ATTACHMENT 2.E.1:
DESKTOP WETLAND AND STREAM DELINEATION REPORT

December 16, 2020

APPALACHIAN POWER COMPANY

Central Virginia Transmission Reliability Project:
Component 1
Joshua Falls – Riverville – Gladstone 138-kV
Transmission Lines
Amherst, Appomattox, Campbell, and Nelson Counties, Virginia

VDEQ Desktop Wetland and Stream Delineation Report

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ACRONYMS AND ABBREVIATIONS

CIR	Color Infrared
Company	Appalachian Power Company
CPCN	Certificate of Public Convenience and Necessity
CR	County Road
CVTRP	Central Virginia Transmission Reliability Project
GIS	Geographic Information System
kV	kilovolt
NHD	National Hydrography Dataset
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
PEM	Palustrine Emergent Wetlands
PFO	Palustrine Forested Wetlands
POWER	POWER Engineers, Inc.
PSS	Palustrine Scrub-Shrub Wetlands
PUB	Palustrine Unconsolidated Bottom Wetlands
ROW(s)	Right(s)-of-way
SCC	State Corporation Commission
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality

1.0 INTRODUCTION

Appalachian Power Company (Appalachian Power or the Company) is planning to upgrade the local electric transmission grid in five central Virginia counties: Amherst, Appomattox, Albemarle, Campbell and Nelson ("the Central Virginia Transmission Reliability Project" or "CVTRP"). The CVTRP provides a new electrical source for the region, increases reliability to customers and supports the retirement of aging equipment. The Company's application to the Virginia State Corporation Commission (SCC), describes the overall need and necessity for the CVTRP.

The CVTRP has been broken into four components. This Virginia Department of Environmental Quality (VDEQ) desktop wetland and stream delineation report will focus on Component 1 or the Joshua Falls – Riverville – Gladstone 138-kV Transmission Lines Component. Component 1 involves constructing approximately 11 miles of a new 138 kV transmission line between the Joshua Falls Substation and Riverville Substation (the Joshua Falls – Riverville 138 kV Transmission Line), and approximately six miles of a new 138 kV transmission line between the Riverville Substation and Central Virginia Electric Cooperative's (CVEC) Gladstone Substation (the Gladstone – Riverville 138 kV Transmission Line). The Riverville Substation will be expanded as part of the electrical upgrades and will require relocating approximately 1,000 feet of the existing Amherst – Riverville 138 kV transmission line. A substation site selection process was not required for the substations associated with Component 1 as they are existing. Component 1 is located in Amherst, Appomattox, Campbell, and Nelson counties.

A siting effort was undertaken to determine the alignment for the Joshua Falls – Riverville and Gladstone – Riverville 138 kV Transmission Lines (the Proposed Route). From the Joshua Falls Substation in Campbell County, the Proposed Route (Alternative Routes D and E) extends generally northeast through Appomattox County and crosses the James River to reach the Riverville Substation. From the Riverville Substation, the Proposed Route continues northeast through Amherst and Nelson counties to reach the Gladstone Substation for approximately six miles.

Structure type may vary along the line route depending on the needs of the Project; however, the Company plans to primarily use galvanized steel H-frame structures or three-pole dead end structures to build the new 138 kV transmission line within a new 100-foot right-of-way. Lattice tower structures will be used to cross the James River in order to meet span constructability and engineering requirements. The anticipated structure heights of the proposed 138 kV transmission line range from 55 feet to 100 feet tall with an average structure height of approximately 70 feet. The anticipated river crossing structure heights of the proposed 138 kV transmission line range from 80 feet to 120 feet, with an average height of 100 feet.

The Company contracted POWER Engineers, Inc. (POWER) to prepare this desktop wetland and stream delineation report that will support the Company's VDEQ Supplement for Component 1 of the CVTRP. One VDEQ Supplement for each of the CVTRP components will be included in the Application for a Certificate of Public Convenience and Necessity (CPCN) to be filed with the SCC, which approves or denies such applications.

The purpose of the desktop delineation report is to identify and compare potential for regulated waters (waters of the United States and waters of the State) within a 100-foot-wide ROW for Component 1.

The report includes a description of the methodologies used in the determination of regulated waters probability and location, as well as a summary of results by waters type and acres located within the proposed and alternate ROWs.

2.0 METHODS

2.1 Data Sources and Background Information

POWER reviewed various mapping sources and Geographic Information System (GIS) data in order to identify areas where wetlands or streams could potentially be located within the ROWs of the Joshua – Riverville – Gladstone 138-kV Transmission Lines Component. The GIS data and mapping sources are included in the following:

- United States Geological Survey (USGS) topographic mapping (USGS 2019).
- Esri Basemap color aerial photography (Esri 2020).
- Color Infrared (CIR) aerial imagery and orthophotography (Virginia Base Mapping Program 2018).
- Google Earth color aerial photography, including historical aerial data (Google Earth, Imagery dates vary by location).
- National Hydrography Dataset (NHD) stream and river data (USGS 2020).
- United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) mapping (USFWS 2020).
- Natural Resources Conservation Service (NRCS) Gridded Soil Survey of Campbell County and City of Lynchburg (NRCS 1977), Amherst County (NRCS 2009), Appomattox County (NRCS 2008), and Nelson County (NRCS 2010), Virginia.
- Federal Emergency Management Agency (FEMA) Riverine Mapping and Floodplain Boundaries Guidance (FEMA 2019)

2.2 Wetland Definitions

Federal regulations define wetlands as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation, typically adapted for life in saturated soil conditions” (Clean Water Act Section 404, United States Environmental Protection Agency [USEPA] 2020).

Under normal circumstances, three parameters must be present for an area to be considered a wetland: hydrophytic vegetation, wetland hydrology, and hydric soils. Applicable technical guidance that defines these parameters and provides criteria for the evaluation of associated data and field indicators is provided in the *1987 Wetland Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the United States Army Corps of Engineers (USACE) Wetland Delineation Manual, Eastern Mountains and Piedmont Region* (USACE 2012).

Using the data sources outlined above, POWER identified areas that could potentially meet the three parameters required to meet the definition of a wetland provided by the USACE. Following identification, aerial imagery was used to determine potential cover type and all wetlands were classified according to the naming convention found in Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979). The Cowardin classification is a taxonomic system that divides wetlands and deepwater habitats into five systems based on hydrologic factors. Those systems are further broken down into additional taxonomic groups based on vegetation and substrate. Cowardin wetland types encountered along the proposed and alternate ROWs fall into the following four classifications:

Palustrine Emergent (PEM) Wetlands

Emergent wetlands are typically characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is usually present for most of the growing season in most years.

Palustrine Scrub-Shrub (PSS) Wetlands

Scrub-shrub wetlands are typically characterized by woody vegetation less than 20 feet tall. The species include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions.

Palustrine Forested (PFO) Wetlands

Forested wetlands are usually characterized by woody vegetation that is 20 feet tall or taller. These wetlands typically possess an overstory of trees, an understory of young trees or shrubs, and an herbaceous layer.

Palustrine Unconsolidated Bottom (PUB) Wetlands

Unconsolidated bottom wetlands include all wetland and deepwater habitats with at least 25 percent cover of particles smaller than stones and a vegetative cover less than 30 percent.

2.3 Wetland and Stream Data Interpretation

2.3.1 Aerial Imagery and Topographic Mapping

The CIR aerial imagery (Virginia Base Mapping Program 2018), current and historical aerial photography (Esri 2020; Google Earth, various dates), and USGS topographic data (USGS 2019) were used to help determine the location, size, and cover type of potential wetland

and stream resources within the proposed and alternate ROWs. The USGS topographic contour lines are useful in helping to identify potential drainage areas from small headwater streams to larger river valleys. The contour lines are also useful in determining areas of flat or depressed terrain where water is more likely to pool for sufficient duration that allows development of the three required wetland parameters. Therefore, as a general guideline, wetlands are more commonly found in flatter areas versus steeper terrain and ridgelines. The CIR aerial imagery can be helpful in identifying areas of open water and saturated areas, because areas of land without vegetative cover will register as black or dark blue on the CIR imagery as these areas do not reflect much light in the infrared spectrum (Minnesota IT Services 2018). CIR aerial imagery can be used to identify areas of potential wetlands and streams within the ROW. Additionally, actively photosynthesizing vegetation has a high reflectance and results in actively growing vegetation to appear bright red in CIR imagery. Non-photosynthesizing plants appear a lighter pink to magenta. The color differentiation allows for the identification of potential wetlands as plants being located in a wetter hydrologic regime would provide a deeper red signature on the imagery due to a more active level of photosynthesis.

2.3.2 National Wetland Inventory Dataset

As part of this analysis, POWER reviewed NWI mapping to identify areas previously mapped as potential wetlands. The NWI is an index of locations identified by the USFWS as areas that exhibit potential wetland characteristics on aerial photography. The NWI data is prepared from the analysis of high-altitude imagery and therefore, it reflects conditions during the specific year and season the data was acquired. As a result, wetlands present in an area may not be readily identified (USFWS 2020). The wetland areas have not been field verified; however, they can be useful for indicating areas where wetlands could occur, especially when used in conjunction with soil mapping and analysis of USGS topographic mapping. NWI wetlands are classified according to the Cowardin classification system (Cowardin et al. 1979).

2.3.3 National Hydrography Dataset

The USGS NHD (USGS 2020) was consulted to identify known streams on site. The USGS NHD is a comprehensive set of digital spatial data representing surface waters, including common features such as lakes, ponds, streams, rivers, canals, and oceans (Simley and Carswell 2009). Although not field verified, the USGS NHD shows the locations of streams, rivers, and open waters, and provides insight into the general location of waters (USGS 2020).

2.3.4 Federal Emergency Management Agency (FEMA) Floodplain Dataset

The FEMA floodplain dataset was reviewed to identify known floodplains on site. The FEMA Riverine Mapping and Floodplain Boundaries Guidance (FEMA 2019) provides digital spatial data representing floodplains associated with recorded streams (see Section 2.3.3 on USGS NHD streams) as well as riverine mapping. Floodplain boundaries are divided into flood insurance rate zones that are rated between 100-year and 500-year floodplains. Both 100-year and 500-year are considered areas of moderate flood hazard. All remaining areas fall under the terms of minimal flood hazard (FEMA 2019).

2.3.5 Soil Survey Mapping

NRCS digital soil survey data for Campbell County and the City of Lynchburg (NRCS 1977), Amherst County (NRCS 2009), Appomattox County (NRCS 2008), and Nelson County, Virginia (NRCS 2010), were used to locate areas of hydric soils, which are typically found in wetlands. The NRCS soil survey groups soil map units into three categories; non-hydric soil units, soil units with hydric soil inclusions, and units that contained all hydric soils. Areas that contain hydric or hydric inclusion map units have a greater probability of supporting wetlands relative to those mapped as non-hydric soil units. Hydric inclusion soils are identified on the map sheets included in Attachments A and B of this desktop report. There are hydric inclusion soil units identified along the ROWs of the Joshua Falls – Riverville – Gladstone 138-kV Transmission Lines to be built and Alternative Routes considered.

2.4 Wetland and Stream Data Evaluation

Tables 1 and 2 show the criteria used to determine the wetland and stream probability within the ROWs of the Joshua Falls – Riverville – Gladstone 138-kV Transmission Lines Component. Potential streams and wetlands were assigned a probability of low potential, moderate potential, or high potential of being a regulated resource.

TABLE 1 WETLAND EVALUATION CRITERIA

WETLAND PROBABILITY	ASSESSMENT CRITERIA
High	• Aerial imagery (color and CIR) and/or topography combined with **two** other indicators such as NWI wetlands, NHD streams, or hydric soils.
Moderate	• Aerial imagery (color and CIR) and/or topography combined with **one** other indicator such as NWI wetlands, NHD streams, or hydric soils.
Low	• Presence of only hydric soils with no topographic or aerial imagery indicator. • Areas identified as wetland with topography and/or aerial photography only. • Presence of only floodplains with no topographic or aerial imagery indicator.

TABLE 2 STREAM EVALUATION CRITERIA

STREAM PROBABILITY	ASSESSMENT CRITERIA
High	• Streams identified with NHD and aerial imagery (color and CIR).
Moderate	• Streams identified with aerial imagery (color and CIR) and/or topography combined with one other indicator such as NWI wetlands or hydric soils.
Low	• Areas identified as streams with topography or aerial photography only.

3.0 RESULTS AND DISCUSSION

The results of the desktop wetland and stream delineations for Component 1 are presented in Tables 3 and 4. Figures showing the location of desktop delineated wetlands and streams can be found in Attachment A (Joshua Falls to Riverville) and B (Riverville to Gladstone) of this desktop report. The desktop report evaluates features in a 100-foot wide ROW to assess potential impacts for Alternative Routes A – D between the Joshua Falls and Riverville substations, and Alternative Routes E and F between the Riverville and Gladstone substations. One high probability PUB wetland (totaling 0.5 acres) was identified within the 100-foot-wide ROW at the Amherst – Riverville 138-kV transmission line relocation; however, the PUB wetland is a retention pond on the Greif Paper Mill.

TABLE 3 DESKTOP WETLAND DELINEATION RESULTS FOR COMPONENT 1

COMPONENT 1	JOSHUA FALLS – RIVERVILLE 138-KV TRANSMISSION LINE								GLADSTONE – RIVERVILLE 138-KV TRANSMISSION LINE			
ROUTES	**ALTERNATIVE ROUTE A**		**ALTERNATIVE ROUTE B**		**ALTERNATIVE ROUTE C**		**ALTERNATIVE ROUTE D (Proposed Route)**		**ALTERNATIVE ROUTE E (Proposed Route)**		**ALTERNATIVE ROUTE F**	
WETLAND TYPES	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**
High												
PFO[1]	0	0.00	2	0.89	2	0.89	2	0.89	0	0	0	0
PUB	2	1.25	1	0.50	1	0.50	1	0.50	1	0.01	0	0
PSS	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
PEM/PSS	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
PEM/PFO	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

COMPONENT 1	**JOSHUA FALLS – RIVERVILLE 138-KV TRANSMISSION LINE**								**GLADSTONE – RIVERVILLE 138-KV TRANSMISSION LINE**			
ROUTES	**ALTERNATIVE ROUTE A**		**ALTERNATIVE ROUTE B**		**ALTERNATIVE ROUTE C**		**ALTERNATIVE ROUTE D (Proposed Route)**		**ALTERNATIVE ROUTE E (Proposed Route)**		**ALTERNATIVE ROUTE F**	
WETLAND TYPES	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**
PEM/PUB	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
PSS/PFO	0	0.00	0	0	0	0	0	0	0	0	0	0
High Wetlands Total	**2**	**1.25**	**3**	**1.39**	**3**	**1.39**	**3**	**1.39**	**1**	**0.01**	**0**	**0.00**
Note: No high probability PEM, PSS, PEM/PFO, PEM/PUB, or PEM/PSS wetland types were located within the ROWs for Component 1. [1] Two high probability PFO wetlands (totaling 0.89 acre) are located at the James River crossing and the southern Alternative Routes B – D would span high above the water to avoid tree clearing and impacts to the wetland.												
Moderate												
PFO[2]	2	1.57	2	0.63	2	0.63	2	0.63	0	0.00	0	0.00

COMPONENT 1	**JOSHUA FALLS – RIVERVILLE 138-KV TRANSMISSION LINE**								**GLADSTONE – RIVERVILLE 138-KV TRANSMISSION LINE**			
ROUTES	**ALTERNATIVE ROUTE A**		**ALTERNATIVE ROUTE B**		**ALTERNATIVE ROUTE C**		**ALTERNATIVE ROUTE D (Proposed Route)**		**ALTERNATIVE ROUTE E (Proposed Route)**		**ALTERNATIVE ROUTE F**	
WETLAND TYPES	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**
PUB	0	0.00	0	0.00	0	0.00	0	0.00	1	0.10	0	0.00
PSS/PFO	1	0.36	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Moderate Wetlands Total	**3**	**1.93**	**2**	**0.63**	**2**	**0.63**	**2**	**0.63**	**1**	**0.10**	**0**	**0.00**
Note: No moderate probability PEM, PSS, PEM/PFO, PEM/PUB, or PEM/PSS wetland types were located within the ROWs for Component 1. [2] Two moderate probability PFO wetlands (totaling 0.63 acre) are located at the James River crossing and the southern Alternative Routes B – D would span high above the water to avoid tree clearing and impacts to the wetland.												
Low												
PFO	4	1.83	5	2.29	8	3.17	5	1.96	2	2.39	0	0.00

COMPONENT 1	**JOSHUA FALLS – RIVERVILLE 138-KV TRANSMISSION LINE**								**GLADSTONE – RIVERVILLE 138-KV TRANSMISSION LINE**			
ROUTES	**ALTERNATIVE ROUTE A**		**ALTERNATIVE ROUTE B**		**ALTERNATIVE ROUTE C**		**ALTERNATIVE ROUTE D (Proposed Route)**		**ALTERNATIVE ROUTE E (Proposed Route)**		**ALTERNATIVE ROUTE F**	
WETLAND TYPES	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**	**NUMBER OF WETLAND OCCURANCES**	**ACREAGE WITHIN ROW**
PSS	1	0.14	0	0.00	2	0.18	0	0.00	0	0.00	0	0.00
PFO/PSS	0	0.00	2	0.93	2	.80	3	1.54	0	0.00	5	2.22
Low Wetlands Total	**5**	**1.97**	**7**	**3.22**	**12**	**4.15**	**8**	**3.50**	**2**	**2.39**	**5**	**2.22**
Note: No low probability PEM, PUB, PEM/PSS, PEM/PFO, or PEM/PUB wetland types were located within the ROWs for Component 1.												

TABLE 4 DESKTOP STREAM DELINEATION RESULTS FOR COMPONENT 1

COMPONENT 1	JOSHUA FALLS – RIVERVILLE 138-KV TRANSMISSION LINE								GLADSTONE – RIVERVILLE 138-KV TRANSMISSION LINE			
ROUTES	ALTERNATIVE ROUTE A		ALTERNATIVE ROUTE B		ALTERNATIVE ROUTE C		ALTERNATIVE ROUTE D (PROPOSED ROUTE)		ALTERNATIVE ROUTE E (PROPOSED ROUTE)		ALTERNATIVE ROUTE F	
STREAM TYPE	NUMBER OF STREAM OCCURRENCES	LINEAR FOOTAGE WITHIN ROW	NUMBER OF STREAM OCCURRENCES	LINEAR FOOTAGE WITHIN ROW	NUMBER OF STREAM OCCURRENCES	LINEAR FOOTAGE WITHIN ROW	NUMBER OF STREAM OCCURRENCES	LINEAR FOOTAGE WITHIN ROW	NUMBER OF STREAM OCCURRENCES	LINEAR FOOTAGE WITHIN ROW	NUMBER OF STREAM OCCURRENCES	LINEAR FOOTAGE WITHIN ROW
High Streams Total	16	2,607	16	1,682	21	2,472	17	1,782	11	1,481	7	934
Moderate Streams Total	0	0	0	0	1	121	0	0	2	224	0	0
Low Streams Total	1	105	5	602	6	842	7	955	0	0	0	0
Totals	**17**	**2,712**	**21**	**2,284**	**28**	**3,435**	**24**	**2,737**	**13**	**1,705**	**7**	**934**

3.1 Joshua Falls – Riverville 138-kV Transmission Line

3.1.1 Alternative Route A

Alternative Route A is mostly located on the north side of the James River in Amherst County. Alternative Route A crosses the James River north of the Joshua Falls Substation and continues generally northeast in Amherst County and turns south to reach the Riverville Substation. Alternative Route A includes an approximately 1,700-foot span across the James River, a USACE Section 10 navigable waterway. Alternative Route A is 11.64 miles and is located in Amherst (11.1 miles) and Campbell (0.5 mile) counties (Map Tiles 2- 20, and 53 Attachment A).

High Probability

Two high probability PUB wetlands (totaling 1.25 acres) were identified within the ROW of Alternative Route A (Map Tiles 18 and 53, Attachment A). No other high probability wetlands were identified within the ROW of Alternative Route A. A total of 16 high probability streams, including the James River, are within the ROW and approximately 2,606.61 linear feet in length (Map Tiles 2, 5, 9, 14-18, and 20, Attachment A).

Moderate Probability

Two moderate probability PFO wetlands (totaling 1.57 acres) were identified within the ROW of Alternative Route (Map Tiles 1 and 17, Attachment A). One 0.36-acre PSS/PFO wetland was identified on the northern riverbank of the James River (Map Tile 2, Attachment A). Due to the location of the existing railroad, it is not likely that trees would need to be cleared within the PFO along the riverbank and railroad ROW. No other moderate probability wetlands or streams were identified within the ROW of Alternative Route A.

Low Probability

Four low probability PFO wetlands (totaling 1.83 acres) and one 0.14-acre, low probability PSS wetland were identified along the ROW of Alternative Route A (Map Tiles 5, 8, 14-15, Attachment A). No other low probability wetlands were identified within the ROW of Alternative Route A. One low probability stream (105.23 linear feet) is within the ROW (Map Tile 14, Attachment A).

3.1.2 Alternative Route B

Alternative Route B exits the Joshua Falls Substation to the south and is the northernmost route considered on the south side of the James River. Alternative Route B continues generally northeast and north of major residential roadways like Appomattox County Road (CR) 605 and Tin Top Place, then crosses the James River to reach the proposed Riverville Substation expansion from the south. Alternative Route B is 10.5 miles and is located in Amherst (0.6 mile), Appomattox (8.6 miles) and Campbell (1.3 miles) counties (Map Tiles 21 – 36 and 49 – 53, Attachment A).

High Probability

No high probability wetlands were located on the south side of the river, except where Alternative Route B joins with Alternative Routes C and D to reach the Riverville Substation. Two high probability PFO wetlands (totaling 0.89 acre) and one, 0.5-acre high probability PUB wetland were identified within the ROW of Alternative Route B at the James River crossing and near the Riverville Substation (Map Tiles 52 and 53, Attachment A). The PFO wetlands are located in the James River and the southern Alternative Routes, including Alternative Route B, would span high above the water to avoid tree clearing and impacts to the wetland (Map Tile 52, Attachment A). The high probability PUB wetland is crossed by all southern Alternative Routes and the Amherst – Riverville 138-kV transmission line relocation; however, the PUB wetland is an existing retention pond on the Greif industrial property (Map Tile 53, Attachment A). A total of 16 high probability stream crossings, including the James River, were identified within the ROW and approximately 1,681.52 linear feet in length (Map Tiles 22, 25, 26, 30-35, and 52, Attachment A).

Moderate Probability

No moderate probability wetlands were located on the south side of the river, except where Alternative Route B joins with Alternative Routes C and D to reach the Riverville Substation. Two moderate probability PFO wetlands (totaling 0.63 acre) were identified within the ROW of Alternative Route B at the James River crossing and near the high probability PFO wetlands (Map Tile 52, Attachment A). The PFO wetlands are located in the James River and the southern Alternative Routes, including Alternative Route B, would span high above the water to avoid tree clearing and impacts to the wetland (Map Tile 52, Attachment A).

Low Probability

Five low probability PFO wetlands (totaling 2.29 acres) were identified within the ROW of Alternative Route B (Map Tiles 22, 30, 31, 34, and 52, Attachment A). Two low probability PSS/PFO wetlands (0.93 acre) were identified within the ROW of Alternative Route B (Map Tiles 32 and 52, Attachment A). A total of five low probability stream crossings (totaling 602.48 linear feet) were identified within the ROW of Alternative Route B (Map Tiles 22, 23, and 32, Attachment A).

3.1.3 Alternative Route C

Alternative Route C exits the Joshua Falls Substation to the south and follows the same trajectory of Alternative B but diverts south to avoid crossing Chestnut Mountain. Alternative Route C continues as the southernmost route on the south side of Appomattox CR 605 then joins Alternative Route B to cross the James River to reach the proposed Riverville Substation expansion. Alternative Route C is 11.1 miles and is located in Amherst (0.6 mile), Appomattox (9.2 miles) and Campbell (1.3 miles) counties (Map Tiles 22-26, 36-48, and 50-53, Attachment A).

High Probability

Alternative Route C crosses the same two high probability PFO wetlands (totaling 0.89 acre) and one, 0.5-acre PUB wetland as Alternative Route B at the James River crossing and near the Riverville Substation (Map Tiles 52 and 53, Attachment A). The PFO wetlands are located in the James River and the southern Alternative Routes, including Alternative Route C, would span high above the water to avoid tree clearing and impacts to the wetland (Map Tile 52, Attachment A). No other high probability wetlands were identified in the ROW of Alternative Route C. A total of 21 high probability stream crossings (totaling 2,471.8 linear feet), including the James River, were identified within the ROW of Alternative Route C (Map Tiles 22, 36-46, and 52, Attachment A).

Moderate Probability

Two moderate probability PFO wetlands (totaling 0.63 acre) were identified within the ROW of Alternative Route C at the James River crossing (Map Tile 52, Attachment A). The PFO wetlands are located in the James River and the southern Alternative Routes, including Alternative Route C, would span high above the water to avoid tree clearing and impacts to the wetland (Map Tile 52, Attachment A). No other moderate probability wetlands were identified within the ROW of Alternative Route C. One moderate probability stream crossing (121.45 linear feet) was identified within the ROW (Map Tile 43, Attachment A).

Low Probability

Eight low probability PFO wetlands (totaling 3.17 acres) were identified within the ROW of Alternative Route C (Map Tiles 43-46 and 52, Attachment A). Two low probability PSS wetlands (totaling 0.18 acre) and two PSS/PFO wetlands (totally 0.80 acres) were identified within the ROW of Alternative Route C (Map Tiles 22, 37, 38, and 42, Attachment A). Six low probability stream crossings (totaling 841.16 linear feet) were identified within the ROW of Alternative Route C (Map Tiles 22, 23, 32, 37, 41, and 48, Attachment A).

3.1.4 Alternative Route D (Proposed Route)

Alternative Route D is a combination of Alternative Routes B and C; Alternative Route D remains south of Chestnut Mountain and north of Appomattox CR 605. Alternative Route D joins Alternative Routes B and C to cross the James River to reach the proposed Riverville Substation expansion. Alternative Route D is 11.1 miles and is located in Amherst (0.6 mile), Appomattox (9.2 miles) and Campbell (1.3 miles) counties (Map Tiles 22-26, 33-41, and 48-53, Attachment A).

High Probability

Alternative Route D crosses the same two high probability PFO wetlands (totaling 0.89 acre) and one, 0.5-acre PUB wetland as Alternative Routes B and C at the James River crossing and near the Riverville Substation (Map Tiles 52 and 53, Attachment A). The PFO wetlands are located in the James River and the southern Alternative Routes, including Alternative Route D, would span high above the water to avoid tree clearing and impacts to the wetland (Map Tile 52, Attachment A). No other high probability wetlands were identified in the ROW of Alternative Route D. A total of 17 high probability stream crossings (totaling 1,781.62 linear feet), including the James River, were identified within the ROW of Alternative Route D (Map Tiles 22, 31-41, 48, 52, Attachment A).

Moderate Probability

Two moderate probability PFO wetlands (totaling 0.63 acre) were identified within the ROW of Alternative Route D at the James River crossing (Map Tile 52, Attachment A). The PFO wetlands are located in the James River and the southern Alternative Routes, including Alternative Route D, would span high above the water to avoid tree clearing and impacts to the wetland (Map Tile 52, Attachment A). No other moderate probability wetlands or streams were identified within the ROW of Alternative Route D.

Low Probability

Five low probability PFO wetlands (totaling 1.96 acre) and three PSS/PFO wetlands (totaling 1.54 acre) were identified within the ROW of Alternative Route D (Map Tiles 22, 32, 34, 37, and 52, Attachment A). Seven low probability stream crossings (totaling 954.52 linear feet) were identified within the ROW of Alternative Route D (Map Tiles 22, 23, 32, 37, and 41, Attachment A).

3.2 Gladstone – Riverville 138-kV Transmission Line

3.2.1 Alternative Route E (Proposed Route)

Alternative Route E is the northernmost route connecting the Riverville and Gladstone substations. Alternative Route E is 6.3 miles and is located in Amherst (3.2 miles) and Nelson (3.1 miles) counties (Map Tiles 2 – 20 and 73, Attachment B).

High Probability

One, 0.01-acre high probability PUB wetland was identified within the ROW of Alternative Route E (Map Tile 10, Attachment B). No other high probability wetlands were identified within the ROW of Alternative Route E. A total of 11 high probability stream crossings (totaling 1,481.2 linear feet) were identified within the ROW of Alternative Route E (Map Tiles 4, 7, and 9 – 11, Attachment B).

Moderate Probability

One, 0.10-acre moderate probability PUB wetland was identified within the ROW of Alternative Route C (Map Tile 9, Attachment B). No other moderate probability wetlands were identified in the ROW of Alternative Route E. Two moderate probability stream crossings (totaling 223.79 linear feet) were identified within the ROW of Alternative Route E (Map Tile 6, Attachment B).

Low Probability

Two low probability PFO wetlands (totaling 2.39 acres) were identified within the ROW of Alternative Route E (Map Tiles 6 – 7, Attachment B). No other low probability wetlands or streams were identified in the ROW of Alternative Route E.

3.2.2 Alternative Route F

Alternative Route F is the southernmost route connecting the Riverville and Gladstone substations. Alternative Route F is 5.54 miles and is located in Amherst (3.05 miles) and Nelson (2.49 miles) counties (Map Tiles 2 and 12-18, Attachment B).

High Probability

No high probability wetlands were identified within the ROW of Alternative Route F. Seven high probability stream crossings were identified within the ROW of Alternative Route F (Map Tiles 12 and 17, Attachment B).

Moderate Probability

No moderate probability wetlands or stream crossings were identified in the ROW of Alternative Route F.

Low Probability

Five low probability PSS/PFO wetlands (totaling 2.22 acres) were identified within the ROW of Alternative Route F (Map Tile 6, Attachment B). No low probability stream crossings were identified within the ROW of Alternative Route F.

4.0 CONCLUSION

A summary of the desktop wetland and stream resources identified for Component 1 is provided below in Table 5. The Joshua Falls – Riverville 138-kV Transmission Line Proposed Route ROW (Alternative Route D) includes 13 wetlands with a total combined area of 5.52 acres and crosses 24 streams with a total combined linear footage of 2,736 feet. Alternative Route A includes 10 wetlands with a total combined of 5.15 acres and crosses 17 streams with a total combined linear footage of 2,712 feet. Alternative Route B includes 12 wetlands with a total combined of 5.24 acres and crosses 21 streams with a total combined linear footage of 2,284 feet. Alternative Route C includes 17 wetlands with a total combined of 6.17 acres and crosses 28 streams with a total combined linear footage of 3,434 feet. The Gladstone – Riverville 138-kV Transmission Line Proposed Route ROW (Alternative Route E) includes four wetlands with a total combined area of 2.5 acres and crosses 13 streams with a total combined linear footage of 1,705 feet. The ROW of Alternative F includes five wetlands with a total combined area of 2.22 acres and crosses seven streams with a total linear footage of 934 feet. Lastly, one high probability PUB wetland (totaling 0.5 acres) was identified within the 100-foot-wide ROW at the Amherst – Riverville 138-kV transmission line relocation (Map Tile 53, Attachment A); however, the PUB wetland is a retention pond on the Greif industrial facility property.

TABLE 5 SUMMARY OF DESKTOP WETLAND AND STREAM DELINEATIONS FOR COMPONENT 1

COMPONENT 1	JOSHUA FALLS – RIVERVILLE 138-KV TRANSMISSION LINE								GLADSTONE – RIVERVILLE 138-KV TRANSMISSION LINE			
ROUTES	ALTERNATIVE ROUTE A		ALTERNATIVE ROUTE B		ALTERNATIVE ROUTE C		ALTERNATIVE ROUTE D (PROPOSED ROUTE)		ALTERNATIVE ROUTE E (PROPOSED ROUTE)		ALTERNATIVE ROUTE F	
TYPE	NUMBER OF OCCURRENCES	ACREAGE/LINEAR FOOTAGE WITHIN ROW	NUMBER OF OCCURRENCES	ACREAGE/LINEAR FOOTAGE WITHIN ROW	NUMBER OF OCCURRENCES	ACREAGE/LINEAR FOOTAGE WITHIN ROW	NUMBER OF OCCURRENCES	ACREAGE/LINEAR FOOTAGE WITHIN ROW	NUMBER OF OCCURRENCES	ACREAGE/LINEAR FOOTAGE WITHIN ROW	NUMBER OF OCCURRENCES	ACREAGE/LINEAR FOOTAGE WITHIN ROW
Wetland Total	10	5.15 acres	12	5.24 acres	17	6.17 acres	13	5.52 acres	4	2.50 acres	5	2.22 acres
Stream Total	17	2,712 feet	21	2,284 feet	28	3,434 feet	24	2,736 feet	13	1,705 feet	7	934 feet

Alternative Route D, on the south side of the James River, crosses more high- and low probability wetlands than Alternative Route A, but comparable acreage; Alternative Route A crosses significantly more moderate probability wetlands and larger acreage than Alterative Routes B – D. Alternative Route D, the Proposed Route for the Joshua Falls – Riverville 138-kV Transmission Line, crosses moderate- and high probability wetlands at the James River crossing where tree clearing can be avoided (PFO wetland) and the PUB wetland is a retention pond on Greif Paper Mill. The ROWs of Alternative Routes B – D, on the south side of the river, cross a greater number of streams than Alternative Route A though the overall length of streams is comparable and will likely be spanned in all cases. Alternative Routes A – D unavoidably cross the James River to reach the Riverville Substation.

The Gladstone – Riverville 138-kV Transmission Line Proposed Route (Alternative Route E) crosses fewer wetlands than Alternative Route F, and comparable acreage. The high probability wetlands crossed by Alternative Route E, the Proposed Route, are minimal and existing ponds. The Gladstone – Riverville 138-kV Transmission Line Proposed Route (Alternative Route E) crosses nearly twice as many streams as Alternative Route E given the longer line length. Although, Alternative Route F crosses less acreage of wetlands and linear footage of streams, there are more associated impacts to Allens Creek, a stream conservation unit designated by the Virginia Department of Conservation and Recreation (VDCR), which has been given a moderate significant biodiversity ranking to aquatic natural heritage resources. The Allens Creek Stream Conservation Unit is unavoidably crossed by both Alternative Routes E and F, but Alternative Route F crosses Allens Creek three times and crosses three low probability PFO/PSS wetlands (Map Tile 69) whereas the Proposed Route (Alternative Route E) crosses Allens Creek once (Map Tiles 59).

In general, impacts to wetlands and streams during construction of transmission lines can usually be avoided through strategic placement of transmission structures/foundations to minimize impacts to regulated resources. In most cases, wetlands and streams can be spanned entirely by a transmission line. Where avoidance or mitigation is not possible, permanent impacts to wetlands are generally minimal due to the relatively small footprint of transmission line structure foundations.

Typically, impacts to wetlands from access roads, which are required to construct the transmission lines, can be minimized through the use of timber mats to reduce disturbance of the ground surface within wetland areas. In some cases, timber mat bridges can also be used to span stream channels. Impacts from access roads are often temporary in nature, as access roads are often restored to pre-construction conditions at the end of construction.

The results of this desktop wetland and stream delineation are intended solely for use as an indication of probable wetlands and streams within the ROWs associated with the Joshua Falls – Riverville – Gladstone 138-kV Transmission Lines Component of the CVTRP. This analysis is designed for planning purposes only and does not represent the results of an on-the-ground, wetland and stream field delineation. Accurate determination of regulated resource boundaries is only possible through field delineations of wetlands and streams utilizing the USACE wetland delineation manual (Environmental Laboratory 1987), the applicable regional supplement (USACE 2012), and other appropriate regulatory guidance.

5.0 REFERENCES

Cowardin, L.M., F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. Office of Biological Services, Fish and Wildlife Service, U.S. Department of the Interior, Washington, DC. 103 p.

Environmental Laboratory. 1987. U.S. Army Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi. 100 p, plus appendices.

Esri. 2020. Esri Basemap color aerial photography. Available at: https://www.esri.com/en-us/home.

Federal Emergency Management Agency (FEMA). 2019. Guidance for Flood Risk Analysis and Mappings; Guidance Document 60 - Riverine Mapping and Floodplain Boundaries Guidance. Available at: http://www.fema.gov/guidelines-and-standards-flood-risk-analysis-and-mapping.

Google Earth. Imagery dates vary by location. Google Earth Pro, Version 7.3.3.7786. Available at: https://www.google.com/earth/.

Minnesota IT Services. 2018. Geospatial Information Office: Color Infrared (CIR) Imagery. Available at: http://www.mngeo.state.mn.us/chouse/airphoto/cir.html.

Natural Resource Conservation Service (NRCS). 2009. Gridded Soil Survey Geographic for Amherst County, Virginia. U.S. Department of Agriculture. Available at: https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/virginia/amherstVA2009/Amherst_VA.pdf

_____. 2008. Soil Survey of Appomattox County, Virginia. Available at: https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/virginia/VA011/0/Appomattox.pdf.

_____. 2010. Soil Survey of Nelson County, Virginia. Available at: https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/virginia/nelsonVA2010/Nelson_VA.pdf.

_____. 1977. Soil Survey of Campbell County and City of Lynchburg, Virginia. Available at: https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/virginia/campbelllcVA1977/campbelllcVA1977.pdf

Simley, J.D. and W.J. Carswell, Jr. 2009. The National Map - Hydrography: US Geological Survey Fact Sheet 2009-3054, 4 pp.

United States Army Corps of Engineers (USACE). 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region, Version 2.0. Eds: J.F. Berkowitz, J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-12-9. Vicksburg, MS: U.S. Army Engineer Research and Development Center. 147 pp, plus appendices.

United States Environmental Protection Agency. 2020. Section 404 of the Clean Water Act: How Wetlands are Defined and Identified. Available at: https://www.epa.gov/cwa-404/section-404-clean-water-act-how-wetlands-are-defined-and-identified.

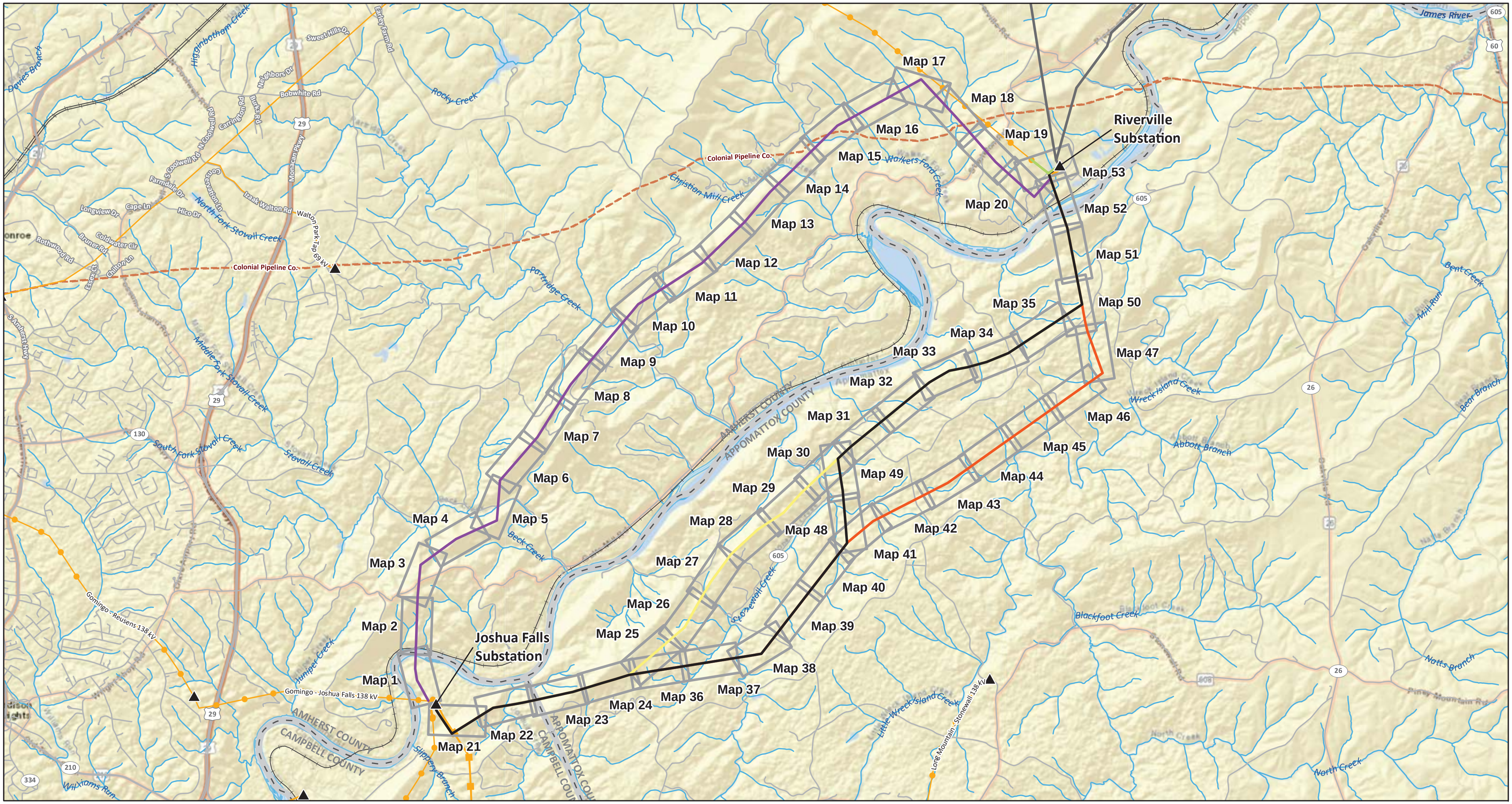
United States Fish and Wildlife Service (USFWS). 2020. National Wetlands Inventory (NWI) by state. Available at: http://www.fws.gov/wetlands/data/State-Downloads.html.

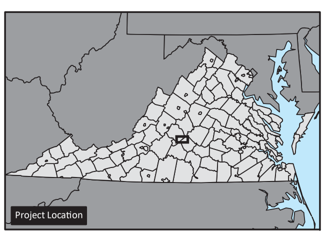
United States Geological Survey (USGS). 2020. National Hydrography Dataset (NHD). Available at: https://www.usgs.gov/core-science-systems/ngp/national-hydrography/national-hydrography-dataset?qt-science_support_page_related_con=0#qt-science_support_page_related_con.

_____. 2019. USGS Geological Survey 10m DEM. Available at: https://viewer.nationalmap.gov.

Virginia Base Mapping Program. 2018. CIR Imagery and Orthophotography. Available at: http://gismaps.vita.virginia.gov/arcgis/rest/services.

ATTACHMENT A: DESKTOP MAPPING FOR JOSHUA FALLS – RIVERVILLE ALTERNATIVE ROUTES (A-D)





▲	Existing AEP Substation
	Joshua Falls - Riverville Proposed Route
	Joshua Falls - Riverville Alternative A
	Joshua Falls - Riverville Alternative B
	Joshua Falls - Riverville Alternative C
	Riverville - Gladstone Alternative Routes
	Amherst - Riverville 138 kV Transmission Line Relocation
	Existing AEP Transmission Line (69 kV or lower)
	Existing AEP Transmission Line (115-230 kV)
	Existing AEP Transmission Line (345 kV +)
	Natural Gas Pipeline
	Road/Highway
	Railroad
	Stream (NHD)
	City/County Boudary
	River (NHD)
	Map Tile

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic
North American 1983

Amherst, Appomattox, Campbell, & Nelson Counties, Virginia

0 1 2
Miles

1" = 1 miles

INDEX

Desktop Wetland and Stream Delineation

Joshua Falls - Riverville
138 kV Transmission Line
Project Overview

Date: 12/2/2020
Author: CK
Project: 149227

APPALACHIAN POWER
An AEP Company
BOUNDLESS ENERGY

Imagery Layer Credit:
VITA, Esri, HERE, Garmin, INCREMENT P, NGA, USGS

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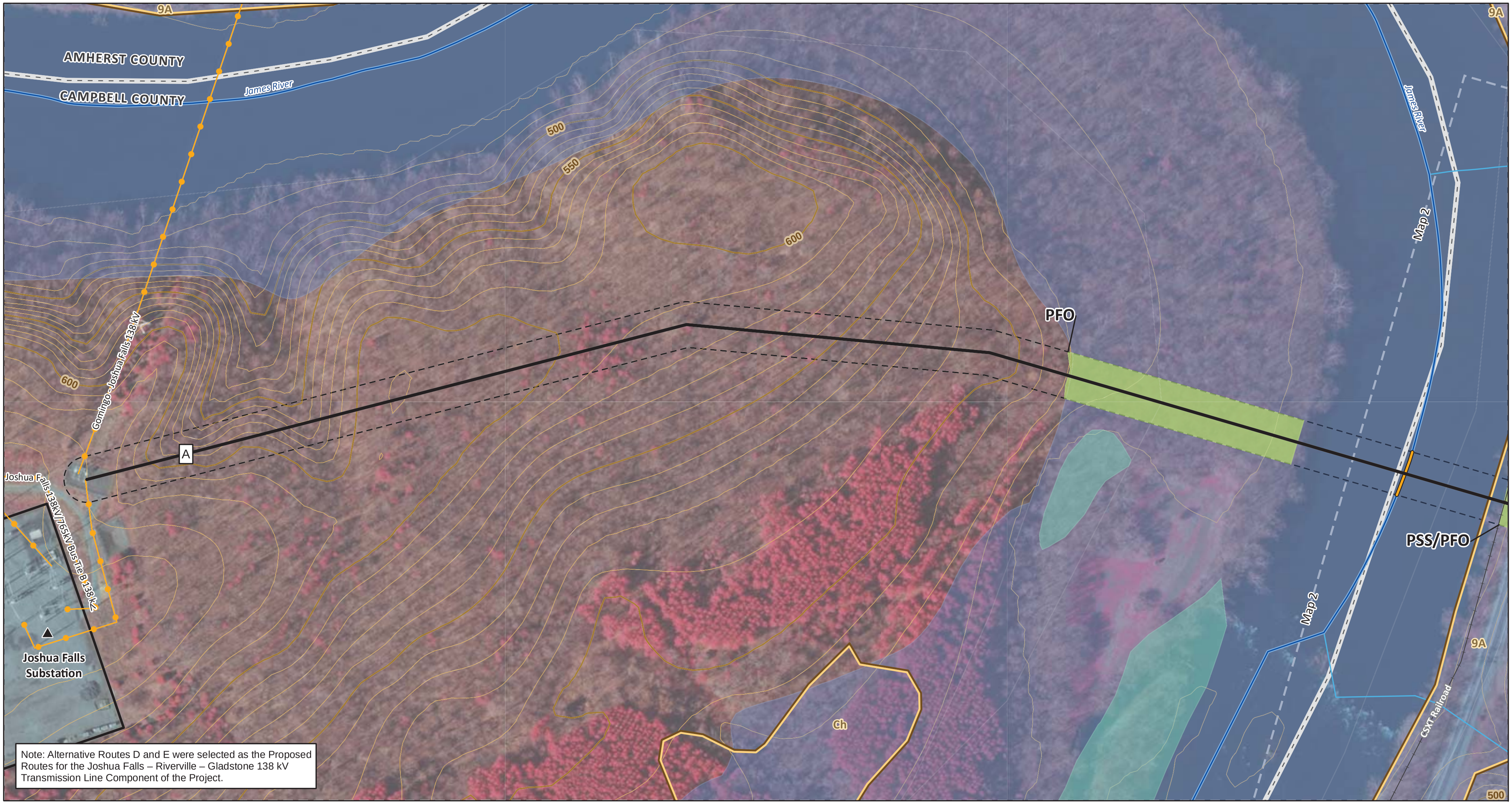

Note: Alternative Routes D and E were selected as the Proposed Routes for the Joshua Falls – Riverville – Gladstone 138 kV Transmission Line Component of the Project.

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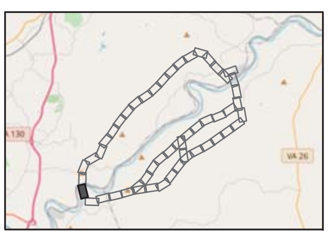


Legend		
Existing AEP Substation	Stream (NHD)	Map Tile
Alternative Routes	City/County Boundary	Substation Fence
High Probability Stream	Wetland Probability - MOD	Hydric Inclusion Soils
Existing AEP Transmission Line (115-230 kV)	Wetlands (NWI)	Index Contour
Railroad	100-year Floodplain	Intermediate Contour
James River	Right-of-Way (100')	

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic
North American 1983

Amherst, Appomattox, Campbell, & Nelson Counties, Virginia

0 100 200 400
Feet

1"= 200'

Map 1 of 53

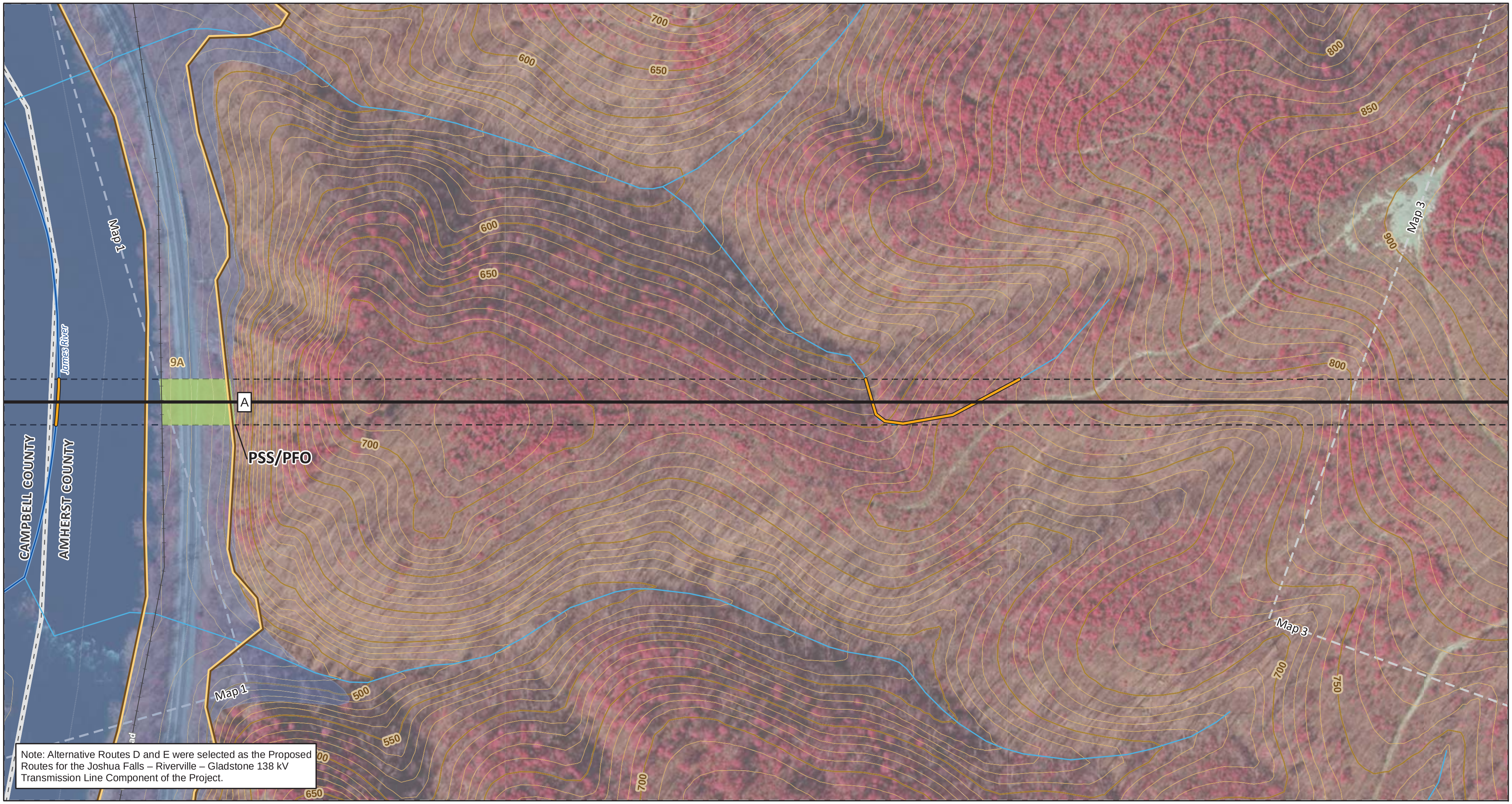
Desktop Wetland and Stream Delineation

Component 1: Joshua Falls-Riverville 138 kV Transmission Line

APPALACHIAN POWER
An AEP Company
BOUNDLESS ENERGY

Date: 12/2/2020;
Author: CK;
Project: 153520, 153521

Imagery Layer Credit:
VBMP 2018 Infrared;
(VGIN) Aerial Imagery



Note: Alternative Routes D and E were selected as the Proposed Routes for the Joshua Falls – Riverville – Gladstone 138 kV Transmission Line Component of the Project.

Alternative Routes
High Probability Stream
Railroad
James River
Stream (NHD)
City/County Boundary
Wetland Probability - MOD
100-year Floodplain
Right-of-Way (100')
Map Tile
Hydric Inclusion Soils
Index Contour
Intermediate Contour

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic
North American 1983

Amherst, Appomattox, Campbell, & Nelson Counties, Virginia

0 100 200 400
Feet

1"= 200'

Map 2 of 53

Desktop Wetland and Stream Delineation

Component 1: Joshua Falls-Riverville 138 kV Transmission Line

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An AEP Company
BOUNDLESS ENERGY

Date: 12/2/2020;
Author: CK;
Project: 153520, 153521

Imagery Layer Credit:
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(VGIN) Aerial Imagery

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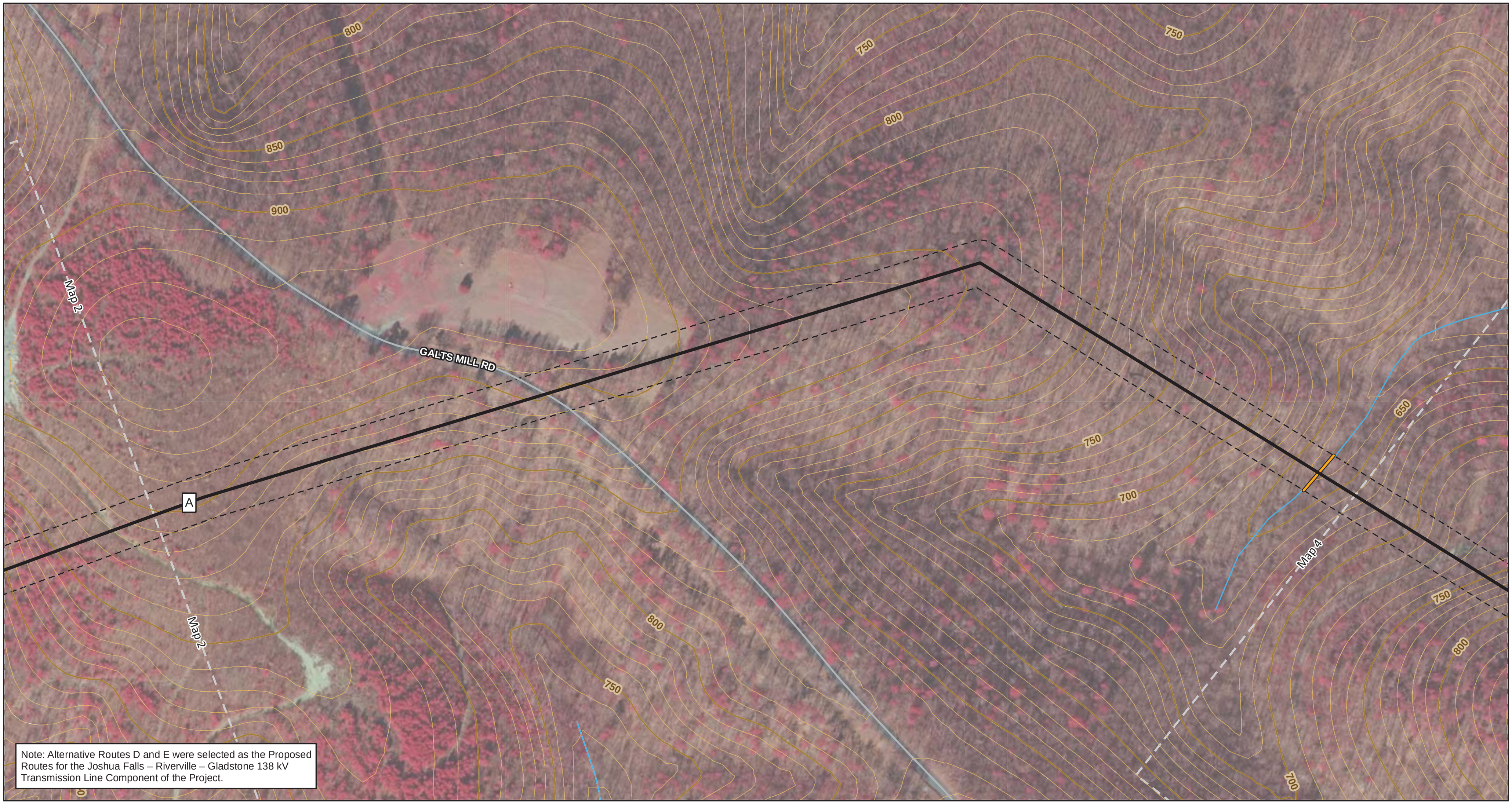
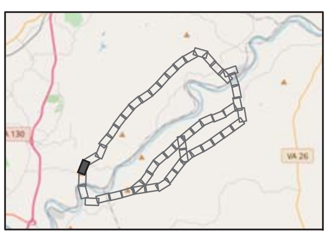


Note: Alternative Routes D and E were selected as the Proposed Routes for the Joshua Falls – Riverville – Gladstone 138 kV Transmission Line Component of the Project.



Alternative Routes
High Probability Stream
Road/Highway
Stream (NHD)
Right-of-Way (100')
Map Tile
Index Contour
Intermediate Contour

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic
North American 1983

Amherst, Appomattox, Campbell, & Nelson Counties, Virginia

0 100 200 400
Feet

1"= 200'

Desktop Wetland and Stream Delineation

Component 1: Joshua Falls-Riverville 138 kV Transmission Line

APPALACHIAN POWER
An AEP Company
BOUNDLESS ENERGY

Date: 12/2/2020;
Author: CK;
Project: 153520, 153521

Imagery Layer Credit:
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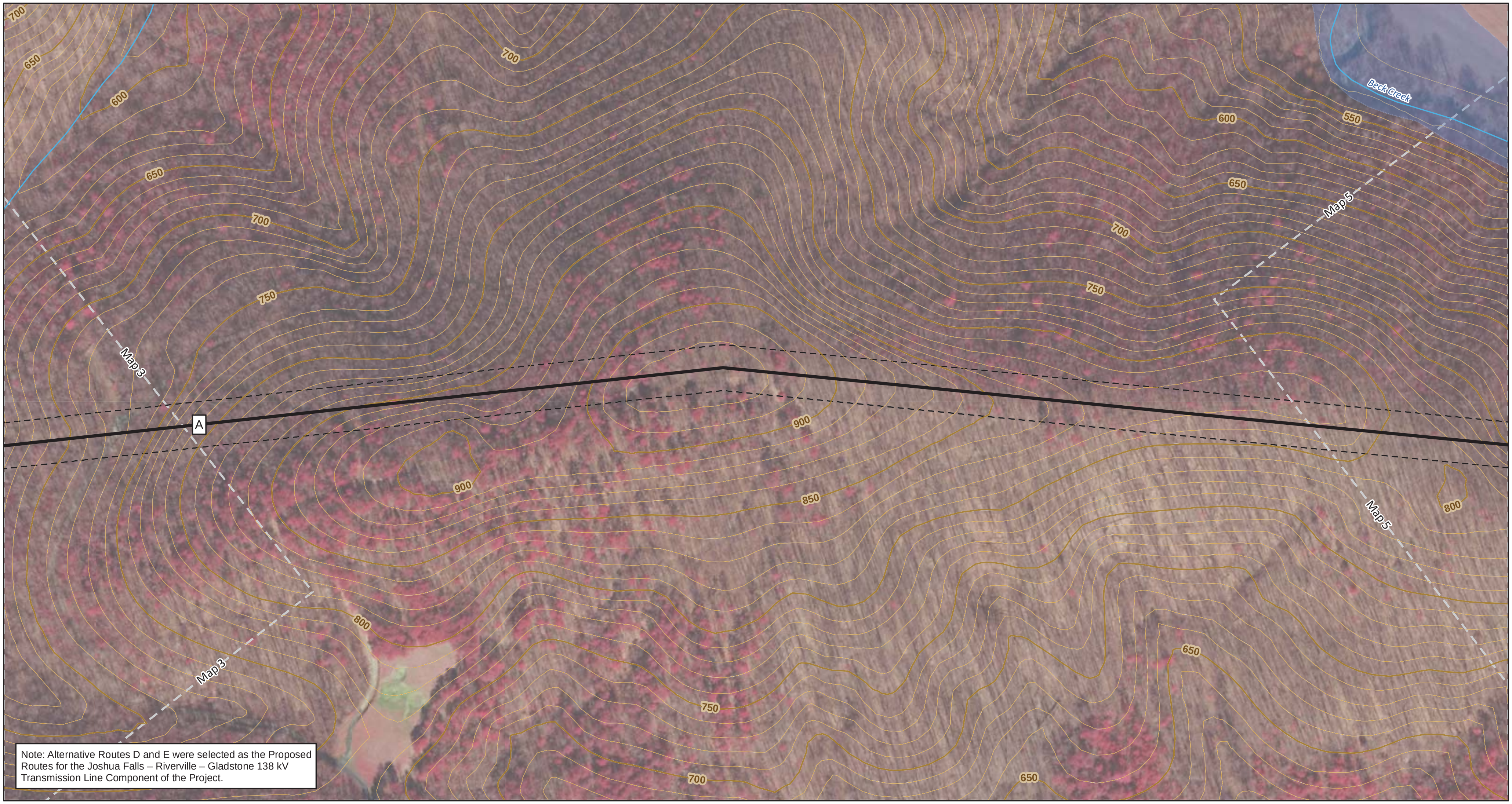
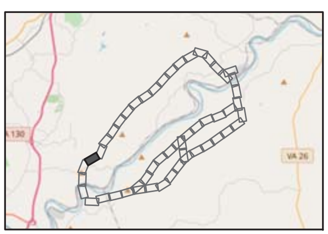


Note: Alternative Routes D and E were selected as the Proposed Routes for the Joshua Falls – Riverville – Gladstone 138 kV Transmission Line Component of the Project.



Alternative Routes
Stream (NHD)
100-year Floodplain
Right-of-Way (100')
Map Tile
Index Contour
Intermediate Contour

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic
North American 1983

Amherst, Appomattox, Campbell, & Nelson Counties, Virginia

0 100 200 400
Feet

1"= 200'

Map 4 of 53

Desktop Wetland and Stream Delineation

Component 1: Joshua Falls-Riverville
138 kV Transmission Line

APPALACHIAN POWER
An AEP Company
BOUNDLESS ENERGY

Date: 12/2/2020;
Author: CK;
Project: 153520, 153521

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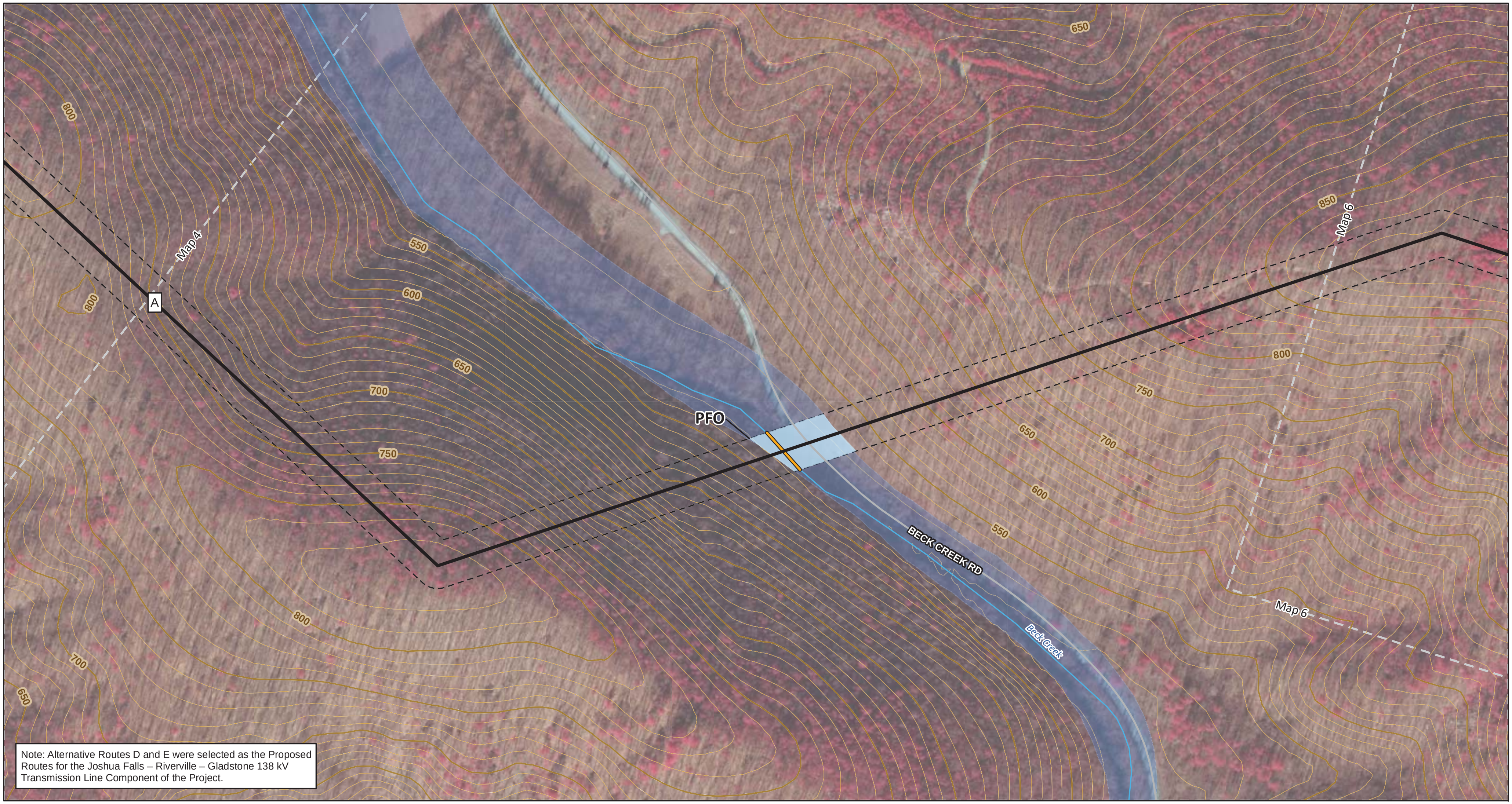
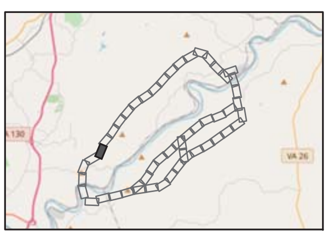


Note: Alternative Routes D and E were selected as the Proposed Routes for the Joshua Falls – Riverville – Gladstone 138 kV Transmission Line Component of the Project.



- Alternative Routes
- High Probability Stream
- Road/Highway
- Stream (NHD)
- Wetland Probability - LOW
- 100-year Floodplain
- Right-of-Way (100')
- Map Tile
- Index Contour
- Intermediate Contour

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic
North American 1983

Amherst, Appomattox, Campbell, & Nelson Counties, Virginia

0 100 200 400
Feet

1"= 200'

Map 5 of 53

Desktop Wetland and Stream Delineation

Component 1: Joshua Falls-Riverville 138 kV Transmission Line

APPALACHIAN POWER
An AEP Company
BOUNDLESS ENERGY

Date: 12/2/2020;
Author: CK;
Project: 153520, 153521

Imagery Layer Credit: VBMP 2018 Infrared; (VGIN) Aerial Imagery

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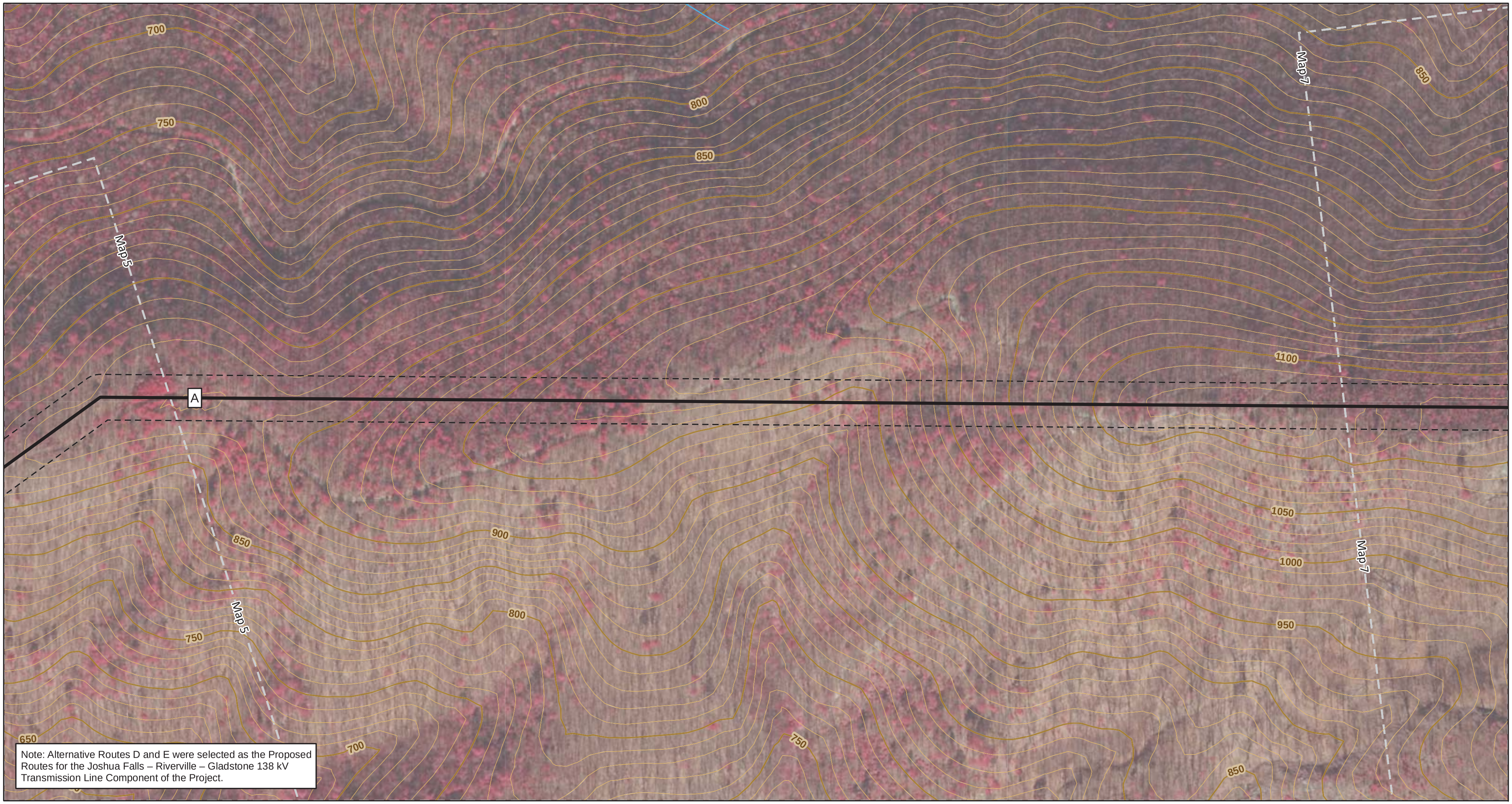

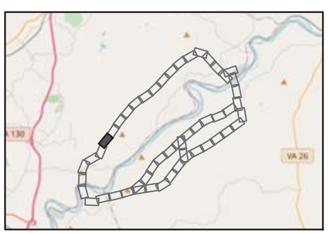

Alternative Routes
Stream (NHD)
Right-of-Way (100')
Map Tile
Index Contour
Intermediate Contour

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic
North American 1983

Amherst, Appomattox, Campbell, & Nelson Counties, Virginia

0 100 200 400
Feet

1"= 200'

Map 6 of 53

Desktop Wetland and Stream Delineation

Component 1: Joshua Falls-Riverville 138 kV Transmission Line

APPALACHIAN POWER
An AEP Company
BOUNDLESS ENERGY

Date: 12/2/2020;
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Project: 153520, 153521

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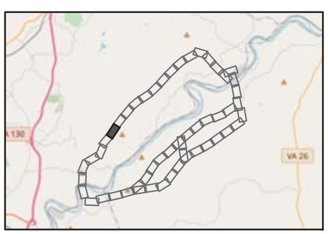
Note: Alternative Routes D and E were selected as the Proposed Routes for the Joshua Falls – Riverville – Gladstone 138 kV Transmission Line Component of the Project.



Alternative Routes

Road/Highway

Stream (NHD)

Right-of-Way (100')

Map Tile

Index Contour

Intermediate Contour

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic
North American 1983

Amherst, Appomattox, Campbell, & Nelson Counties, Virginia

0 100 200 400
Feet

1"= 200'

Map 7 of 53

Desktop Wetland and Stream Delineation

Component 1: Joshua Falls-Riverville
138 kV Transmission Line

APPALACHIAN POWER
An AEP Company
BOUNDLESS ENERGY

Date: 12/2/2020;
Author: CK;
Project: 153520, 153521

Imagery Layer Credit:
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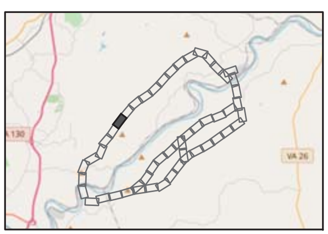


Alternative Routes
High Probability Stream
Road/Highway
Stream (NHD)
Right-of-Way (100')
Map Tile
Index Contour
Intermediate Contour

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic
North American 1983

Amherst, Appomattox, Campbell, & Nelson Counties, Virginia

0 100 200 400
Feet

1"= 200'

Desktop Wetland and Stream Delineation

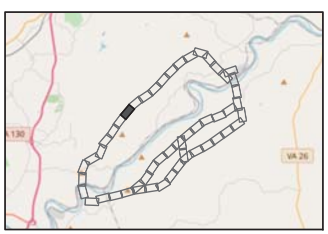
Component 1: Joshua Falls-Riverville
138 kV Transmission Line

APPALACHIAN POWER
An AEP Company
BOUNDLESS ENERGY

Date: 12/2/2020;
Author: CK;
Project: 153520, 153521

Imagery Layer Credit:
VBMP 2018 Infrared;
(VGIN) Aerial Imagery

Note: Alternative Routes D and E were selected as the Proposed Routes for the Joshua Falls – Riverville – Gladstone 138 kV Transmission Line Component of the Project.



- Alternative Routes
- High Probability Stream
- Road/Highway
- Stream (NHD)
- Wetland Probability - LOW
- 100-year Floodplain
- Right-of-Way (100')
- Map Tile
- Index Contour
- Intermediate Contour

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic
North American 1983

Amherst, Appomattox, Campbell, & Nelson Counties, Virginia

0 100 200 400
Feet

1"= 200'

Map 9 of 53

Desktop Wetland and Stream Delineation

Component 1: Joshua Falls-Riverville 138 kV Transmission Line

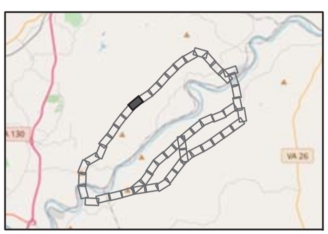
Date: 12/2/2020;
Author: CK;
Project: 153520, 153521

APPALACHIAN POWER
An AEP Company
BOUNDLESS ENERGY

Imagery Layer Credit:
VBMP 2018 Infrared;
(VGIN) Aerial Imagery

Path: C:\Ram120_Projects\AEP\149227_CliffordScottsville_TP20170081\GIS\JoshuaFallsGladstone.aprx

Note: Alternative Routes D and E were selected as the Proposed Routes for the Joshua Falls – Riverville – Gladstone 138 kV Transmission Line Component of the Project.



Alternative Routes
High Probability Stream
Road/Highway
Stream (NHD)
Wetland Probability - LOW
100-year Floodplain
Right-of-Way (100')
Map Tile
Index Contour
Intermediate Contour

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic
North American 1983

Amherst, Appomattox, Campbell, & Nelson Counties, Virginia

0 100 200 400
Feet

1"= 200'

Map 10 of 53

Desktop Wetland and Stream Delineation

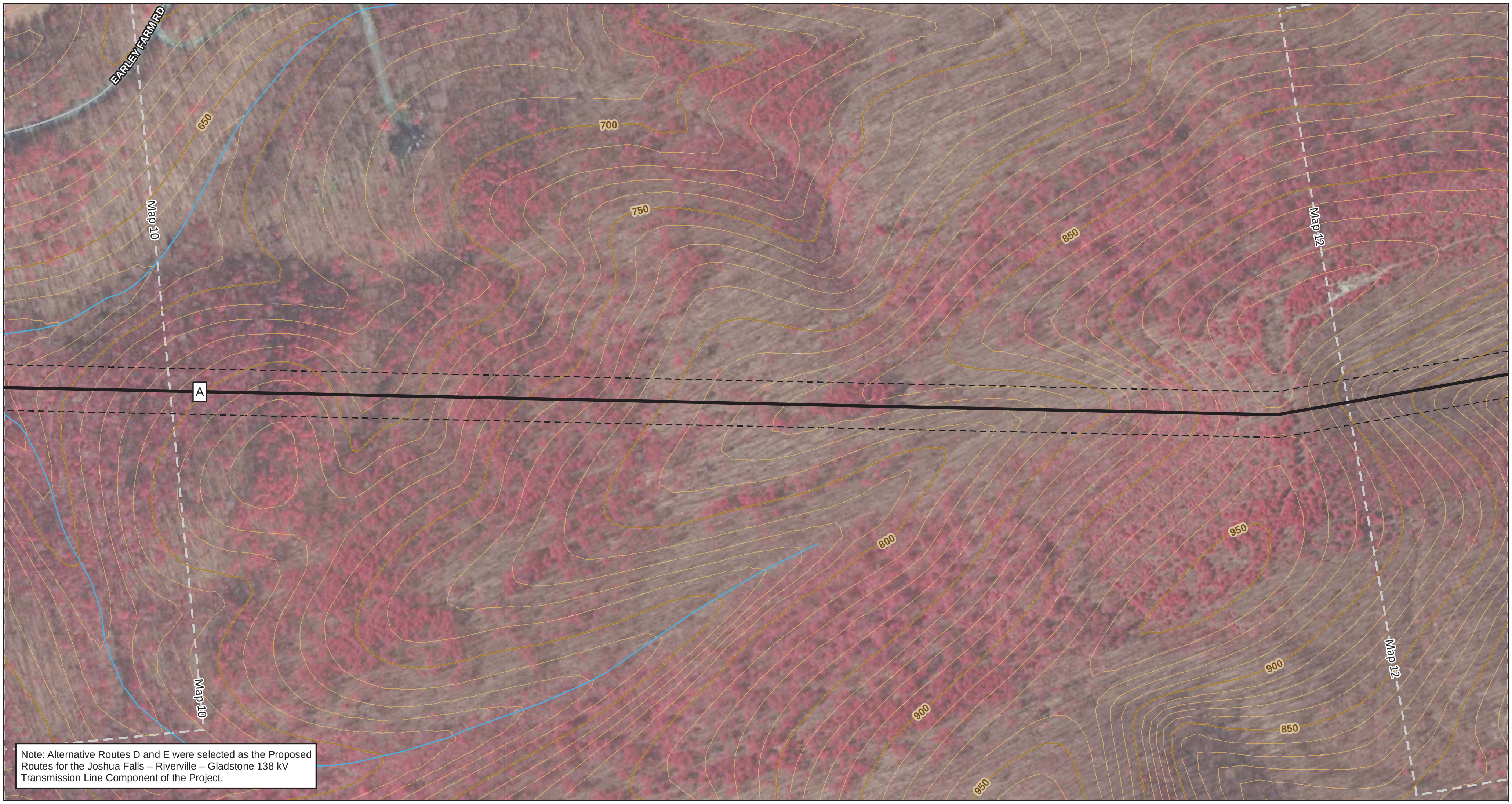
Component 1: Joshua Falls-Riverville 138 kV Transmission Line

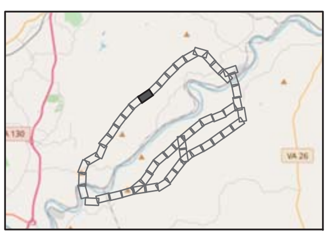
Date: 12/2/2020;
Author: CK;
Project: 153520, 153521

APPALACHIAN POWER
An AEP Company
BOUNDLESS ENERGY

Imagery Layer Credit:
VBMP 2018 Infrared;
(VGIN) Aerial Imagery

Path: C:\Ram120_Projects\AEP\149227_CliffordScottsville_TP2017081\GIS\JoshuaFallsGladstone.aprx





Alternative Routes
Road/Highway
Stream (NHD)
Right-of-Way (100')
Map Tile
Index Contour
Intermediate Contour

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic
North American 1983

Amherst, Appomattox, Campbell, & Nelson Counties, Virginia

0 100 200 400
Feet

1"= 200'

Map 11 of 53

Desktop Wetland and Stream Delineation

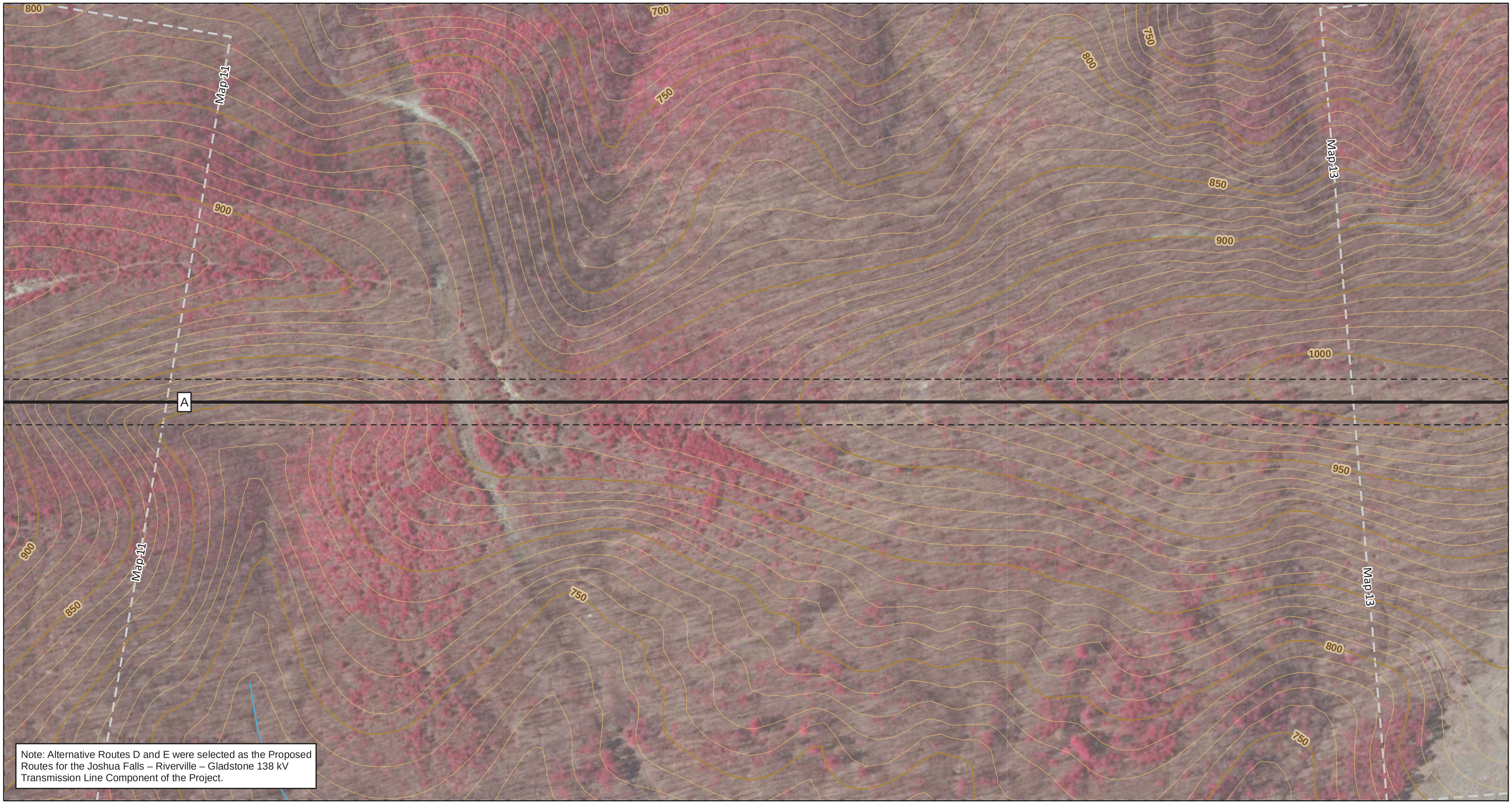
Component 1: Joshua Falls-Riverville
138 kV Transmission Line

APPALACHIAN POWER
An AEP Company
BOUNDLESS ENERGY

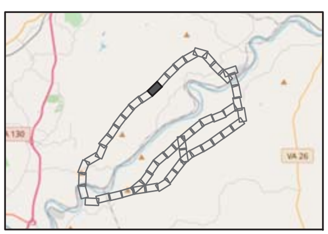
Date: 12/2/2020;
Author: CK;
Project: 153520, 153521

Imagery Layer Credit:
VBMP 2018 Infrared;
(VGIN) Aerial Imagery

Path: C:\Ram120_Projects\AEP\149227_CliffordScottsville_TP20170831\GIS\JoshuaFallsGladstone.aprx



Note: Alternative Routes D and E were selected as the Proposed Routes for the Joshua Falls – Riverville – Gladstone 138 kV Transmission Line Component of the Project.



Alternative Routes
Stream (NHD)
Right-of-Way (100')
Map Tile
Index Contour
Intermediate Contour

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic
North American 1983

Amherst, Appomattox, Campbell, & Nelson Counties, Virginia

0 100 200 400
Feet

1"= 200'

Map 12 of 53

Desktop Wetland and Stream Delineation

Component 1: Joshua Falls-Riverville 138 kV Transmission Line

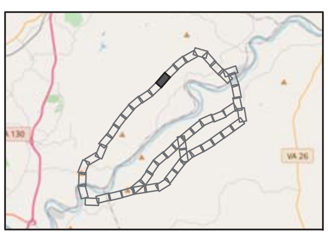
APPALACHIAN POWER
An AEP Company
BOUNDLESS ENERGY

Date: 12/2/2020;
Author: CK;
Project: 153520, 153521

Imagery Layer Credit: VBMP 2018 Infrared; (VGIN) Aerial Imagery

Path: C:\Ram120_Projects\AEP\149227_CliffordScottsville_TP20170831\GIS\JoshuaFallsGladstone.aprx

Note: Alternative Routes D and E were selected as the Proposed Routes for the Joshua Falls – Riverville – Gladstone 138 kV Transmission Line Component of the Project.



Alternative Routes

Stream (NHD)

100-year Floodplain

Right-of-Way (100')

Map Tile

Index Contour

Intermediate Contour

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic
North American 1983

Amherst, Appomattox, Campbell, & Nelson Counties, Virginia

0 100 200 400
Feet

1"= 200'

Map 13 of 53

Desktop Wetland and Stream Delineation

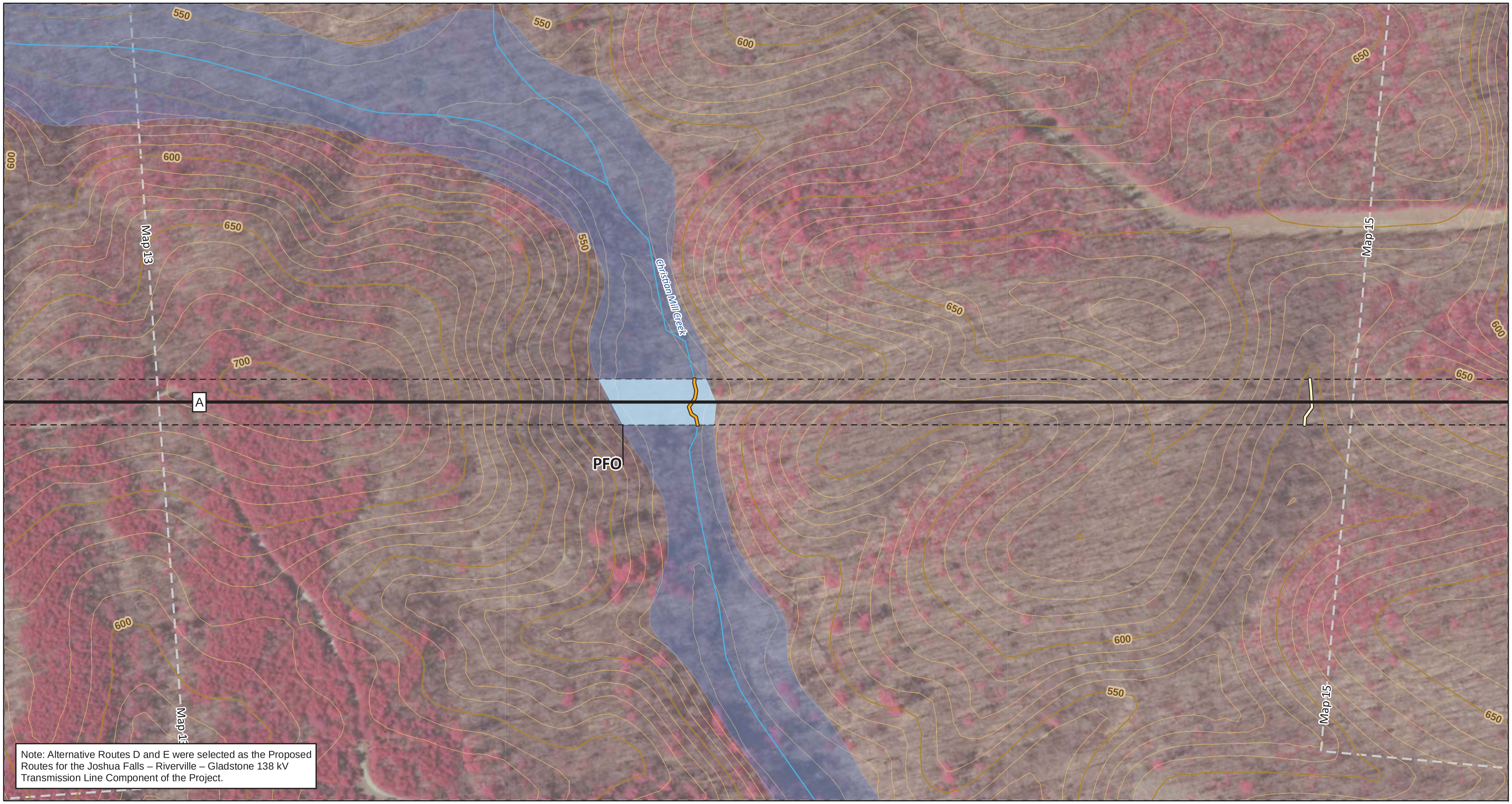
Component 1: Joshua Falls-Riverville
138 kV Transmission Line

APPALACHIAN POWER
An AEP Company
BOUNDLESS ENERGY

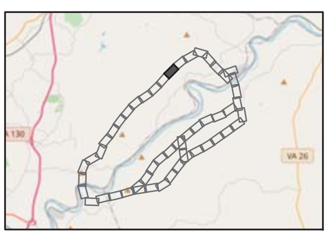
Date: 12/2/2020;
Author: CK;
Project: 153520, 153521

Imagery Layer Credit:
VBMP 2018 Infrared;
(VGIN) Aerial Imagery

Path: C:\Ram120_Projects\AEP\149227_CliffordScottsville_TP20170831\GIS\JoshuaFallsGladstone.aprx



Note: Alternative Routes D and E were selected as the Proposed Routes for the Joshua Falls – Riverville – Gladstone 138 kV Transmission Line Component of the Project.



Alternative Routes	Stream (NHD)
High Probability Stream	Wetland Probability - LOW
Low Probability Stream	100-year Floodplain
Right-of-Way (100')	Map Tile
Index Contour	Intermediate Contour

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic
North American 1983

Amherst, Appomattox, Campbell, & Nelson Counties, Virginia

0 100 200 400
Feet

1"= 200'

Map 14 of 53

Desktop Wetland and Stream Delineation

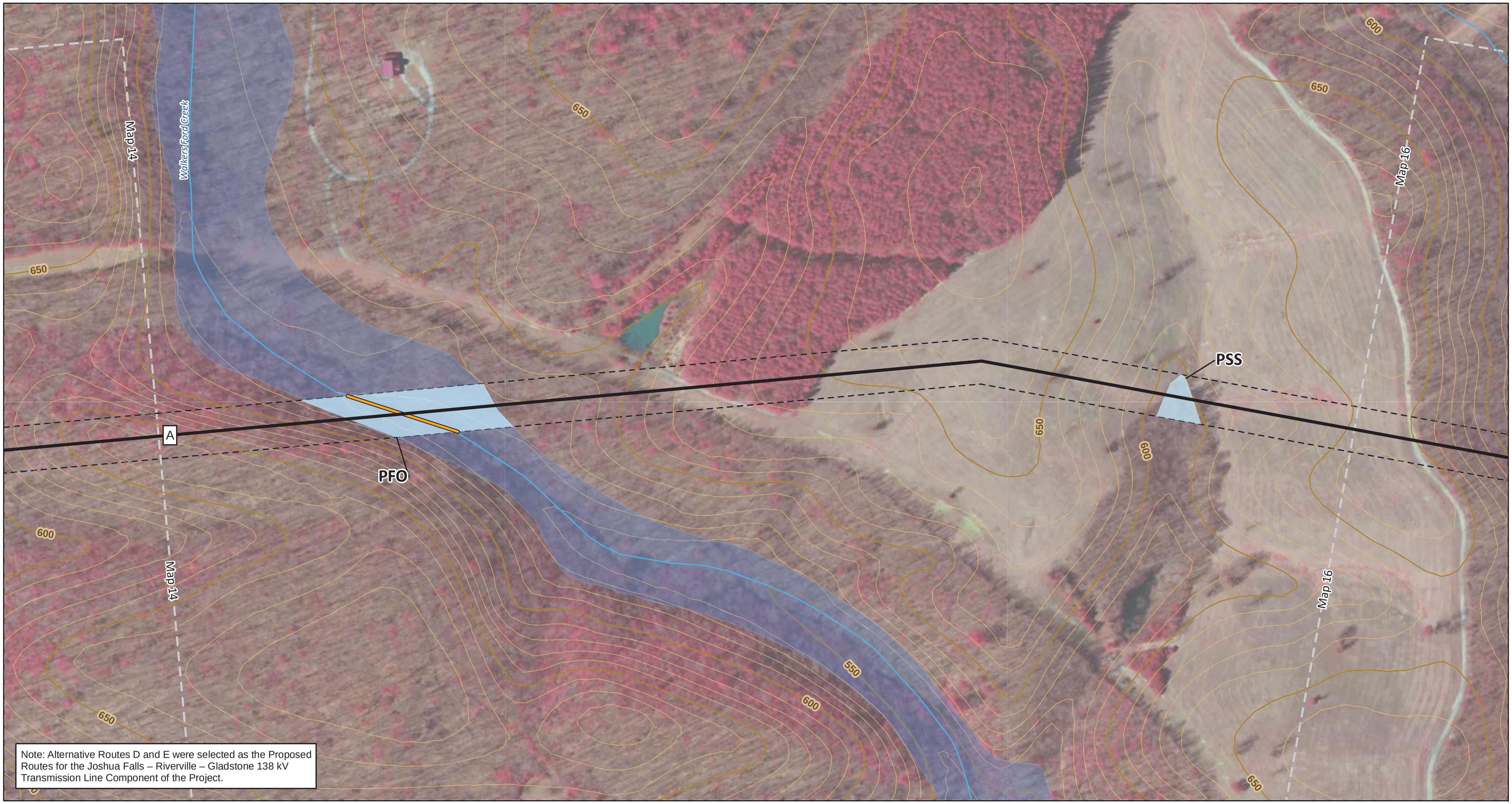
Component 1: Joshua Falls-Riverville
138 kV Transmission Line

APPALACHIAN POWER
An AEP Company
BOUNDLESS ENERGY

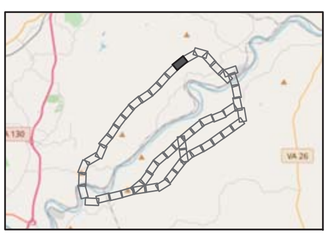
Date: 12/2/2020;
Author: CK;
Project: 153520, 153521

Imagery Layer Credit:
VBMP 2018 Infrared;
(VGIN) Aerial Imagery

Path: C:\Ram120_Projects\AEP\149227_CliffordScottsville_TP20170810\GIS\JoshuaFallsGladstone.aprx



Note: Alternative Routes D and E were selected as the Proposed Routes for the Joshua Falls – Riverville – Gladstone 138 kV Transmission Line Component of the Project.



- Alternative Routes
- High Probability Stream
- Stream (NHD)
- Wetland Probability - LOW
- 100-year Floodplain
- Right-of-Way (100')
- Map Tile
- Index Contour
- Intermediate Contour

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic
North American 1983

Amherst, Appomattox, Campbell, & Nelson Counties, Virginia

0 100 200 400
Feet

1"= 200'

Map 15 of 53

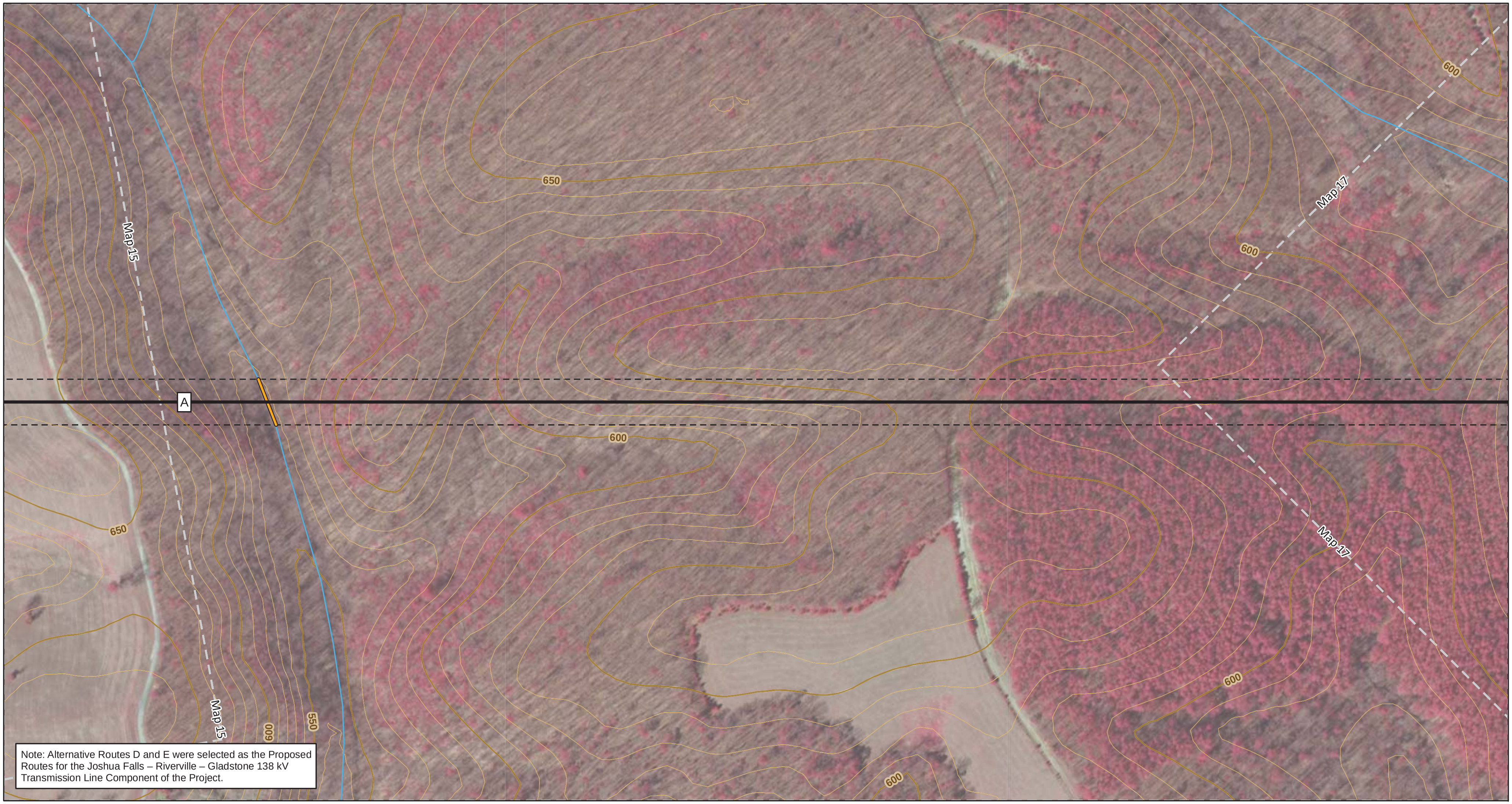
Desktop Wetland and Stream Delineation

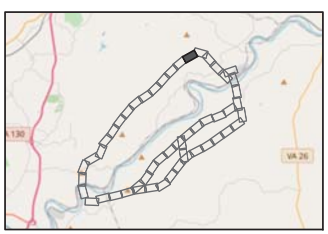
Component 1: Joshua Falls-Riverville 138 kV Transmission Line

Date: 12/2/2020;
Author: CK;
Project: 153520, 153521

Imagery Layer Credit: VBMP 2018 Infrared; (VGIN) Aerial Imagery

Path: C:\Ram120_Projects\AEP\149227_CliffordScottsville_TP20170831\GIS\JoshuaFallsGladstone.aprx





Alternative Routes
High Probability Stream
Stream (NHD)
Right-of-Way (100')
Map Tile
Index Contour
Intermediate Contour

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic
North American 1983

Amherst, Appomattox, Campbell, & Nelson Counties, Virginia

0 100 200 400
Feet

1"= 200'

Map 16 of 53

Desktop Wetland and Stream Delineation

Component 1: Joshua Falls-Riverville 138 kV Transmission Line

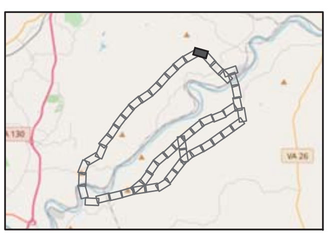
APPALACHIAN POWER
An AEP Company
BOUNDLESS ENERGY

Date: 12/2/2020;
Author: CK;
Project: 153520, 153521

Imagery Layer Credit: VBMP 2018 Infrared; (VGIN) Aerial Imagery

Path: C:\Ram120_Projects\AEP\149227_CliffordScottsville_TP20170831\GIS\JoshuaFallsGladstone.aprx

Note: Alternative Routes D and E were selected as the Proposed Routes for the Joshua Falls – Riverville – Gladstone 138 kV Transmission Line Component of the Project.



- Alternative Routes
- High Probability Stream
- Existing AEP Transmission Line (115-230 kV)
- Stream (NHD)
- Wetland Probability - MOD
- Wetlands (NWI)
- 100-year Floodplain
- Right-of-Way (100')
- Map Tile
- Index Contour
- Intermediate Contour

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic
North American 1983

Amherst, Appomattox, Campbell, & Nelson Counties, Virginia

0 100 200 400
Feet

1"= 200'

Map 17 of 53

Desktop Wetland and Stream Delineation

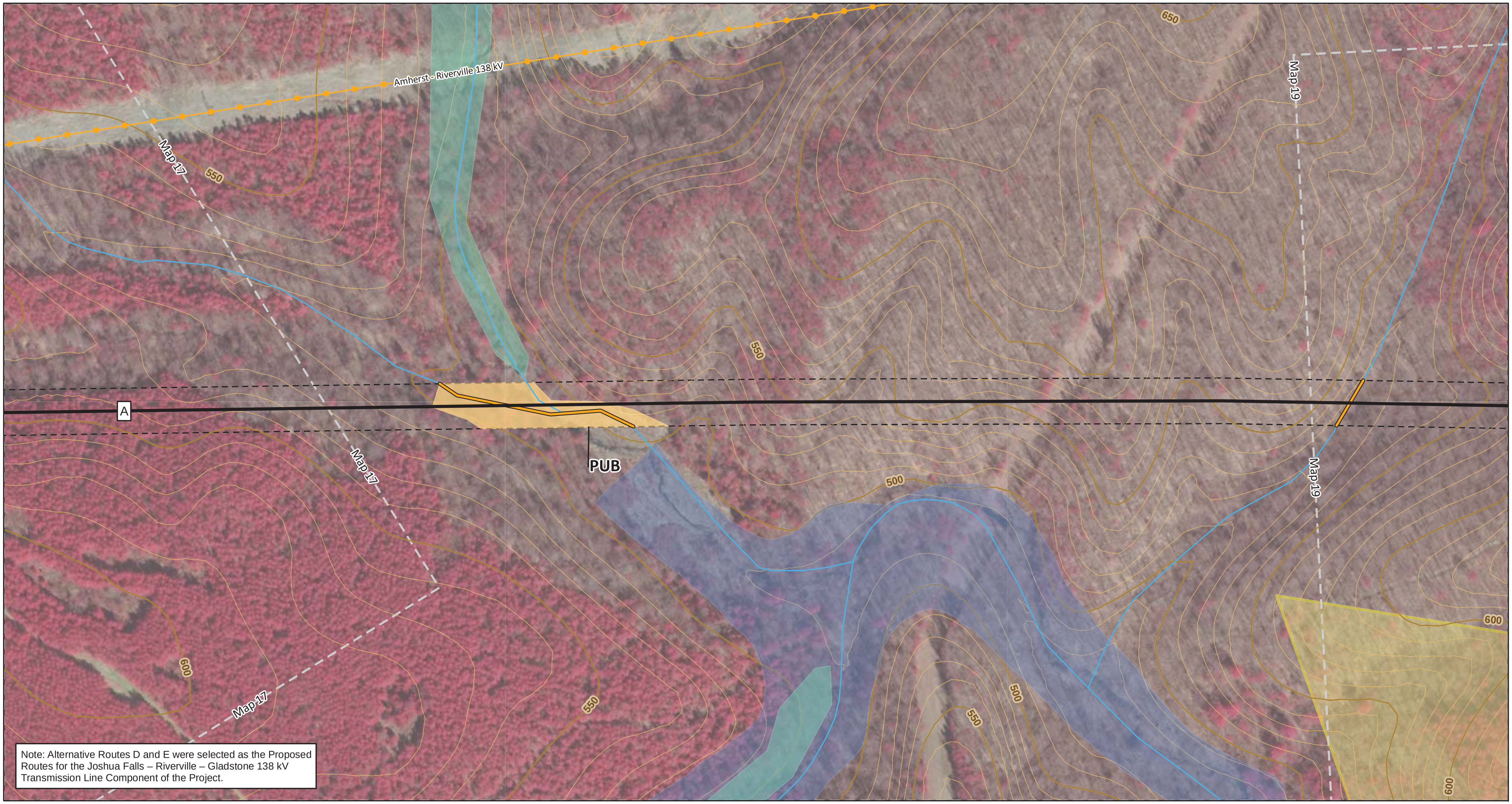
Component 1: Joshua Falls-Riverville 138 kV Transmission Line

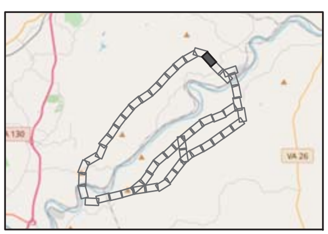
APPALACHIAN POWER
An AEP Company
BOUNDLESS ENERGY

Date: 12/2/2020;
Author: CK;
Project: 153520, 153521

Imagery Layer Credit: VBMP 2018 Infrared; (VGIN) Aerial Imagery

Path: C:\Ram120_Projects\AEP\149227_CliffordScottsville_TP2017081\GIS\JoshuaFallsGladstone.aprx





Alternative Routes
High Probability Stream
Existing AEP Transmission Line (115-230 kV)
Stream (NHD)
Wetland Probability - HIGH
Wetlands (NWI)
100-year Floodplain
Right-of-Way (100')
Map Tile
VOF Easement
Index Contour
Intermediate Contour

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic
North American 1983

Amherst, Appomattox, Campbell, & Nelson Counties, Virginia

0 100 200 400
Feet

1"= 200'

Map 18 of 53

Desktop Wetland and Stream Delineation

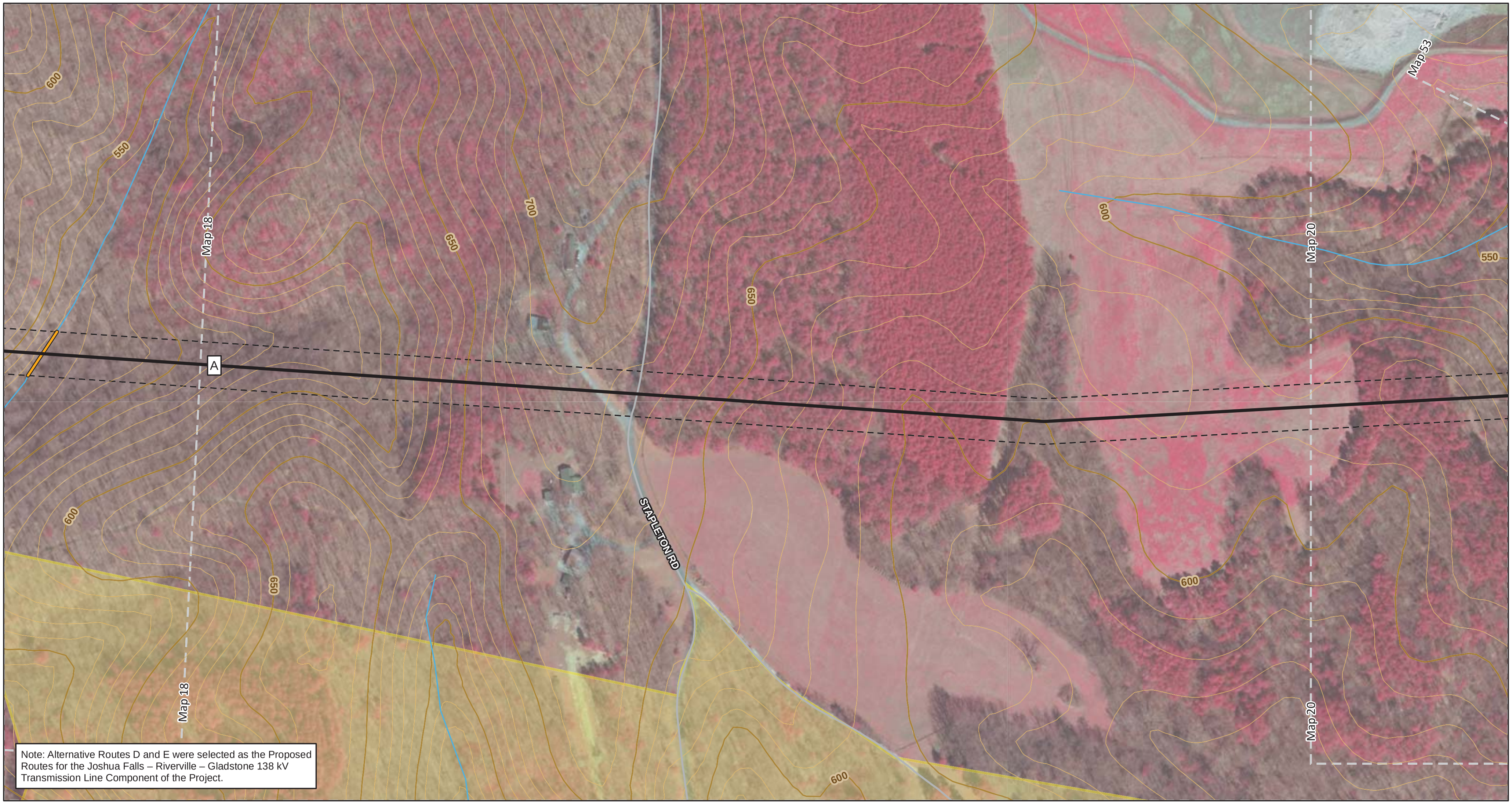
Component 1: Joshua Falls-Riverville 138 kV Transmission Line

APPALACHIAN POWER
An AEP Company
BOUNDLESS ENERGY

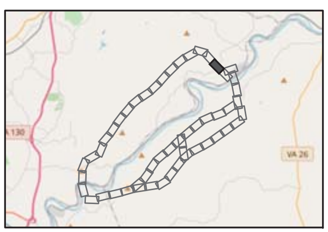
Date: 12/2/2020;
Author: CK;
Project: 153520, 153521

Imagery Layer Credit: VBMP 2018 Infrared; (VGIN) Aerial Imagery

Path: C:\Ram120_Projects\AEP\149227_CliffordScottsville_TP20170831\GIS\JoshuaFallsGladstone.aprx



Note: Alternative Routes D and E were selected as the Proposed Routes for the Joshua Falls – Riverville – Gladstone 138 kV Transmission Line Component of the Project.



- Alternative Routes
- High Probability Stream
- Road/Highway
- Stream (NHD)
- Right-of-Way (100')
- Map Tile
- VOF Easement
- Index Contour
- Intermediate Contour

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic
North American 1983

Amherst, Appomattox, Campbell, & Nelson Counties, Virginia

0 100 200 400
Feet

1"= 200'

Map 19 of 53

Desktop Wetland and Stream Delineation

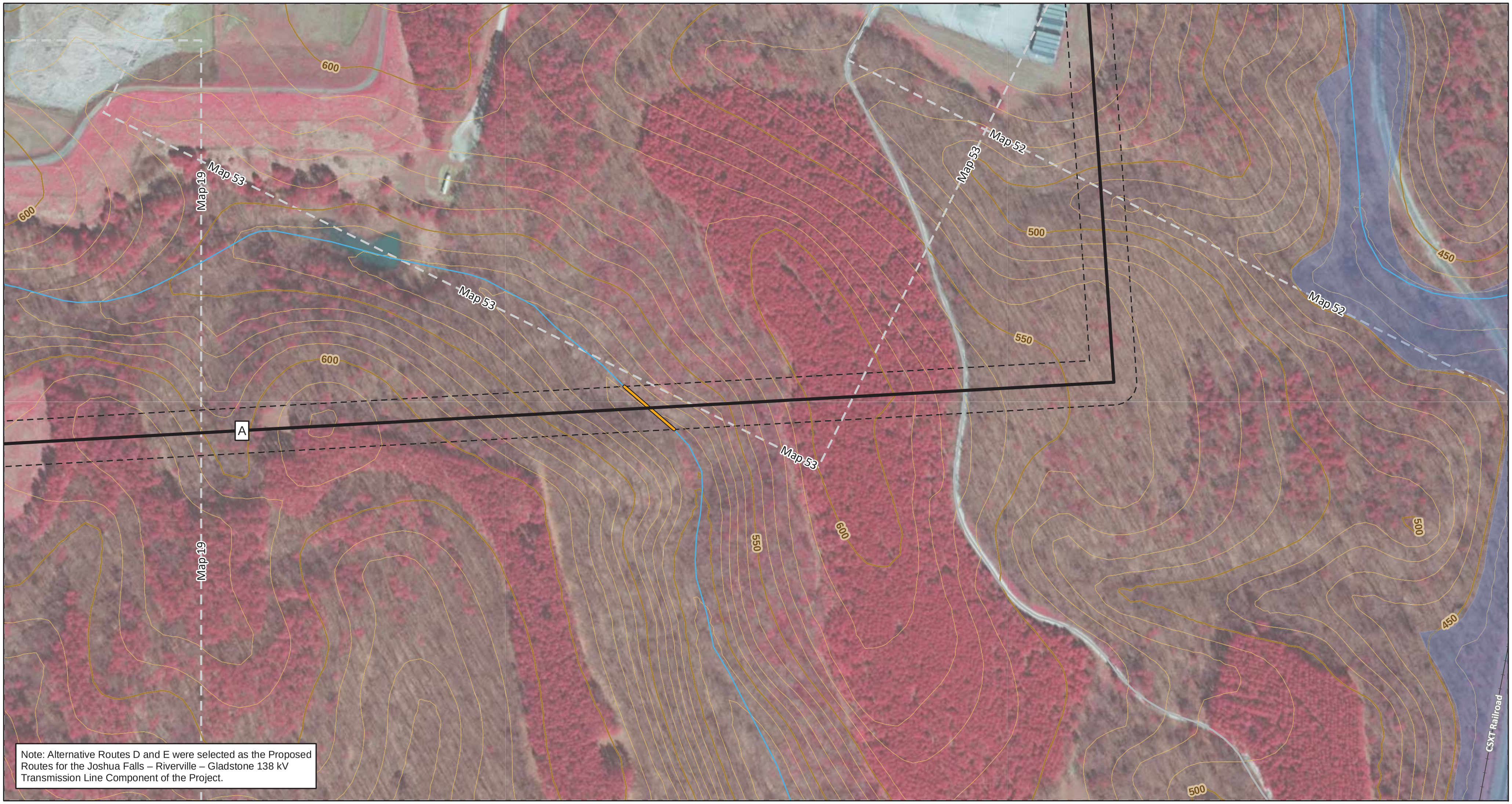
Component 1: Joshua Falls-Riverville 138 kV Transmission Line

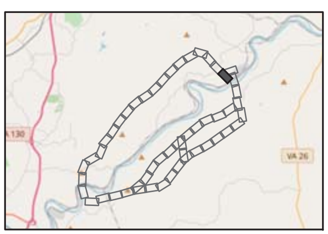
Date: 12/2/2020;
Author: CK;
Project: 153520, 153521

APPALACHIAN POWER
An AEP Company
BOUNDLESS ENERGY

Imagery Layer Credit:
VBMP 2018 Infrared;
(VGIN) Aerial Imagery

Path: C:\Ram120_Projects\AEP\149227_CliffordScottsville_TP20170817\GIS\JoshuaFallsGladstone.aprx





Alternative Routes
High Probability Stream
Road/Highway
Railroad
Stream (NHD)
100-year Floodplain
Right-of-Way (100')
Map Tile
Index Contour
Intermediate Contour

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic
North American 1983

Amherst, Appomattox, Campbell, & Nelson Counties, Virginia

0 100 200 400
Feet

1"= 200'

Map 20 of 53

Desktop Wetland and Stream Delineation

Component 1: Joshua Falls-Riverville
138 kV Transmission Line

APPALACHIAN POWER
An AEP Company
BOUNDLESS ENERGY

Date: 12/2/2020;
Author: CK;
Project: 153520, 153521

Imagery Layer Credit:
VBMP 2018 Infrared;
(VGIN) Aerial Imagery

Path: C:\Ram120_Projects\AEP\149227_CliffordScottsville_TP20170811\GIS\JoshuaFallsGladstone.aprx