBHDS performs unannounced site visits and requires

annual license renewal. Further, Condition No. 5 requires the operator to establish an "Emergency and Safety Plan" for emergency situations including overdoses and evacuations. Such a plan would be required to be reviewed for approval by the James City County Fire Marshal and Chief of Police.

PLANNING AND ZONING HISTORY

The County received a complaint that there was an unpermitted group home operating at 2010 Old Route 60 West in the fall of 2023. After meeting with the operators of the group home to make them aware of the Zoning Ordinance requirements, the operators brought to County staff attention the operation at 4622 Rochambeau Drive. The operators submitted conceptual plans for both properties to fully understand the appropriate steps forward in December 2023. Staff provided information on the appropriate steps in January 2024.

The applicants, representing the operators of the group home, submitted the required SUP application in March 2025. The Fire Marshal visited the property during this time to require certain bedrooms on the first and second floors be left unoccupied as they did not have the necessary means of egress. Planning staff also conducted a tour of the property on May 2, 2025, in order to understand the proposed use.

SURROUNDING ZONING AND DEVELOPMENT

This property is located at the corner of Rochambeau Drive and Cloverleaf Lane, adjacent to Interstate 64 (I-64). To the west and south are single-family and two-family homes (duplexes), and to the north and east across I-64 are single-family homes.

This staff report is prepared by the James City County Planning Division to provide information to the Planning Commission and Board of Supervisors to assist them in making a recommendation on this application. It may be useful to members of the general public interested in this application.

**SPECIAL USE PERMIT-25-0004. 4622 Rochambeau Drive Evolution House Group Home
Staff Report for the September 9, 2025, Board of Supervisor Public Hearing**

- The following table lists the information on the adjacent parcels:

	ZONING DESIGNATION	EXISTING LAND USE	FUTURE LAND USE DESIGNATION
NORTH	A-1, General Agricultural	Single- Family Residential	Rural Lands
SOUTH	A-1, General Agricultural	Single- Family and Two-Family Residential	Rural Lands
EAST	A-1, General Agricultural	Single- Family Residential	Rural Lands
WEST	A-1, General Agricultural	Single- Family and Two-Family Residential	Rural Lands

This staff report is prepared by the James City County Planning Division to provide information to the Planning Commission and Board of Supervisors to assist them in making a recommendation on this application. It may be useful to members of the general public interested in this application.

SPECIAL USE PERMIT-25-0004. 4622 Rochambeau Drive Evolution House Group Home
Staff Report for the September 9, 2025, Board of Supervisor Public Hearing

Impacts/Potentially Unfavorable Conditions	Status <i>(No Mitigation Required/Mitigated/Not Fully Mitigated)</i>	Considerations/Proposed Mitigation of Potentially Unfavorable Conditions
<u>Public Transportation: Vehicular</u>	<u>Mitigated</u>	- The proposal is not anticipated to generate significant traffic as the narrative indicates that the residents generally will not have individual personal vehicles while living on-site. Residents will be transported by staff-driven vans for medical appointments and other trips. - The subject property is located on Rochambeau Drive and Cloverleaf Lane, publicly maintained roads that are classified by the Virginia Department of Transportation as major collector and local road, respectively. Staff finds that the roads are adequate for this use.
<u>Public Transportation: Bicycle/Pedestrian</u>	<u>No Mitigation Required</u>	- The James City County Sidewalk Master Plan indicates a sidewalk is planned for the west side of Rochambeau Drive, across the road from the subject property. The Regional Bikeways Plan indicates that a bike lane is proposed on Rochambeau Drive. The subject property has approximately 300 feet of frontage along Rochambeau Drive which currently does not have the indicated bike lane. However, Zoning Ordinance Section 24-35 would not require installation of the path for this proposal, as a site plan or major subdivision are not required at this time.
<u>Public Safety</u>	<u>Mitigated</u>	- Fire Station 1 on Forge Road serves this area of the County and is approximately 3.5 miles from the proposed group home.
<u>Public Schools</u>	<u>No Mitigation Required</u>	- N/A since no new residential dwelling units are proposed.
<u>Public Parks and Recreation</u>	<u>No Mitigation Required</u>	- N/A since no new residential dwelling units are proposed.
<u>Public Libraries and Cultural Centers</u>	<u>No Mitigation Required</u>	- Staff finds this project does not generate impacts that require mitigation.

This staff report is prepared by the James City County Planning Division to provide information to the Planning Commission and Board of Supervisors to assist them in making a recommendation on this application. It may be useful to members of the general public interested in this application.

SPECIAL USE PERMIT-25-0004. 4622 Rochambeau Drive Evolution House Group Home
Staff Report for the September 9, 2025, Board of Supervisor Public Hearing

Impacts/Potentially Unfavorable Conditions	Status <i>(No Mitigation Required/Mitigated/Not Fully Mitigated)</i>	Considerations/Proposed Mitigation of Potentially Unfavorable Conditions
<u>Groundwater and Drinking Water Resources</u>	<u>No Mitigation Required</u>	- The property is served by a private well and private septic system. - The proposal does not generate impacts that require mitigation to groundwater or drinking water resources.
<u>Watersheds, Streams, and Reservoirs</u> Project is located in the Skimino Creek Watershed.	<u>No Mitigation Required</u>	- No new impervious surface is proposed as part of this SUP request. Should exterior site improvements be made in the future, those improvements would be subject to environmental review at that time.
<u>Cultural/Historic</u>	<u>No Mitigation Required</u>	- No new impervious surface is proposed as part of this SUP request. The subject property has no known cultural resources on-site.
<u>Nearby and Surrounding Properties</u>	<u>Mitigated</u>	- The use will operate similar to a residential home, the subject property must adhere to the County's Noise Ordinance, and future expansions of the use would require an SUP amendment.
<u>Community Character</u>	<u>Mitigated</u>	- The proposal does not include any alteration that would affect the existing landscaping along the existing roadways. - This parcel is not located within a Community Character Area.
<u>Covenants and Restrictions</u>	<u>No Mitigation Required</u>	- The applicants have verified that they are not aware of any covenants or restrictions on the property that prohibit the proposed use.

This staff report is prepared by the James City County Planning Division to provide information to the Planning Commission and Board of Supervisors to assist them in making a recommendation on this application. It may be useful to members of the general public interested in this application.

COMPREHENSIVE PLAN

The site is designated Rural Lands on the Comprehensive Plan Land Use Map. All surrounding properties are designated Rural Lands.

Per the adopted Comprehensive Plan, appropriate primary uses include traditional agricultural and forestal activities, but also innovative agriculture, horticulture, silviculture, specialty or niche farming, commercial and noncommercial equine opportunities, agri-tourism, rural-based public or commercial recreation, rural-support businesses and certain public or semi-public and institutional uses that require a spacious site and are compatible with the natural and rural surroundings. The Comprehensive Plan further notes that generally residential development is not recommended, but that any such residences should be at a density of one residence per 20 acres or less. The use is proposing to operate within an existing single-family residence and would not increase the existing residential density within the Rural Lands.

Per the adopted Comprehensive Plan language, uses in Rural Lands should reflect and enhance the rural character of the County. Particular attention should be given to locating structures and uses outside of sensitive areas, and maintaining existing topography, vegetation, trees, and tree lines to the maximum extent possible, especially along roads and uses. The proposal utilizes the existing improvements and does not include removing existing wooded areas of the property.

Within the Housing Chapter of the Comprehensive Plan, Housing Goal 2 states “Promote housing production that results in housing choices for all County residents and workers and is designed to respect the County’s unique natural, historic, and cultural resources.” While this is typically thought of as a goal for low-income and workforce housing, it applies also to individuals seeking a suitable housing situation given their disabilities. Group homes provide a unique support structure for those recovering from addictions, which assists those County residents who need such support.

Additionally, Housing Goal 3 states “Provide adequate housing opportunities for special needs populations, including persons with all forms of disabilities, and senior citizens.” This proposal provides an important type of housing for those with a disability and does it in a location with little to no expected impacts. Staff has proposed a set of conditions to mitigate possible impacts.

STAFF RECOMMENDATION

Per the Impact Analysis noted above, staff finds the proposed use will not negatively impact surrounding property nor is it expected to negatively impact LOS for roads or other public services. Per the Comprehensive Plan analysis noted above, staff finds that the proposed use fills a housing need within the County. Staff, therefore, recommends the Board of Supervisors approve this application, subject to the proposed conditions (Attachment No. 1).

TC/ap
SUP25-4EvolHs

Attachments:

1. Resolution
2. Location Map
3. Master Plan
4. Applicant Narrative
5. Proposed Resident Handbook
6. Current Floor Plan
7. Applicant Letter to Neighbors
8. Approved Minutes of the July 2, 2025, Planning Commission Regular Meeting

This staff report is prepared by the James City County Planning Division to provide information to the Planning Commission and Board of Supervisors to assist them in making a recommendation on this application. It may be useful to members of the general public interested in this application.

RESOLUTION

CASE NO. SUP-25-0004. 4622 ROCHAMBEAU DRIVE EVOLUTION HOUSE GROUP HOME

WHEREAS, the Board of Supervisors of James City County, Virginia (the “Board”), has adopted by Ordinance specific land uses that shall be subjected to a Special Use Permit (“SUP”) process; and

WHEREAS, Mr. Greg Davis, on behalf of Evolution House, LLC, has applied for an SUP to allow for a group home with more than eight individuals located at 4622 Rochambeau Drive and further identified as James City County Real Estate Tax Map Parcel No. 1430300010B (the “Property”); and

WHEREAS, the Planning Commission, following its public hearing on July 2, 2025, recommended approval of Case No. SUP-25-0004 by a vote of 6-0; and

WHEREAS, a public hearing was advertised, adjoining property owners notified, and a hearing conducted on Case No. SUP-25-0004; and

WHEREAS, the Board of Supervisors of James City County, Virginia, finds this use to be consistent with good zoning practices and the 2045 Comprehensive Plan Land Use Map designation for the Property.

NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of James City County, Virginia, after consideration of the factors in Section 24-9 of the James City County Code (the “County Code”), does hereby approve the issuance of Case No. SUP-25-0004 as described herein with the following conditions:

1. Master Plan. This SUP shall permit a Group Home on the property located at 4622 Rochambeau Drive and further identified as James City County Real Estate Tax Map Parcel No. 1430300010B (the “Property”). The use and layout of the Property shall be generally as shown on the document entitled “SUP-25-0004. 4622 Rochambeau Drive - Evolution House Group Home” and dated June 20, 2025 (the “Master Plan”), with any deviations considered per Section 24-23(a)(2) of the Zoning Ordinance, as amended.
2. Commencement. Evidence of a business license, updated Certificate of Occupancy, and approved change-in-use from the Virginia Department of Health (VDH) for the Property shall be provided to the Director of Planning within 12 months from the issuance of the SUP, or this SUP shall be void.
3. Number of Resident Occupants. Occupancy at the Property shall be limited to the lesser of the following: i) 16 occupants at any time; ii) the building occupancy number as established by the Building Official on the issued Certificate of Occupancy; iii) the maximum occupancy as established by the VDH for the on-site sewage system capacity; or iv) the maximum licensed capacity as established by the Virginia Department of Behavioral Health and Development Services (DBHDS).

4. Occupancy Verification. On or before January 30 of each year, the Zoning Administrator shall be provided with a notarized statement certifying actual occupants for the previous year. Such data shall include the total number of full-time occupants residing at the Property for each day of the prior calendar year. Furthermore, the statement shall also include the name and contact information for a responsible contact person who shall be able to address complaints related to the use of the Property, and respond to any call from the County to address such issues within 24 hours. At any point in the operation of the Group Home, if the Zoning Administrator, Fire Marshal, or Building Official has reason to suspect a violation of the maximum capacity, the operator shall provide access for the purpose of verifying capacity within 24 hours of any written or verbal notice.
5. Emergency and Safety Procedures. An Emergency and Safety Plan that defines protocols and procedures for emergency situations including overdose procedures and evacuation routes shall be submitted and approved by the James City County Fire Marshal and the James City County Chief of Police prior to the issuance of the updated Certificate of Occupancy.
6. Signage. No exterior signage related to the use of the Group Home shall be permitted on the Property.
7. Access. No new ingress or egress points, driveways, or access paths shall be created to any public road.
8. Property Boundary and Fencing. On or within the Property's interior side boundary, there shall be fencing and/or signage stating no trespassing or entry onto the adjoining property. The existing fencing as generally shown on the Master Plan shall be maintained. No barbed wire fencing shall be used on the Property. All such fencing and/or signage shall be installed prior to the issuance of the updated Certificate of Occupancy.
9. Staffing. Employees of the Group Home shall be present on the Property at all times while there are residents on-site.
10. Screening. No sex offender pursuant to Section 9.1-900 of the Code of Virginia, 1950, as amended (the "Virginia Code") shall be permitted to reside on the Property. No person who is a felon convicted of a single "act of violence" (i.e. violent criminals) as defined by Section 19.2-297.1 of the Virginia Code shall be permitted to reside on the Property. Provided however, that such a convicted felon may be permitted to reside on the Property if a Virginia Licensed Clinical Social Worker (LCSW) or Virginia Certified Substance Abuse Counselor (CSAC) determines that the facts and circumstances of such applicant justify admission to the programs conducted there based upon time between conviction and present day, the felonious act committed, and circumstances which allow a reasonable conclusion that recurrence of acts of violence are unlikely. In order to permit residence on the Property by such felon, the determination of the LCSW or CSAC shall be reviewed and a second approval granted by a Virginia Licensed Professional Counselor. A list of any and all residents admitted who have been convicted of any "act of violence" as defined above shall be maintained at the Property and provided to the County Director of Planning or Chief of Police at any time upon request.
11. Parking. There shall be provided one van-accessible handicap parking space located closest to the ramp to access the house entrance.

12. Ceasing the Use. If the Group Home ceases to operate, the building shall be converted to a permitted use and obtain all necessary permits and approvals for such use prior to continuing occupancy of the property, and this SUP shall automatically be void if such cessation continues for a two-year period. A certified copy of the Board of Supervisors' SUP resolution shall be recorded against the Property in the Williamsburg/James City County Circuit Court prior to issuance of an updated Certificate of Occupancy for the Project. Proof of recordation shall be provided to the Zoning Administrator.
13. Licensing. The applicants shall obtain and maintain all applicable licenses to conduct the Group Home, including, but not limited to, those that may be required by the Virginia DBHDS.
14. Severance Clause. This SUP is not severable. Invalidation of any word, phrase, clause, sentence, or paragraph shall invalidate the remainder.

James O. Icenhour, Jr.
Chair, Board of Supervisors

ATTEST:

Teresa J. Saeed
Deputy Clerk to the Board

HIPPLE
NULL
LARSON
MCGLENNON
ICENHOUR

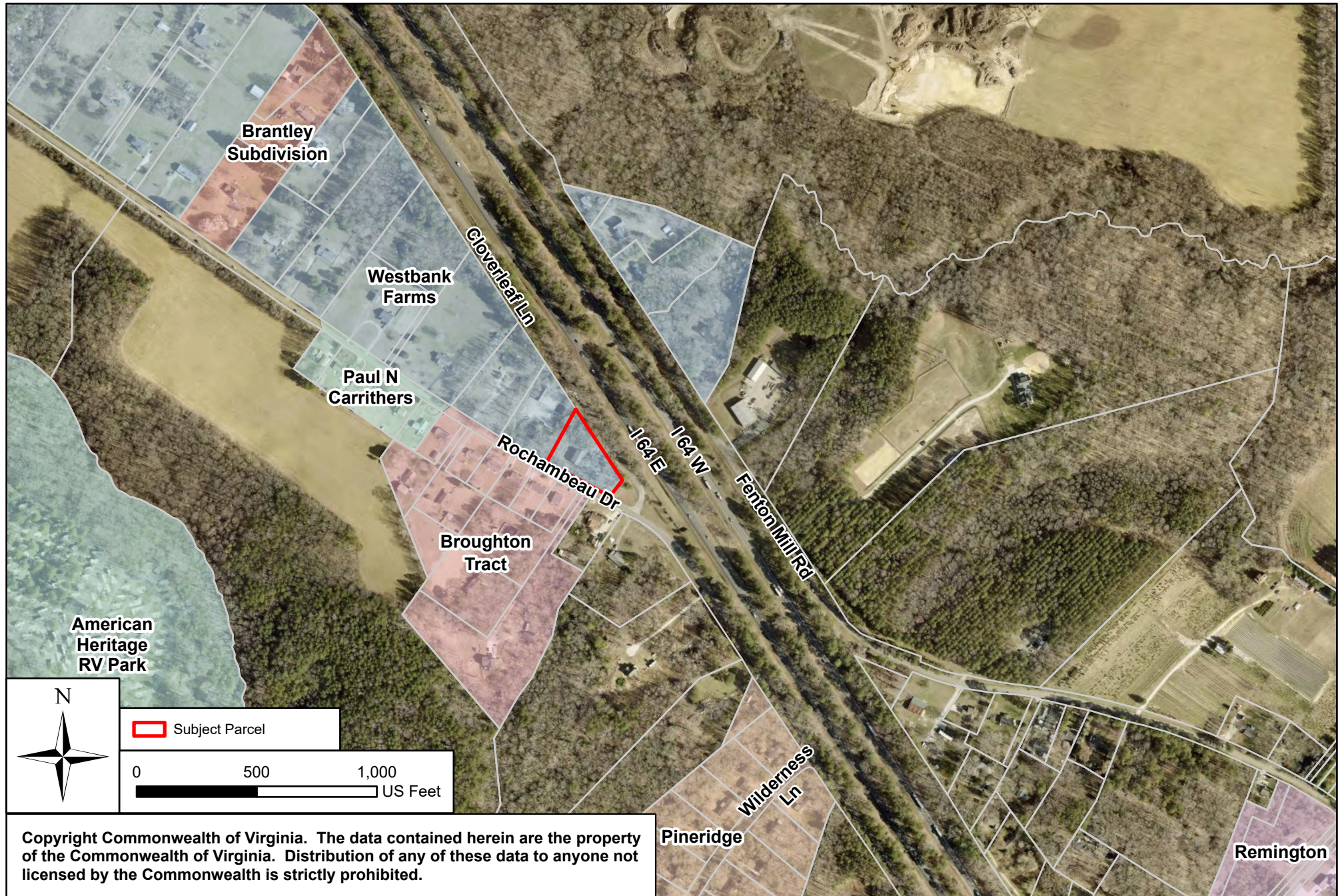
VOTES

<u>AYE</u>	<u>NAY</u>	<u>ABSTAIN</u>	<u>ABSENT</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Adopted by the Board of Supervisors of James City County, Virginia, this 9th day of September, 2025.

SUP24-4EvolHs-res

JCC SUP25-0004 - 4622 Rochambeau Drive Evolution House Group Home



SUP-25-0004. 4622 Rochambeau Drive - Evolution House Group Home



Property Information

1430300010B
4622 Rochambeau Drive
Williamsburg, VA 23188
A1-General Agriculture
2045 Comp. Plan: Rural Lands
Parcel Acreage: 1.2
PSA: Outside

General Notes

1. No changes to water/sewer utilities.
2. This site does not appear to be located in the Resource Protection Area.
3. This site does appear to be located in Zone X on Flood Insurance Rate Map 51095C0039D, effective 12/16/15.
4. No outdoor lighting is proposed.
5. Call Miss Utility at 811 to mark any utilities prior to construction.

Sheet Index

1. Cover Page
2. Location Map
3. Site Details



June 20, 2025

Maps Not To Scale

Adjacent Properties

- 1430100041
Richardson, Archie Carl III &
Shelly Renee
4649 Rochambeau Drive
A-1, General Agricultural
- 1430400001
Mowry, Jodi W Trustee & Arthur M. Trustee
3236 Oak Branch Lane
Toano, VA 23168
A-1, General Agricultural
- 1430400002
Hickman, Randy P
113 Chinkapin Lane
Williamsburg, VA 23188
A-1 General Agricultural
- 1430400004B
Zanca, Nicholas K & Crystal D
4625 Rochambeau Drive
Williamsburg, VA 23188
A-1 General Agricultural
- 1430300010A
JRS Properties LLC
PO Box 134
Lightfoot, VA 23090
A-1 General Agricultural
- 1430400004A
Payne, Brenda G
4627 Rochambeau Drive
Williamsburg, VA 23188
A-1 General Agricultural
- 1430400005
Trost, William C & Irina
4629 Rochambeau Drive
Williamsburg, VA 23188
A-1 General Agricultural

SUP-25-0004. 4622 Rochambeau Drive - Evolution House Group Home





Legend:

Red: Property Line

Orange: Existing 6' Privacy Fence

Blue: Existing Drain Field Area

Green: Natural Open Space
Easement

Black: BMP Infiltration Basin

White: H/C Parking

Note: Trees/shrubs are not
permitted on the drain field.

Note: Sheds located on or near
the natural open space at the rear
of the property will be removed or
relocated pending the review of
the open space requirements.

Parking Count

13 spaces, including
one van-accessible
handicap space

**Evolution House
4622 Rochambeau Road**

Narrative to Accompany Special Use Permit Application

Overview

This Narrative accompanies an application for a special use permit to allow the operation of a group home of more than 8 residents at 4622 Rochambeau Road, Williamsburg (James City County), Virginia 23188. The subject property is located in the general agriculture A-1 zoning district which generally permits group homes with 8 or fewer residents by right. Evolution House LLC has applied for a special use permit which would allow the 4,024 square foot building on Rochambeau Road to house up to 16 residents.

Evolution House LLC establishes and operates group homes offering a safe, stable and supportive residential environment for individuals diagnosed with substance use disorders who are recovering from their addiction. Residents are required to have completed an intensive inpatient therapy program (often referred to as “detox”) elsewhere, followed by an intensive period of at least 30 days of therapy and sobriety also at other facilities. After completing these important preliminary steps in recovery, many people in the James City County community who are recovering need a safe place to live in an environment with people who are also recovering, and who offer support and encouragement under a set of house rules which require continued sobriety as a condition of residence.

Evolution House applicants are pre-screened for eligibility. No residents are admitted to Evolution House based on court-ordered detention or treatment programs. No sex offenders or violent criminals are admitted into Evolution House programs, and failure to stay clean and sober results in immediate expulsion (witnessed urine testing is conducted three times per week as a condition of residency).

This low intensity residential service model does not include medical detoxification or acute psychiatric care. Instead, residents engage in structured daily programming, life skills development and therapy while attending offsite clinical activities all day and into the evening. The group home ensures individualized attention, safety and operational guidelines.

Evolution House has a resident handbook or manual which establishes clear rules for occupants. A copy of the current handbook created specifically for the 4622 Rochambeau Road location is attached in order to provide assurances that strict rules govern residents. Weekly resident meetings are held to discuss rules, policies for safe and enjoyable cohabitation at the property, and activities like visits to movie theaters, church attendance and the like. These resident meetings give Evolution House the ability to address concerns or complaints from neighbors, if any (such complaints have been rare at the applicant’s facilities).

Visits from friends and family are permitted on Sundays, but must be arranged in advance. No pets are permitted by residents, although pets may accompany friends and family on Sunday visits. Residents are not permitted to use their own vehicles and passenger van transportation is provided

by Evolution House for residents to therapy, group recreation and other activities (movie theaters, Busch Gardens, for example). Violation of house rules can lead to expulsion from the house.

History of Evolution House LLC

Evolution House LLC was the vision of founders Jeffrey Carver and Ryan Whatley, both of whom have been through substance abuse disorder recovery programs and saw the great benefit and demand for the proposed intermediate or step-down care needed as people with life disorders transition back into society, family and jobs. Jeffrey and Ryan established their first location just before the COVID-19 pandemic forced closure of such facilities.

After pandemic restrictions were lifted, the demand for substance use disorder treatment sky rocketed because of the isolation, social limits and emotional impacts of COVID-19. An investor who believed in the Evolution House mission purchased the Rochambeau Road property in 2022 and leased it to Evolution House LLC.

Jeffrey and Ryan are highly skilled communicators, successfully recovered from their substance use, but they had no experience before founding Evolution House in business, real estate, and establishment of treatment facilities. They were unaware that the James City County zoning ordinance limited a group home located in the A-1 zoning district to 8 or fewer residents without a special use permit. Written approvals by the Virginia Department of Behavioral Health and Developmental Services for 16 residents issued in 2022 and a Fire Inspection Report by the James City County Fire Marshall's Office on April 23, 2021 led the founders to believe that they had complied with regulatory requirements. The James City County zoning administrator contacted Evolution House in late 2024 with notice that housing approximately 12-14 residents at 4622 Rochambeau Road was not in accordance with the zoning ordinance. The company immediately began work with the county, hosted a neighborhood meeting, engaged counsel and this application ensued.

Today Evolution House operates facilities in 5 locations in the Tidewater Area.

Impacts on the Community

The proposed use is designed to have minimal impact on the surrounding neighborhood. The group home will:

- **Ensure Safety:** All residents undergo a thorough intake process, including background checks and clinical assessments, to ensure they are appropriate for a low-intensity residential setting. No residents are currently admitted to this location as a part of court-ordered drug or rehabilitation programs which is prohibited by the Virginia Department of Health licensure of the facility.
- **Maintain Property Standards:** The home will be maintained in accordance with all applicable zoning, building, and safety codes. Landscaping and property upkeep will meet or exceed neighborhood standards.
- **Limit Traffic and Parking Concerns:** The program provides passenger vans for all necessary transportation for residents to external clinical services, employment, and

community support meetings, thereby minimizing additional vehicle traffic. Adequate on-site parking will be provided to accommodate staff vehicles and vans.

- **Promote Stability and Order:** The facility will be staffed 24/7, with trained professionals ensuring a structured, supportive, and accountable living environment. Residents are subject to house rules, curfews, and drug-free requirements, with regular toxicology screenings in place as referenced above.

Site Description

The 4622 Rochambeau Road property was previously used as the medical office of Dr. Kevin Bedell. The doctor's office was a far more intensive, commercial use which generated more vehicular and pedestrian traffic. Adjacent land uses include Interstate 64 to the east, a contractor yard with a small associated residence to the north and west, and residences across Rochambeau Road to the south.

Neighborhood Meeting

On February 26, 2025, before drafting its application, Evolution House mailed notices to nearby property owners and held a neighborhood meeting at the Croaker library. This meeting, attended by approximately 10 people, aired questions and concerns from the neighbors and led to concrete elements of this application and proposed special use permit conditions.

The primary concern raised by neighbors was the presence of those recovering from substance abuse in their neighborhood. Information about the Evolution House admissions standards and lack of criminal activity around Evolution House facilities was shared in response. A proposed Special Use Permit condition requiring screening of applicants and prohibiting Evolution House admission of violent criminals and sex offenders is included with the application in response to these concerns.

Other neighbors reported incidents of people walking along Rochambeau Road, entering into yards or driveways of houses on Rochambeau Road. It could not be confirmed that these incidents involved Evolution House residents (there is another group home on Rochambeau Road nearby as reported by neighbors.) Nonetheless the Evolution House manual for this location has been amended to include a good neighbor policy which directs residents not to trespass, cut across neighbors' yards, or engage in any other activities on the private property of others (see attached.) Neighbors were particularly concerned about pedestrian traffic on Rochambeau Road at night; the Evolution House manual now establishes a 10:00 curfew on weekdays, and 11:00 curfew on Saturday and Sunday nights.

Proposed Special Use Permit Conditions

The applicant is aware that the County may impose conditions upon it as a part of the SUP approval process. Nonetheless, in an effort to be proactive and assure neighbors and the community that Evolution House is committed to mitigating any impacts which its operation may create, the attached proposed SUP conditions are tendered as acceptable to the applicant and appropriate restrictions on use of the 4622 Rochambeau Road Site.

Resident Testimonials

Several Evolution House residents who have completed their recovery have offered to speak publicly about the importance of the applicant in their return to sobriety, their families and our community. In order to protect the privacy of these brave supporters, their testimonials will be provided to County staff, Planning Commissioners and Supervisors as public hearings approach.

Conclusion

The requested SUP will allow for the responsible operation of a clinically managed low-intensity residential service group home that meets a vital community need while preserving neighborhood integrity. A shortage of similar facilities exists in James City County, and the applicant serves an important function for our community. The applicant is committed to upholding the highest standards of safety, compliance, and community engagement to ensure a positive and beneficial presence in the area.

EVOLUTION HOUSE

WELCOME HOME

We're so glad you're here!

We understand that coming here might not have been easy.

Please keep this manual, it will help you to understand the expectations of being a resident at Evolution House | Rochambeau Treatment Center.

* After we go over it, we'll ask you to sign and keep this copy. If you have any questions about anything in this manual, please ask.

DIRECTORY

House Number:

757-794-3218

4622 Rochambeau Rd.

Williamsburg VA, 23188

Peers:

Henry.....757-634-1274

Clinical Director:

Jami 757-603-3903

Numbers from your phone:

•

•

•

•

•

•

•

MISSION STATEMENT:

Creating a safe haven for people in recovery.

VISION STATEMENT:

Elevating the course of humanity by creating a recovery culture that inspires freedom from active addiction.

OUR GUIDING PRINCIPLES:

Leading With Honor.

Honesty is the first step of recovery.

Only Love Matters.

Anything else is a cry for Love.

Pay it Forward.

We have the ability to make a positive impact on others.

STAFF COMMITMENT TO YOU:

All staff members are dedicated to providing an environment that is based on safety, support, and collaboration for all.

- We provide a place of growth and learning, where you can feel free to safely and respectfully express yourself.
- We strive to provide a physically and emotionally safe environment for everyone.
- We believe in treating each other with dignity and respect.
- We provide opportunities to learn new and helpful life skills.
- We want to create the most inclusive, recovery-oriented residential environment possible.

HOW DO WE DO THAT?

- The EVO House team believes in focusing on strengths, not weaknesses.
- We believe in the power of positive role-modeling.
- Our philosophy is rooted in compassion and LOVE; it is based on the belief that nothing that happened in your past can prevent you from being successful now.
- We believe that if you challenge yourself, if you remain focused, if you reach out for help and advice, and if you embrace change, you will discover your resiliency and your emotional strength.
- We will encourage you to go to recovery meetings, meet friends in recovery and call them, find a sponsor, consider joining a homegroup and getting a service position. This is what recovery looks like.

Evolution House Philosophy

Evolution House's goal is to create a recovery culture that inspires freedom from active addiction. We work very hard to maintain a **brotherhood** in the house of supportive and unwavering honesty with one another. This bond is forged by having first-hand knowledge of the horrors of addiction. This level of compassion and accountability is the cornerstone of Evolution House.

This is definitely **not just a sober place to live**. We require honest self-appraisal and a commitment to a recovery lifestyle. We encourage our residents to **live a life of service** and integrity. You will be asked to be involved in activities that will rebuild self-esteem and accountability, such as going to meetings, the maintenance and upkeep of your house, volunteering outside the residence, caregiving, creative ventures, social events, and physical activities. These things combined with a strong recovery foundation will lay the groundwork to a whole new life. Abstinence is required. This means absolutely no mind or mood-altering substances, including prescription medicine, over the counter medication, drugs, alcohol, CBD, kratom, spice, or anything you are using to make you feel different.

Our house meetings will give you the opportunity to freely share things that you might not feel comfortable sharing in a larger group and provide a place to discuss your recovery goals. We will ask you about your meeting attendance and encourage you to talk about relapse behaviors in a **non-judgmental and supportive environment**. Everyone at the house meetings will be in recovery and provide a wealth of knowledge and understanding. We will give you honest straightforward feedback that often will be difficult to hear unless you have an open mind. We will give you the same information that was given to us in early recovery. Evolution's deepest desire is for our residents to go on to lead lives that are productive and continually seek out opportunities to be **an inspiration to others to change the world** around them in a positive way.

RESIDENT COVENANT COMMITMENT:

I am hereby making a commitment to the following:

1. It is my desire to go all-in for my recovery, so that I may become a better person, son, brother, husband, father, friend, leader and contributor to society.
2. I will maintain abstinence from drugs and other mind/mood altering substances. I understand that honesty is the first step in recovery and I will put forth my best effort to be honest if I have used any substances, understanding that Evolution House is here to help and support me on every step of my path.
3. I understand that I will take direct, unfiltered feedback. I will do everything in my power to receive it in love and to learn from it. I will avoid defensiveness, realizing that when I defend, I lose the opportunity to learn. I commit to being open in examining myself – my personality, my past, my habits, my anger, and my responses to people. I want to learn. I want to change, to recover in every fiber of my being.
4. I will ask for help. I surrender my old thoughts, beliefs and ideas for an open mind and a new experience. Admitting that I need help and asking for it will become my greatest strength in recovery.
5. I commit to attending every group counseling session, community meeting, house activities, events and house meetings whenever possible, to be there on time, and to have my work done. I understand and agree that I will have to say “no” to other important things in order to put my recovery first to meet this commitment, and I am willing to do so. I understand that the schedule is posted so I can manage my other commitments around the dates and times of my treatment programming.
6. I commit to anonymity. What is shared by residents in groups and house meetings, stays in the group.
7. In order to protect the integrity of the house, if I see one of my brothers struggling, participating in dishonest or relapse behavior outside of group I will let a staff member know or submit an anonymous note in the feedback box. Everyone is here because we have asked for help, and it is my duty to look after my brothers in Evolution House.
8. I further agree that, at some point in my recovery, when my sponsor and higher power lets me know that I am ready, I will pay it forward and help others. As a person in recovery from substance use disorder, I am uniquely qualified to help others with this illness, and in recovery it becomes my superpower. And I know that I can only keep what I have, by giving away what was freely given to me.

EVOLUTION HOUSE

1. Follow staff directions at all times.No flirting or contacting staff about anything other than your treatment and recovery.
2. No use or possession of mind or mood altering substances or paraphernalia.
3. All prescription and OTC medications, supplements, and vitamins must be turned over to staff.
4. Urine screens and breathalyzer tests may be administered by staff at any time. Urine samples must be provided within 60 minutes.
5. No violence or threats of violence, (verbal or otherwise) this includes bullying, name calling, and to include racial or sexual slurs.
6. No weapons of any kind (including pocket knives).
7. Rooms and residents are subject to random search, with or without resident present. Doors should be left unlocked at all times. Residents are not allowed to change rooms.
8. Clients must adhere to all local, state and federal laws including no stealing or deliberate destruction of property.
9. Do not enter another resident's bedroom for any reason without that resident being present. The door must remain open.
10. Sexual activity or attempts of sexual activity are prohibited.
11. Approved guests are welcome Sundays in common areas only. No closed doors with guests present. Overnight guests are not allowed.
12. Day passes are allowed after the first 3 weeks. With a day pass, clients must be home by 10pm during the week and 11am on Friday and Saturday. Overnight passes are allowed after transferring to Inpatient/Outpatient Program(IOP). Passes may not interfere with counseling groups, morning meditation, or house meetings. Passes must be submitted for request Monday - Friday ONLY, at least 3 days in advance. Residents must sign out and in on the day of their pass. **Reminder: passes are a privilege, not a right.**
13. Clients may not be in the house without staff present. Clients must join the group where they are when arriving back from passes.
14. Must participate in all individual/therapeutic groups & scheduled appointments and complete assignments as directed.
15. Clients and guests must adhere to the dress code at all times.
16. Be truthful. Take responsibility for creating a safe environment. If you are aware of another client using drugs, or aware of conflicts, inform staff.
17. Please keep the noise down after 11pm so others may rest. No inappropriate/disruptive behavior at any time.
18. Clients are not permitted to lend, borrow, or transact any money, food stamps, items, or anything of value between other clients or staff.
19. No smoking/vaping inside the house, rooms and van - this is permitted in designated area(s) only.
20. We are all responsible for keeping the house clean and safe. Residents must make their bed daily, keep their rooms and common areas clean and tidy, and complete weekly chores.
21. Residents must attend a minimum of FOUR recovery-focused meetings per week and work with a sponsor or mentor regularly.
22. Evolution House managers have the authority to amend or change rules based on circumstances.

EMERGENCY PROCEDURES

CALL 911 in case of an Overdose/ Fire / Life-Threatening
Emergency

HOUSE ADDRESS:

**4622 Rochambeau Drive
Williamsburg VA, 23188**

EMERGENCY CONTACTS:

EMERGENCY 911

Police, James City County, (Non-Emergency)..... 757-220-2333

JCC Fire Station..... 757-220-0626

Poison Control..... 800-222-1222

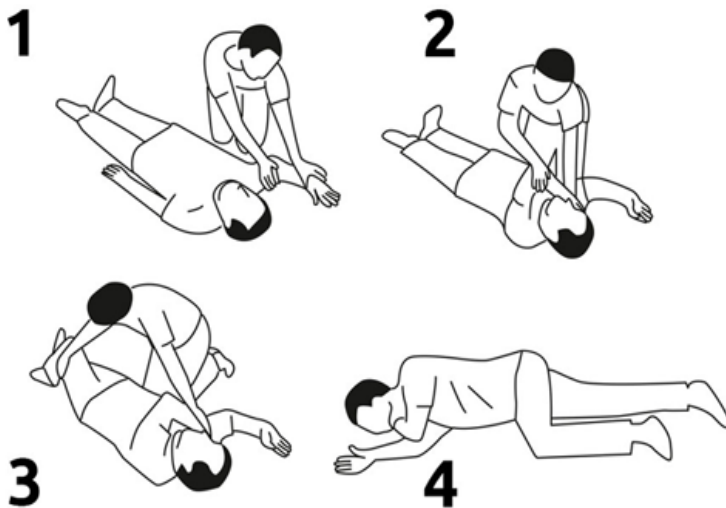
OVERDOSE PROCEDURE:

What do I do if I suspect an overdose?

1. Call 911

If you suspect an overdose and the person is unresponsive, call 911. Try getting their attention by doing a sternum rub. Give the emergency responders the address, 4622 Rochambeau Dr., and as much information as you can (e.g., unconscious, not breathing, drugs used if known, etc.).

If they remain unresponsive and you must leave them alone to call 911, it's important to put them in the recovery position — on their side with legs bent and head resting on the arm on the floor (see image below). This is to avoid aspiration if they vomit.



2. Administer Naloxone

Naloxone is only effective in the case of an opioid overdose. However, if you are unsure of the substance(s) involved, it's best to err on the side of caution and administer it. Naloxone is not known to cause any harm in the case of a non-opioid overdose.

PEEL

EVOLUTION HOUSE



Peel back the package to remove the device. Hold the device with your thumb on the bottom of the red plunger and 2 fingers on the nozzle.

PLACE



Place and hold the tip of the nozzle in either nostril until your fingers touch the bottom of the patient's nose.

PRESS



Press the red plunger firmly to release the dose into the patient's nose.

Not a substitute for emergency medical care. When administering **NARCAN® Nasal Spray**, always be sure to call 911 right away, even if the person wakes up. Keep the patient under surveillance or close watch. If breathing does not return to normal or if breathing difficulty resumes, after 2-3 minutes, give an additional dose of NARCAN® Nasal Spray using a new device in the alternate nostril. Repeat doses may be necessary.

3. Conduct rescue breathing: if they have labored breathing or are not breathing at all. It is vital to conduct rescue breathing. Tilt the head back, pinch the nose closed and give one slow breath every 5 seconds until they resume breathing on their own or until the paramedics arrive. Watch to see that their chest rises and falls with each breath.

4. Comfort and support: once they are breathing on their own, place them in the recovery position until paramedics arrive. Comfort them as they may be confused, upset, and going through withdrawal (feeling sick from a lack of opioids if their body is dependent on them) when revived. Do not allow them to use drugs.

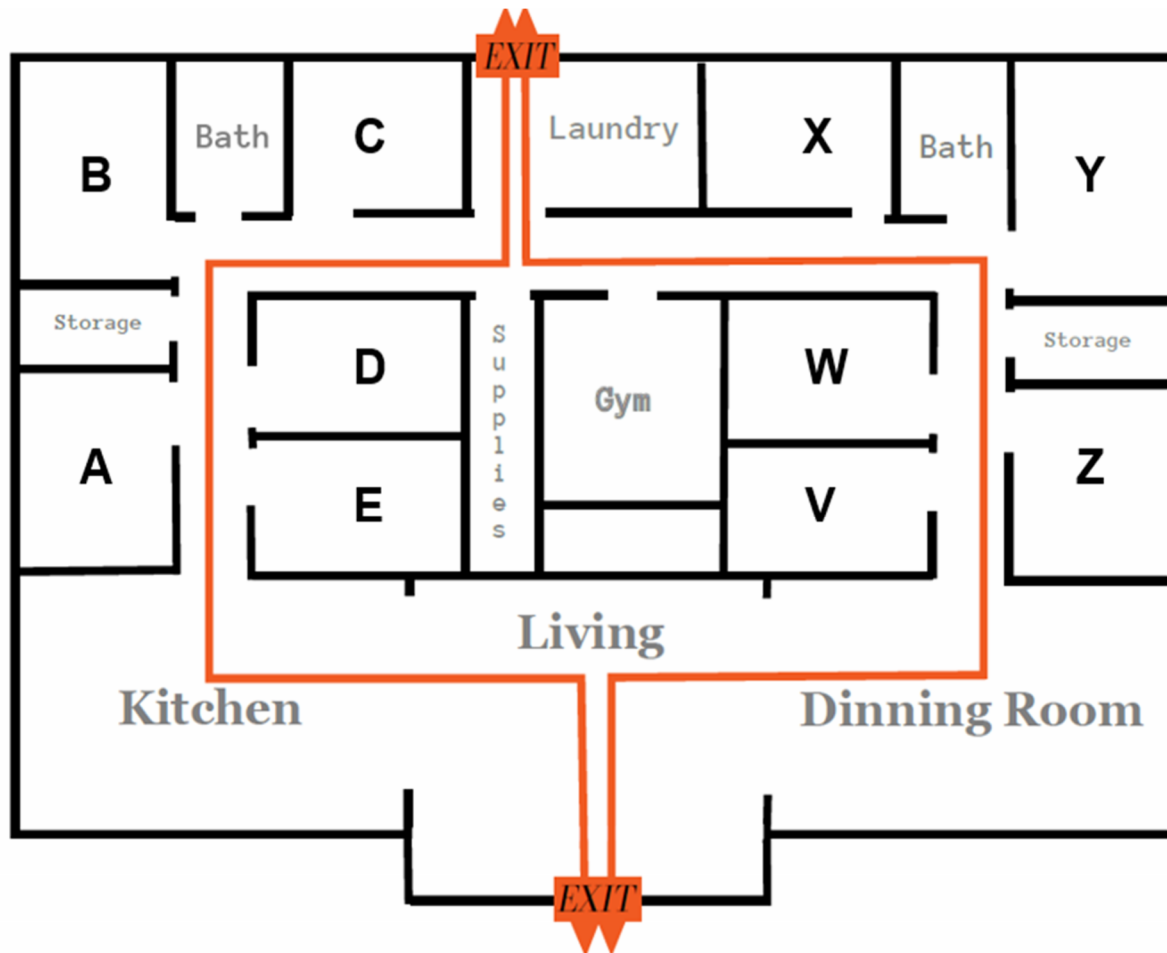
EVOLUTION HOUSE

FIRE PROCEDURE

Preparedness: Familiarize yourself with the location of fire exits and fire extinguishers in your area. Keep access ways, hallways, exit doors, and roadways clear.

IN CASE OF FIRE / FIRE ALARM:

1. Close the door as you leave the room.
2. If possible, notify sleeping or unaware individuals.
3. Attempt to extinguish the fire only if you can do so SAFELY.
4. Evacuate the building via the nearest exit.
5. Proceed to the assembly area on street (**Clover Leaf Lane**) away from the building to conduct a roll call.
6. Report the fire, call 911



ACTIVE SHOOTER PROCEDURE

1. **Evacuate.** If there is an accessible escape path, attempt to evacuate the premises.
Be sure to:

- Have an escape route and plan in mind
- Help others escape, if possible
- Evacuate regardless of whether others agree to follow
- Leave your belongings behind
- Prevent individuals from entering an area where the active shooter may be
- Keep your hands visible
- Follow the instructions of any police officers
- Do not attempt to move wounded people
- Call 911 when you are safe

2. **Hideout if evacuation is not possible.** Find a place to hide where the active shooter is less likely to find you. Your hiding place should:

- Be out of the active shooter's view
- Provide protection if shots are fired in your direction (i.e., an office with a closed and locked door)
- Not trap you or restrict your options for movement
- To prevent an active shooter from entering your hiding place:
 - Lock the door
 - Blockade the door with heavy furniture

NATURAL DISASTER PROCEDURE

Tornadoes, Floods, Hurricanes, or Earthquake

Move to designated "safe area" or to corridors or interior rooms; STAY AWAY from all windows and large glass objects. (see Emergency Evacuation Map located in all rooms). Crouch down and cover your head and neck. AVOID being underneath heavier objects such as lights, wall hangings, and other items that may fall. STAY INDOORS, do not exit the building. If you can't reach a "safe area," stay away from windows, crouch down, and cover your head. Follow directions of the Peer Leader. Listen for messages on the Public Address system. In the case of a power outage, there are hand-held lights, emergency water, and emergency food in the pantry.

OUR POLICIES

CLIENT WORKING FOR EVO POLICY

Clients are **not allowed to engage in labor of any kind at the Treatment Center.** (i.e. yard work, construction, etc.) If something needs to be done, please bring it to the attention of the Peer on duty. However, clients are responsible for routine chores and regular housekeeping. We all share the responsibility for keeping the house clean and safe.

SOCIAL MEDIA POLICY

Residents must be mindful of their actions on social media; your actions are a reflection of the Evolution House. You should always have the utmost respect for the confidentiality of others in the house when posting and engaging in all social media platforms. **You are not allowed to tag Evolution in any way on social media.**

GOOD NEIGHBOR POLICY

We must show utmost respect to the neighbors and their property. No loud music or contributing to noise pollution. No smoking out front. Smoking is only allowed in designated areas in the backyard. Be quiet. Be mindful of your surroundings and keep the volume of conversations down when outside. No yelling or offensive language. Park in Evolution House parking areas only. Do not block the neighbors' driveways. Pick up after yourself. Pick it up even if it isn't your litter. Drive slowly. The speed limit is 25 mph. Stop at all stop signs.

As a resident of Evolution House, please understand that there are restrictions on trespassing or entering onto adjoining properties. These rules are in place to respect the privacy and property rights of our neighbors. This means you are prohibited from fishing in neighboring private lakes or ponds, cutting across neighbors' yards or land when walking, or engaging in any other activities that involve entering private property without permission. We encourage everyone to stay within the boundaries of the group home's property and use designated paths or public areas for recreation and travel. If you have any questions about these boundaries or need clarification, please feel free to speak with a staff member.

FIRE PIT SAFETY / OUTDOOR GRILL POLICY

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Clients are to never use the fire pit or outdoor grill without the presence of a peer. If you choose to join the activities involving the fire pit or outdoor grill, you do so at your own risk. You are never required to participate in anything involving the fire pit / outdoor grill. Never use gas, kerosene, lighter fluid or any flammable liquids to start the fire. Keep anything flammable away from the fire pit and outdoor grill area.

PERSONAL PROPERTY & FUNDS POLICY

All personal belongings/property are the responsibility of the individual owning the property. All belongings must be kept in the individual's room. We are not responsible for theft, damage, or loss of property by any means. Do not bring valuables or a significant amount of cash! Do not buy, trade or borrow anything from residents or staff. Any personal property left at the Evolution House will be stored for 7 days. After that point it will be donated. If discharge occurs after business hours or on the weekend, the individual must return within the next week (M-F from 9am-5pm) in order to receive their medication. After that point, the medication will be destroyed.

SEARCH POLICY

Evolution House staff at any point during a resident's stay can search a resident's personal property or person. These circumstances include, but are not limited to, a suspicion involving drugs, alcohol, electronics, banned items or weapons in a residents' possession, or any other scenario where other residents and/or the safety of the Treatment Center as a whole are in jeopardy. In the event a search is deemed necessary, Evolution staff and or Peer will conduct the search. This search policy is for the safety of the house and to uphold the atmosphere of recovery and code of ethics in Evolution House.

DRUG TESTING POLICY

Drug testing is performed on a random and regular basis. Drug tests will be administered after any overnight stays, suspicious activity, and randomly. A urine sample must be submitted within 1 hour of the request to be tested. Failure to provide a urine sample is considered a refusal to test (i.e. a positive). On screening days at the Counseling Center, it is your responsibility to ask a staff member to observe you.

DRESS CODE

Make sure that you are covered up at all times when you are not in your room. Do not wear clothing

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with drug or alcohol references of any kind while you are resident of the Evolution House Treatment Center.

PHONE POLICY

Upon arrival, you will give your phone to a peer, who will keep it for one week. During this time, you will collect phone numbers from members of the recovery community met at meetings. You may use the house phone, as needed. After your first week, you will sit down with a peer and review your (mandatory) contact list, (optional) phone log, and contacts previously in your phone. You will be able to delete the contact information/social media of old connections that no longer serve you, and add your new friends and contacts in recovery. If your phone is needed during your first week (i.e. for a doctor's appointment, etc.), you may get your phone for the activity and give it back afterwards. Furthermore, your phone is a privilege; it may be taken away for disciplinary infractions at any time during your stay at the Treatment Center.

MEDICATION POLICY

All medications must be given to a Peer & kept locked in the med room, to include OTC meds and prescription medications. Keeping any type of meds or supplements in your room/car is a serious rule violation and will be dealt with accordingly.

It is your responsibility to ask the peer on duty for your medication during the times allotted. You will not be given medication outside of these windows. If you miss a window, you must wait until the next one to get your medicine.

Medication Disbursement Windows

Morning: 7:00am to 8:00am

Afternoon: 3:30pm to 4:30pm

Night: 8:30pm to 10:30pm

BANNED SUBSTANCE LIST

This list is just examples of some of the drugs that are not allowed but in no way represents a comprehensive list. **If you are using anything to get high or change the way you feel, it is not allowed.**

Alcohol	Dextromethorphan (DXM)
Ayahuasca	Over-the-Counter
Cannabis (Marijuana/Pot/Weed)	Loperamide
Central Nervous System Depressants (Benzos)	PCP (Angel Dust)
Cocaine (Coke/Crack)	Prescription Opioids (Oxy/Percs)
GHB	Prescription Stimulants (Speed)
Hallucinogens	Psilocybin (Magic Mushrooms/Shrooms)
Heroin	Rohypnol® (Flunitrazepam/Roofies)
Inhalants	Salvia
Ketamine	Steroids (Anabolic)
Khat	Synthetic Cannabinoids (K2/Spice /Delta 8)
Kratom	Synthetic Cathinones (Bath Salts/Flakka)
LSD (Acid)	Research Chemicals
MDMA (Ecstasy/Molly)	THC delta 8
Mescaline (Peyote)	Other legal highs
Methamphetamine (Crystal/Meth)	

ADVANCED DIRECTIVE

A mental health advance directive is a written document that describes what you want to happen if you become so incapacitated by mental illness that your judgment is impaired and/or you are unable to communicate effectively. It can inform others about what treatment you want or do not want, and it can identify a person to whom you have given the authority to make decisions on your behalf. The law requires mental health providers to respect your mental health advance directive, but they are not required to follow it in all cases. If instructions or preferences in your mental health advance directive are against hospital policy, are unavailable, or would violate state or federal law or immediately endanger you or others, providers are not obligated to comply with those provisions. Also, if you are involuntarily hospitalized under the Involuntary Treatment Act, or are incarcerated in jail, your mental health advance directive may not be fully honored. If you are interested in creating an advanced directive, Evo Treatment Center will be happy to help. Please ask the Peer on staff to coordinate time for human resources to help you fill one out.

NON-DISCRIMINATION POLICY

Evolution House does not and shall not discriminate on the basis of race, color, religion (creed), gender, gender expression, age, national origin (ancestry), disability, marital status, sexual orientation, or military status in any of its activities or operations. These activities include, but are not limited to, hiring and firing of staff, selection of volunteers and vendors, and provision of services. We are committed to providing an inclusive and welcoming environment for all members of our staff, guests, volunteers, subcontractors, vendors, and residents.

It is Your.... **Right**

- To Be Treated With Dignity And Respect
- To Be Told About Your Treatment
- To Have A Say In Your Treatment
- To Have Your Complaints Resolved
- To Speak To Others In Private
- To Say What You Prefer
- To Ask Questions And Be Told About Your Rights
- To Get Help With Your Rights

DISCIPLINARY ACTION PLAN

Our goal is that Evolution House is among the finest, cleanest, and most effective treatment centers in the State of Virginia— Specializing in providing the highest quality of care to help our residents recover from substance use disorder. Part of what makes us great is that we all work as a team, and have all agreed to uphold these standards of excellence.

As a resident you are the most important player in helping us achieve our collective goals. Upon entering Evolution House, you agreed to follow the rules of the program. This program is designed to stretch you outside of your comfort zone; to break old patterns and habits.

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In an effort to help you grow, we will hold you accountable in the following way:

1st Verbal Discussion

2nd Written Note - Phone is taken away

3rd Written Note - Potential discharge

Some issues can be escalated to 2nd or 3rd violations based on safety and severity of the circumstance. Certain actions & Illegal conduct is not subject to progressive discipline and may result in immediate discharge. Theft, substance use, intoxication, fighting and other acts of violence are excluded from progressive discipline and may be grounds for immediate dismissal from the program.

SINGLE ROOM POLICY

You will be assigned a single room once you are the resident who has been in the shared rooms for the longest time and someone moves out from the first floor. Individual rooms are a privilege. This means that you are expected to make your bed every morning and keep your space tidy. No exposed food is allowed in rooms. If your room is unorganized and/or dirty the following action plan will be followed: 1st warning: discussion about the state of your room and a plan to get it back on track; 2nd warning: phone taken away for 24 hours or until room is cleaned; 3rd warning: you will be moved back up to a double room and your phone will be taken away until your room is made up.

Grievance Policy and Human Rights

Evo Recovery Treatment Center has a Human Rights Coordinator that can assist you with the complaint and grievance process. This person also monitors staff and all programs and services to ensure that no client or family is experiencing abuse, neglect, and/or exploitation or any type.

What is a Complaint?

A complaint is an informal way the state allows you to express your dissatisfaction with Evo Treatment Center and/or its affiliates. It is a good idea to try to resolve your complaint with the person directly involved or ask our Human Rights Advocate to assist you before you try other things. Explain your concern. Let the person know what would work better for you. Be clear about what your complaint is. Also, be clear about what an acceptable solution will be. Try to find some ways to reach an agreement that will satisfy both you and the other person.

What is a Grievance?

There are two types of formal complaints that you may make. One type is an appeal, which is a formal complaint about an action. An action is a denial, suspension, reduction, or termination of certain services. See below for a description of the appeal process. The second type is a grievance, which is a formal complaint about any other issue.

The purpose of this policy and procedure is to prevent and resolve conflict. Evo Treatment Center acknowledges that any client, who has a grievance or is dissatisfied with any matter concerning the programs, services or staff at Evo Treatment Center, will have the right to file a grievance. Evo Treatment Center will consider and attempt to resolve any grievance in a timely manner.

Any client or group of clients may lodge a grievance of direct concern to the client in terms of the grievance procedure. Management will consider all grievances in a fair and just manner. No harassment of any client who has filed a grievance will be tolerated. Evo Treatment Center will allow parties to call witnesses to testify. Evo Treatment Center will question witnesses if necessary. The investigation will not proceed if the aggrieved party is not present. Any client lodging a grievance may be accompanied and represented at any stage of the procedure by a colleague of his/her choice. The grievance procedure may be used by all clients of Evo Treatment Center.

Step 1: Lodge Complaint

A client who has a grievance must first notify his/her assigned counselor, who will attempt to resolve the issue within 24 hours of the issue being raised. The manager will inform Human Resources of the grievance.

If the client is not satisfied with his/her counselor's/case manager's decision, then the client will have the right to raise a formal grievance with the next level of Management within two work days of the supervisor's/manager's decision.

Step 2: Formal Grievance

If the client is not satisfied with the case manager's decision or if the grievance poses concerns for the client's case manager, then the client shall complete a formal Grievance Form and submit the form to the Management Team within two work days of the case manager's decision.

The Management Team will schedule a meeting within three business days after having received the formal Grievance Form. The time period may be extended upon agreement by the parties concerned.

The Management Team will review the information. The individual filing the formal grievance may be called to attend a meeting if deemed necessary by the Management Team. In the event that a meeting is deemed necessary, the meeting should be attended by the client, case manager, or the immediate supervisor, and will be chaired by the manager. In any meeting conducted by the Management Team, with or without the presence of the client, the manager will ensure that minutes are kept of the meeting, whether written or on a tape recording device; however, any decision made will be recorded on the Formal Grievance Form by the manager.

If no satisfactory resolution or decision is reached within two work days of the meeting, The Management Team will assist the client with the next step. This will be noted on the formal Grievance Form, and the client will be advised to take the issue to the Human Rights Advocate. This step should be done within two business days.

Step 3: Human Rights Advocate

This is the highest level within the Company's appointing authority. The Management Team (in step 2) will advise the Human Rights Advocate who will review all documents pertaining to the incident. The Human Rights Advocate will provide the client with the company's decision in writing within two business days. The decision made by the Human Rights Advocate will be final. The Human Rights Advocate will advise the client of their rights if the decision reached is not found to be satisfactory by the client. The Human Rights Advocate will supply further contact information for contacting the Local and State Human Rights Committee, if necessary.

Your Human Rights Advocates are:

Rebecca Waton RPRS 757-705-3202

Jay Sexton 757-345-1656

Notice of Privacy Practice We are required by law to keep your protected health information (PHI) private in many situations, to inform you of these practices and to follow the practices set forth. Disclosing and Using Your Information With Your Consent When you begin receiving care from Evolution House, we will ask you (or your legally authorized representative) to sign a consent form that will permit us to provide care for you. Please ask the peer on staff to coordinate time for human resources to help you fill one out.

Substance Abuse Intensive Outpatient Program (SA IOP): This ASAM Level 2.1 highly structured program utilizes Licensed Clinicians (LPC, LCSW), Certified Substance Abuse Counselors (CSAC), and Peer Recovery Specialists (RPRS) to provide clinical group individual, and family therapy between 19-hours (max) and 9-hours for

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adults or 6-hours for “young adults” (adolescents age 18-21). SA IOP will supply a therapeutic environment including counseling and rehabilitative therapies, integrated psychiatric and medical treatment, Medication Assisted Treatment (MAT), Primary Medical Care (PCP), community-based case management, and recovery support services to meet the holistic needs of our clients. In addition to urine drug screening, Medication Management, & MAT, SA IOP staff will remain on-call 24hrs/7days per week to provide SA Crisis Intervention coverage outside of daily program hours.

Substance Abuse Case Management (SACM): Evolution House’s SA IOP program utilizes CSAC-A’s to provide SA Case Management services assisting our clients and their family members in accessing and coordinating needed services including specialist medical, psychiatric, and psychological treatments as well as social, educational, vocational, veterans employment, and recovery supports in the community essential to meeting their basic needs. Incorporating person-centered, individualized, culturally and linguistically appropriate approaches based on identified patient and family member’s needs, CSAC-A Case Managers will maintain consistent communication and involvement to ensure the consistency and effectiveness of ASAM’s integrative multidisciplinary treatment philosophy including: a) sharing of important clinical information between participating providers on behalf of individuals and families; b) accompanying / advocating for individuals when necessary to strengthen engagement of participant with all multidisciplinary service providers involved; and c) working together to keep individuals and their families involved and informed throughout community reintegration.

Outpatient Therapy (OP): Evolution House’s unwavering commitment is to facilitate holistic recovery within community-based care through wrap-around service provision fueled by strategic leadership, creative ingenuity, and continuous quality improvement. Our flagship Outpatient practice is committed to integrating behavioral health into primary care.

Residential Services: ERS incorporates peer recovery specialists to provide 24-hr.

(ASAM L3.1) Clinically Managed Low-Intensity Residential Treatment for substance use and co-occurring disorders. Provided in a smaller traditional behavioral health home setting instead of a hospital or psychiatric facility, this transitional residential service includes 5-hrs./week of on-site clinical treatment in combination with peer recovery support providing a cost-effective alternative, which can be combined with SA IOP/OP services as needed.

Service Goals - §580. C.1.

Our goal is to forge a model program for efficient delivery of integrated substance abuse, psychiatric, and primary healthcare treatment services that raises local quality standards and promotes the following patient outcomes:

1. Increase personal insight, learning, and applying recovery skills.
2. Maintain extended abstinence, prevent relapse, and engage in active long-term recovery.
3. Provide healing for underlying emotional wounds, grief, and painful trauma from past experiences that perpetuates substance abuse.
4. Promote disease self-management through mastery of advanced mindfulness skills increasing frustration tolerance and independence.
5. Promote systemic healing in families through warm familial engagement in treatment to rebuild protective and positive natural supports.

Philosophy of Service

Evolution House takes pride in providing quality community-based services, substance abuse care, and therapy. Our team of licensed clinical social workers and professional counselors, licensed-eligible mental health professionals, certified substance abuse counselors, and other qualified mental health professionals are available for your needs. We believe that addiction is a chronic relapsing disease that requires individually tailored therapeutic treatment, relapse prevention, and recovery strategies that look different for each person to be successful.

Structured Program of Care

Evolution House’s Structured Program of Care is defined as a comprehensive and planned daily, weekly, monthly routine, including appropriate supervision that meets the needs of the client and their family (if applicable) that includes, but is not limited to:

- ASAM Multidimensional assessment / diagnostic evaluation
- Comprehensive Needs Assessment
- Individualized Service Planning
- Group Counseling including:

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- Addiction & Mental Illness Psychoeducation
- Mindfulness Skills Training
- Relapse Prevention Therapy / Interactive Feedback
- Individual Psychotherapy
- Integrated Psychiatric / Medical Care
- Medication Assisted Treatment (Vivitrol & Buprenorphine – referrals to OTP)
- Urine Drug Screening
- Interdisciplinary Treatment Team Meetings
- Skill Building
- Recovery Support Services
- Care coordination
- Discharge Planning
- Substance Abuse Case Management
- Client Advocacy

My signature below indicates that I have reviewed, clearly understand, and am providing informed consent for all necessary release / sharing of Protected Health Information between my Evolution House treatment team of interdisciplinary providers and staff members at their discretion across all services in the aforementioned description including:

- **Evolution Recovery Services, LLC**
- **Dr. Bruce Mayer, MD**

FREEDOM OF CHOICE STATEMENT

I, the Client, am making the decision/choice under the DMAS Freedom of Choice provision, which includes both my freedom to choose and/or reject services from any provider participating in the Medicaid program. Under this provision, I request services from 1 NPI#: 1063093748 on the date of signing.

I attest that I have not received any compensation in exchange for my request to participate in services with Evolution Recovery Services, LLC., and am choosing to do so without being solicited, coerced, bribed or threatened in any way to sign this document. I acknowledge that Evolution Recovery Services, LLC has made all reasonable attempts to educate me regarding my rights to choose a provider(s).

NOTIFICATION OF HUMAN RIGHTS

As an Individual receiving services with Evolution Recovery Services, LLC, you will be assured your legal rights and care consistent with basic human dignity insofar as it is within the reasonable capabilities and limitations of the Department or Evolution Recovery and is consistent with sound therapeutic treatment. As a Client/Patient of Evolution Recovery, you will:

1. Retain your legal rights as provided by state and federal law;
2. Receive prompt evaluation and treatment or training about which you are informed insofar as you are capable of understanding;
3. Be treated with dignity as a human being and be free from abuse or neglect;
4. Not be the subject of experimental or investigational research without your prior written and informed consent or that of his legally authorized representative;
5. Be afforded an opportunity to have access to consultation with a private physician at your own expense and, in the case of hazardous treatment or irreversible surgical procedures, have, upon request, an impartial review prior to implementation, except in case of emergency procedures required for the preservation of your health;

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6. Be treated under the least restrictive conditions consistent with your condition and not be subjected to unnecessary physical restraint and isolation;
7. Be allowed to send and receive sealed letter mail;
8. Have access to your medical and clinical treatment, training, or habilitation records and be assured of their confidentiality but, notwithstanding other provisions of law, this right shall be limited to access consistent with your condition and sound therapeutic treatment;
9. Have the right to an impartial review of violations of the rights assured under this section and the right of access to legal counsel;
10. Be afforded appropriate opportunities, consistent with your capabilities and capacity, to participate in the development and implementation of your individualized services plan; and
11. Be afforded the opportunity to have a person of your choice notified of your general condition, location, and transfer to another facility.

It is your right...

- To be treated with dignity and respect
- To be told about your treatment
- To have a say in your treatment
- To speak to others in private
- To have your complaints resolved
- To say what you prefer
- To ask questions and be told about your rights
- To get help with your rights
- Address your concerns with your assigned counselor.
- Contact the program contact person for Human Rights listed below.

If after addressing your concern with your counselor and program contact person, you feel your concern has not been resolved to your satisfaction, you may then file a complaint with the Program Contact:

Program Director: Jay Sexton

Clinical Director: Robin Russell

By signing, below, you are acknowledging that you have read and understand your Human Rights as a Client/Patient of Evolution Recovery Services, LLC.

Human Rights Complaint Process

If you believe your human rights have been violated, you have the right to:

Make a complaint that Evolution House has violated any of the rights indicated, above.

Have a timely and fair review of any complaint in accordance to Evolution Recovery's human rights complaint resolution policies and procedures;

1. Make a complaint that Evolution House has violated any of the rights indicated, above.
2. Have someone file a complaint on your behalf;
3. Have a timely and fair review of any complaint in accordance to Evolution Recovery's human rights complaint resolution policies and procedures;
4. Use these and other complaint procedures;
5. Make a complaint under any other applicable law, including to the protection and advocacy agency.
6. Be contacted by the director or the director's designee regarding the complaint within 24 hours;
7. Have access to a human rights advocate for assistance with the complaint;
8. Be protected from retaliation and harm;
9. Have the complaint reviewed, investigated, and resolved as soon as possible;
10. Receive a report with the director's decision and action plan within 10 working days;
11. Be notified in writing of his right to and the process for appealing the director's decision and action plan to the LHRC.

Finally, if you do not feel your concern has been resolved after filing a formal complaint, you may contact the Human Rights Officer, Jay Sexton.

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RELEASE OF LIABILITY WAIVER

I, the Client, on the behalf of myself as he is over age 18.

I hereby assume all risk of personal injury, sickness, death, damage and expense as a result of participation in any Evolution Recovery Services service, activity or event to include, but not limited to: home visits, school visits, community outings, case management, discharge from services without medical advice, vehicles during transportation, property of Evolution Recovery, behavior management system, bodily search, administration of medication, engaging with staff, volunteers, or agents of Evolution Recovery or other activities related to treatment services.

I do hereby release, forever discharge and agree to hold harmless: Evolution Recovery and its owners, directors, employees, contractors, students, interns, and volunteers from any and all liability, claims, or demands for personal injury, sickness, death, damage or expense of any nature which may be incurred by the undersigned and/or child while participating in any service, event or activity of Evolution Recovery. This includes, but is not limited to: home visits, school visits, community outings, case management, discharge from services without medical advice, vehicles during transportation, property of Evolution Recovery behavior management system, bodily search, administration of medication, engaging with staff, volunteers, or agents of Evolution Recovery or other activities related to treatment services.

I also further authorize Evolution Recovery to provide psychiatric, psychosocial, psychotherapeutic, and supportive services and care to myself or my child and to obtain medical care from any licensed physician or hospital should participant(s) become injured. I assume the responsibility of any emergency medical bills, if any.

Without limiting the scope of the release, waiver and hold harmless set forth above, and my assumption of risk, I understand that this document will prohibit me from bringing a lawsuit or otherwise claiming damages against Evolution Recovery or any of its affiliates. By signing this waiver, I agree to all of the contents contained therein:

- Mission, Vision and Philosophy of Evolution Recovery Services, LLC
- Introduction of Services Provided, Treatment Strategies and Service
- DSM-IV Mental Health Diagnosis Statement
- Client Bill of Rights and Responsibilities: Participation in treatment and discharge; Confidentiality Practices, and Authorizations (HIPAA)
- Freedom of Choice and Title VI of the Civil Rights Act of 1964 Statements
- Advanced Directive
- Grievance Policy: Human Rights Policies and Reporting Violations
- Notice of Privacy Practices: Protected Health Information
- General Policies and Procedures: Hours and days of operation, Emergency contact numbers, After-hour services,
- Weapons, Tobacco, Inclement weather, Financial and Fee for service policies
- General Policies and Procedures: Behavior Management Policy
- General Policies and Procedures: Emergency Preparedness and Fire Safety
- General Policies and Procedures: Building Layout and Evacuation Plans
- Program Specific Policies and Procedures: Program Handbook/Parental Support
- Program Specific Policies and Procedures: Urine Drug Screening Policy/Procedures
- Staff Introduction and Contact Information

ACKNOWLEDGMENT

I, the undersigned, do agree that the contents of the client orientation as well as other programs and services have been thoroughly explained to me by Evolution Recovery Services, LLC.

Client Information

Client Bill of Rights and Responsibilities - §150. Compliance with applicable laws, regulations and policies.

Every client receiving services from Evolution Recovery Services, LLC has inherent rights and responsibilities.

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These Client Rights and Responsibilities are discussed during the assessment/admission process, distributed to clients via this Program and Client Handbook and are posted in all our facilities. Additionally, our professionals receive annual training on various topics related to providing and protecting client's rights and responsibilities. Prior to the beginning of treatment services, you will read and are asked to sign the Client Orientation Checklist, which acknowledges your voluntary participation in Evolution House programs and services, your understanding of these client rights and responsibilities, and other important aspects of your health care.

Client Rights

Professional Standards

- The right to quality care delivered by professionals who have met all pertinent requirements.
- The right to quality healthcare that is professional and courteous, which does not discriminate because of age, race, disability, national origin, religious beliefs, gender, sexual orientation, political affiliations or veteran status. You have a right to healthcare that is free from harassment of any kind.
- The right to safe care that is delivered in a facility that complies with safety standards. You have a right to know what measures are taken to assure your safety such as emergency preparedness drills, fire drills and inspections.

Treatment Participation

- The right to participate in the development and review of your treatment plan, including known effects of receiving or not receiving such treatment and alternative treatment as may be available.
- The right to receive care that is medically necessary.
- The right to refuse treatment against medical advice to the extent permitted by law. If you refuse the recommended treatment and/or leave any program or service against advice, neither Evolution House, any employee of Evolution House, nor our related contractors will be held responsible for any harm to you or others as a result of this action.
- The right to choose another provider at any time.

Least Restrictive Setting

- The right to receive treatment in the least restrictive setting that responds to your treatment needs.
- The right to have freedom from seclusion and restraints used for the management of behavior unless clinically required.

Confidentiality - §130. Confidentiality of records; §870. Written records management policy.

- The right to confidential maintenance of information about yourself and treatment received. We may not tell a person outside this agency that you attend our programs or discuss any information identifying you as a client within our services without your written authorization, unless compelled by law (including court orders, medical emergency, insurance inquiry or requests for subsequent authorization of services, suspected abuse or neglect, to report a crime, or a threat to harm someone, etc.).
- The right to have your records kept in a locked file in a locked room and/or maintained electronically in accordance with HIPAA regulations.

Access to Information and Records

- The right to inspect your own record in the presence of your primary MHC or agency representative and, under most conditions, the right to have a copy of your own record at your expense.
- The right to access information in sufficient time to facilitate your decision-making.
- The right to ask your healthcare provider for current information in understandable terms regarding your diagnosis, treatment, and anticipated outcome.

Constitutional/Civil Rights

- The right to exercise constitutional, statutory, and civil rights, except those denied or limited by court action. No person shall, on the grounds of race, religion, ethnicity, color, national origin, ancestry, age, handicap, or sexual preference, be excluded from participation in, be denied the benefit of, or be otherwise subjected to discrimination under any program or activity of the Evolution House in the provision of its services.

Protection from Abuse, Neglect, or Exploitation

- The right to humane care and protection from harm. Staff members are prohibited from any use of psychological abuse, including humiliating, threatening, and exploiting actions. All instances of abuse, neglect or exploitation should be reported to Evolution House staff immediately.

Waivers

- The right to waive your rights. At no time will admission to services be conditional upon a person's

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waiver of their rights. However, you retain the option to waive any of your rights. Such a waiver must be given voluntarily, knowingly, and in writing and can be withdrawn at any time.

Informed Consent

- The right to have informed consent, refusal, or expression of choice regarding: 1) the delivery of services; 2) release of confidential information; 3) any concurrent services; or 4) the composition of your treatment team.
- The right to have your guardian, next of kin, or legally authorized responsible person be granted the right to exercise, to the extent permitted by law, your rights if you have been declared incompetent in accordance with the law; are found by your health care provider to be medically incapable of understanding the proposed treatment or procedure; are unable to communicate your wishes regarding treatment; or are a minor.

Legal Counsel

- The right to contact or consult with legal counsel of your choice at your own expense.

Consumer Advocate: Questions, Concerns, Complaints, or Grievances (see page 8 for explanation of these terms)

- The right to have your questions answered, to make complaints about services you receive, violations of these rights, and to have those complaints heard and addressed promptly.
- If you have a grievance or complaint, Evolution House staff will contact you within 3 days to discuss the complaint and update you as to the status of the investigation.

Financial: Explanation of Treatment Fees and your Bill

- The right to information regarding fees for services and programs. This includes being notified of what services may be involved, additional charges, the nature of the charges and methods of payment.
- The right to information about your bill. (Medicaid does not allow providers to furnish a copy of the bill to the client.)
- The right to inquire about financial assistance in paying your bill.
- If a client meets the criteria for “failed services” (as set forth by DMAS and defined as the services not effectively treating or resolving the client’s mental health and/or behavioral issues within a certain timeframe), they have the right to be referred to an appropriate or alternative level of service.

If you feel, at any time throughout your treatment, that your rights have been or may be violated, you may ask questions, file a complaint or discuss the matter with the Program Director, Chief Clinical Officer, CEO, or human rights program advocates listed in this handbook in the Grievance section. These individuals are program supervisors ethically committed to protecting your human rights and providing non-judgmental guidance / assistance in navigating the complaint resolution process. If you feel that you need additional, outside assistance concerning your rights, you may contact the Regional Advocate for Human Rights for Region 4: Sharae Henderson – 804-524-7479.

Client Responsibilities

- Provide accurate and complete information about your past illnesses, hospitalizations, medications, other matters relating to your health, and to answer any questions concerning these matters.
- Inform staff immediately if you are experiencing homicidal or suicidal ideations.
- Ask questions if you do not understand the explanation of your diagnosis, treatment, prognosis, or any instructions.
- Cooperate with health care staff by following instructions concerning medications, follow-up visits, education recommendations, other essential steps in your treatment plan, and to notify your health care provider if this plan cannot be followed or if problems develop.
- Inform your pharmacist when having prescriptions filled about prescription and over-the-counter medications you are currently taking.
- Inform Evolution House or any of its professionals of the existence of any advance directive (including health care proxy, power of attorney, DNR, living will) you may have created.
- Conduct yourself in an appropriate manner. Rule violations or behaviors that interfere with the treatment process may lead to a limitation or termination of service. In some cases, the police may be called. Visitors and staff shall not: 1) carry or be under the influence of intoxicating beverages or illegal substances; 2) steal, attempt to steal, or deface property of Evolution House; 3) assault or sexually harass anyone; 4) possess firearms or dangerous weapons; 5) threaten, intimidate, harass, coerce, or interfere with other people; 6) falsify information provided to Evolution House; or 7) smoke inside any Evolution House facilities. Services may also be limited or terminated if a client fails to keep their scheduled appointments.

Transportation

Medicaid will only reimburse for services provided as defined as clinically necessary in the client’s ISP. To promote

EVOLUTION HOUSE

independent living skills and long-term community stabilization

After these time-limited services are no longer deemed clinically necessary, Evolution House provides coordination of transportation assistance which may include connection to agencies licensed to provide transportation assistance (e.g., care vans) to medical appointments and activities required for the client to access/utilize public transportation. Ability to access transportation services is determined by your MHC and clinical treatment team. We do not unfortunately provide clients with bus tickets or any other form of financial assistance. Evolution House is not a Non-Emergency Medical Transportation (NEMT) provider.

Freedom of Choice and Title VI of the Civil Rights Act of 1964 Statements

You may choose your mental health care provider in Virginia. You have the right to change mental health care providers at any time. You can also ask for a change for any reason. If you think you have a good reason, you can ask for additional changes. The change may or may not be granted depending on the circumstances. Evolution complies with the Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. §§ 2000d through 2000d-4a), which requires that no person be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance on the grounds of race, color, or national origin; as well as the Rehabilitation Act of 1973, as amended (29 U.S.C. § 794), which states that no otherwise qualified client with a disability shall, solely by reason of her or his disability, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance. The Act requires reasonable accommodations for certain persons with disabilities. Evolution agrees to hold information regarding recipients confidential. A provider shall disclose information in his/her possession only when the information is used in conjunction with a claim for health benefits or the data necessary for the functioning of the state agency.

By signing the corresponding Freedom of Choice Statement below and after carefully reading and having Evolution House explain this document, you attest that neither you nor your dependents have been coerced, bribed, offered money or favors for requesting services and choose to participate in services offered by Evolution House Comprehensive Counseling Services, Inc., Evolution House Integrative Counseling, and/or Evolution House Residential Services, LLC.

HIPAA Notice Privacy Practices

THIS NOTICE DESCRIBES HOW MEDICAL INFORMATION ABOUT YOU MAY BE USED AND DISCLOSED AND HOW YOU CAN GET ACCESS YOUR INFORMATION.

If you have any questions about this notice, please contact Rebecca Watson at 540-290-0718.

WHO WILL FOLLOW THIS NOTICE?

- Any employee, staff and clinical personnel
- Any healthcare professional authorized to enter information into your medical chart

OUR PLEDGE REGARDING MEDICAL INFORMATION

We understand that your health information is personal, and we are committed to protecting it. We create a record of care and service you receive. We need this record to provide you with quality care and to comply with certain legal requirements. This notice applies to all the records of your care generated by Evolution House, whether made by organization's personnel or your personal doctor. Your personal doctor may have different policies or notices regarding the doctor's use and disclosure of your medical information created in the doctor's office or clinic.

- This notice will tell you about the ways in which we may use and disclose medical information about you. We also describe your rights and certain obligations we have regarding the use and disclosure of medical information.
 - Make sure the medical information that identifies you is kept private
 - Give you this notice of our legal duties and privacy practices respect to medical information about you
 - Follow the terms of the notice that is currently in effect

HOW WE MAY USE AND DISCLOSE MEDICAL INFORMATION ABOUT YOU

The following categories describe different ways that we use and disclose medical information. For each category used or disclosed, we will explain what we mean and try to give some examples. Not every use of disclosure in a category will be listed. However, all the ways we are permitted to use and disclose information will fall within one of the categories.

- **FOR TREATMENT:** We may use medical information about you to provide you with medical

EVOLUTION HOUSE

treatment or services. We may disclose medical information about you to doctors, nurses, clinician, direct care staff and others who are involved in taking care of you. For example, a doctor treating you for a mental illness may need to know if you have diabetes since this may affect your ability to recover. We also may disclose medical information about you to people outside the organization who may be involved in your medical care after you leave the organization, such as therapists, physicians, family members and or others we use to provide services that are part of your care. Your protected health information will be maintained in the office which is located at 4622 Rochambeau Dr. Williamsburg, VA 23188.

- **FOR PAYMENT:** We may use and disclose medical information about you so that the treatment and services you receive may be billed to and payment collected from DBHDS or third party.

HIPAA PRIVACY NOTICE ACKNOWLEDGEMENT

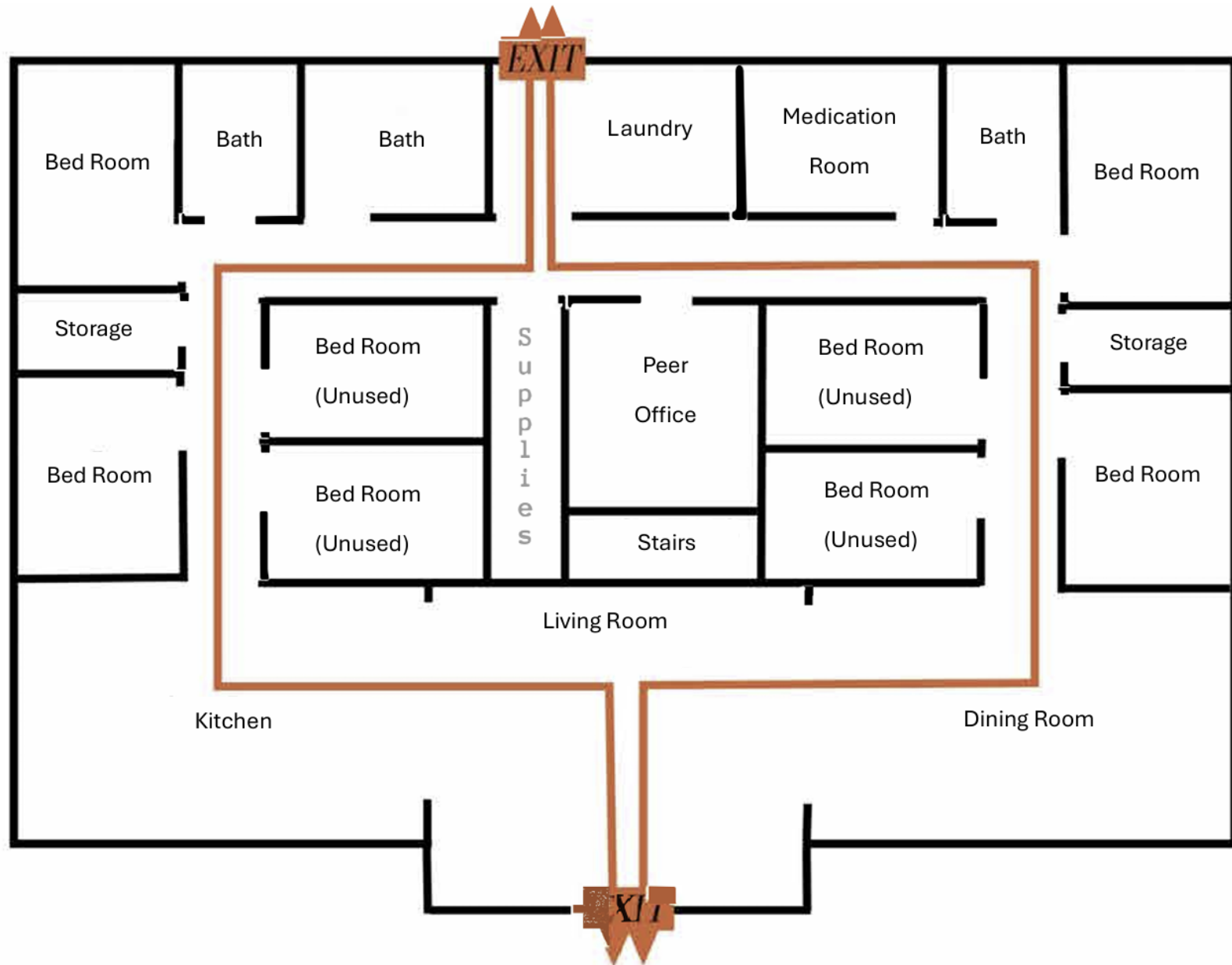
Once Notice of Privacy Practices provides information about how we may use and disclose protected health information about you, your signature below indicates that you have received and had an opportunity to restrict the use and/or disclosure of your protected health information as allowed by law.

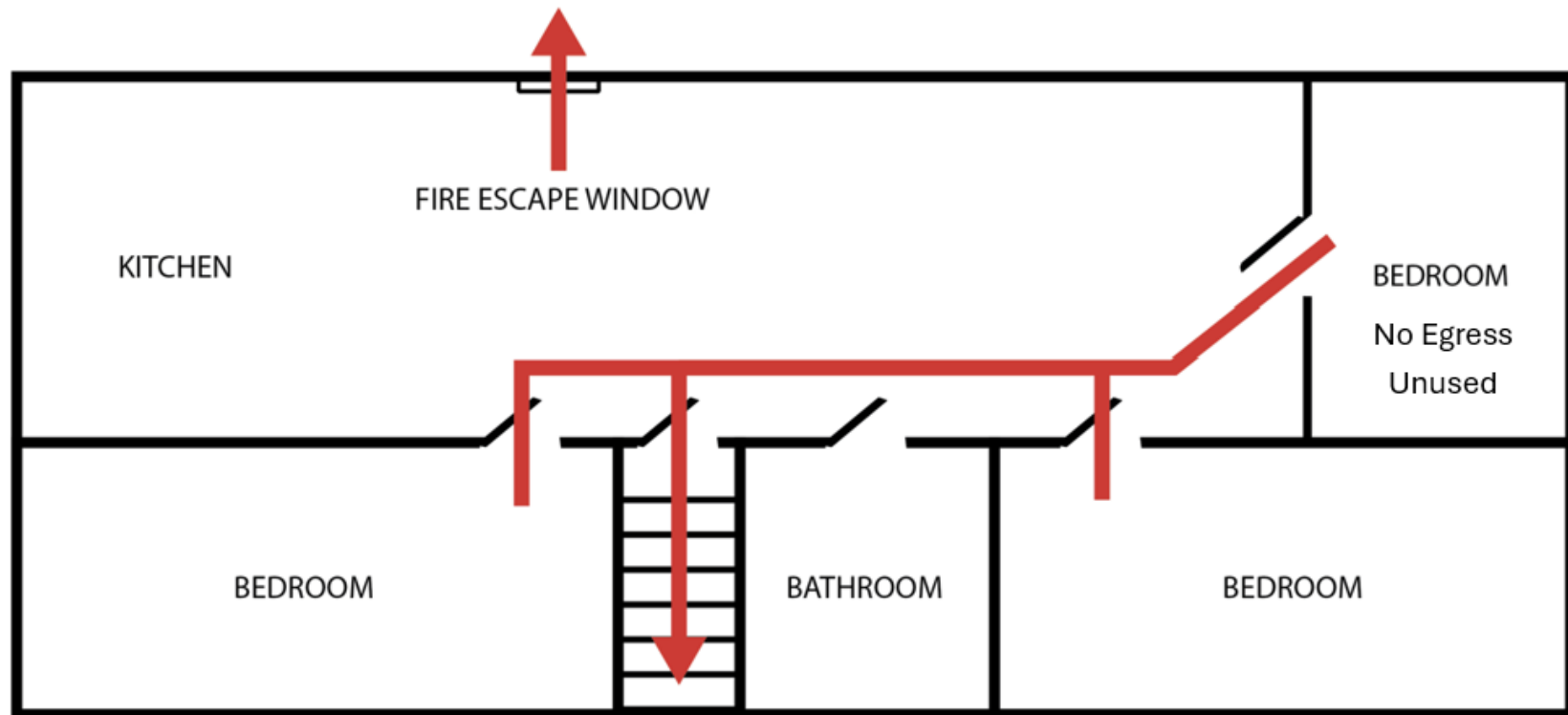
Evolution House Contract

Evolution House rules have been explained to me so that I understand them. I have read and fully understand the contents of all these documents in the Resident Handbook
I agree to all terms, conditions, policies, and requirements. By signing, I agree to follow Evolution House rules at all times and understand failure to comply can result in discharge from the program.

Name Printed _____

Signature _____ **Date**_____ ¹





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kaufCAN.com

June 13, 2025

Re: My Client: Evolution House
Application for SUP: 4622 Rochambeau Road, Williamsburg (James City County), VA

Dear Neighbors of the Evolution House:

Thank you for meeting with me and members of the Evolution House leadership at the Croaker Road library on February 17th in advance of my client's application for a special use permit ("SUP") to permit 16 residents of the Evolution House located in your neighborhood. Your comments at that meeting and subsequent emailed comments have led to material changes in the SUP application, and I write to update you on the matter and to reassure you that your comments and concerns have been heard and addressed.

BACKGROUND

You will recall that Evolution House offers a place for men recovering from substance use disorders to live while they reconnect with family, the community and the work force after undergoing more intensive treatment elsewhere. All residents are housing challenged: substance abuse has caused them to lose family ties, savings and borrowing ability such that they have no secure living arrangements. Stable and sober housing is critical to successful recovery.

The James City County zoning ordinance permits a group home like Evolution House to operate with 8 or fewer residents. A SUP is required for more than 8 residents. Demand for the highly successful Evolution House facilities (my client operates 6 at present) is high. In the past local folks were forced to seek comparable recovery services out of the area, in Northern Virginia or Richmond.

The Rochambeau Road facility, a commercial building known formerly as the offices of Dr. Kevin Bedell, has been operating with 8 or fewer residents in recent weeks pending the outcome of the SUP application; if the application is denied, Evolution House intends to continue at the Rochambeau Road location with 8 residents.

The SUP requires public hearings before both the county Planning Commission and Board of Supervisors. The Planning Commission hearing is currently scheduled for July 2, 2025. As part of approving a SUP, the Board of Supervisors has the legal authority to impose conditions on an applicant and their property use. Failure to adhere to SUP conditions thereafter constitutes a zoning violation, which can result in fines, criminal charges or court-ordered discontinuation of the land use. This SUP condition process is important to understanding the ways in which Evolution House has addressed your input.

Although SUP conditions can be enacted by the Board without applicant consent, in the Evolution House case we have suggested conditions to the county to be imposed on Evolution House in order to assure neighbors that Evolution House will comply with measures promised to mitigate potential impacts of the facility.

NEIGHBOR CONCERNS

1. Unknown folks walking the community or trespassing. At our neighborhood meeting, several nearby residents expressed concerns over unknown people walking down Rochambeau Road and even trespassing onto private property. Evolution House does not condone trespassing. And the management of Evolution House understands that strangers in the neighborhood, particularly at night, is unsettling. Accordingly, the Manual issued to and reviewed in detail with every Evolution House resident has been revised to contain provisions against trespassing and requiring respect of neighbor rights to privacy and security. A 10:00 pm curfew applies to all residents, and an 11:00 pm lights out requirement is enforced. At least two (2) Evolution House employees are on the site at all times, day and night.

Visitors to the Rochambeau Road house are permitted only on Sundays; although visitors are encouraged, most Sundays are quiet. No pets are permitted at the house, very few residents bring vehicles (transportation to daily therapy and recreation activities is provided by Evolution House vans.)

These rules and the manual are addressed at weekly house meetings led by Evolution House staff; a breach of rules can result in expulsion from the house.

An excellent suggestion raised by one neighbor was that Evolution House make available a contact person, someone in a position of authority who could be reached if nearby residents had complaints or concerns emanating from the Rochambeau Road facility. The contact for such person is as follows: Eric Rhodes, Chief Executive Officer, 3402 Acorn Street, Ste. 101, Williamsburg, VA 23188, 757-705-3202, e.rhodes@evolutionhouse.org

In addition, my client has requested that the SUP conditions imposed by the county include an obligation to update the county as to the current contact person for neighbor concerns related to Evolution House.

2. Resident Screening Process. Perhaps your primary concern expressed regarding the Evolution House SUP was that my client would house dangerous or violent individuals who might harm your families. We explained to you at our meeting the screening process which Evolution House conducts before accepting residents. The facility does not participate in court-ordered rehabilitation efforts or accept residents who have come to Evolution House in lieu of jail sentences.

The unfortunate truth is that applicants to substance abuse recovery programs often have convictions. Evolution House does not admit sexual offenders. We have requested that the Board of Supervisors impose a SUP condition prohibiting admission of sex offenders.

Further, Evolution House screens the criminal history of every resident in order to deny admission to dangerous criminals. My client has requested imposition of a two-approval screening process which would require professionals licensed and regulated by the Commonwealth of Virginia (Licensed Clinical Social Workers, Certified Substance Abuse Counselors and a Licensed Professional Counselor) to approve admission of any resident who has any history of an act of violence. A list of any such residents admitted must be supplied to the Chief of Police and County Planning Director. I have worked with the County Attorney and Zoning Administrator to develop special language for such a SUP condition in order to allay your concerns.

3. Drug Use. Evolution House residents are subjected to drug testing 3 times per week as a condition of continuing their stay at the house. The testing reveals a broad panel of substances. Any drug or alcohol use results in immediate dismissal. You need not be concerned about impaired or intoxicated residents in your neighborhood coming from Evolution House.

4. Property Values. Some expressed concerns at our meeting that locating Evolution House on Rochambeau Road would affect property values.

In response we researched the issue thoroughly and spoke with a local appraiser who is licensed by the Commonwealth of Virginia. The appraiser indicated that standard appraisal practices include adjustments for geographic features, land uses and circumstances surrounding a piece of property which is being evaluated: interstate highways, bodies of water and the like are the subject of industry standard adjustments to value when comparing one piece of real estate to another. The appraiser's research revealed no standard appraisal practices which would call for an adjustment based upon the fact that a substance disorder rehabilitation facility is adjacent or nearby to a subject property.

In addition we identified the enclosed detailed study which was conducted in 2019 by the National Bureau of Economic Research (NBER), a private non-profit research organization which conducts and disseminates nonpartisan economic research to business and governmental entities. That study (report enclosed) found "no statistically significant evidence that [substance use treatment center] entrance into a local area leads to changes in property values." (see page 7 of enclosed report). NBER further states that "the perceived negative effects of [treatment centers] on residential property values may be overstated" (see page 29). Particularly when isolated by the interstate and the commercial use next door to 4622 Rochambeau Road, a facility like Evolution House would not devalue adjacent properties or affect marketability.

5. Approval of Subsequent Owners. The discussion at our neighbors meeting led some to observe that the current leaders and management of Evolution House were responsible, responsive and right minded about operating a recovery facility near your homes. But you were concerned about the future: a sale of the Evolution House business might result in less satisfactory operations and more impacts on you. Some suggested that Evolution House be required to obtain county approval of any buyer or new operator of the Rochambeau Road house.

First and foremost, please know that Evolution House is not a company being built and groomed for sale. Jeffrey Carver and Ryan Whatley founded Evolution House after their own journeys to recovery from substance abuse. Their efforts are mission driven, not profit driven. I am assured that there are no plans for sale of any Evolution House facility or the company as a whole.

A requirement that future operators or a sale be approved by James City County is not possible. If subjected to such a requirement, Evolution House could not borrow money or renew leases: no lender or landlord would contract with a company subject to such restrictions. And Ryan and Jeffrey as founding fathers would face potential limitations on their ability to retire and see the Evolution House success continue.

We have given this request great consideration, but have not been able to find a path to accommodate such an unusual and limiting requirement.

Rest assured that IF a change of ownership occurred, the new operator would be required by state law to obtain licensure and regulation by the Virginia Department of Behavioral Health and Developmental

Services. The VDBHDS has performance standards, undertakes unannounced inspections annually, and imposes a rigorous regulatory procedure on all licensees which can be reviewed in detail at dbhds.virginia.gov. The state can revoke the license of a future operator who fails to meet these standards, shutting down the Evolution House facility.

CONCLUSION

The progress of the SUP application for Evolution House at 4622 Rochambeau Road has been delayed as my client worked with James City County to incorporate your concerns into SUP conditions and operating practices. As the case nears public hearings, please do not hesitate to contact me or Mr. Rhodes (contact information above) with additional comments or questions. Evolution House has operated in your neighborhood for almost 5 years, and hopes to address your comments and concerns as it continues to provide a critical service to our community.

Very truly yours,



Gregory R. Davis

GRD:kl

cc: Eric Rhodes, Chief Executive Officer of Evolution House (via e-mail)
Allison Jackura, James City County Planning (via e-mail)

NBER WORKING PAPER SERIES

SUBSTANCE USE DISORDER TREATMENT CENTERS AND PROPERTY VALUES

Brady P. Horn
Aakrit Joshi
Johanna Catherine Maclean

Working Paper 25427
<http://www.nber.org/papers/w25427>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
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Substance Use Disorder Treatment Centers and Property Values
Brady P. Horn, Aakrit Joshi, and Johanna Catherine Maclean
NBER Working Paper No. 25427
January 2019
JEL No. H0,I1,R3

ABSTRACT

Substance use disorders (SUDs) are a major social concern in the United States and other developed countries. There is an extensive economic literature estimating the social costs associated with SUDs in terms of healthcare, labor market outcomes, crime, traffic accidents, and so forth. However, beyond anecdotal claims that SUD treatment centers (SUDTCs), settings in which patients receive care for their SUDs, have a negative effect on property values, there is scant empirical work on this question. In this paper, we investigate the effect of SUDTCs on residential property values using data from Seattle, Washington, and SUDTC location, entry, and exit information. To mitigate bias from the potential endogeneity of SUDTC location choices, we apply a spatial differences-in-differences (SDD) model, which uses property and SUDTC location to construct treatment and comparison groups. Our findings suggest that SUDTCs endogenously locate in lower value areas, and naïve models imply that the entry of an SUDTC leads to a 3.4% to 4.6% reduction in property values. When an SDD model is applied, we find no evidence that SUDTCs affect property values. Overall, our findings suggest anecdotal claims that SUDTCs reduce property values are potentially overstated.

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1. Introduction

Substance use disorders (SUDs) are chronic health conditions that impose substantial costs, both costs fully internalized by the affected individual and costs externalized to society. For the affected individual, SUDs hinder overall health, employment, financial stability, and relationships, and can lead to incarceration and other legal consequences, and for some, death. In terms of negative externalities, SUDs are incredibly costly to society in terms of direct addiction treatment costs which have historically been financed by public payers within the U.S., increased costs of general healthcare, increased reliance on social services, traffic accidents, and crime and violence (Carpenter 2005; Balsa et al. 2009; French, Fang, and Balsa 2011; Jayakody, Danziger, and Pollack 2000; Anderson, Hansen, and Rees 2013; Markowitz and Grossman 2000; Popovici, Maclean, and French 2017; Terza 2002).

Overall, the annual costs of SUDs to the U.S. are estimated to be very high: \$544B (Caulkins, Kasunic, and Lee 2014).¹ For comparison, government estimates suggest that heart disease and stroke, which are leading causes of mortality and morbidity, are associated with \$359B each year in terms of healthcare costs and lost productivity in the U.S. (Department of Health and Human Services 2018).² Given these high costs, both private and public agents allocate substantial financial resources to curtail SUDs. For instance, the U.S. spends approximately \$28B annually on direct SUD treatment, with 71% of this treatment financed by public payers (Substance Abuse and Mental Health Services Administration 2014).³ While treatment programs are obviously heterogeneous, there is compelling evidence that numerous treatment modalities are clinically effective and cost-effective in reducing SUDs and associated

¹ This estimate is inflated by the authors from the original estimate of \$481B (with \$255B attributable to alcohol and \$226B attributable to psychoactive drugs) in 2011 dollars to 2018 dollars using the Consumer Price Index (CPI).

² Inflated from the original estimate (\$317B in 2011 dollars) to 2018 dollars using the CPI.

³ Inflated by the authors from the original estimate of \$23.4B in 2009 dollars to 2018 dollars using the CPI.

social costs (Collins et al. 2010; Doran 2008; French and Drummond 2005; Holder 1998; McCollister and French 2003; Murphy and Polsky 2016). Moreover, receiving SUD treatment is not uncommon. For instance, in 2016, 3.8M Americans 12 years and older received SUD treatment (Center for Behavioral Health Statistics and Quality 2017).

SUD treatment is generally regarded as valuable to society. However, situating an SUDTC, a setting in which many patients receive care for their SUDs, is often an unpopular and contentious decision. In particular, there is a ‘not in my back yard’ (NIMBY) sentiment, where local residents boycott SUDTC openings as they are concerned that the introduction of an SUDTC may increase noise, traffic, crime, nuisance behavior, and generally unpleasant activities in the neighborhood (Keiger 2016).⁴ These perceived negative attributes of SUDTCs could plausibly translate into reductions in residential property values. As residential properties reflect the most substantial investment that most Americans undertake in their lives (Kraft and Munk 2011), this potential external cost of SUDTCs may result in a considerable reduction in wealth for many individuals and families. In 2016, there were 18,087 licensed SUDTCs in the U.S. (Substance Abuse and Mental Health Services Administration 2017). Thus, if NIMBY concerns are valid, then many individuals and families are exposed to centers that may substantially reduce the worth of their most valuable investment.

While there is a large literature evaluating the extent to which a wide range of both amenities and dis-amenities affect residential property values (Chay and Greenstone 2005; Gawande and Jenkins-Smith 2001; Gibbons 2004; Muehlenbachs, Spiller, and Timmins 2015;

⁴ For instance, recent articles by media outlets in both Massachusetts and New York document the negative sentiment towards SUDTC openings by local residents. We refer an interested reader to the following websites: <https://www.urbancny.com/urban-colonialism-and-how-a-neighborhood-fought-a-development-and-won/>, <https://theswellesleyreport.com/2018/10/wellesley-residents-urge-opioid-treatment-center-reps-to-reconsider-location/> (accessed December 20, 2018).

Pope and Pope 2012; Thaler 1978; Li et al. 2015; Davidoff and Leigh 2008), there is surprisingly little empirical work investigating the effect of SUDTCs. To the best of our knowledge, only one study explores this question. In a real estate study, La Roche, Waller, and Wentland (2014) apply three-stage-least squares to property sales data from Central Virginia over the period 2001 to 2011 to test for SUDTC effects. The authors document that SUDTCs are associated with an 8% reduction in residential property values. The results of La Roche, Waller, and Wentland (2014) suggest a substantial negative effect of SUDTCs on property values and provide *prime facie* support for NIMBY concerns. However, given the identification strategy employed by La Roche, Waller, and Wentland (2014), how best to interpret these findings is unclear. In particular, the three stage least squares approach used by LaRoche and colleagues is identified off non-linearities in the model. Such identification departs from approaches based on quasi-experimental variation that are used in many recent empirical economic studies studying factors that influence property values (outlined in Section 2.1).

Moreover, the net effect of SUDTCs on property value is *ex ante* ambiguous. In addition to the potentially negative aspects of SUDTCs articulated in NIMBY concerns, there are factors associated with SUDTCs that may in fact increase property values. First, if SUDTCs offer effective treatment to neighborhood residents, these facilities can reduce SUD prevalence and associated harms. Swensen (2015) shows that SUDTC entry reduces the level of SUDs, proxied by overdose deaths, within the local area. In terms of reducing costs associated with SUDs, recent economic work by Bondurant, Lindo, and Swensen (2018), and Wen, Hockenberry, and Cummings (2017) shows that SUDTCs reduce crime within the local area. Clinical evidence provides further support for the inverse treatment-crime relationship (Doran 2008; Ettner et al. 2006; McCollister et al. 2003; Rajkumar and French 1997; Westerberg et al. 2016).

Furthermore, Freeborn Fand McManus (2010) document that additional SUDTCs in a county decrease alcohol-related fatal traffic fatalities in that locality. A second pathway through which SUDTCs could raise property values is increased employment opportunities (e.g., hiring SUDTC employees) and economic activity (e.g., demand for SUDTC-related goods and services) within a local area. For instance, in 2016, the average SUDTC employed 22 workers and the economic opportunities for local residents are often touted when a center opens.⁵

Finally, an empirical reason for an observed association between SUDTC entry and property values is the potential endogeneity of SUDTC location choices. If SUDTCs strategically locate in areas with lower (or higher) property values, such sorting could lead to biased estimates of property value effects. This final pathway suggests that any observed correlation between SUDTC entry and property values could be spurious and not causal.

To empirically address endogenous location choices in estimation of amenities and disamenities, several recent studies apply a spatial differences-in-differences (SDD) estimator (Congdon-Hohman 2013; Dealy, Horn, and Berrens 2017; Linden and Rockoff 2008). The SDD model is comparable in many ways to canonical differences-in-differences (DD) methods, which estimate average changes in outcomes in treatment and comparison groups, pre- and post-treatment (Angrist and Pischke 2008). In the SDD model, spatial location information (as opposed to legislatively defined geographic areas or groups defined by their demographics, e.g., age and/or gender) is used to construct the treatment and comparison groups in close proximity to the (dis)amenity. No study has applied an SDD to estimate the effects of SUDTCs.

⁵ Authors' calculation of the 2016 U.S. Census Bureau Community Business Patterns data base for the following industry codes: 621420 (outpatient treatment facilities) and 623220 (residential inpatient treatment facilities) (Swensen 2015; Bondurant, Lindo, and Swensen 2018). More details available on request. Please see the following news article: <https://www.bizjournals.com/dayton/news/2018/12/14/addiction-treatment-center-invests-1m-in-dayton.html> (accessed December 20, 2018).

In this paper, we follow the recent hedonic pricing model literature and estimate the effect of SUDTCs on residential property values using an SDD model. We use granular residential property value and administrative SUDTC data from Seattle, Washington. Specifically, we link property values data over the period 2003 to 2016 with geocoded government administrative data on the exact locations of all licensed SUDTCs in Seattle.

Several findings emerge from our analysis. First, we document that SUDTCs endogenously locate in lower property values areas, which implies that estimates generated in models which do not address such sorting are vulnerable to bias. Second, naïve (non-SDD) models that do not account for endogenous location choices produce estimates that imply a modest, but statistically significant, negative effect of SUDTC entry on property values of 3.4% to 4.6%. Third, when an SDD estimator is used, we find no statistically significant evidence that SUDTC entrance into a local area leads to changes property values. Indeed, in our preferred specifications we can rule out all but modest decreases in property values. Our findings are stable across numerous robustness checks, including alternative distance band specifications and time dynamics. Our findings suggest that anecdotal NIMBY concerns regarding the stigma associated with being located in close proximity to an SUDTC, and related reductions in residential property values, may not be fully warranted.

The paper proceeds as follows. Section 2 provides background on the related residential property value literature, SUDs, and SUDTCs. Our conceptual framework and empirical model are presented in Section 3. Data are reported in Section 4. Section 5 presents our main results and robustness checking. Section 6 concludes.

2. Background

2.1 Background on amenities and dis-amenities, stigma, and residential property values

There is a large and historic hedonic pricing model literature evaluating the effect of various amenities and dis-amenities on residential property values. Comprehensively reviewing this vast literature is beyond the scope of this study. Instead, we attempt to briefly summarize studies most relevant for our research question.

In terms of amenities, access to high quality schools (Davidoff and Leigh 2008), ‘walkability’ (Rauterkus and Miller 2011), diversity (Koster and Rouwendal 2012), and proximity to parks and green spaces (Anderson and West 2006; Voicu and Been 2008) increase residential property values. On the other hand, dis-amenities such as airport noise (Espey and Lopez 2000; Pope 2008), forest infestations (Price, McCollum, and Berrens 2010), nuclear waste sites (Gawande and Jenkins-Smith 2001; McCluskey and Rausser 2003a), rail stations (Bowes and Ihlanfeldt 2001), and wildfires (Kalhor et al. 2018) reduce residential property values.

Similarly, undesirable and socially repugnant behaviors by neighborhood residents, which can be viewed as dis-amenities, within the local area have been linked with lower residential property values. In particular, several studies show that increased crime reduces property values (Gibbons 2004; Thaler 1978; Pope and Pope 2012). For instance, Pope and Pope (2012) find a substantial increase in residential property values following the large decline in U.S. crime rates that occurred in the 1990s. Studies also evaluate the effect of convicted sex offenders migrating into a neighborhood on local residential property values. Federal legislation passed in 1996, known as ‘Megan’s Law’, requires that all states create a sex offender registry and make information regarding sex offender residential addresses publicly available. Evaluating this law, Larsen, Lowrey, and Coleman (2003) find a reduction in value of 17% for residential properties in close proximity to sex offenders in Montgomery County, Ohio.

In sum, the hedonic pricing literature documents that many forms of dis-amenities reduce residential property values. In addition to an initial decline in residential property values, several studies provide convincing evidence that this reduction in value persists over time. For instance, several environmental risks leave a permanent, or highly persistent, ‘scar’ on property values (McCluskey and Rausser 2003b). Put differently, even after the dis-amenity is removed from the local area, residential property values persistently remain at a lower level. The particular mechanisms behind a scaring effect are not entirely clear and are likely heterogeneous across dis-amenities, but this phenomena suggests that affected property owners may persistently own a less valuable asset. Given the importance of residential properties for overall wealth and financial well-being, permanent reductions in property values are concerning.

A key empirical challenge in estimating the effect of any local (dis)amenity on property values is the potential endogeneity of (dis)amenity location. Put differently, amenities and dis-amenities, including SUDTCs, are not likely to be randomly assigned across neighborhoods and instead are plausibly located based on the (presumably) rational decisions of economic agents; in our context SUDTC owners and operators. Taking such systematic location selection into account, Linden and Rockoff (2008) reevaluate the effect of sex offenders on property values using an SDD estimator, which creates treatment and comparison groups based on geographic distance to the sex offender location. Applying this model to data from Mecklenburg County, North Carolina, the authors document that, on average sex, offenders locate in lower property value areas, and failure to account for these endogenous location choices can lead to a substantial overestimate of the effect of a sex offender on property values. After accounting for the endogenous location of offenders, Linden and Rockoff find that the arrival of sex offender within

a neighborhood reduces the average residential property values by 4%. This estimate is less than one quarter of the Larsen et al (2003) non-SDD estimate of a 17% reduction in property values.

The SDD approach has also recently been used to study the effect of several other dis-amenities on residential property values. Congdon-Hohman (2013) and Dealy, Horn, and Berrens (2017) use this technique to study the effect of clandestine methamphetamine laboratories ('meth labs') on property values. The production of meth involves the combination of explosive and deadly chemicals; this process is harmful to health. Both studies show that meth labs endogenously locate in lower value areas and a significant decrease in property values associated with lab discovery. Dealy, Horn, and Berrens (2017) also identify a stigma effect: property values of residences surrounding the meth lab remain persistently lower even after the lab is fully decontaminated following a state-mandated environmental clean-up process. Stigma effects suggest that the dis-amenity permanently, or at least persistently, alters neighborhood characteristics (real or perceived) in a way that reduces the value of nearby properties. For instance, clandestine meth labs may result in lingering environmental toxins in the neighborhood that persistently harm (or are perceived to harm) residents' health.

Brooks, Humphreys, and Nowak (2016) study the effect of strip clubs on residential property values in Seattle, Washington – the same location that we examine – using an SDD model. The authors find that club openings and closing have no statistically significant effect on the value of nearby residences. This study is important for our work as it focuses a dis-amenity that may plausibly impose similar costs and benefits on the neighborhood as an SUDTC.

Our contribution to this literature is twofold. First, we examine the effects of SUDTCs on property values using an SDD estimator which will allow us to account for endogenous

location choices and hence recover causal estimates of SUDTC effects on residential property values. Second, we test for potential stigma effects associated with SUDTCs.

2.2 Background on SUDs and SUDTCs

In 2016, 20 million U.S. residents 12 years and older, or 7.5% of the population, met diagnostic criteria for an SUD (Center for Behavioral Health Statistics and Quality 2017).

According to the American Psychiatric Association (2013) SUDs ‘occur when the recurrent use of alcohol and/or drugs causes clinically and functionally significant impairment, such as health problems, disability, and failure to meet major responsibilities at work, school, or home.’

Afflicted individuals may act out in violent and reckless ways, and turn to illegal activities to procure funds to purchase substances. Many individuals with an SUD have co-occurring mental illness (Grant, Stinson, Dawson, Chou, Dufour, et al. 2004; Grant, Stinson, Dawson, Chou, Ruan, et al. 2004), which plausibly exacerbates substance-related problems.

In addition to individuals meeting the clinical definition of an SUD, millions of Americans engage in risky substance misuse such as binge drinking, heavy drinking, and nonmedical use of prescription drugs, and are thus at risk of developing an SUD.⁶ For instance, in 2016, 24.5% and 6.0% of U.S. residents 12 year and older were classified as binge and heavy drinkers respectively, while 10.6% of adults used illicit drugs in the past 30 days (Center for Behavioral Health Statistics and Quality 2017).

Given the high levels of substance misuse, unintentional fatal alcohol poisonings and (overall) psychoactive drug overdoses are the leading causes of injury death in the U.S. with over

⁶ According to the Centers for Disease Control and Prevention (CDC), binge drinking is defined as consuming five (four) or more drinks in one drinking session for men (women) while heaving drinking is defined as drinking two (one) or more drinks per day for men (women). Non-medical use of prescription medications is defined as the use of medications without a prescription from a healthcare provider, use of the medication in a manner other than as directed (e.g., taking a higher dosage than prescribed), and/or use only for the medication’s psychotropic experience.

58,000 deaths in 2016, which exceeds the deaths attributable to suicides, traffic accidents, and firearm-related accidents (Centers for Disease Control and Prevention 2018a). Further, the U.S. is currently experiencing an unprecedented rise in SUD-related mortality, largely due to OUD overdoses (Rudd et al. 2016). For instance, each day there are 115 OUD-related overdose deaths and this rate has more than quadrupled since 1999 (Centers for Disease Control and Prevention 2018b). The rise in OUD and associated harms has prompted the federal government to declare that the country is experiencing an ‘opioid epidemic’ (Centers for Disease Control and Prevention 2018b) and allocate billions of dollars in financing to support OUD prevention, treatment, and harm reduction (114th U.S. Congress 2015).

Although SUDs are incredibly harmful, numerous treatment modalities have been shown to be effective in treating these conditions (Collins et al. 2010; Doran 2008; French and Drummond 2005; Holder 1998; McCollister and French 2003; Murphy and Polsky 2016; Schori 2011). In 2016, 3.8M Americans ages 12 years and older received some form of SUD treatment (Center for Behavioral Health Statistics and Quality 2017). However, addiction specialists contend that treatment is substantially underused: only 10% of individuals who meet diagnostic criteria for an SUD receive treatment in any given year (Center for Behavioral Health Statistics and Quality 2017). While there are myriad reasons for not seeking treatment, including not wanting to stop using substances, inability to locate a provider is a commonly stated barrier. Taking this reason for not receiving treatment at face value, expanding the number of providers (including the specialized SUDTCs that we examine in our study) could increase treatment uptake and, in turn, reduce SUD prevalence and associated harms. Further, allowing providers to locate in areas that are convenient to patients may enhance treatment uptake and outcomes.

SUD treatment often begins with detoxification, a process that many times involves the use of medications to ease withdrawal symptoms (e.g., tremors, pain, and nausea) and allows the body to rid itself of substances. After detoxification is complete, there are a wide range of effective treatment options available to patients. For example, counselling services, outpatient care, residential treatment, and inpatient hospital care are all widely used, and in many cases, highly effective treatment modalities. In our analysis we focus on care that is offered in specialized outpatient and inpatient treatment centers (residential facilities and psychiatric hospitals). This modality of care represents the majority of care received within the U.S. Further, specialty care involves patients residing in the center and/or regularly visiting the center for an extended period of time (e.g., a common treatment duration is 30 days), and SUDTCs are large in size with approximately 88 patients on any given day receiving treatment.⁷ Thus, if NIMBY concerns exist, we contend that they are most likely to be observed in this the type of care we consider in this study. We do not consider office-based care or treatment received in non-psychiatric hospitals. We refer interested readers to an excellent review of treatment modalities available to patients provided by the National Institute on Drug Abuse (2018).

3. Conceptual framework and empirical approach

3.1 Hedonic pricing model

Our empirical analysis, outlined below, is grounded in hedonic pricing theory. Within this framework residential properties are viewed as assets that provide owners with a bundle of characteristics that, in turn, affects utility. The characteristics that define the residential property as an asset include structural attributes (e.g., property size and quality; S_i) and neighborhood

⁷ Authors' calculation based on the National Survey of Substance Abuse Treatment Services (N-SSATS).

attributes (e.g., schools and parks; N_i). We augment the standard hedonic pricing framework to incorporate proximity to an SUDTC (Q_i) as a residential property attribute that affects utility.

Rational consumers are assumed to choose the residential property that maximizes their utility function subject to a standard budget constraint. At market equilibrium, residential property i will sell at price P_i according the following pricing equation:

$$P_i = f(S_i, N_i, Q_i) \quad (1)$$

The effect of each attribute on price is simply the partial derivate of that attribute with respect to price in Equation (1): $\partial P_i / \partial X_i$ where $X_i \in \{S_i, N_i, Q_i\}$. All else equal, we expect amenities (e.g., larger properties and good schools) to increase values and dis-amenities (e.g., poor quality properties and limited access to parks) to reduce values.

As noted in Section 1, the relationship between proximity of a residential property i to an SUDTC (Q_i) has an ambiguous effect the price (P_i). SUDTCs are associated with numerous factors in the local area that could have both positive (e.g., reduced SUD prevalence, and increased employment opportunities and demand for local goods and services) and negative (e.g., crime, violence, traffic, noise pollution, and nuisance behaviors) effects on property values, leaving the net effect unclear. While we are not able to separately estimate each of the possible pathways through which SUDTCs could influence residential property values, our objective is to provide an estimate of the overall average SUDTC effect, which is a first order question.

3.2 SDD model

We apply an SDD model to test for the causal effect of SUDTCs on proximal property values. The treatment and comparison groups are constructed using geographic distance bands, or ‘rings’, surrounding each SUDTC. Residential properties located within a ring with radius r around the SUDTC form the treatment group. Residential properties located in a second

concentric ring, with radius $k = r + \varepsilon$ with $\varepsilon > 0$, form the comparison group. This identification strategy compares properties adjacent to an SUDTC with a comparison group of properties in very close proximity to, but just far enough away, so as to be unaffected by the SUDTC.

Figure 1 displays an example of a location-defined treatment group and comparison group. In our main specifications, we define the treatment group as those properties within 0.2 miles of a SUDTC as the treatment group and define those properties 0.2 to 0.4 miles from an SUDTC as the comparison group. Clearly the true geographic definitions of the treatment and comparison group are *a priori* unknown, and any selected definition is to some extent arbitrary. Moreover, it is plausible that the true definition varies across (dis)amenties (e.g., clandestine methamphetamine labs, parks, schools, and sex offenders) and, indeed, different studies use different distances (see studies applying an SDD cited in Section 2.1). Thus, in robustness checks, and following Dealy, Horn, and Berrens (2017), we re-estimate our SDD regressions using alternate distance-ring specifications. Results (reported later in the manuscript) are highly robust across these alternative specifications, which supports the hypothesis that our findings are not driven by selection of a specific treatment and comparison group combination.

Specifically, we apply the following SDD model:

$$\ln(P_{i,j,t}) = X_{i,j,t}\beta + (\theta_1 D_{i,j,t}^{0.2} + \theta_2 D_{i,j,t}^{0.4}) + (\theta_3 D_{i,j,t}^{0.2} + \theta_4 D_{i,j,t}^{0.4})\tau_{i,t}^{entry} + \alpha_{j,t} + \varepsilon_{i,j,t} \quad (2)$$

In this equation, $P_{i,j,t}$ is the inflation adjusted sales price, where i indicates an individual property, j indicates the location of the property (i.e., zip code) and t indicates the time period (i.e., year) in which the property is sold. We take the logarithm to account for skewness in sales prices. In terms of explanatory variables, $X_{i,j,t}$ is vector of property characteristics, $\alpha_{j,t}$ is a vector of year-by-area fixed effects, and $\varepsilon_{i,j,t}$ is the error term.

We cluster standard errors at the zip code level. We have 34 zip codes in our sample, which implies that we may have too few clusters in our data to generate consistent estimates of our standard errors. However, in robustness checking reported later in the manuscript, we show that our results are not appreciably different if we instead apply a wild-cluster bootstrap approach to inference that has been shown to produce consistent standard error estimates when the number of clusters is small (Cameron and Miller 2015).

We also estimate a variant of Equation (2) in a ‘limited sales sample’ which includes only property sales that occur within 0.4 miles of an SUDTC. Thus, sales that occur outside the treatment and comparison groups are excluded from this analysis sample. In this specification we include year-by-SUDTC fixed effects, and cluster standard errors at the SUDTC level. We have 114 clusters in this specification. While the full sample is more common in the extant hedonic pricing model literature, the limited sales sample is more analogous to the canonical DD model in which all localities are either in the treatment or comparison group. For these reasons, we present results based on both samples and specifications. Our results are not appreciably different across these two specifications, however.

The treatment group is indicated by $D_{i,j,t}^{0.2}$, which represents properties within 0.2 miles of where an SUDTC is located and the comparison group is indicated by $D_{i,j,t}^{0.4}$, which represents properties within 0.4 miles of where an SUDTC is located. Due to the overlapping structure of the distance variables, θ_2 captures preexisting level differences in properties within 0.4 of an SUDTC compared with properties more than 0.4 miles away from an SUDTC. Analogously, θ_1 will capture preexisting level differences in property values for residences located within 0.2 miles of an SUDTC and properties located within 0.2 to 0.4 miles of an SUDTC. These variables are akin to the ‘treatment’ indicator in a canonical DD model. The timing of SUDTC

opening is captured by $\tau_{i,t}^{entry}$, which indicates the time period after the SUDTC enters a local area and parallels the ‘treatment*post’ interaction in the canonical DD model. The parameter of interest (θ_3) estimates the change in property values for properties within 0.2 miles of an SUDTC relative to properties 0.2 to 0.4 miles and θ_4 will capture any time trends associated with properties in the general vicinity of where an SUDTC locates.

As noted in Section 2.1, another important consideration when estimating the effect of SUDTCs on property values is stigma, or a potential lasting effect of an SUDTC on proximal residential property values after the SUDTC has exited the local area. To test for stigma effects, we estimate an augmented version of Equation (2) that incorporates SUDTC exits:

$$\ln(P_{i,j,t}) = X_{i,j,t}\beta + (\theta_1 D_{i,j,t}^{0.2} + \theta_2 D_{i,j,t}^{0.4}) + (\theta_3 D_{i,j,t}^{0.2} + \theta_4 D_{i,j,t}^{0.4})\tau_{i,t}^{entry} + (\theta_5 D_{i,j,t}^{0.2} + \theta_6 D_{i,j,t}^{0.4})\tau_{i,t}^{exit} + \alpha_{j,t} + \varepsilon_{i,j,t} \quad (3)$$

In this specification $\tau_{i,t}^{exit}$ is an indicator variable for the time period after an SUDTC exits, and θ_5 will capture any rebound effect on property values of the SUDTC exiting. Thus, $\theta_3 + \theta_5$ will represent any lasting stigma effect of an SUDTC on property values. Stigma effects may occur if, for instance, SUDTCs permanently reduce SUD prevalence within the neighborhood, then this change could reduce SUD-related behaviors (crime, violence, etc.). On the other hand, if an SUDTC permanently draws individuals with SUDs and who engage in crime, violence, nuisance behaviors, and so forth into the neighborhood, then we may observe persistently lower residential property values. We test for such effects through Equation (3). We investigate joint significance of these terms with an F -test.

4. Data

4.1 Residential property sales data

We use all residential property transactions in Seattle, Washington between January 1st, 2003 and December 31st, 2016 in our analysis. In 2016 Seattle was the 18th largest city in the U.S., with 704,352 residents, and was the largest city in Washington State. Thus, our effects are representative of a large, Pacific coast U.S. city. We obtained residential property sales data from the King County Department of Assessments (Seattle is located in King County). This agency provides detailed property sales through its online platform.⁸ These data include all legal sales that occurred in the county, and contain the exact location and sales price. In particular, in Seattle all residential property sales are required to be registered with the Department of Assessments. We convert all sales prices to 2016 dollars using the Consumer Price Index.

The King County Department of Assessments data also contain a wide range of property characteristics including: the number of living units, number of stories, number of bedrooms, number of bathrooms, total living space, percentage of the property constructed with brick stone, whether the property had been renovated prior to its sale, and the age of the property. Also, the data contain square footage information for the basement, garage, porch, and deck. For all properties, the King County Department of Assessment provides a variable that captures building quality. This variable ranges from 1 to 20, where higher values indicate greater property quality.

We exclude some observations from the analysis sample to minimize outliers and remove other observations unlikely to be actual residential properties. Observations with sale price less than \$50,000 ($n=1,157$) and above \$2 million ($n=926$) are excluded. Likewise, observations with no bathrooms ($n=1,043$), no bedrooms ($n=80$), and living space less than 100 square feet ($n=7$), and observations sold pre-construction ($n=4,248$) are excluded. After exclusions, the final analysis dataset contains 131,862 residential property sale transactions.

⁸ These data are publicly available: <http://info.kingcounty.gov/assessor/DataDownload/default.aspx> (last accessed, December 20, 2018).

4.2 SUD treatment centers (SUDTCs)

We obtain SUDTC information from the Substance Abuse and Mental health Services Administration's (SAMHSA) National Directory of Drug and Alcohol Abuse Treatment Programs (NDDAATP).⁹ This directory includes all licensed specialty SUDTCs that are known to SAMHSA and complete the National Substance Abuse Treatment Services Survey (N-SSATS). The N-SSATS is used by SAMHSA to monitor SUD treatment service provision within the U.S.; we do not use the N-SSATS information directly in our study.

The NDDAATP is the premier resource available to prospective patients and providers seeking a center that can provide specialized SUD treatment for themselves, their family members, or their patients. Given the importance of being listed on this directory for SUDTCs, response rates for N-SSATS (which forms the survey frame for the NDDAATP) are very high: 91% to 96% over our study period. The NDDAATP directories include the name, exact street address (which we leverage in our study), offered services, and accepted forms of payments for all SUDTCs licensed to provide SUD treatment that are known to SAMHSA. In 2016, there were 18,087 known and licensed specialty SUDTCs in the U.S. (Substance Abuse and Mental Health Services Administration 2017). Thus, we are able to capture the vast majority of licensed specialty SUDTCs using these data. Moreover, the NDDAATP is the only dataset that includes exact location of specialty SUDTCs and is therefore the best available data for our study.

Specialty SUD treatment is defined by SAMHSA as a hospital, a residential facility, an outpatient treatment facility, or other facility with a SUD treatment program. For background,

⁹ Data were accessed from the following website: <https://www.dasis.samhsa.gov/dasis2/nssats.htm> (last accessed December 20, 2018).

this modality represents 75% of non-self-help SUD treatment and reflects the majority of SUD treatment expenditures in the U.S. (Center for Behavioral Health Statistics and Quality 2017).¹⁰

SUDTC opening and closings offer the variation that we use to identify SUDTC effects in our SDD model. Openings reflect the ‘entrance’ of an SUDTC into the neighborhood while closings capture SUDTC ‘exit.’ We use the NDDAATP information to construct a year-by-year panel of all licensed SUDTCs in Seattle. In particular, we link SUDTC entrance and exit information to residential property sales data using geographic information system (GIS) coordinates. Because of the annual structure of the NDDAATP directory (i.e., the N-SSATS, which forms the survey frame, is completed once per year and the NDDAATP is thus updated annually), SUDTC entry (exits) are coded in the year the SUDTC appeared (no longer appeared) in the NDDAATP directories.¹¹ This linking process likely introduces some measurement error into our analysis dataset. We explore the potential implications of such measurement error in robustness checking later in the manuscript.

Residential property sale transactions are matched to SUDTCs both in terms of geodetic distances and timing of the proximate SUDTCs. Over the study period there are 120 SUDTC openings and 69 SUDTC closings in Seattle. On average there are 54 operating SUDTCs in Seattle in a given year.¹² Figure 2 graphically displays all SUDTCs that operated in Seattle over

¹⁰ Authors’ calculations based on Table 5.18B. Self-help involves informal care such as religious counselling and Alcoholics Anonymous. Details on this calculation available on request. Details on specialty SUD treatment can be found at <https://www.dasis.samhsa.gov/dasis2/nssats.htm> (last accessed December 20, 2018).

¹¹ In particular, as noted above, SUDTCs listed on NDDAATP must complete the above-noted N-SSATS survey. The N-SSATS is administered in the last week of March in each year of our study period and captures information on services offered by each SUDTC, including whether or not the facility is in operation. We use March 31st as the date on which SUDTCs opened and April 1st as the date on which they closed. Details available on request.

¹² During our study period, there are three non-psychiatric hospitals that provide SUD treatment listed on the NDDAATP: Swedish Medical Center- Ballard, VA Puget Sound Health Care System, and Seattle Children’s Hospital. Although these hospitals provide SUD treatment, the primary focus of non-psychiatric hospitals is to provide general inpatient healthcare services to patients. We expect that non-psychiatric hospitals may affect residential property values through different mechanisms than outlined in our conceptual framework. We exclude non-psychiatric hospitals providing SUD treatment services from our analysis. Details available on request.

our study period. While there is some evidence of clustering of SUDTCs in the central portion of Seattle, SUDTCs appear to operate in a range of different neighborhoods in the city.

A concern with our analysis is that zoning regulations may limit the locations in which an SUDTC may operate. As is the case with businesses in general, SUDTCs must locate in commercial zones. However, as discussed by La Roche, Waller, and Wentland (2014), there are numerous Federal regulations that prohibit many forms of discrimination in center location (e.g., the Fair Housing Act, Rehabilitation Act, Americans with Disabilities Act). In addition, we have communicated with administrators at the Washington State Substance Abuse Agency regarding zoning regulations related to SUDTC location. Our conversations with administrators at this agency suggest that there are no such regulations that will limit SUDTC location choices. Overall, our review of the available evidences suggests that SUDTCs face no additional (legal) restrictions on location than other businesses.

5. Results

5.1 Summary statistics

Table 1 presents the summary statistics of characteristics for all properties within 0.2 miles of where an SUDTC has located, and properties within 0.2 and 0.4 miles of where an SUDTC locates. Between 2003 and 2016, there was a total of 131,862 residential property sales, 8,982 of which were within 0.2 miles of an SUDTC and 22,671 that were within 0.2 and 0.4 miles. Median sale prices in Seattle are relatively high (\$554K in January of 2016) in comparison to the U.S. median cities (\$182k in January of 2016).¹³ However, Seattle residential property values are comparable to other large U.S. cities such as New York City (\$567K), Los Angeles (\$559K), and San Diego (\$529K); values reflect median prices in January 2016.

¹³ Median home prices are obtained from <https://www.zillow.com/research/data/> (accessed December 20, 2018).

In our sample, the average sale prices for the treatment group (\$471k in 2016 dollars) is approximately 3.4% lower than the full sample. Properties within 0.2 miles of an SUDTC and properties within 0.2 and 0.4 miles of an SUDTC are not identical, in terms of sales price or housing characteristics, but are more similar compared to the full sample. Importantly, we control for all characteristics listed in table 1 in our regressions.

5.2 Graphical evidence

Figure 3 presents a graph of the logarithm of daily sales prices using optimal Epanechnikov kernel smoothing for two-year periods before and after SUDTC entry,¹⁴ for both properties within 0.2 miles of an SUDTC, and between 0.2 and 0.4 miles of an SUDTC. A necessary assumption for the SDD model to recover causal estimates is that the treatment and the comparison groups would have trended similarly in terms of outcomes (residential property sales prices in our context) had the treatment group not been treated (the entrance of an SUDTC in our study); i.e., ‘parallel trends.’ In figure 3, prior to SUDTC entry, we observe that the treatment and comparison groups exhibit generally similar trends, this pattern provides suggestive evidence that the data can satisfy the parallel trends assumption. We return to parallel trends more formally through estimation of an event-study model later in the manuscript. Examination of the trends post-SUDTC entry reveals no evidence of substantial differences between the two groups, which foreshadows our null findings for SUDTC effects on residential property values.

5.3 Non-SDD regression results

Table 2 presents the results for a naïve empirical model that does not account for endogenous SUDTC location choices. Column 1 presents selected parameter estimates from a model estimated with housing characteristics and year fixed effects, column 2 presents selected

¹⁴ In particular, we use local polynomial smoothing with a bandwidth of 35 days. Details available on request.

parameter estimates for a model estimated with housing characteristics and year-zip code fixed effects, and column 3 additionally clusters standard errors at the zip code level. In all models coefficient estimates are negative and significant, suggesting that SUDTCs are associated lower residential property values. Coefficient estimates from table 2 imply that the entrance of an SUDTC in a neighborhood is associated with a 3.4% to 4.6% reduction in property values.¹⁵

5.4 SDD regression results

Table 3 presents testing for endogenous location choices by SUDTCs and the main regression results from our preferred SDD model. First, column 1 presents results from a test for endogenous location choice by SUDTC. In this test observations are dropped if the sale occurred within 0.4 miles of an SUDTC after the SUDTC becomes active (i.e., the only remaining SUDTC observations are before the SUDTC enters). This model allows us to test whether SUDTCs endogenously locate in areas with lower residential property values. Columns 2 and 3 present SDD models estimated using the full sample. Columns 4 and 5 present SDD estimates generated in the limited sales sample, where all observations are dropped that are outside of a 0.4 miles radius of an SUDTC. Columns 2 and 4 present results without the exit parameters, corresponding to Equation (2), and columns 3 and 5 present the results with the exit parameters included, corresponding to Equation (3). A full set of control variable coefficient estimates for the full sample model, including exit parameters, is reported in appendix table 1.

There are two main findings in table 3. First, in column 1 the $D^{0.4}$ parameter estimate is negative and statistically significant, documenting that on average SUDTCs endogenously locate in areas with lower residential property values. In particular, SUDTCs locate in areas with 2.2% lower property values. Second, once this endogeneity in location choice is accounted for through

¹⁵ Semi-log point estimates are converted to percent changes using the following formula: $(\exp^{\hat{\beta}} - 1) \times 100\%$.

the use of the SDD model, we find no statistically significant evidence that SUDTC entries and exits affect residential property values. In both the full and limited sales sample models the parameter estimates are statistically indistinguishable from zero and very small in magnitude. Similarly, exit parameter estimates are statistically indistinguishable from zero and small. Finally, joint F -tests for the joint significance of the entry and exit parameter estimates (which capture stigma effects) are not statistically different from zero.

Our standard errors are sufficiently small that we can rule out all but relatively modest decreases in residential property values following SUDTC entry. For instance, in the basic SDD model in the full sample model reported in column 2, we can rule out decreases in residential property values greater than 3.2% with 95% confidence. Similarly, in the basic SDD model in the limited sales sample, reported in column 4, we can rule out decreases in residential property values greater than 2.2% at this level of confidence. Results based on Equation (3), which incorporates SUDTC entrances and exits, provide similar results: 3.8% and 2.7% respectively.¹⁶ Using these estimates, we can generate 95% confidence intervals for the maximum dollar value reduction in residential property values. Over our study period, the average property value in our treatment group is \$471K (see table 1). Thus, using a 3.8% decline, we can rule out any more than a \$18K in lost residential property values associated with SUDTC entry. Finally, we are able to rule out all but modest increases in values following SUDTC exit as well.

5.5 Robustness checks

We conducted a number of robustness checks to assess the stability of our findings. Overall, our results are highly stable across these additional analyses. First, as noted above, to mitigate bias from endogenous location choices of SUDTCs, we construct treatment and

¹⁶ This specification is more data hungry than Equation (2) and thus our standard errors necessarily increase in size, which implies that larger values are included in our 95% confidence intervals.

comparison groups using geographic proximity to SUDTCs. To this end, in our main analysis, SUDTC distance bands for the treatment and comparison groups are defined as within 0.2 miles and within 0.2 to 0.4 miles of an SUDTC. We re-estimate Equation (2) in which we both expand and contract the distance based used to form the treatment and comparison groups. Results are presented for regressions using 0.1/0.3 miles, 0.1/0.4 miles, 0.1/0.5 miles, 0.2/0.4 miles (our baseline specification), 0.2/0.5 miles, 0.2/0.6 miles, 0.3/0.5 miles, and 0.3/0.6 miles distance band specifications. Table 4a presents results for the full sample and table 4b presents results for the limited sales sample. Treatment-entry and treatment-exit parameter estimates are statistically indistinguishable from zero in all specifications. Joint *F*-tests assessing stigma effects are also statistically indistinguishable from zero in every specification.

Second, we investigate time dynamics in the effects of SUDTC entry/exit on residential property values. As outlined by Wolfers (2006), in a study testing the effects of state unilateral divorce laws, it is plausible that the effect of an SUDTC entry/exit may change over time. Put differently, our primary specification, Equation (3), forces an abrupt change in property values at SUDTC entrance/exit than remains constant thereafter. This pattern may depart from real world SUDTC effects if the social disruption (e.g., crime, noise, traffic) or benefits (e.g., reduced SUD prevalence, increased economic activity) vary over time. To evaluate potential dynamics in the effect of SUDTCs on residential property values, we estimate an event-study model in the spirit of Autor (2003). In particular, we decompose the SUDTC entrance variable into one-year windows both before and after SUDTC entry. The omitted category is one year prior to SUDTC entrance. We impose endpoint restrictions: we assume that effects are not observable more than four years before or after SUDTC entrance (Kline 2012; McCrary 2007). We code all areas in which an SUDTC does not enter as zero for all lead and lag indicators (Lovenheim 2009). In

addition to allowing for dynamic effects in the post-period, the event-study allows us to test a conditional version of the parallel trends tests by examining coefficient estimates on the lead variables. If lead variable coefficient estimates are small in magnitude and imprecise, that pattern of results supports the hypothesis that our data satisfies a conditional version of the parallel trends assumption.

We report event-study results for the full sample and the limited sales sample. As can be observed in figure 4, all event-study point estimates are small and statistically indistinguishable from zero, and no pre- or post-trends are evident. Overall, the event-study analysis suggests: (i) our data satisfy the parallel trends assumption and (ii) there are no dynamic SUDTC effects.

Third, recall that a limitation of the SUDTC data provided by the NDDAATP directory is that the data are only updated yearly (see Section 4.2). Thus, SUDTC entry and exits are only observed on an annual basis, and we will miss some entries/exits in the one-year period between surveys. This data feature may lead to some measurement error in our data; the bias from such error is difficult to sign (Bound, Brown, and Mathiowetz 2001).¹⁷ To explore the empirical importance of this data limitation, we estimate ancillary models in which we exclude observations in the between-directory period where entry and exits could be mis-classified. Results generated in this ancillary analysis are presented in in appendix table 2. The results are not appreciably different from our core specification (table 3).

Fourth, we implement several robustness checks regarding SUDTC heterogeneity, and both fixed-effect and clustering specifications. Specifically, we (i) estimate the effect of multiple SUDTCs within a locality to assess whether there is a dose-response effect of SUDTC entrance;

¹⁷ We attempted to locate exact opening and closing dates through SAMHSA (the agency that manages the NDDAATP) and the Washington State Substance Abuse Agency (the agency tasked with overseeing licensed SUDTCs in Seattle and that provides data to SAMHSA for management of NDDAATP). Collecting exact SUDTC opening and closing dates is not feasible based on our investigations into this issue. Details available on request.

(ii) estimate the effect of SUDTCs that provide methadone treatment;¹⁸ (iii) estimate models using quarter-by-year fixed effects to better capture seasonality in housing sales prices (U.S. Census Bureau 2018); (iv) estimate limited sales sample models with standard errors clustered at the zip code level; and (v) estimate full-sample models using a wild cluster bootstrap approach to estimate standard errors (Cameron & Miller, 2015).¹⁹ Results generated in these alternate specifications are presented in appendix tables 3 to 6. Findings are comparable to our main results (table 3). Finally, we exclude all residential property value variables and re-estimate Equations (2) and (3). We exclude the property-level controls as some of these could plausibly be influenced by SUDTC entrances/exits if – for instance – these entrances/exits alter the composition of residential properties listed for sale, thus leading to over-controlling bias in our estimates (Angrist and Pischke 2008). Results, reported in appendix table 7, are not appreciably different from our adjusted models (table 3).

6. Discussion

SUDs are prevalent and harmful health conditions within the U.S. and other developed countries. Treatment can effectively allow afflicted individuals to obtain abstinence, which additionally can reduce the associated negative societal costs of SUDs. However, SUDTCs require a physical space to occupy. There are anecdotal NIMBY concerns that these centers increase crime, littering, noise, and nuisance behaviors, which stigmatizes these centers and potentially reduces property values for residences in close proximity to the SUDTCs. On the

¹⁸ We study centers that offer OUD treatment – specifically centers offering methadone – as the U.S. is in the midst of an opioid epidemic and how best to address this epidemic is a pressing question facing local, state, and federal governments. We note that buprenorphine is also indicated to treat OUD. However, this medication is generally prescribed in general physicians' outpatient offices and not specialty treatment facilities such as we study here.

¹⁹ In our main specifications we cluster at the SUDTC area and zip code level respectively.

other hand, SUDTCs may increase property values by reducing SUD prevalence and associated behaviors and increasing employment opportunities within the neighborhood.

Given the scope of the SUD epidemic currently facing the U.S., the number of treatment facilities is expanding. For instance in 2003 (the first year of our study) there were 15,124 licensed specialty SUDTC facilities in the U.S. and by 2016 (the last year of our study) this number had risen to 18,087 (Substance Abuse and Mental Health Services Administration 2017, 2004), representing a 20% increase.²⁰ Thus, understanding the implications of SUDTC locations on the values of residential properties, which reflect major financial investments for many Americans, is of growing importance. Further, accurately understanding the effects of SUDTCs on property values is necessary to assess the overall costs of SUDs to society. While much of the literature that explores the costs of SUDs has focused on negative externalities such as crime and/or direct treatment costs, we explore a potential indirect treatment cost: financial spillovers to individuals who reside near an SUDTC.

In this study we provide new evidence on the effect of SUDTCs on residential property values using data from Seattle, Washington from 2003 to 2016, and an SDD estimator that mitigates bias from endogenous SUDTC location choices. We find that SUDTCs endogenously locate in areas with somewhat lower property values (2.2%). When we do not account for endogenous location choice, we find that SUDTCs reduce residential property values by 3.4% to 4.6%. However, after accounting for such location choices through the use of an SDD model, we find no statistically significant evidence that SUDTC entrance or exit influences residential property values. Moreover, our point estimates for both entrances and exits are very small in magnitude. Indeed, in our preferred SDD models we can rule out declines in property values

²⁰ Authors' calculations based on the 2003 and 2016 N-SSATS, details available on request.

following SUDTC entrance larger than 2.2% to 3.8% with 95% confidence. Our SDD estimates are robust to a wide range of specifications and sensitivity checks.

We note that our findings change when we apply the SDD model to account for endogenous location selection on the part of SUDTC owners and operators. In particular, we find no statistically significant evidence that SUDTCs affect property values when we apply the SDD estimator; coefficient estimates decline in magnitude and become statistically indistinguishable from zero. This pattern of results suggests that perhaps the perceived negative effects of SUDTCs on residential property values may be overstated. Previous economic research estimating dis-amenity effects also documents that failure to account for endogenous location choices can lead to estimates biased away from zero (Linden and Rockoff 2008). Our results thus link to a growing literature suggesting that empirical studies account for endogenous location choices when evaluating the effect of both amenities and dis-amenities on property values (Congdon-Hohman 2013; Dealy, Horn, and Berrens 2017; Linden and Rockoff 2008).

Local residents are often concerned that entrance of an SUDTC will impose costs on the neighborhood and, in turn, reduce residential property values. However, our findings suggest that the potential benefits of SUDTCs to the community may offset potential costs, leaving property values unchanged. Notably, SUDTCs reduce the prevalence of SUDs within the local area (Swensen 2015). Additionally, many studies document reductions in crime associated with SUDs treatment, and these effects have a considerable economic impact (Cohen and Piquero 2009; Doran 2008; McCollister et al. 2017; McCollister, French, and Fang 2010). In terms of SUDTCs, Bondurant et al., (2018) and Wen, Hockenberry, and Cummings (2017) show that that SUDTCs reduce both violent and financially motivated crimes in local areas. The social costs (e.g., legal system and healthcare costs) of one murder are very high: \$11M (McCollister et al.

2017).²¹ Finally, our study suggests that cost-benefit analyses of social goods (such as SUDTCs that reduce SUDs for individuals and associated harms to society) should incorporate the potential financial costs to individuals who reside near the location of the social good.

Our study has several limitations. First, we consider only SUDTCs licensed to deliver SUD treatment that are known to SAMHSA and complete the N-SSATS. We suspect that the number of SUDTCs that we miss is small given the importance of being listed on the NDDAATP for attracting patients and that SUDTCs are legally required to be licensed prior to delivering treatment to patients. Second, a critical step in application of the SDD model is selection of a suitable treatment and comparison group combination. In particular, the econometrician must locate a comparison group that can be used to estimate counterfactual trends in residential property values for the treatment group but is untreated by the event. While our results are robust to several alternative distance band specifications, we acknowledge that the most appropriate treatment-comparison group combination is unknown. Third, due to data limitations we are not able to determine the exact date at which SUDTCs enter and exit the market. However, our findings appear to be robust to several sensitivity analyses related to these limitations. Finally, we rely on a single city (Seattle). Moreover, Seattle experienced a large housing boom over our study period, which may alter the effects of dis-amenities. We note that our results are robust to numerous time and location fixed-effect specifications, which should account for non-linear changes in residential property values over time. Future studies are needed in more areas to fully understand the effect of SUDTCs on residential property values.

In summary, our findings shed new light on an important and relatively unstudied potential cost associated with SUDs, potential reductions in the value of housing values in close

²¹ Inflated by the authors from the estimate reported in the original manuscript (\$10,086,337 in 2016) to 2018 dollars using the CPI.

proximity to SUDTCs. We show that previous empirical evidence and anecdotes likely overstated the negative effects of SUDTCs on residential property values. While we did not study this question in our paper, it is possible that stigma against SUDTCs and NIMBY local efforts may have prevented these centers from optimally locating, which may impede treatment effectiveness and, in turn, patient outcomes and exacerbate social costs associated with SUDs.

Table 1: Residential Property Characteristics

Variable	Sample		
	Full sample	Treatment (0.2 miles)	Comparison (0.2 to 0.4 miles)
Sale Price (\$1,000 in 2016 dollars)	487.56 (283.80)	471.02 (259.49)	479.14 (270.10)
More than 1 No. of living unit (1= yes, 0 = no)	0.03 (0.17)	0.07 (0.25)	0.04 (0.20)
No. of Stories	1.37 (0.49)	1.54 (0.60)	1.43 (0.52)
No. of Bedrooms	3.23 (1.00)	3.13 (1.05)	3.20 (1.00)
No. of Bathrooms	1.45 (0.65)	1.48 (0.66)	1.46 (0.66)
Age	58.10 (29.58)	57.69 (36.93)	61.02 (32.26)
Renovated (1= yes, 0 = no)	4.25 (3.22)	4.69 (3.93)	4.76 (3.59)
Total Living (1,000 Square Feet)	1.83 (0.77)	1.71 (0.74)	1.77 (0.73)
Total Basement (1,000 Square Feet)	0.67 (0.53)	0.61 (0.48)	0.63 (0.49)
Total Garage (1,000 Square Feet)	0.17 (0.22)	0.14 (0.20)	0.15 (0.20)
Total Porch (1,000 Square Feet)	0.05 (0.09)	0.05 (0.08)	0.05 (0.09)
Total Deck (1,000 Square Feet)	0.11 (0.17)	0.08 (0.14)	0.10 (0.16)
Percent Brick Stone	7.71 (24.65)	3.89 (17.88)	5.27 (20.64)
Building Grade (quality)	7.25 (0.94)	7.23 (0.93)	7.20 (0.91)
N	131,862	8,982	22,671

Notes: Residential properties can have more than one living unit.

Table 2: Effect of SUDTC Entrance and Exit on Residential Property values: Naïve OLS Model

Model:	(1)	(2)	(3)
Mean value of outcome variable (\$1,000 in 2016 dollars):	487.56	487.56	487.56
$D^{0.2}$	-0.0467*** (0.0054)	-0.0344*** (0.0048)	-0.0344* (0.0181)
Constant	11.7253*** (0.0566)	12.2773*** (0.0568)	12.2773*** (0.0740)
N	131,862	131,862	131,862
adj. R^2	0.533	0.646	0.646
Housing Characteristics	✓	✓	✓
Year FE	✓		
Year $\times$ Zip code Fixed Effects		✓	✓
Zip Code SE Cluster			✓

Notes: Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$.

Table 3: Effect of SUDTC Entrance and Exit on Residential Property values: SDD Results

Model:	(1) Test for Endogenous locations	(2) Full Sample	(3) Full Sample	(4) Limited Sales Sample	(5) Limited Sales Sample
Mean value of outcome variable (\$1,000 in 2016 dollars):	486.65	487.56	487.56	476.84	476.84
$D^{0.2}$	-0.0101 (0.0138)	-0.0079 (0.0136)	-0.0080 (0.0137)	-0.0302** (0.0138)	-0.0304** (0.0137)
$D^{0.4}$	-0.0223* (0.0117)	-0.0225* (0.0126)	-0.0228* (0.0125)		
$D^{0.2} * \tau_{\text{entry}}$		-0.0055 (0.0135)	-0.0111 (0.0143)	0.0098 (0.0161)	0.0064 (0.0172)
$D^{0.4} * \tau_{\text{entry}}$		0.0032 (0.0149)	0.0008 (0.0177)	-0.0094 (0.0188)	-0.0086 (0.0184)
$D^{0.2} * \tau_{\text{exit}}$			0.0198 (0.0164)		0.0134 (0.0142)
$D^{0.4} * \tau_{\text{exit}}$			0.0096 (0.0161)		0.0291 (0.0177)
Constant	12.3972*** (0.0703)	12.2954*** (0.0762)	12.2923*** (0.0761)	12.1320*** (0.1039)	12.1371*** (0.1074)
N	108,128	131,862	131,862	31,653	31,653
adj. R^2	0.651	0.646	0.646	0.630	0.630
Housing Characteristics	✓	✓	✓	✓	✓
Year × Zip code Fixed Effects	✓	✓	✓		
Year Fixed Effects				✓	✓
SUDTC Fixed Effect				✓	✓
Zip Code SE Cluster		✓	✓		
SUDTC area SE Cluster				✓	✓
Restricted to 0.4 miles				✓	✓
Observation within 0.4 miles after SUDTC entry dropped	✓				

Notes: Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$.

Table 4A: Effect of SUDTC Entrance and Exit on Residential Property values: SDD Results with Alternative Distance Band Specifications – Full

	Sample							
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment group	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3
Comparison group	0.3	0.4	0.5	0.4	0.5	0.6	0.5	0.6
Mean value of outcome variable (\$1,000 in 2016 dollars):	487.56	487.56	487.56	487.56	487.56	487.56	487.56	487.56
$D^{\text{Treatment}}$	-0.0168 (0.0177)	-0.0169 (0.0199)	-0.0174 (0.0204)	-0.0080 (0.0137)	-0.0081 (0.0153)	-0.0078 (0.0169)	0.0019 (0.0155)	0.0021 (0.0161)
$D^{\text{Comparison}}$	-0.0199 (0.0142)	-0.0242* (0.0130)	-0.0297* (0.0162)	-0.0228* (0.0125)	-0.0288* (0.0165)	-0.0365* (0.0182)	-0.0295 (0.0182)	-0.0370* (0.0195)
$D^{\text{Treatment}} * \tau_{\text{entry}}$	0.0117 (0.0172)	0.0092 (0.0188)	0.0105 (0.0205)	-0.0111 (0.0143)	-0.0085 (0.0164)	-0.0107 (0.0165)	-0.0081 (0.0178)	-0.0110 (0.0174)
$D^{\text{Comparison}} * \tau_{\text{entry}}$	-0.0044 (0.0209)	-0.0017 (0.0182)	-0.0025 (0.0192)	0.0008 (0.0177)	-0.0014 (0.0192)	0.0013 (0.0192)	-0.0022 (0.0194)	0.0011 (0.0193)
$D^{\text{Treatment}} * \tau_{\text{exit}}$	-0.0035 (0.0251)	0.0029 (0.0280)	-0.0030 (0.0287)	0.0198 (0.0164)	0.0117 (0.0158)	0.0123 (0.0157)	0.0123 (0.0158)	0.0132 (0.0157)
$D^{\text{Comparison}} * \tau_{\text{exit}}$	0.0181 (0.0183)	0.0115 (0.0151)	0.0195 (0.0155)	0.0096 (0.0161)	0.0196 (0.0160)	0.0202 (0.0144)	0.0202 (0.0154)	0.0206 (0.0139)
Constant	12.2830*** (0.0750)	12.2918*** (0.0758)	12.2979*** (0.0754)	12.2923*** (0.0761)	12.2992*** (0.0758)	12.3107*** (0.0745)	12.2960*** (0.0760)	12.3074*** (0.0748)
N	131,862	131,862	131,862	131,862	131,862	131,862	131,862	131,862
adj. R^2	0.646	0.646	0.646	0.646	0.646	0.646	0.646	0.646
Housing Characteristics	✓	✓	✓	✓	✓	✓	✓	✓
Year $\times$ Zip code Fixed Effects	✓	✓	✓	✓	✓	✓	✓	✓
Zip Code SE Cluster	✓	✓	✓	✓	✓	✓	✓	✓

Notes: Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$.

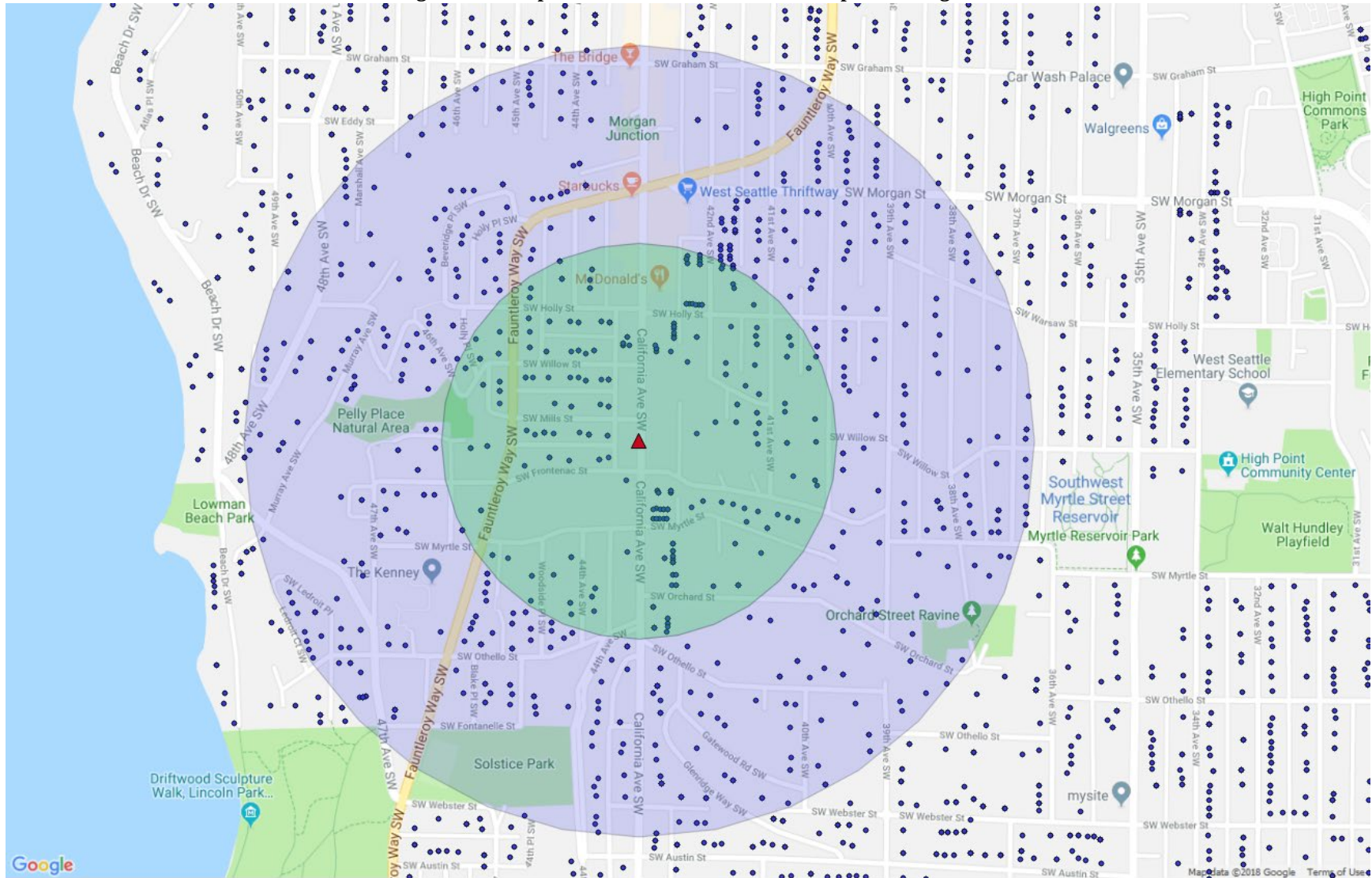
Table 4B: Effect of SUDTC Entrance and Exit on Residential Property values: SDD Results with Alternative Distance Band Specifications – Limited Sales Sample

Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment group	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3
Comparison group	0.3	0.4	0.5	0.4	0.5	0.6	0.5	0.6
Mean value of outcome variable (\$1,000 in 2016 dollars):	473.77	476.84	474.33	476.84	474.33	474.50	474.33	474.50
$D^{\text{Treatment}}$	-0.0406** (0.0161)	-0.0411** (0.0173)	-0.0436** (0.0186)	-0.0304** (0.0137)	-0.0323** (0.0154)	-0.0320* (0.0163)	-0.0097 (0.0105)	-0.0096 (0.0114)
$D^{\text{Treatment}} * \tau_{\text{entry}}$	0.0214 (0.0232)	0.0161 (0.0246)	0.0184 (0.0265)	0.0064 (0.0172)	0.0093 (0.0190)	0.0075 (0.0190)	0.00001 (0.0134)	-0.0025 (0.0131)
$D^{\text{Comparison}} * \tau_{\text{entry}}$	-0.0120 (0.0200)	-0.0067 (0.0184)	0.0003 (0.0176)	-0.0086 (0.0184)	-0.0014 (0.0179)	-0.0009 (0.0174)	-0.0017 (0.0181)	-0.0005 (0.0175)
$D^{\text{Treatment}} * \tau_{\text{exit}}$	-0.0005 (0.0285)	0.0073 (0.0297)	0.0033 (0.0304)	0.0134 (0.0142)	0.0097 (0.0142)	0.0133 (0.0135)	0.0136 (0.0132)	0.0171 (0.0127)
$D^{\text{Comparison}} * \tau_{\text{exit}}$	0.0331* (0.0192)	0.0288 (0.0180)	0.0344** (0.0168)	0.0291 (0.0177)	0.0353** (0.0164)	0.0382** (0.0161)	0.0321** (0.0157)	0.0346** (0.0155)
Constant	11.8386*** (0.3415)	12.1270*** (0.1083)	12.1568*** (0.1149)	12.1371*** (0.1074)	12.1642*** (0.1141)	12.1473*** (0.1010)	12.1461*** (0.1141)	12.1344*** (0.1014)
N	19,390	31,653	43,847	31,653	43,847	56,799	43,847	56,799
adj. R^2	0.636	0.630	0.622	0.630	0.622	0.622	0.622	0.622
Housing Characteristics	✓	✓	✓	✓	✓	✓	✓	✓
Year Fixed Effects	✓	✓	✓	✓	✓	✓	✓	✓
SUDTC Fixed Effects	✓	✓	✓	✓	✓	✓	✓	✓
SUDTC SE Cluster	✓	✓	✓	✓	✓	✓	✓	✓
Restricted to Comparison Region	✓	✓	✓	✓	✓	✓	✓	✓

Notes: Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$.

Figure 1: Example SUDTC Treatment and Comparison Region



Notes: ▲ is the SUDTC Center, ● are the residential properties sales.
 First circle: within 0.2 miles of SUDTC, Second Circle: within 0.2-0.4 miles of SUDTC

Figure 2: SUDTC Locations in Seattle from 2003 to 2016

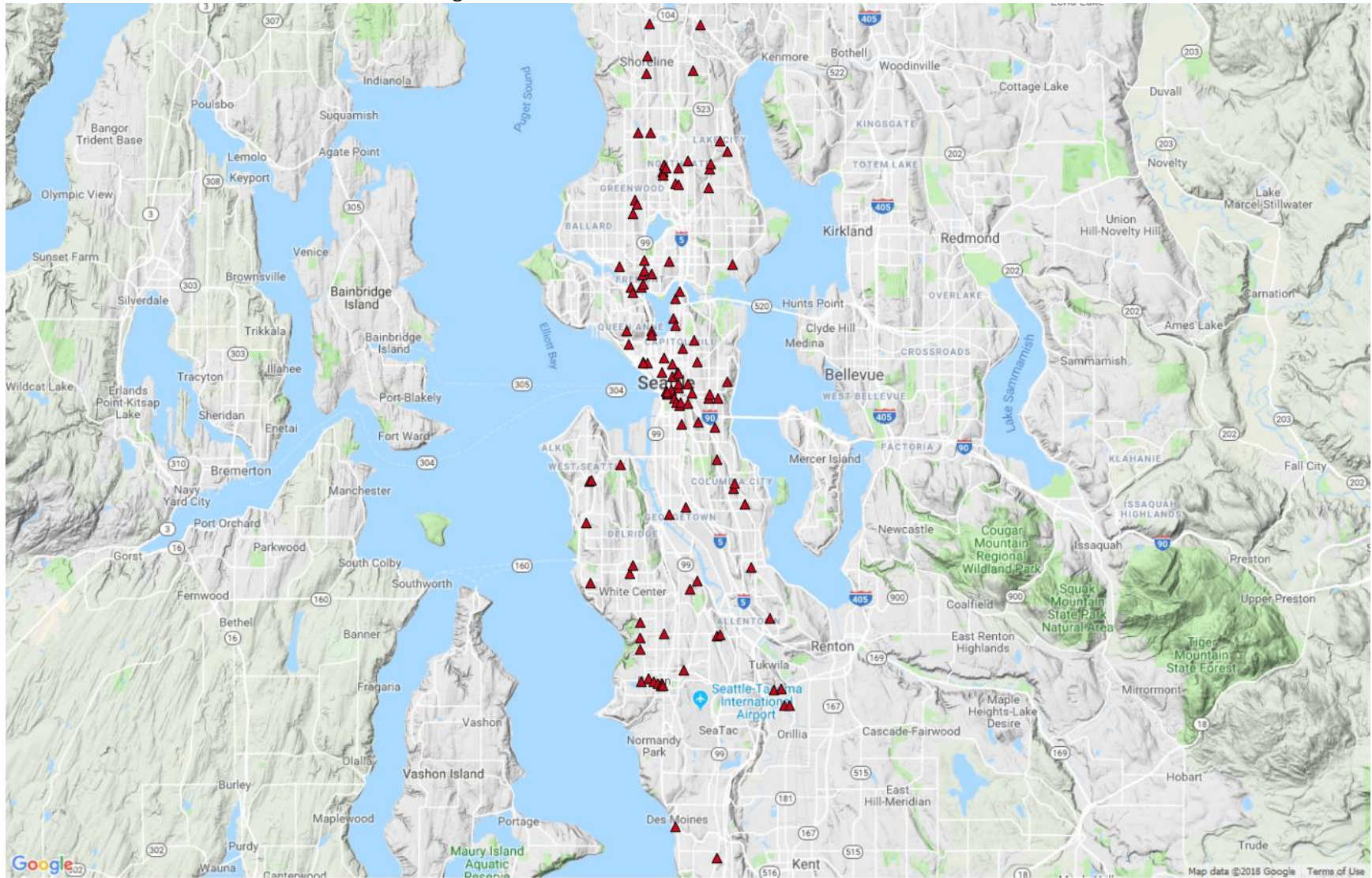
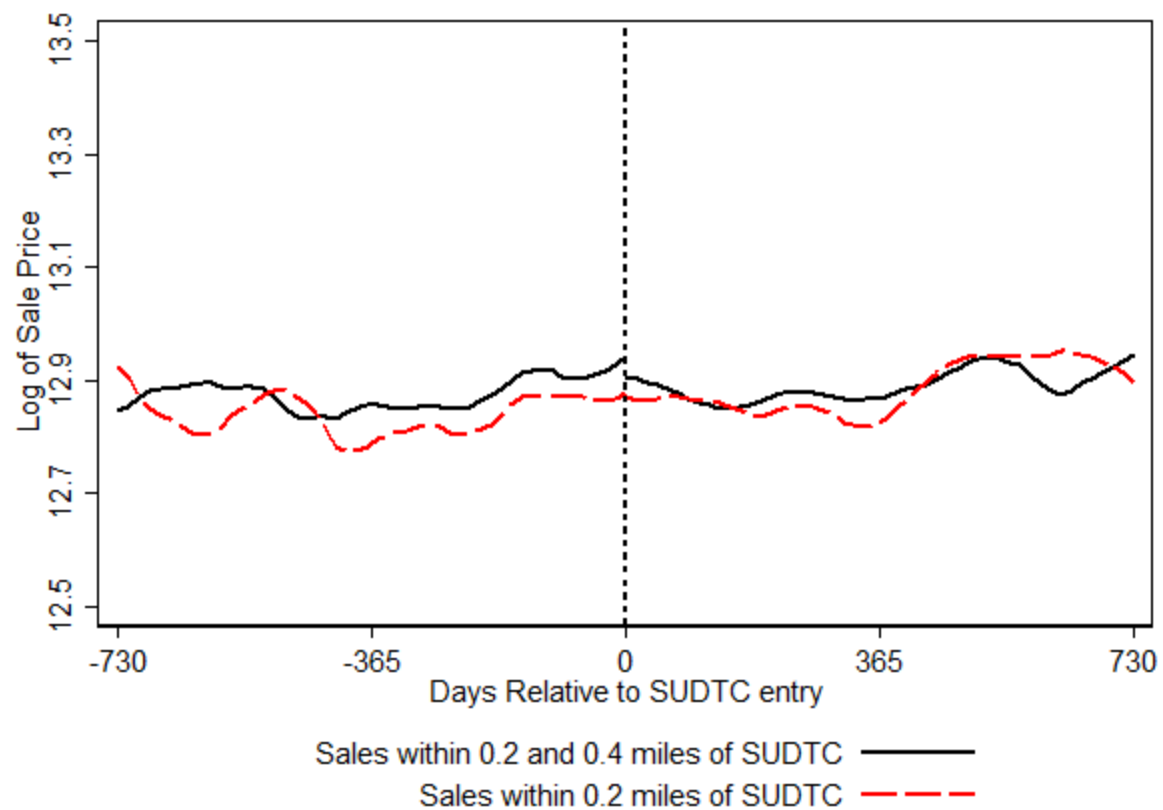
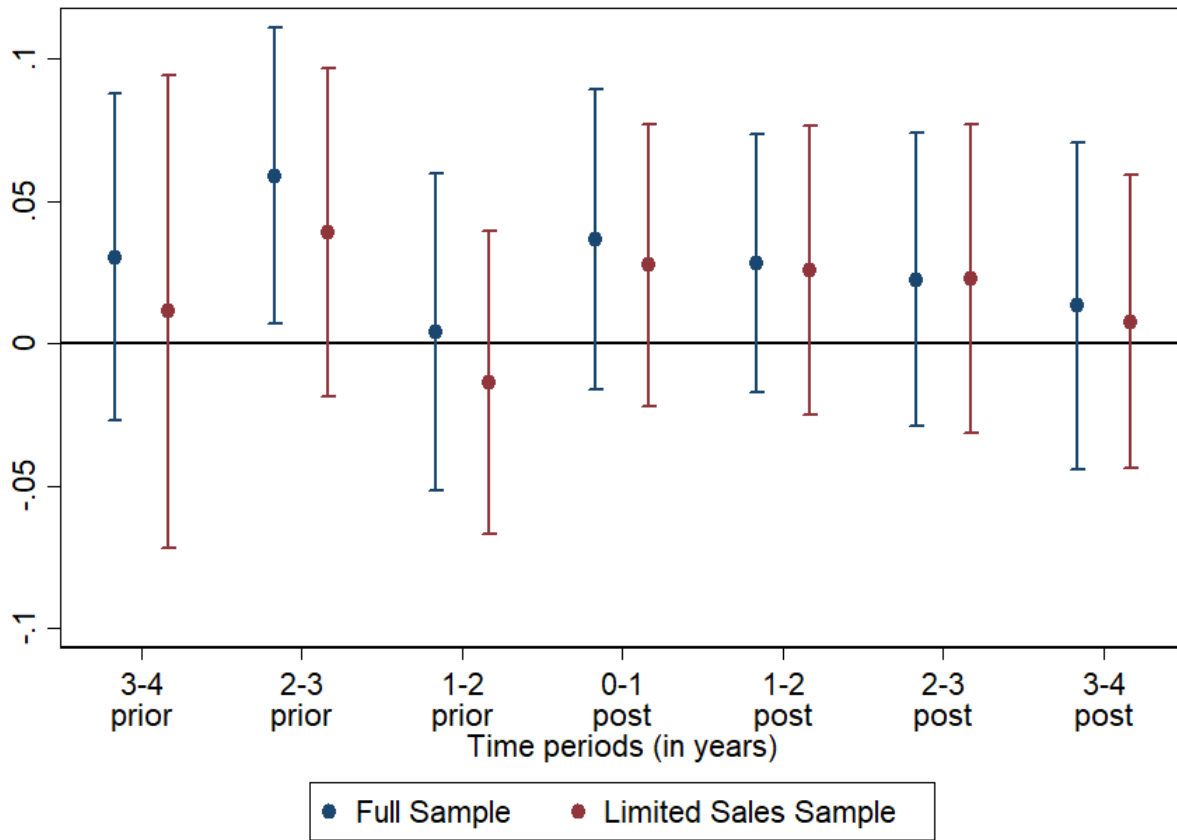


Figure 3: Trends in Residential Housing Prices in Seattle: Pre-and Post- SUDTC Entry



Notes: Data are centered around the SUDTC entry. The treatment group includes residential property sales that occur 0 to < 0.20 miles from an SUDTC. The comparison group includes residential property sales that occur 0.2 to 0.4 miles from an SUDTC. Epanechnikov local polynomial smoothing with bandwidth of 35 days.

Figure 4: Effect of SUDTC Entrance and Exit on Residential Property values: Event-study Coefficients Plotted for Treatment Region (0.2 miles from SUDTC)



Notes: Entry period defined as 0-1 years prior to survey date. Observations restricted to 4-years prior and 4-years post SUDTC entry. The omitted category is 0-1 years prior to SUDTC entry. Mean value of the outcome variable (\$1,000 in 2016 dollars): 487.

Appendix Table 1: Effect of SUDTC Entrance and Exit on Residential Property values: SDD Model Full Set of Control Variable Coefficient Estimate

Control Variable Coefficient Estimates for Column (3) in Table 3	Beta (Standard error)
Mean value of outcome variable (\$1,000 in 2016 dollars):	487.56
More than 1 No. of living unit (1= yes, 0 = no)	-0.0266** (0.0116)
No. of Stories	0.0257*** (0.0079)
No. of Bedrooms	-0.0115*** (0.0033)
No. of Bathrooms	-0.0024 (0.0033)
Age	0.0018*** (0.0005)
Age-squared	-0.0035 (0.0045)
Renovated (1= yes, 0 = no)	0.0578*** (0.0079)
Total Living (1,000 Square Feet)	0.1726*** (0.0060)
Total Basement (1,000 Square Feet)	0.0345*** (0.0063)
Total Garage (1,000 Square Feet)	0.0904*** (0.0104)
Total Porch (1,000 Square Feet)	0.1252*** (0.0199)
Total Deck (1,000 Square Feet)	0.1611*** (0.0146)
Percent Brick Stone	0.0004*** (0.0001)
Constant	12.2923*** (0.0761)
<i>N</i>	131,862
adj. <i>R</i> ²	0.646
Building Grade Variables	✓

Notes: All models estimated with OLS. Standard errors clustered at Zip Code level reported in parentheses.

* $p < .1$, ** $p < .05$, *** $p < .01$.

**Appendix Table 2: Effect of SUDTC Entrance and Exit on Residential Property values: SDD Results
Dropping Observations in the Between-N-SSATS Survey Period**

Model:	(1) Full Sample	(2) Full Sample	(3) Limited Sales Sample	(4) Limited Sales Sample
Mean value of outcome variable (\$1,000 in 2016 dollars):	487.56	487.56	476.84	476.84
$D^{0.2}$	-0.0008 (0.0147)	-0.0008 (0.0147)	-0.0267 (0.0167)	-0.0269 (0.0166)
$D^{0.4}$	-0.0236* (0.0123)	-0.0241* (0.0121)		
$D^{0.2} * \tau_{\text{entry}}$	-0.0135 (0.0136)	-0.0184 (0.0142)	0.0056 (0.0186)	0.0028 (0.0195)
$D^{0.4} * \tau_{\text{entry}}$	0.0047 (0.0145)	0.0016 (0.0172)	-0.0074 (0.0209)	-0.0050 (0.0206)
$D^{0.2} * \tau_{\text{exit}}$		0.0178 (0.0151)		0.0122 (0.0143)
$D^{0.4} * \tau_{\text{exit}}$		0.0125 (0.0153)		0.0332* (0.0175)
Constant	12.2952*** (0.0765)	12.2918*** (0.0764)	12.1243*** (0.1052)	12.1299*** (0.1087)
N	130,380	130,380	30,171	30,171
adj. R^2	0.647	0.647	0.632	0.632
Housing Characteristics	✓	✓	✓	✓
Year × Zip code Fixed Effects	✓	✓		
Year Fixed Effects			✓	✓
SUDTC Fixed Effect			✓	✓
Zip Code SE Cluster	✓	✓		
SUDTC area SE Cluster			✓	✓
Restricted to 0.4 miles			✓	✓
Observation dropped within 0.4 miles for 365 days before entry	✓	✓	✓	✓

Notes: Standard errors in parentheses. Sale observations 365 days before the survey date dropped at control level (0.4 miles). * $p < .1$, ** $p < .05$, *** $p < .01$.

Appendix Table 3: Effect of SUDTC Entrance and Exit on Residential Property values: SDD Results with Alternate Fixed Effect and Clustering Specifications

Model:	(1) Full Sample	(2) Full Sample	(3) Full Sample	(4) Limited Sales Sample	(5) Limited Sales Sample	(6) Limited Sales Sample
Mean value of outcome variable (\$1,000 in 2016 dollars):	487.56	487.56	487.56	476.84	476.84	476.84
$D^{0.2}$	-0.0080 (0.0137)	-0.0043 (0.0157)	-0.0080 (0.0120)	-0.0036 (0.0141)	-0.0295** (0.0135)	-0.0295** (0.0135)
$D^{0.4}$	-0.0228* (0.0125)	-0.0246 (0.0149)	-0.0228* (0.0124)			
$D^{0.2} * \tau_{\text{entry}}$	-0.0111 (0.0143)	-0.0158 (0.0158)	-0.0111 (0.0173)	-0.0156 (0.0138)	0.0073 (0.0142)	0.0073 (0.0169)
$D^{0.4} * \tau_{\text{entry}}$	0.0008 (0.0177)	-0.0034 (0.0192)	0.0008 (0.0046)	-0.0184 (0.0204)	-0.0148 (0.0214)	-0.0148 (0.0181)
$D^{0.2} * \tau_{\text{exit}}$	0.0198 (0.0164)	0.0193 (0.0173)	0.0198 (0.0176)	0.0194 (0.0168)	0.0119 (0.0170)	0.0119 (0.0139)
$D^{0.4} * \tau_{\text{exit}}$	0.0096 (0.0161)	0.0275 (0.0171)	0.0096 (0.0194)	0.0113 (0.0222)	0.0216 (0.0167)	0.0216 (0.0175)
Constant	12.2923*** (0.0761)	12.2558*** (0.0736)	12.4368*** (0.0000)	12.1275*** (0.1785)	12.0576*** (0.1685)	12.0576*** (0.1091)
N	131,862	131,862	131,862	31,653	31,653	31,653
adj. R^2	0.646	0.639	0.646	0.616	0.636	0.636
Housing Characteristics	✓	✓	✓	✓	✓	✓
Year × Zip code Fixed Effects	✓		✓			
Quarter Year Fixed Effects		✓		✓	✓	✓
Zip Code Fixed Effects		✓	✓	✓		
SUDTC fixed effects					✓	✓
Zip Code SE Cluster	✓	✓	✓	✓	✓	
SUDTC SE Cluster						✓
Wild Cluster Boot Strap at Zip Code level			✓			
Restricted to 0.4 miles				✓	✓	✓

Notes: All models estimated with OLS. Standard errors reported in parentheses. Treatment group is defined as all properties sold 0 to <0.2 miles from an SUDTC. Comparison group is defined as all properties sold 0.2 to 0.4 miles from an SUDTC. * $p < .1$, ** $p < .05$, *** $p < .01$.

Appendix Table 4: Effect of SUDTC Entrance and Exit on Residential Property values: SDD Result using Methadone Maintenance and Methadone Detoxification SUDTCs Only

Model:	(1) Full Sample	(2) Full Sample	(3) Limited Sales Sample	(4) Limited Sales Sample
Mean value of outcome variable (\$1,000 in 2016 dollars):	487.56	487.56	476.84	476.84
$D^{0.2}$	-0.0080 (0.0137)	-0.0080 (0.0137)	-0.0303** (0.0137)	-0.0306** (0.0135)
$D^{0.4}$	-0.0225* (0.0126)	-0.0229* (0.0126)		
$D^{0.2} * \tau_{\text{entry}}$	-0.0084 (0.0139)	-0.0160 (0.0145)	0.0075 (0.0166)	0.0027 (0.0178)
$D^{0.2} * \tau_{\text{entry}} * \theta^{\text{Methadone}}$	0.0359 (0.0397)	0.0437 (0.0383)	0.0256 (0.0410)	0.0305 (0.0414)
$D^{0.4} * \tau_{\text{entry}}$	0.0027 (0.0135)	-0.0004 (0.0163)	-0.0122 (0.0199)	-0.0129 (0.0191)
$D^{0.4} * \tau_{\text{entry}} * \theta^{\text{Methadone}}$	0.0049 (0.0353)	0.0084 (0.0354)	0.0214 (0.0217)	0.0358 (0.0241)
$D^{0.2} * \tau_{\text{exit}}$		0.0246 (0.0157)		0.0169 (0.0138)
$D^{0.4} * \tau_{\text{exit}}$		0.0108 (0.0158)		0.0316* (0.0184)
Constant	12.2955*** (0.0765)	12.2918*** (0.0763)	12.1325*** (0.1026)	12.1389*** (0.1062)
N	131,862	131,862	31,653	31,653
adj. R^2	0.646	0.646	0.630	0.630
Housing Characteristics	✓	✓	✓	✓
Year × Zip code Fixed Effects	✓	✓		
Year Fixed Effects			✓	✓
SUDTC Fixed Effect			✓	✓
Zip Code SE Cluster	✓	✓		
SUDTC area SE Cluster			✓	✓
Restricted to 0.4 miles			✓	✓

Notes: Standard errors in parentheses. $\theta^{\text{Methadone}}$ represents SUDTC providing Methadone maintenance and Methadone detoxification service in operation. * $p < .1$, ** $p < .05$, *** $p < .01$.

**Appendix Table 5: Effect of SUDTC Entrance and Exit on Residential Property values: SDD Results
Accounting for Multiple SUDTCs in Proximity to Property**

Model:	(1) Full Sample	(2) Full Sample	(3) Limited Sales	(4) Limited Sales
Mean value of outcome variable:	487.56	487.56	476.84	476.84
D ^{0.2}	-0.0079 (0.0136)	-0.0080 (0.0137)	-0.0302** (0.0138)	-0.0303** (0.0137)
D ^{0.4}	-0.0224* (0.0126)	-0.0228* (0.0125)		
D ^{0.2} * τ_{entry}	-0.0050 (0.0131)	-0.0110 (0.0134)	0.0105 (0.0161)	0.0066 (0.0173)
D ^{0.2} * τ_{entry} * $\theta^{\text{Secondary SUDTC}}$	-0.0099 (0.0347)	-0.0009 (0.0334)	-0.0167 (0.0238)	-0.0057 (0.0237)
D ^{0.4} * τ_{entry}	0.0031 (0.0149)	0.0007 (0.0177)	-0.0097 (0.0189)	-0.0087 (0.0185)
D ^{0.2} * τ_{exit}		0.0197 (0.0155)		0.0131 (0.0139)
D ^{0.4} * τ_{exit}		0.0096 (0.0161)		0.0290 (0.0178)
Constant	12.2952*** (0.0762)	12.2923*** (0.0761)	12.1314*** (0.1041)	12.1369*** (0.1076)
N	131,862	131,862	31,653	31,653
adj. R ²	0.646	0.646	0.630	0.630
Housing Characteristics	✓	✓	✓	✓
Year × Zip code Fixed Effects	✓	✓		
Year Fixed Effects			✓	✓
SUDTC Fixed Effect			✓	✓
Zip Code SE Cluster	✓	✓		
SUDTC area SE Cluster			✓	✓
Restricted to 0.4 miles			✓	✓

Notes: Standard errors in parentheses. $\theta^{\text{Secondary SUDTC}}$ represents other SUDTCs in operation within 0.2 miles.

* $p < .1$, ** $p < .05$, *** $p < .01$.

Appendix Table 6: Effect of SUDTC Entrance and Exit on Residential Property values: SDD Results for Sample with Exit Parameter Suppressed for SUDTC that Entered Multiple Times

Model:	(1) Full Sample	(2) Full Sample	(3) Limited Sales Sample	(4) Limited Sales Sample
Mean value of outcome variable:	487.56	487.56	476.84	476.84
$D^{0.2}$	-0.0079 (0.0136)	-0.0080 (0.0137)	-0.0302** (0.0138)	-0.0300** (0.0139)
$D^{0.4}$	-0.0225* (0.0126)	-0.0230* (0.0125)		
$D^{0.2} * \tau_{\text{entry}}$	-0.0055 (0.0135)	-0.0070 (0.0147)	0.0096 (0.0161)	0.0091 (0.0169)
$D^{0.4} * \tau_{\text{entry}}$	0.0032 (0.0149)	-0.0020 (0.0173)	-0.0094 (0.0189)	-0.0073 (0.0188)
$D^{0.2} * \tau_{\text{exit}}$		0.0069 (0.0142)		0.0038 (0.0143)
$D^{0.4} * \tau_{\text{exit}}$		0.0205 (0.0153)		0.0424** (0.0193)
Constant	12.2954*** (0.0762)	12.2916*** (0.0761)	12.1321*** (0.1041)	12.1368*** (0.1085)
N	131,862	131,862	31,653	31,653
adj. R^2	0.646	0.646	0.630	0.630
Housing Characteristics	✓	✓	✓	✓
Year × Zip code Fixed Effects	✓	✓		
Year Fixed Effects			✓	✓
SUDTC Fixed Effect			✓	✓
Zip Code SE Cluster	✓	✓		
SUDTC area SE Cluster			✓	✓
Restricted to 0.4 miles			✓	✓
Exit parameter suppressed for SUDTC with multiple entry	✓	✓	✓	✓

Notes: Standard errors in parentheses. SUDTC with multiple entry at the same locations are considered to have never left the location. * $p < .1$, ** $p < .05$, *** $p < .01$.

**Appendix Table 7: Effect of SUDTC Entrance and Exit on Residential Property values: SDD Results
Excluding Residential Property Controls**

Model:	(1) Full Sample	(2) Full Sample	(3) Limited Sales Sample	(4) Limited Sales Sample
Mean value of outcome variable (\$1,000 in 2016 dollars):	487.56	487.56	476.84	476.84
$D^{0.2}$	-0.0343 (0.0235)	-0.0344 (0.0235)	-0.0639*** (0.0222)	-0.0641*** (0.0220)
$D^{0.4}$	-0.0728*** (0.0257)	-0.0734*** (0.0257)		
$D^{0.2} * \tau_{\text{entry}}$	-0.0003 (0.0203)	-0.0095 (0.0237)	0.0291 (0.0259)	0.0226 (0.0277)
$D^{0.4} * \tau_{\text{entry}}$	0.0199 (0.0302)	0.0158 (0.0329)	-0.0028 (0.0206)	-0.0011 (0.0203)
$D^{0.2} * \tau_{\text{exit}}$		0.0324 (0.0419)		0.0235 (0.0336)
$D^{0.4} * \tau_{\text{exit}}$		0.0162 (0.0285)		0.0258 (0.0211)
Constant	13.4539*** (0.0145)	13.4490*** (0.0154)	12.8962*** (0.0101)	12.9038*** (0.0106)
N	131,862	131,862	31,653	31,653
adj. R^2	0.403	0.403	0.466	0.467
Year $\times$ Zip code Fixed Effects	✓	✓		
Year Fixed Effects			✓	✓
SUDTC Fixed Effect			✓	✓
Zip Code SE Cluster	✓	✓		
SUDTC area SE Cluster			✓	✓
Restricted to 0.4 miles			✓	✓

Notes: Standard errors in parentheses. * $p < .1$, ** $p < .05$, *** $p < .01$.

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Approved Minutes of the July 2, 2025, Planning Commission Regular Meeting

Ms. Allison Jackura, Senior Planner, addressed the Commission stating that Mr. Greg Davis had applied on behalf of Evolution House, LLC, to operate a group home with more than eight individuals at 4622 Rochambeau Drive. Ms. Jackura explained that the property is zoned A-1, General Agricultural, designated Rural Lands by the Comprehensive Plan, and is located outside of the Primary Service Area (PSA). Ms. Jackura noted that the building was previously used as a doctor's office and has an improved driveway, septic system, and Best Management Practice (BMP).

Ms. Jackura reminded the Commission that the Fair Housing Act prohibits discrimination in housing based upon a person's disability, and recovering from addiction is considered a disability. Ms. Jackura noted that an SUP is required to operate a group home with more than eight people in the A-1, General Agricultural Zoning District.

Ms. Jackura explained that the applicant had requested to have up to 16 residents with staff on-site at all times. Ms. Jackura noted that no exterior changes had been proposed, and parking would be in the existing parking lot from the former doctor's office. Ms. Jackura stated that the Comprehensive Plan has housing goals to support diversity of housing, and this project would provide a valuable housing resource for those with disabilities.

Ms. Jackura stated that staff recommended approval of the application subject to the proposed conditions.

Mr. Haldeman disclosed that he had spoken to the applicant's attorney prior to the meeting.

Mr. Haldeman opened the Public Hearing.

Mr. Greg Davis of Kaufman & Canoles P.C. 4801 Courthouse Street, Williamsburg, VA, addressed the Commission stating that he was representing Evolution House, LLC. Mr. Davis explained that Evolution House fulfills a critical need for the County as it provides a local option for residents. Mr. Davis noted that Evolution House has a success rate 30% higher than the national average, due to the focus on group spaces. Mr. Davis stated that the applicant had invested in bringing Evolution House to compliance based on the building code and fire safety violations.

Mr. Davis explained that Evolution House was located next to a contractor storage yard and noted the fences currently on the property. Mr. Davis stated that per the SUP conditions, either a fence or No Trespassing signs would be required between Evolution House and the neighboring contractor storage yard.

Mr. Davis stated that a meeting between Evolution House and the neighboring properties had been held to receive feedback on the proposed project. Mr. Davis explained that the neighbors were concerned with pedestrians wandering over from the Evolution House. Mr. Davis stated that in response to those concerns, Evolution House imposed stricter curfew rules, where any trespassing and interfering with the neighbors would result in expulsion from the house. Mr. Davis continued, stating that no sex offenders were permitted and two levels of screening by licensed professionals of any house members with felony charges would be required by the SUP conditions.

Mr. Davis stated that Evolution House prohibits drug and alcohol use, and each resident is required to test three times a week. Mr. Davis explained that Evolution House has a zero-tolerance policy, and any member who tests positive for drugs or alcohol would be subject to discharge.

Mr. Davis stated that Evolution House would be staffed 24/7 by trained professionals, as required by the SUP conditions.

Mr. Davis explained that there would be limited impacts on traffic, as residents were not able to bring their own vehicles to Evolution House. Mr. Davis noted that Evolution House uses passenger vans to take members off property for therapy, recreation, etc.

Mr. Davis stated that the neighbors were concerned about the impact of Evolution House on property values. Mr. Davis stated that a consulting group had completed a study concluding that the presence of a group home, such as Evolution House, had no impact on property values.

Mr. Davis explained that Evolution House would remain accountable for its members by including SUP conditions that required an annual report to the Police Chief of any screened and admitted convicted felons. Mr. Davis stated that an annual report to the Zoning Administrator of the daily count of residents would be required per the SUP conditions, to ensure the number of residents did not exceed the allotted amount. Mr. Davis noted that a contact person for neighboring property owners to call if any issues arose had been arranged and included in the SUP conditions.

Mr. Davis stated that the neighboring residents did request a condition where the County would review the SUP periodically, or any transfer of the property, but it was decided it would not be agreeable.

Mr. Robert Faillace, 3806 Summit Loop, Williamsburg, VA, addressed the Commission in support of the proposed project.

Ms. Marie Miller, 3405 Liberty Ridge Parkway, Williamsburg, VA, addressed the Commission in support of the proposed project.

Mr. Cole Sanderson, 117 Winston Drive, Williamsburg, VA, addressed the Commission in support of the proposed project.

Mr. Haldeman closed the Public Hearing.

Mr. Polster stated he had concerns about the impact of the proposed project on the nearby property owners but was impressed by the documentation provided of the community meeting and the replies the applicant provided to the neighbors in response to their concerns. Mr. Polster then commended the applicant for adding the SUP condition that required a contact for Evolution House and stated he was supportive of the proposed project.

Mr. Rodgers commended the applicant for holding a community meeting and working with staff to propose SUP conditions to address the concerns of the neighboring property owners. Mr. Rodgers then stated he would be supportive of the project.

Mr. Haldeman asked for a motion to recommend approval of SUP-25-0004. 4622 Rochambeau Drive Evolution House Group Home with conditions to the Board of Supervisors.

Mr. Polster made a motion to recommend approval of SUP-25-0004. 4622 Rochambeau Drive Evolution House Group Home with conditions to the Board of Supervisors.

On a roll call vote, the Commission voted to recommend approval. (6-0)

MEMORANDUM

DATE: September 9, 2025

TO: The Board of Supervisors

FROM: John H. Carnifax, Jr., Project Manager

SUBJECT: Farming Lease with Riverside Farm, Inc.

James City County, on July 24, 2025, purchased a certain parcel of land located in the County of James City at 6693 Richmond Road, further identified as James City County Real Estate Tax Map Parcel No. 2430100033 (the "Property").

Prior to the County purchasing the Property, Riverside Farm, Inc., by verbal agreement with the prior Property owner, farmed the Property.

The County, as the new Property owner, wishes to execute a Lease agreement with Riverside Farm, Inc., to allow Riverside Farm, Inc., to continue to farm the Property until such time as the County begins improvements to the Property.

If adopted, Riverside Farm, Inc., will pay the County \$100 annually. The County may terminate the Lease upon providing thirty (30) days' written notice to Riverside Farm, Inc.

Staff recommends approval of the attached Lease.

JHC/ap
FrmLseRvrsdeFarm-mem

Attachment

RESOLUTION

DISPOSITION OF REAL PROPERTY - 6693 RICHMOND ROAD

FARMING LEASE WITH RIVERSIDE FARM, INC.

WHEREAS, James City County, on July 24, 2025, purchased a certain parcel of land located in the County of James City at 6693 Richmond Road, further identified as James City County Real Estate Tax Map Parcel No. 2430100033 (the "Property"); and

WHEREAS, prior to the County purchasing the Property, Riverside Farm, Inc., by verbal agreement with the prior Property owner, farmed the Property; and

WHEREAS, the County, as the new Property owner, wishes to execute a Lease agreement with Riverside Farm, Inc., to allow Riverside Farm, Inc., to continue to farm the Property until such time as the County begins improvements to the Property; and

WHEREAS, the Board of Supervisors, following a public hearing, is of the opinion that the County should execute a Lease agreement with Riverside Farm, Inc.

NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of James City County, Virginia, does hereby authorize and direct the County Administrator to execute those documents necessary to execute a Lease Agreement with Riverside Farm, Inc., allowing Riverside Farm, Inc., to farm the property located at 6693 Richmond Road.

James O. Icenhour, Jr.
Chair, Board of Supervisors

ATTEST:

		VOTES			
		<u>AYE</u>	<u>NAY</u>	<u>ABSTAIN</u>	<u>ABSENT</u>
_____ Teresa J. Saeed Deputy Clerk to the Board	HIPPLE	_____	_____	_____	_____
	NULL	_____	_____	_____	_____
	LARSON	_____	_____	_____	_____
	MCGLENNON	_____	_____	_____	_____
	ICENHOUR	_____	_____	_____	_____

Adopted by the Board of Supervisors of James City County, Virginia, this 9th day of September, 2025.

FrmLseRvrsdeFarm-res

- a. Lessee shall maintain the Property, subject to all easements, covenants, and restrictions, in a condition acceptable to the County, including but not limited to the landscape, ~~buildings,~~ *Remove* and other improvements.
- b. Lessee shall be responsible for the removal of any trees that fall into any areas cultivated for agricultural purposes.
- Property has never been mowed, maintained by weed kill applications* *Remove* c. ~~Lessee shall mow all grassed areas on the Property at least two (2) times per year during the growing season and as may be reasonably requested by the County.~~
- d. Lessee may plant and harvest any crop consistent with good agricultural practices.
- e. Lessee shall use generally accepted best management practices, integrated pest management practices, and the cultural practices that:
- i. Demonstrate farming practices that promote wise use of natural resources, resulting high crop yields and enhance non-destructive wildlife habitat;
 - ii. Reduce soil erosion;
 - iii. Provide rotation of crops;
 - iv. Use conservation tillage practices; and
 - v. Prevent the introduction or growth on noxious weeds, control existing common and noxious weeds, and reduce or eliminate noxious weeds.
- f. Lessee may store farm machinery, equipment, supplies, etc., on the Property if in an orderly manner and only in designated areas identified by the County. All fields shall be kept free of litter and weeds. If Lessee uses additional laborers, all Virginia Department of Health regulations pertinent to the use of migrant workers shall be followed. If Lessee is required to provide adequate sanitary facilities, the locations of the facilities shall be coordinated with the County.
- g. Any temporary structures or fencing installed by the Lessee must be approved by the County in advance and must be removed if required by the County. Lessee shall be responsible for all maintenance to any temporary structures and/or fencing.