

# What is a Data Center?

Data Centers are specialized facilities housing critical infrastructure and technology to support our modern world and keep pace with digital demands.



"The Cloud"  
storage for  
files, photos, etc.



Email, text  
messages,  
voicemail



Healthcare,  
telehealth,  
prescription refills



Emergency  
response,  
disaster recovery



Streaming movies,  
watching TV,  
playing games



Video calls,  
virtual meetings,  
FaceTime



Airline, hotel, car,  
travel bookings



Mapping apps,  
navigation, GPS



Social media,  
internet



Online banking,  
bill pay



Online Shopping,  
e-Commerce



Search Engines  
Artificial Intelligence



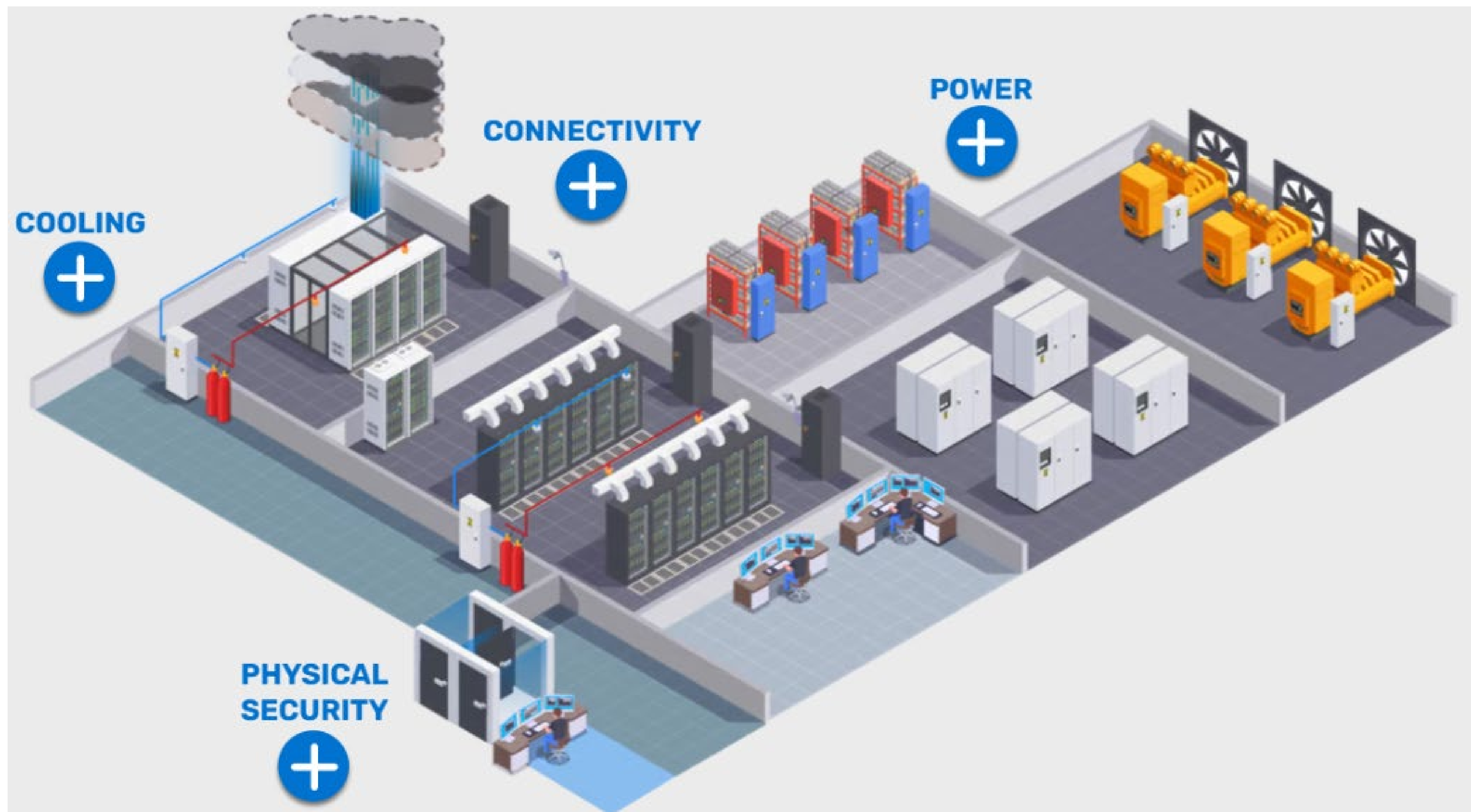
Average US household uses 650–700 GB of broadband data per month

*\*1 GB ≈ 500 high-resolution photos or 1 hour of HD video streaming*



# Data Center Overview

## HOW DO DATA CENTERS WORK?



### POWER

Redundant power systems, including backup generators and uninterruptible power supplies (UPS), to ensure continuous operations.

### COOLING

HVAC, liquid cooling and other systems that maintain optimal IT hardware environments

### CONNECTIVITY

High-speed internet connections, often from multiple providers and interconnection options

### PHYSICAL SECURITY

Biometric scanners, security cameras, and on-site guards protect facilities, equipment, and intellectual property

## Inside the Data Center



### DISTINCT AREAS:

- Data Halls
- Network Rooms
- Electrical Rooms
- Cooling Galleries
- Offices & Administrative Space
- Logistics Space



# Data Center Cooling Strategies

## WATER & POWER CONSIDERATIONS

### COOLING TOWERS

- Uses evaporation to remove heat
- Lower energy usage
- Heavily water dependent
- Efficient for larger data centers
- Highest overall cost, (capital and operational cost combined)

### DIRECT EVAPORATIVE COOLING

- Uses evaporation to cool air
- Less water dependent
- Effective for hot, dry climates
- More efficient than cooling towers
- Less energy consumption
- Simple design
- Lowest overall cost

### INDIRECT EVAPORATIVE COOLING

- Separated data center air from outside air
- Heat exchangers
- Least water dependent of water-based strategies
- Enhanced efficiency
- Effective for varying climates
- Greater system complexity
- Higher capital costs
- Lower operational costs
- Slightly higher than DEC

### AIR COOLED CHILLERS

- Uses refrigerant for cooling
- Heavy Energy Usage
- Minimal Water Usage
- Noise from near constant operation
- Effective in cooler climates
- Moderate maintenance required
- Lower capital cost
- Higher operational costs due to energy demand



# Project Overview

## MOUNTAIN ROAD TECHNOLOGY PARK SOUTH ANNA DISTRICT, HANOVER COUNTY

- Future Land Use & Strategic Planning
  - Envision Hanover Comprehensive Plan
    - Land Use = Employment Center
    - Within Suburban Service Area
    - Mountain Road Gateway Economic Development Zone
    - Within Utility Service Area
  - Route 33 Gateway Small Area Plan
    - Industrial Zone
    - Data Centers identified as a recommended use
- Site Design that preserves natural areas and buffers, while minimizing impacts
- Power Proximity
- Existing Utility & Infrastructure Capacity
  - Available, existing water capacity
  - Existing, unused County pump station
- Access & Transportation Infrastructure
  - Served by Route 33/Mountain Road
  - Proximity to Interstate
- ALL infrastructure investment & upgrades paid by the Developer



PROPERTY SUMMARY		
AREA	ACREAGE	PERCENT
BUILDING AREAS	131.1	30.7
DEVELOPMENT AREAS	122.6	28.7
NATURAL AREA/RPA/BUFFER	173	40.5
PARCEL TOTAL	426.7	

- PRIMARY SITE ACCESS
- SECURITY CHECKPOINT
- SECONDARY/EMERGENCY ACCESS
- TRAILHEAD ACCESS
- EMERGENCY & UTILITY ACCESS ONLY
- PRIMARY SITE CIRCULATION\*
- INTERNAL SITE CIRCULATION\*
- PROPOSED HARD SURFACE TRAIL\*

\*Site circulation and trail layout is conceptual, final alignment will be determined during site plan review.



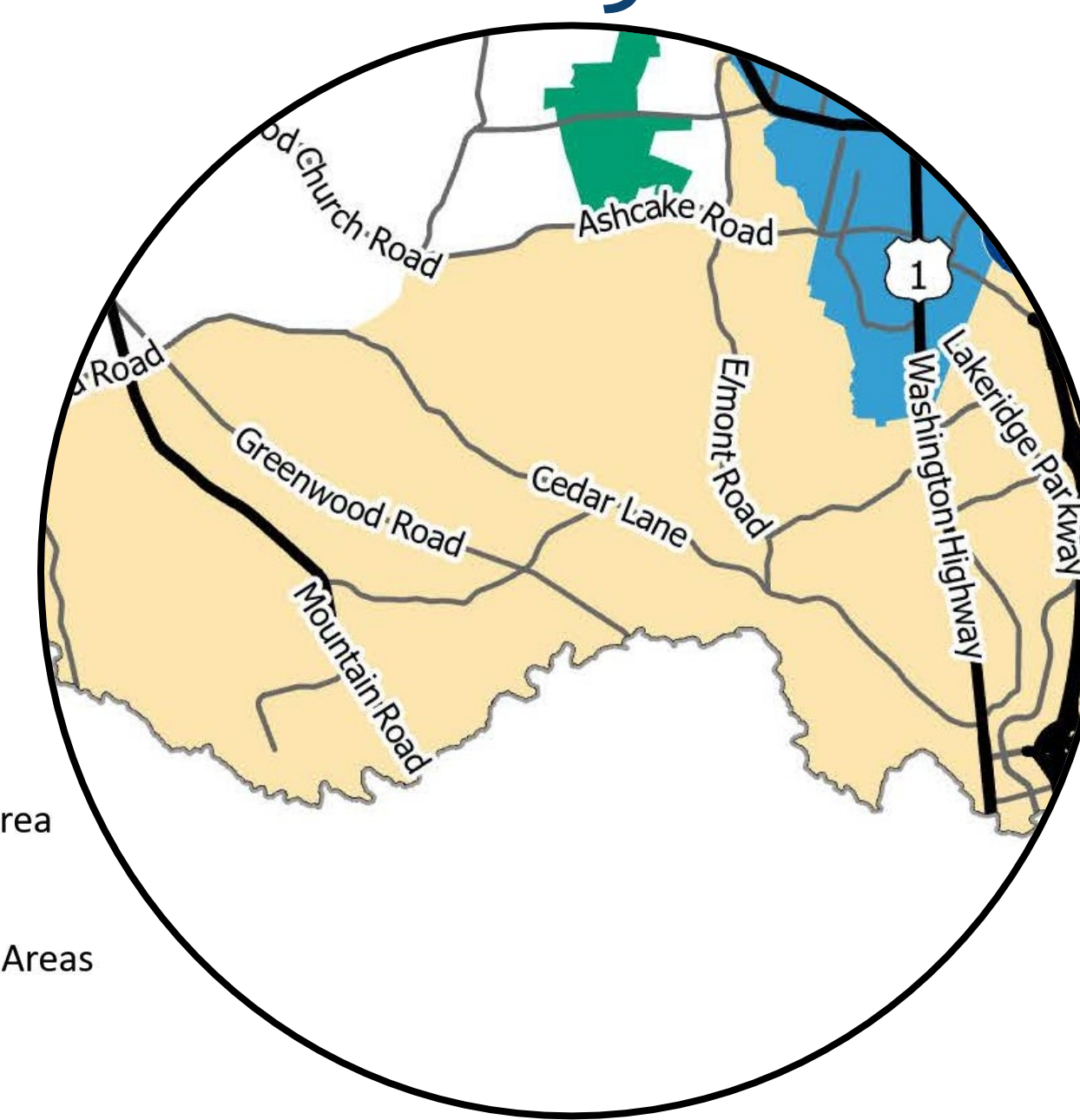
# Planning Framework

ENVISION

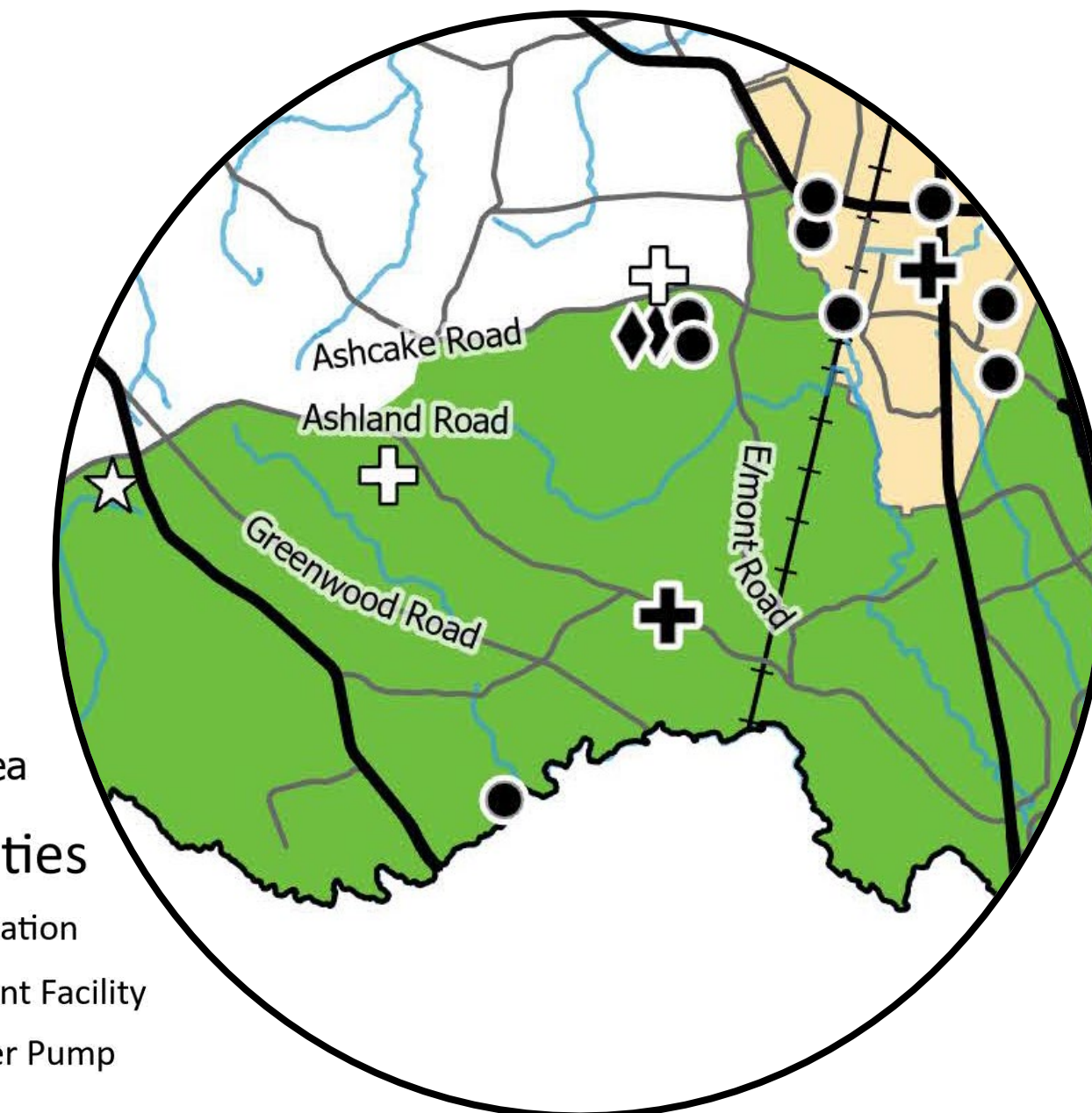


HANOVER

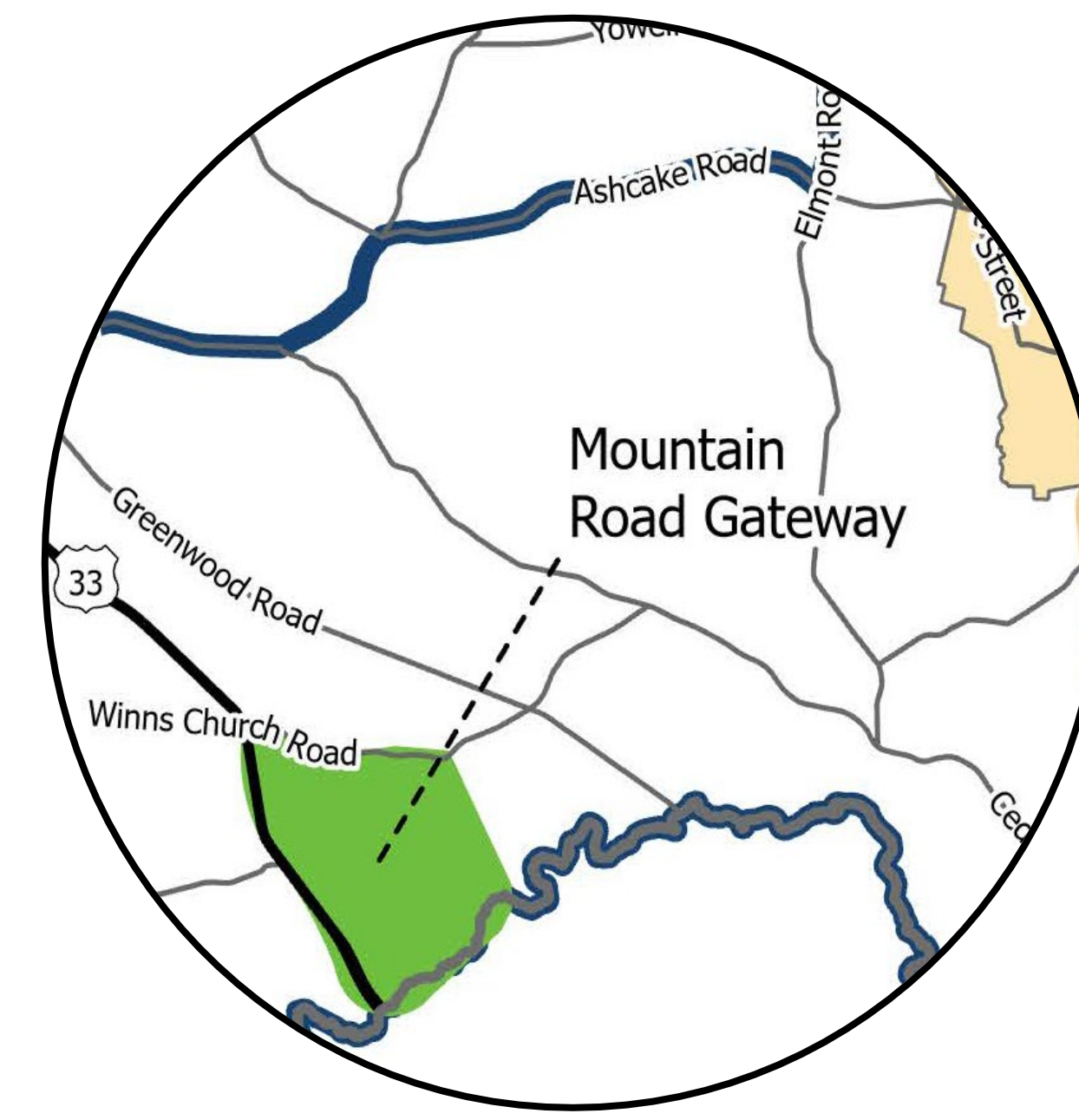
## Growth Management Plan



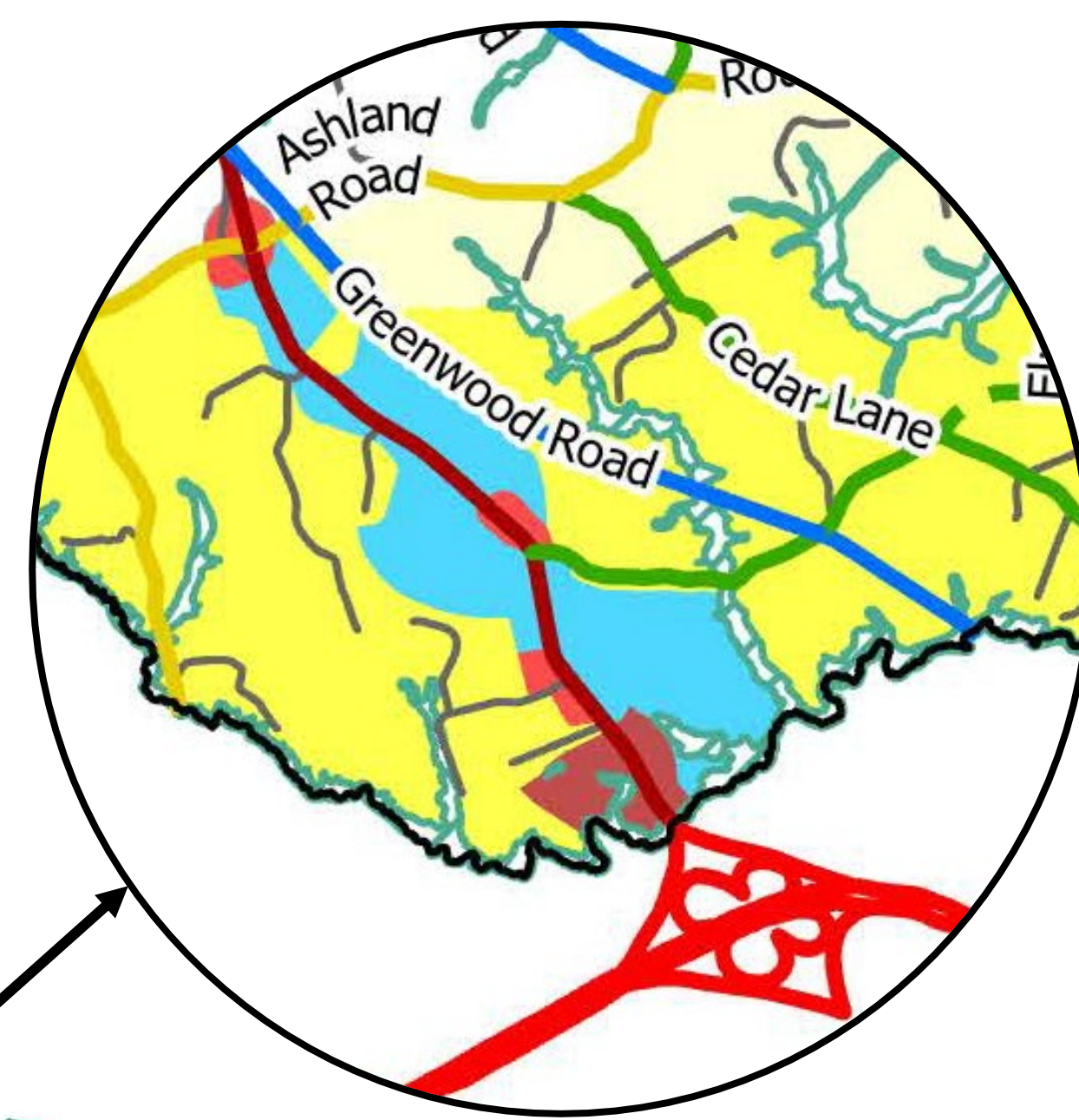
## Public Utilities Plan



## Economic Development Zones

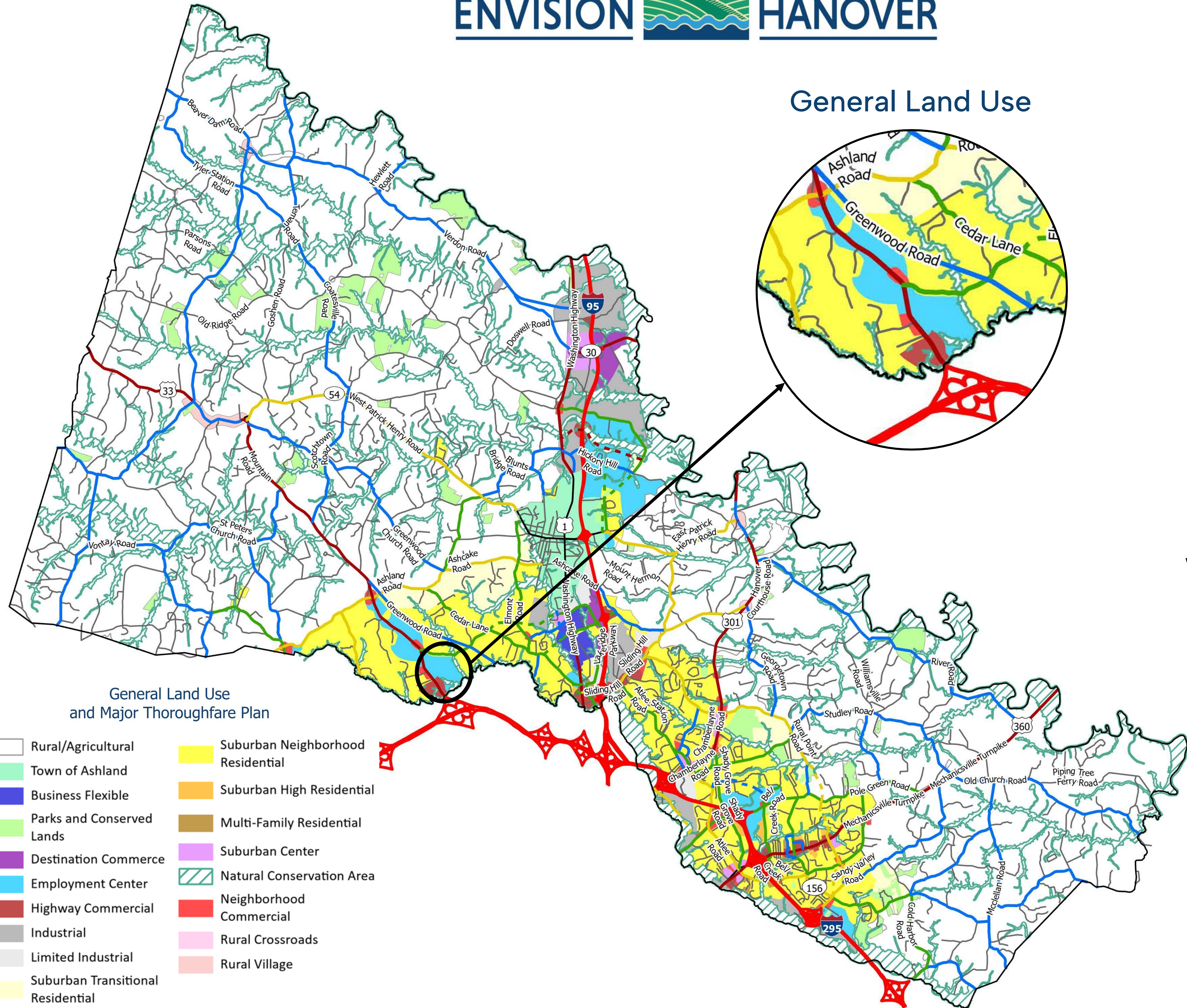


## General Land Use



## General Land Use and Major Thoroughfare Plan

- |                                   |                                   |
|-----------------------------------|-----------------------------------|
| Rural/Agricultural                | Suburban Neighborhood Residential |
| Town of Ashland                   | Suburban High Residential         |
| Business Flexible                 | Multi-Family Residential          |
| Parks and Conserved Lands         | Suburban Center                   |
| Destination Commerce              | Natural Conservation Area         |
| Employment Center                 | Neighborhood Commercial           |
| Highway Commercial                | Rural Crossroads                  |
| Industrial                        | Rural Village                     |
| Limited Industrial                |                                   |
| Suburban Transitional Residential |                                   |

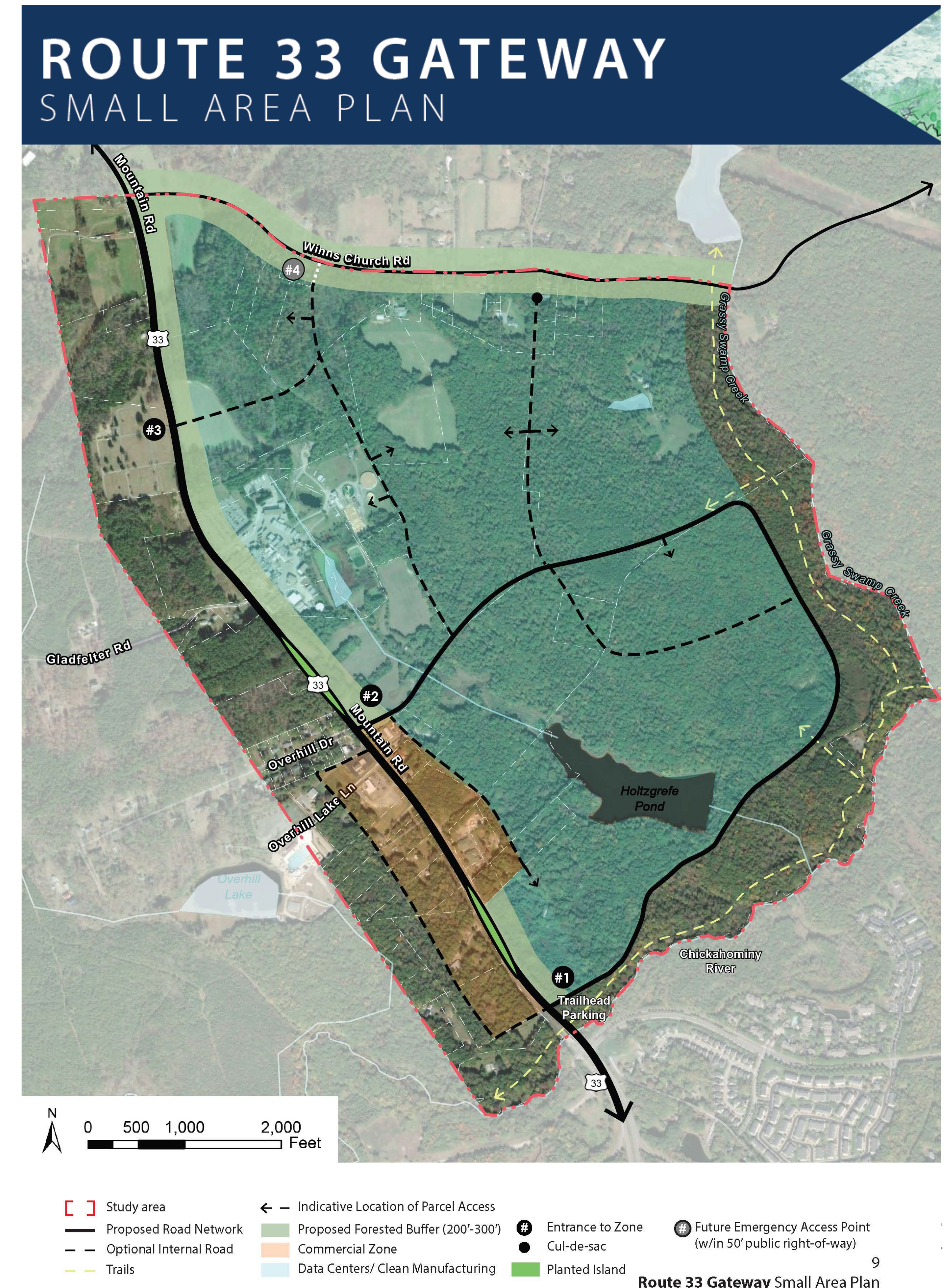




# Route 33 Gateway Small Area Plan

**Adopted by the Hanover County Board of Supervisors, August 2025**

- Mountain Road Gateway: Emerging Employment Hub
- Balance between economic development and compatibility with existing uses
- Focuses on:
  - Uses with lower traffic
  - Buffers and screening
  - Transitions and visual continuity
  - Limited intensity at edges
- Recommended Uses:
  - **Data Centers**
  - Light Industrial
  - Clean Manufacturing





# Concept Plan Overview

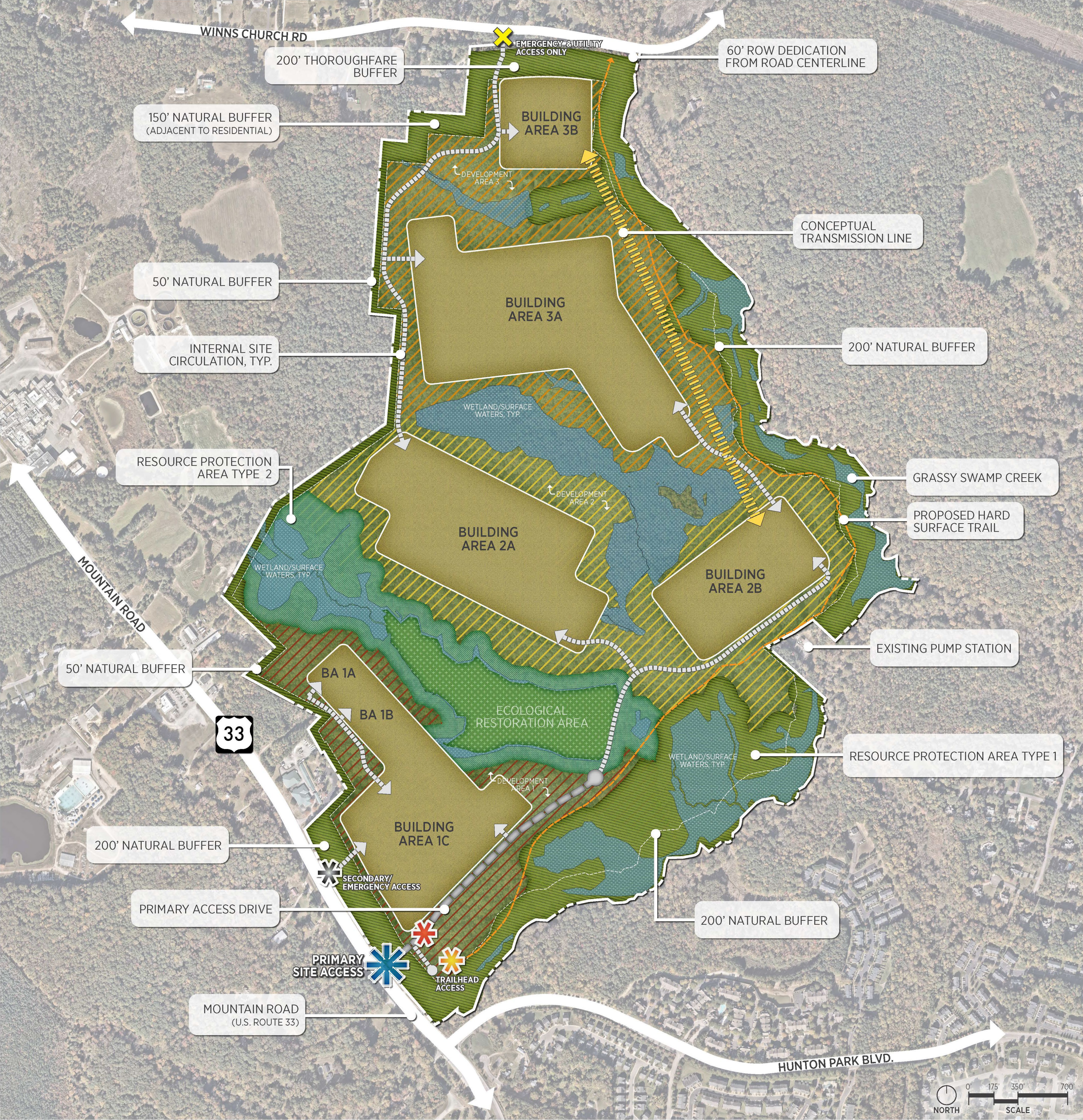
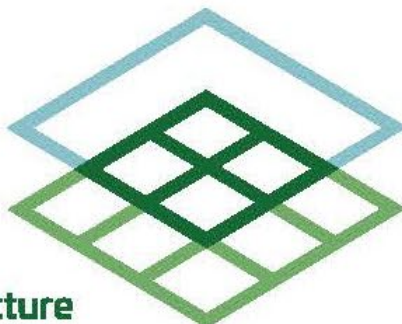
## LEGEND

- BUILDING AREAS (BA)
- DEVELOPMENT AREA 1
- DEVELOPMENT AREA 2
- DEVELOPMENT AREA 3
- RESOURCE PROTECTION AREA TYPE 1 (RPA)
- RESOURCE PROTECTION AREA TYPE 2 (RPA)
- WETLANDS/SURFACE WATERS
- ECOLOGICAL RESTORATION AREA

- PRIMARY SITE ACCESS
- SECONDARY/EMERGENCY ACCESS
- EMERGENCY & UTILITY ACCESS ONLY
- SECURITY CHECKPOINT
- TRAILHEAD ACCESS

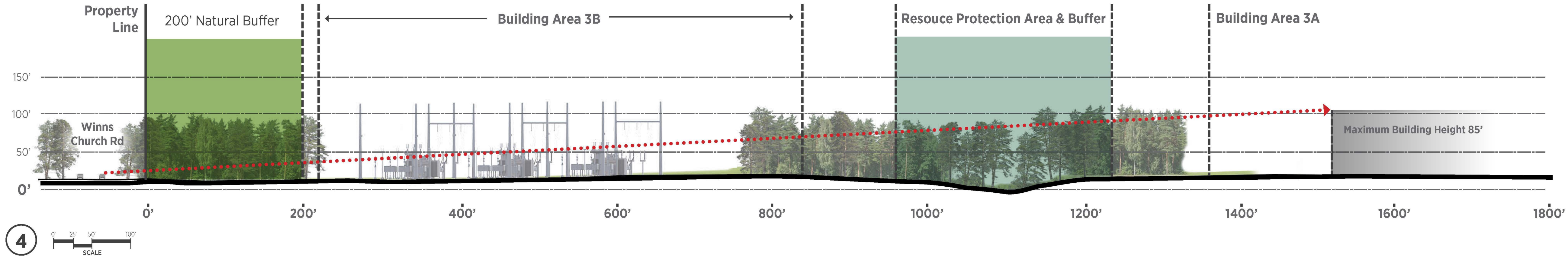
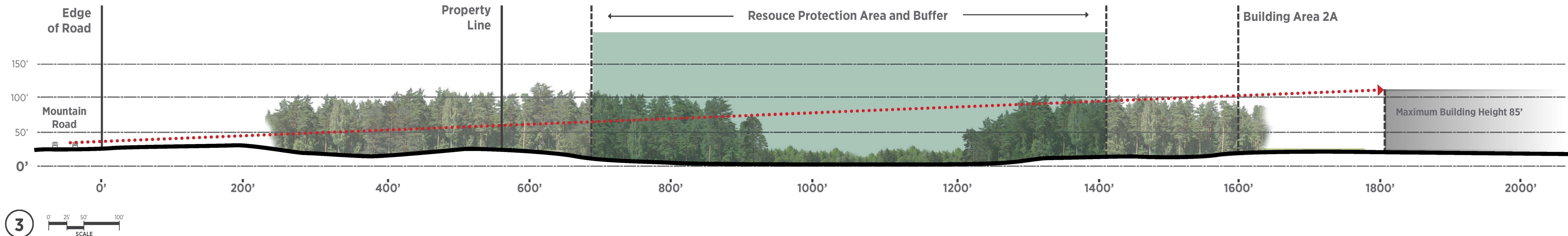
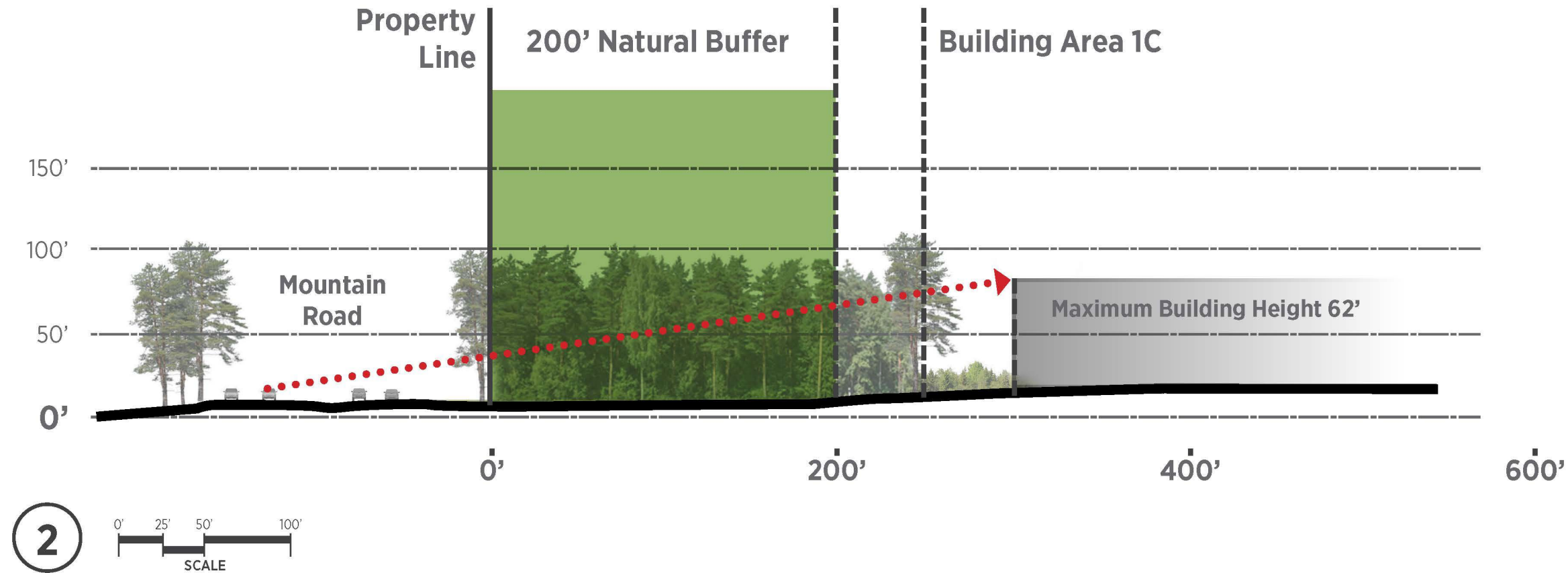
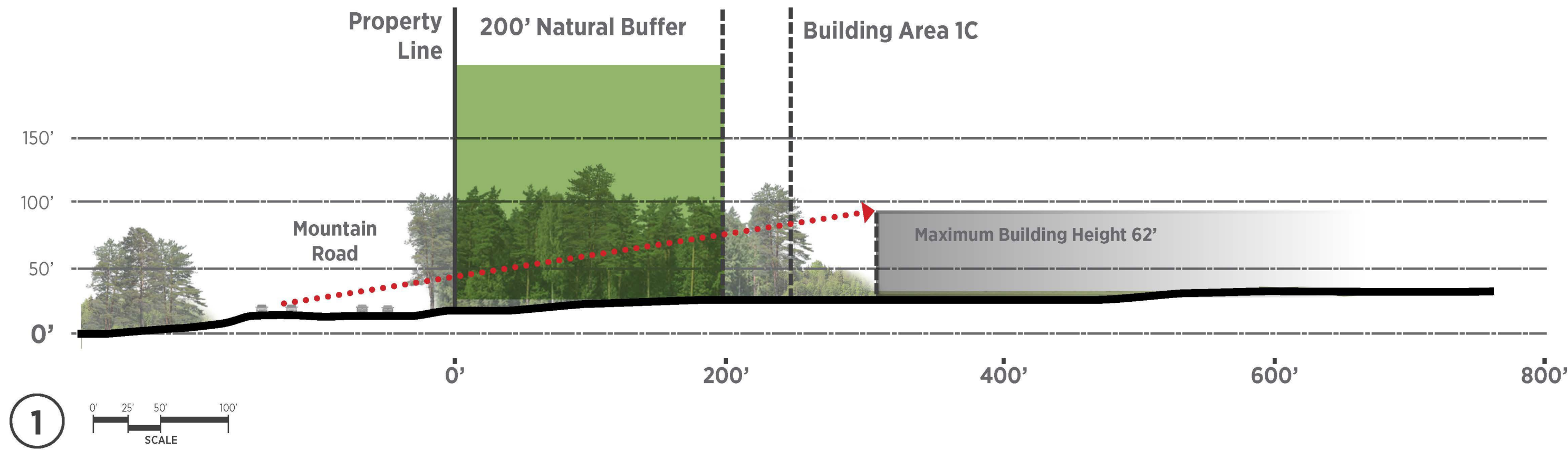
- CONCEPTUAL OVERHEAD TRANSMISSION LINE
- PRIMARY SITE CIRCULATION\*
- INTERNAL SITE CIRCULATION\*
- PROPOSED HARD SURFACE TRAIL\*

*\*Site circulation and trail layout is conceptual, final alignment will be determined during site plan review.*





KEY MAP





# Power Reliability

Electric reliability will remain with data center development.

- Dominion Energy studies data center load to ensure it can safely and reliably be added to the grid
- Data centers and the Hanover County community will be powered by different substations
- Data center development can enhance reliability of Hanover County grid for all residents and businesses
- Tract is actively planning the site with Dominion Energy
  - Dominion Energy's target in-service date is Q1 2030





# Power Costs

The data center pays, not the community.

New electric rate approved by VA State Corporation Commission ensures power costs stay with data center developer

- Shields Hanover County residents from higher electric bills
- Data centers pay under separate rate structure designed to protect residential customers
- Data centers must execute long-term contract with Dominion Energy for infrastructure
  - Full collateral and cash deposits provided by the data center for every substation

## Electric Bill Breakdown

### Meter Reading

Cost of electricity consumed during a billing period



### Electric Supply Charges

Cost of producing the electricity consumed



### Electric Delivery Charges

Cost of distributing and transporting electricity



### Capacity Charges

Fees to ensure electricity generation for peak demand



### Usage Profile

Account details and historical electricity usage





# Why Electricity Prices Change and What Actually Helps

Load growth at the state level has tended to depress retail electricity prices in recent years, by spreading fixed costs over greater load.

## Why Costs Are Rising

### Aging infrastructure

Just like replacing a roof before it leaks, utilities must replace decades old equipment to keep the grid safe and reliable

### Extreme weather

Stronger storms and hotter summers damage equipment and force upgrades

### Fuel prices

When natural gas prices spike, electricity prices follow

## What's Helping

### Load growth

Data centers paying for the infrastructure needed to support their sites and the greater grid

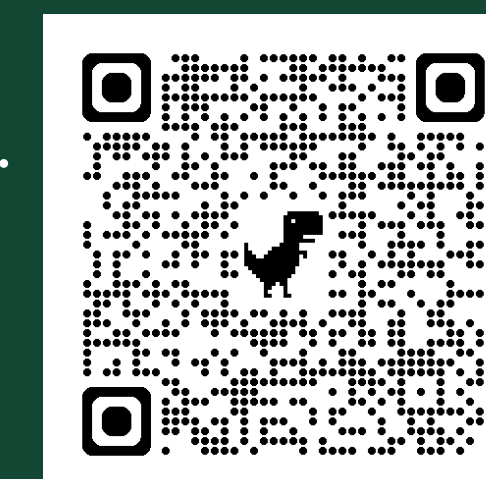
### Cost sharing

When data centers connect to the grid, they help share the cost of maintaining and upgrading the system

### Predictable loads

Keeps electric bills more stable

Load growth helps fund grid improvements and share system costs, which supports long-term price stability. For more on this topic, please see the Lawrence Berkeley National Laboratory study funded by the Department of Energy (Scan QR Code or visit: [https://eta-publications.lbl.gov/sites/default/files/2025-10/full\\_summary\\_retail\\_price\\_trends\\_drivers.pdf](https://eta-publications.lbl.gov/sites/default/files/2025-10/full_summary_retail_price_trends_drivers.pdf))<sup>1</sup>.

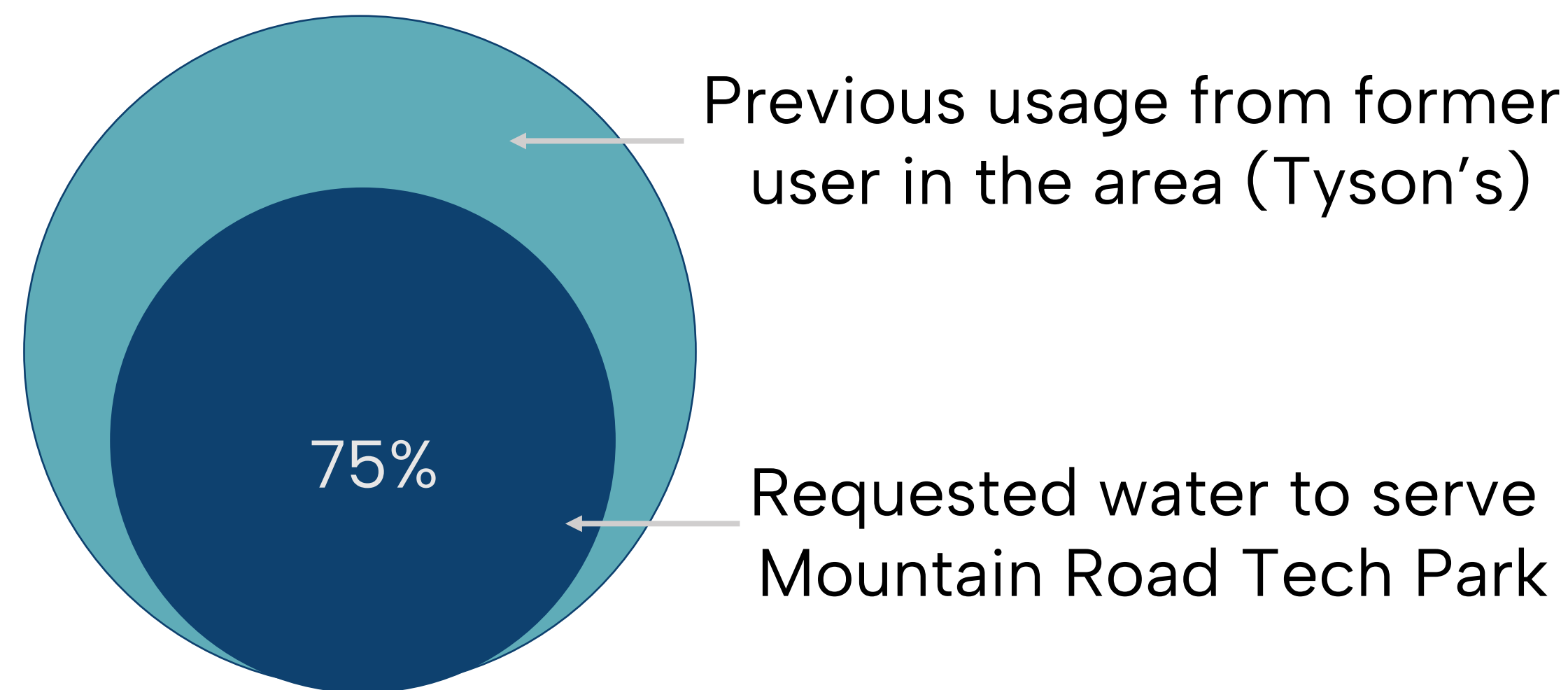




# Water & Wastewater Infrastructure

## Water

- Existing water infrastructure in place
- Existing capacity



- NO well water used to serve development

## Wastewater

- Existing pumpstation (for wastewater) and additional infrastructure in place



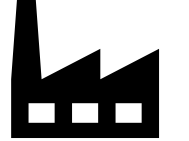

**Developer is responsible for infrastructure costs associated with the development.**





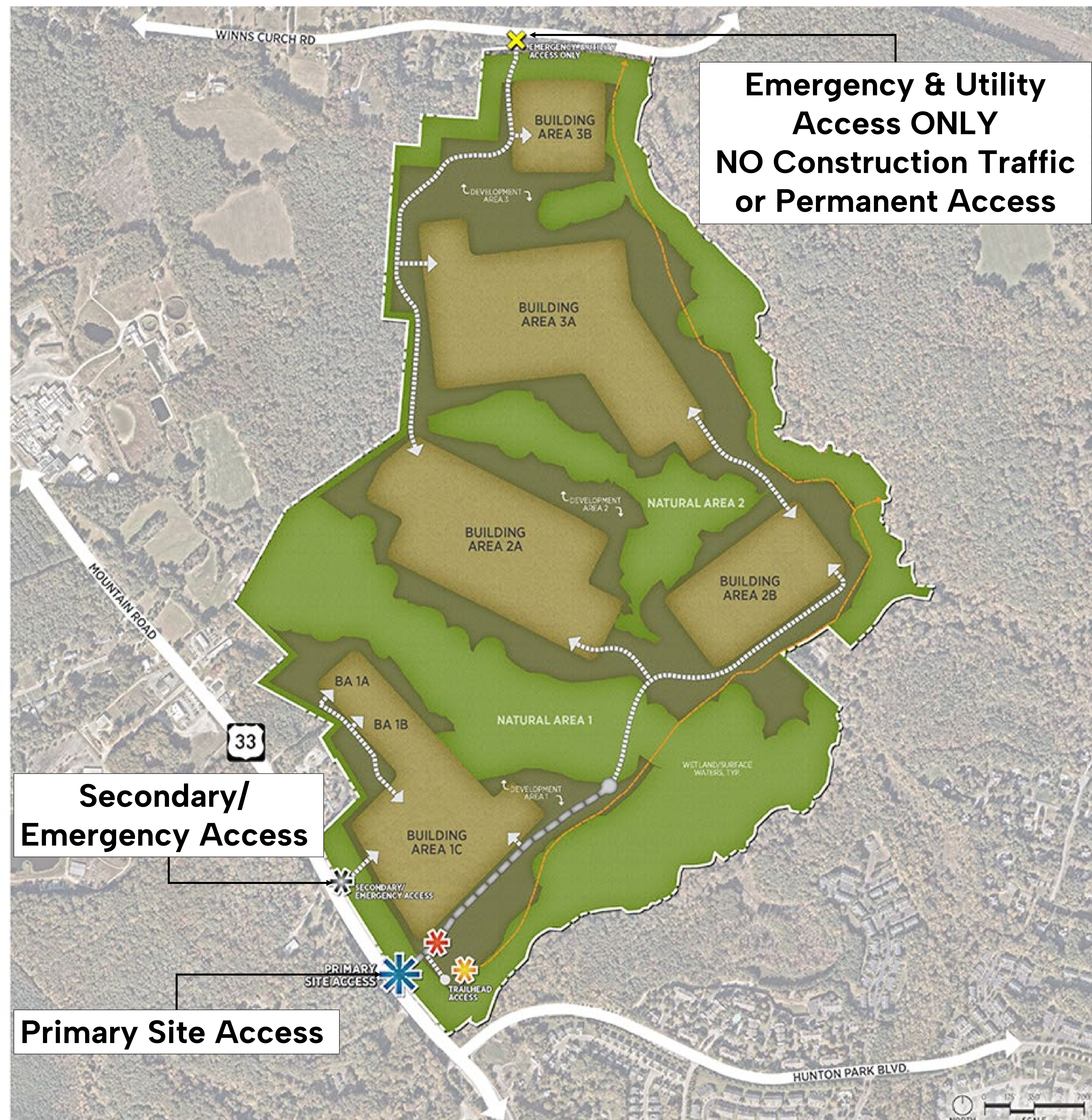
# Transportation & Access

- Traffic Impact Analysis (TIA) Completed & Approved by VDOT
- **NO** construction or permanent access on Winns Church Rd.
- Transportation Improvements
  - Primary entrance from Route 33/Mountain Rd
  - Secondary entrance from Route 33/Mountain Rd
  - Dedicated Right Turn at project entrances
- Construction Management Plan to regulate construction traffic
- Daily Trip Generation Information

	Use	Average Trips/Day
	Data Center <sup>1</sup>	99
	Light Industrial <sup>1</sup>	487
	Manufacturing <sup>1</sup>	579
	Single Family Homes <sup>2</sup>	1,909

<sup>1</sup> Trips/100,000 sq ft of building area

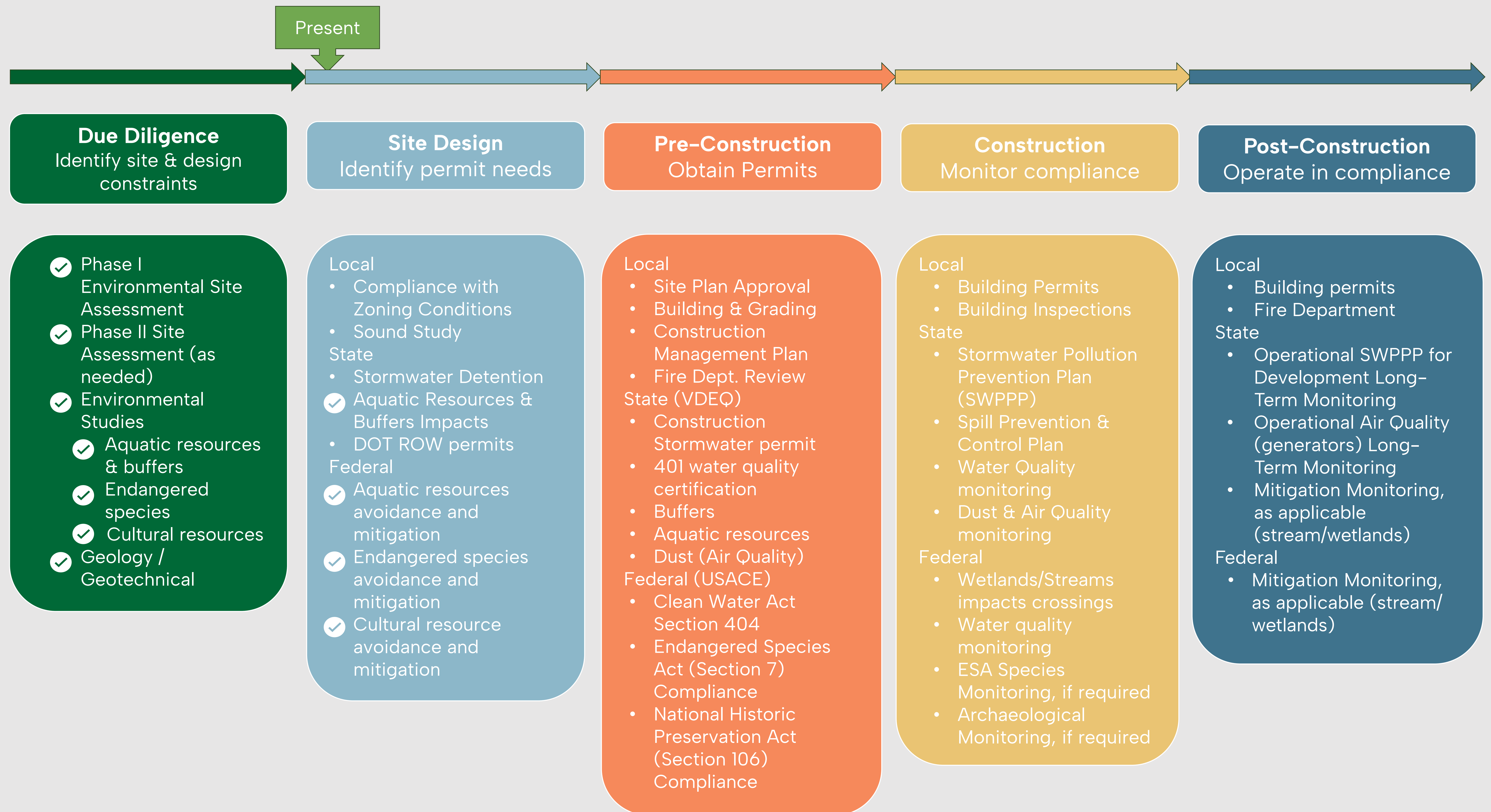
<sup>2</sup> Trips/200 homes





# Agency Oversight & Permitting

## PROACTIVE COLLABORATION & REGULATORY COMPLIANCE





# Data Center Sound

## ■ Types of Sound

- Chillers/ventilation
  - Variation in location
  - Physical sound screening & mechanical attenuation measures
- Generators
  - Run only during testing and emergencies
  - Physically buffered and strategically located
- Low Frequency Sound (*frequencies below 250 Hz*)
  - Sound levels produced by data centers are well below levels that can cause harm (US EPA, Acoustical Society of America)



## ■ Sound Study Underway to Assess and Inform:

- Mechanical equipment selection
- Building and equipment placement
- Attenuation around the equipment
- Screening, landscaping buffers, barrier walls

Maximum sound levels (Hanover County Code)  
*From Agricultural & Residential Zones*

7 am – 10 pm: 57 dB | 10 pm – 7 am: 52 dB

### Comparison sound levels

 Refrigerator (50 dB)	 Car (70 dB)
 Drip Coffee Maker (55 dB)	 Jackhammer (100 dB)
 Conversation (60 dB)	 Police Siren (120 dB)

*\*\*Sound levels from this project will not exceed the maximum sound levels at the property line\*\**

## ■ Summary of Proffers Related to Sound & Noise

- Noise Study required for all data center buildings to ensure conformance with noise ordinance
- Any required mitigation measures implemented within 60 days
- Sound attenuation will be installed on any mechanical equipment to ensure there is no incremental noise from mechanical equipment
- Limitations on testing of back-up generators

**\*\*This project will comply with the County's noise regulations\*\***



# Proffered Conditions

## Proffers to ensure consistency with Route 33 Small Area Plan

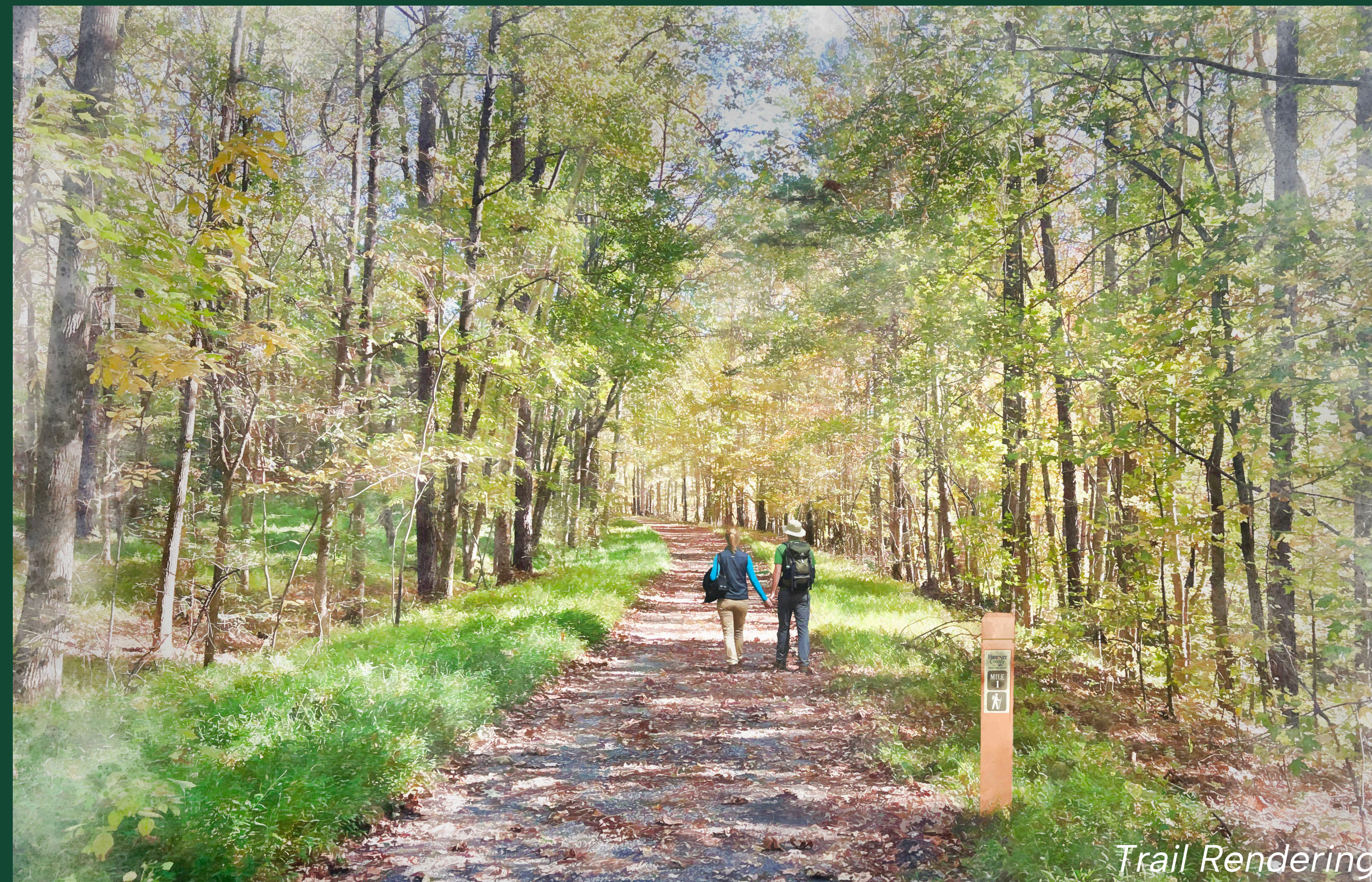
- Buffers
  - Required Perimeter Buffers
  - Inventory of Existing Vegetation
  - Maintenance & Supplemental Planting
  - Buffer Protection
- Trails & Gateway Feature Construction
  - Hard surface trail
  - Trailhead
  - Gateway entry feature
- Design Standards
  - Building Setbacks & Height
  - Landscaping & Pedestrian Access
  - Building Facades, Materials, Roofs
- Generators
  - Tier IV generators only
- Screening of Equipment
- Water & Sewer
  - Connected to County's infrastructure only
- Signage, Security, and Lighting
  - Lighting type, height, and shielding
  - Fencing
- Transportation
  - Entrances & access
  - Restricted access on Winns Church Road
  - Turn lanes at project entrance
  - Construction damage
- Noise
  - Noise study for each building post construction
- Construction
  - Construction management plan required
  - Access



# Project Benefits

## ECONOMIC & COMMUNITY

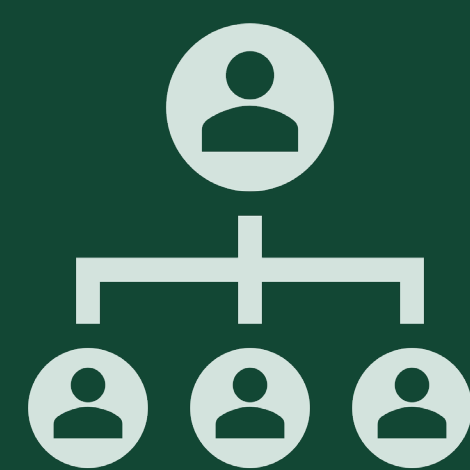
- Trails: Chickahominy & Grassy Swamp Creek



Trail Rendering

### Projected Employment

- 320 Direct Jobs
- 1,100 Construction Jobs
- Supporting/Spinoff Jobs



**EACH DIRECT  
DATA CENTER JOB  
SUPPORTS 6+ JOBS  
ELSEWHERE IN THE ECONOMY**



**AVERAGE WEEKLY  
WAGES IN THIS SECTOR  
GREW BY 36%  
FROM 2020 - 2024**

## Property & Sales Tax Revenue

*As analyzed and prepared by Ernst & Young*

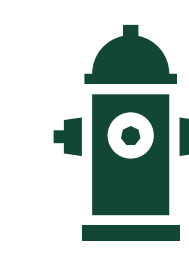
### Average Annual Projected County Revenue from Property Tax<sup>1</sup>



Schools  
\$24M/year



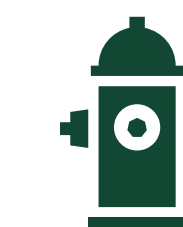
General Fund  
\$17M/Year



Other<sup>2</sup>  
\$7M/Year



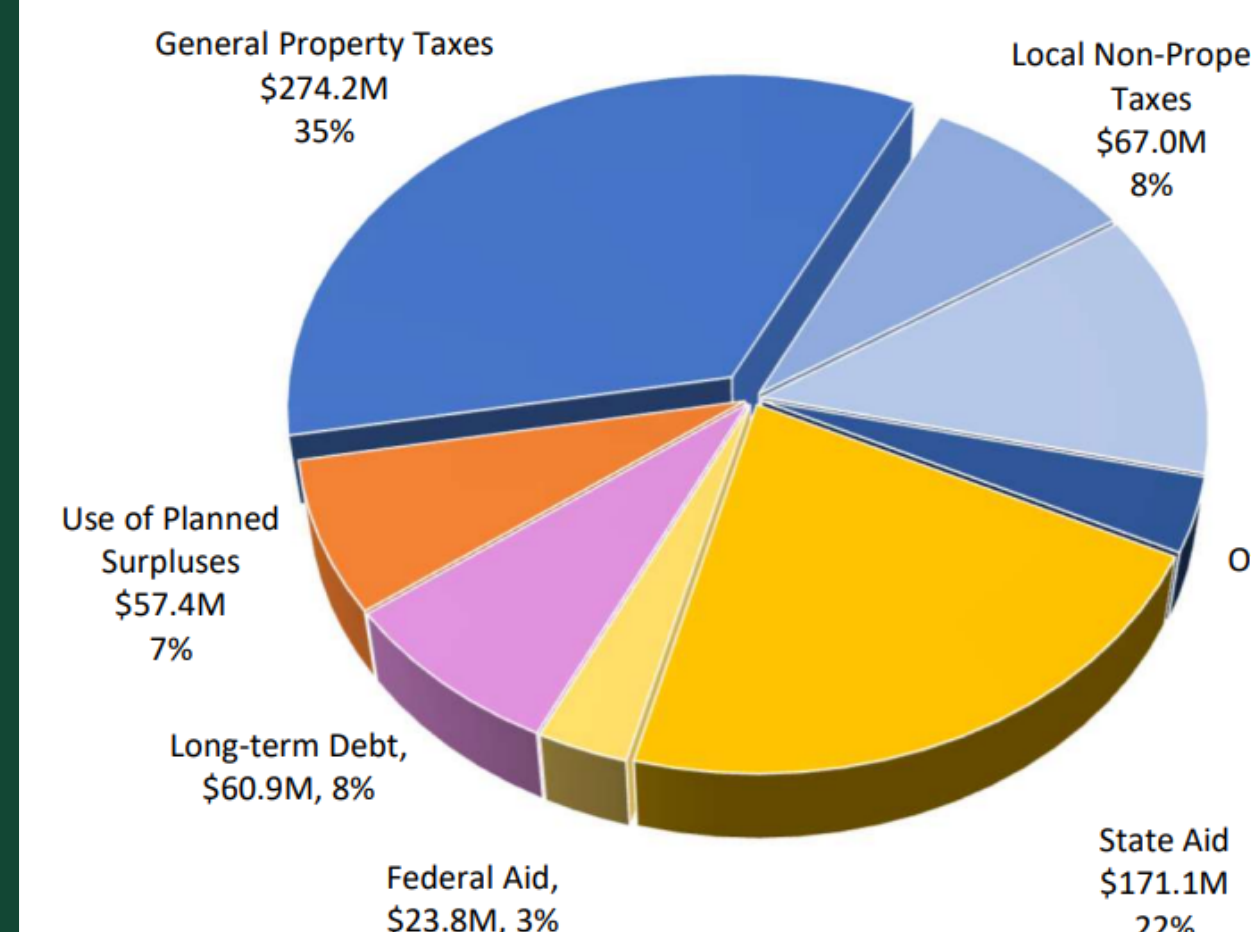
Capital Improvements  
\$10M/Year



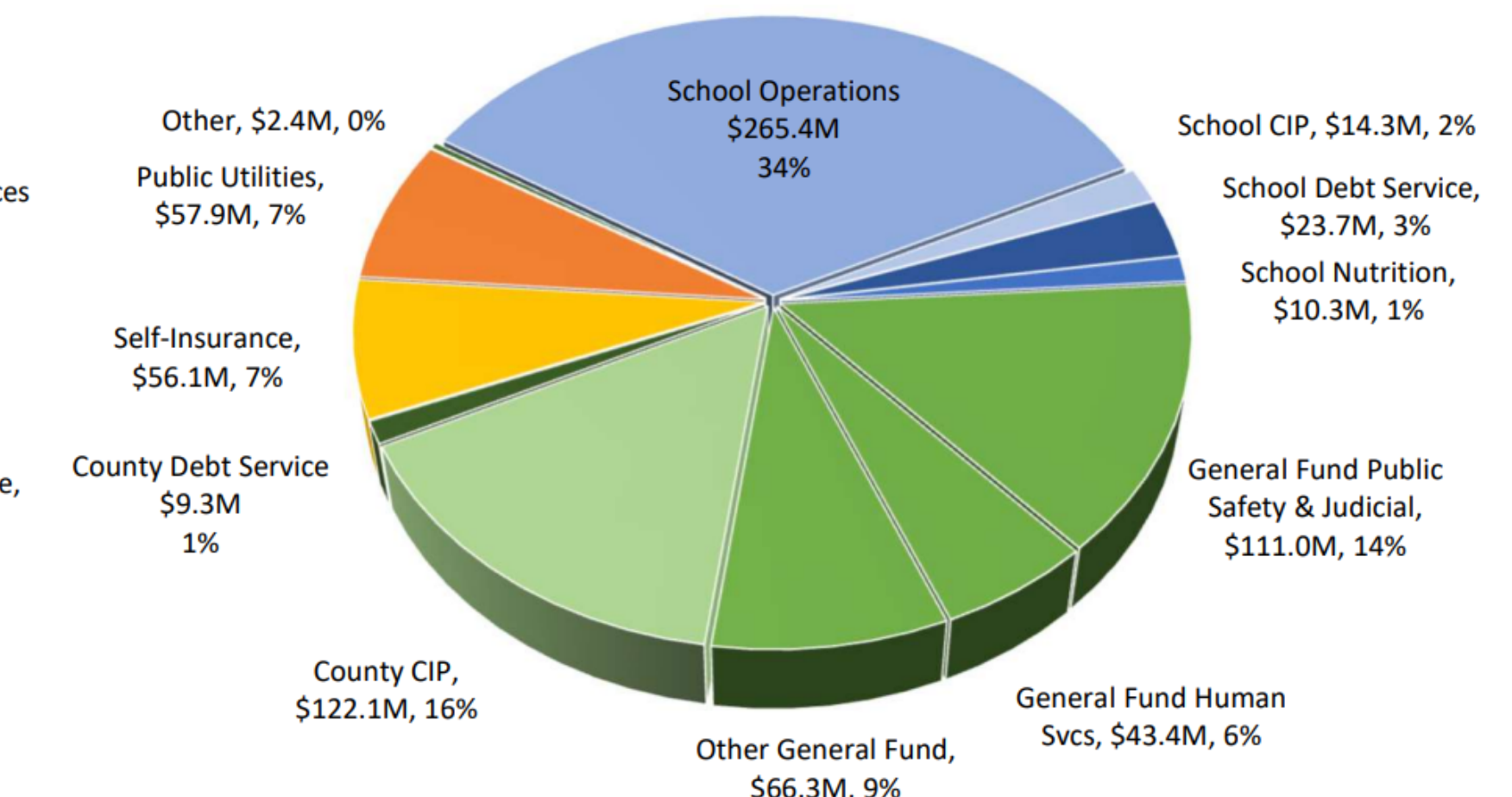
Public Utilities  
\$4M/Year

*At buildout, annual revenue from this project is projected to be equal to nearly 8% of the County's FY 2026 budgeted revenues*

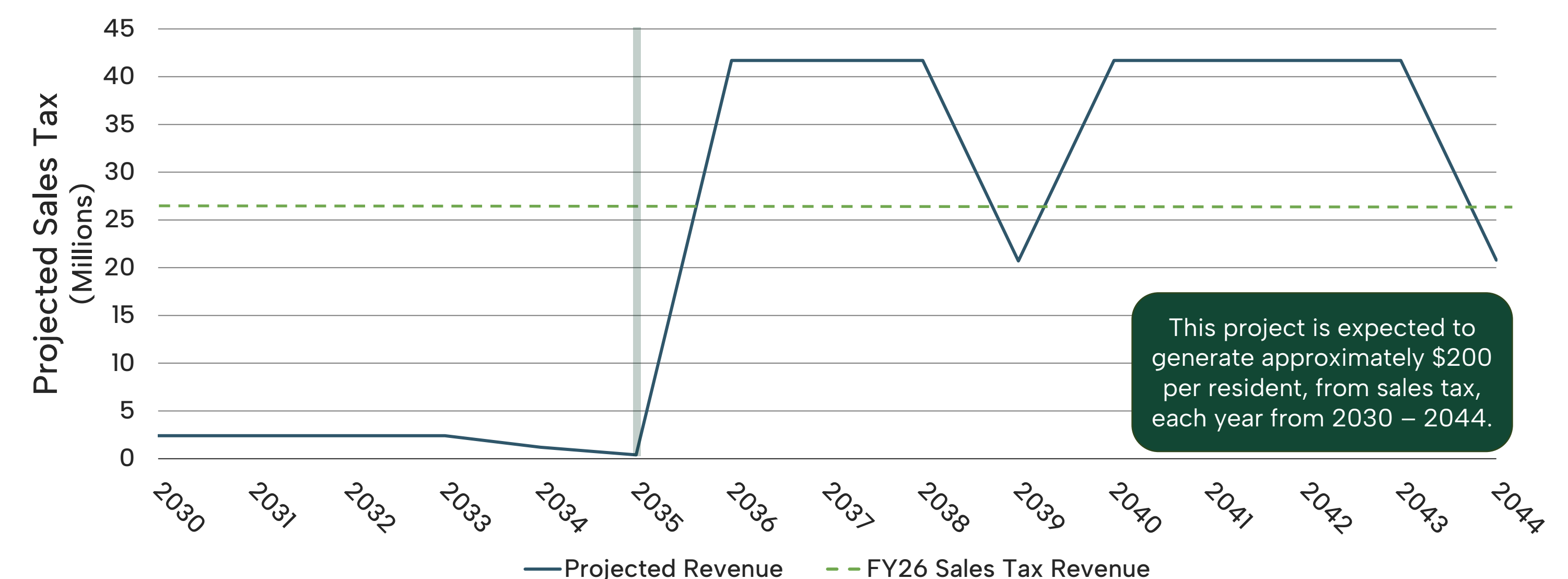
**FY26 All Funds Revenue(Hanover County)  
\$782.2M Total**



**FY26 All Funds Expenditures(Hanover County)  
\$782.2M Total**



### Projected Sales & Use Tax Revenue 2030 - 2044



<sup>1</sup> Revenue projected from real property (buildings) and personal property (servers), using current County budget allocations. Personal property is depreciated according to Hanover County's published Data Center Depreciation Table.

<sup>2</sup> Other includes County debt service and self-insurance.