Evaluation for Solar Farm Development

Cassingham LLC Property Boone, WV

September 2022

Prepared for:

WV Office Of Energy

A Division of the West Virginia Development Office

Prepared by:

Marshall University

Center for Environmental, Geotechnical and Applied Sciences and

Marshall University's WV Brownfields Assistance Center

Report financially assisted through a grant administered by the U.S. Department of Energy

ACKNOWLEDGMENT: The development of this report was financially assisted through a grant administrated by the U.S. Department of Energy. This report was prepared through a cooperative effort by the WEST VIRGINIA OFFICE OF ENERGY and Marshall University Research Corporation (MURC) and compiled by Marshall University's Center for Environmental, Geotechnical and Applied Sciences (CEGAS).

Table of Contents

Introduction / Report Background

Marshall University's Center for Environmental, Geotechnical and Applied Sciences (CEGAS) and its West Virginia Brownfields Assistance Center were retained by the West Virginia Office of Energy, a division of the West Virginia Development Office to complete limited property evaluation studies on select mine land and other properties for potential large-scale solar farm use. This specific evaluation is for property owned by Cassingham LLC and includes information obtained from multiple sources regarding site-specific information and conditions, local area demographics, available electric utilities, and interaction with property owners. The purpose of this evaluation is to provide sufficient information on the subject property for potential redevelopment and/or reuse considerations by interested parties for solar farm use. CEGAS believes, to the best of its knowledge, that the information contained in the report is accurate at the time of compilation, however, no guarantees are warranted. It is ultimately the responsibility of interested parties to perform their own due diligence in fully evaluating the subject property for potential new development.

Site Name and Location

The Cassingham LLC property is in the southeastern part of West Virginia (WV) in Boone County near the unincorporated town of Julian and the incorporated town of Danville. The property is located approximately 25 miles southwest of Charleston, WV. The property can be accessed directly from Charleston via U.S. Route 119 / Corridor G. Private roads formerly used for surface mine operations transect the property. A site location map is provided as an attachment. The property is outside of any designated flood zone area.

The entire property is comprised of approximately 1,390 calculated acres, and is listed on the West Virginia Property Viewer (mapwv.gov/parcel) on one tract:

District	Map	Parcel	Parcel Suffix	Book	Page	WV Property Viewer (link)
05	0022	0003	0000	288	550	

Current Property Owner

The property is owned by Cassingham LLC. The contacts for this property are:

Steve Webb
WVEDA
Director Financial Services
681/313-2008
Steven.J.Webb@wv.gov

Joe Brouse
WVEDA
Senior Loan officer
681/313-2795
Joseph.D.Brouse@wv.gov

Site History and Current Status

The property has been utilized for underground and surface coal extraction for multiple decades, beginning in the early 1970s. The mining complex was historically known as Hobet 21 Mine, one of the largest surface mine operations in WV and throughout Appalachia. Operations included the use of a multi-mile surface beltline to transfer coal from the mine face to the preparation facility for washing and loading. Hobet 21 Mine was known for utilizing one of the largest drag-line operations in the world, reportedly producing up to 1.8 million tons of coal per year for many years. Hobet 21 Mine helped Boone County to be ranked as one of the highest producing coal counties in WV.

Currently, the property has no coal extraction operations occurring. Some areas have on-going mining reclamation activities being performed. Some sections of the site have been completely reclaimed.

Site maps and aerial photos of the location are included as attachments. (Note - property boundaries indicated on each site map are based on information obtained from the WV Map Viewer and may or may not be completely accurate. For more accurate data, a field survey based on actual property deeds should be conducted). Aerial videos of property, collected in April of 2021, can be viewed using the following web link:

Site Video:
https://youtube.com/playlist?list=PLO4Yig1CAOAmzAysDIaAlo_tCjNjxpW5R

As seen on the aerial photos and videos, the property has post-mine land scrubby growth, including small trees, bushes, fields and overgrown brushy areas throughout. Due to mining permits still being open on parts of the property, consultation with the WV Department of Environmental Protection will be required as part of site redevelopment efforts.

Active natural gas wells are located on the property and are not owned by Cassingham LLC. Future development of the property will need to include access to gas wells.

Local Area Summary

Boone County is located within the Charleston, WV Metropolitan Statistical Area, the largest metropolitan area entirely within West Virginia. This area has an estimated total population of 258,859. The local area associated with this property is within a primarily rural setting. Boone County has a population of only 21,897 in an area of 503 square miles (43.5 people per square mile). The local Town of Danville has a population of 782 (population data from U.S. Census Bureau, 2020 estimates). No residences are located within the immediate vicinity of the property.

Boone County's history is deeply steeped in bituminous coal extraction. By the 1950s, Boone County was a top producing coal county in WV. From the 1980s through the early 2000s, Boone County was the top producing coal county in the eastern U.S. From ~2009 to 2015, coal production in Boone County declined by ~80% (ARC Study "Overview of Coal Economy in Appalachia", January 2018)).

Electric Utility Summary

Electric service is provided by Appalachian Power Company, a unit of American Electric Power Company, Inc. Three-phase power is available on the property. The Beth Metering Station is located to the east of the property. 765 KV electric transmission lines are located west of the property, and 115-138 KV electric lines are located east of the property. A map depicting electric power lines in the vicinity of the property is

provided as an attachment. Additional power lines previously owned and used by the coal company are present, used historically for coal removal and related operations.

Potential Solar Farm Use

The property has been evaluated using DEMs derived from FEMA-purchased QL2 LiDAR collected between 2018 and 2020. Properties were evaluated using 10% and 15% maximum slope factors to determine available land potentially suitable for solar farm development. Using ESRI's ArcGIS software, slope analysis was calculated from DEM referenced data. A map depicting slope characteristics is provided as an attachment. A summary of the slope analysis is provided in the following table:

Total Acreage (excluding waste coal disposal area)	10% or less slope (acreage)	15% or less slope (acreage)
~1,260	~354	~466

Note: The waste coal disposal area was not included in this study, as that area may be set apart for other future use. In the event this area is confirmed for solar farm use, an additional 123 acres of land with less than or equal to 10% slope would be available.

Property Availability

The WVEDA is interested in long-term (25 year plus) lease agreements for solar farm use. Terms for lease rates are negotiable, dependent on multiple factors including amount of property utilized and length of lease.

The Nature Conservancy's (TNC) Resilient Land Mapping Tool Report

As requested by the West Virginia Office of Energy, CEGAS utilized The Nature Conservancy's Resilient Land Mapping Tool for the property for site resiliency

evaluations. TNC's Nature and Economy Program Director, Eriks Brolis, provided the following description of TNC's Resilient Land Mapping Tool.

> The Nature Conservancy is working across the country to help private and public partners deliver clean, wildlife-friendly renewable power to customers faster and cheaper with the least potential conflict for people, water, and wildlife. In conjunction, the Nature Conservancy is identifying and mapping a representative, connected network of climate resilient sites which if conserved, could help sustain biodiversity into the future as it moves and changes to adapt to a changing climate. The network also protects the source water, carbon stocks, oxygen, and recreation space that people depend on.
>
> TNC's Resilient and Connected Network (RCN) is a proposed conservation network of representative climate-resilient sites designed to sustain biodiversity and ecological functions into the future under a changing climate. The network was identified and mapped over a 10-year period by Nature Conservancy scientists using public data available at the state and national scale, and an inclusive process that involved over 250 scientists from agencies, academia and NGOs across the US. The Resilient and Connected Map quantifies and integrates three nation-wide assessments:
>
> **Climate Resilient Sites**: Ecologically representative sites with a diversity of connected microclimates and low human modification.
>
> **Connectivity and Climate Flow:** Linkages that allow species to move across sites and climate gradients.
>
> **Recognized Biodiversity Value**: Places with intact habitats, rare species, or exemplary communities.
>
> Resilience Score: The map allows users to calculate a site specific "Resilience Score". A site's Resilience Score estimates its capacity to maintain species diversity and ecological function as the climate changes. It was determined by evaluating and quantifying physical characteristics that foster resilience,

> particularly the site's landscape diversity and local connectedness. The score is calculated within ecoregions based on all cells of the same geophysical setting and is described on a relative basis as above or below the average. Generally, the higher the score the more important the land is for conservation, the lower the score the less concern for development.
>
> To learn more, please visit: https://www.conservationgateway.org/ConservationPractices/ClimateChange/Pages/Climate-Resilience.aspx

The Nature Conservancy's (TNC) Resilient Land Mapping Tool results for the Cassingham property are shown below.

Resilient Land Summary

Total land area: 1,390.6 acres (1,390.6 land, 0 open water) in the Southeast, Northeast study area(s) in the Western Allegheny Plateau, Cumberlands And Southern Ridge And Valley ecoregion(s).

Resilient and Connected Network Results

Note: These results are based on the **nationally-consistent** ecoregional data. They are derived from the detailed representations of the Resilient and Connected Networks which can be visualized under the Resilient & Connected Network Components section at right.

Resilience, Flow and Recognized Biodiversity: 0 ac.

Resilience and Flow: 338.9 ac.

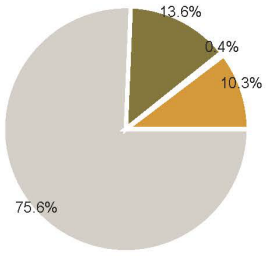
Resilient, Concentrated Flow (Climate Informed): 189.5 ac.

Resilient, Diffuse Flow (Climate Informed): 6 ac.

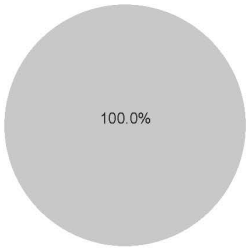
Mostly Resilient, Concentrated Flow: 143.4 ac.

Resilience and Recognized Biodiversity: 0 ac.

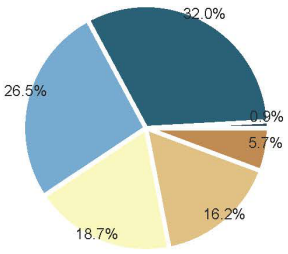
Outside Prioritized Network: 1,052.4 ac.



Biodiversity



Connectivity and Climate Flow (Continuous)

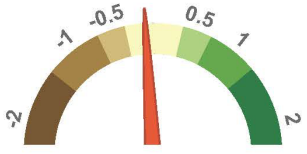


Average Terrestrial Resilience with Polygon

(all scores relative to ecoregion)

Resilience
Average (0.29 SD)

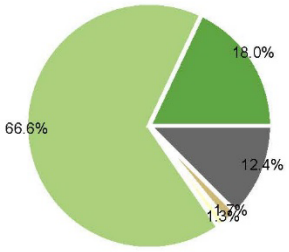
Local Connectedness
Average (-0.09 SD)



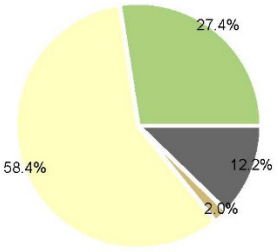
Landscape Diversity
Slightly Above Average (0.69 SD)

Terrestrial Resilience Categories

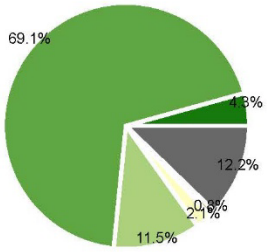
Resilience



Local Connectedness



Landscape Diversity



Geophysical Setting Results

The mean elevation in the polygon is 341.11 m (1119.13 ft) and the three most common geophysical settings are:

Low Elevation Acidic Sedimentary : 1,312 acres

Very Low Elevation Acidic Sedimentary : 51 acres

Low Elevation Moderately Calcareous : 12 acres

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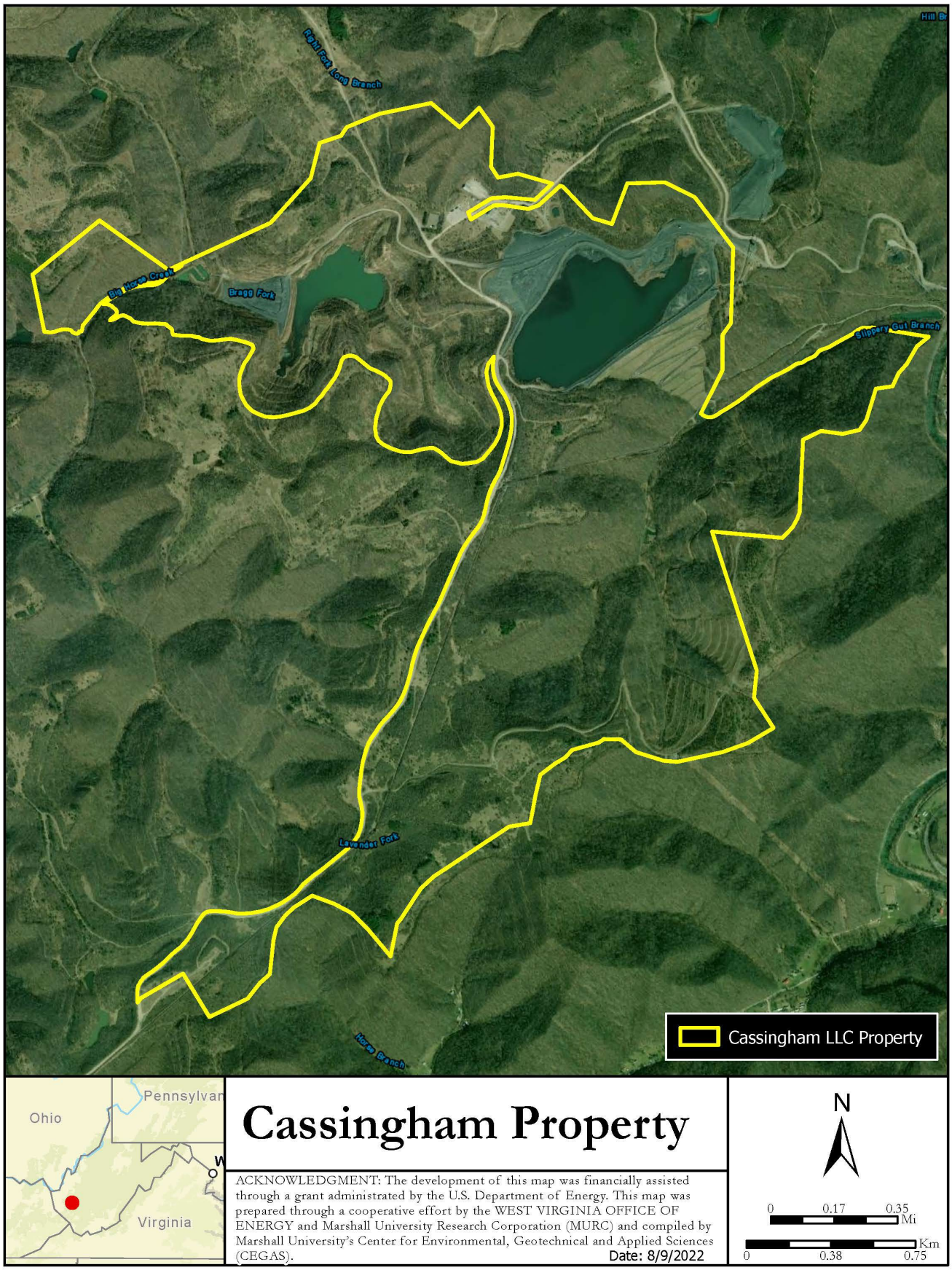
Attachments

Maps


Hill Br
Right Fork Long Branch
Big Horse Creek
Bragg Fork
Slippery Gut Branch
Lavender Fork
Horse Branch
Cassingham LLC Property
Pennsylvan
Ohio
Virginia
Cassingham Property
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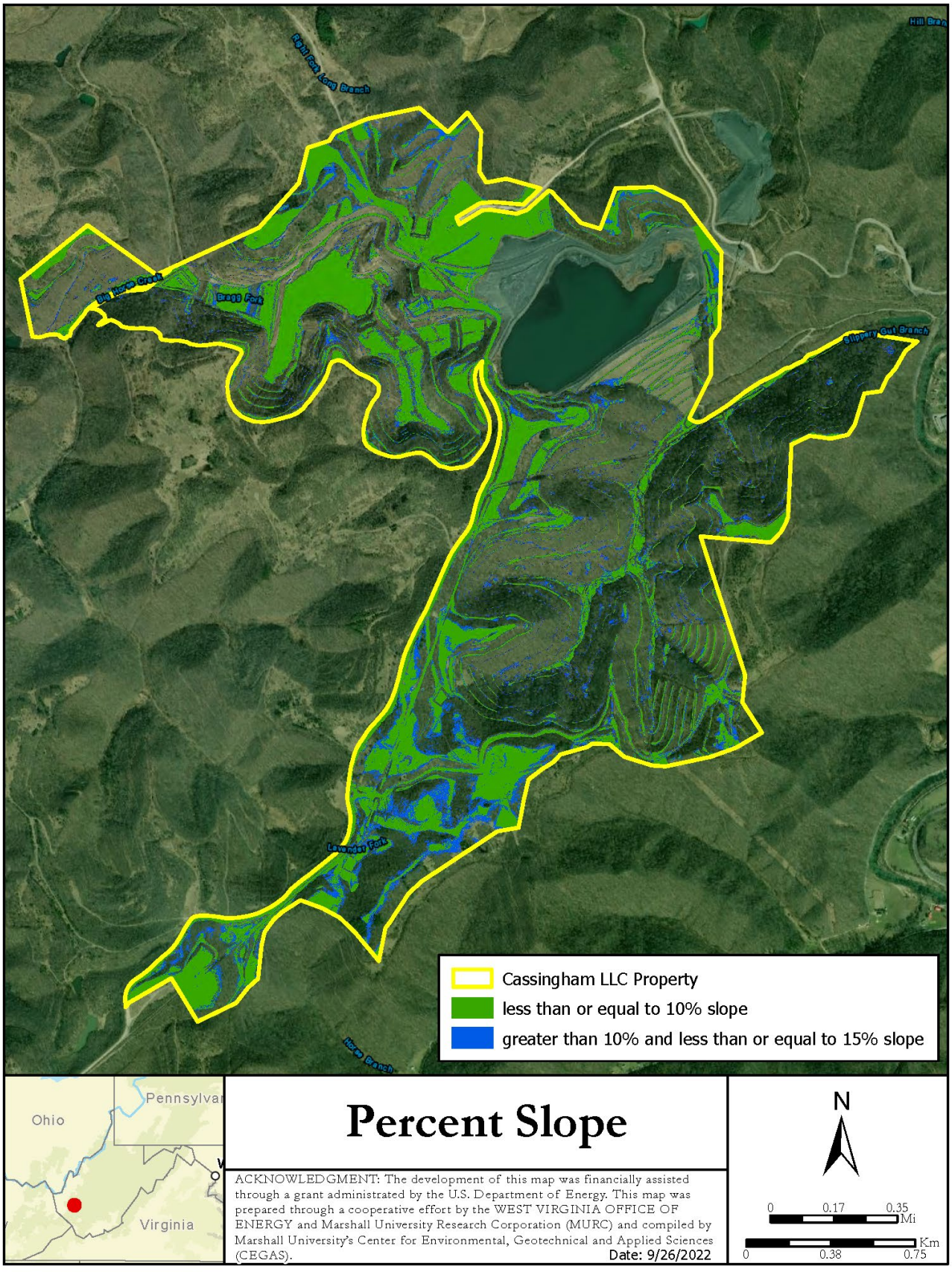
Date: 8/9/2022
N
0 0.17 0.35 Mi
0 0.38 0.75 Km



Percent Slope

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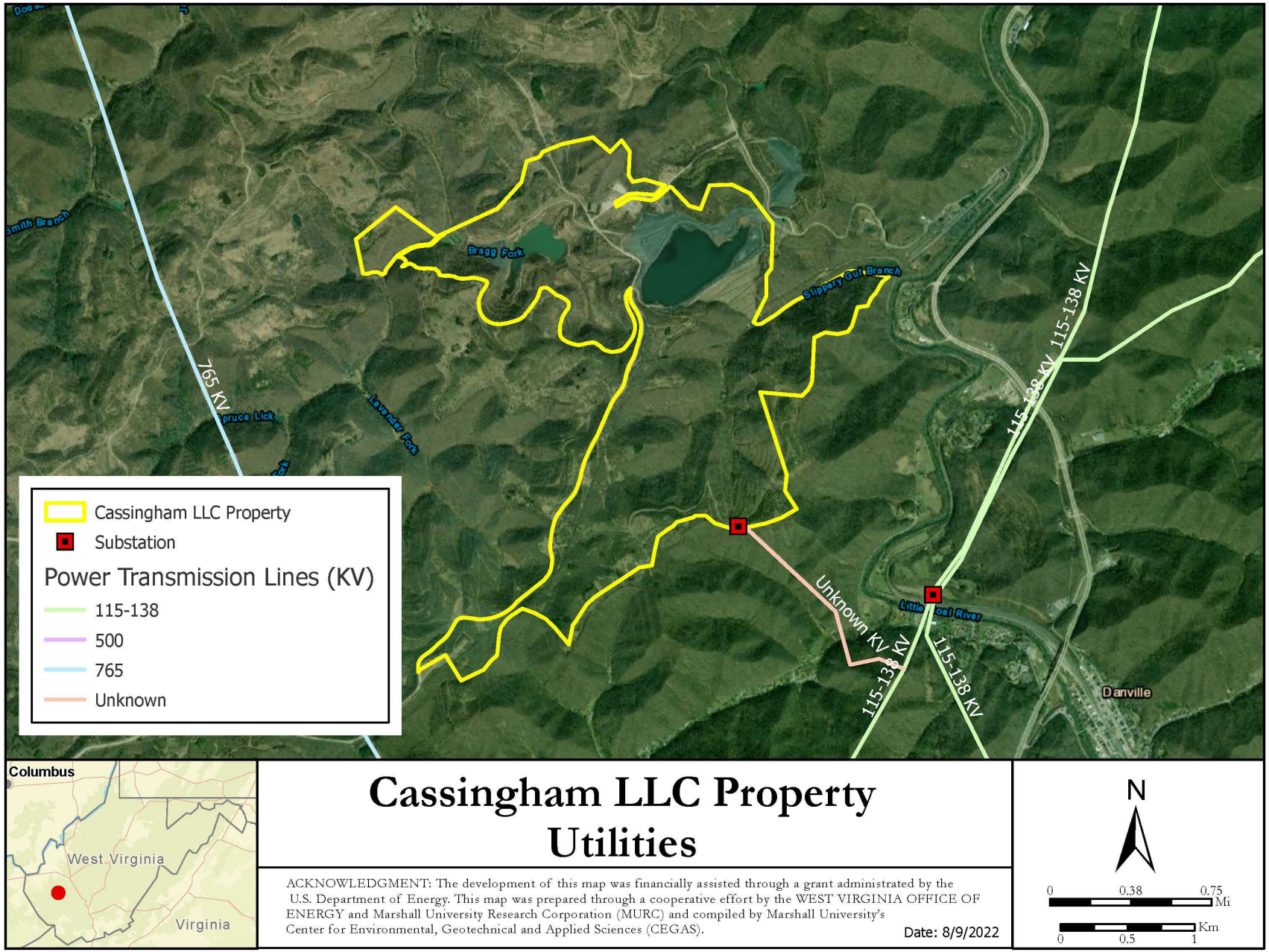
Date: 9/26/2022



Cassingham LLC Property Utilities

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Date: 8/9/2022

Photos