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Solar Facility Impacts Analysis

An Examination of Land Use Impacts

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Solar Facility Impacts Analysis

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OVERVIEW

The emphasis on clean energy has created a new challenge for localities to update their land use regulations to better evaluate solar facility uses as a major electric generation utility. The implementation of federal and state tax incentives has accelerated the energy industry's efforts to bring facilities online as quickly as possible, while at the same time negatively impacting the potential positive financial benefit to localities hosting the clean energy facilities. While Mecklenburg County's vision includes sustainability, industries must bring an overall value to the County beyond a clean energy moniker.

So, how does Mecklenburg County properly evaluate the overall impacts of this clean energy use on the community?

This analysis reviews the land use impacts of these uses and related issues. While the economics of these facilities and their overall fiscal impact to the community are important factors for Mecklenburg County to research and weigh into a decision, the emphasis in this report is on the direct land use considerations that should be carefully evaluated.



MECKLENBURG COUNTY WILL BE RECOGNIZED
FOR HAVING A HEALTHY, SUSTAINABLE,
DIVERSE AND GROWING ECONOMY OFFERING
ATTRACTIVE JOB OPTIONS TO ITS CITIZENS.

Mecklenburg 2035 Long-Range Plan



Manage effectively and conserve land and natural resources
in order to enhance and sustain the rural quality of life
valued by residents of Mecklenburg County.

Mecklenburg 2035



BACKGROUND

In 2016, Mecklenburg County received its first solar facility special exception permit (SEP) application. As a land use application, this request was processed as any SEP with the tools available in terms of the existing Comprehensive Plan and Zoning Ordinance. The Zoning Ordinance was amended (Article 20 – Solar Energy Systems), also in 2016, to bring some structure to the SEP process for these uses, particularly given their new and unique nature in the land use realm.

Article 20 is based on model solar ordinance templates created by the Virginia Department of Environmental Quality (DEQ) for solar energy facilities and is not sufficient to properly mitigate the adverse impacts to Mecklenburg County of these facilities. These models were released in 2012 and were created to help promote clean energy facilities.

As stated on the DEQ website –

The model local ordinances for wind and solar energy projects were developed because of differences in the responsibilities of the state and local governments. The Commonwealth is responsible for the natural-resource impacts of construction and operation of renewable energy projects, while local governments are responsible for other issues, such as:

- Siting, including land use and zoning.
- Health and safety, including setbacks, noise and building codes.
- Decommissioning, including financial assurance.

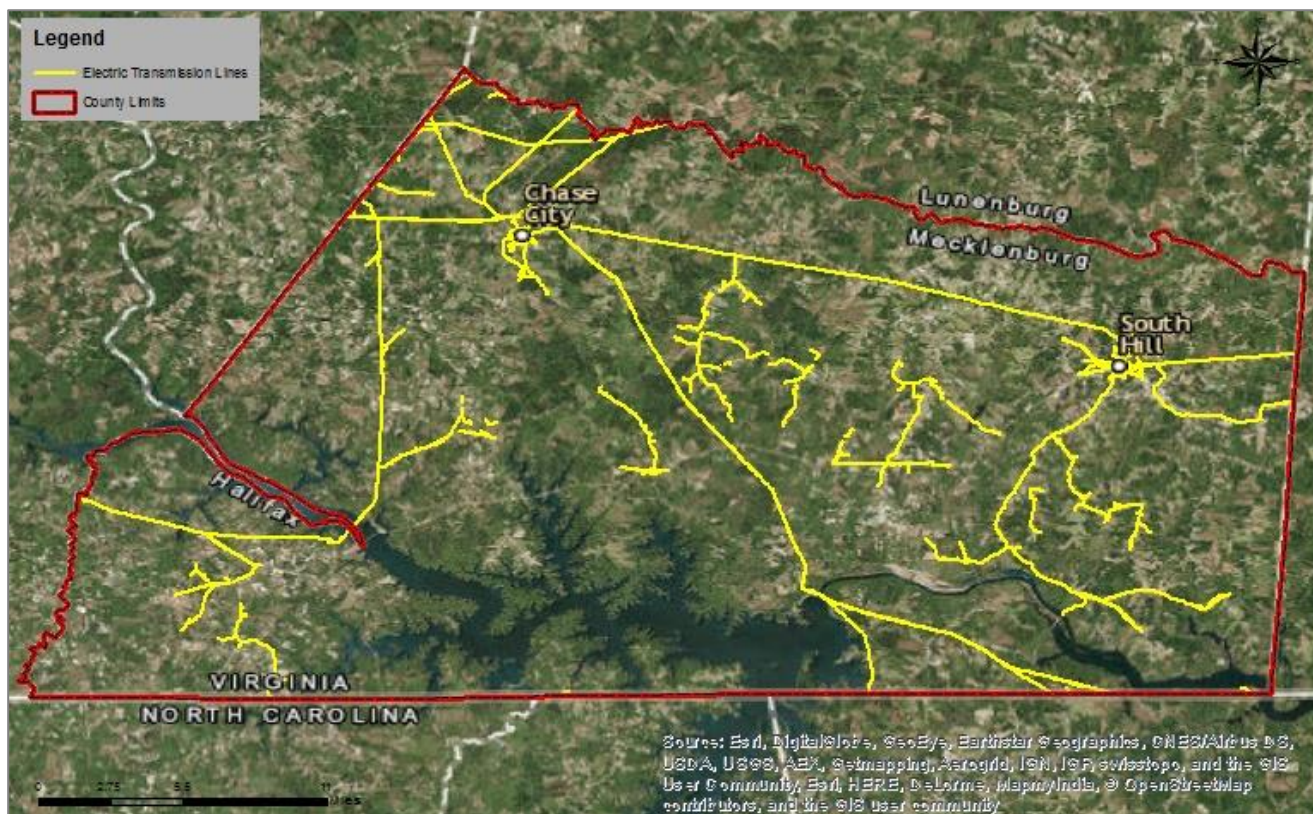
Since 2012, a number of solar facilities have located in the Commonwealth including, but not limited to, the counties of Accomack, Buckingham, King William, Louisa, Powhatan, and Southampton. With each of these processes, local planning staff has compiled information through research, use of the model ordinances, and reliance on professional networks to cobble together a local process and permit conditions to better address anticipated adverse impacts associated with utility-scale solar. The issues related to siting, mitigating impacts through setbacks and buffers, land disturbance processes and permits, financial securities, and the like has proven to be a significant and ongoing challenge to local planning staff, planning commissions, and governing bodies. These experiences point to the need for a more comprehensive approach than what the model ordinances set forth early in the evolution of these facilities.

Since Mecklenburg County's first SEP application in 2016 (the Bluestone application), it received another application for a 946 acre, 80 MW ground-mount solar photovoltaic facility (the Grasshopper application). Both facilities are proposed to be located adjacent to Chase City with the Grasshopper facility proposed to be located along the northeastern side of the town (see *Appendix* for more information). In addition to these two SEP applications, other land leases and purchase options are being pursued by various companies for large acreage holdings, also near Chase City.

Why Mecklenburg County? Why Chase City? Why now?

Mecklenburg County has significant infrastructure in terms of its electrical grid and its transportation system. It also has thousands of acres of agricultural and forested properties in various levels of production. Chase City, for example, is located at a confluence of electric transmission lines and being close to those lines is a significant cost savings to the industry. The land lease versus purchase option is also a financial incentive to land owners to earn revenue while retaining the ownership of the property.

Mecklenburg County Major Electrical Transmission Line Infrastructure



These factors – combined with the tax incentives provided by the state and federal government – create land use development pressure that, absent effective and relevant land use regulatory and planning tools, is difficult to properly evaluate and make informed decisions about for the community's benefit.

So, what factors should be evaluated? What are the impacts to a community? How should Mecklenburg County respond to and fairly evaluate these land use applications?

This report sets forth the impacts of solar facilities, defines and classifies these facilities, analyzes their land use impacts, and makes recommendations for how to evaluate and mitigate the impacts of utility-scale solar facilities.

SOLAR FACILITY LAND USE IMPACTS

As with any land use application, there are numerous potential impacts that need to be evaluated with solar facility uses. Given their potential scale and longevity, the effects of these uses may have a greater than normal impact on the communities in which they locate. All solar facilities are not created equal, and the land use regulations should reflect those differences in scale and impact accordingly.

Solar energy facilities, like the proposed Bluestone and Grasshopper applications, involve large tracts of land. The Bluestone application involves over 300 acres. The Grasshopper application involves over 900 acres. On these large parcels, the solar panels would cover much of the land area of the parcels. The solar facility use is essentially permanent – projected at 40 years. Establishing a solar facility use may take an existing agricultural or forestry operation out of production and will make it difficult, if not impossible, to resume future agricultural/forestal operations. A new solar facility use will have impacts on residential uses in the area, and takes up valuable future residential land if located near towns or other identified growth areas. Because of the size of such uses, a solar facility can change the character of an area and the nature of and suitability of that area for any future development.

A solar facility that is close to a town may affect the pattern of development around the town. If a solar facility is close to a major road, it could affect the viewshed and attractiveness in the area. Areas surrounding towns are future residential growth areas for Mecklenburg County. There are other potential impacts as well, such as using industrial, agricultural, or previously forested land for these long-term industrial scale utility uses. In short, the potential impacts of a utility-scale solar facility must be carefully considered because of the size and scale of the use; the potential conversion of land to an industrial scale use that was agricultural, forestal, or residential land; as well as the potential impact on nearby properties and the area in general.

To emphasize the potential impact of utility-scale solar facilities, the Grasshopper application is 946 acres. The area of the entire Town of Chase City is 2.201 square miles, or 1,408 acres. The proposed Grasshopper project area, therefore, is equal to approximately 67% of the entire land area of the Town. Combining the area of the proposed Bluestone facility (332.5 acres) with the proposed Grasshopper facility area (946 acres) results in a proposed solar facilities area adjacent to the Town of 1,278.5 acres – nearly equal to the total Town area of 1,408 acres.

Solar Facility Classifications

Solar facilities can be classified based primarily on the area affected and the capacity to generate electric power (i.e., size and scale).

Solar facility, small-scale

A facility that either (a) generates less than 15 kilowatts (kW) electricity from sunlight, consisting of one or more Photovoltaic (PV) systems and other appurtenant structures and facilities within the boundaries of the site, or (b) utilizes sunlight as an energy source to heat or cool buildings, heat or cool water, or produce electrical or mechanical power by means of any combination of collecting, transferring, or converting solar-generated energy; and (c) meets at least one of the following criteria: has a disturbance zone equal to or less than an acre; is mounted on or over a building, parking lot, or other previously disturbed area; or utilizes integrated PV only.

Solar facility, medium-scale

A facility that generates electricity from sunlight primarily to reduce onsite consumption of utility power for commercial and industrial applications. Sites are generally between one to three acres with a maximum capacity of 999 kW.

Solar facility, utility-scale

A facility that generates electricity from sunlight which will be used to provide electricity to a utility provider. Sites are generally over two acres and have a capacity in excess of one megawatt (1 MW).

Solar Facility Impacts

Change in Use/Future Land Use

A primary impact of utility-scale solar facilities, or solar farms, is that they often remove active forest land or agricultural land from current use to use the land for an industrial-scale utility use. An argument made by the solar industry is that this preserves the land for future agricultural use and there are sometimes conditions with the use that the land will be restored to its previous condition. This is easiest when the land was initially used for grazing, but it is still not without its challenges, particularly on large acreages.

*Surrounding Virginia's largest lake, Mecklenburg County in 2035
will be a modern and thriving rural place that retains its
agricultural heritage and close-knit communities.
Mecklenburg County will be recognized for having a healthy,
sustainable, diverse and growing economy offering attractive
job options to its citizens.*

– Mecklenburg 2035

Agricultural/Forestral Use

A large scale solar facility use will require the installation of equipment over large areas. The site will need to be graded in places and then re-vegetated to stabilize the soil and that vegetation needs to be managed (i.e., mowing, herbicides, etc.) over a long period of time. This prolonged management changes the natural characteristics of the soil making restoration of the site for future agricultural use difficult. If a site is deforested, then it can be reforested in the future, but over an extended length of time.

Residential Use

While replacing agricultural uses with residential uses is a more typical land use planning concern, in some areas this is anticipated and desired over time. “People have to live somewhere” and where they live in the future should be near existing infrastructure typical of towns and villages rather than sprawled out over the countryside. This makes land lying within designated growth areas, or otherwise located near existing population centers, a logical location for future residential use. Permitting a utility-scale use ties up the land for 30-40 years (a generation or two), which may be appropriate in some areas, but not others.

Industrial Zoned Land

Solar facilities can be a good use of brownfields or other previously disturbed land. The challenge in Mecklenburg County is that industrial zoned land is limited (1% of the County’s land area) and County officials, and the Comprehensive Plan, place a premium on industries that create and retain good paying jobs. While utility-scale solar facilities are not necessarily incompatible with other commercial and industrial uses, the amount of space required make them an inefficient use of industrially zoned land. Industrial zoned land in Mecklenburg County equates to a “highest and best use” consisting of quality jobs and an array of taxes paid to the County (i.e., property, real estate, machinery & tools).

Targeted industry sectors for Mecklenburg County are:

- Advanced manufacturing,
- Information technology and data processing, and
- Regional distribution;
- Other targeted industries suited to the assets of Mecklenburg County - biotechnology and pharmaceuticals, plastics, alternative energy, wood products, and retirement and vacation living.

- *Strategic Economic Development Plan*

As discussed above, the location of solar facilities is a concern due to the large amount of land required and the extended period that land is dedicated to this singular use. Solar facilities can be appropriately located in areas where they are difficult to detect, the prior use of the land has been marginal, and there is no designated future use specified (i.e., not in growth areas, not on prime farmland or farmlands of statewide importance, not near recreational areas, etc.).

The proximity of solar facilities to Mecklenburg County's towns should be a concern. While the Comprehensive Plan does not designate growth areas, it is a logical expectation that the areas adjacent to the towns, at least within a mile or two, will develop over time in a pattern consistent with the desire of those communities. This means areas dedicated to residential, commercial, or industrial uses in a pattern that fits the scale and capacity of each town both currently and as envisioned in the future.



Concentration of Uses

A concentration of solar facilities is a concern due to the homogenous land use such a combined scale of commercial uses creates. For example, if Chase City planned nothing but residential uses around its current boundary, that would also be a concern if no additional commercial or industrial uses were envisioned. Similarly, if the residential density of the proposed uses was not compatible with either the pattern of existing uses or the community vision of future uses, that would be problematic for the future land use pattern of the town and surrounding areas in Mecklenburg County. The large scale of the land use, particularly when solar facilities are concentrated, also significantly exacerbates the adverse impacts to the community in terms of land consumption, use pattern disruptions, and environmental impacts (i.e., stormwater, erosion, habitat). Such concentrations change the character of the area and alter the natural and historic development pattern of a community.

The attraction of solar facilities to areas near some population centers is in response to the same forces that attract other uses – the infrastructure is already there (i.e., electrical grid, water/sewer, roads, etc.). Whereas, one solar facility in a particular geographic area may be an acceptable use of the land, when multiple facilities are attracted to the same geography for the same reasons, this tips the land use balance toward too much of a singular utility scale use. The willingness of land owners to cooperate with energy companies (or their representatives) is understandable, but that does not automatically translate into good planning for the community. The short term (and medium term) gain for land owners can have a lasting negative impact on their community.

Public Rights-of-Way

The visual impact of utility-scale solar facilities can be significantly minimized with effective screening and buffering. However, there are locations where this is challenging due to the historic or otherwise scenic nature of the landscape. In Mecklenburg County, routes 47 and 903 are designated as Scenic Byways and Highway 1 has a historic designation. Solar facilities off these routes cause a major concern about their impact to the rural aesthetic that currently, and historically, exists along these transportation routes. On the other hand, Route 92 is a main artery within the County, on which buffering or screening may also be appropriate even though this route has no special scenic or historic designation.

The location of large solar facilities within Mecklenburg County needs to account for views from public rights-of-way, regardless of their designation or location. Sites of scenic or



*Scenic Vista
(proposed solar facility on far knoll)*

historic areas should be avoided, while other sites should be effectively screened from view with substantial vegetative or other types of buffers. Berms, for example, can provide a very effective screen, particularly if combined with appropriate vegetation. Effective screening reduces visual impacts to adjacent property owners and passersby. Appropriate screening techniques should be coordinated with County officials on a case by case basis relative to each proposed site and specific viewshed or boundary.

Decommissioning

The size and scale of solar facilities presents significant challenges to localities to ensure the decommissioning and removal of the equipment and other improvements when the facility shuts down. The removal of the equipment can cost millions in today's dollars. There may or may not be a market to salvage the equipment when removed. The impact of inflation over decades is difficult to calculate. Providing for adequate security to ensure that financial resources are available to remove the equipment is a significant challenge. The worst possible outcome would be an abandoned utility-scale solar facility with no resources available to pay for its removal.

Environmental

While solar energy is a renewable, green resource, its generation is not without environmental impacts. Typical impacts such as air or water emissions are absent, but the land use impacts of utility-scale solar facilities can be significant, particularly in terms of their scale and the size of land disturbance. The location of sites, the arrangement of panels within the site, and the ongoing management of the site are important.

Buffers and Wildlife Corridors

The establishment of buffers and berms, as discussed above, can be an effective means to mitigate the visual impact of large solar facilities. A substantial buffer also acts as a wildlife corridor along the project perimeter. The arrangement of panels within a project site is also important to maintain those areas where wildlife logically travels on the site. In other words, if there are existing trees or other vegetation that link open areas, it would be logical to preserve these areas that serve as wildlife cover. Such sensitivity to the land's use also breaks up the panel bay groups and will make the eventual restoration of the land to its previous state that much easier and more effective.



*100' vegetative buffer from property line
(left to right)*

Stormwater/Erosion and Sediment Control

The site disturbance required for these facilities is significant and requires the submission of both stormwater and erosion/sediment control (ESC) plans. The plan review and submission process is no different with these facilities than it is for any other land disturbing activity except that the plans can be more complex due to their scale. Due to this complexity, and the fact that the County does not conduct stormwater reviews at the County level, it is recommended that an independent third party review all stormwater and ESC plans in addition to the normal review procedures. The successful implementation of these plans and ongoing maintenance of the mitigation measures is also critical and should be addressed in each proposal and with sufficient performance bonds and long-term maintenance provisions in place.



Example compliant with state requirements



Example not compliant with state requirements

Cultural/Environmental/Recreational Resources

Every proposed site should undergo an evaluation using the Virginia Department of Historic Resources Virginia Cultural Resources Information System (HGR V-CRIS) to identify any architectural, archaeological or other cultural resources on or near proposed facilities. Additionally, sites located near recreational or environmental resources, such as Kerr Reservoir, should be avoided.

Tourism is recognized as a key sector for future economic growth in the region. As such, the Board of Supervisors adopted the *Strategic Tourism Plan* in 2010. The plan calls for creating a tourism-friendly culture, promoting quality of life, and establishing a brand for the County, among other specific recommendations.

Premier Tourism Assets

Outdoor Recreation

Lakes

Trails

Rosemont Winery/Vineyard

Festivals

Historic Downtowns

Museums

Scenic Byways

Cultural Activities

Libraries

Shopping

Events

- Strategic Tourism Plan

Airports



**Federal Aviation
Administration**

The proximity of solar facilities to airports is a concern. Facilities within several miles of an airport should perform an *Obstruction Evaluation / Airport Airspace Analysis (OE/AAA)* and submit an obstruction evaluation report to the FAA if required. This analysis should be performed and demonstrated to Mecklenburg County officials regardless of FAA requirements. Glare is the main issue and as solar panels age; their anti-glare coatings erode. Even anti-glare panels can cause visual concerns and the location of any solar facility near an airport should be done in consultation with those airport officials and other local government officials.

ADDITIONAL SOLAR FACILITY IMPACTS

The following impacts are important considerations that should be considered in the evaluation of a Special Exception or other land use application process. While a full analysis of these issues is beyond the scope of this report, these impacts should be considered by the Board of Supervisors as part of their decision under the Code of Virginia (§ 15.2-2283).

Financial Incentives

The federal and state incentives making this technology more economically feasible for the energy industry are subject to political change and will not continue indefinitely. Those macro economic development and energy policy focused incentives limit Mecklenburg County's ability to fully collect on potential local revenues (i.e., real estate, property, machinery & tools). While these uses can generate a significantly higher income potential for landowners compared to agricultural income streams, the relative financial benefit to the community through new tax revenues appears to be negligible.

Fiscal impact

As indicated above, the fiscal impact to Mecklenburg County is based on a 20% valuation of the equipment as opposed to the full fair market value. Further, Virginia Code § 58.1-3661 authorizes local exemptions of up to 100 percent to encourage the use of solar facilities. The valuation of the underlying real estate will increase to an extent as a utility-scale solar facility (e.g., \$3k/ac in agricultural/forestal land use vs. market rate for this type of use), but this increase in revenue is not significant relative to Mecklenburg County's overall budget. Depreciation rates applied to the equipment also reduce the tax value to the County over time.

Employment

While there is an initial increase in jobs during the construction stage (200-300 workers for a year or less), there are minimal operational requirements for full-time jobs (1-3 persons/month on-site). The main labor requirements are seasonal vegetation management and care and occasional equipment maintenance. It is not known whether the construction workforce would involve local contractors or workers.

Encourage targeted economic growth, business diversification and job creation that will result in a gainfully employed labor force within a diverse marketplace.

– Mecklenburg 2035

Property Values

Research in this area is variable and results do not appear to be neutral in many cases. Industry provided analyses consistently do not show a negative impact, but other analyses (from project opponents or adjacent neighbors) demonstrate negative impacts to property values. This discrepancy in property value analyses of the potential impact on property values is present with the two recent solar facility applications (Bluestone and Grasshopper).

Typically land uses that create impacts that you can “see, taste, hear, smell or feel” will have a negative impact on adjacent property values. However, the “out of sight, out of mind” factor is also pertinent in that projects that are well buffered by berms and vegetation and cannot be seen by adjacent property owners or from public rights-of-way should have negligible impact on property values. The issue of property value impacts is highly variable and is commonly heard with major land use applications. Unless property impacts can be clearly substantiated – one way or the other – by neutral, credible third parties, then this potential impact is a difficult basis by which to analyze a project.

Health Concerns/Odor/Noise

No health impacts have been noted in the research or during this project analysis. There is no odor and noise is minimal and typically contained on the property.

THE COMPREHENSIVE PLAN

Mecklenburg County's Comprehensive Plan does not directly address or envision the use of solar facilities within the County. Solar facilities, bolstered in recent years with federal and state incentives, are not discussed in *Mecklenburg 2035*, nor was it considered as a specific type of land use application until 2016. The provision of state and federal financial incentives, combined with Mecklenburg County's robust system of electrical transmission lines have led to a recent flurry of solar facility activity including land leases and two Special Exception Permit (SEP) applications. Any review of a utility-scale solar facility relative to the Comprehensive Plan is challenging until or unless the plan is amended to address such facilities.

2232 Review

In considering a utility-scale solar facility, a 2232 review by the County is required by the *Code of Virginia* (§15.2-2232). This Code provision provides for a review by the Planning Commission of public utility facility proposals to determine if their general or approximate location, character and extent are substantially in accord with the Comprehensive Plan. The 2232 review process applies to public utility or public service corporation facilities, whether publicly or privately owned.

To achieve the Vision for 2035 and address the challenges and opportunities discussed in this Long-Range Plan, requires a future development strategy that focuses on natural resource conservation, targeted economic growth, and town revitalization and expansion.

- Mecklenburg 2035, Land Use and Development, Future Land Use and Growth Management

The 2232 review process requires a public hearing before the Planning Commission if the proposed facility is not directly supported by the Comprehensive Plan and cannot be processed as a "feature shown". This process follows the same procedure as other land use applications as set forth in §15.2-2204 of the *Code of Virginia*. After the public hearing, the Planning Commission determines if the general location, character or extent of the proposal is in substantial accord with the County's Comprehensive Plan and either approves or denies the application. The 2232 review process may be performed concurrently by the Planning Commission with other zoning approvals such as a Special Exception Permit (SEP). The SEP staff report, if any, could include a discussion of the 2232 review and the public hearing advertisement would identify the 2232 review process along with the SEP application. The Board of Supervisors can overrule the Planning Commission on a 2232 review if the decision of the Planning Commission is appealed to the Board by the applicant or if the Board, on its own motion, chooses to hear the application.

Mecklenburg 2035 Long-Range Plan

The discussion in the current Comprehensive Plan about the types of industry desired by the County do not include a utility-scale solar facility use type. The Comprehensive Plan repeatedly references the importance of agricultural operations to the County, as well as its scenic rural landscape. The Plan's emphasis on tourism, jobs, and natural and scenic resources is inconsistent with the use pattern associated with utility-scale solar facilities. The importance of town expansion and revitalization is also discussed. Additionally, there is no mention of public utilities outside of the need for adequate infrastructure to support the County's economic development objectives. As currently written, the Comprehensive Plan, at best, does not address solar facilities and does not appear to support that type of development over more traditional agricultural or industrial operations.

It is worth noting that even if a facility receives 2232 approval, that does not mean that a specific land use application (SEP) must be approved. Likewise, any SEP receiving approval without a 2232 review is, at least potentially, not in compliance with state code.

If Mecklenburg County desires to amend its Comprehensive Plan to more specifically address solar facilities, then it may request assistance from outside agencies such as the Southside Planning District Commission and the Soil and Water Conservation District to provide information and mapping. Any amendments should clarify the character, location, and extent under which these facilities would be permitted in the County.

Recommended Comprehensive Plan Amendments

If Comprehensive Plan amendments are made the following topics should be addressed:

- Identify major electrical facilities (i.e., transmission lines, transfer stations, generation facilities, etc.);
- Identify growth area boundaries around each town or appropriate population center;
- Recommend an additional public review and comment opportunity for land use applications within a growth area boundary, within a specified distance from an identified growth area boundary, or within a specified distance from identified population centers (e.g., town limits);

- Recommend location parameters for large solar facilities such as:
 - establish target acreage (a suggested maximum acreage) or density parameters (e.g., not more than two facilities within two miles) to mitigate the impacts related to the scale of these facilities;
 - establish any desired maximum percent usage of assembled property to mitigate impacts to habitat, soil erosion, and stormwater runoff;
 - should be located adjacent to, or close to, existing electric transmission lines;
 - should be located on brownfields or near existing industrial uses (but not within growth boundaries);
 - avoid or minimize impact to prime farmland or farmlands of statewide importance as defined by the USDA and Commonwealth of Virginia, respectively (See Farmland map in *Mecklenburg 2035*);
 - should be located outside of a growth area/town boundary or a specified distance from an identified growth boundary;
 - should be located outside of the viewshed of any scenic, cultural, or recreational resources (i.e., solar facilities may not be seen from surrounding points that are in line-of-sight with a resource location);
 - should be located outside of a specified radius of an airport (e.g., Chase City Municipal and Hazelswart, Twin Towers).
- The Comprehensive Plan could also identify recommended conditions to mitigate negative effects:
 - Any SEP approval should include appropriate conditions to mitigate negative effects on nearby properties and the area. Potential examples could address:
 1. Concept plan compliance
 2. Buffers
 3. Earthen berms
 4. Setbacks
 5. Decommissioning plan and security
 6. Landscaping maintenance

THE ZONING ORDINANCE

In addition to, or separate from, Comprehensive Plan amendments, the Zoning Ordinance (Article 20) should be amended to more specifically set forth the process and requirements necessary for a thorough land use evaluation of an application. As previously stated, the current Zoning Ordinance section addressing solar facilities is based on the DEQ model solar ordinance and is insufficient in its content and requirements to perform an adequate application assessment.

Recommended Application Process

Pre-application Meeting

The process of requiring applicants to meet with staff prior to the submission of an application often results in a better, more complete application and a smoother process once an application is submitted. This meeting allows the potential applicant and staff to sit down to discuss the location, scale and nature of the proposed use and what will be expected during that process. The pre-application meeting is one of the most effective tools planners can use to ensure a more efficient, substantive process.

2232 Review

As discussed previously, the 2232 review for public utility facilities can occur as part of the Special Exception Permit (SEP) process. Any SEP not including the 2232 review would be subject to such review in compliance with § 15.2-2232. If the 2232 review is not done concurrently with the SEP application, then it should be conducted prior to the receipt of an SEP application.

An application not substantially in accord with the Comprehensive Plan should not be recommended for approval regardless of the conditions placed on the use. Depending on the location, scale and extent of the project, it is difficult to sufficiently mitigate the adverse impacts of a project that does not conform with the Plan.

SEP Application

If the 2232 review is completed, and it is not part of the SEP process, and found in compliance with the Comprehensive Plan, then the SEP process can proceed once a complete application is submitted. Application completion consists of the submission of all requirements set forth in the Zoning Ordinance and is at the discretion of the Zoning Administrator if there is any question as to what is required or when it is required.

Applications should contain all required elements at the time of submittal and no components should be outstanding at the time of submittal (e.g., the Traffic Study is underway and should be done by the PC meeting.) The following minimum requirements should be submitted or initiated at the time of applications submittal for all utility-scale solar facilities:

1. Application requirements. Each applicant requesting a Special Exception Permit (SEP) shall submit the following:
 - a) A complete SEP application form.
 - b) Documents demonstrating the ownership of the subject parcel(s).
 - c) Proof that the applicant has authorization to act upon the owner's behalf.
 - d) Identification of the intended utility company who will interconnect to the facility.
 - e) List of all adjacent property owners, their tax map numbers and addresses.
 - f) A description of the current use and physical characteristics of the subject parcels.
 - g) A description of the existing uses of adjacent properties and the identification of any solar facilities – existing or proposed – within a five mile radius of the proposed location.
 - h) Aerial imagery which shows the proposed location of the solar energy facility, fenced area and driveways with the closest distance to all adjacent property lines and dwellings along with main points of ingress/egress.
 - i) A Concept Plan that shows: the subject parcels; the proposed location of the solar panels and related facilities; the location of proposed fencing, driveways, internal roads, and structures; the closest distance to adjacent property lines and dwellings; the location of proposed setbacks; the location and nature of proposed buffers including vegetative and constructed buffers and berms; the location of points of ingress/egress; any proposed construction phases.
 - j) A detailed decommissioning plan.
 - k) A reliable and detailed estimate of the costs of decommissioning, including provisions for inflation.
 - l) A proposed method of providing appropriate escrow, surety or security for the cost of the decommissioning plan.
 - m) Traffic study submitted with application modelling the construction and decommissioning processes. County staff will review the study in cooperation with VDOT.
 - n) An estimated construction schedule.

- o) Fourteen sets (11"× 17" or larger), one reduced copy (8½"× 11") and one electronic copy of site plans, including elevations and landscape plans as required. Site plans shall meet the requirements of this ordinance.
- p) The County may require additional information deemed necessary to assess compliance with this section based on the specific characteristics of the property or other project elements as determined on a case by case basis.
- q) Application Fee to cover any additional review costs, advertising, or other required staff time.

2. Public Notice.

- a) Special Exception Permits shall follow the public notice requirements as set forth in the Mecklenburg County Zoning Ordinance.
- b) Neighborhood meeting: A public meeting shall be held prior to the public hearing with the Planning Commission to give the community an opportunity to hear from the applicant and ask questions regarding the proposed project.
 - i. The applicant shall inform the Zoning Administrator's Office and adjacent property owners in writing of the date, time and location of the meeting, at least seven but no more than 14 days, in advance of the meeting date.
 - ii. The date, time and location of the meeting shall be advertised in the County's newspaper of record by the applicant, at least seven but no more than 14 days, in advance of the meeting date.
 - iii. The meeting shall be held within the County, at a location open to the general public with adequate parking and seating facilities which may accommodate persons with disabilities.
 - iv. The meeting shall give members of the public the opportunity to review application materials, ask questions of the applicant and make comments regarding the proposal.
 - v. The applicant shall provide to the Zoning Administrator summary of any input received from members of the public at the meeting.

3. Minimum Development Standards.

- a) No solar facility shall be located within a reasonable radius of an existing or permitted solar facility, airport, or town boundary.

- b) The minimum setback from property lines shall be a reasonable distance and correlated with the buffer requirement.
- c) The facilities, including fencing, shall be significantly screened from the ground-level view of adjacent properties by a buffer zone of a reasonable distance extending from the property line that shall be landscaped with plant materials consisting of an evergreen and deciduous mix (as approved by County staff), except to the extent that existing vegetation or natural land forms on the site provide such screening as determined by the Zoning Administrator. In the event, existing vegetation or land forms providing the screening are disturbed, new plantings shall be provided which accomplish the same. Opaque architectural fencing may be used to supplement other screening methods, but shall not be the primary method.
- d) The design of support buildings and related structures shall use materials, colors, textures, screening and landscaping that will blend the facilities to the natural setting and surrounding structures.
- e) No signage of any type may be placed on the facility other than notices, warnings, and identification information required by law.
- f) Maximum height of primary structures and accessory buildings shall be a reasonable height as measured from the finished grade at the base of the structure to its highest point, including appurtenances. The Board of Supervisors may approve a greater height based upon the demonstration of a significant need where the impacts of increased height are mitigated.
- g) All solar facilities must meet or exceed the standards and regulations of the Federal Aviation Administration ("FAA"), State Corporation Commission ("SCC") or equivalent, and any other agency of the local, state or federal government with the authority to regulate such facilities that are in force at the time of the application.
- h) To ensure the structural integrity of the solar facility, the owner shall ensure that it is designed and maintained in compliance with standards contained in applicable local, state and federal building codes and regulations that were in force at the time of the permit approval.
- i) The facilities shall be enclosed by security fencing on the interior of the buffer area (not to be seen by other properties) of a reasonable height. A performance bond reflecting the costs of anticipated fence maintenance shall be posted and maintained. Failure to maintain the security fencing shall result in revocation of the SEP and the facility's decommissioning.

- j) Ground cover on the site shall be native vegetation and maintained in accordance with established performance measures or SEP conditions.
 - k) Lighting shall use fixtures as approved by the County to minimize off-site glare and shall be the minimum necessary for safety and/or security purposes. Any exceptions shall be enumerated on the Concept Plan and approved by the Zoning Administrator.
 - l) No facility shall produce glare that would constitute a nuisance to the public.
 - m) Any equipment or situations on the project site that are determined to be unsafe must be corrected within 30 days of citation of the unsafe condition.
 - n) Any other condition added by the Planning Commission or Board of Supervisors as part of a SEP approval.
4. Coordination of local emergency services. Applicants for new solar energy facilities shall coordinate with the County's emergency services staff to provide materials, education and/or training to the departments serving the property with emergency services in how to safely respond to on-site emergencies.
5. Decommissioning. The following requirements shall be met:
- a) Solar farms which have reached the end of their useful life or have not been in active and continuous service for a reasonable period of time shall be removed at the owner's or operator's expense, except if the project is being repowered or a force majeure event has or is occurring requiring longer repairs; however, the County may require evidentiary support that a longer repair period is necessary.
 - b) Decommissioning shall include removal of all solar electric systems, buildings, cabling, electrical components, security barriers, roads, foundations, pilings, and any other associated facilities, so that any agricultural ground upon which the facility and/or system was located is again tillable and suitable for agricultural uses. The site shall be graded and re-seeded to restore it to as natural a condition as possible, unless the land owner requests in writing that the access roads or other land surface areas not be restored, and this request is approved by the Board of Supervisors (other conditions might be more beneficial or desirable at that time).
 - c) The site shall be re-graded and re-seeded to as natural condition as possible within a reasonable timeframe after equipment removal.

- d) The owner or operator shall notify the Zoning Administrator by certified mail, return receipt requested, of the proposed date of discontinued operations and plans for removal.
- e) Decommissioning shall be performed in compliance with the approved decommissioning plan. The Board of Supervisors may approve any appropriate amendments to or modifications of the decommissioning plan.
- f) Hazardous material from the property shall be disposed of in accordance with federal and state law.
- g) The applicant shall provide a reliable and detailed cost estimate for the decommissioning of the facility prepared by a professional engineer or contractor who has expertise in the removal of solar facilities. The decommissioning cost estimate shall explicitly detail the cost and shall include a mechanism for calculating increased removal costs due to inflation and without any reduction for salvage value. This cost estimate shall be recalculated every five (5) years and the surety shall be updated in kind.
- h) The decommissioning cost shall be guaranteed by cash escrow at a federally insured financial institution approved by the County before any building permits are issued. The Board of Supervisors may approve alternative methods of surety or security, such as a performance bond, letter of credit or other surety approved by the County, to secure the financial ability of the owner or operator to decommission the facility.
- i) If the owner or operator of the solar facility fails to remove the installation in accordance with the requirements of this permit or within the proposed date of decommissioning, the County may collect the surety and the County or hired third party may enter the property to physically remove the installation.

Performance Measures (or SEP conditions)

To better mitigate the potential adverse impacts, of utility-scale solar facilities, the following minimum performance standards are recommended:

1. All federal, state, and local laws, regulations, permit requirements and ordinances will be adhered to, including but not limited to:
 - a) Solar facilities shall meet all requirements of the National Electrical Code (NEC), National Electrical Safety Code (NESC), American Society of Civil Engineers (ASCE), American National Standards Institute (ANSI), Institute of Electrical and Electronics Engineers (IEEE), Underwriters Laboratories (UL), or International Electrotechnical Commission (IEC) or any other federal and state codes as applicable, and shall be inspected by a County building inspector through the building permit process.
 - b) An Erosion and Sediment Control plan must be submitted and reviewed by a qualified third-party at the County's discretion, then approved by either the Soil & Water Conservation District or County staff prior to any land disturbance.
 - c) A Stormwater Management Plan must be submitted and reviewed by a qualified third-party at the County's discretion, then approved by either the Department of Environmental Quality (DEQ) or County staff prior to any land disturbance.
 - d) Wetlands shall be inventoried, delineated, and avoided.
2. Concept Plan.
 - a) The facility shall be constructed and operated in substantial compliance with the approved Concept Plan, with allowances for changes required by the Virginia Department of Environmental Quality (DEQ) Permit by Rule (PBR) process.
 - b) The project shall be limited to the phases and conditions set forth in the Concept Plan that constitutes part of this application, notwithstanding any DEQ requirements resulting from the PBR process. No additional phasing or a reduction in facility size shall be permitted, and no extensions beyond the initial period shall be granted without amending the SEP.
3. Setbacks and screening shall meet the requirements of the Zoning Ordinance and the Concept Plan.

4. Site Plan requirements. In addition to the site plan requirements set forth in the Zoning Ordinance, a Construction Management Plan shall be submitted that includes:

- Traffic Control Plan (subject to VDOT and County approval)
- Delivery and parking areas
- Delivery routes
- Permits (state/local)

Additionally, a Construction/Deconstruction Mitigation Plan shall also be submitted including:

- Hours of operation
- Noise mitigation (e.g., construction hours)
- Smoke and burn mitigation (if necessary)
- Dust mitigation
- Road monitoring and maintenance

5. The building permit must be obtained within a reasonable time of obtaining the Special Exception Permit and commencement of the operation shall also begin within a reasonable timeframe from building permit issuance.

6. All solar panels and devices are considered primary structures and subject to the requirements for such, along with the established setbacks and other requirements for solar facilities.

7. Site Maintenance.

- a) Native grasses shall be used to stabilize the site for the duration of the facility's use.
- b) Weed control or mowing shall be performed routinely and a performance bond reflecting the costs of such maintenance for a period of six (6) months shall be posted and maintained. Failure to maintain the site may result in revocation of the SEP and the facility's decommissioning.
- c) Anti-reflection coatings. Exterior surfaces of the collectors and related equipment shall have a non-reflective finish and solar panels shall be designed and installed to limit glare to a degree that no after image would occur towards vehicular traffic and any adjacent building.
- d) Repair of panels. Panels shall be repaired or replaced when either non-functional or in visible disrepair.

8. Signage shall identify the facility owner, provide a 24-hour emergency contact phone number, and conform to the requirements set forth in the Zoning Ordinance.
9. At all times, the solar facility shall comply with the County's noise ordinance.
10. The solar facility shall not obtain a building permit until evidence has been given to the County that an electric utility company has a signed interconnection agreement with the permittee.
11. All documentation submitted by the applicant in support of this SEP request becomes a part of the conditions. Conditions imposed by the County shall control over any inconsistent provision in any documentation provided by the applicant.
12. Nothing in this approval obligates the County to acquire any interest in property, to construct, maintain or operate any facility or to grant any permits or approvals except as may be directly related hereto.
13. If any one or more of the conditions is declared void for any reason, such decision shall not affect the remaining portion of the permit, which shall remain in full force and effect, and for this purpose, the provisions of this are hereby declared to be severable.
14. Any infraction of the above-mentioned conditions, or any Zoning Ordinance regulations, may lead to a stop order and revocation of the special exception permit.
15. The County Administrator, Building Official, or Zoning Administrator, or any other parties designated by those County officials, shall be allowed to enter the property at any reasonable time to check for compliance with the provisions of this permit, with reasonable advanced notice and subject to the security, health and safety standards and regulations that apply to the project site.

CONCLUSION

The solar energy market is having major impacts on land use across the country and federal and state tax incentives have resulted in numerous applications in the Commonwealth. While the benefits of clean energy are often touted, the impact of utility-scale solar facilities on Mecklenburg County can be significant. Applicants often cite that a particular project will “only” take up some small percentage of agricultural, forestal, or other land use category. The impact of these uses extends beyond simply replacing an existing land use (or a future one).

The Project Site would account for only .305% of the county's total agricultural land.

- Grasshopper SEP Application Information

The scale and duration of these facilities complicates everything from the land disturbance permitting process through surety requirements. Utility-scale solar facilities can change the character of an area, altering the future of communities for generations.

Fiscal impact to a community is also often cited as an incentive. The positive fiscal impact to land owners with leases or the sale of property for solar energy facilities is clear, however, the fiscal impact to the overall community is less clear and, in the case of Mecklenburg County, negligible compared to its overall budget (\$93,756,863 FY17). Fiscal impact, in and of itself, is not a compelling reason to approve (or disapprove) a land use application.

Local officials need to weigh these land uses within the context of their Comprehensive Plan and carefully consider each individual application in terms of the impact that it will have in that area of the community by itself, as well as if combined with additional sites. *The concentration of solar facilities is a major consideration in addition to their individual locations.* A solar facility here or there, close to major transmission lines, not visible from public rights-of-way or adjacent

properties, and not located in growth areas, on prime farmland or farmlands of statewide importance , or near an airport, might be an acceptable land use with a beneficial impact on the community. Otherwise, the argument for these facilities, at a county-level scale weakens considerably.

CHASE CITY, VA = 1,408 AC

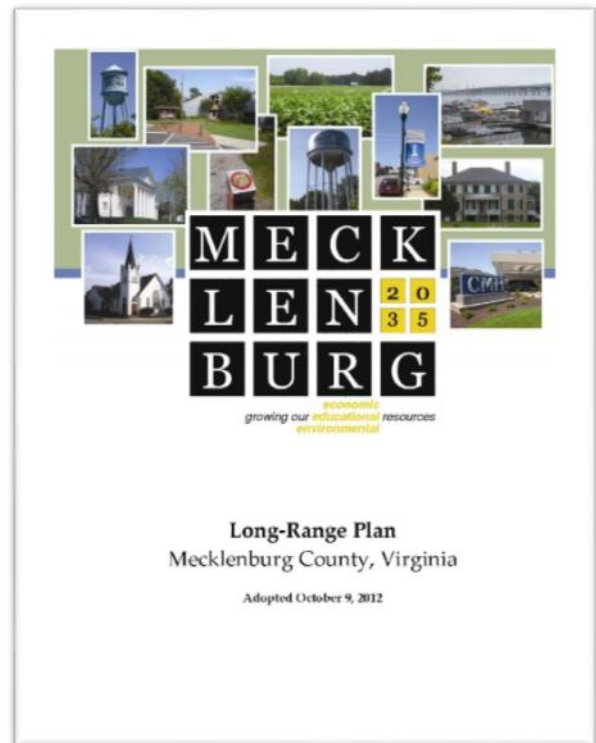
GRASSHOPPER SOLAR SEP = 946 AC

BLUESTONE FARM SEP = 332 AC

BOYDTON, VA = 519 AC

This report has examined the land use impacts of utility-scale solar facilities and made recommendations in terms of Comprehensive Plan amendments and Zoning Ordinance amendments that Mecklenburg County may wish to consider. This research is a compilation of case studies, primarily in Virginia, as well as other studies from across the country. Additionally, an analysis of both the Bluestone Farm and Grasshopper applications illustrate the importance of properly evaluating and, to the extent possible, mitigating the impacts of these facilities by carefully controlling their location, scale, size, and other site specific impacts.

More specific criteria, by which to evaluate and regulate these land use applications, are recommended to properly guide the responsible location of energy facilities within the vision and goals set forth by Mecklenburg County citizens and public representatives. If this recommendation is the desire of the County, then the Planning Commission or Board of Supervisors may initiate corresponding text amendments at any time.



APPENDIX

GRASSHOPPER & BLUESTONE FARM SEP APPLICATIONS

GRASSHOPPER & BLUESTONE FARM SEP APPLICATIONS

This report has established the land use intricacy of utility-scale solar facilities and the recommended application process, development criteria and performance measures reflect that complexity. Mecklenburg County has received a SEP application from Grasshopper Solar, LLC for a 946 acre, 80 Megawatt (MW) solar energy facility located northeast of Chase City in between (and with frontage on) Highway 47 and Highway 49. The facility is proposed to be operated for not less than 20 years, and up to 40 years, under a power purchase agreement with an unspecified utility. Geenex Solar is the contractor for the project's development. The proposed facility will have photovoltaic panels mounted on steel and aluminum support frames. The panels will move with the sun to increase efficiency. An electrical substation is also proposed on-site to transmit power from the facility to the electrical grid. The property, known locally as the "Spaulding Farm", is currently owned by Malcolm and Betty Bailey (TPN 8197 and 21491) and is used as a fenced pasture for grazing cattle.

The Grasshopper application is the County's second solar facility application received within several months. The first application was from Bluestone Farm Solar, LLC for a 332 acre, 49.9 MW facility west of Chase City approximately 0.45 miles from Highway 47. The property owners are listed as McBride and others for two parcels. The site proposes a landscape buffer adjacent to Spanish Grove Road consisting either of existing vegetation or a 15 feet wide area of evergreen shrubs. Additionally, the application states that the facility will adhere to the AG zoning district setbacks and have a six foot tall fence with three strands of barbed wire securing the site. None of the details proposed in the application were stated as conditions in the approved SEP. The SEP application was approved by the Board of Supervisors on November 7, 2016.

Notably, a 2232 Review was not part of the SEP process and has yet to be conducted by the County. The Bluestone application notes that the County's *Long-Range Plan Future Land Use Map* shows the area as "Agricultural/Residential" and states that solar energy systems make good transitional land uses in areas where suburban development is not envisioned in the immediate future. Additionally, the property value market impact analysis submitted with the Bluestone Farm application materials concluded that solar facilities have no impact on the sale price for adjacent agricultural, residential, or vacant residential land.

The final approval of these applications would mean over 1,200 acres of solar panels tied up for 20-40 years in a primary growth area for the County altering, if not inhibiting, the future residential or agricultural growth that would occur around Chase City over the next generation. The Bluestone application states that, "At the end of the project life, the land can easily be converted back to its original condition for agricultural uses which supports the County's future land use recommendation of continued agricultural land use." The County has not determined the accuracy of this statement, nor how it interprets the Comprehensive Plan for these uses.

A further comparison of the two solar energy applications can be seen below:

Application/Project Comparison

Factor	Bluestone	Grasshopper
1. Location	West of Chase City	Northeast of Chase City
2. Road Frontage	Spanish Grove Road	Route 47 Route 49
3. Size/Area	332.5 acres	946 acres
4. Existing Uses	Forested/partially open	Fenced pasture (cattle grazing)
5. Area Uses/Adjoining Uses	Agricultural and woodlands	Agricultural/Commercial Residential/Industrial
6. Distance from Town/Growth Area/Population Center	Adjacent	Adjacent
7. Visibility	Medium	High
8. Proximity to other solar facilities.	Grasshopper	Bluestone
9. Conditions	None	3/30/17 Proposal (Limited)
10. Concept Plan	None	None
11. Setbacks	Zoning Ordinance AG only	Zoning Ordinance AG only
12. Buffers/Screening	Described generally in application	As per site plan; 3/30/17
13. Decommissioning Plan	None	11/2/16 draft
14. Decommissioning Cost Estimate	\$2,979,652	\$509,400
15. Escrow/Surety/Security for decommissioning costs	None	Expected
16. Scenic/Cultural/Recreation impacts.	Not determined	Not determined (HWY 47 is a scenic byway)
17. 2232 Review Status	Requested 3/29/17	3/10/17 Grasshopper proposed Comprehensive Plan amendments.
18. SEP status	Approved 11/7/16	Deferred
19. Project Cost	Not stated in application	\$156,000,000
20. Potential tax revenues	Unknown	Unknown
21. Employment	Unknown	3 (part-time/seasonal)
22. Power generation capacity	49.9 MW	80 MW
23. Use Area / Total Area	286.7 ac / 332.5 ac (86%)	913 ac / 946 ac (97%)

Grasshopper Application

The Planning Commission conducted a public hearing on the Grasshopper application on December 1, 2016. After the public hearing, the Planning Commission tabled the application until a later meeting. Grasshopper then submitted supplemental application materials in January, February, March, and April, 2017. Grasshopper submitted proposed Comprehensive Plan amendments on March 10, 2017. The Planning Commission has not acted on the SEP application or the proposed amendments to the Comprehensive Plan.

A number of issues, as outlined in this report and further exemplified in the Bluestone Farm/Grasshopper Comparison Table, should be carefully examined by the Planning Commission and Board of Supervisors.

1. Large area and scale of the project (946 acres)
 - a) Impact on adjoining properties and the character of the area
 - b) Unknown impact on property values
2. Frontage on both Route 47 (designated scenic byway) and Route 49
 - a) Visibility/Buffers
 - c) Gateways into town
3. The project site is a well-established, significant agricultural use with fenced pasture
4. Residential uses in area (existing and future potential)
5. Properties zoned for industrial uses nearby (across Route 49)
6. The project site would enclose approximately one quarter of the Town
7. Close to Bluestone
 - a) Factor – Encirclement of Town
 - b) Inhibiting future agricultural and residential growth in or near Town
8. Application proposes minimal conditions
 - a) No Concept Plan condition
 - b) No buffer/screening condition
 - c) Minimum setbacks
 - d) Significant portion of property covered
 - e) No detailed decommissioning plan
 - f) Questions about the reliability of the decommissioning cost estimate
 - g) No meaningful provision for cash escrow surety/security for decommissioning costs
 - h) No explanation of reason for location of the wildlife corridor
9. No 2232 Review
10. Unknown fiscal impact
11. No significant employment