

Planning, Regulating, and Permitting Utility-Scale Solar Facilities

2023 VLGMA Winter Conference
Regulating Solar Facilities Session
February 16, 2023

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- Involvement with Utility-Scale Solar Facilities



September/October 2019

American Planning Association
Planning Advisory Service
Creating Great Communities for All

PAS MEMO

Planning for Utility-Scale Solar Energy Facilities

By Darren Coffey, AICP

Solar photovoltaics (PV) are the fastest-growing energy source in the world due to the decreasing cost per kilowatt-hour—60 percent to date since 2010, according to the U.S. Department of Energy (U.S. DOE n.d.)—and the comparative speed in constructing a facility. Solar currently generates 0.4 percent of global electricity, but some University of Oxford researchers estimate its share could increase to 20 percent by 2027 (Hawken 2017). Utility-scale solar installations are the most cost-effective solar PV option (Hawken 2017).

Transitioning from coal plants to solar significantly decreases carbon dioxide emissions and eliminates sulfur, nitrous oxides, and mercury emissions. As the U.S. Department of Energy states, “As the cleanest domestic energy source available, solar supports broader national priorities, including national security, economic growth, climate change mitigation, and job creation” (U.S. DOE n.d.). As a result, there is growing demand for solar energy from companies (e.g., the “RE100” 100 global corporations committed to sourcing 100 percent renewable electricity by 2050) and governments (e.g., the Virginia Energy Plan commits the state to 16 percent renewable energy by 2022).

Federal and state tax incentives have accelerated the energy industry’s efforts to bring facilities online as quickly as possible. This has created a new challenge for local governments, as many are ill-prepared to consider this new and unique land-use option. Localities are struggling with how to evaluate utility-scale solar facility applications, how to update their land-use regulations, and how to achieve positive benefits for hosting these clean energy facilities.

As a land-use application, utility-scale solar facilities are processed as any other land-use permit. Local tools available: the existing comprehensive (general zoning ordinance). In many cases, however, ordinances do not address this type of use. Planners amend these documents to bring some structure, and transparency to the evaluation process for solar facilities.

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Figure 1. Utility-scale solar facilities are large-scale uses that can have significant land-use impacts on communities. Photo by Flickr user U.S. Department of Energy/Michael Faria.

Unlike many land uses, these solar installations will occupy vast tracts of land for one or more generations; they require tremendous local resources to monitor during construction (and presumably decommissioning); they can have significant impacts on the community depending on their location, buffers, installation techniques, and other factors (Figure 1); and they are not readily adaptable for another industrial or commercial use, hence the need for decommissioning.

While solar energy aligns with sustainability goals held by an increasing number of communities, solar industries must bring an overall value to the locality beyond the clean energy label.



SOLAR@SCALE

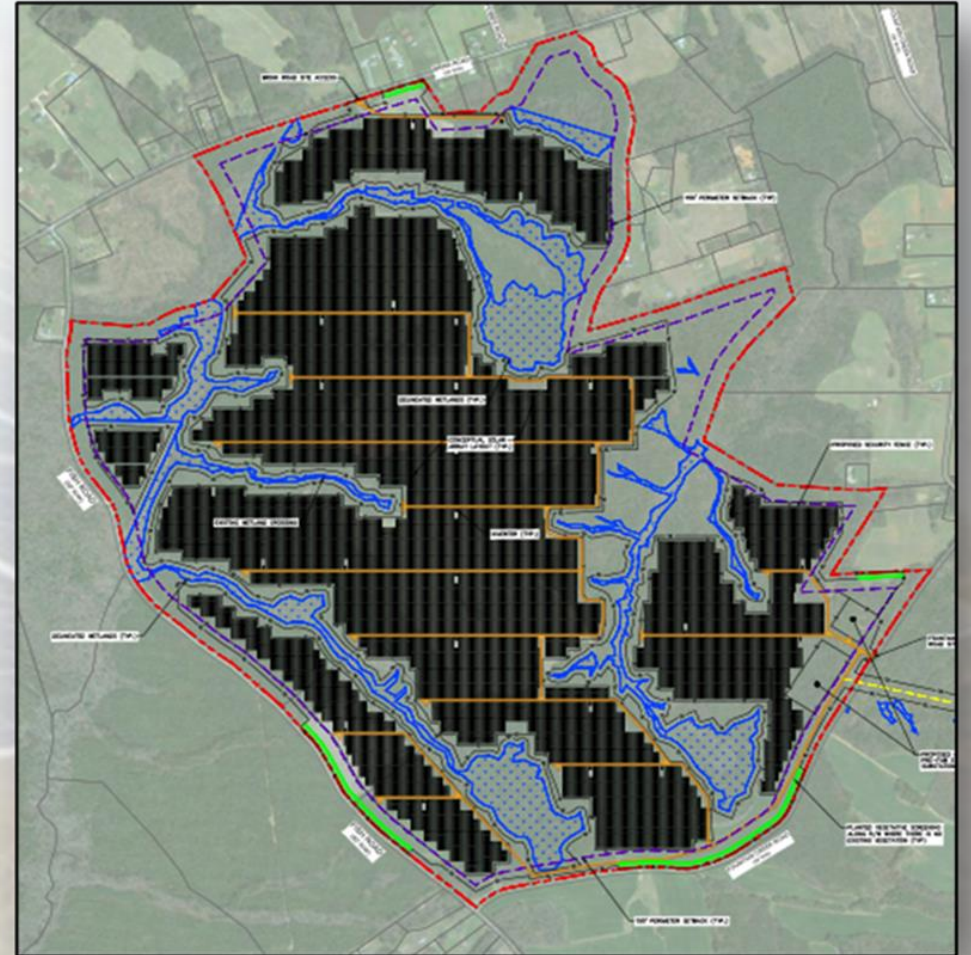
A Local Government Guidebook
for Improving Large-Scale
Solar Development Outcomes



What is Utility-Scale Solar?

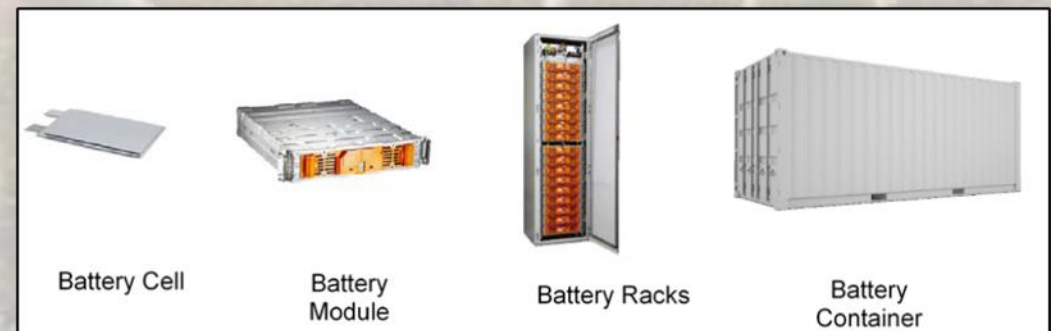
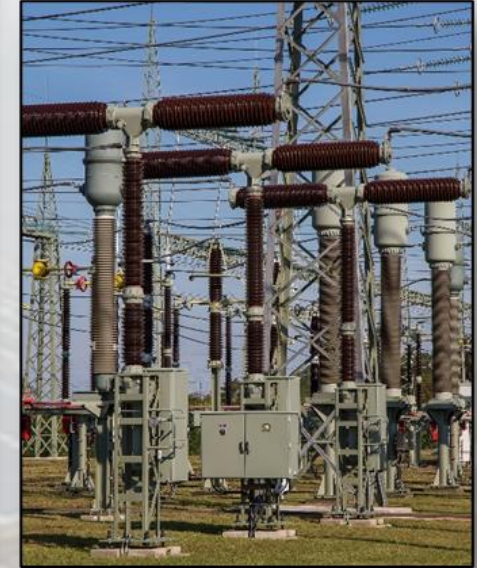
Large-scale Solar Energy Facility. A ground-mounted solar facility that generates electricity from sunlight on an area adequate to support a rated capacity of five megawatts (MW) alternating current or greater.

Medium-Scale Solar Energy Facility. A ground-mounted solar facility that generates electricity from sunlight on an area adequate to support a rated capacity greater than one megawatt (1 MW) and less than five megawatts (5 MW) alternating current.



What is Utility-Scale Solar?

- Solar PVs and Racking
- Inverters
- Substation
- Switchyard
- Generator lead lines (gen-tie lines)
- Battery storage
- Fencing



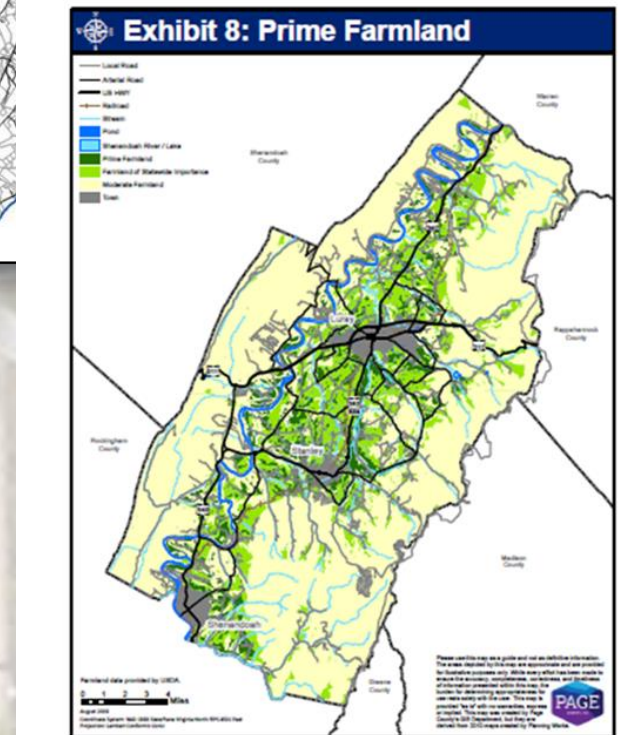
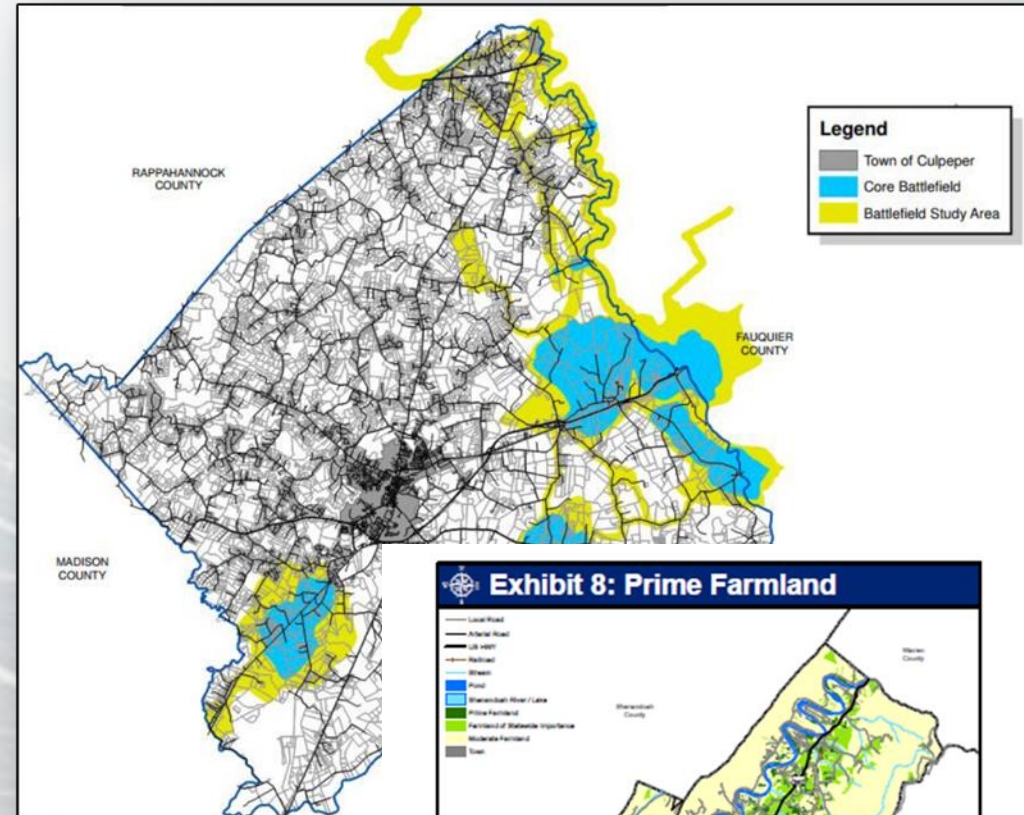
Planning & Policies

- Comprehensive Plan
 - Does it address utilities, renewable energy, solar?
 - What are the community's vision, goals, and objectives?
 - Consider current and future land use.
 - Assists in establishing objective regulations/standards, but also informs discretionary decisions
- Fiscal, Economic, Employment Goals



Planning & Policies – Comp Plan

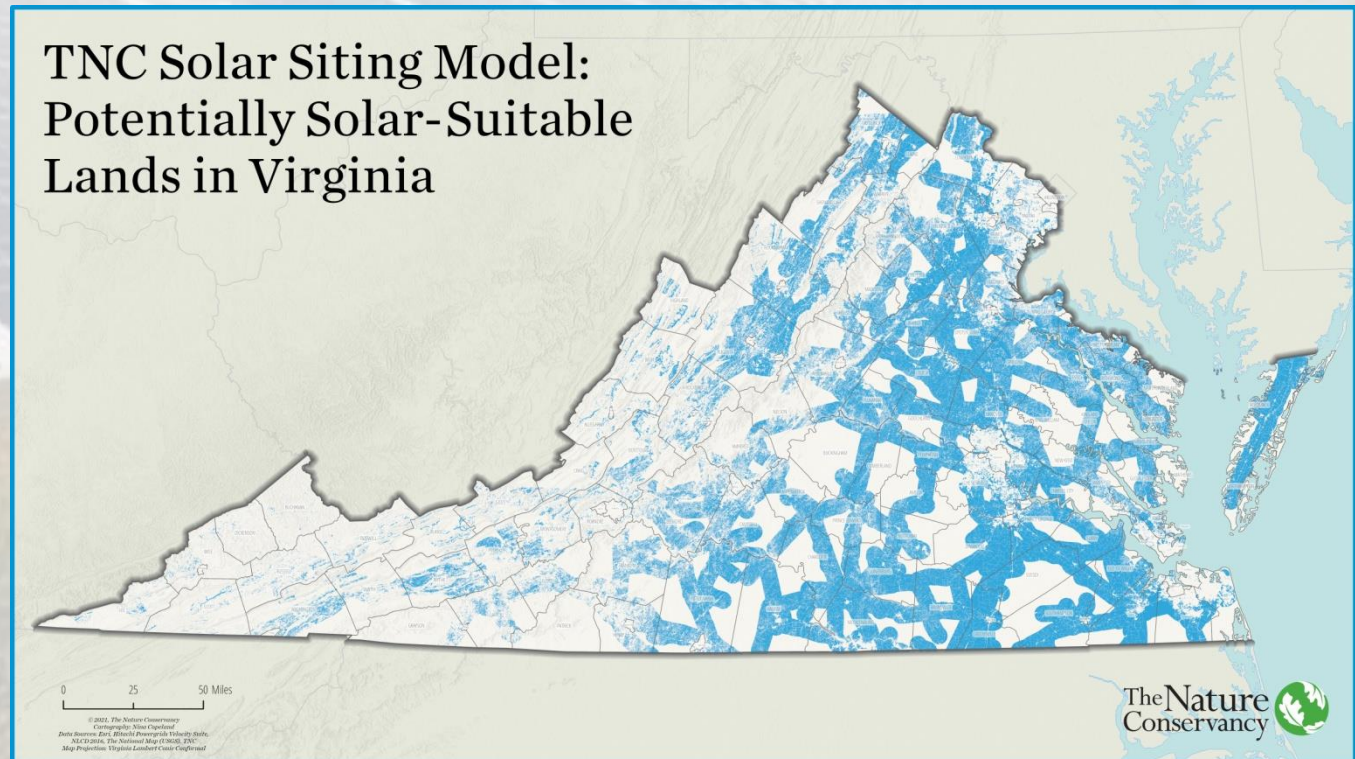
- Consider Establishing Policies
 - Describing preferred solar project features
 - Defining project types (utility-scale Solar Facilities (>1MW))
 - Agriculture, brownfields, landfills
 - Avoid prime farmland, forests, development areas
 - Consider proximity to residences; historic, cultural, recreational, or environmentally-sensitive areas; and scenic viewsheds



Planning & Policies – Comp Plan

- Preferential Areas
 - Close to high-capacity transmission lines
 - Land that isn't sloped
 - Not developed
 - Prime forest
 - Prime agriculture
 - Water resources
 - Brownfields

**TNC Solar Siting Model:
Potentially Solar-Suitable
Lands in Virginia**



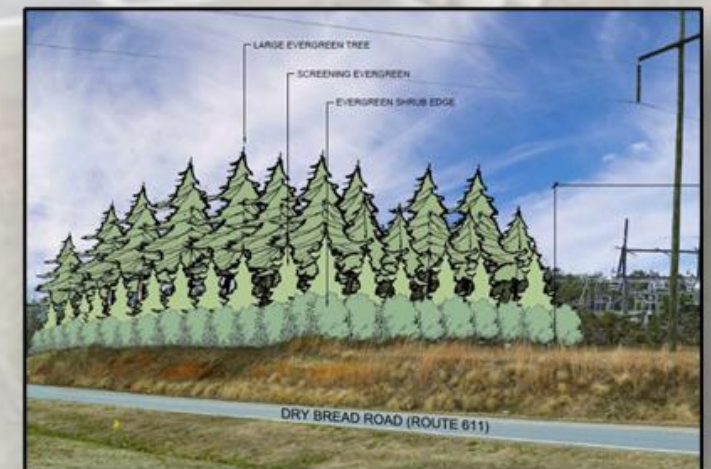
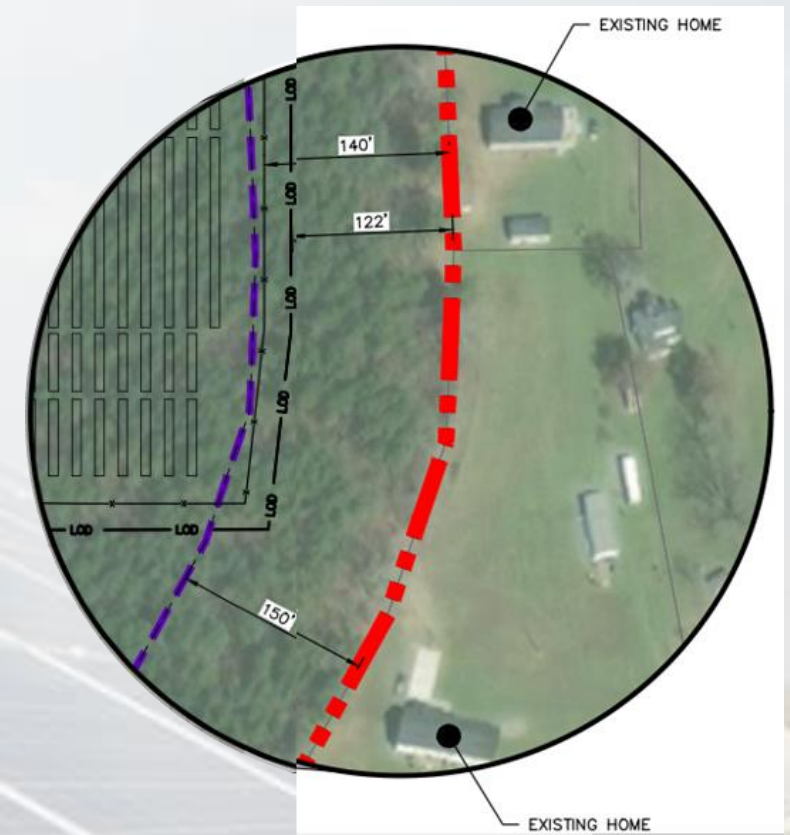
Regulations – Zoning Ordinance

- Define different types and sizes of systems; related terms
- Principal/accessory use; associated components; BESS
- Zoning districts
- Permitting requirements; application materials
- Development regulations & performance standards
- Decommissioning



Regulations - ZO Development & Performance Standards

- Setbacks
- Height
- Lot coverage
- Area/density limits
- Fencing; wildlife corridors
- Buffering, screening, landscaping
- Site conditions: soil quality, historic/cultural sites, natural resources
- Coordination with existing regulations



Zoning Ordinance - Permitting

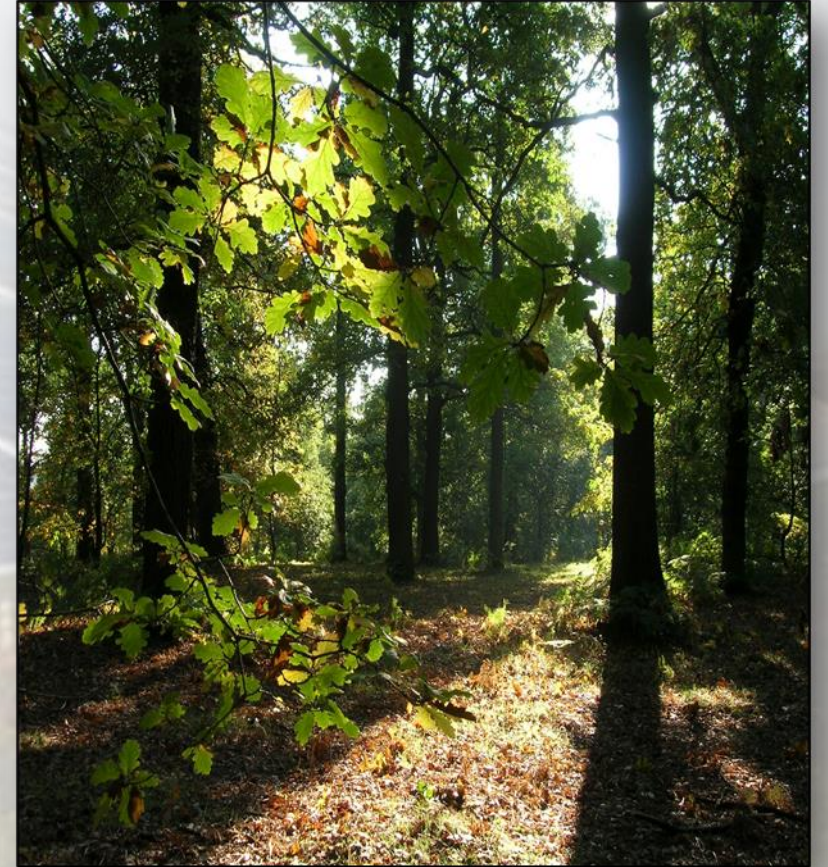
- Generally, discretionary permitting (i.e. conditional/special use permit)
- Public utility review (2232 Review in Virginia)
- Site plan and building permit review



Zoning Ordinance – Use Permit Permitting

Change in Land Use

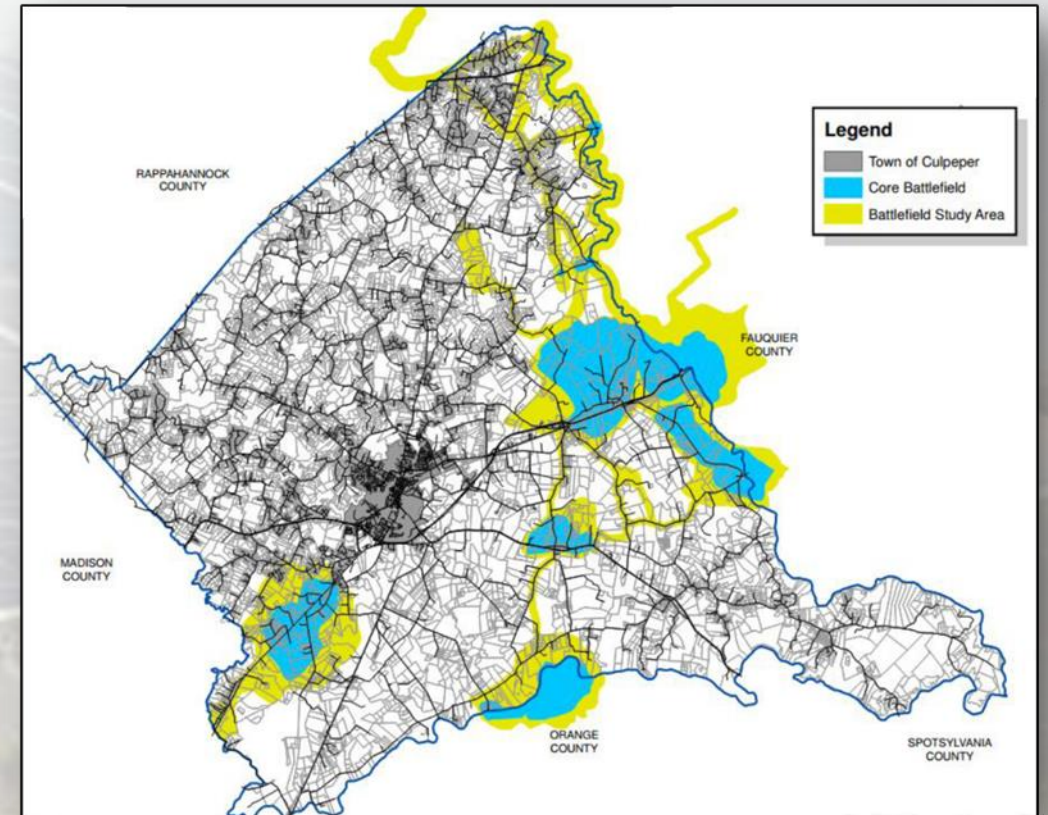
- Agricultural and forested
- Residential
- Industrial



Permitting – Use Permit

Sensitive Areas

- Prime farmland
- Ecologically-sensitive areas
- Historical sites
- Growth areas



Permitting – Use Permit

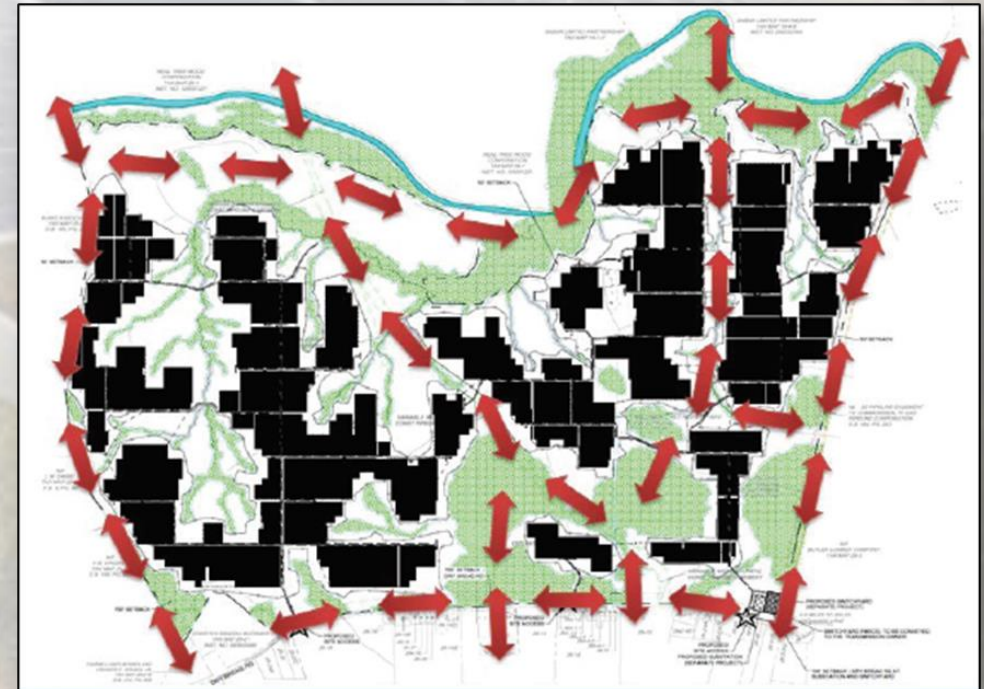
Project Design

- Visual impacts
- Near transmission infrastructure
- Environmental impacts

Post-construction



6 years later



Permitting – Use Permit

Recommendation & Permit Conditions

- Plan submittal
- Operations
- Buffers
- Traffic
- Decommissioning
- Security
- Training
- Violation of conditions



Questions?

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