



REGIONAL OPTICAL COMMUNICATIONS

2023 STATEWIDE BROADBAND STUDY REPORT



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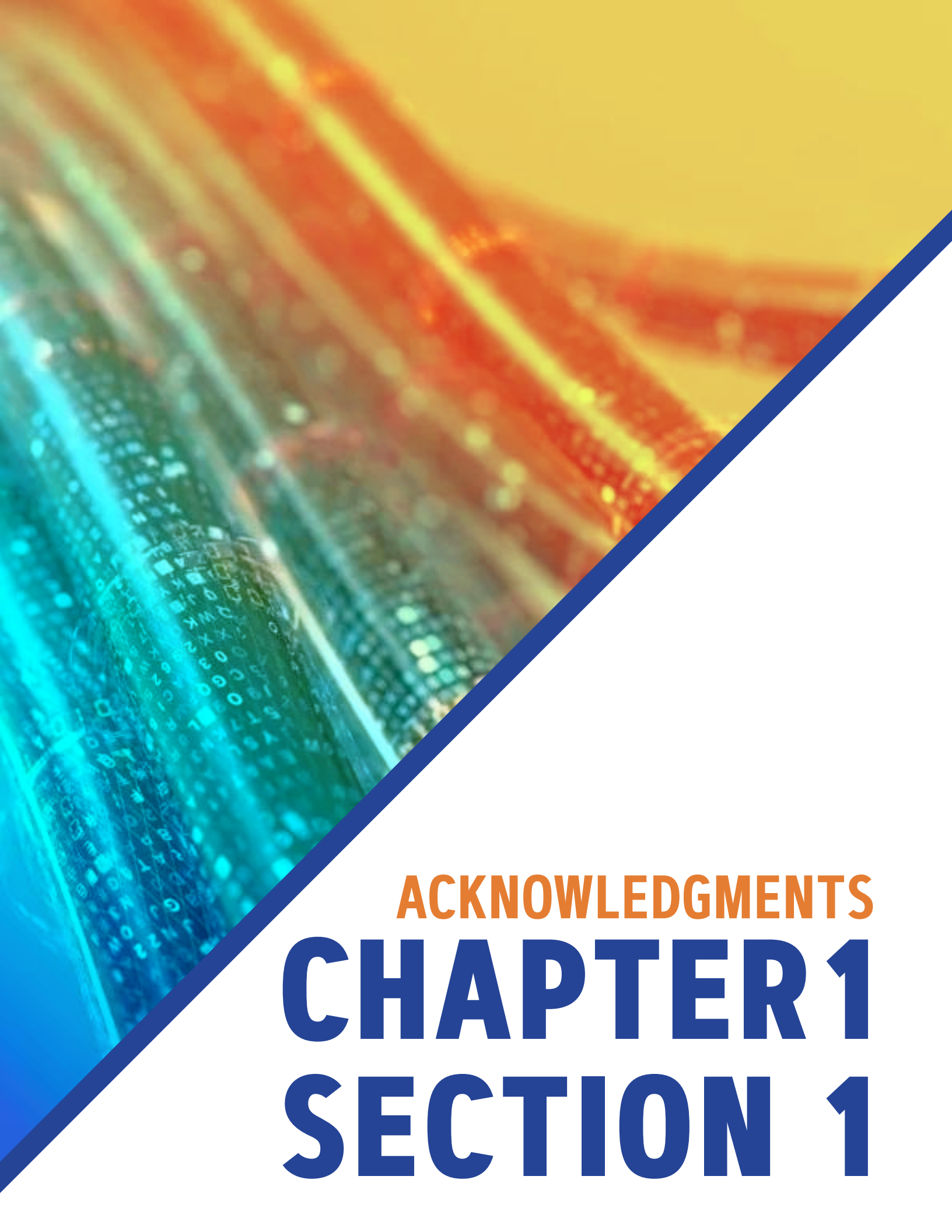
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ACKNOWLEDGMENTS
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SECTION 1

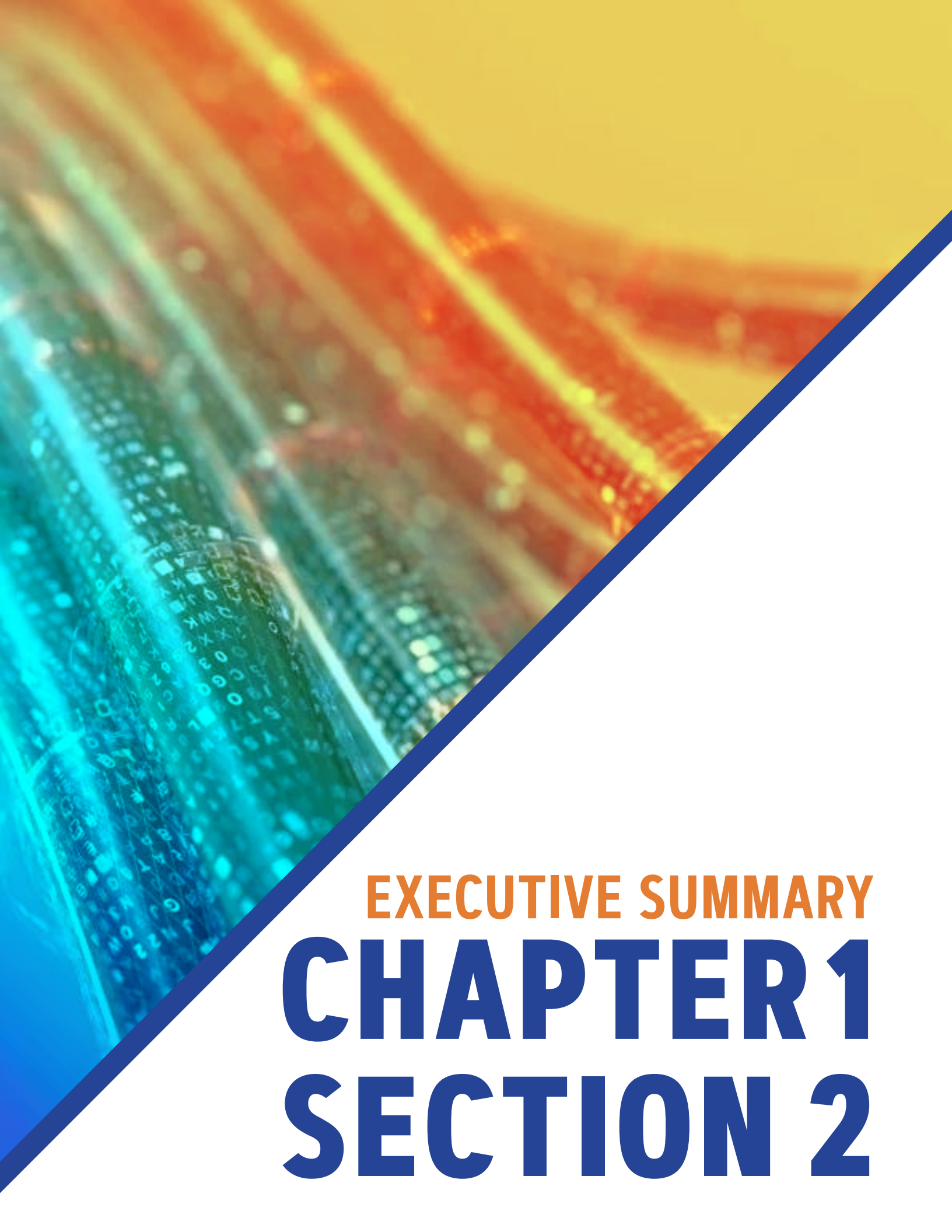
ACKNOWLEDGMENTS

Regional Optical Communications (ROC) has a host of organizations to recognize for their efforts in this project. First and foremost, we would like to thank the United States Economic Development Administration and the Appalachian Regional Commission for providing the grant funding that allowed this project to happen. We would also like to recognize the West Virginia Department of Economic Development’s Office of Broadband for their leadership in moving the state’s broadband infrastructure forward – their cooperation in providing the most up-to-date data for this study was invaluable, and without their involvement, the project would not have been possible. Similarly, we would like to recognize the West Virginia Broadband Enhancement Council for helping champion this project and solicit support for our efforts. Last, but certainly not least, we would like to thank the boards of the Region 1 and Region 4 Planning and Development Councils for their

vision and their confidence in our team to tackle this project.

Next, ROC had several partners throughout the project process itself. The Thrasher Group handled all project management, engineering, address classification, and cost estimates for the entirety of the state, as well as development of this report – thanks to Jeffrey Hartley, Chad Riley, and their team for taking on the task. Lit Fiber (Lit Communities) – led by Jessica Fowler – oversaw the public outreach portion of the project, while Generation West Virginia’s Annie Stroud, John Golden, and team provided implementation assistance at the local and county level. We appreciate the seamless coordination of these entities to develop and execute a study that will impact West Virginians in every corner of the state for years to come.





EXECUTIVE SUMMARY
CHAPTER 1
SECTION 2

INTRODUCTION & PROJECT PURPOSE

Regional Optical Communications — a 19-county non-profit consortium dedicated to improving broadband access in West Virginia — took on the task of coordinating a statewide study aimed at identifying the current status of and future need for broadband service in West Virginia. The project, managed by engineering firm The Thrasher Group, took a county-by-county look at the addresses in the state that were classified as unserved or underserved broadband locations. This data was used to create preliminary routes along existing utility poles to identify how to bring fiber to those addresses in the future. These routes — and associated cost estimates — were developed to provide a roadmap for regional planning and development councils (RPDCs), counties, municipalities, and local internet service providers

(ISPs) to develop projects that could be further designed and constructed. A compilation of this information was provided to each of West Virginia's 55 counties.

The overarching goal of the study was to bring communities closer to closing the state's digital divide. With unprecedented amounts of funding available at both the federal and state levels, having shovel-ready projects is immensely important — those closer to being ready for construction are far more likely to be funded than projects still in their infancy. The data collected in this study provides a strong baseline for RPDCs, counties, and ISPs to show funding agencies the measurable outcomes their projects will have. This can increase the likelihood of receiving the requested funding and gives a much shorter timeframe for finalizing route designs and moving projects to construction.



14,824+

miles of preliminary routing developed



\$1.2 BILLION

in future estimated construction costs

In total, more than 14,824 miles of preliminary routing was developed through the course of this study, amounting to approximately \$1,227,841,007 in future estimated construction costs. This report provides details on how these routes and estimates were developed, the results found in each county, and how communities can use this information to bring expanded broadband service to their area.

BROADBAND OVERVIEW

PROJECT BACKGROUND

This project was made possible because of funding that [Regional Optical Communications \(ROC\)](#) received from the [Appalachian Regional Commission](#) and the [United States Economic Development Administration](#). Once secured, ROC worked with the [West Virginia Department of Economic Development's Office of Broadband \(WVOBB\)](#) to move the project forward.

The venture has been a long time coming, though, as ROC has been focused on planning and collaboration efforts to improve broadband in the state since its inception in 2019. Led by key staff from the [Region 1 and Region 4 Planning and Development Councils](#), ROC completed its first study of broadband needs in 2020, centered specifically on the 11 counties that comprise Regions 1 and 4. The data collected resulted in identification of more than 40 potential broadband implementation projects. With the preliminary information required to submit high-quality, competitive grant applications in hand, the study helped these counties be shovel-ready when broadband funding became available. This model proved extraordinarily successful. As a result of the information discovered in the study, ROC — working with [Generation West Virginia](#) and the West Virginia Office of Broadband — secured more than **\$16.6 million in state and federal broadband funding in 2022 alone** to support further planning and construction of several of the projects.

After seeing this tremendous success — and recognizing a need in counties beyond ROC's typical jurisdiction — the ROC team approached the WVOBB about the possibility of replicating this study on a statewide scale. The WVOBB recognized the value and agreed to be a partner on the project. Their primary role in this new statewide study was to provide ROC the most up-to-date broadband

coverage data available, which would be used as the baseline information for the new study. ROC and Generation West Virginia moved forward by applying for USEDA funding for the statewide effort in 2021, securing the grant needed for the work.

Additionally, the WVOBB worked with ROC and its project team to identify how this study could integrate into the state's larger broadband efforts. This primarily came in the form of coordination on the federal [Broadband Equity, Access, and Deployment \(BEAD\) Program](#). Overseen by the [National Telecommunications and Information](#)

[Administration \(NTIA\)](#), this \$42.45 billion program divvies out funding to each state to assist in planning, infrastructure deployment, and adoption programs related to high-speed internet access. Each state is required to provide a multi-part proposal, digital equity plan, and workforce plan to NTIA that details how they will use their

BEAD allocation. The ROC statewide study will be an important component of this process. One reason is its direct impact on providing some of the detailed information that was required in the [Preliminary Proposal Volume 1](#), which must identify the specific project locations to receive BEAD funding. With more than \$1.21 billion coming to West Virginia through this program — **the 11th highest allocation in the nation¹** — the quality of data included in this process will be vital to the state's success.

While the WVOBB was a helpful partner for the project, ROC engaged several other key entities throughout the process as well. Generation West Virginia, [The Thrasher Group](#), and [Lit Fiber \(Lit Communities\)](#) each played significant roles in the study. A detailed look at their roles is broken down in the [Methodology](#) section of this report.

With more than \$1.21 billion coming to West Virginia through this program — the 11th highest allocation in the nation — the quality of data included in this process will be vital to the state's success.

KEY CONCEPTS

While internet use is a daily task for most and the word “broadband” is heard often, it is important to note the specific definition of the term in the context of this project, as well as several other key concepts covered by the study.

Broadband can be generally defined as the transmission of wide bandwidth data over a high-speed internet connection². This study focuses specifically on ensuring sufficient broadband service is provided to every **Broadband Serviceable Address (BSL)** in West Virginia. A BSL is as “a business or residential location in the United States at which mass-market fixed broadband internet access service is, or can be, installed.”³ What is considered “sufficient broadband service” is based on specific speed levels. Addresses receiving internet speeds below 100 megabytes per second (Mbps) download and 20 Mbps upload are considered “underserved”, while anything less than 25 Mbps download and 30 Mbps upload is considered “unserved.”⁴ These were the two key metrics taken into consideration during the **ROC** study.

Also important to note, all of the routing planned in this study is specifically for the deployment of new fiber optic cable. **Fiber** is a material type used for transmitting internet service. It is made up of very thin strands of glass that use light to transmit data. There are several other delivery methods that are also capable of transmitting internet service — such as coax, copper line, fixed wireless internet towers, cellular networks, and satellite internet — but fiber was the chosen method for this study. Fiber networks offer significantly higher speeds, more reliable and secure connections, and

longer material lifespans than other methods. In fact, **a single strand of fiber offers 1,000 times more capacity than alternative communication solutions.**⁵ Because of these benefits, fiber was determined to be the most beneficial option for West Virginia’s communities. The fiber itself, though, must be operated by an internet service provider for a signal to be transmitted. The role of ISPs will be noted later in this report, along with greater detail on the fiber deployment planning process.

Another set of key concepts are middle mile, last mile, and fiber to the home (FTTH). According to the NTIA, **middle mile infrastructure** refers to “the connection between a local network, also called a ‘last mile’ connection, and the backbone internet network,” while **last mile** refers to “the technology and process of connecting the end customer’s home or business to the local network provider.” The ROC study at hand is considered a middle mile to last mile project with no lateral service drop. This means that the routes designed reach an end point but are not technically FTTH projects, as **FTTH** requires delivery and connection of fiber optics directly to the home itself. Once an internet service provider opts to serve a route from this study, their service drop will complete the FTTH connection.

As a comparison, broadband infrastructure can be thought of similarly to roadway infrastructure. In this scenario, the backbone network is the equivalent of a highway, while middle mile is similar to main county roads, last mile is like broadband’s version of streets, and lateral service drops are the equivalent of a home’s driveway.

¹ Biden-Harris Administration Announces State Allocations for \$42.45 Billion High-Speed Internet Grant Program as Part of Investing in America Agenda | National Telecommunications and Information Administration (ntia.gov)

² BroadbandUSA: Connecting America’s Communities (doc.gov)

³ About the Fabric: What a Broadband Serviceable Location (BSL) Is and Is Not — BDC Help Center (fcc.gov)

⁴ Microsoft PowerPoint - State_Local 2-Pager_Final 01.27.2022 (doc.gov)

⁵ A Guide to Fiber-Optic Cable Bandwidth (thenetworkinstallers.com)

IMPACT ON WEST VIRGINIA'S COMMUNITIES

BROADBAND STATUS IN THE STATE

With a mountainous terrain and countless rural communities, it comes as no surprise that broadband accessibility in West Virginia does not meet national standards. In fact, according to the [West Virginia State Broadband Plan 2020-2025](#), the state measures in the bottom tier – or in some cases dead last – across most broadband access and adoption measures. [US News and World Report's Internet Access Rankings](#) places West Virginia last on their list as well, with broadband subscription rate and access to Gigabit internet large factors. Further, [FCC](#) data recognizes more than 900,000 broadband serviceable locations (BSLs) in the state, but data shows 30.17% of those locations as unserved, receiving speeds under 25/3 Mbps. This is the second highest percentage of unserved locations in the nation, ranked only slightly below Alaska's 31.97%.⁶

These numbers are significant and have deep implications for residents of the Mountain State. West Virginia has long struggled to have a diversified, stable, and growing economy. The state has experienced particularly devastating impacts over the last several decades through the decline of the coal industry, a wavering natural gas trade, the ongoing opioid epidemic, and the COVID-19 pandemic. With so many facets of the business world now reliant on internet access – from entirely remote careers and video conferencing capabilities to online product delivery and service models – the lack of reliable broadband access is a key factor in West Virginia's economic development landscape. Not only that, broadband service is also imperative for adequate access to educational resources, healthcare services, government programs, and social connections.

MAPPING AND DATA QUICK FACTS

- » West Virginia is second in the Nation for percentage of unserved locations at 30.17%, following Alaska's 31.97%.
- » West Virginia is 12th in the Nation for most unserved locations totaling 271,623.
- » West Virginia's per capita allocation is among the highest in the nation at \$4,458 per unserved location.
- » In the latest update of the National Broadband Map, the FCC identified 900,408 Broadband Serviceable Locations (BSLs) in West Virginia. (900,408 BSLs /271,623 unserved locations = 30.17% unserved)
- » West Virginia gained 86,860 unserved locations in the latest version of the National Broadband Map accounting for a total of 271,623 unserved locations.
- » West Virginia gained the second highest number of unserved locations in the Nation in the Version 2 release of the National Broadband Map, following North Carolina at 114,718.

From: BEAD Allocations Announced June 26, 2023-West Virginia's Allocation Exceeds \$1.2 Billion - WV Broadband : WV Broadband

⁶ BEAD Allocations Announced June 26, 2023-West Virginia's Allocation Exceeds \$1.2 Billion - WV Broadband : WV Broadband

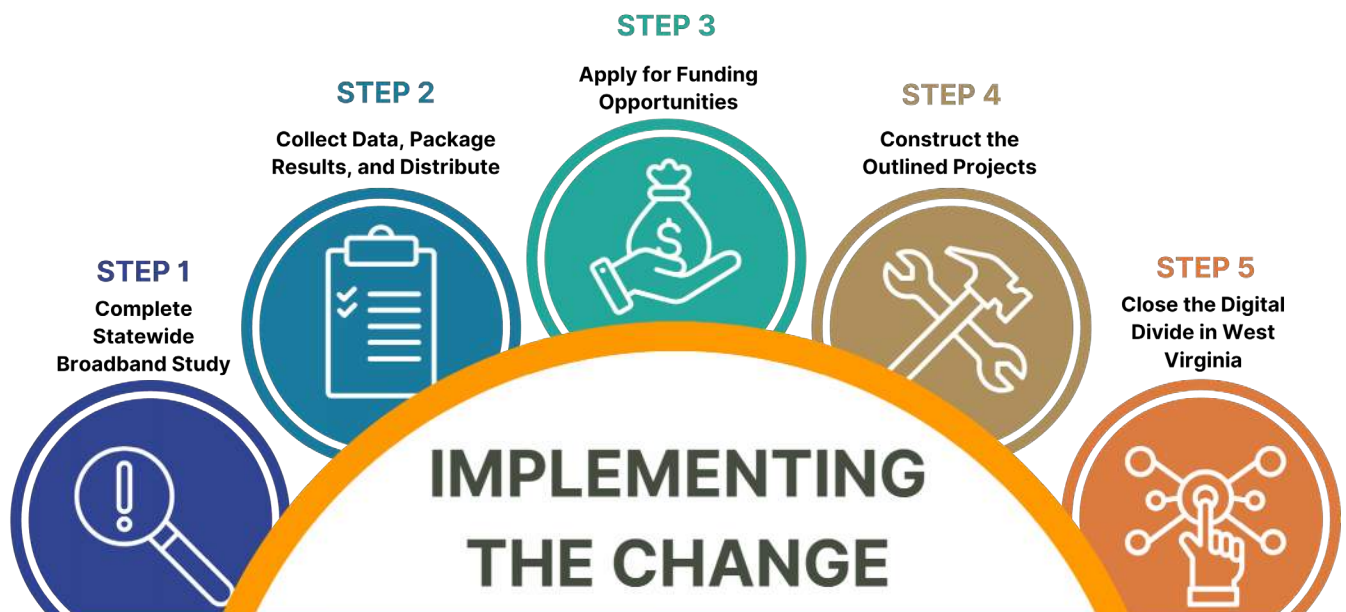
IMPLEMENTING CHANGE FOR THE FUTURE

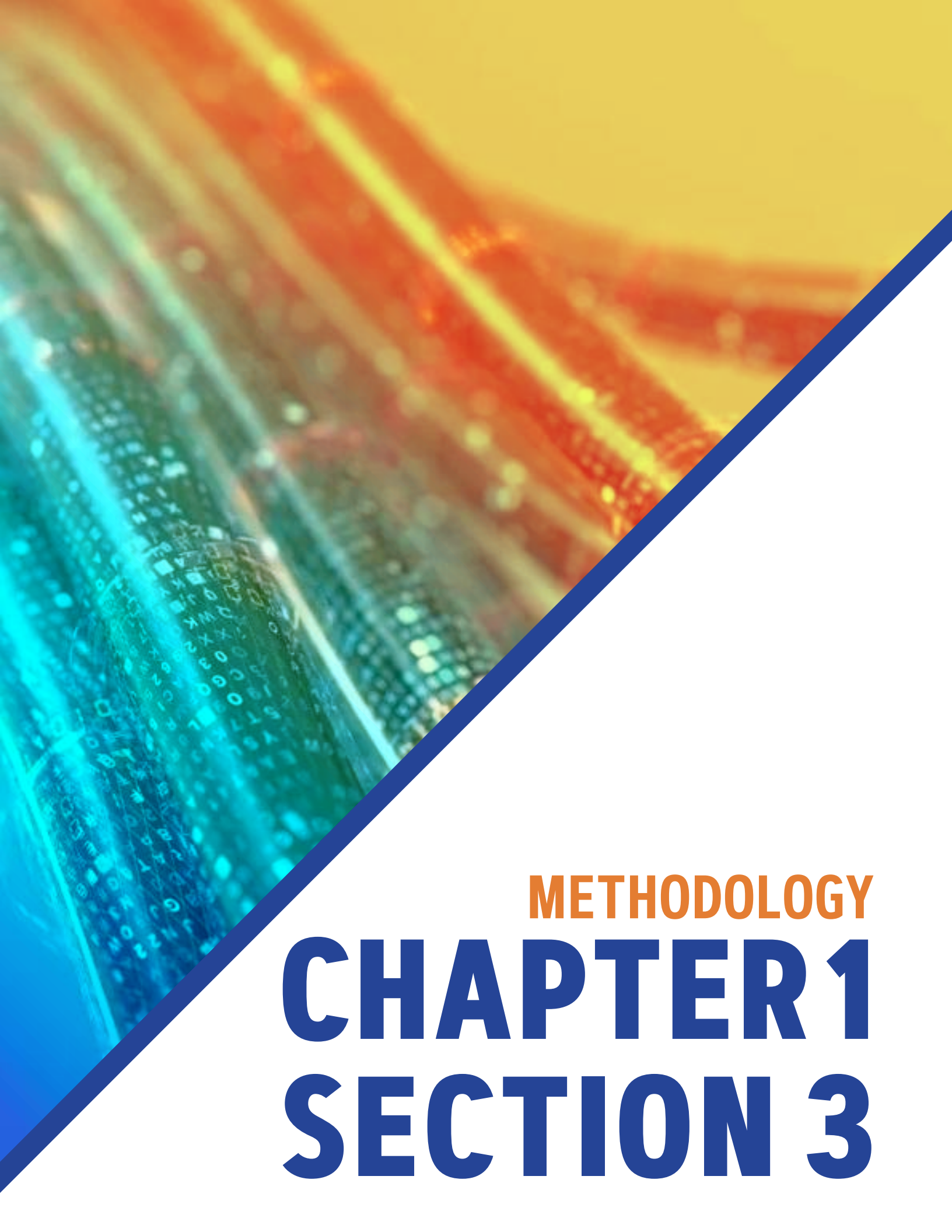
There has never been a more apt time to address these concerns. One of the many outcomes of the global COVID pandemic was an increased awareness towards the importance of internet accessibility. Experiencing a time when everything from healthcare consultations to grocery orders needed to be completed online led to a vast increase in federal funding available to address connectivity issues. West Virginia recognized the growing availability of opportunities, worked to position itself to capitalize on the moment, and maximized funding allocations for the state.

ROC's statewide broadband study will play a vital component in the process moving forward. The data gleaned from the study was packaged and distributed to each county. This information provides a clear idea of what broadband implementation projects are feasible in their area. It gives the needed resources for counties, municipalities, regional planning and development councils (RPDC), internet service providers (ISP), and other entities to apply for the federal and state funding opportunities coming available, making it possible to construct the outlined projects and truly close the digital divide in West Virginia. Without this grant assistance, the cost to construct these projects is nearly insurmountable. Rough terrain and sparse population densities in

so many areas of the state make it economically unfeasible for ISPs to expand their territory at their own cost. Federal funds, however, will help remove a substantial amount of financial burden from communities and ISPs, giving a much stronger ability to deploy projects in every part of the state.

Local leaders will be instrumental in making that happen. It will be down to the RPDCs, county commissions, economic development authorities, and ISPs to operationalize the data provided in this study. This will be a collaborative effort, starting with the assistance of the entities involved in the study – including ROC, The Thrasher Group, Generation West Virginia, and Lit Fiber – to ensure the data provided is understood and next steps are clear. This task has been started through virtual presentations with each RPDC and follow-up meetings with individual entities to explain their results. Ultimately, though, it will be the leadership of the counties and ISPs themselves that moves implementation projects forward to secure funding and go to construction. The work West Virginia communities do to deploy reliable broadband service will have an immeasurable impact on the state for generations to come, facilitating better access to employment, education, healthcare, government services, and connection to others.





METHODOLOGY

CHAPTER 1
SECTION 3

ENTITIES INVOLVED



REGIONAL OPTICAL COMMUNICATIONS

REGIONAL OPTICAL COMMUNICATIONS

Regional Optical Communications (ROC) orchestrated this study. Comprised of both public and private-sector representatives, ROC has historically focused on broadband efforts in a multi-county region. After completing a broadband study of their core area that proved highly effective for generating fundable broadband deployment projects, ROC identified the potential for taking the work statewide. To make it happen, ROC and partners secured funding from the Appalachian Regional Commission (ARC) and United States Economic Development Administration (USEDA).

Once funding was secured, ROC contributed several more key elements for project success. First, their proven methodology from the initial study was carried over as the basis for how to conduct the statewide effort. Additionally, ROC played an integral role in both the front- and back-end user experience of the study itself. The ROC staff members who led the charge for this project, John Tuggle and Jason Roberts, are executive directors of the Region 4 and Region 1 RPDCs respectively. As such, they and their staff members used their peer networks to contact the regional planning and development councils across the state to solicit existing data upfront in order to incorporate it into the baseline information used for the study. Input from Mr. Tuggle and Mr. Roberts was also taken into account when determining the format of the final deliverables, as they have a deep understanding of how the RPDCs and counties will use the information based on their personal experiences.

THRASHER

THE THRASHER GROUP

While ROC provided oversight for the entirety of the study, The Thrasher Group (Thrasher) was responsible for project execution. A West Virginia-based engineering, architecture, and field services consulting firm, Thrasher was hired through a competitive, qualifications-based process to serve as the engineer and project manager for the study. As such, Thrasher's team — led by Jeffrey Hartley and Chad Riley — coordinated the entirety of the project. This included data collection, GIS mapping, preliminary routing, cost estimation, stakeholder coordination, integration into the state's BEAD plan, development of this report, and overall management of the project. Details on how Thrasher approached each of these topics will be covered in greater detail later in this section.

GENERATION^{WV}

GENERATION WEST VIRGINIA

Generation West Virginia (GWV) is a statewide organization dedicated to attracting, retaining, and advancing young people in the Mountain State. They have worked with ROC on broadband development efforts since 2020 and continued that partnership through this project. With vast expertise in the grant writing field, the broadband team at GWV was integrated into this project at both its beginning and end. To start, they assisted ROC in pursuing and securing the initial ARC and USED A funding used to execute the study. Moving forward, they will be instrumental in helping regions, counties, communities, and internet service providers pursue funding to bring projects to life — GWV will offer pro bono grant writing services on a first-come, first-served basis to those interested in using the data from this study in grant applications in the future.



Lit Communities

LIT FIBER (LIT COMMUNITIES)

Lit Fiber (Lit) works with municipalities and local governments to build the infrastructure needed to deliver the highest levels of future-proof connectivity to communities across the US. For this project, Lit’s main task centered on community outreach. Primarily, this was seen through the development, advertising, and execution of informational webinars. Lit’s team put together the materials for each webinar — which will be discussed later in this document — with a goal of providing RPDCs, county commissions, and local stakeholders with an overarching understanding of what the study accomplished and what materials they would be receiving upon its completion. Lit also participated in the webinars, where they were able to offer technical expertise from the perspective of an internet service provider, as needed.



WEST VIRGINIA Office of Broadband

WEST VIRGINIA OFFICE OF BROADBAND

The West Virginia Office of Broadband (WVOBB) was created to support broadband development in the state and serves as the main hub for its broadband data. As such, the primary role of the WVOBB for this project revolved around data supply. To start the project, the WVOBB provided Thrasher with their most up-to-date address data to ensure accuracy in the study. They also provided ongoing input on projects that may not yet be reflected in the data but recently received funding, so that the most up-to-date information was taken into consideration. Additionally, WVOBB connected Thrasher with Tilson, the state’s broadband engineer, in an effort to align this study with Tilson’s work on the West Virginia BEAD plan. While Thrasher’s work remained primarily focused on executing the scope needed for a statewide connectivity study, the Thrasher team incorporated specific additional details that allowed the study to contribute to the larger efforts of the BEAD plan — which is required by the NTIA before the state’s \$1.2 billion is released — which helped secure funding for future West Virginia broadband projects.

DATA COLLECTION

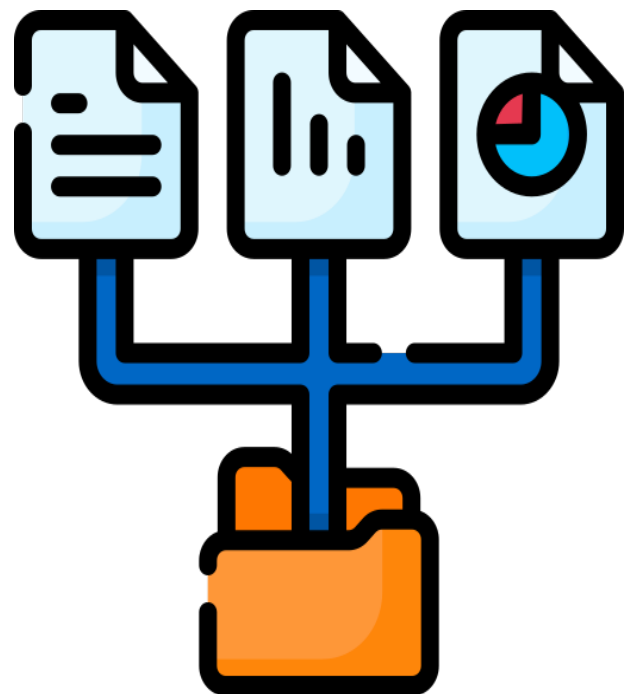
The first step in the project process was data collection. This was arguably the most important piece of the puzzle and a multi-faceted step. Thrasher worked with several entities to gather the most up-to-date information available to use as a base for the routing and cost estimate deliverables created through this study.

This was primarily a collaboration with the [West Virginia Office of Broadband \(WVOBB\)](#). As the state’s official broadband oversight entity, the WVOBB has access to West Virginia’s portion of the [Federal Communications Commission National Broadband Map](#). This map is made up of two separate sets of data – the Fabric and broadband availability. In the simplest terms, the Fabric shows all broadband serviceable locations (BSLs) – addresses that can be connected to the internet – while the broadband availability data shows what level of broadband service, if any, currently exists at each BSL. Both of these datasets are updated by the [FCC](#) approximately every six months. The WVOBB provided [Thrasher](#) with the most recent version of the map at the time of the study’s start (the BTA map). This map served as the basis of information during the routing process.

While the BTA map provided the most accurate information available at the outset, additional data was incorporated to increase its precision. The largest component of this was the integration of funded projects, so that these unbuilt but planned routes could be accounted for in the study. The WVOBB proved incredibly helpful during this process. They provided information on a variety of federally funded projects, such as the [NTIA Middle Mile Broadband Infrastructure Grant Program](#) and the [Appalachian Regional Commission’s Partnerships for Opportunity and Workforce and Economic Revitalization \(POWER\) Initiative grant](#). They also provided input on projects which had received funding directly from WVOBB, including those funded through the state’s Line Extension Advancement and Development (LEAD), Major

Broadband Project Strategies (MBPS), and GigReady programs.

The last step of the data collection process went beyond the state level to directly engage communities, making an effort to capture plans and studies that may have been done independently or received funding through a non-federal or non-state avenue. To accomplish this, [ROC](#) sent a letter to [regional planning and development councils \(RPDCs\)](#) to explain the project their team was undertaking and requested information be submitted on any broadband studies or plans completed in their region in recent history. After this initial contact, The Thrasher Group reached out to all 55 of the state’s county commissions with the same general information and request. These efforts yielded responses from several of the entities contacted, each of which provided Thrasher with information and GIS files on their current broadband landscape for incorporation into the base map. Several ISPs were contacted during this process as well, but because their information is proprietary, it was not shared for the study.



MAP CREATION AND ADDRESS CLASSIFICATION

COUNTY MAPS

Thrasher's team put all of this data into [Esri](#) — a geographic information system (GIS) — which allowed all of the data to be directly tied to specific geographic points on a map. Interactive maps were created for each county in West Virginia using the information provided by the [WVOBB](#) as the base of the maps. Data was then compiled in multiple layers that could be toggled on and off depending on what information was necessary during each step of the project.

DATA LAYERS

- **Targeted Addresses:** Those receiving less than 100/20 Mbps; addresses needing broadband service
- **Unserviceable Targeted Addresses:** A location receiving less than 100/20 Mbps but without the infrastructure available that is needed to bring service to the address
- **Other Addresses:** A location that already met the speed guideline to qualify as served or where grant funds were already allocated to that address
- **Existing Routes:** Places where known broadband routes existed
 - » *This was largely based on the information available through legacy files of historical GIS data and was used to help identify where new broadband routes needed to begin and end. Additionally, if a route was known to be funded — even if not yet built — it was considered existing.*
- **Proposed Routes:** Any broadband route that was planned but not yet constructed; where applicable a separate Proposed Buried Routes layer was also added
 - » *This includes the routes Thrasher developed throughout the study.*
- **RDOF Zones:** Areas covered by Rural Digital Opportunity Fund (RDOF) zone funding
 - » *RDOF is a previous broadband funding initiative through the FCC in which ISPs bid on opportunities to build out their networks in specific locations. There are large swaths of RDOF-eligible areas in West Virginia — publicly available data was used to populate these areas on their own map layer for this study. Further explanation of why this was important and how it impacted the routing process is included in the next section of this report.*

ADDRESS CLASSIFICATION

The address classification process was the initial step in accurately populating these maps, as addresses were the base information upon which all other layers were reliant. The initial information from WVOBB had addresses classified in one of two ways: *Targeted* (those not meeting 100/20 Mbps speeds) and *Other* (those considered served or where funds were already in place for the location to become served). Thrasher staff did not update any address classifications based on speeds. They did, however, make classification adjustments based on new funding announcements and research into each address's BSL status.

As announcements were made public for newly funded projects, [Thrasher's](#) team updated the base map to reflect the addresses in these areas as *Other* to indicate it would already be served. This was done for two key reasons. First, any address that already had federal dollars allocated to it became automatically ineligible to receive additional federal funding. Second, the goal of [ROC's](#) study was to create the most accurate picture of West Virginia's current broadband landscape possible. Thus, including everything already accounted for under a funded project helped paint that picture

and reduced the chances of duplicating the already planned route in a future project.

Next, the focus moved to Targeted Addresses. While the existing data from [WVOBB](#) indicated that these addresses did not have adequate broadband service, there was not a distinction of whether the address could receive service. To determine whether service was truly needed, these targeted addresses were further classified into *Serviceable* or *Unserviceable*. This was done to help ensure that only broadband serviceable locations (BSLs) were being routed to, which would save time, effort, and grant allocations down the road. To do this, Thrasher's team used in-house aerial imagery to inspect every Targeted Address. The aerial imagery alone could not determine whether a structure was a home/business/etc., so the existence of utilities was used to help identify these facilities. If the structures appeared to be sheds (or other accessory buildings adjacent to houses), barns, dilapidated structures, fields, etc., they were identified as Unserviceable Targeted Addresses and not included in the routing portion of the study. All Targeted Addresses which clearly had power utilities associated with the structure remained as Targeted Addresses.

 <h3 style="text-align: center;">TARGETED ADDRESSES</h3> <hr/> <p style="text-align: center;">Do not meet 100/20 Mbps speeds</p> <p style="text-align: center;">Do not have adequate broadband service</p> <p style="text-align: center;"><i>Serviceable - Homes, businesses, or structures with power utilities</i></p> <p style="text-align: center;"><i>Unserviceable - Sheds, accessory buildings, barns, dilapidated structures, fields, etc.</i></p>	 <h3 style="text-align: center;">OTHER ADDRESSES</h3> <hr/> <p style="text-align: center;">Are currently being served</p> <p style="text-align: center;">Have federal dollars allocated to become served</p> <p style="text-align: center;"><i>Including everything already accounted for under a funded project reduced the chances of duplicating the already planned route in a future project.</i></p>
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ROUTING

ESTABLISHING PARAMETERS

Before the preliminary routes could be developed, standard parameters were defined. The most important consideration was the decision to use existing power routes as the primary guide for designing new fiber routes. This was chosen for several reasons. First, it provided a more cost-effective option overall — West Virginia’s power routes are typically aerial networks, which are generally less expensive to utilize than underground utility placement. Using power poles was also the most scalable option for a project of this magnitude — aerial imagery could be used to follow the routes via desktop review, as opposed to conducting a full field study of the state, which would be far more costly and time intensive. Further, power routes were found to help provide the most accurate data in terms of footages and expected cost, particularly when compared to roadways. While many high-level broadband studies do use roadways for their routing, West Virginia’s winding roads have a direct impact on the footages that would be produced, thus increasing the anticipated cost of a project. There are also a large portion of roadways in the state which do not have power poles directly following them, so while roadways and power poles may provide similar footages in other states, it was not found to be as accurate a measure in West Virginia.

Another parameter established at the beginning of the process was where a route should generally terminate on a property. Because there are a variety of different internet service providers who may be involved in the actual execution of the projects that result from this study, [Thrasher](#) was mindful that each entity operates differently for the last mile portion of their projects. Therefore, routes were drafted to within 250 feet of each serviceable address. It was expected that the ISP would cover the remaining distance to the home through their service drop.

DESIGN PROCESS

Once the baseline parameters were set, the preliminary routing process began. Routes were completed on a county-by-county basis, with a singular person responsible for the entirety of a county’s initial

design. In order to maintain a level of consistency and familiarity with the vast amount of data in each county, the Thrasher staff member who performed the initial address classification of the county also performed the preliminary route development there.

The assigned staff person — a Routing Specialist — began by analyzing the existing telecommunication routes in the county, using the Existing Routes layer on the [Esri](#) map developed for the study. This was overlaid with the Targeted Addresses layer. The Routing Specialist then identified a serviceable location and found an existing route nearby to extend to that location. This was done throughout the entire county. During the process, a distinct effort was made to ensure that all newly proposed routes connected to a currently existing route. This was done to avoid creating “islands” of service.

A focus on feasibility — and cost effectiveness — drove the vast majority of decisions during the routing process. For example, if there were clearly multiple options on how to route to a specific address, the route that offered the shortest amount of linear feet while still being routed on power poles was the option chosen. Similarly, the Thrasher team was careful to match existing conditions in an area. While the default option was aerial routing, if the existing power source in an area was underground, the fiber route developed for that area was also underground. The same was true for existing broadband routes — if a county submitted a study or existing infrastructure route during the data collection process that was specifically routed underground, that was reflected in the routing conducted through this study. This method was adopted to match existing infrastructure and maximize the feasibility of constructing the proposed routes. It should be noted, however, that field verification was not performed to determine whether available conduit existed.

Another part of the feasibility focus involved periodic checks on potential make-ready efforts. During the design process, Thrasher’s Routing Specialist would perform a spot check using [Google Earth](#) Street View,

where possible, to get a rough idea of the status of the power poles in the area. This would involve reviewing how many attachments already existed on the pole and if it appeared to have additional available capacity for a new line in the communications space. Typically, poles with more attachments have more expensive make-ready costs because it takes more to accommodate a new line. In some cases when the communication space does not have capacity available, the entire pole will need replaced with a taller one to accommodate the increased number of lines, resulting in a higher make-ready cost.

Consideration of [Rural Digital Opportunity Fund \(RDOF\) zones](#) also played a part in the routing process. As mentioned previously, a map layer was provided for each county that highlighted anywhere considered an RDOF zone, where federal RDOF funds were already awarded for broadband expansion. This layer was important to incorporate from a logistics and feasibility perspective, but remained a complicated piece of the puzzle. Addresses that exist in RDOF zones had been designated as Other by [WVOBB](#) in the initial address data provided, indicating that they did not need served.

As mentioned, any addresses already receiving federal funding would not be eligible to “double dip” and receive additional federal funding. Because plans were in place for the addresses to become served, new routes did not need established. These RDOF zones, though, were created based on Census Blocks. By design, Census Blocks have varied and irregular shapes and sizes, and not every Census Block in an area qualified for RDOF. Because of this, there were many places found to have small pockets of unserved addresses within what appeared to be largely served communities. [Thrasher’s](#) team used the RDOF zone data layer to determine the appropriate routing for addresses in these pockets to ensure they were not missed in the process.

LIMITATIONS

As with any study, there were limitations to the process. While Thrasher and [ROC](#) made every attempt to get the most updated address and routing information available, the project team was reliant on local partners

to provide input on the most recent data. Not every [regional planning and development council \(RPDC\)](#) or county commission responded to requests for input, so it is likely that some planned or recently funded routes did not get incorporated into the base map. The study was also a multi-month process, so additional build-outs of broadband lines could have occurred after the initial data was received, which would not be reflected in the Existing Routes layer.

There were also instances in which best judgment had to be used to interpret existing data. For example, if all addresses in an area were provided to Thrasher with the designation of Other — indicating that they were served — but Thrasher did not have record of an existing route there, the assumption was made that a route did in fact exist. Conversely, assumptions on right-of-way (ROW) access were left out of the study - in order to keep the scope of work manageable, research on ROW ownership was not included as part of the process. While many power companies already have communication lines included in their ROW agreement with residents, some areas will almost certainly need approval from the resident before a new communication line can be added. Determination of ROW access will be left to the entity that pursues construction of a project, and they will have to identify if or how much the ROW impacts its feasibility.

Last, there is the limitation of human implementation. This study was not an automated process — every piece of the project was examined by individuals, so human error is a possibility in the outcome. While automated programs would reduce that chance, the use of human judgment allowed Thrasher’s team to go beyond simply choosing the shortest route possible. Rather, this allowed Thrasher to follow the power routes specifically and attempt to follow power-only poles or joint-owned poles. This was done by reviewing aerial imagery to identify which poles had transformers, which was assumed to indicate they were owned by the power company. An automated program wouldn’t be able to provide that level of judgment without having specific pole data points, which were only available in some areas of the state. While that system made human error a possibility, it allowed for a much more detailed and thorough end product.

COST ESTIMATING

Once a county's routes were outlined and reviewed, the cost estimating process began. The estimates were developed to provide a rough view of what funding would be needed to get the entire county served, as well as an idea of what local match funding might need to be generated. It is not broken down by route or specific sections but provides overall unit costs per item and per mile so that approximate costs can be developed when a specific project area is later identified.

FIVE MAIN CATEGORIES FACTORED INTO COST ESTIMATES:

ENGINEERING

- Covers anticipated needs related to survey, engineering design, development of construction plans, and the bidding process
- **Allocated \$5,500 per mile**

PERMITTING, EASEMENTS, AND ENCROACHMENT ACQUISITION

- Covers anticipated permitting needs — particularly environmental and West Virginia Division of Highways permits — as well as fees associated with the easement and encroachment processes and right-of-way research
- **Allocated \$1,500 per mile**

POLE PLACEMENT AND MAKE-READY

- Covers the anticipated needs around adjusting existing pole attachments to allow adequate room for a new fiber line or the replacement of a pole should more space be needed to add a fiber line
- **Allocated \$15,000 per mile**

AERIAL CONSTRUCTION LABOR

- Covers the labor and materials required to construct aerial fiber routes
- **Allocated \$50,000 per mile**

UNDERGROUND CONSTRUCTION LABOR

- For routes specifically designed as underground fiber, covers associated construction costs to place the routes underground
- **Allocated \$150,000 per mile**

Costs for these items were developed based on industry experience and meant to serve as an average amount to anticipate the need for the entirety of the county. For example, pole make-ready costs may be less expensive than the allocated \$15,000 per mile in the rural areas of a county, but this extra budget will likely be needed to help cover more expensive make-ready costs in downtown areas.

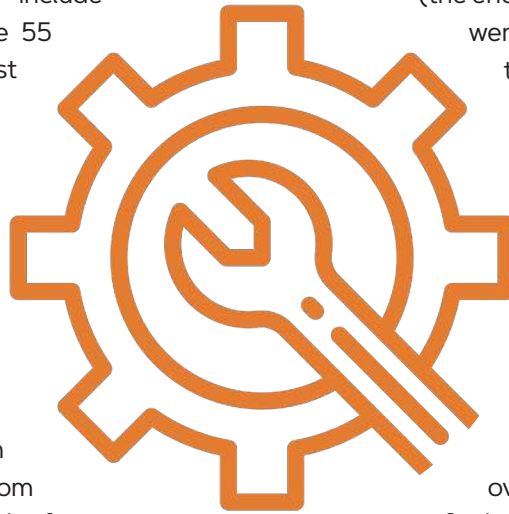
Additionally, several soft costs were factored into the estimating process. Because the build-out process for these projects will likely be lengthy, a 10% construction contingency was added. This

was intended to help cover the varying cost of materials and labor that may arise over the next several years, as well as provide a cushion for unexpected costs that may arise. A 1.5% legal fee and a 2% administrative fee were also taken into consideration so that items like grant administration, legal counsel, and other similar tasks would be included in the final cost. These are pieces that were suggested by the [ROC team's Region 1 and Region 4 RPDC members](#), as they are often overlooked but can majorly impact a project's budget. Factoring them in from the beginning was done to help ensure the entire cost of a project would be understood and pursued from the outset.

QA/QC

DOCUMENTATION

Every piece of the project had a quality-assurance and quality-control element assigned to it to help provide the best product possible. A tracking document was set up at the beginning of the project to note the progress being made and who from the [Thrasher](#) team was responsible for each task. The document was broken down to include the following data for each of the 55 counties: what Routing Specialist was assigned to the county, who was responsible for reviewing the route, the percentage of routing complete, the percentage of review complete, and any questions that needed answered regarding the county's routing. This information was used in weekly internal meetings during which the Thrasher team reviewed progress and questions from the previous week and planned tasks for the upcoming week. It was also instrumental in driving project discussion with [ROC](#) during bi-weekly progress meetings. ROC also had access to an interactive, web-based map where live progress could be seen throughout the process.



ROUTING

As the main portion of work and the area that yielded the most data points, the routing process had a heavy layer of quality control integrated. Keeping the Routing Specialist consistent was a vital quality-assurance measure to put in place since such a vast amount of information was held within each county.

Therefore, the Routing Specialist who performed the address classification used their existing familiarity with the county to perform the same county's routing. When that initial Routing Specialist deemed the county complete, a different team member would step in to review the routes identified. This allowed a fresh set of eyes to check the work, bringing no pre-conceived knowledge or assumptions about the area.

This second team member specifically followed all of the routes that the original Routing Specialist laid out, examining both the routes themselves and all Targeted Addresses in the county. This process was completed using a grid system to ensure no areas were missed. Reviewers verified that the routes were all on poles and all routes reached the last address in the area (the end-of-line user), ensuring no addresses were left off the county's routes. After the second team member completed their review, a third team member performed a high-level look at the county, turning off all map layers except for Targeted Addresses and Proposed Routes. This step was designed to identify if any redundancies existed and help ensure the most cost-effective routes were being used. Once the process was complete, Thrasher's overall project manager provided a final review of all information. The project manager also provided a high-level review to determine if any routes in the county at hand could connect to routes in a neighboring county to allow for a regional approach for bringing broadband service to the area in the future.

COST ESTIMATES

To help provide the highest-quality cost estimates possible, this portion of work was not started for a county until all stages of its routing review were complete. The unit pricing used for the estimates was also verified with both the West Virginia Office of Broadband ([WVOBB](#)) and [Tilson](#), the WVOBB's engineering consultant. These two entities used their experience in the state and across the broadband industry to verify the unit pricing would provide an accurate picture of cost for the counties. Several internet service providers were also contacted for their input on accuracy of market value. Additionally, representatives from [ROC](#) were consulted as to what amounts of soft costs should be factored into the estimates to assure the full picture of a project was taken into account.

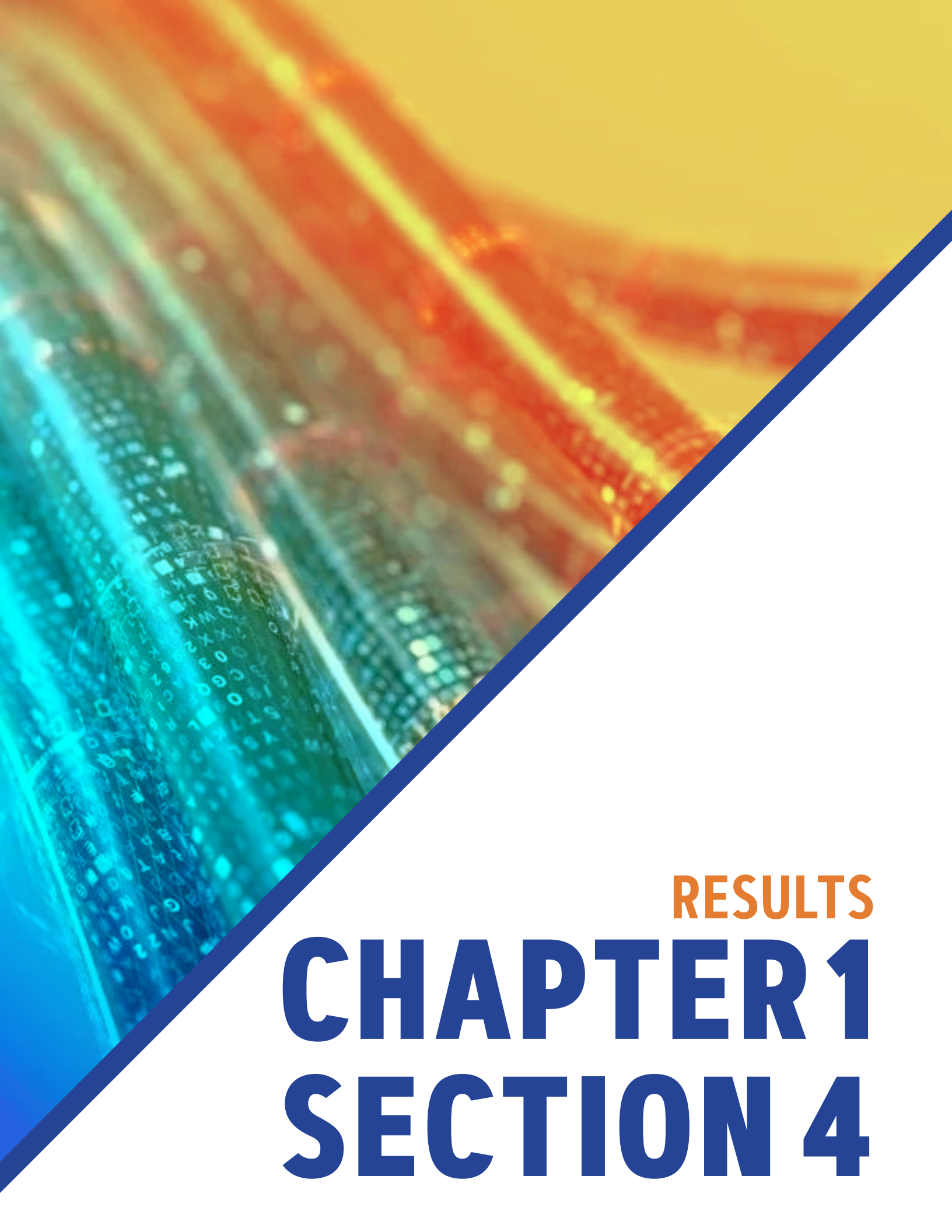
COMMUNITY ENGAGEMENT

Last, but certainly not least, it is important to note that community engagement efforts were made throughout the project. As discussed previously, outreach efforts on the front end consisted of contacting [RPDCs](#) and county commissions to solicit existing and planned broadband infrastructure across the state. As the study began coming to an end, the community-outreach process was revived in an attempt to re-engage communities ahead of their receipt of the data collected. This primarily came in the form of informational webinars.

First, a pre-recorded introductory webinar was created and distributed to all 11 RPDCs. This video served to re-introduce [ROC](#) and the study at hand, the importance of broadband to the state’s communities, what deliverables would come from the study, and

the next steps that may need taken to use the data. Then, a live webinar was held with each individual RPDC — and additional community stakeholders invited by the RPDCs — to further explain the study, provide a high-level overview of the results for each of that RPDC’s counties, and what to expect from the final deliverables. These were interactive webinars that allowed for question-and-answer throughout the process, and participants were provided with a recording of the webinar afterwards to share with others as needed. These presentations were created by the team at [Lit Fiber](#) and had participants from all of the ROC study team entities: Lit Fiber, Regions 1 and 4, [The Thrasher Group](#), and [Generation West Virginia](#). The webinars were held on the following schedule:

WEBINAR DATE	REGION	COUNTIES
July 17	Region 9	Berkeley, Jefferson, Morgan
July 17	Region 11	Brooke, Hancock
August 7	Region 8	Grant, Hampshire, Hardy, Mineral, Pendleton
August 7	Region 10	Marshall, Ohio, Wetzel
August 21	Region 1	McDowell, Mercer, Monroe, Raleigh, Summers, Wyoming
August 21	Region 4	Fayette, Greenbrier, Nicholas, Pocahontas, Webster
August 28	Region 2	Cabell, Lincoln, Logan, Mason, Mingo, Wayne
August 28	Region 7	Barbour, Braxton, Gilmer, Lewis, Randolph, Tucker, Upshur
September 11	Region 6	Doddridge, Harrison, Marion, Monongalia, Preston, Taylor
September 11	Region 3	Boone, Clay, Kanawha, Putnam
September 18	Region 5	Calhoun, Jackson, Pleasants, Ritchie, Roane, Tyler, Wirt, Wood



RESULTS

CHAPTER 1
SECTION 4

DELIVERABLES PROVIDED

MAPPING AND ROUTES

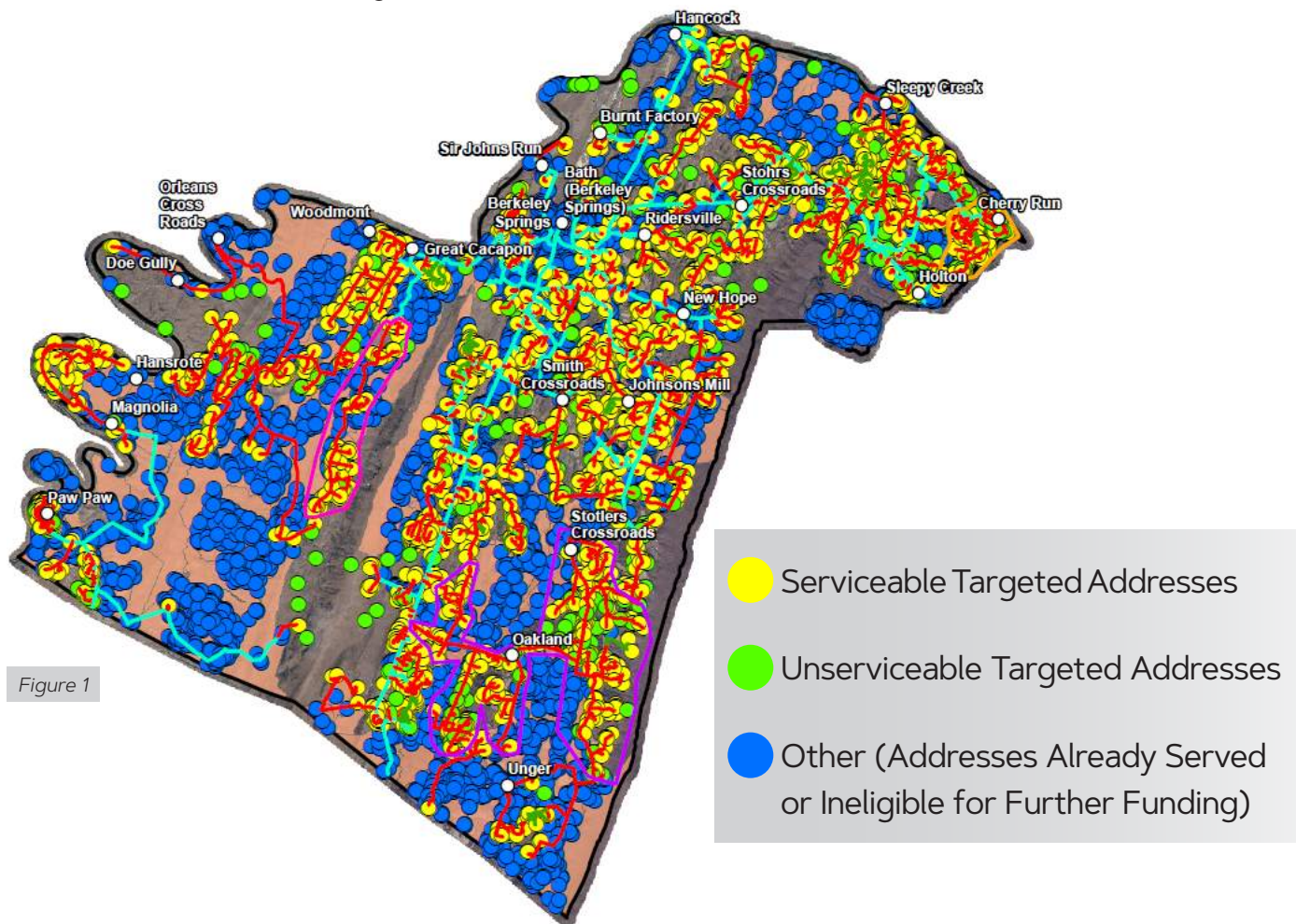
The main portion of deliverables from this study was focused on maps of the addresses and routes in each county. This information was distributed in three different file formats: PDF, KMZ, and shapefiles. These documents will be instrumental in helping a regional planning and development council (RPDC), county, or internet service provider (ISP) understand the current broadband landscape in the county — from what already exists to where new service is needed — so that projects can be developed and built out to the remaining unserved areas.

PDFs

Two PDFs were distributed for each county. These documents provide the highest-level overview of the data collected. The PDF titled “OVERALL” gives a snapshot of the county’s broadband framework. This includes all known existing fiber routes, the

proposed fiber routes determined in the study (including proposed buried fiber routes if applicable), as well as every address and its classification. The address classifications (see Figure 1) include Targeted Addresses that indicate broadband serviceable locations; Unserviceable Targeted Addresses that are not routed to; and Other Addresses that indicate places already served or those that are ineligible to receive further funding. The PDF map also highlights RDOF areas and shows outlines of three sample potential projects.

A second PDF titled “SHEETS” was produced for each county as well. Because of the large quantity of data being displayed, this document breaks the county’s overall map into several different pages, with a zoomed in view of different sections of the county featured on each. This allows for a slightly more detailed look at the routes and addresses in each area.



KMZs

Though the SHEETS document provides a deeper view than the OVERALL map, PDFs are static documents that can only show so much information. In order to provide a more interactive experience and allow for complete exploration of the highly detailed data available, each county also received a KMZ file containing the same information as the PDFs.

KMZ files store data that is tied to geographic points on a map and can be viewed in GIS applications, with the most common being Google Earth.

RPDCs and county staff can review their KMZ file using [Google Earth](#) to take a complete look at each piece of data collected through the study — all of the routing, addresses, and [RDOF](#) areas are shown, as well as sample potential project areas. While the KMZ map will open to the full county image, users can zoom in to a much more micro level, allowing a view of every individual address point and fiber route in the county. These data points are also interactive — a route can

be clicked on to display a text box showing whether it is a proposed or existing route and the length of that route. Each address point can also be clicked (**see Figure 2**) to display the municipality in which the address is located, the street it's on, the point's address classification (Targeted, Unserviceable, Other), and its latitude and longitude.

The information shown in the KMZ file comes straight from the map layers developed in the study — each layer created during the routing process is included as its own layer on the KMZ. The layers can be turned on and off to display only certain information at a time. For example, should a county want to review only the proposed fiber routes identified, the Existing Fiber, Targeted Addresses, Unserviceable Targeted Addresses, Other Addresses, and RDOF layers can all be toggled off to limit the information being viewed. Any combination of the layers can be seen together to help counties, RPDCs, and their teams understand and work with the information they've received.

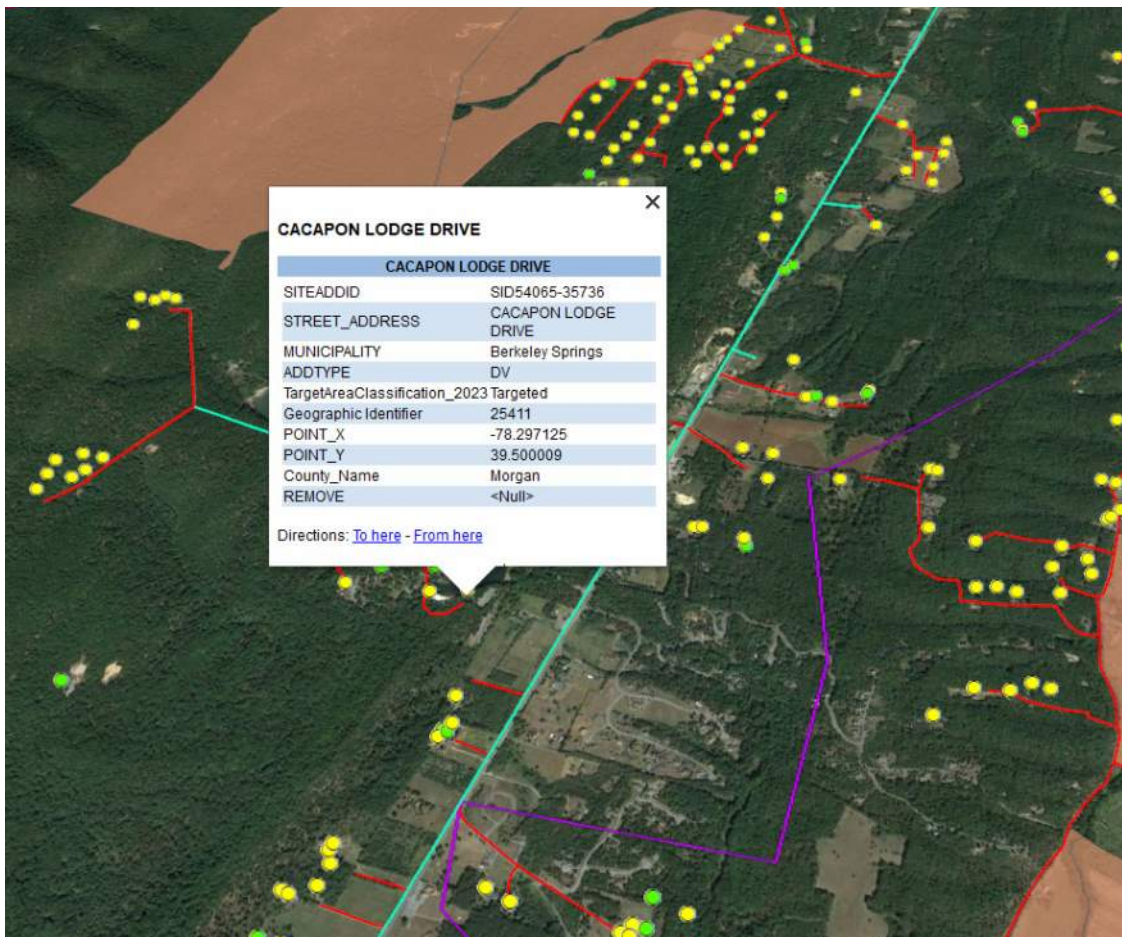


Figure 2

SHAPEFILES

Last, but not least, every county got multiple shapefiles containing all of their data. Shapefiles (SHP) are another type of geospatial data format – every layer on the map comes from its own shapefile. These files provide the raw data collected during the study, which lives in the shapefile and gets exported to create the KMZ and PDFs. Should changes need to be made to the data, the edits would need done directly in that layer’s shapefile. For example, if a county reviews their routing and notices that an existing route needs to be added to the map, the route would have to be added to the Existing Routes shapefile specifically. This can be done in programs like [Esri](#) or other similar GIS and design applications. A GIS or engineering professional is typically used to access and edit shapefiles – [Thrasher](#) can be contacted for assistance should the need arise. Additionally, it should be noted that if an entity needed to share information with an ISP or engineer during project development, they would need the shapefiles specifically.

SAMPLE PROJECTS

Every county was also supplied with three sample projects. These are meant to be an example of how [RPDCs](#), counties, or ISPs may want to break up the countywide information into realistically buildable projects. These samples are just that – an example. While they are set up with all the information needed to pursue the next step towards completing a project, they are by no means an area that must be pursued or that is being recommended for pursuit or priority. Rather, they are outlined as an example of the types of groupings that would be logical to use when deciding what projects an entity wants to construct. Some may include a very specific, close geographic area – as shown by the pink outline of **Figure 3** below. Others may appear to cover a wider, less-obvious area. Examples such as the purple outline in **Figure 4** are meant to encourage more regionally based ideas, as sometimes larger projects like these are more attractive to funding agencies.

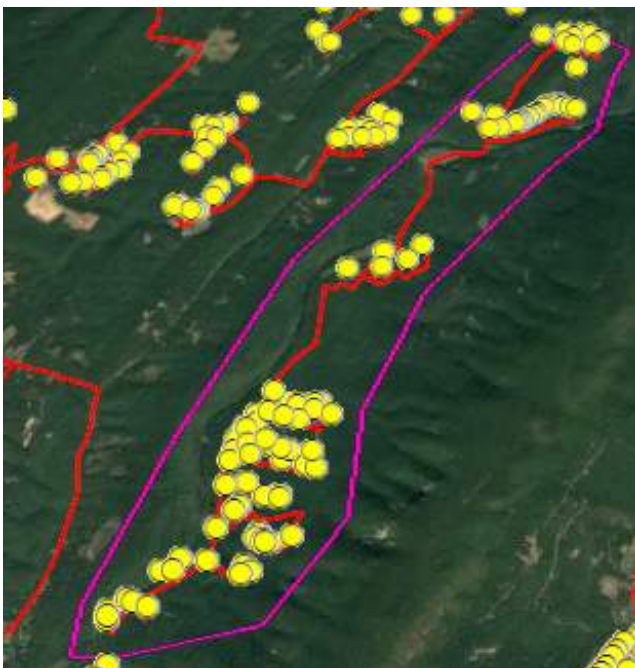


Figure 3

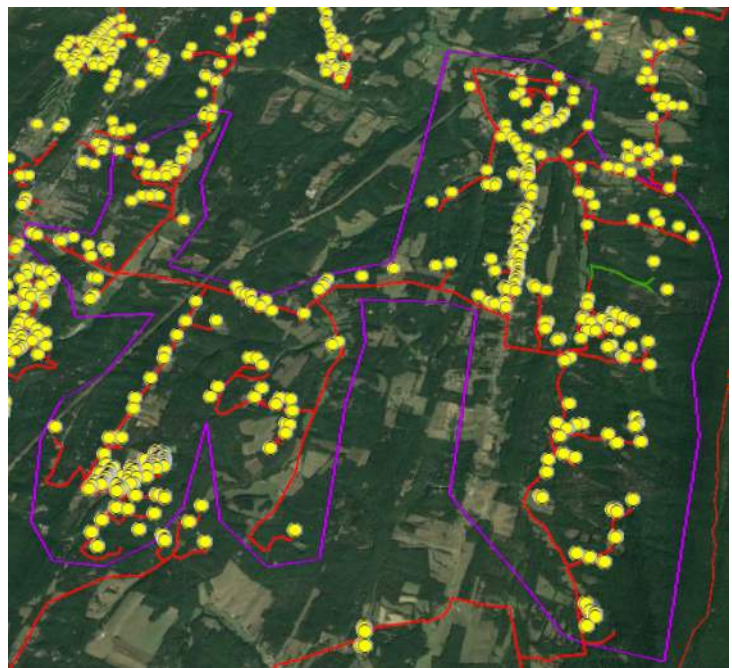


Figure 4

COST ESTIMATES

In addition to the mapping provided, cost estimate information was also given for each county. These estimates are a high-level view of what funding may be needed to build out every proposed route in the county so that each Targeted Serviceable Address is reached. This is aimed to assist with not only planning of overall funding needs, but to give entities an idea of what level of match they may have to provide, as many grant sources require a certain percentage of the grant amount be contributed by the grantee as a funding “match.” While every funding source has different percentage requirements, knowing the likely overall cost of a project will help entities identify how much money they may be responsible for

providing during the process so that budgets can be allocated accordingly.

As seen in **Figure 5**, the cost estimates specifically include unit costs and quantities for engineering; permitting, easements, and encroachment acquisition; pole placement and pole make-ready; aerial construction labor; and underground construction labor (if applicable). Lump-sum costs were also factored in for a 10% construction contingency, a 1.5% legal fee, and a 2% administrative fee. The estimates were provided in both a PDF format and Excel document, with the Excel file intended to be used by those pursuing projects as a working document that can be updated as progress is made.

EXAMPLE COUNTY COST ESTIMATE				
ITEM	UNIT COST (\$)	UNIT TYPE	UNIT QTY (#)	TOTAL
Engineering	\$5,500.00	Per Mile	349	\$1,921,150.00
Permitting, Easements, and Encroachment Acquisition	\$1,500.00	Per Mile	349	\$523,950.00
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	333	\$4,995,000.00
Aerial Construction Labor	\$50,000.00	Per Mile	333	\$16,650,000.00
Underground Construction	\$150,000.00	Per Mile	16	\$2,445,000.00
Project Construction Contingency 10%	\$1,909,500.00	Lump Sum	1	\$1,909,500.00
Legal 1.5%	\$286,425.00	Lump Sum	1	\$286,425.00
Administrative 2%	\$381,900.00	Lump Sum	1	\$381,900.00
TOTAL COST:				\$29,112,925.00

Figure 5

Additionally, the same information was provided for the three sample projects in the county. Again, these sample projects were intended to be used as an example of how to take the overarching county data and parse it into manageable projects. The individual cost estimates for the sample projects will help in the identification of magnitude for potential grant match needs.

OVERVIEW OF RESULTS

The work completed through the [ROC](#) study offers a vast amount of data. In total, the project developed preliminary routing for approximately 14,824 miles of fiber, which is estimated at approximately \$1,227,841,007 in future construction costs. Additionally, more than 1,095,041 total addresses were examined, with 105,127 determined to be broadband serviceable locations (BSLs), shown as Targeted Addresses on the chart and maps that follow. To provide an easily digestible breakdown of this information, the address, mileage, and anticipated cost information for each county is outlined in **Figure 6** below.

REGION	COUNTY	# SERVED ADDRESSES	# TARGETED ADDRESSES	# UNSERVICEABLE TARGETED ADDRESSES	# MILES PROPOSED	ANTICIPATED COST
1	McDowell	17,077	1,351	766	161.19	\$12,693,713
	Mercer	29,245	3,977	534	383.81	\$31,209,053
	Monroe	6,764	1,398	93	305.41	\$24,602,638
	Raleigh	38,036	6,076	902	392.32	\$33,103,570
	Summers	7,218	1,848	139	220.04	\$17,812,770
	Wyoming	12,387	1,134	454	116.77	\$9,195,638
2	Cabell	39,948	2,034	94	216.03	\$17,869,313
	Lincoln	9,908	1,559	385	207.98	\$16,431,615
	Logan	19,995	3,491	1,225	101.85	\$8,038,418
	Mason	13,144	1,569	259	221.04	\$17,637,390
	Mingo	15,600	2,257	1,152	228.54	\$17,997,525
	Wayne	22,509	3,596	3,775	454.01	\$36,087,203
3	Boone	11,679	707	259	138.94	\$10,941,525
	Clay	6,774	1,141	1,390	228.07	\$18,012,718
	Kanawha	96,323	4,254	554	520.50	\$41,937,930
	Putnam	23,760	2,490	255	355.70	\$28,916,590
4	Fayette	18,750	5,435	644	579.57	\$48,178,188
	Greenbrier	19,084	3,379	360	746.62	\$62,782,620
	Nicholas	14,028	2,570	806	351.71	\$27,823,243
	Pocahontas	5,228	1,473	40	346.58	\$30,063,980
	Webster	4,228	169	35	122.14	\$9,749,530
5	Calhoun	2,007	728	90	182.16	\$14,354,950
	Jackson	12,626	3,410	370	472.41	\$37,849,433
	Pleasants	5,180	1,110	301	162.30	\$13,410,540
	Ritchie	11,333	390	366	78.20	\$6,200,605
	Roane	12,930	1,550	1,975	346.31	\$27,271,913
	Tyler	5,404	593	66	200.99	\$15,827,963
	Wirt	5,091	699	385	121.27	\$9,765,728
	Wood	41,259	2,330	131	400.01	\$32,444,418

Figure 6

Continued on next page...

CHAPTER 1 SECTION 4

REGION	COUNTY	# SERVED ADDRESSES	# TARGETED ADDRESSES	# UNSERVICEABLE TARGETED ADDRESSES	# MILES PROPOSED	ANTICIPATED COST
6	Doddridge	7,903	707	305	51.49	\$4,214,408
	Harrison	32,309	2,803	295	313.30	\$25,057,510
	Marion	34,756	2,554	2,820	312.41	\$25,345,963
	Monongalia	52,220	1,136	129	164.36	\$14,117,470
	Preston	16,249	1,240	66	273.97	\$22,369,048
	Taylor	6,942	1,031	74	149.08	\$12,360,783
7	Barbour	6,018	3,798	576	470.15	\$37,953,168
	Braxton	9,802	3,465	3,040	477.35	\$38,237,473
	Gilmer	6,834	590	791	166.94	\$14,131,525
	Lewis	14,462	1,787	3,097	306.89	\$25,528,858
	Randolph	14,690	1,423	206	297.74	\$25,746,015
	Tucker	7,468	528	448	114.91	\$10,157,288
	Upshur	9,370	3,491	340	456.05	\$37,370,485
8	Grant	7,097	743	89	234.30	\$22,664,955
	Hampshire	13,740	2,410	103	422.95	\$35,227,078
	Hardy	8,176	1,153	90	208.98	\$18,955,135
	Mineral	13,610	1,025	74	258.02	\$22,030,020
	Pendleton	5,636	882	294	271.17	\$28,795,328
9	Berkeley	52,928	2,304	99	233.71	\$21,714,263
	Jefferson	23,810	2,628	369	331.15	\$30,306,668
	Morgan	11,532	3,246	1,603	311.06	\$26,105,465
10	Marshall	15,299	1,724	379	297.58	\$23,434,425
	Ohio	18,715	375	80	52.87	\$4,954,468
	Wetzel	8,188	1,104	380	256.65	\$20,386,518
11	Brooke	16,192	57	43	2.46	\$193,725
	Hancock	14,729	205	129	26.64	\$2,272,245
TOTAL RESULTS		956,190	105,127	33,724	14,824.65	\$1,277,841,007

Figure 6 continued

COUNTY-BY-COUNTY BREAKDOWN

OVERVIEW

Further details for each county will be provided on the following pages. This section includes a copy of the Overall map and Sheets documents mentioned in the Deliverables section above, the overall cost estimates for the county, and an overview of the cost estimates for the three sample projects identified in each county.

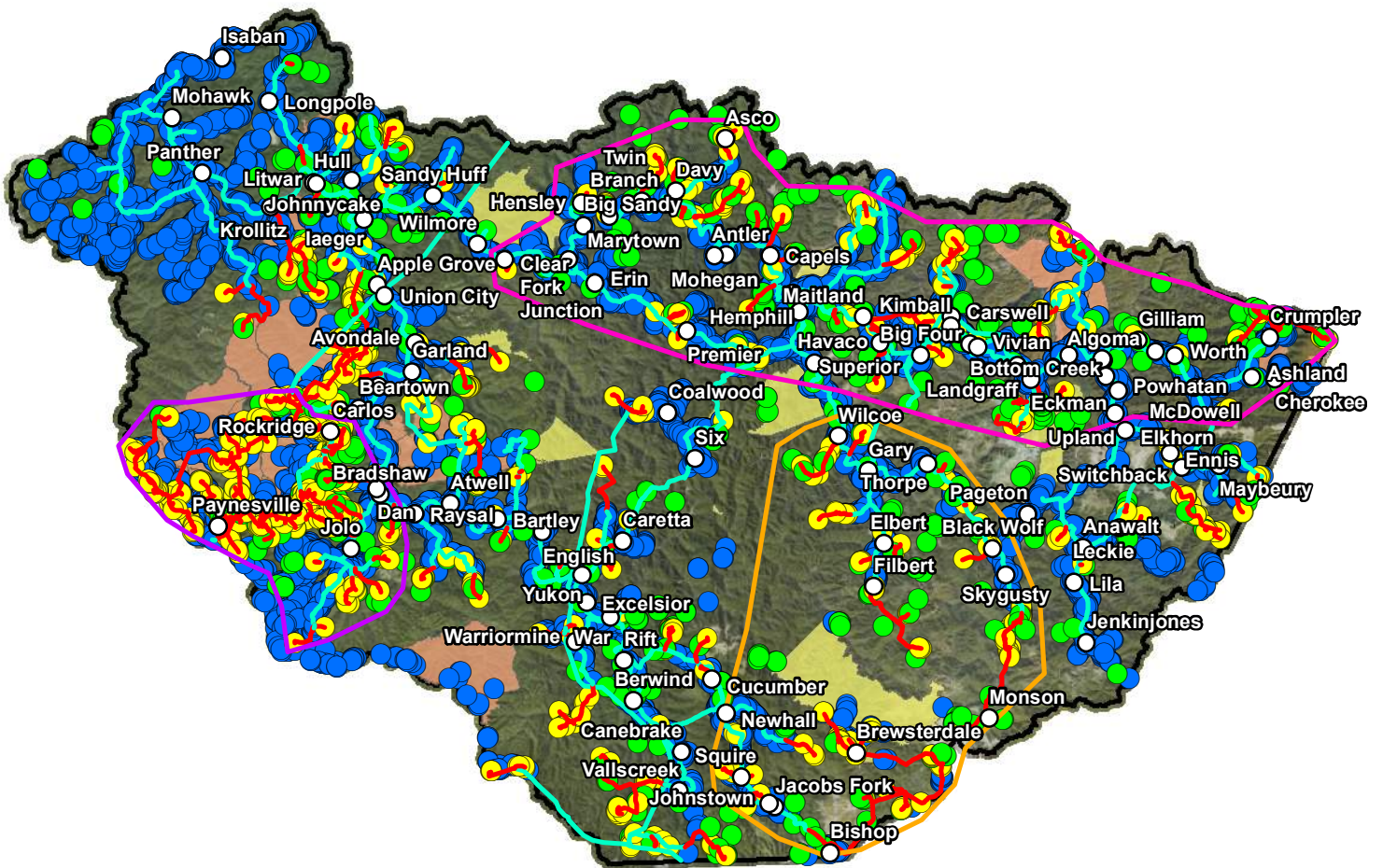
REGION 1

McDowell, Mercer, Monroe, Raleigh,
Summers, and Wyoming Counties

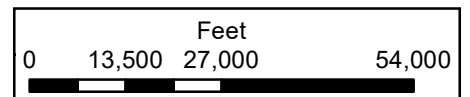


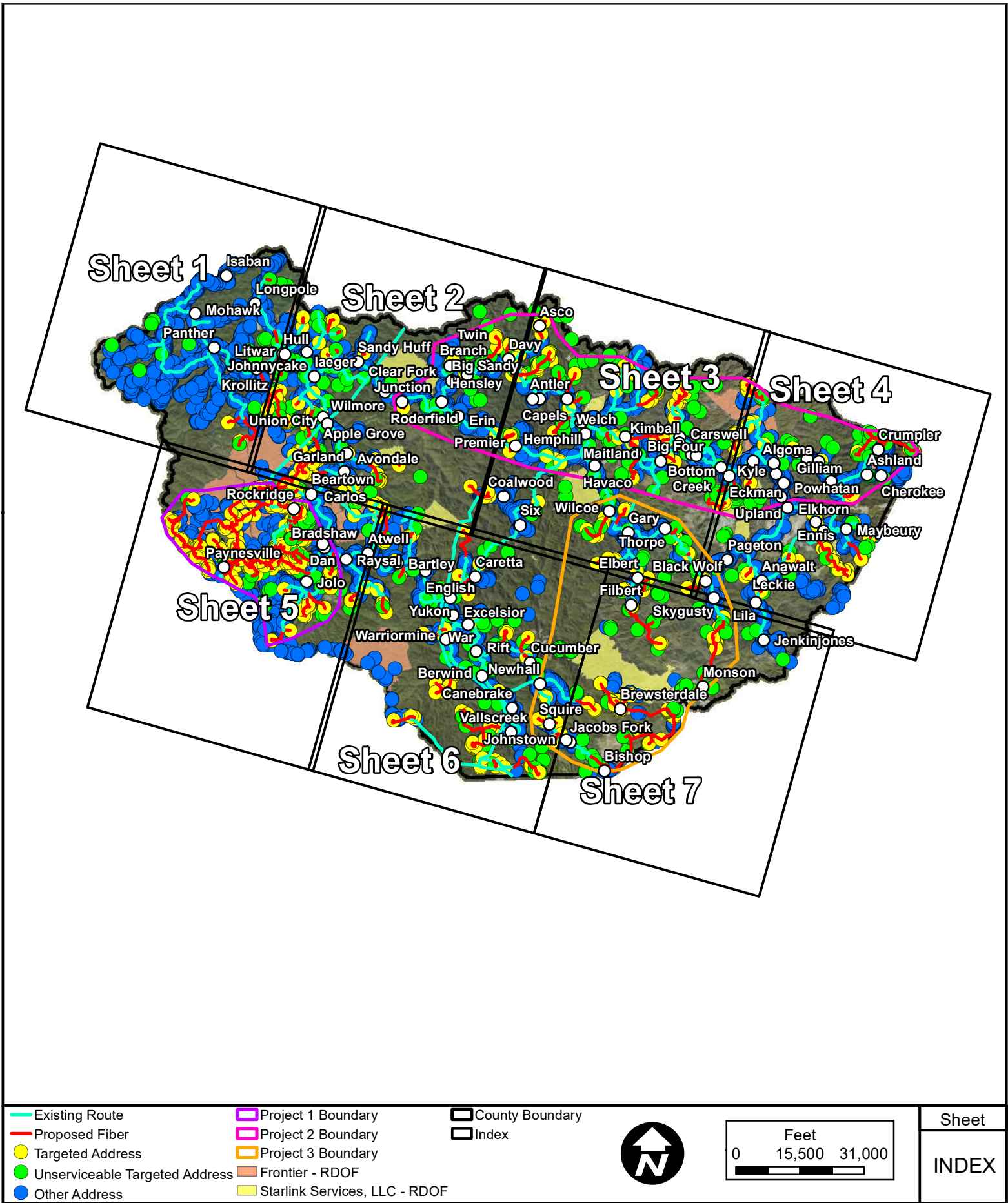


McDOWELL COUNTY

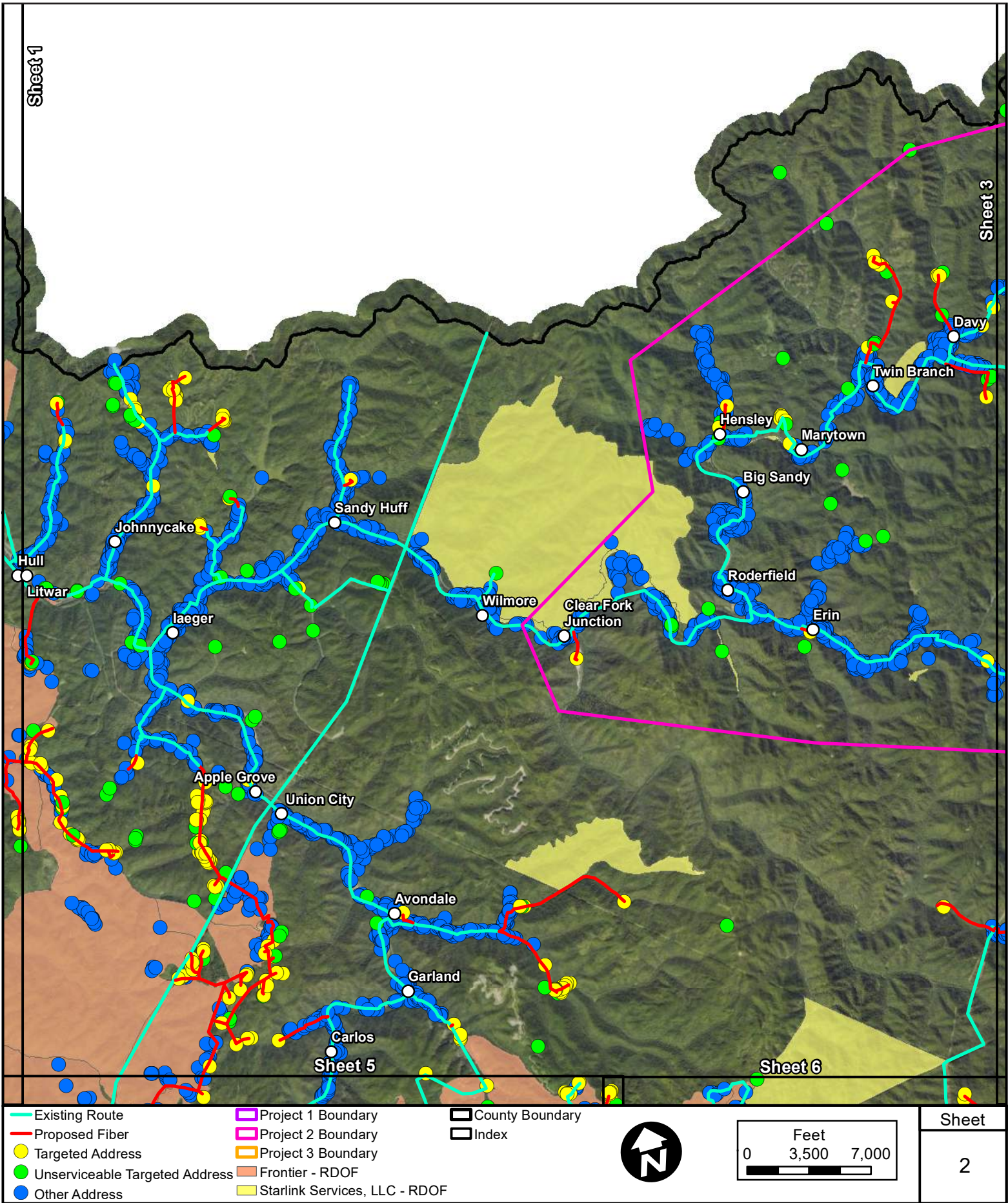


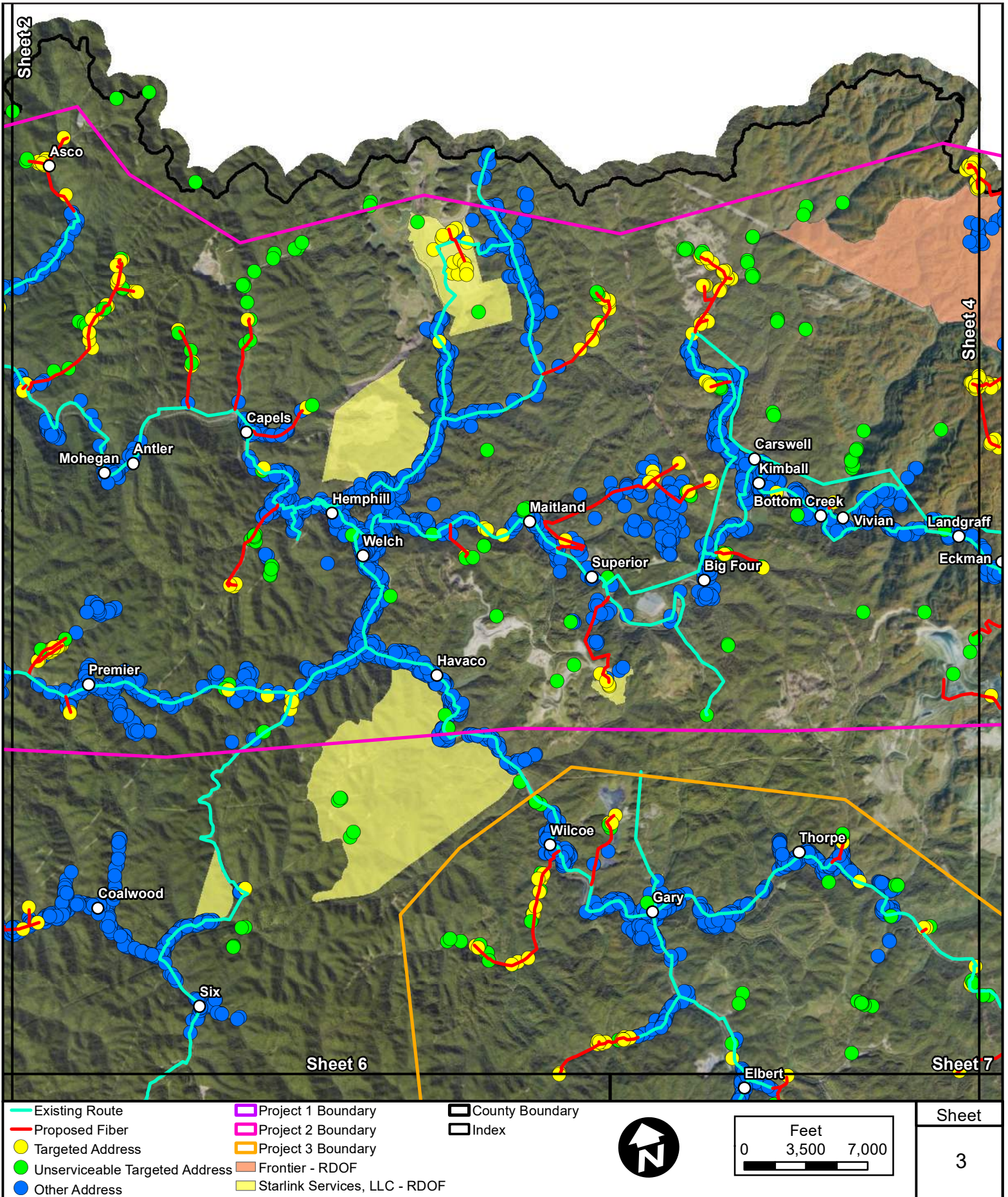
- Existing Route
- Proposed Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary

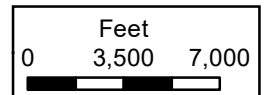
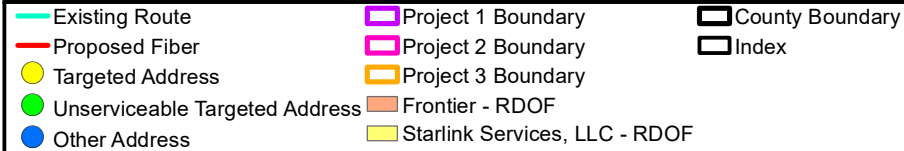
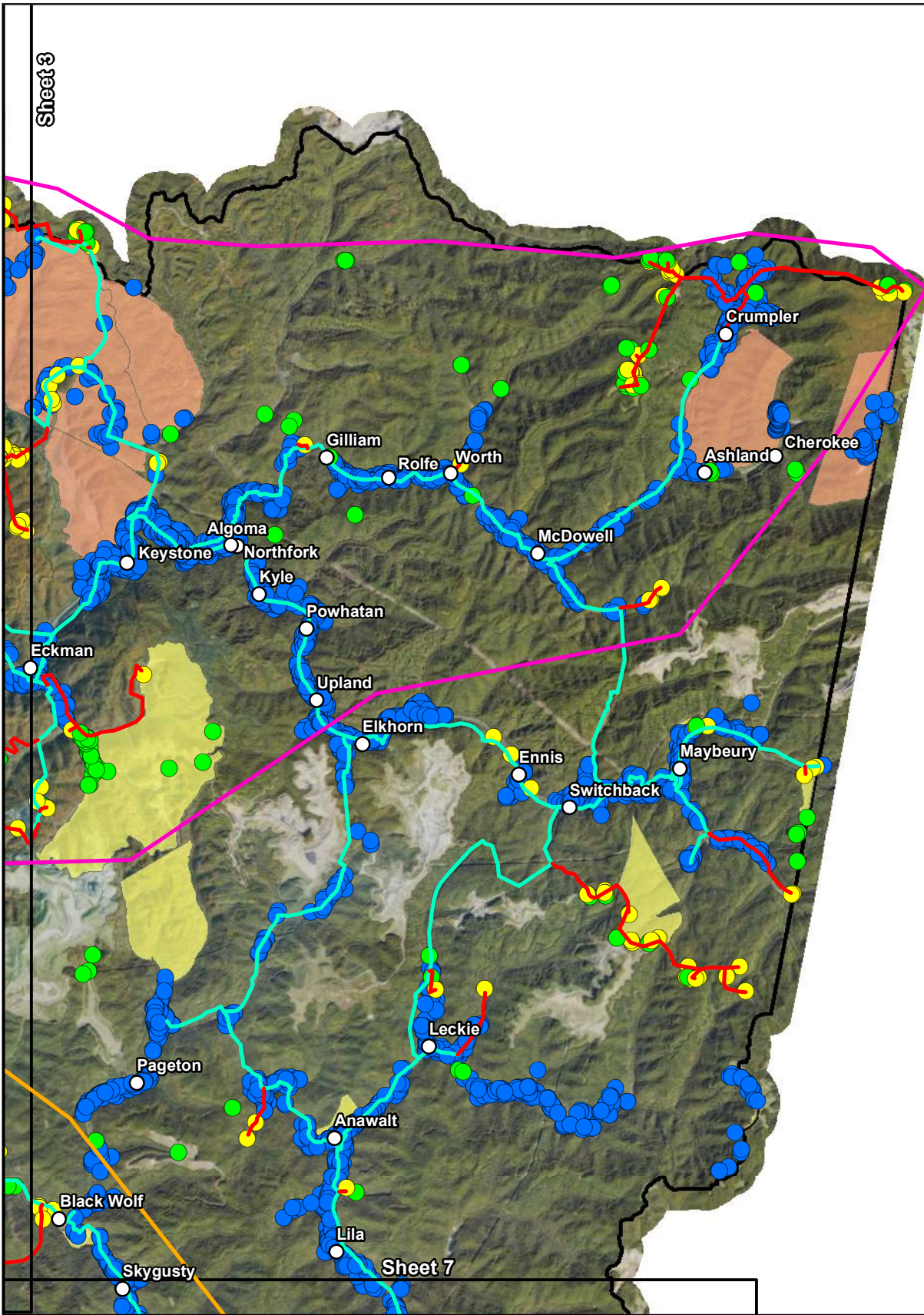


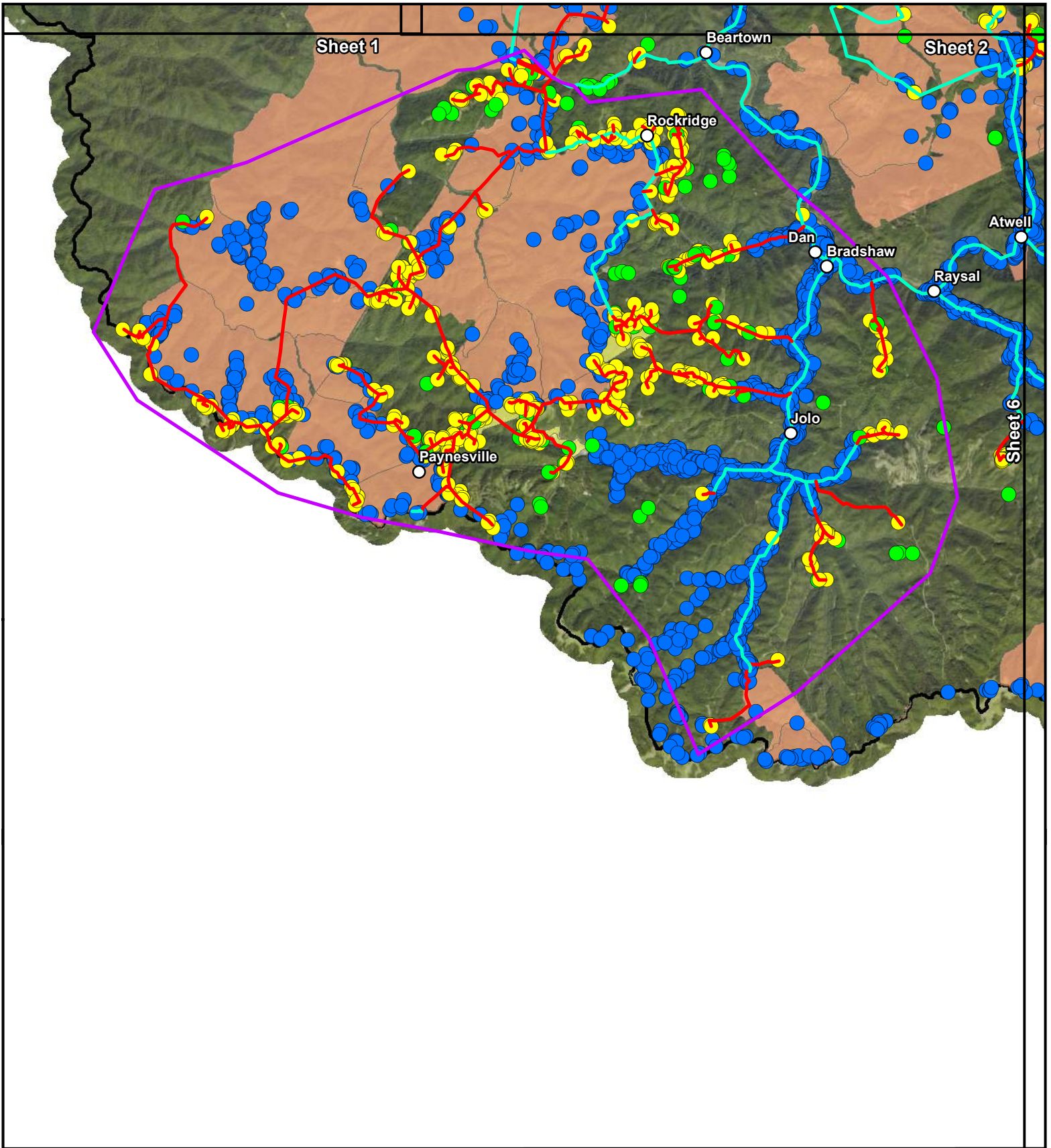




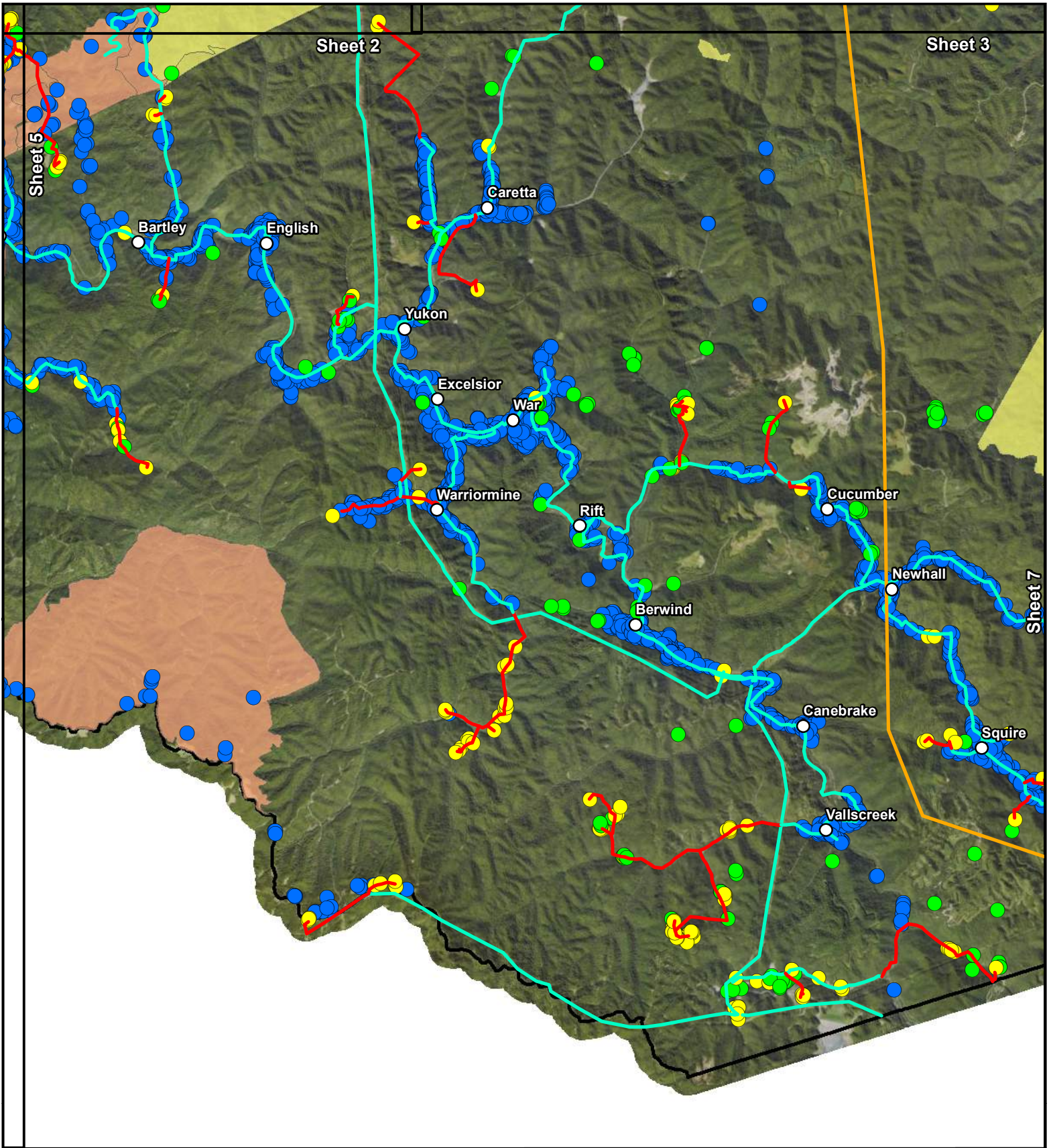




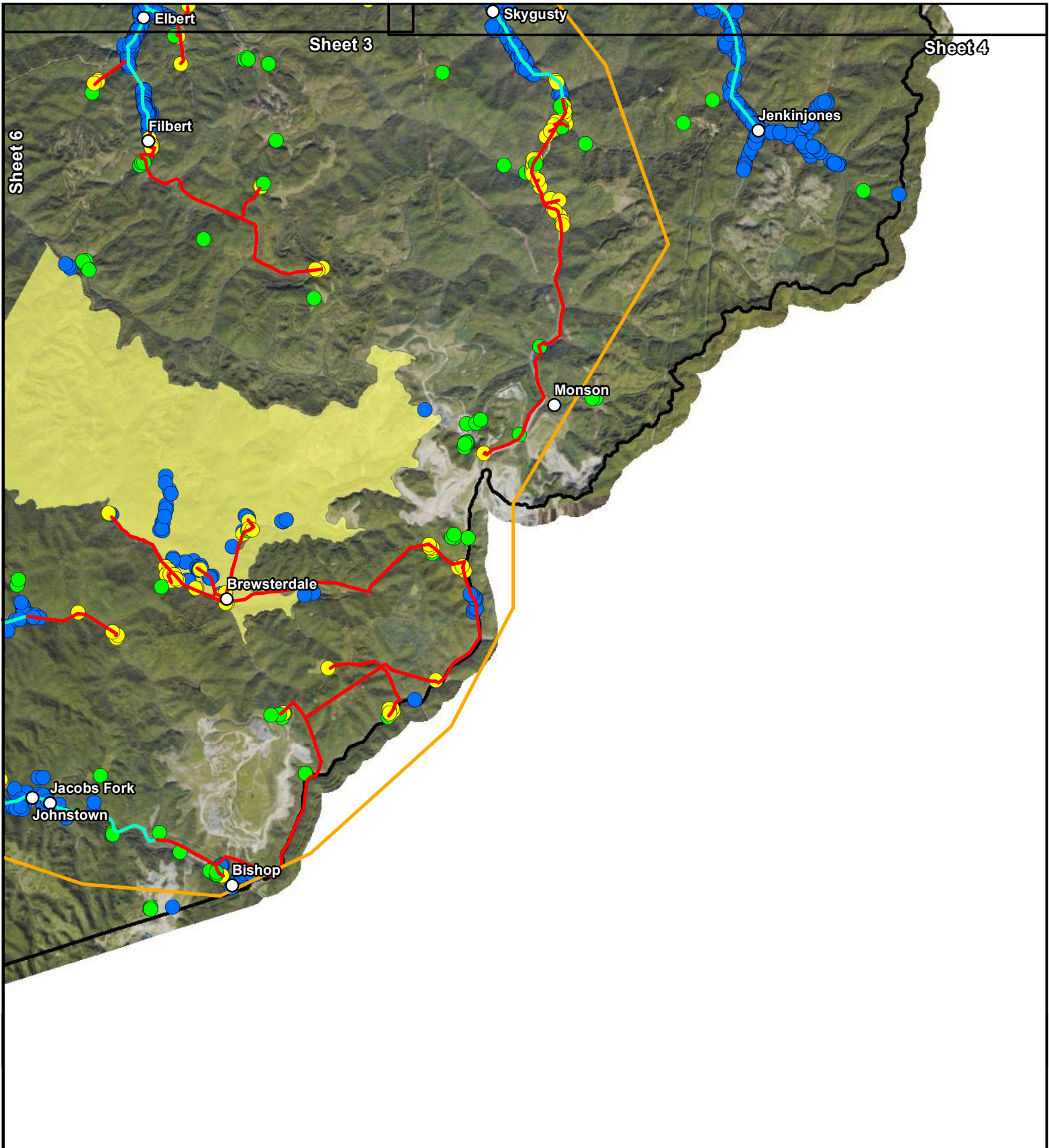






Existing Route	Project 1 Boundary	County Boundary		<table border="1"> <tr> <th colspan="3">Feet</th> </tr> <tr> <td>0</td> <td>3,500</td> <td>7,000</td> </tr> <tr> <td colspan="3"></td> </tr> </table>	Feet			0	3,500	7,000				Sheet
Feet														
0	3,500	7,000												
Proposed Fiber	Project 2 Boundary	Index			5									
Targeted Address	Project 3 Boundary													
Unserviceable Targeted Address	Frontier - RDOF													
Other Address	Starlink Services, LLC - RDOF													



Existing Route	Project 1 Boundary	County Boundary		<table border="1"> <tr> <th colspan="2">Feet</th> </tr> <tr> <td>0</td> <td>3,500 7,000</td> </tr> </table>	Feet		0	3,500 7,000	Sheet
Feet									
0	3,500 7,000								
Proposed Fiber	Project 2 Boundary	Index			6				
Targeted Address	Project 3 Boundary	Frontier - RDOF							
Unserviceable Targeted Address	Starlink Services, LLC - RDOF								
Other Address									



<ul style="list-style-type: none"> — Existing Route — Proposed Fiber ● Targeted Address ● Unserviceable Targeted Address ● Other Address 	<ul style="list-style-type: none"> Project 1 Boundary Project 2 Boundary Project 3 Boundary Frontier - RDOF Starlink Services, LLC - RDOF 	<ul style="list-style-type: none"> County Boundary Index 		<div style="border: 1px solid black; padding: 5px;"> <p>Feet</p> <p>0 3,500 7,000</p>  </div>	<table border="1" style="width: 100%;"> <tr> <td style="padding: 5px;">Sheet</td> </tr> <tr> <td style="text-align: center; padding: 5px;">7</td> </tr> </table>	Sheet	7
Sheet							
7							

McDowell County, WV – 2023 ROC Study – Cost Estimate – Whole County

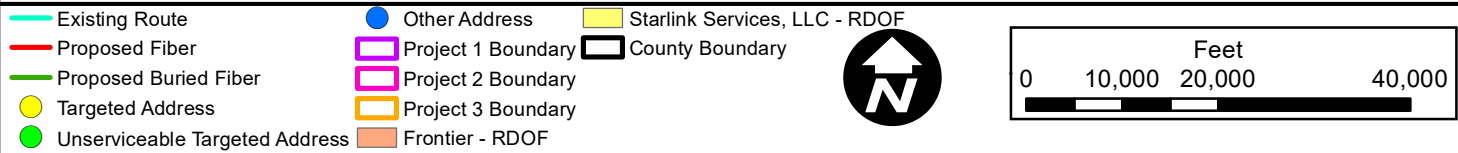
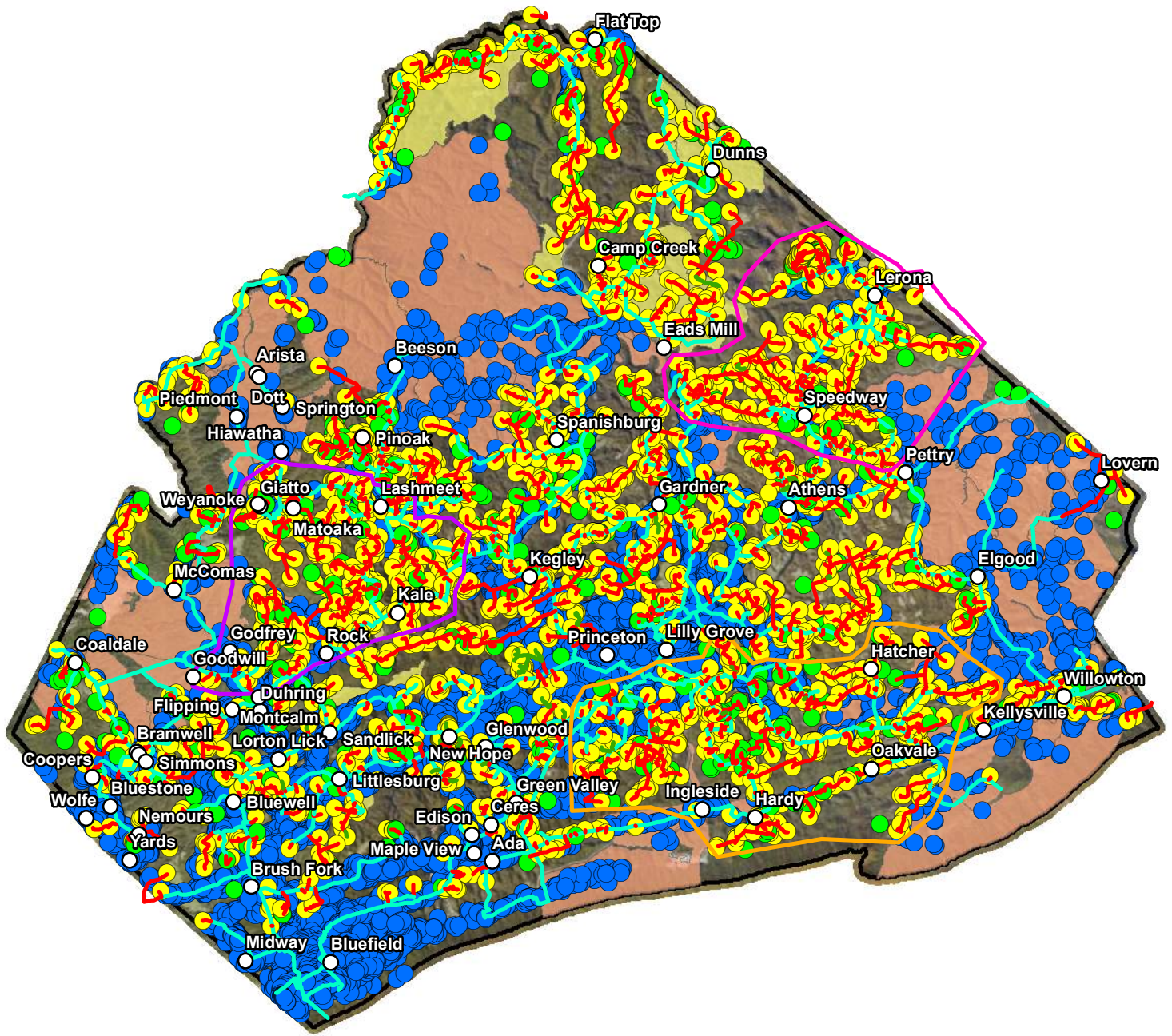
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	161.19	\$886,545
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	161.19	\$241,785
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	161.19	\$2,417,850
Aerial Construction Labor	\$50,000.00	Per Mile	161.19	\$8,059,500
Underground Construction Labor	\$150,000.00	Per Mile	0.00	\$0
Project Construction Contingency 10%	\$805,950.00	Lump Sum	1	\$805,950
Legal 1.5%	\$120,892.50	Lump Sum	1	\$120,893
Administrative 2%	\$161,190.00	Lump Sum	1	\$161,190
TOTAL COST = \$12,693,713				

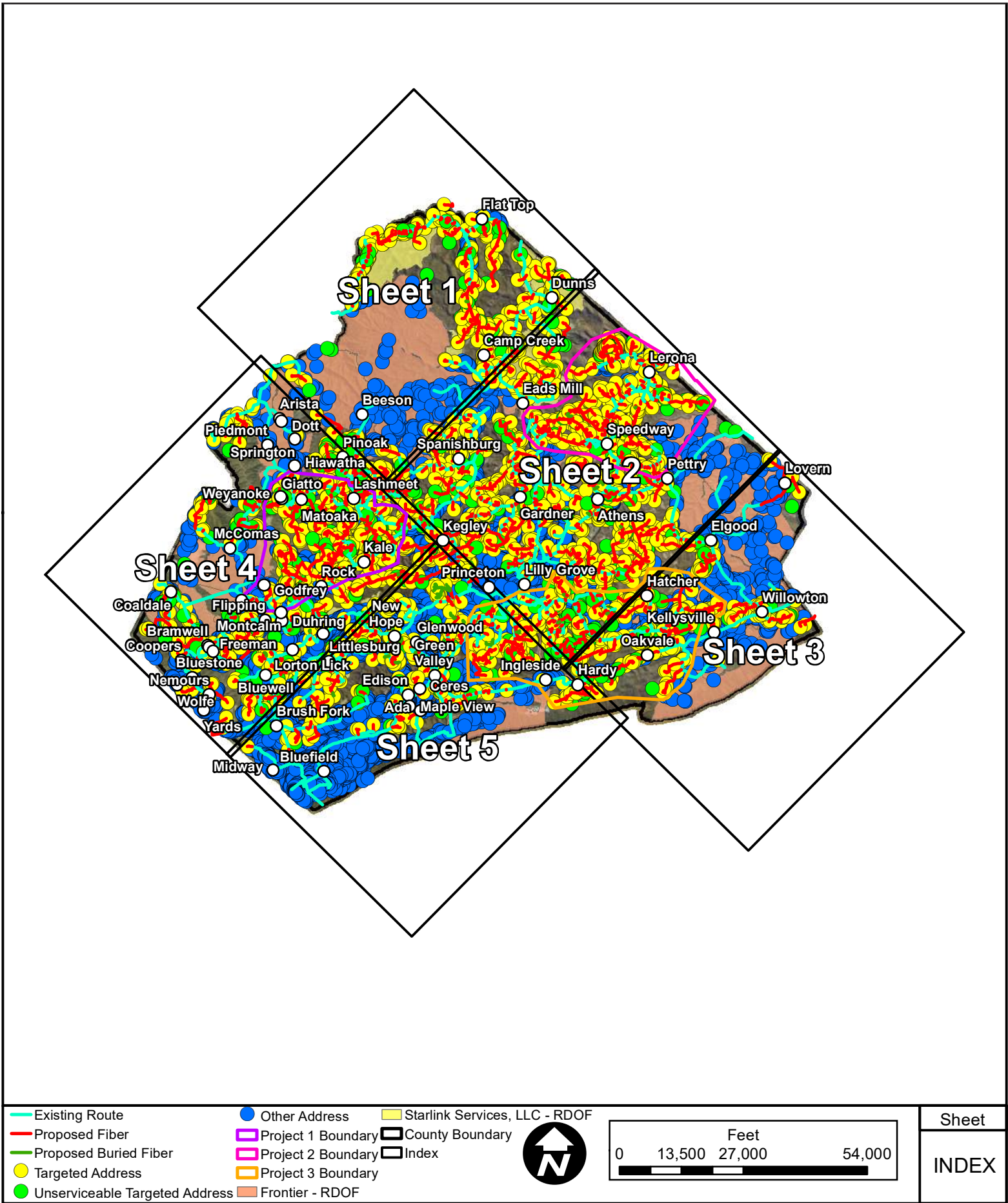
COUNTY SAMPLE PROJECT

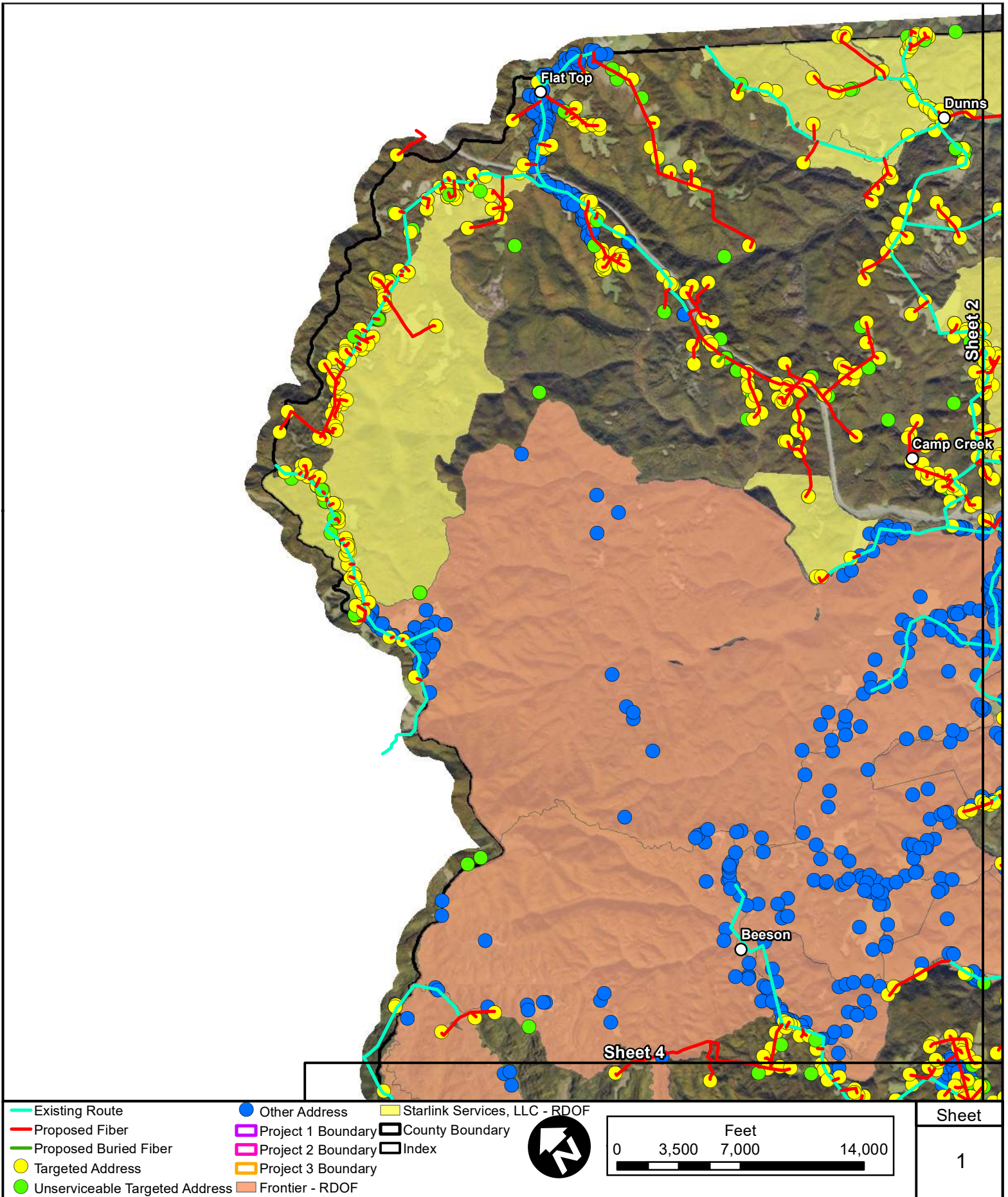
Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
1	McDowell	1	522	51.03	\$4,018,613
		2	272	33.02	\$2,600,325
		3	166	30.66	\$2,414,475

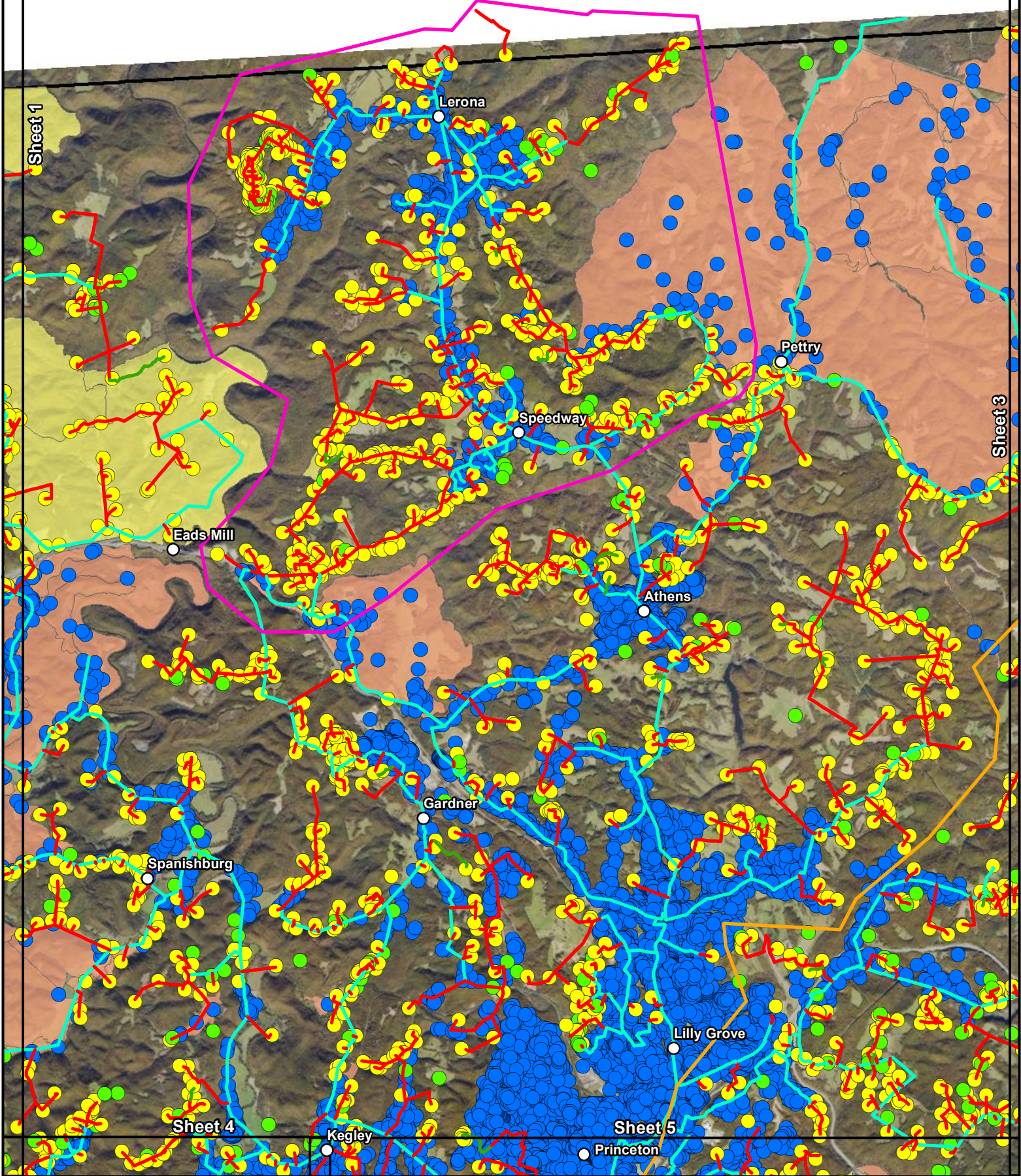


MERCER COUNTY







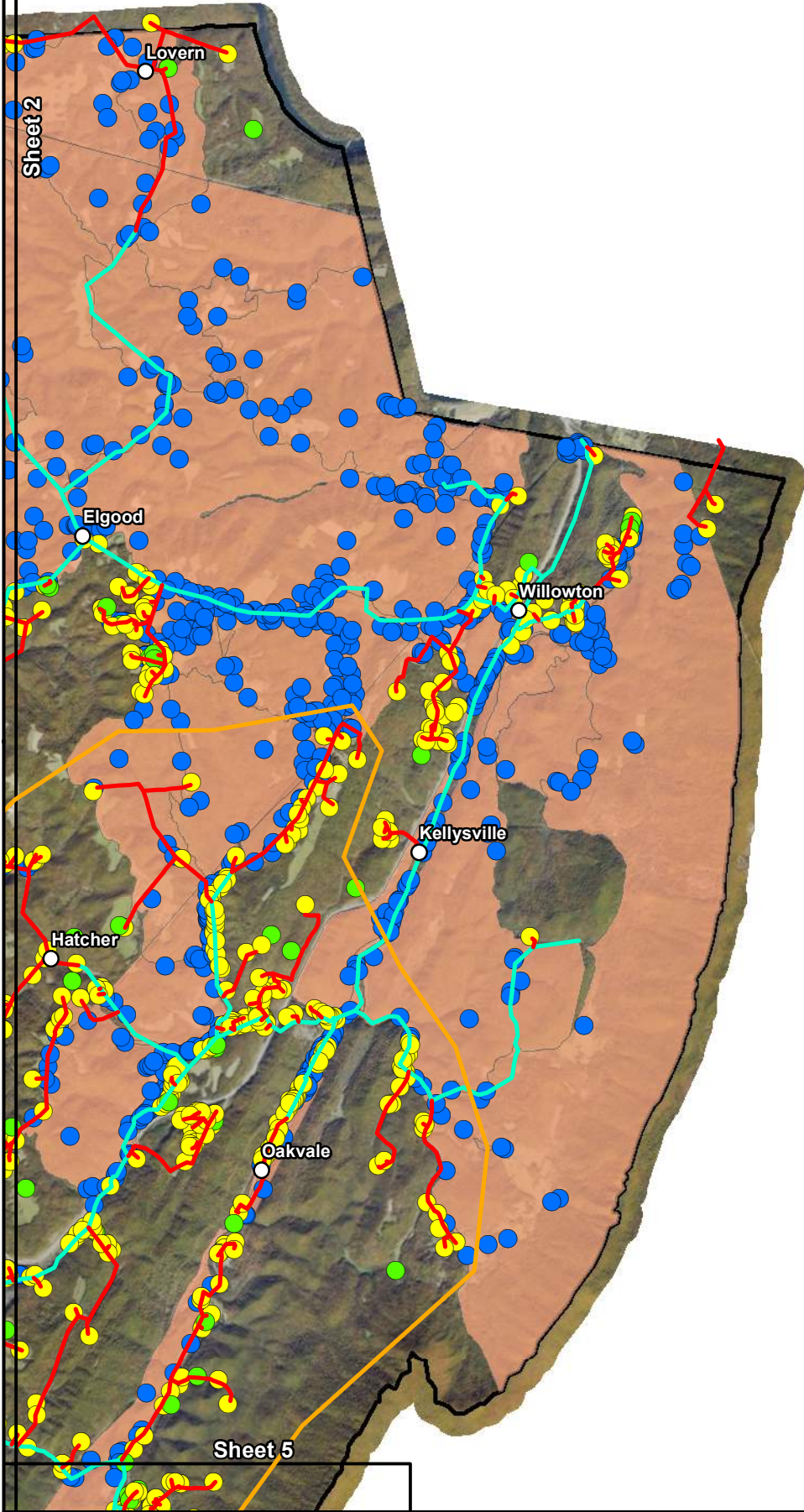


Existing Route	Other Address	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

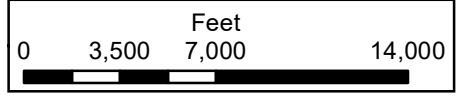
Feet

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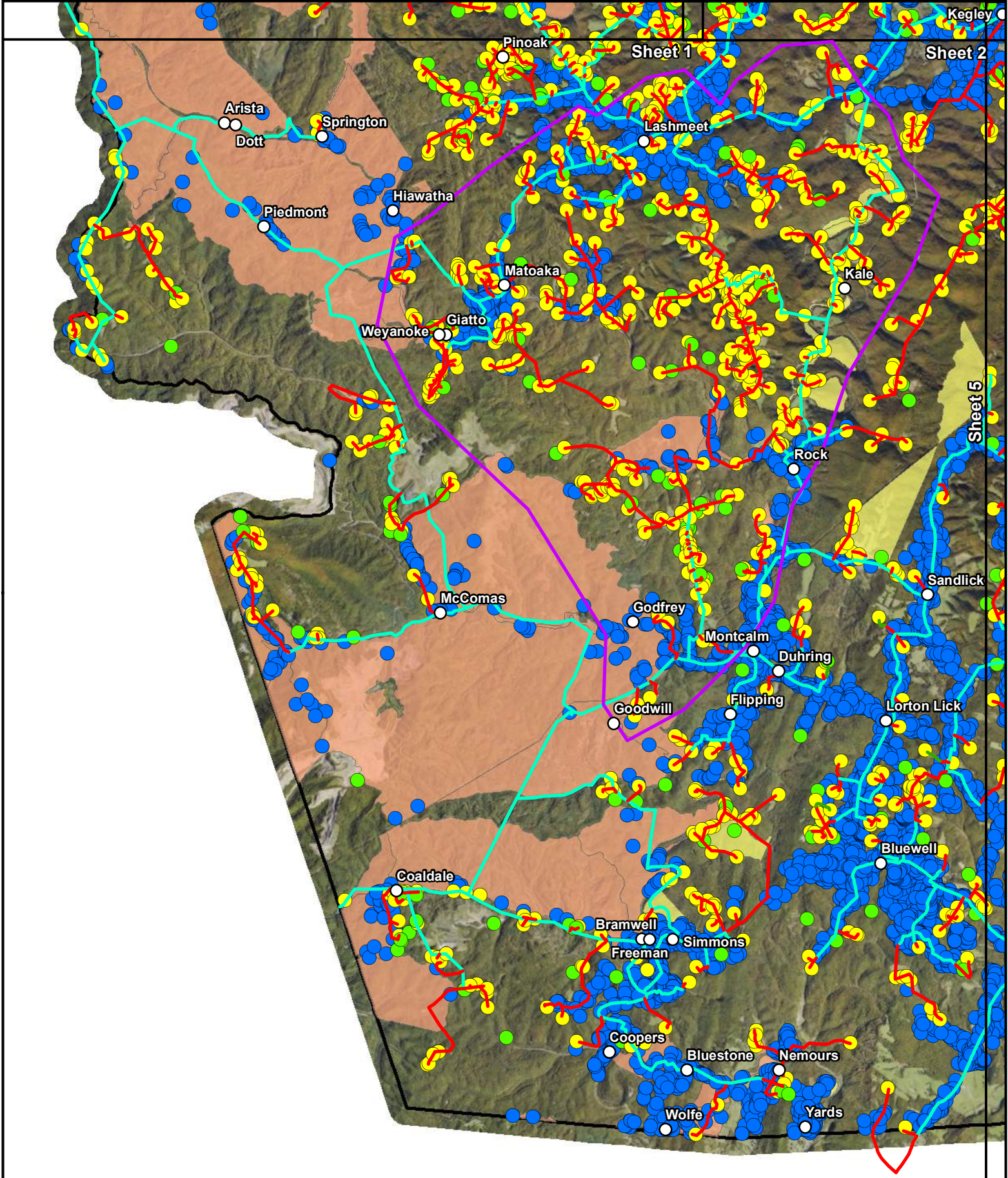
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- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Starlink Services, LLC - RDOF
- Frontier - RDOF
- County Boundary
- Index



Sheet
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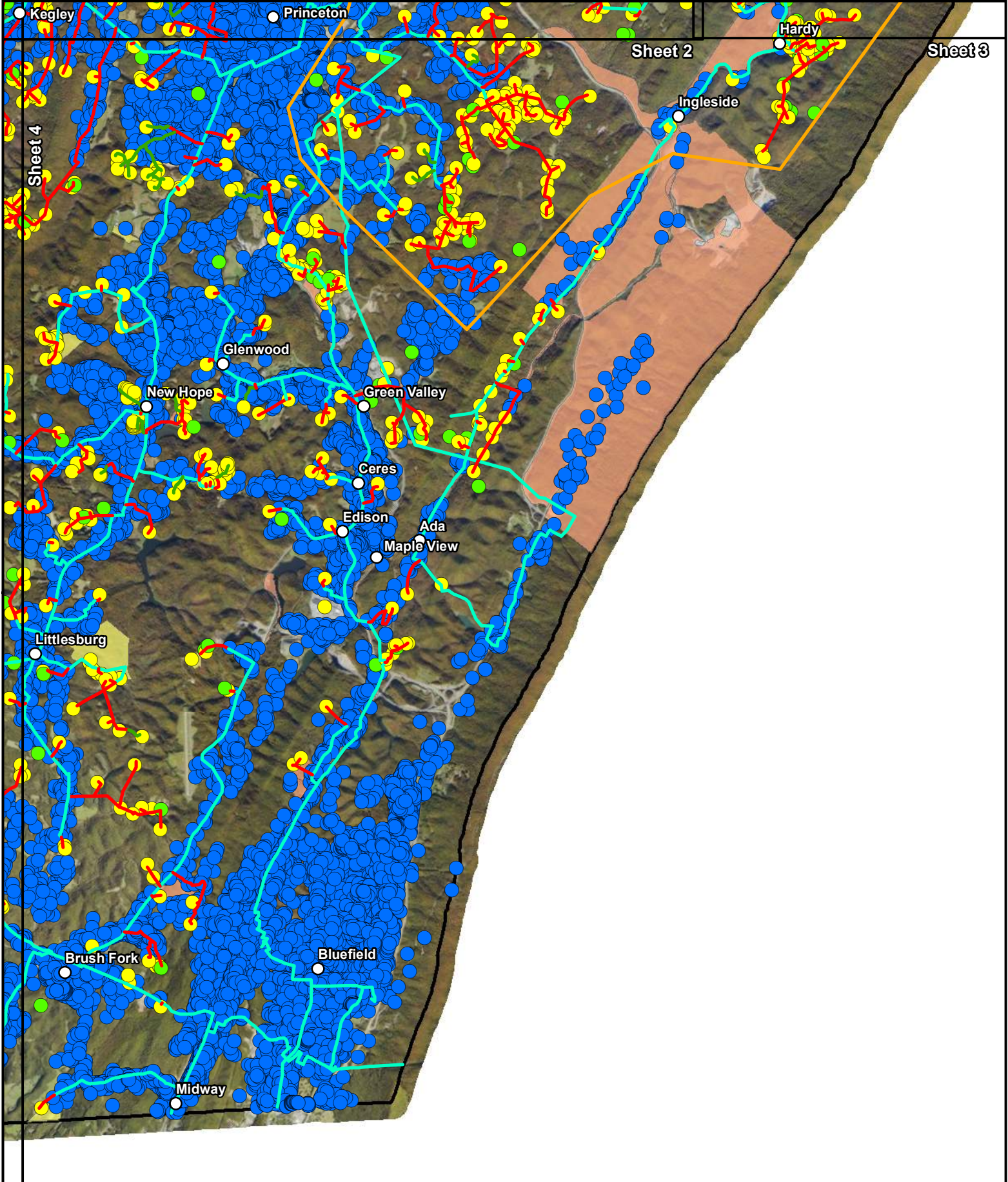


Existing Route	Other Address	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Feet

0 3,500 7,000 14,000

Sheet
4



Existing Route	Other Address	Starlink Services, LLC - RDOF		Feet 0 3,500 7,000 14,000	Sheet
Proposed Fiber	Project 1 Boundary	County Boundary			5
Proposed Buried Fiber	Project 2 Boundary	Index			
Targeted Address	Project 3 Boundary				
Unserviceable Targeted Address	Frontier - RDOF				

Mercer County, WV – 2023 ROC Study – Cost Estimate – Whole County

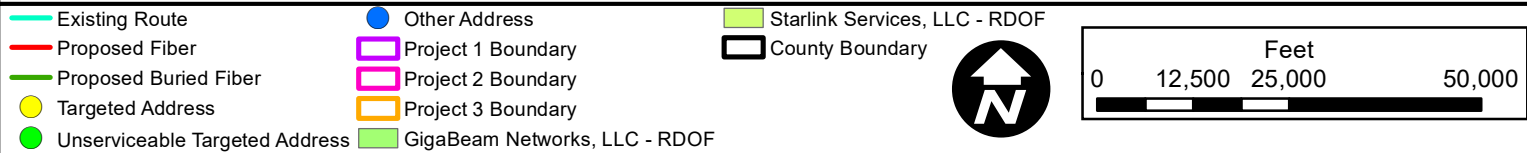
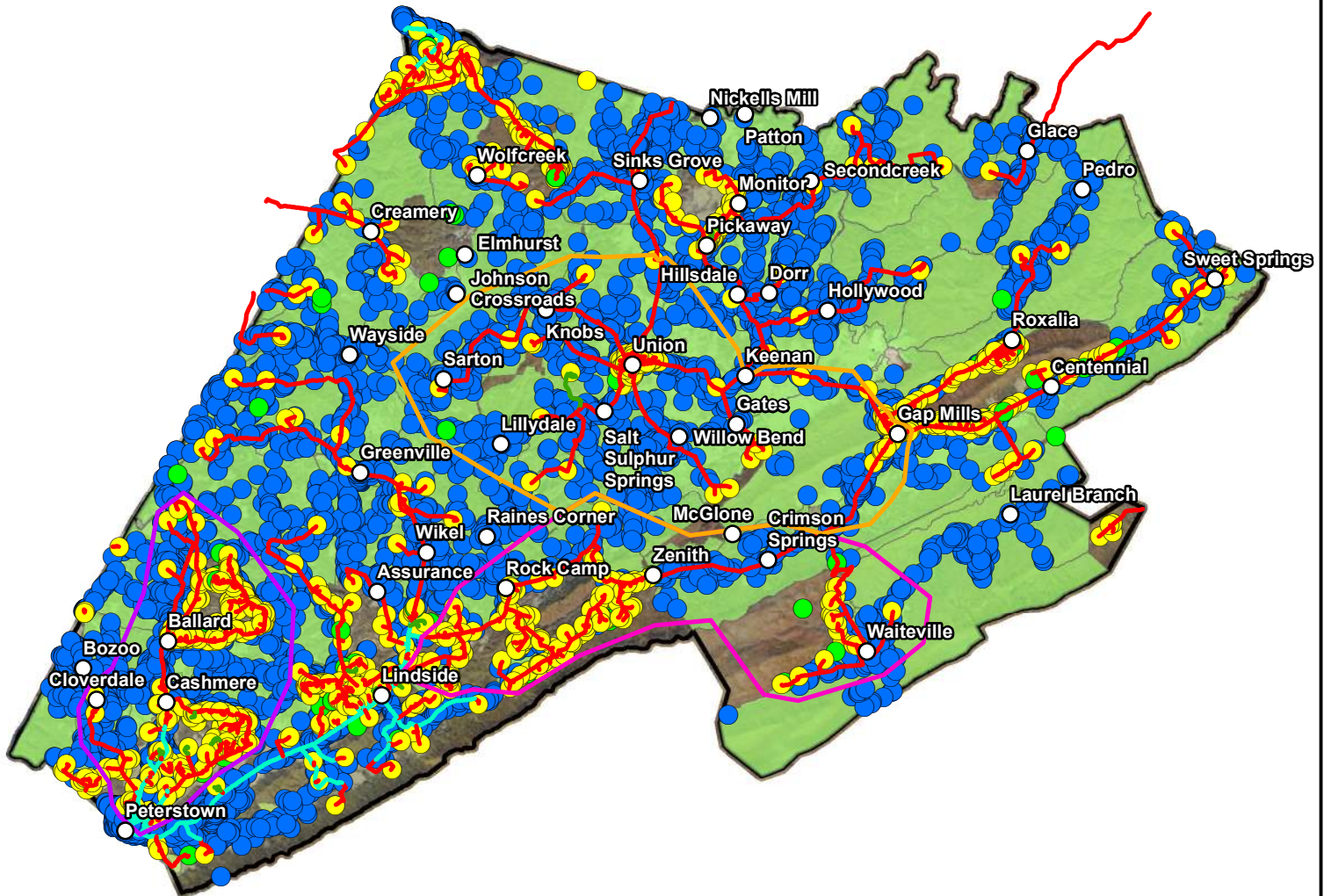
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	313.81	\$2,110,955
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	313.81	\$575,715
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	373.82	\$5,607,300
Aerial Construction Labor	\$50,000.00	Per Mile	373.82	\$18,691,000
Underground Construction Labor	\$150,000.00	Per Mile	9.99	\$1,498,500
Project Construction Contingency 10%	\$2,018,950.00	Lump Sum	1	\$2,018,950
Legal 1.5%	\$302,842.50	Lump Sum	1	\$302,843
Administrative 2%	\$403,790.00	Lump Sum	1	\$403,790
TOTAL COST = \$31,209,053				

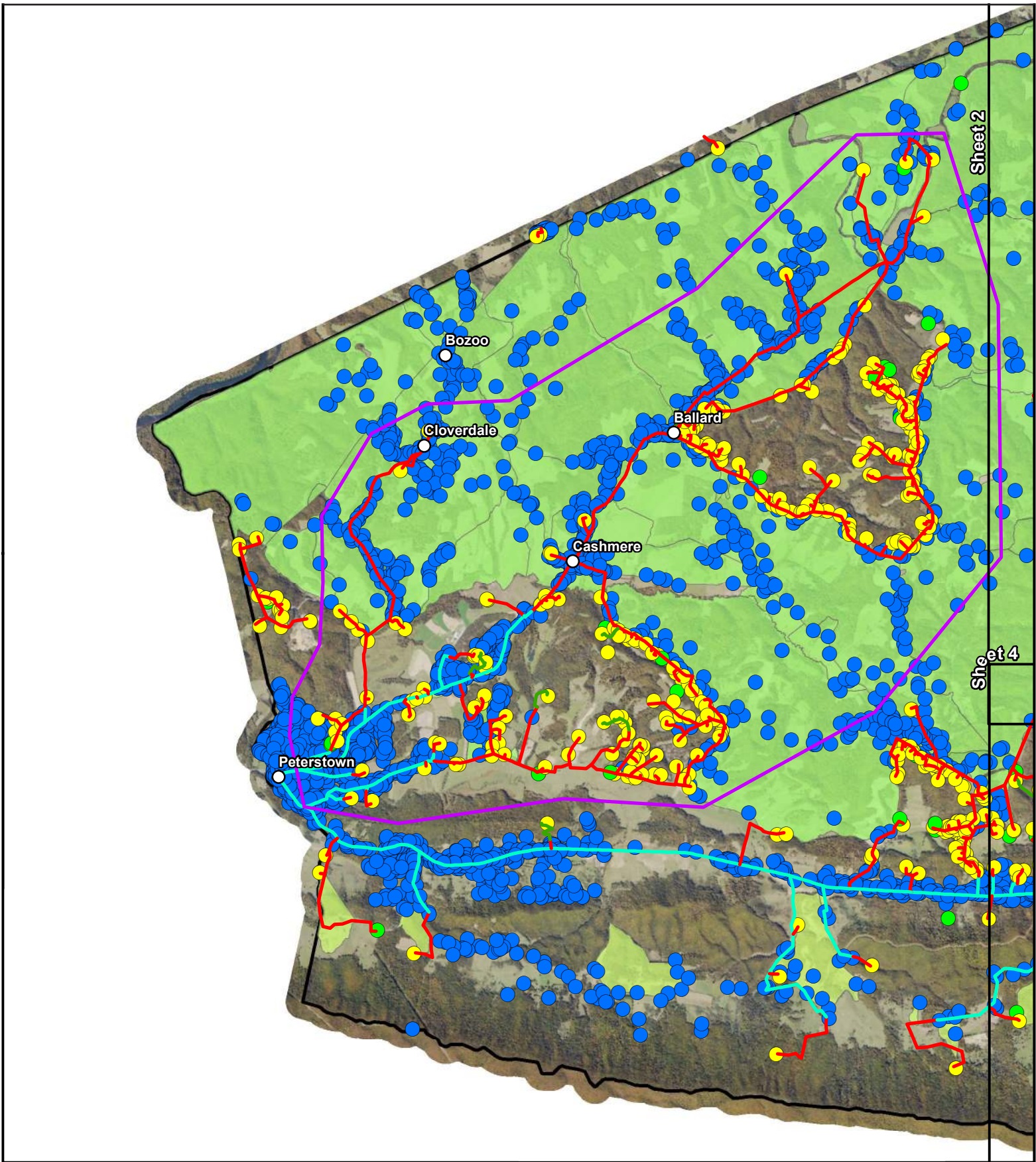
COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
1	Mercer	1	468	45.78	\$3,609,115
		2	586	44.45	\$3,564,463
		3	603	57.94	\$4,663,245

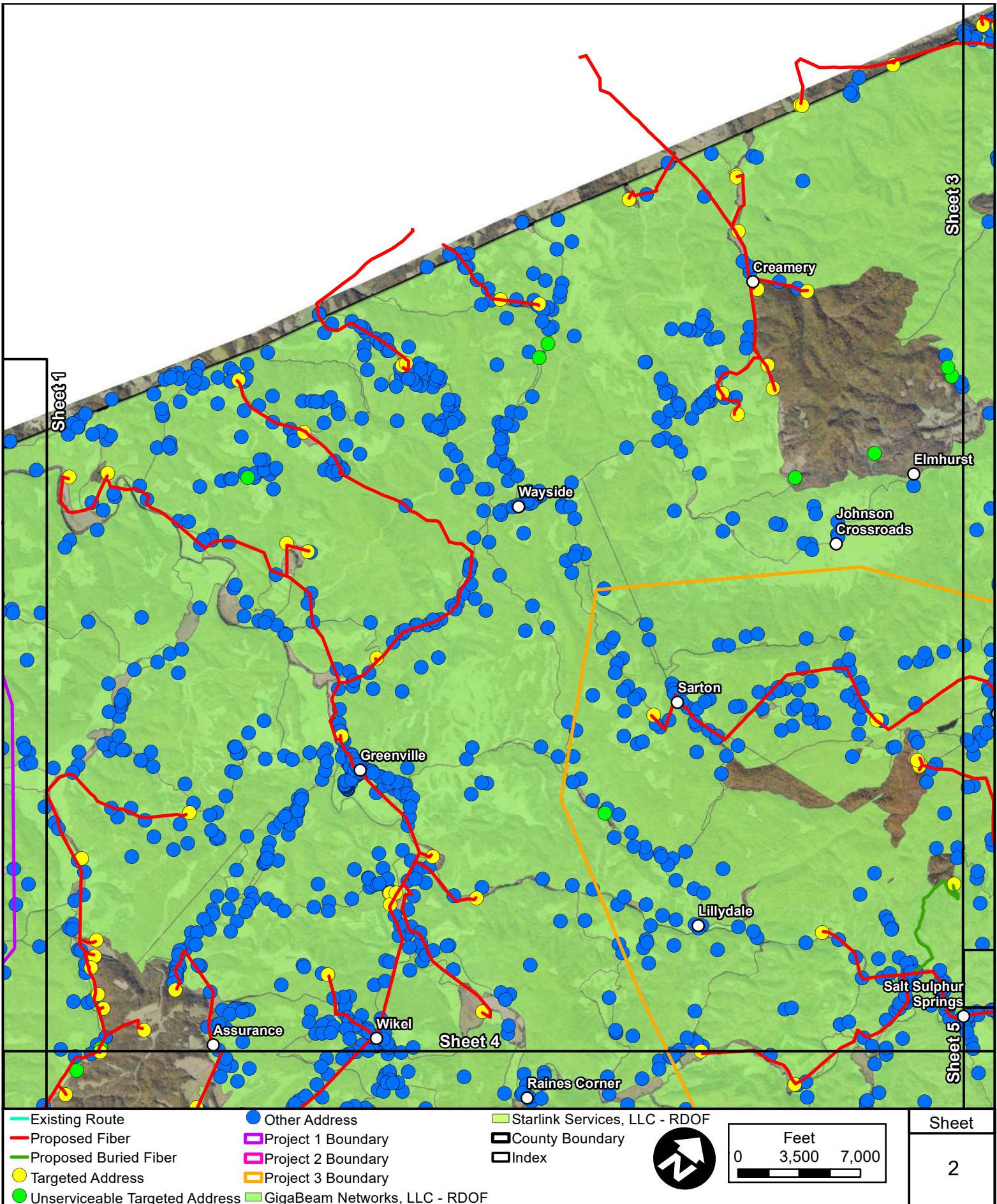


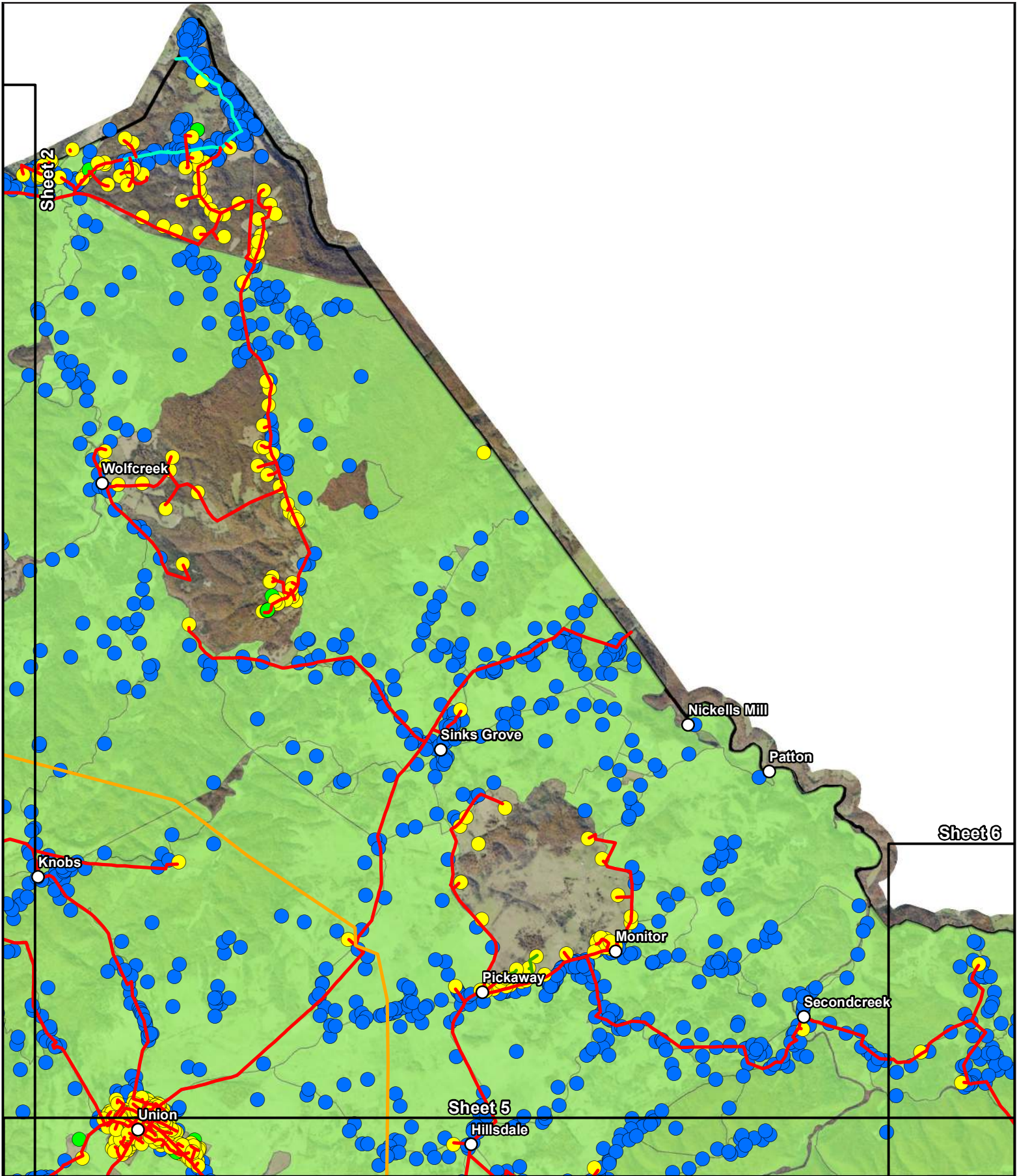
MONROE COUNTY



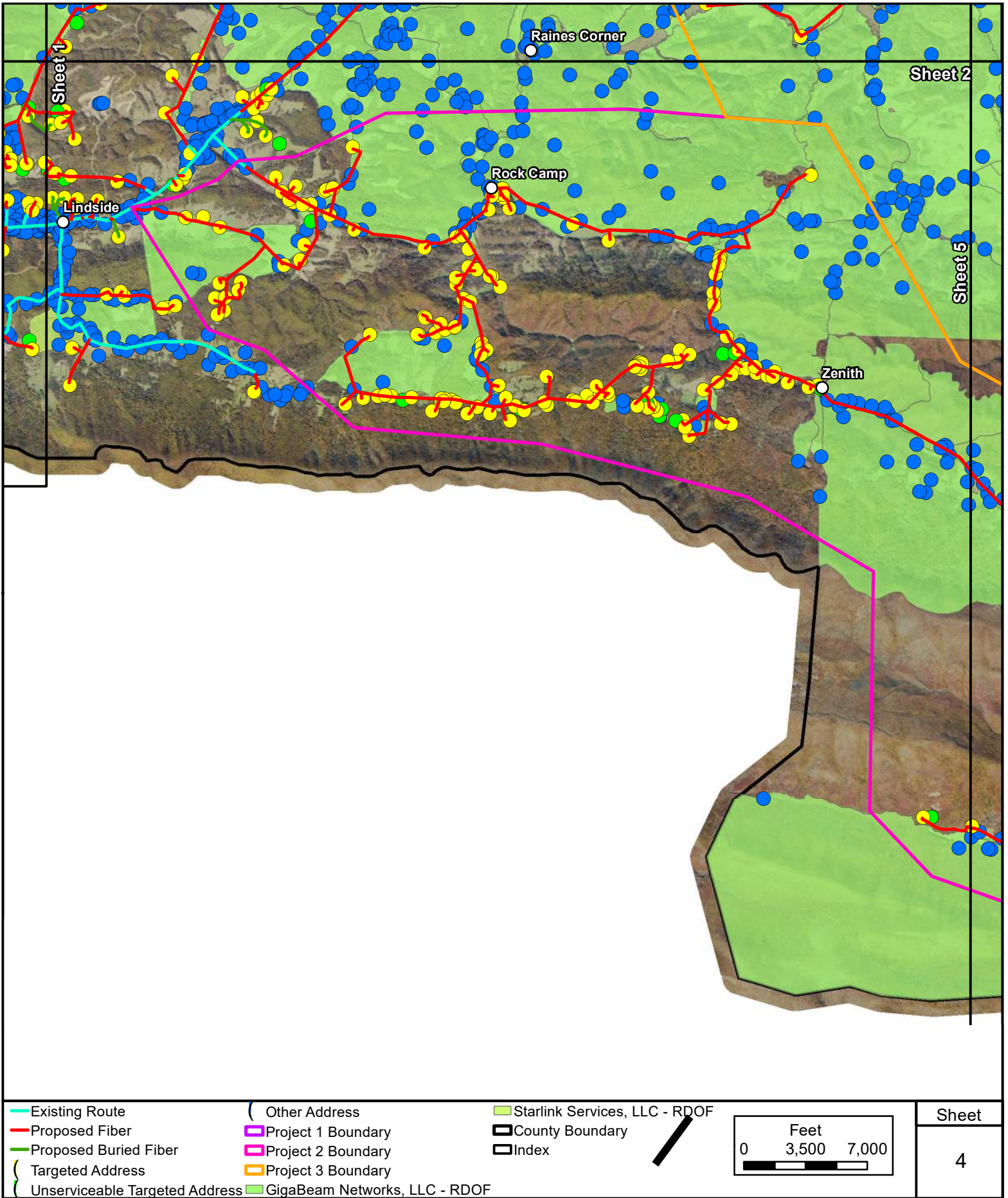


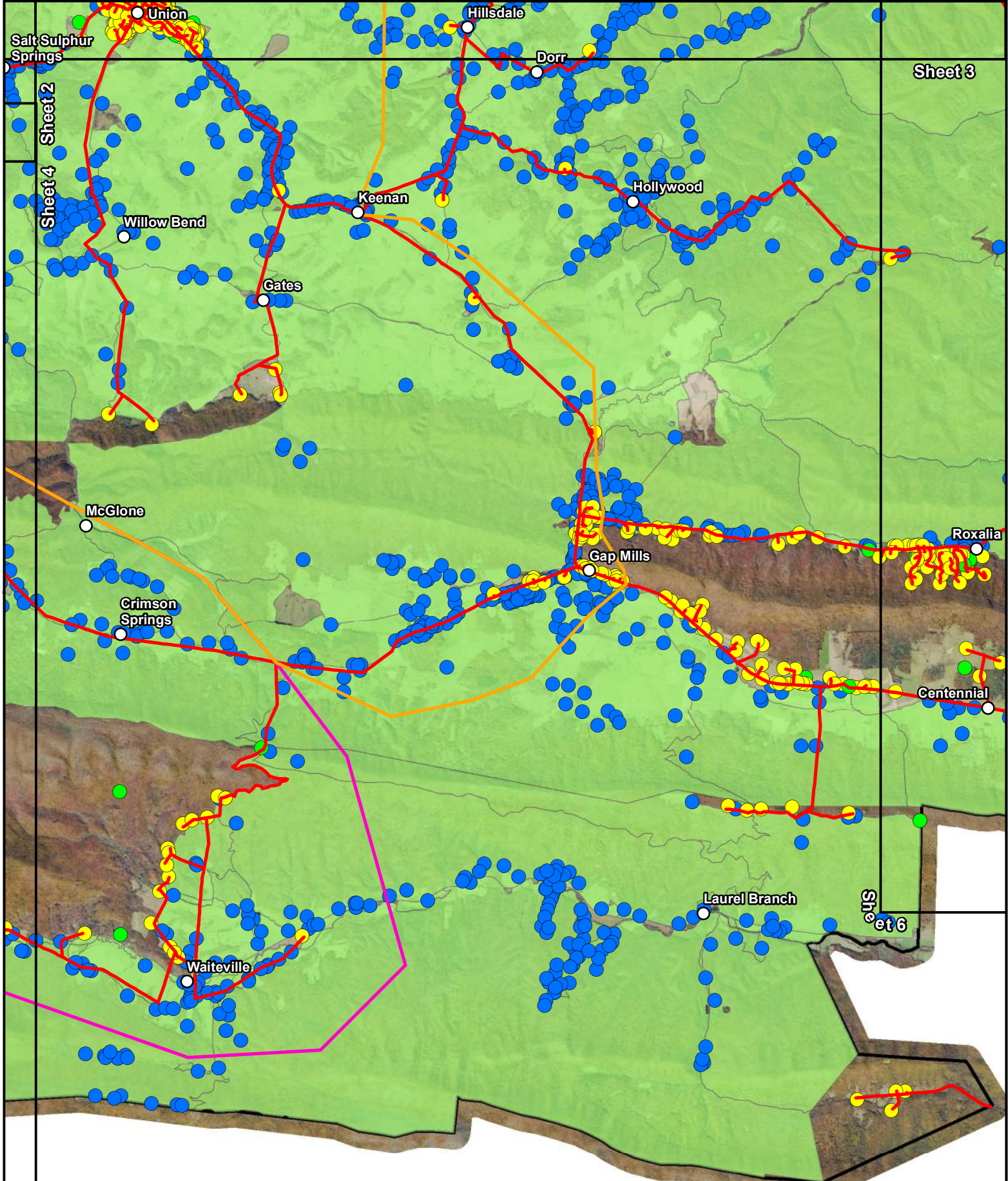
Existing Route	Other Address	Starlink Services, LLC - RDOF		<table border="1"> <tr> <th colspan="3">Feet</th> </tr> <tr> <td>0</td> <td>3,500</td> <td>7,000</td> </tr> </table>	Feet			0	3,500	7,000	Sheet
Feet											
0	3,500	7,000									
Proposed Fiber	Project 1 Boundary	County Boundary			1						
Proposed Buried Fiber	Project 2 Boundary	Index									
Targeted Address	Project 3 Boundary										
Unserviceable Targeted Address	GigaBeam Networks, LLC - RDOF										



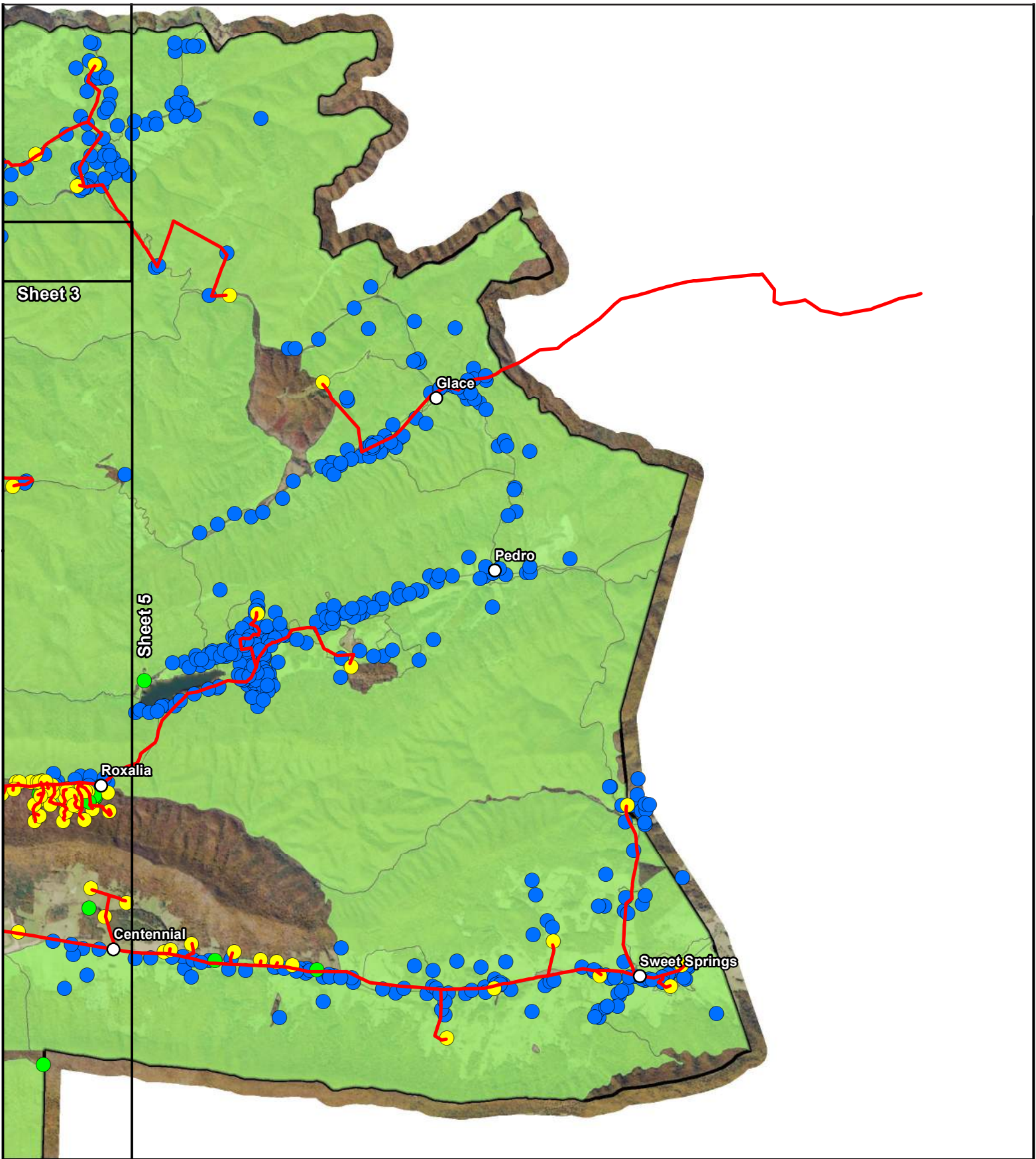


Existing Route	Other Address	Starlink Services, LLC - RDOF	 Feet 0 3,500 7,000	Sheet
Proposed Fiber	Project 1 Boundary	County Boundary		3
Proposed Buried Fiber	Project 2 Boundary	Index		
Targeted Address	Project 3 Boundary	GigaBeam Networks, LLC - RDOF		
Unserviceable Targeted Address				





Existing Route	Other Address	Starlink Services, LLC - RDOF		<table border="1"> <tr> <th colspan="2">Feet</th> </tr> <tr> <td>0</td> <td>3,500 7,000</td> </tr> </table>	Feet		0	3,500 7,000
Feet								
0	3,500 7,000							
Proposed Fiber	Project 1 Boundary	County Boundary	<table border="1"> <tr> <th colspan="2">Sheet</th> </tr> <tr> <td colspan="2">5</td> </tr> </table>	Sheet		5		
Sheet								
5								
Proposed Buried Fiber	Project 2 Boundary	Index						
Targeted Address	Project 3 Boundary							
Unserviceable Targeted Address	GigaBeam Networks, LLC - RDOF							



Existing Route	Other Address	Starlink Services, LLC - RDOF	 Feet 0 3,500 7,000	Sheet
Proposed Fiber	Project 1 Boundary	County Boundary		6
Proposed Buried Fiber	Project 2 Boundary	Index		
Targeted Address	Project 3 Boundary			
Unserviceable Targeted Address	GigaBeam Networks, LLC - RDOF			

Monroe County, WV – 2023 ROC Study – Cost Estimate – Whole County

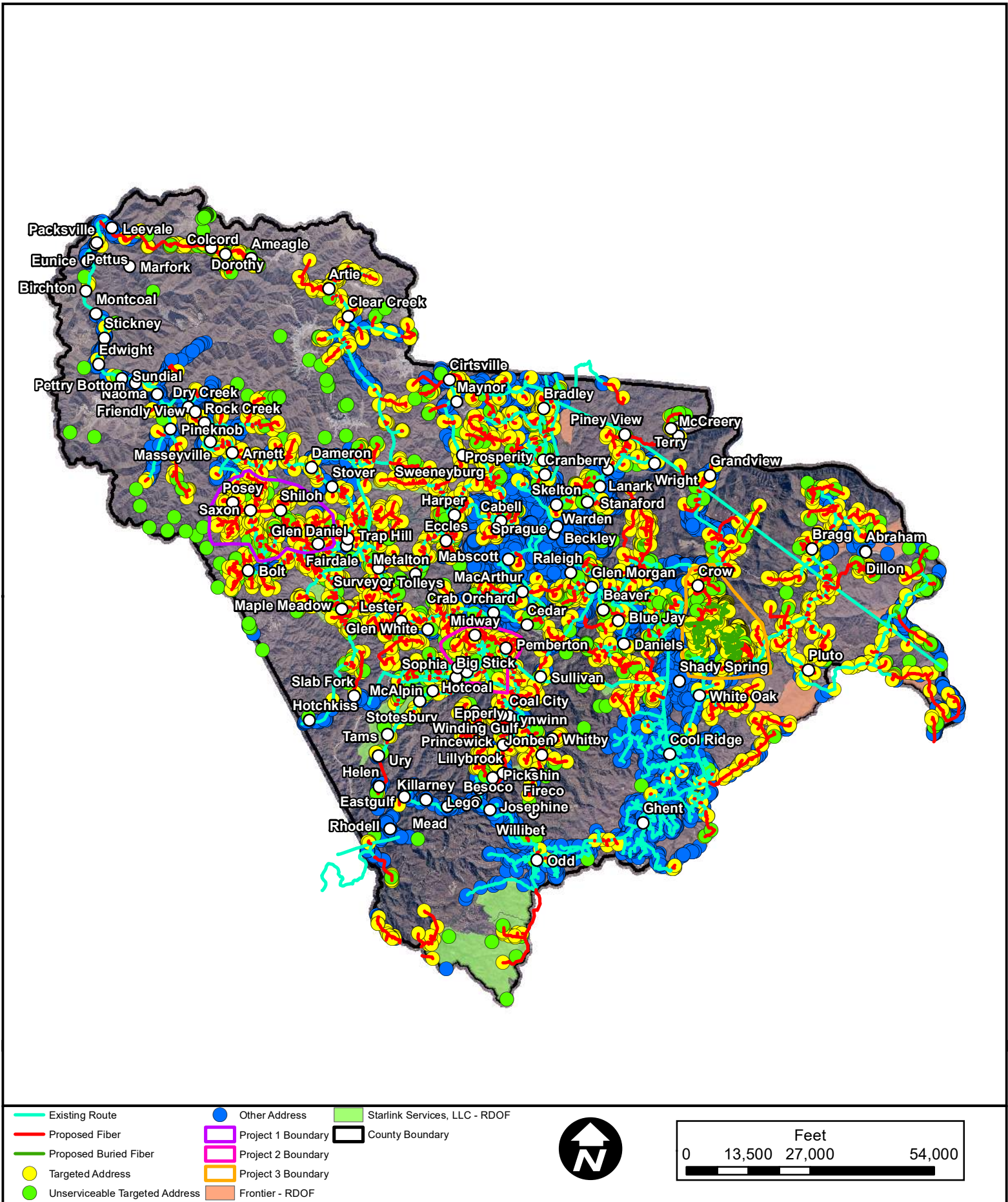
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	305.41	\$1,679,755
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	305.41	\$458,115
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	299.81	\$4,497,150
Aerial Construction Labor	\$50,000.00	Per Mile	299.81	\$14,990,500
Underground Construction Labor	\$150,000.00	Per Mile	5.60	\$840,000
Project Construction Contingency 10%	\$1,583,050.00	Lump Sum	1	\$1,583,050
Legal 1.5%	\$237,457.50	Lump Sum	1	\$237,458
Administrative 2%	\$316,610.00	Lump Sum	1	\$316,610
TOTAL COST = \$24,602,638				

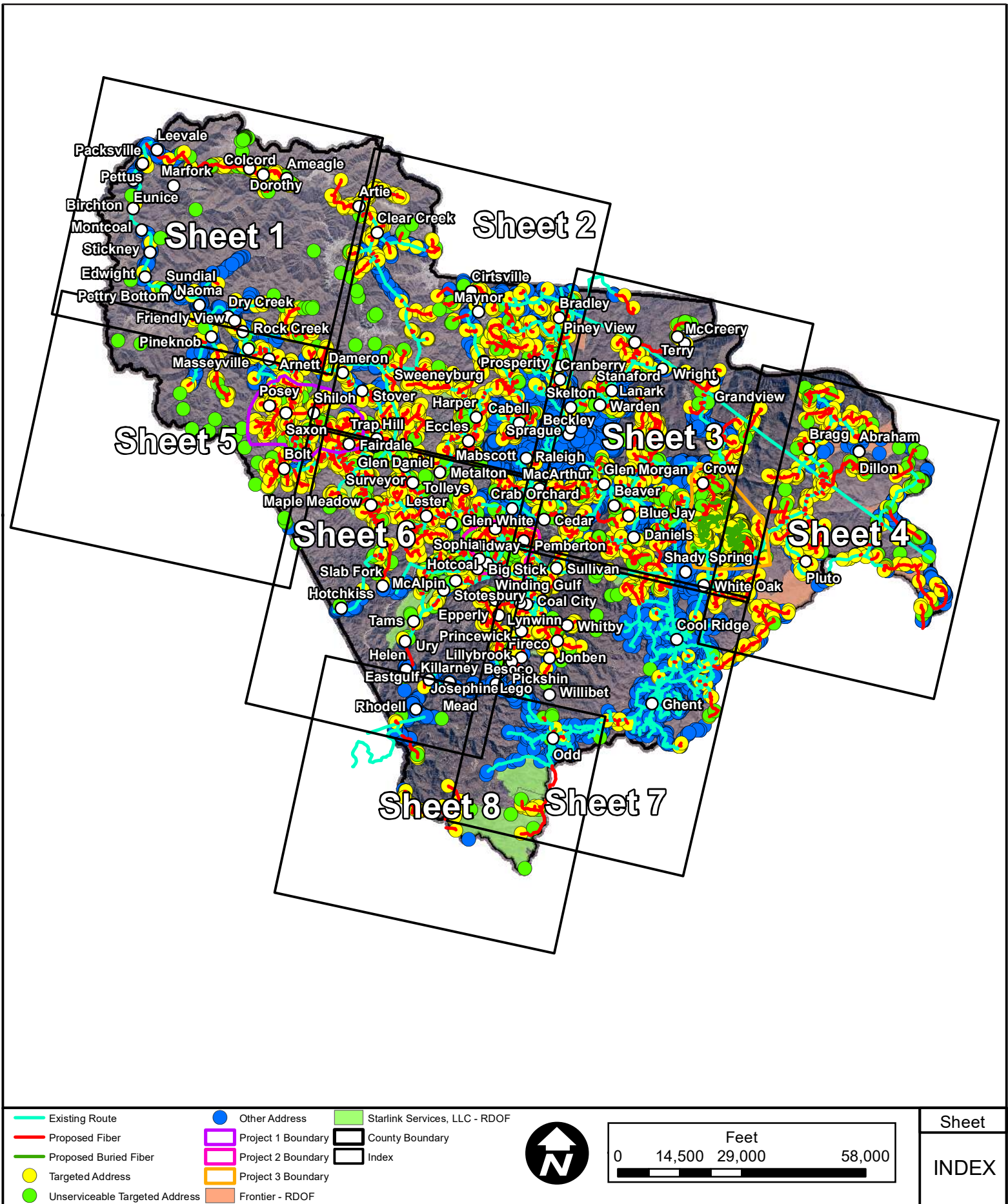
COUNTY SAMPLE PROJECT

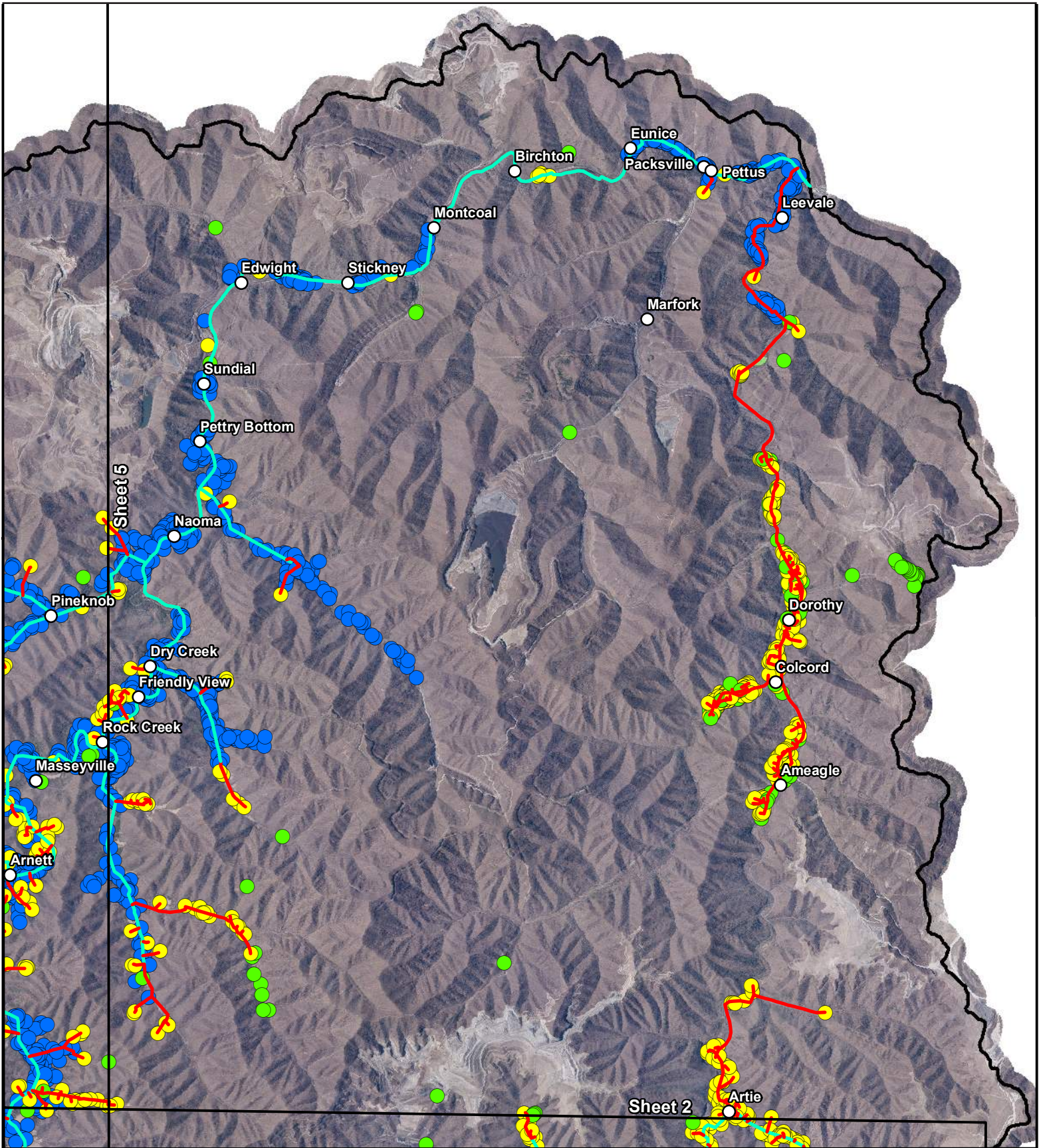
Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
1	Monroe	1	270	44.63	\$3,636,473
		2	164	46.12	\$3,631,950
		3	466	52.38	\$4,293,360



RALEIGH COUNTY







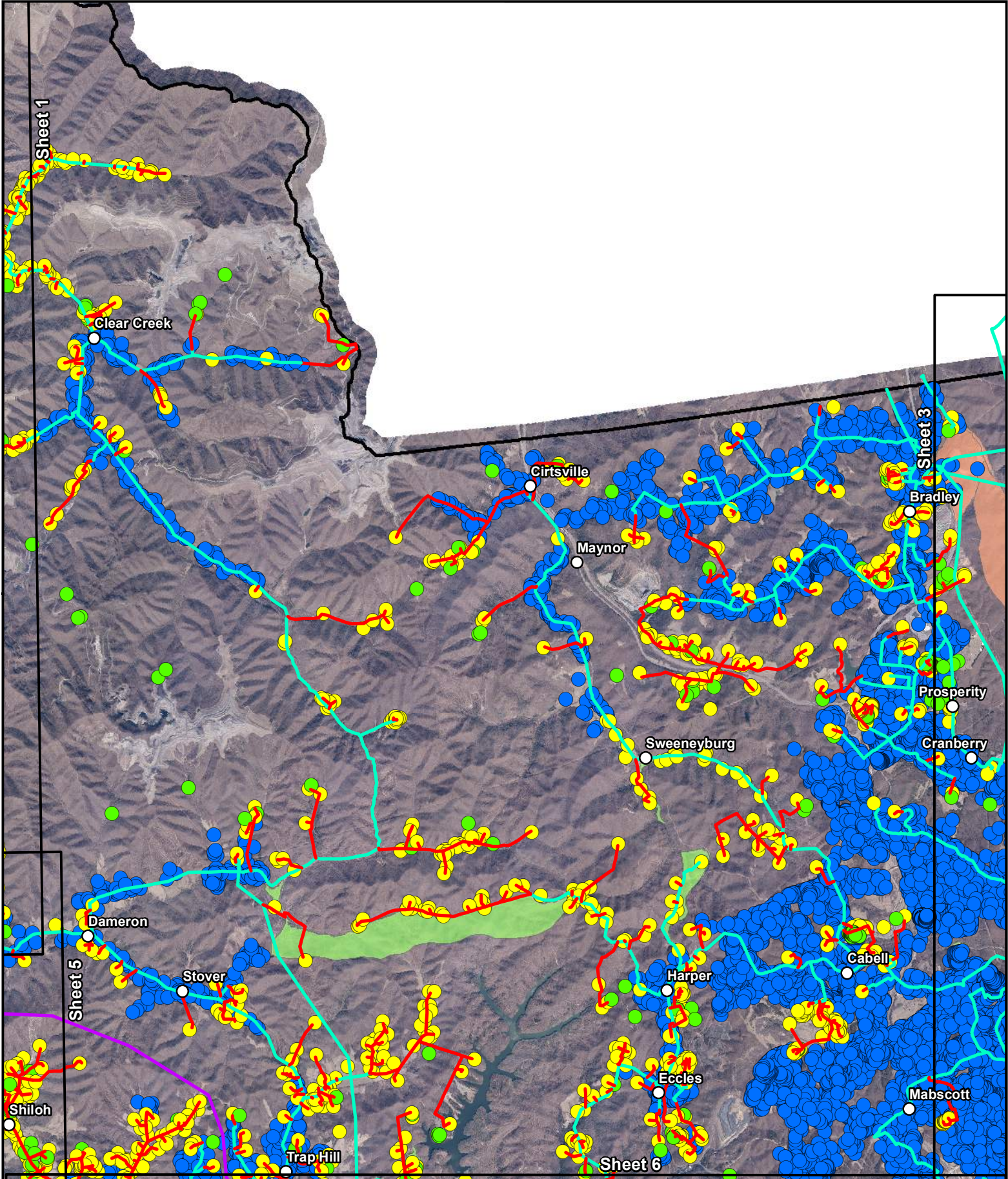
Existing Route	Other Address	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

0 3,500 7,000 14,000

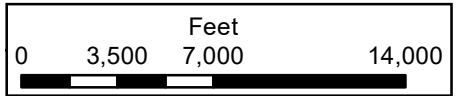
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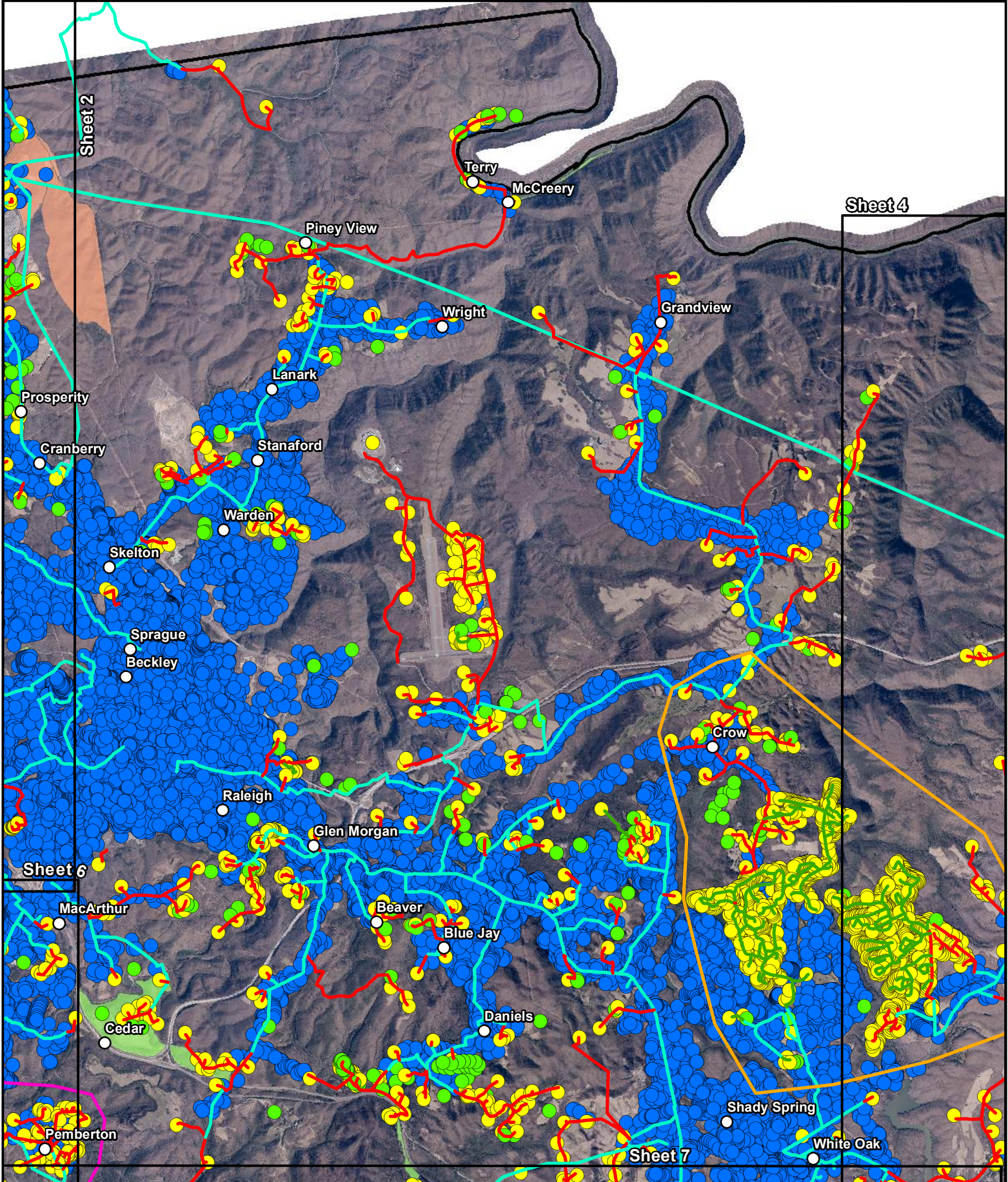
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- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Starlink Services, LLC - RDOF
- County Boundary
- Index
- Frontier - RDOF



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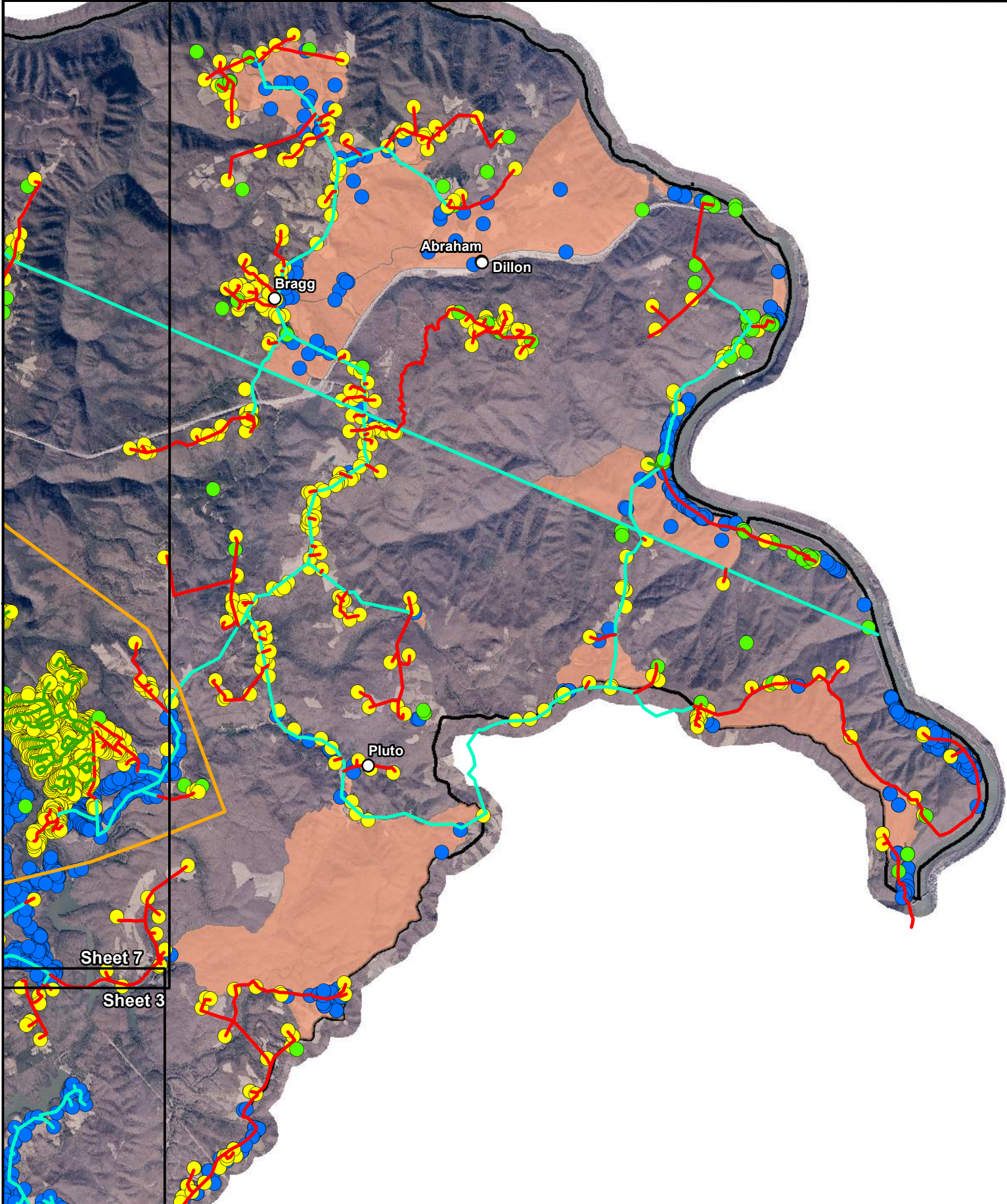
Existing Route	Other Address	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Feet

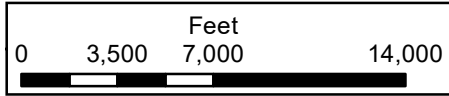
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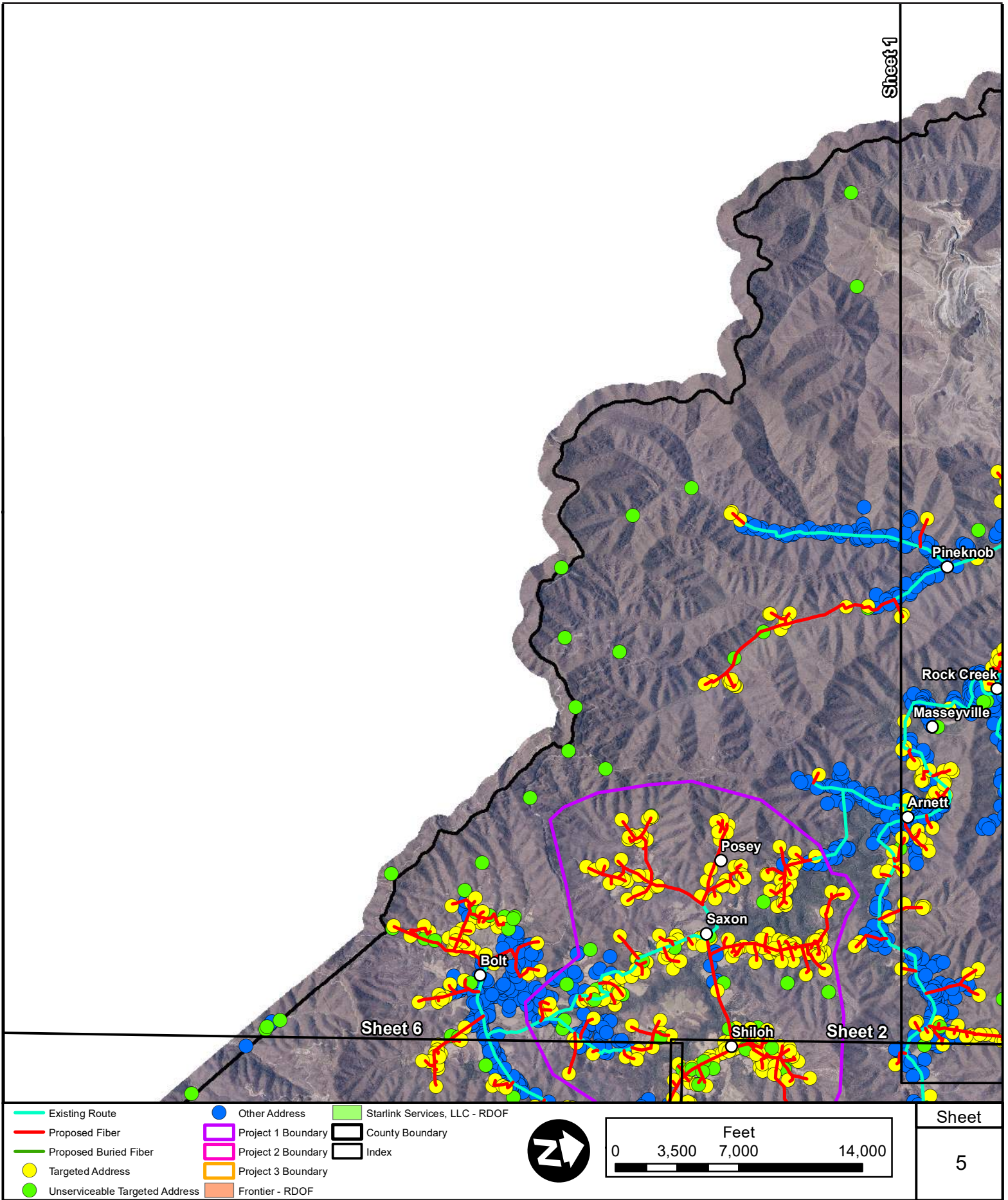
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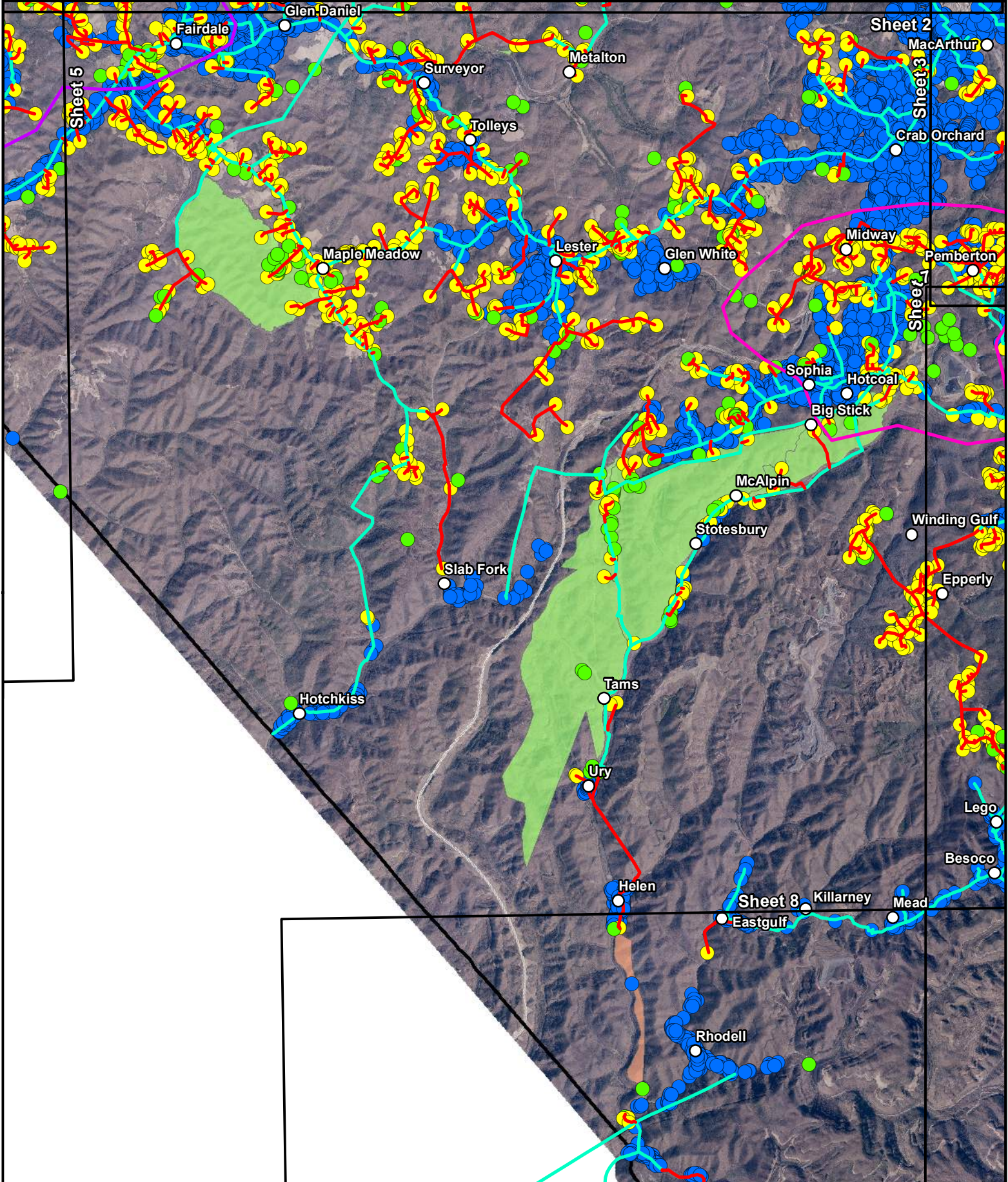


- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index



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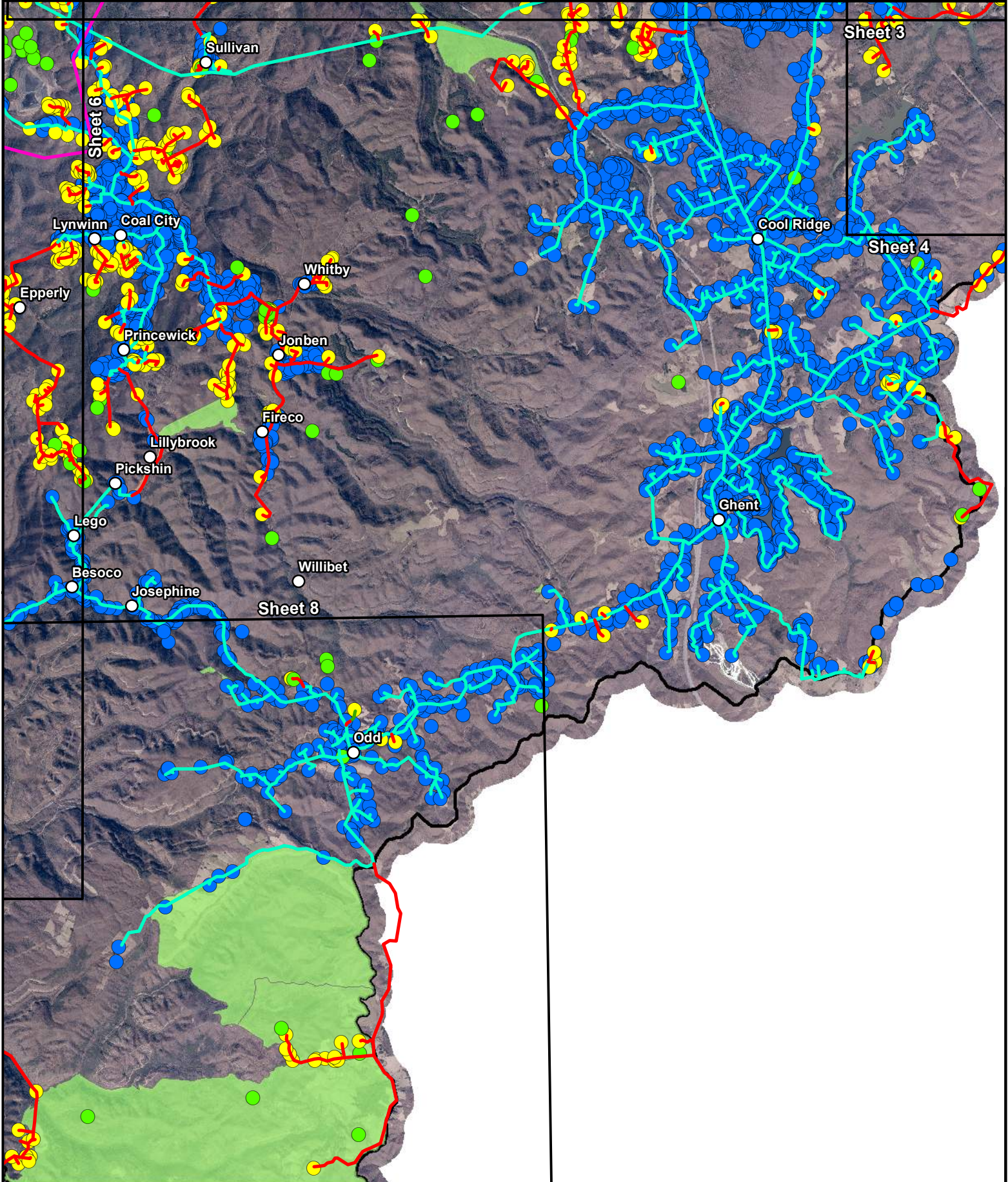


Existing Route	Other Address	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

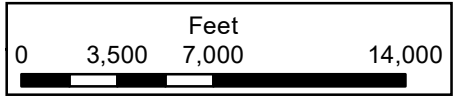
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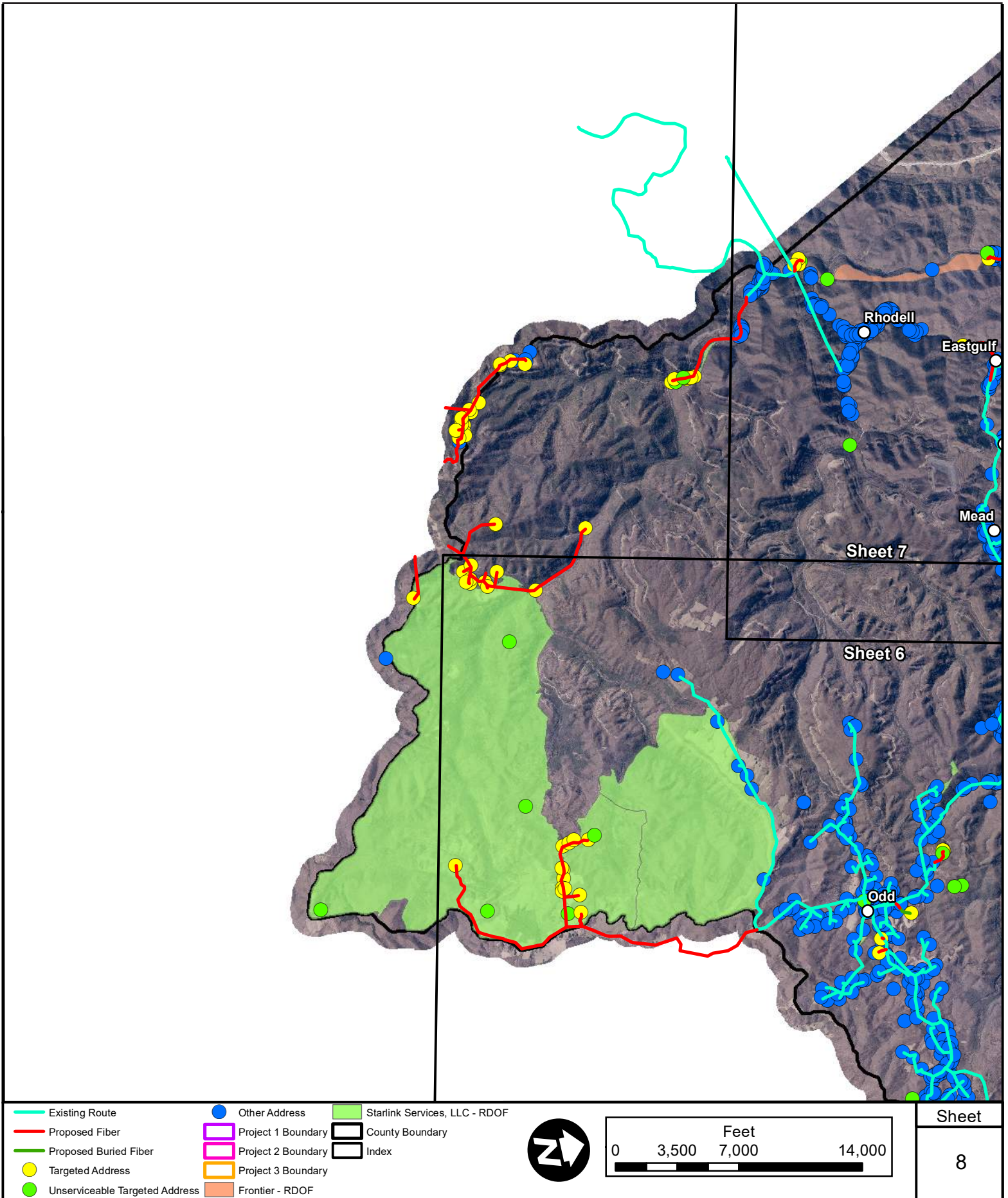
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- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index



Sheet
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Raleigh County, WV – 2023 ROC Study – Cost Estimate – Whole County

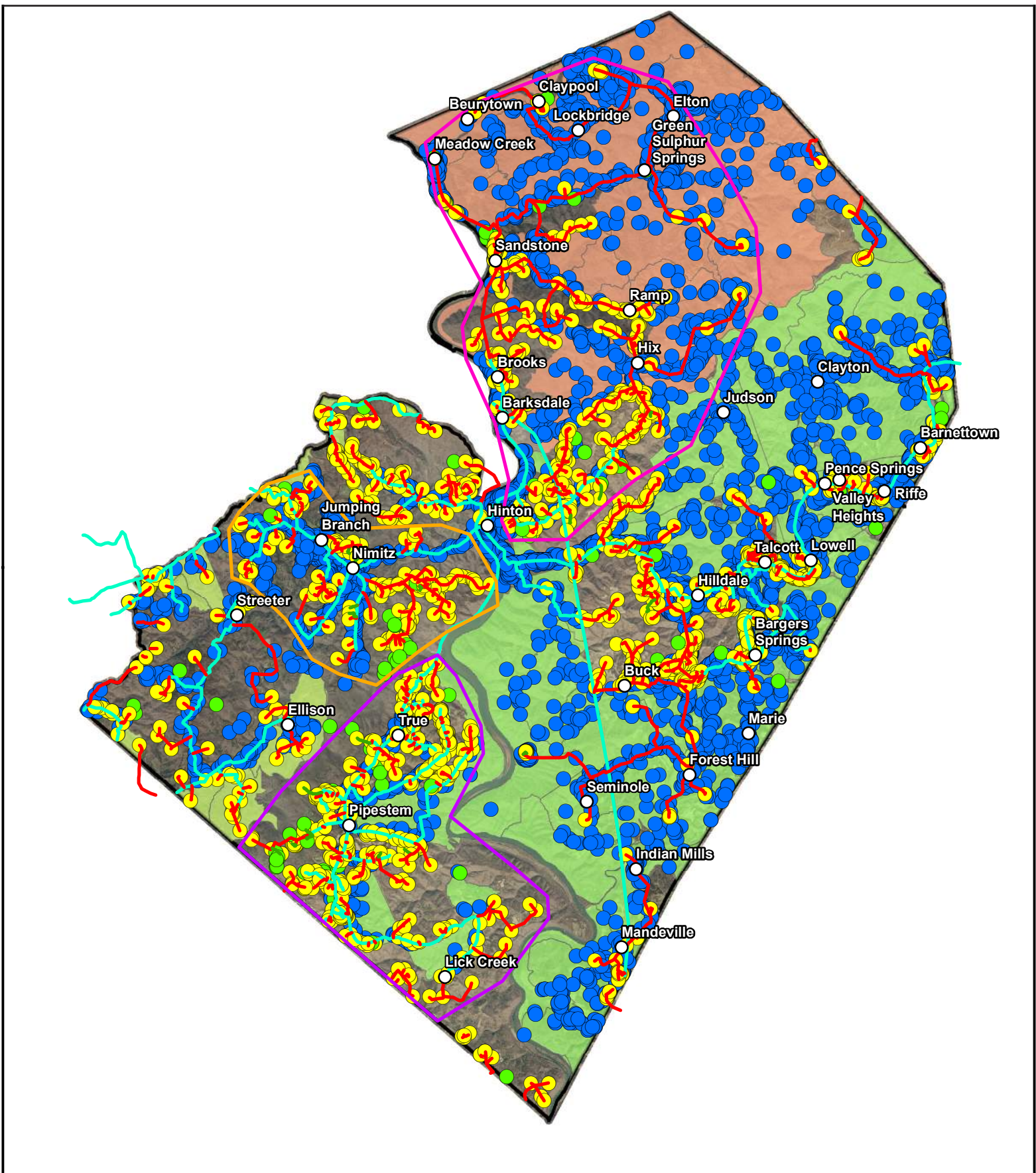
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	392.32	\$2,157,760
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	392.32	\$588,480
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	369.90	\$5,548,500
Aerial Construction Labor	\$50,000.00	Per Mile	369.90	\$18,495,000
Underground Construction Labor	\$150,000.00	Per Mile	22.42	\$3,363,000
Project Construction Contingency 10%	\$2,185,800.00	Lump Sum	1	\$2,185,800
Legal 1.5%	\$327,870.00	Lump Sum	1	\$327,870
Administrative 2%	\$437,160.00	Lump Sum	1	\$437,160
TOTAL COST = \$33,103,570				

COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
1	Raleigh	1	351	28.09	\$2,212,088
		2	275	12.57	\$989,888
		3	1802	31.82	\$4,602,890



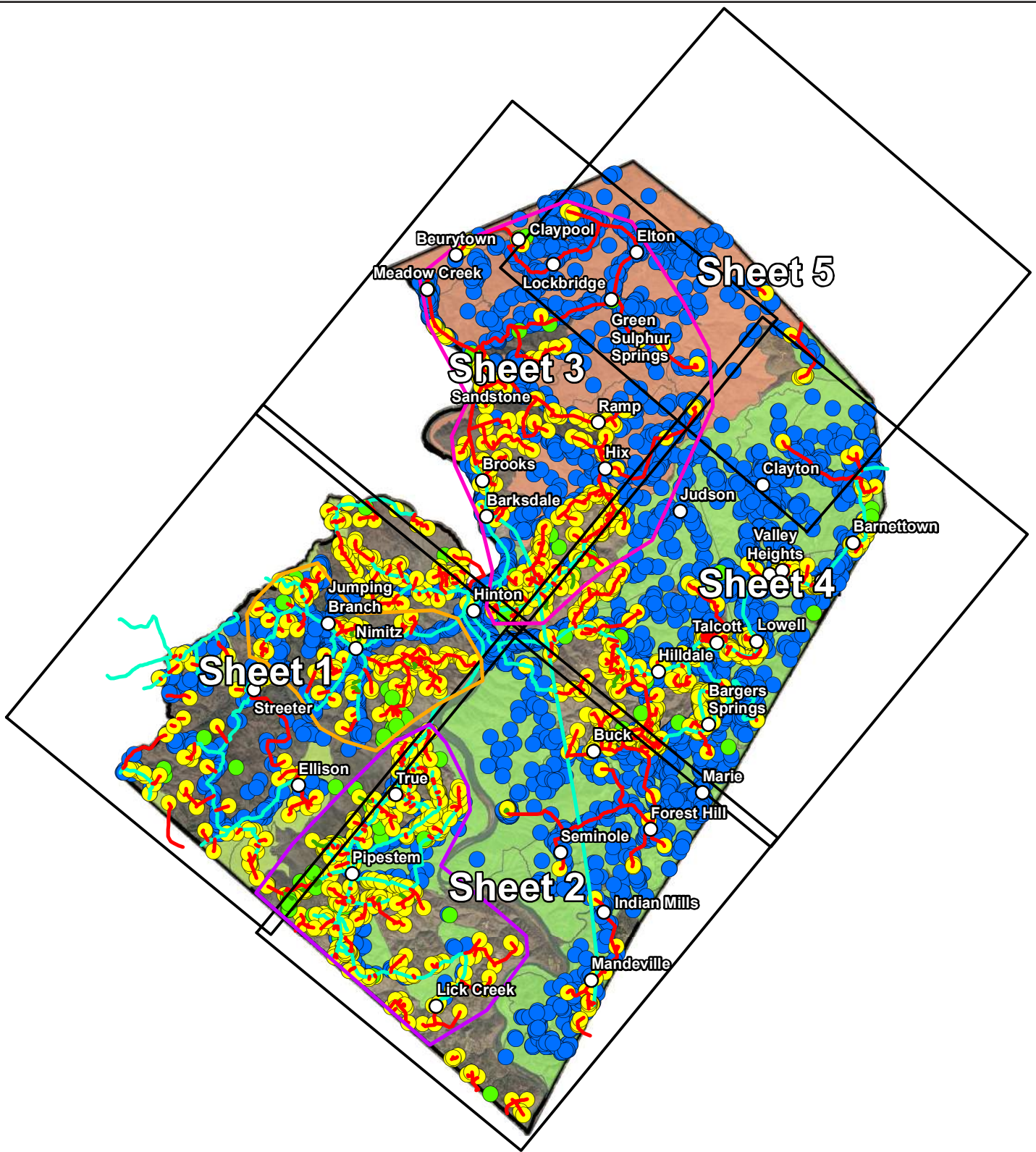
SUMMERS COUNTY



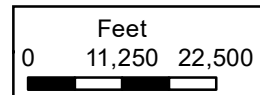
Existing Route	Other Address	GigaBeam Networks, LLC - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Feet

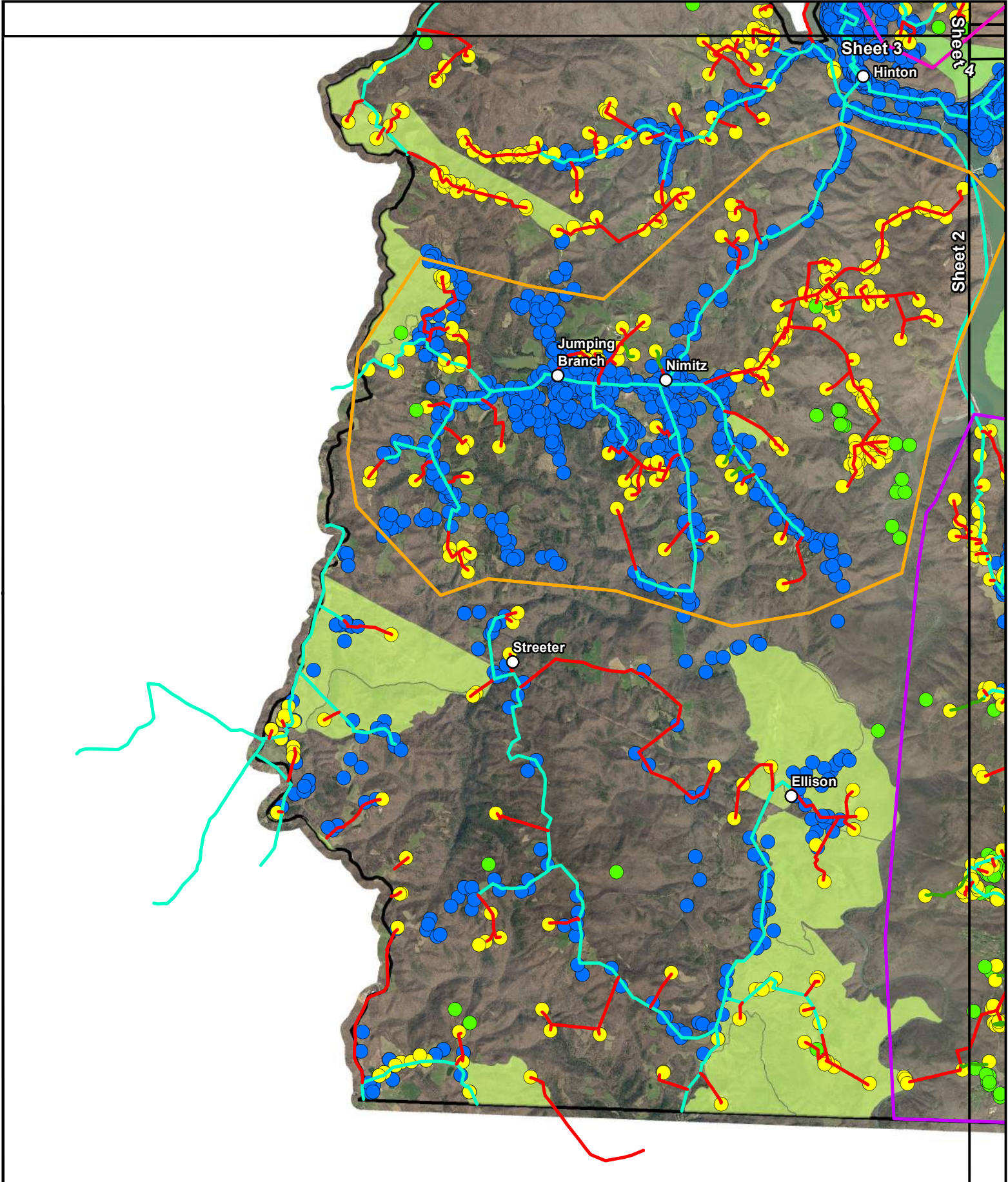
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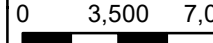
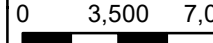
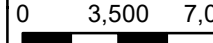


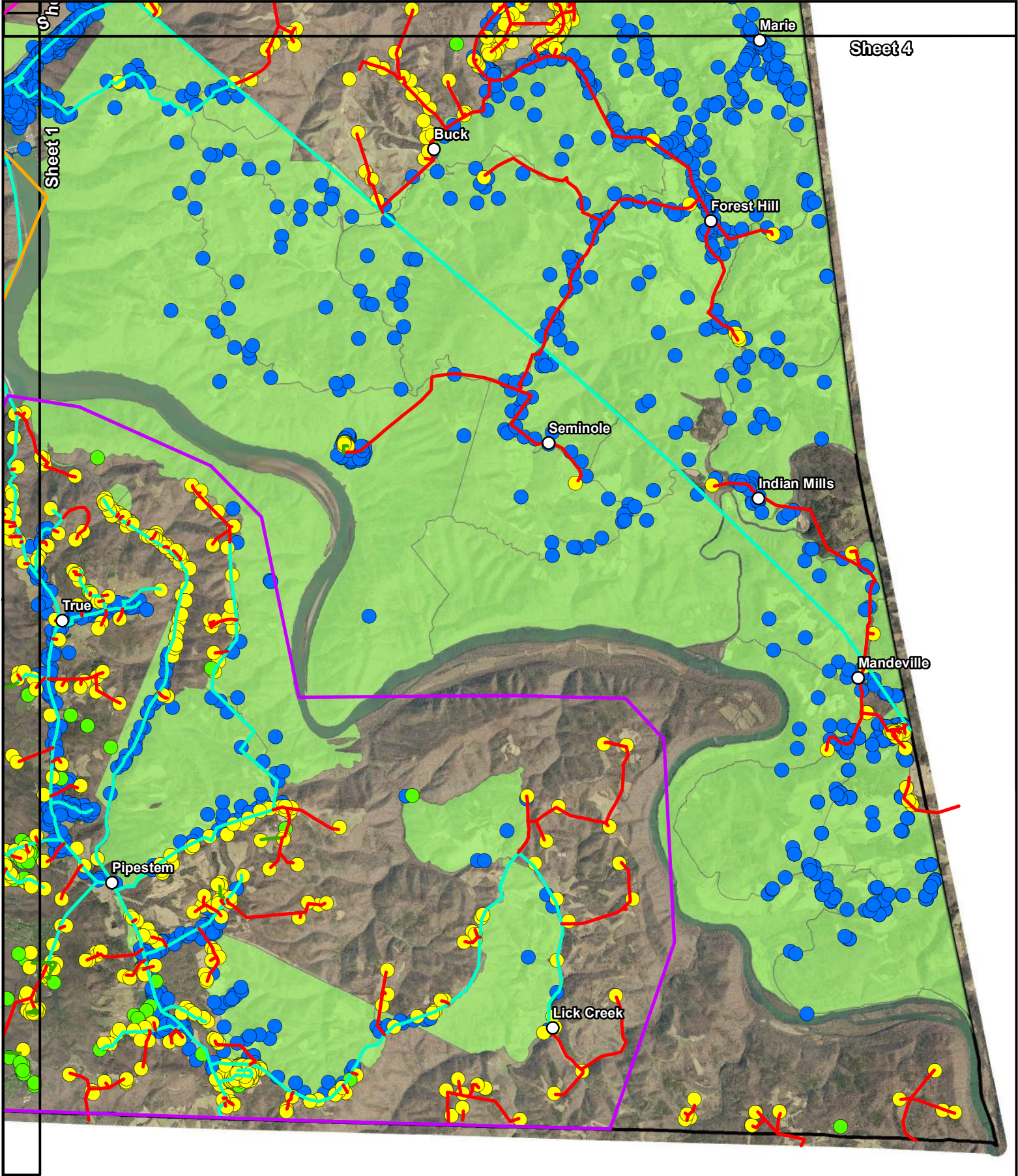
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- GigaBeam Networks, LLC - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index



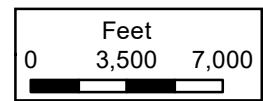
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INDEX



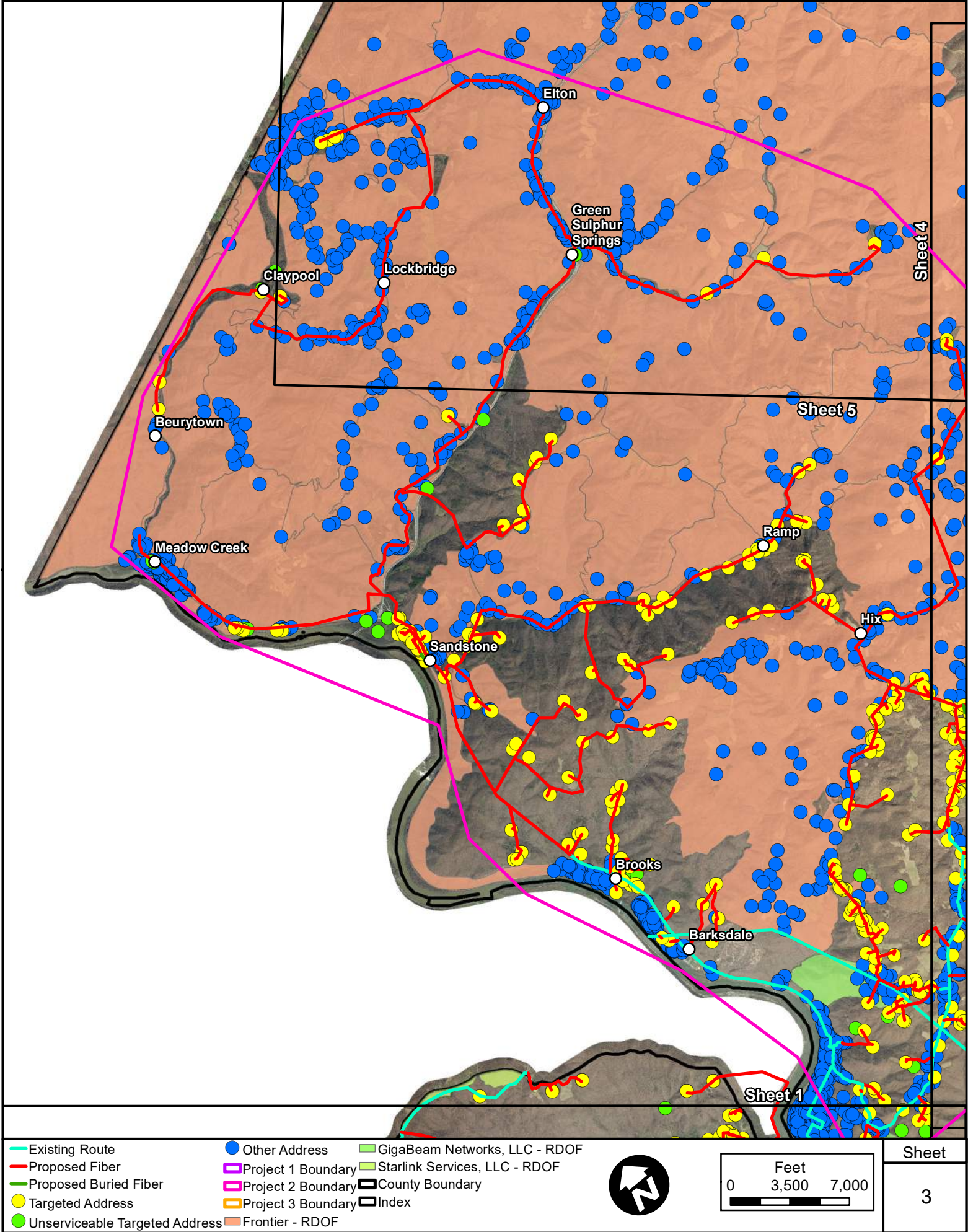
Existing Route	Other Address	GigaBeam Networks, LLC - RDOF		<table border="1"> <tr> <th colspan="3">Feet</th> </tr> <tr> <td>0</td> <td>3,500</td> <td>7,000</td> </tr> <tr> <td colspan="3">  </td> </tr> </table>	Feet			0	3,500	7,000				Sheet
Feet														
0	3,500	7,000												
														
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF	1											
Proposed Buried Fiber	Project 2 Boundary	County Boundary												
Targeted Address	Project 3 Boundary	Index												
Unserviceable Targeted Address	Frontier - RDOF													

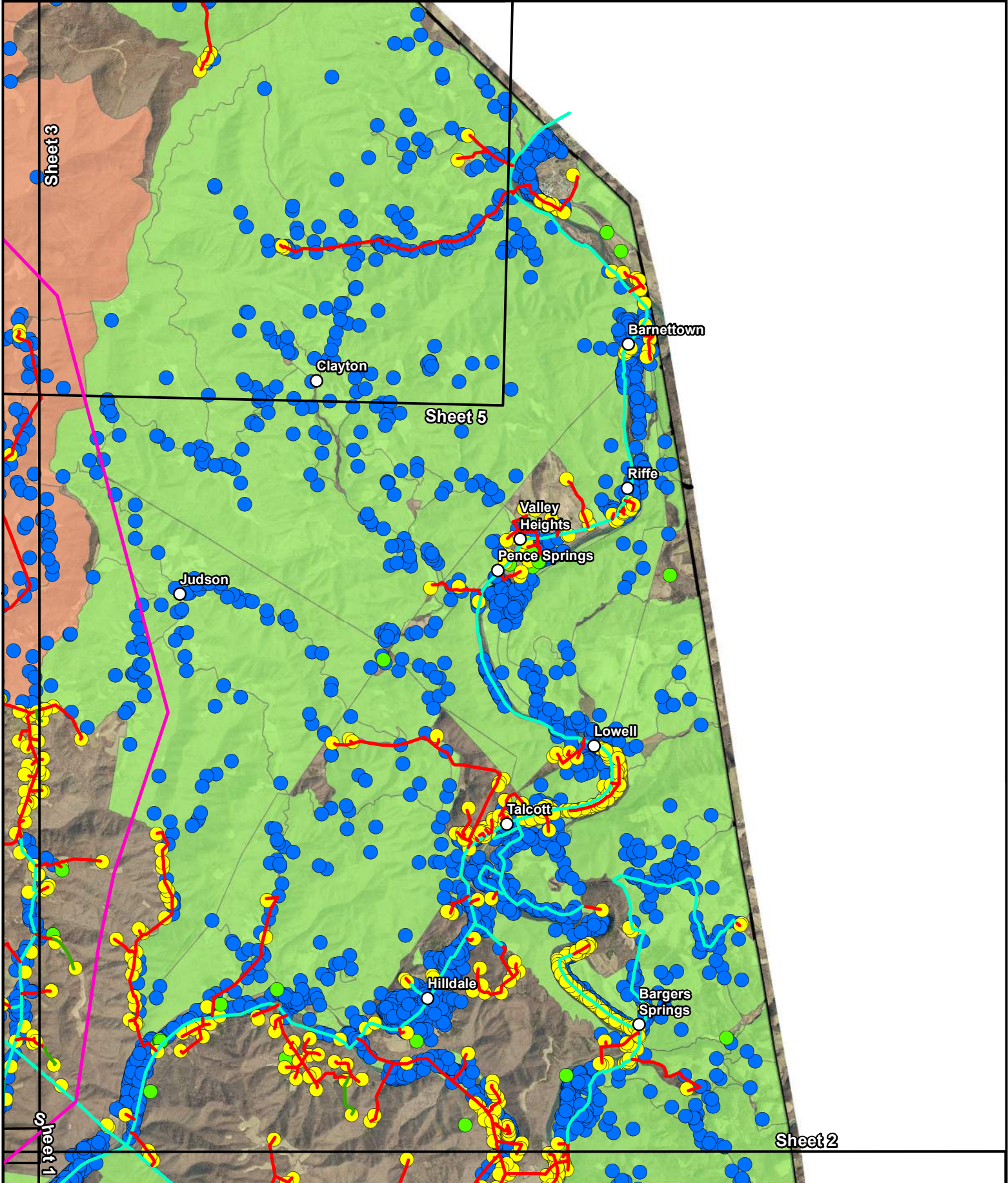



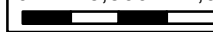
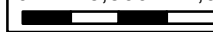
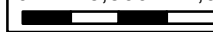
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- GigaBeam Networks, LLC - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index

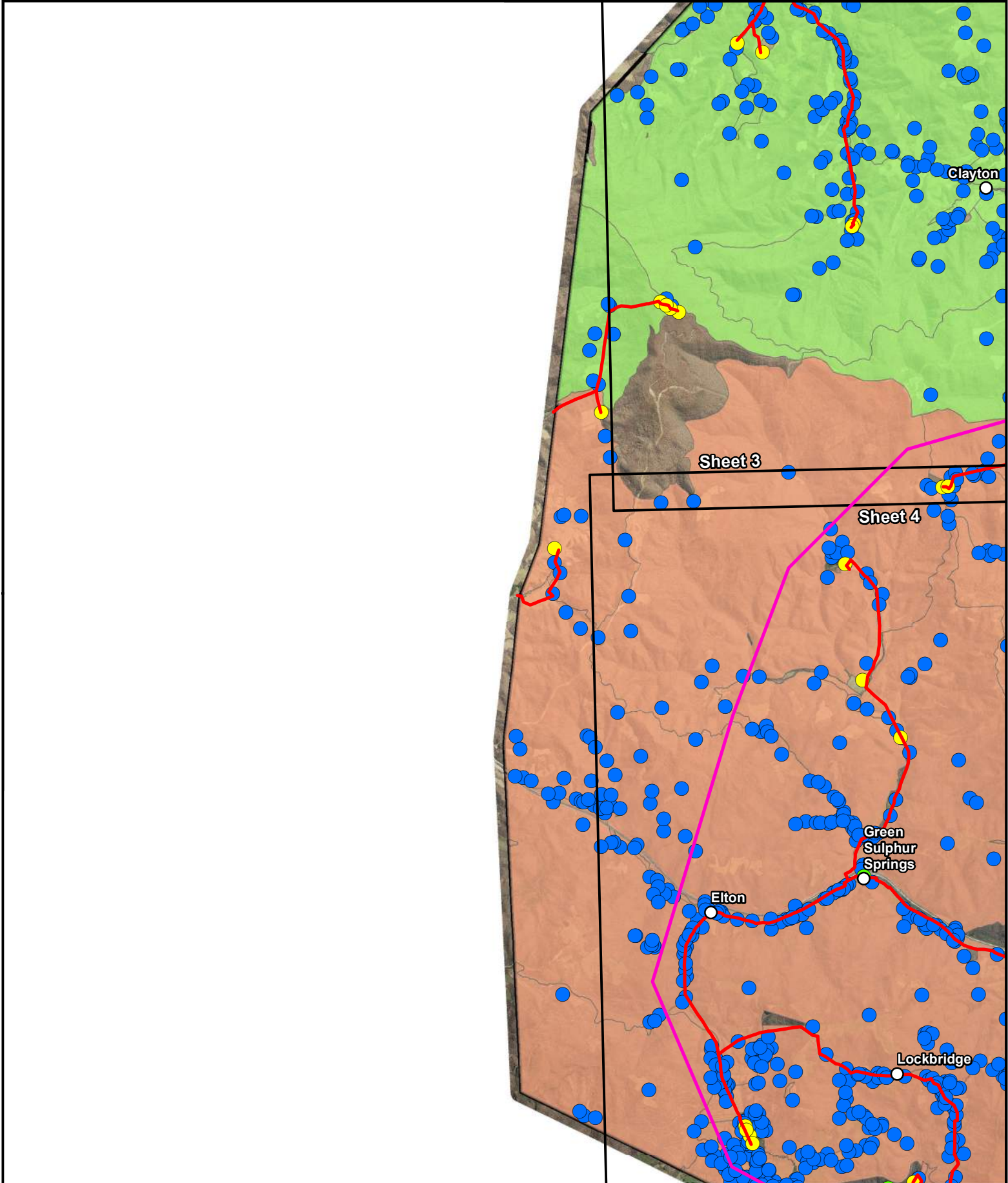


Sheet
2





<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Address Project 1 Boundary Project 2 Boundary Project 3 Boundary County Boundary Index 	<ul style="list-style-type: none"> GigaBeam Networks, LLC - RDOF Starlink Services, LLC - RDOF Frontier - RDOF 		<table border="1"> <tr> <td colspan="3">Feet</td> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">3,500</td> <td style="text-align: center;">7,000</td> </tr> <tr> <td colspan="3"></td> </tr> </table>	Feet			0	3,500	7,000				<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td style="text-align: center;">4</td> </tr> </table>	Sheet	4
Feet																
0	3,500	7,000														
																
Sheet																
4																



Existing Route	Other Address	GigaBeam Networks, LLC - RDOF		<table border="1"> <tr> <td colspan="3">Feet</td> </tr> <tr> <td>0</td> <td>3,500</td> <td>7,000</td> </tr> <tr> <td colspan="3"></td> </tr> </table>	Feet			0	3,500	7,000			
Feet													
0	3,500	7,000											
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF	Sheet										
Proposed Buried Fiber	Project 2 Boundary	County Boundary	5										
Targeted Address	Project 3 Boundary	Index											
Unserviceable Targeted Address	Frontier - RDOF												

Summers County, WV – 2023 ROC Study – Cost Estimate – Whole County

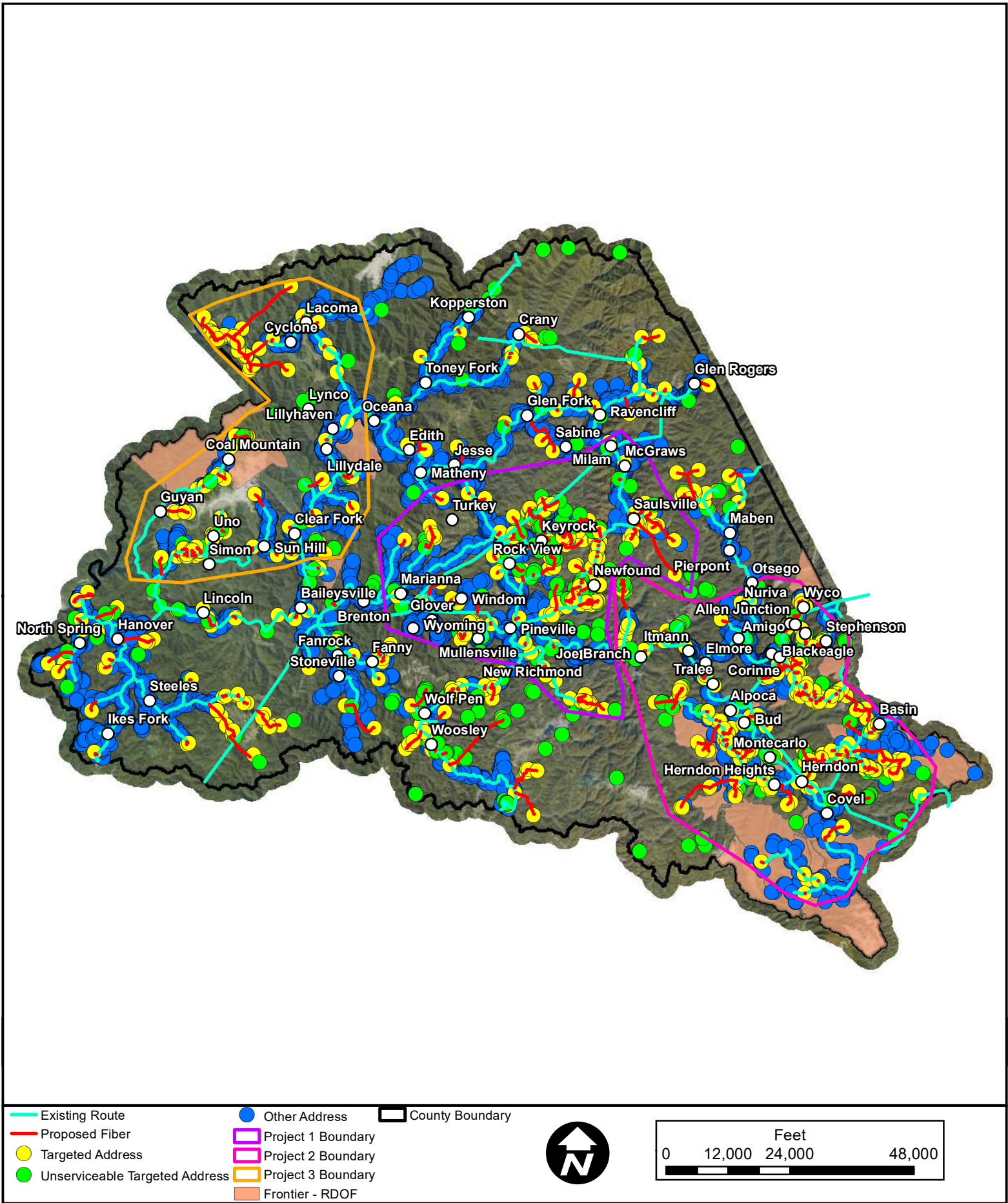
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	220.04	\$1,210,220
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	220.04	\$330,060
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	215.12	\$3,226,800
Aerial Construction Labor	\$50,000.00	Per Mile	215.12	\$10,756,000
Underground Construction Labor	\$150,000.00	Per Mile	4.92	\$738,000
Project Construction Contingency 10%	\$1,149,400.00	Lump Sum	1	\$1,149,400
Legal 1.5%	\$172,410.00	Lump Sum	1	\$172,410
Administrative 2%	\$229,880.00	Lump Sum	1	\$229,880
TOTAL COST = \$17,812,770				

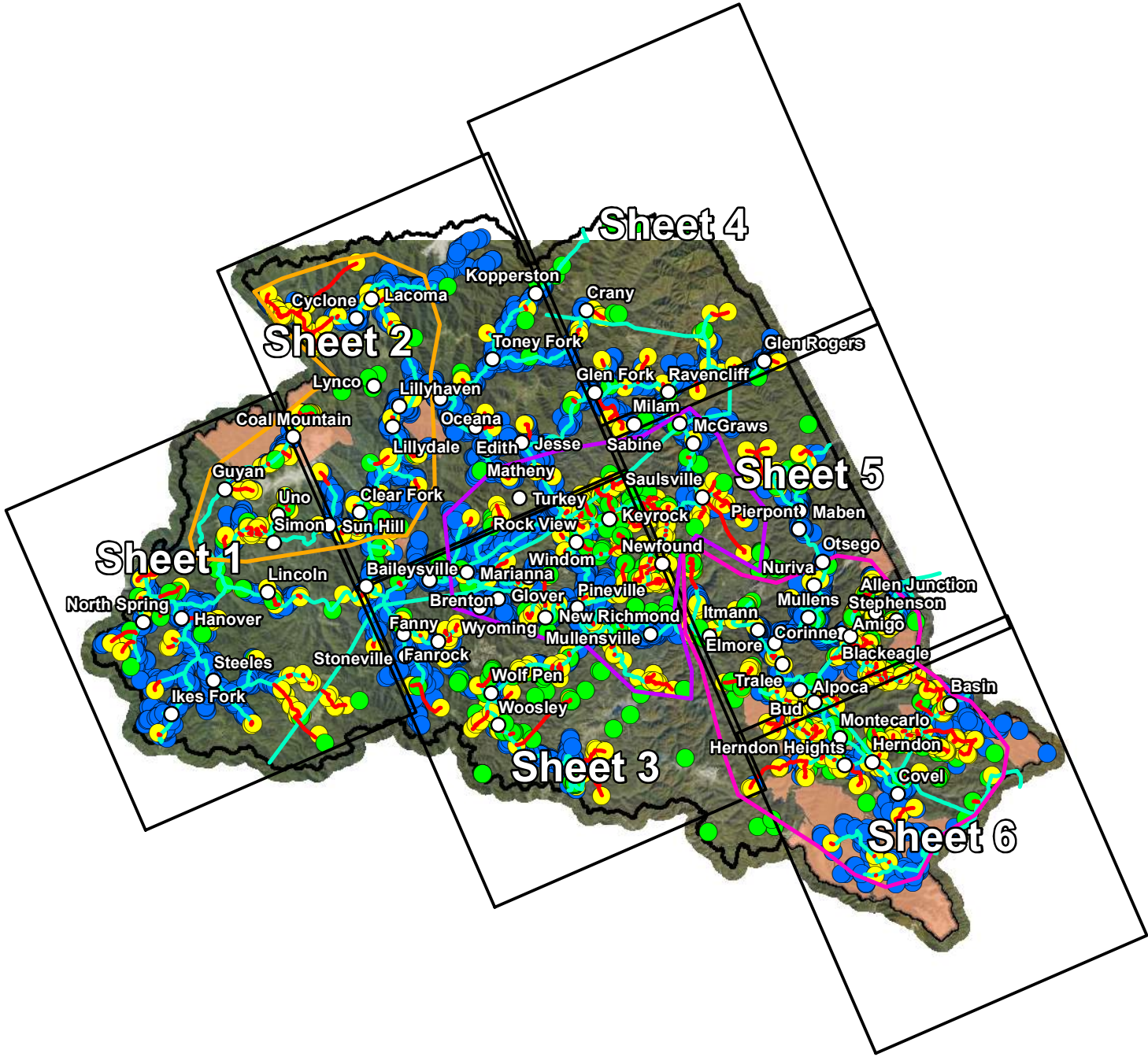
COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
1	Summers	1	509	30.87	\$2,668,398
		2	302	75.18	\$6,005,135
		3	177	26.10	\$2,159,785

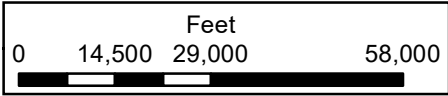


WYOMING COUNTY

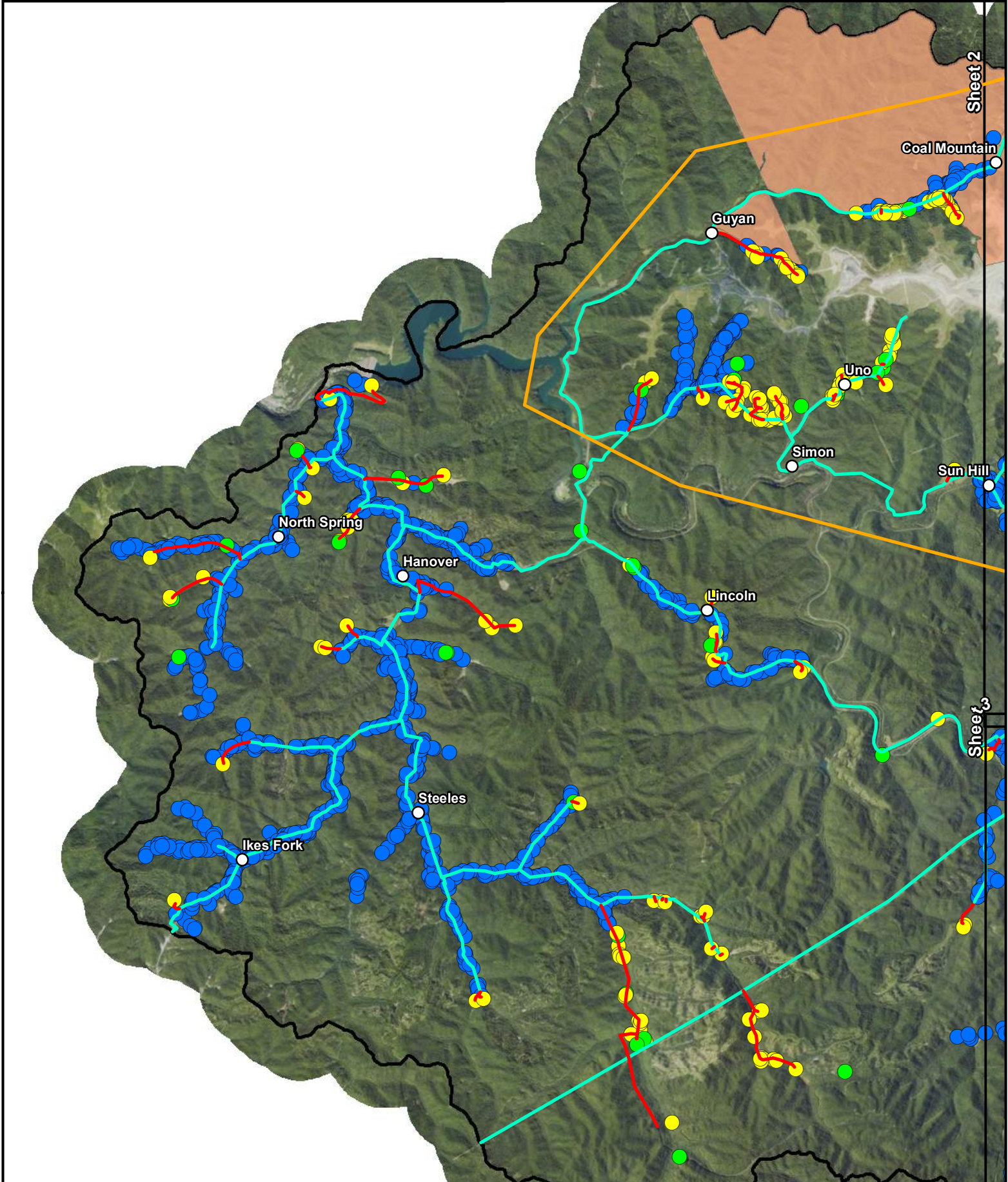




- Existing Route
- Proposed Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary
- Index



Sheet
INDEX



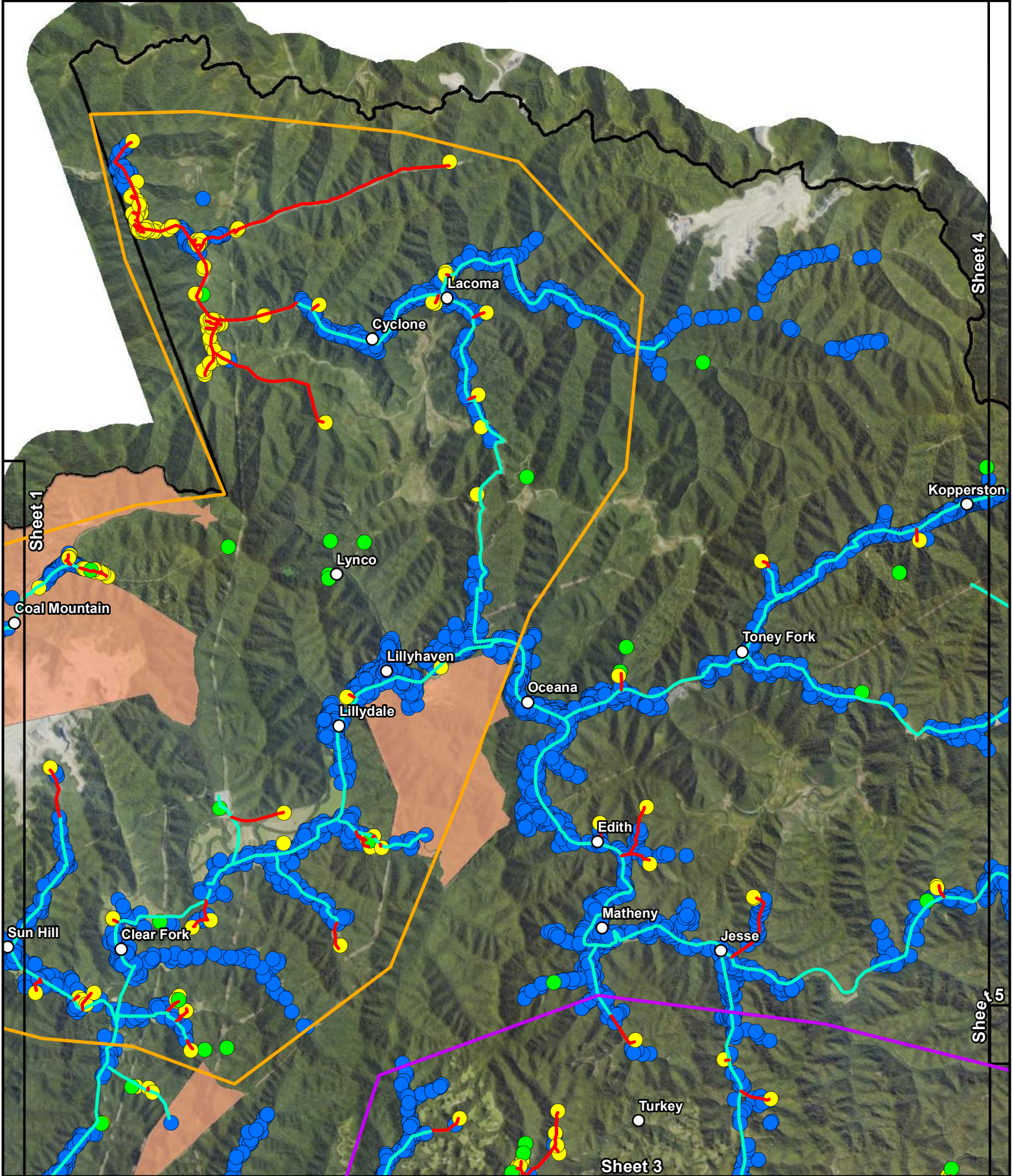
Existing Route	Other Address	County Boundary
Proposed Fiber	Project 1 Boundary	Index
Targeted Address	Project 2 Boundary	
Unserviceable Targeted Address	Project 3 Boundary	
	Frontier - RDOF	

Feet

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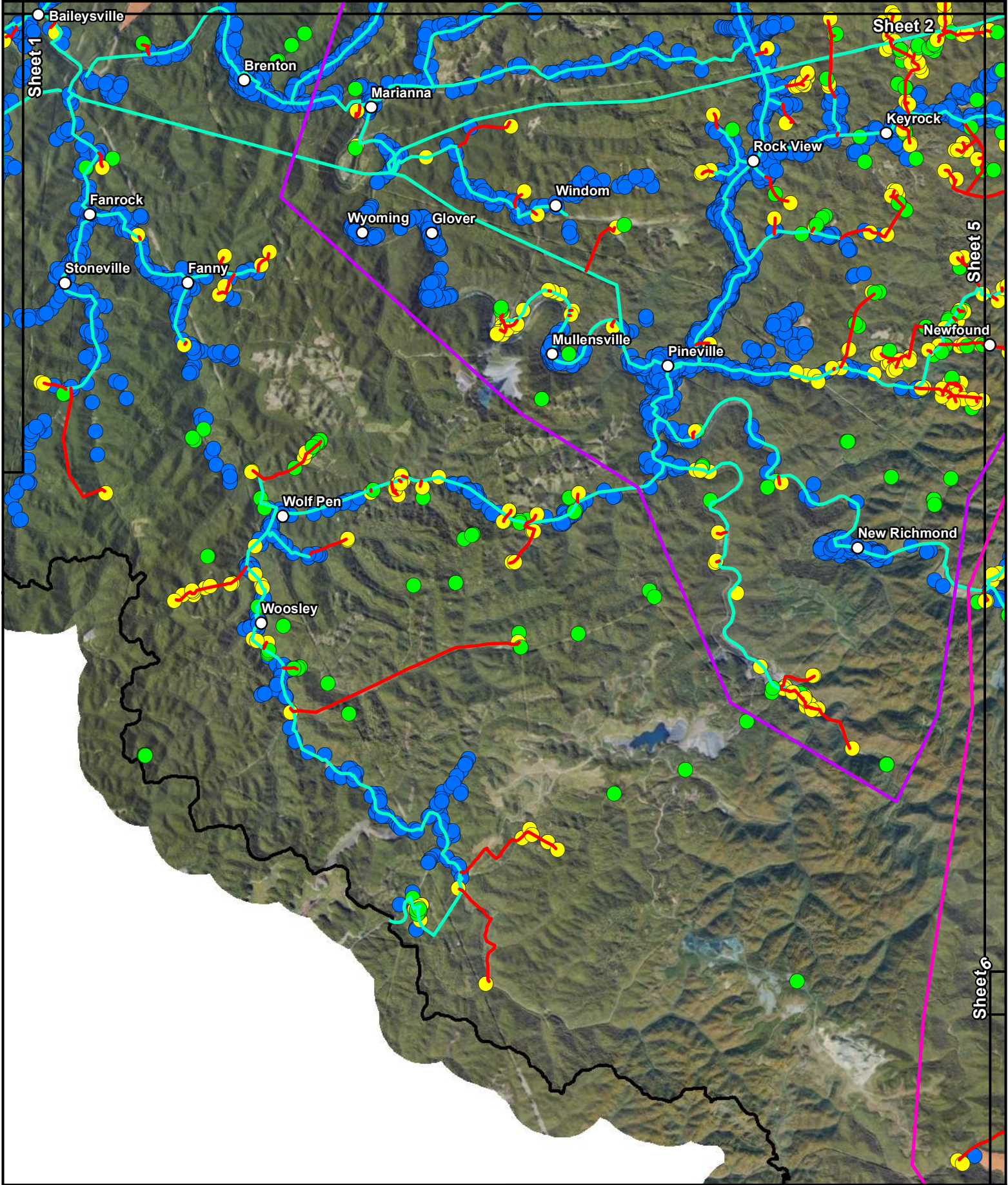
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Existing Route	Other Address	County Boundary
Proposed Fiber	Project 1 Boundary	Index
Targeted Address	Project 2 Boundary	
Unserviceable Targeted Address	Project 3 Boundary	
	Frontier - RDOF	

Feet			
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Sheet
2



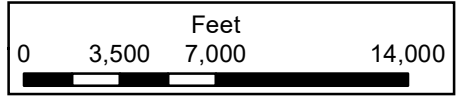
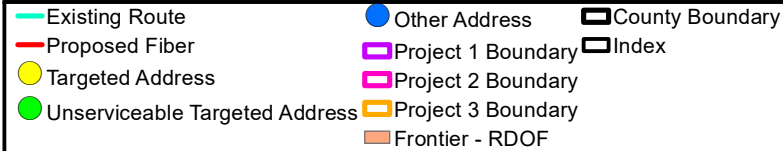
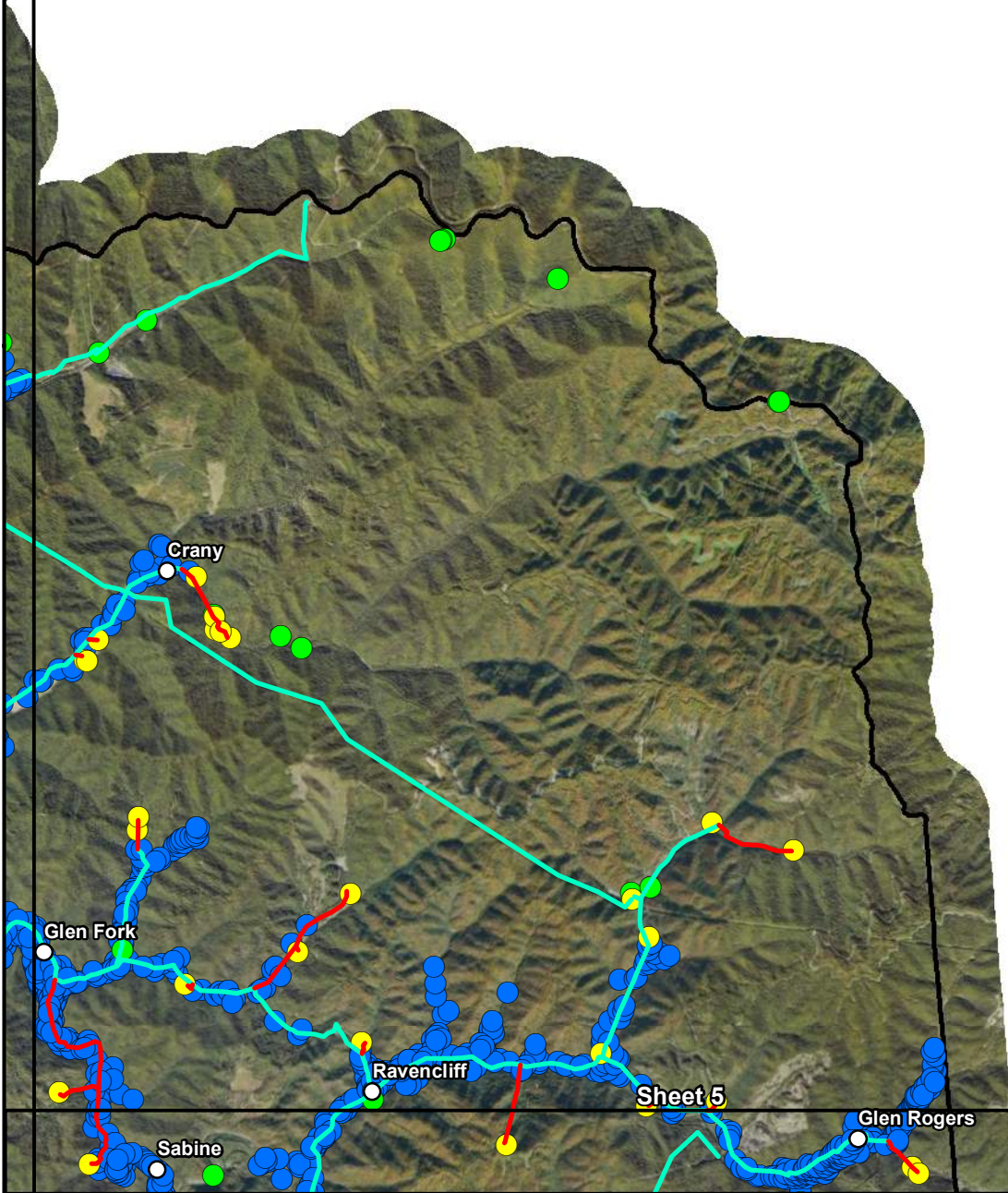
Existing Route	Other Address	County Boundary
Proposed Fiber	Project 1 Boundary	Index
Targeted Address	Project 2 Boundary	
Unserviceable Targeted Address	Project 3 Boundary	
	Frontier - RDOF	

Feet

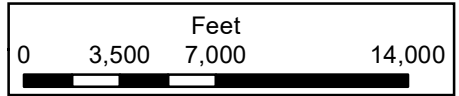
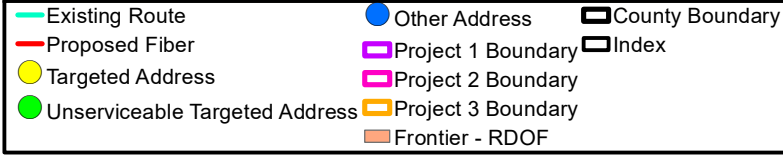
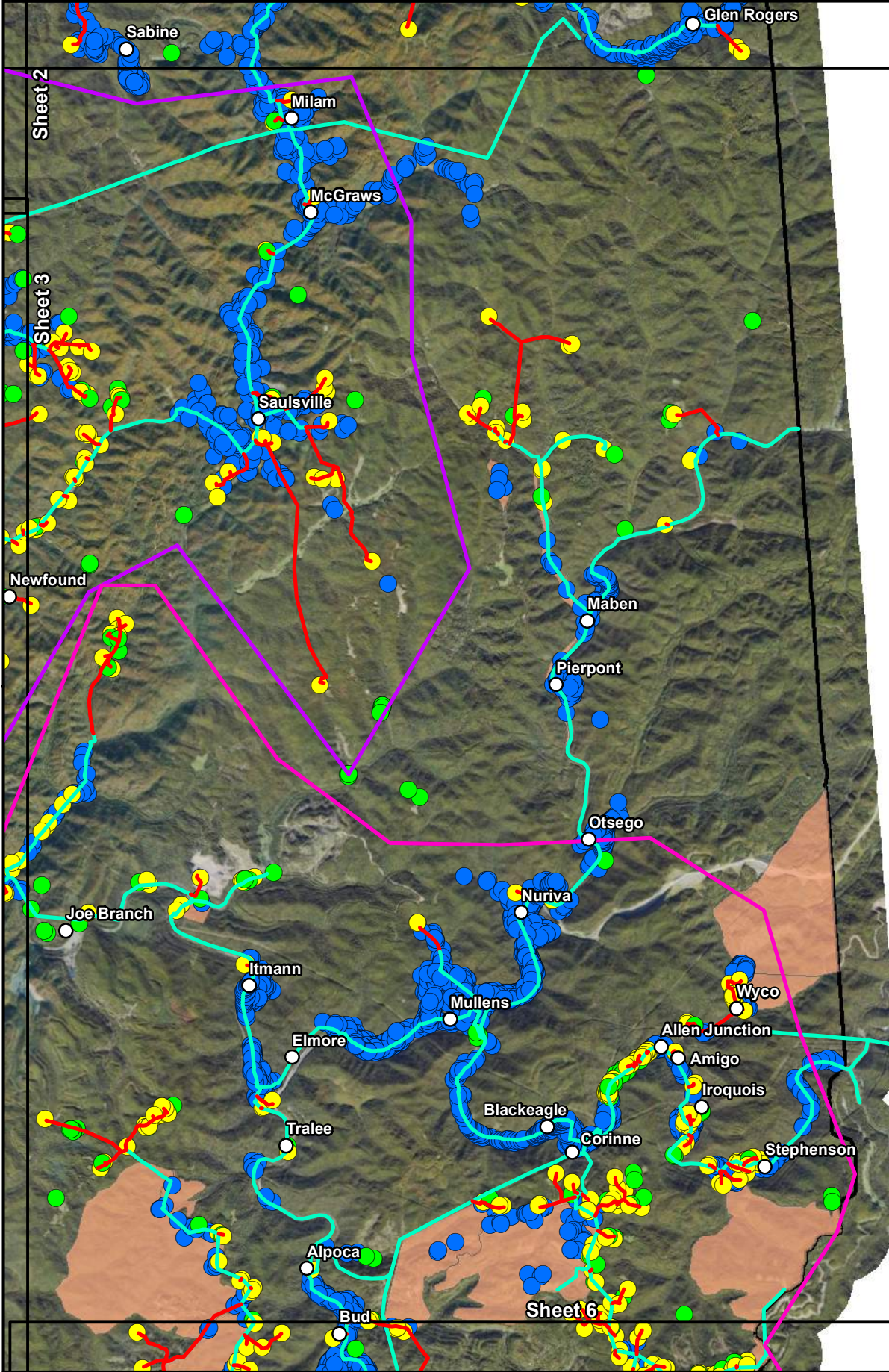
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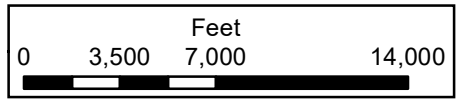
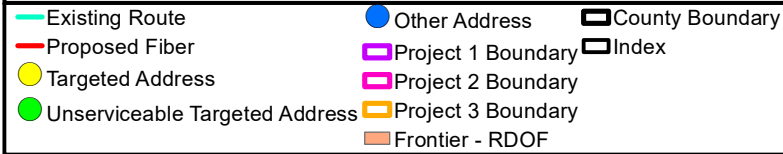
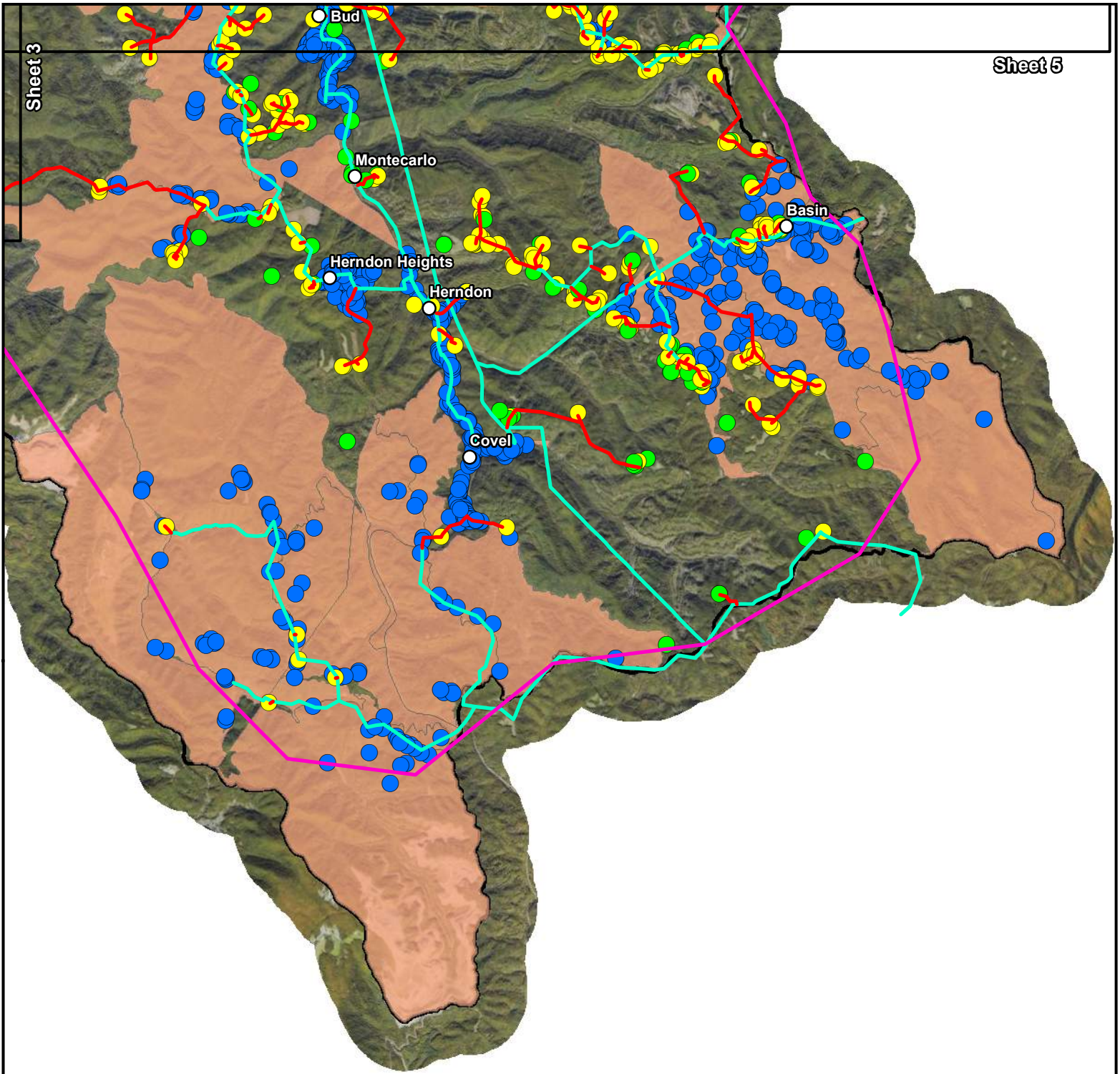
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Sheet
4



Sheet
5



Wyoming County, WV – 2023 ROC Study – Cost Estimate – Whole County

Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	116.77	\$642,235
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	116.77	\$175,155
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	116.77	\$1,751,550
Aerial Construction Labor	\$50,000.00	Per Mile	116.77	\$5,838,500
Underground Construction Labor	\$150,000.00	Per Mile	0.00	\$0
Project Construction Contingency 10%	\$583,850.00	Lump Sum	1	\$583,850
Legal 1.5%	\$87,577.50	Lump Sum	1	\$87,578
Administrative 2%	\$116,770.00	Lump Sum	1	\$116,770
TOTAL COST = \$9,195,638				

COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
1	Wyoming	1	258	29.14	\$2,294,775
		2	416	34.46	\$2,713,725
		3	241	17.58	\$1,384,425

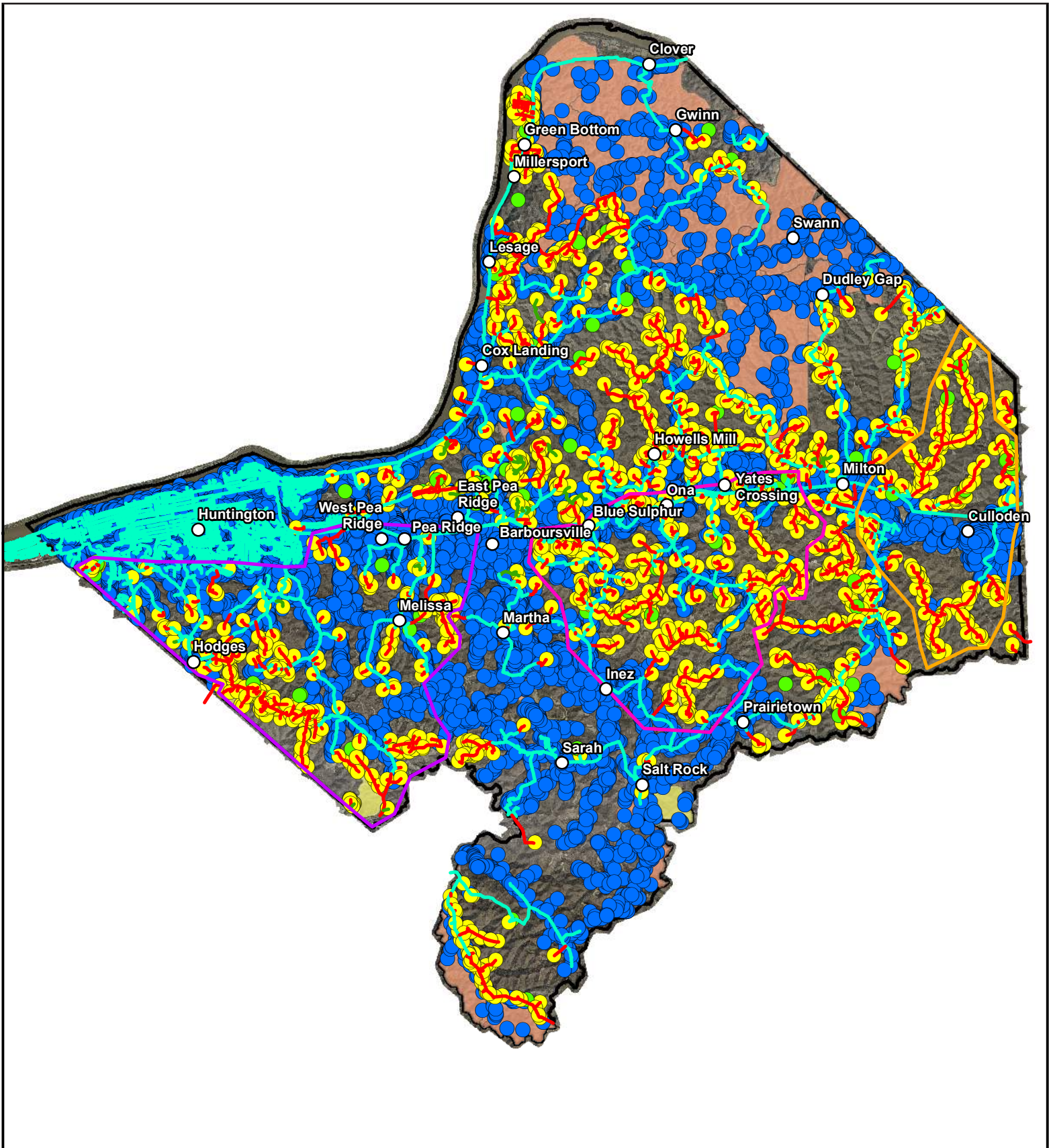
REGION 2

Cabell, Lincoln, Logan, Mason,
Mingo, and Wayne Counties



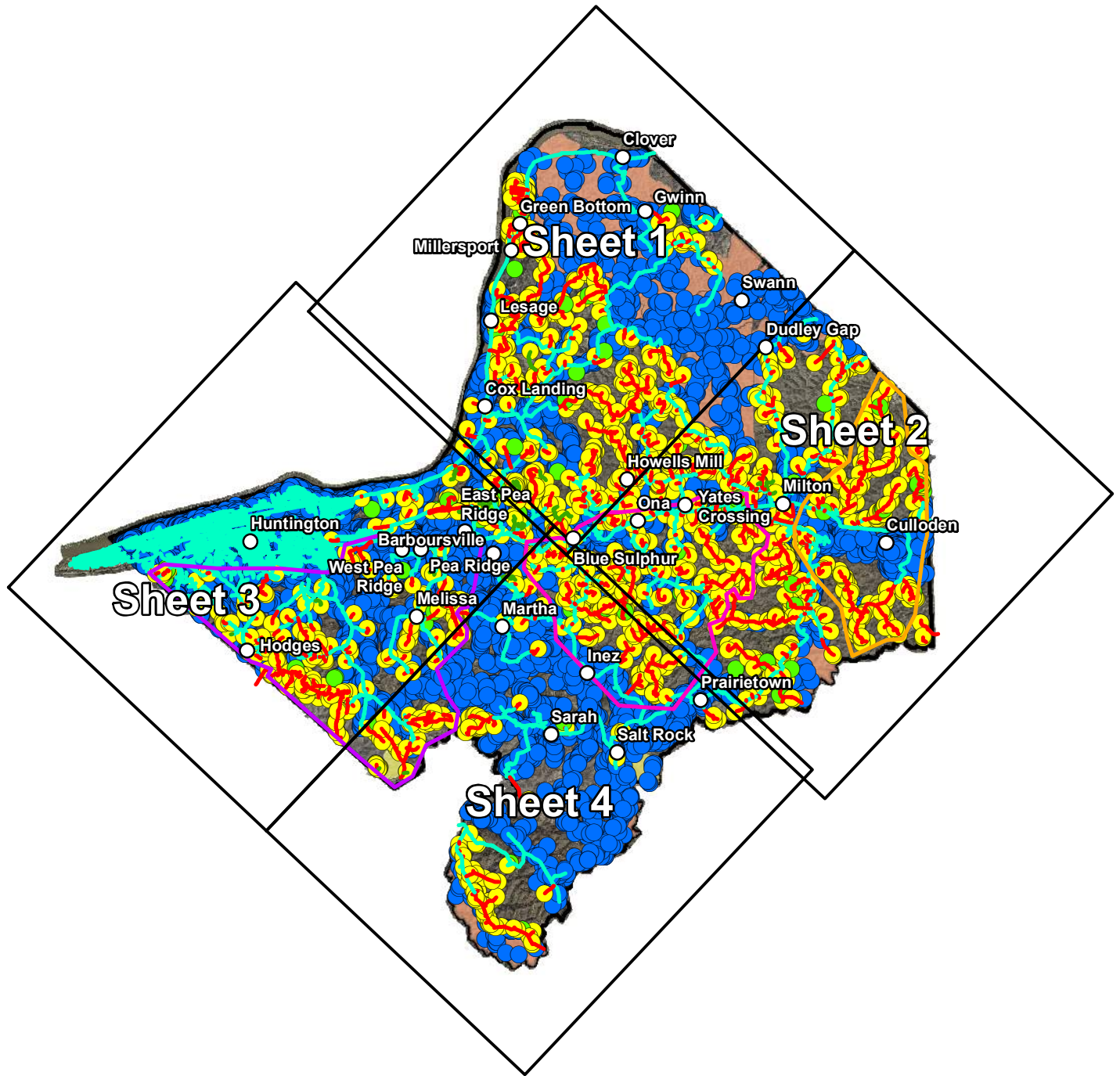


CABELL COUNTY

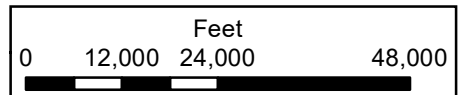


Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Feet			
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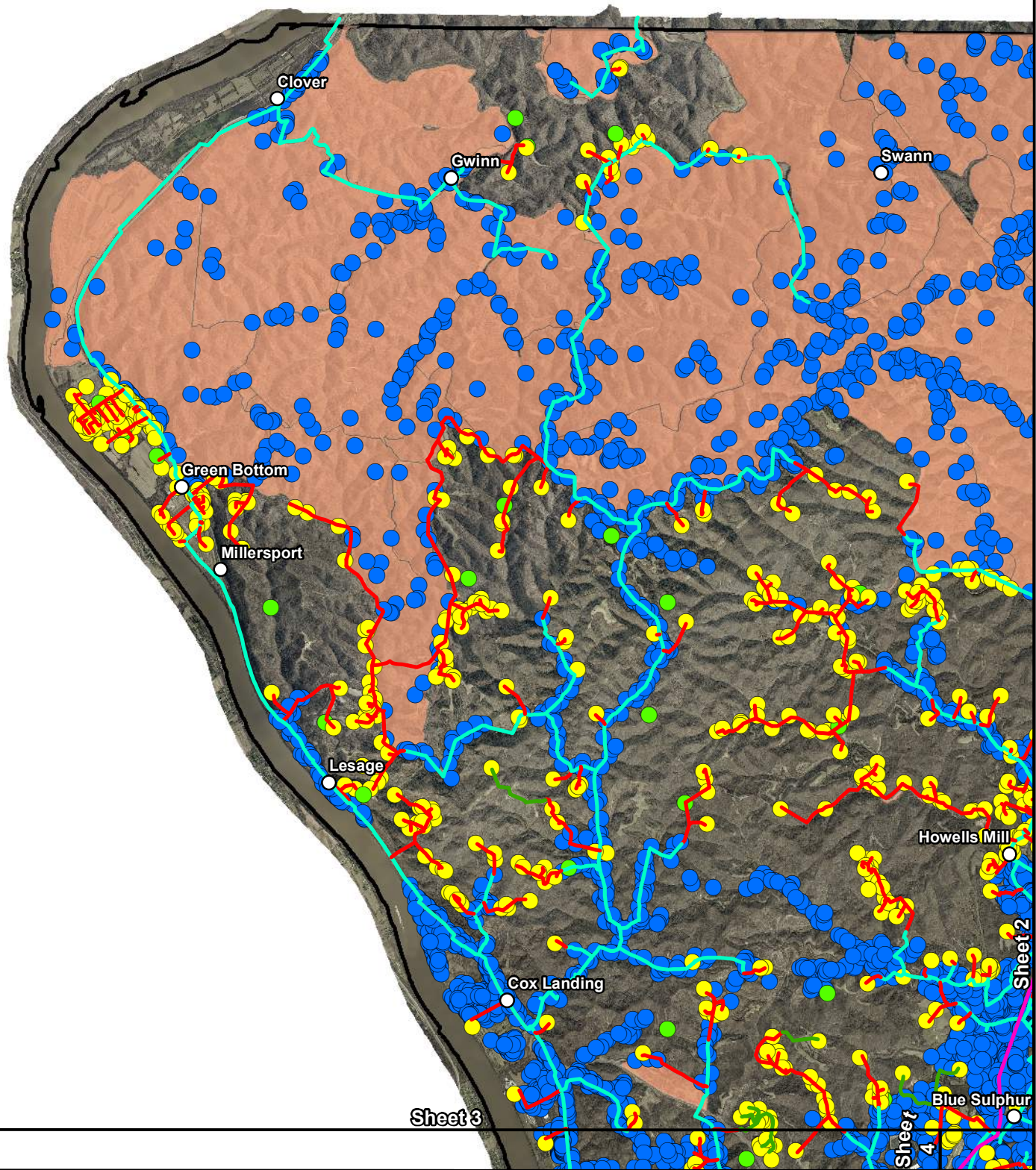


- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index

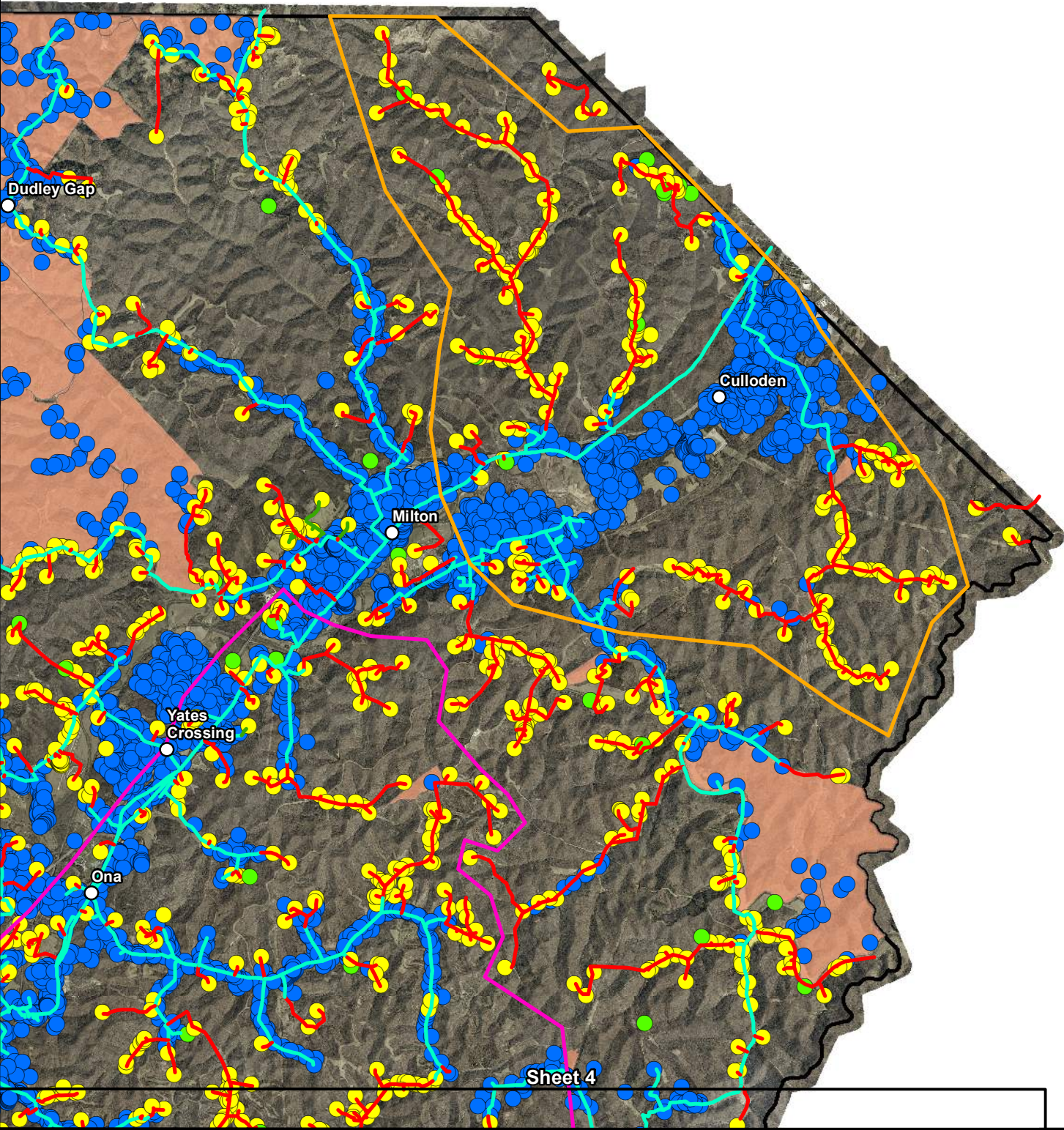


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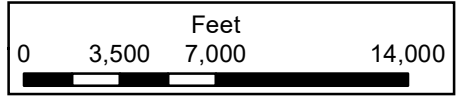
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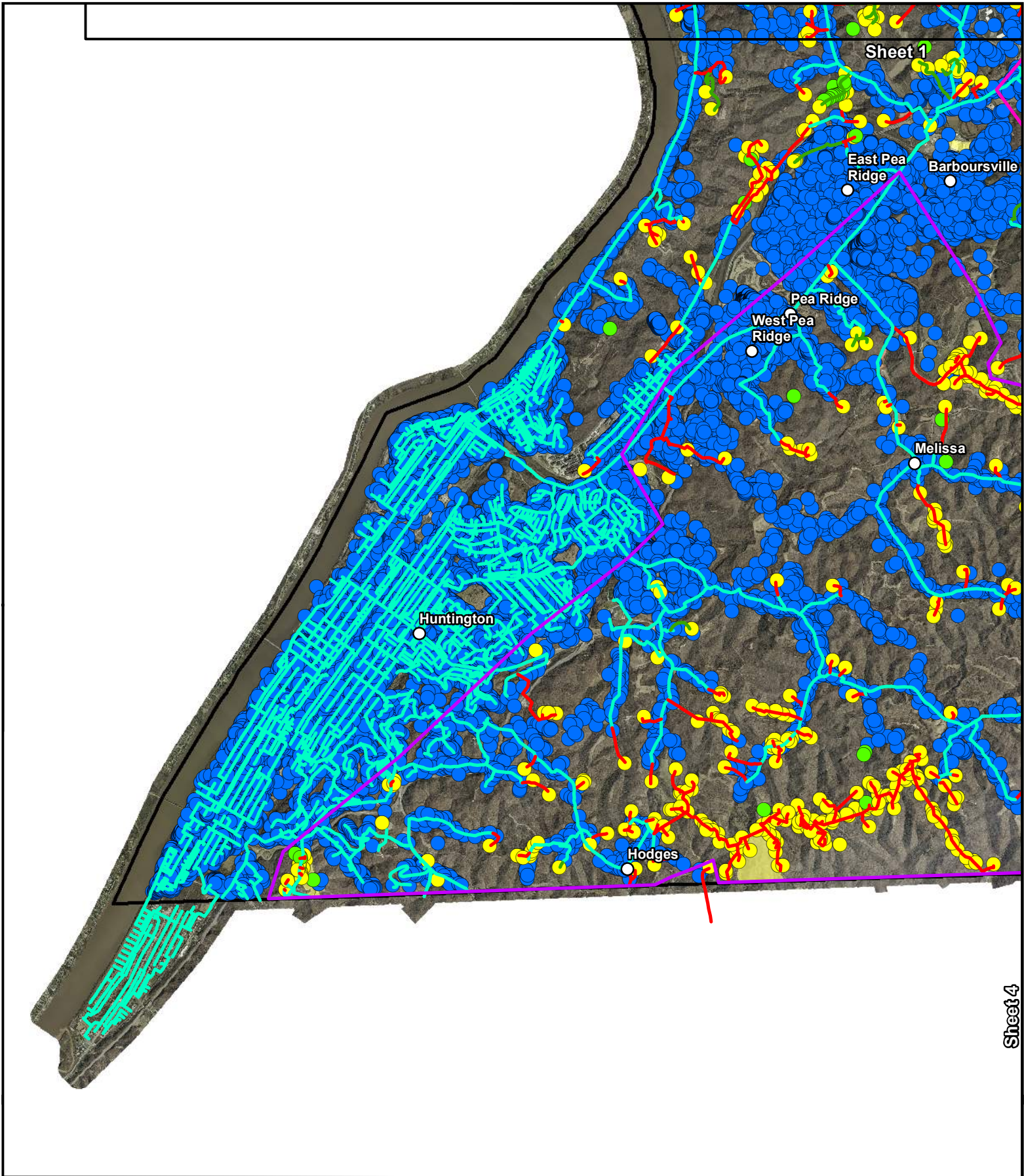



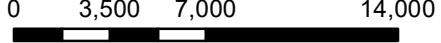
<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses Project 1 Boundary Project 2 Boundary Project 3 Boundary Frontier - RDOF 	<ul style="list-style-type: none"> Starlink Services, LLC - RDOF County Boundary Index 		<p>Feet</p> <p>0 3,500 7,000 14,000</p> 	<p>Sheet</p> <p>1</p>
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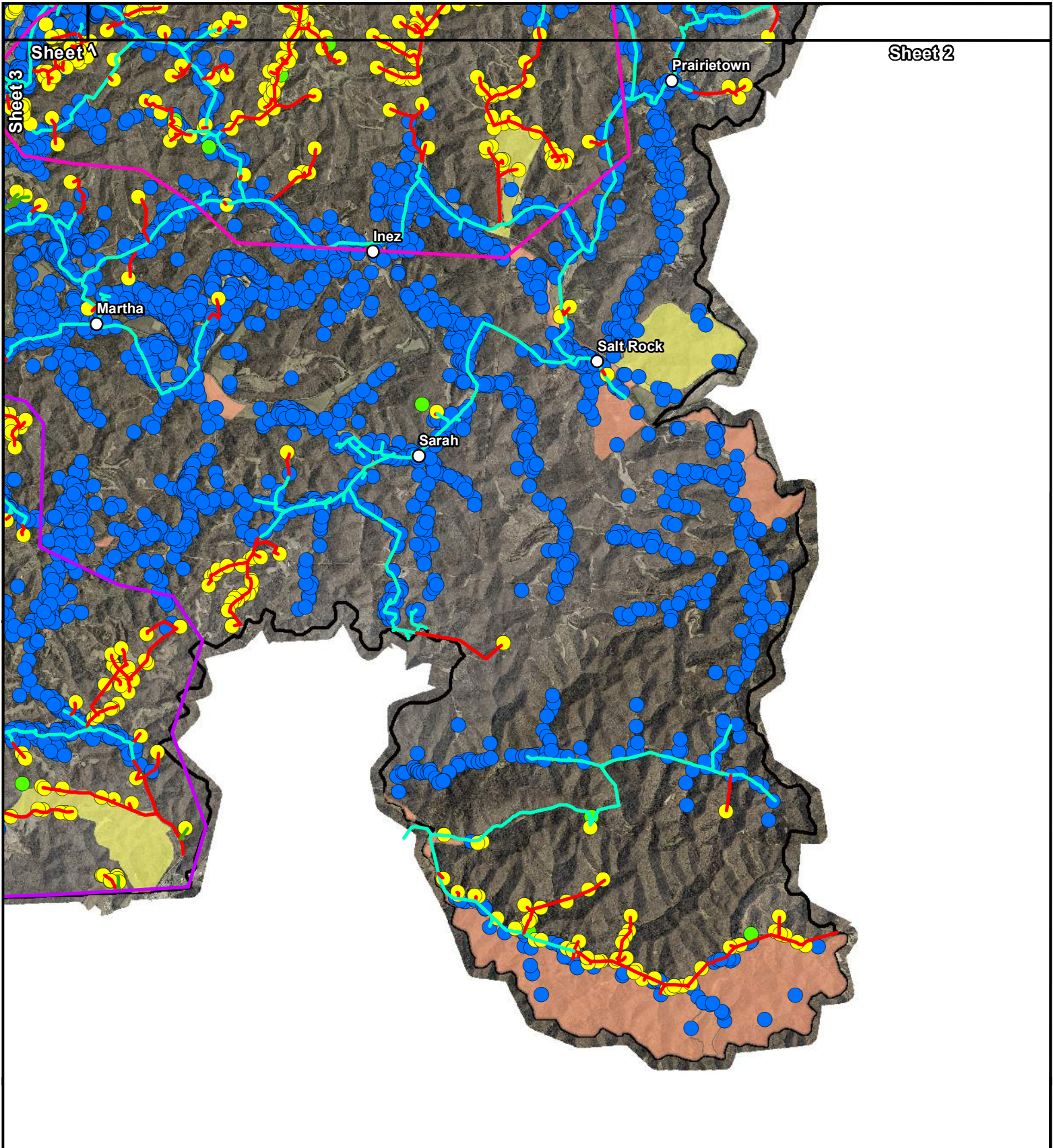



- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Starlink Services, LLC - RDOF
- County Boundary
- Index
- Frontier - RDOF





<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses Project 1 Boundary Project 2 Boundary Project 3 Boundary Frontier - RDOF 	<ul style="list-style-type: none"> Starlink Services, LLC - RDOF County Boundary Index 		<p>Feet</p> <p>0 3,500 7,000 14,000</p> 	<p>Sheet</p> <p>3</p>
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<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses Project 1 Boundary Project 2 Boundary Project 3 Boundary Frontier - RDOF 	<ul style="list-style-type: none"> Starlink Services, LLC - RDOF County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="width: 25%;">0</td> <td style="width: 25%;">3,500</td> <td style="width: 25%;">7,000</td> <td style="width: 25%;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td style="padding: 5px;">Sheet</td> </tr> <tr> <td style="text-align: center; padding: 5px;">4</td> </tr> </table>	Sheet	4
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Sheet															
4															

Cabell County, WV – 2023 ROC Study – Cost Estimate – Whole County

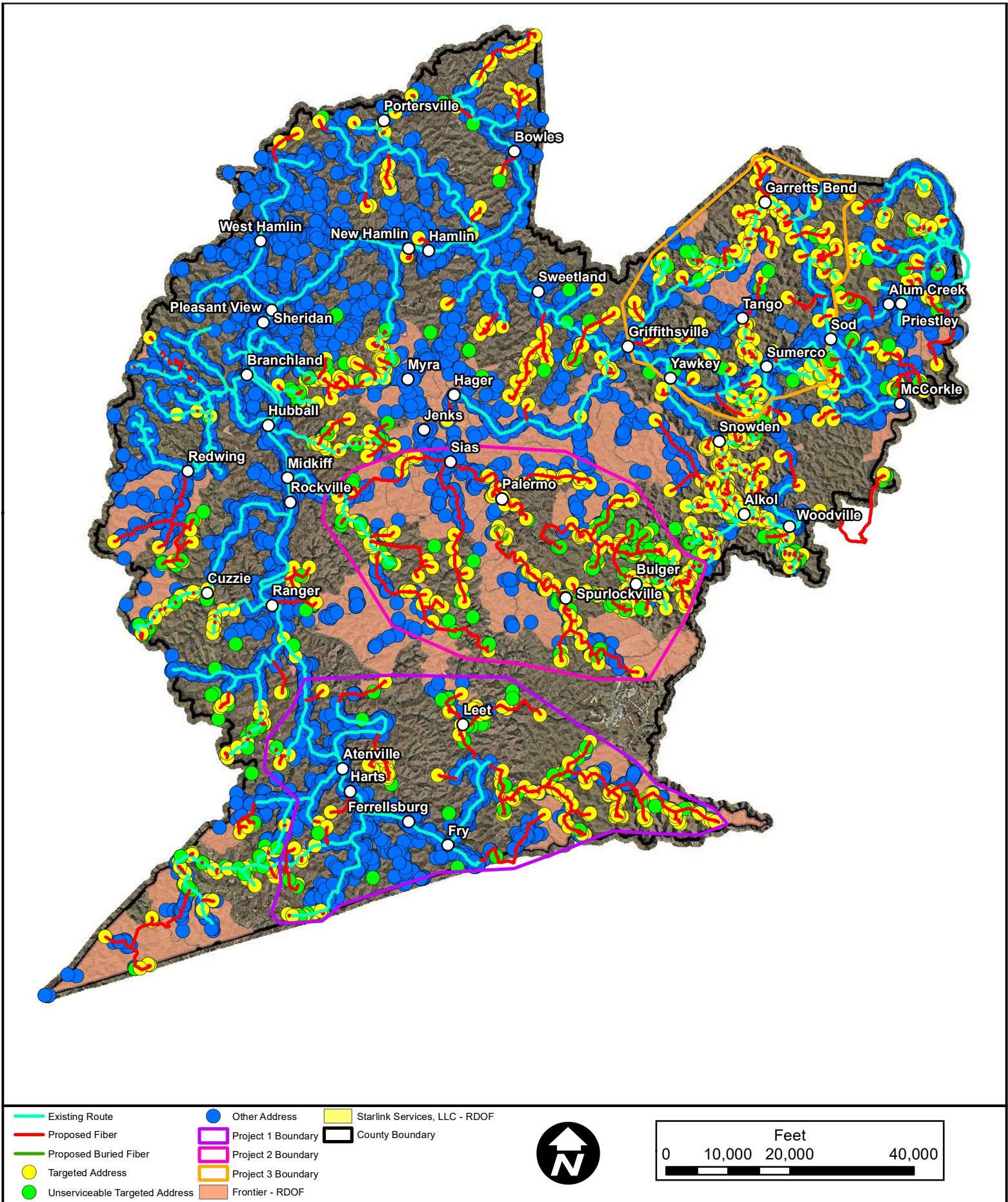
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	216.03	\$1,188,165
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	216.03	\$324,045
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	207.33	\$3,109,950
Aerial Construction Labor	\$50,000.00	Per Mile	207.33	\$10,366,500
Underground Construction Labor	\$150,000.00	Per Mile	8.70	\$1,305,000
Project Construction Contingency 10%	\$1,167,150.00	Lump Sum	1	\$1,167,150
Legal 1.5%	\$175,072.50	Lump Sum	1	\$175,073
Administrative 2%	\$233,430.00	Lump Sum	1	\$233,430
TOTAL COST = \$17,869,313				

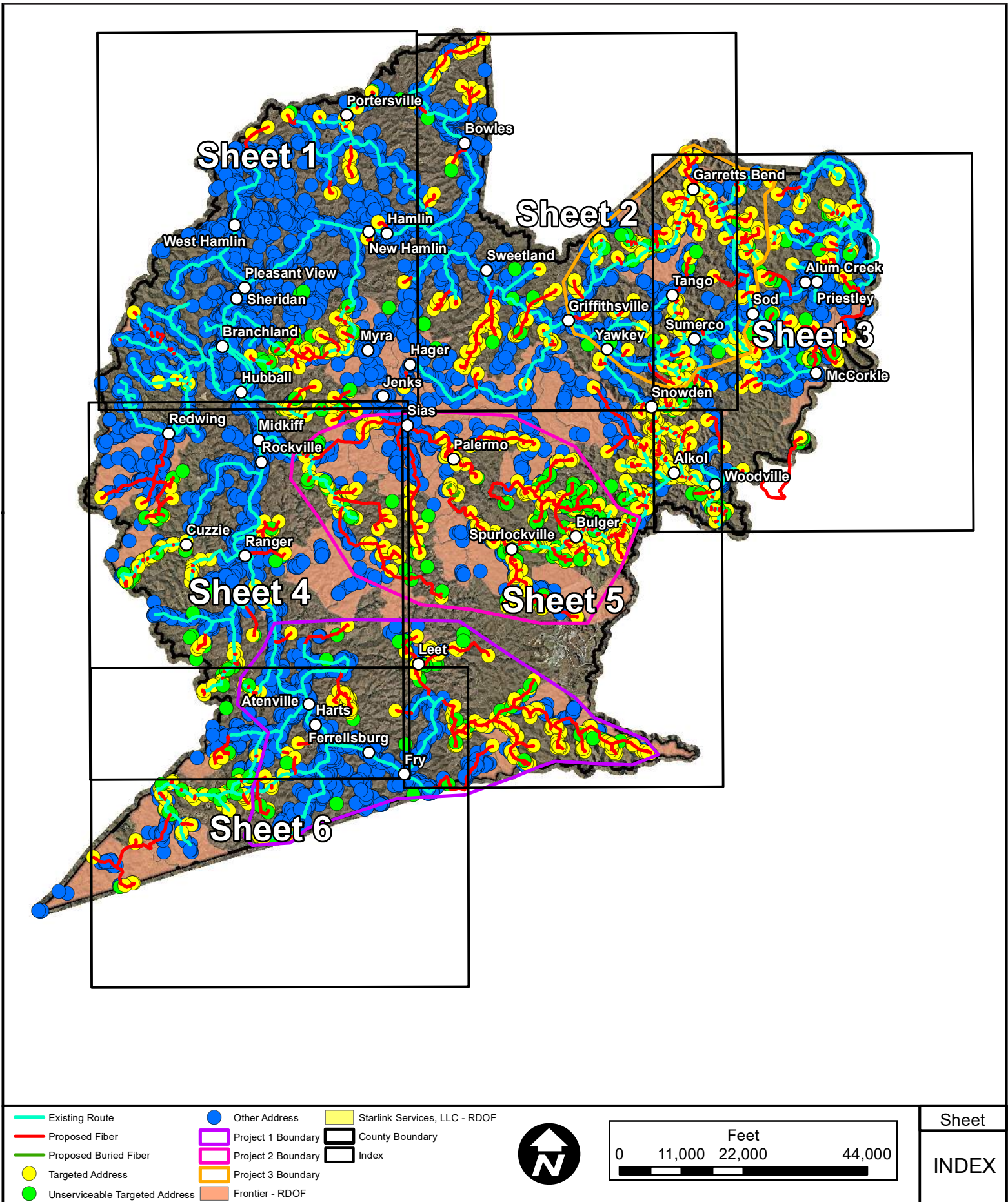
COUNTY SAMPLE PROJECT

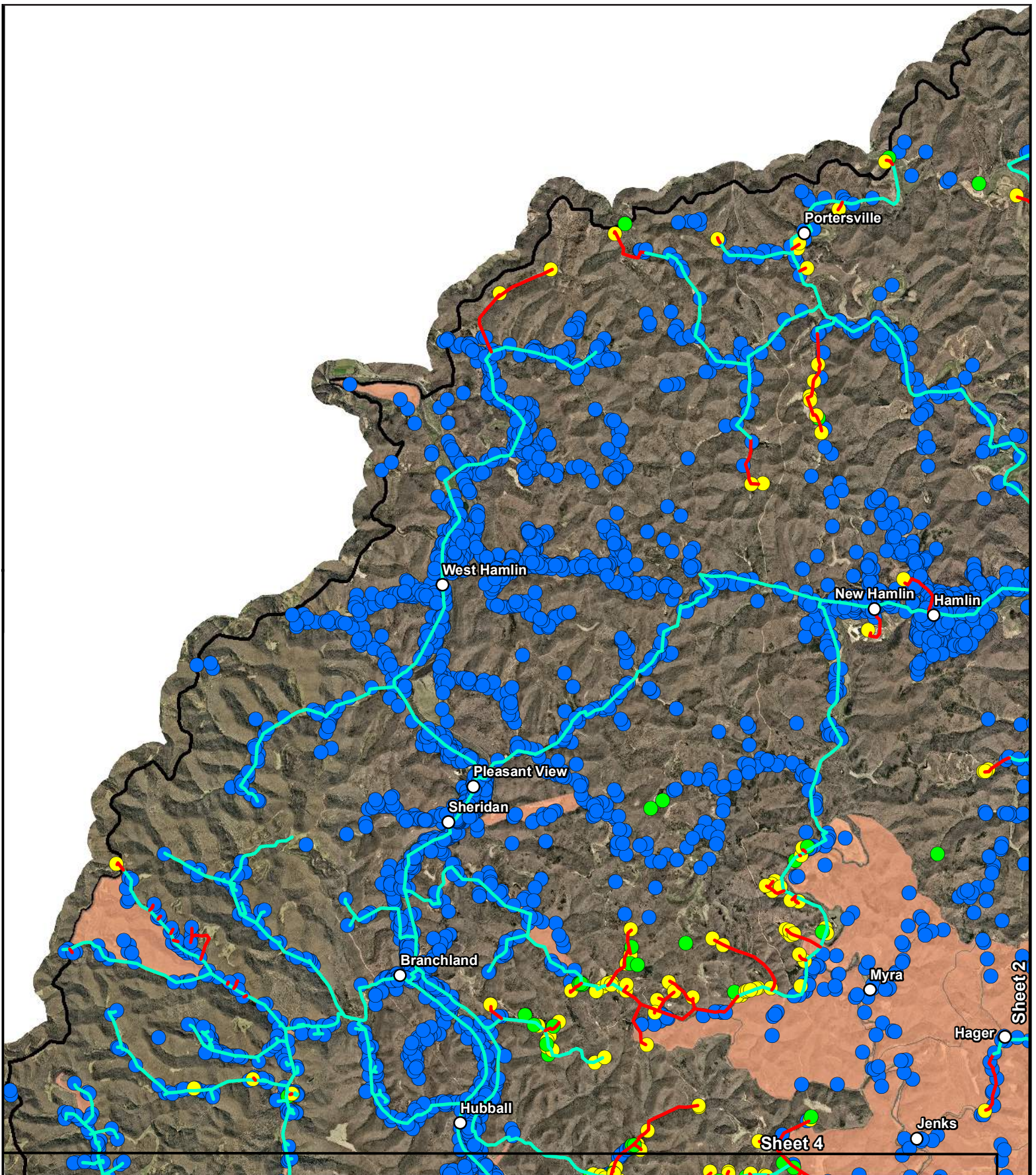
Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
2	Cabell	1	370	35.31	\$2,876,208
		2	341	35.61	\$2,811,183
		3	214	24.12	\$1,899,450



LINCOLN COUNTY



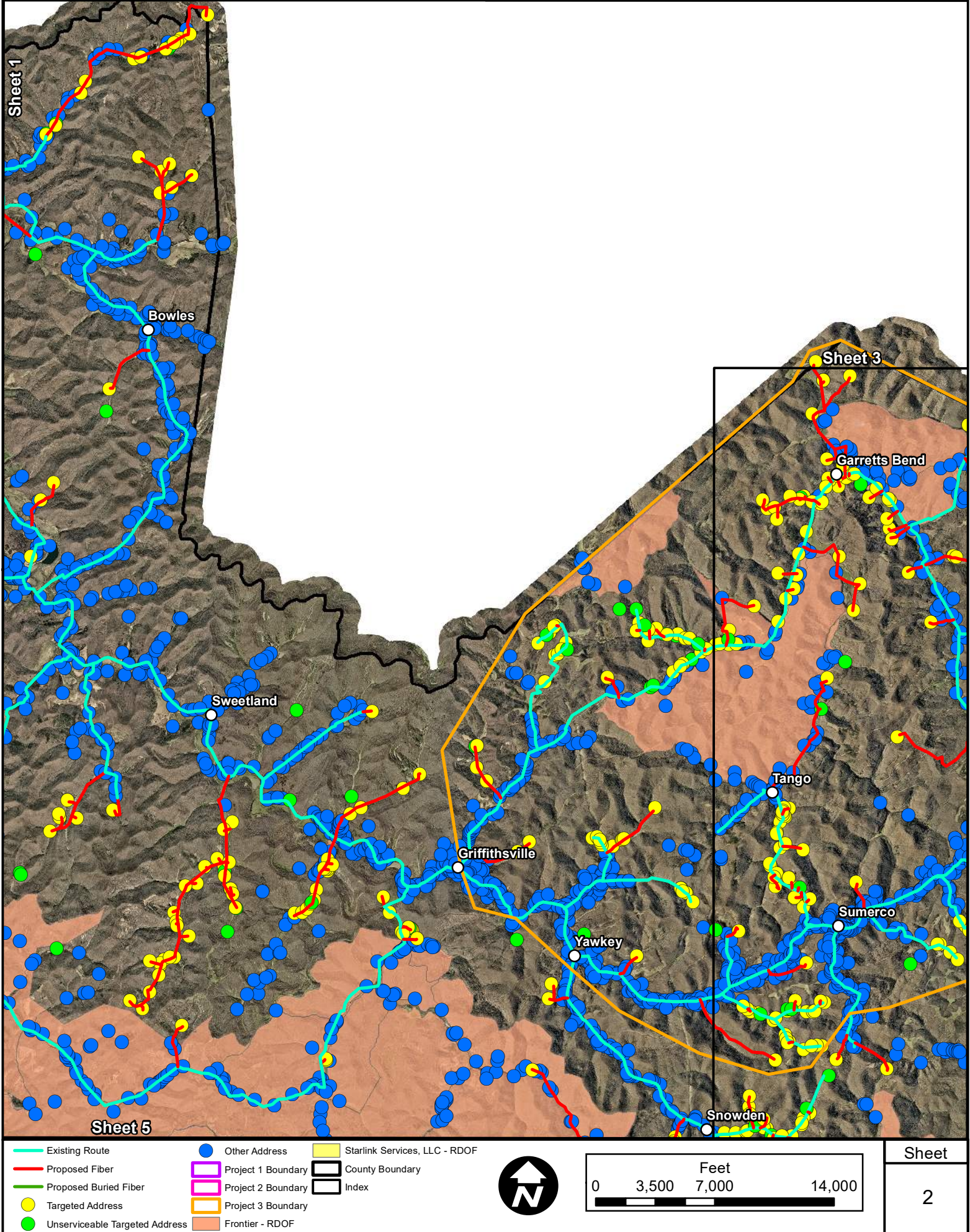


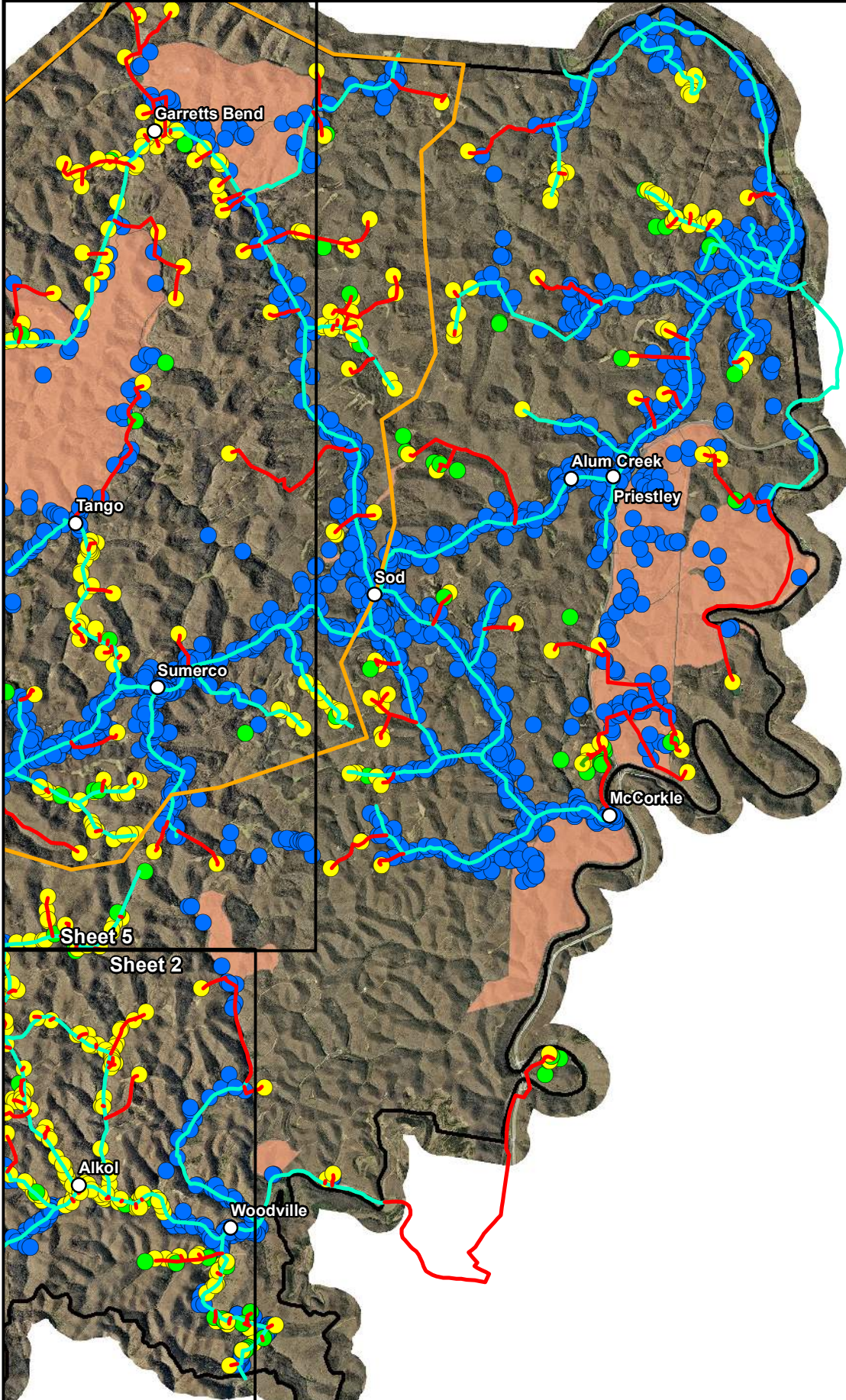


Existing Route	Other Address	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	Frontier - RDOF
Unserviceable Targeted Address		

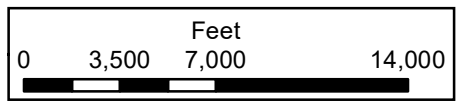
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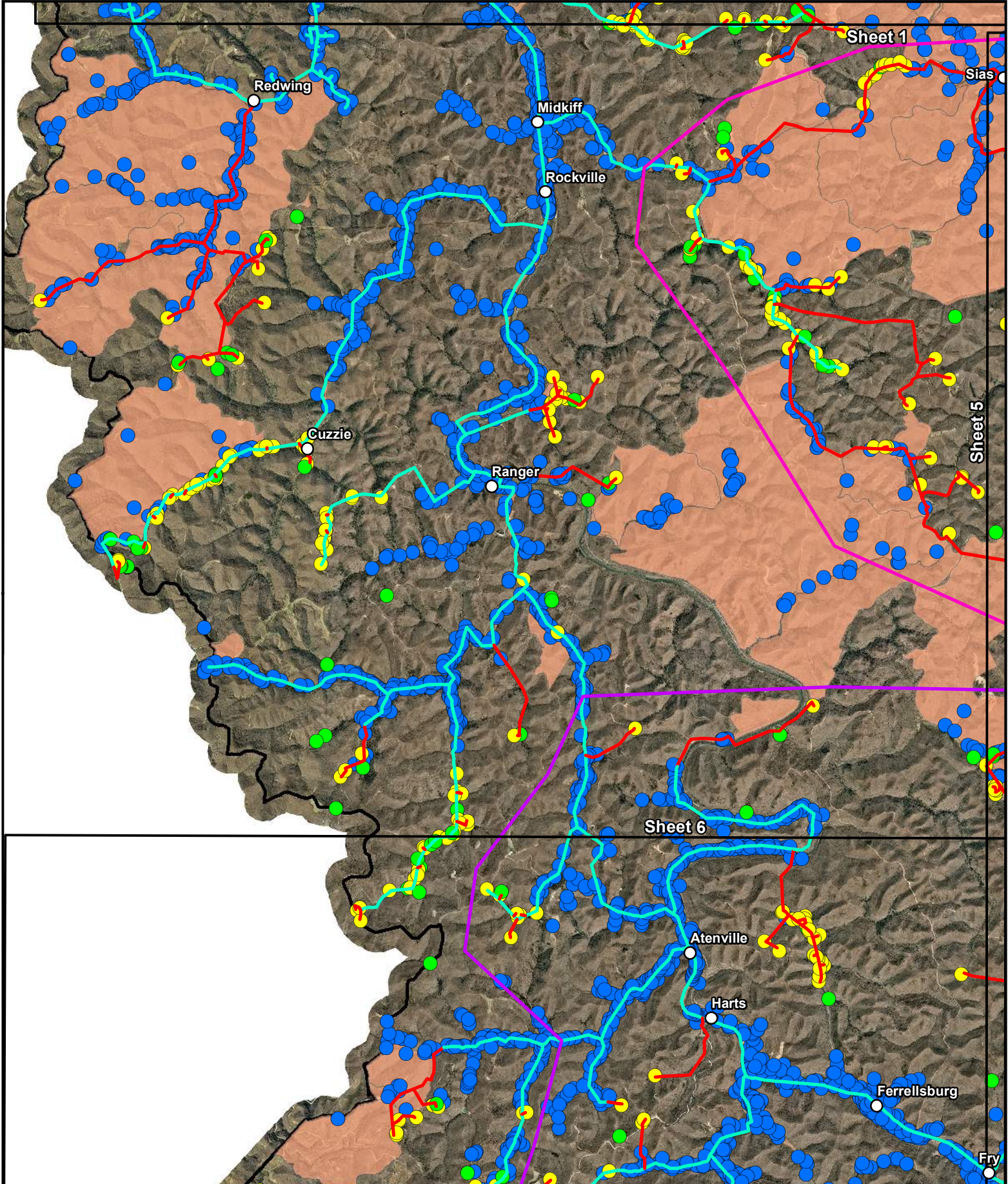




- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index



Sheet
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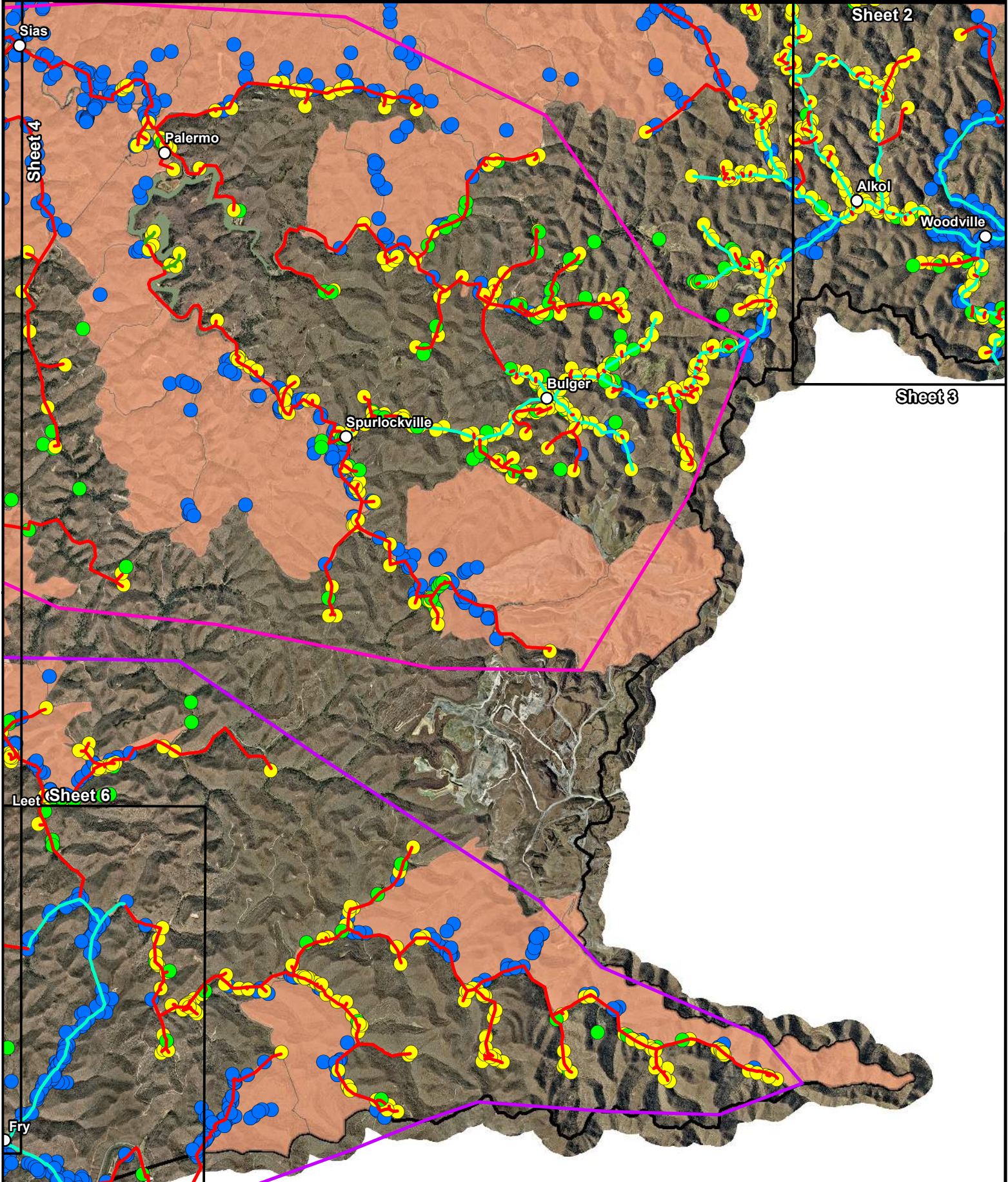
Existing Route	Other Address	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	Frontier - RDOF
Unserviceable Targeted Address		

Feet

0 3,500 7,000 14,000

Sheet

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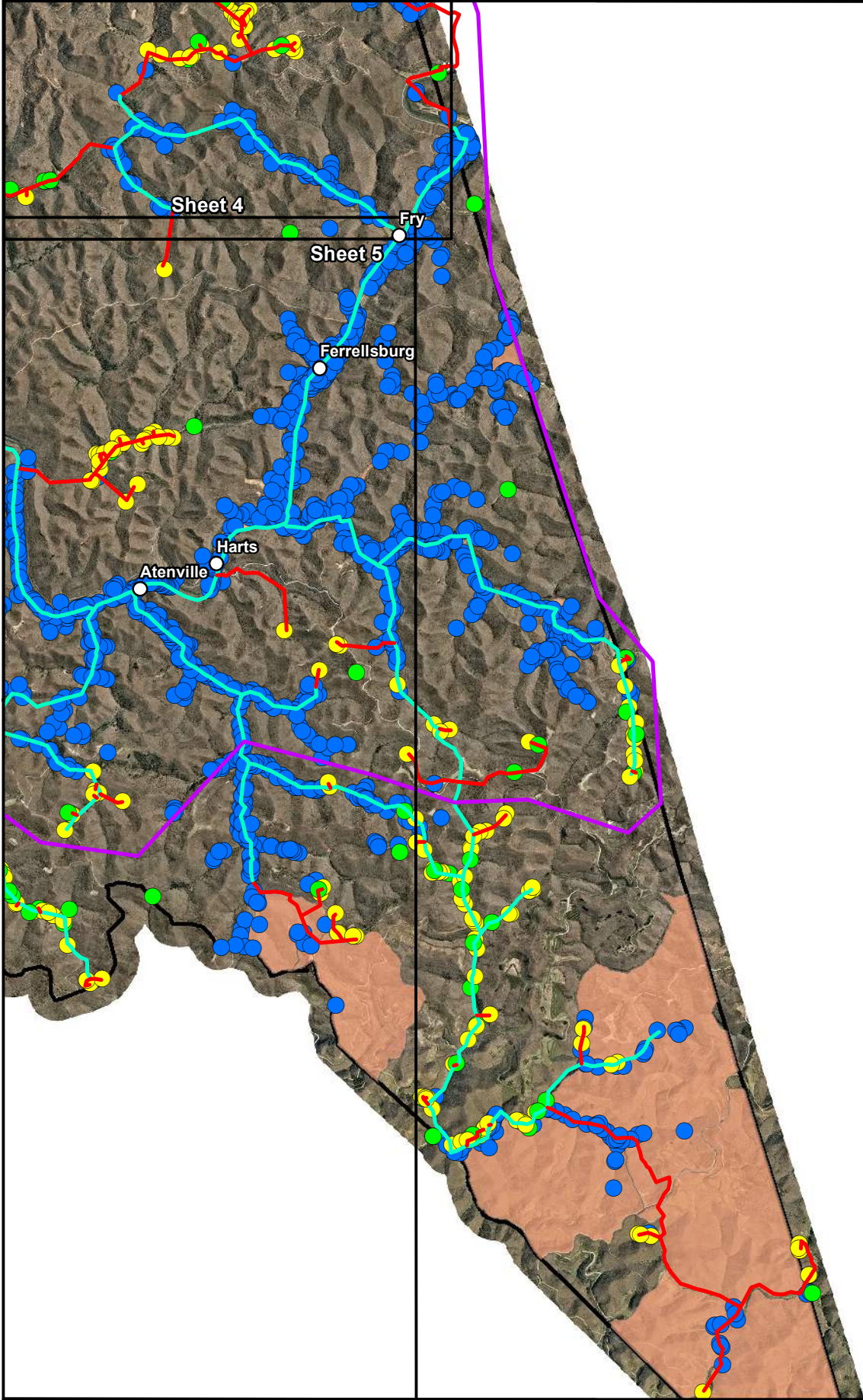


Existing Route	Other Address	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

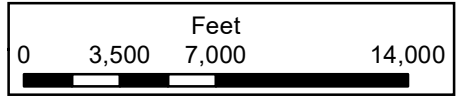
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Sheet
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- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Starlink Services, LLC - RDOF
- County Boundary
- Index
- Frontier - RDOF



Sheet
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Lincoln County, WV – 2023 ROC Study – Cost Estimate – Whole County

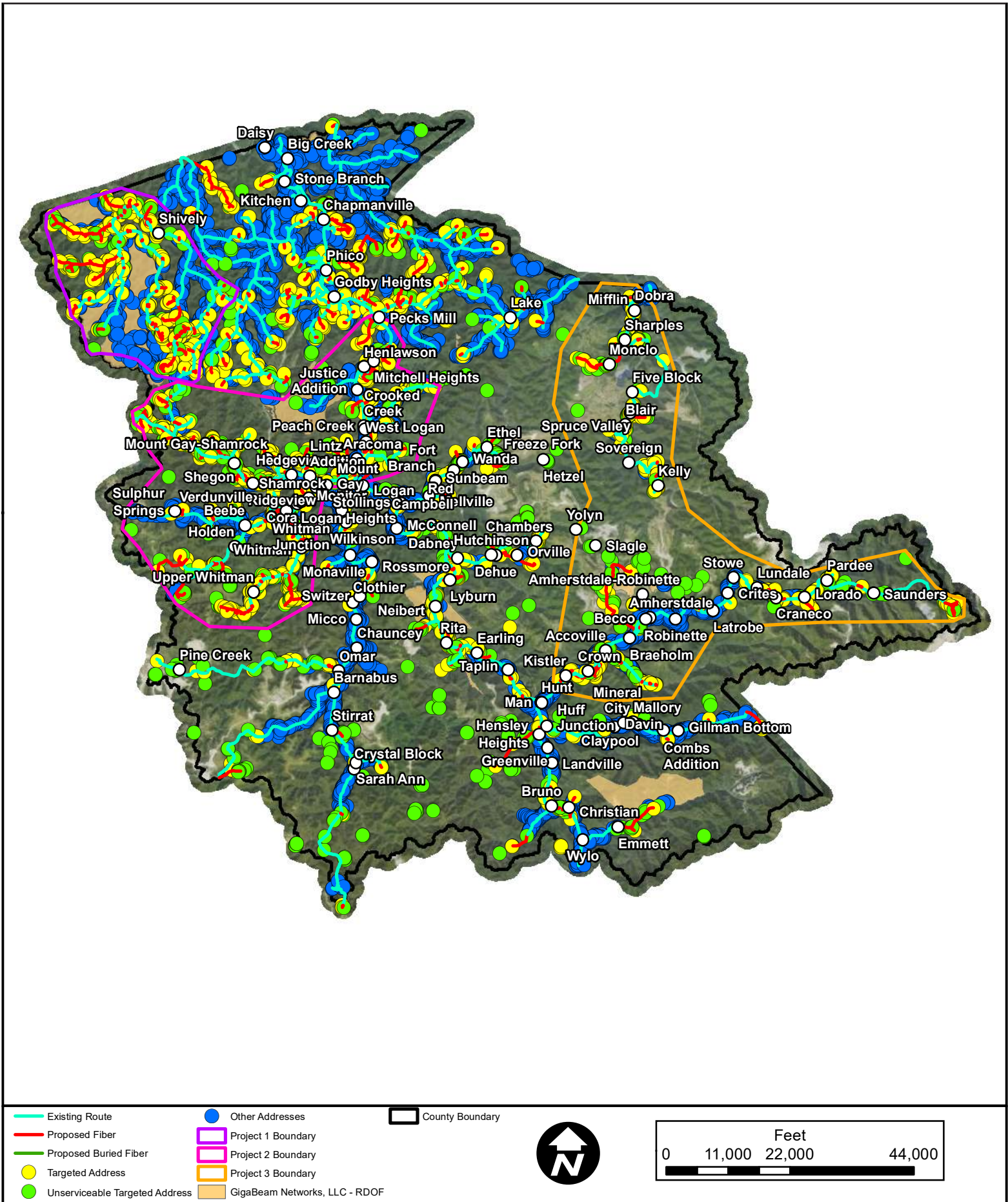
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	207.98	\$1,143,890
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	207.98	\$311,970
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	207.44	\$3,111,600
Aerial Construction Labor	\$50,000.00	Per Mile	207.44	\$10,372,000
Underground Construction Labor	\$150,000.00	Per Mile	0.54	\$81,000
Project Construction Contingency 10%	\$1,045,300.00	Lump Sum	1	\$1,045,300
Legal 1.5%	\$156,795.00	Lump Sum	1	\$156,795
Administrative 2%	\$209,060.00	Lump Sum	1	\$209,060
TOTAL COST = \$16,431,615				

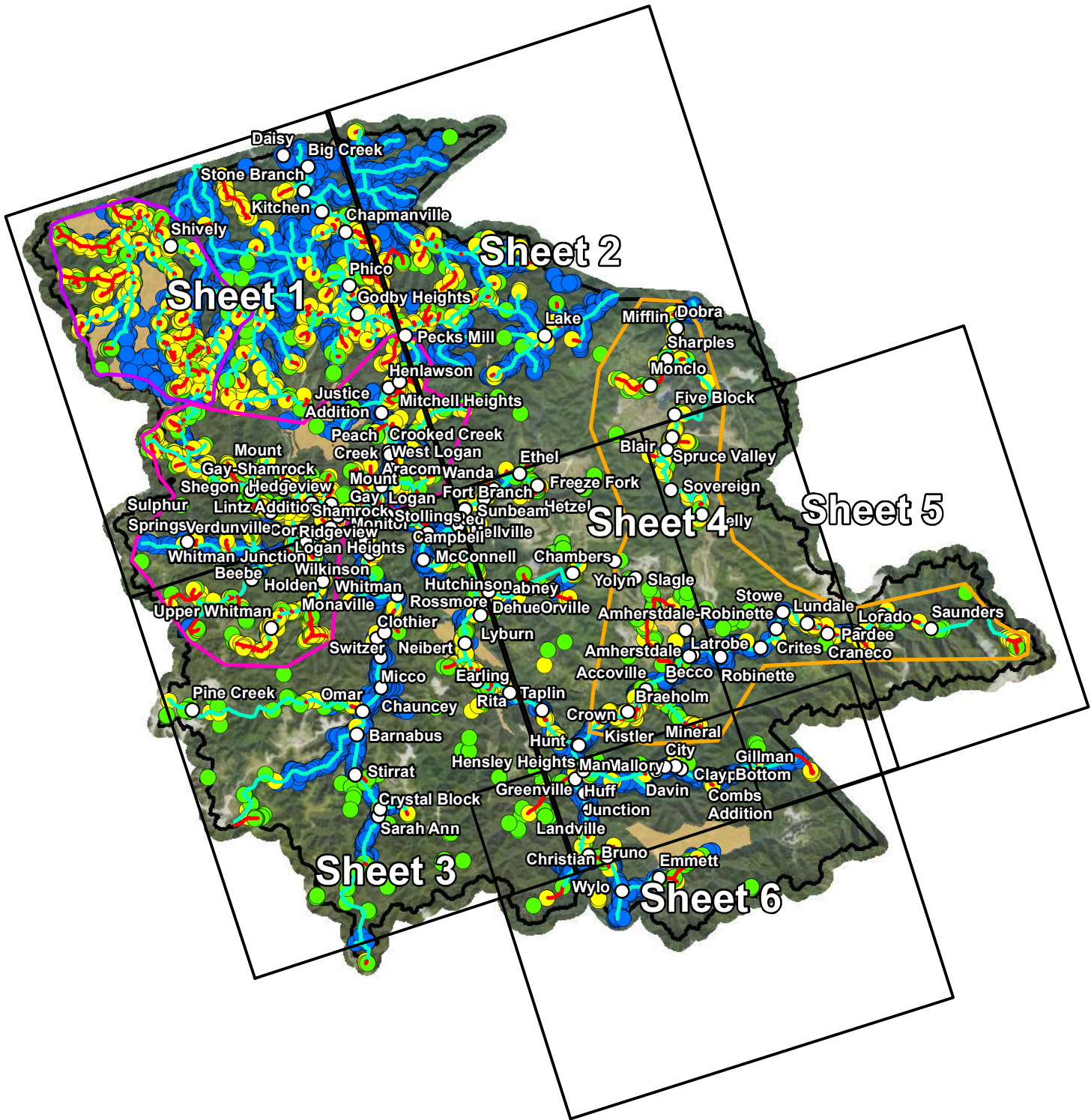
COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
2	Lincoln	1	213	38.29	\$3,015,338
		2	393	59.24	\$4,709,475
		3	202	20.79	\$1,637,213

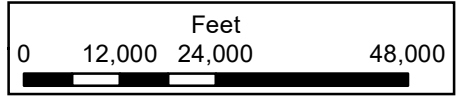


LOGAN COUNTY

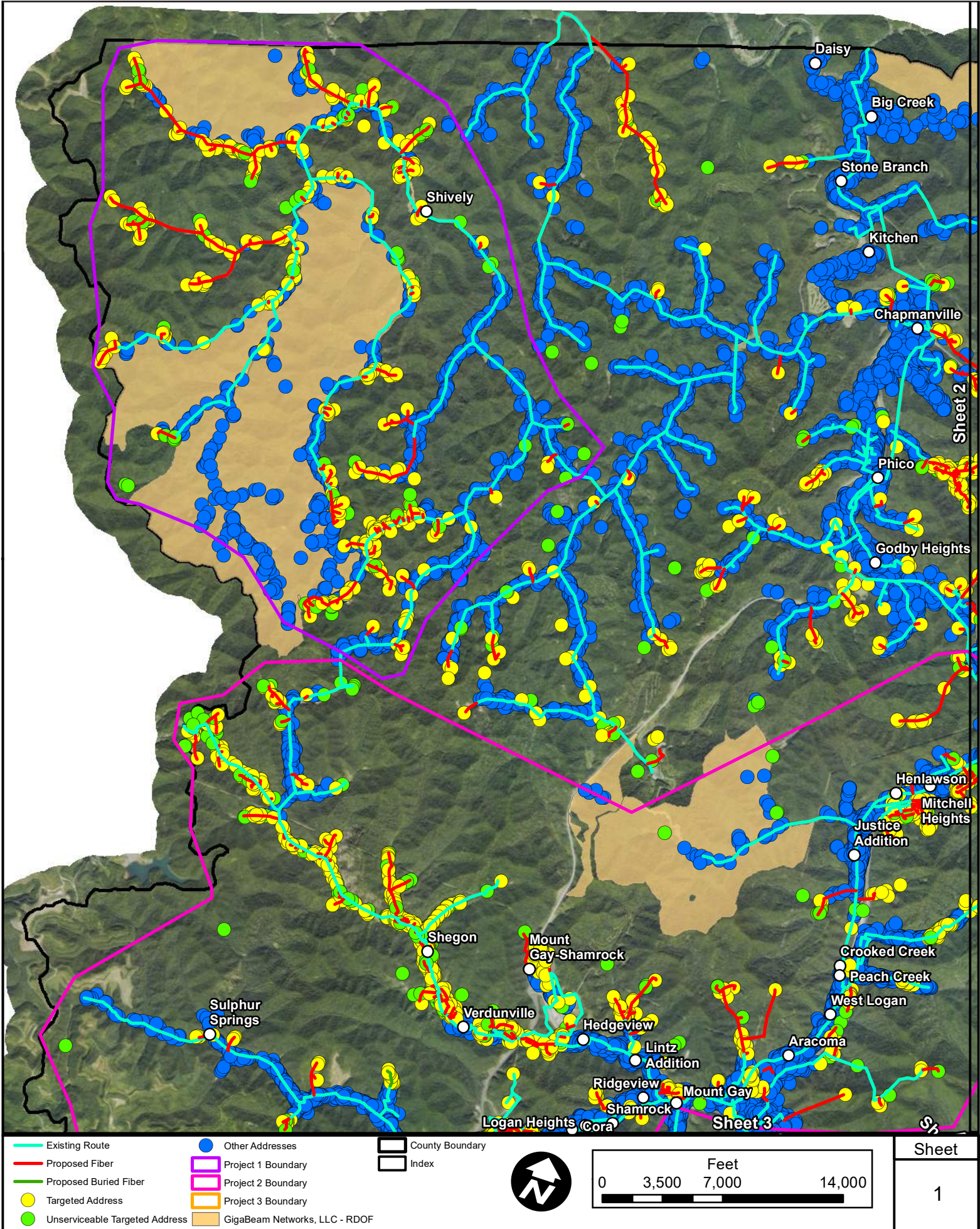


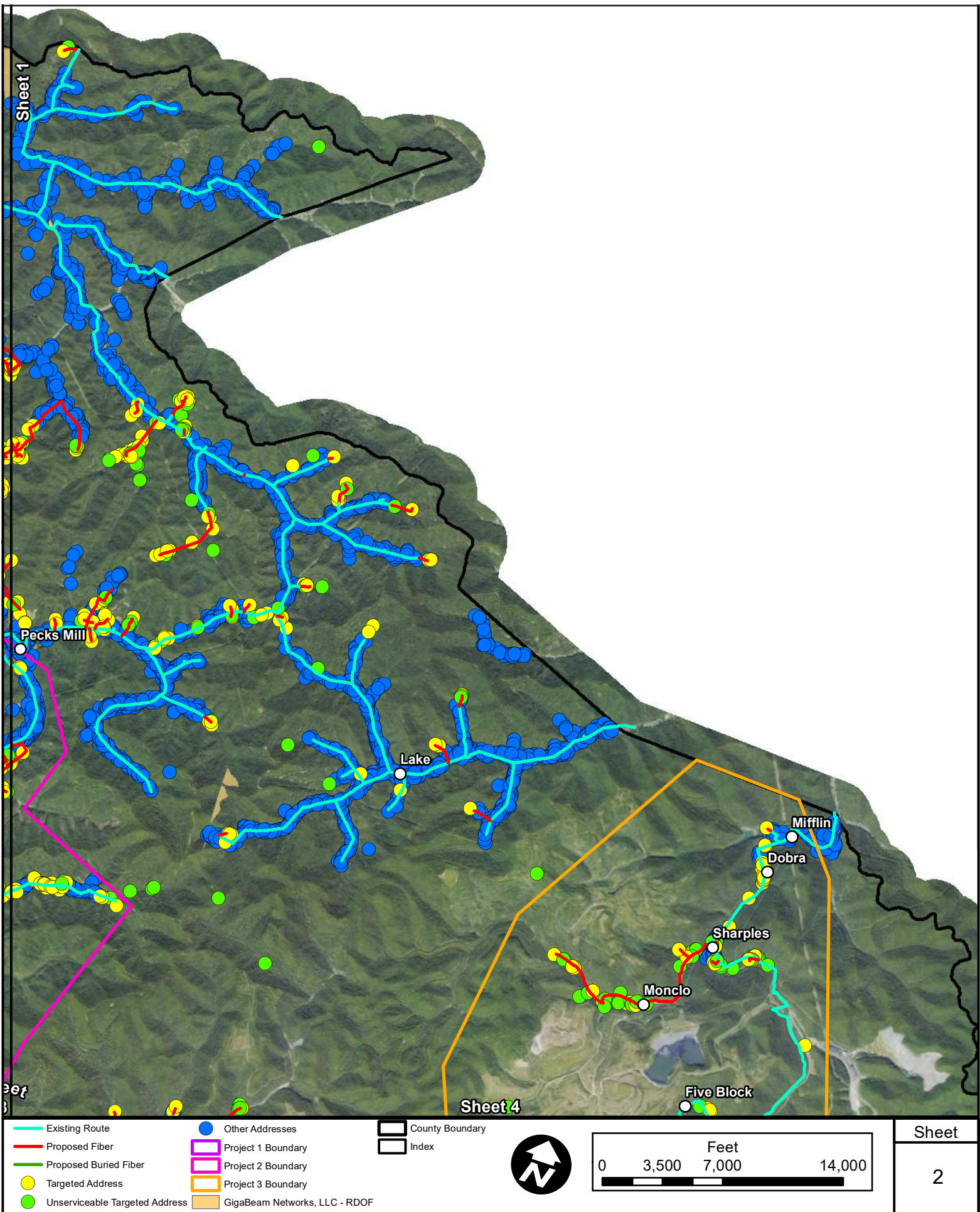


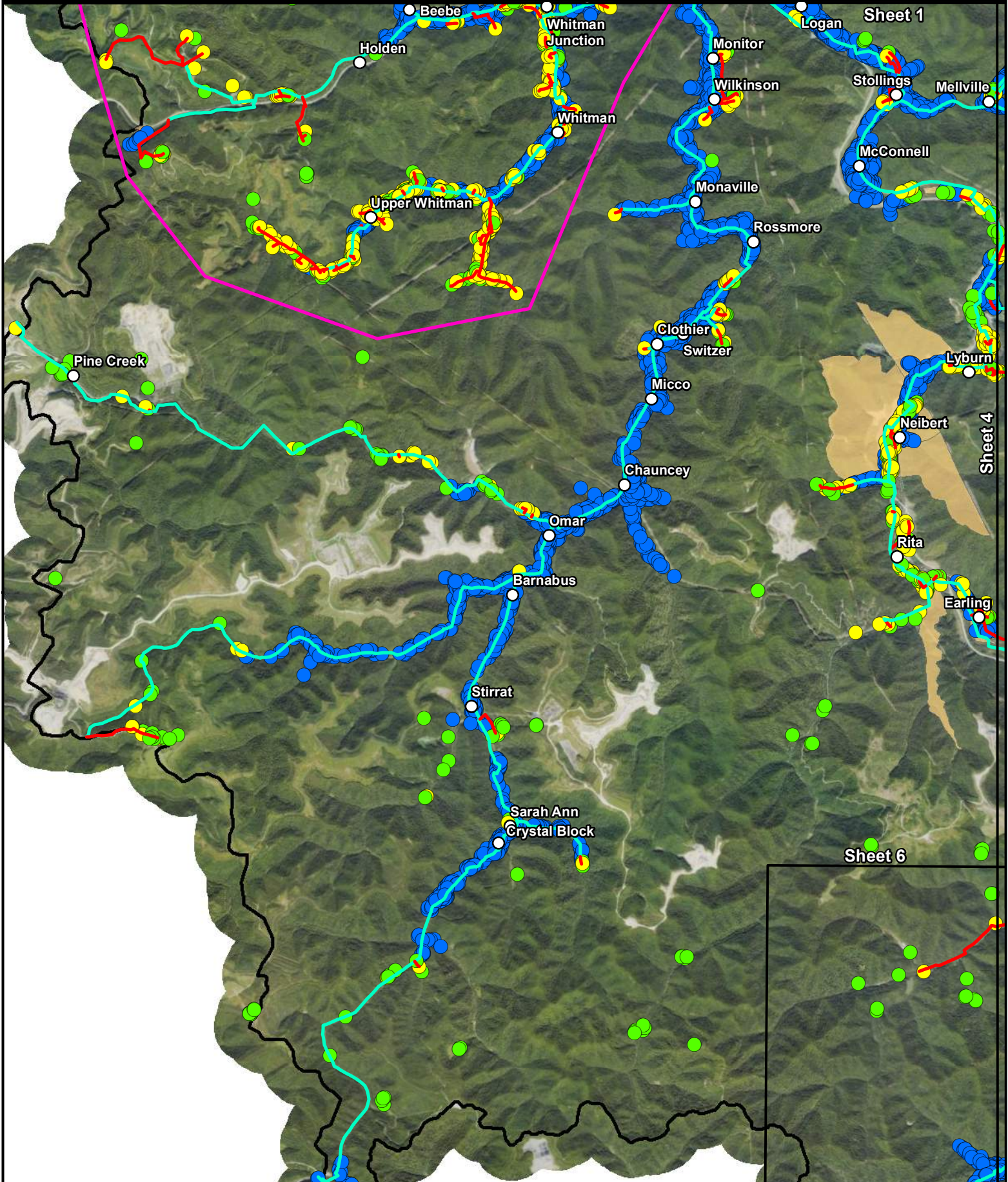
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- GigaBeam Networks, LLC - RDOF
- County Boundary
- Index



Sheet
INDEX

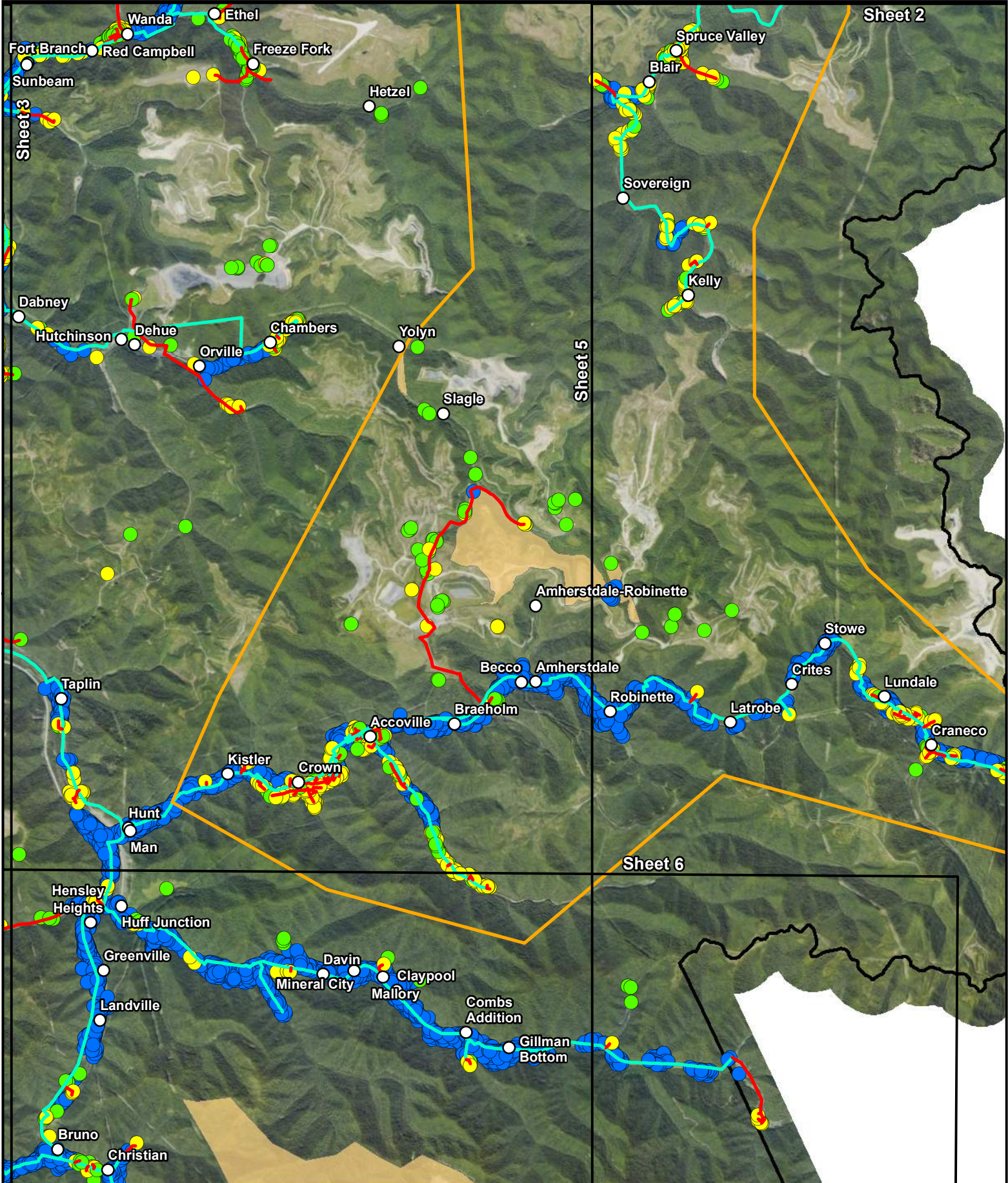






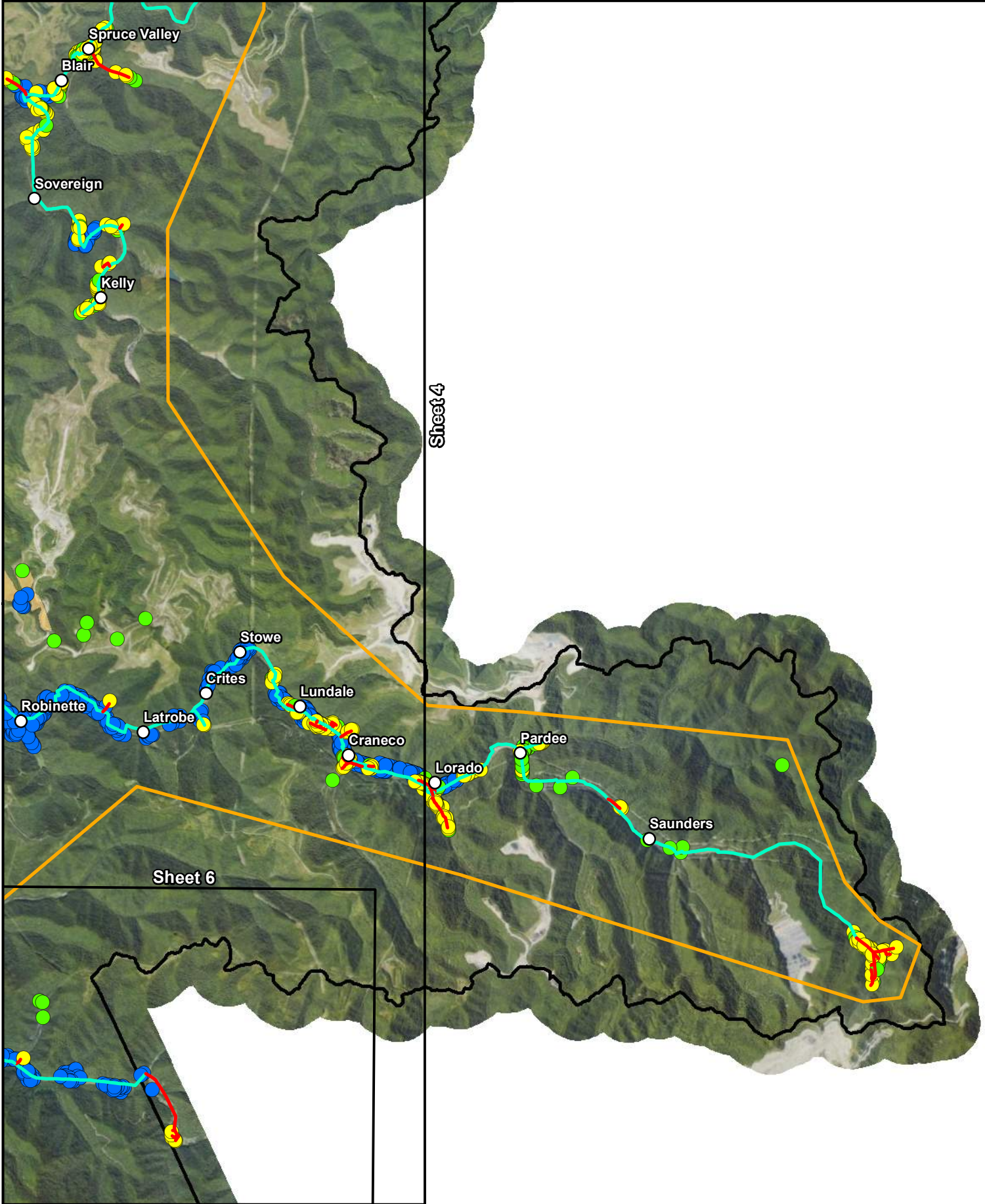
Existing Route	Other Addresses	County Boundary
Proposed Fiber	Project 1 Boundary	Index
Proposed Buried Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	GigaBeam Networks, LLC - RDOF	

Sheet
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Existing Route	Other Addresses	County Boundary
Proposed Fiber	Project 1 Boundary	Index
Proposed Buried Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	GigaBeam Networks, LLC - RDOF	

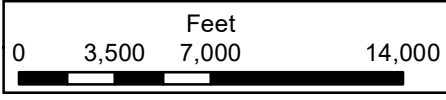
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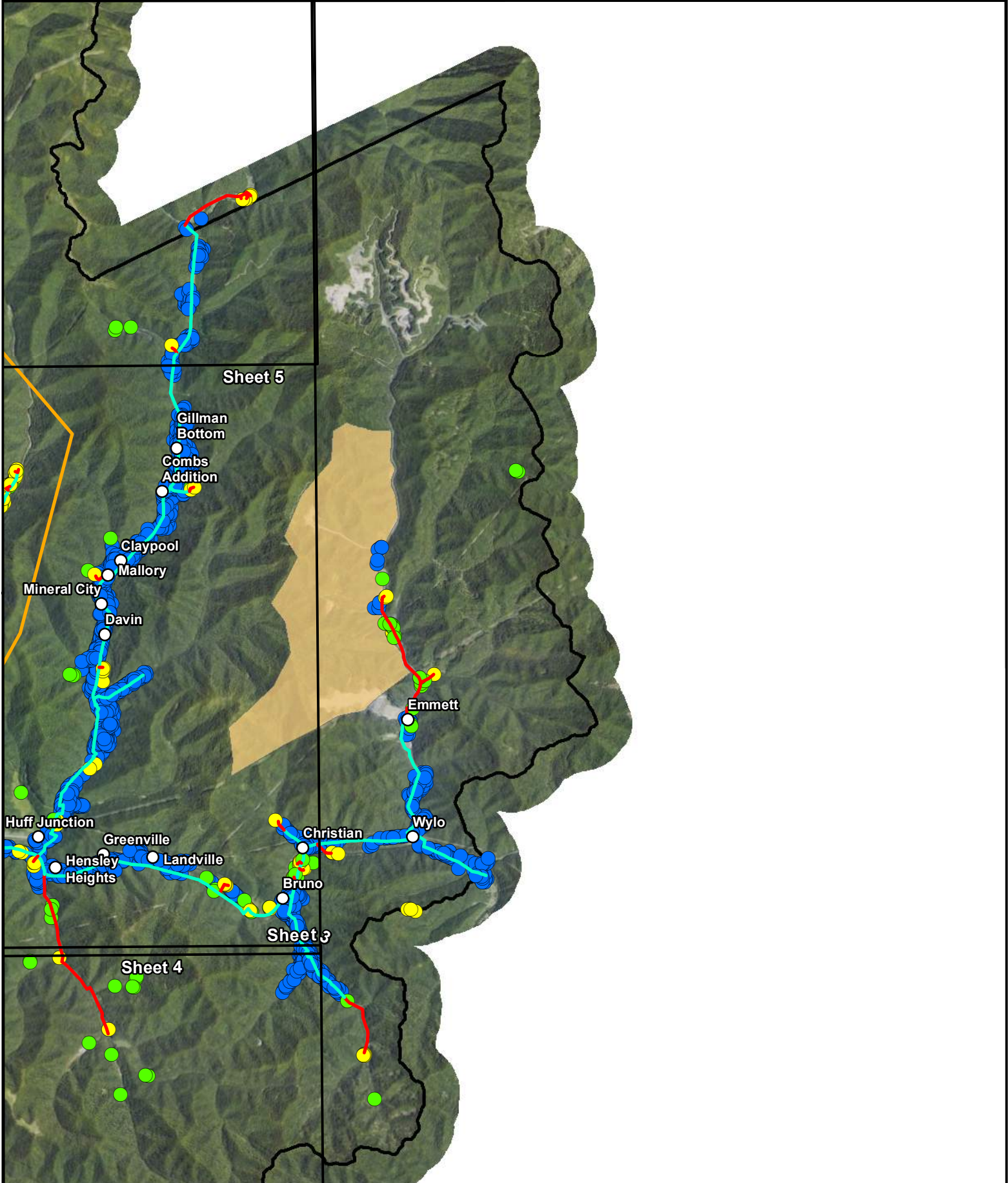
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Sheet 6

- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- GigaBeam Networks, LLC - RDOF
- County Boundary
- Index



Sheet
5



Existing Route	Other Addresses	County Boundary
Proposed Fiber	Project 1 Boundary	Index
Proposed Buried Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	GigaBeam Networks, LLC - RDOF	

Sheet	
	6

Logan County, WV – 2023 ROC Study – Cost Estimate – Whole County

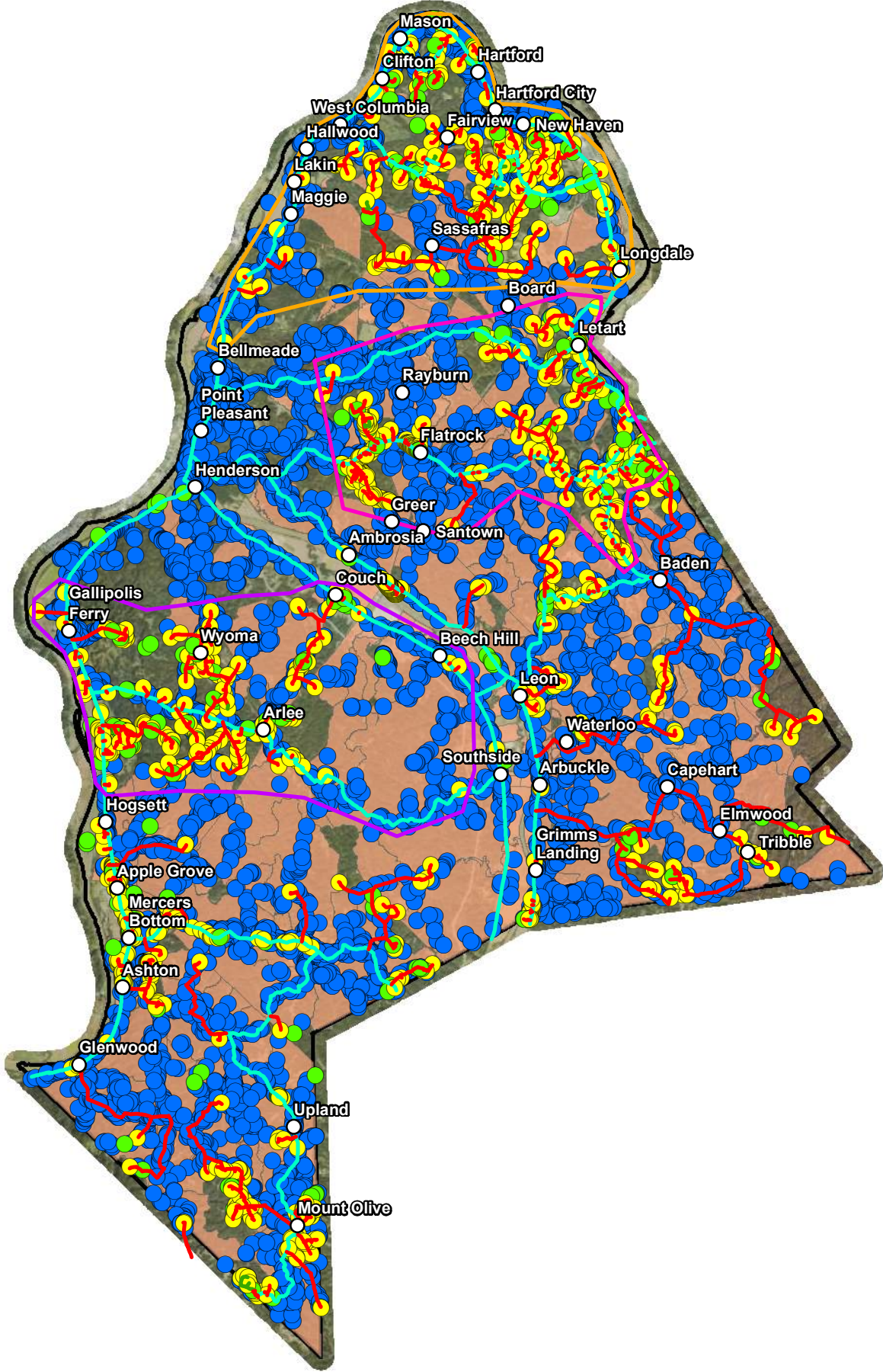
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	101.85	\$560,175
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	101.85	\$152,775
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	101.67	\$1,525,050
Aerial Construction Labor	\$50,000.00	Per Mile	101.67	\$5,083,500
Underground Construction Labor	\$150,000.00	Per Mile	0.18	\$27,000
Project Construction Contingency 10%	\$511,050.00	Lump Sum	1	\$511,050
Legal 1.5%	\$76,657.50	Lump Sum	1	\$76,658
Administrative 2%	\$102,210.00	Lump Sum	1	\$102,210
TOTAL COST = \$8,038,478				

COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
2	Logan	1	398	16.37	\$1,289,138
		2	1457	63.61	\$8,151,438
		3	613	14.44	\$1,137,150

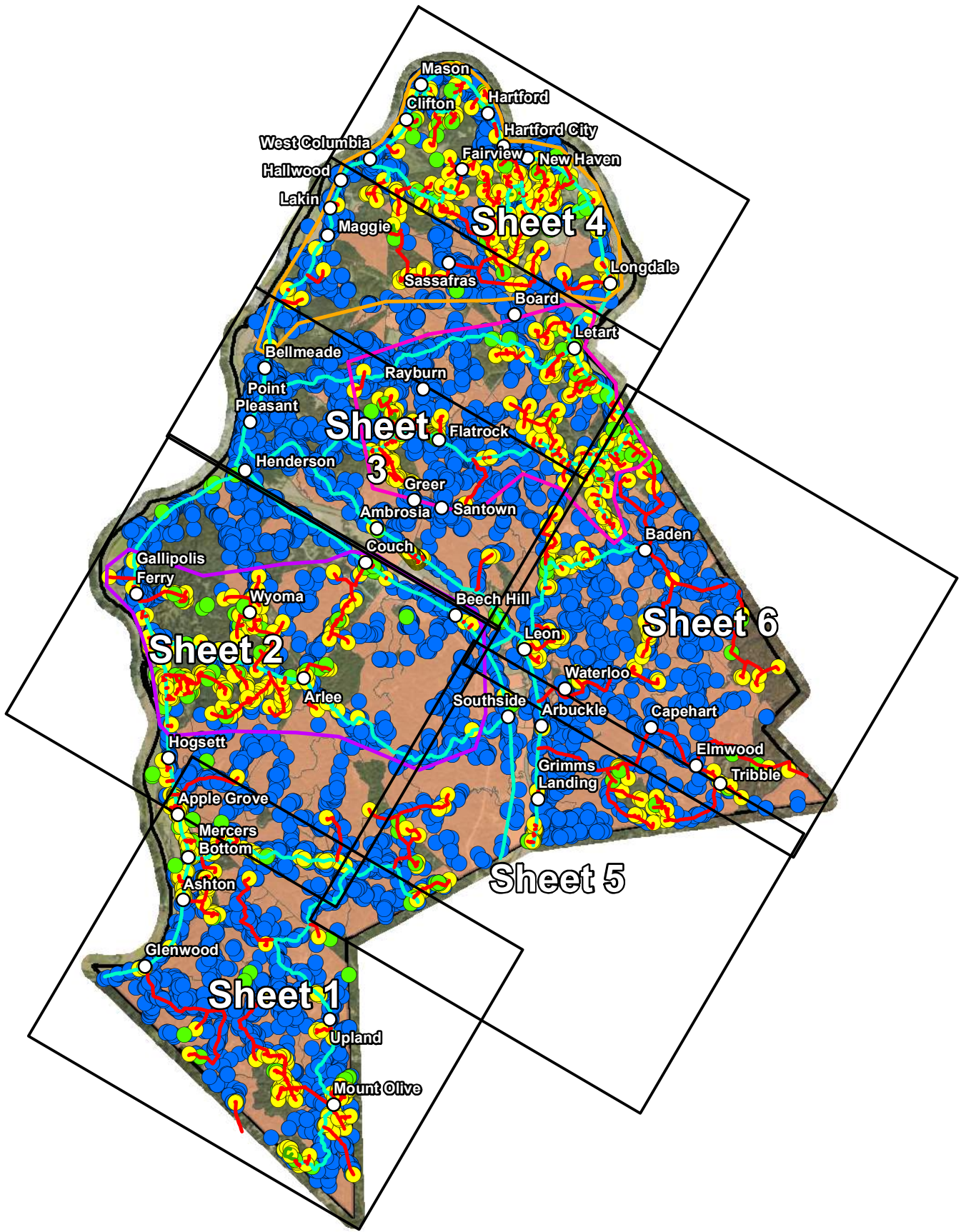


MASON COUNTY

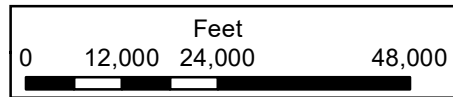


Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 3 Boundary	Frontier - RDOF
Targeted Address		
Unserviceable Targeted Address		

Feet			
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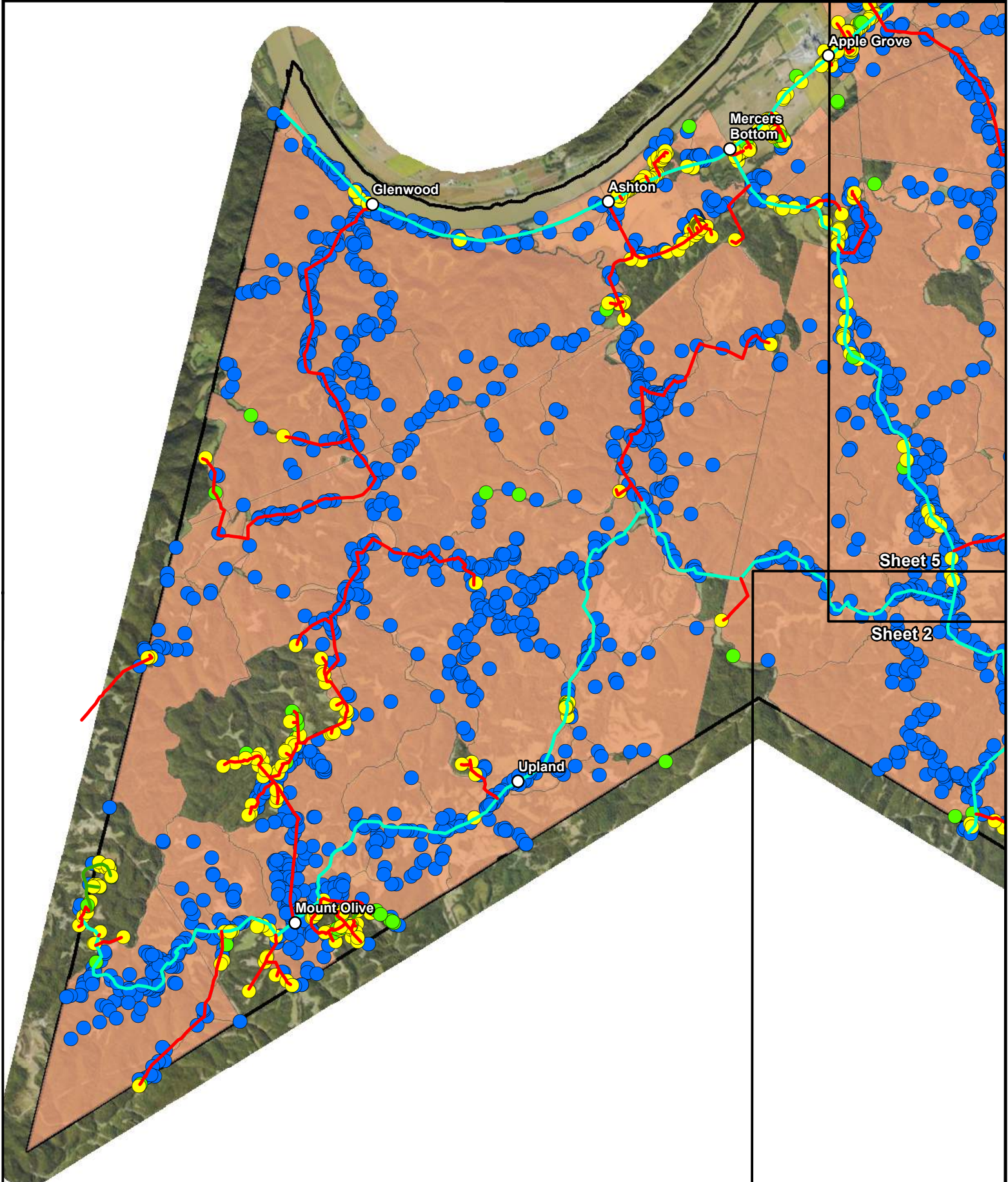


- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index



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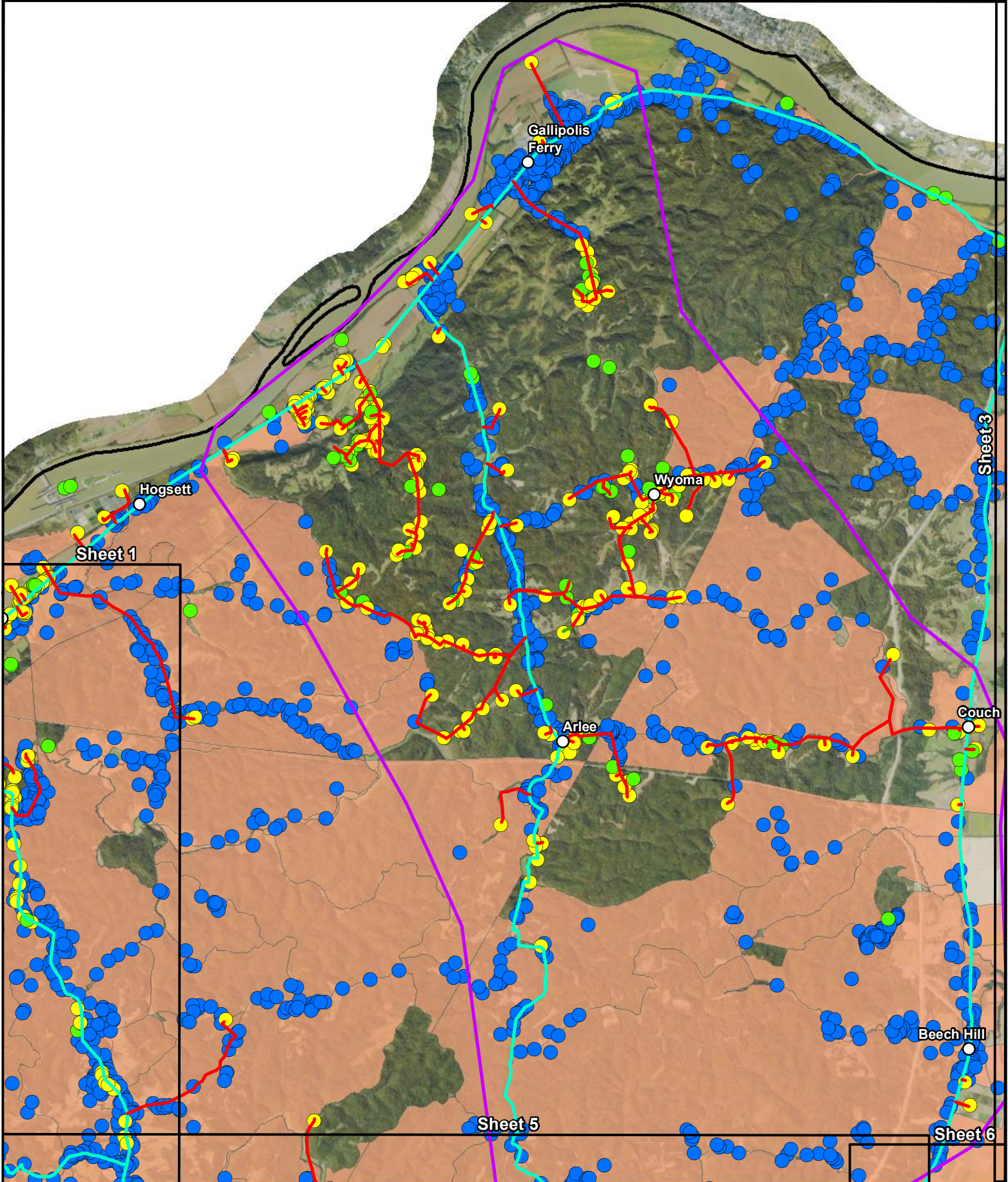


Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Feet

0 3,500 7,000 14,000

Sheet
1



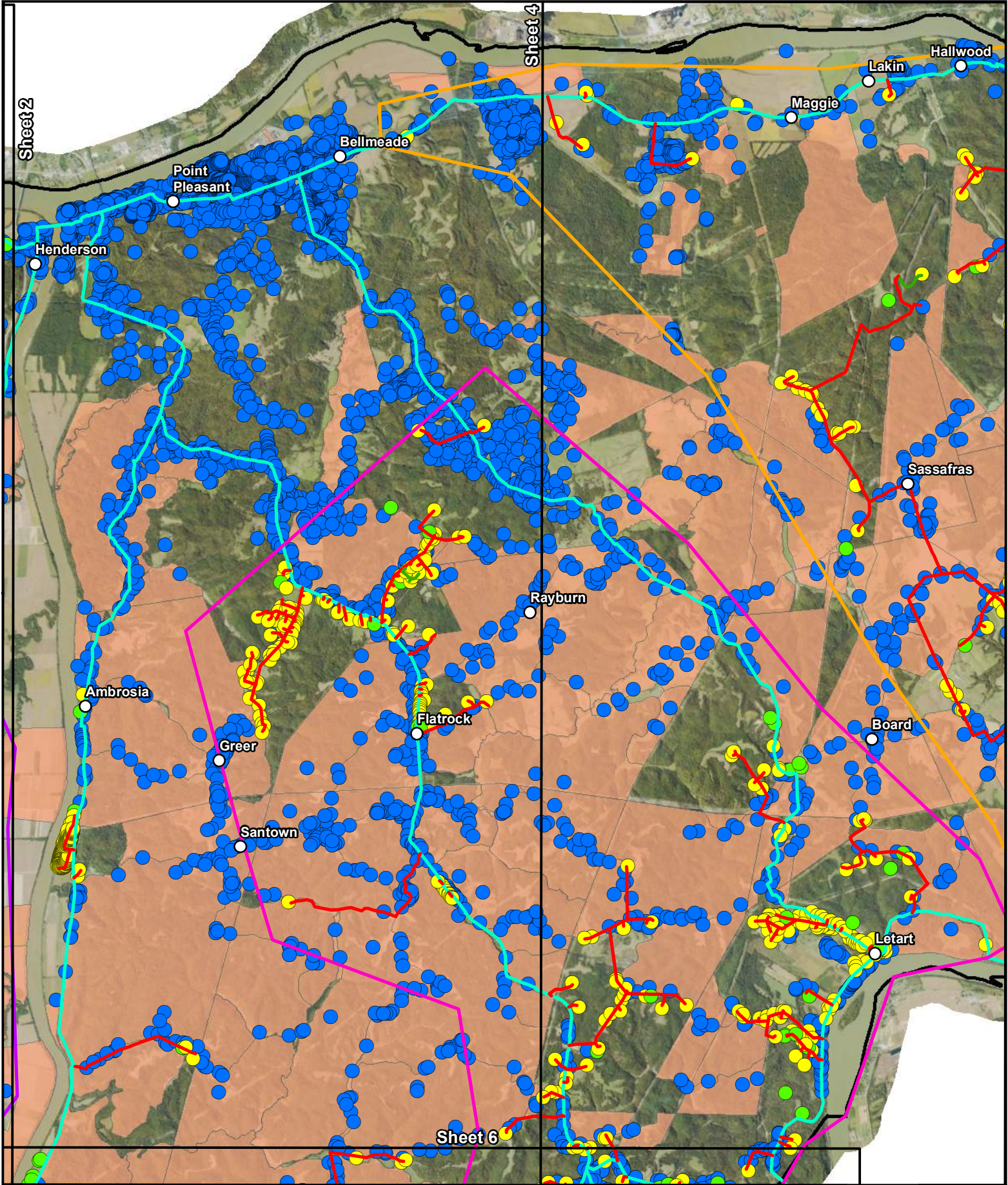
Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Feet

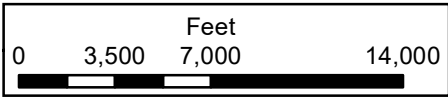
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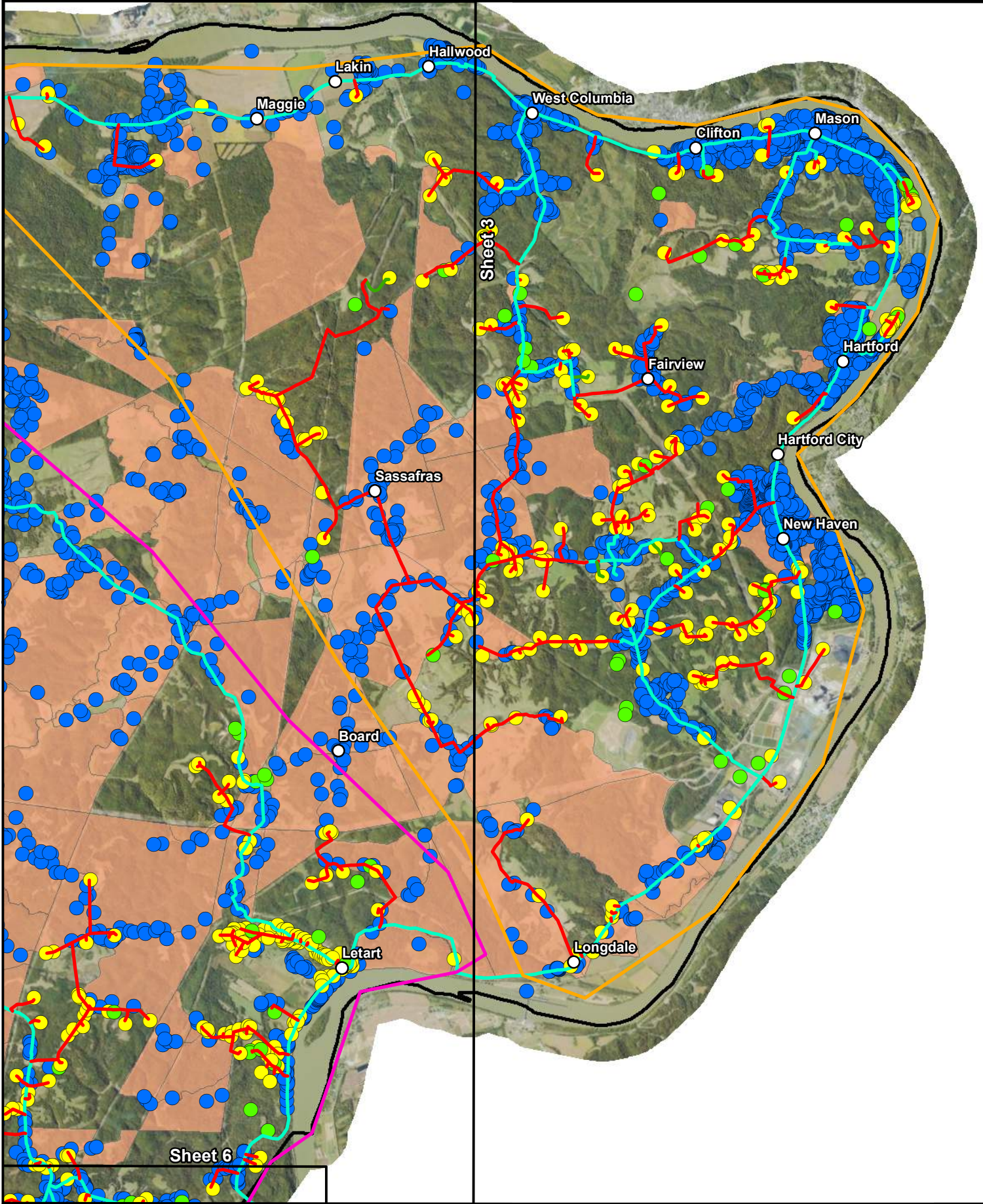
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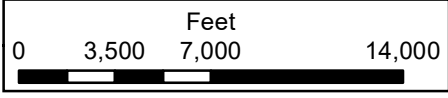
Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	



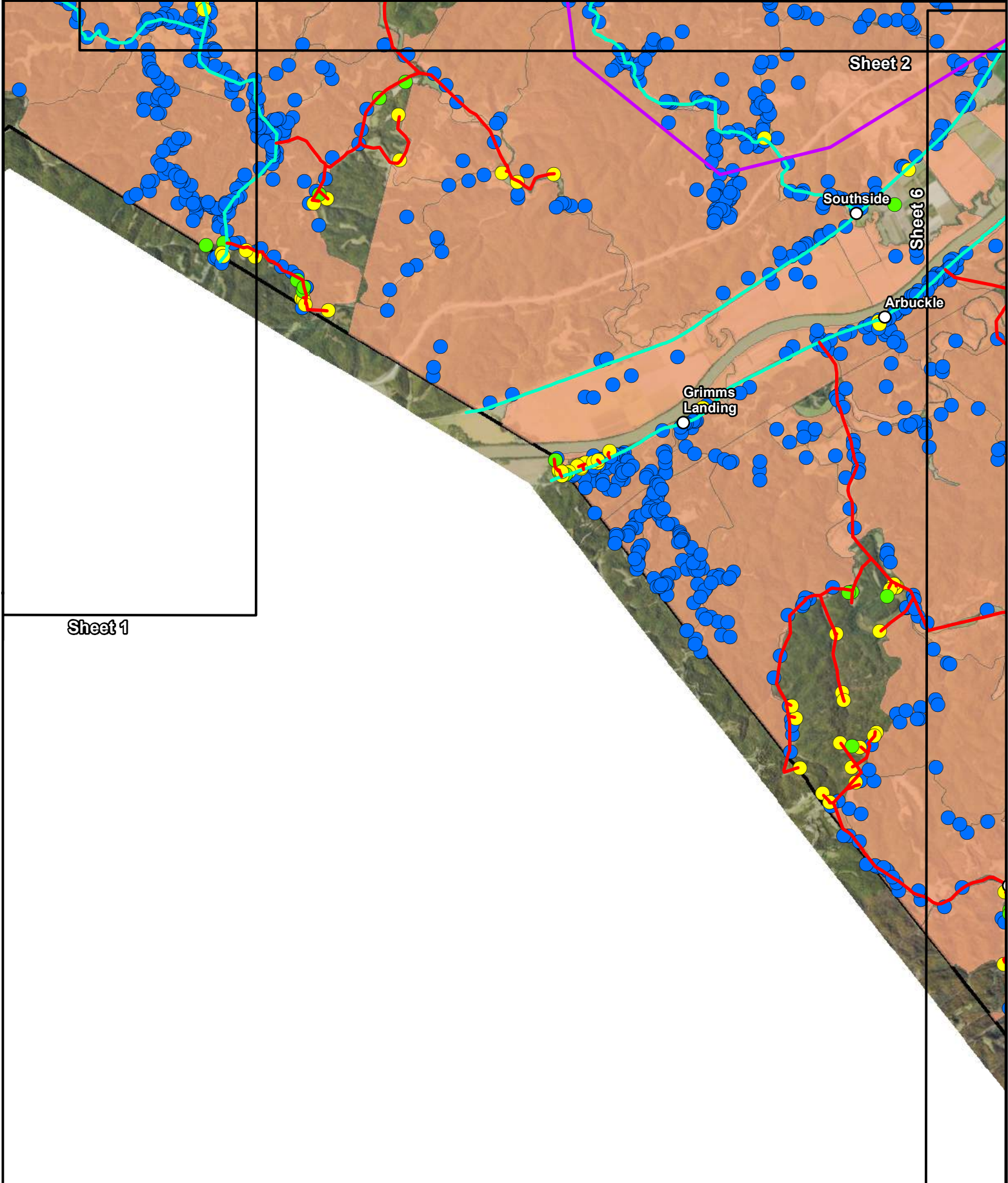
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Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	Frontier - RDOF
Unserviceable Targeted Address		



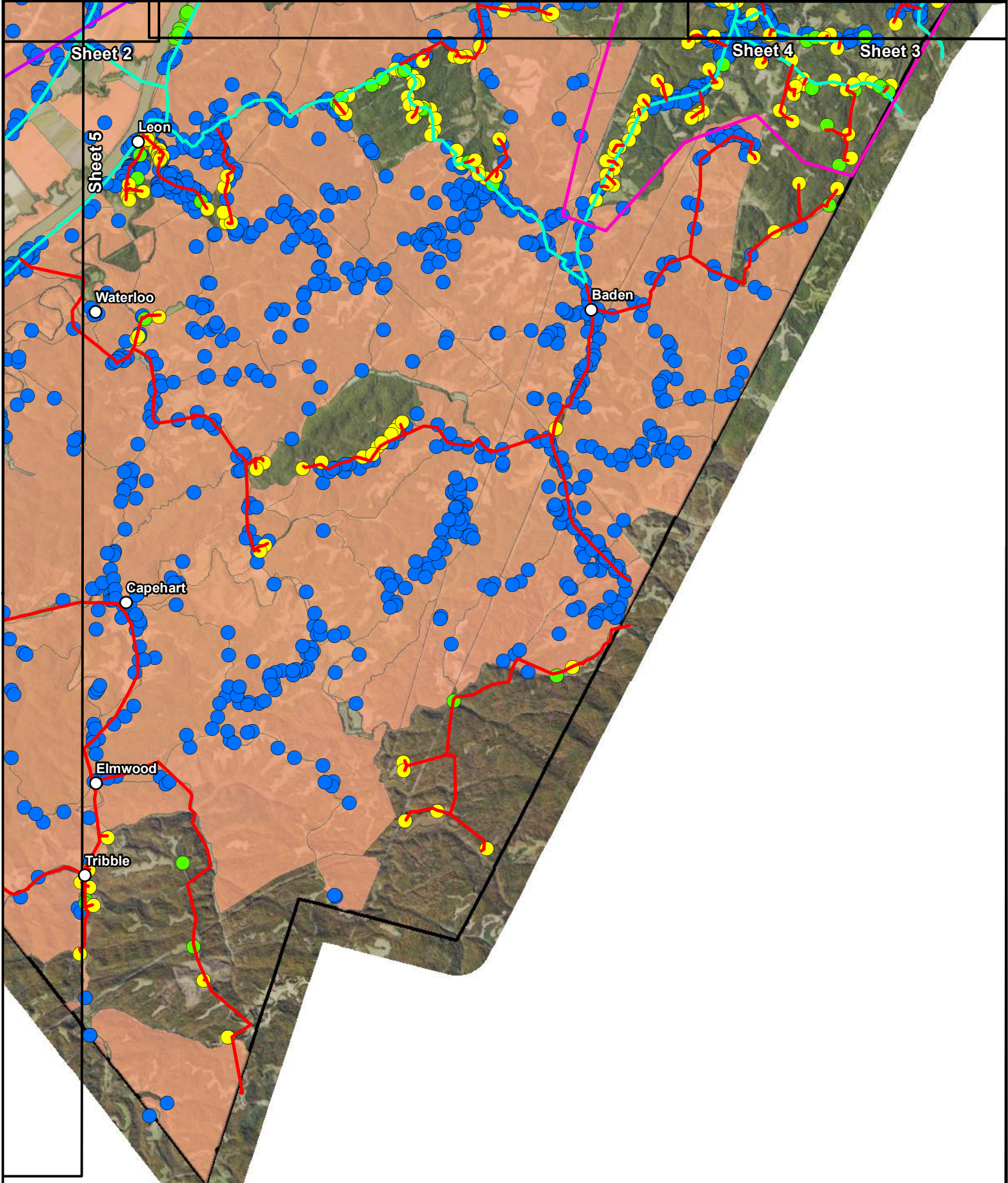
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Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	Frontier - RDOF
Unserviceable Targeted Address		

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Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

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Mason County, WV – 2023 ROC Study – Cost Estimate – Whole County

Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	221.04	\$1,215,720
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	221.04	\$331,560
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	218.70	\$3,280,500
Aerial Construction Labor	\$50,000.00	Per Mile	218.70	\$10,935,000
Underground Construction Labor	\$150,000.00	Per Mile	2.34	\$315,000
Project Construction Contingency 10%	\$1,128,600.00	Lump Sum	1	\$1,128,600
Legal 1.5%	\$169,290.00	Lump Sum	1	\$169,290
Administrative 2%	\$225,720.00	Lump Sum	1	\$225,720

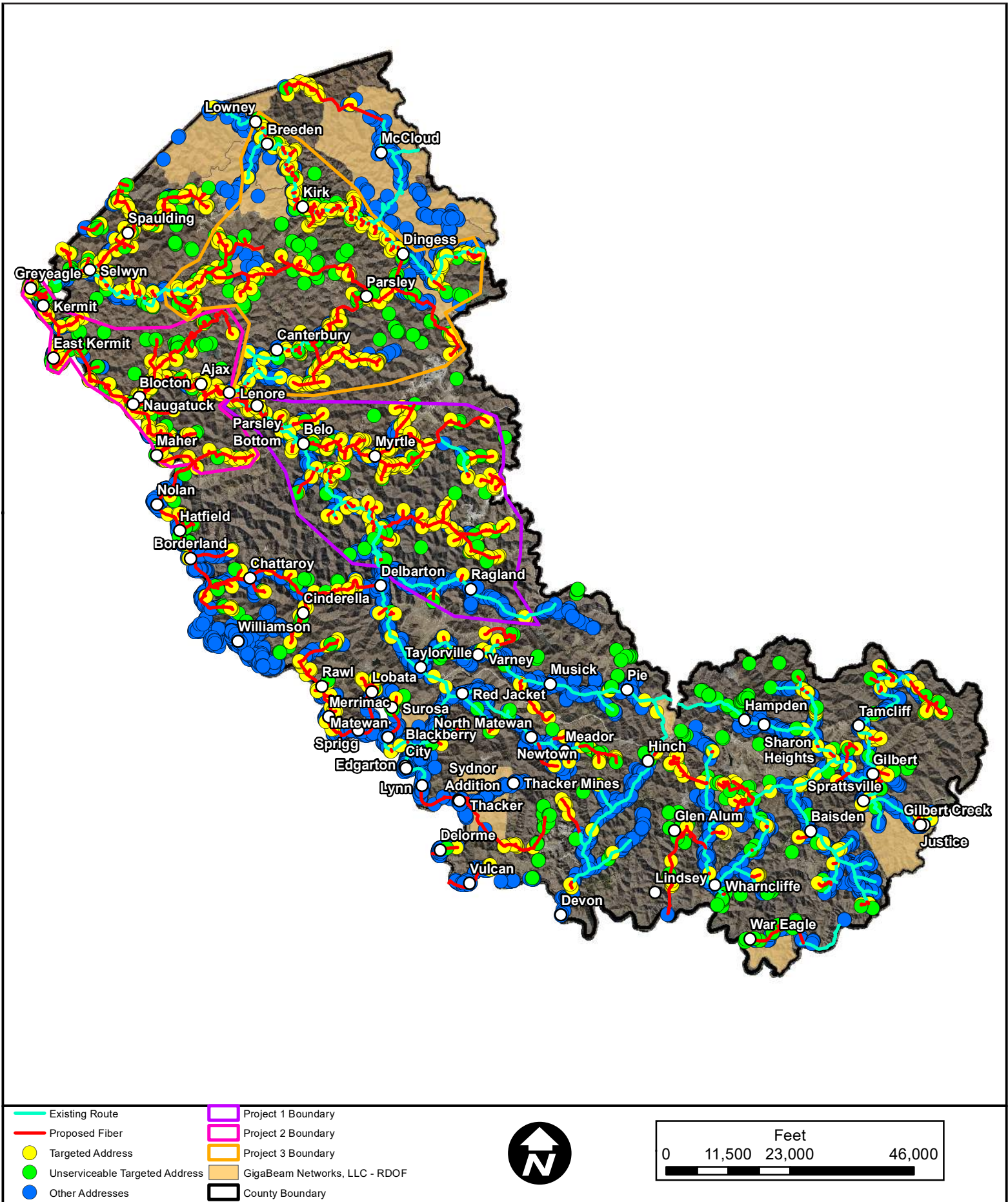
TOTAL COST = \$17,637,390

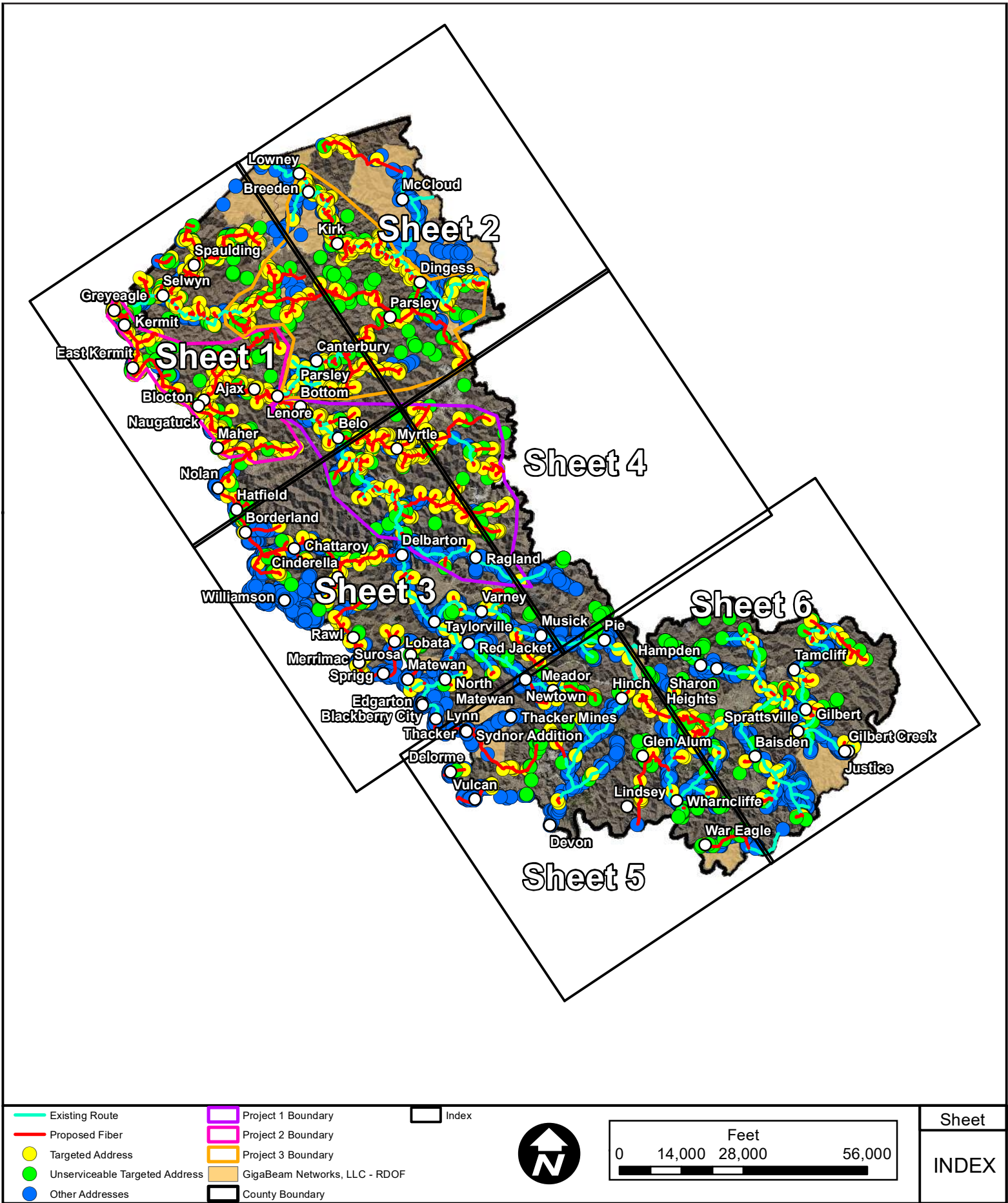
COUNTY SAMPLE PROJECT

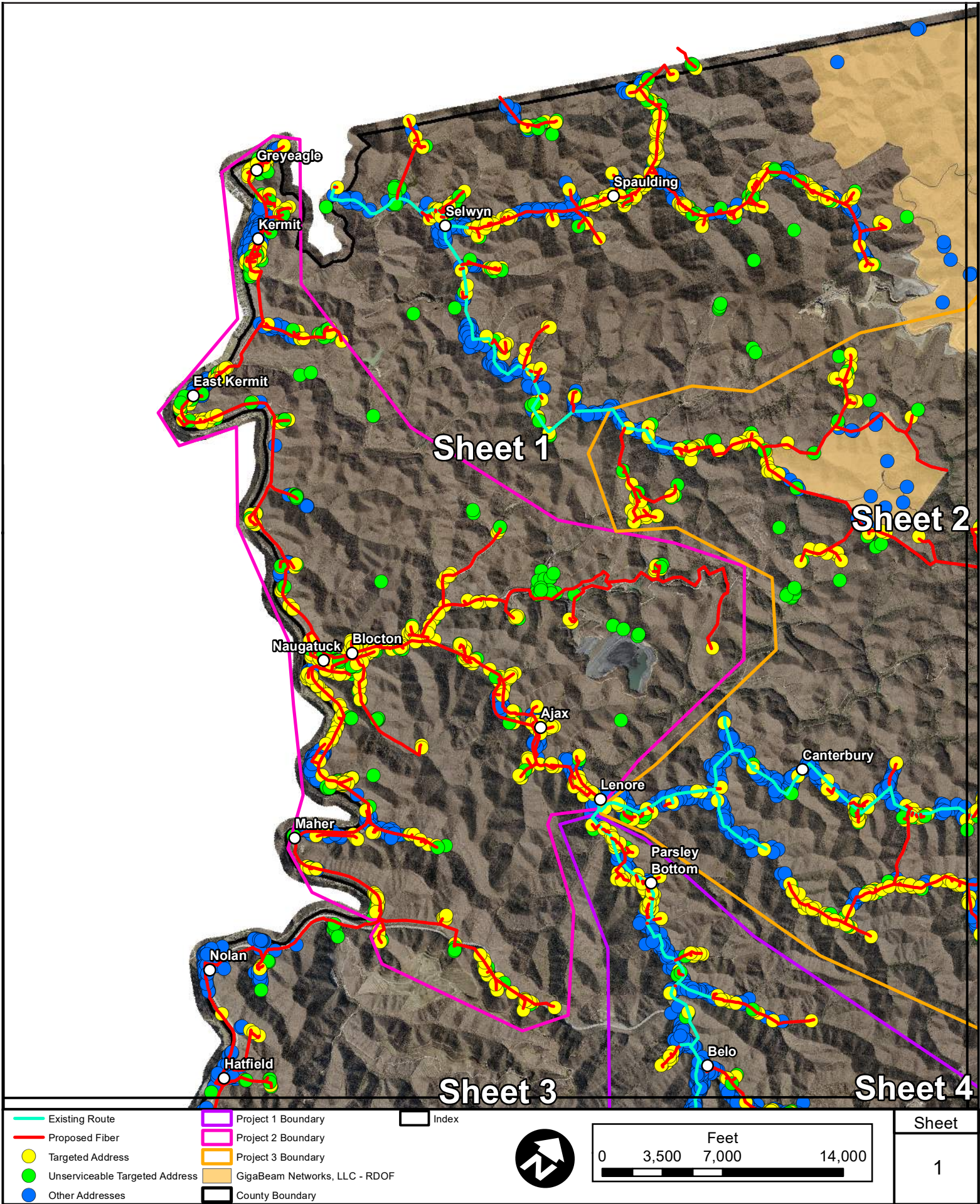
Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
2	Mason	1	252	34.48	\$2,723,180
		2	346	30.61	\$2,388,295
		3	245	47.89	\$3,859,003

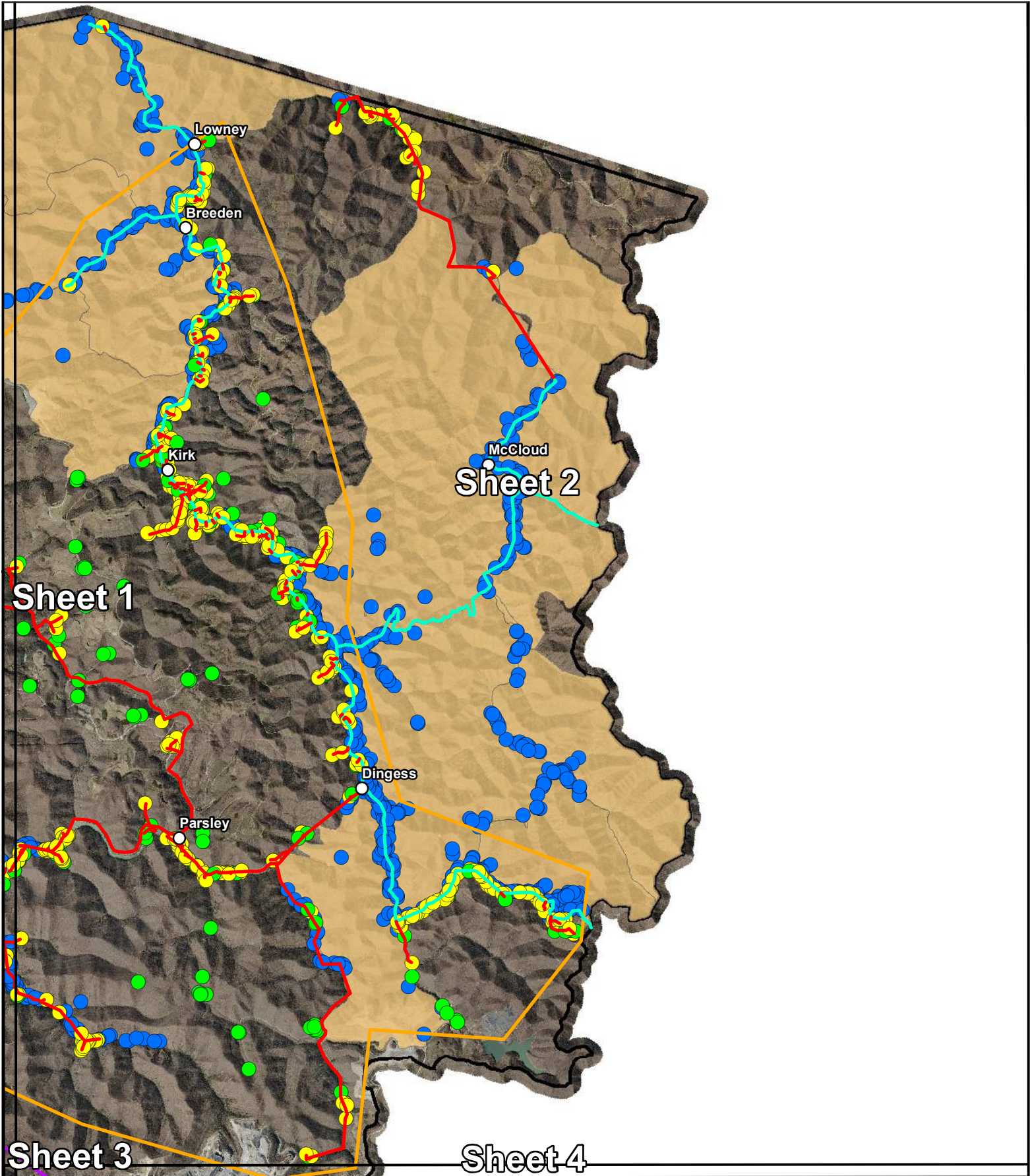


MINGO COUNTY









<ul style="list-style-type: none"> — Existing Route — Proposed Fiber ● Targeted Address ● Unserviceable Targeted Address ● Other Addresses 	<ul style="list-style-type: none"> Project 1 Boundary Project 2 Boundary Project 3 Boundary GigaBeam Networks, LLC - RDOF County Boundary 	<ul style="list-style-type: none"> Index 	<div style="text-align: center;">  </div>	<div style="text-align: center;"> <p>Feet</p> <p>0 3,500 7,000 14,000</p>  </div>	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="padding: 5px;">Sheet</td> </tr> <tr> <td style="padding: 5px;">2</td> </tr> </table>	Sheet	2
Sheet							
2							

Sheet 1

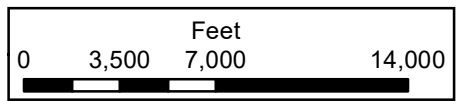
Sheet 2

Sheet 3

Sheet 4

Sheet 5

- Existing Route
- Proposed Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- GigaBeam Networks, LLC - RDOF
- County Boundary
- Index



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Sheet 1 Sheet 2

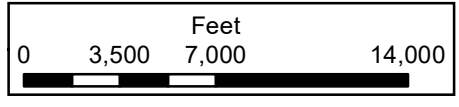
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Sheet 4

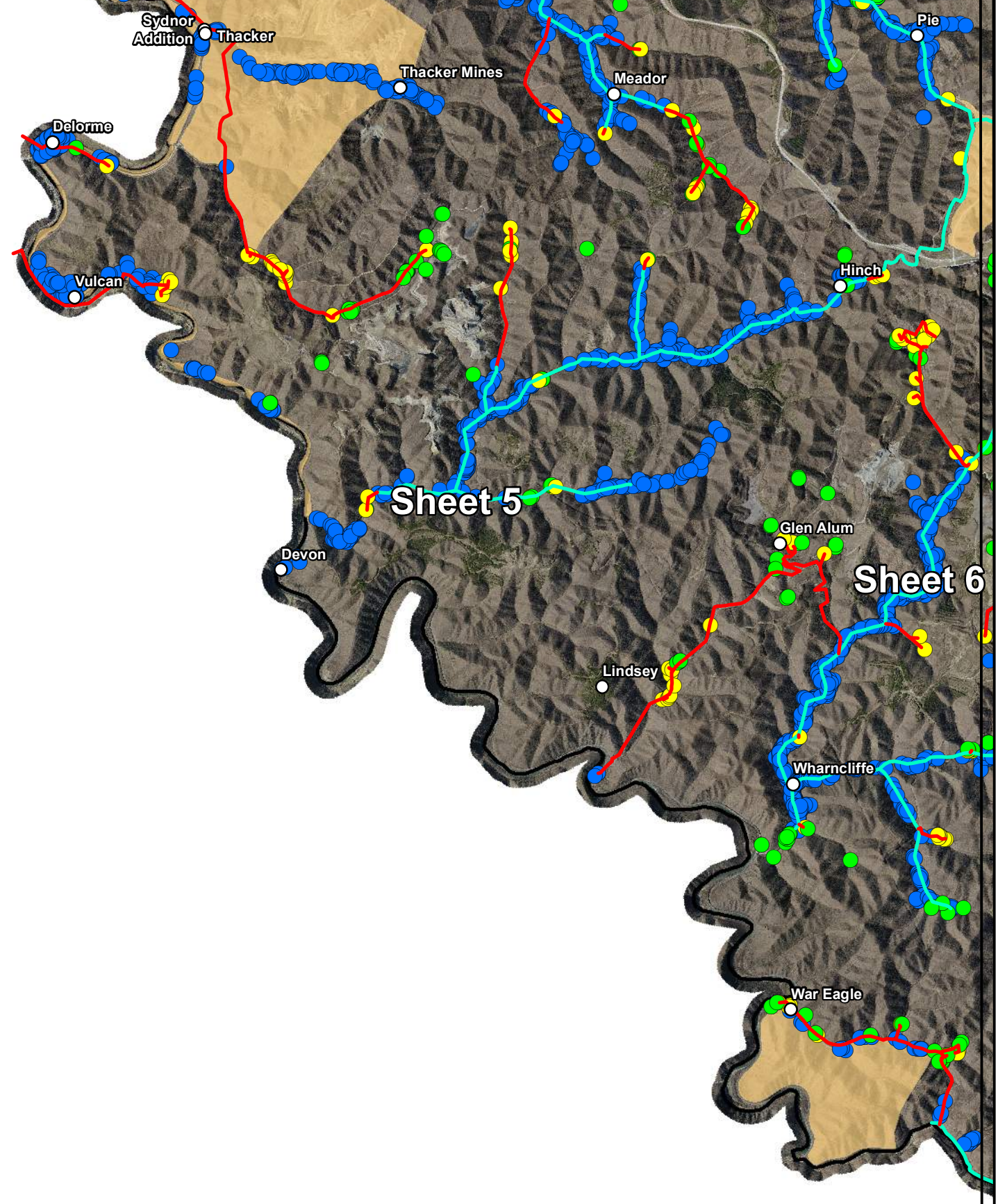
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Sheet 6

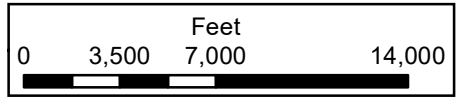
-  Existing Route
-  Proposed Fiber
-  Targeted Address
-  Unserviceable Targeted Address
-  Other Addresses
-  Project 1 Boundary
-  Project 2 Boundary
-  Project 3 Boundary
-  GigaBeam Networks, LLC - RDOF
-  County Boundary
-  Index



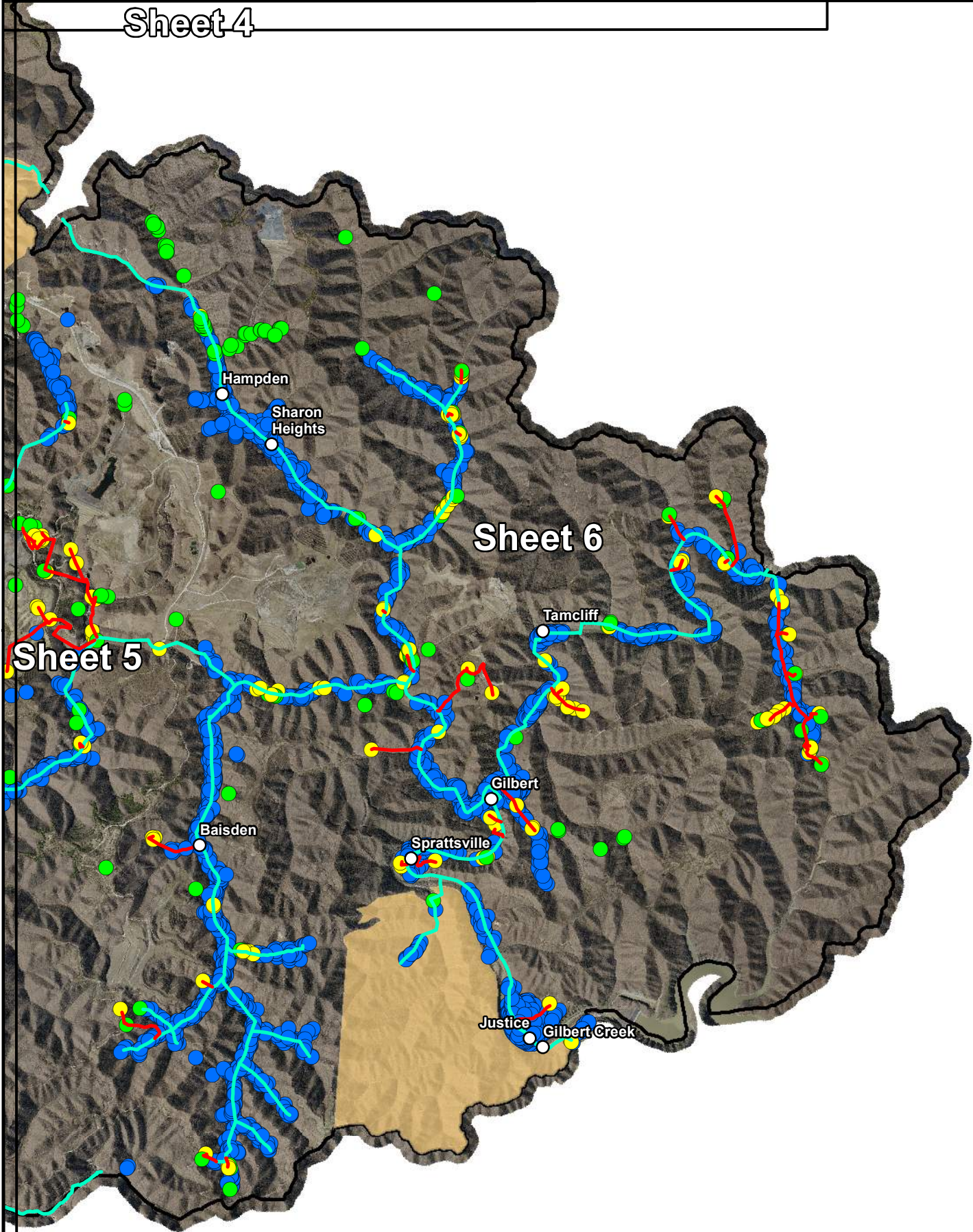
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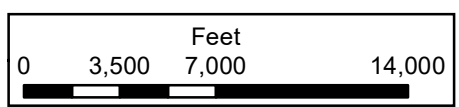
- Existing Route
- Proposed Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- GigaBeam Networks, LLC - RDOF
- County Boundary
- Index



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- Existing Route
- Proposed Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- GigaBeam Networks, LLC - RDOF
- County Boundary
- Index



Sheet
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Mingo County, WV – 2023 ROC Study – Cost Estimate – Whole County

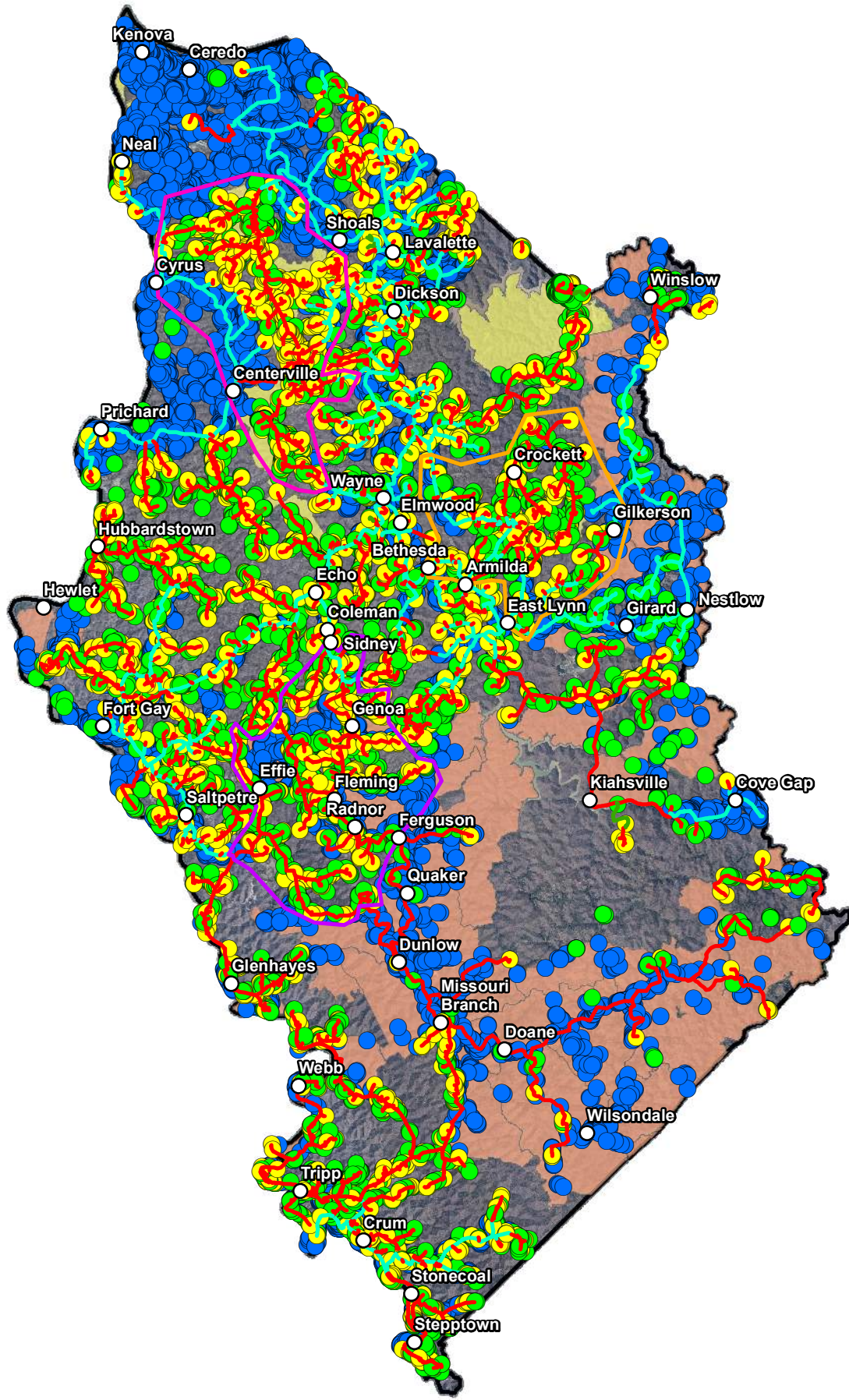
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	228.54	\$1,256,970
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	228.54	\$342,810
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	228.54	\$3,428,100
Aerial Construction Labor	\$50,000.00	Per Mile	228.54	\$11,427,000
Underground Construction Labor	\$150,000.00	Per Mile	0.00	\$0
Project Construction Contingency 10%	\$1,142,700.00	Lump Sum	1	\$1,142,700
Legal 1.5%	\$171,405.00	Lump Sum	1	\$171,405
Administrative 2%	\$228,540.00	Lump Sum	1	\$228,540
TOTAL COST = \$17,997,525				

COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
2	Mingo	1	450	36.96	\$2,910,600
		2	458	41.08	\$3,235,050
		3	674	42.48	\$3,345,300

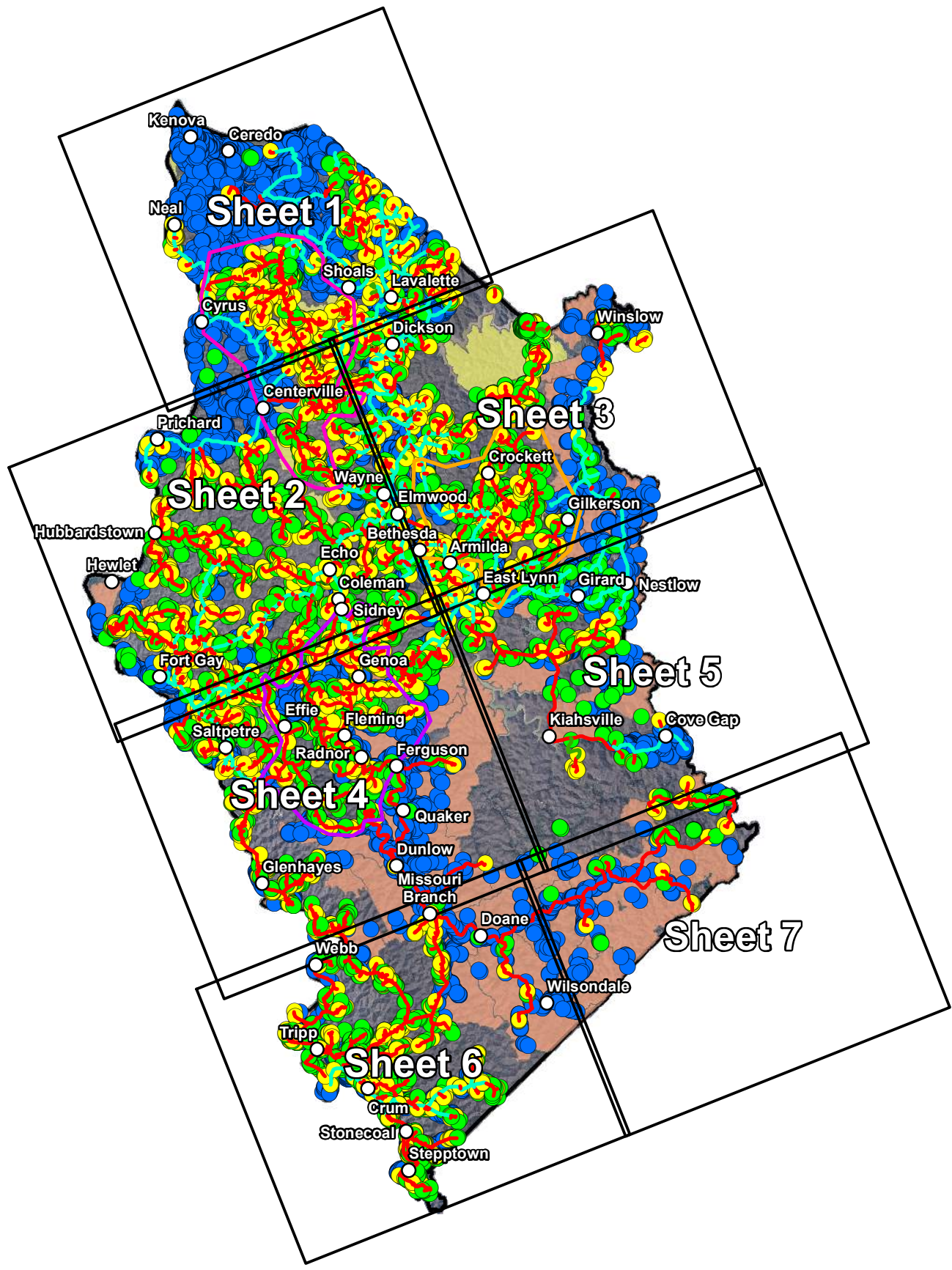


WAYNE COUNTY

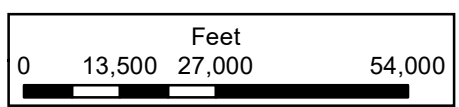


Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 3 Boundary	
Targeted Address	Frontier - RDOF	
Unserviceable Targeted Address		

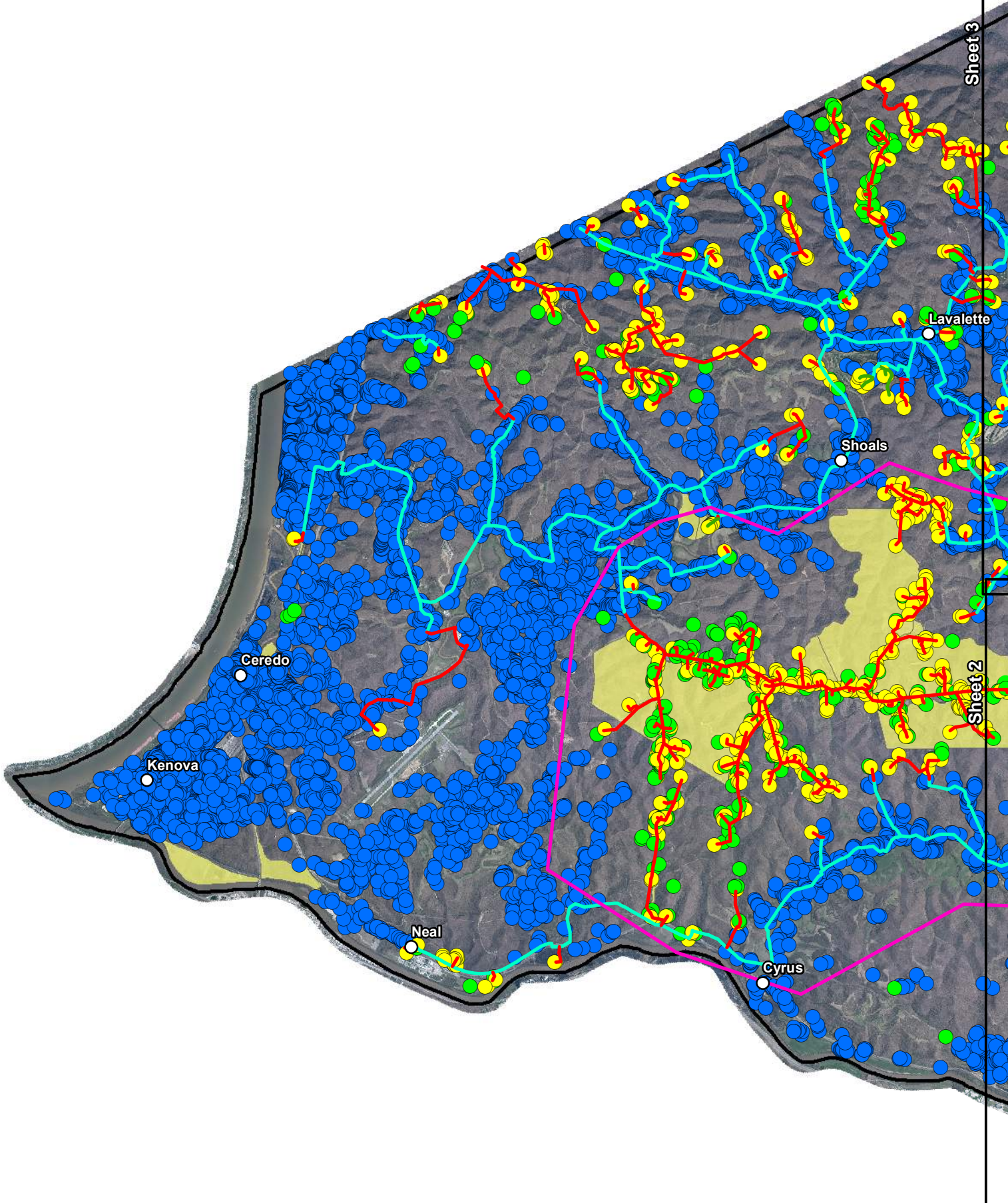
Feet			
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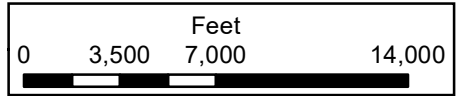
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index



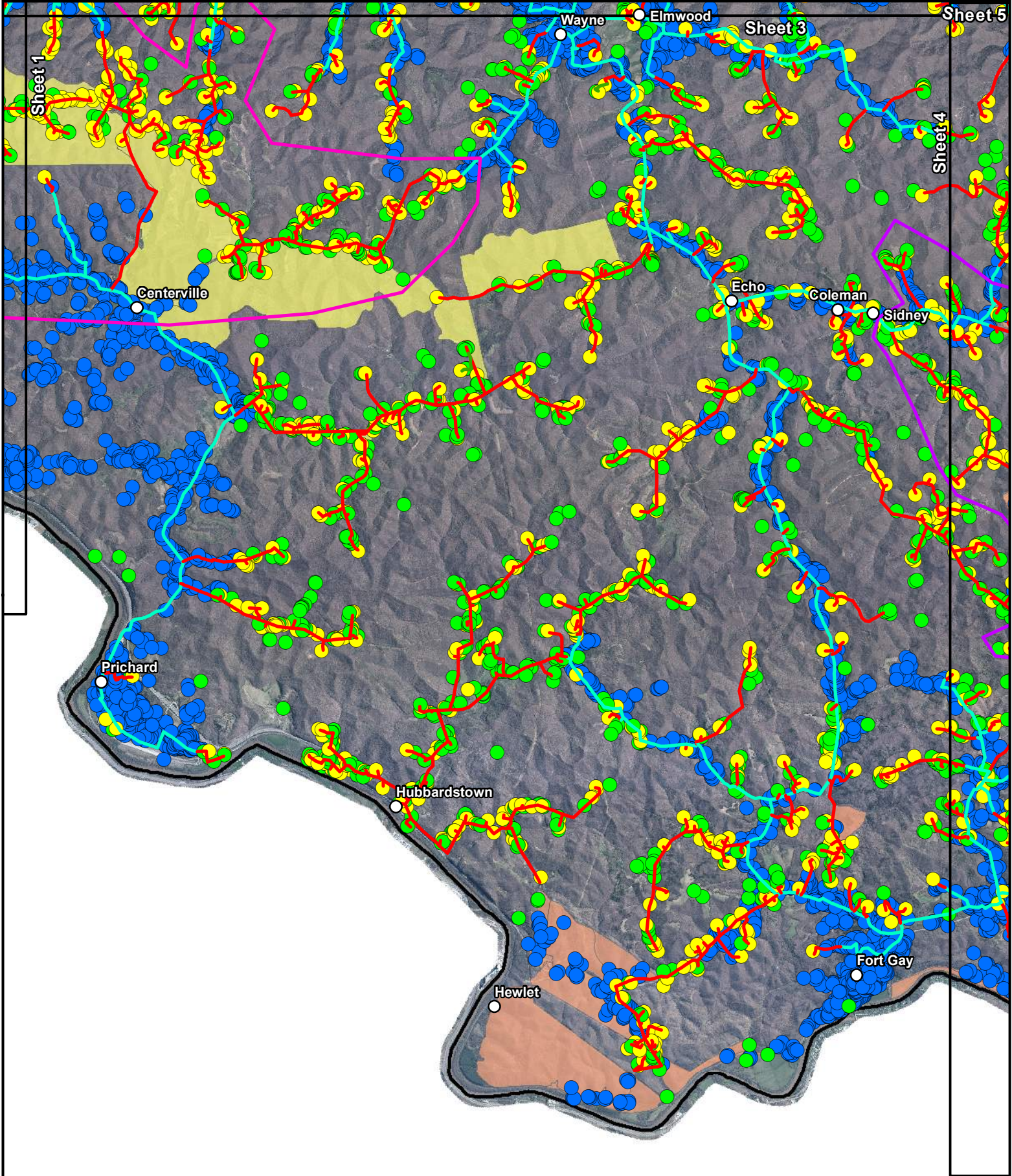
Sheet
INDEX



- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Starlink Services, LLC - RDOF
- County Boundary
- Index
- Frontier - RDOF



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1



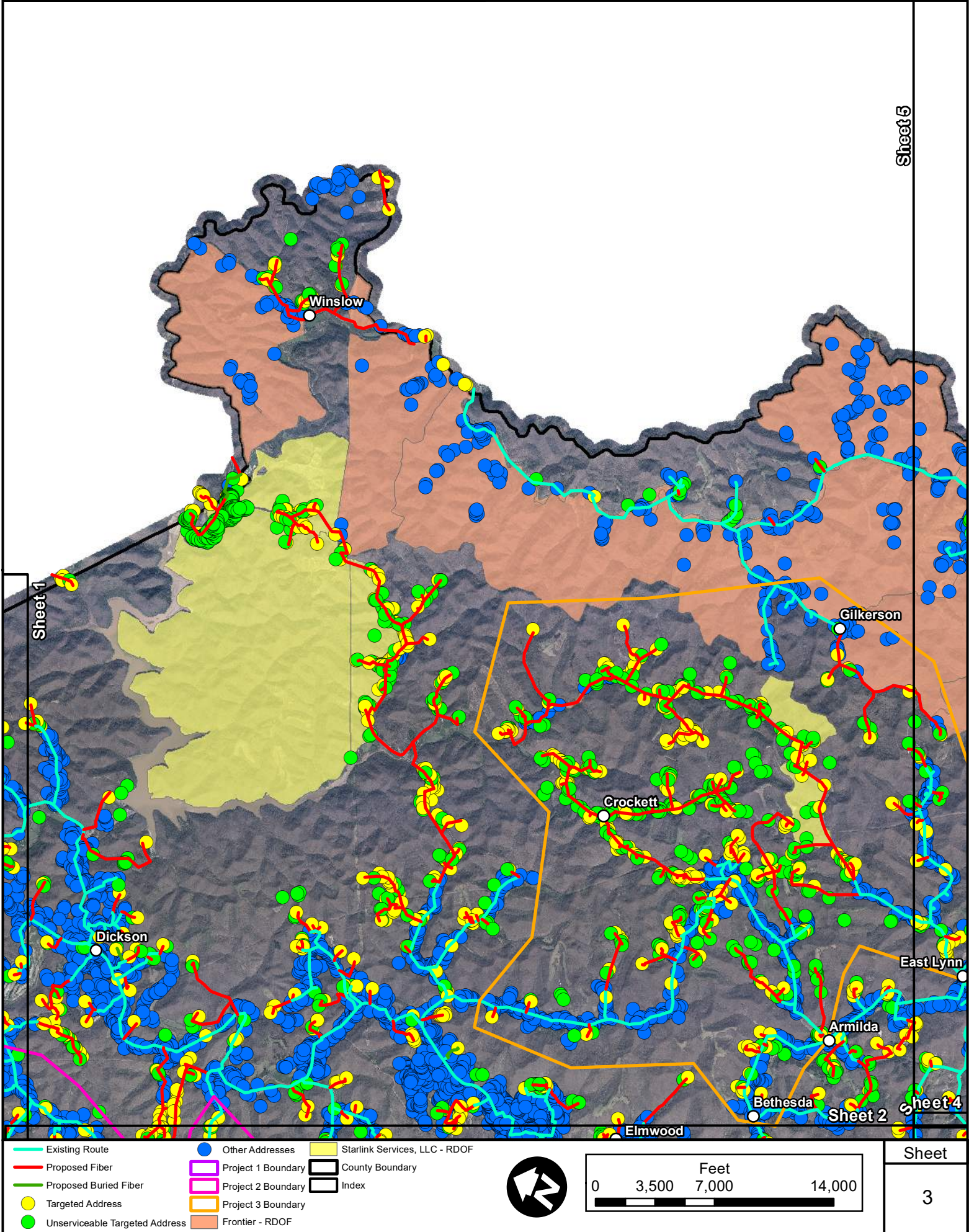
Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

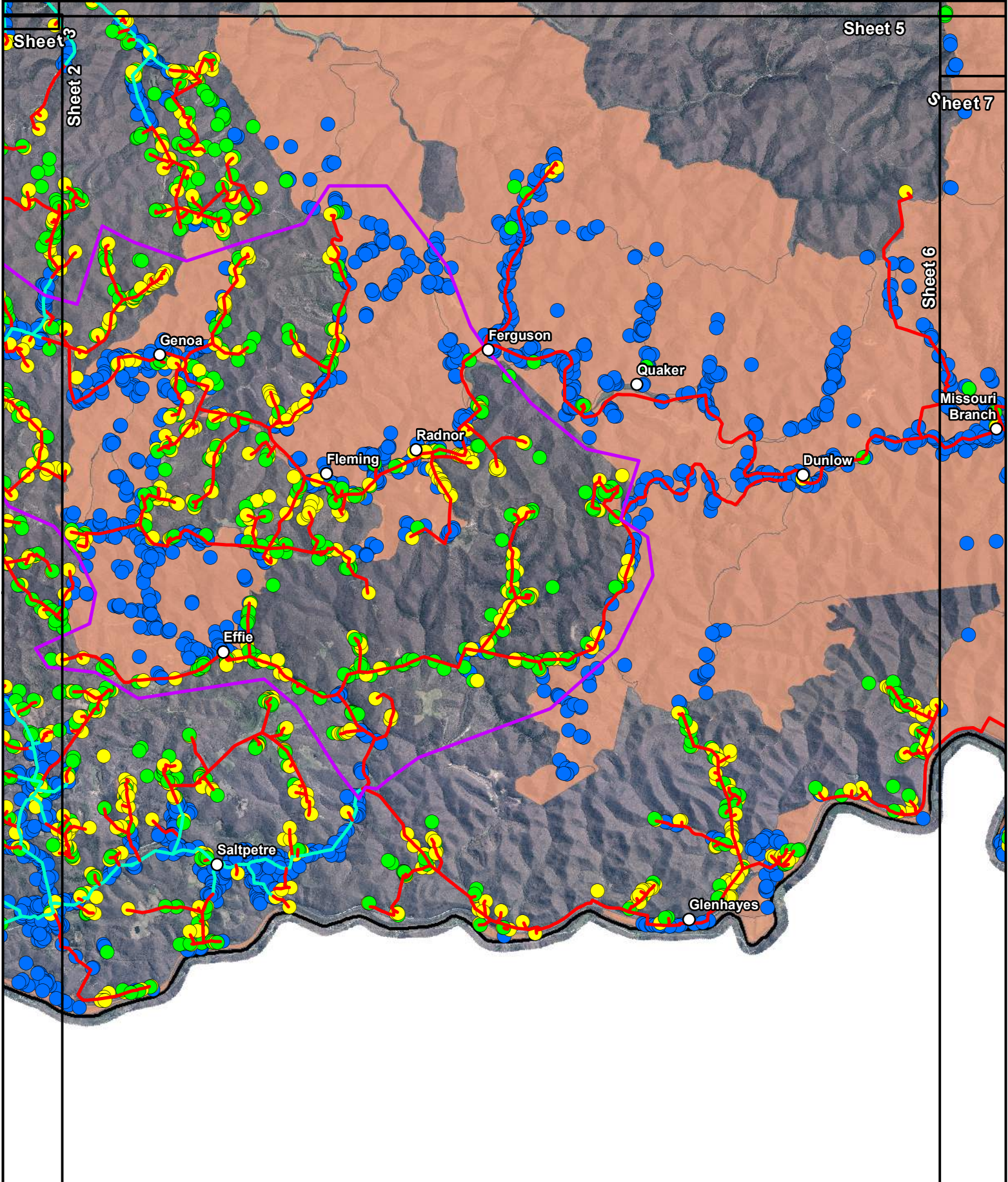
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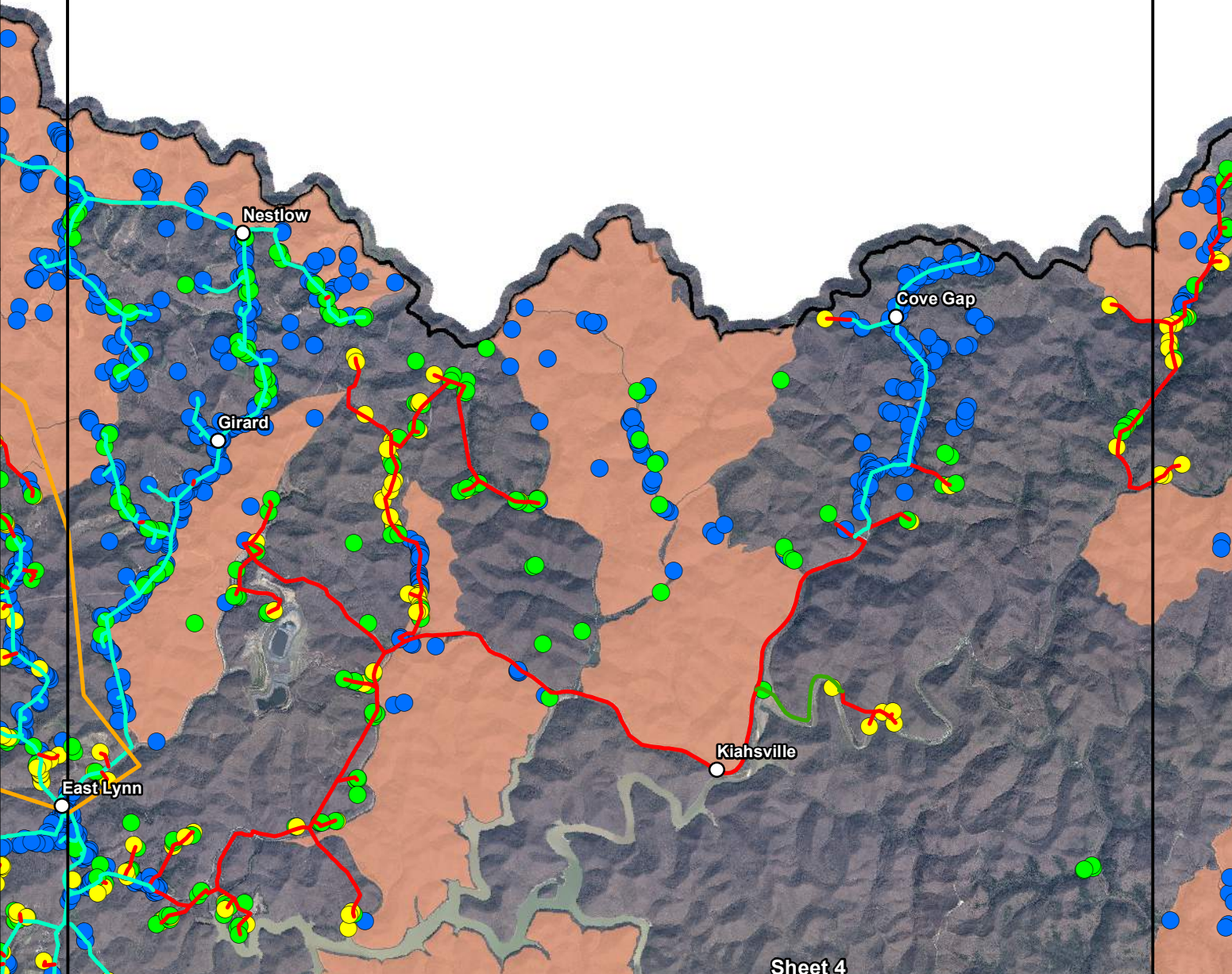
Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	Frontier - RDOF
Unserviceable Targeted Address		

Feet

0 3,500 7,000 14,000

Sheet

4

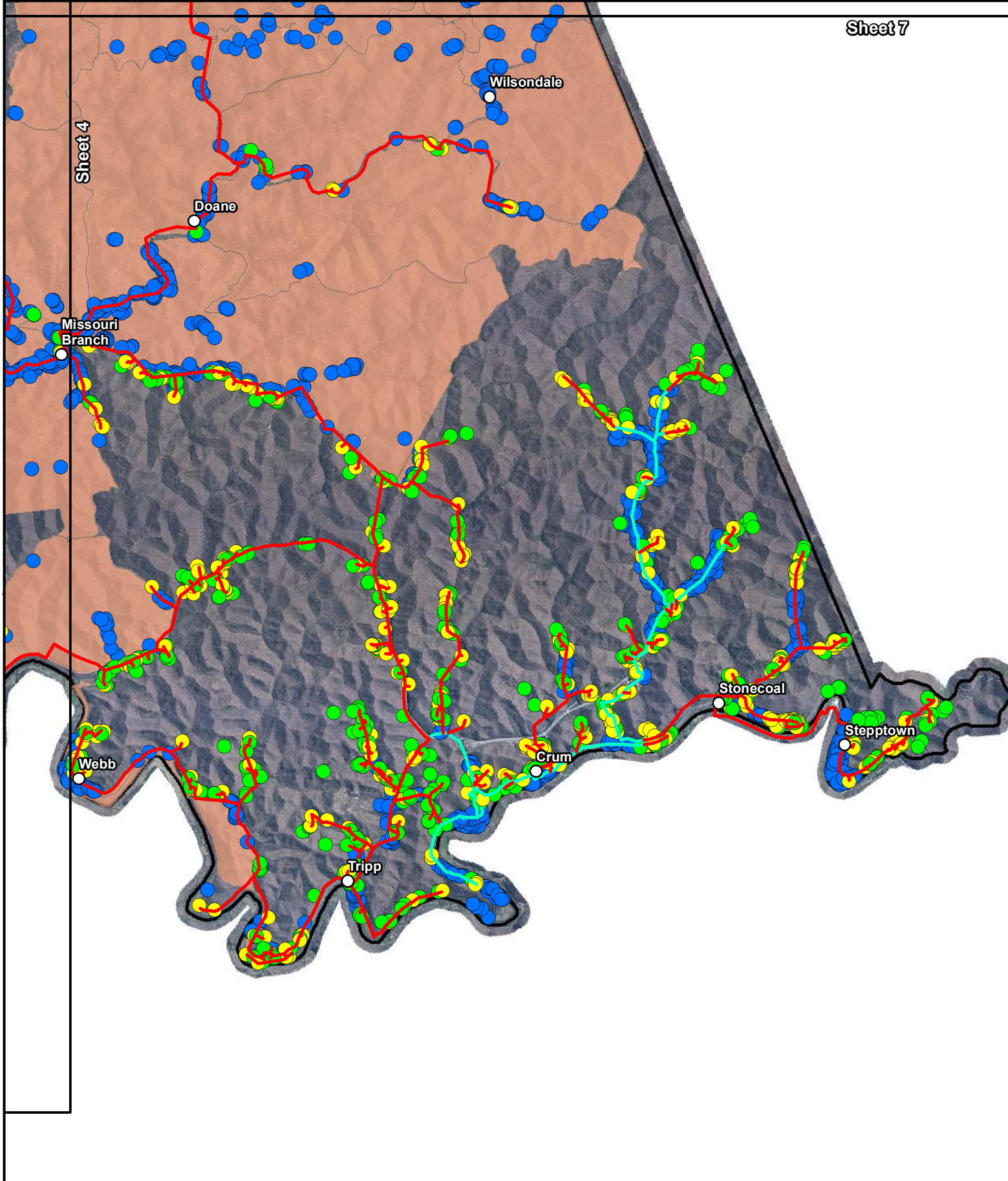


Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

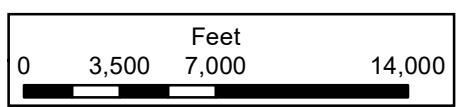
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Sheet 4

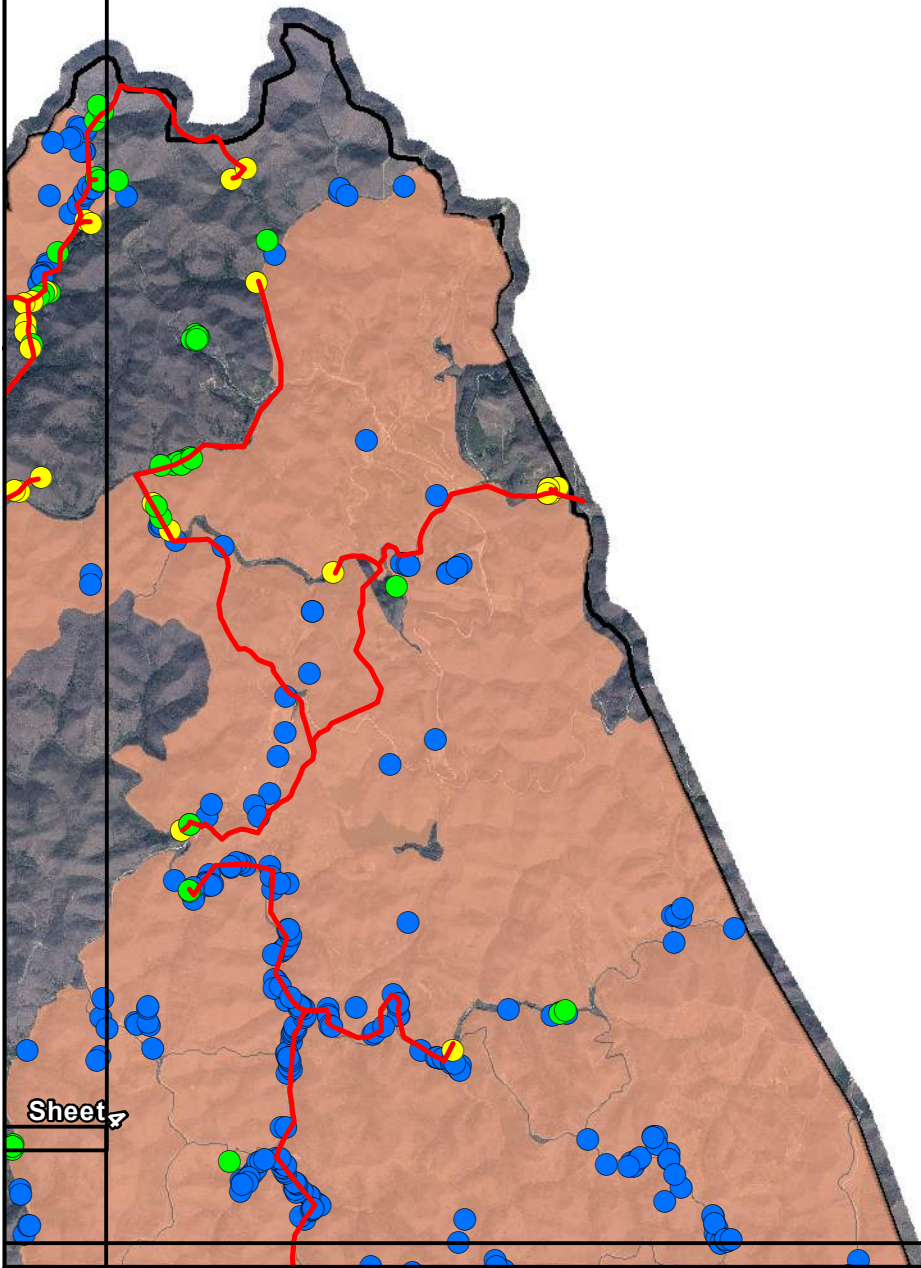


- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index



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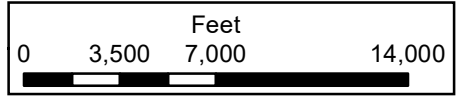
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Sheet 7

Sheet 6

- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Starlink Services, LLC - RDOF
- County Boundary
- Index
- Frontier - RDOF



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Wayne County, WV – 2023 ROC Study – Cost Estimate – Whole County

Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	454.01	\$2,497,055
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	454.01	\$681,015
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	450.62	\$6,759,300
Aerial Construction Labor	\$50,000.00	Per Mile	450.62	\$22,531,000
Underground Construction Labor	\$150,000.00	Per Mile	3.39	\$508,500
Project Construction Contingency 10%	\$2,303,950.00	Lump Sum	1	\$2,303,950
Legal 1.5%	\$345,592.50	Lump Sum	1	\$343,593
Administrative 2%	\$460,790.00	Lump Sum	1	\$460,790
TOTAL COST = \$36,087,203				

COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
2	Wayne	1	369	51.06	\$4,020,975
		2	593	46.82	\$3,699,880
		3	320	31.26	\$2,461,725

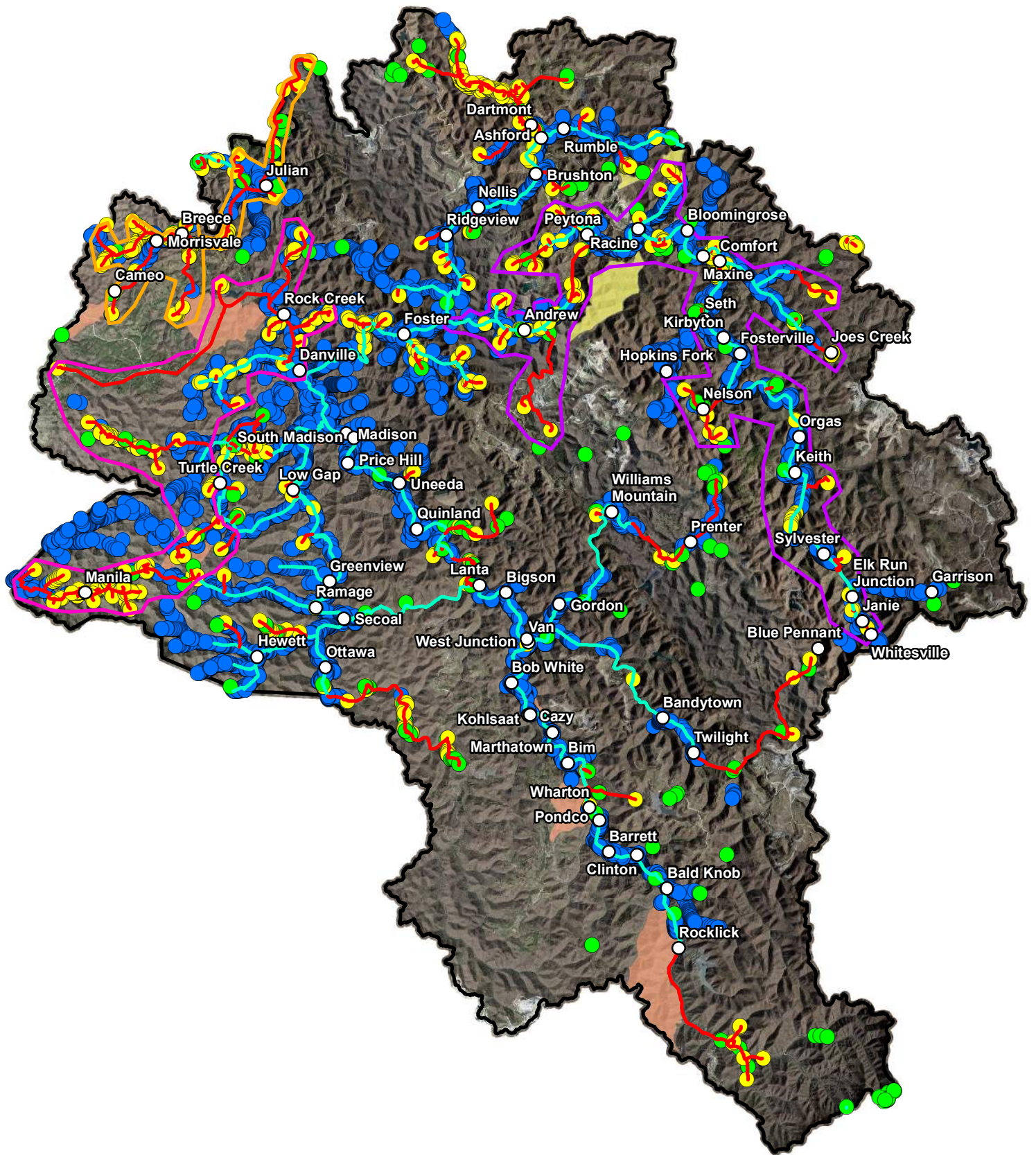
REGION 3

Boone, Clay, Kanawha,
and Putnam Counties

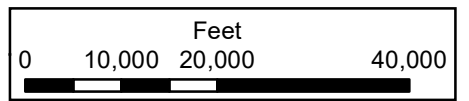


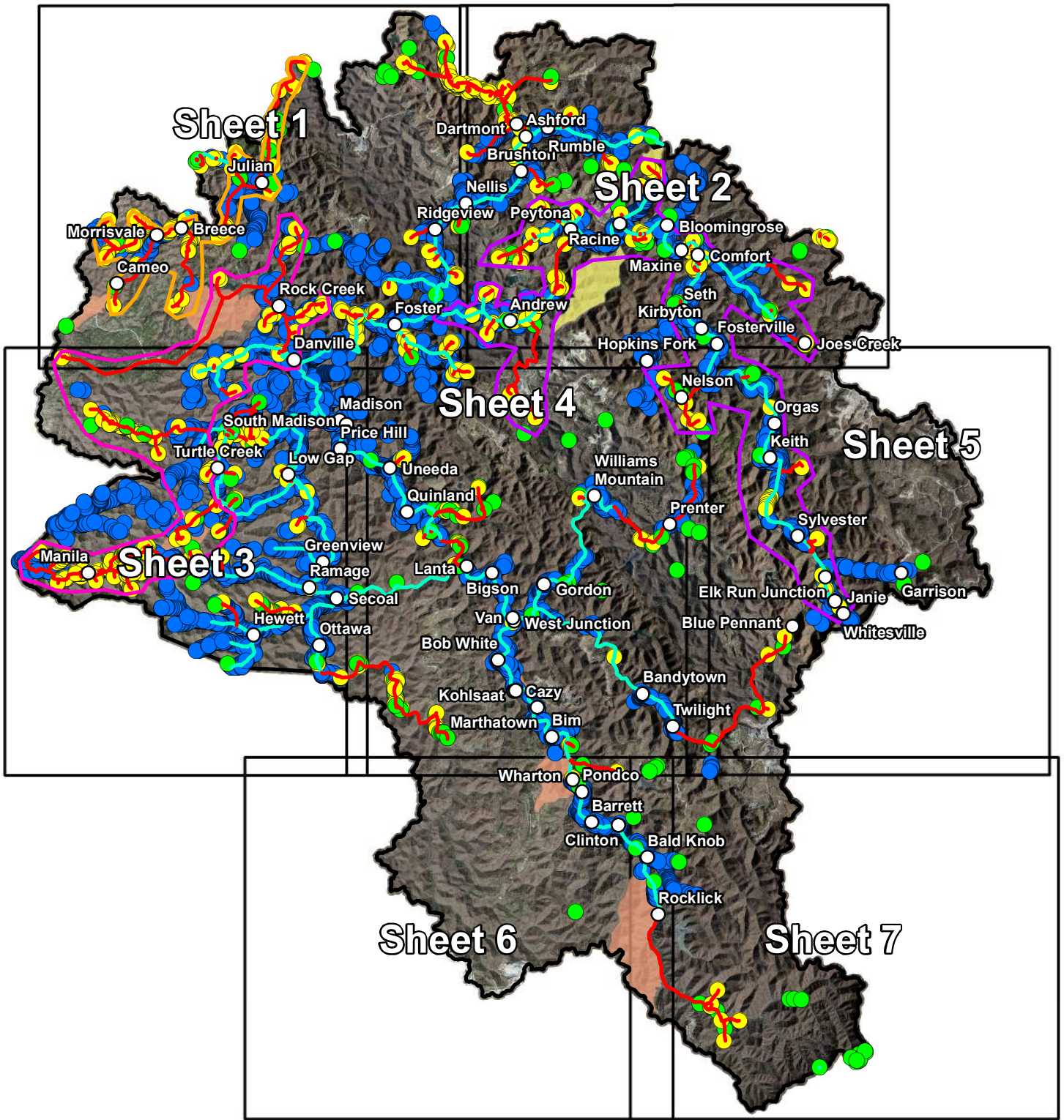


BOONE COUNTY

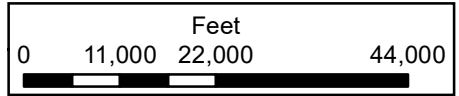


- Existing Route
- Proposed Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary

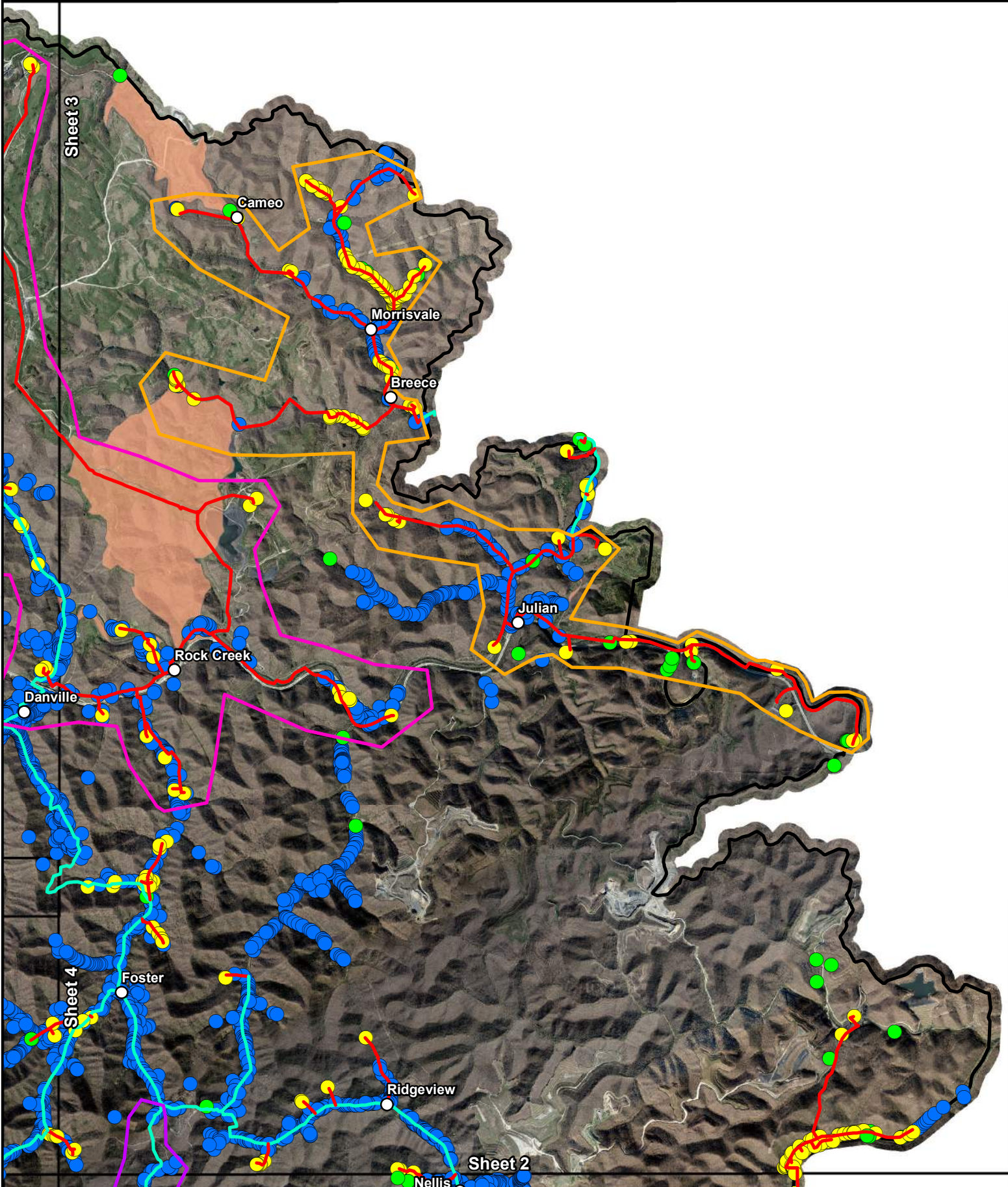




- Existing Route
- Proposed Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index



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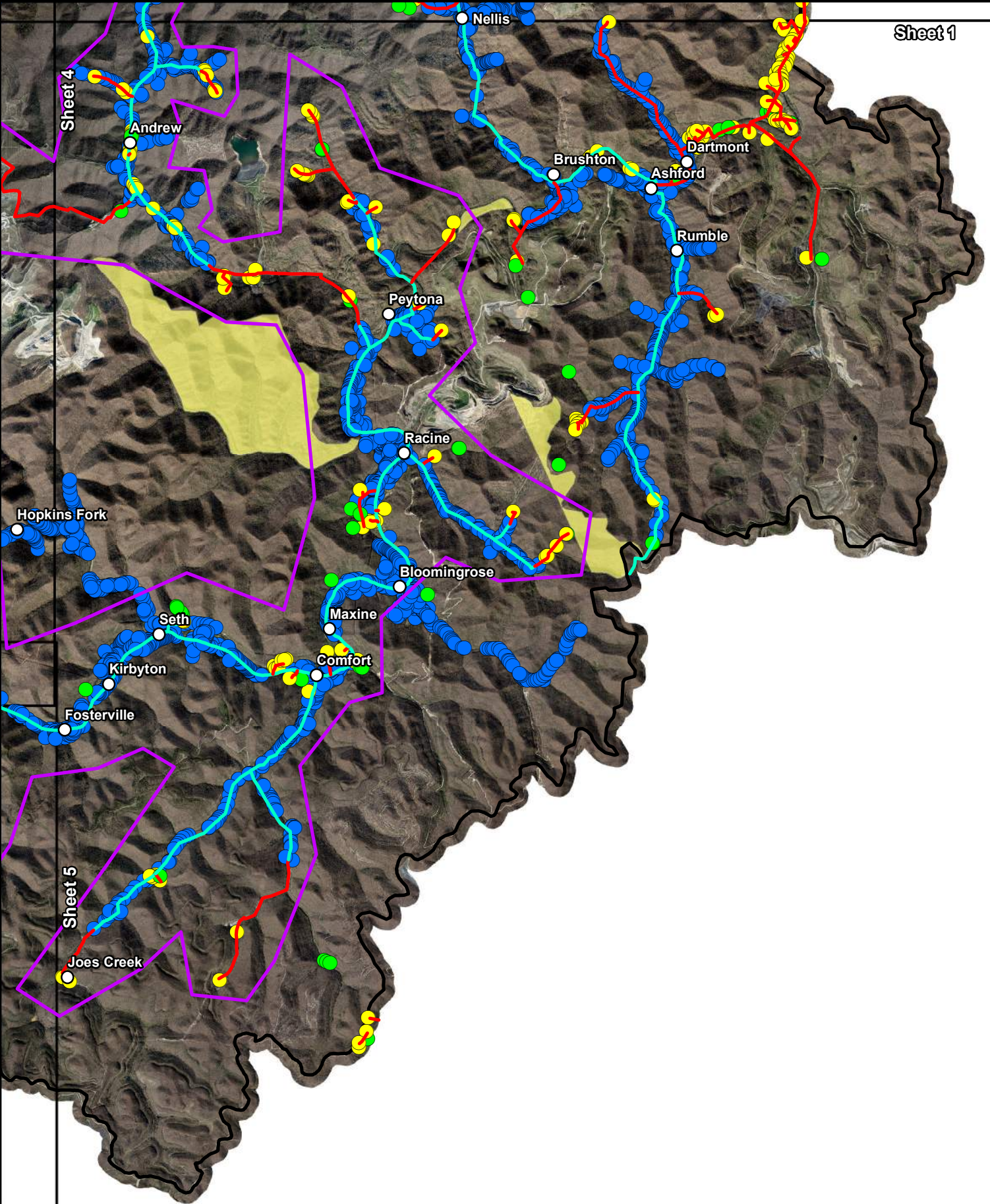
Existing Route	Project 1 Boundary	County Boundary
Proposed Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	
Other Addresses	Starlink Services, LLC - RDOF	

Feet

0 3,500 7,000 14,000

Sheet

1



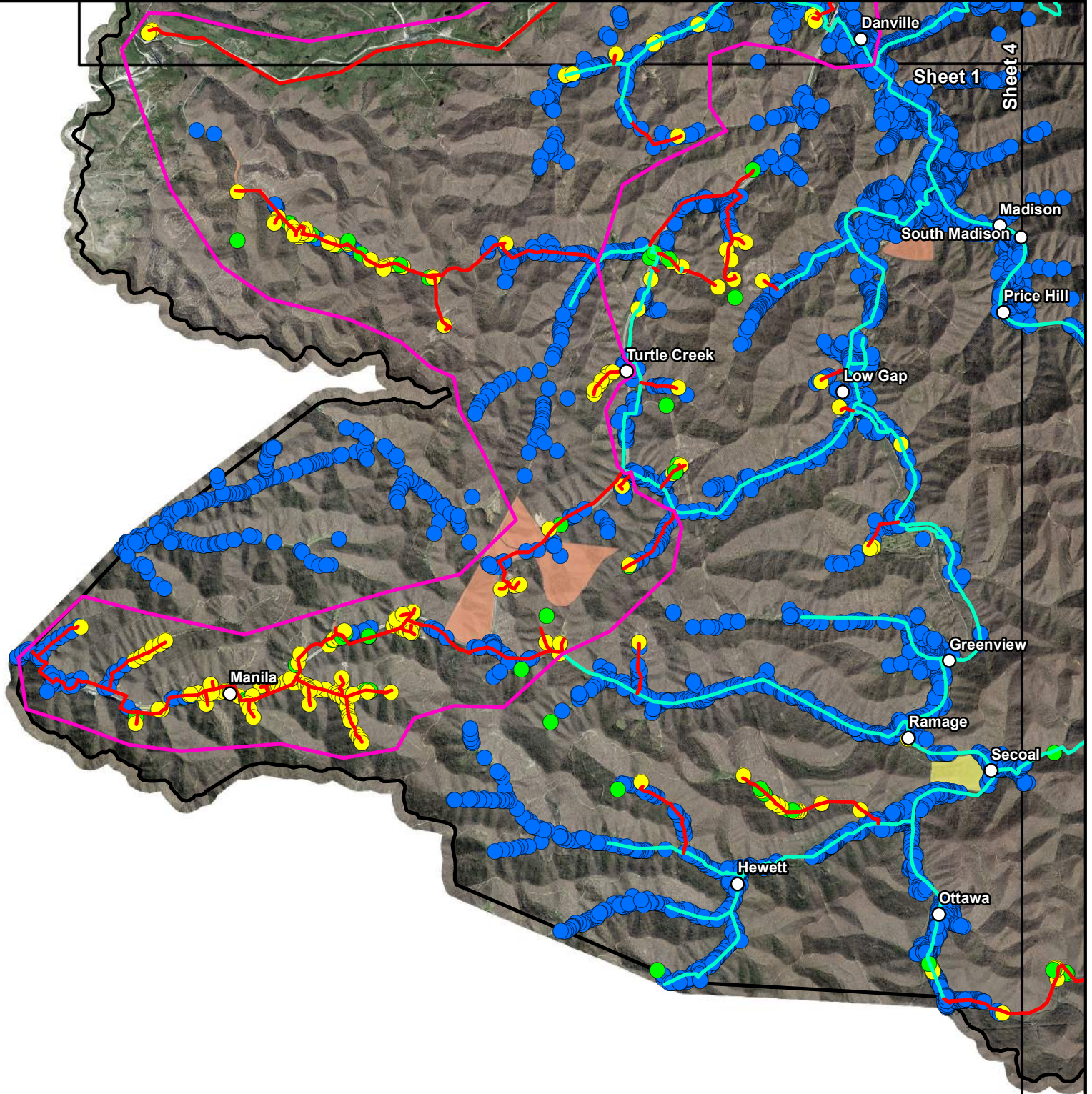
Existing Route	Project 1 Boundary	County Boundary
Proposed Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	
Other Addresses	Starlink Services, LLC - RDOF	

Feet

0 3,500 7,000 14,000

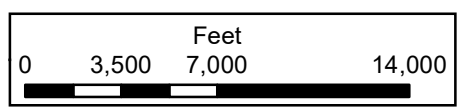
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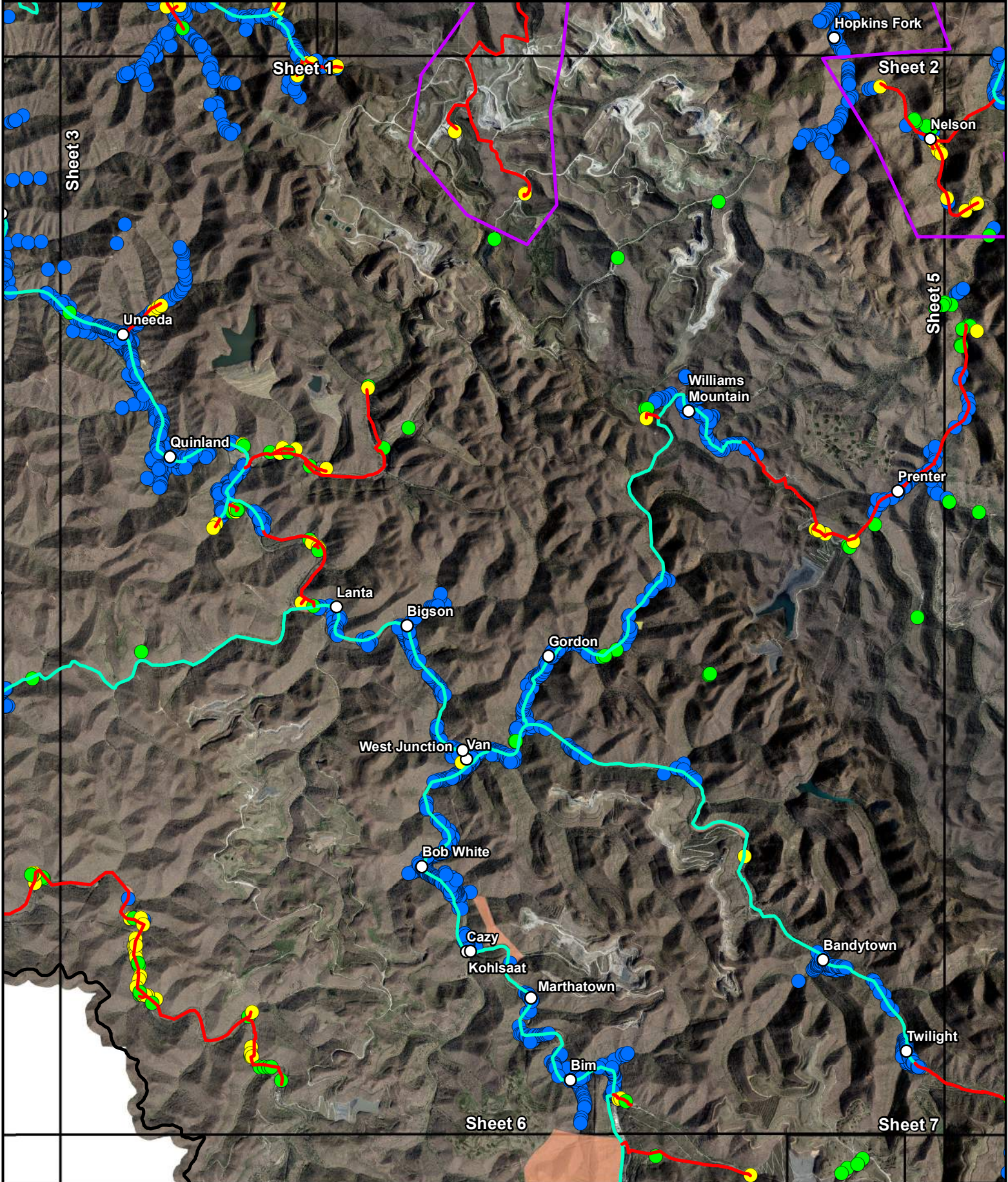


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- Existing Route
- Proposed Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index



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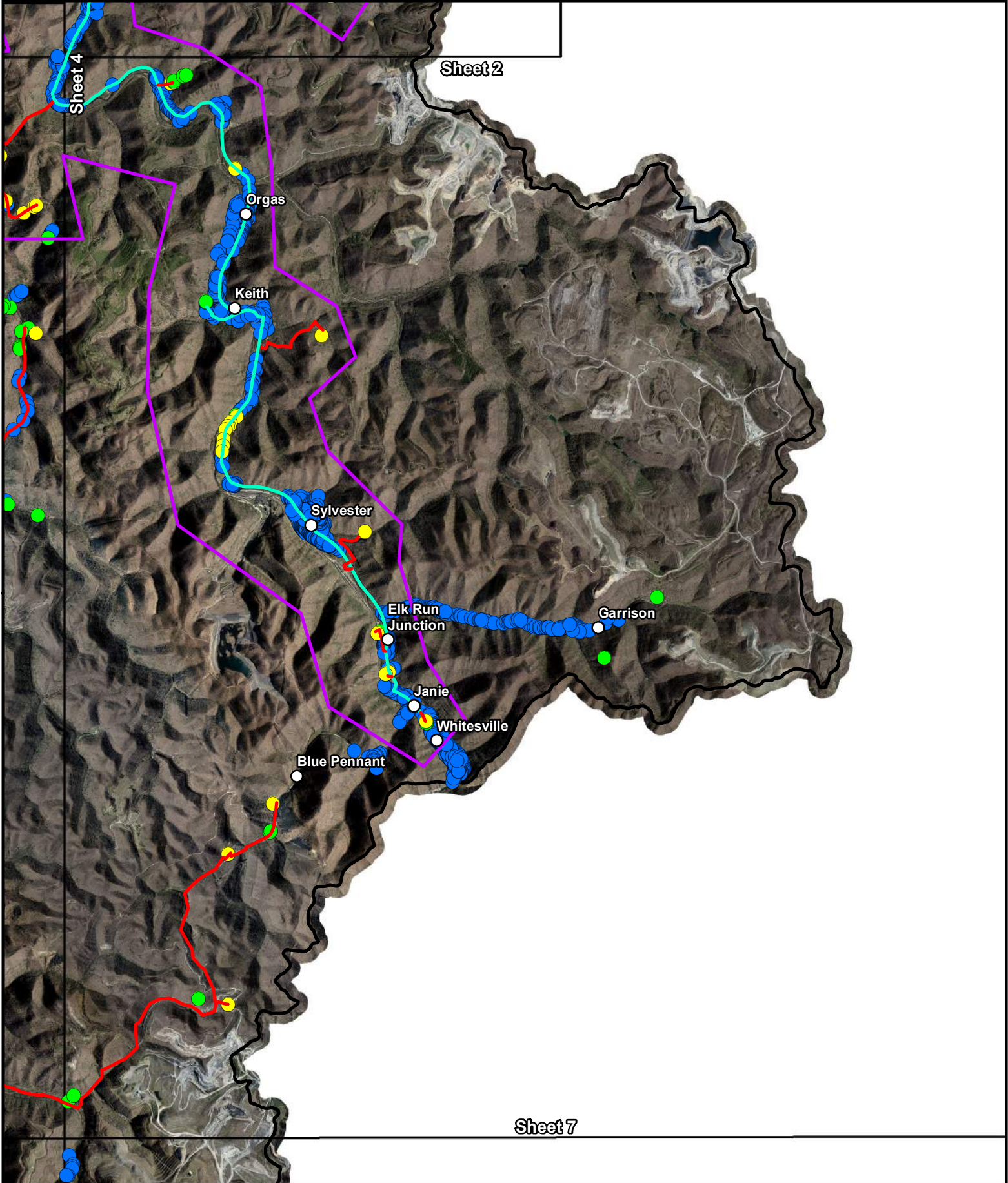


Existing Route	Project 1 Boundary	County Boundary
Proposed Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	
Other Addresses	Starlink Services, LLC - RDOF	

Feet

0 3,500 7,000 14,000

Sheet
4

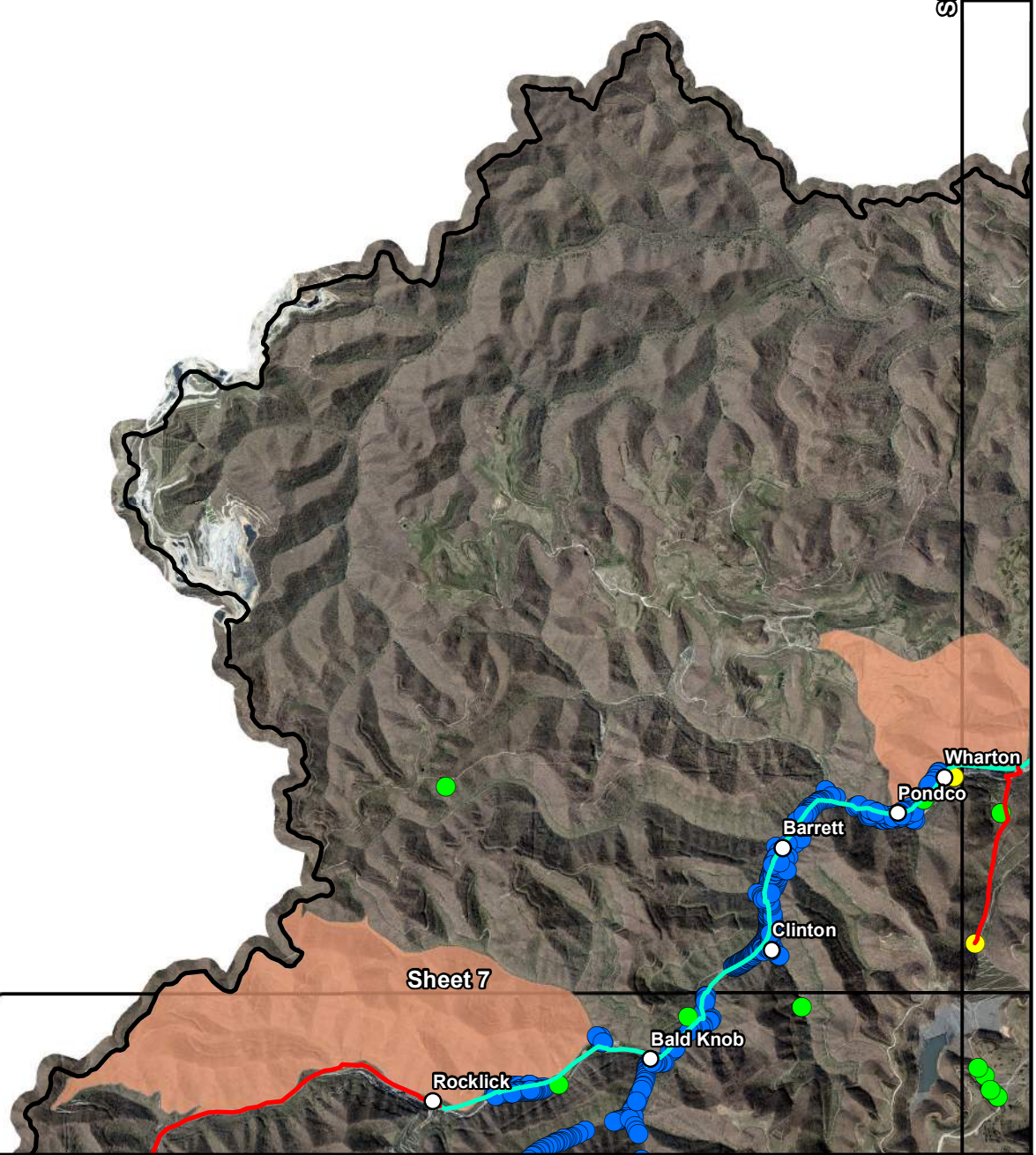


Existing Route	Project 1 Boundary	County Boundary
Proposed Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	
Other Addresses	Starlink Services, LLC - RDOF	

Feet

0 3,500 7,000 14,000

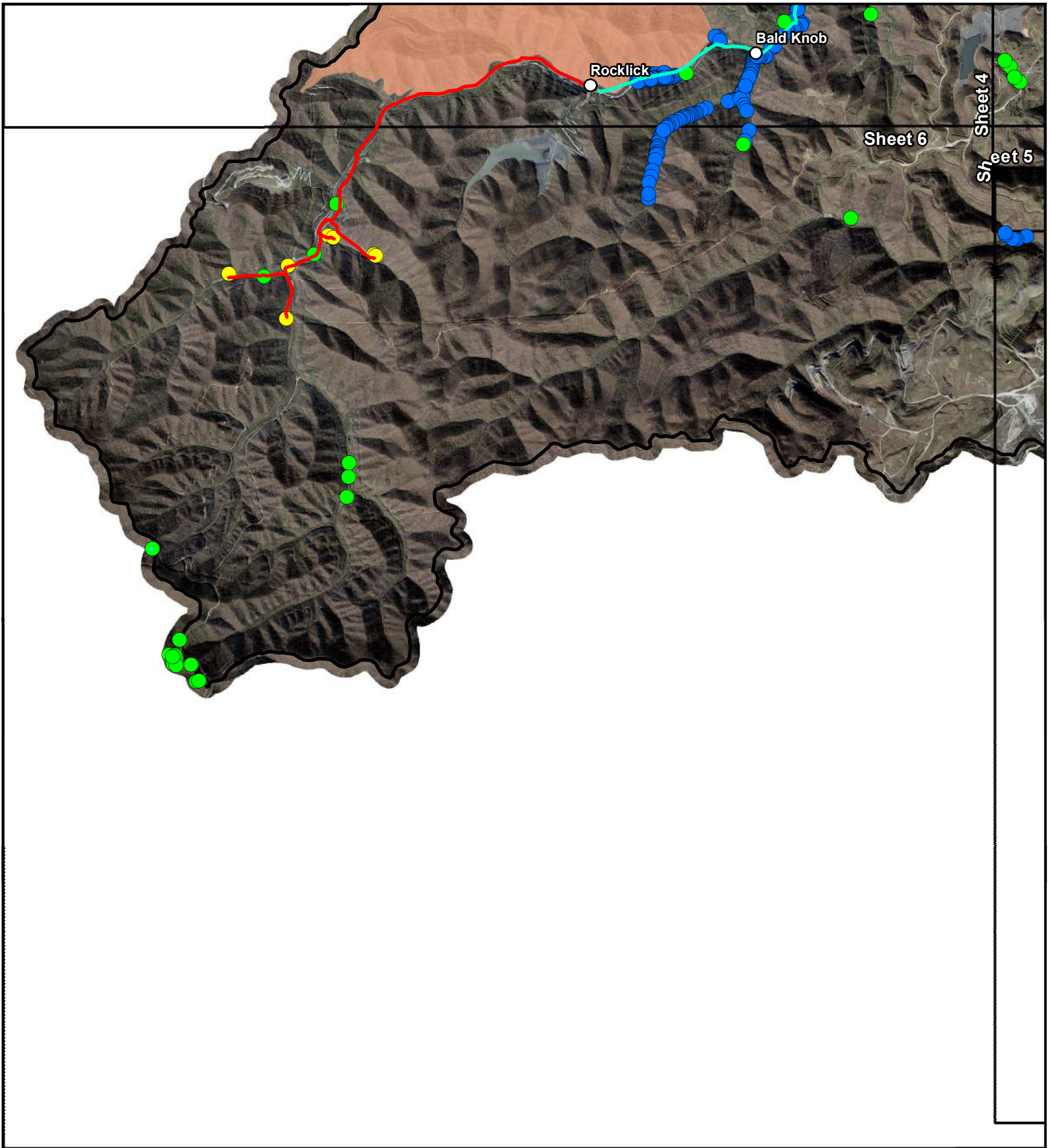
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Existing Route	Project 1 Boundary	County Boundary
Proposed Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	
Other Addresses	Starlink Services, LLC - RDOF	

0 3,500 7,000 14,000

Feet



Existing Route	Project 1 Boundary	County Boundary	
Proposed Fiber	Project 2 Boundary	Index	
Targeted Address	Project 3 Boundary		
Unserviceable Targeted Address	Frontier - RDOF		
Other Addresses	Starlink Services, LLC - RDOF	Feet 0 3,500 7,000 14,000	
			Sheet 7

Boone County, WV – 2023 ROC Study – Cost Estimate – Whole County

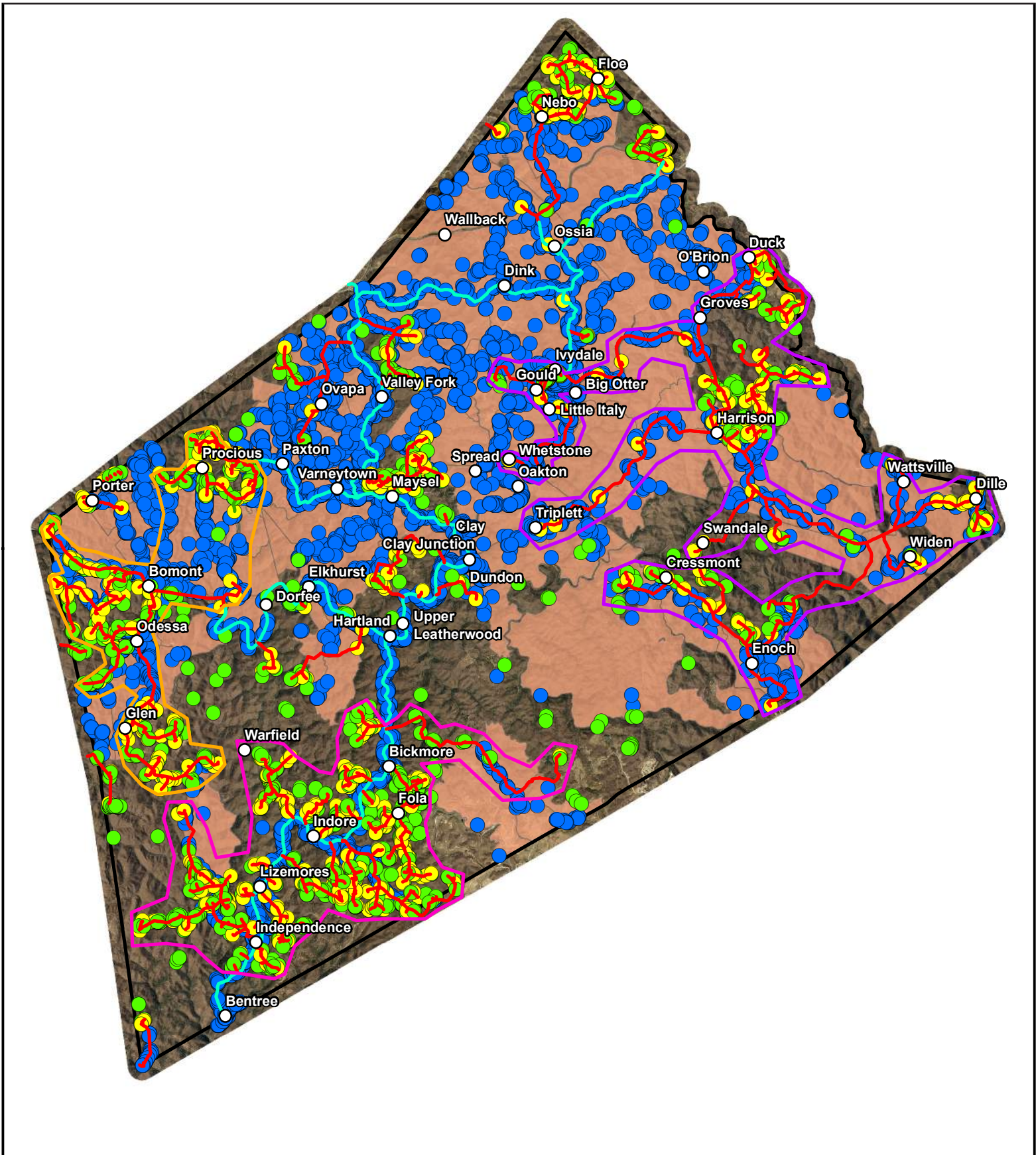
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	138.94	\$746,170
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	138.94	\$208,410
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	138.94	\$2,084,100
Aerial Construction Labor	\$50,000.00	Per Mile	138.94	\$6,947,000
Underground Construction Labor	\$150,000.00	Per Mile	0.00	\$0
Project Construction Contingency 10%	\$694,700.00	Lump Sum	1	\$694,700
Legal 1.5%	\$104,205.00	Lump Sum	1	\$104,205
Administrative 2%	\$138,940.00	Lump Sum	1	\$138,940
TOTAL COST = \$10,941,525				

COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
3	Boone	1	111	20.37	\$1,604,138
		2	185	36.37	\$2,864,138
		3	111	20.37	\$1,604,138

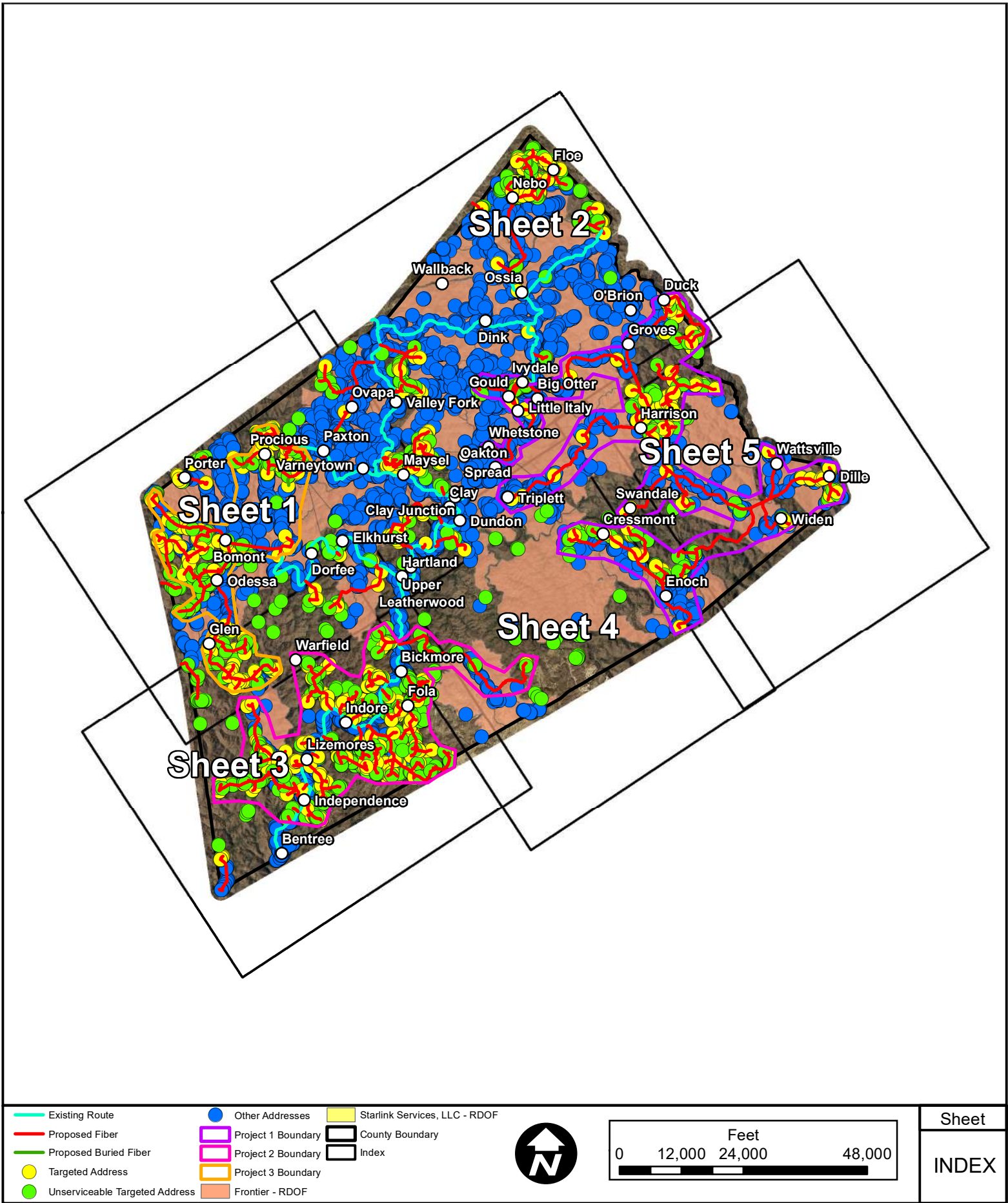


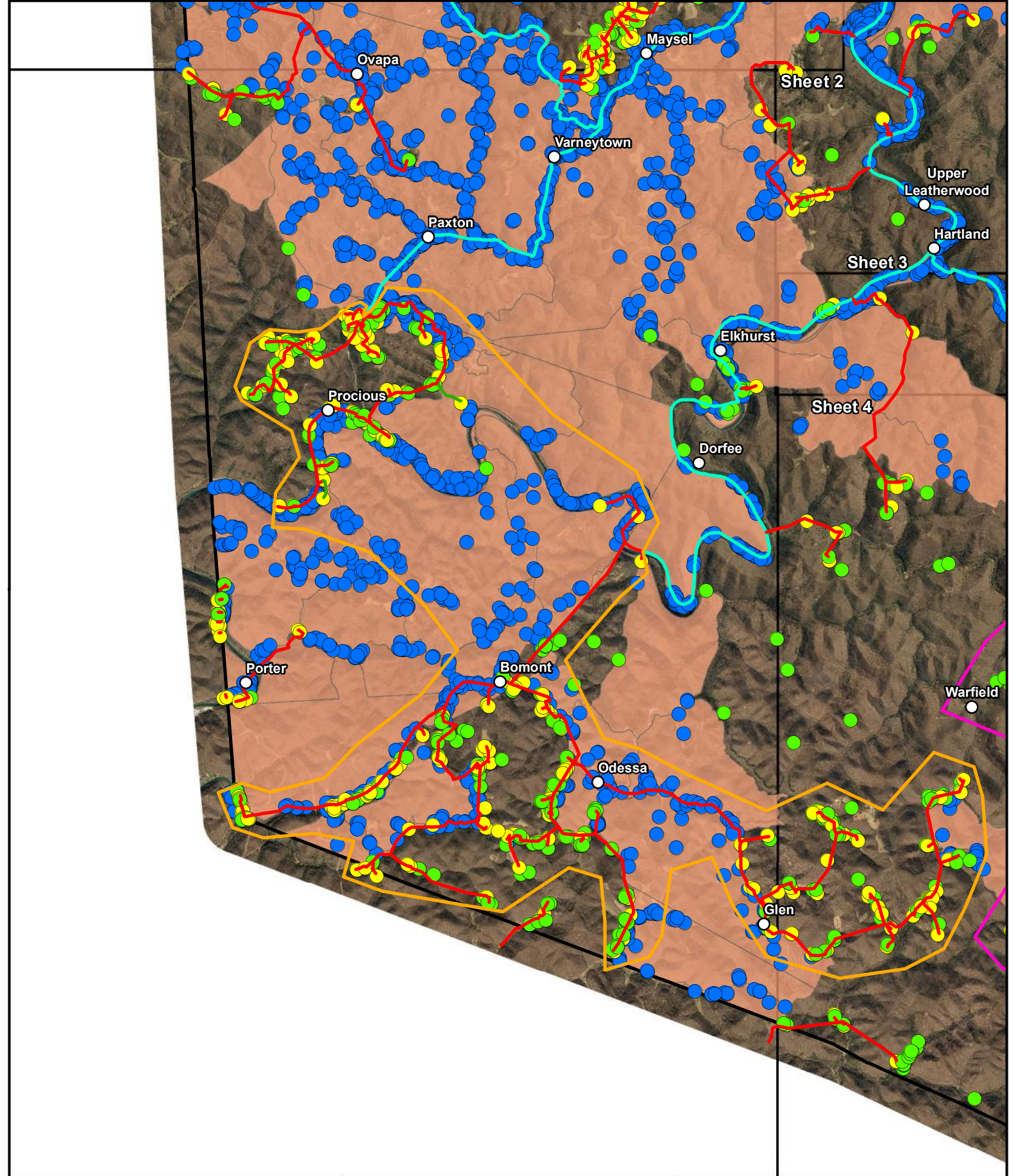
CLAY COUNTY



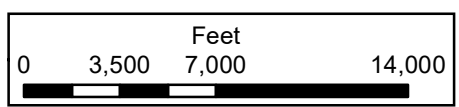
Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 3 Boundary	
Targeted Address	Frontier - RDOF	
Unserviceable Targeted Address		

Feet			
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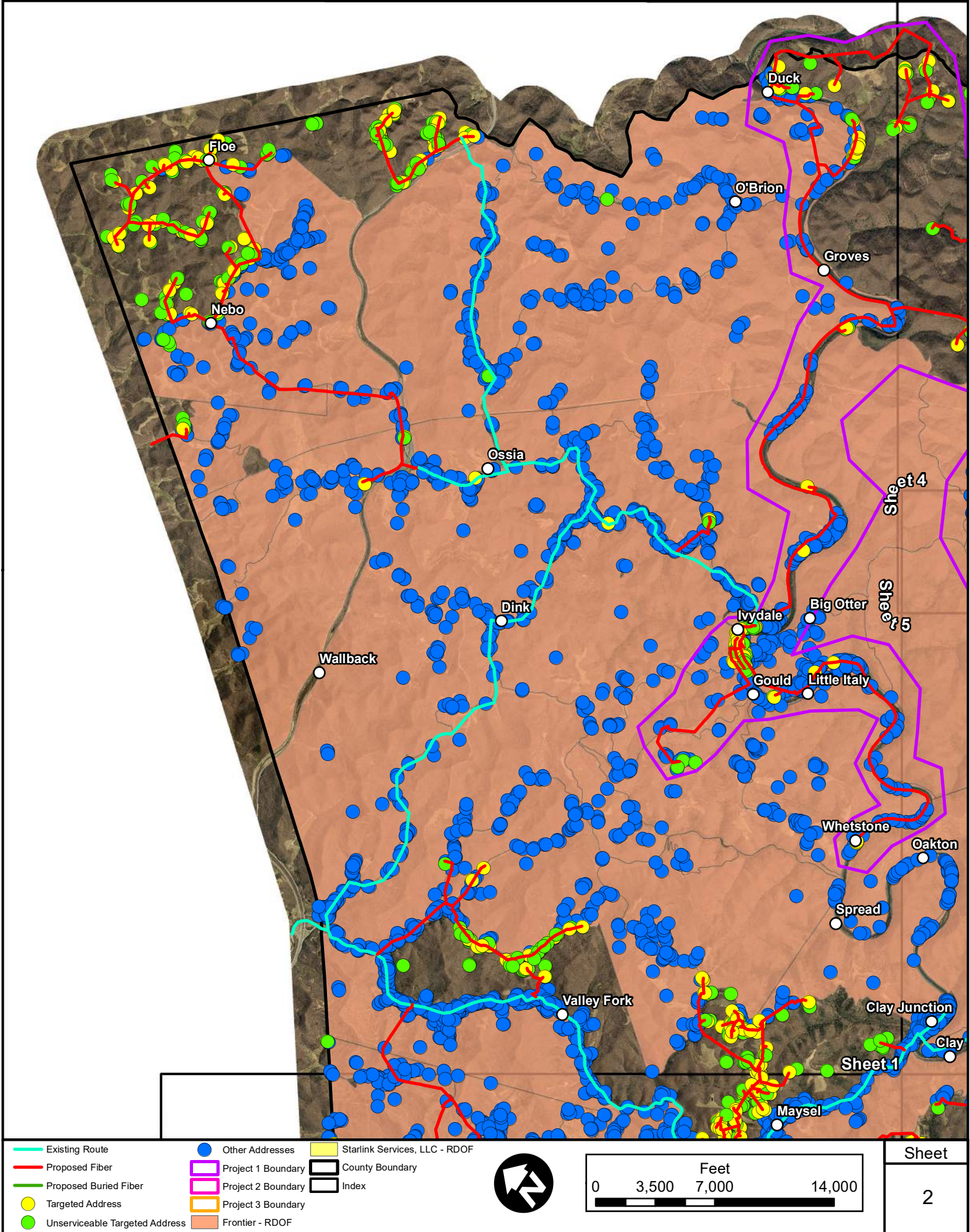


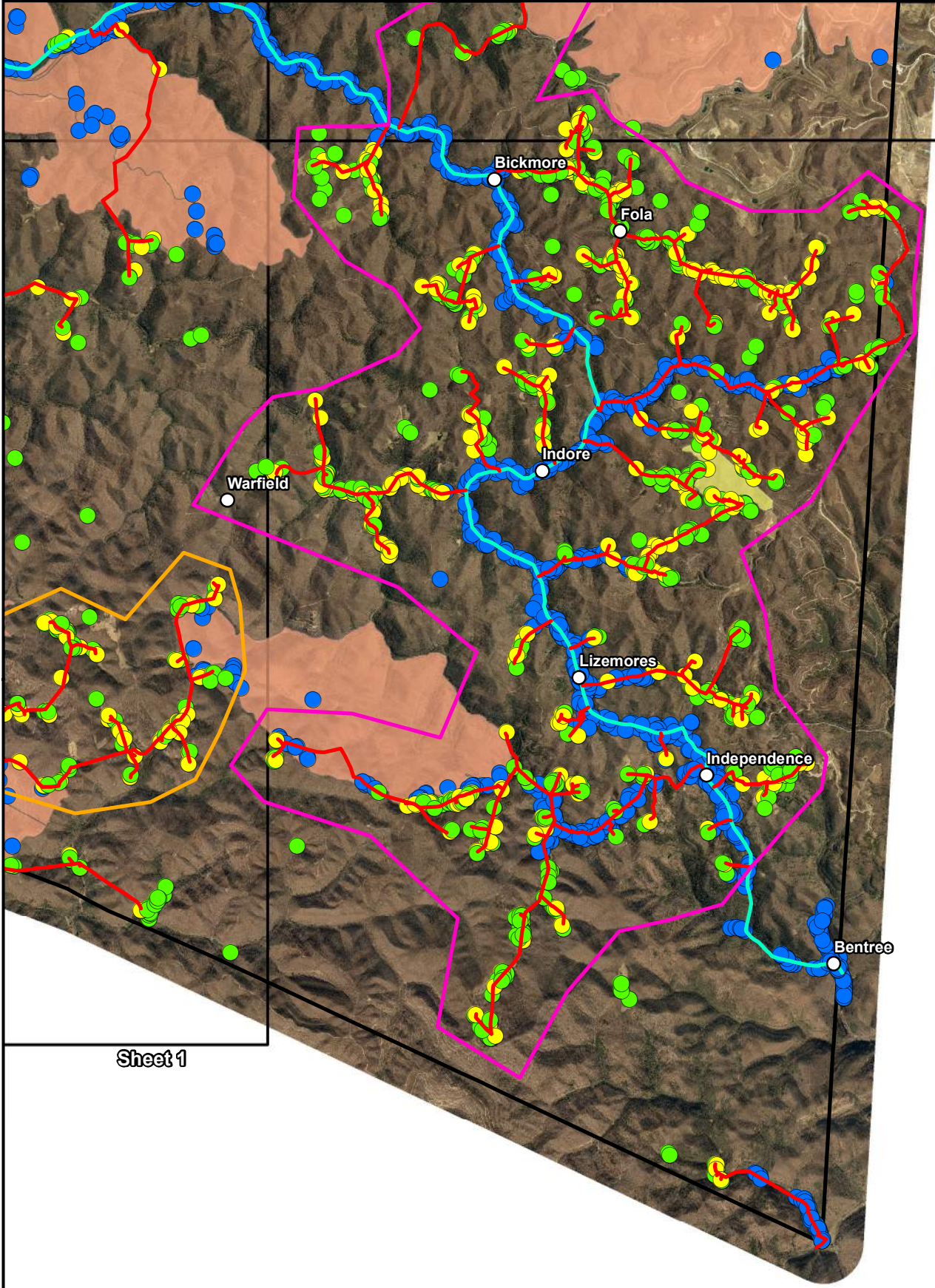


- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary
- Index
- Starlink Services, LLC - RDOF



Sheet
1

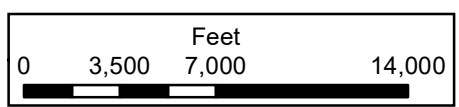




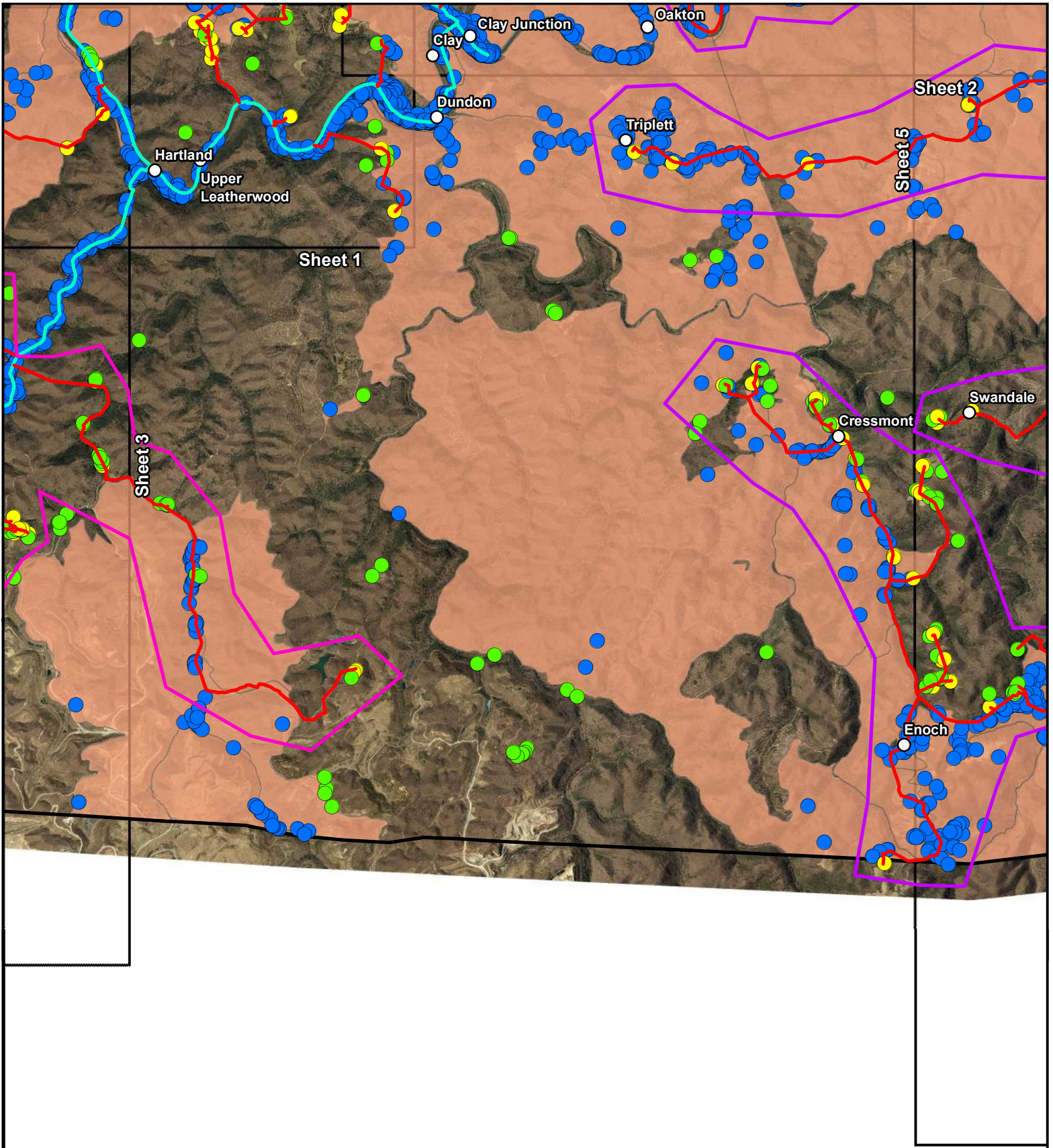
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Sheet 1

- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 3 Boundary
- Project 2 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index



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3

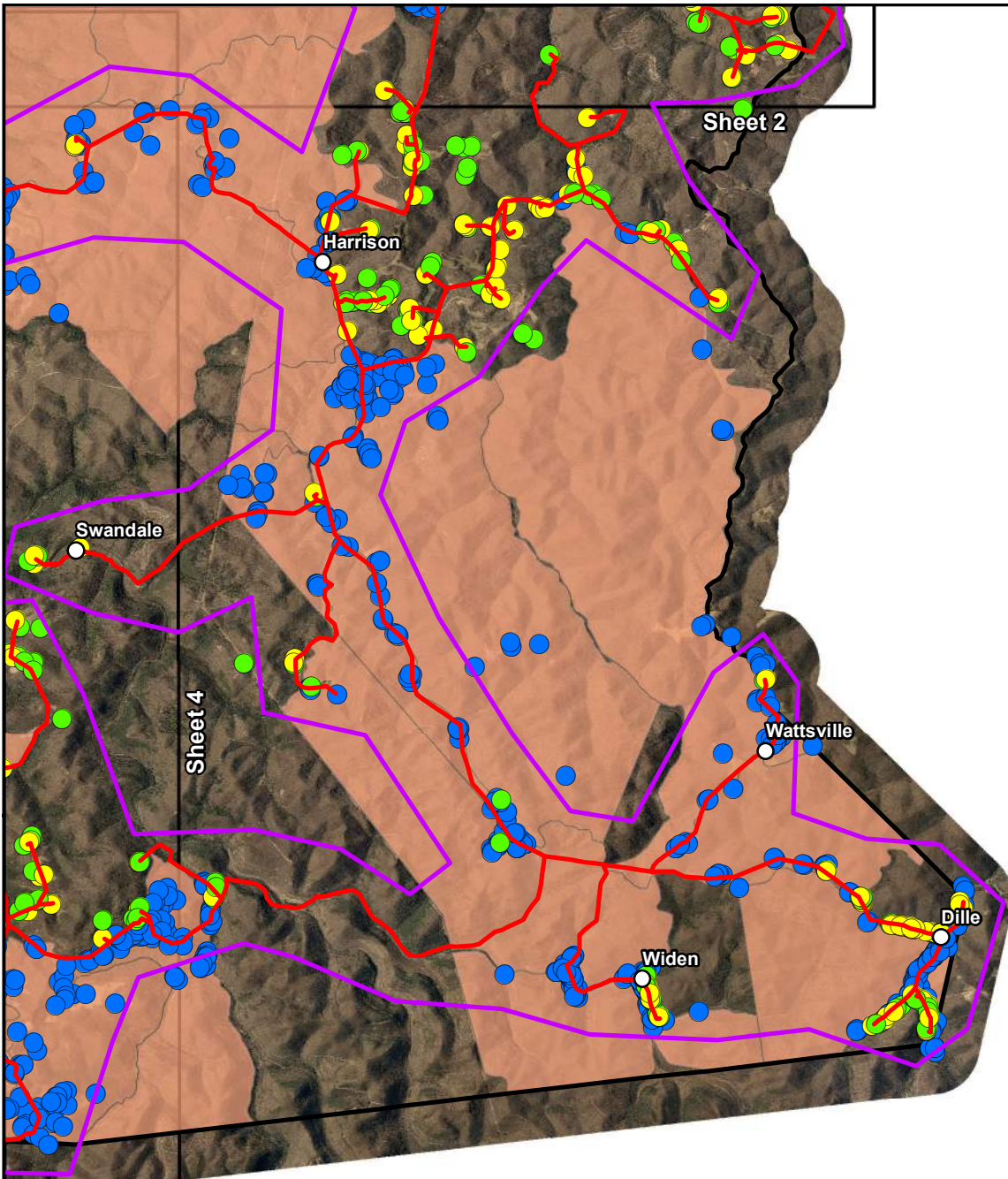


Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	Frontier - RDOF
Unserviceable Targeted Address		

Feet

0 3,500 7,000 14,000

Sheet
4



Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Feet			
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Sheet
5

Clay County, WV – 2023 ROC Study – Cost Estimate – Whole County

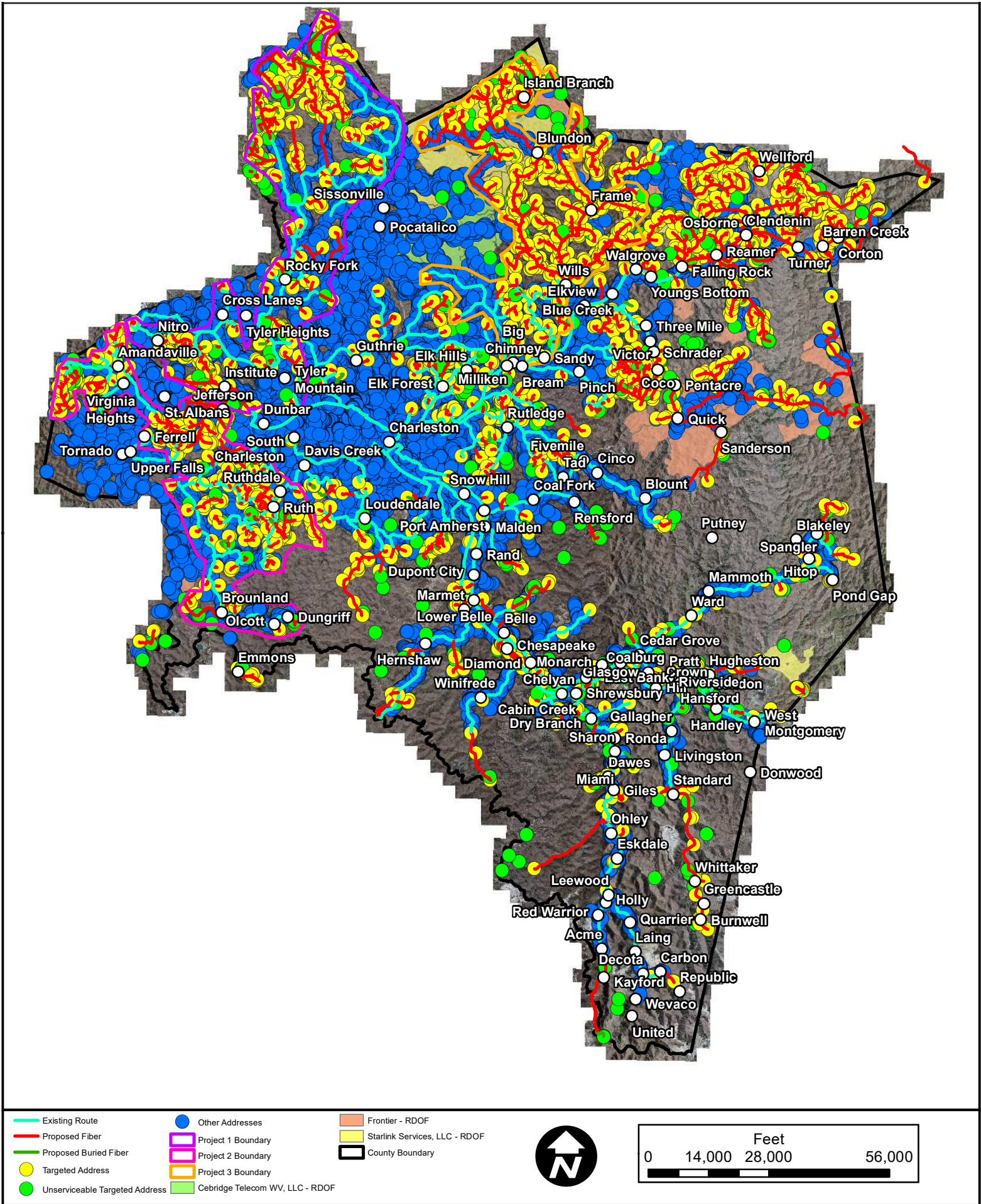
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	228.04	\$1,254,385
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	228.07	\$342,105
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	227.54	\$3,413,100
Aerial Construction Labor	\$50,000.00	Per Mile	227.54	\$11,377,000
Underground Construction Labor	\$150,000.00	Per Mile	0.53	\$79,500
Project Construction Contingency 10%	\$1,145,650.00	Lump Sum	1	\$1,145,650
Legal 1.5%	\$171,847.50	Lump Sum	1	\$171,848
Administrative 2%	\$229,130.00	Lump Sum	1	\$229,130
TOTAL COST = \$18,012,718				

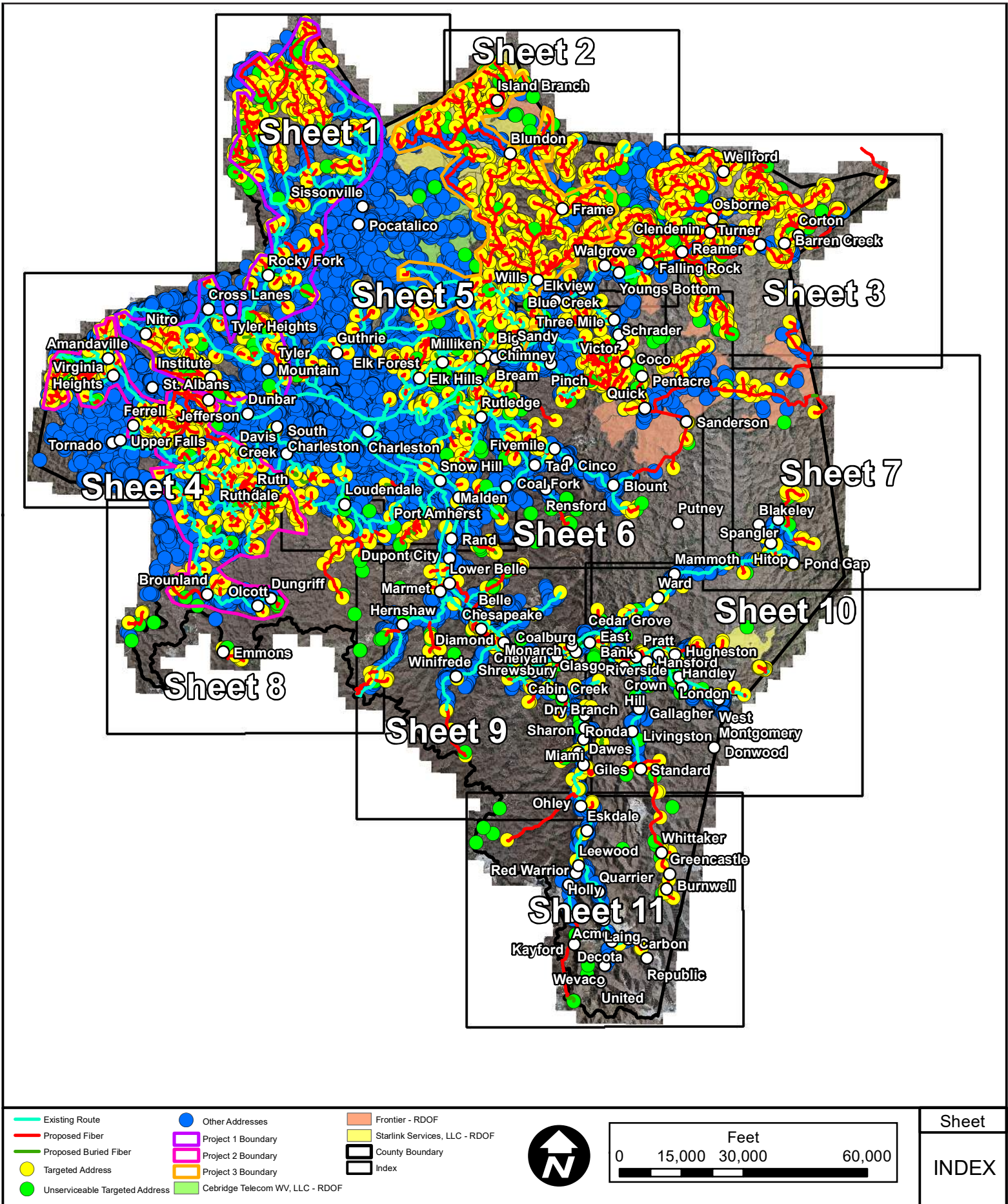
COUNTY SAMPLE PROJECT

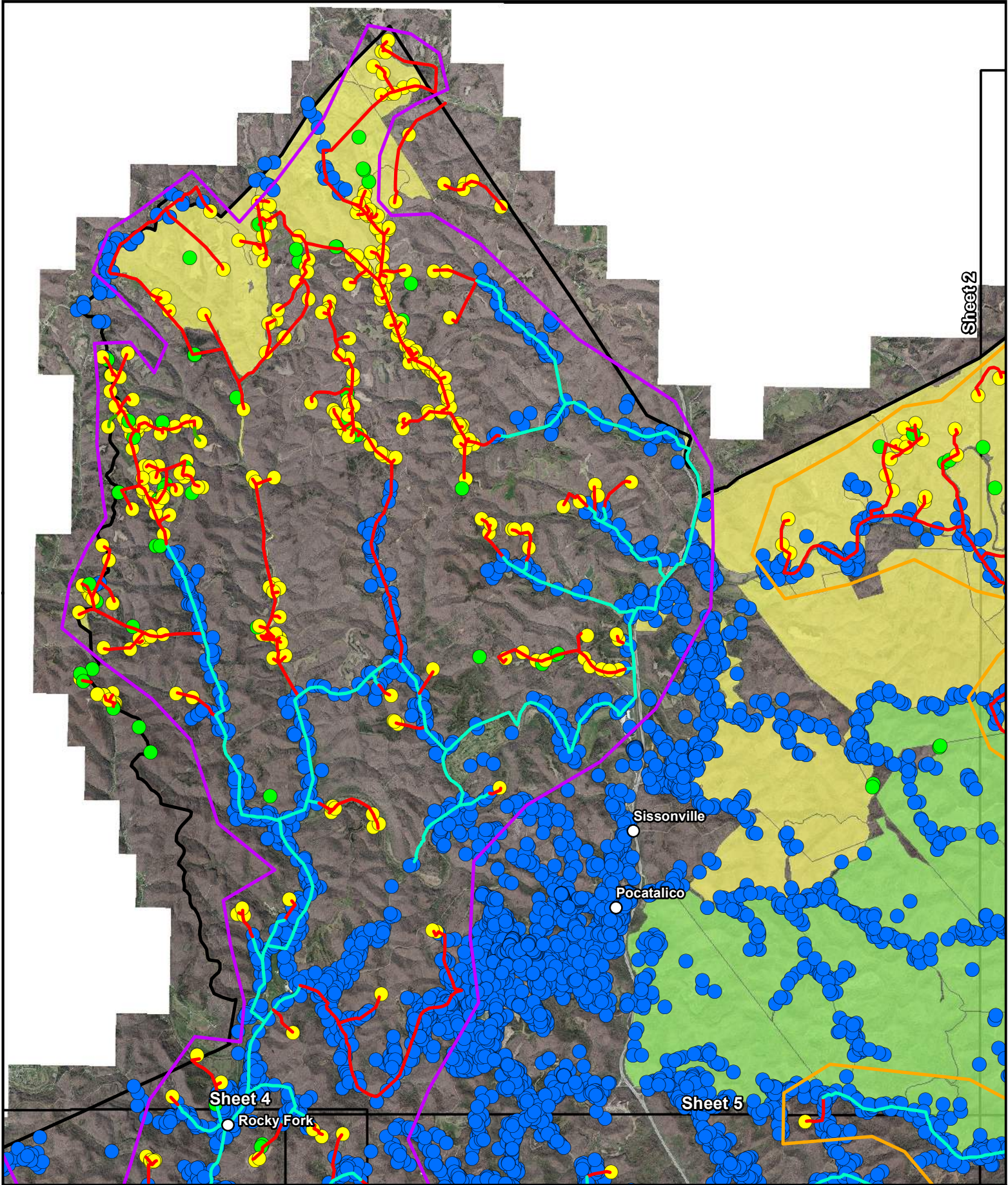
Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
3	Clay	1	229	79.85	\$6,288,188
		2	409	58.31	\$4,591,913
		3	249	39.57	\$3,168,343



KANAWHA COUNTY





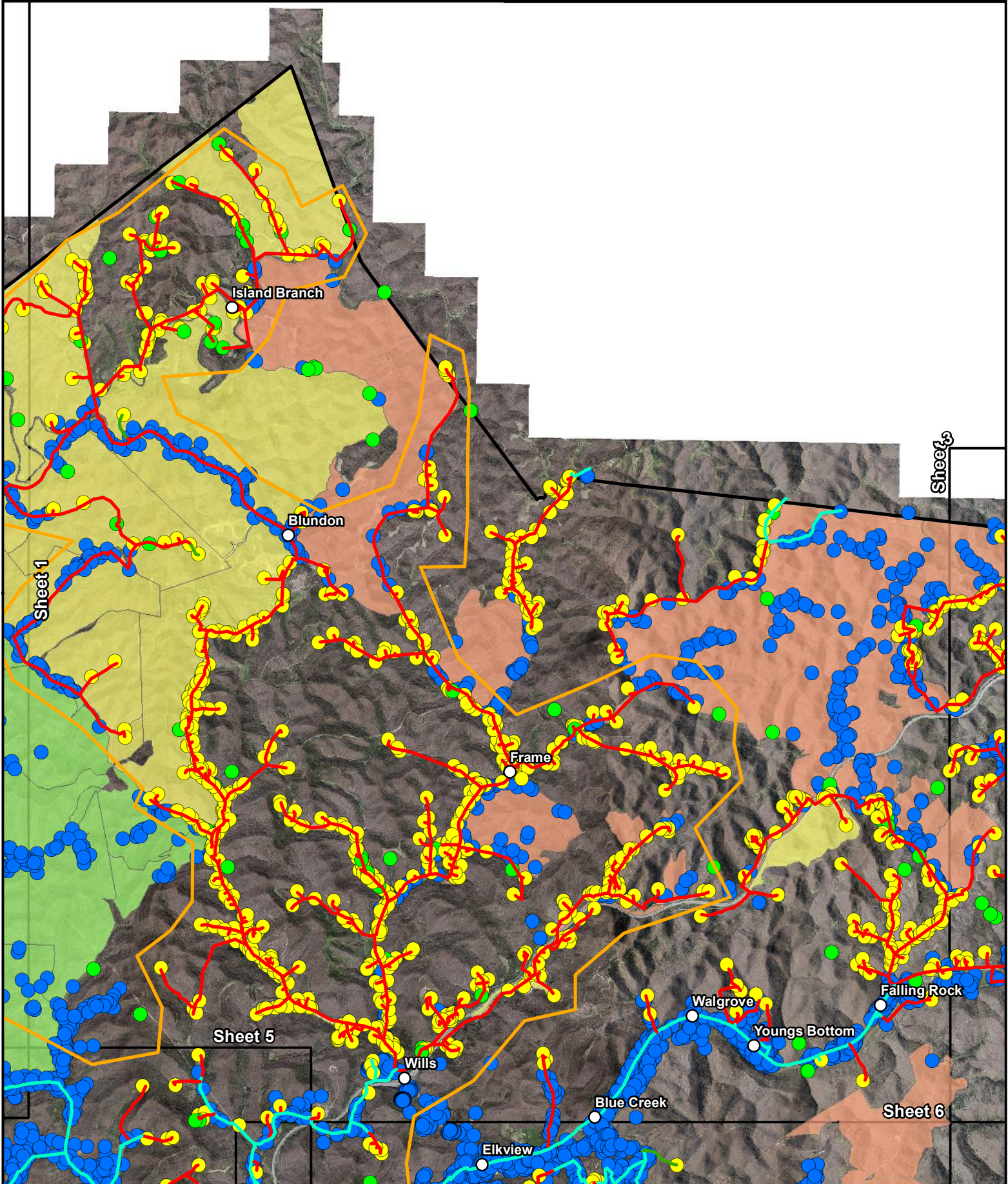


Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Cebridge Telecom WV, LLC - RDOF	

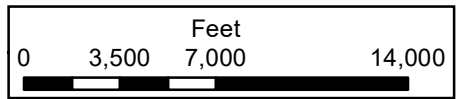
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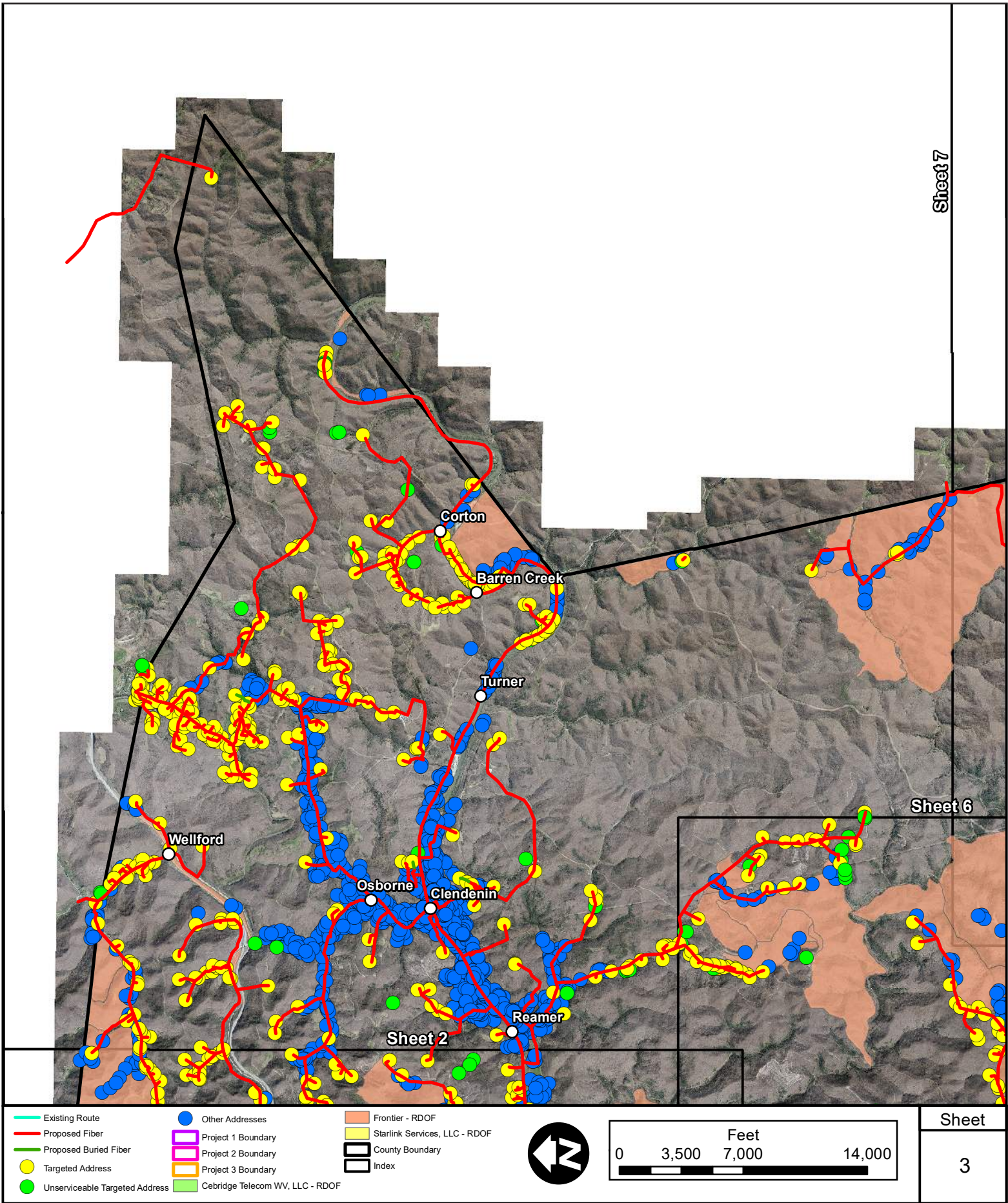
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1



- | | | |
|--------------------------------|---------------------------------|-------------------------------|
| Existing Route | Other Addresses | Frontier - RDOF |
| Proposed Buried Fiber | Project 1 Boundary | Starlink Services, LLC - RDOF |
| Targeted Address | Project 2 Boundary | County Boundary |
| Unserviceable Targeted Address | Project 3 Boundary | Index |
| | Cebridge Telecom WV, LLC - RDOF | |



Sheet
2



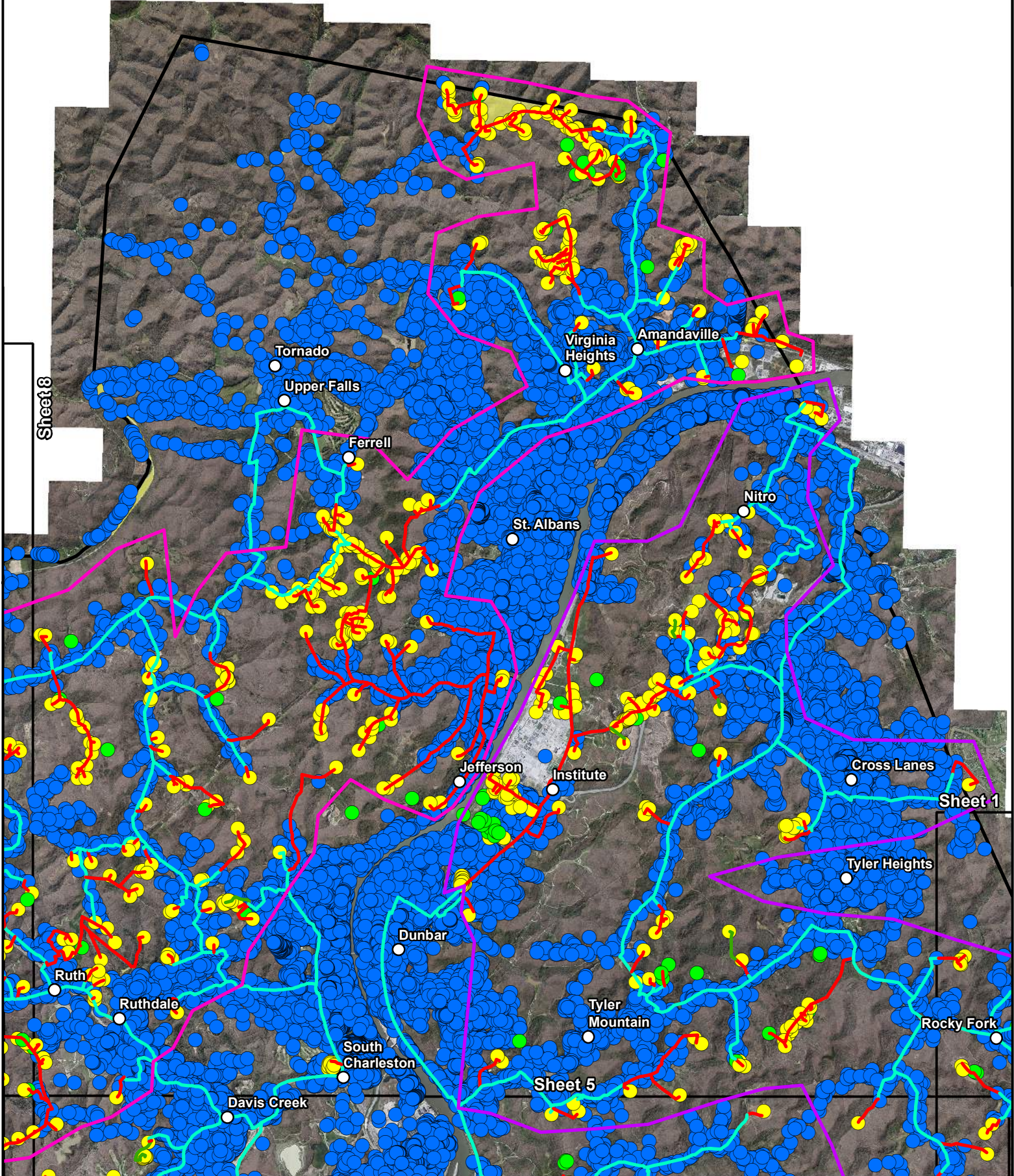
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Sheet 6

Sheet 2

Sheet

3



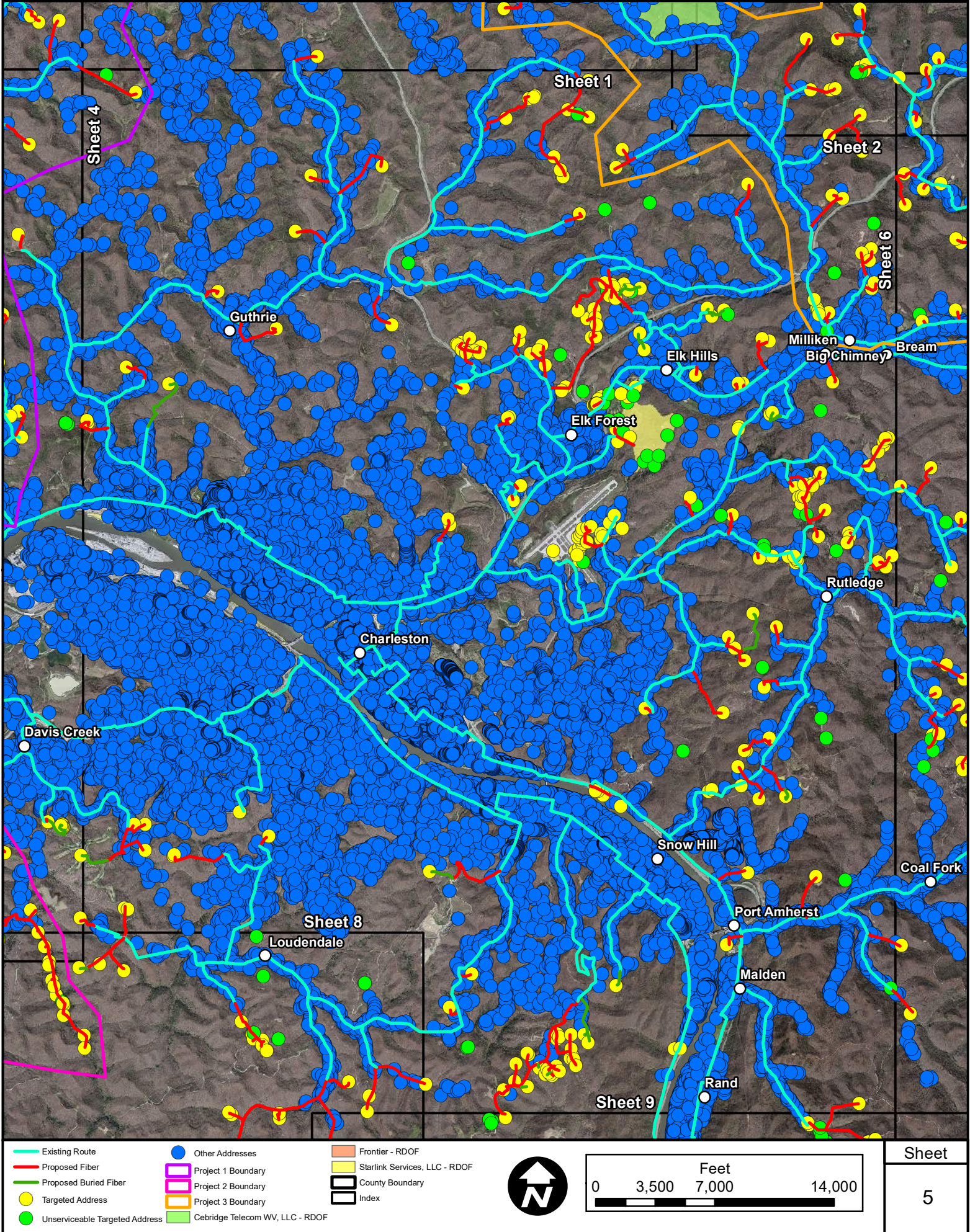
Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Cebridge Telecom WV, LLC - RDOF	

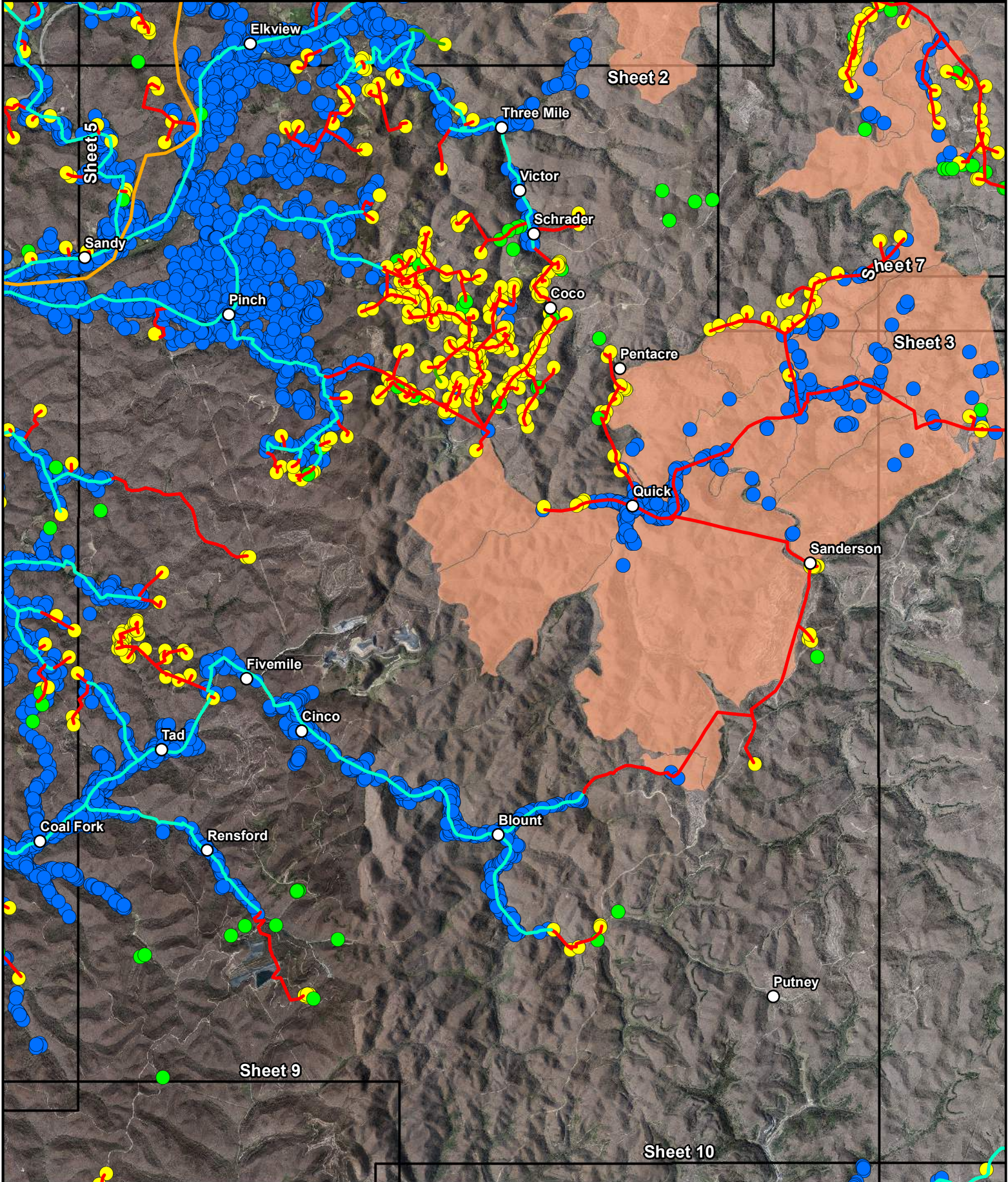
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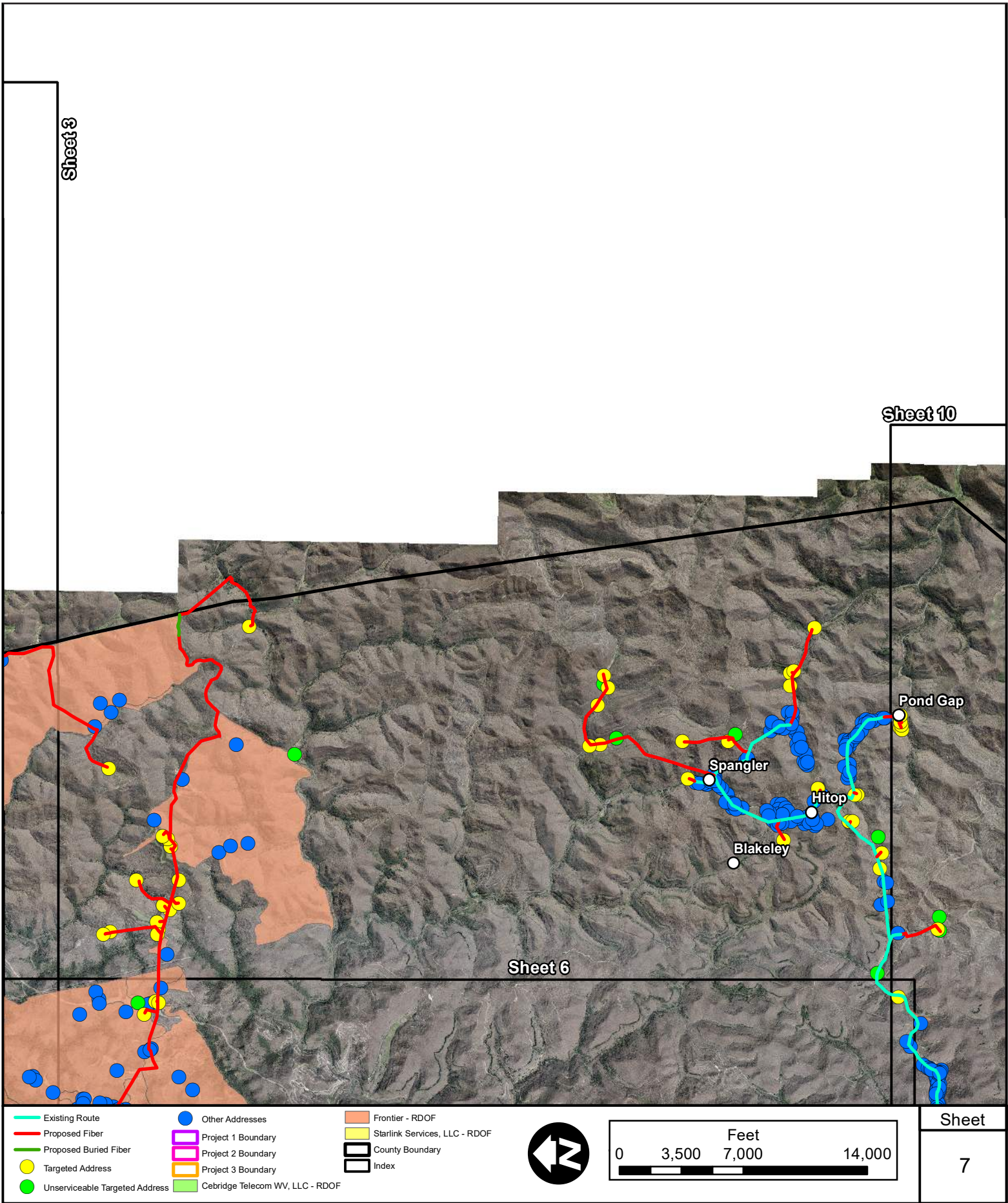
Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Cebridge Telecom WV, LLC - RDOF	

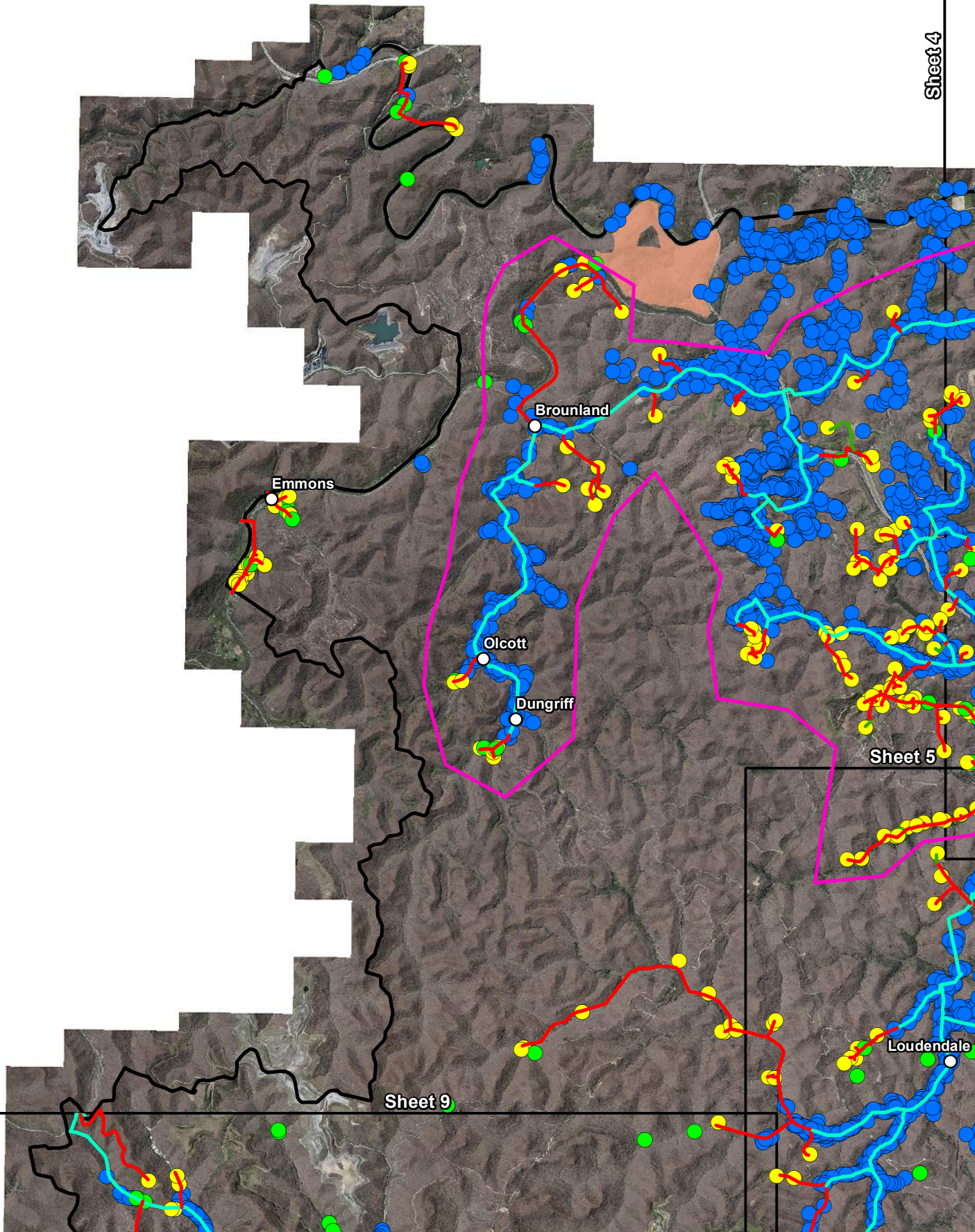
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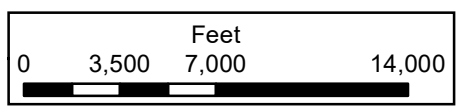


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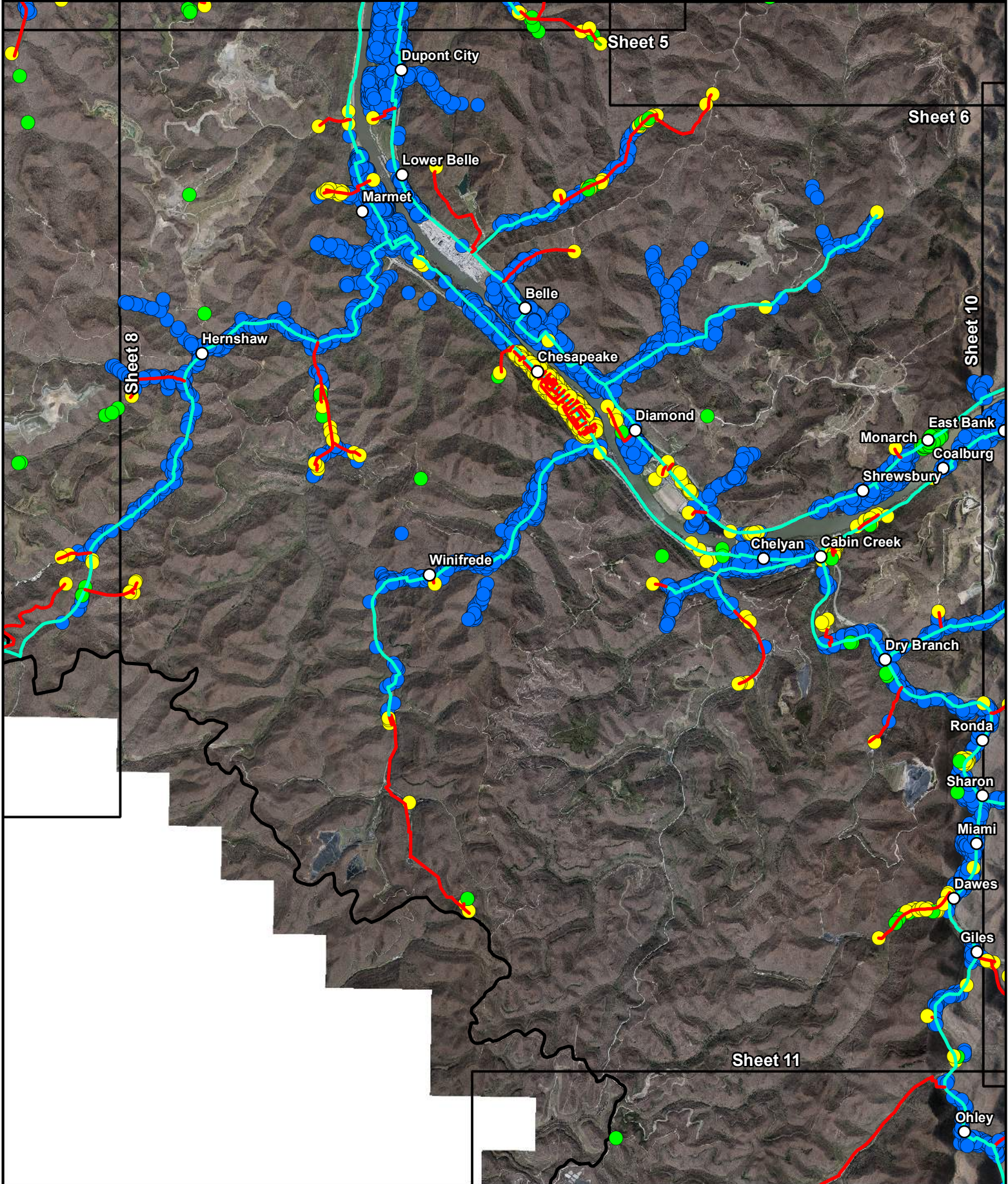
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Loudendale

- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index
- Cebridge Telecom WV, LLC - RDOF



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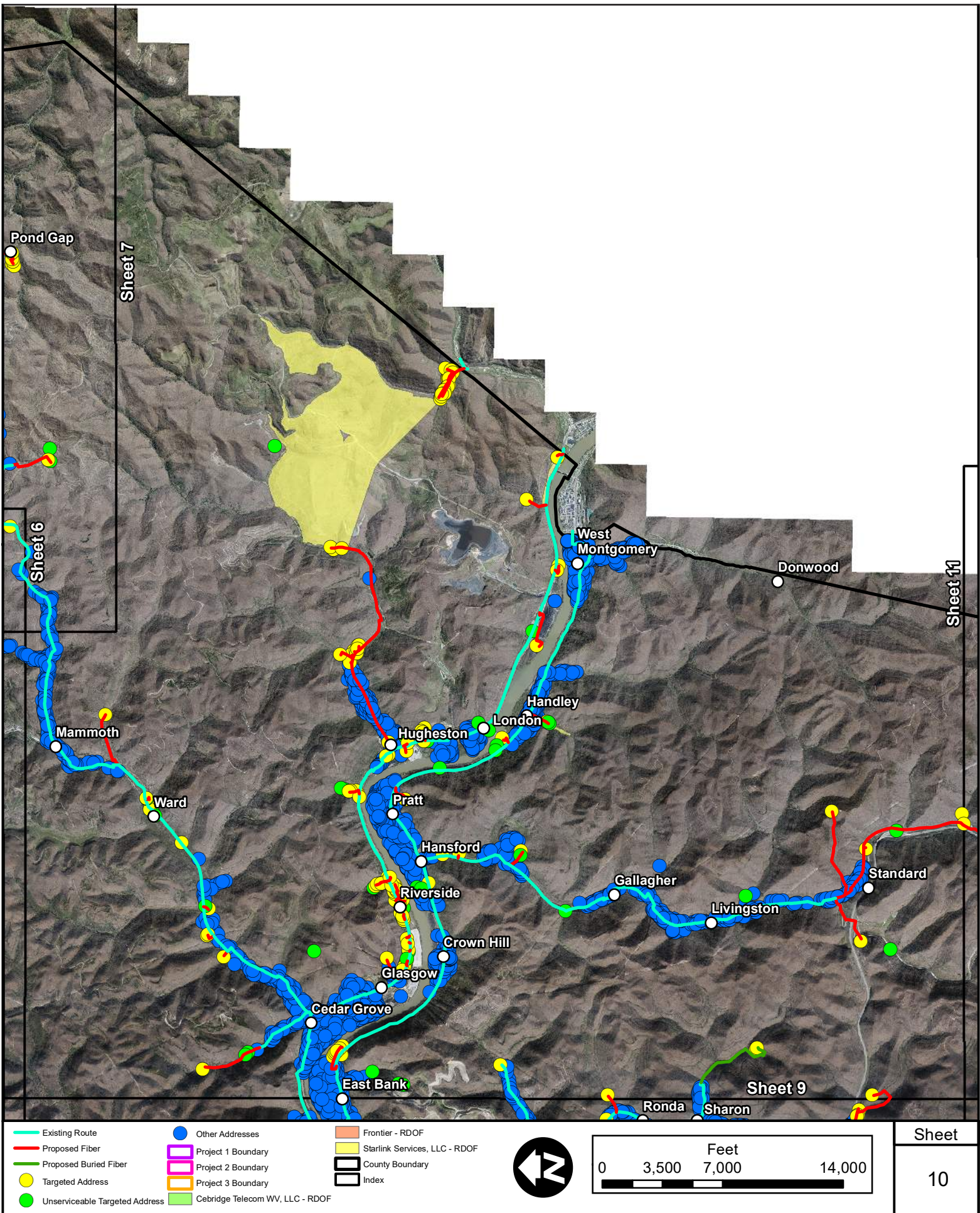


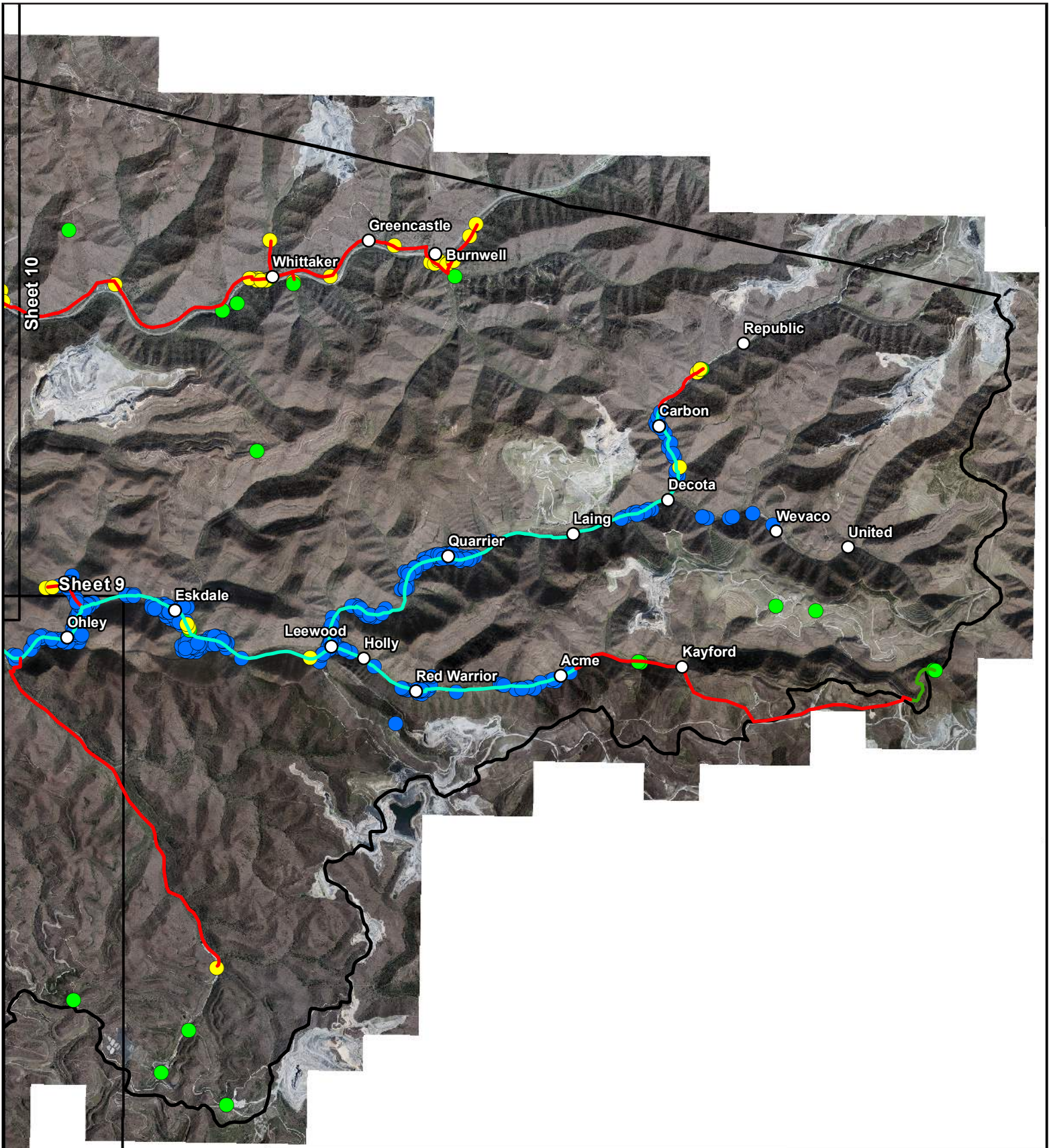
Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Cebridge Telecom WV, LLC - RDOF	

0 3,500 7,000 14,000

Feet

Sheet
9





Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Cebridge Telecom WV, LLC - RDOF	

Feet

0 3,500 7,000 14,000

Sheet
11

Kanawha County, WV – 2023 ROC Study – Cost Estimate – Whole County

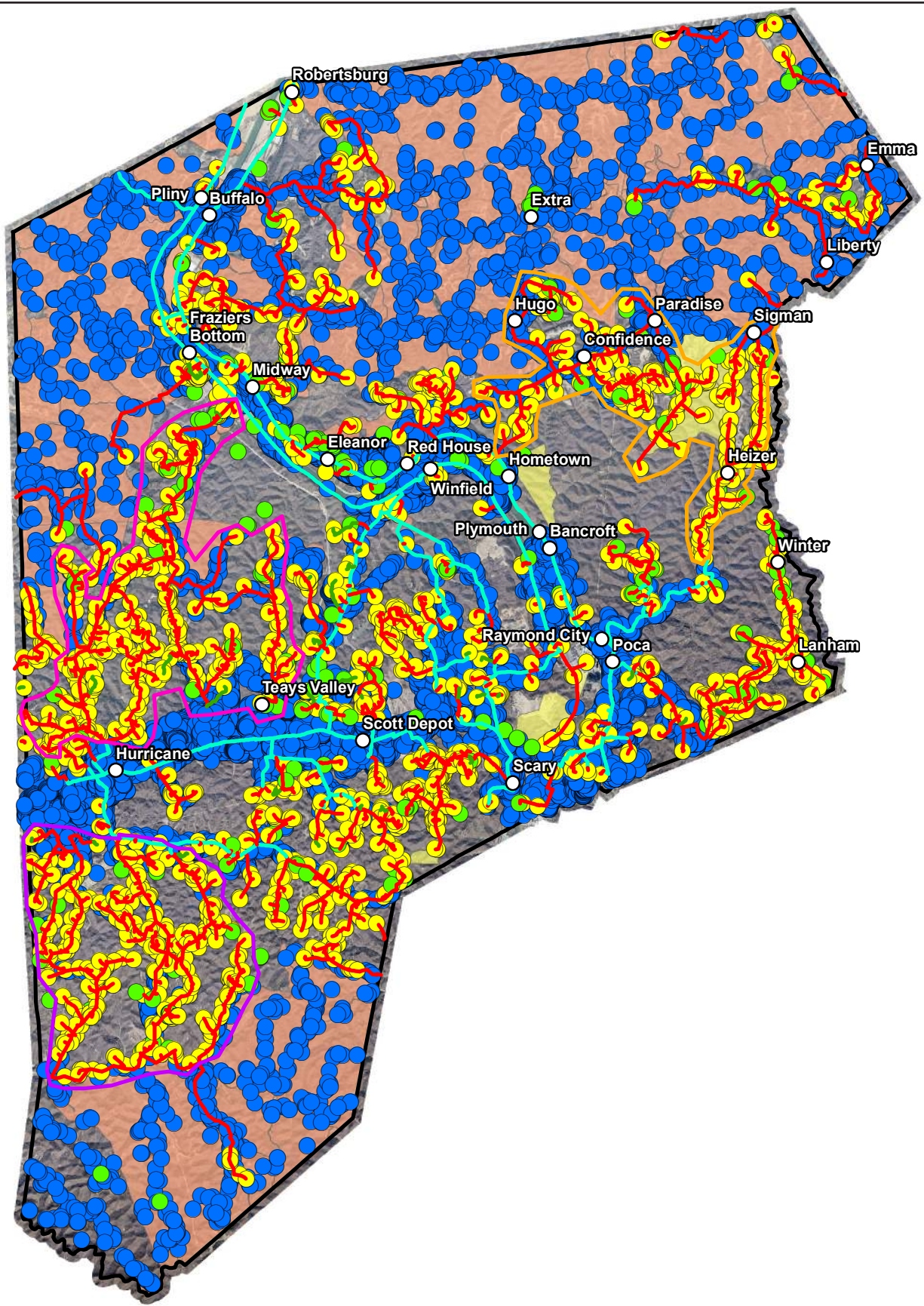
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	520.50	\$2,862,750
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	520.50	\$780,750
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	510.87	\$7,663,050
Aerial Construction Labor	\$50,000.00	Per Mile	510.87	\$25,243,500
Underground Construction Labor	\$150,000.00	Per Mile	9.63	\$1,444,500
Project Construction Contingency 10%	\$2,698,800.00	Lump Sum	1	\$2,698,800
Legal 1.5%	\$404,820.00	Lump Sum	1	\$404,820
Administrative 2%	\$539,760.00	Lump Sum	1	\$539,760
TOTAL COST = \$41,937,930				

COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
3	Kanawha	1	582	77.67	\$6,244,863
		2	451	61.92	\$4,968,790
		3	769	97.44	\$7,711,815

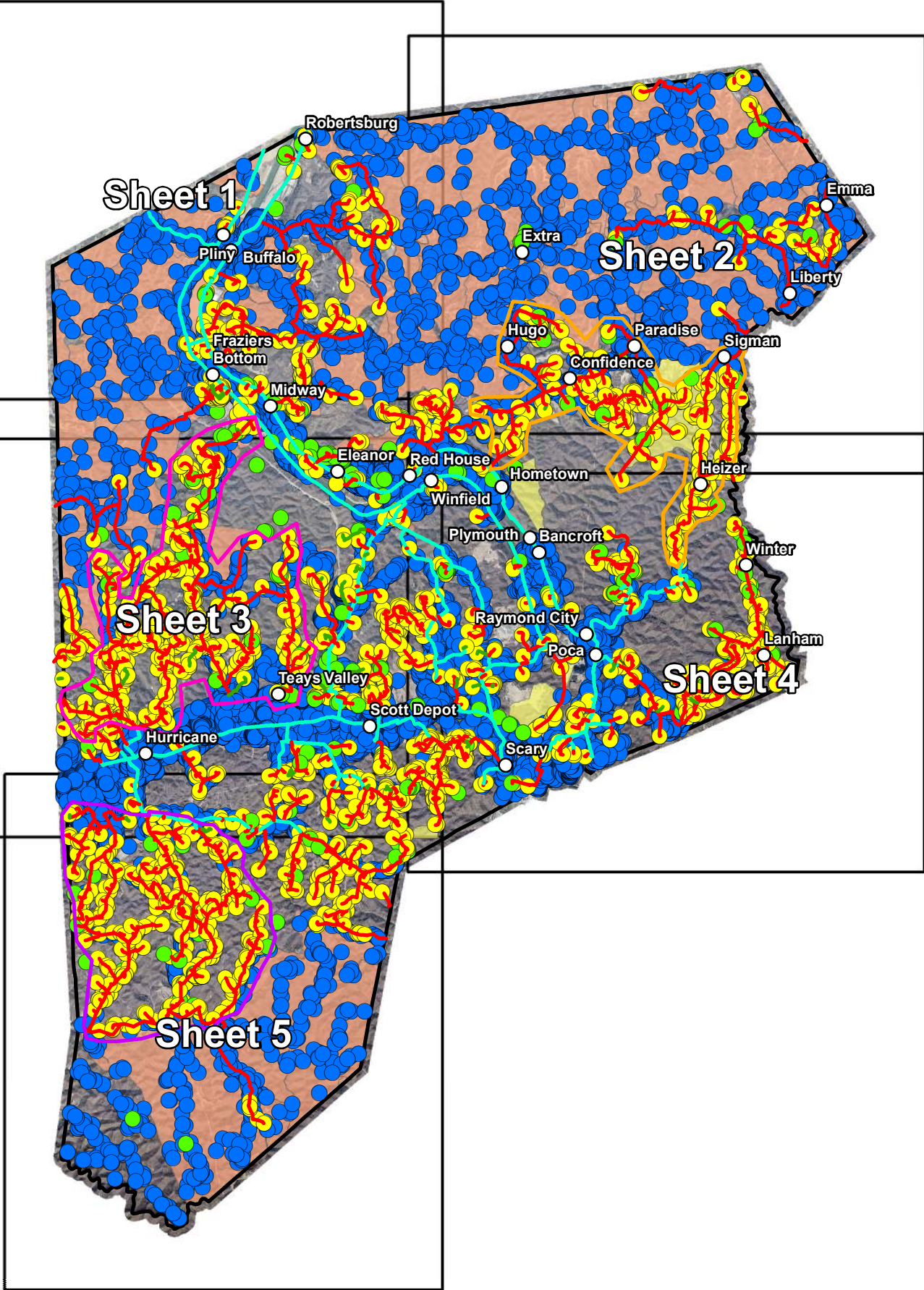


PUTNAM COUNTY

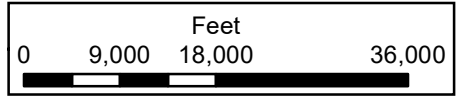


Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

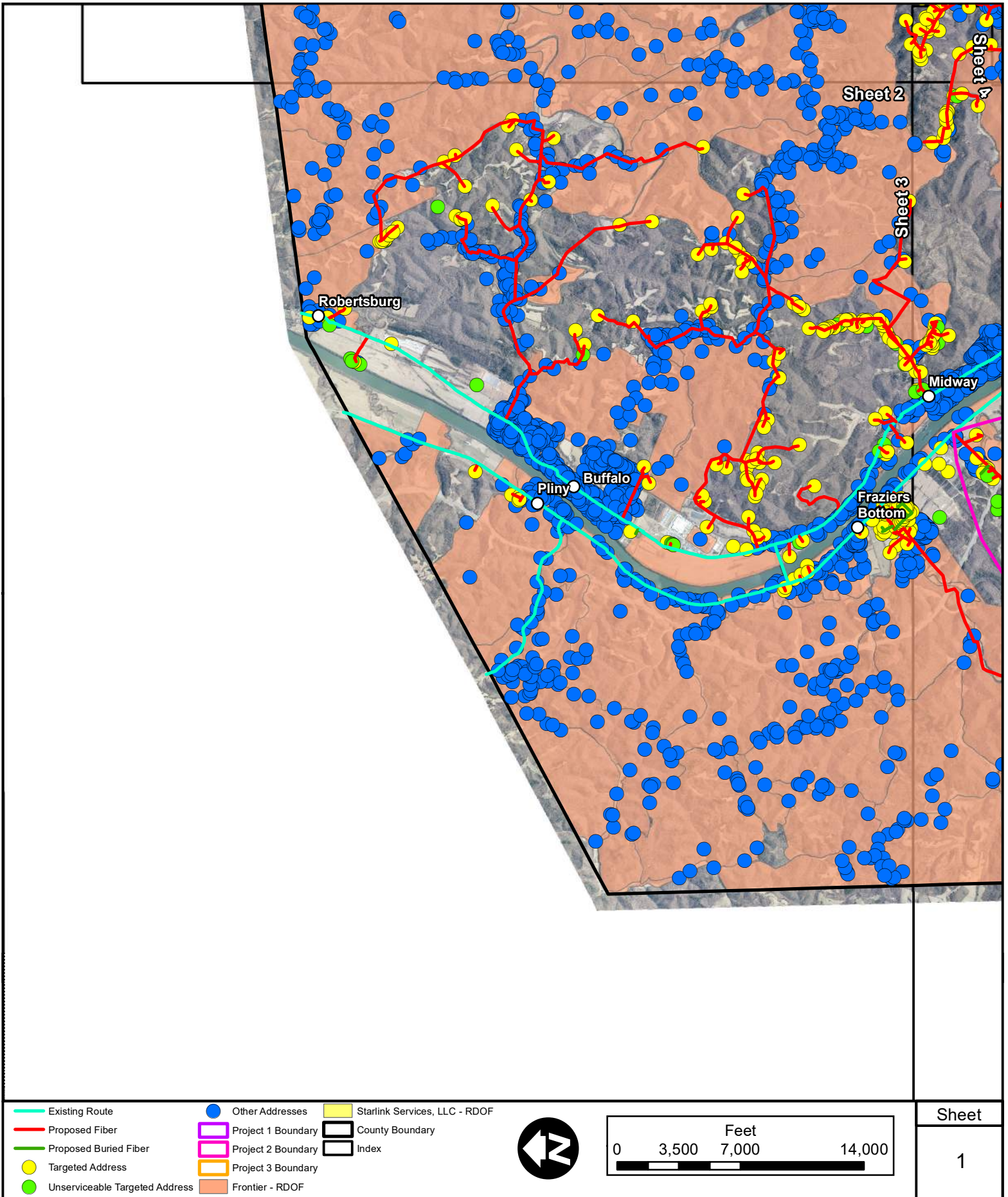
Feet			
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- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index

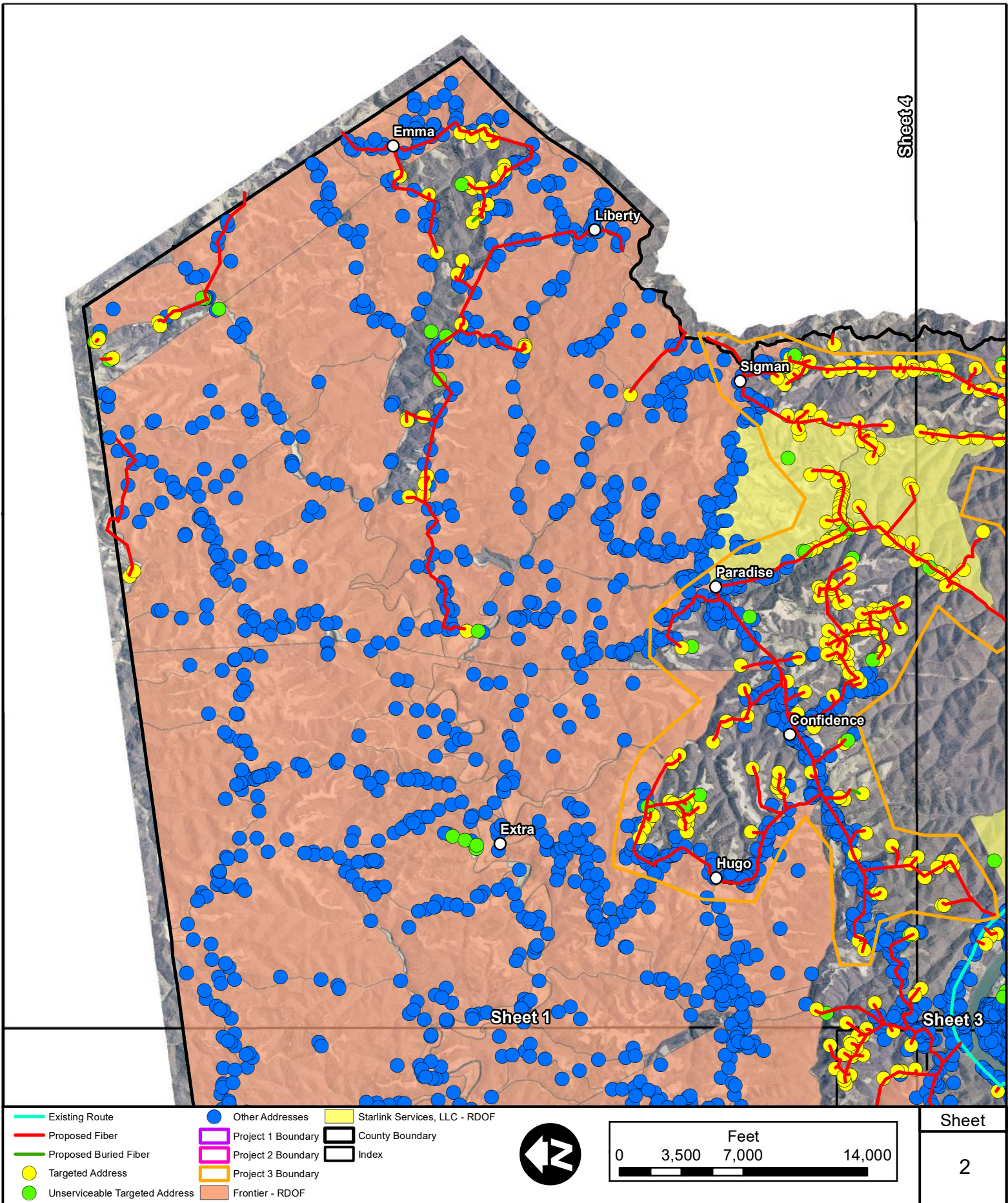


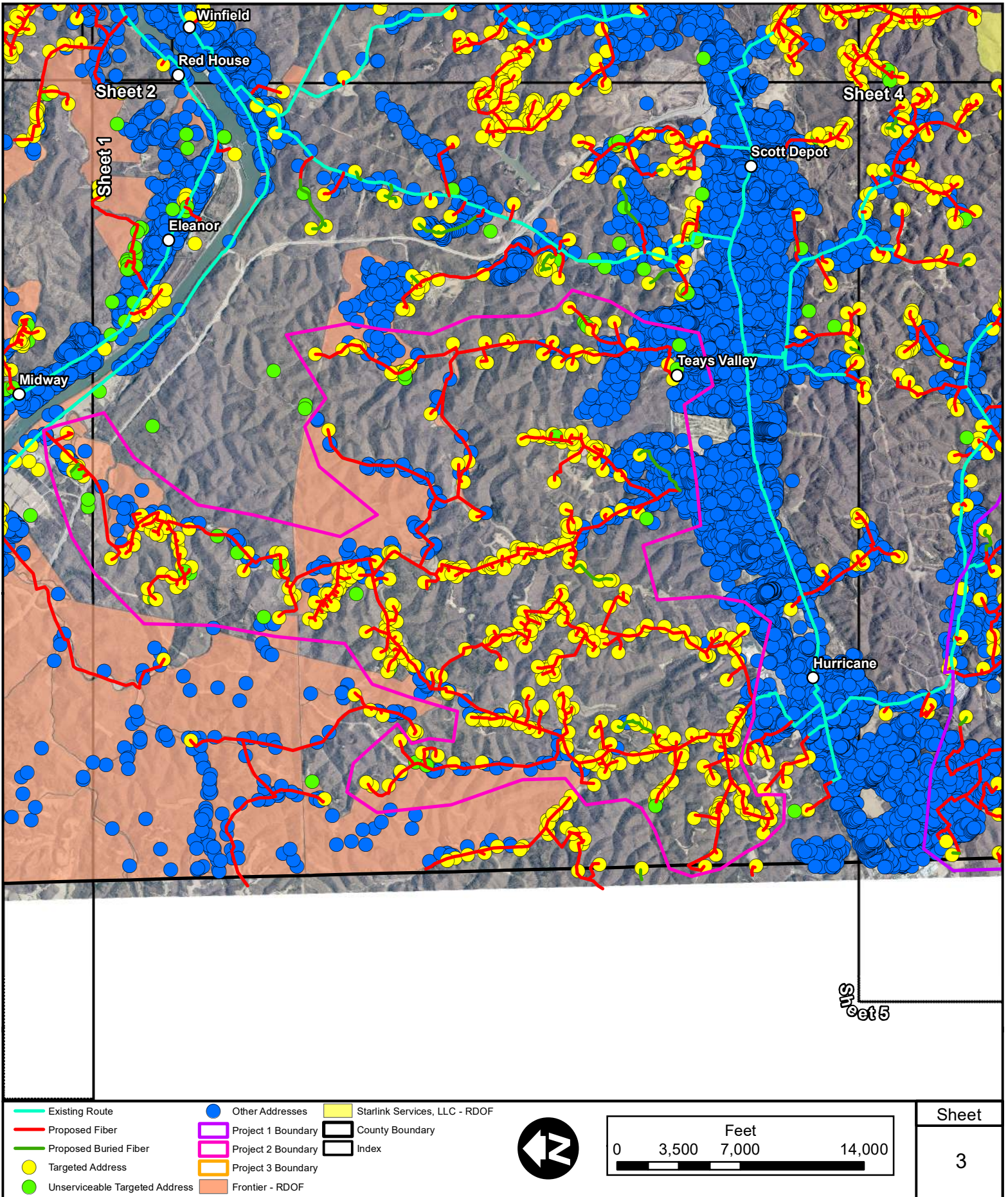
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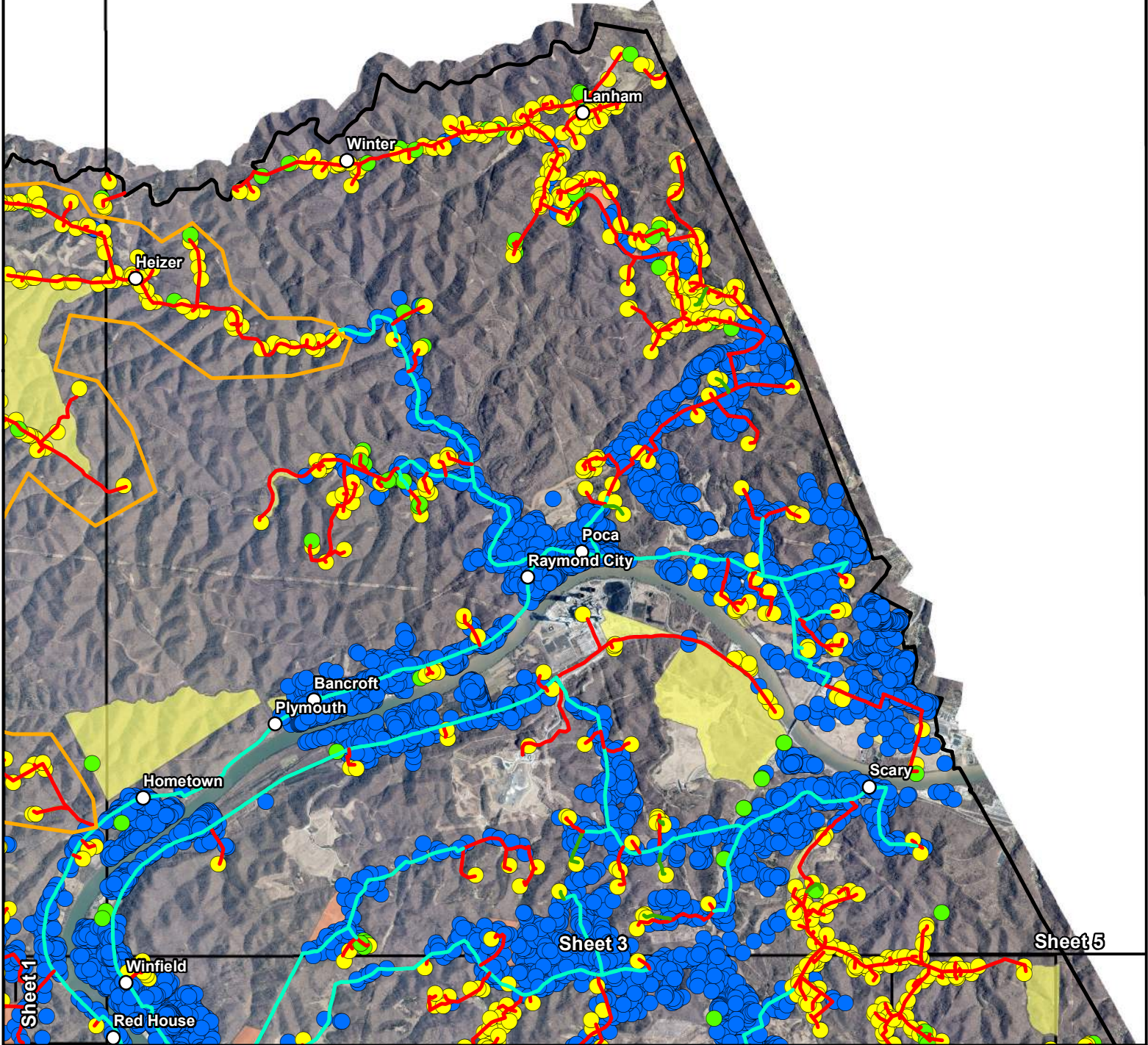
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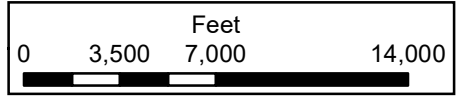




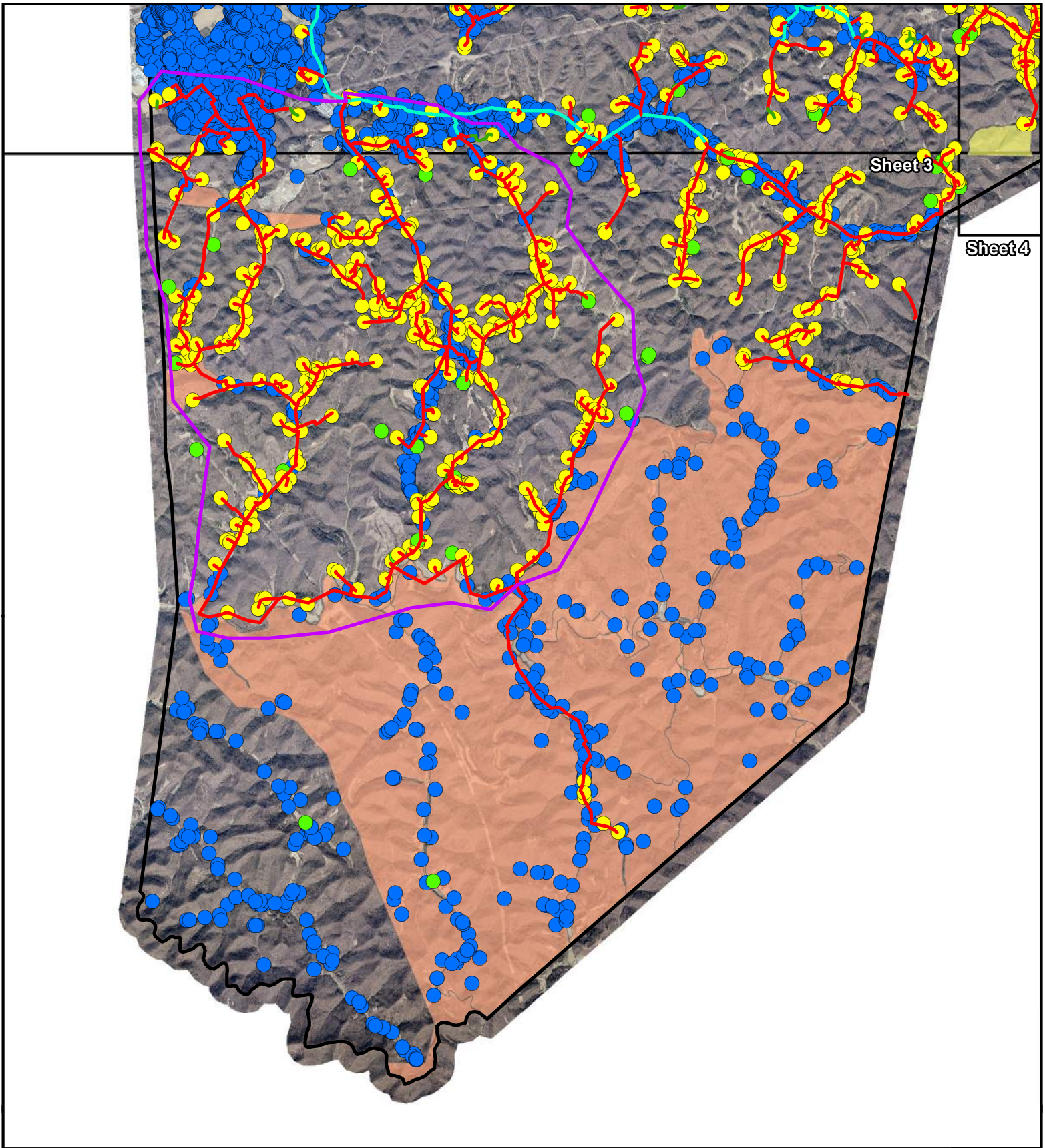
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- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index



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Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	



Feet			
0	3,500	7,000	14,000

Sheet
5

Putnam County, WV – 2023 ROC Study – Cost Estimate – Whole County

Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	355.70	\$1,956,350
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	355.70	\$533,550
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	346.51	\$5,197,650
Aerial Construction Labor	\$50,000.00	Per Mile	346.51	\$17,325,500
Underground Construction Labor	\$150,000.00	Per Mile	9.19	\$1,378,500
Project Construction Contingency 10%	\$1,870,400.00	Lump Sum	1	\$1,870,400
Legal 1.5%	\$280,560.00	Lump Sum	1	\$280,560
Administrative 2%	\$374,080.00	Lump Sum	1	\$374,080
TOTAL COST = \$28,916,590				

COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
3	Putnam	1	379	53.91	\$4,289,738
		2	472	60.37	\$4,924,543
		3	264	44.02	\$3,476,425

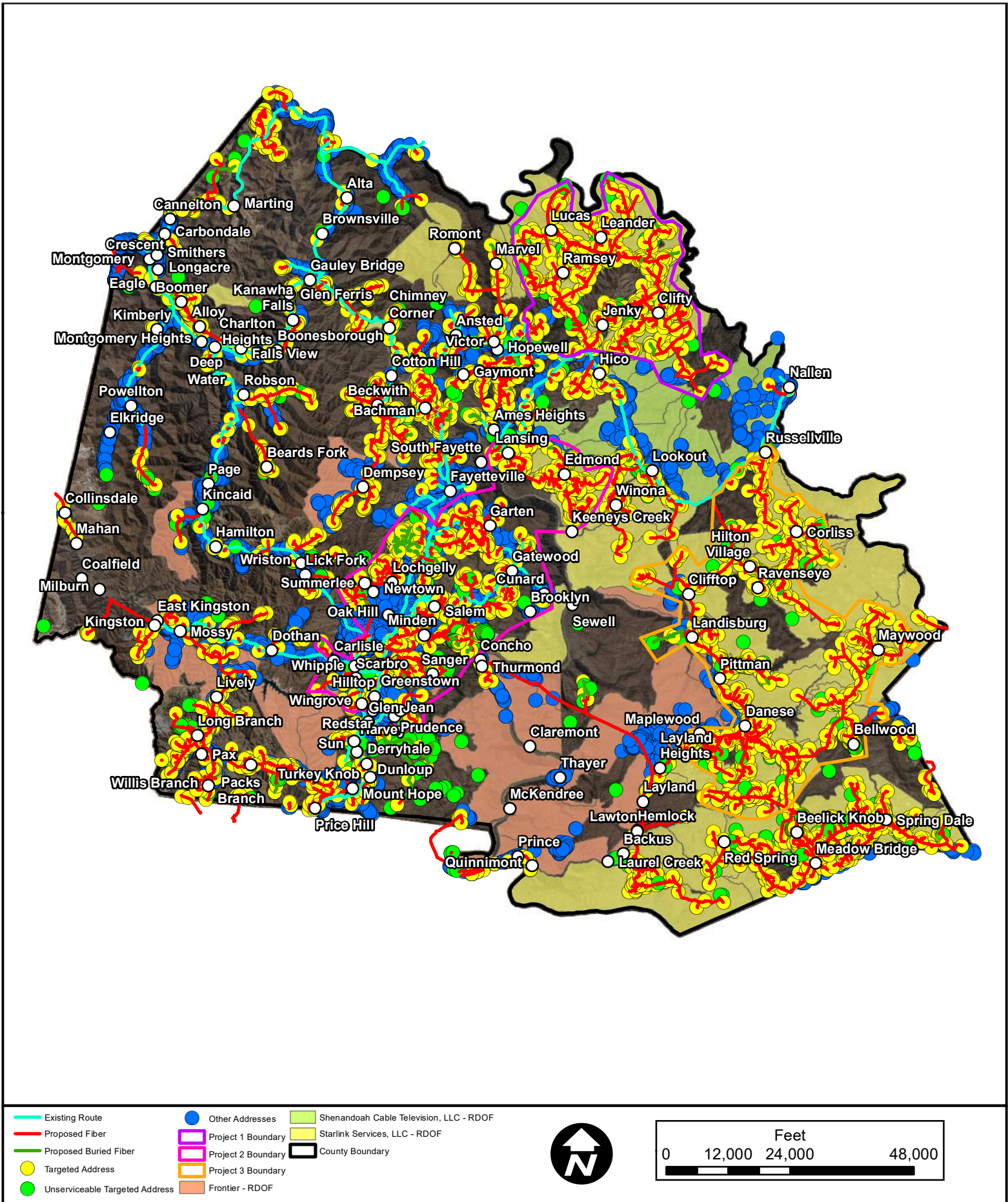
REGION 4

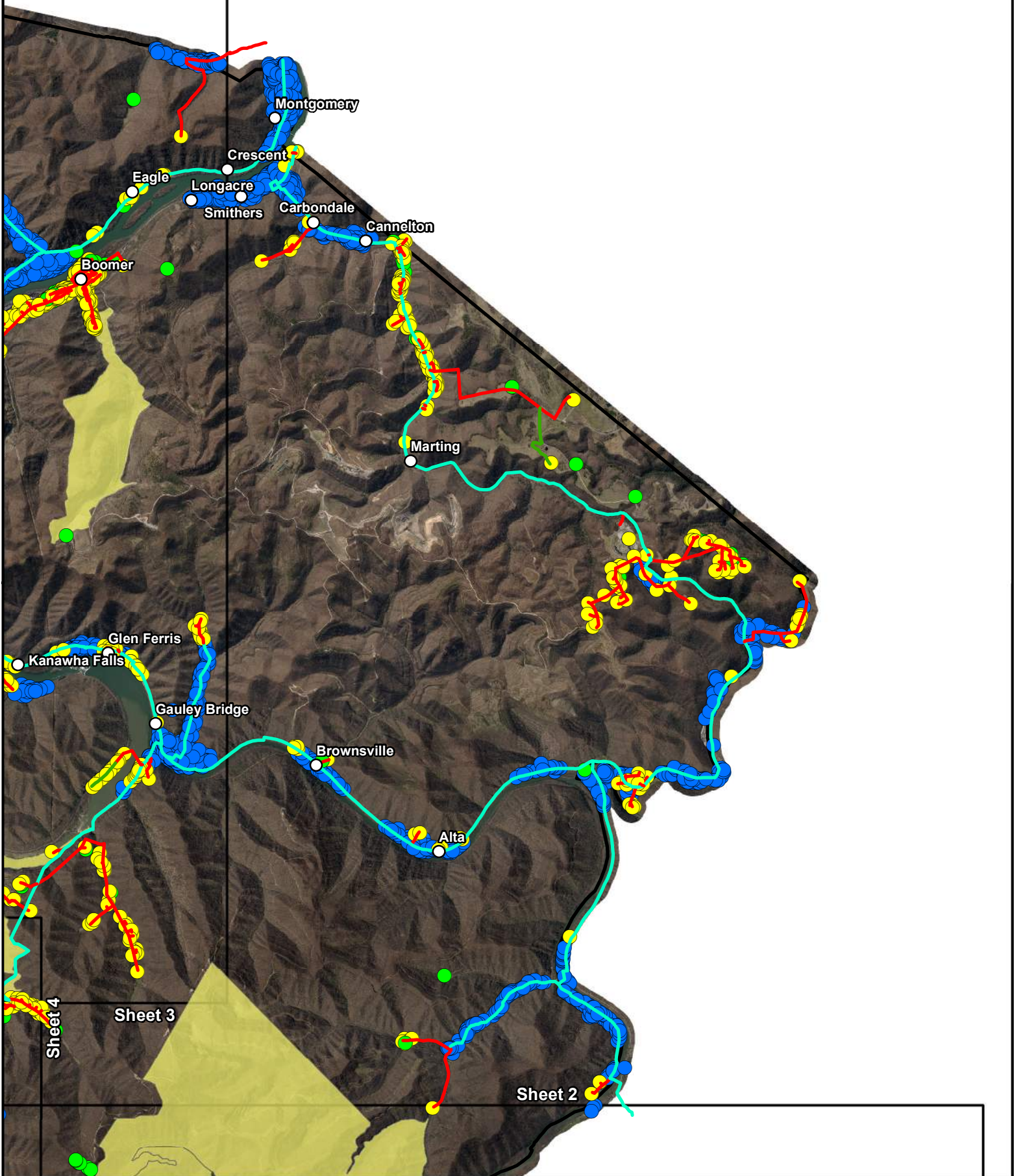
Fayette, Greenbrier, Nicholas,
Pocahontas, and Webster Counties





FAYETTE COUNTY



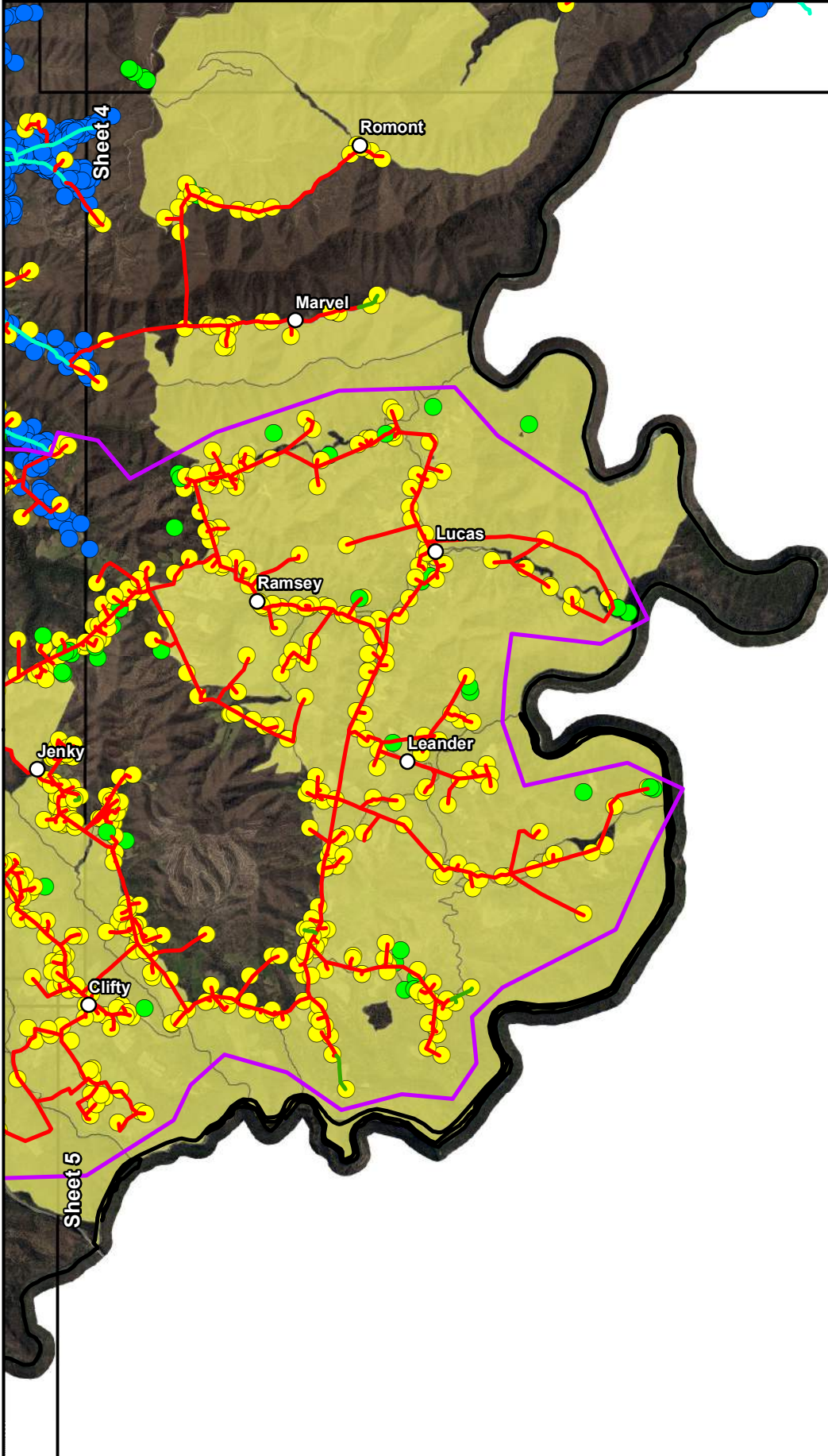


Existing Route	Other Addresses	Shenandoah Cable Television, LLC - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Frontier - RDOF	

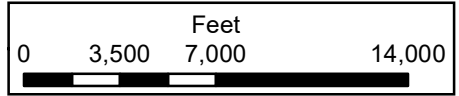
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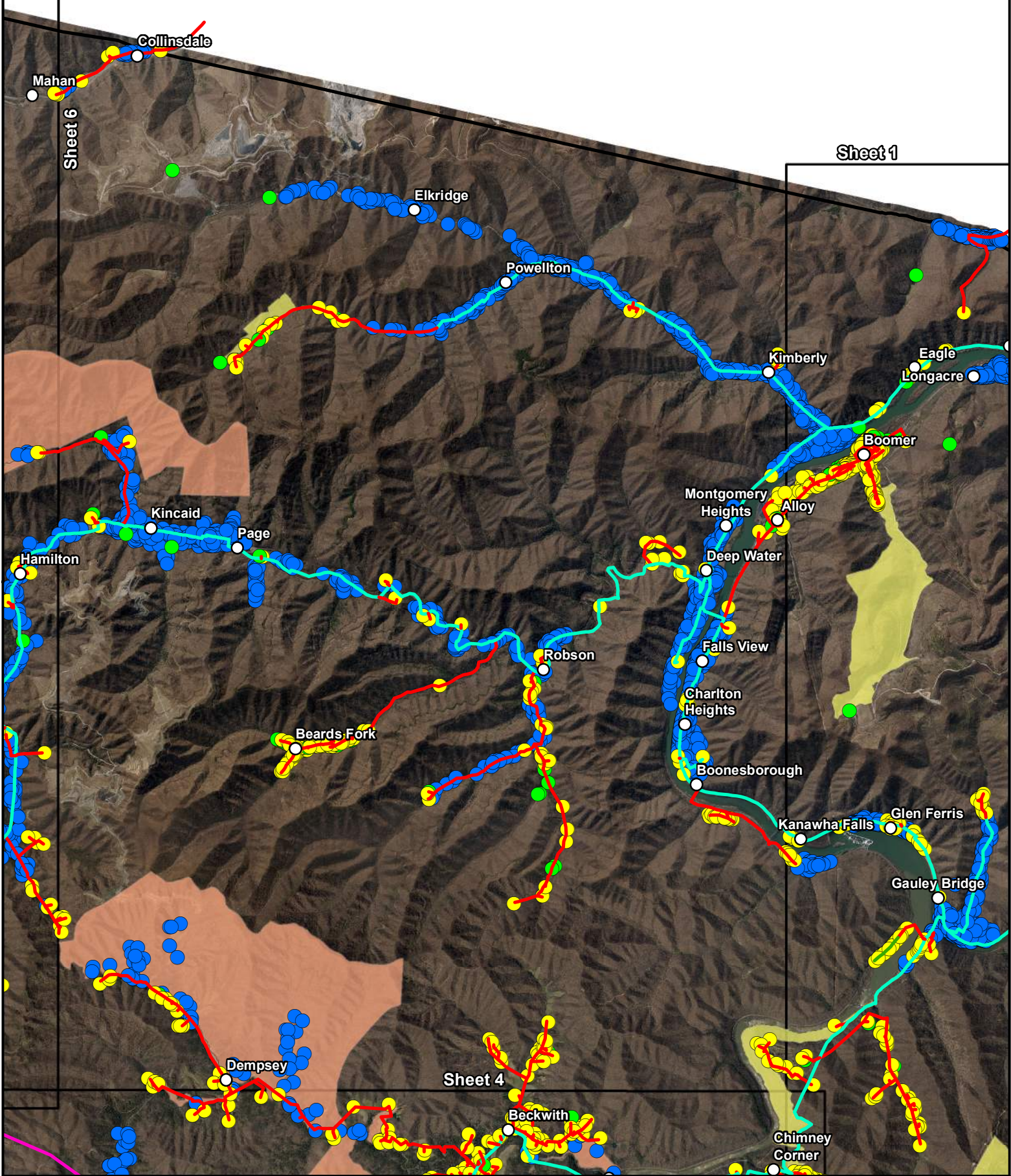
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- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Shenandoah Cable Television, LLC - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index



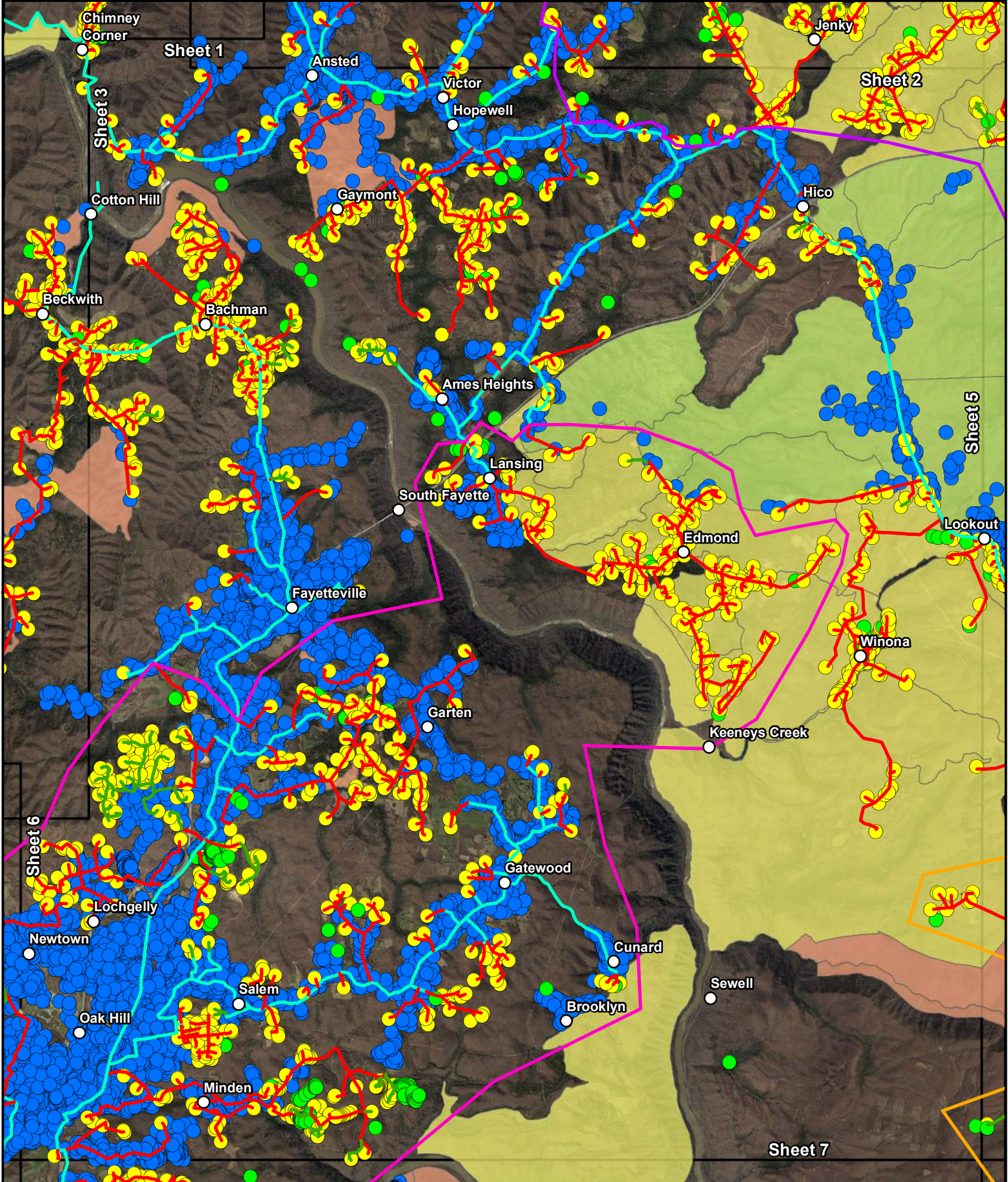
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Existing Route	Other Addresses	Shenandoah Cable Television, LLC - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Frontier - RDOF	

Feet			
0	3,500	7,000	14,000

Sheet
3

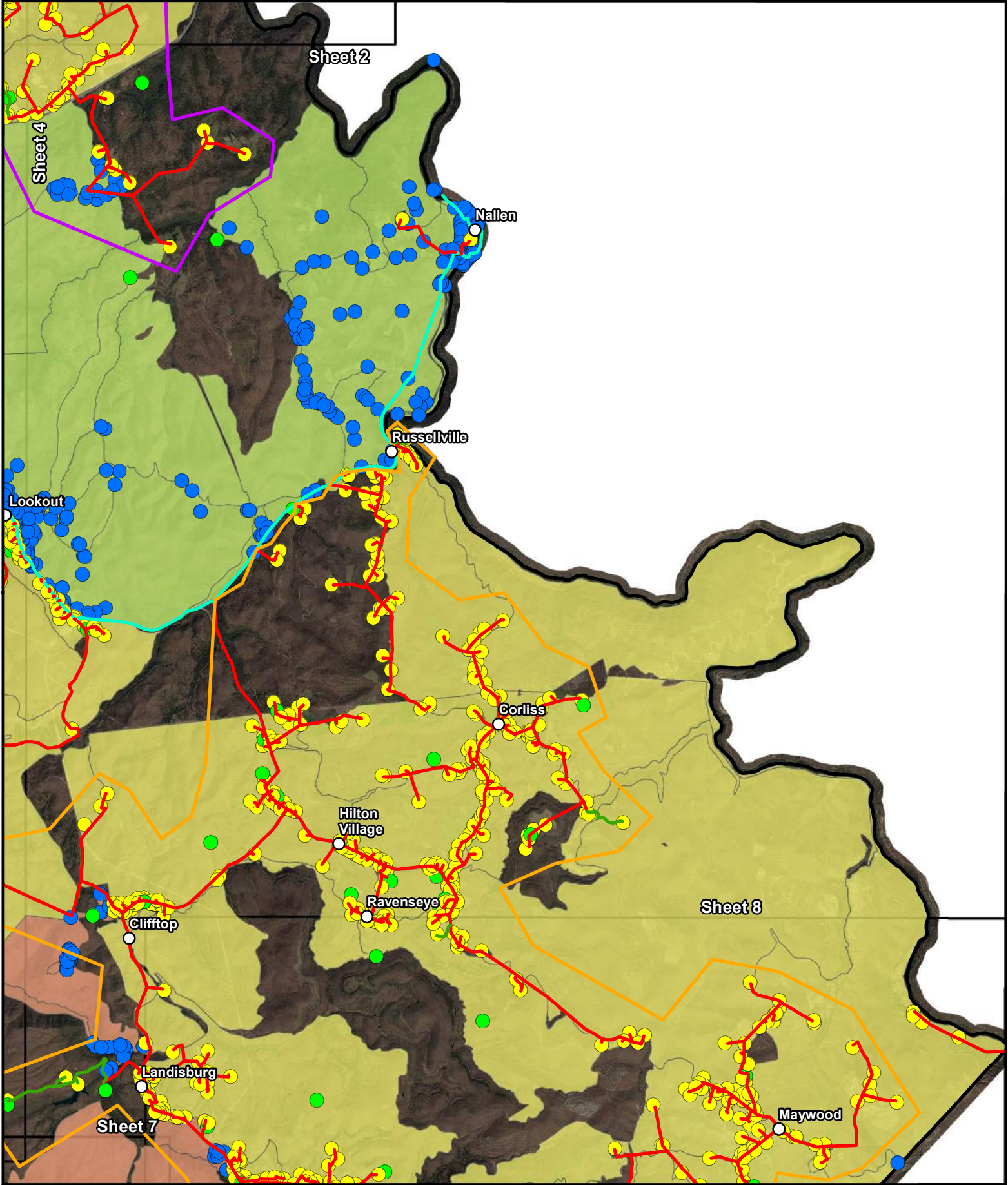


Existing Route	Other Addresses	Shenandoah Cable Television, LLC - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Frontier - RDOF	

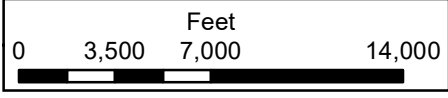
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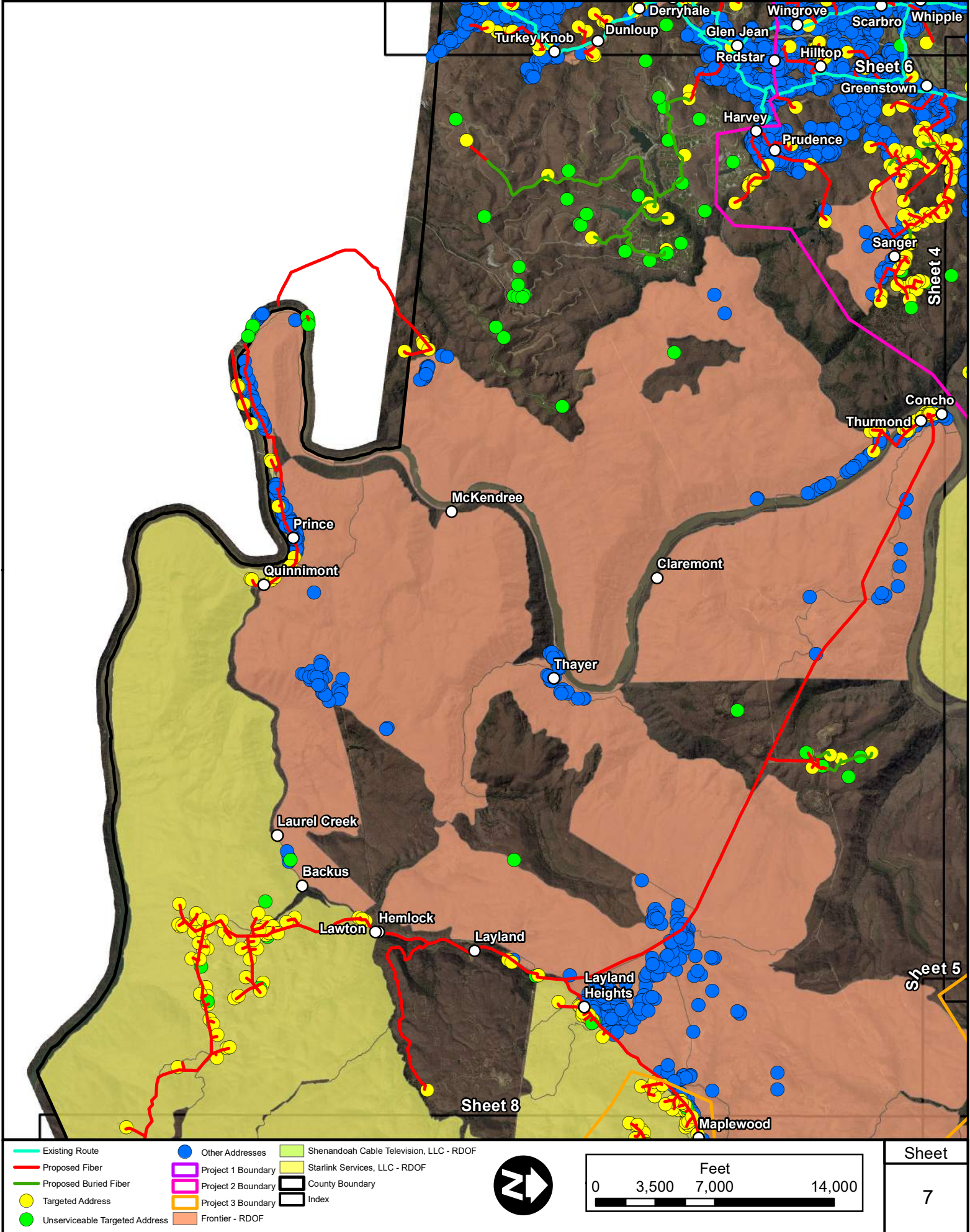
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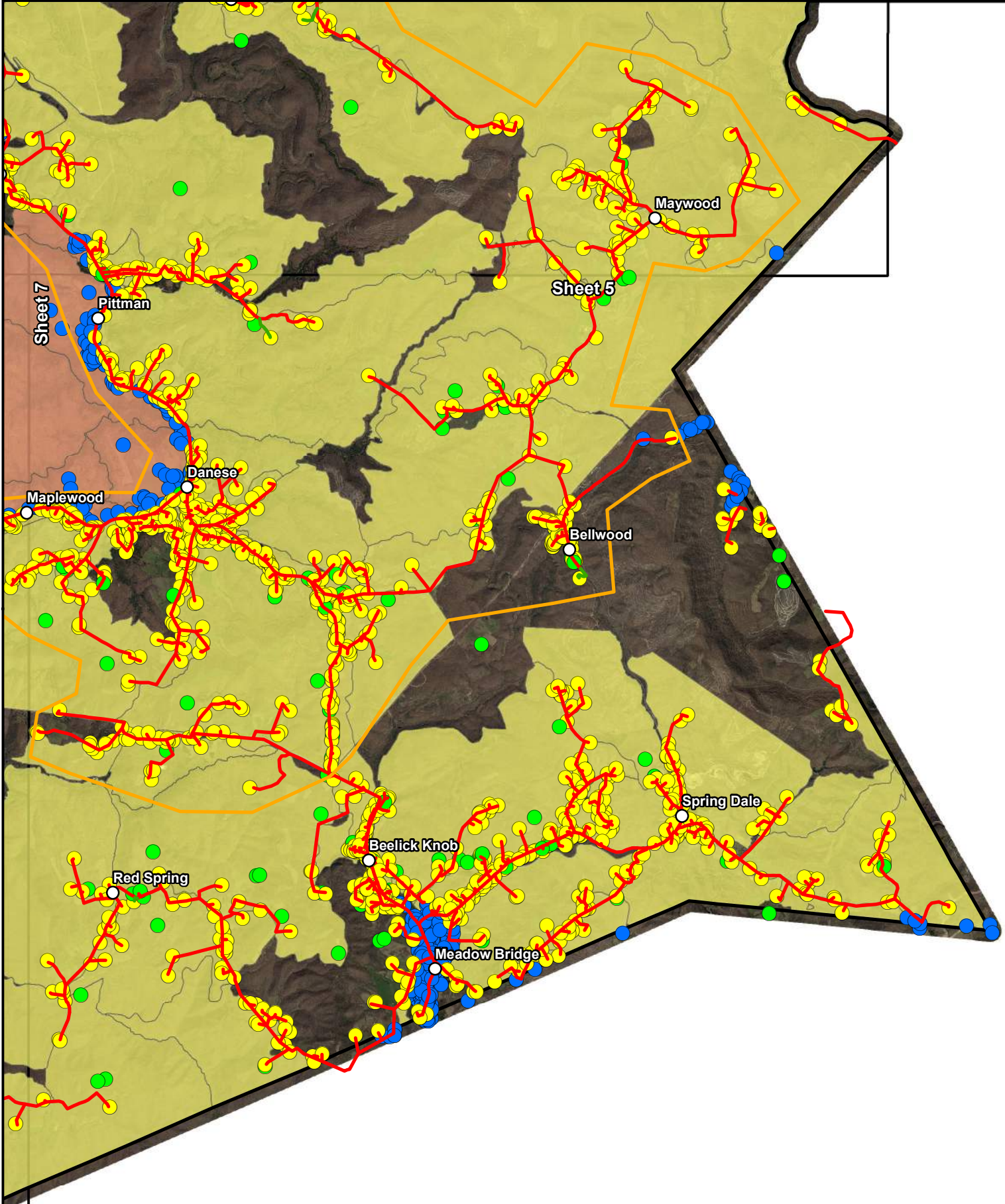


Existing Route	Other Addresses	Shenandoah Cable Television, LLC - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Frontier - RDOF	



Sheet
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Existing Route	Other Addresses	Shenandoah Cable Television, LLC - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Frontier - RDOF	

Sheet	
8	

Fayette County, WV – 2023 ROC Study – Cost Estimate – Whole County

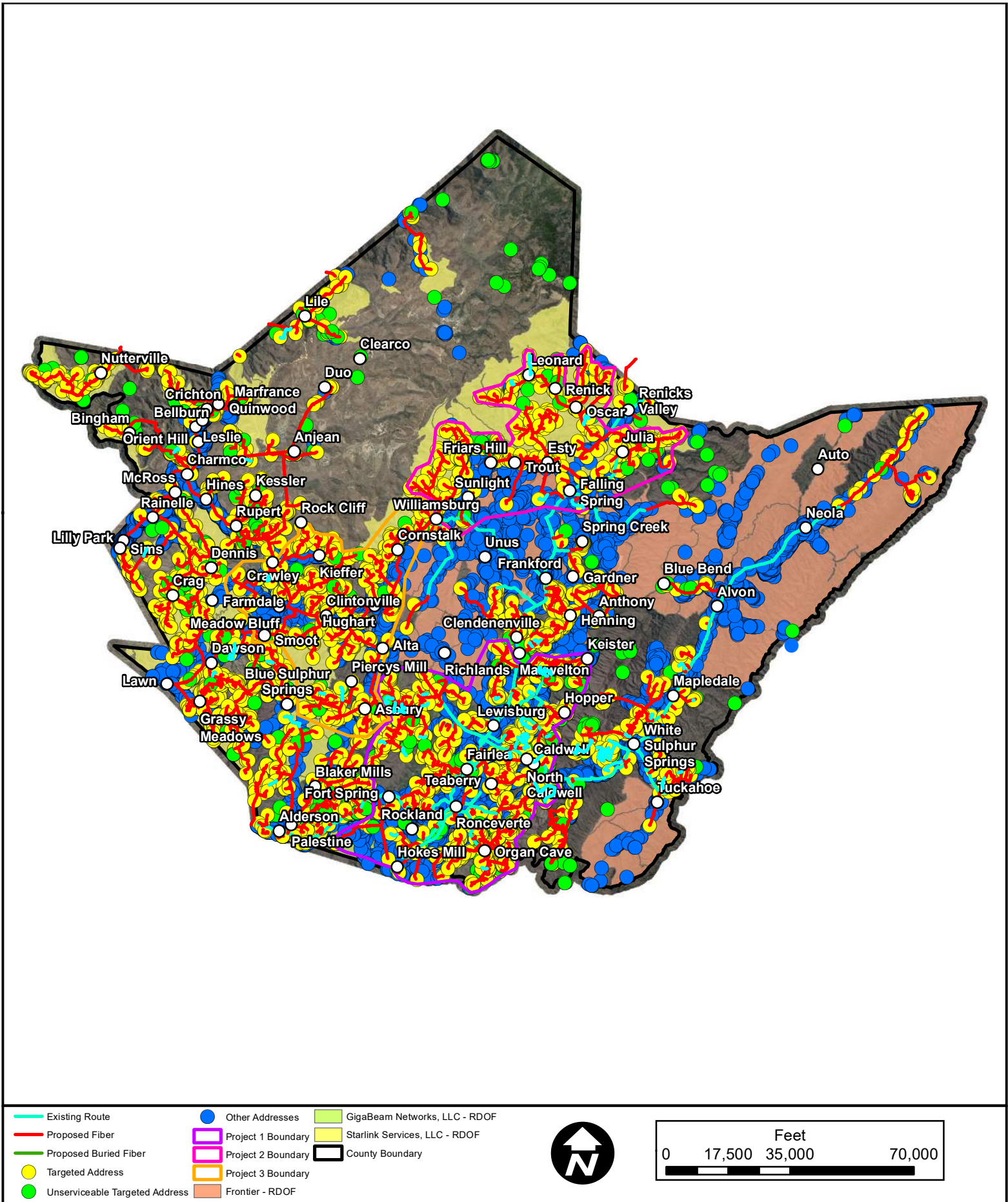
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	579.57	\$3,187,635
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	579.57	\$869,355
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	557.27	\$8,359,050
Aerial Construction Labor	\$50,000.00	Per Mile	557.27	\$27,713,500
Underground Construction Labor	\$150,000.00	Per Mile	25.30	\$3,795,000
Project Construction Contingency 10%	\$3,150,850.00	Lump Sum	1	\$3,150,850
Legal 1.5%	\$472,627.50	Lump Sum	1	\$472,628
Administrative 2%	\$630,170.00	Lump Sum	1	\$630,170
TOTAL COST = \$48,178,188				

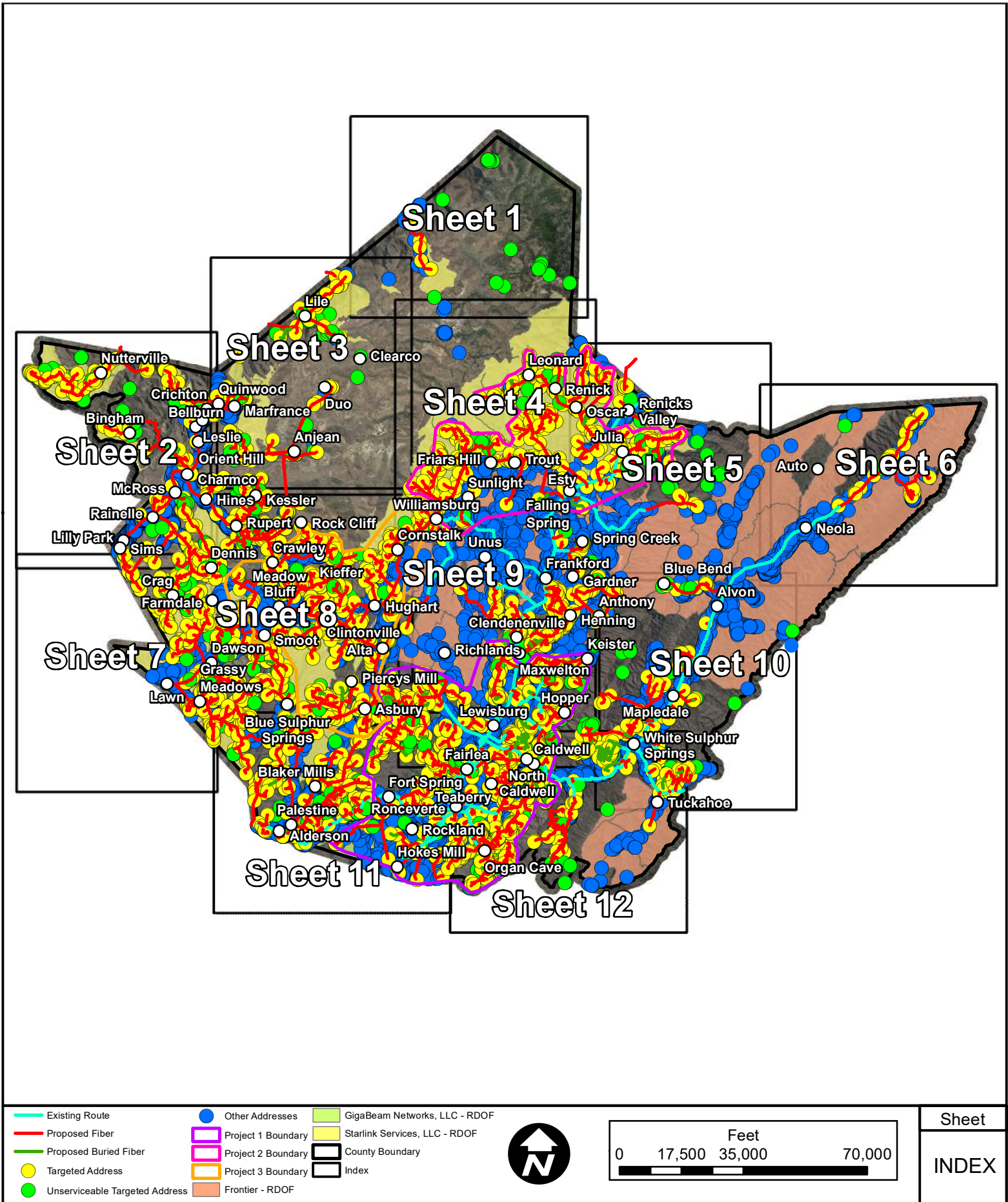
COUNTY SAMPLE PROJECT

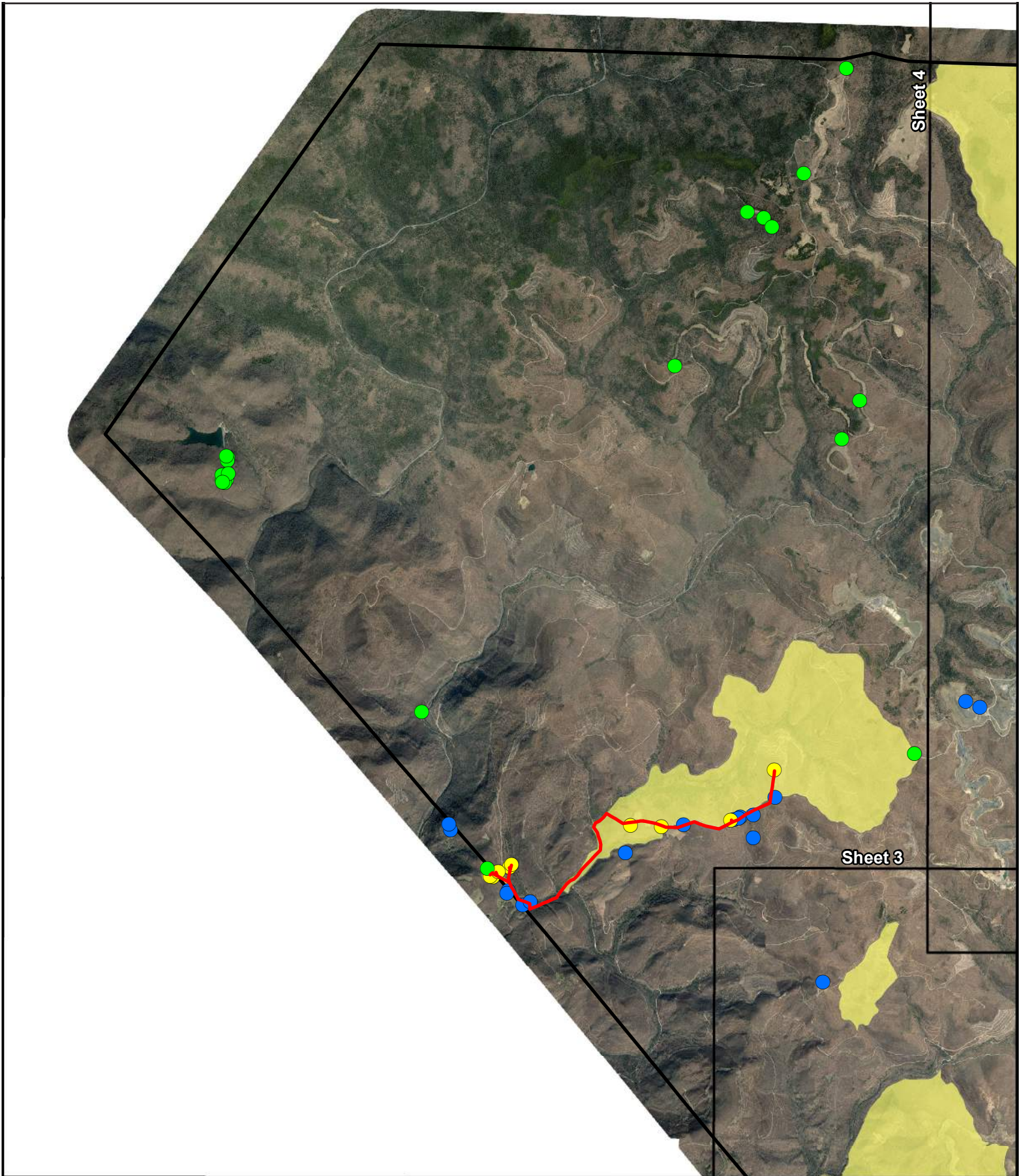
Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
4	Fayette	1	563	76.68	\$6,171,525
		2	830	102.10	\$8,986,960
		3	1062	113.12	\$9,191,880



GREENBRIER COUNTY



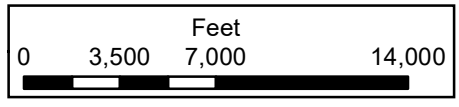




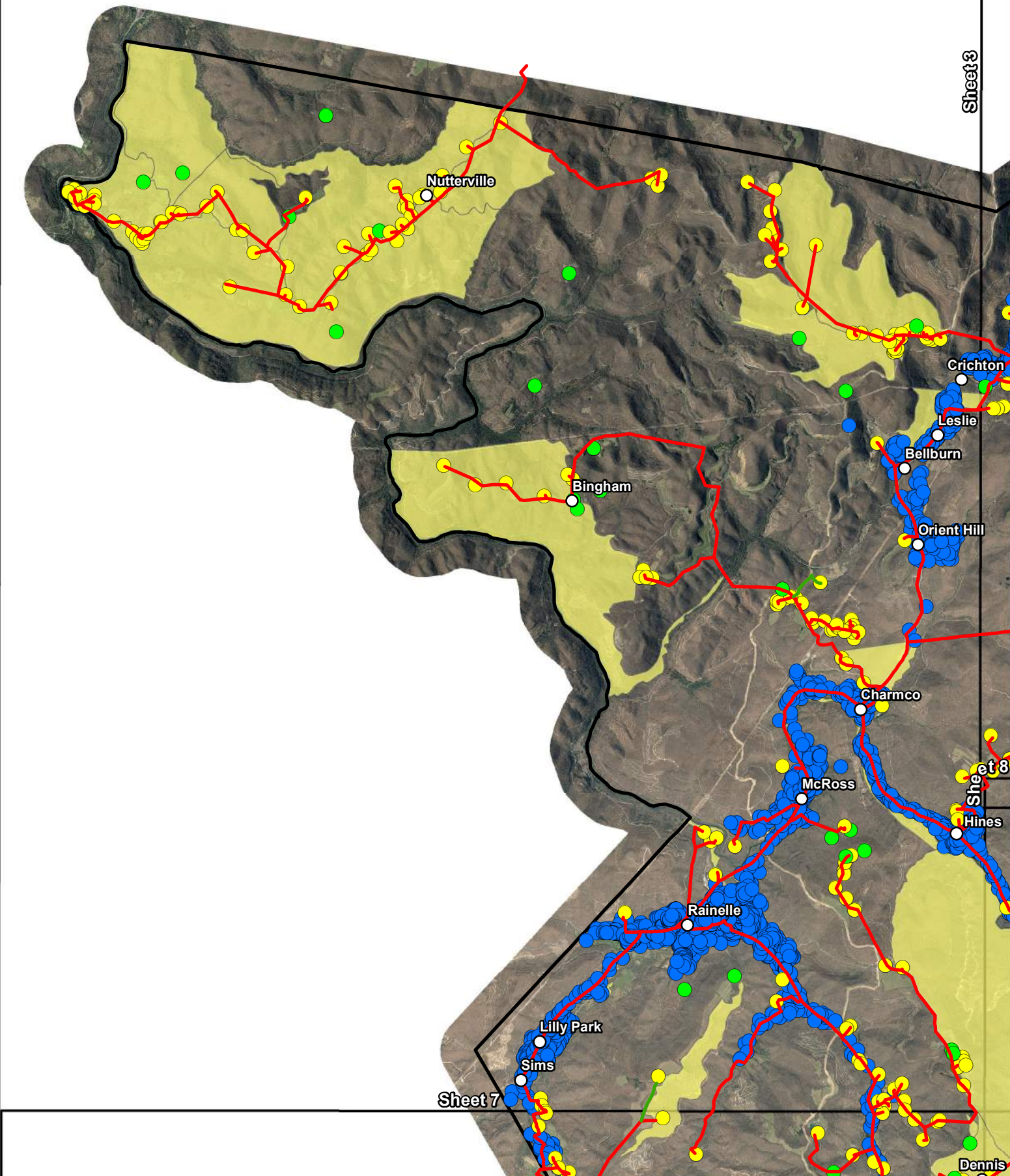
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Sheet 3

- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- GigaBeam Networks, LLC - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index



Sheet
1



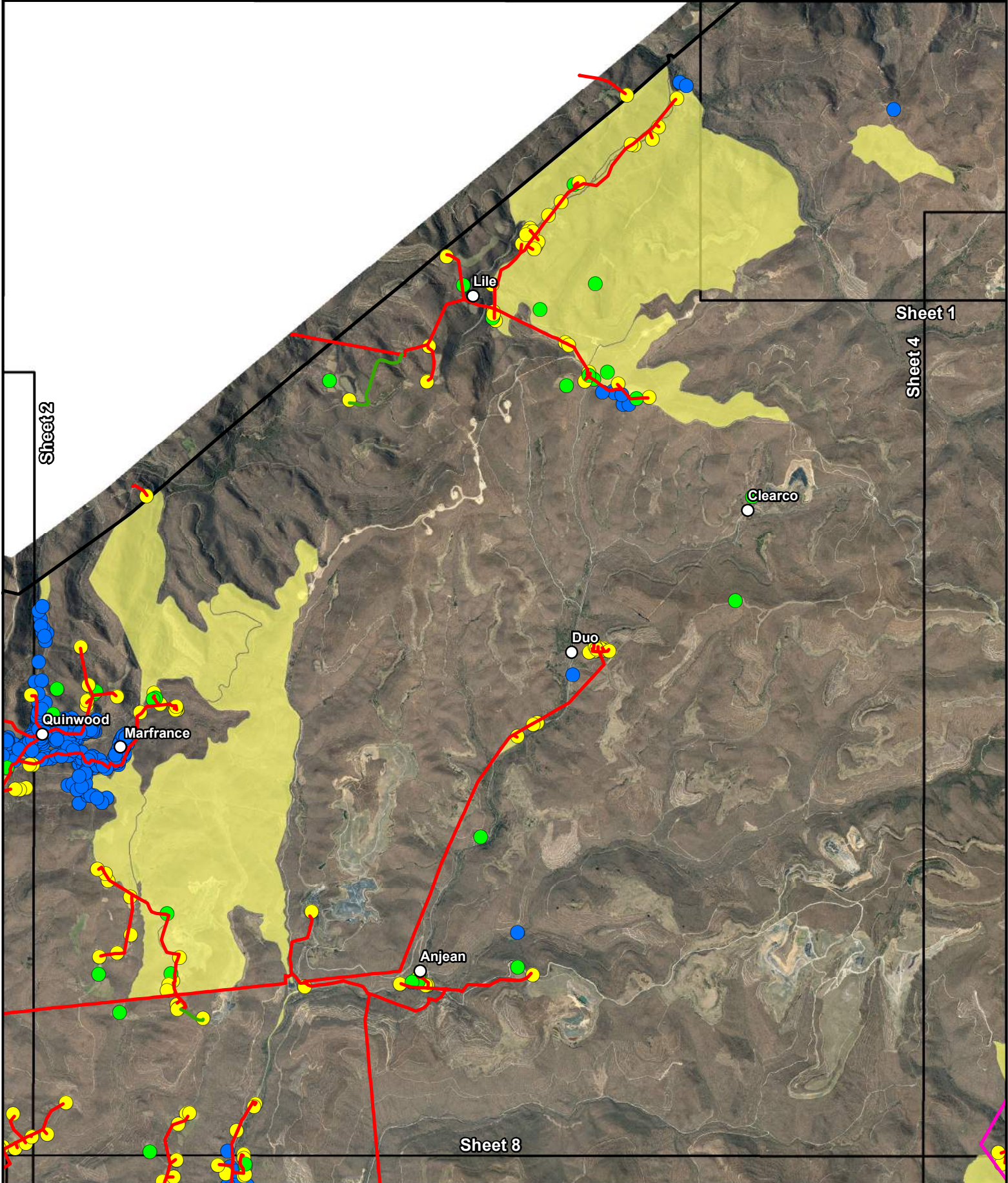
Existing Route	Other Addresses	GigaBeam Networks, LLC - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Frontier - RDOF	

Feet

0 3,500 7,000 14,000

Sheet

2

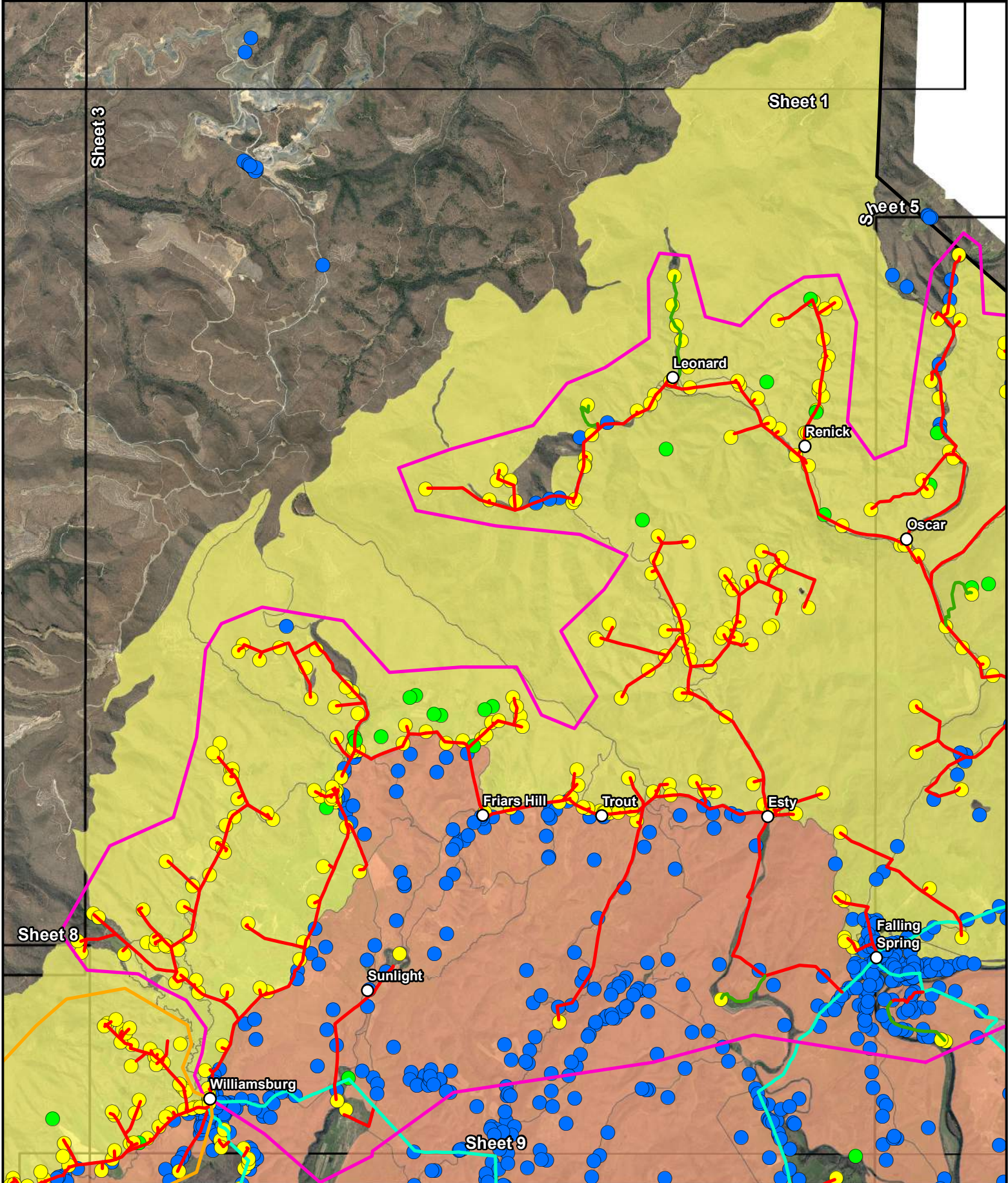


Existing Route	Other Addresses	GigaBeam Networks, LLC - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Frontier - RDOF	

Feet

0 3,500 7,000 14,000

Sheet	3
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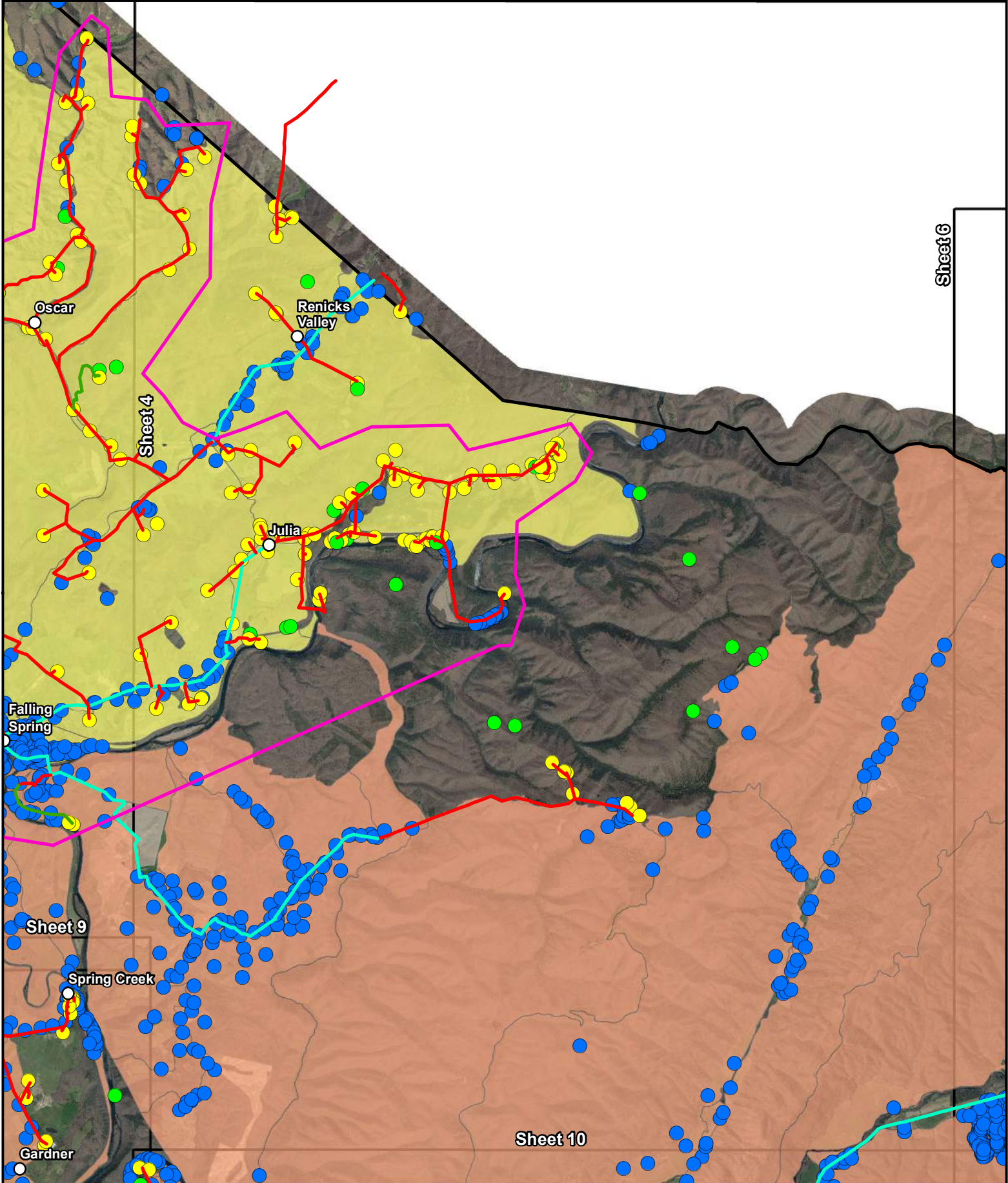


Existing Route	Other Addresses	GigaBeam Networks, LLC - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Frontier - RDOF	

Feet

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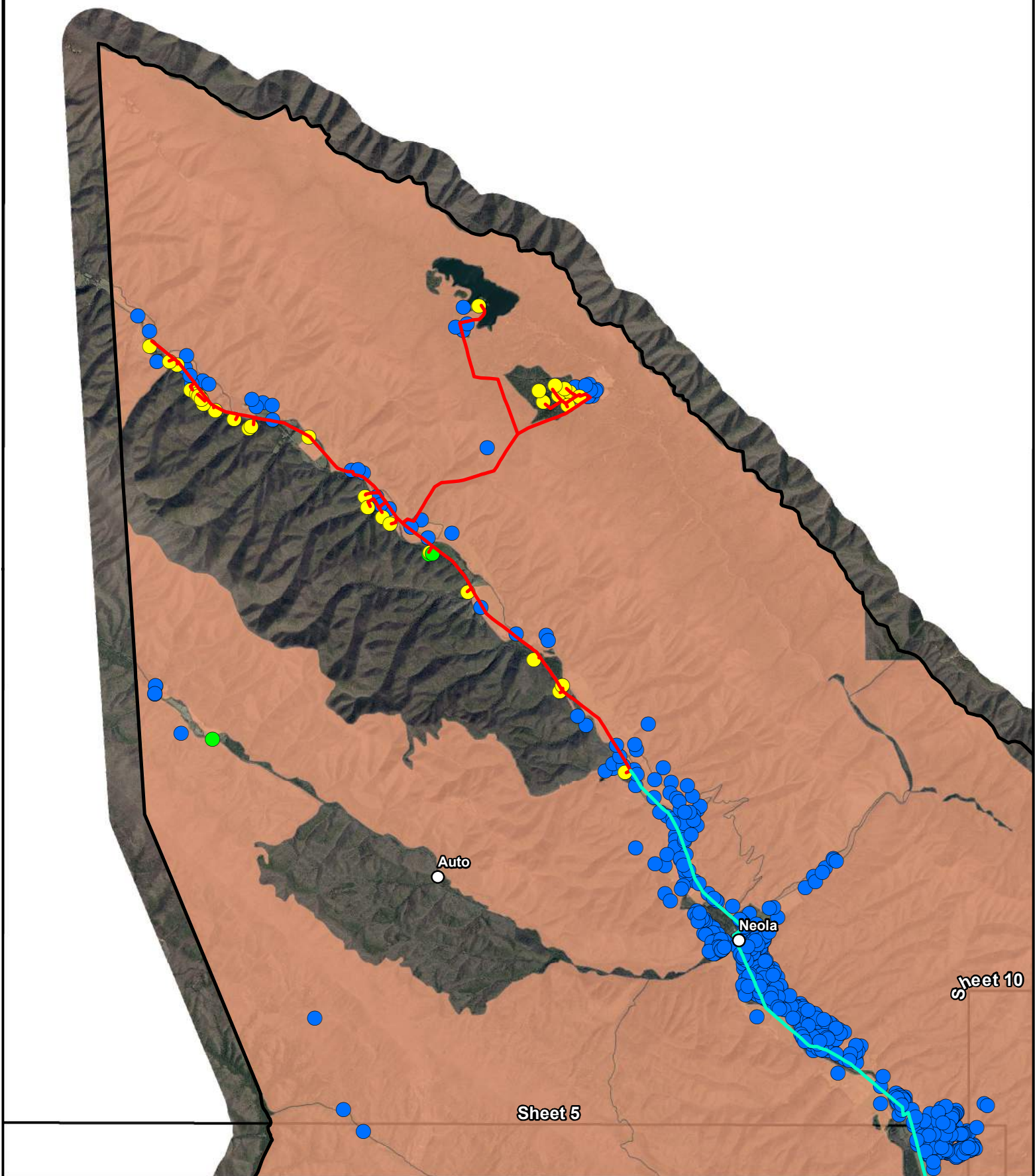
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Existing Route	Other Addresses	GigaBeam Networks, LLC - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Frontier - RDOF	

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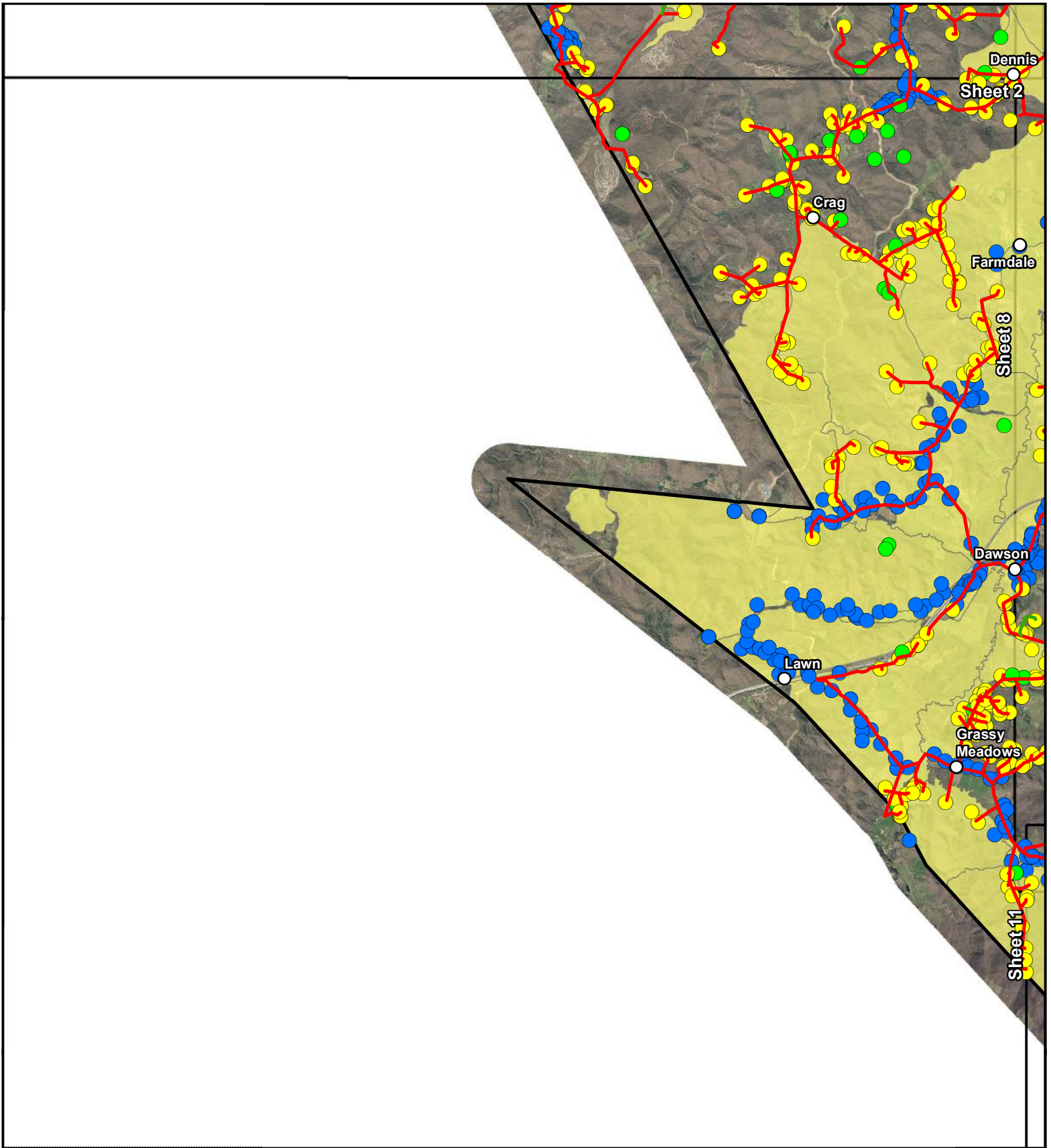
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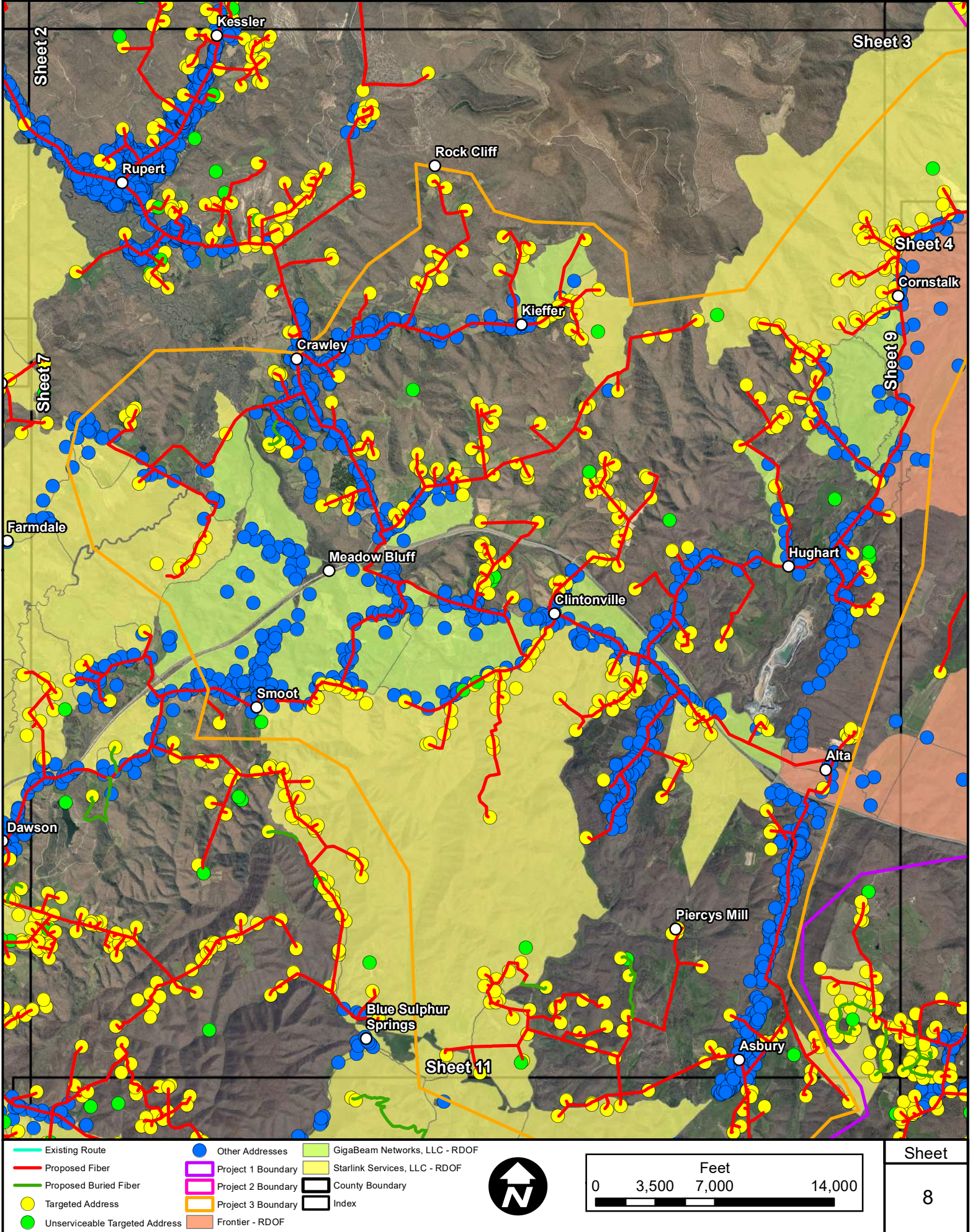
Existing Route	Other Addresses	GigaBeam Networks, LLC - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Frontier - RDOF	

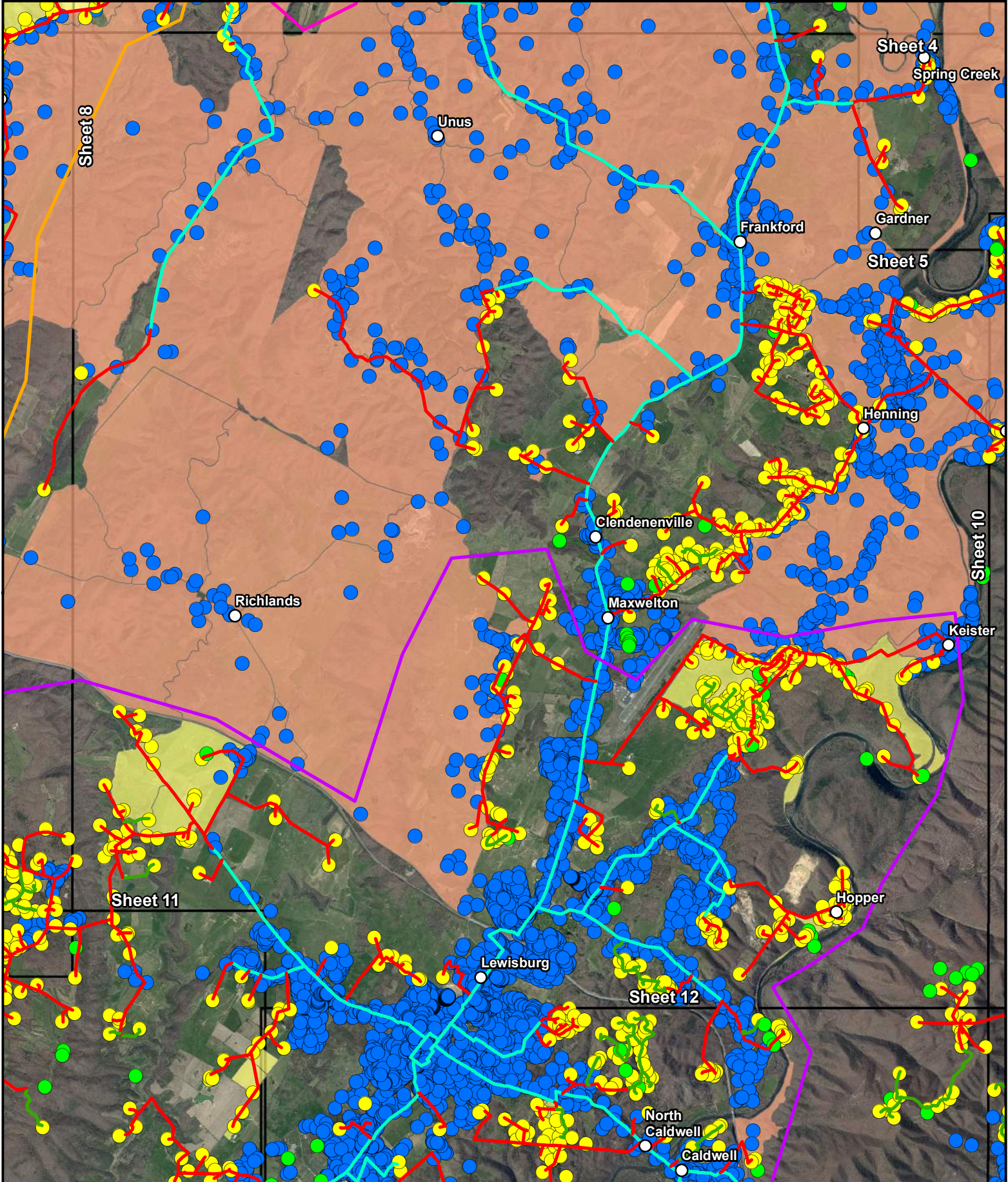
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Existing Route	Other Addresses	GigaBeam Networks, LLC - RDOF		<table border="1"> <tr> <td colspan="4">Feet</td> </tr> <tr> <td>0</td> <td>3,500</td> <td>7,000</td> <td>14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td>7</td> </tr> </table>	Sheet	7
Feet															
0	3,500	7,000	14,000												
Sheet															
7															
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF													
Proposed Buried Fiber	Project 2 Boundary	County Boundary													
Targeted Address	Project 3 Boundary	Index													
Unserviceable Targeted Address	Frontier - RDOF														





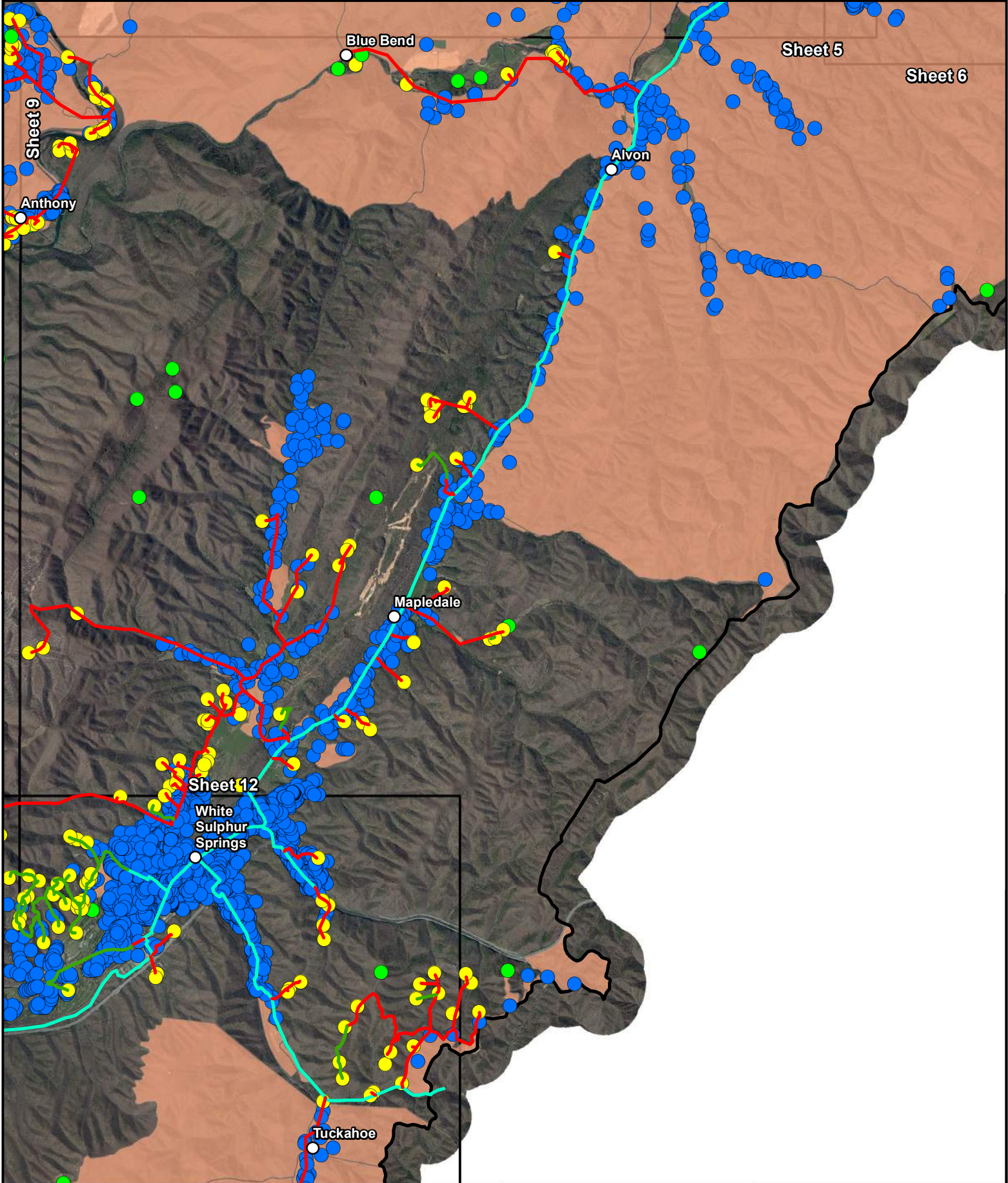
Existing Route	Other Addresses	GigaBeam Networks, LLC - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Frontier - RDOF	

Feet

0 3,500 7,000 14,000

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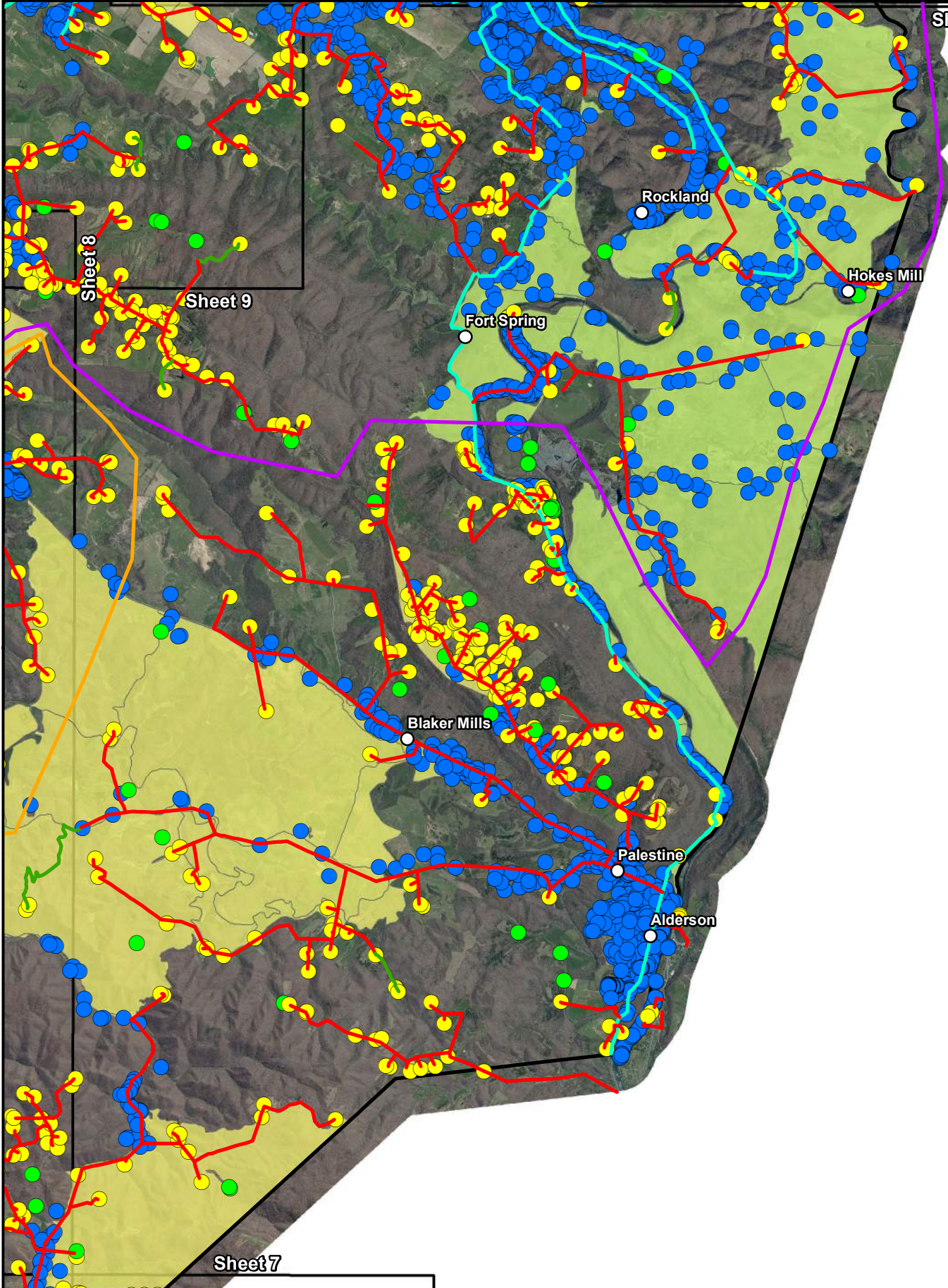
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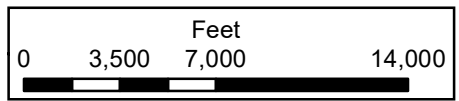
Existing Route	Other Addresses	GigaBeam Networks, LLC - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Frontier - RDOF	

Sheet

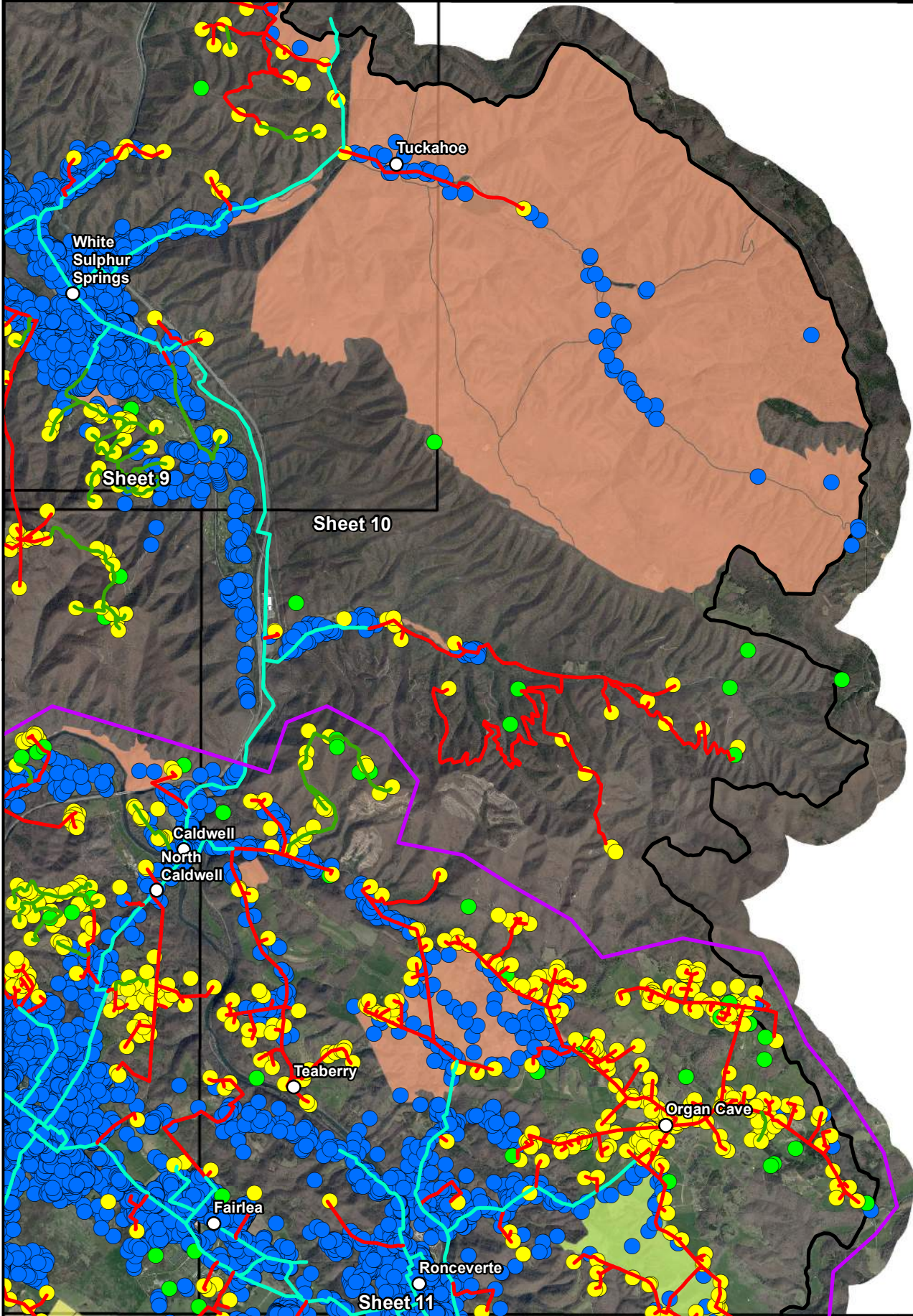
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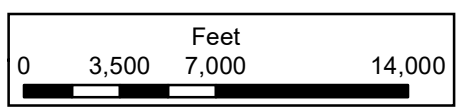
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- GigaBeam Networks, LLC - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index



Sheet
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- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- GigaBeam Networks, LLC - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index
- Frontier - RDOF




Sheet
12

Greenbrier County, WV – 2023 ROC Study – Cost Estimate – Whole County

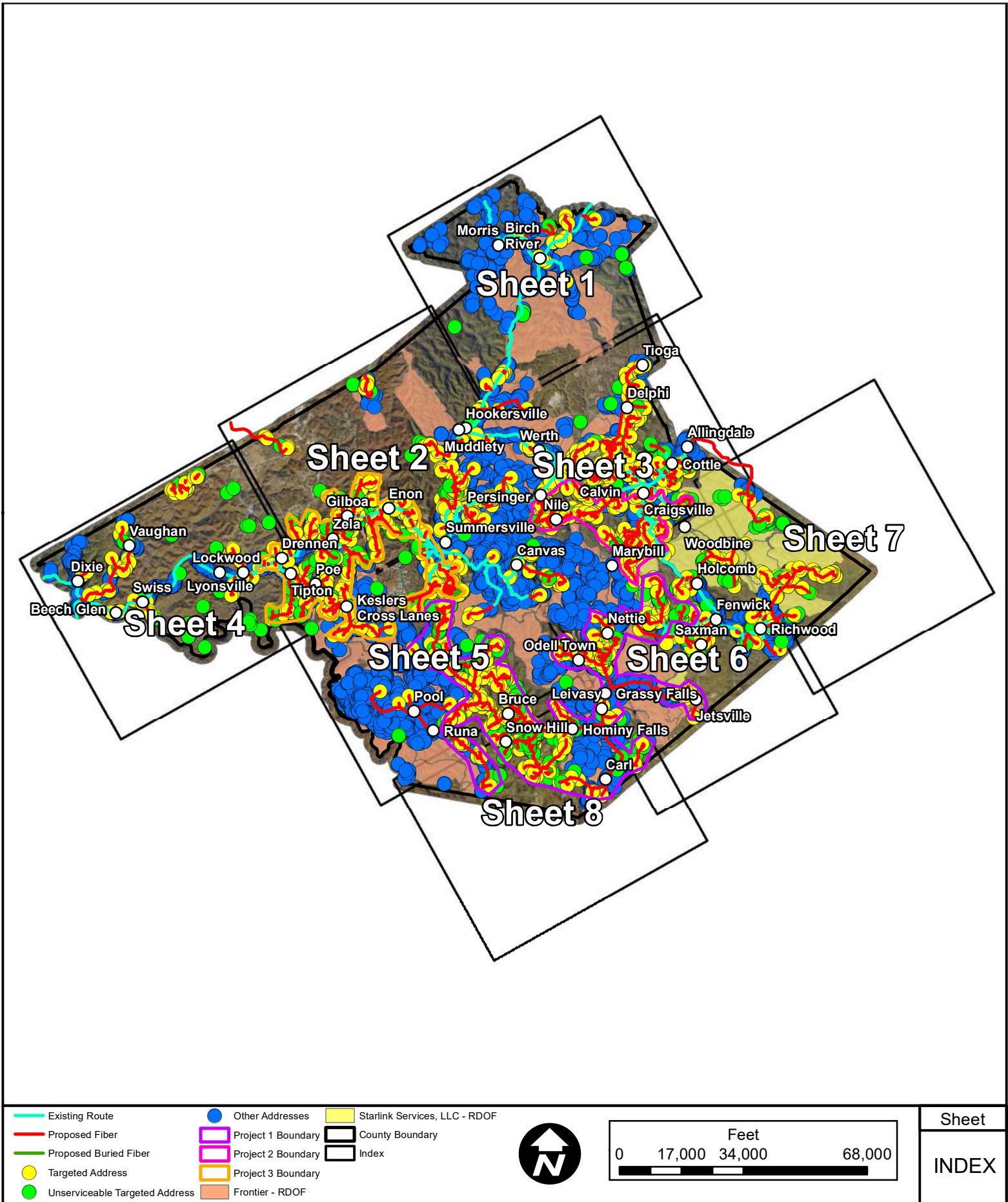
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	746.62	\$4,106,410
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	746.62	\$1,119,930
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	706.15	\$10,592,250
Aerial Construction Labor	\$50,000.00	Per Mile	706.15	\$35,307,500
Underground Construction Labor	\$150,000.00	Per Mile	40.47	\$6,070,500
Project Construction Contingency 10%	\$4,137,800.00	Lump Sum	1	\$4,137,800
Legal 1.5%	\$620,670.00	Lump Sum	1	\$620,670
Administrative 2%	\$827,560.00	Lump Sum	1	\$827,560
TOTAL COST = \$62,782,620				

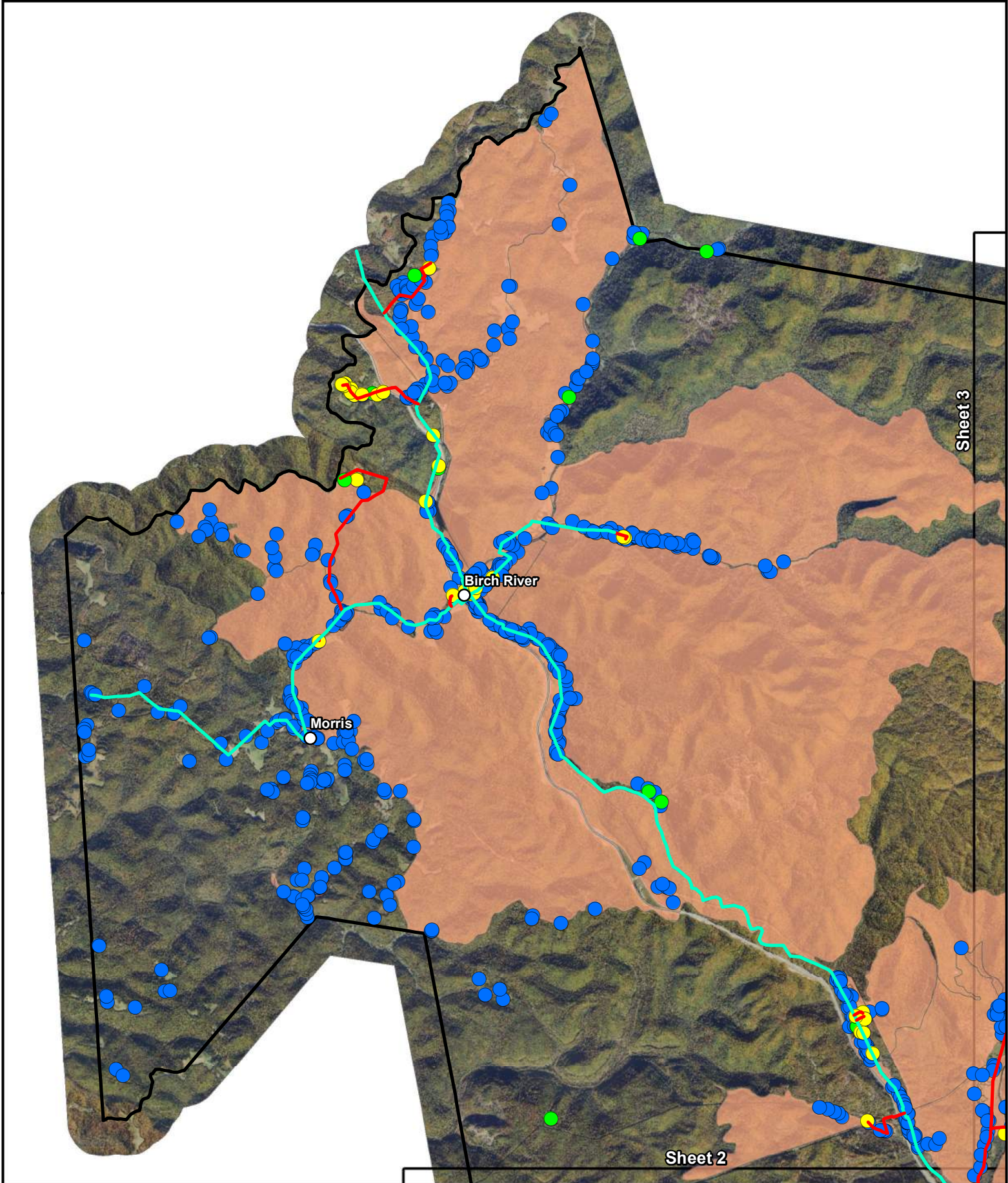
COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
4	Greenbrier	1	1031	152.97	\$14,051,073
		2	332	93.29	\$7,743,543
		3	429	109.05	\$8,741,348



NICHOLAS COUNTY

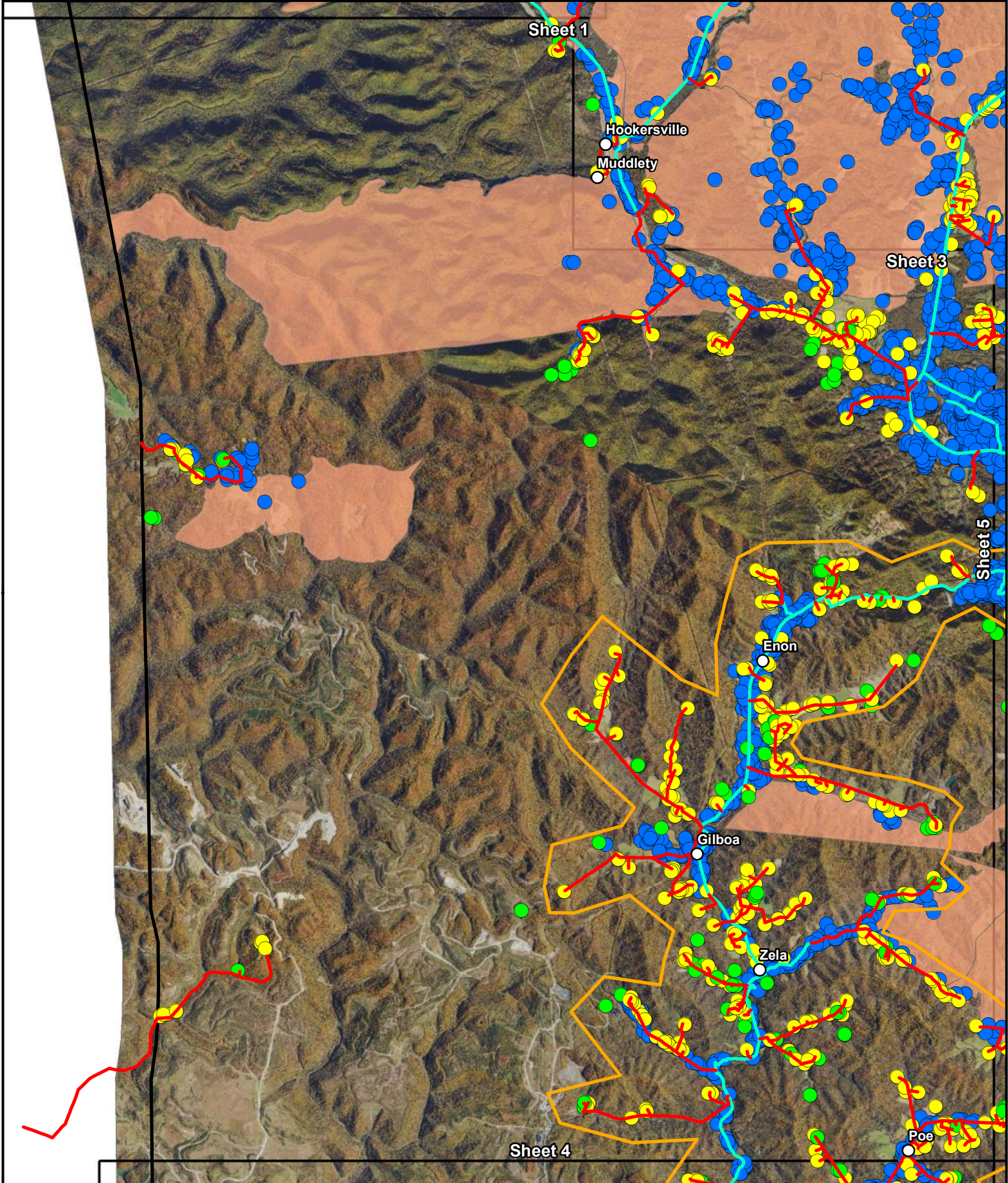




Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Feet			
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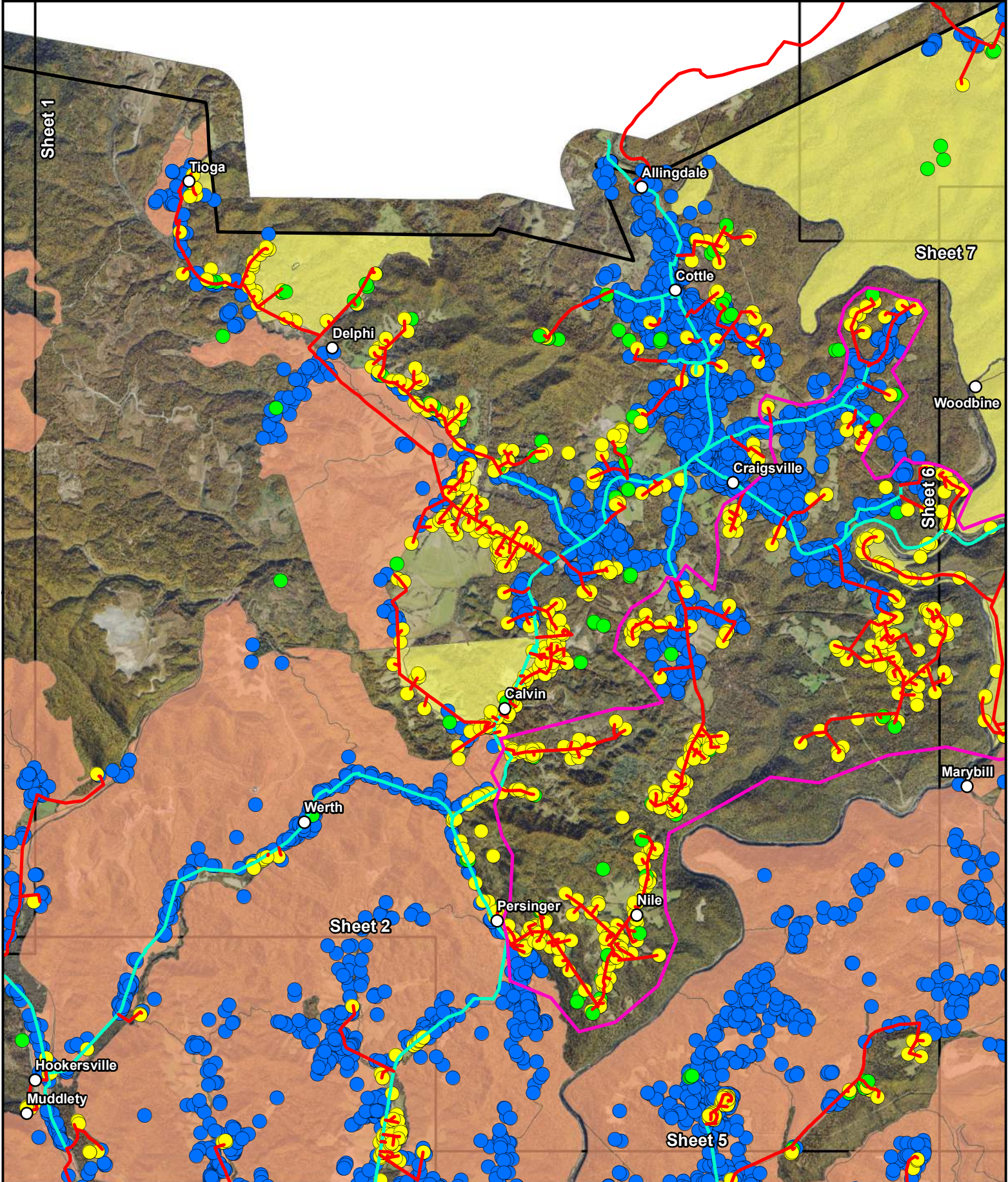


Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Feet

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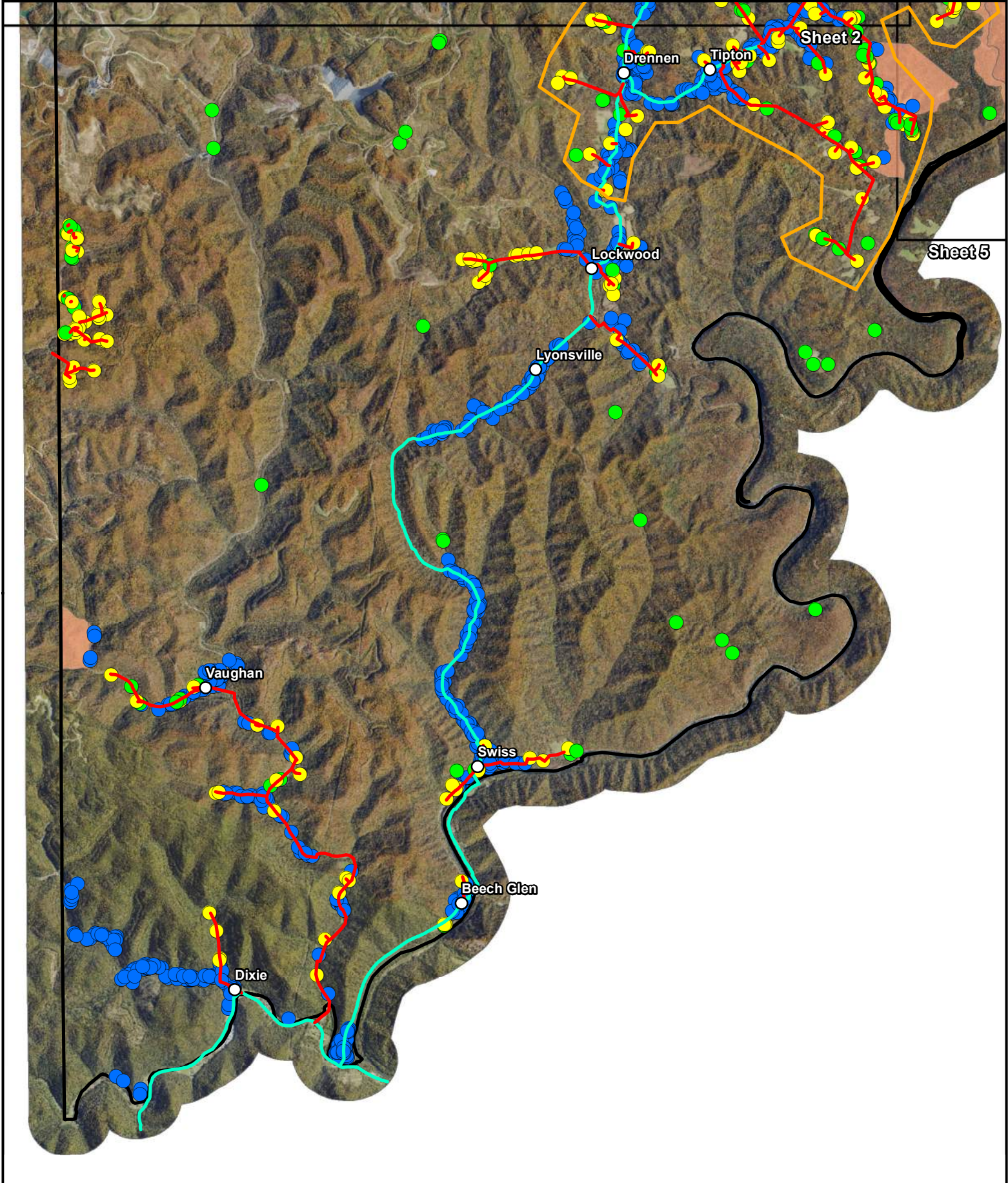
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Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Feet			
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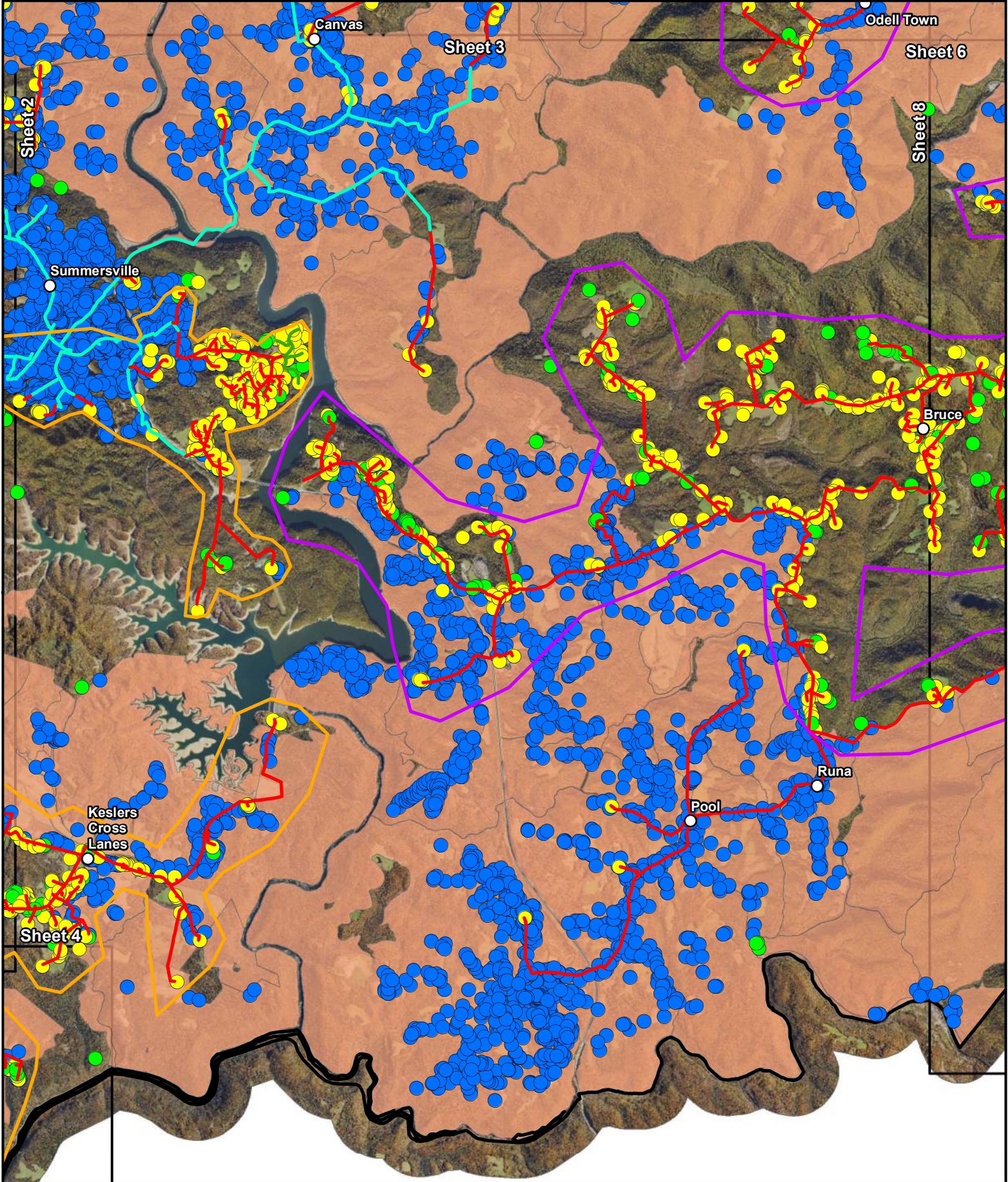
Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

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Feet

Sheet

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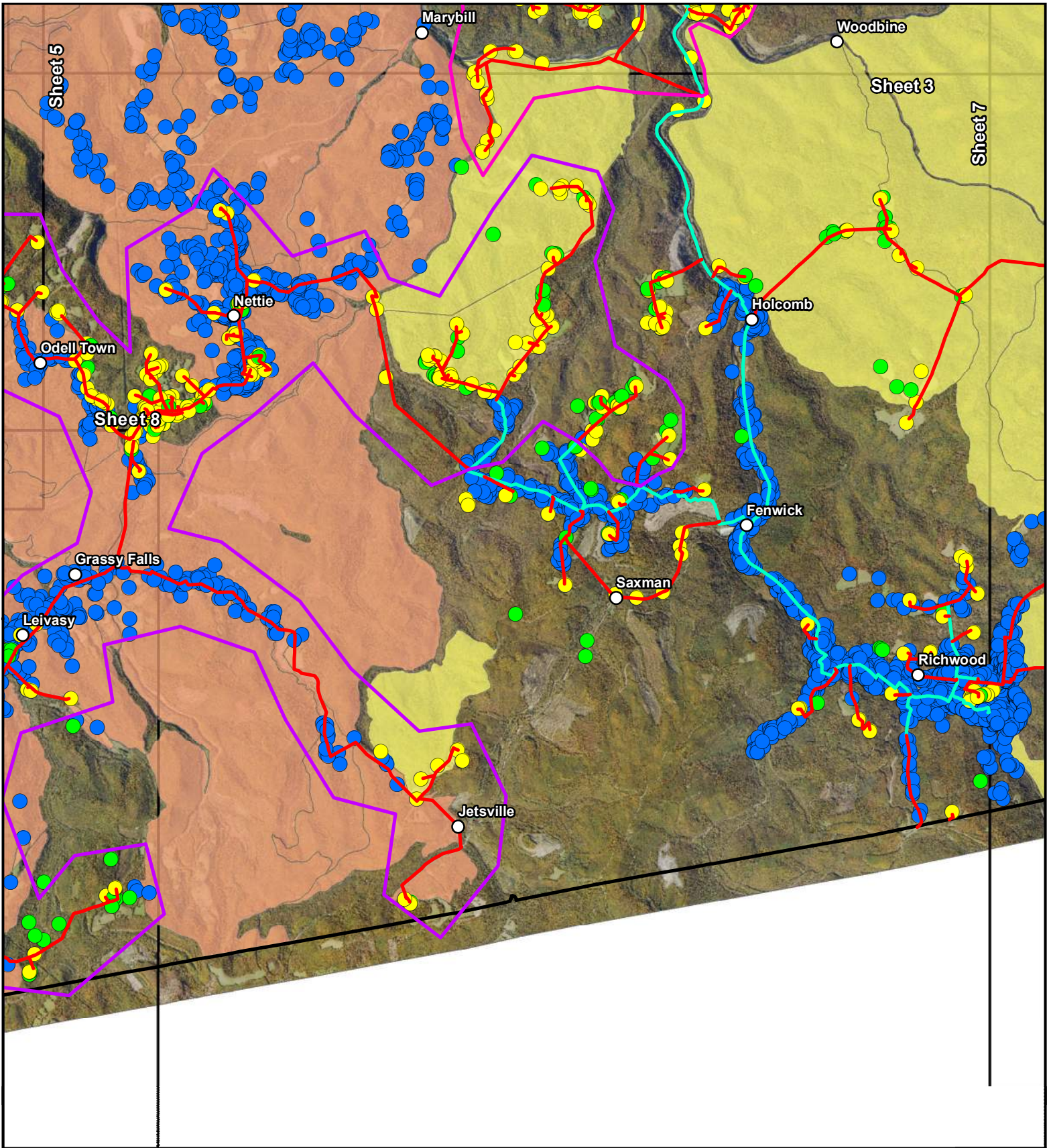


Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Feet

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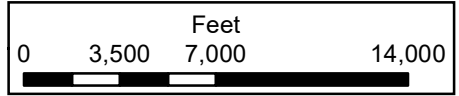
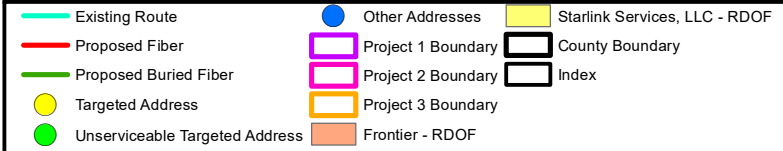
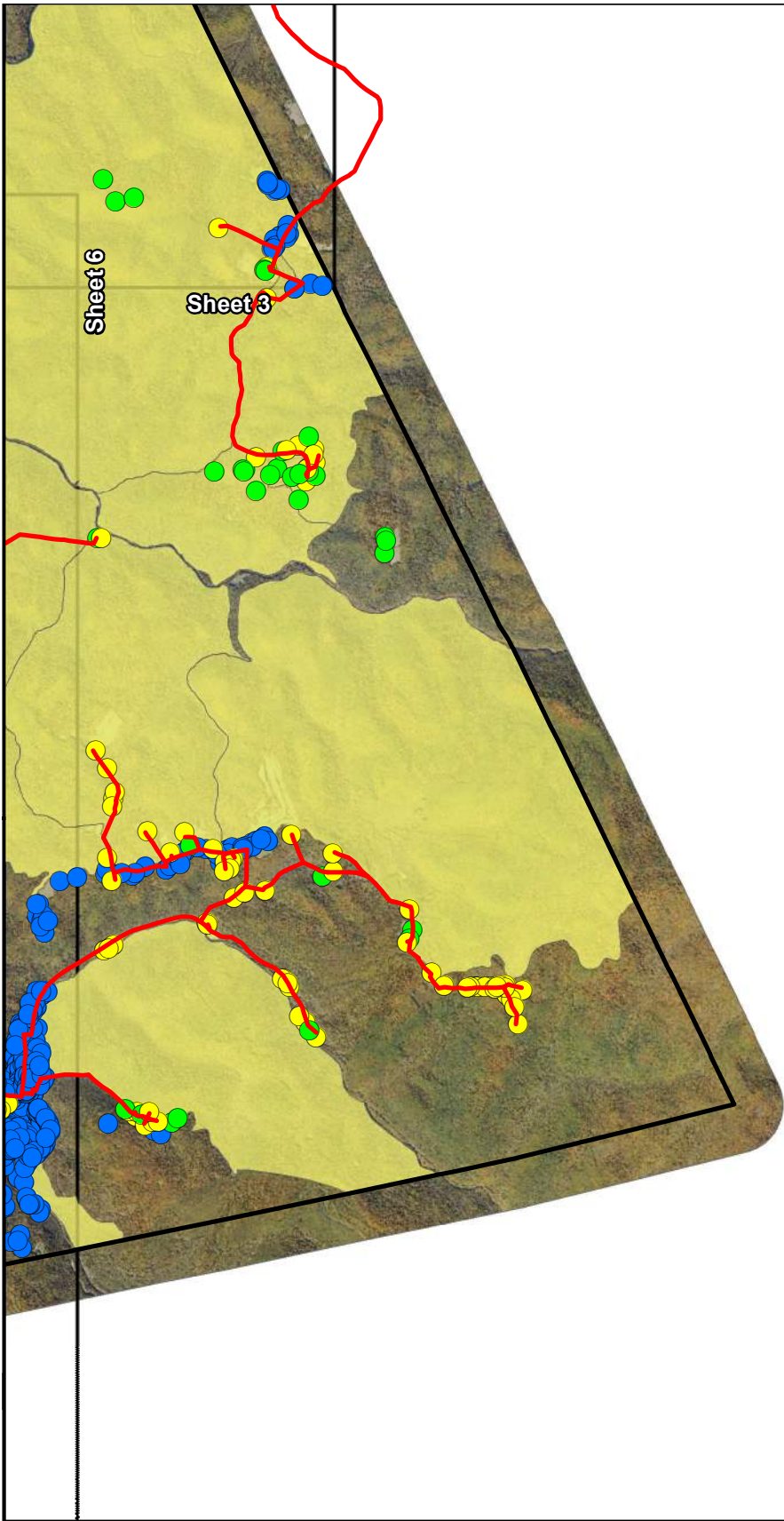


Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

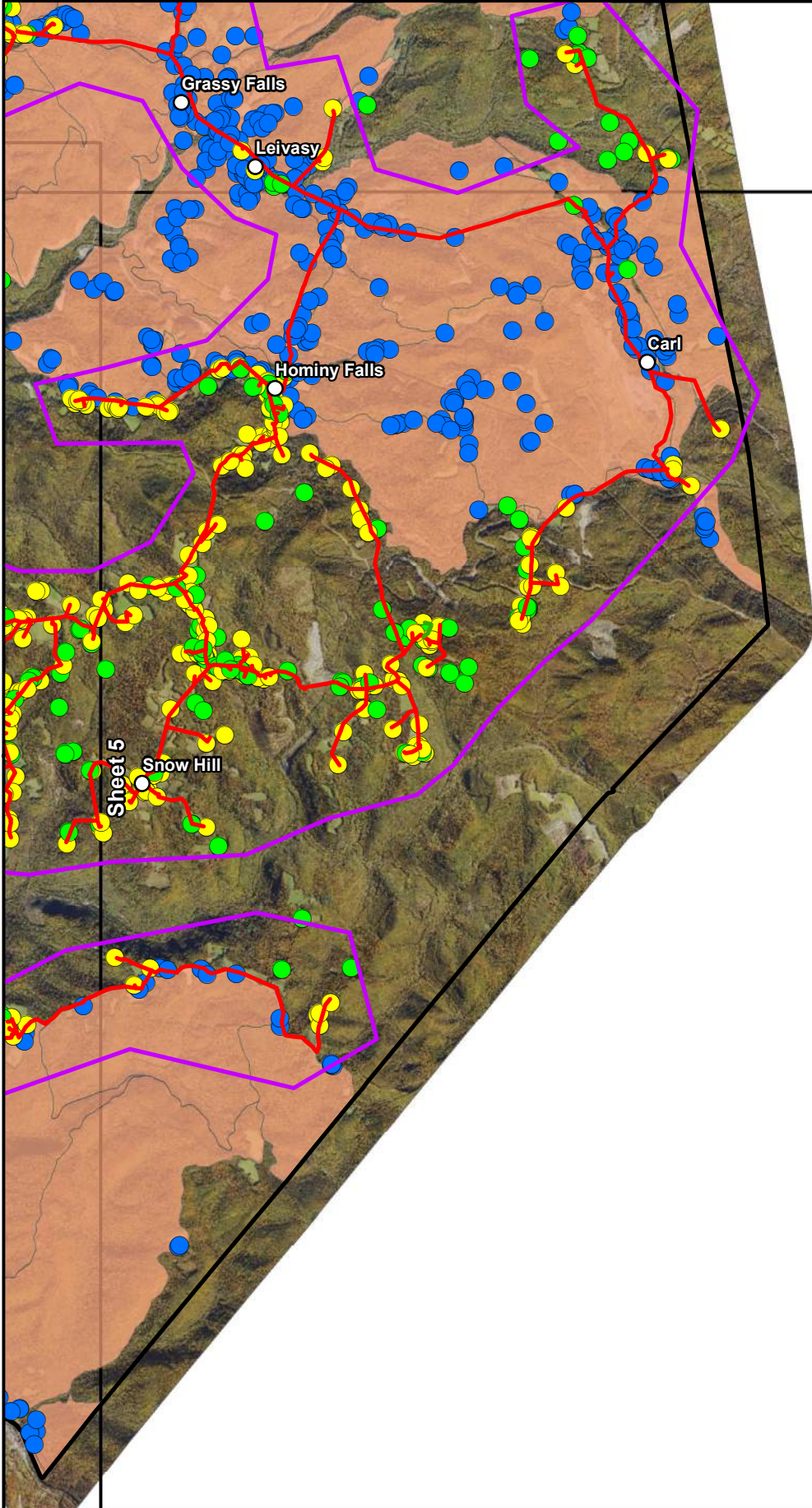
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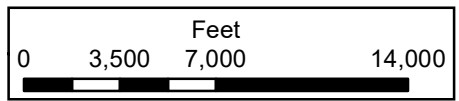
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Sheet 6

Sheet 5

- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Starlink Services, LLC - RDOF
- County Boundary
- Index
- Frontier - RDOF



Sheet
8

Nicholas County, WV – 2023 ROC Study – Cost Estimate – Whole County

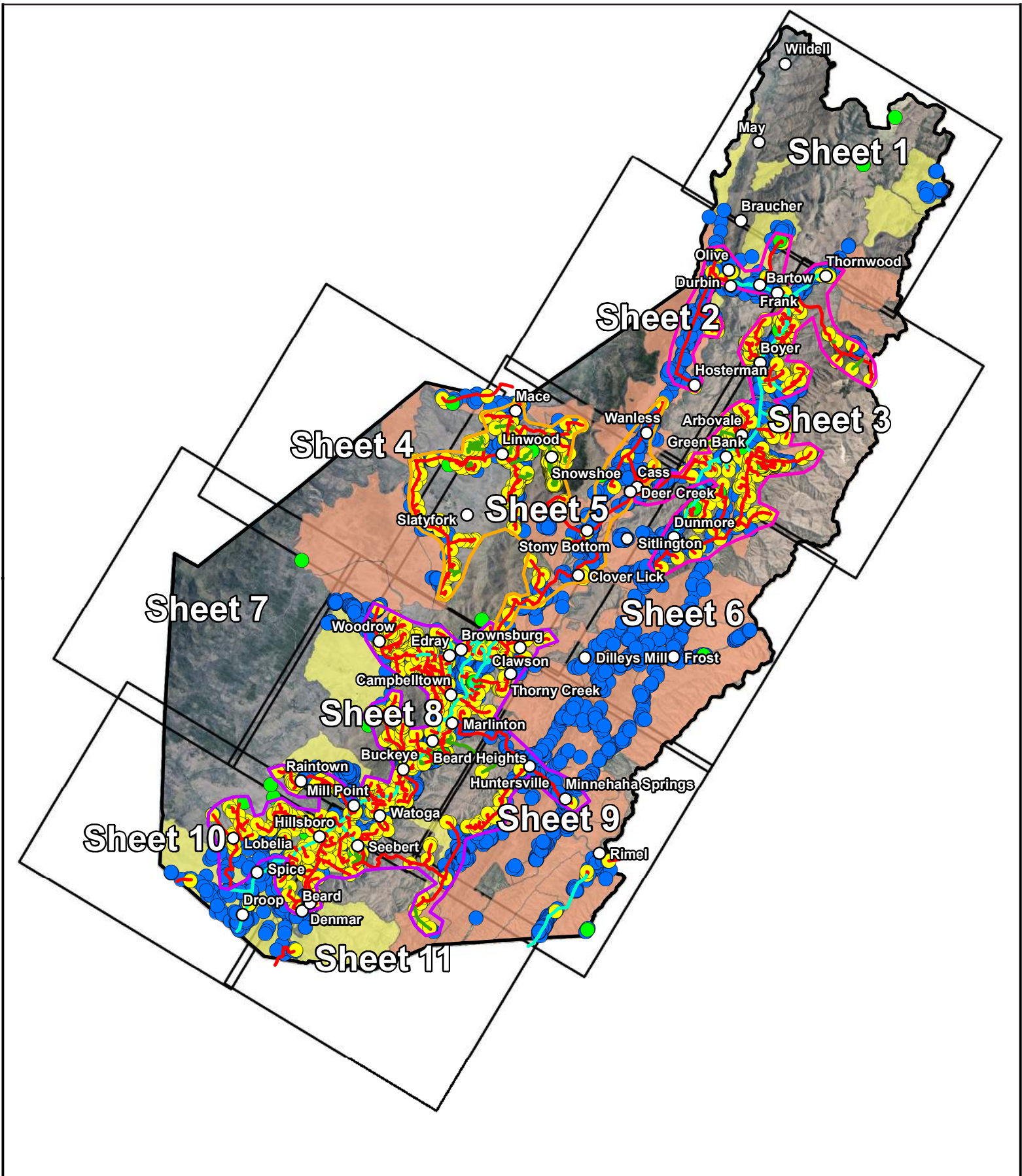
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	351.71	\$1,934,405
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	351.71	\$527,565
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	350.43	\$5,256,450
Aerial Construction Labor	\$50,000.00	Per Mile	350.43	\$17,521,500
Underground Construction Labor	\$150,000.00	Per Mile	1.28	\$192,000
Project Construction Contingency 10%	\$1,771,350.00	Lump Sum	1	\$1,771,350
Legal 1.5%	\$265,702.50	Lump Sum	1	\$265,703
Administrative 2%	\$354,270.00	Lump Sum	1	\$354,270
TOTAL COST = \$27,823,243				

COUNTY SAMPLE PROJECT

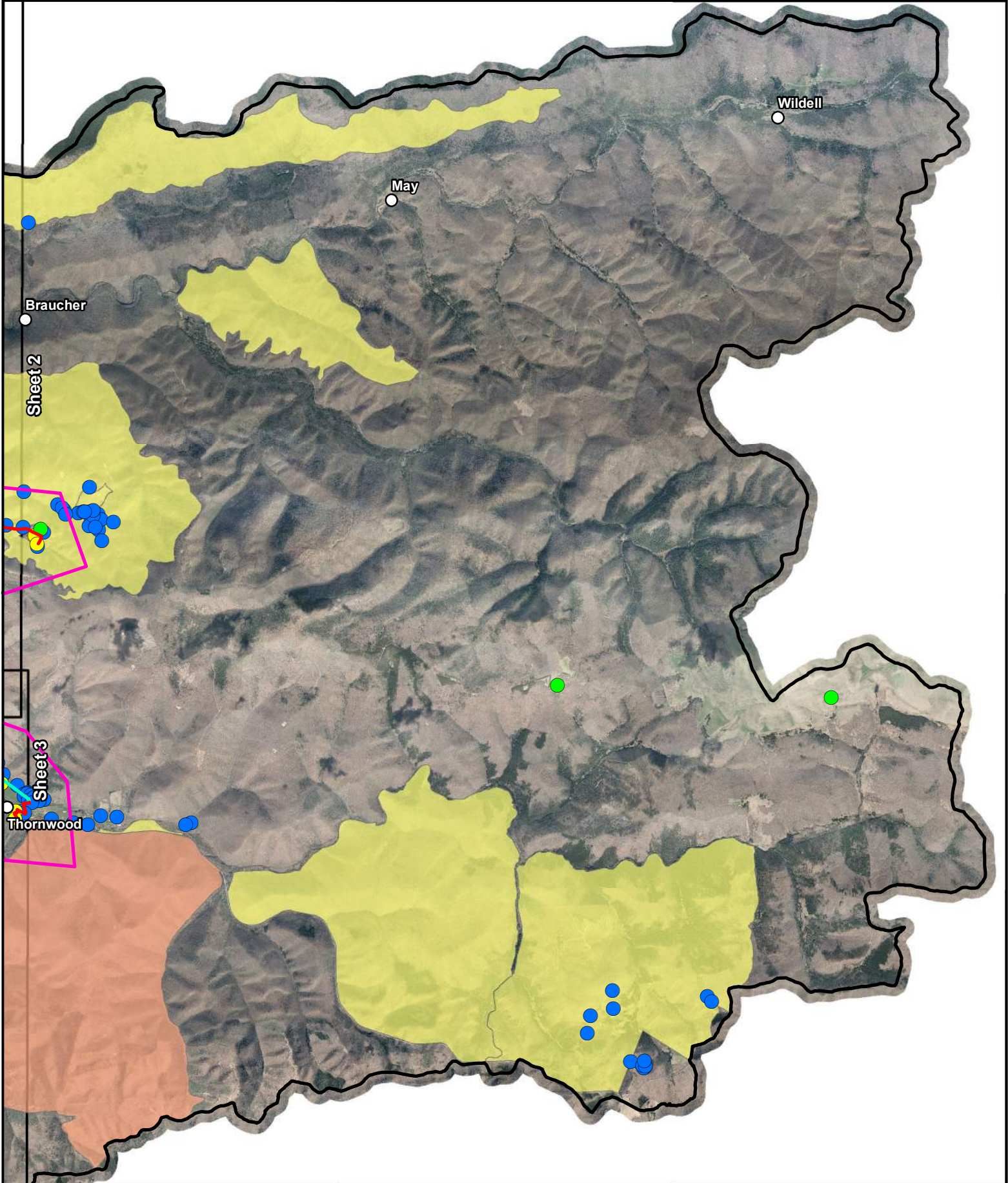
Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
4	Nicholas	1	700	108.72	\$8,561,700
		2	348	37.54	\$2,956,275
		3	581	68.36	\$5,492,685




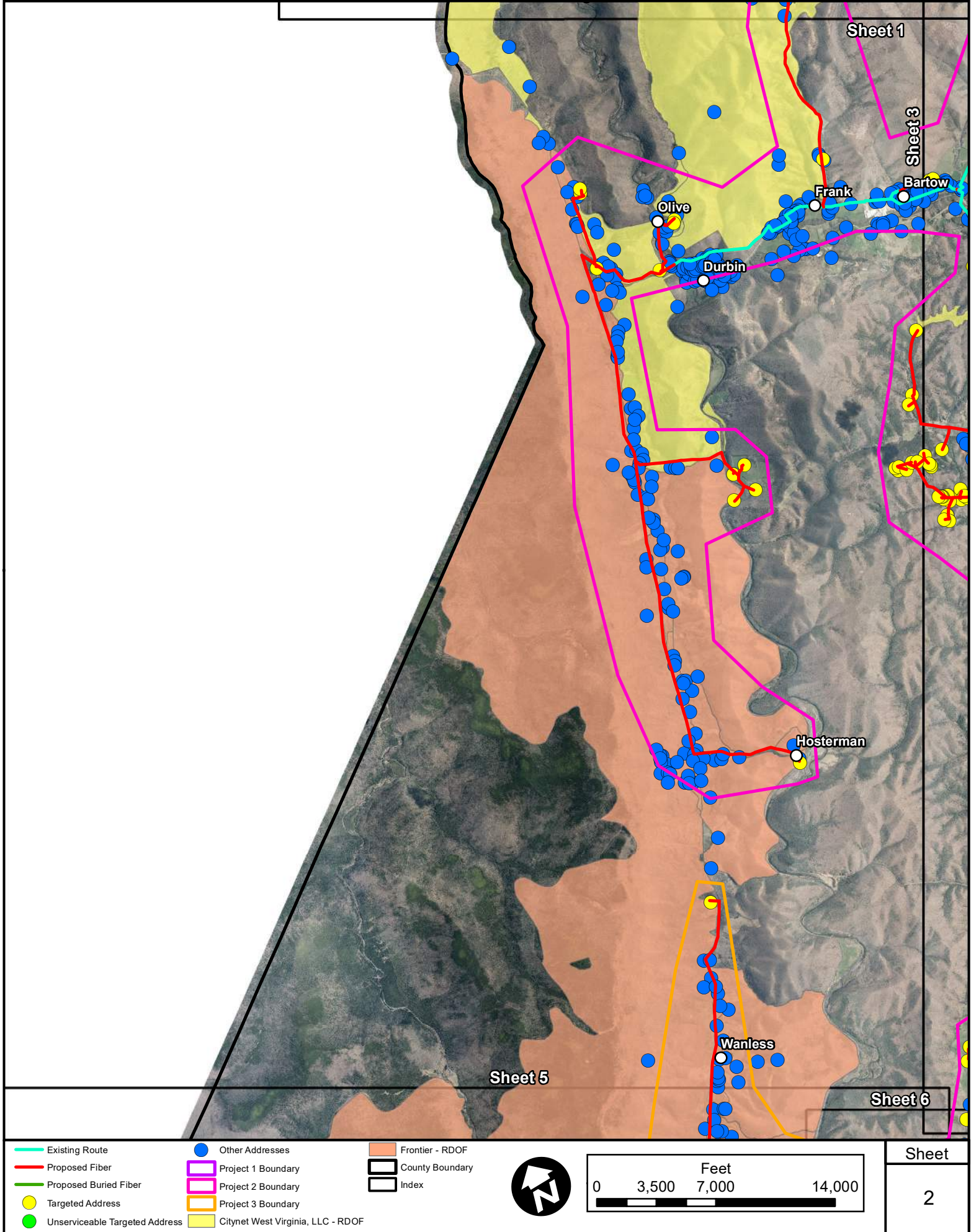
POCAHONTAS COUNTY

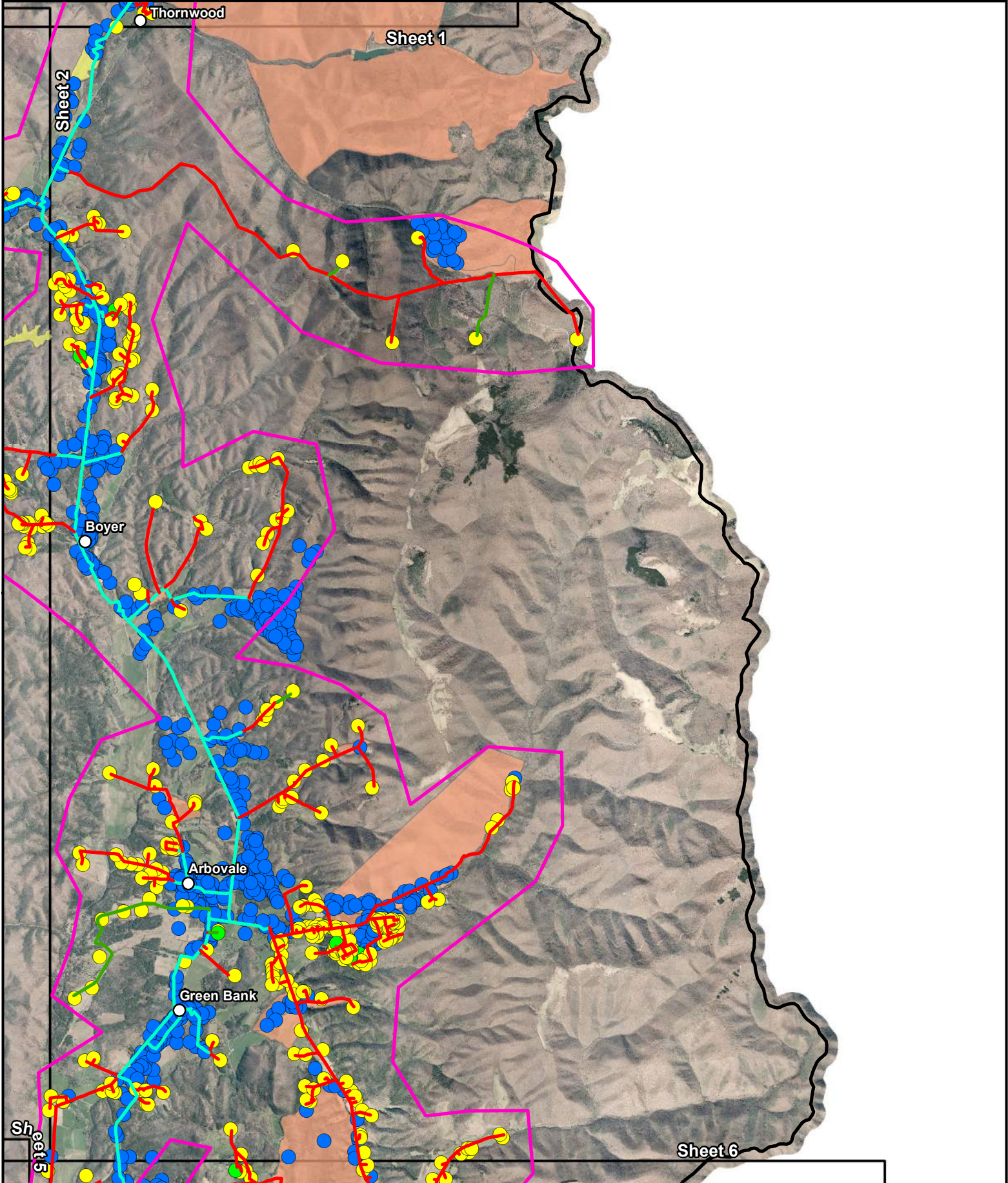



Existing Route	Other Addresses	Frontier - RDOF		<p>Feet 0 17,000 34,000 68,000</p>	Sheet
Proposed Fiber	Project 1 Boundary	County Boundary			INDEX
Proposed Buried Fiber	Project 2 Boundary	Index			
Targeted Address	Project 3 Boundary				
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF				

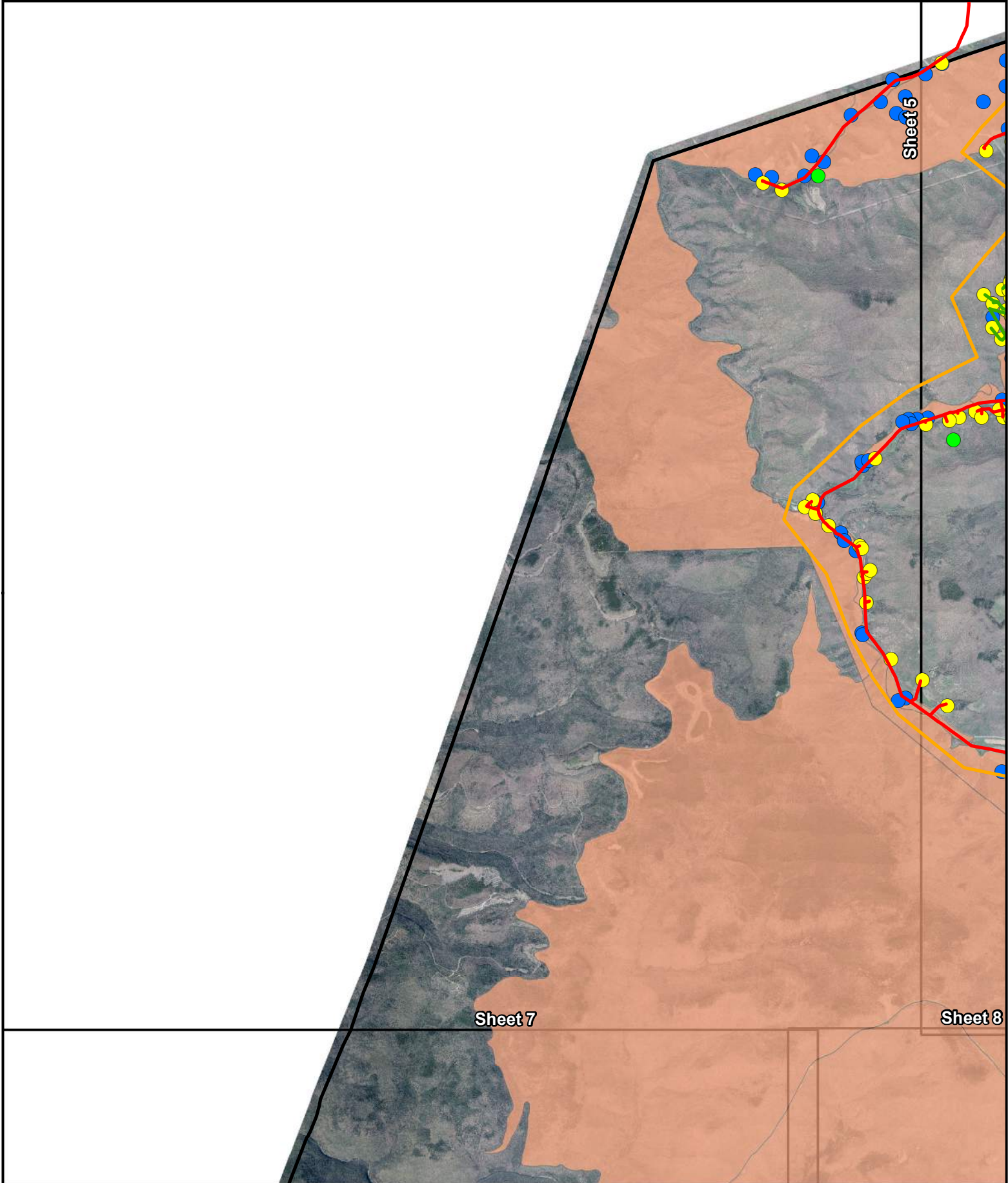


<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses Project 1 Boundary Project 2 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF 	<ul style="list-style-type: none"> Frontier - RDOF County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">3,500</td> <td style="text-align: center;">7,000</td> <td style="text-align: center;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td style="text-align: center;">1</td> </tr> </table>	Sheet	1
Feet															
0	3,500	7,000	14,000												
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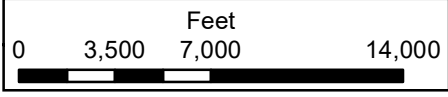


<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses Project 1 Boundary Project 2 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF 	<ul style="list-style-type: none"> Frontier - RDOF County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="width: 20%;">0</td> <td style="width: 20%;">3,500</td> <td style="width: 20%;">7,000</td> <td style="width: 20%;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td style="text-align: center;">3</td> </tr> </table>	Sheet	3
Feet															
0	3,500	7,000	14,000												
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3															



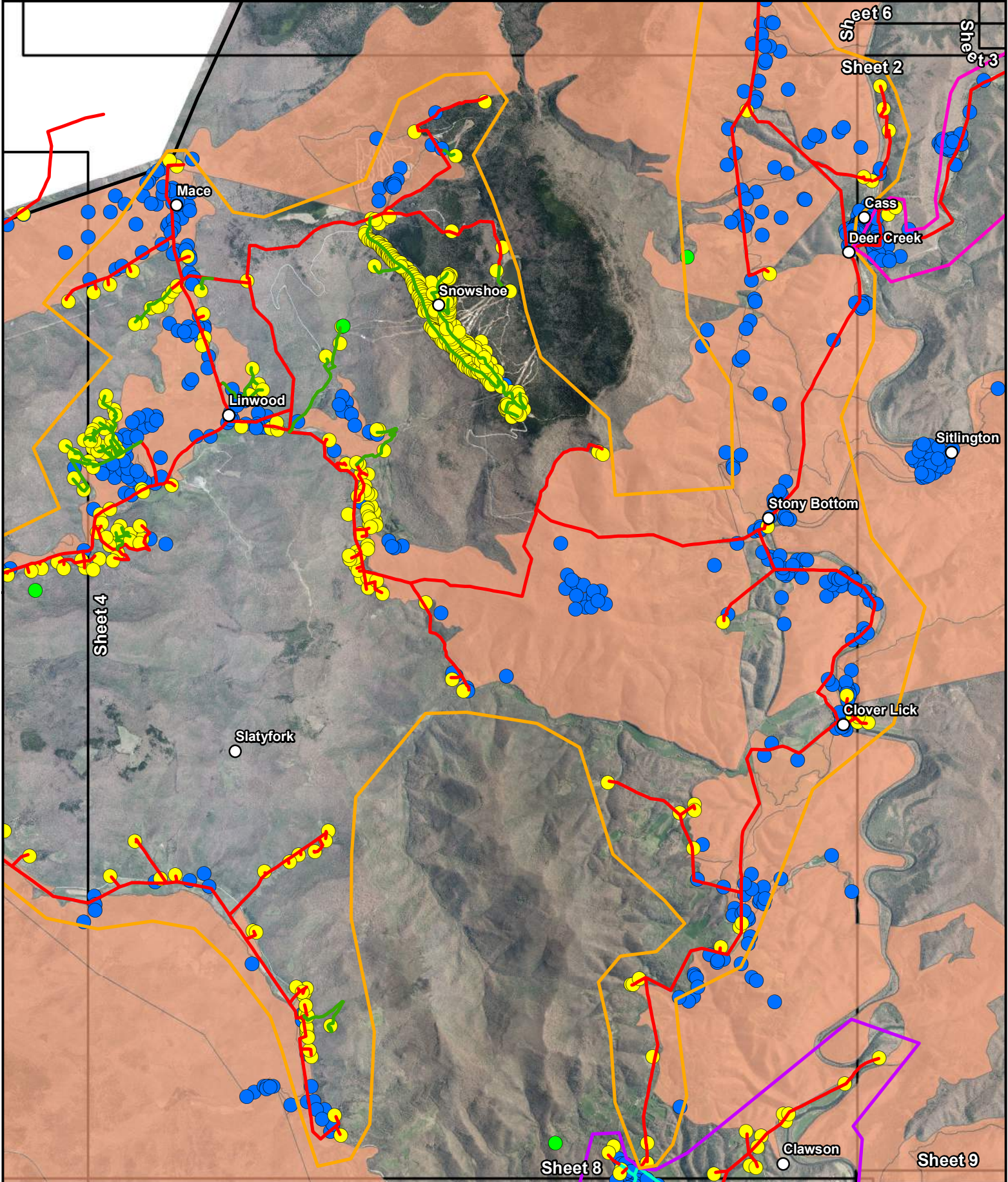
Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	





Sheet

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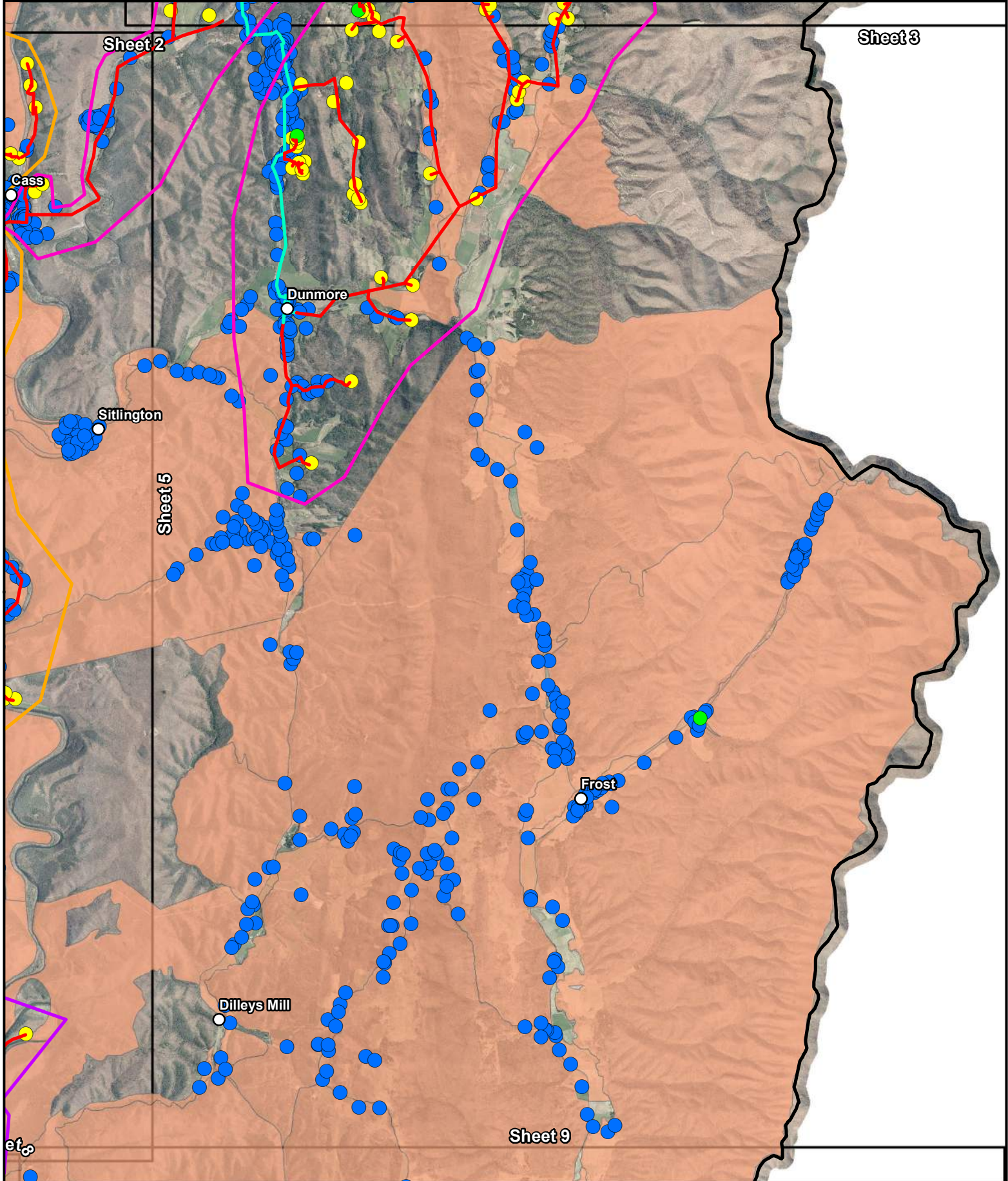
Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

Feet

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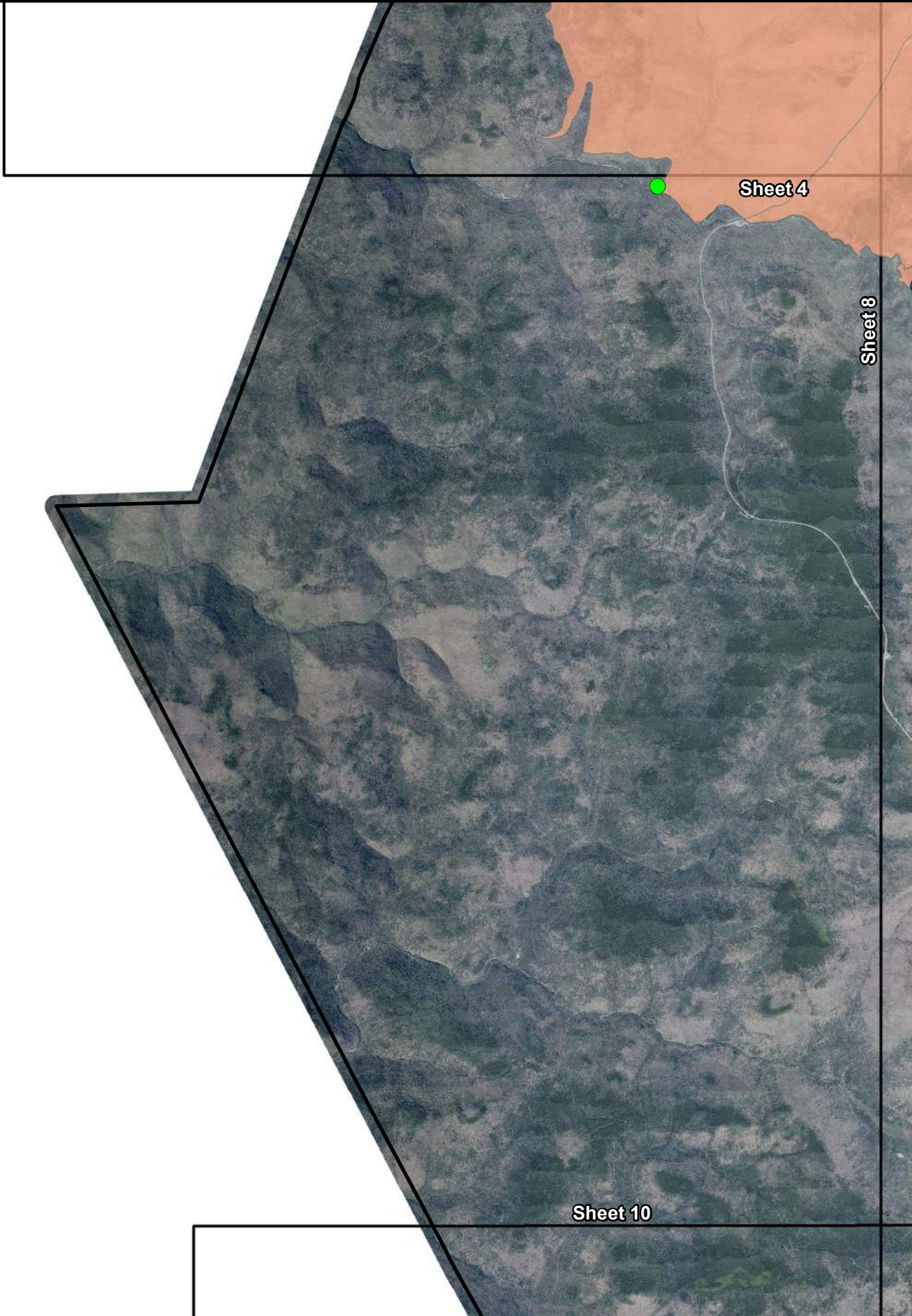
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Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

Sheet
6



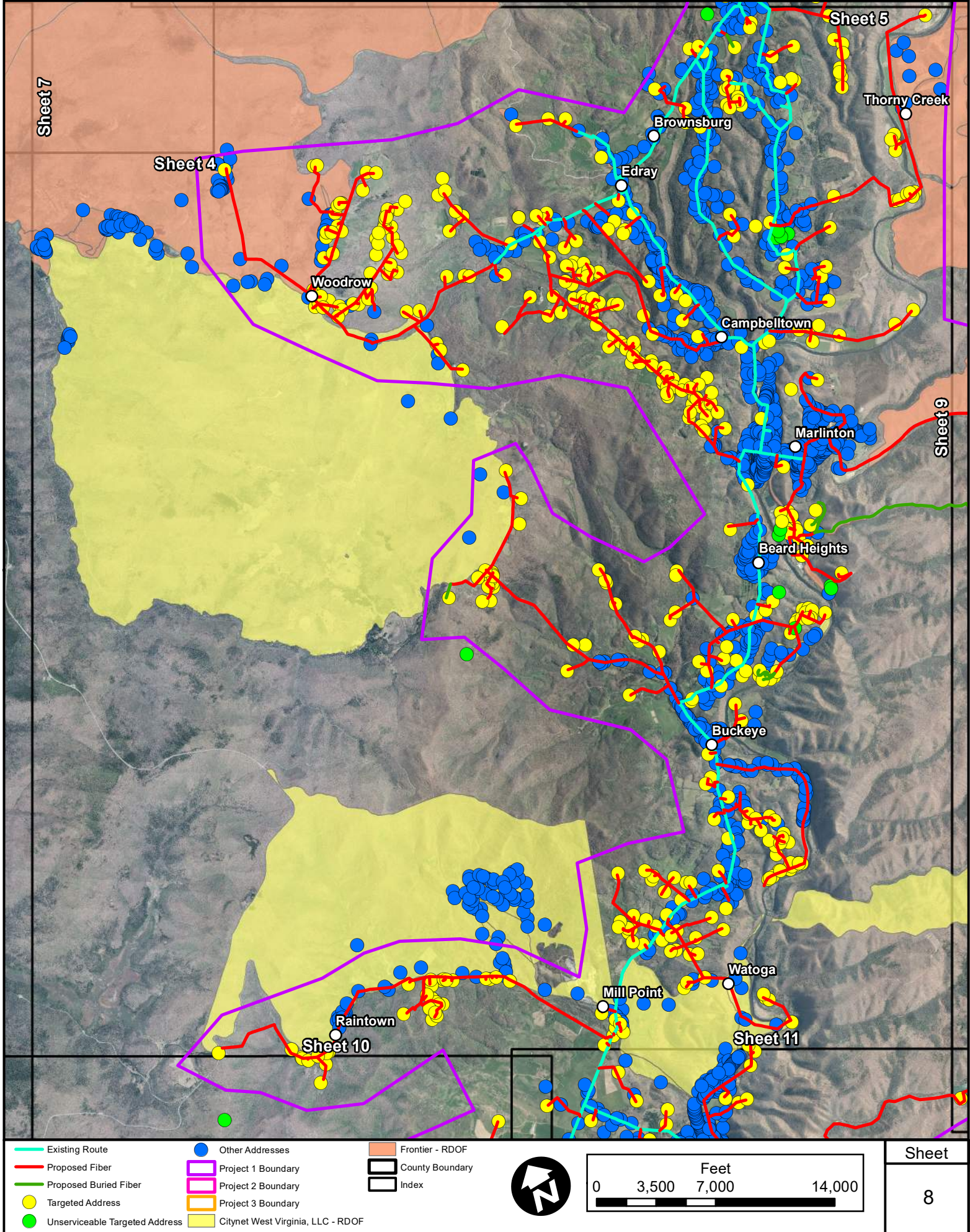
Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

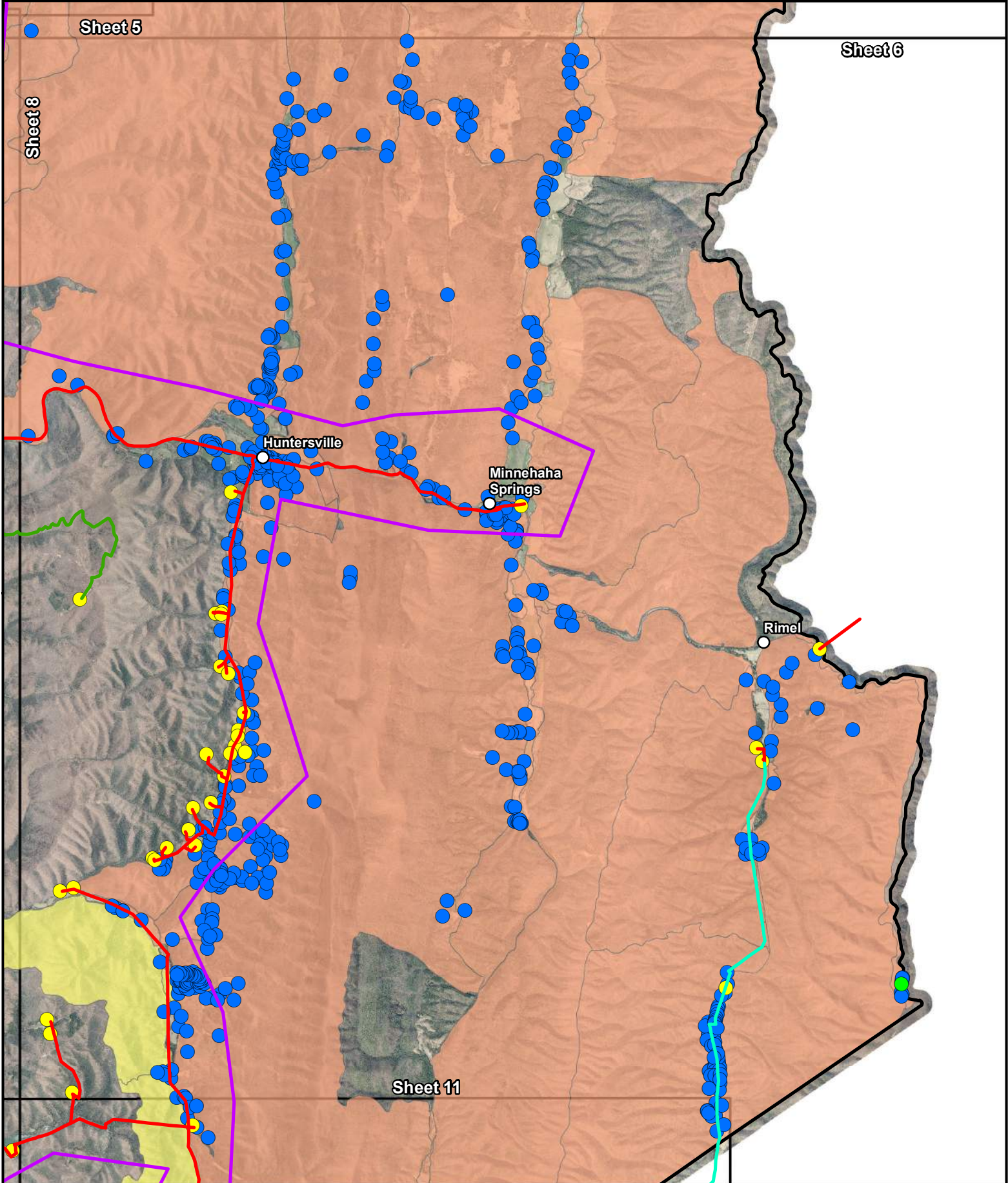
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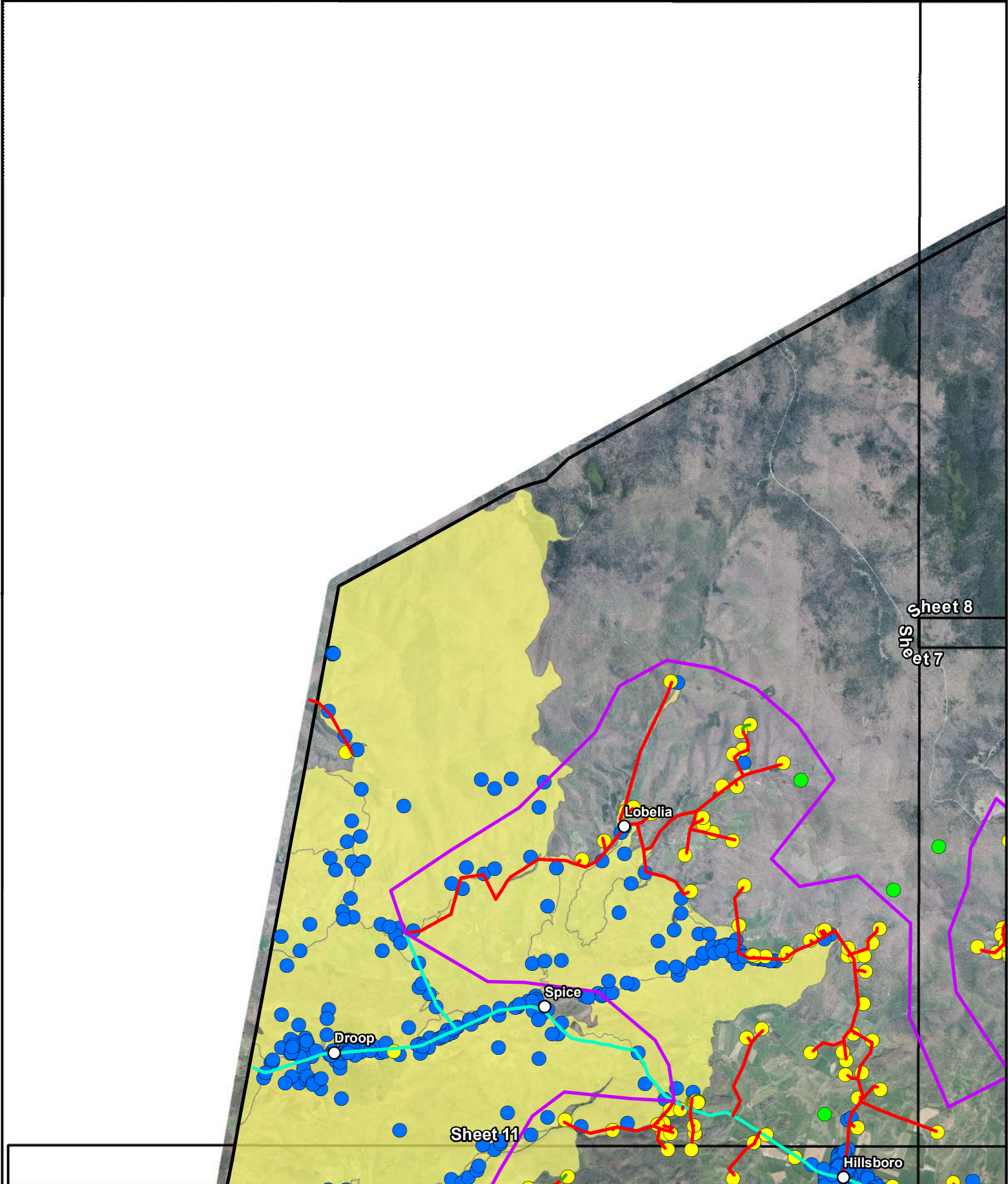




Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

Feet			
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Sheet
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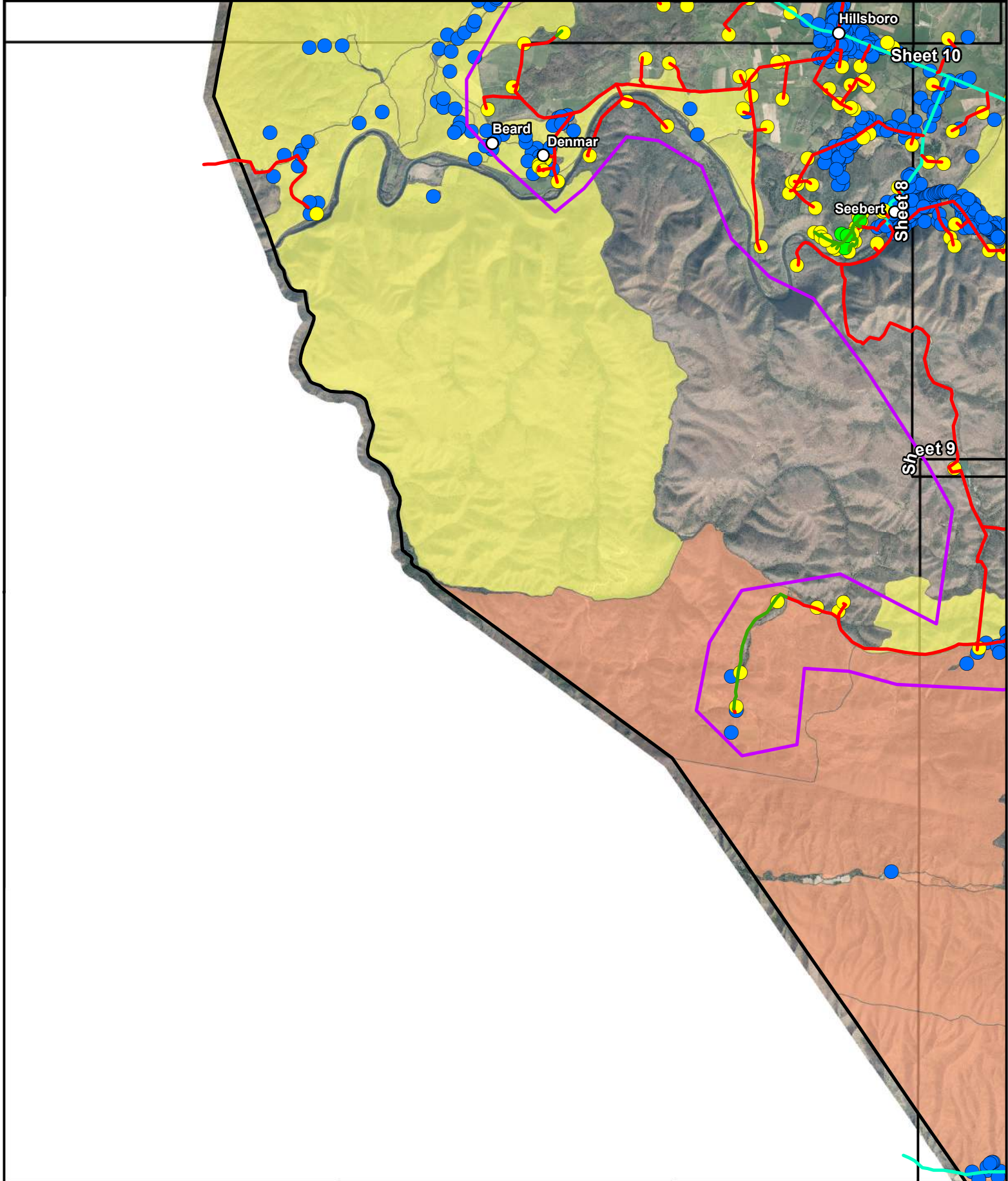
Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

Feet

0 3,500 7,000 14,000

Sheet

10



Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

0 3,500 7,000 14,000

Feet

Sheet

11

Pocahontas County, WV – 2023 ROC Study – Cost Estimate – Whole County

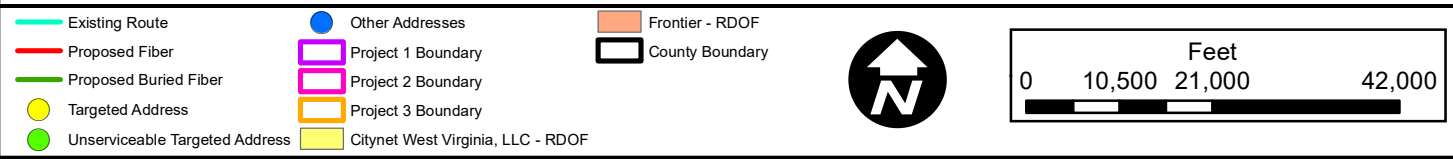
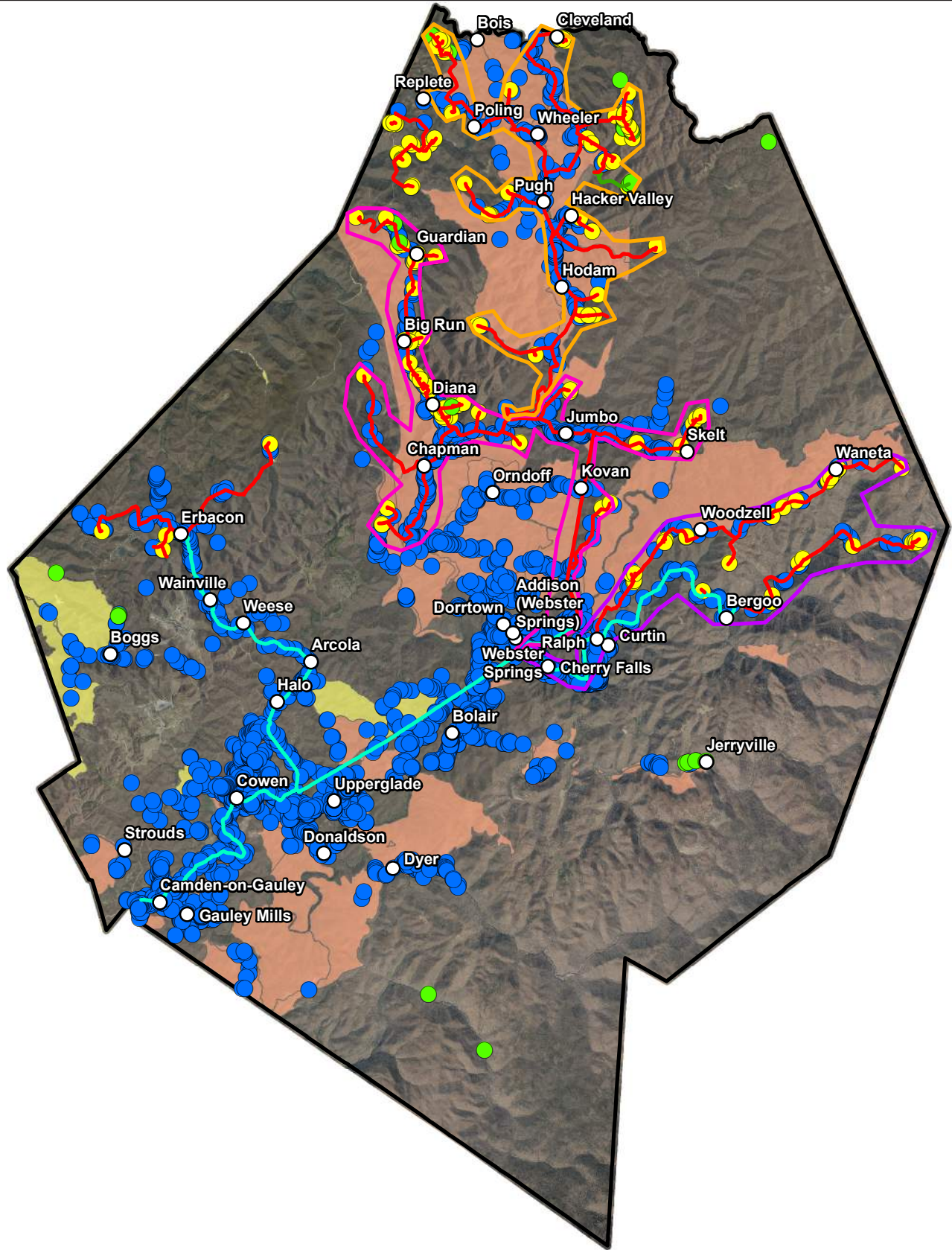
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	346.58	\$1,906,190
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	346.58	\$519,870
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	318.45	\$4,776,750
Aerial Construction Labor	\$50,000.00	Per Mile	318.45	\$15,922,500
Underground Construction Labor	\$150,000.00	Per Mile	28.13	\$4,219,500
Project Construction Contingency 10%	\$2,014,200.00	Lump Sum	1	\$2,014,200
Legal 1.5%	\$302,130.00	Lump Sum	1	\$302,130
Administrative 2%	\$402,840.00	Lump Sum	1	\$402,840
TOTAL COST = \$30,063,980				

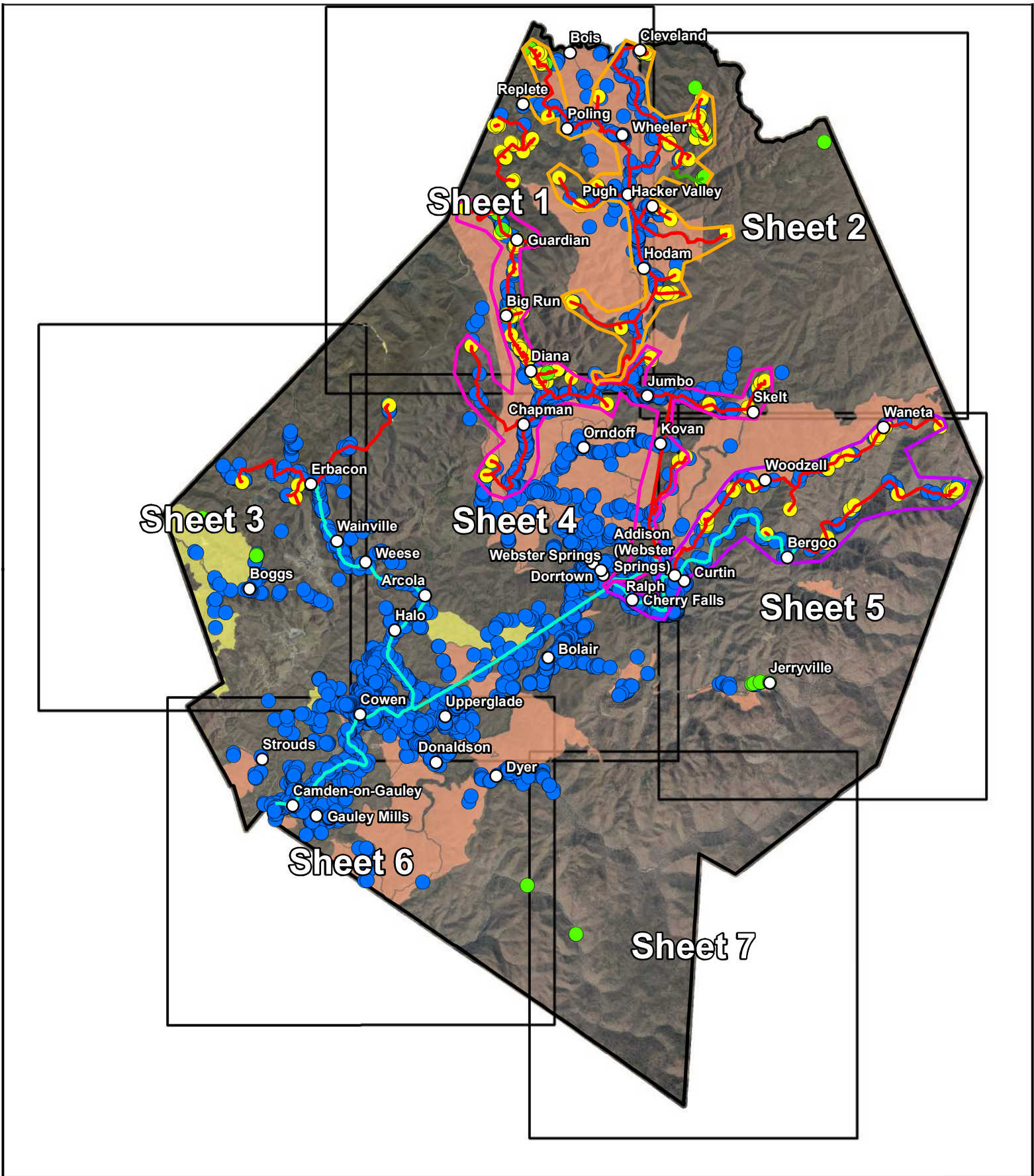
COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
4	Pocahontas	1	637	106.74	\$13,500,450
		2	375	88.36	\$7,300,145
		3	450	90.00	\$8,673,350

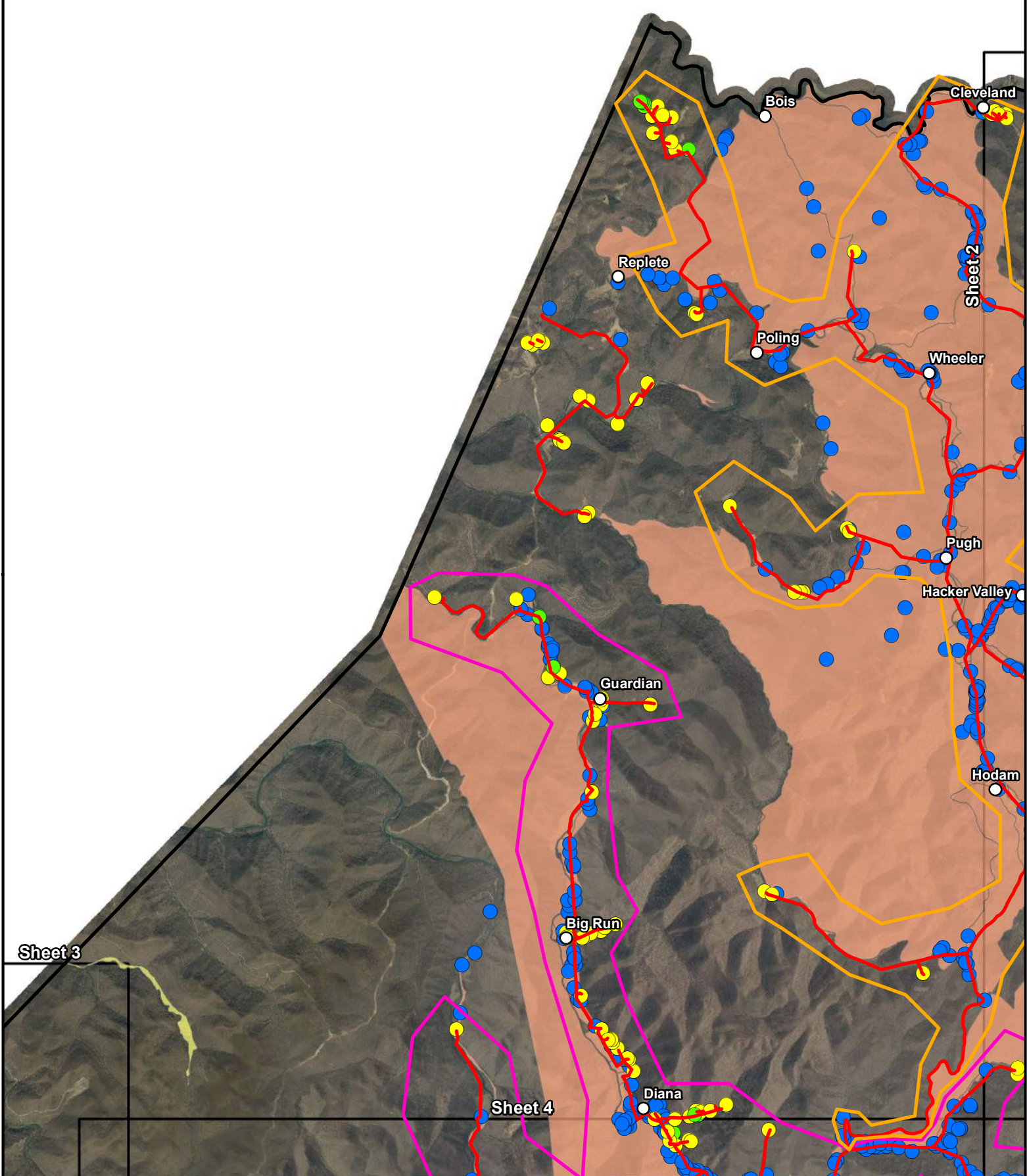


WEBSTER COUNTY





Existing Route	Other Addresses	Frontier - RDOF		Feet 0 11,000 22,000 44,000	Sheet
Proposed Fiber	Project 1 Boundary	County Boundary			INDEX
Proposed Buried Fiber	Project 2 Boundary	Index			
Targeted Address	Project 3 Boundary				
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF				

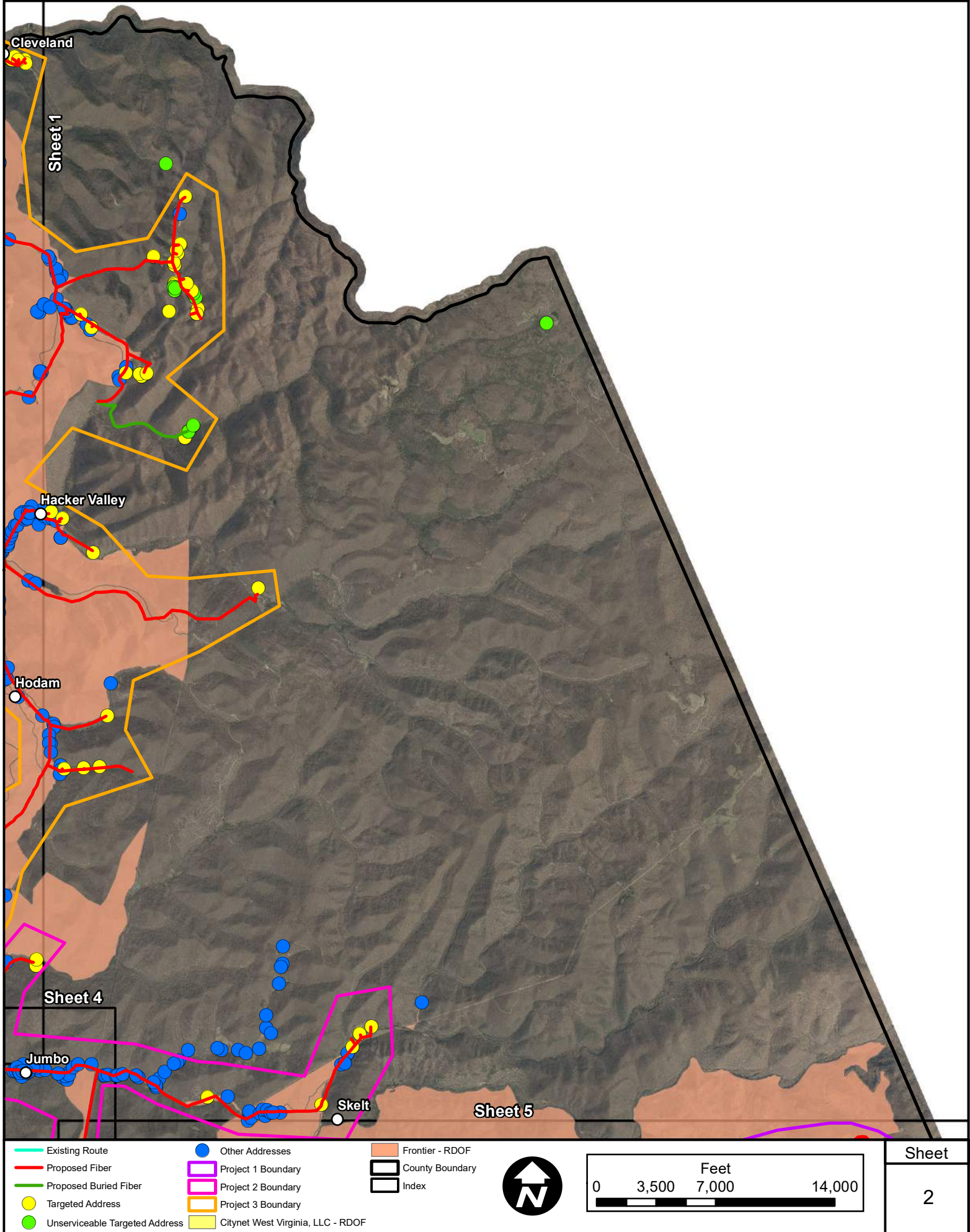


Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

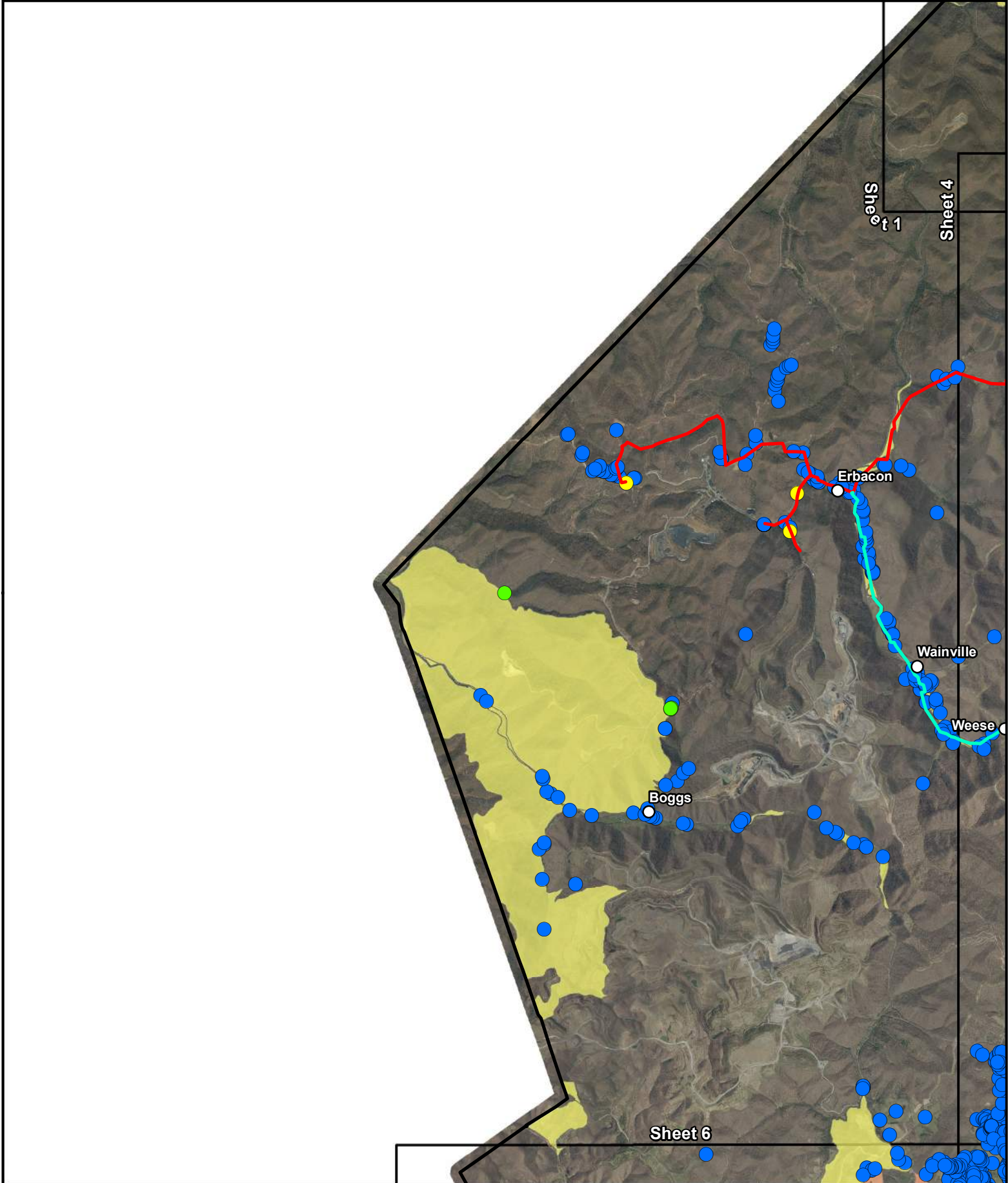
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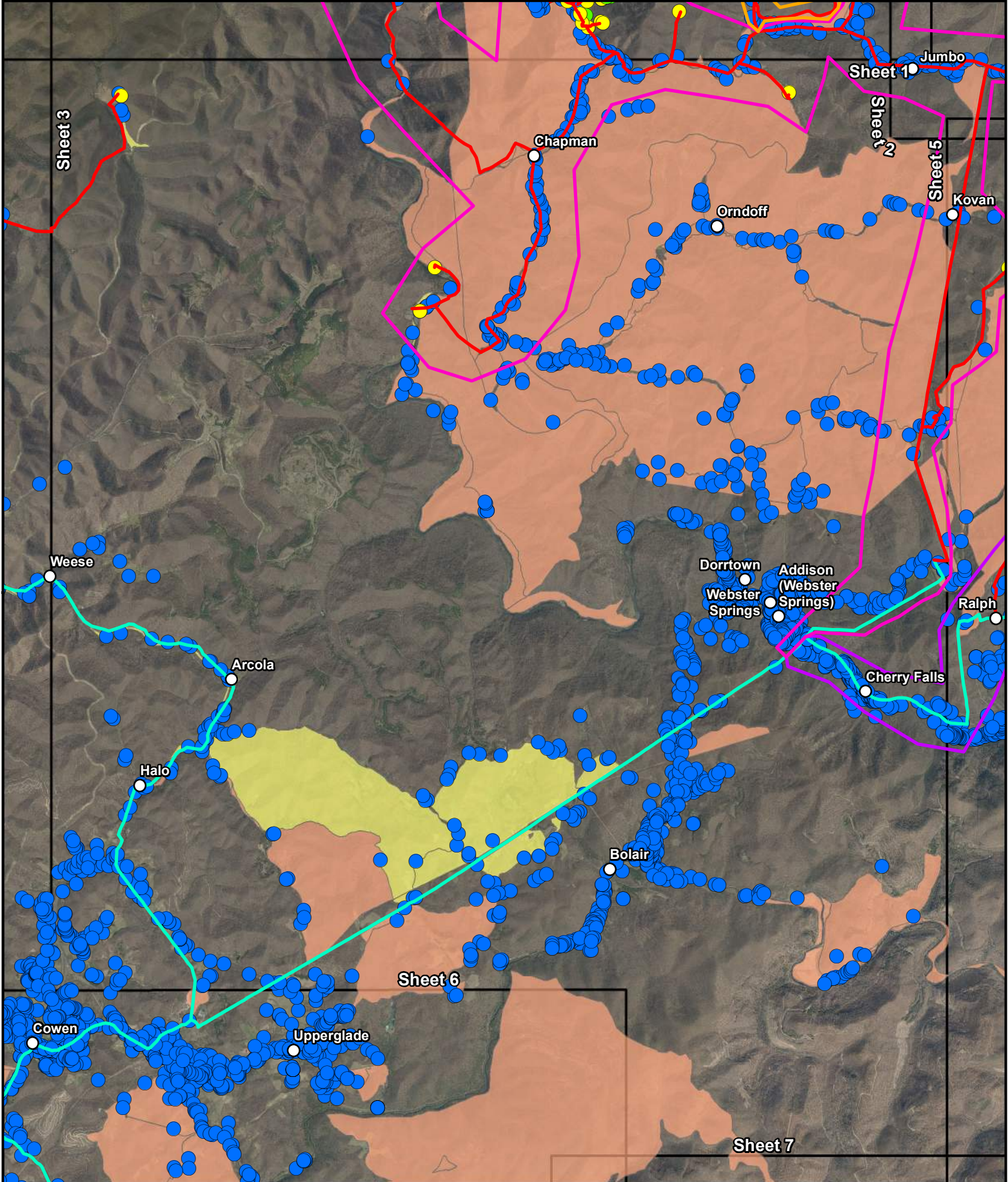
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Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

Feet			
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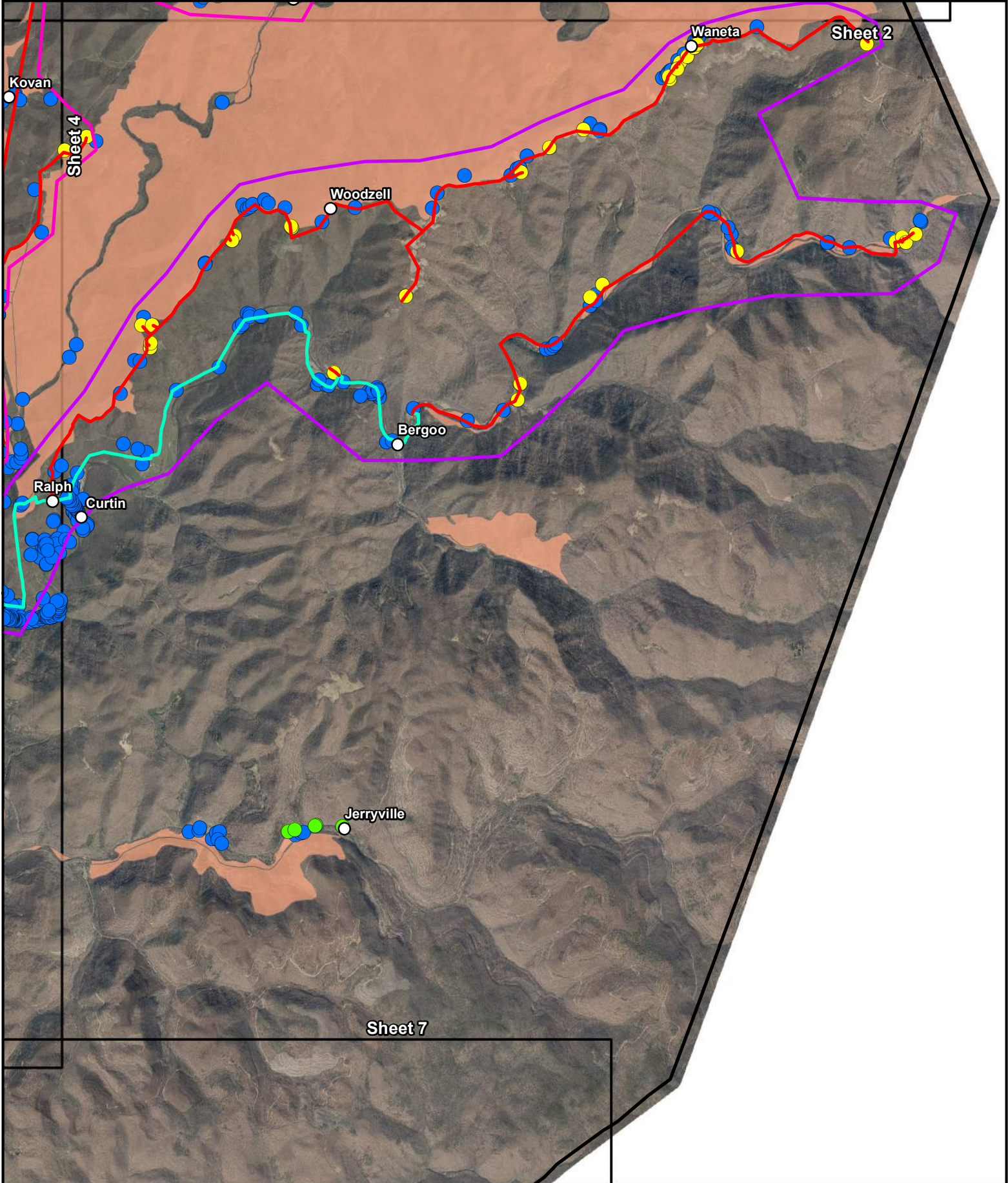


Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

Feet

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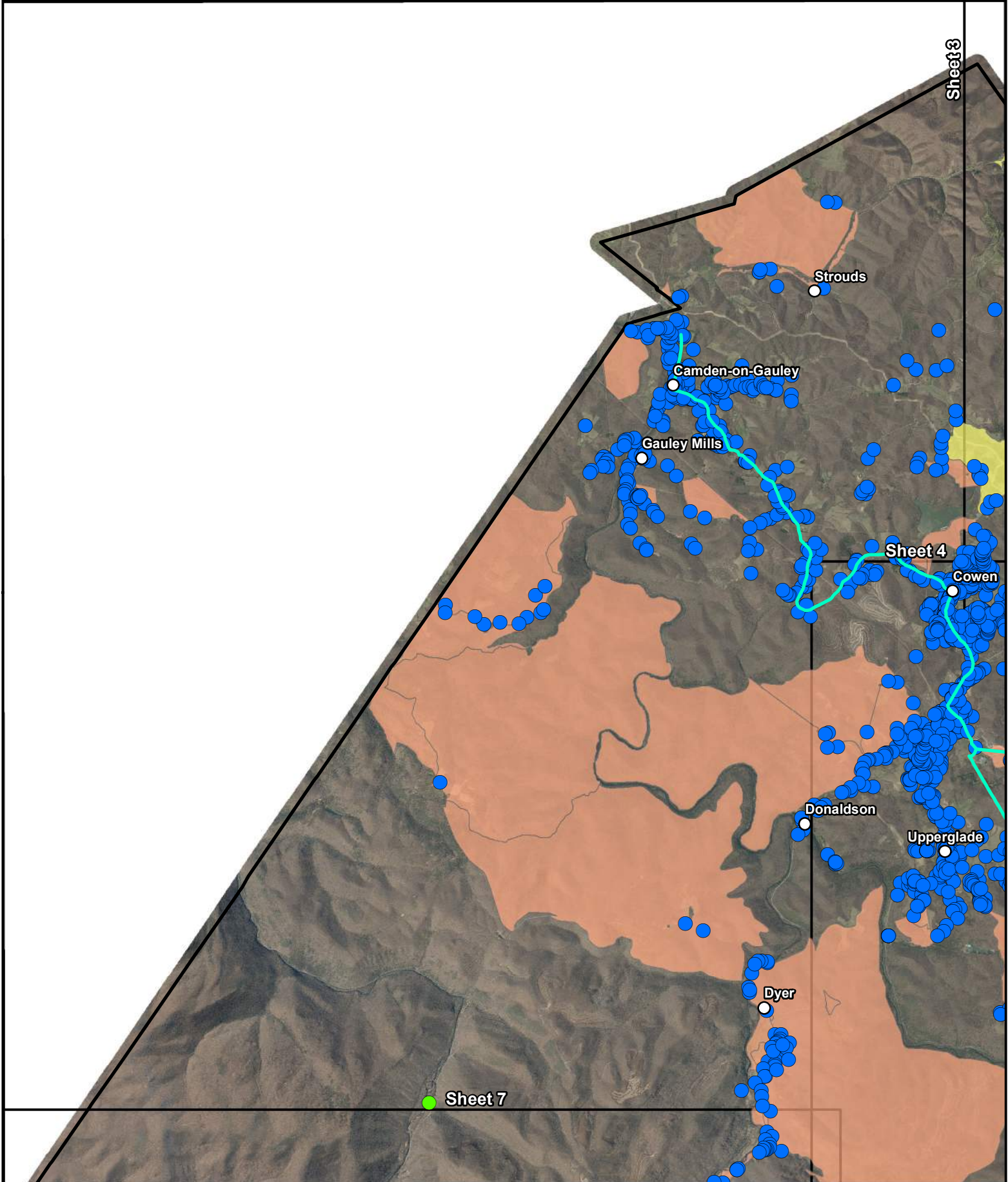


Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

Feet

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Sheet
5

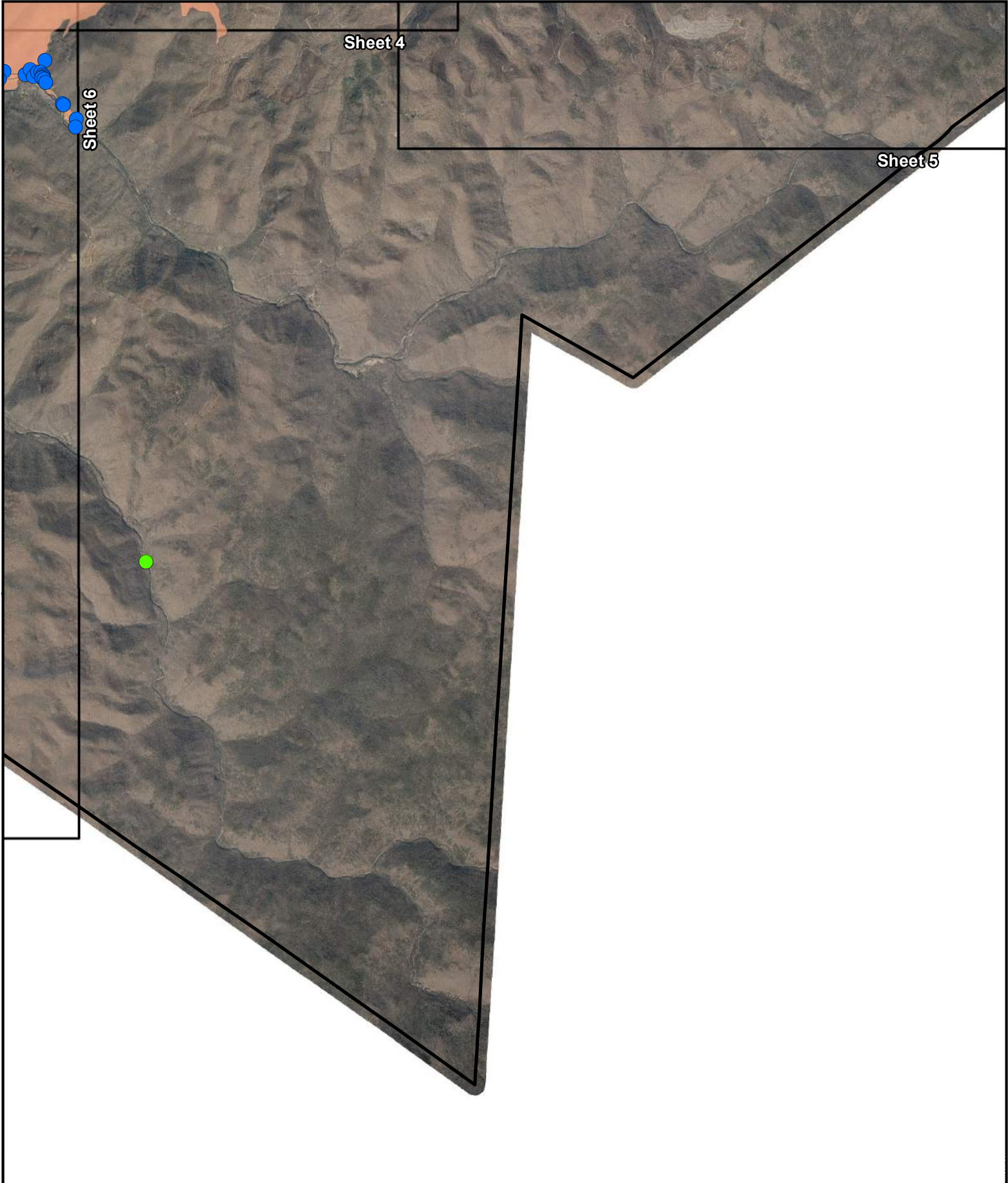


Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

Feet

0 3,500 7,000 14,000

Sheet
6



Existing Route	Other Addresses	Frontier - RDOF		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td>0</td> <td>3,500</td> <td>7,000</td> <td>14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	Sheet
Feet													
0	3,500	7,000	14,000										
Proposed Fiber	Project 1 Boundary	County Boundary			7								
Proposed Buried Fiber	Project 2 Boundary	Index											
Targeted Address	Project 3 Boundary	Citynet West Virginia, LLC - RDOF											
Unserviceable Targeted Address													

Webster County, WV – 2023 ROC Study – Cost Estimate – Whole County

Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	122.14	\$671,770
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	122.14	\$183,210
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	120.81	\$1,812,150
Aerial Construction Labor	\$50,000.00	Per Mile	120.81	\$6,040,500
Underground Construction Labor	\$150,000.00	Per Mile	1.33	\$199,500
Project Construction Contingency 10%	\$624,000.00	Lump Sum	1	\$624,000
Legal 1.5%	\$93,600.00	Lump Sum	1	\$93,600
Administrative 2%	\$124,800.00	Lump Sum	1	\$124,800
TOTAL COST = \$9,749,530				

COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
4	Webster	1	32	21.91	\$1,725,413
		2	57	40.90	\$3,220,875
		3	57	45.14	\$3,685,780

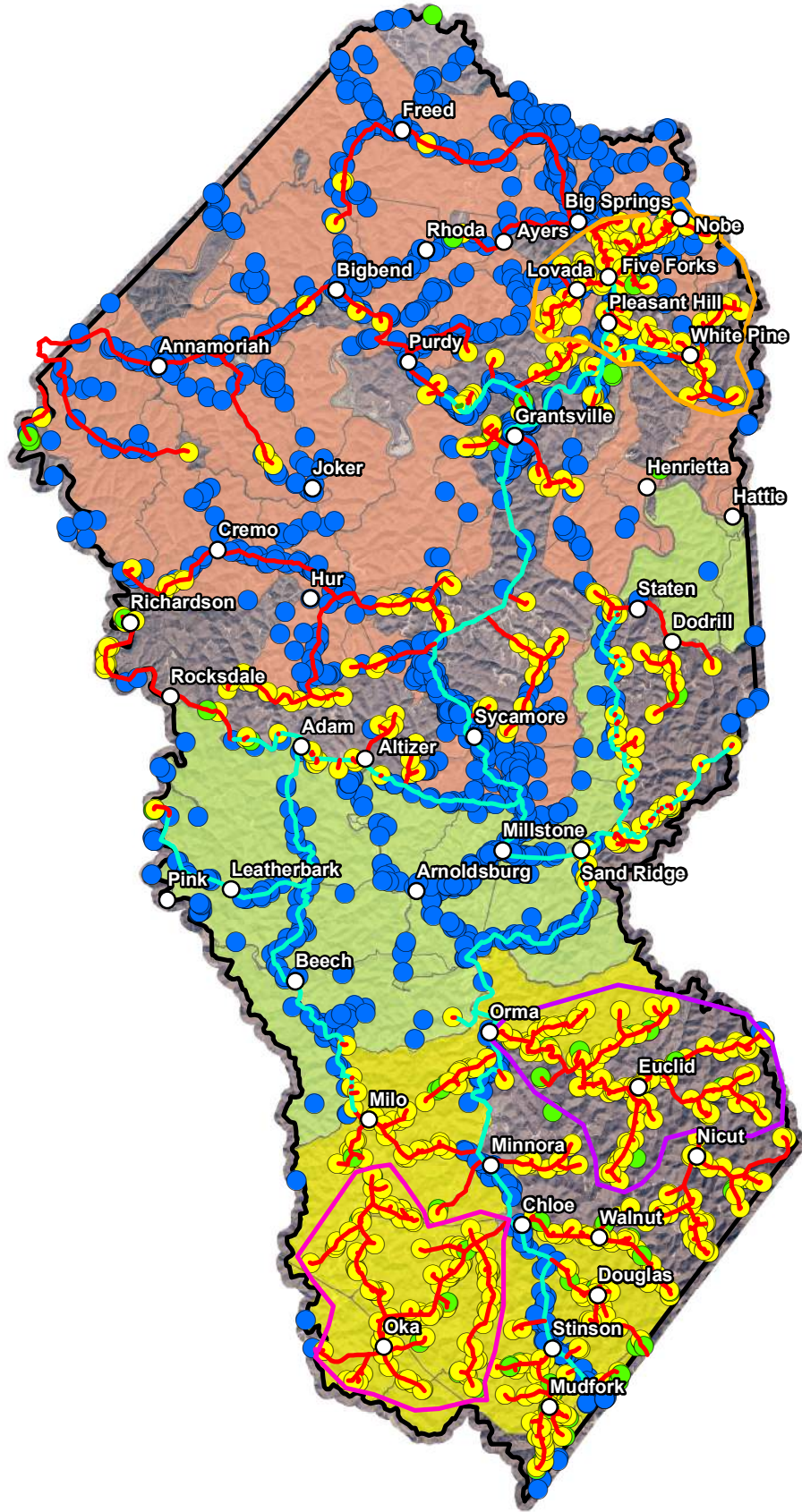
REGION 5

Calhoun, Jackson, Pleasants, Ritchie,
Roane, Tyler, Wirt, and Wood Counties

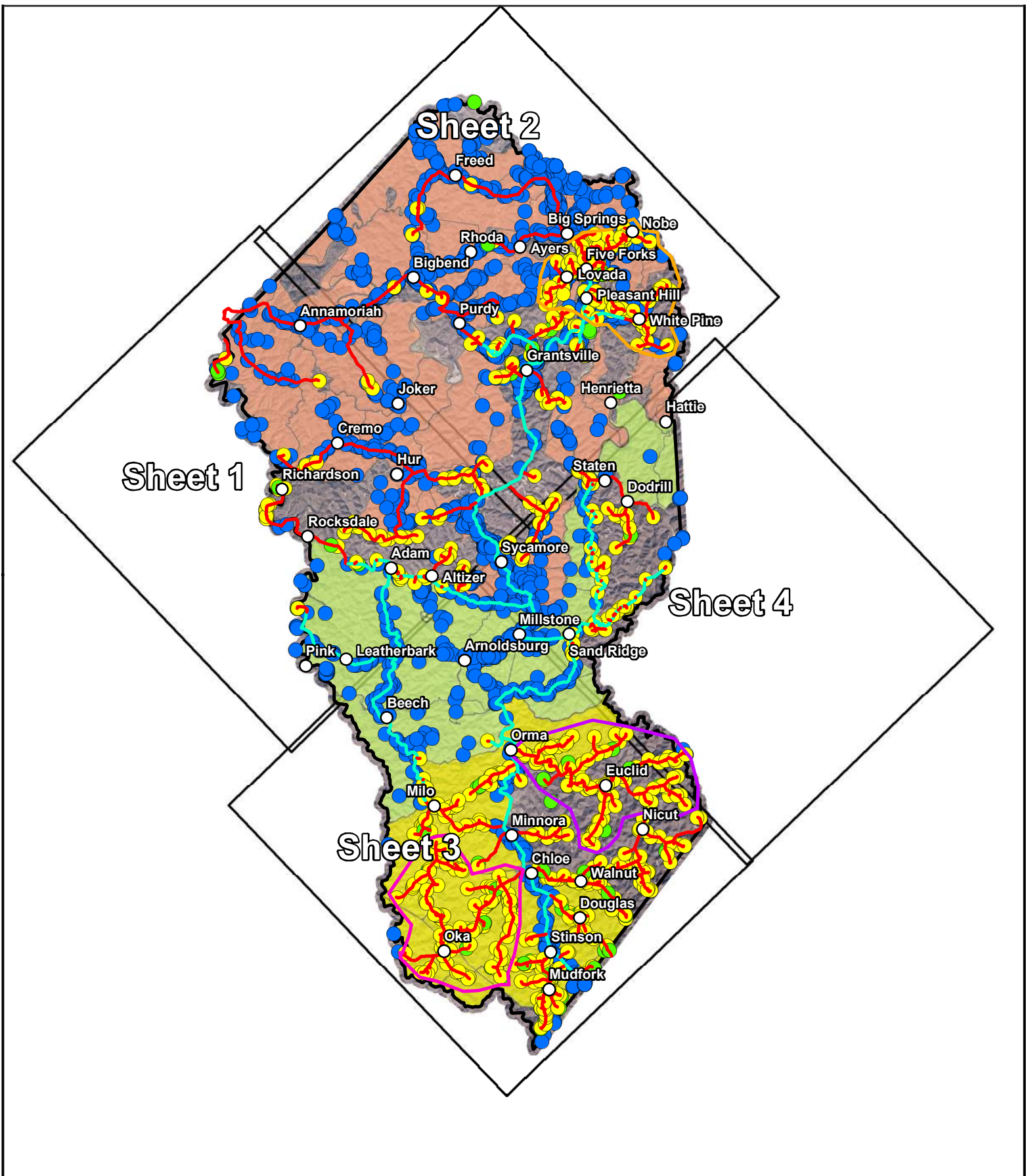




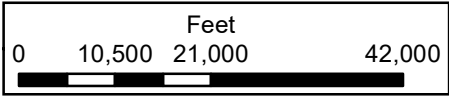
CALHOUN COUNTY



Existing Route	Other Addresses	Frontier - RDOF		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td>0</td> <td>9,000</td> <td>18,000</td> <td>36,000</td> </tr> </table>	Feet				0	9,000	18,000	36,000
Feet												
0	9,000	18,000	36,000									
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF										
Proposed Buried Fiber	Project 2 Boundary	County Boundary										
Targeted Address	Project 3 Boundary											
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF											

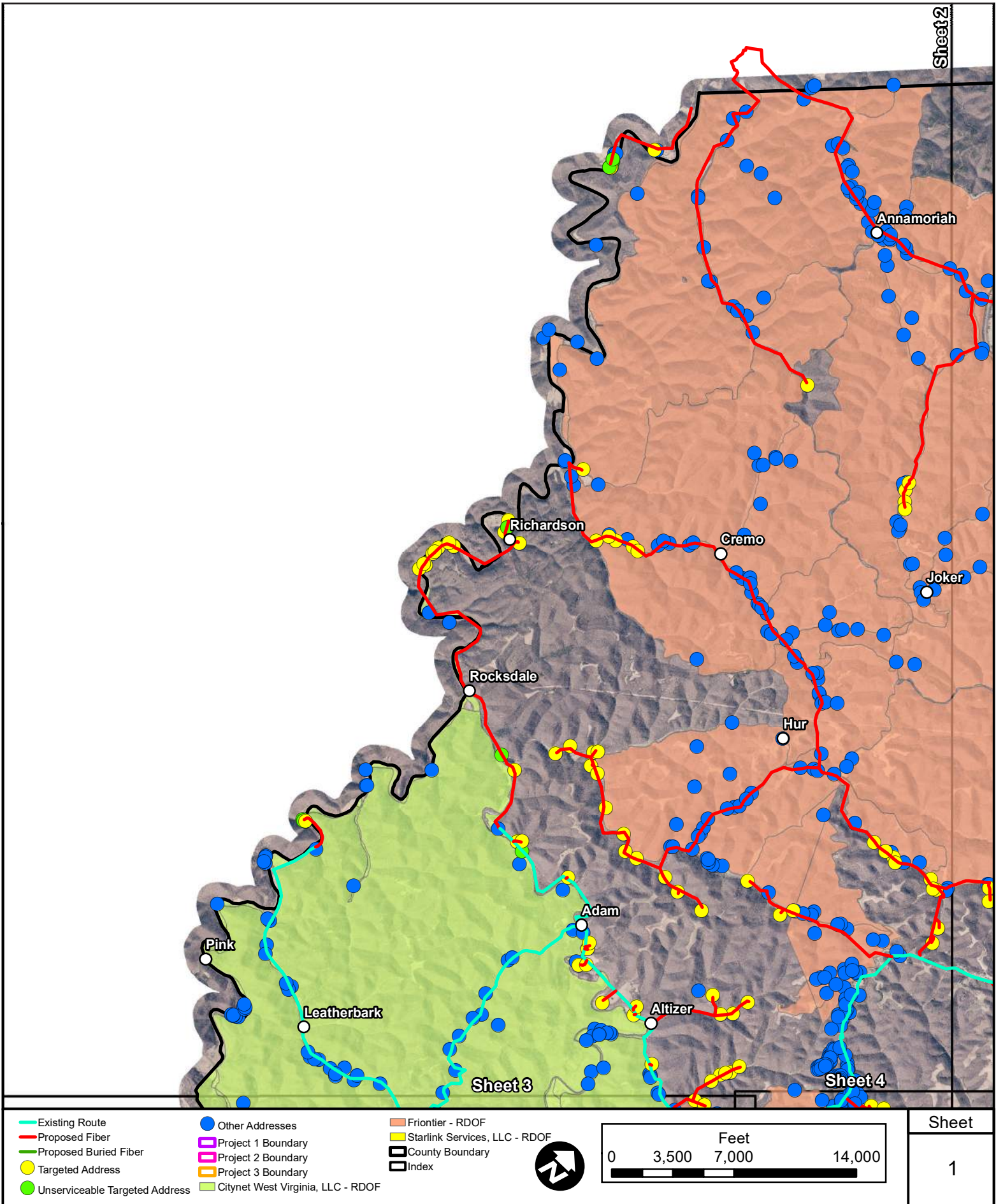


- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index
- Citynet West Virginia, LLC - RDOF



Sheet

INDEX



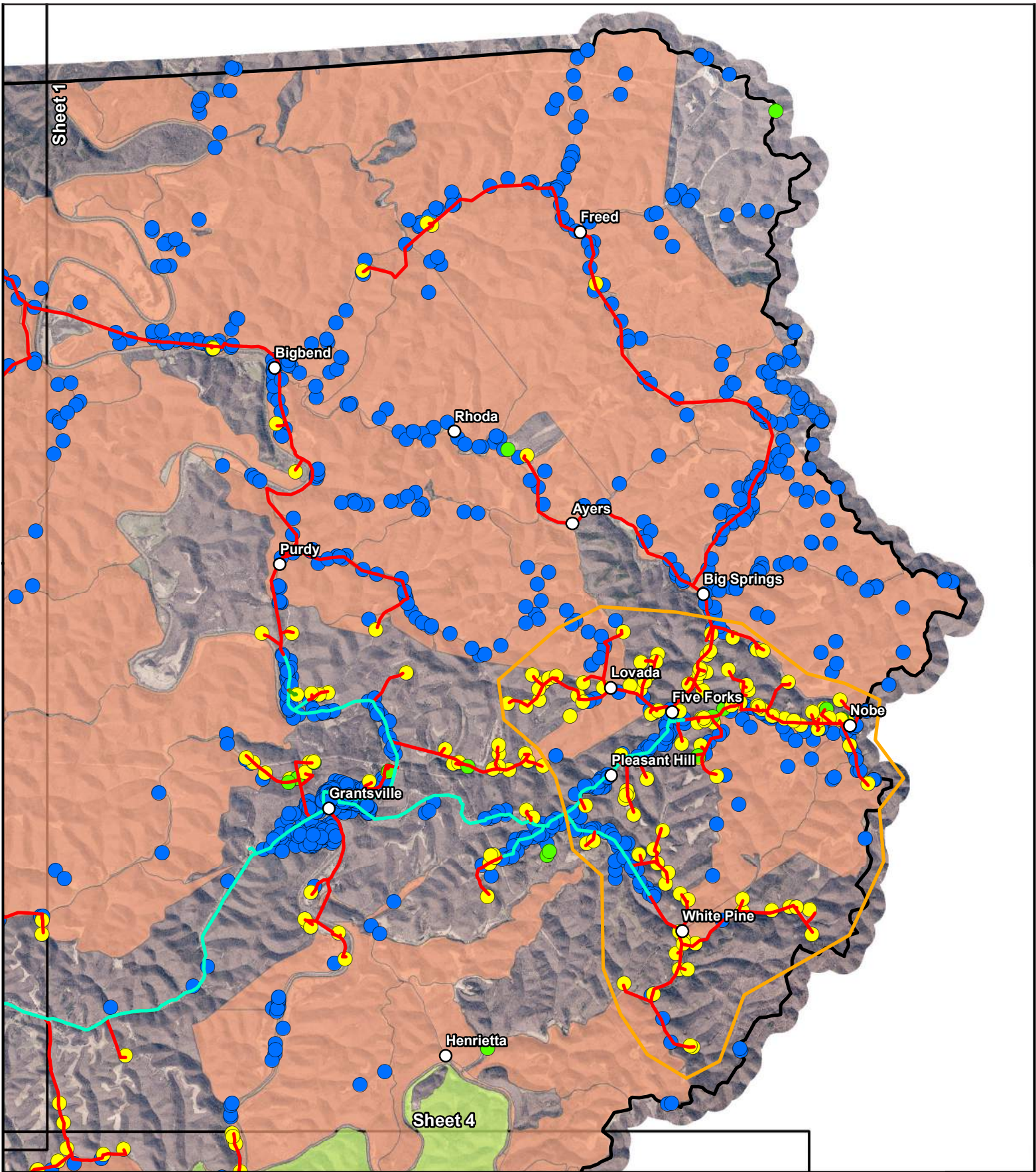
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Sheet 3

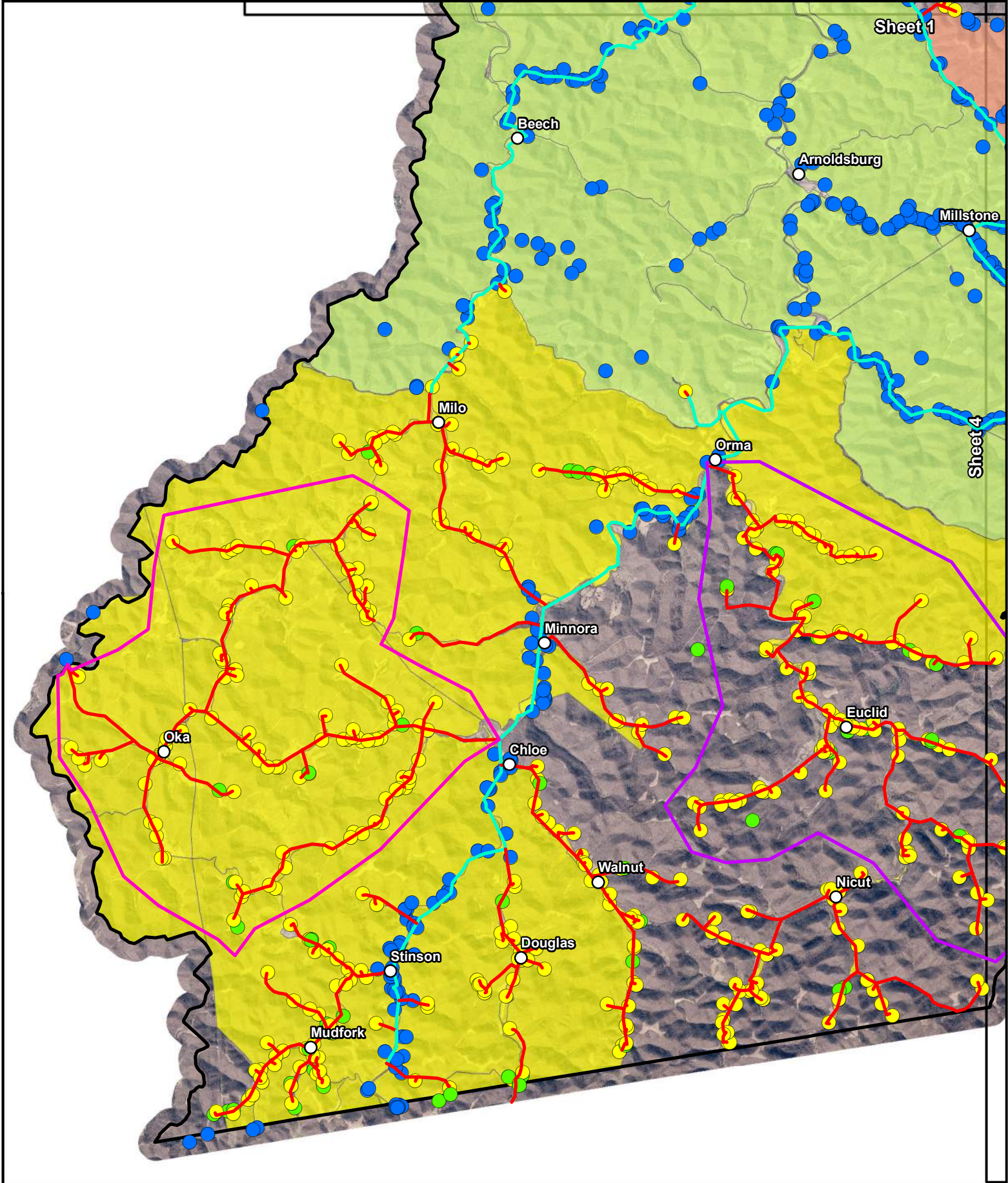
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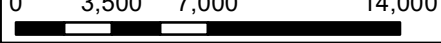
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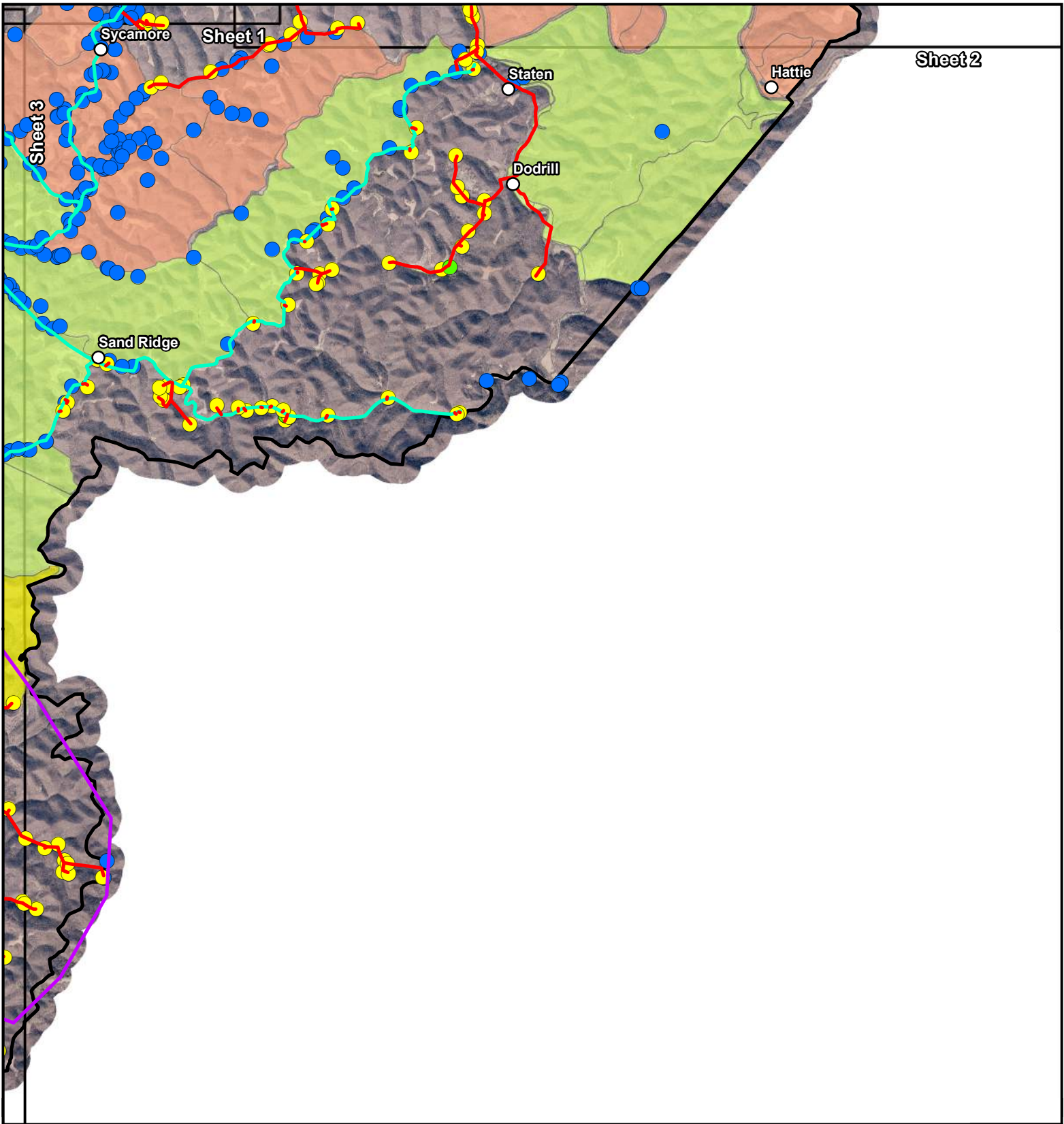
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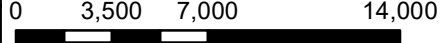


<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses Project 1 Boundary Project 2 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF 	<ul style="list-style-type: none"> Frontier - RDOF Starlink Services, LLC - RDOF County Boundary Index 		<table border="1"> <tr> <td colspan="4">Feet</td> </tr> <tr> <td style="width: 25%;">0</td> <td style="width: 25%;">3,500</td> <td style="width: 25%;">7,000</td> <td style="width: 25%;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td style="text-align: center;">2</td> </tr> </table>	Sheet	2
Feet															
0	3,500	7,000	14,000												
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2															



<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses Project 1 Boundary Project 2 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF 	<ul style="list-style-type: none"> Frontier - RDOF Starlink Services, LLC - RDOF County Boundary Index 		<p>Feet</p> <p>0 3,500 7,000 14,000</p> 	<p>Sheet</p> <p>3</p>
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<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses Project 1 Boundary Project 2 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF 	<ul style="list-style-type: none"> Frontier - RDOF Starlink Services, LLC - RDOF County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">3,500</td> <td style="text-align: center;">7,000</td> <td style="text-align: center;">14,000</td> </tr> </table> 	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td style="text-align: center;">4</td> </tr> </table>	Sheet	4
Feet															
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Calhoun County, WV – 2023 ROC Study – Cost Estimate – Whole County

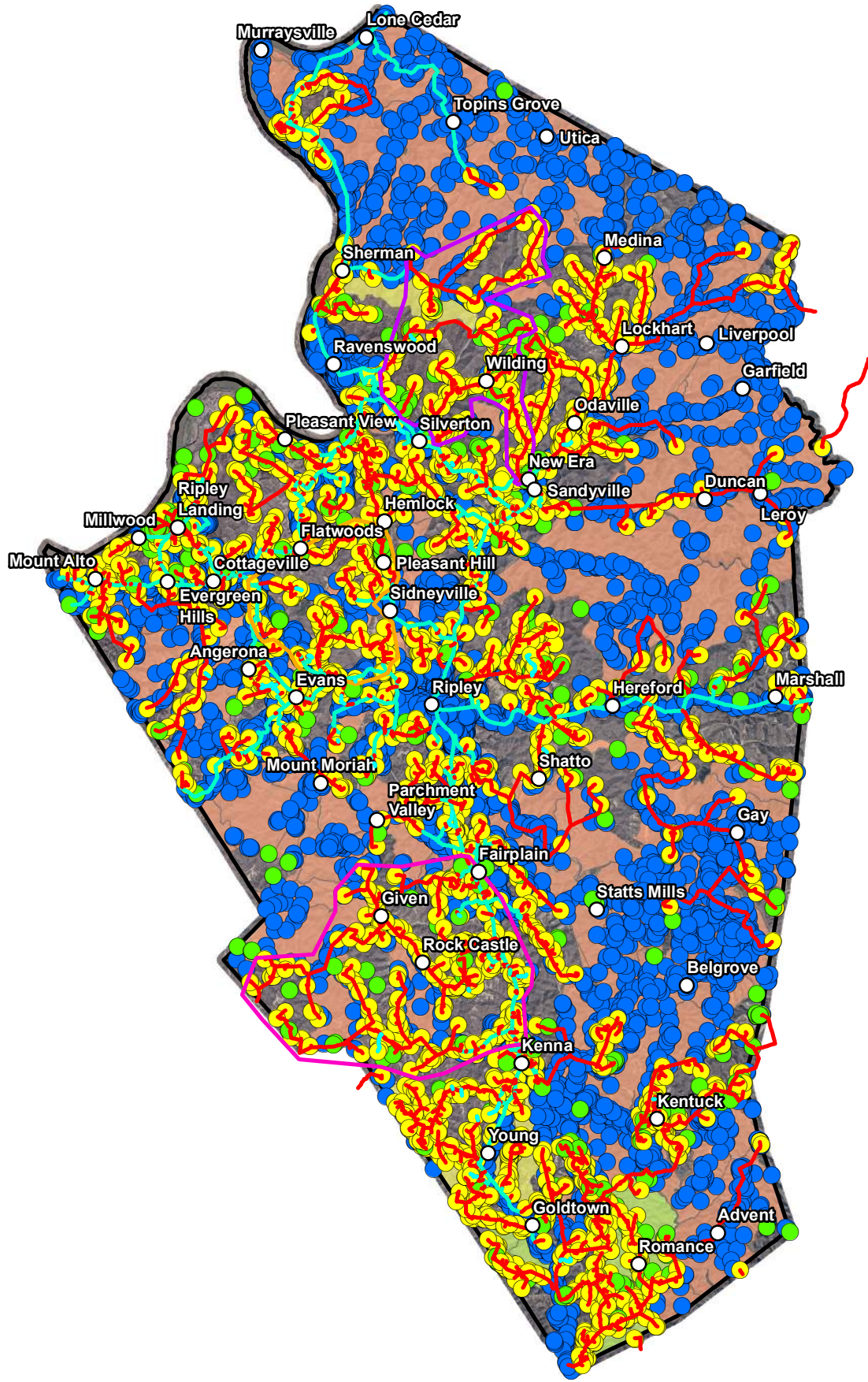
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	182.16	\$1,001,880
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	182.16	\$273,240
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	182.06	\$2,730,900
Aerial Construction Labor	\$50,000.00	Per Mile	182.06	\$9,103,000
Underground Construction Labor	\$150,000.00	Per Mile	0.10	\$15,000
Project Construction Contingency 10%	\$911,800.00	Lump Sum	1	\$911,800
Legal 1.5%	\$136,770.00	Lump Sum	1	\$136,770
Administrative 2%	\$182,360.00	Lump Sum	1	\$182,360
TOTAL COST = \$14,354,950				

COUNTY SAMPLE PROJECT

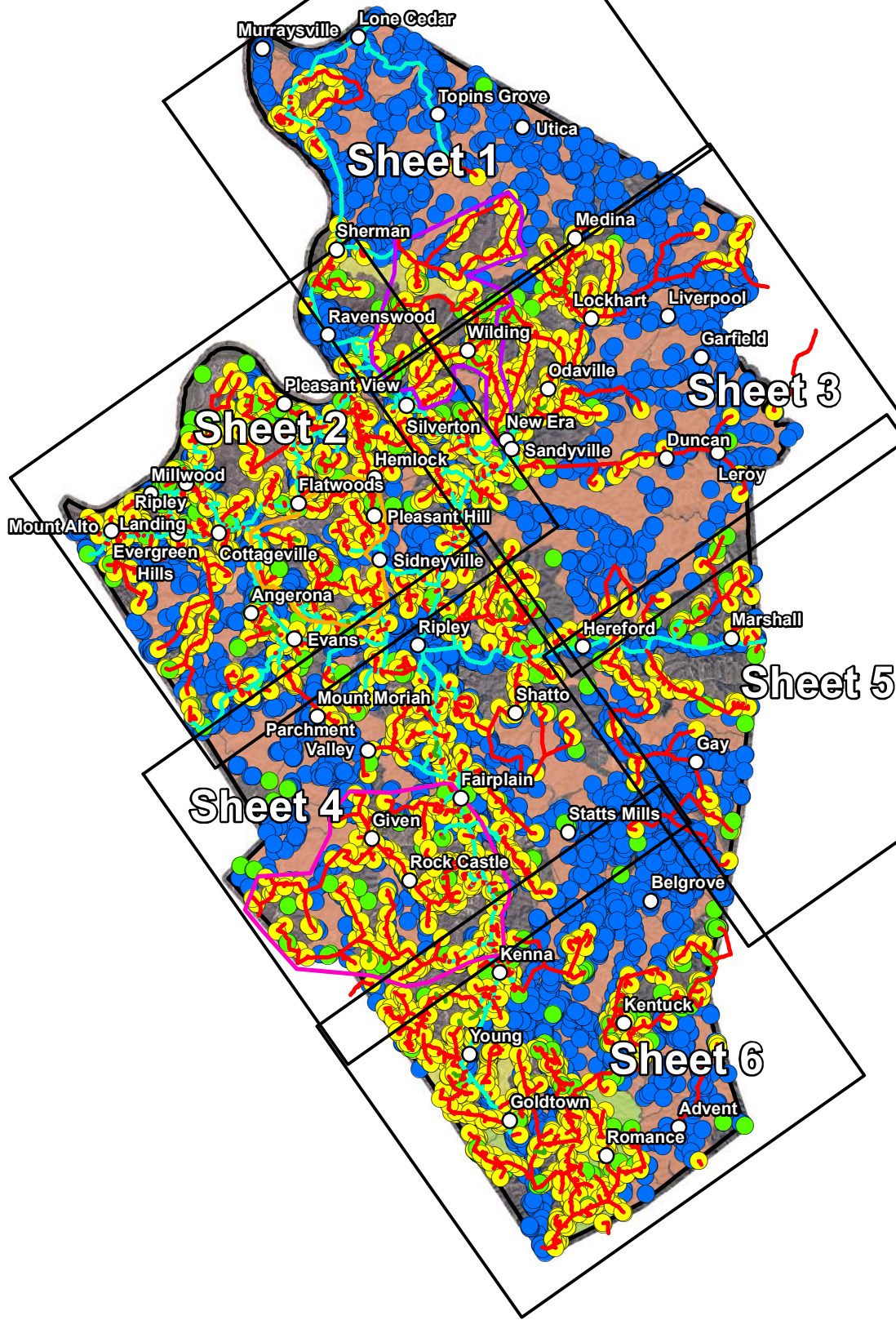
Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
5	Calhoun	1	114	21.21	\$1,670,288
		2	105	21.61	\$1,701,788
		3	107	19.29	\$1,519,088




JACKSON COUNTY

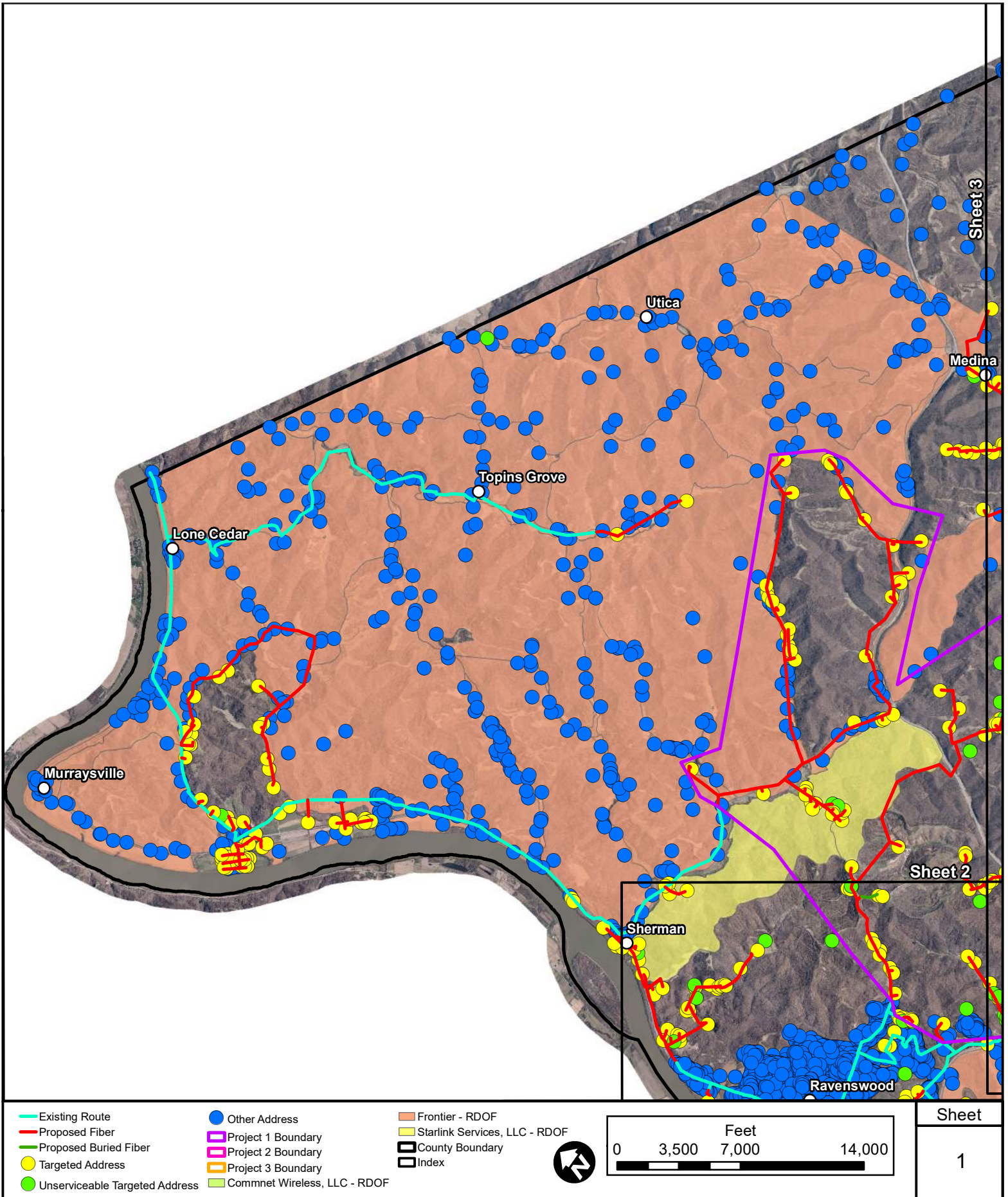


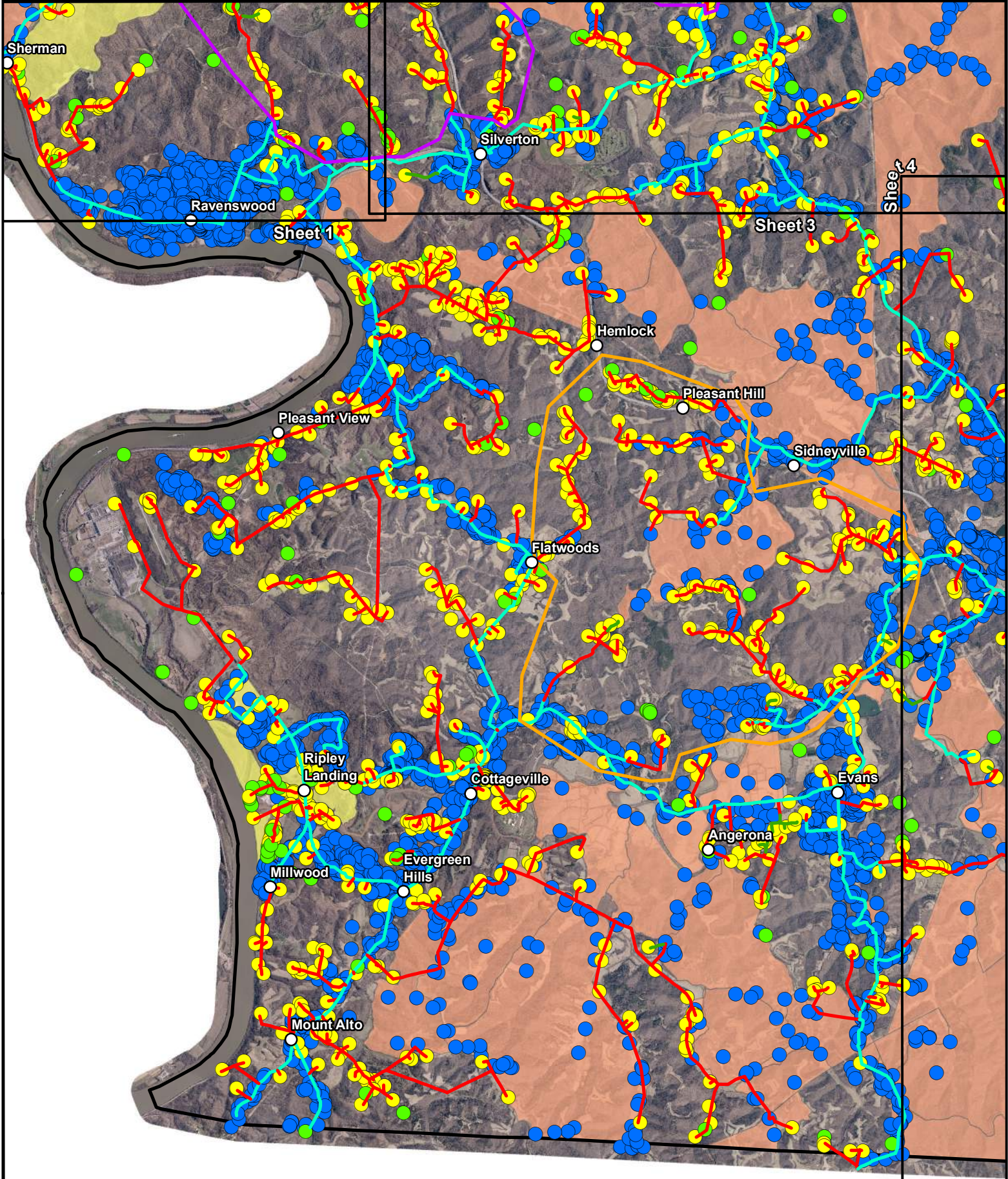
Existing Route	Other Address	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Commnet Wireless, LLC - RDOF	



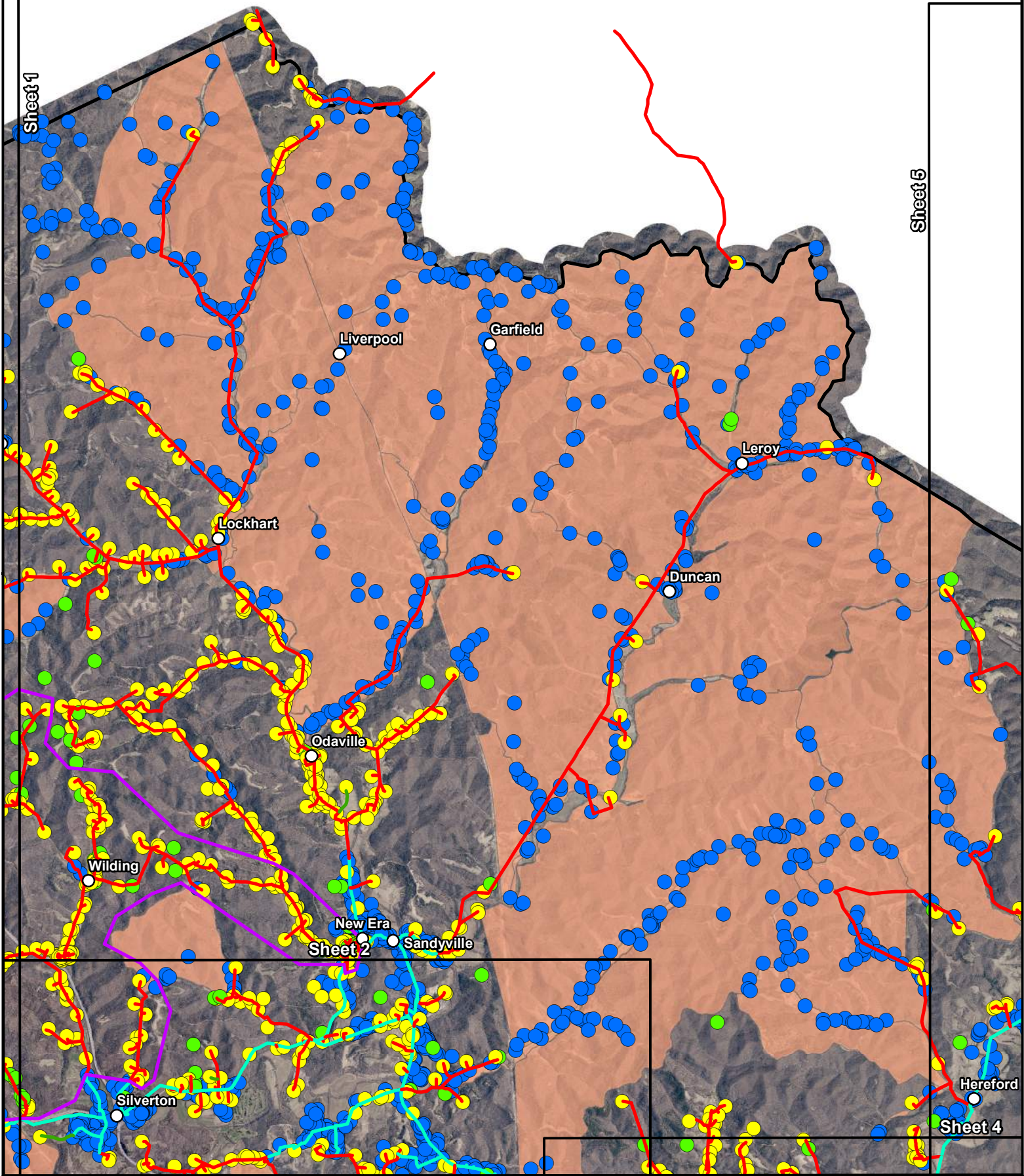
<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Address Project 1 Boundary Project 2 Boundary Project 3 Boundary Commnet Wireless, LLC - RDOF 	<ul style="list-style-type: none"> Frontier - RDOF Starlink Services, LLC - RDOF County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">12,500</td> <td style="text-align: center;">25,000</td> <td style="text-align: center;">50,000</td> </tr> </table>	Feet				0	12,500	25,000	50,000
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0	12,500	25,000	50,000									

Sheet
INDEX





<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Address Project 1 Boundary Project 2 Boundary Project 3 Boundary Frontier - RDOF Starlink Services, LLC - RDOF County Boundary Index Commnet Wireless, LLC - RDOF 	<div style="text-align: center;"> <p>Feet</p> <p>0 3,500 7,000 14,000</p> </div> <div style="text-align: center;"> </div>	<table border="1" style="width: 100%;"> <tr> <td style="text-align: center;">Sheet</td> </tr> <tr> <td style="text-align: center;">2</td> </tr> </table>	Sheet	2
Sheet					
2					



Sheet 1

Sheet 5

Liverpool

Garfield

Leroy

Lockhart

Duncan

Odaville

Wilding

New Era

Sheet 2

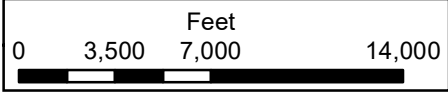
Sandyville

Silverton

Hereford

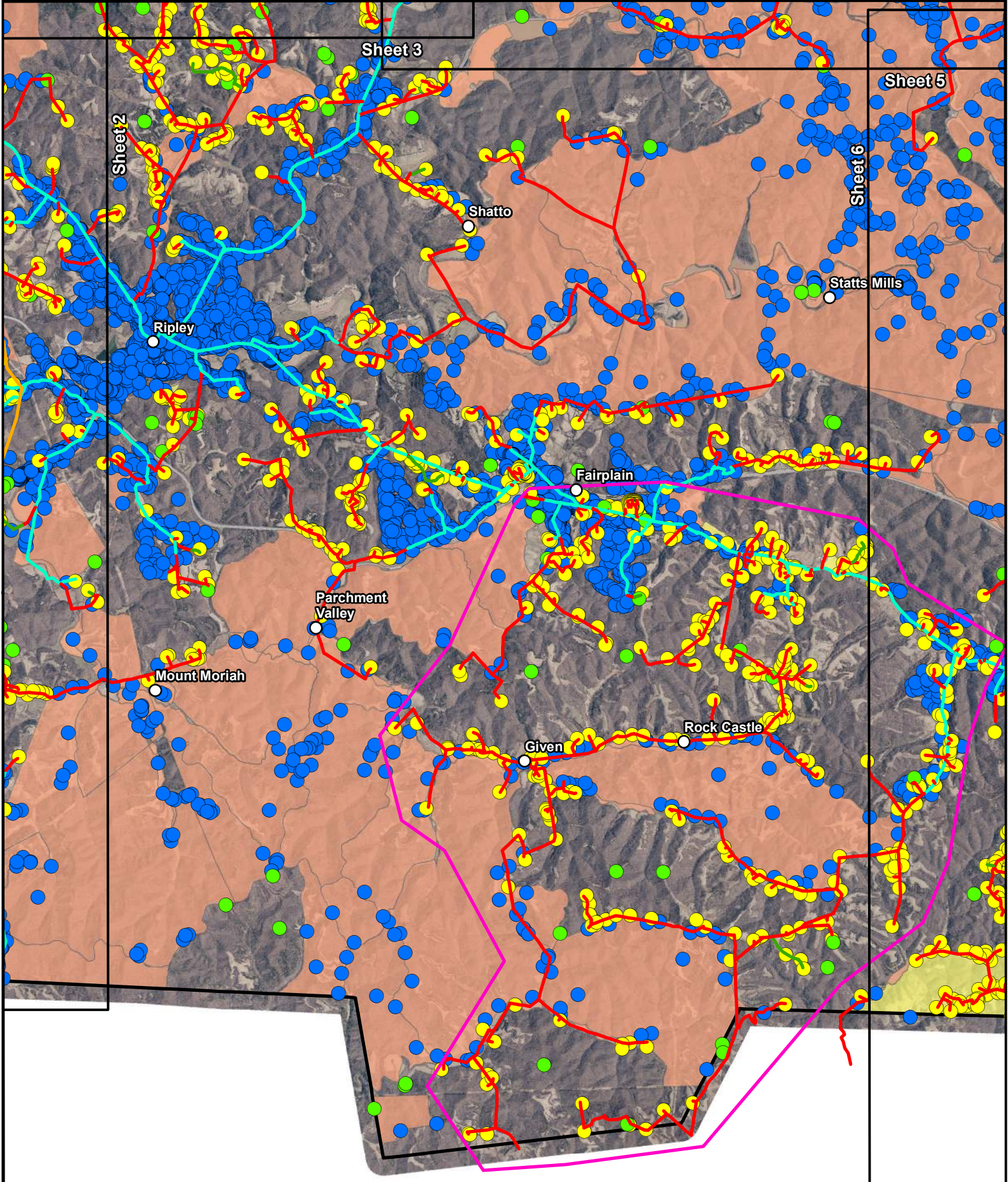
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- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Commnet Wireless, LLC - RDOF
- Frontier - RDOF
- Starlink Services, LLC - RDOF
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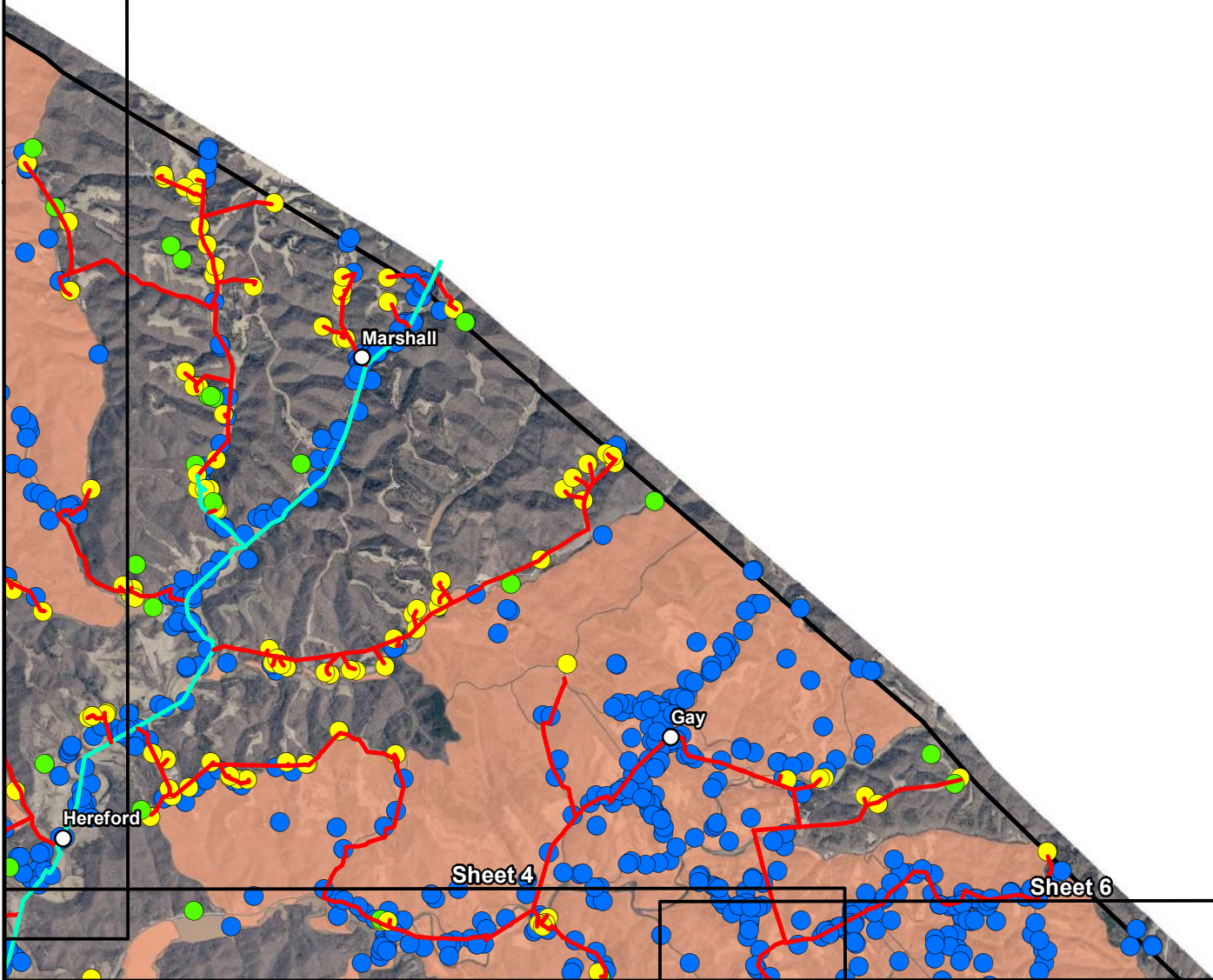
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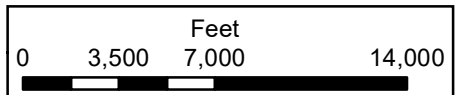


<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Address Project 1 Boundary Project 2 Boundary Project 3 Boundary Frontier - RDOF Starlink Services, LLC - RDOF County Boundary Index Commnet Wireless, LLC - RDOF 	<div style="text-align: center;"> <p>Feet</p> <p>0 3,500 7,000 14,000</p> </div> <div style="text-align: center;"> </div>	<p>Sheet</p> <p>4</p>
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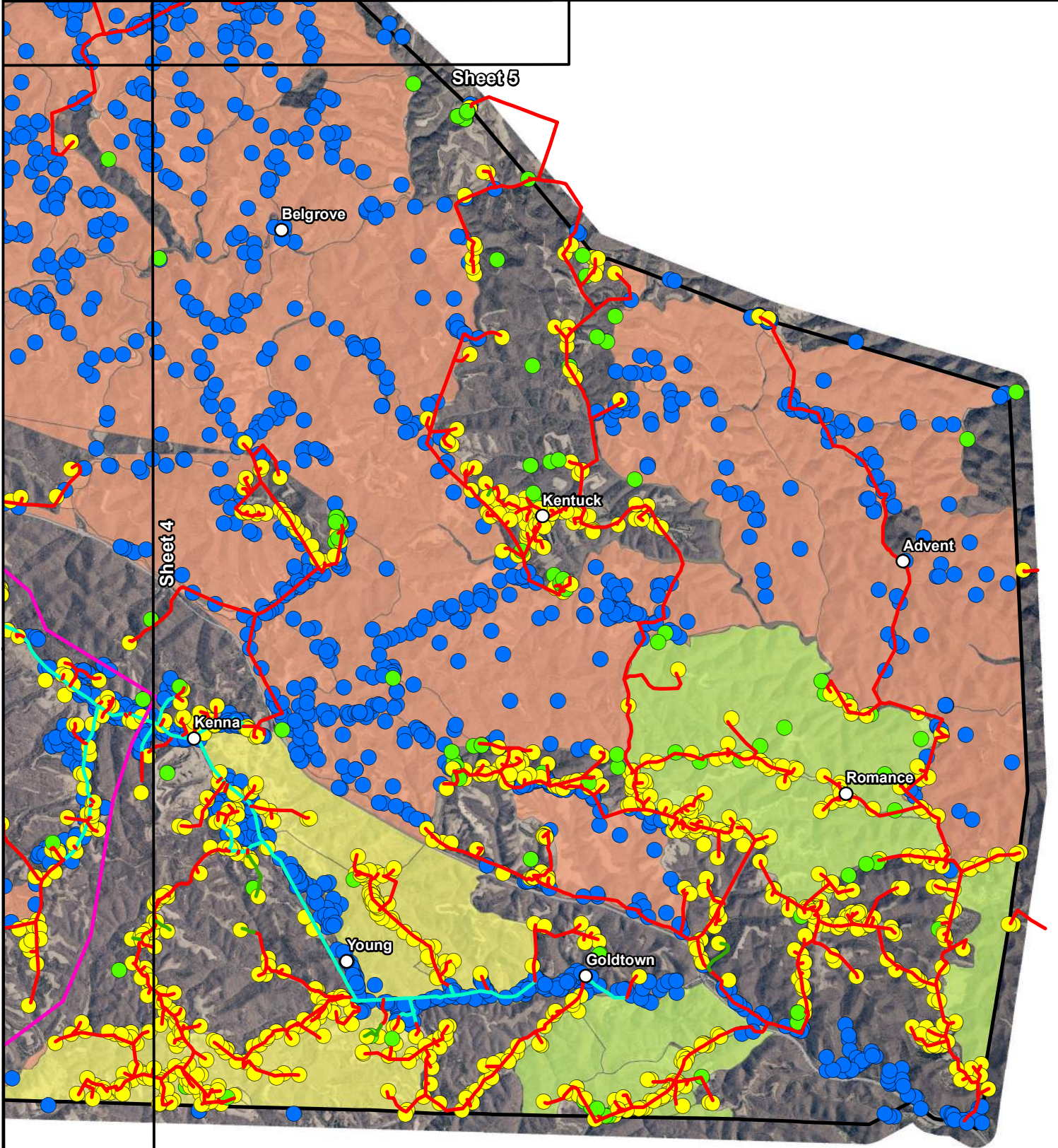


- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Commnet Wireless, LLC - RDOF
- Frontier - RDOF
- Starlink Services, LLC - RDOF
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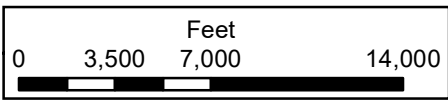


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- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
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- Project 2 Boundary
- Project 3 Boundary
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- Starlink Services, LLC - RDOF
- Commnet Wireless, LLC - RDOF
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Jackson County, WV – 2023 ROC Study – Cost Estimate – Whole County

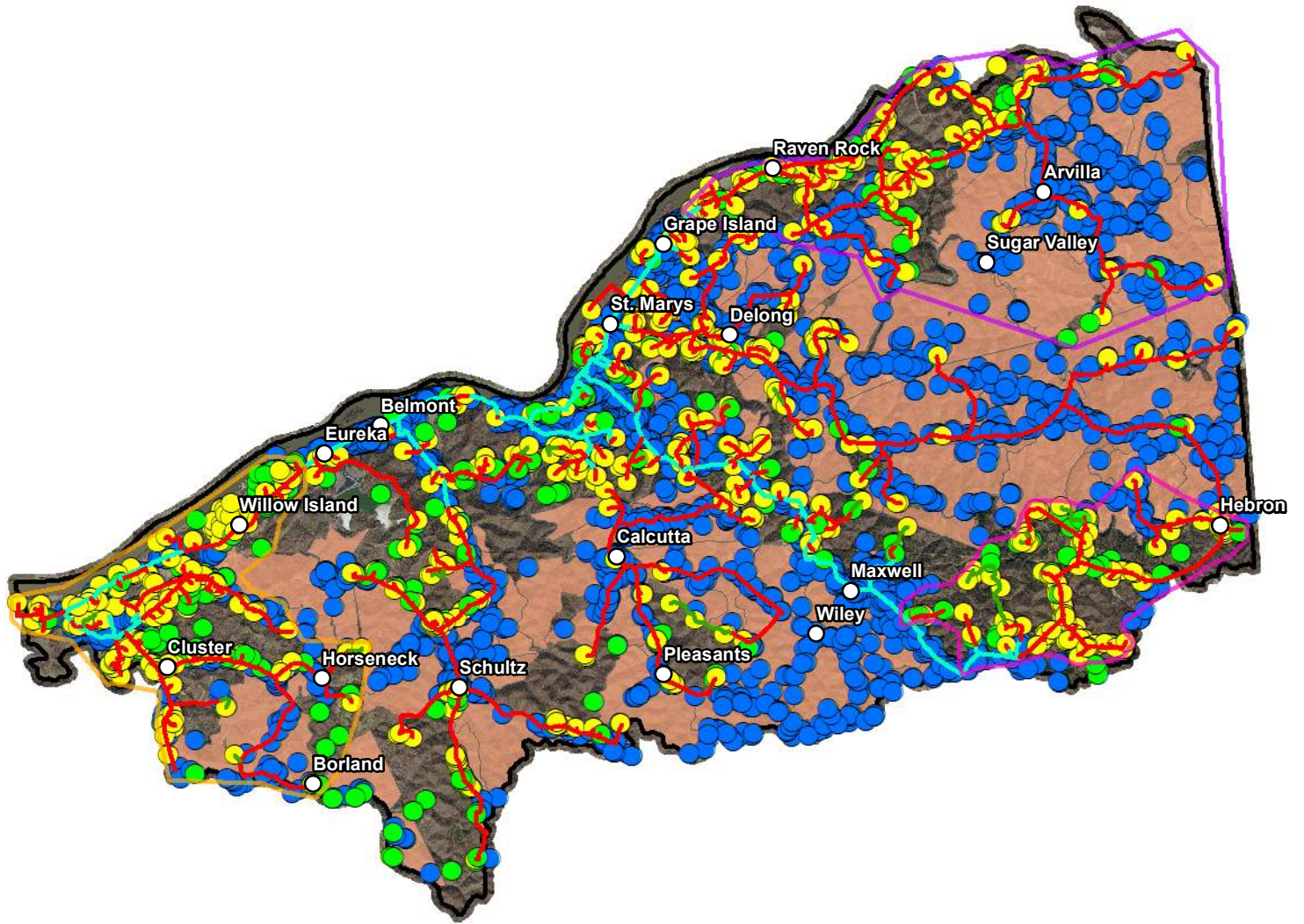
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	472.41	\$2,598,255
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	472.41	\$708,615
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	465.84	\$6,987,600
Aerial Construction Labor	\$50,000.00	Per Mile	465.84	\$23,292,000
Underground Construction Labor	\$150,000.00	Per Mile	6.57	\$985,500
Project Construction Contingency 10%	\$2,427,750.00	Lump Sum	1	\$2,427,750
Legal 1.5%	\$364,162.50	Lump Sum	1	\$364,163
Administrative 2%	\$485,550.00	Lump Sum	1	\$485,550
TOTAL COST = \$37,849,433				

COUNTY SAMPLE PROJECT

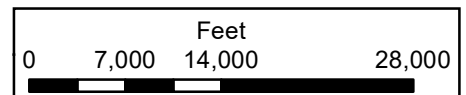
Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
5	Jackson	1	268	35.16	\$2,758,595
		2	413	49.21	\$3,965,908
		3	173	20.54	\$1,654,955

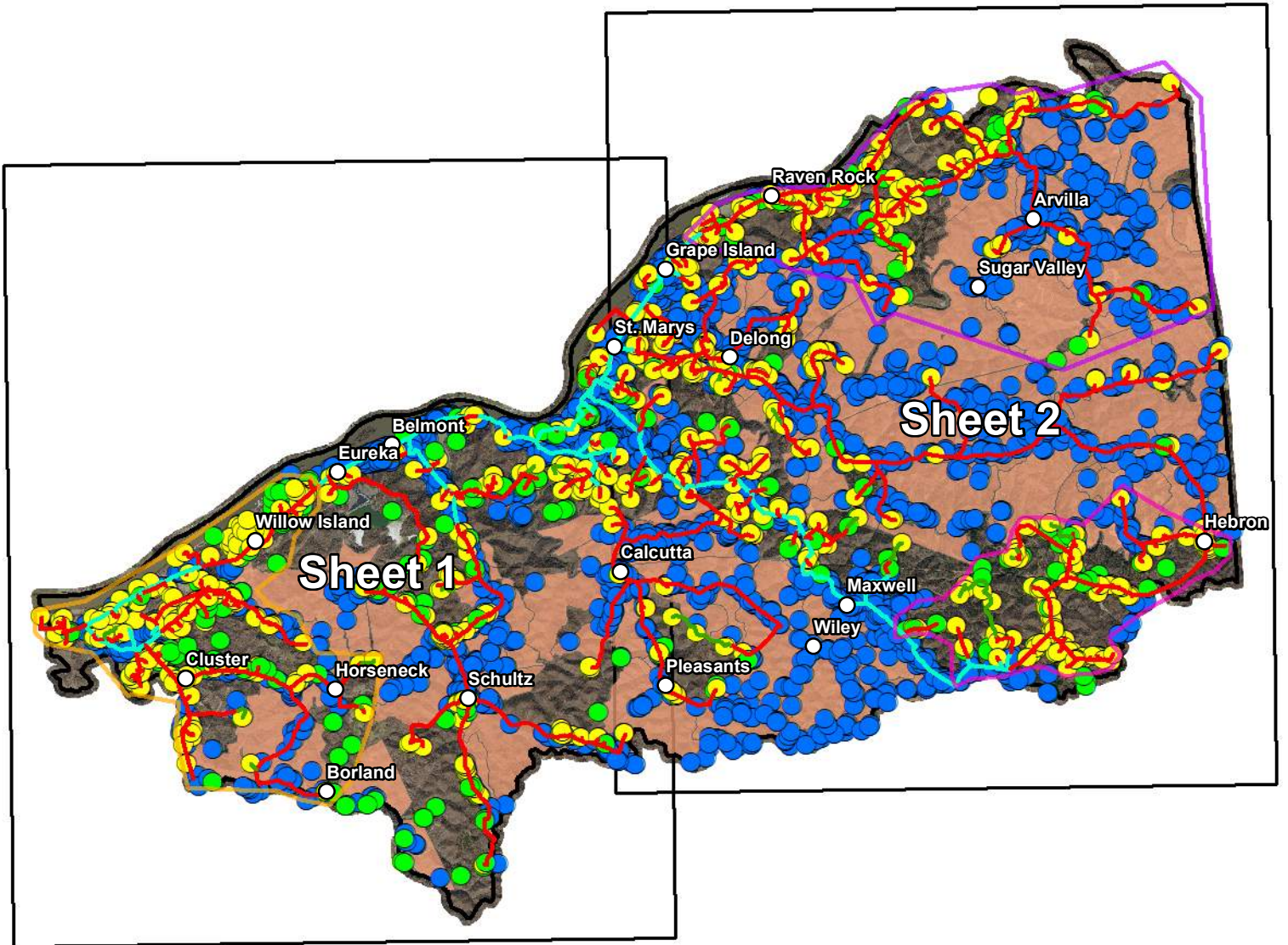


PLEASANTS COUNTY

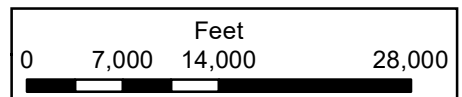


- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Target Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary

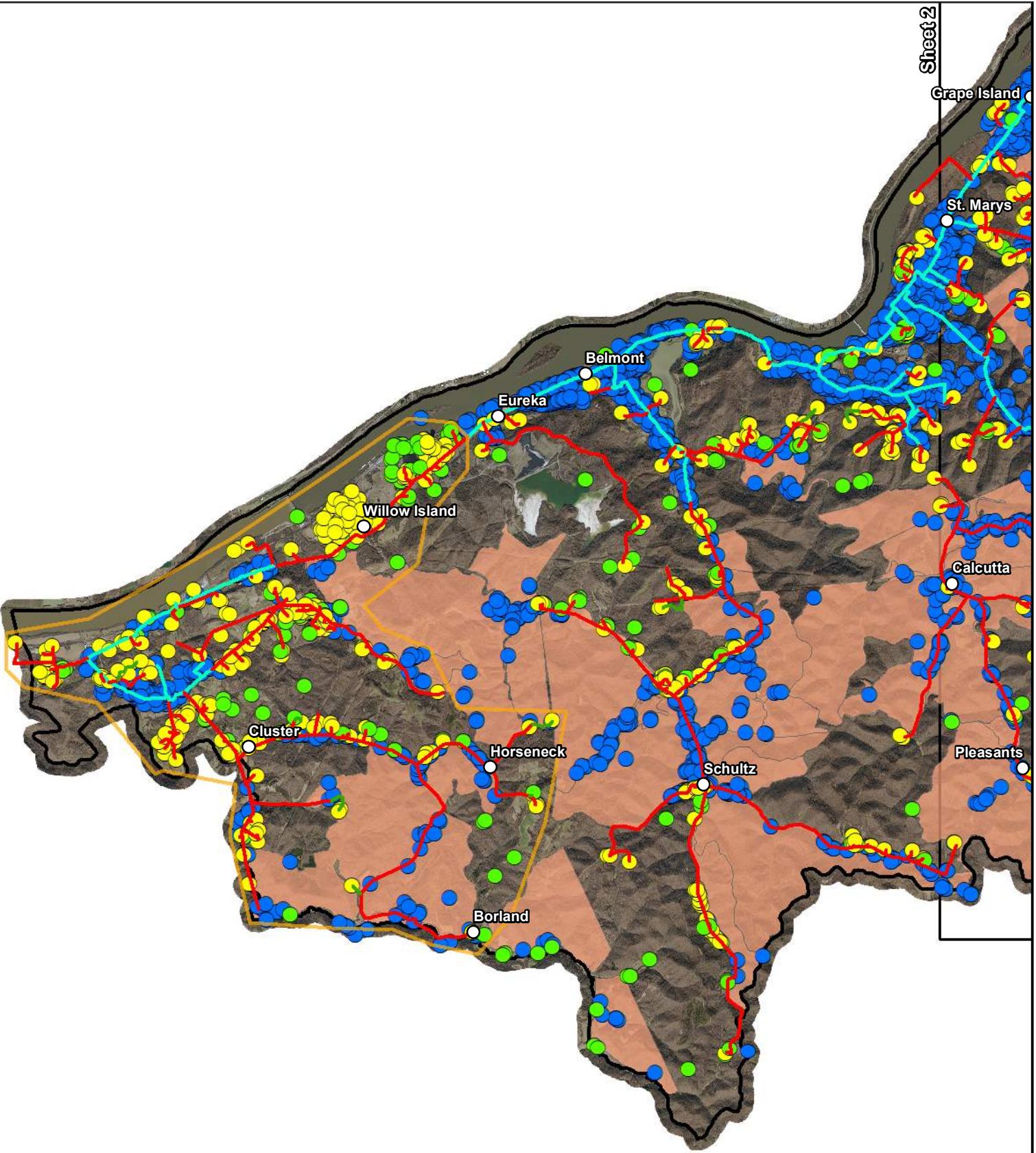




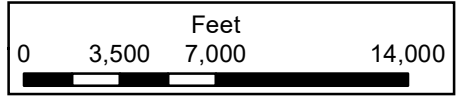
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Target Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
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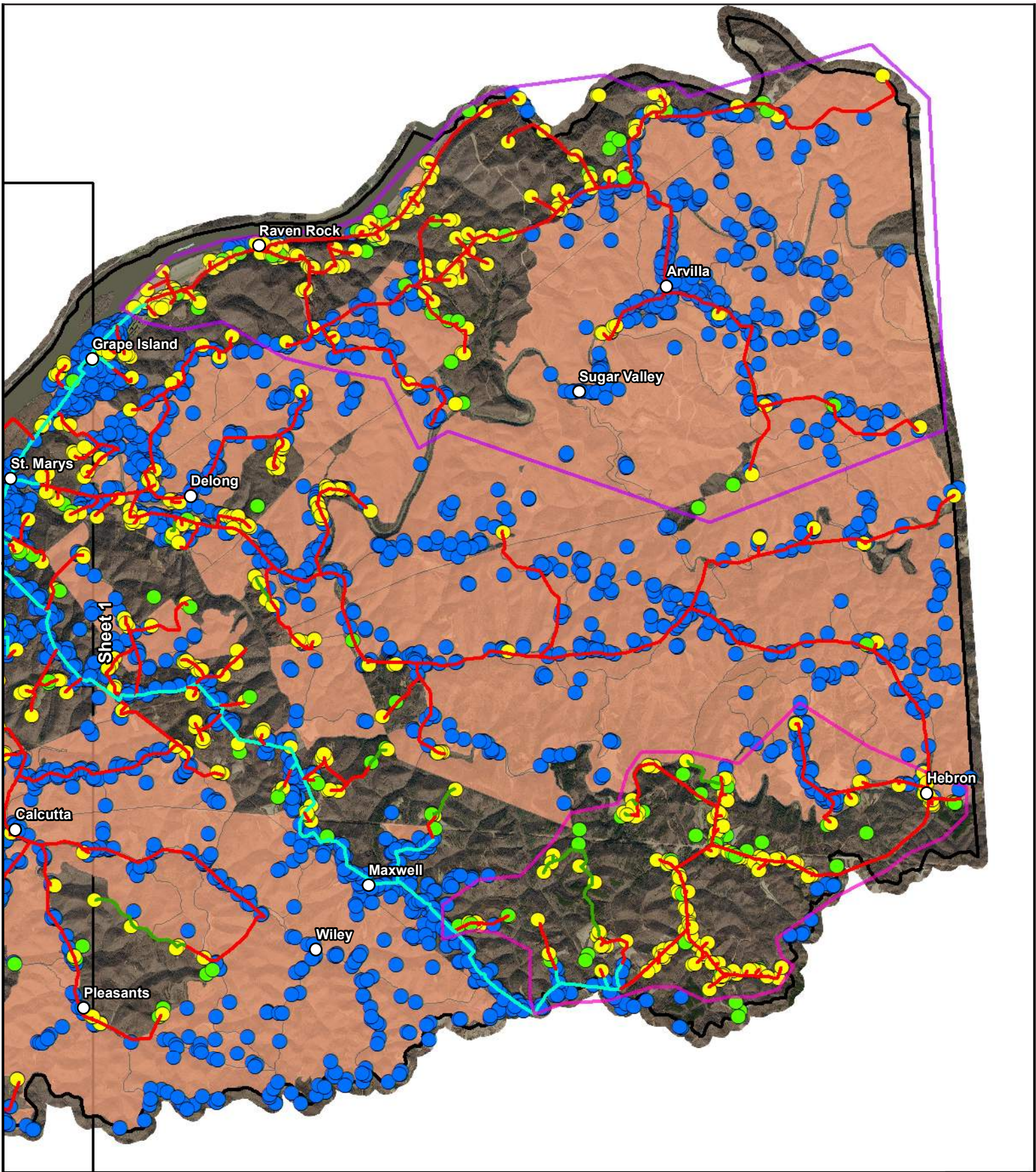
Sheet
INDEX



- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Target Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary
- Index



Sheet
1



<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Target Address 	<ul style="list-style-type: none"> ● Other Addresses Project 1 Boundary Project 2 Boundary Project 3 Boundary Frontier - RDOF 	<ul style="list-style-type: none"> County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="width: 20%;">0</td> <td style="width: 20%;">3,500</td> <td style="width: 20%;">7,000</td> <td style="width: 20%;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td style="text-align: center;">2</td> </tr> </table>	Sheet	2
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Pleasants County, WV – 2023 ROC Study – Cost Estimate – Whole County

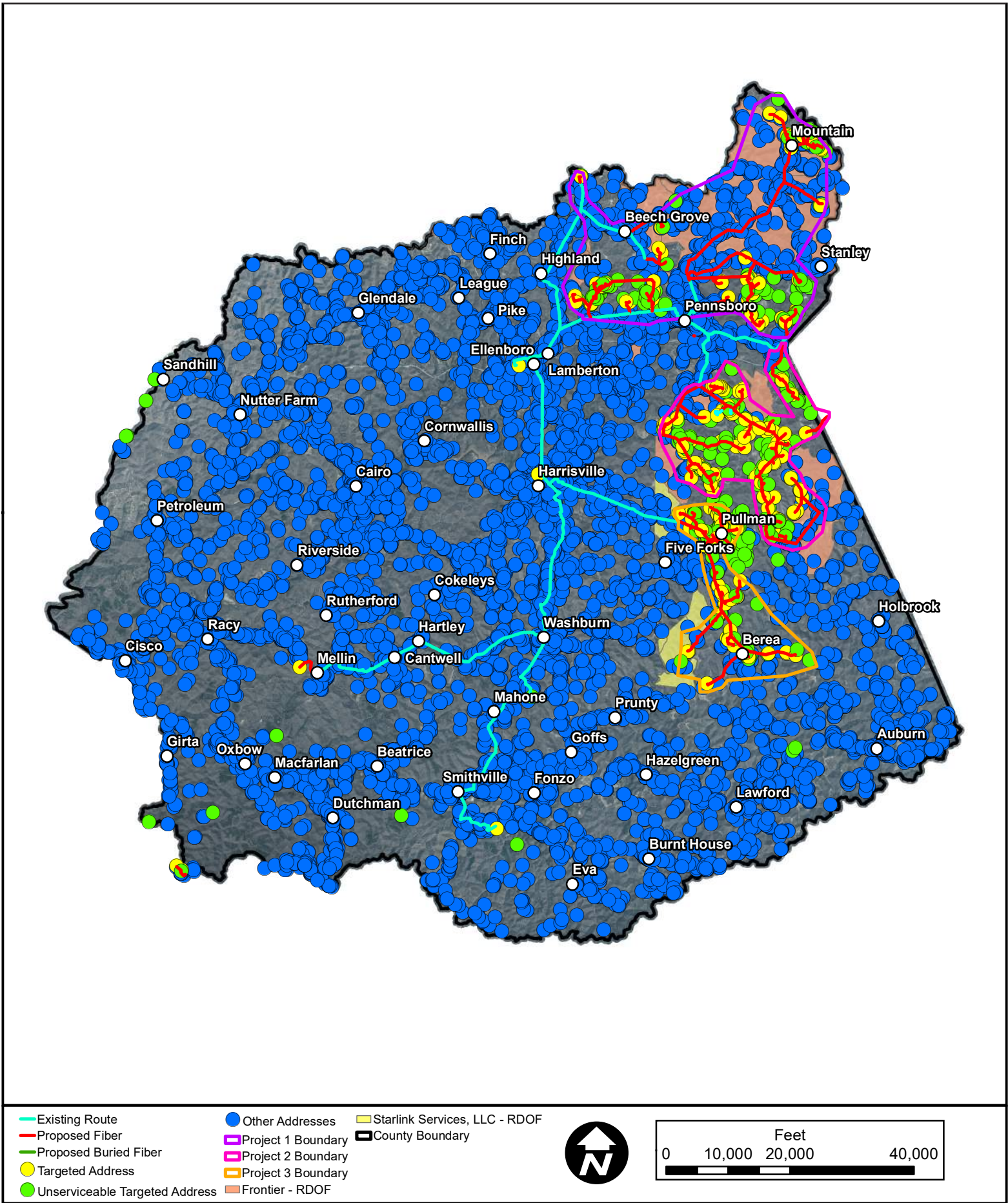
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	162.30	\$892,650
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	162.30	\$243,450
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	155.91	\$2,338,650
Aerial Construction Labor	\$50,000.00	Per Mile	155.91	\$7,795,500
Underground Construction Labor	\$150,000.00	Per Mile	6.39	\$958,500
Project Construction Contingency 10%	\$875,400.00	Lump Sum	1	\$875,400
Legal 1.5%	\$131,310.00	Lump Sum	1	\$131,310
Administrative 2%	\$175,080.00	Lump Sum	1	\$175,080
TOTAL COST = \$13,410,540				

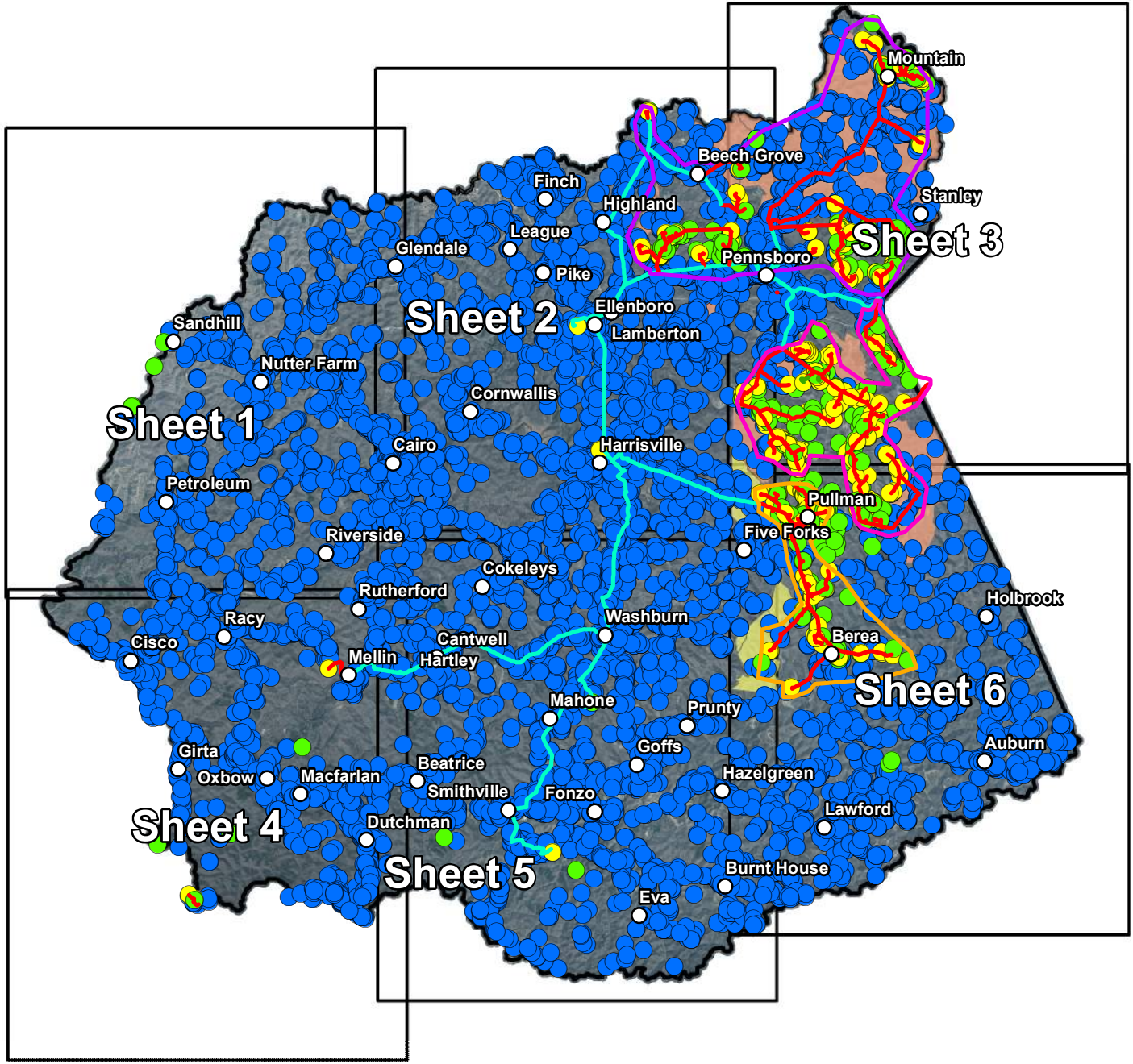
COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
5	Pleasants	1	177	31.27	\$2,462,513
		2	165	18.24	\$1,661,965
		3	307	27.22	\$2,246,015

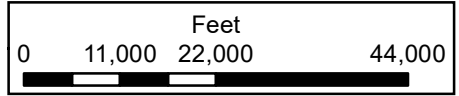


RITCHIE COUNTY

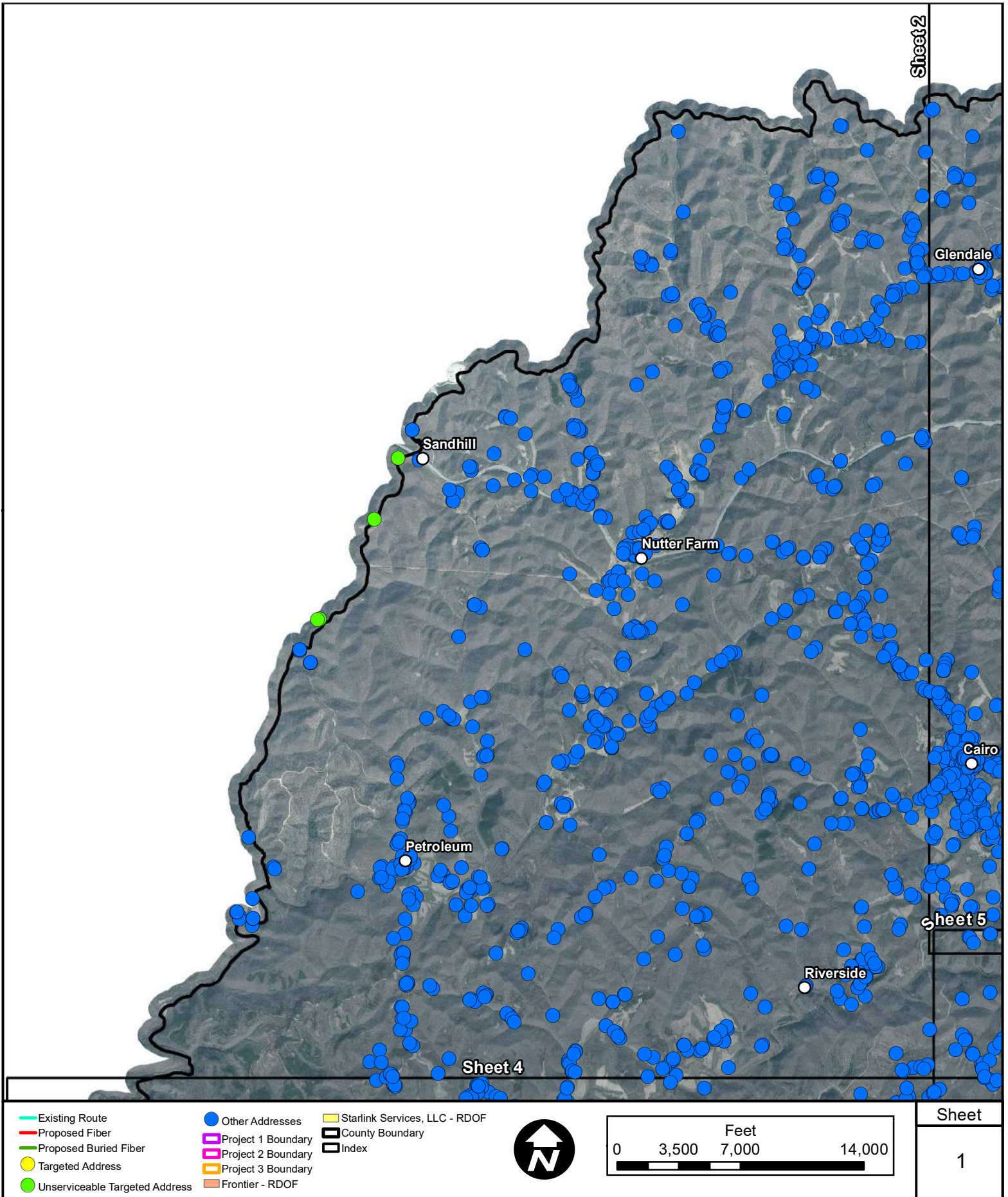


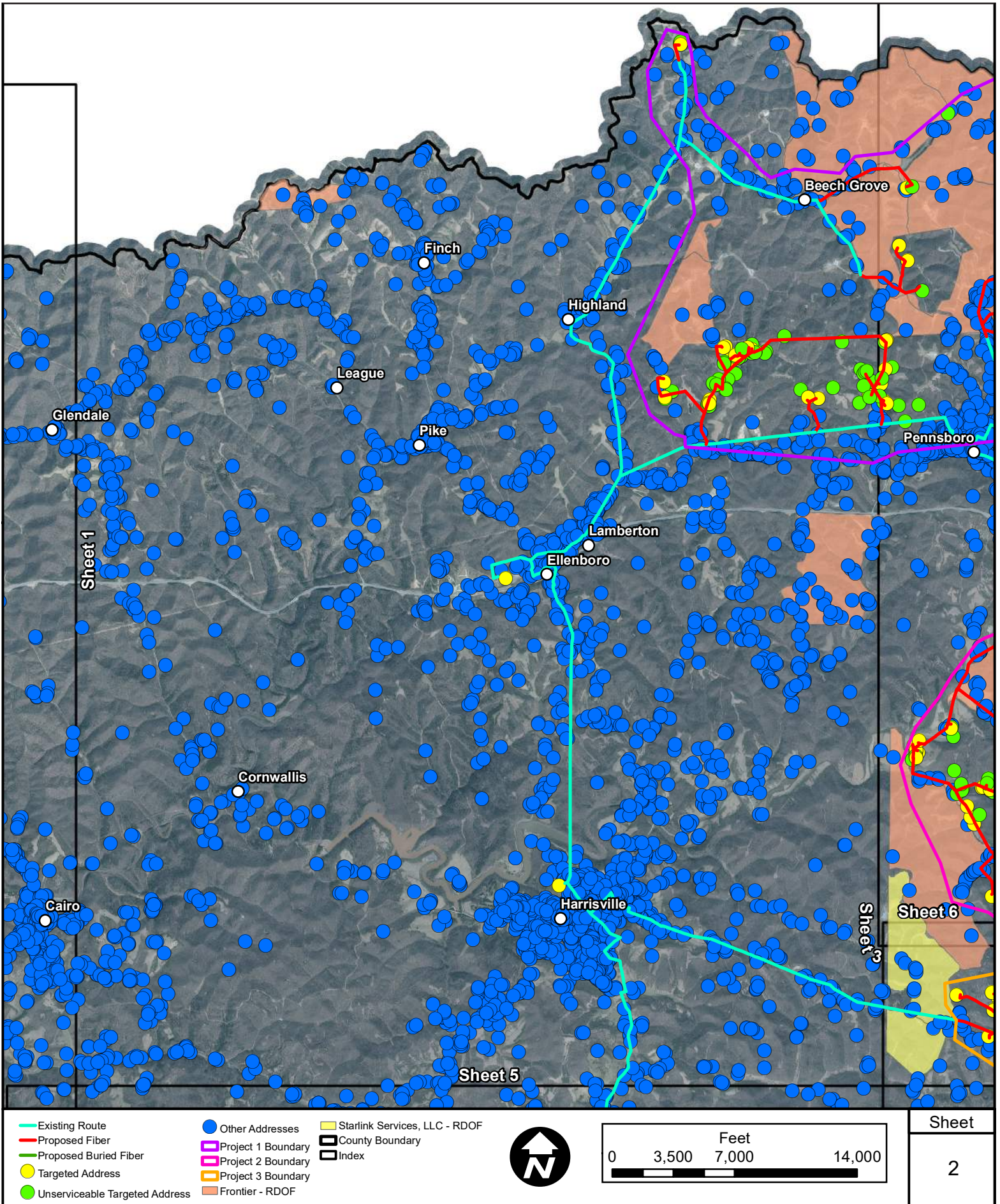


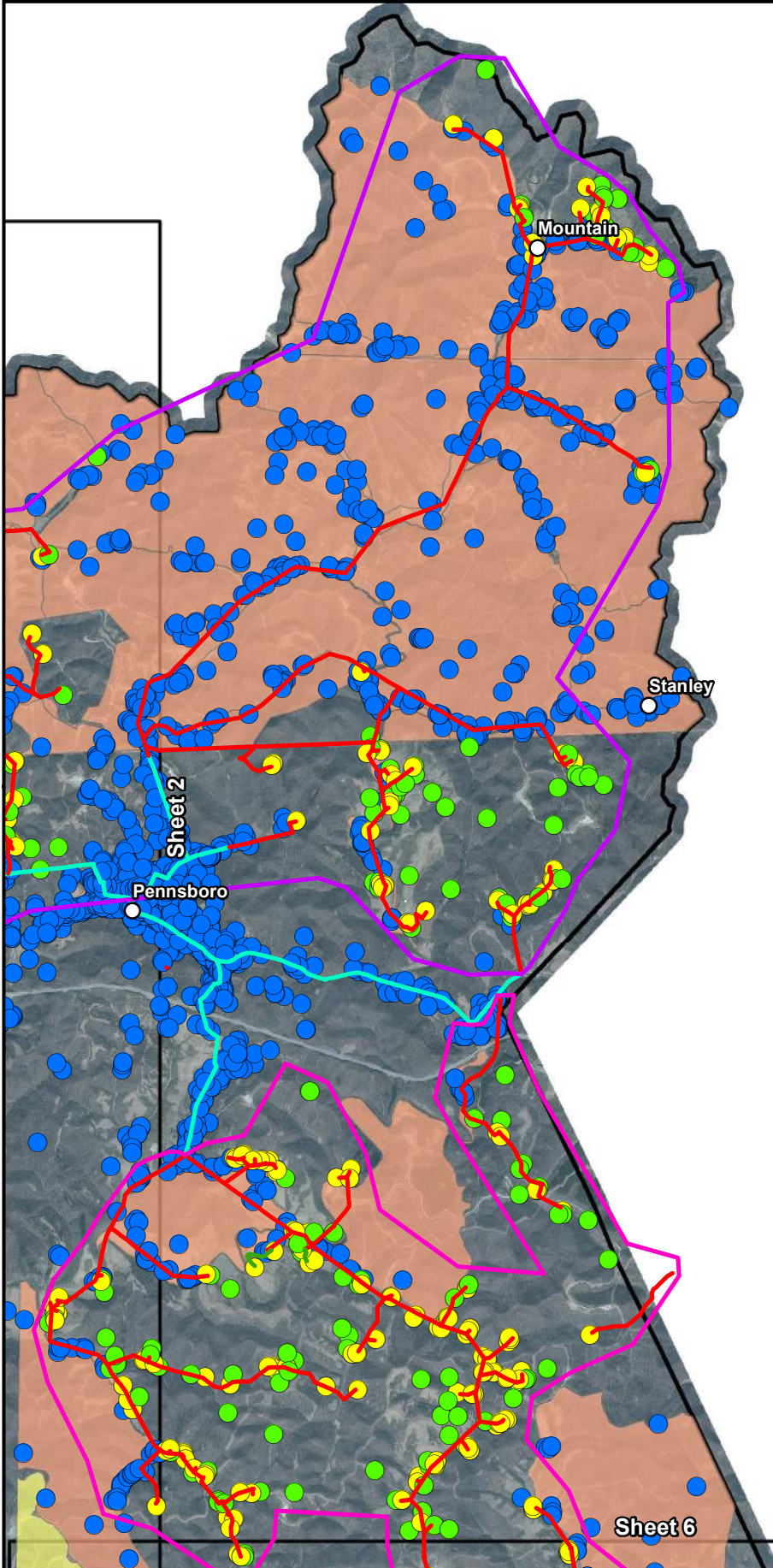
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index



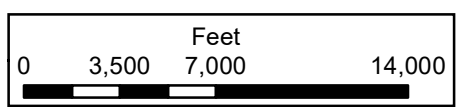
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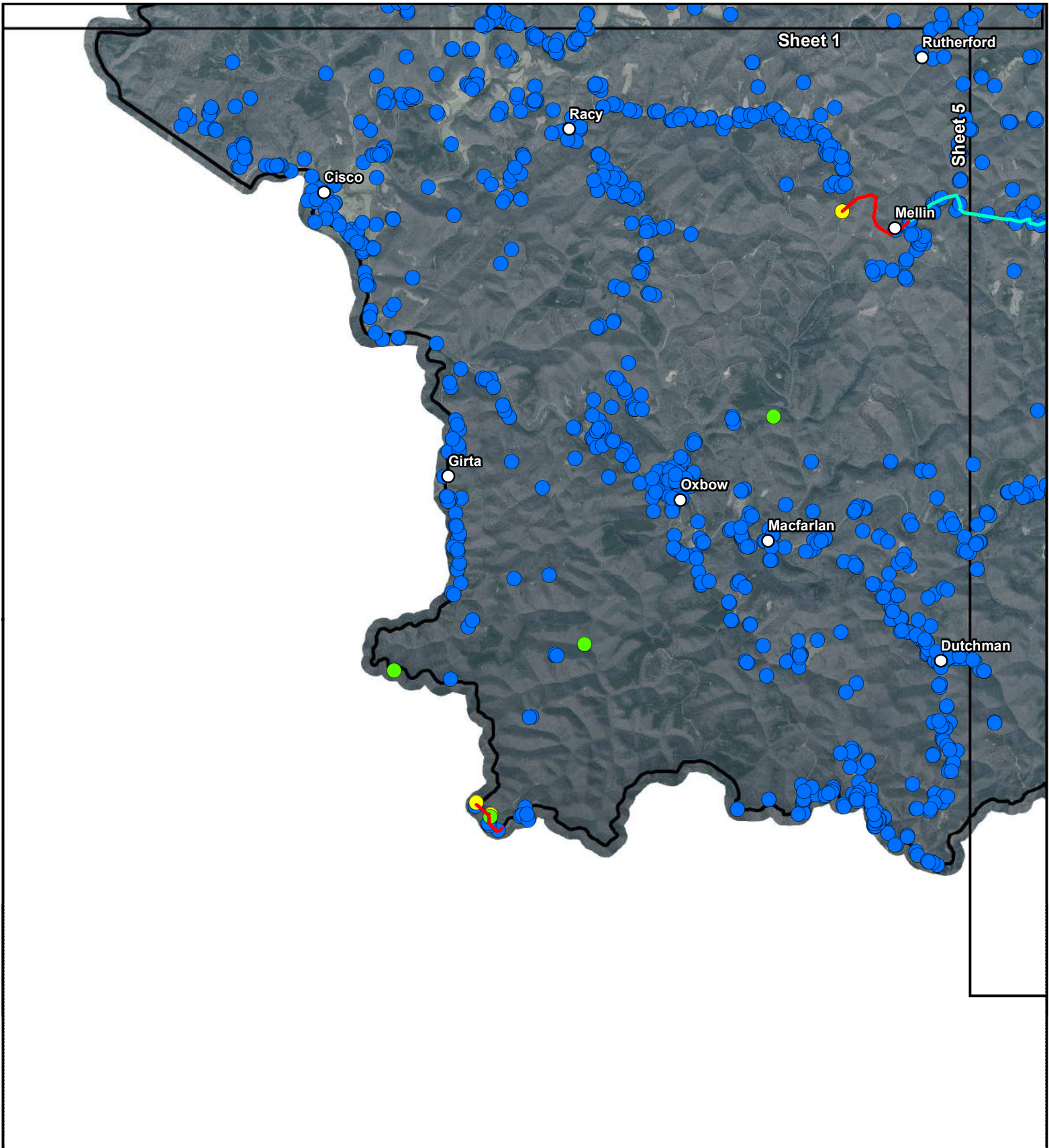





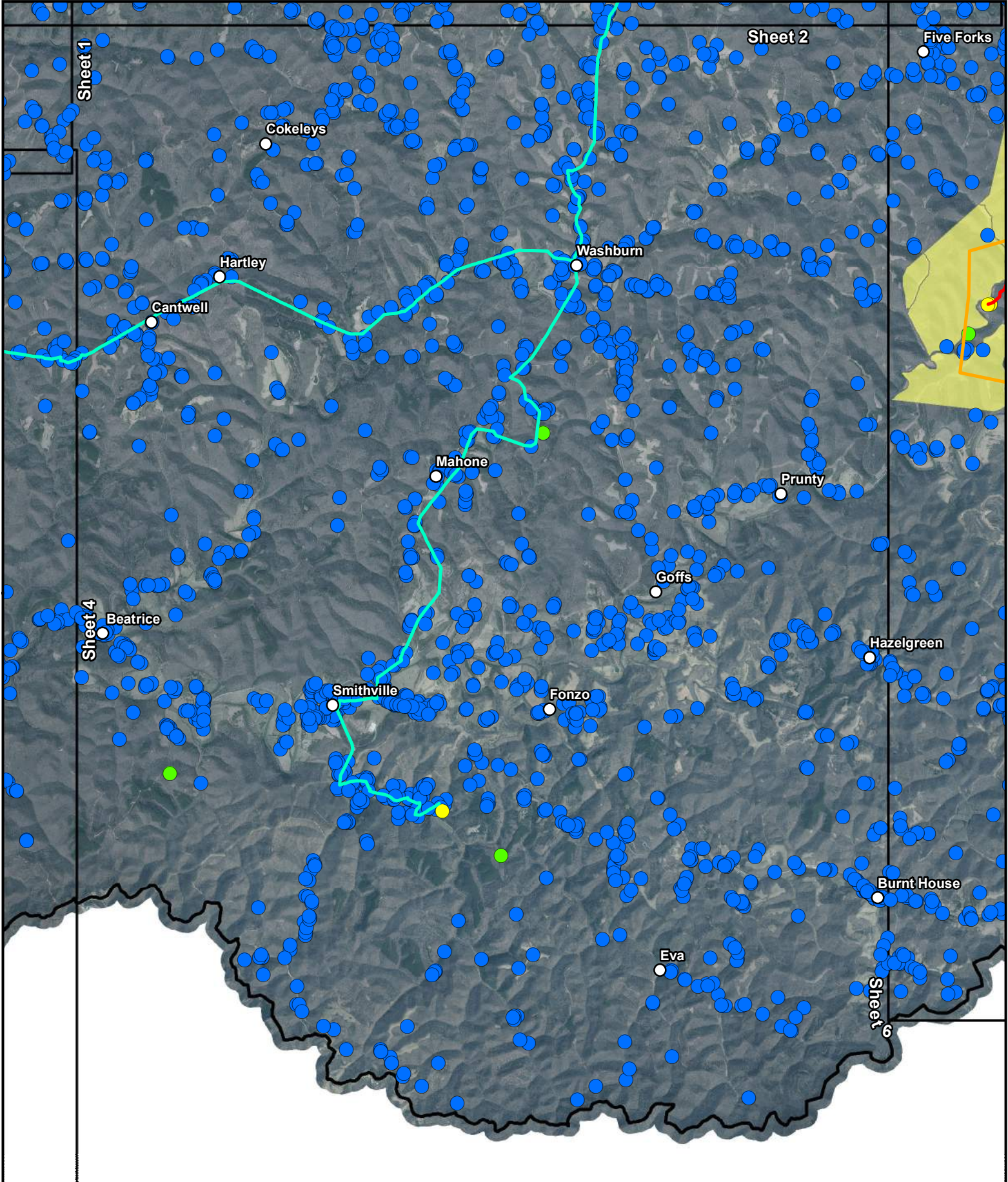
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Starlink Services, LLC - RDOF
- County Boundary
- Index
- Frontier - RDOF


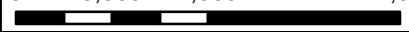
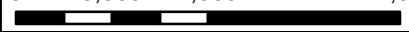
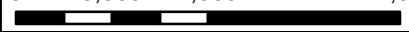


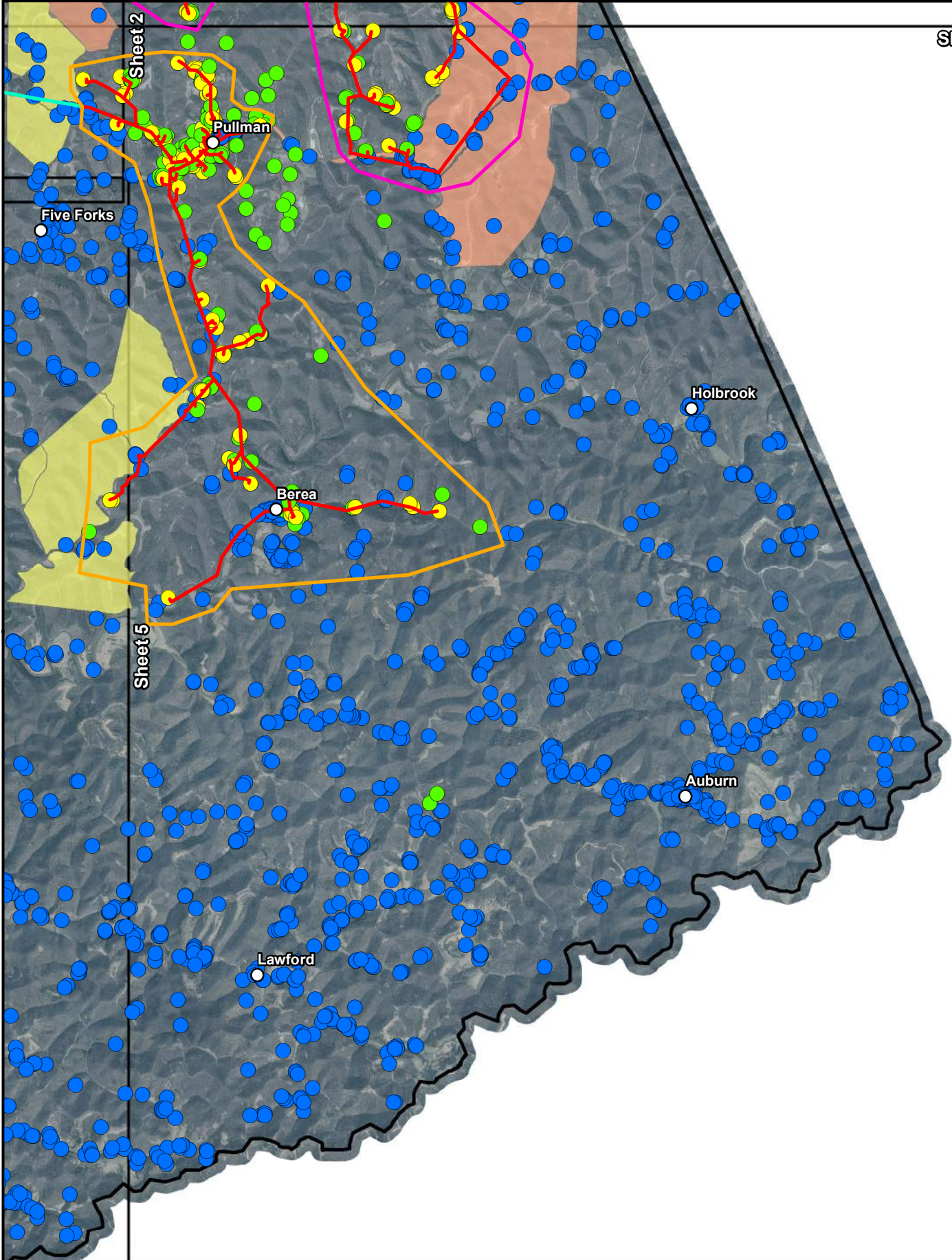
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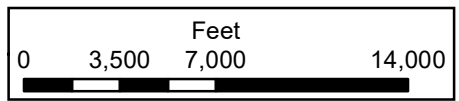
<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses Project 1 Boundary Project 2 Boundary Project 3 Boundary Frontier - RDOF 	<ul style="list-style-type: none"> Starlink Services, LLC - RDOF County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">3,500</td> <td style="text-align: center;">7,000</td> <td style="text-align: center;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td style="text-align: center;">4</td> </tr> </table>	Sheet	4
Feet															
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<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses □ Project 1 Boundary □ Project 2 Boundary □ Project 3 Boundary □ Frontier - RDOF 	<ul style="list-style-type: none"> □ Starlink Services, LLC - RDOF □ County Boundary □ Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="width: 20%;">0</td> <td style="width: 20%;">3,500</td> <td style="width: 20%;">7,000</td> <td style="width: 20%;">14,000</td> </tr> <tr> <td colspan="4"></td> </tr> </table>	Feet				0	3,500	7,000	14,000					<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td style="text-align: center;">5</td> </tr> </table>	Sheet	5
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- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Starlink Services, LLC - RDOF
- County Boundary
- Index
- Frontier - RDOF



Sheet
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Ritchie County, WV – 2023 ROC Study – Cost Estimate – Whole County

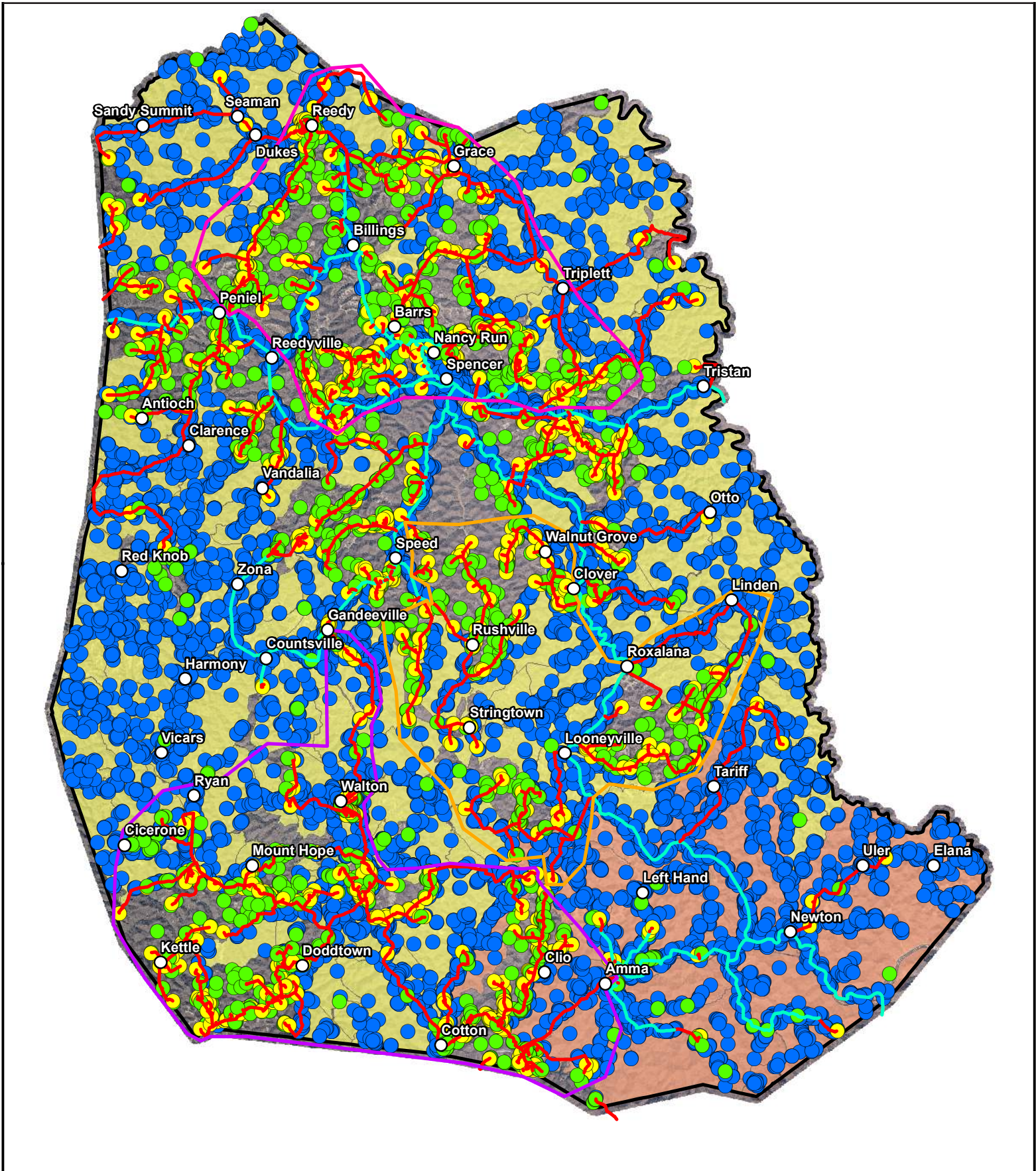
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	78.20	\$430,100
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	78.20	\$117,300
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	77.77	\$1,166,550
Aerial Construction Labor	\$50,000.00	Per Mile	77.77	\$3,888,500
Underground Construction Labor	\$150,000.00	Per Mile	0.43	\$64,500
Project Construction Contingency 10%	\$395,300.00	Lump Sum	1	\$395,300
Legal 1.5%	\$59,295.00	Lump Sum	1	\$59,295
Administrative 2%	\$79,060.00	Lump Sum	1	\$79,060
TOTAL COST = \$6,200,605				

COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
5	Ritchie	1	84	30.78	\$2,423,925
		2	165	28.53	\$2,289,093
		3	134	17.32	\$1,363,950



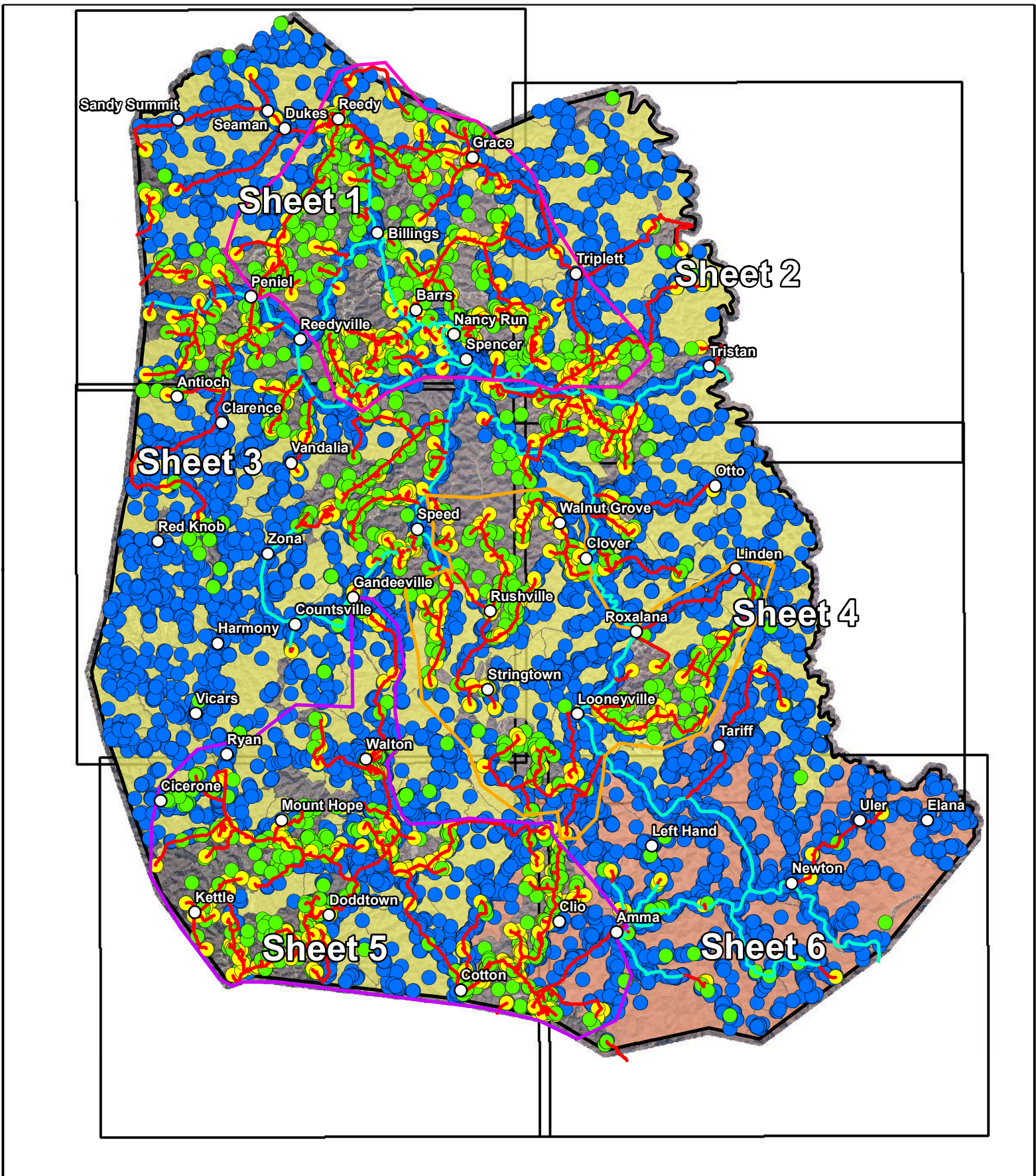
ROANE COUNTY




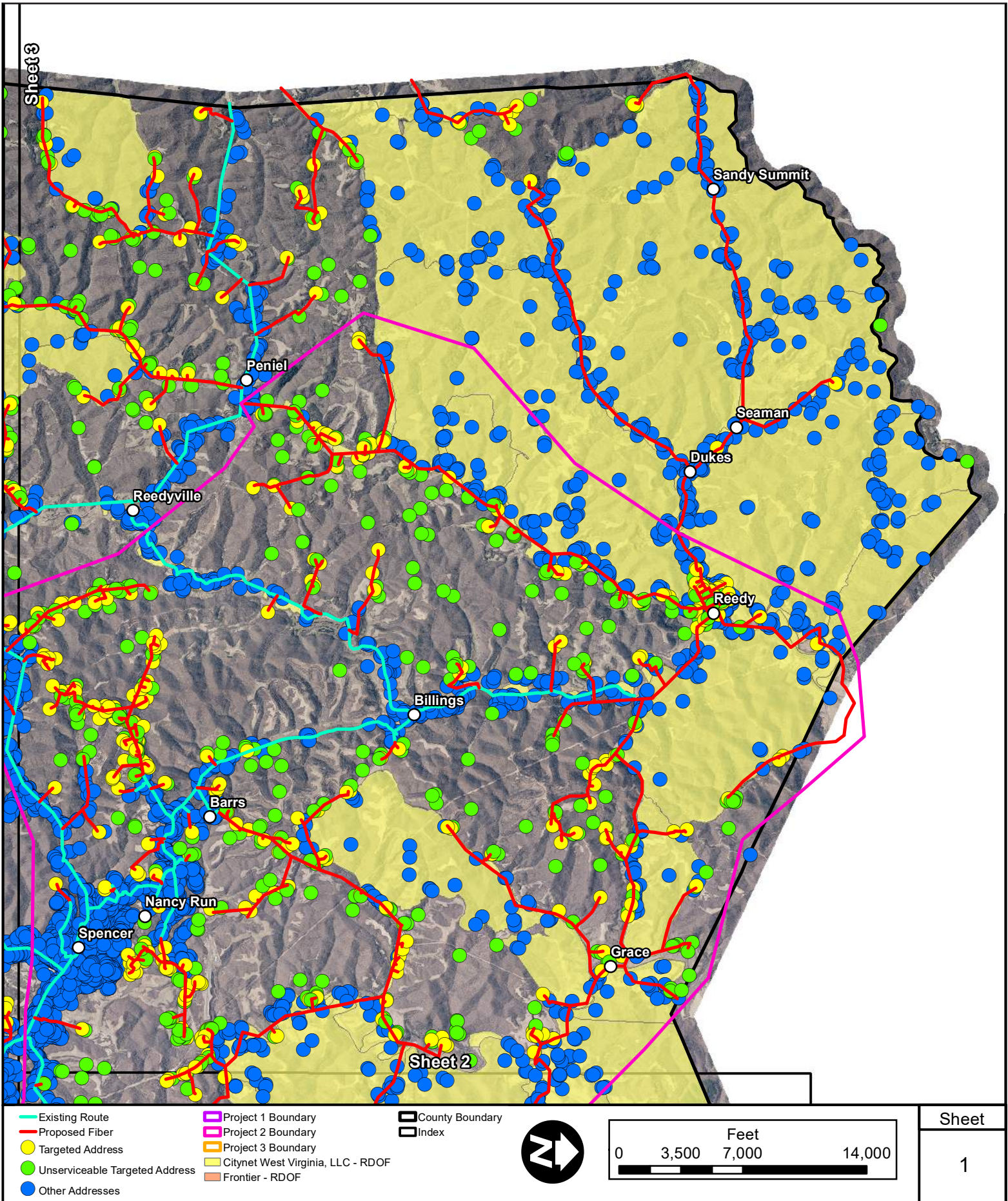
Existing Route	Project 1 Boundary	County Boundary
Proposed Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	
Other Addresses	Frontier - RDOF	

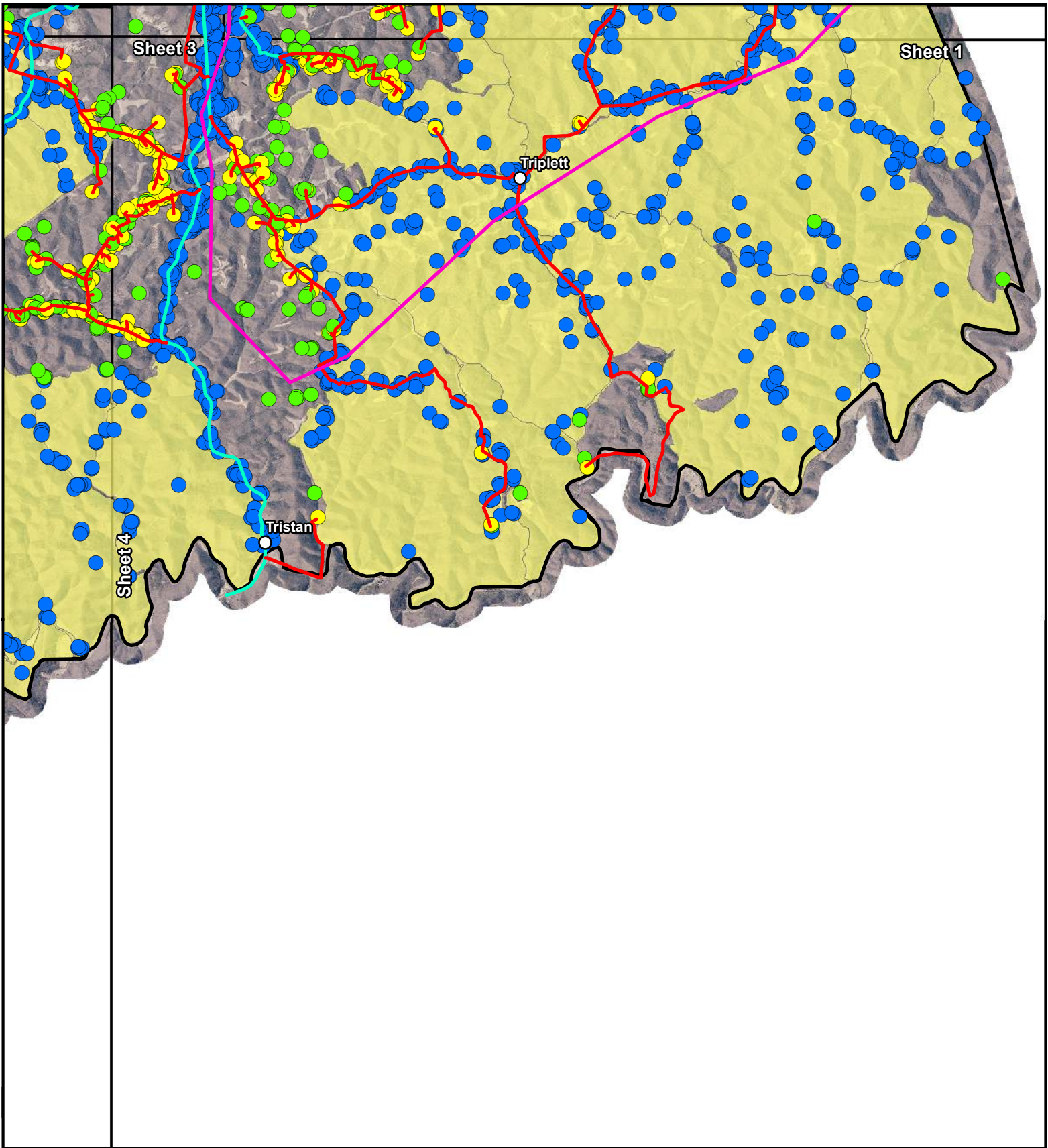
Feet

0 9,000 18,000 36,000

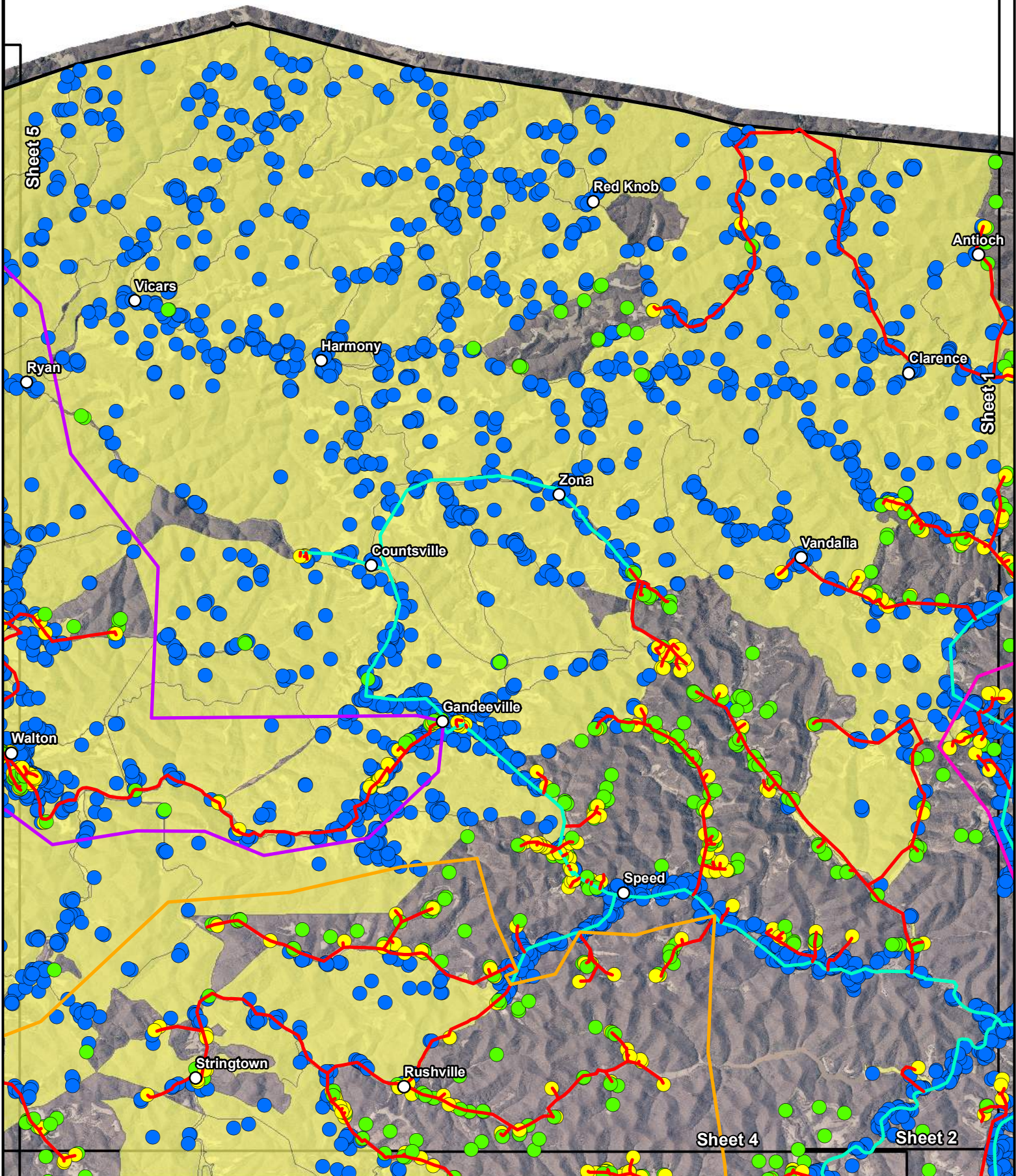


<ul style="list-style-type: none"> — Existing Route — Proposed Fiber ● Targeted Address ● Unserviceable Targeted Address ● Other Addresses 	<ul style="list-style-type: none"> Project 1 Boundary Project 2 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF Frontier - RDOF 	<ul style="list-style-type: none"> County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="width: 25%;">0</td> <td style="width: 25%;">9,500</td> <td style="width: 25%;">19,000</td> <td style="width: 25%;">38,000</td> </tr> </table>	Feet				0	9,500	19,000	38,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td>INDEX</td> </tr> </table>	Sheet	INDEX
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INDEX															

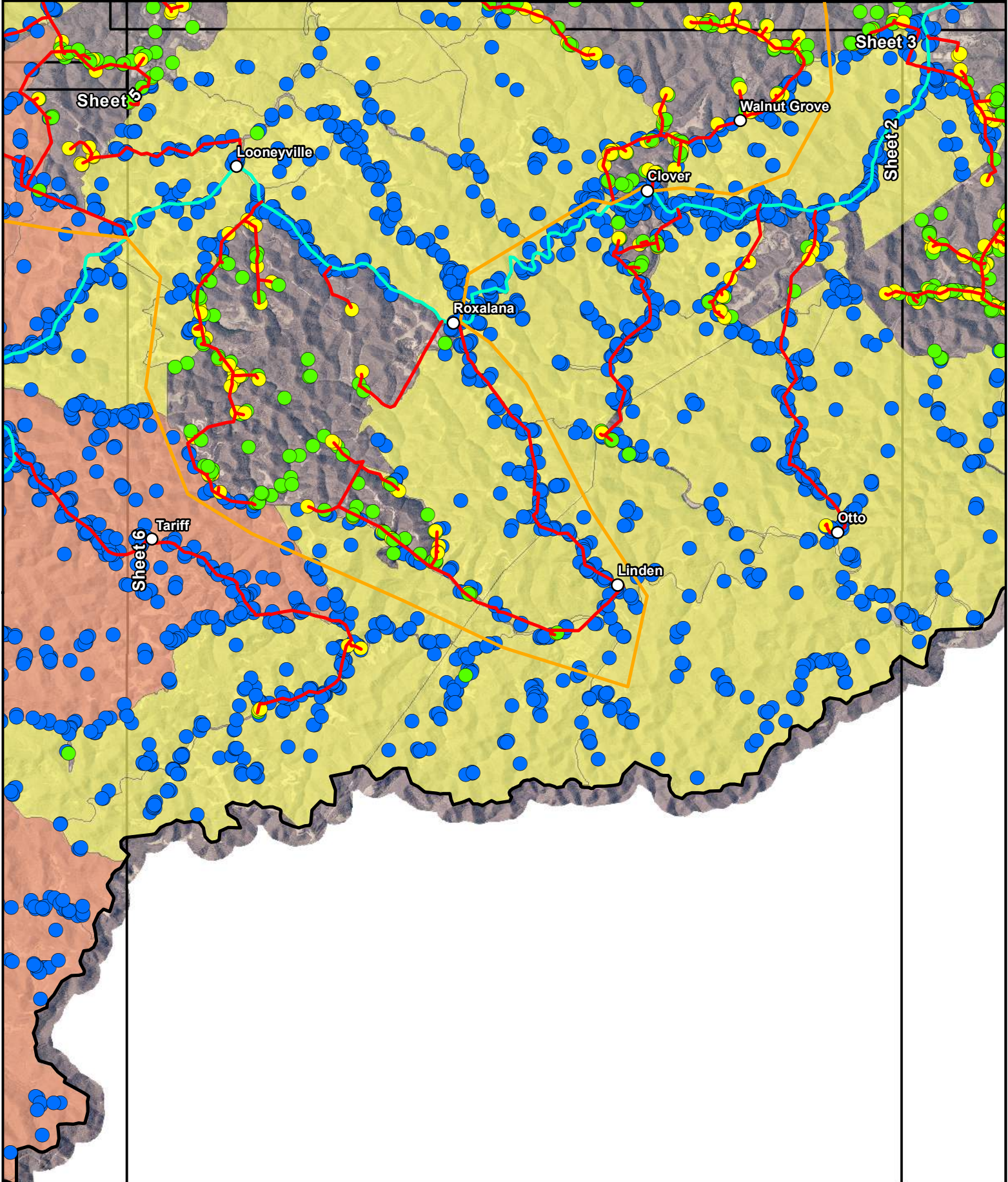




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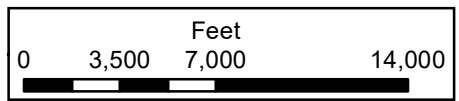


<ul style="list-style-type: none"> — Existing Route — Proposed Fiber ● Targeted Address ● Unserviceable Targeted Address ● Other Addresses 	<ul style="list-style-type: none"> Project 1 Boundary Project 2 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF Frontier - RDOF 	<ul style="list-style-type: none"> County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="width: 20%;">0</td> <td style="width: 20%;">3,500</td> <td style="width: 20%;">7,000</td> <td style="width: 20%;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <th>Sheet</th> </tr> <tr> <td style="text-align: center; font-size: 24px;">3</td> </tr> </table>	Sheet	3
Feet															
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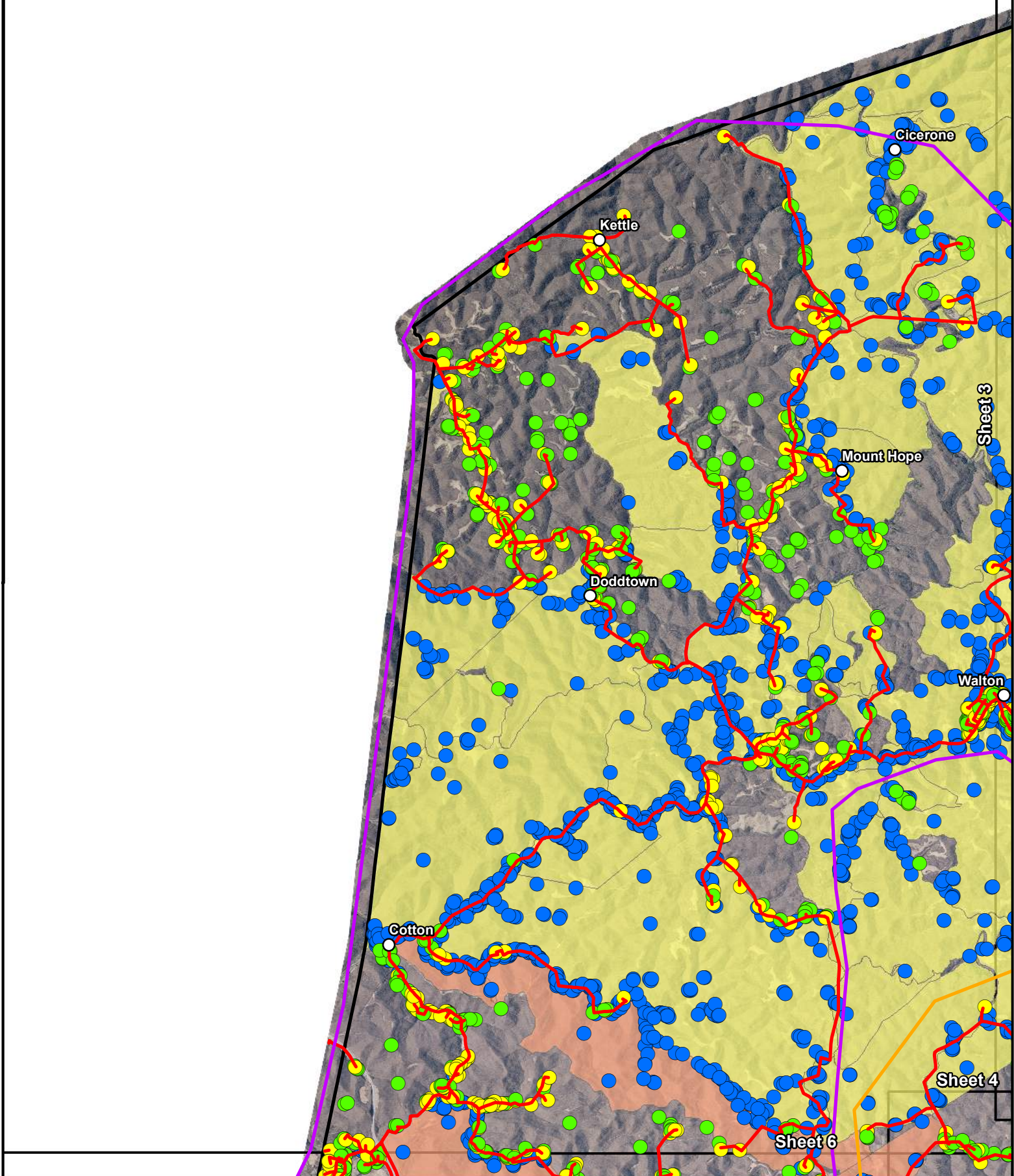



- Existing Route
- Proposed Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Citynet West Virginia, LLC - RDOF
- Frontier - RDOF

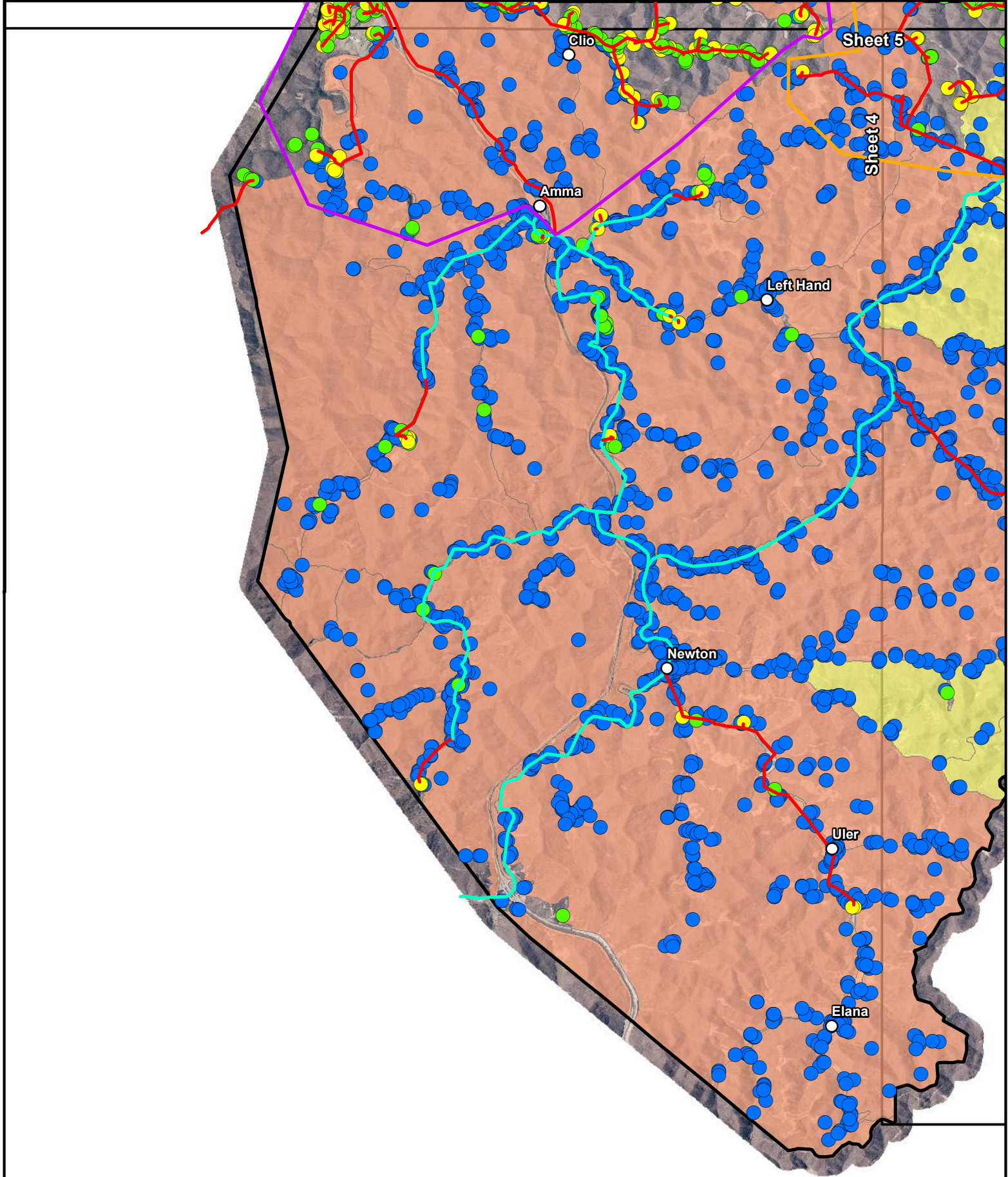
- County Boundary
- Index




Sheet
4



<ul style="list-style-type: none"> — Existing Route — Proposed Fiber ● Targeted Address ● Unserviceable Targeted Address ● Other Addresses 	<ul style="list-style-type: none"> Project 1 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF Frontier - RDOF 	<ul style="list-style-type: none"> County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="width: 25%;">0</td> <td style="width: 25%;">3,500</td> <td style="width: 25%;">7,000</td> <td style="width: 25%;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <th>Sheet</th> </tr> <tr> <td style="text-align: center;">5</td> </tr> </table>	Sheet	5
Feet															
0	3,500	7,000	14,000												
Sheet															
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<ul style="list-style-type: none"> — Existing Route — Proposed Fiber ● Targeted Address ● Unserviceable Targeted Address ● Other Addresses 	<ul style="list-style-type: none"> Project 1 Boundary Project 2 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF Frontier - RDOF 	<ul style="list-style-type: none"> County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="width: 20%;">0</td> <td style="width: 20%;">3,500</td> <td style="width: 20%;">7,000</td> <td style="width: 20%;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td style="text-align: center;">6</td> </tr> </table>	Sheet	6
Feet															
0	3,500	7,000	14,000												
Sheet															
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Roane County, WV – 2023 ROC Study – Cost Estimate – Whole County

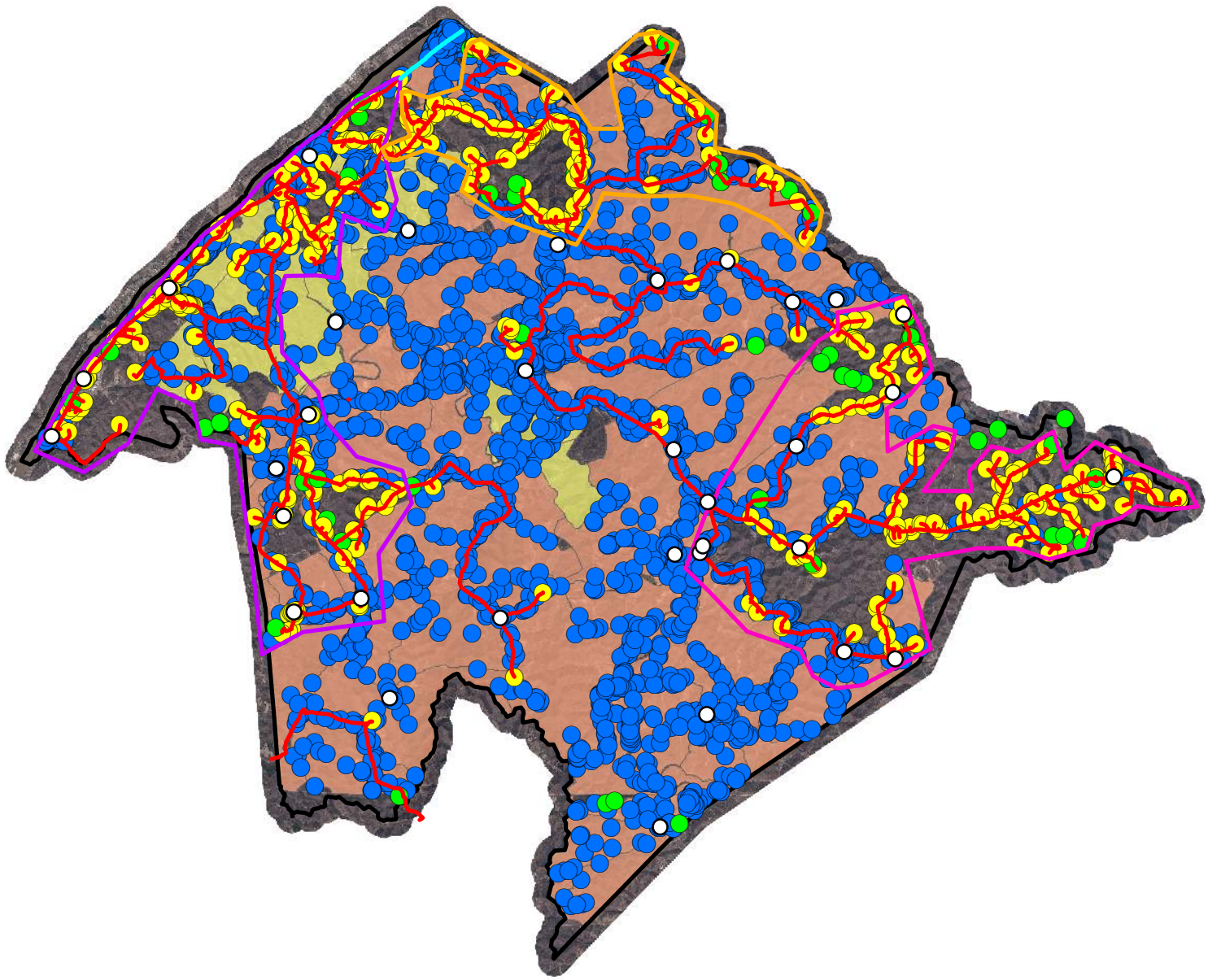
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	346.31	\$1,904,705
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	346.31	\$519,465
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	346.31	\$5,194,650
Aerial Construction Labor	\$50,000.00	Per Mile	346.31	\$17,315,500
Underground Construction Labor	\$150,000.00	Per Mile	2.00	\$300,000
Project Construction Contingency 10%	\$1,761,550.00	Lump Sum	1	\$1,761,550
Legal 1.5%	\$264,232.50	Lump Sum	1	\$264,233
Administrative 2%	\$352,310.00	Lump Sum	1	\$352,310
TOTAL COST = \$27,612,413				

COUNTY SAMPLE PROJECT

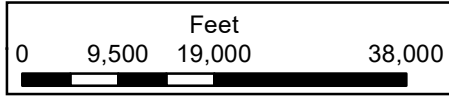
Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
5	Roane	1	511	95.78	\$7,542,675
		2	461	82.95	\$6,532,313
		3	199	57.69	\$4,543,088

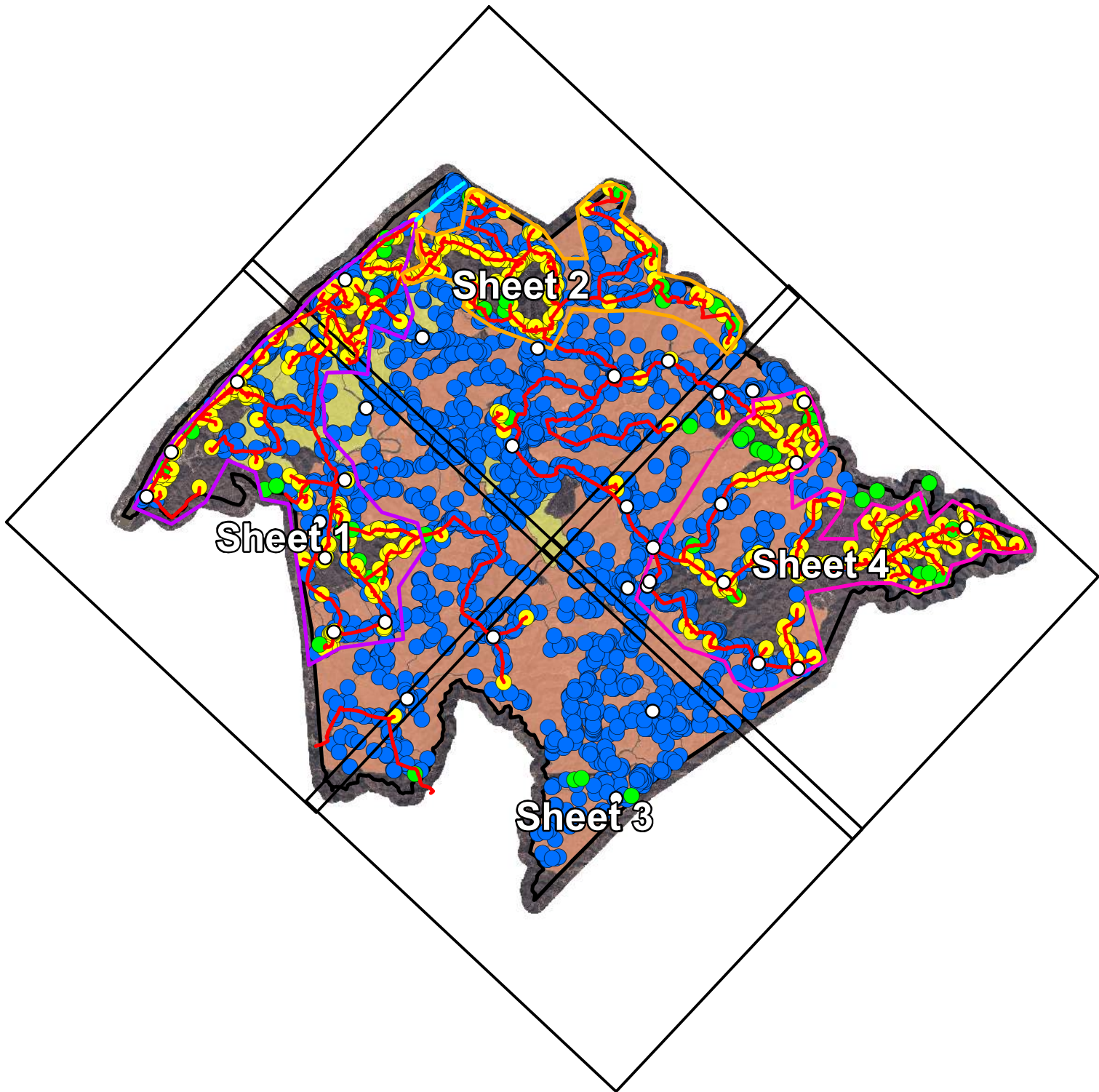


TYLER COUNTY

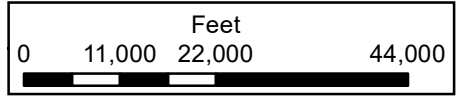


- Existing Route
- Proposed Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Citynet West Virginia, LLC - RDOF
- Frontier - RDOF
- County Boundary

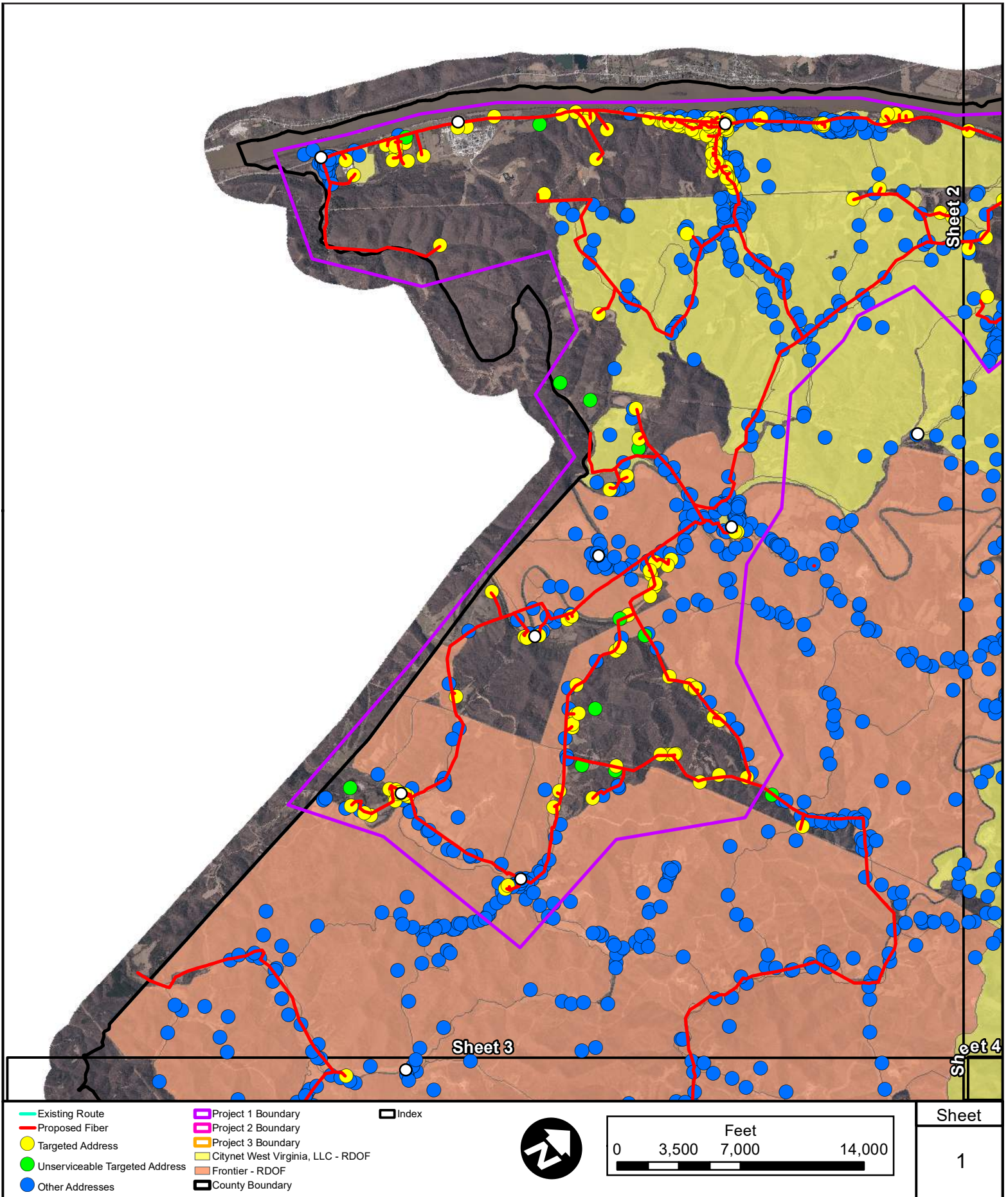


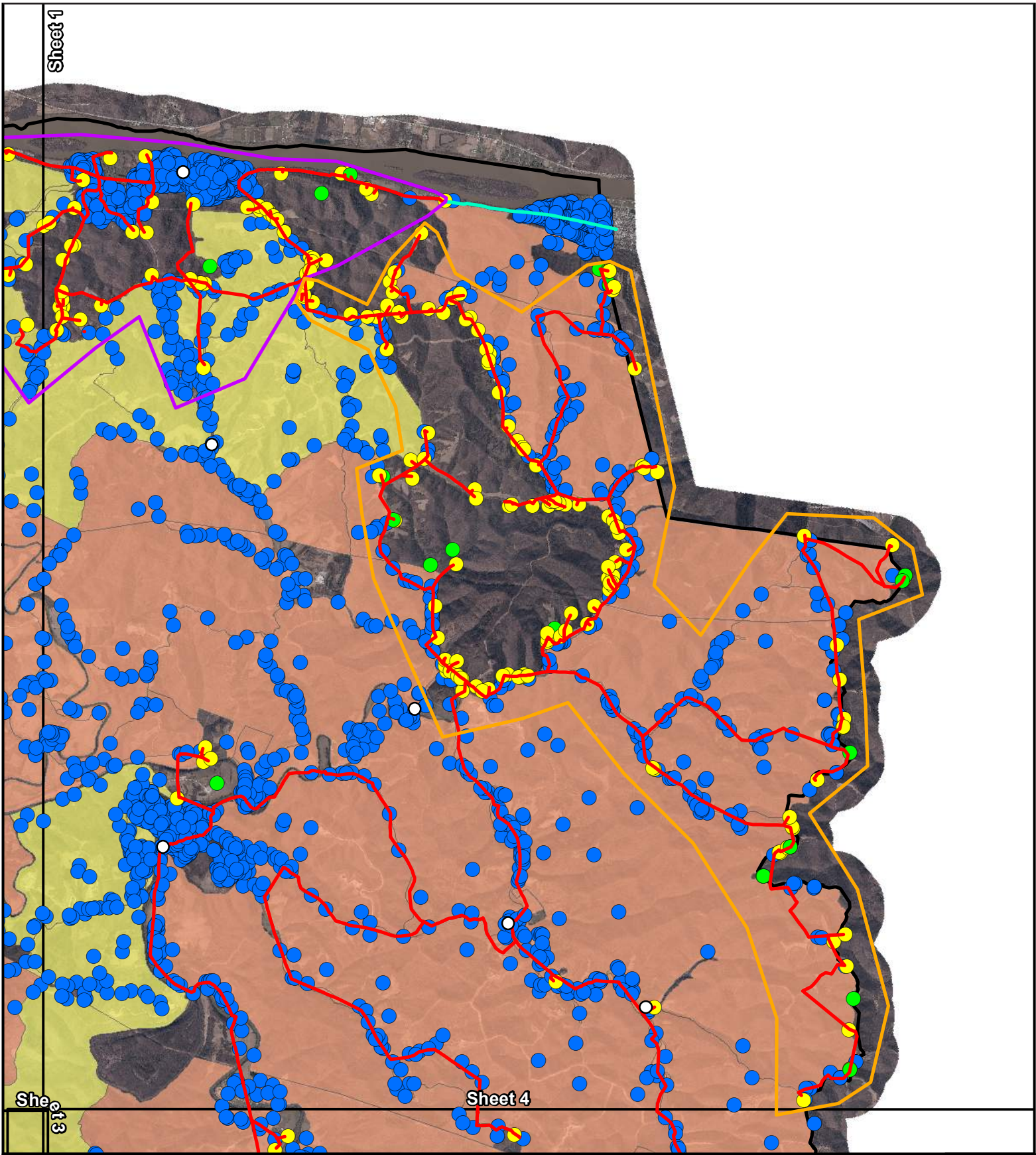


- Existing Route
- Proposed Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Citynet West Virginia, LLC - RDOF
- Frontier - RDOF
- County Boundary
- Index

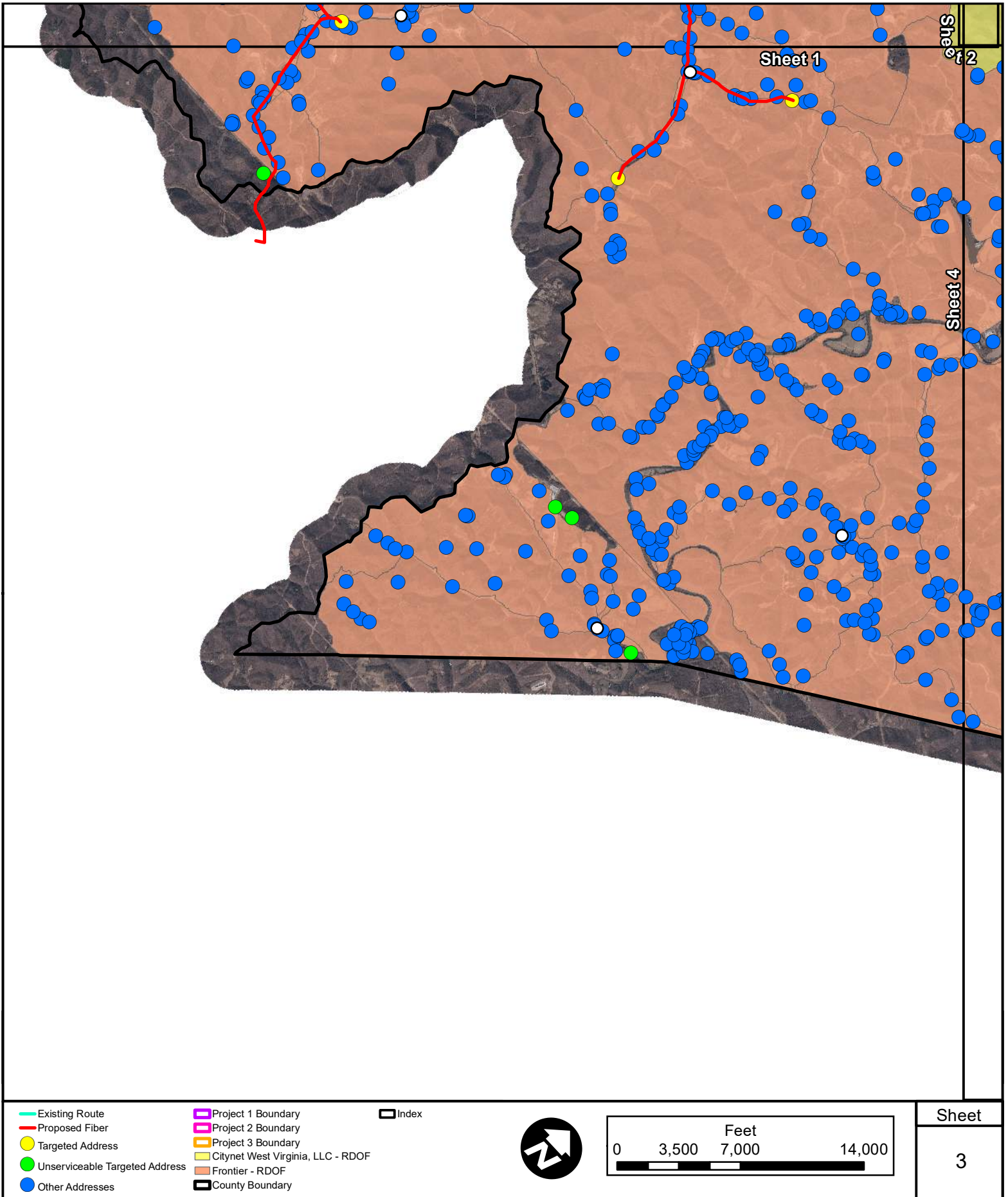


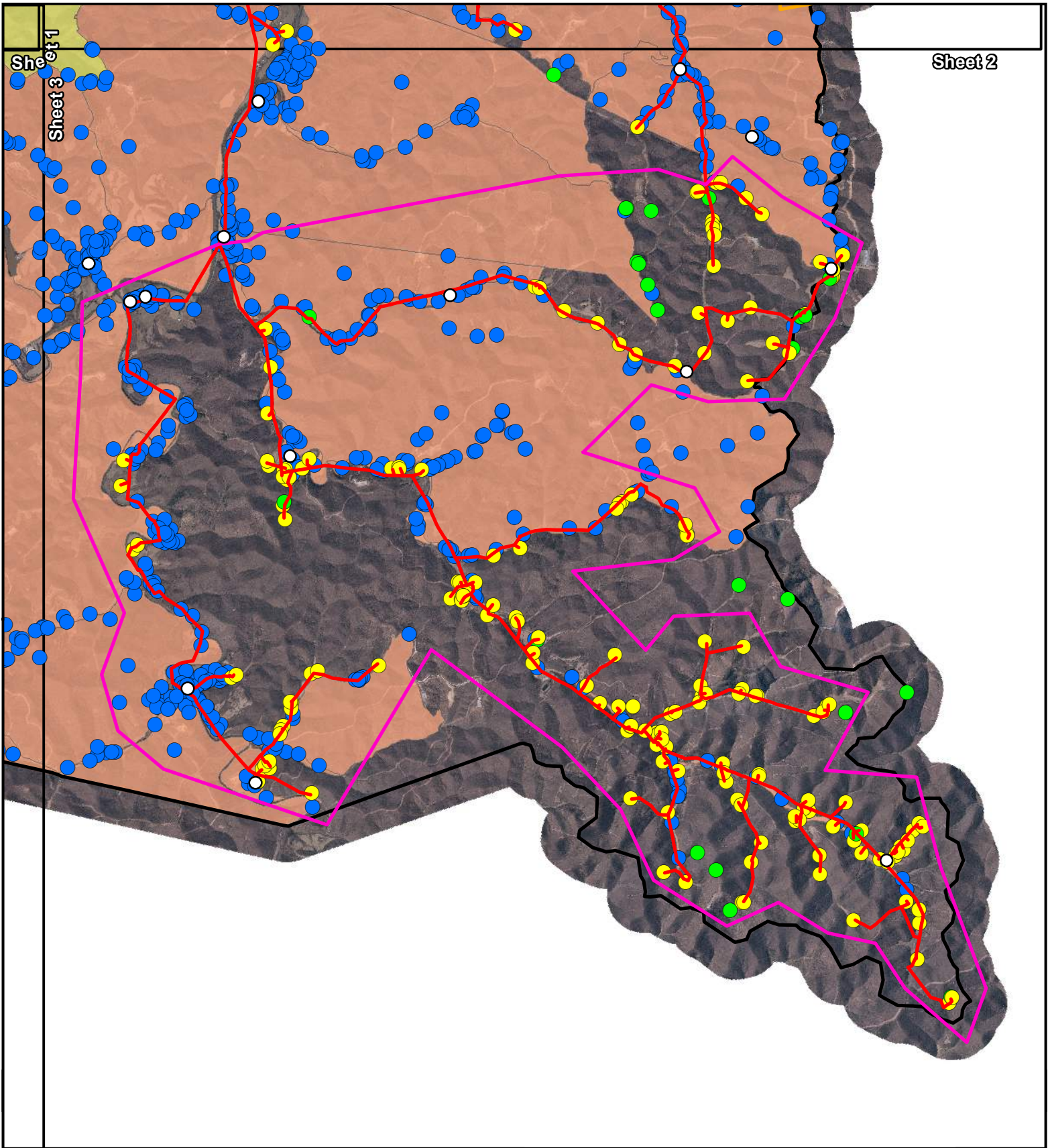
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INDEX





<ul style="list-style-type: none"> — Existing Route — Proposed Fiber ● Targeted Address ● Unserviceable Targeted Address ● Other Addresses 	<ul style="list-style-type: none"> Project 1 Boundary Project 2 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF Frontier - RDOF County Boundary 	<ul style="list-style-type: none"> Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="width: 25%;">0</td> <td style="width: 25%;">3,500</td> <td style="width: 25%;">7,000</td> <td style="width: 25%;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td style="width: 100%;">Sheet</td> </tr> <tr> <td style="text-align: center;">2</td> </tr> </table>	Sheet	2
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<ul style="list-style-type: none"> — Existing Route — Proposed Fiber ● Targeted Address ● Unserviceable Targeted Address ● Other Addresses 	<ul style="list-style-type: none"> Project 1 Boundary Project 2 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF Frontier - RDOF County Boundary 	<ul style="list-style-type: none"> Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">3,500</td> <td style="text-align: center;">7,000</td> <td style="text-align: center;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td style="text-align: right;">Sheet</td> </tr> <tr> <td style="text-align: center;">4</td> </tr> </table>	Sheet	4
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Tyler County, WV – 2023 ROC Study – Cost Estimate – Whole County

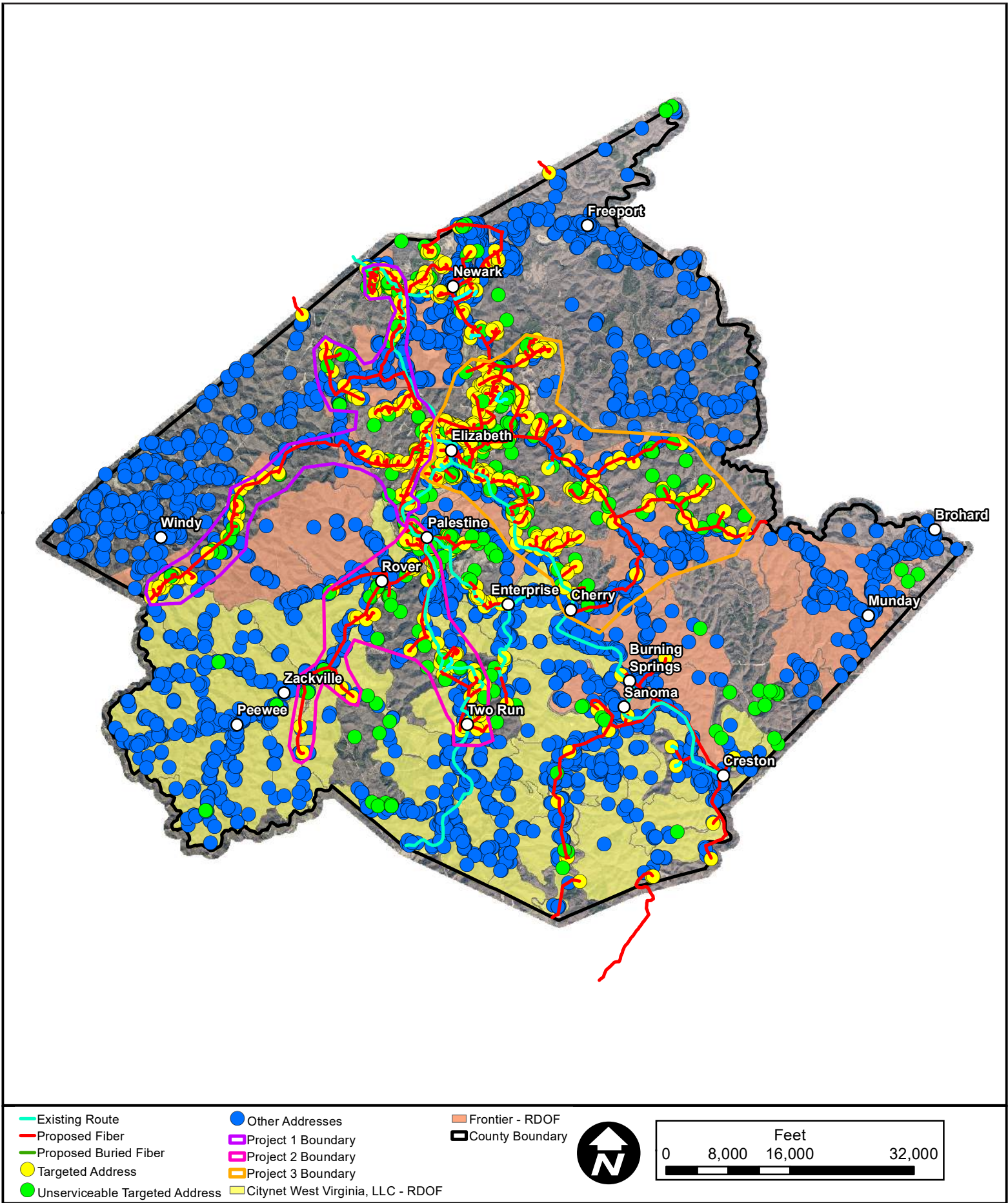
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	200.99	\$1,105,445
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	200.99	\$301,485
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	200.99	\$3,014,850
Aerial Construction Labor	\$50,000.00	Per Mile	200.99	\$10,049,500
Underground Construction Labor	\$150,000.00	Per Mile	0.00	\$0
Project Construction Contingency 10%	\$1,004,950.00	Lump Sum	1	\$1,004,950
Legal 1.5%	\$150,742.50	Lump Sum	1	\$150,743
Administrative 2%	\$200,900.00	Lump Sum	1	\$200,900
TOTAL COST = \$15,827,963				

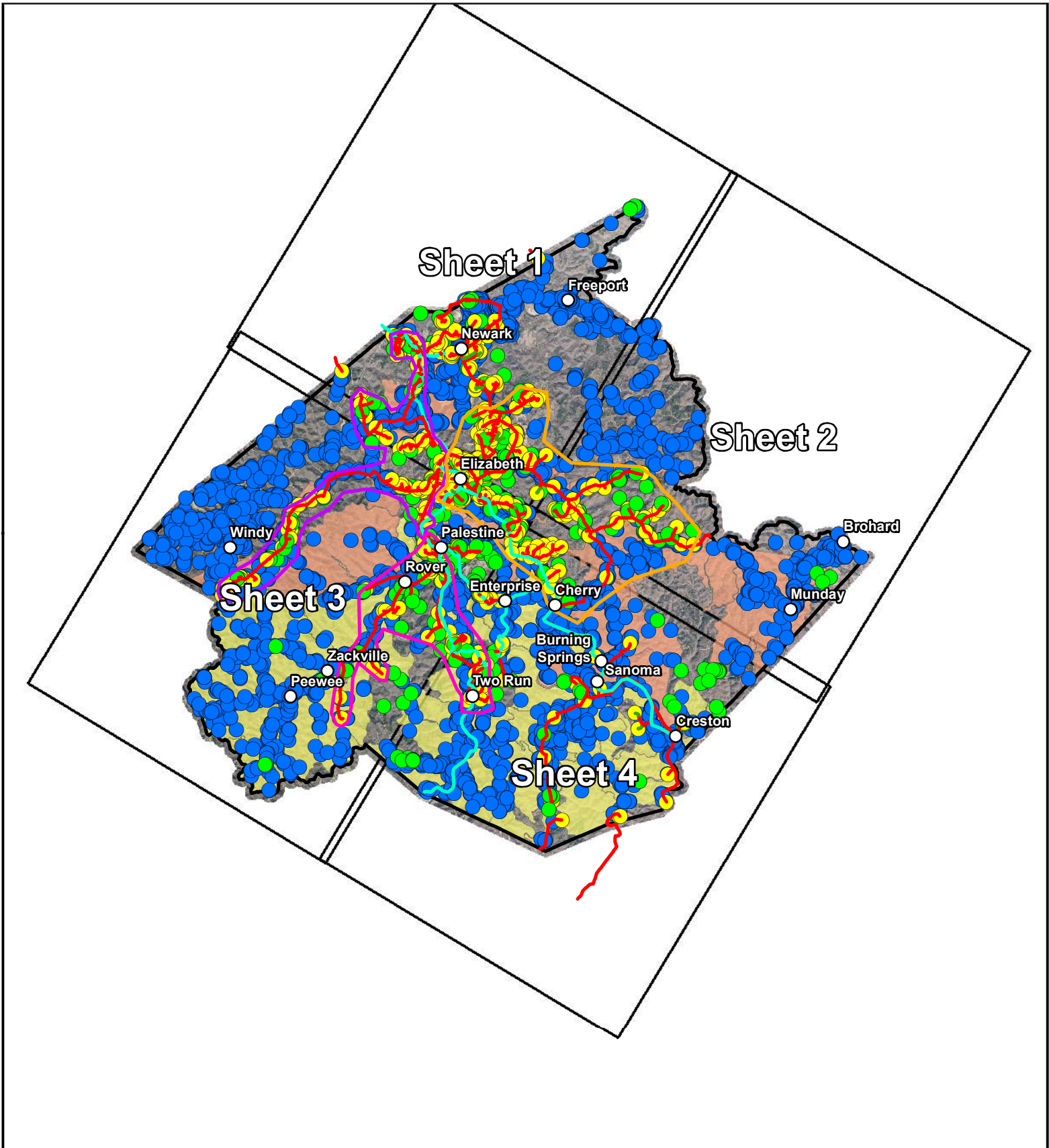
COUNTY SAMPLE PROJECT


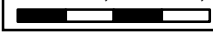
Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
5	Tyler	1	266	67.65	\$5,327,438
		2	190	80.31	\$6,324,413
		3	133	38.20	\$3,008,250

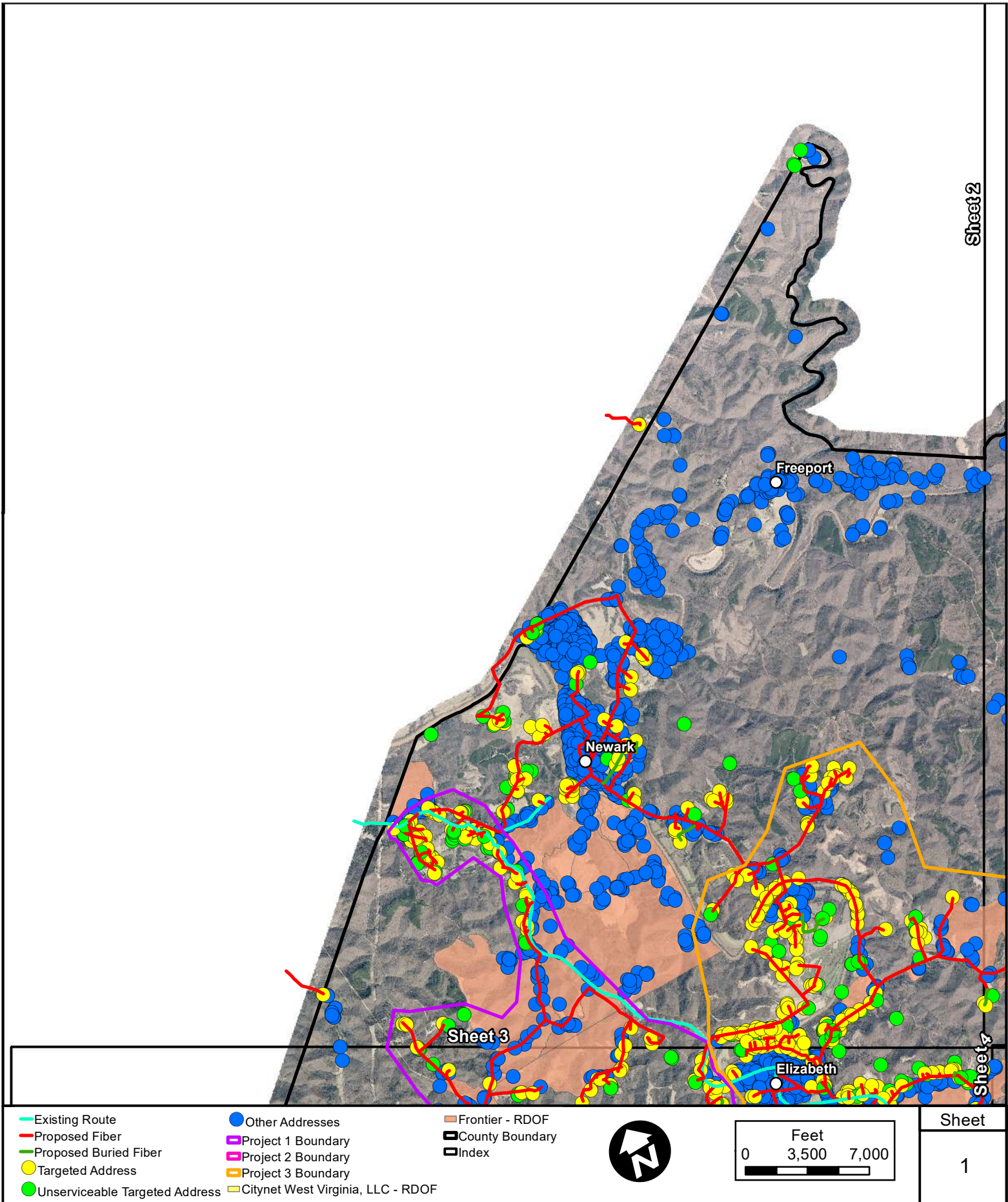


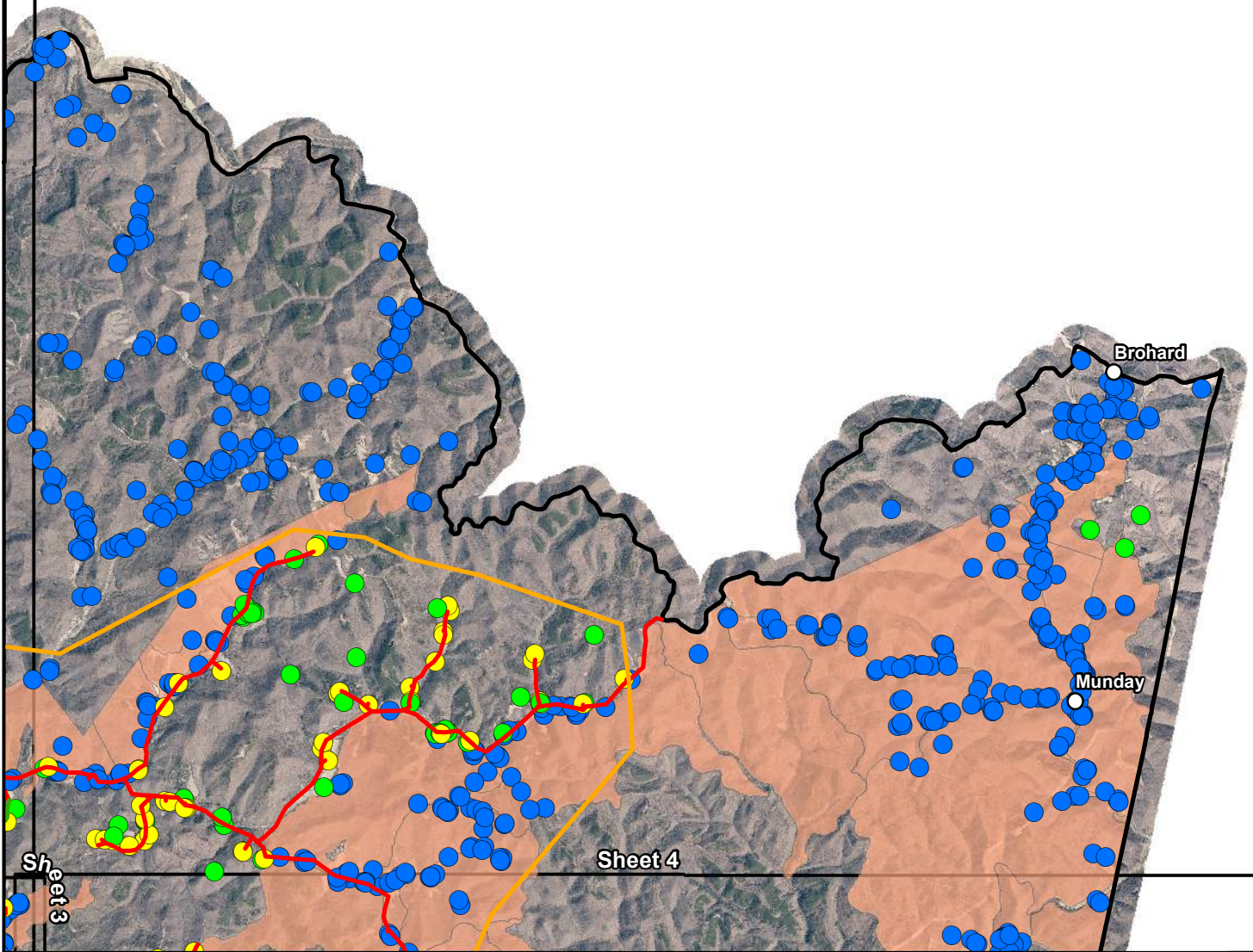
WIRT COUNTY



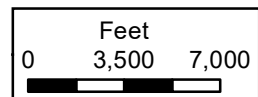


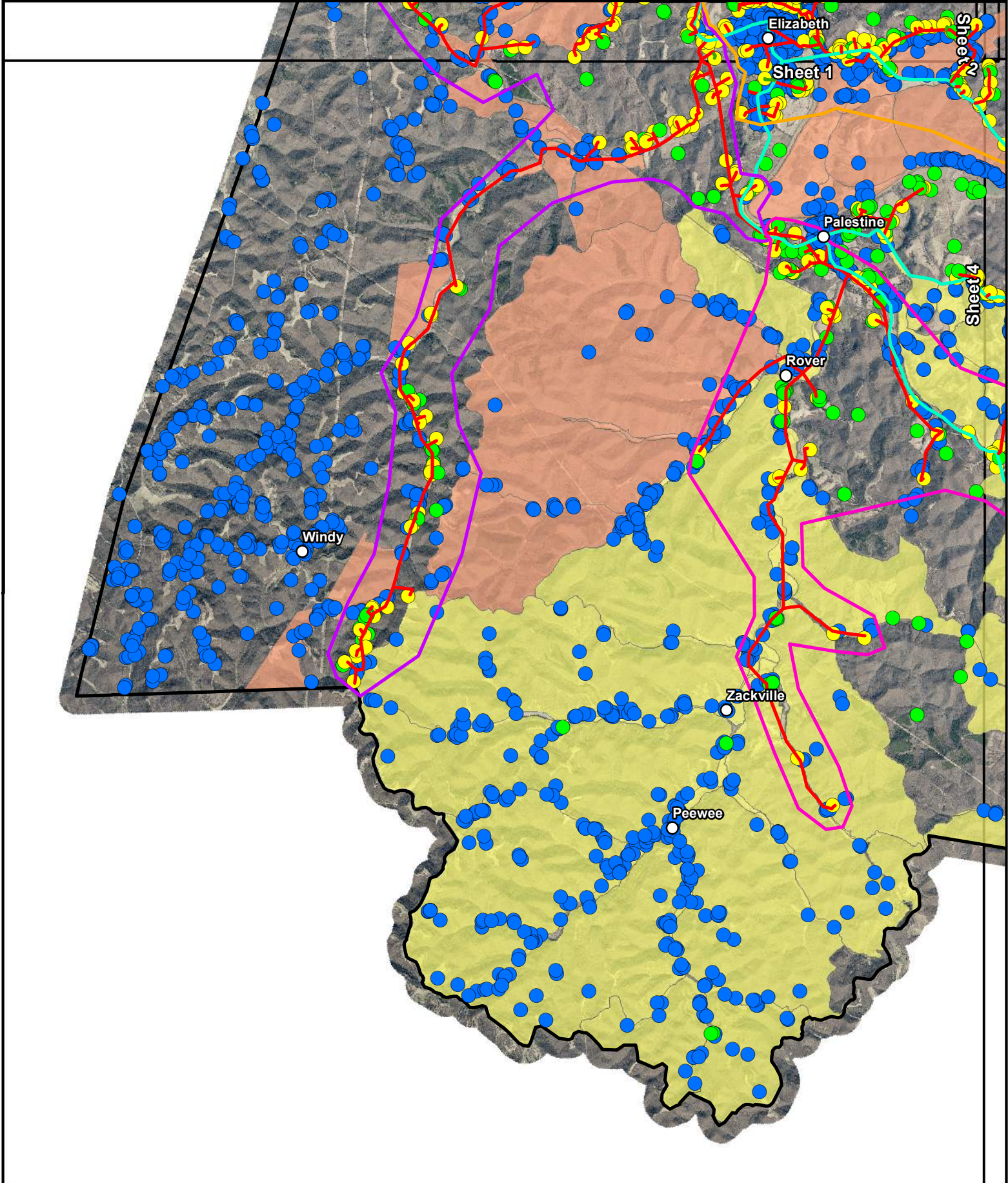
<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses Project 1 Boundary Project 2 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF 	<ul style="list-style-type: none"> Frontier - RDOF County Boundary Index 		<div style="border: 1px solid black; padding: 5px;"> <p>Feet</p> <p>0 10,500 21,000</p>  </div>	<table border="1" style="width: 100%;"> <tr> <td style="padding: 5px;">Sheet</td> </tr> <tr> <td style="padding: 5px;">INDEX</td> </tr> </table>	Sheet	INDEX
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INDEX							


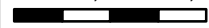
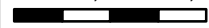
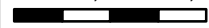


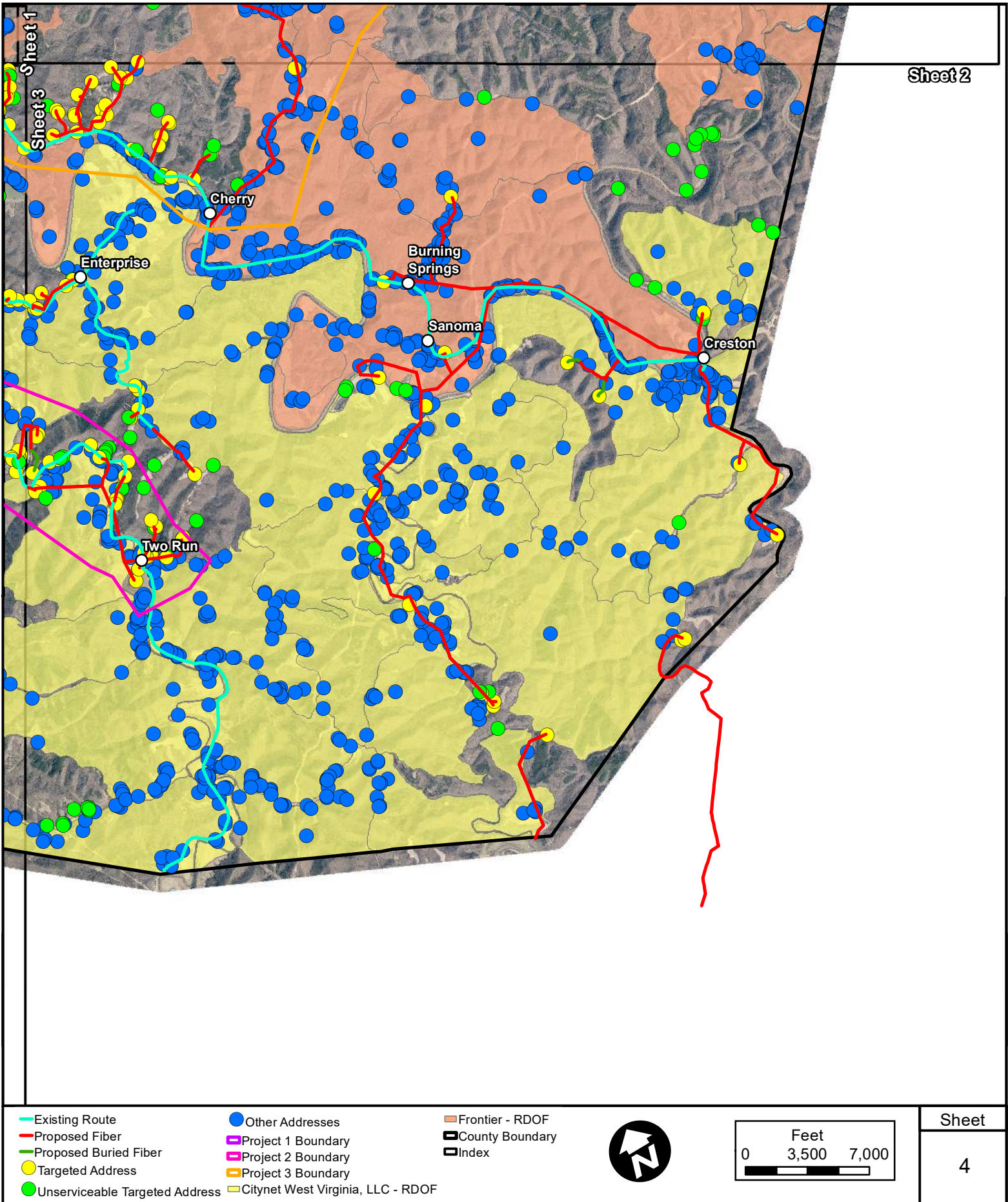


- Existing Route
- Proposed Fiber
- - - Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Citynet West Virginia, LLC - RDOF
- Frontier - RDOF
- County Boundary
- Index





<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses — Project 1 Boundary — Project 3 Boundary Citynet West Virginia, LLC - RDOF 	<ul style="list-style-type: none"> Frontier - RDOF County Boundary Index 		<table border="1"> <tr> <th colspan="3">Feet</th> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">3,500</td> <td style="text-align: center;">7,000</td> </tr> <tr> <td colspan="3" style="text-align: center;"></td> </tr> </table>	Feet			0	3,500	7,000				<table border="1"> <tr> <th>Sheet</th> </tr> <tr> <td style="text-align: center;">3</td> </tr> </table>	Sheet	3
Feet																
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Sheet																
3																



Wirt County, WV – 2023 ROC Study – Cost Estimate – Whole County

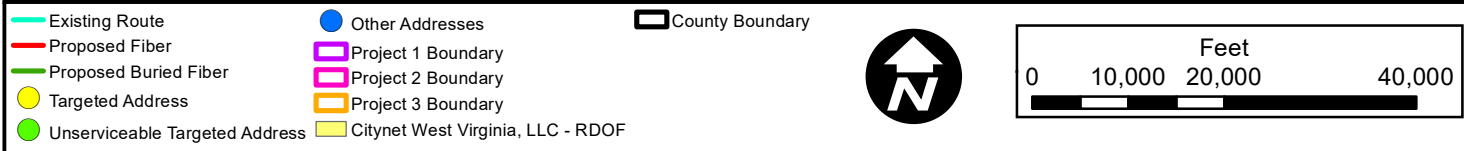
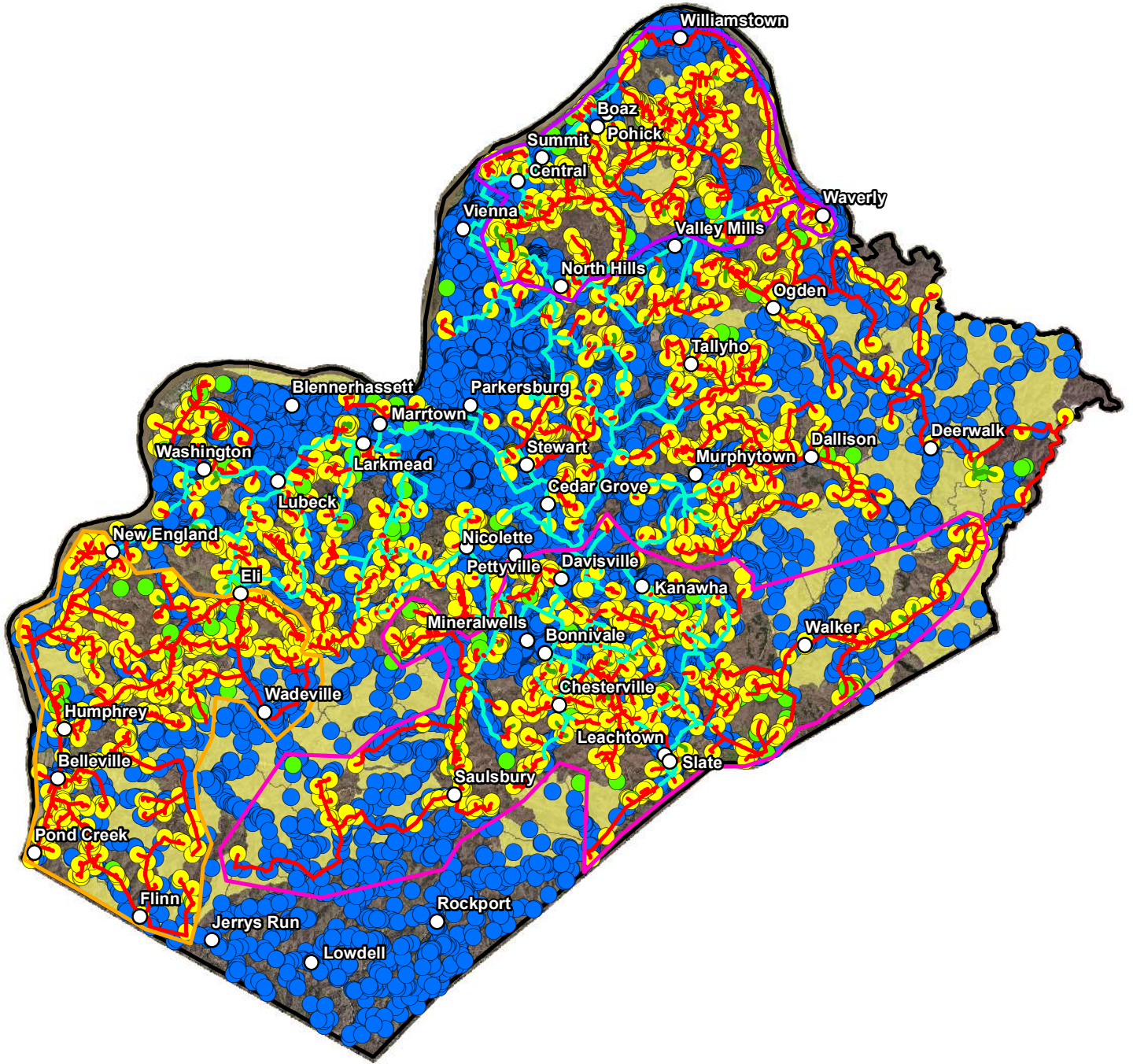
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	121.27	\$666,985
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	121.27	\$181,905
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	119.08	\$1,786,200
Aerial Construction Labor	\$50,000.00	Per Mile	119.08	\$5,954,000
Underground Construction Labor	\$150,000.00	Per Mile	2.19	\$328,500
Project Construction Contingency 10%	\$628,250.00	Lump Sum	1	\$628,250
Legal 1.5%	\$94,327.50	Lump Sum	1	\$94,328
Administrative 2%	\$125,650.00	Lump Sum	1	\$125,650
TOTAL COST = \$9,765,728				

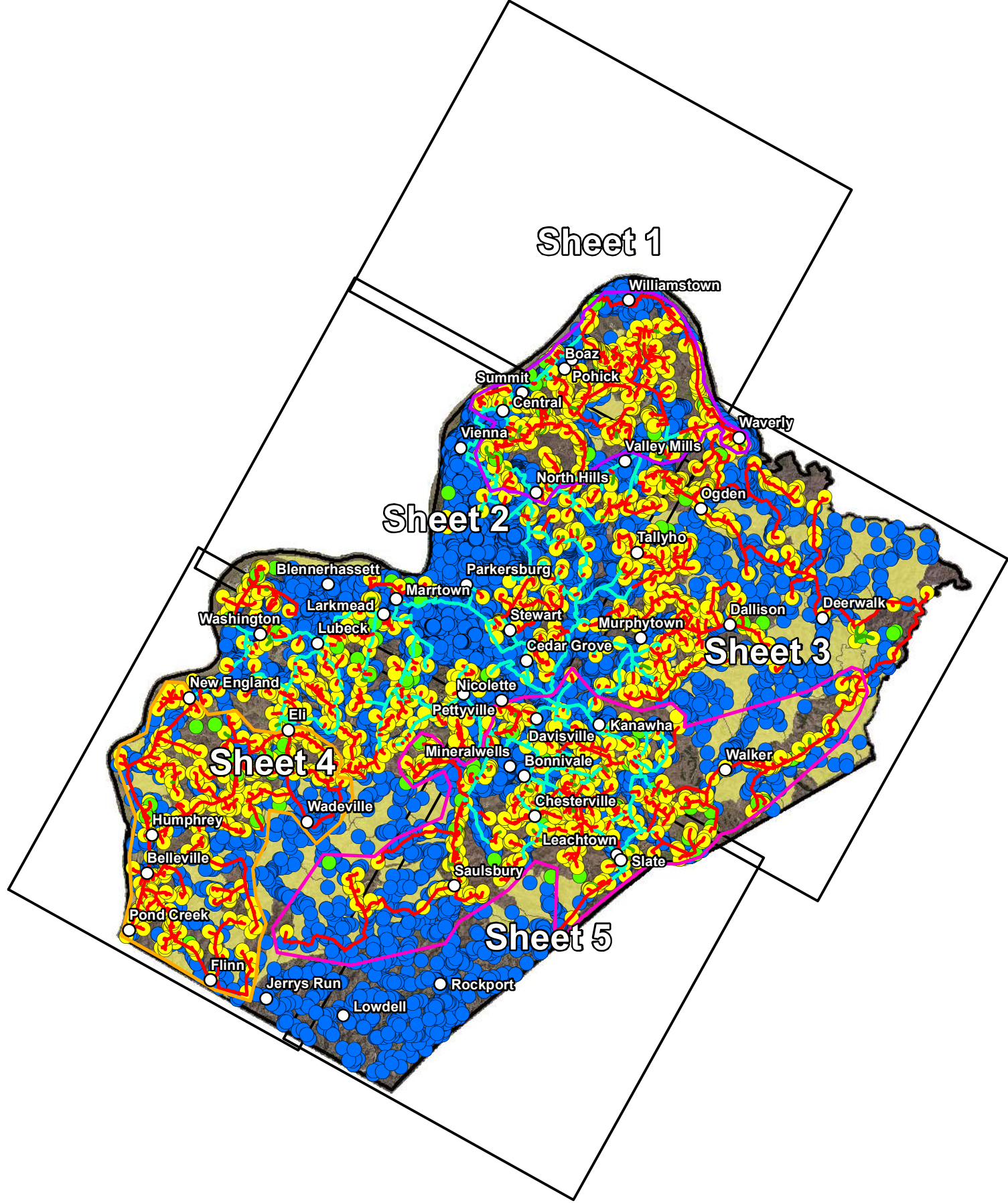
COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
5	Wirt	1	158	28.20	\$2,225,675
		2	74	20.38	\$1,628,565
		3	343	39.66	\$3,200,055

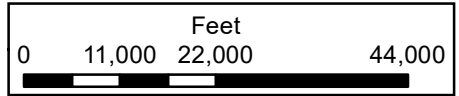


WOOD COUNTY



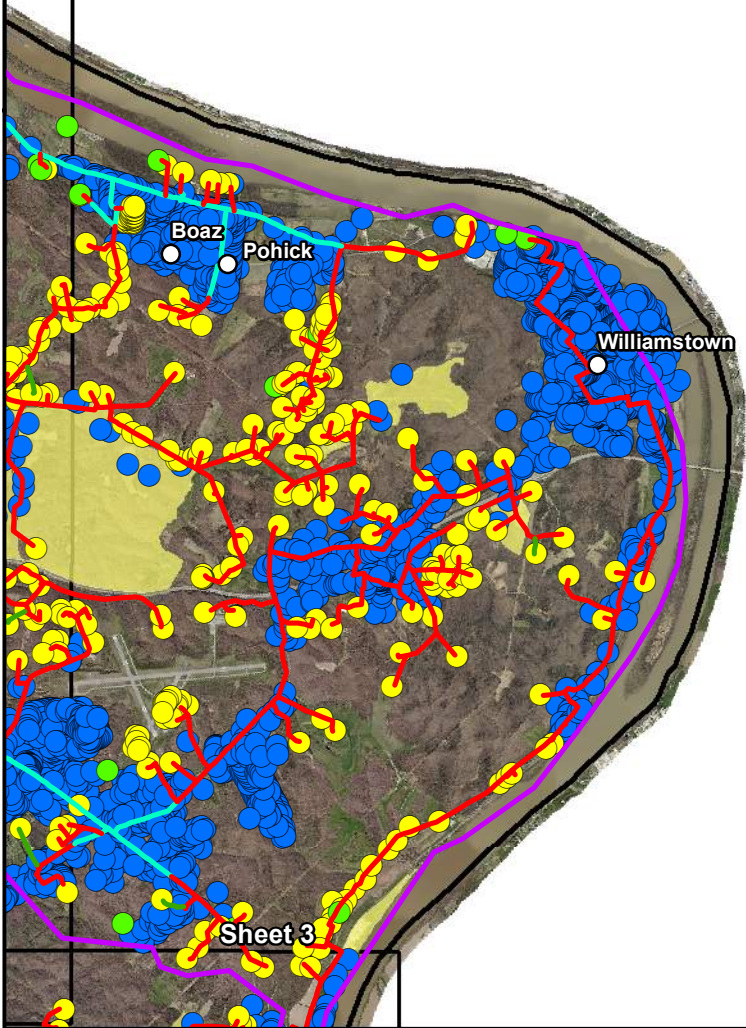


- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Citynet West Virginia, LLC - RDOF
- County Boundary
- Index

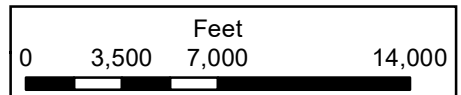


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Sheet 2

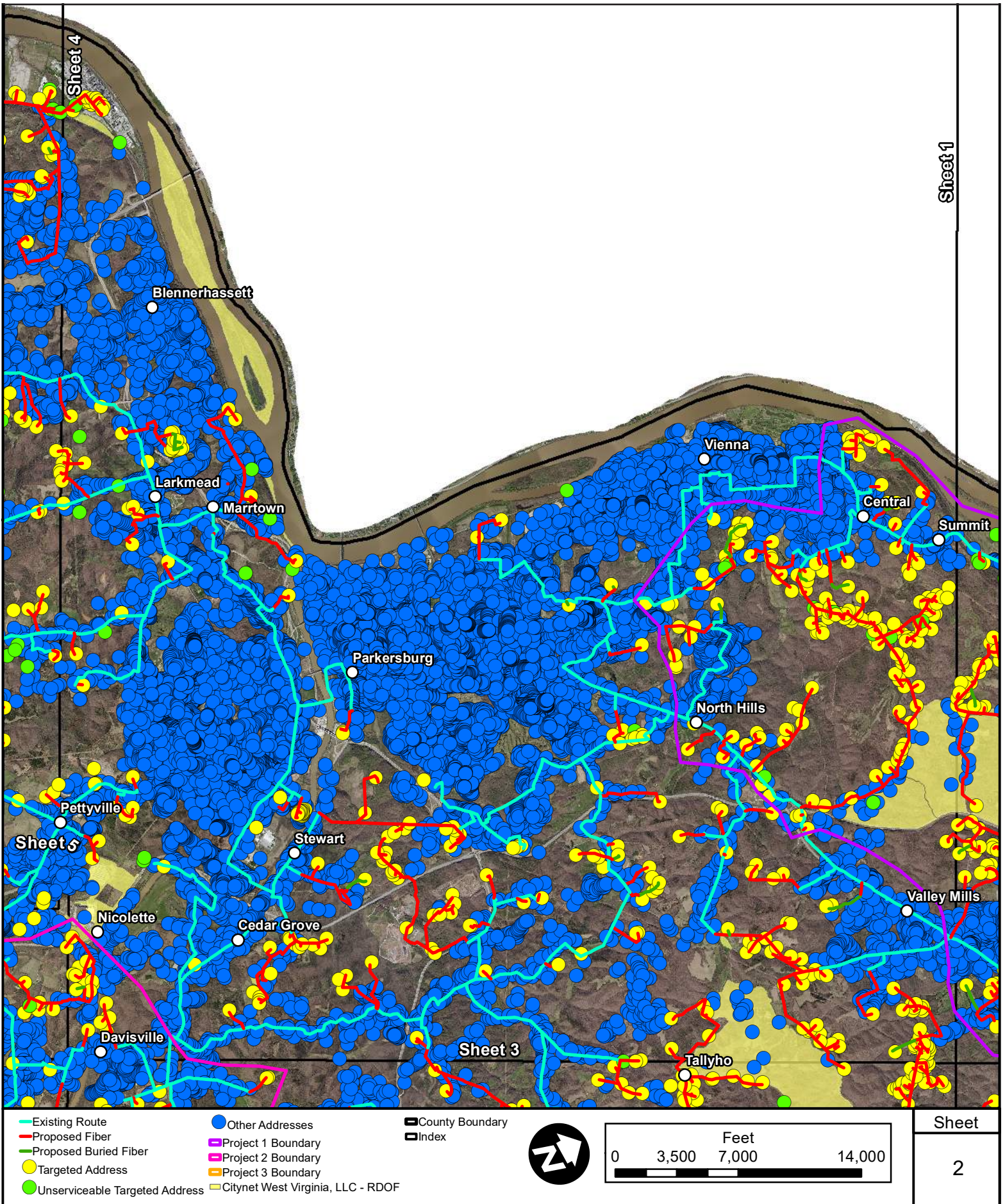


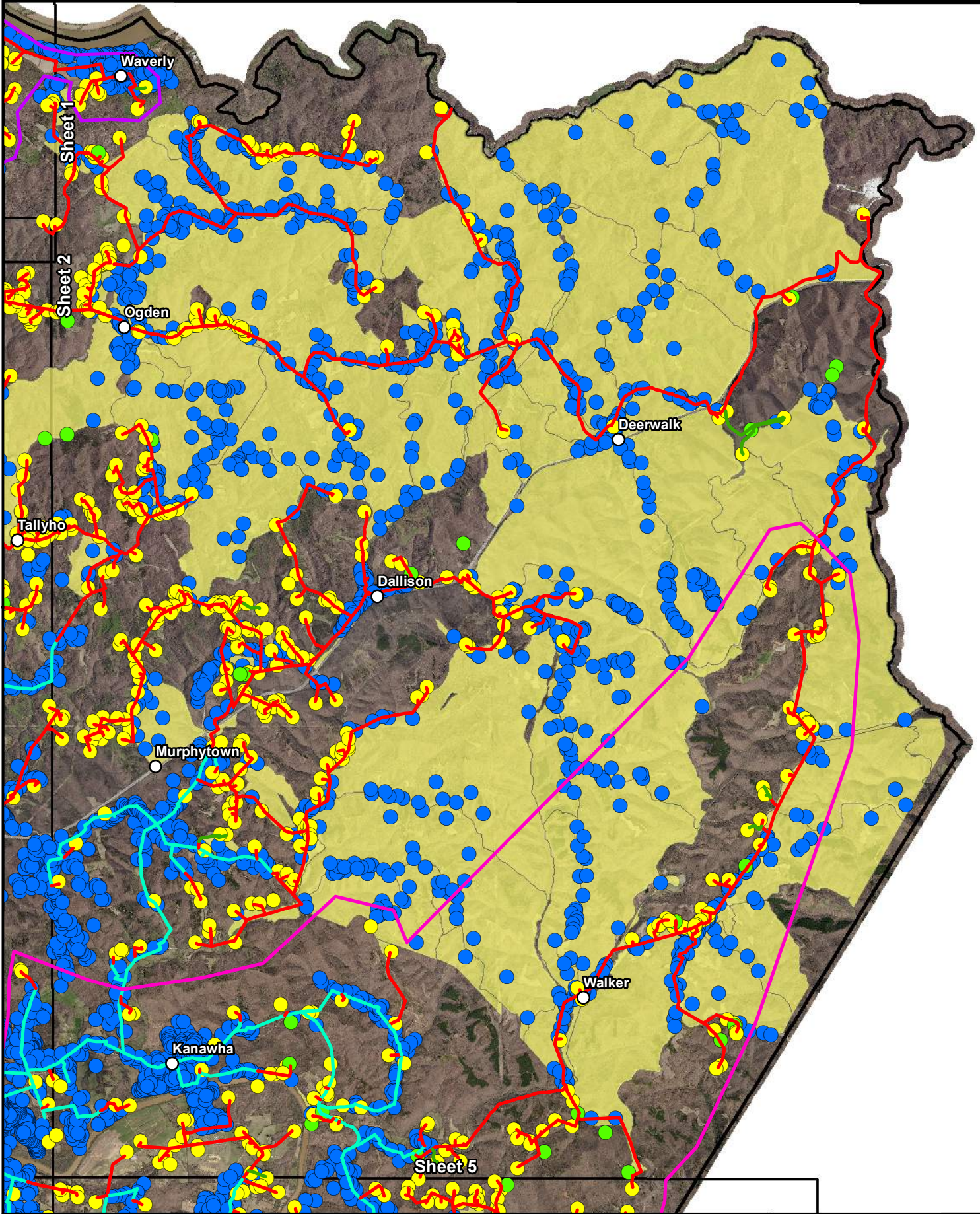
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Citynet West Virginia, LLC - RDOF
- County Boundary
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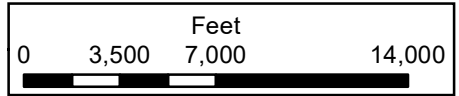
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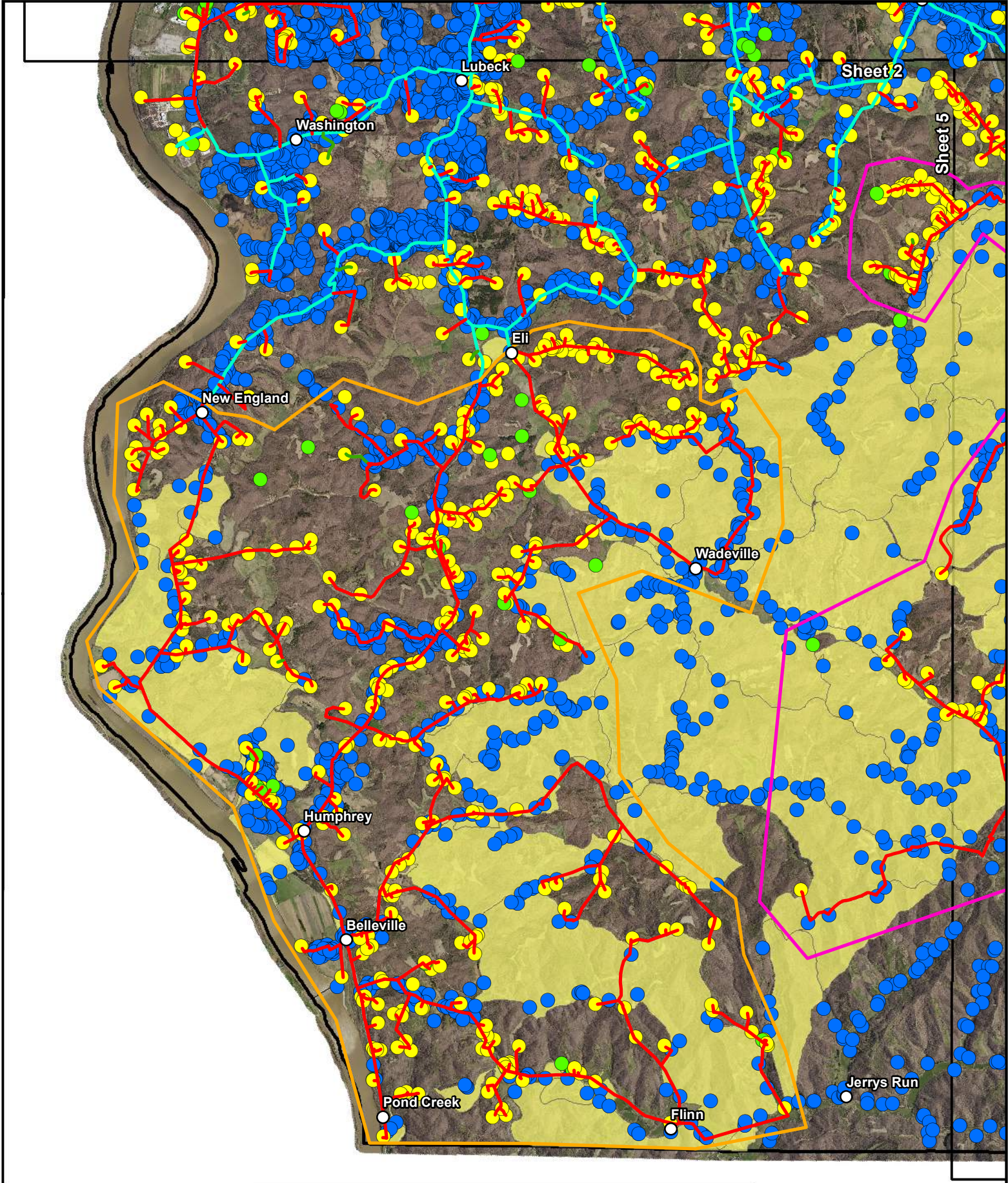





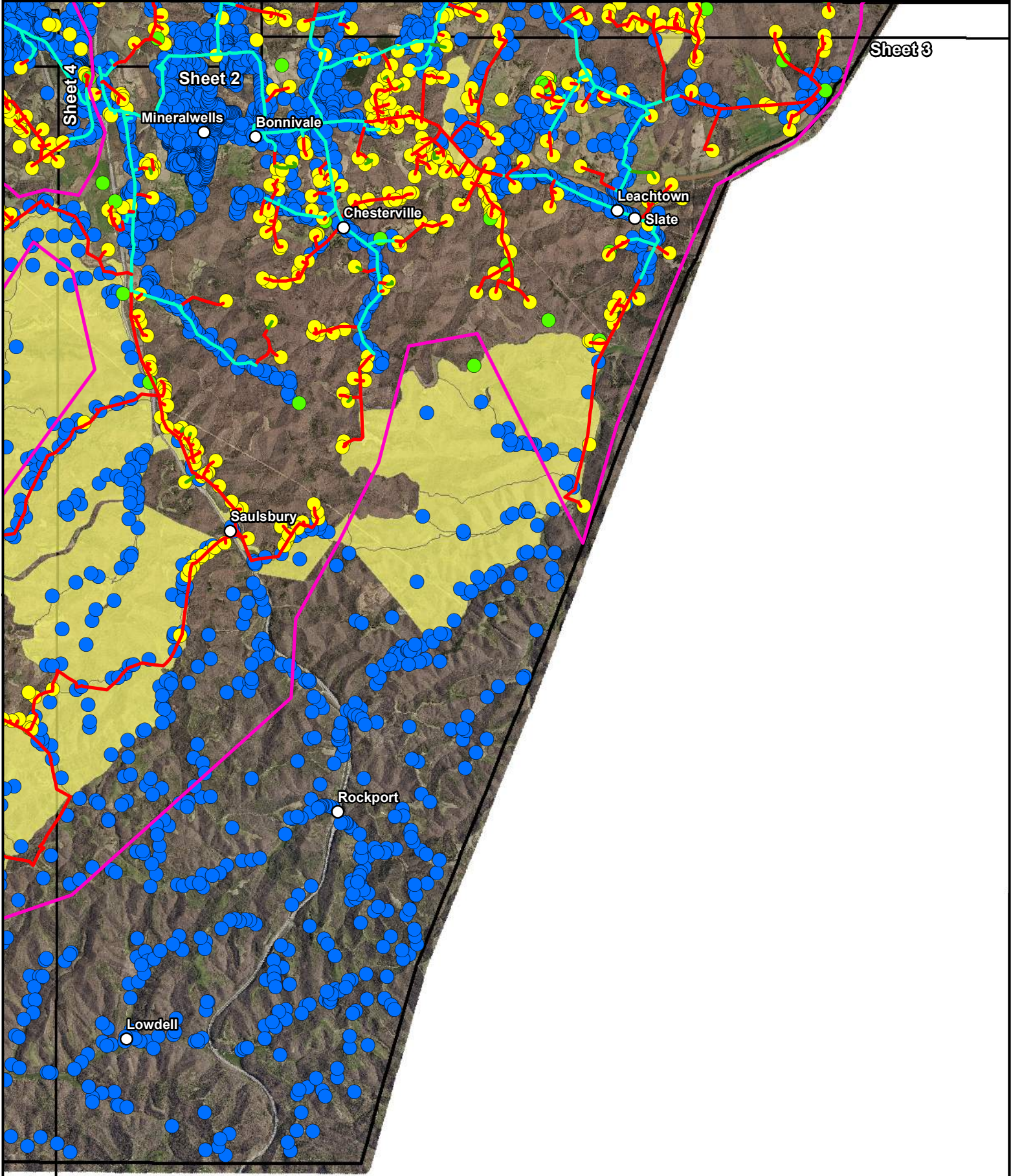
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Citynet West Virginia, LLC - RDOF
- County Boundary
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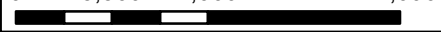


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<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses — Project 1 Boundary — Project 2 Boundary — Project 3 Boundary Citynet West Virginia, LLC - RDOF 	<ul style="list-style-type: none"> County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="width: 20%;">0</td> <td style="width: 20%;">3,500</td> <td style="width: 20%;">7,000</td> <td style="width: 20%;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td style="text-align: center;">4</td> </tr> </table>	Sheet	4
Feet															
0	3,500	7,000	14,000												
Sheet															
4															



<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses Project 1 Boundary Project 2 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF 	<ul style="list-style-type: none"> County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="width: 20%;">0</td> <td style="width: 20%;">3,500</td> <td style="width: 20%;">7,000</td> <td style="width: 20%;">14,000</td> </tr> </table> 	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td style="text-align: center;">5</td> </tr> </table>	Sheet	5
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5															

Wood County, WV – 2023 ROC Study – Cost Estimate – Whole County

Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	400.01	\$2,200,055
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	400.01	\$600,015
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	390.43	\$5,856,450
Aerial Construction Labor	\$50,000.00	Per Mile	390.43	\$19,521,500
Underground Construction Labor	\$150,000.00	Per Mile	9.58	\$1,437,000
Project Construction Contingency 10%	\$2,095,850.00	Lump Sum	1	\$2,095,850
Legal 1.5%	\$314,377.50	Lump Sum	1	\$314,378
Administrative 2%	\$419,170.00	Lump Sum	1	\$419,170
TOTAL COST = \$32,444,418				

COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
5	Wood	1	475	66.51	\$5,439,588
		2	351	84.51	\$6,687,668
		3	566	96.66	\$7,850,345

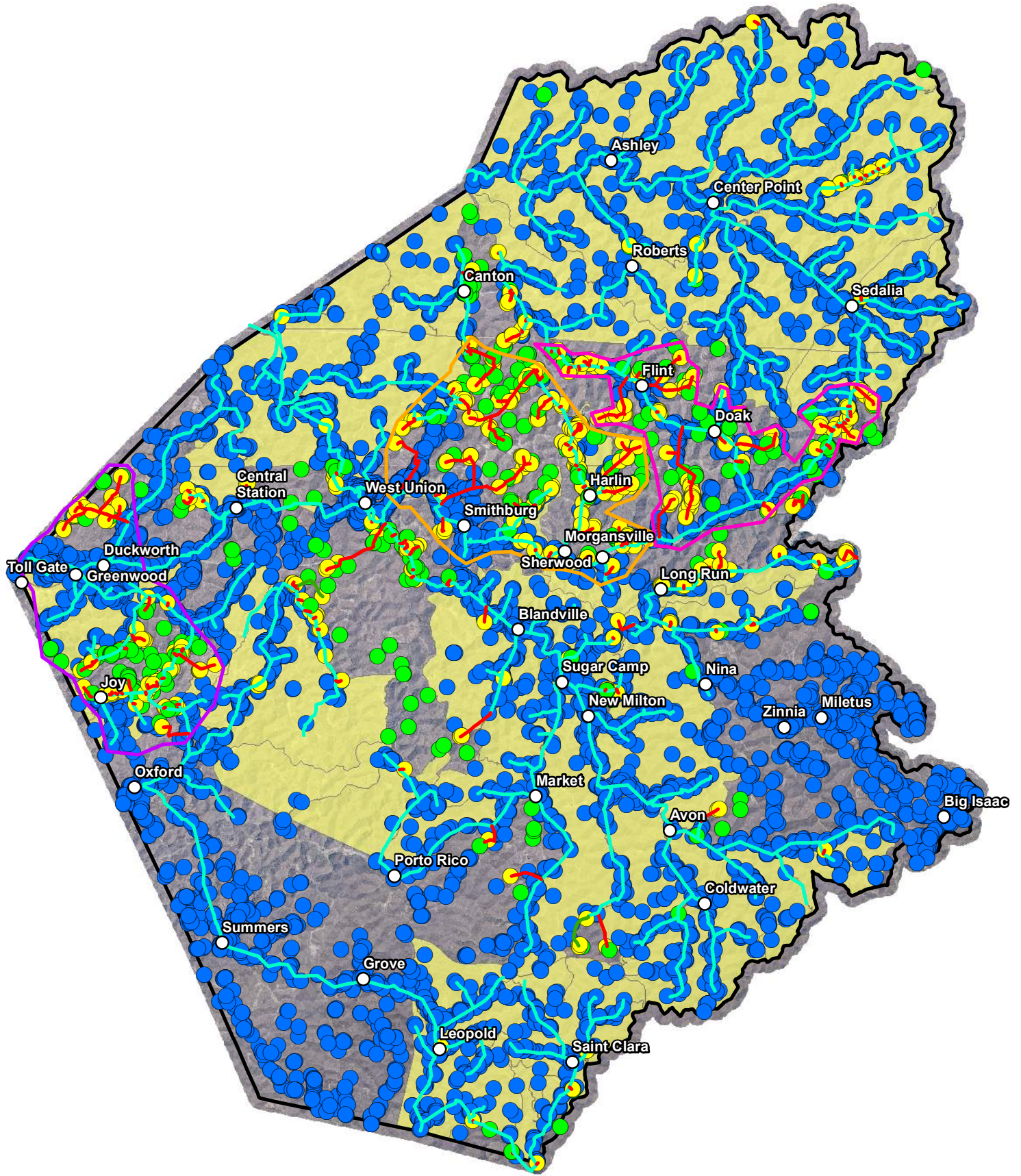
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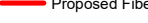


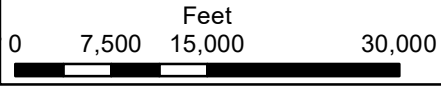
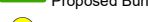





Doddridge, Harrison, Marion,
Monongalia, Preston, and Taylor Counties

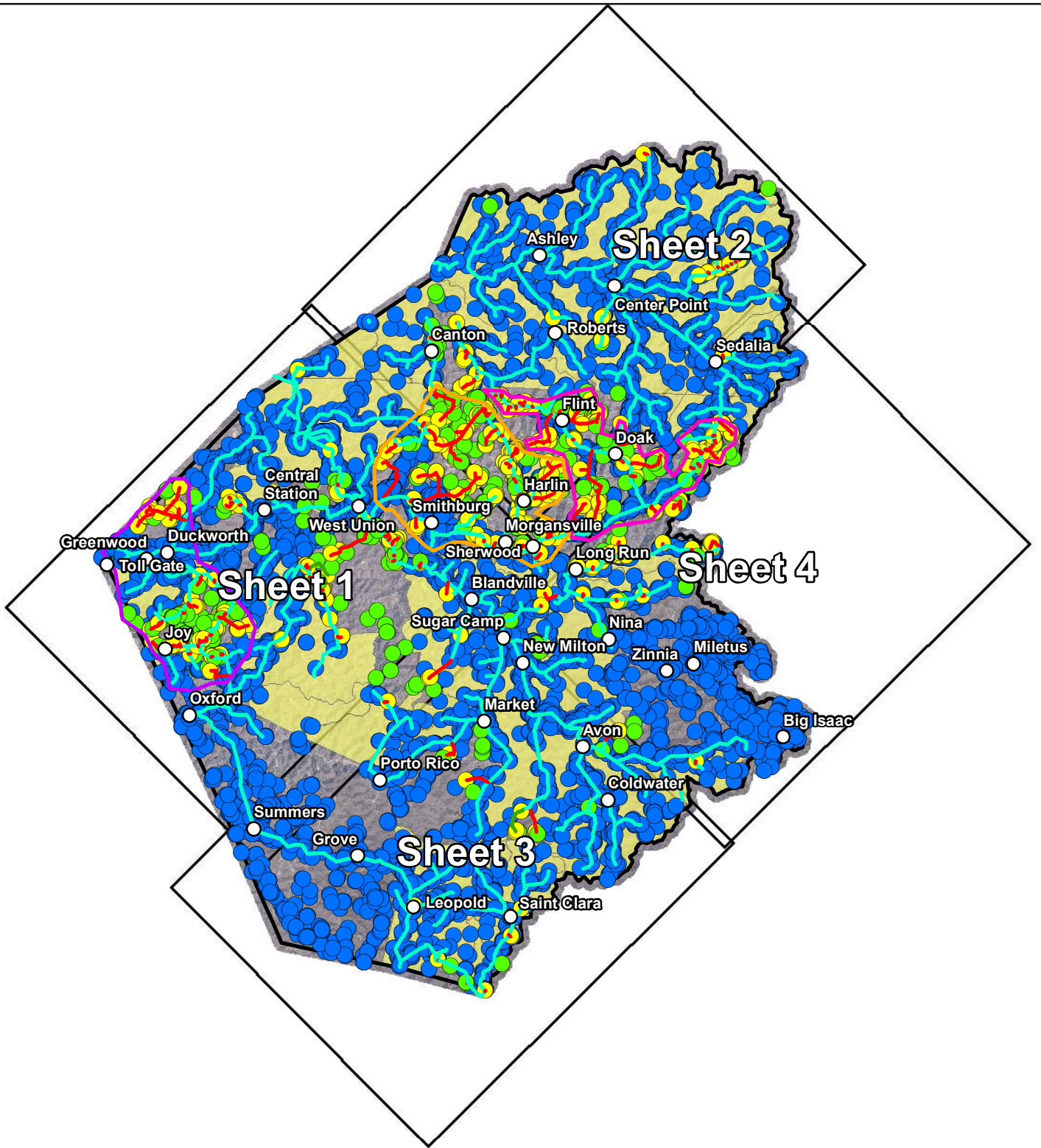




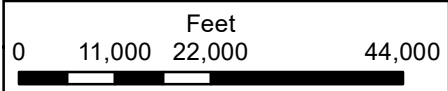
DODDRIDGE COUNTY



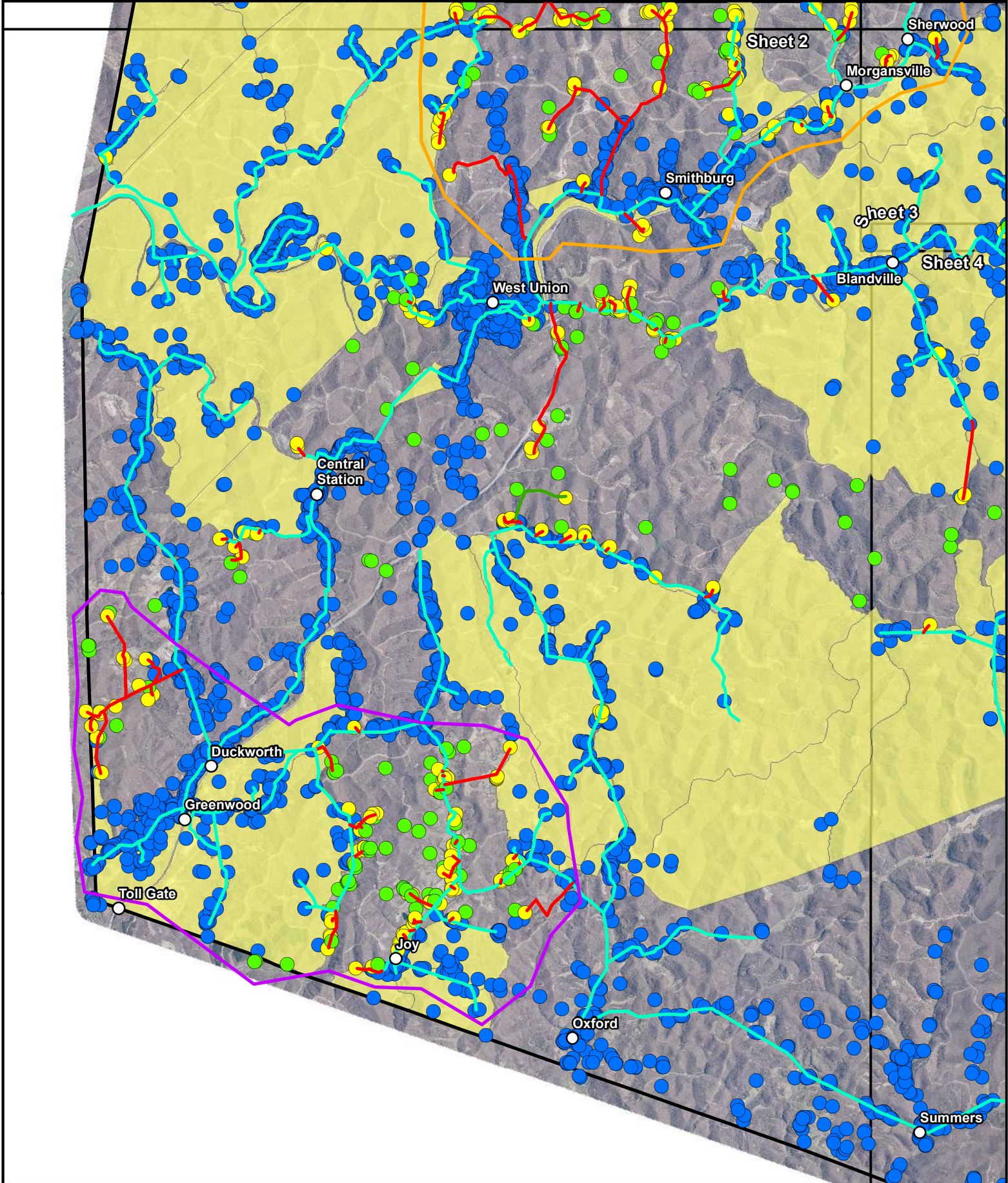
	Existing Route		Other Addresses		County Boundary
	Proposed Fiber		Project 1 Boundary		 Feet 0 7,500 15,000 30,000
	Proposed Buried Fiber		Project 2 Boundary		
	Targeted Address		Project 3 Boundary		
	Unserviceable Targeted Address		Citynet West Virginia, LLC - RDOF		



- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Citynet West Virginia, LLC - RDOF
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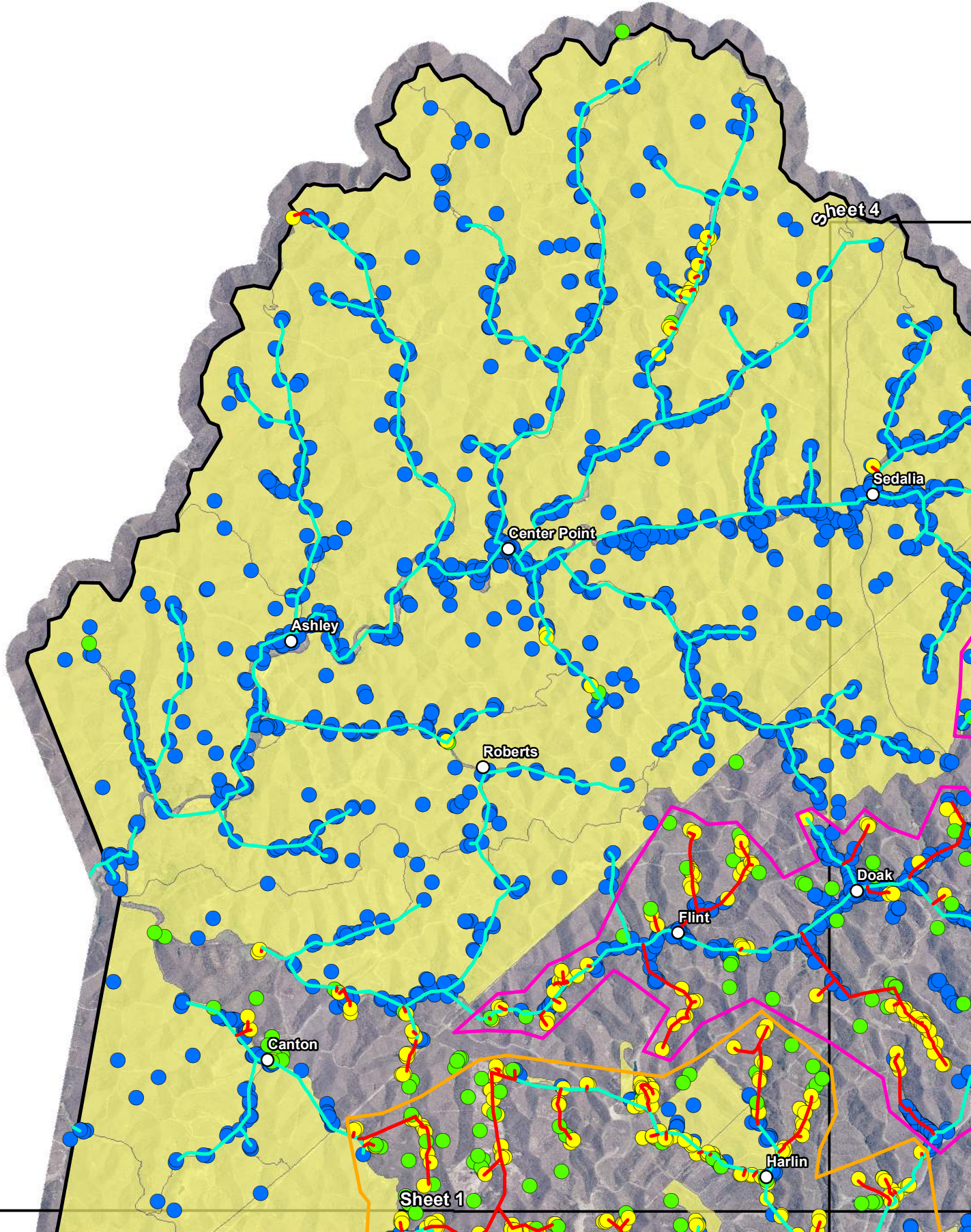
Existing Route	Other Addresses	County Boundary
Proposed Fiber	Project 1 Boundary	Index
Proposed Buried Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

Feet

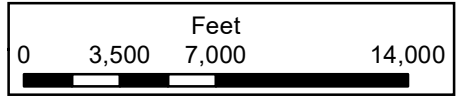
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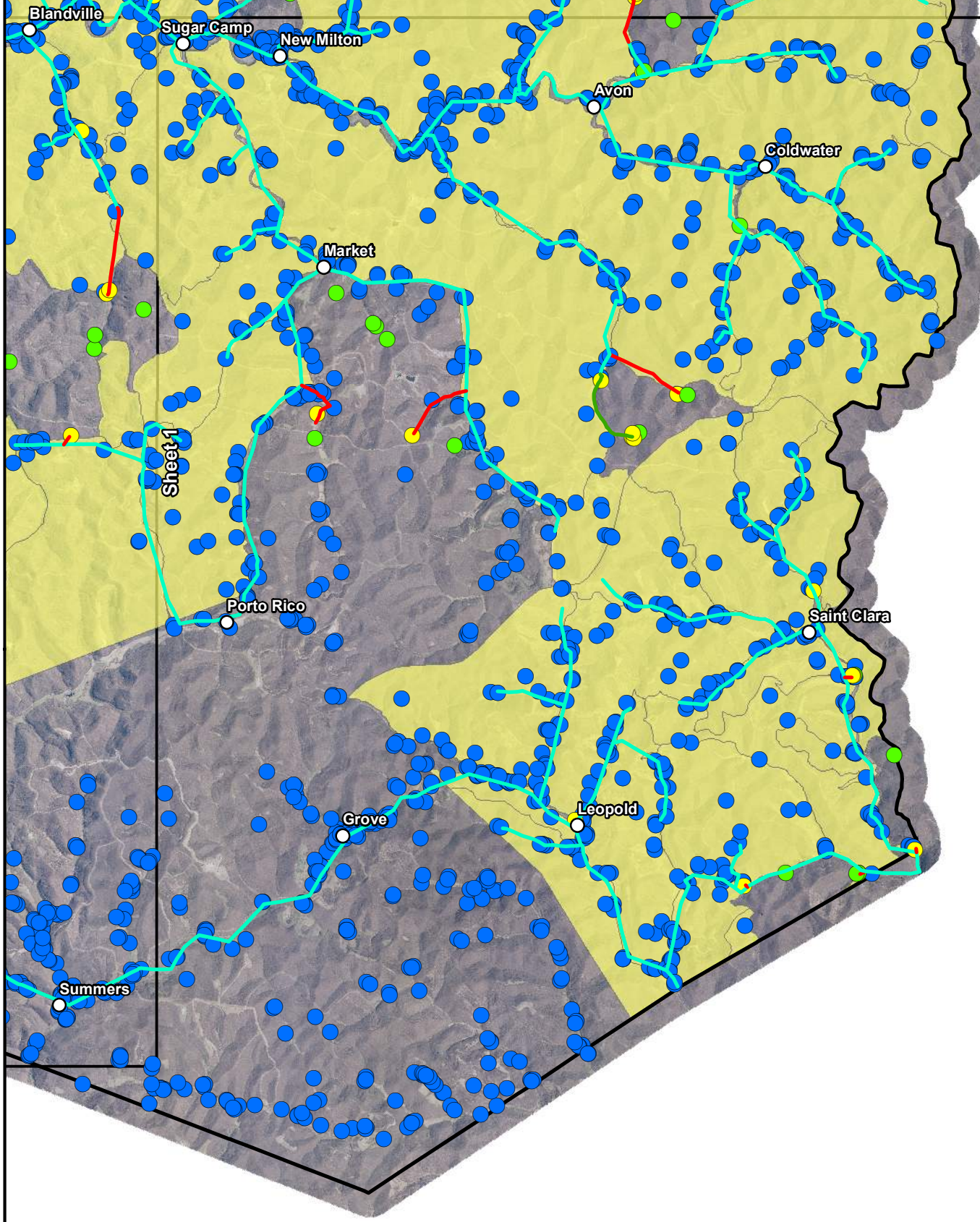
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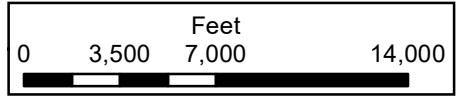
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Citynet West Virginia, LLC - RDOF
- County Boundary
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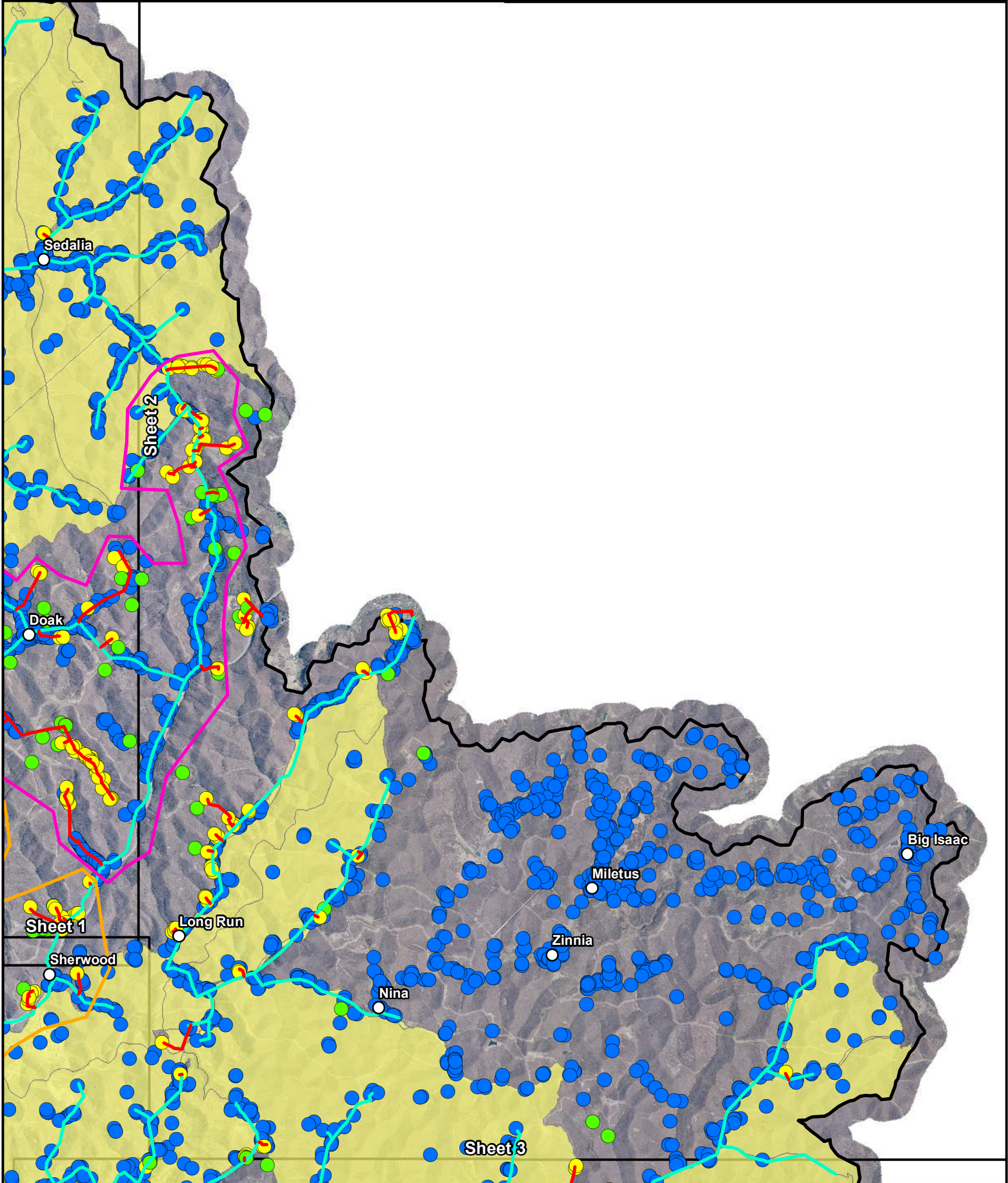
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- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Citynet West Virginia, LLC - RDOF
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Existing Route	Other Addresses	County Boundary
Proposed Fiber	Project 1 Boundary	Index
Proposed Buried Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

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	4

Doddridge County, WV – 2023 ROC Study – Cost Estimate – Whole County

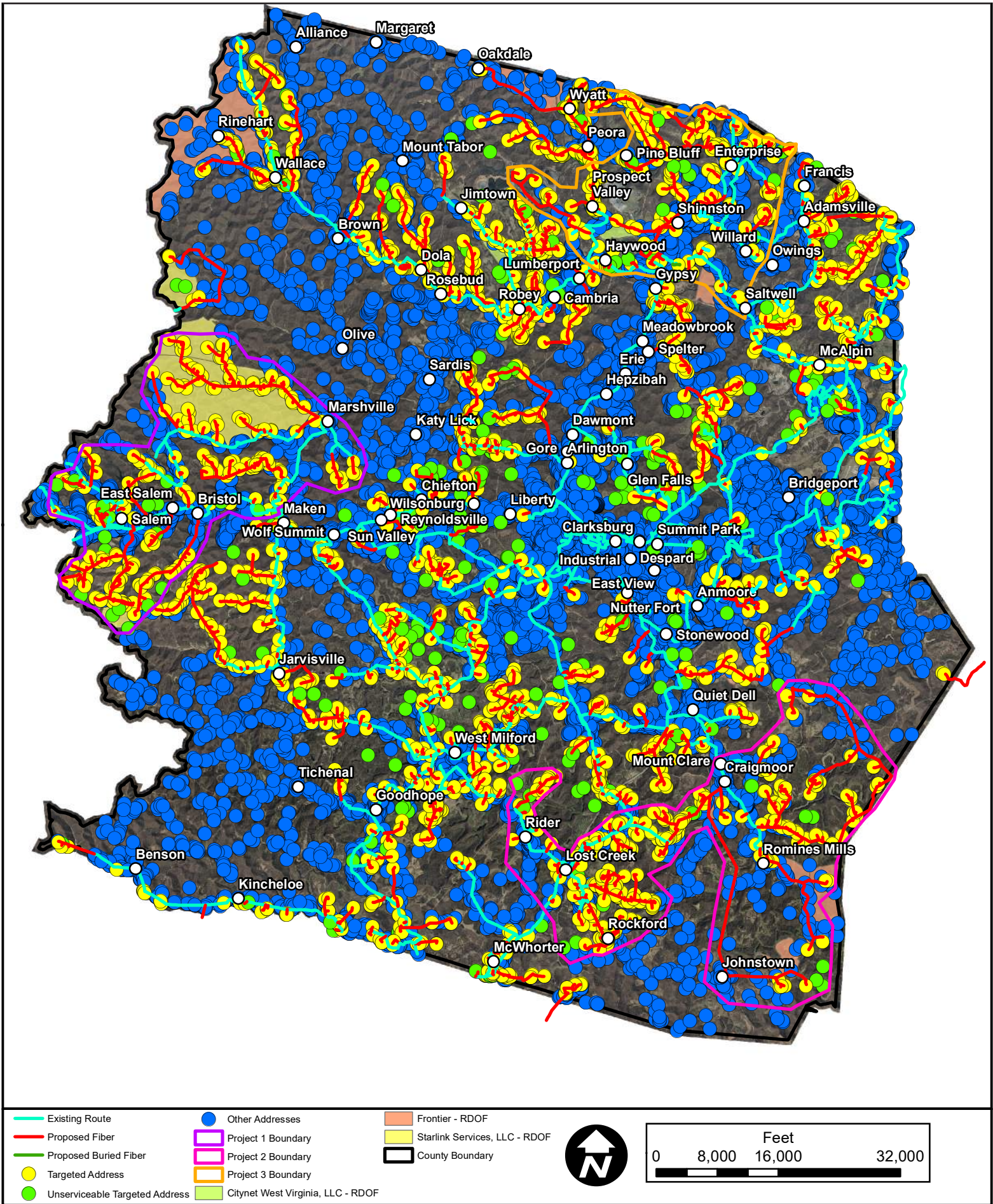
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	51.49	\$283,195
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	51.49	\$77,235
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	49.87	\$748,050
Aerial Construction Labor	\$50,000.00	Per Mile	49.87	\$2,493,500
Underground Construction Labor	\$150,000.00	Per Mile	1.62	\$246,000
Project Construction Contingency 10%	\$273,650.00	Lump Sum	1	\$273,650
Legal 1.5%	\$41,047.50	Lump Sum	1	\$41,048
Administrative 2%	\$54,730.00	Lump Sum	1	\$54,730
TOTAL COST = \$4,214,408				

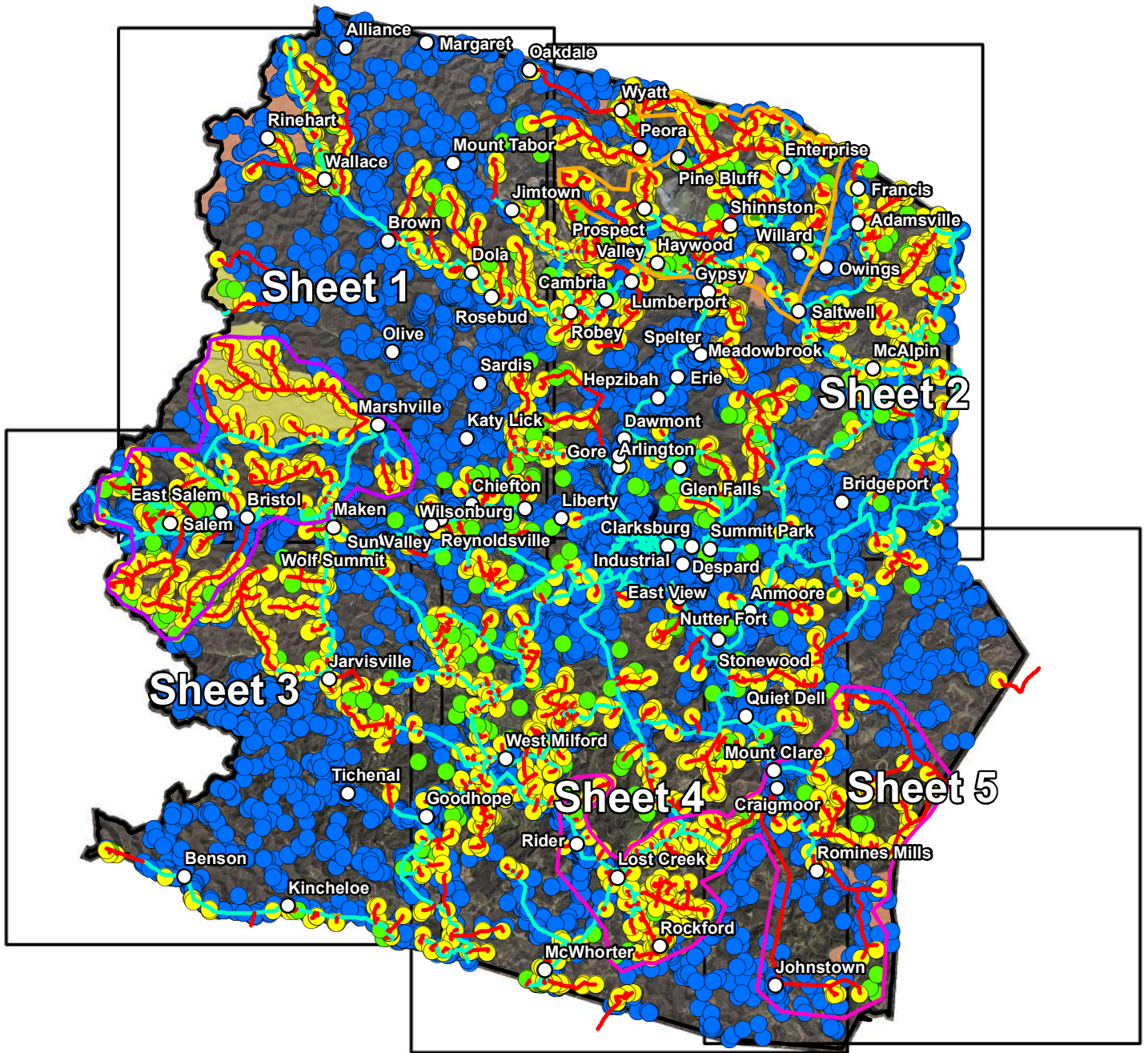
COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
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		2	137	12.19	\$959,963
		3	264	17.13	\$1,596,428

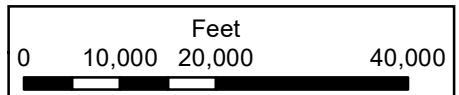


HARRISON COUNTY



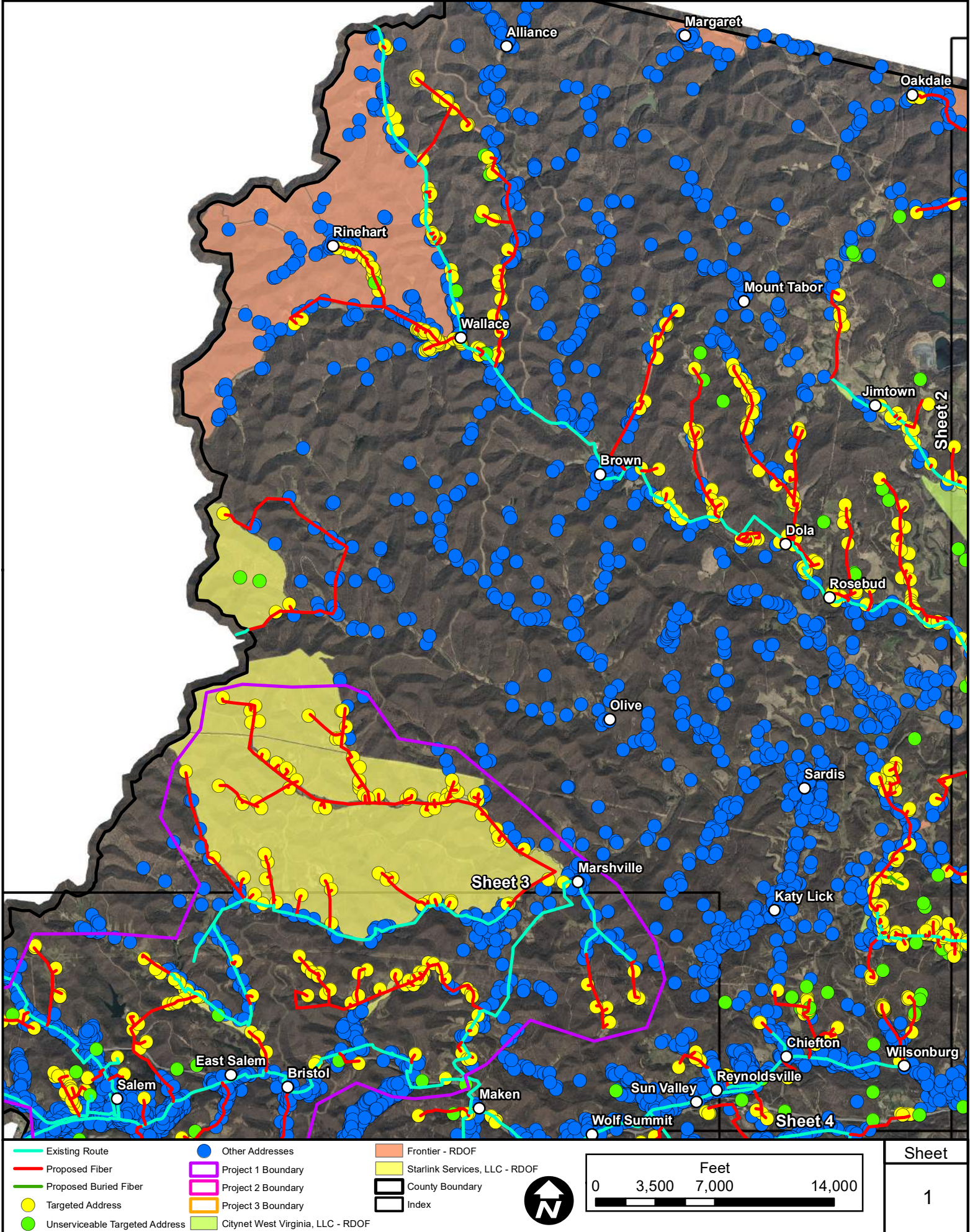


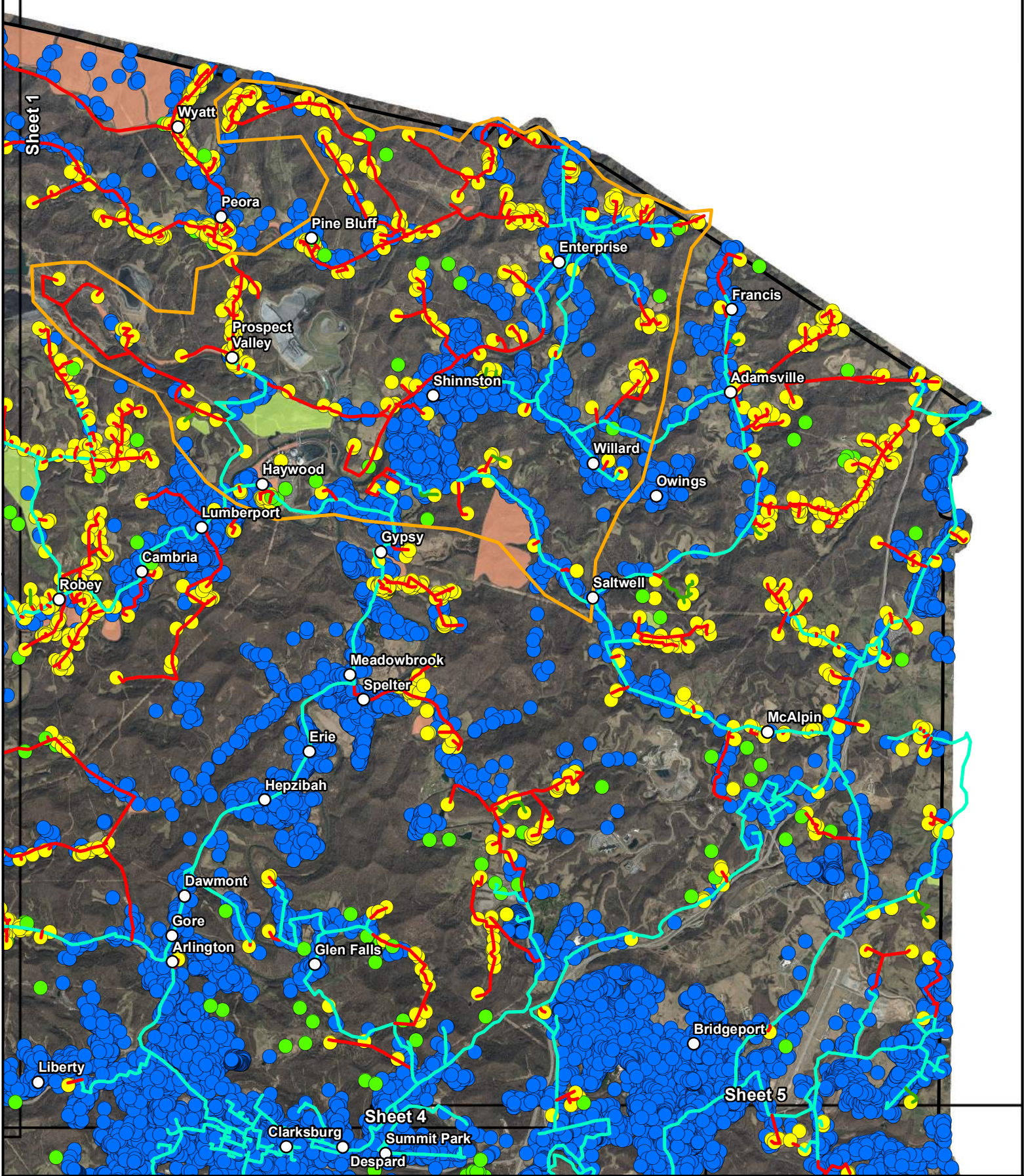
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index
- Citynet West Virginia, LLC - RDOF



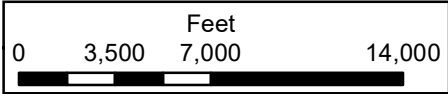
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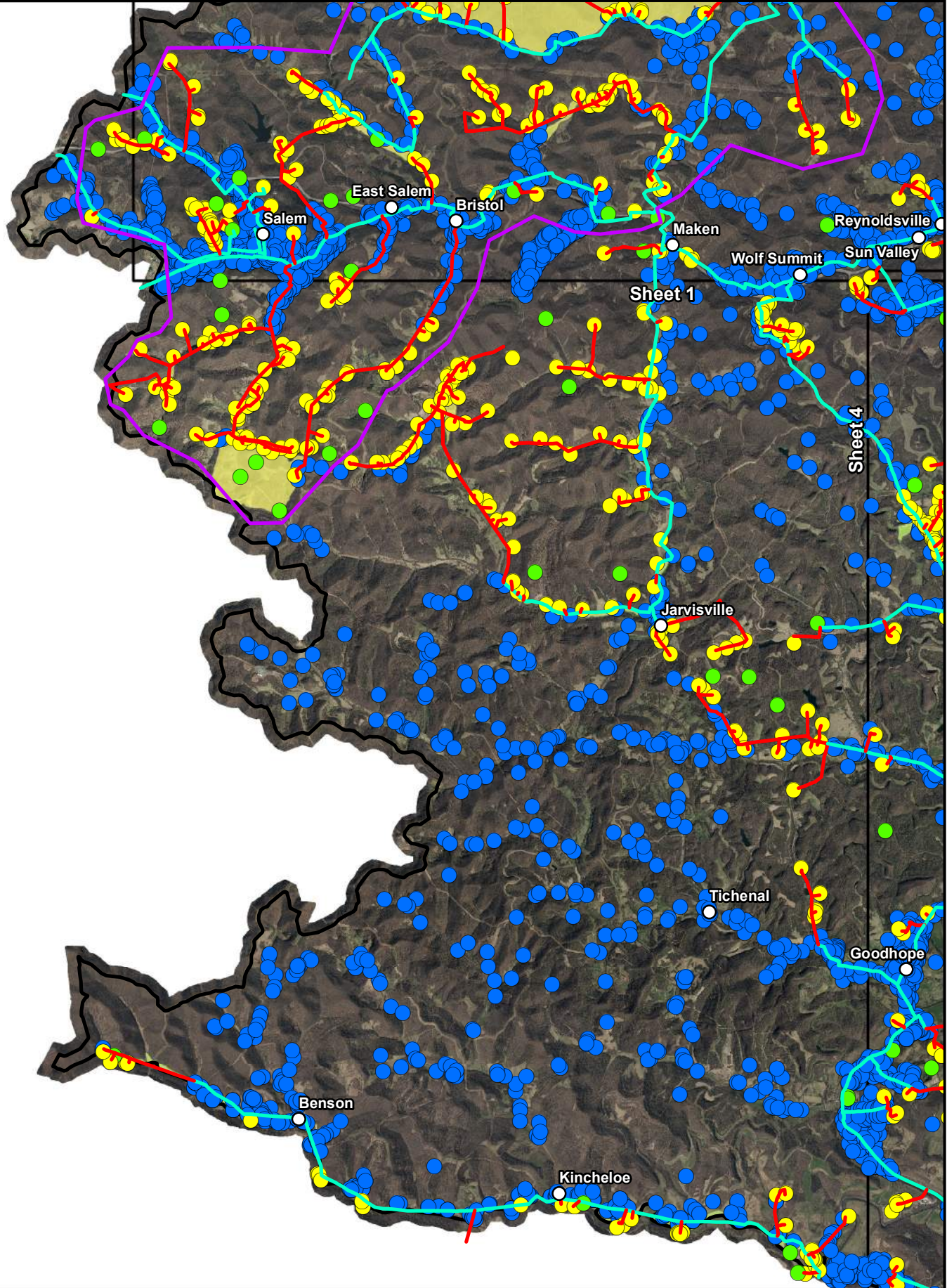


Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

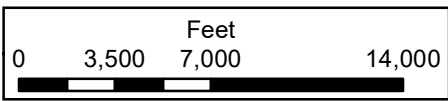


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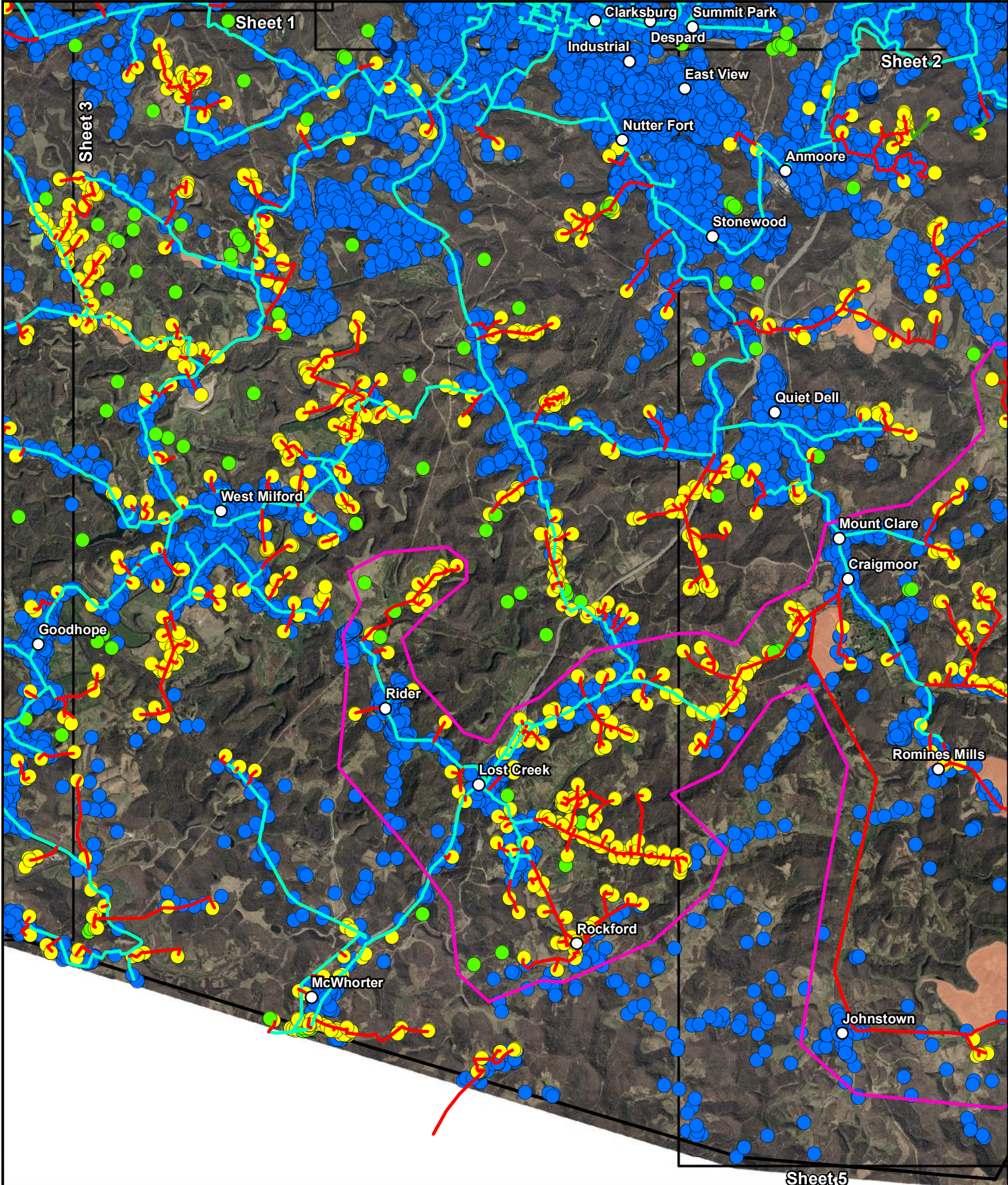
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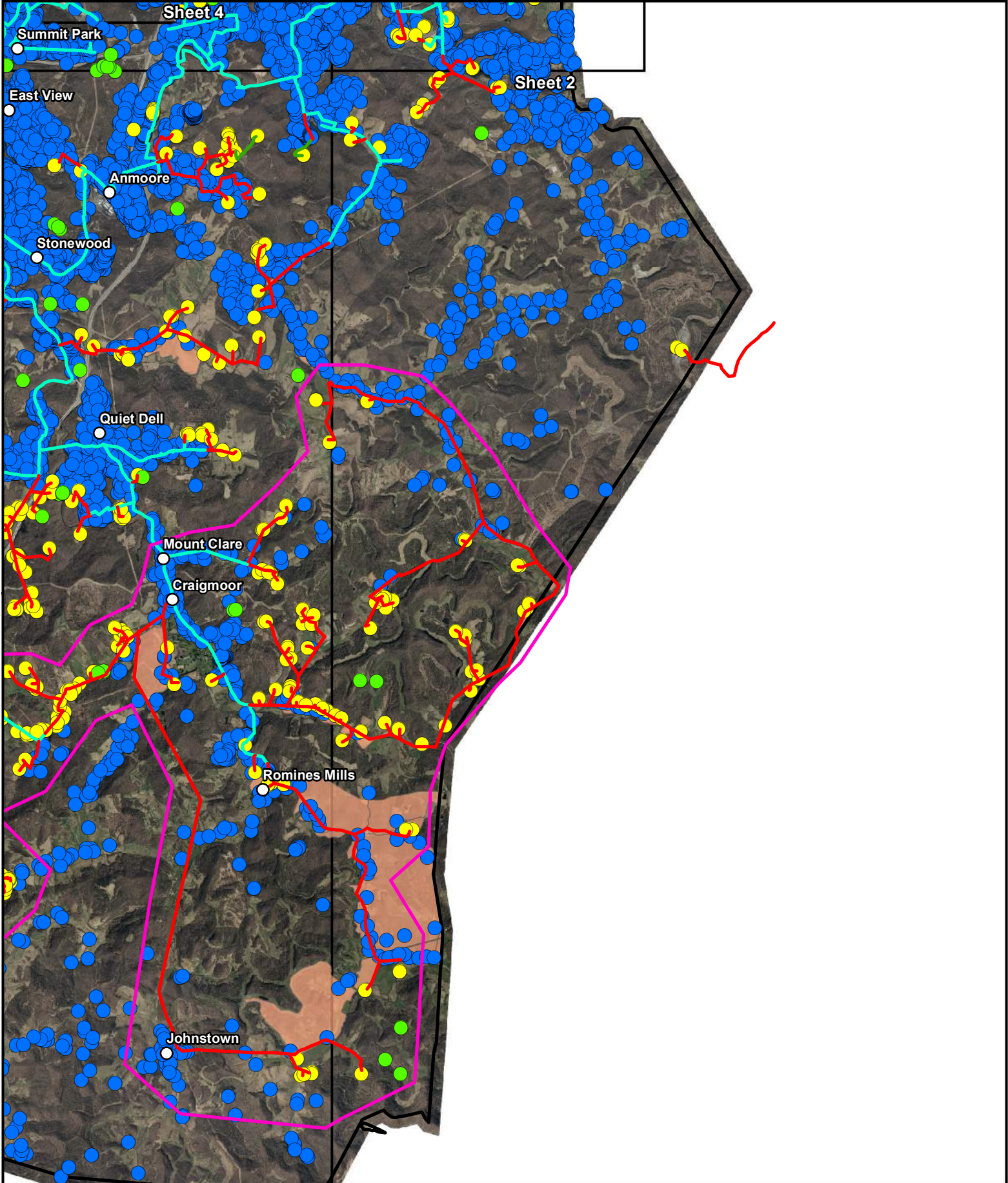
Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	



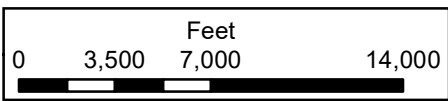
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<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses Project 1 Boundary Project 2 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF 	<ul style="list-style-type: none"> Frontier - RDOF Starlink Services, LLC - RDOF County Boundary Index 	<p>Feet</p> <p>0 3,500 7,000 14,000</p>		<p>Sheet</p> <p style="font-size: 24pt;">4</p>
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Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	



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Harrison County, WV – 2023 ROC Study – Cost Estimate – Whole County

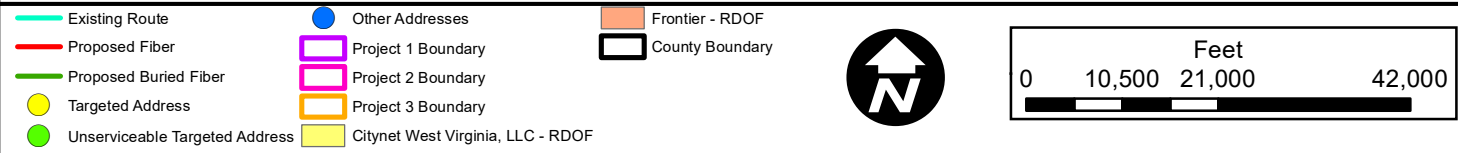
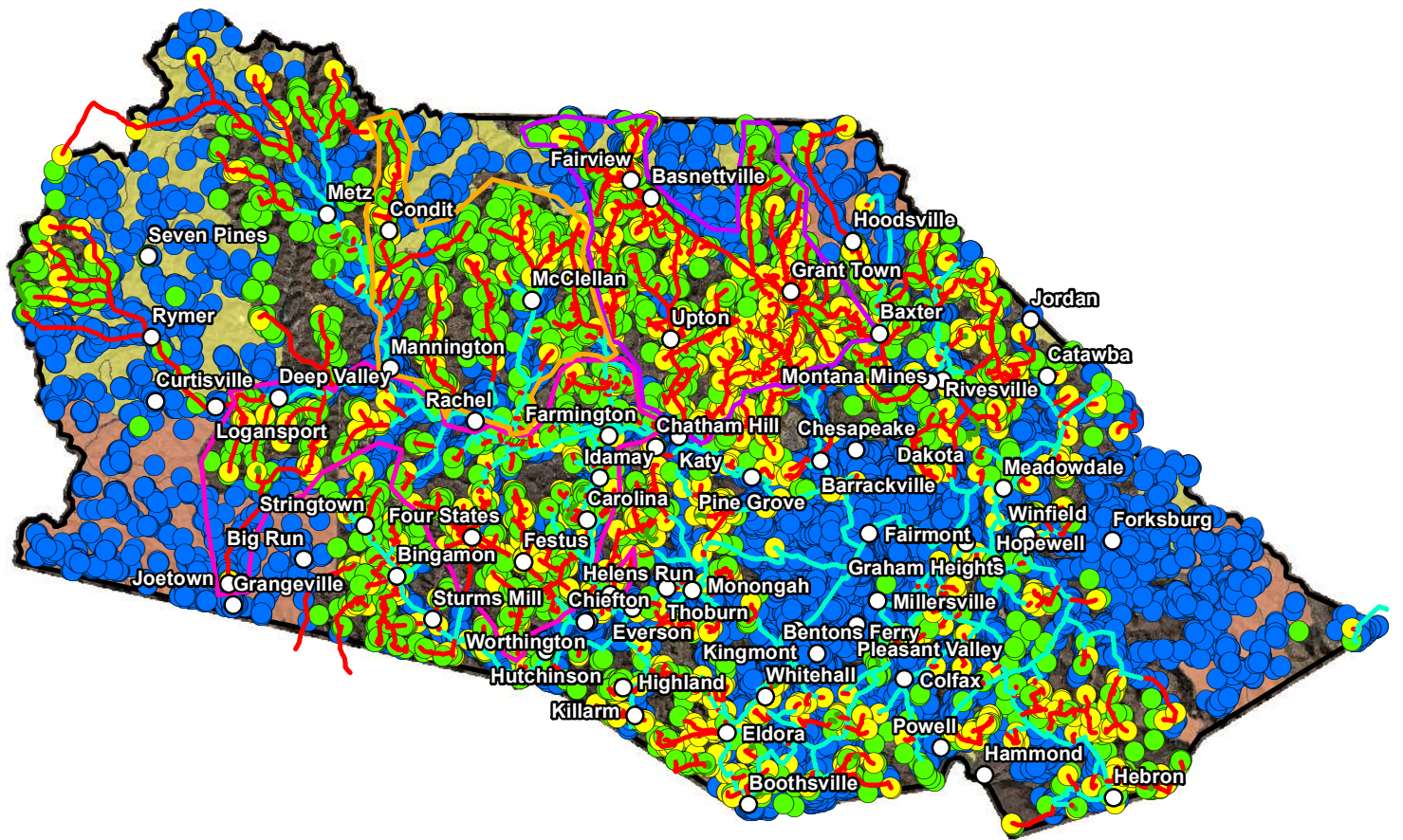
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	313.30	\$1,723,150
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	313.30	\$469,950
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	309.39	\$4,640,850
Aerial Construction Labor	\$50,000.00	Per Mile	309.39	\$15,469,500
Underground Construction Labor	\$150,000.00	Per Mile	3.91	\$586,500
Project Construction Contingency 10%	\$1,605,600.00	Lump Sum	1	\$1,605,600
Legal 1.5%	\$240,840.00	Lump Sum	1	\$240,840
Administrative 2%	\$321,120.00	Lump Sum	1	\$321,120
TOTAL COST = \$25,057,510				

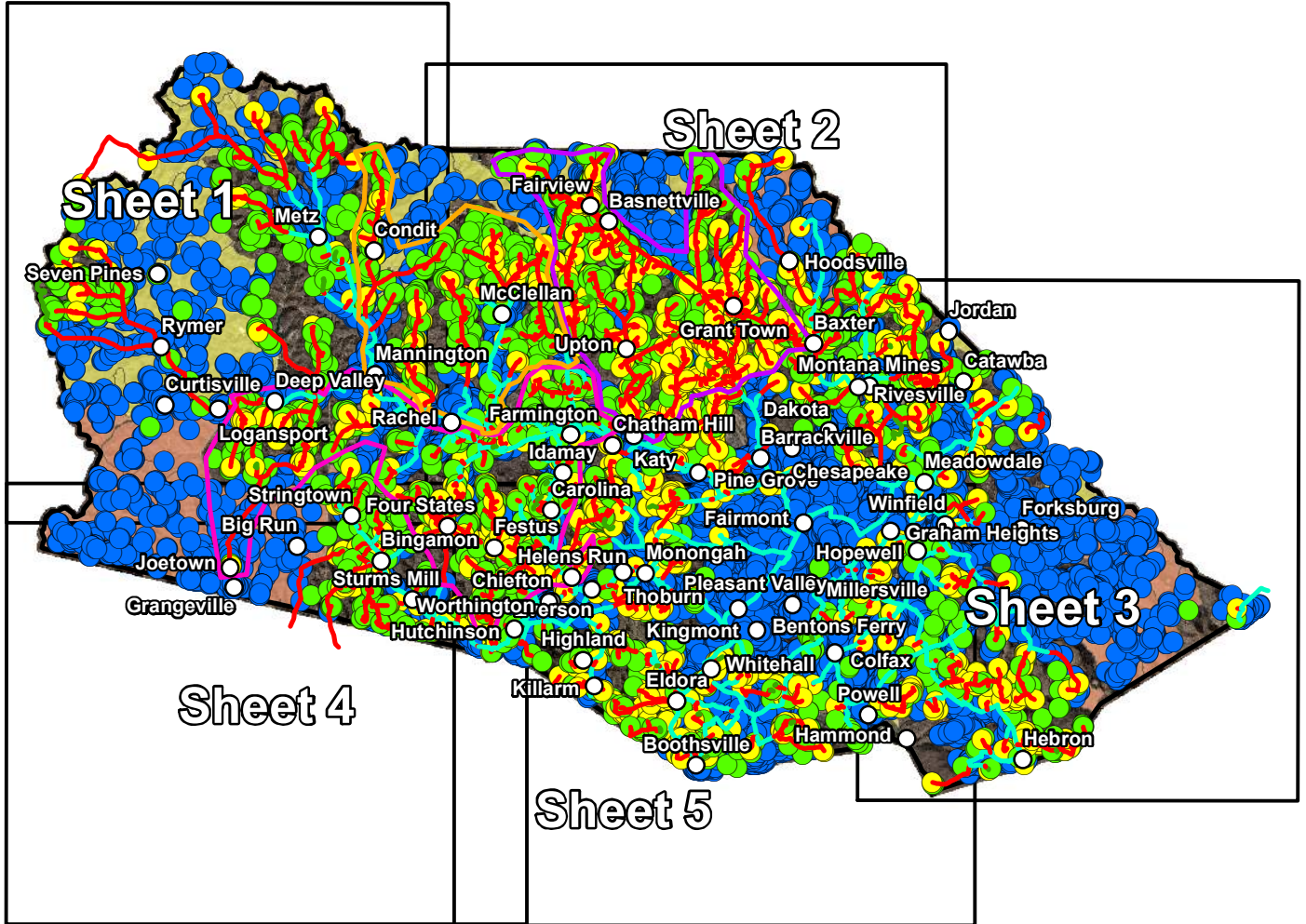
COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
6	Harrison	1	261	40.49	\$3,188,588
		2	299	49.53	\$3,900,488
		3	297	34.72	\$2,819,895

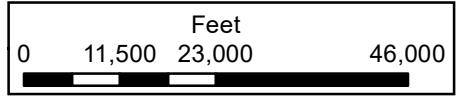


MARION COUNTY

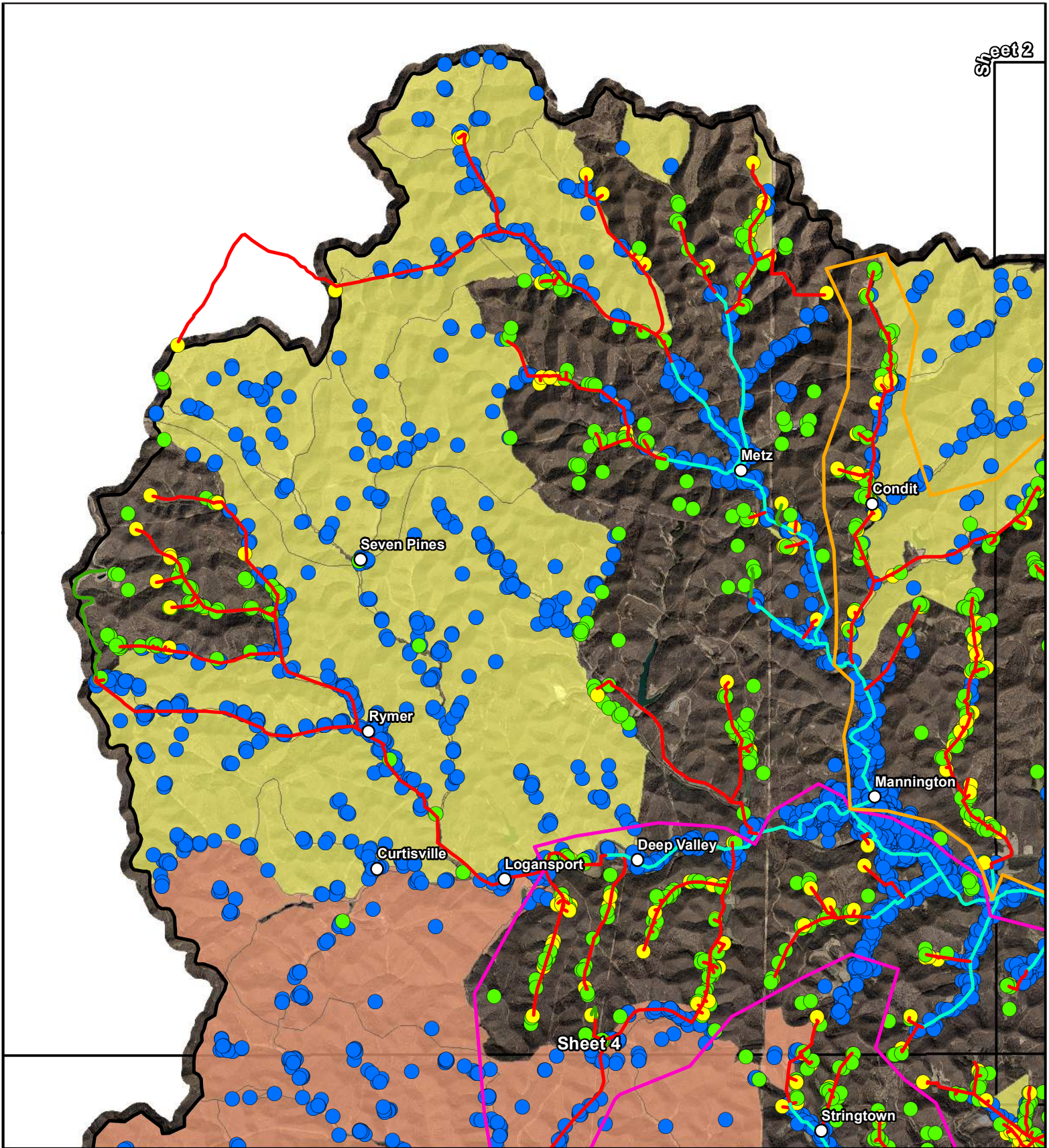




- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Citynet West Virginia, LLC - RDOF
- Frontier - RDOF
- County Boundary
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Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

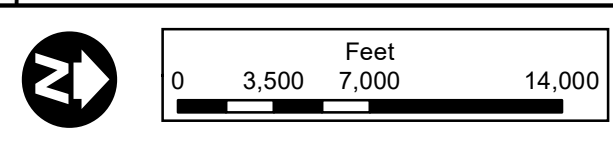
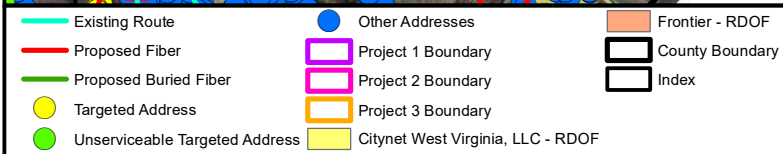
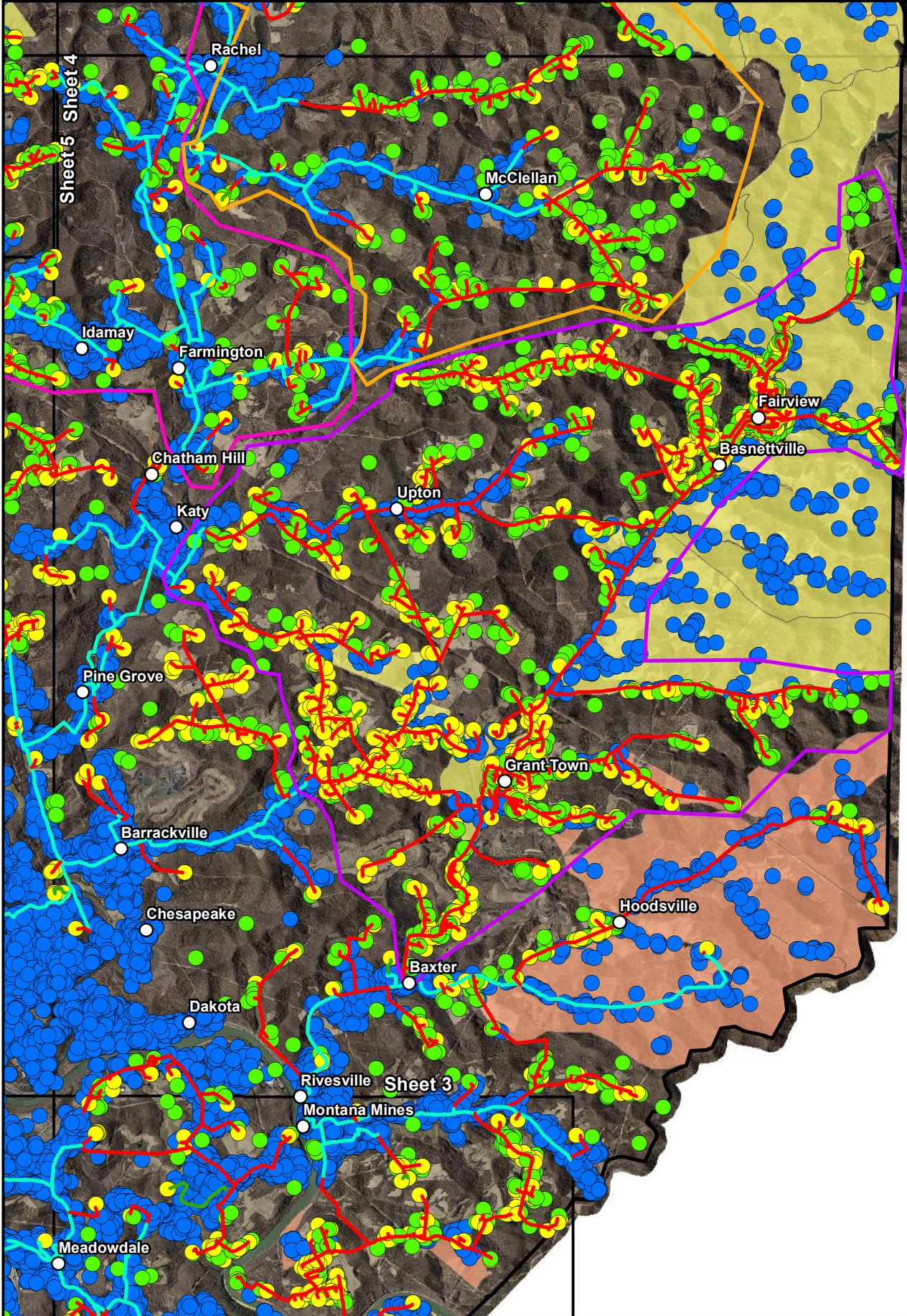
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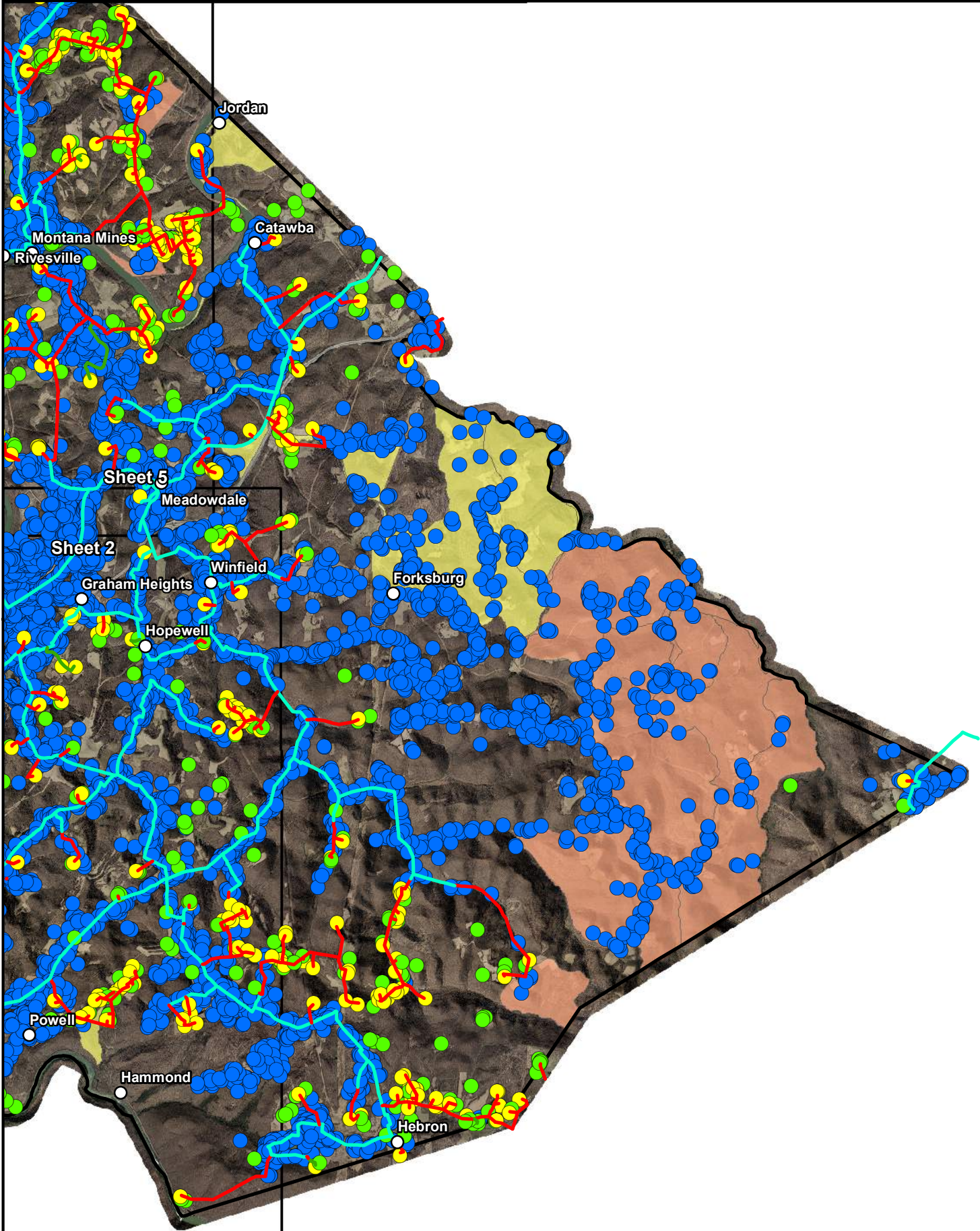
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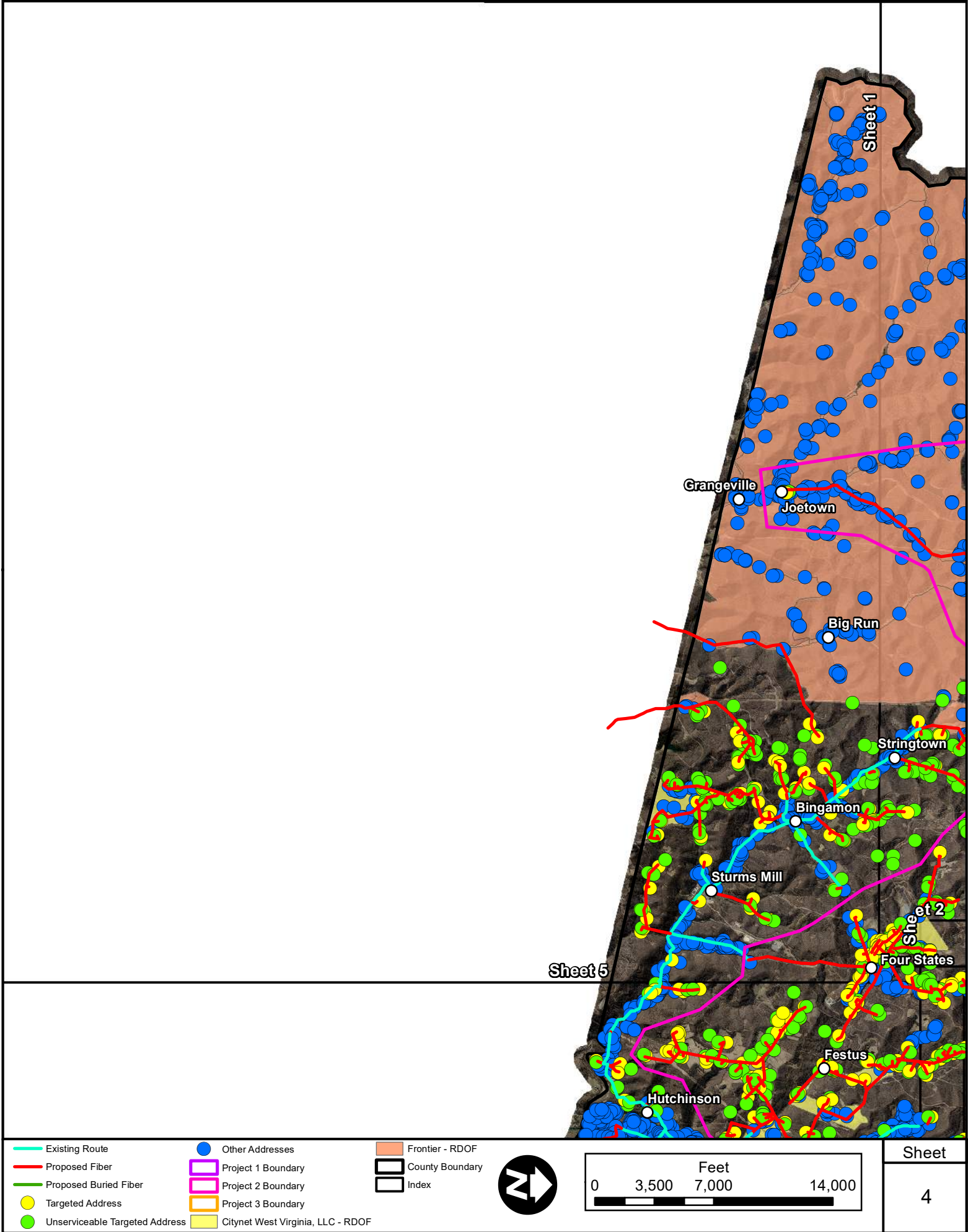


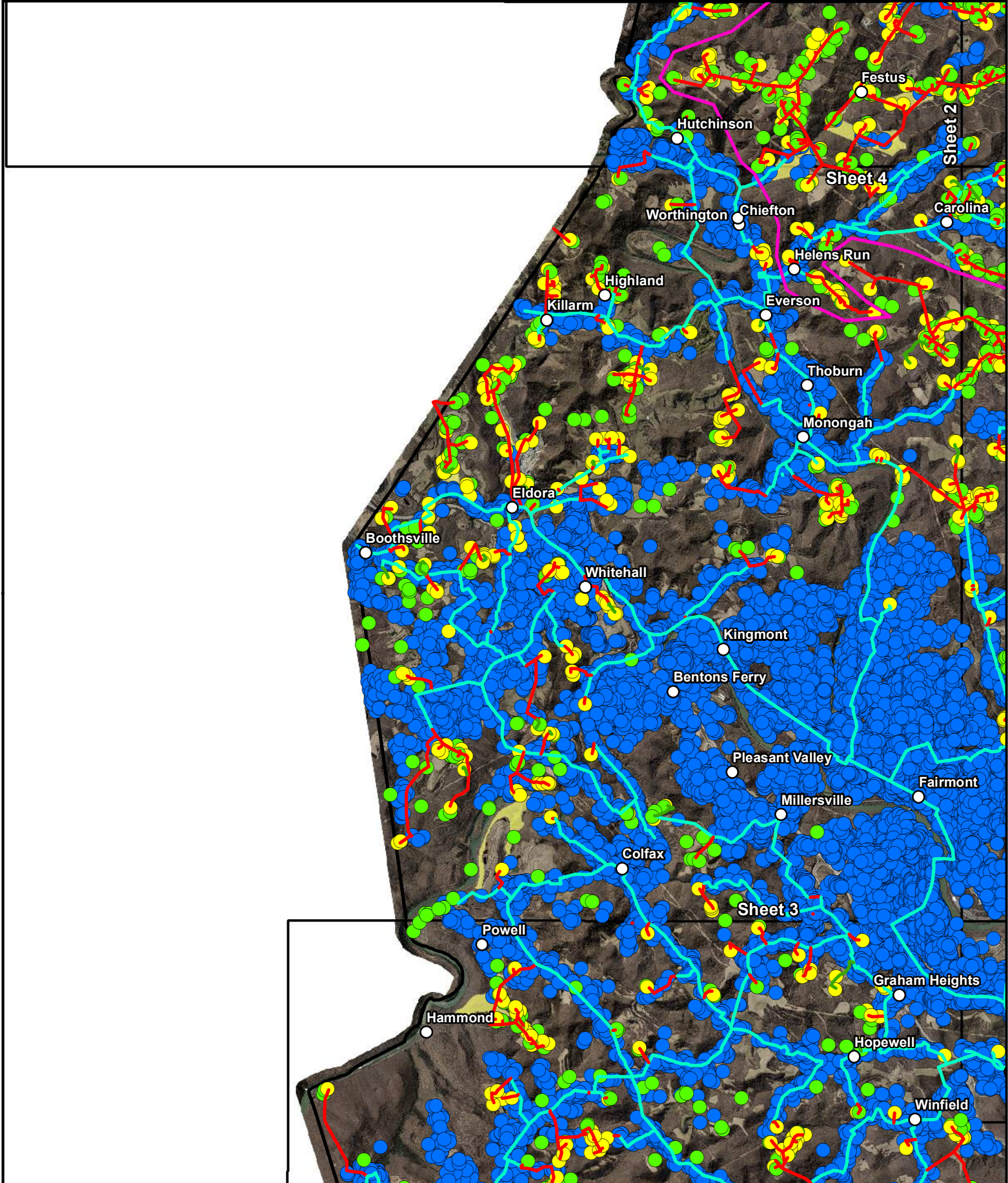
Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

Feet

0 3,500 7,000 14,000

Sheet
3





Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

0 3,500 7,000 14,000

Feet

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Marion County, WV – 2023 ROC Study – Cost Estimate – Whole County

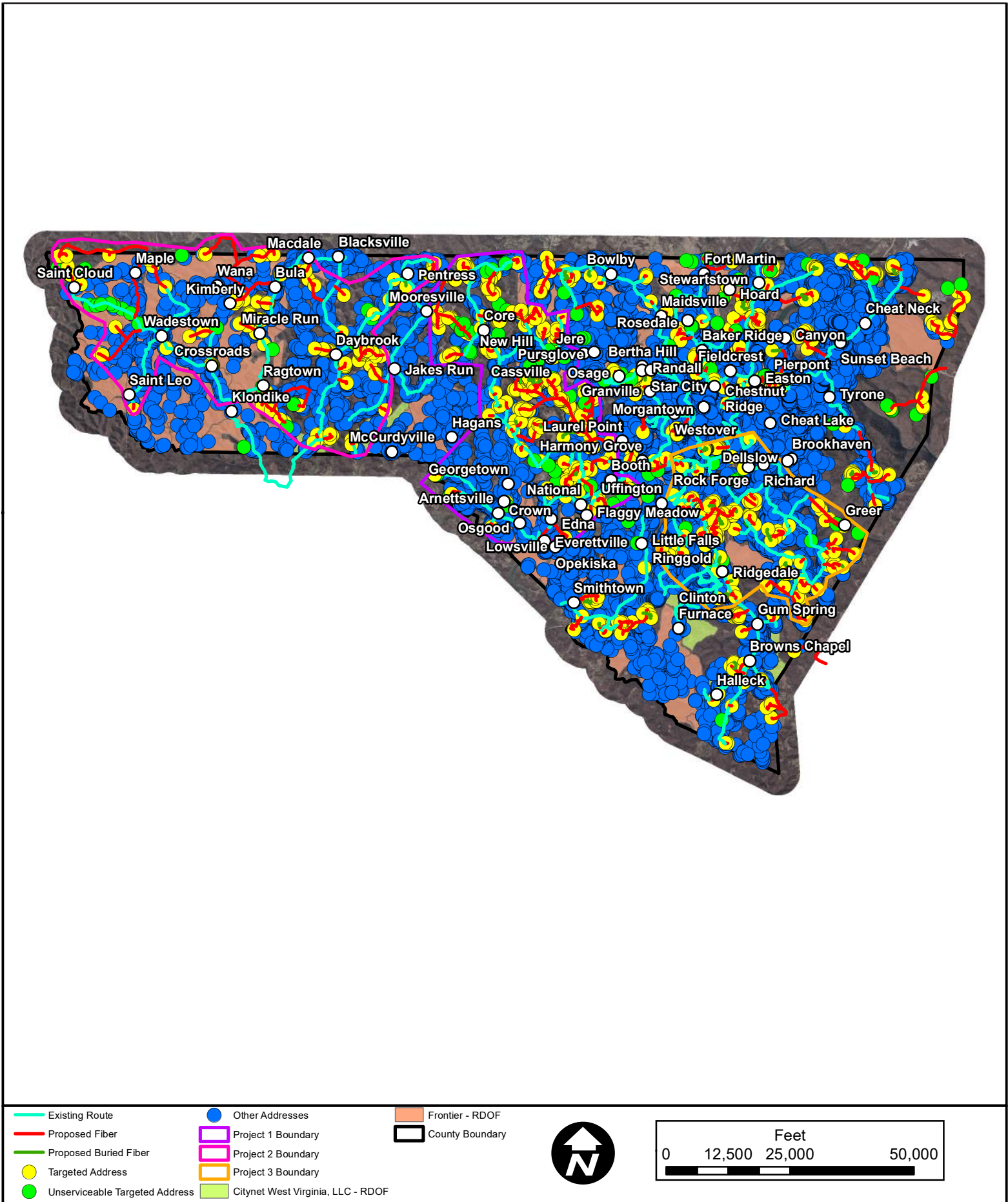
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	312.41	\$1,718,255
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	312.41	\$468,615
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	304.86	\$4,572,900
Aerial Construction Labor	\$50,000.00	Per Mile	304.86	\$15,243,000
Underground Construction Labor	\$150,000.00	Per Mile	7.55	\$1,132,500
Project Construction Contingency 10%	\$1,637,550.00	Lump Sum	1	\$1,637,550
Legal 1.5%	\$245,632.50	Lump Sum	1	\$245,633
Administrative 2%	\$327,510.00	Lump Sum	1	\$327,510
TOTAL COST = \$25,345,963				

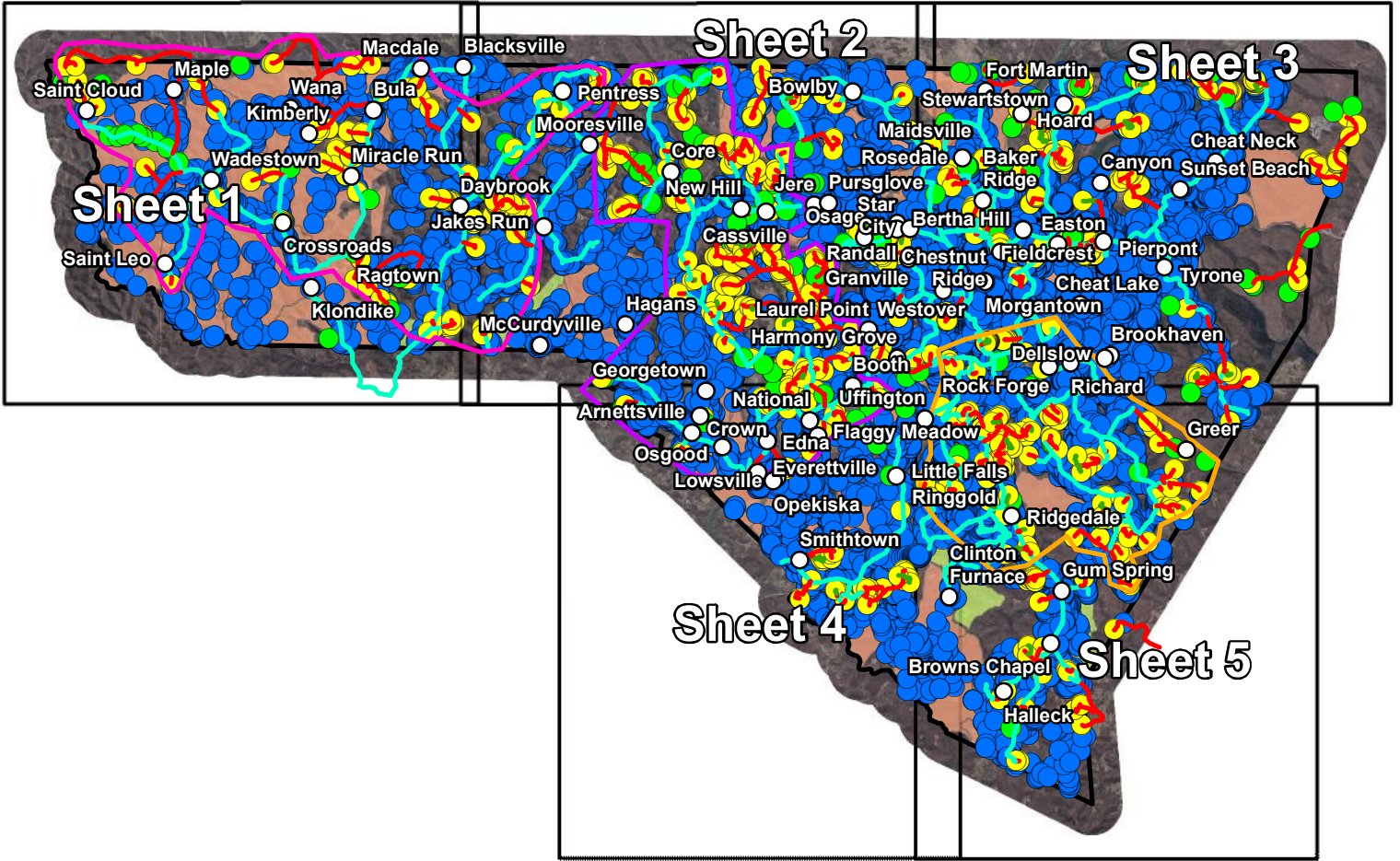
COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
6	Marion	1	1089	72.96	\$5,790,910
		2	307	48.50	\$3,885,370
		3	174	28.73	\$3,273,323

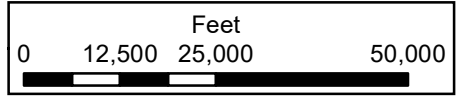


MONONGALIA COUNTY

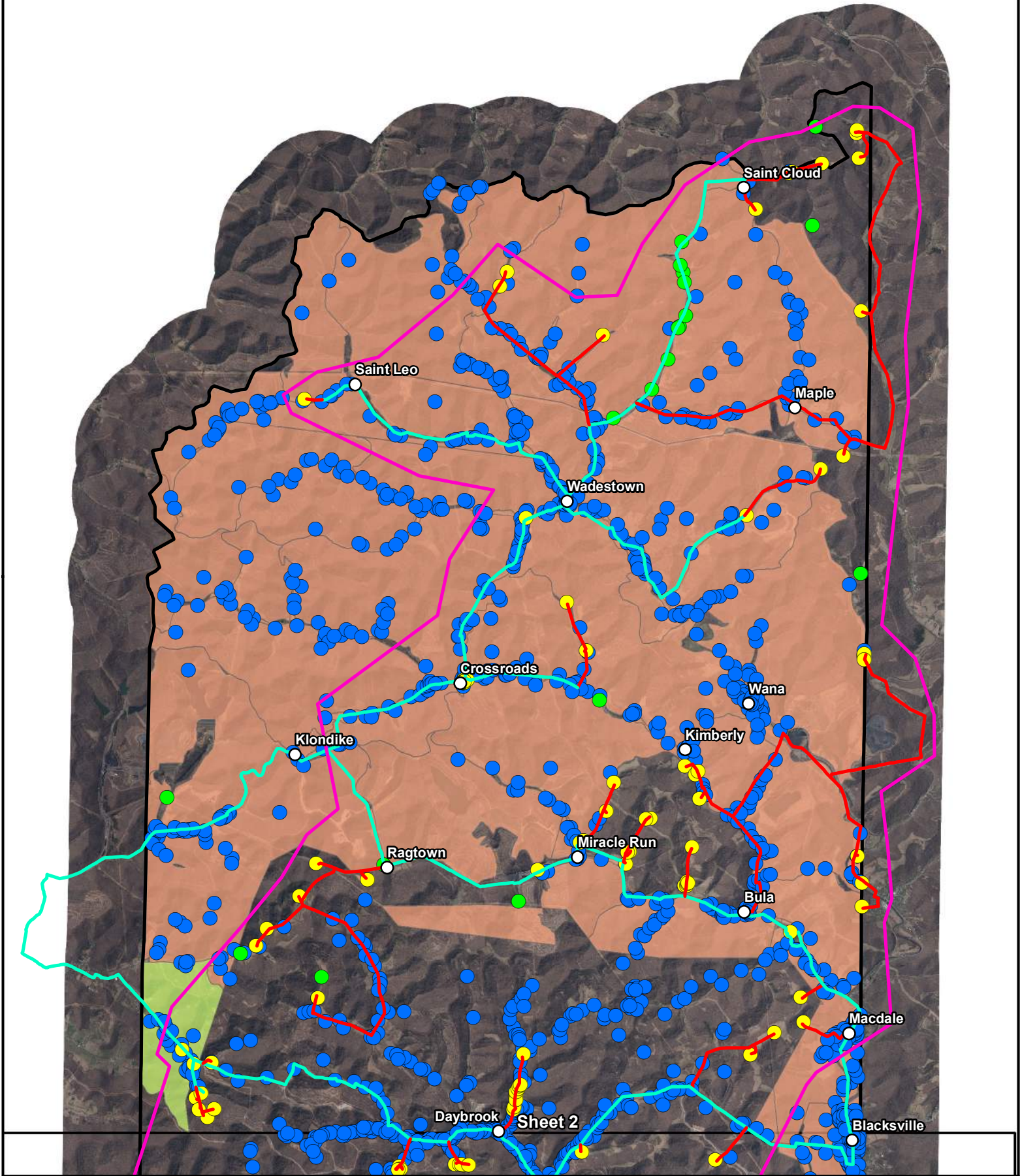



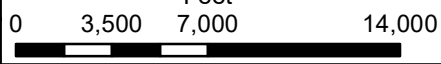


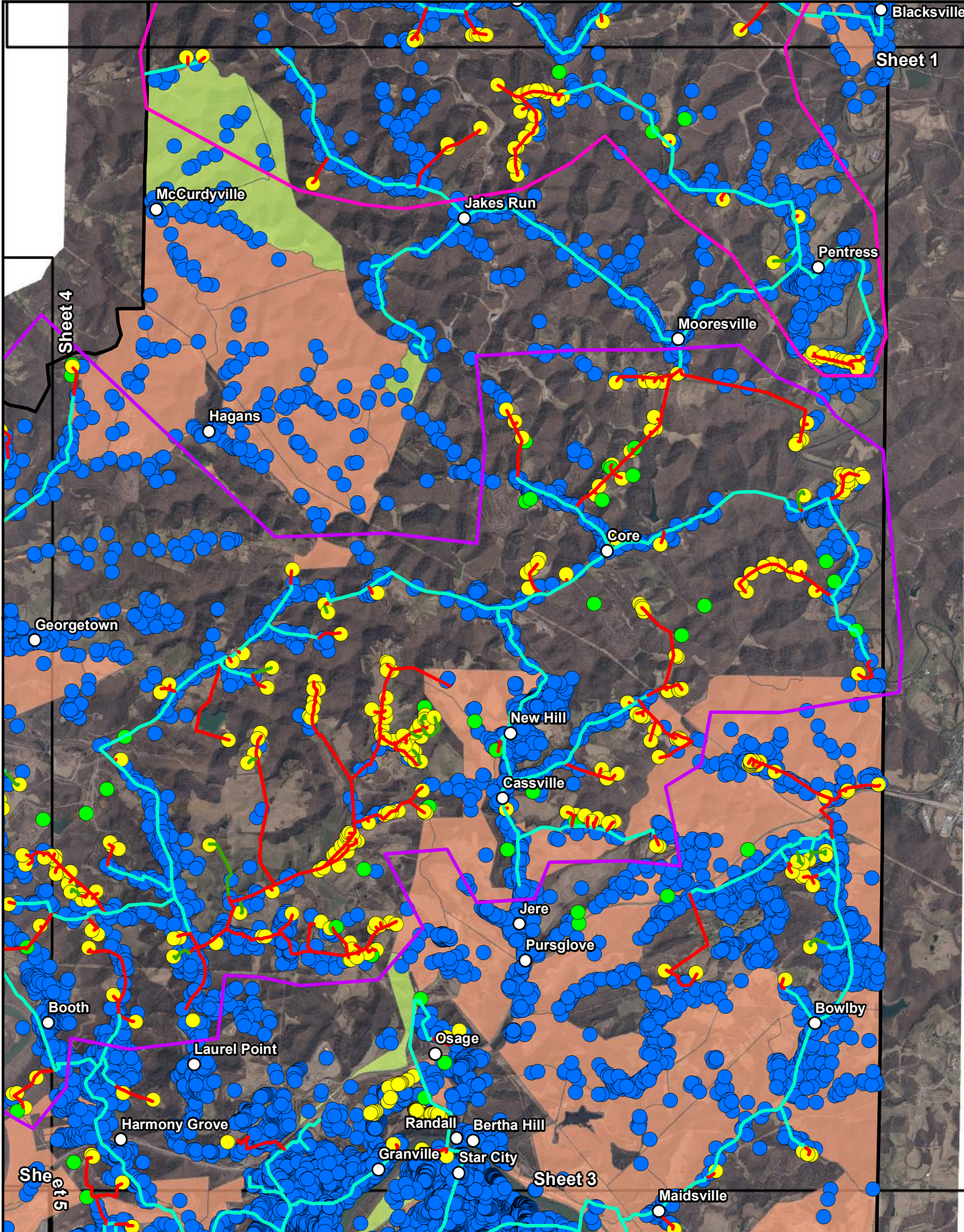
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Citynet West Virginia, LLC - RDOF
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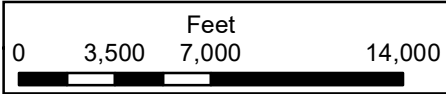
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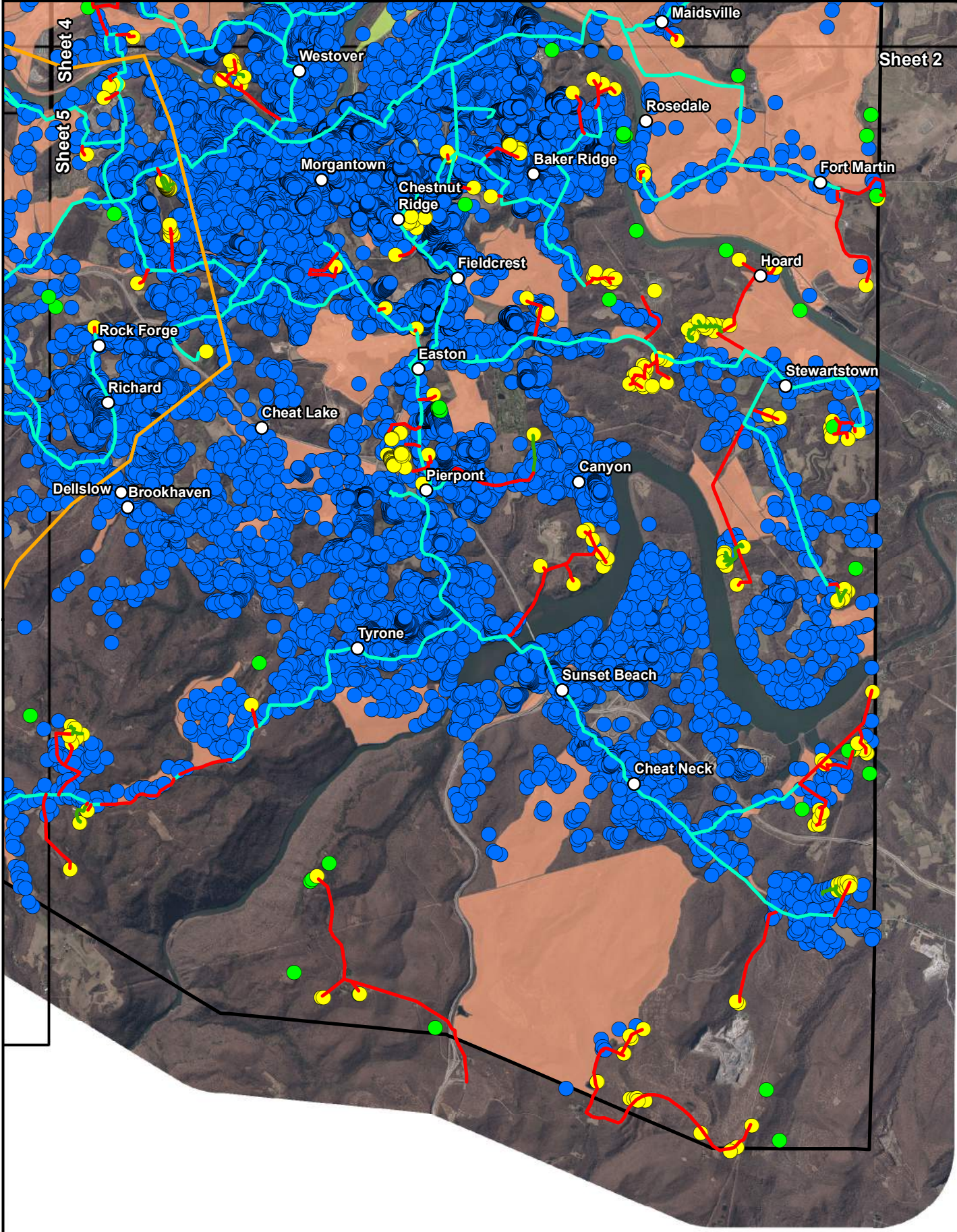
<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses Project 1 Boundary Project 2 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF 	<ul style="list-style-type: none"> Frontier - RDOF County Boundary Index 		<p>Feet</p> <p>0 3,500 7,000 14,000</p> 	<p>Sheet</p> <p style="font-size: 24px; font-weight: bold;">1</p>
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Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	



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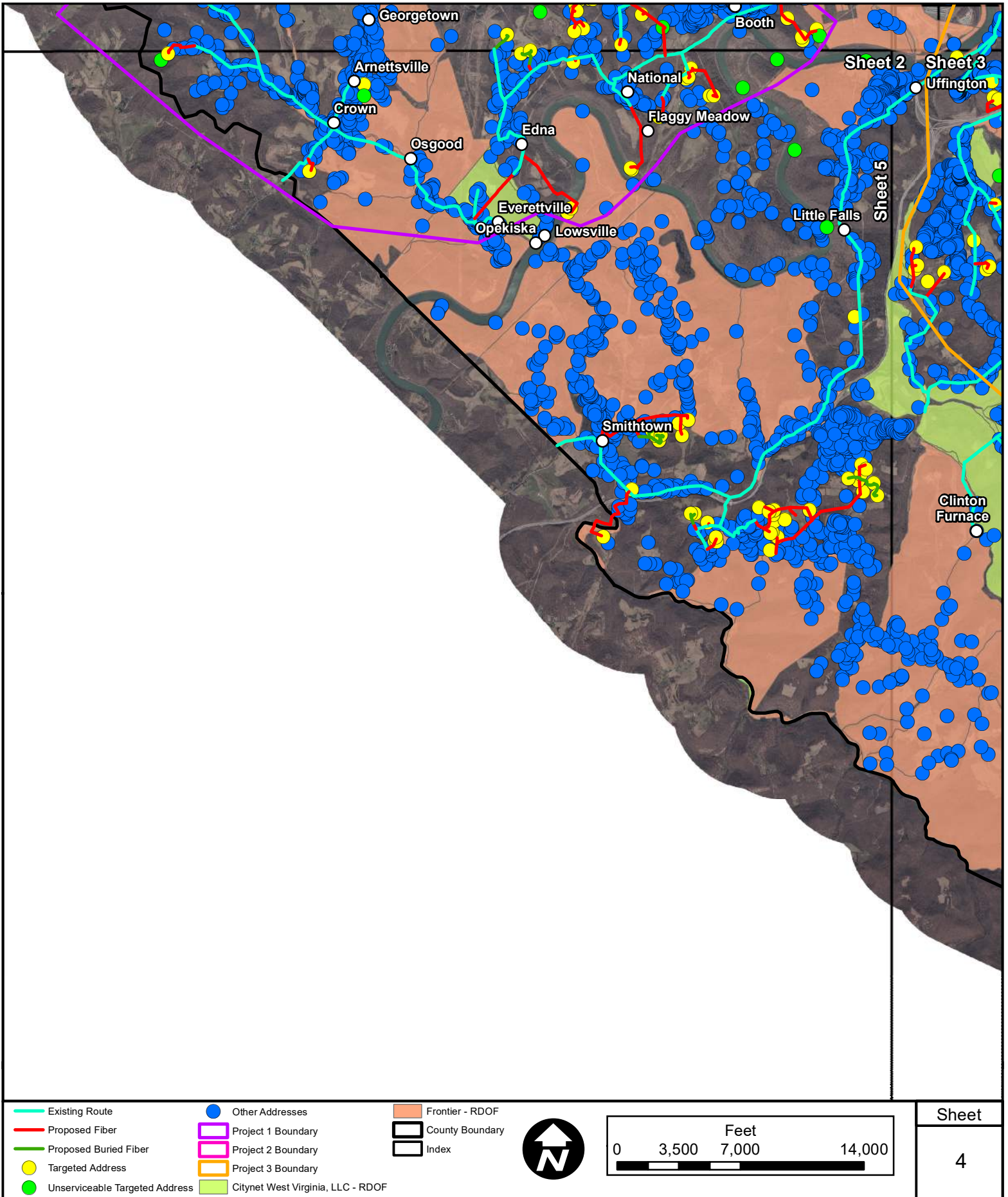


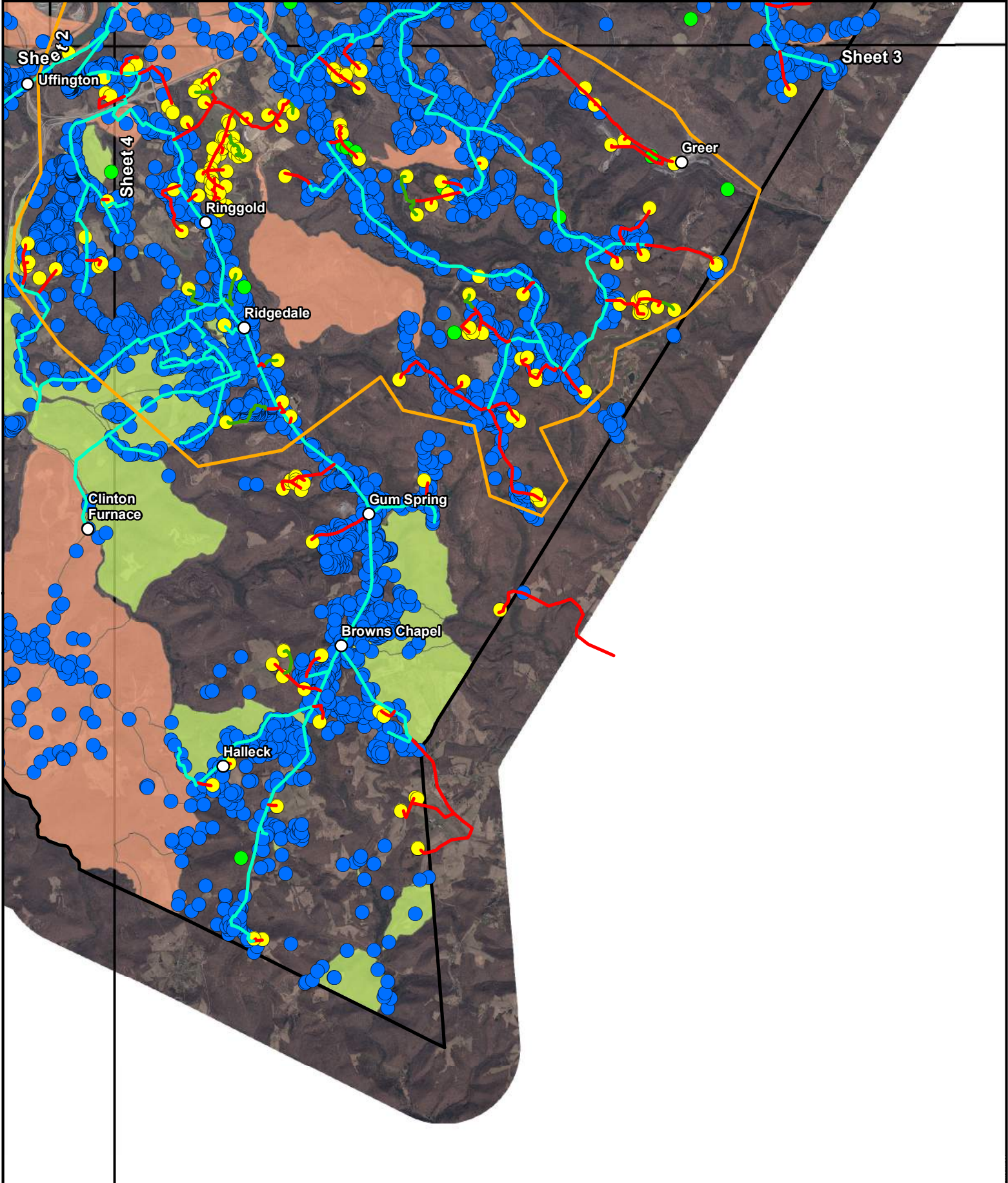
Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

Feet

0 3,500 7,000 14,000

Sheet
3





Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

Feet

0 3,500 7,000 14,000

Sheet
5

Monongalia County, WV – 2023 ROC Study – Cost Estimate – Whole County

Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	164.36	\$903,980
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	164.36	\$246,540
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	152.44	\$2,286,600
Aerial Construction Labor	\$50,000.00	Per Mile	152.44	\$7,622,000
Underground Construction Labor	\$150,000.00	Per Mile	11.92	\$1,788,000
Project Construction Contingency 10%	\$941,000.00	Lump Sum	1	\$941,000
Legal 1.5%	\$141,150.00	Lump Sum	1	\$141,150
Administrative 2%	\$188,200.00	Lump Sum	1	\$188,200

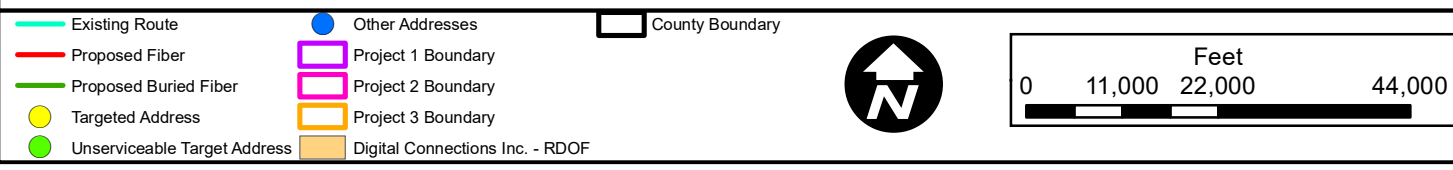
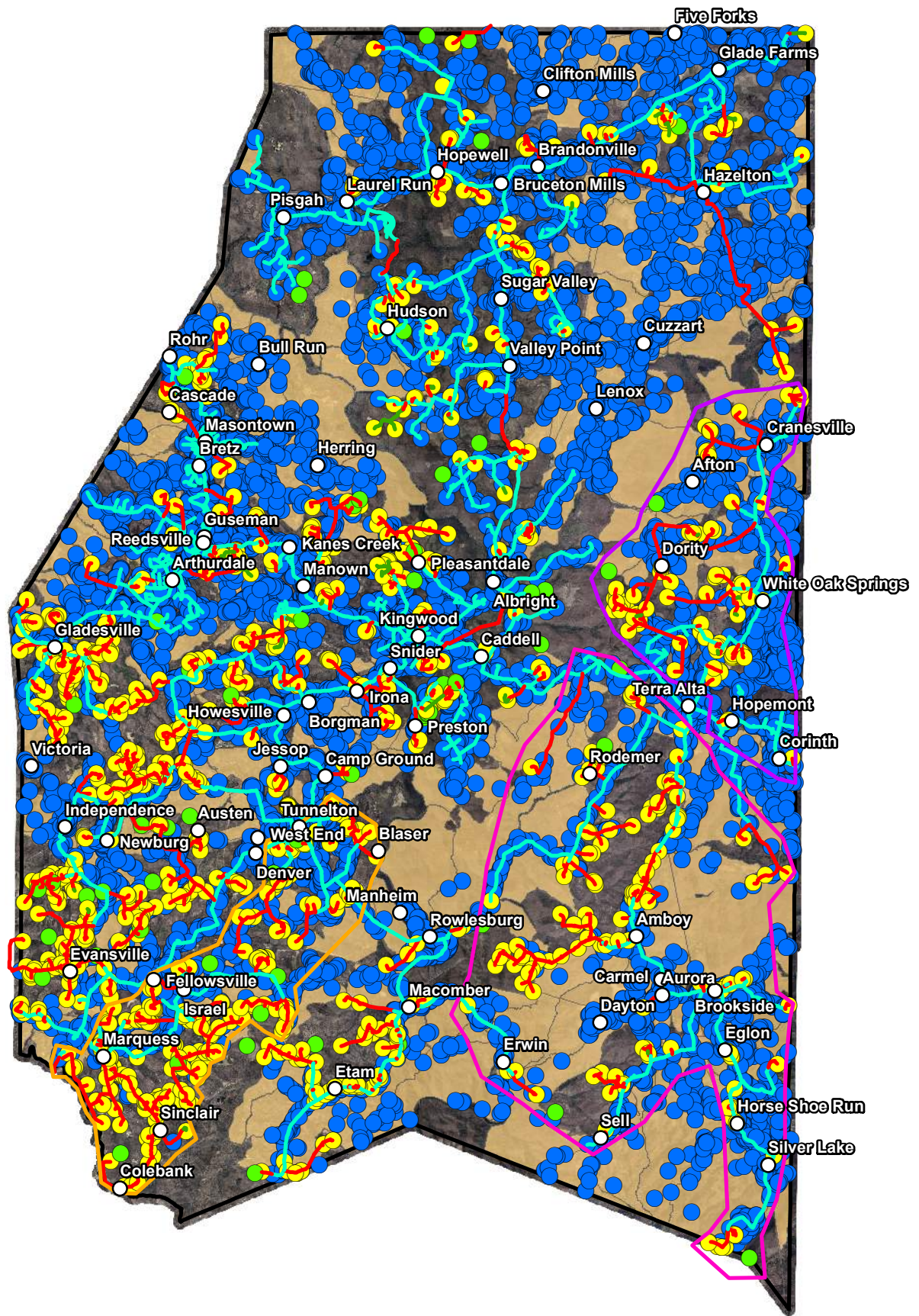
TOTAL COST = \$14,117,470

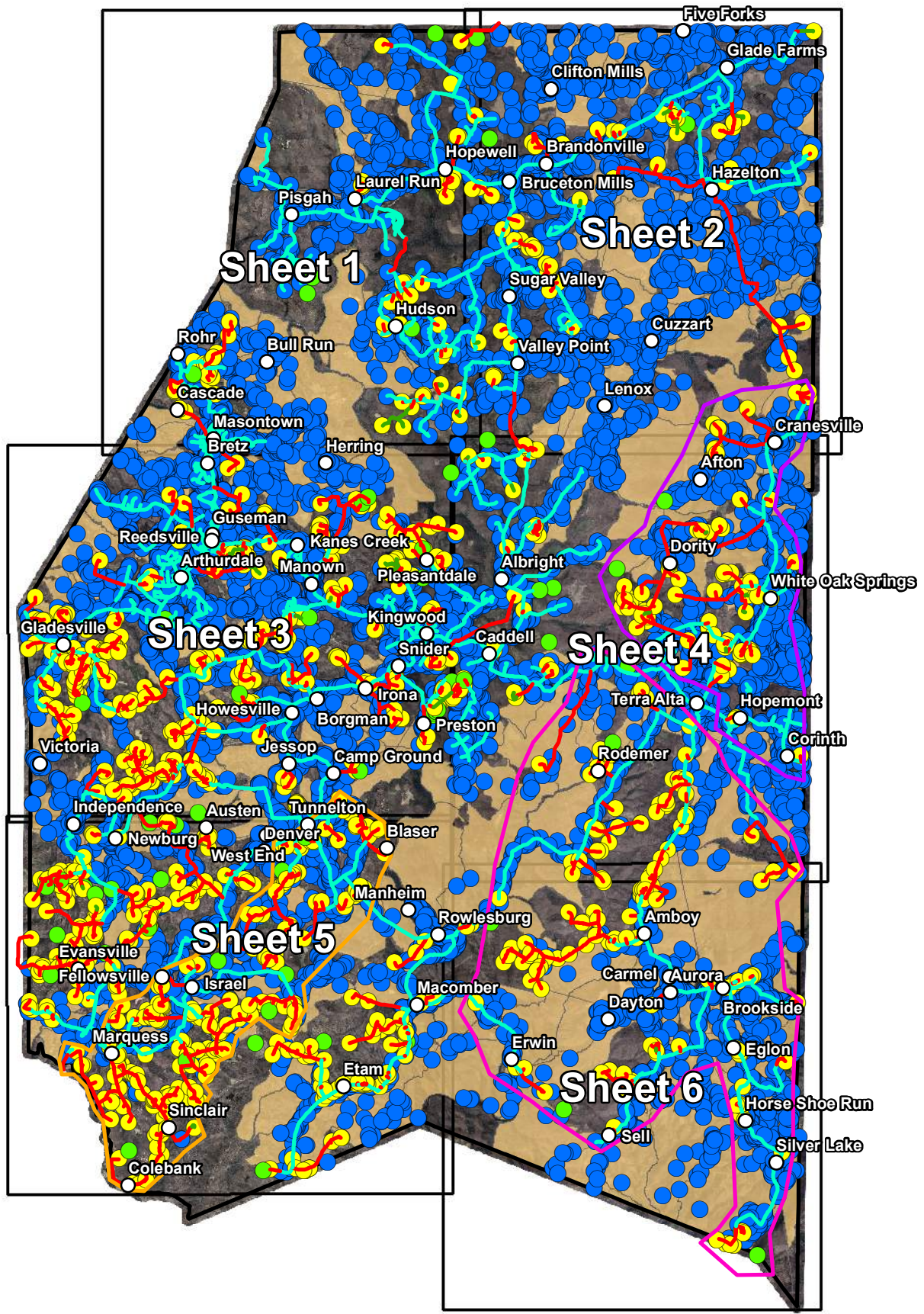
COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
6	Monongalia	1	248	41.86	\$3,591,975
		2	133	37.97	\$3,009,838
		3	183	25.76	\$2,374,335

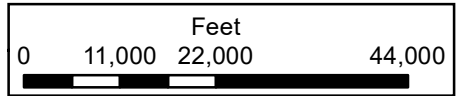


PRESTON COUNTY

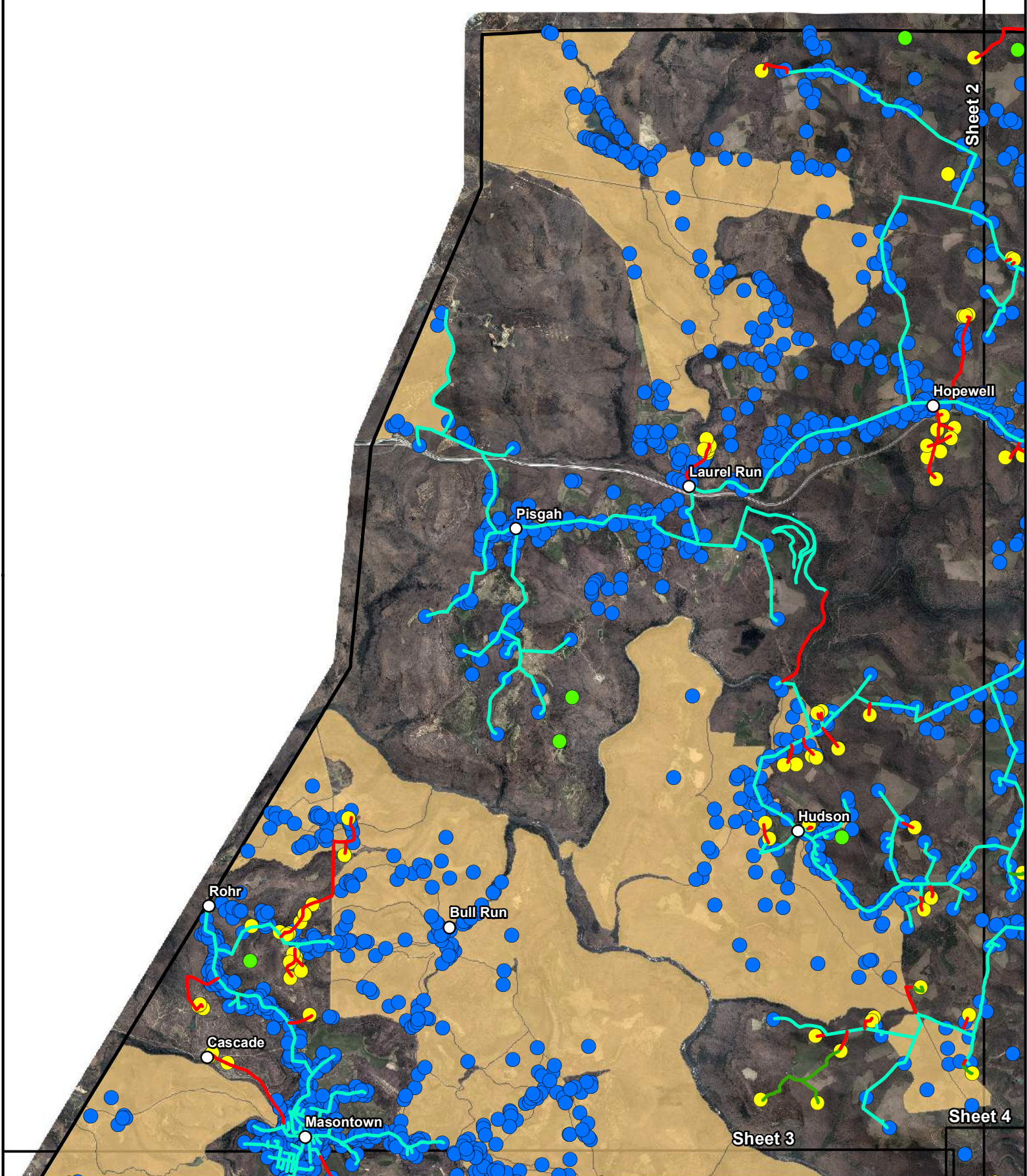




- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Target Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Digital Connections Inc. - RDOF
- County Boundary
- Index



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INDEX

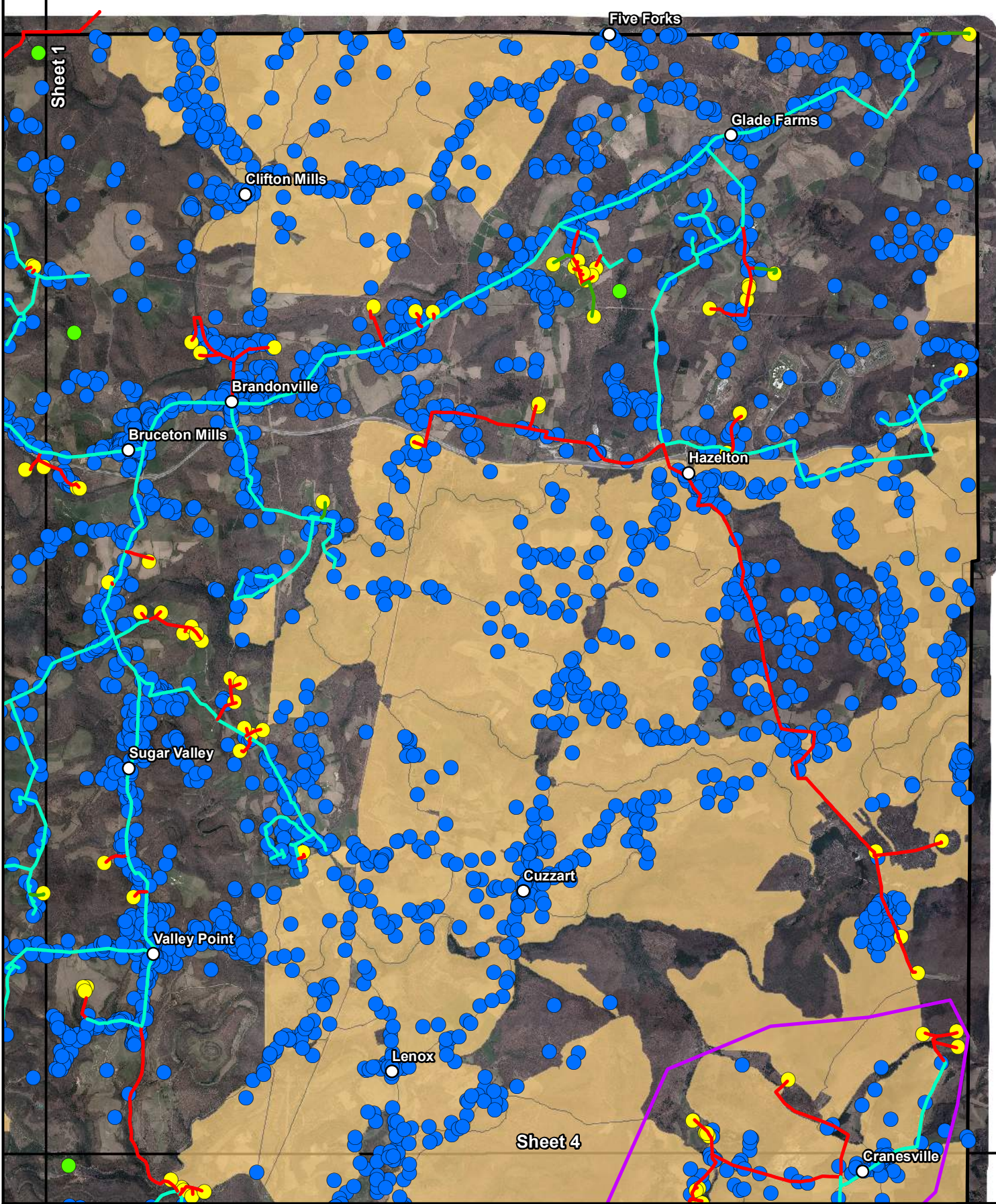


Existing Route	Other Addresses	County Boundary
Proposed Fiber	Project 1 Boundary	Index
Proposed Buried Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Target Address	Digital Connections Inc. - RDOF	

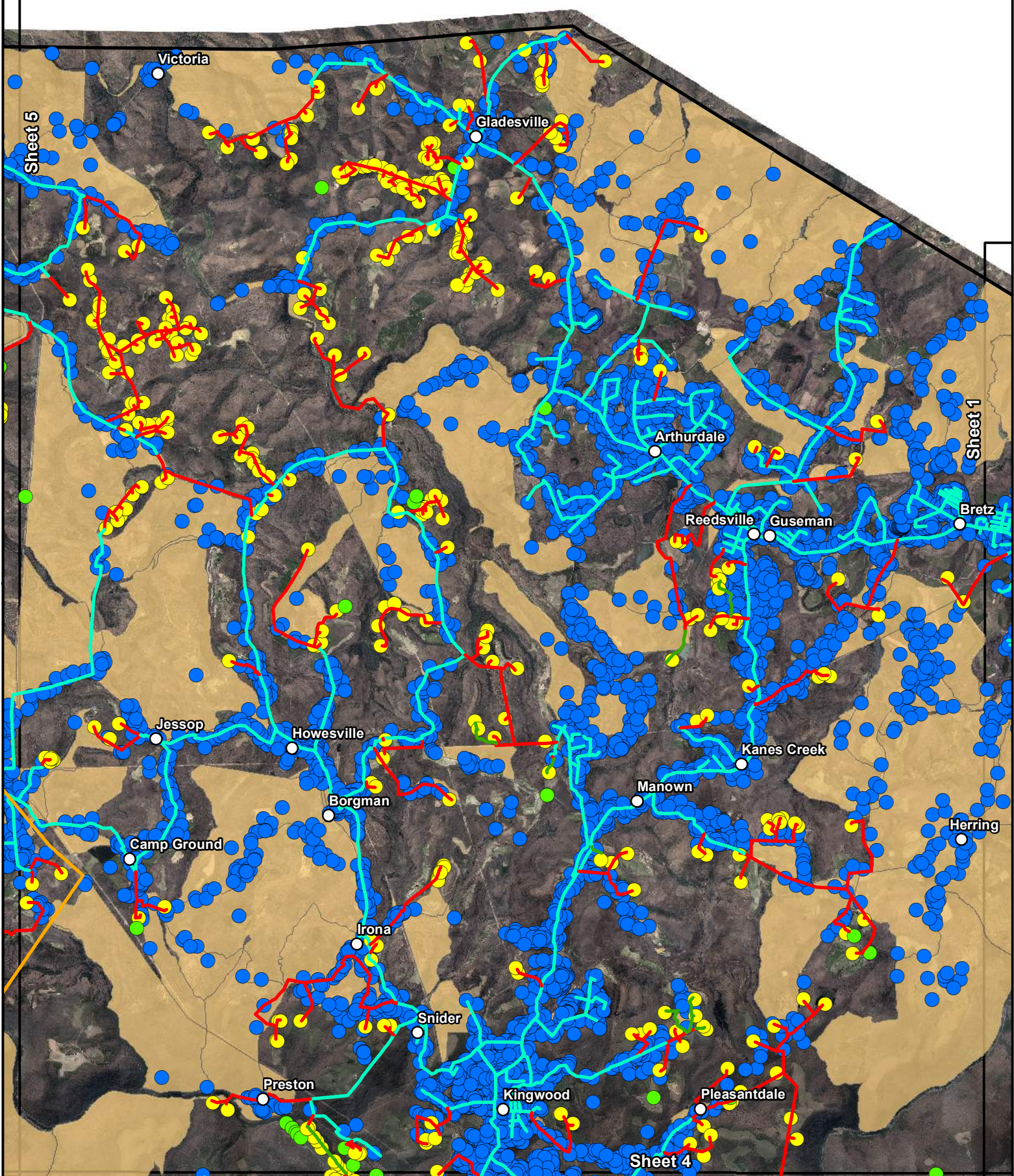
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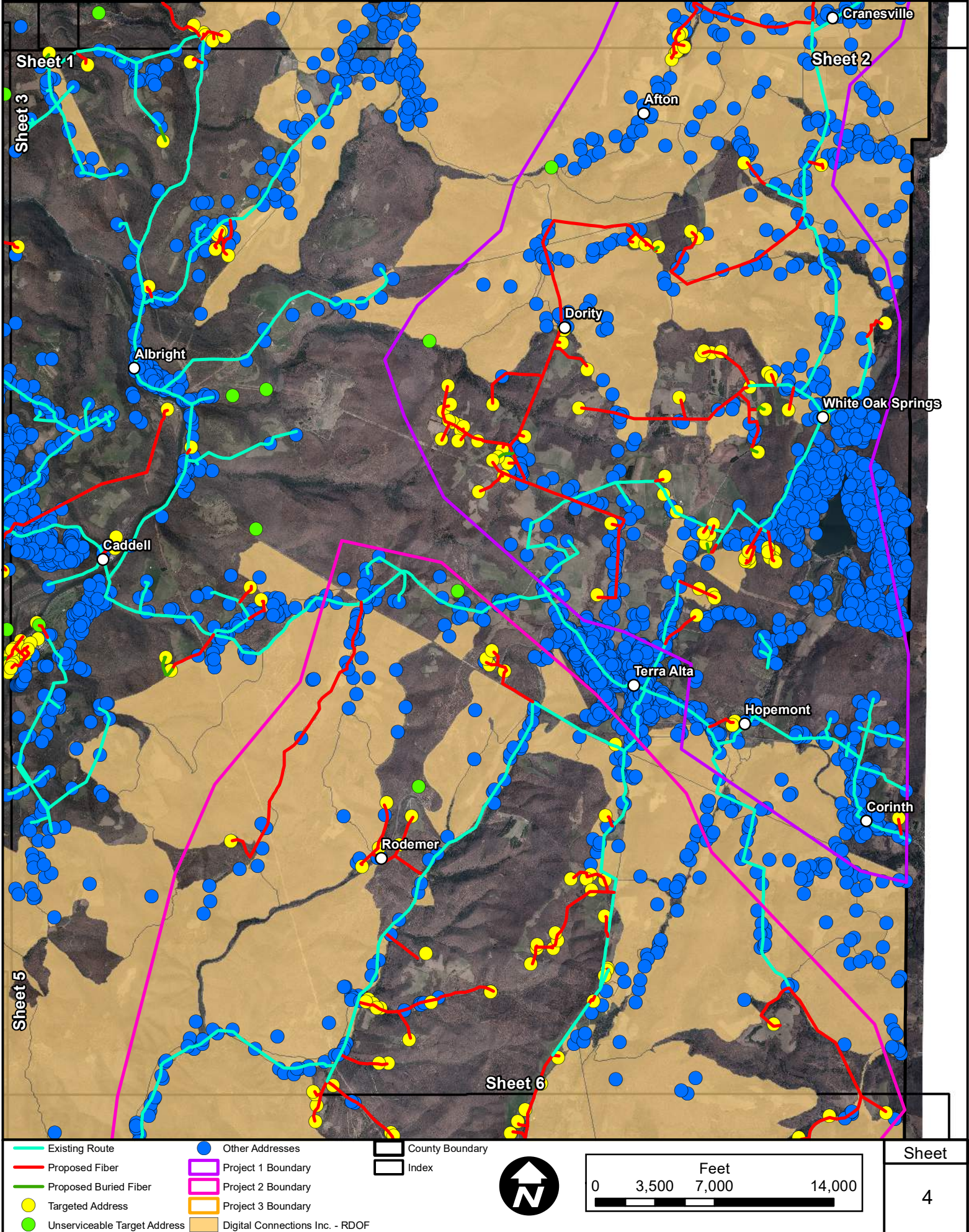


Existing Route	Other Addresses	County Boundary		 Feet 0 3,500 7,000 14,000	Sheet
Proposed Fiber	Project 1 Boundary	Index			2
Proposed Buried Fiber	Project 2 Boundary				
Targeted Address	Project 3 Boundary				
Unserviceable Target Address	Digital Connections Inc. - RDOF				

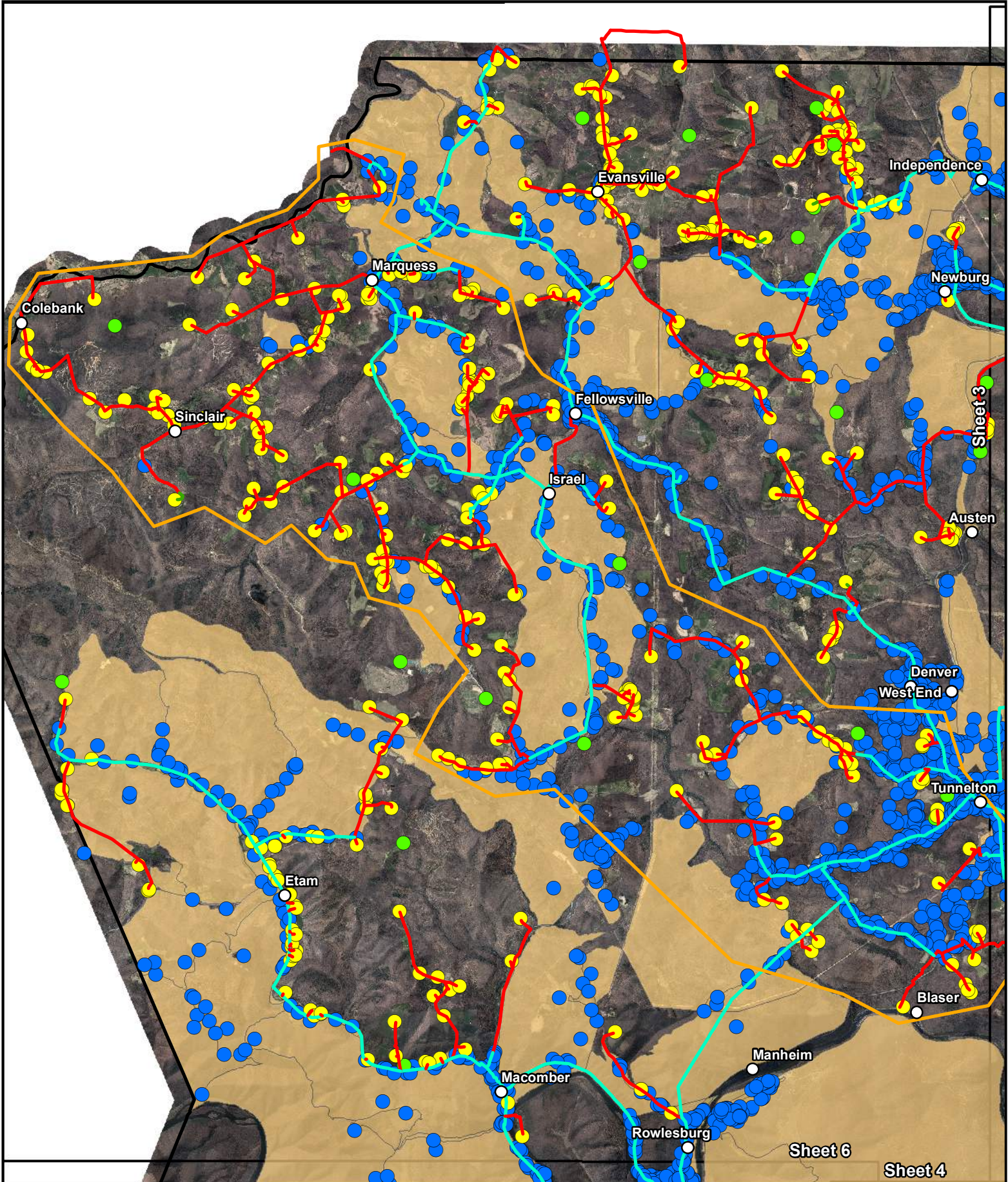


Existing Route	Other Addresses	County Boundary
Proposed Fiber	Project 1 Boundary	Index
Proposed Buried Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Target Address	Digital Connections Inc. - RDOF	

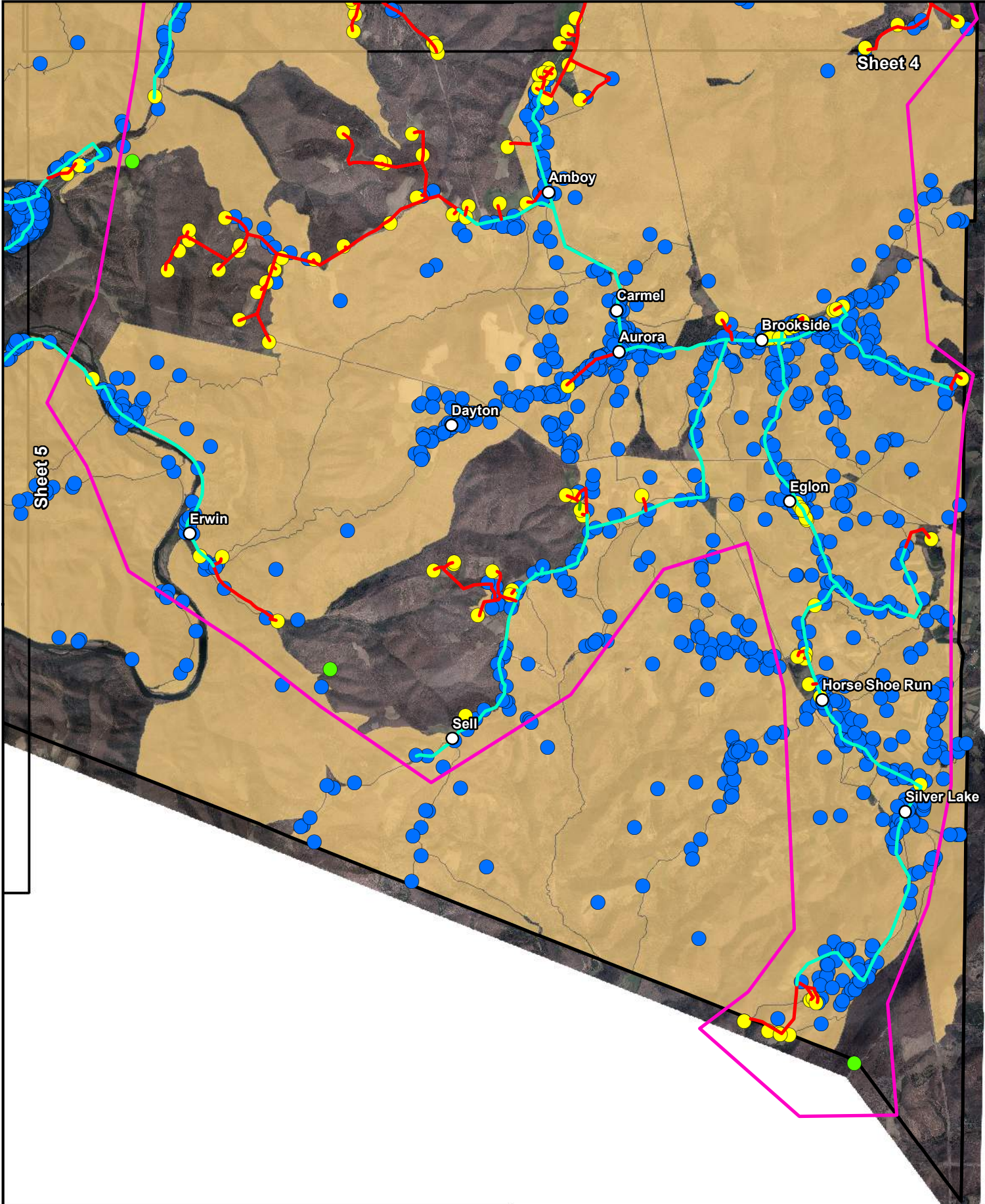
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Existing Route	Other Addresses	County Boundary		Feet 0 3,500 7,000 14,000	Sheet
Proposed Fiber	Project 1 Boundary	Index			5
Proposed Buried Fiber	Project 2 Boundary				
Targeted Address	Project 3 Boundary				
Unserviceable Target Address	Digital Connections Inc. - RDOF				



Sheet 4

Sheet 5

Existing Route	Other Addresses	County Boundary		Feet 0 3,500 7,000 14,000	Sheet
Proposed Fiber	Project 1 Boundary	Index			6
Proposed Buried Fiber	Project 2 Boundary				
Targeted Address	Project 3 Boundary				
Unserviceable Target Address	Digital Connections Inc. - RDOF				

Preston County, WV – 2023 ROC Study – Cost Estimate – Whole County

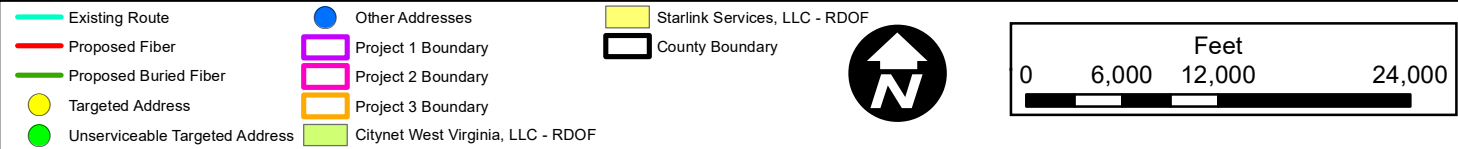
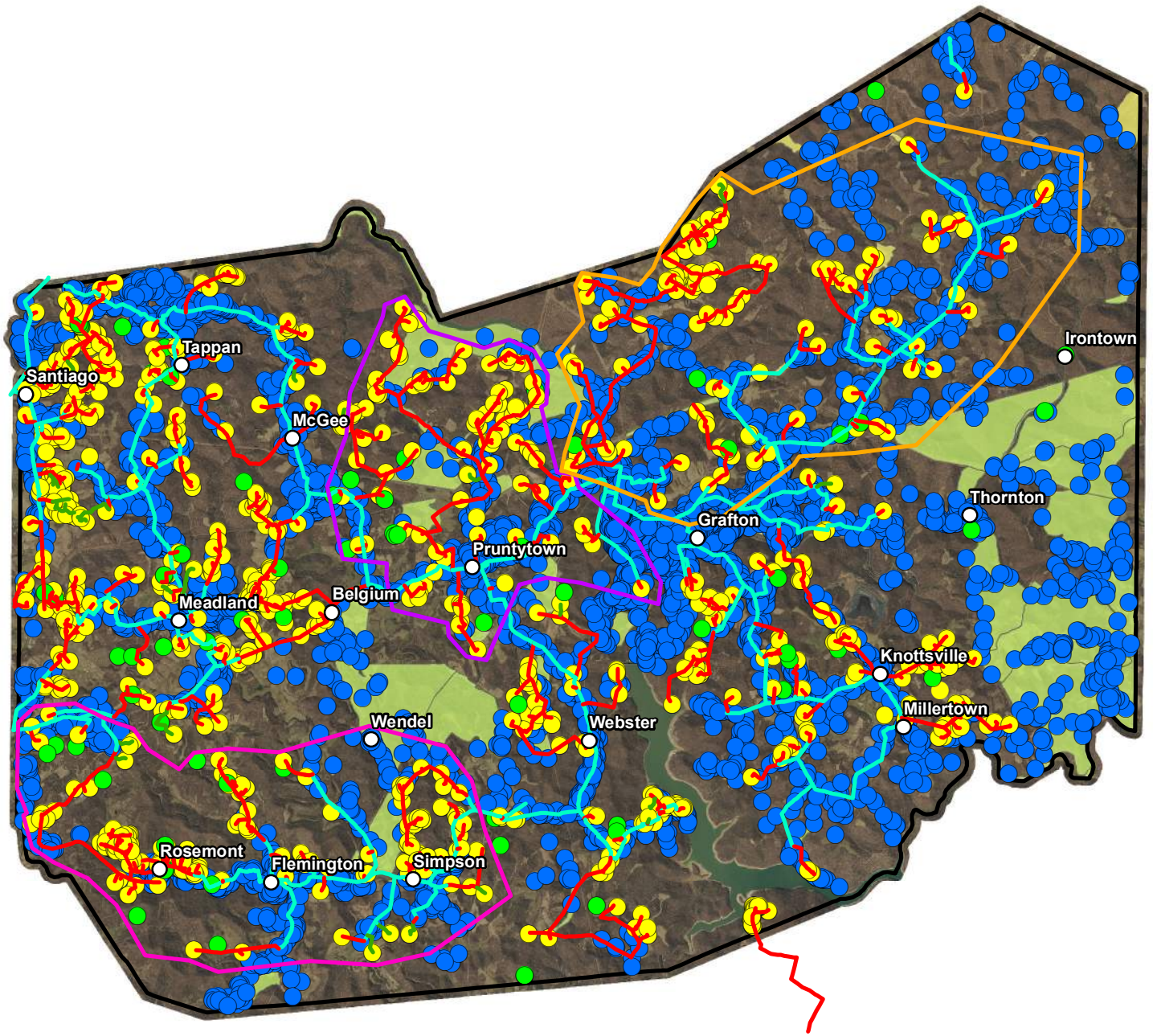
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	273.97	\$1,506,835
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	273.97	\$410,955
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	265.91	\$3,988,650
Aerial Construction Labor	\$50,000.00	Per Mile	265.91	\$13,295,500
Underground Construction Labor	\$150,000.00	Per Mile	8.06	\$1,209,000
Project Construction Contingency 10%	\$1,450,450.00	Lump Sum	1	\$1,450,450
Legal 1.5%	\$217,567.50	Lump Sum	1	\$217,568
Administrative 2%	\$290,090.00	Lump Sum	1	\$290,090
TOTAL COST = \$22,369,048				

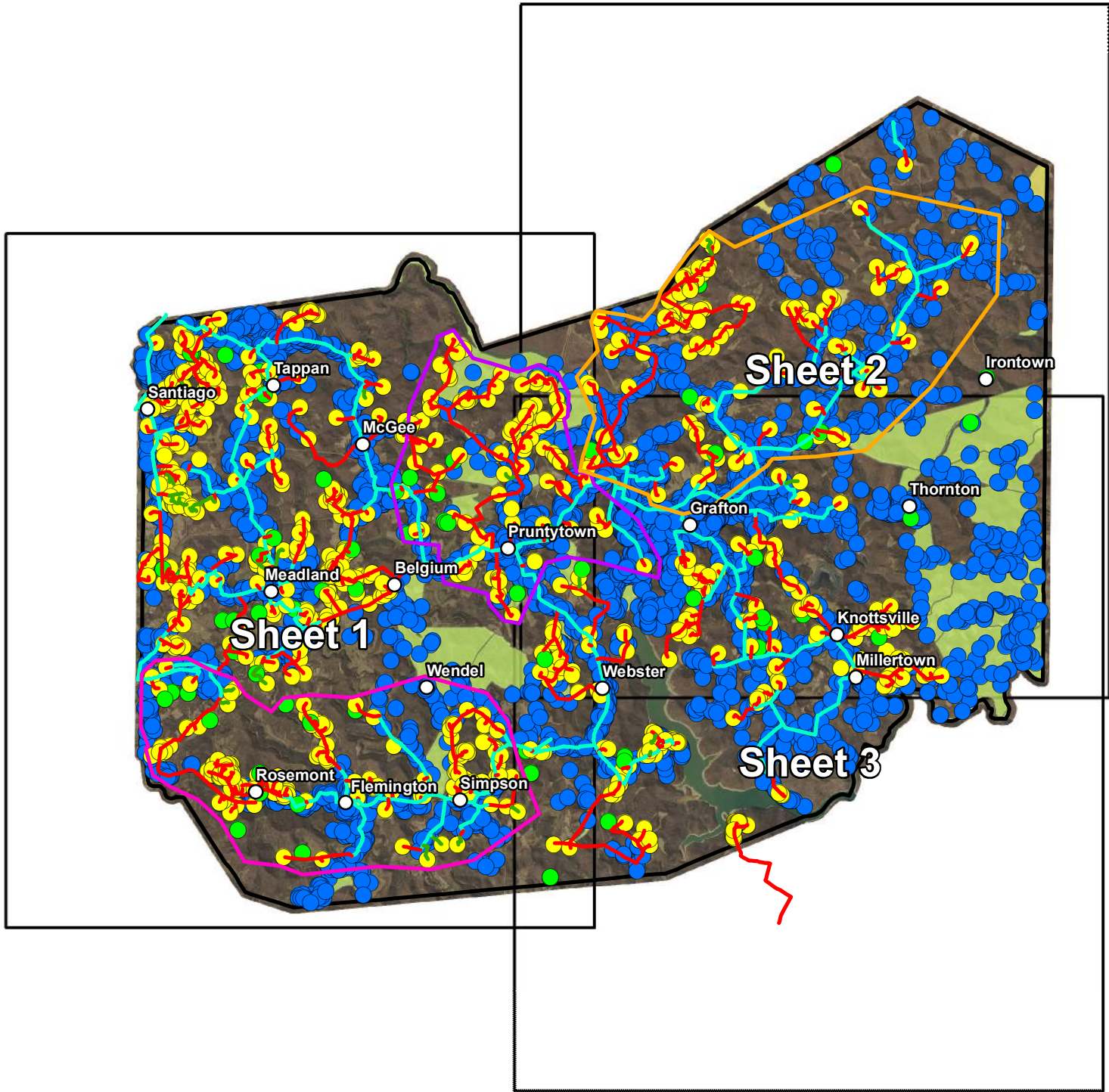
COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
6	Preston	1	84	26.44	\$2,131,398
		2	152	36.22	\$2,858,235
		3	217	47.29	\$3,500,393



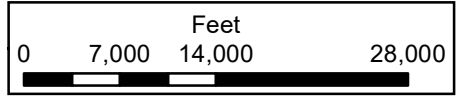
TAYLOR COUNTY



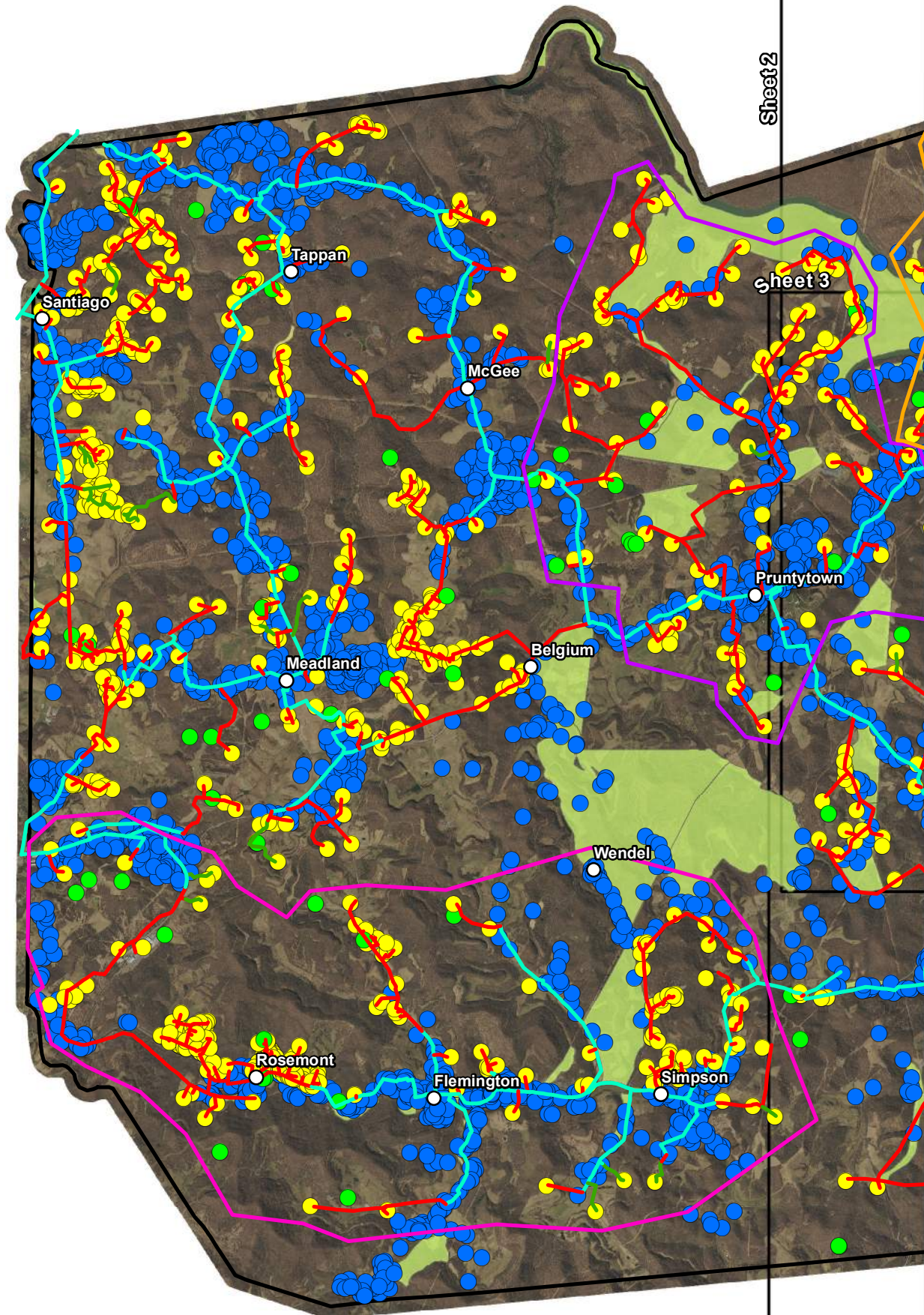


- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Citynet West Virginia, LLC - RDOF

- Starlink Services, LLC - RDOF
- County Boundary
- Index

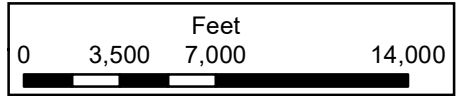


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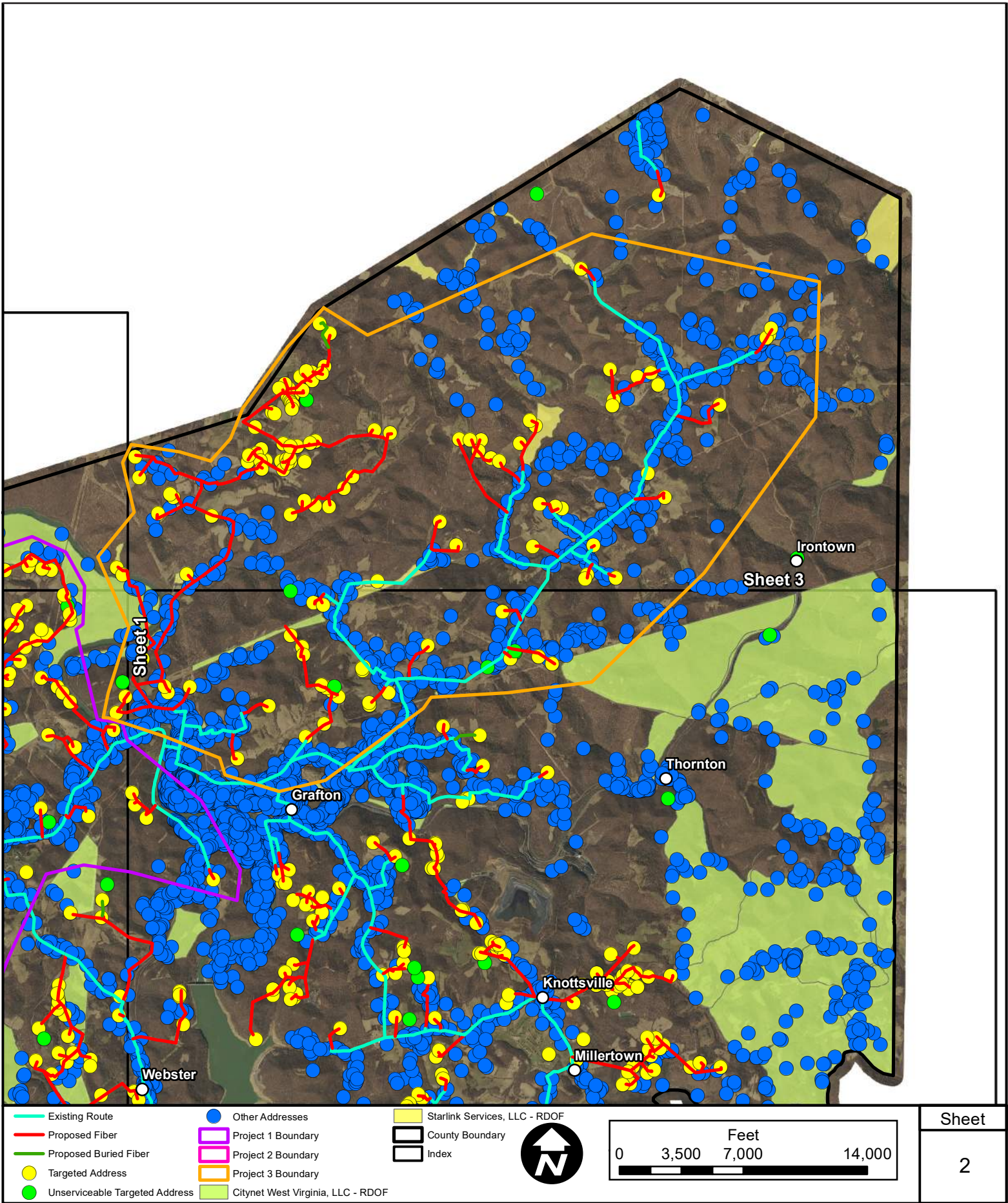


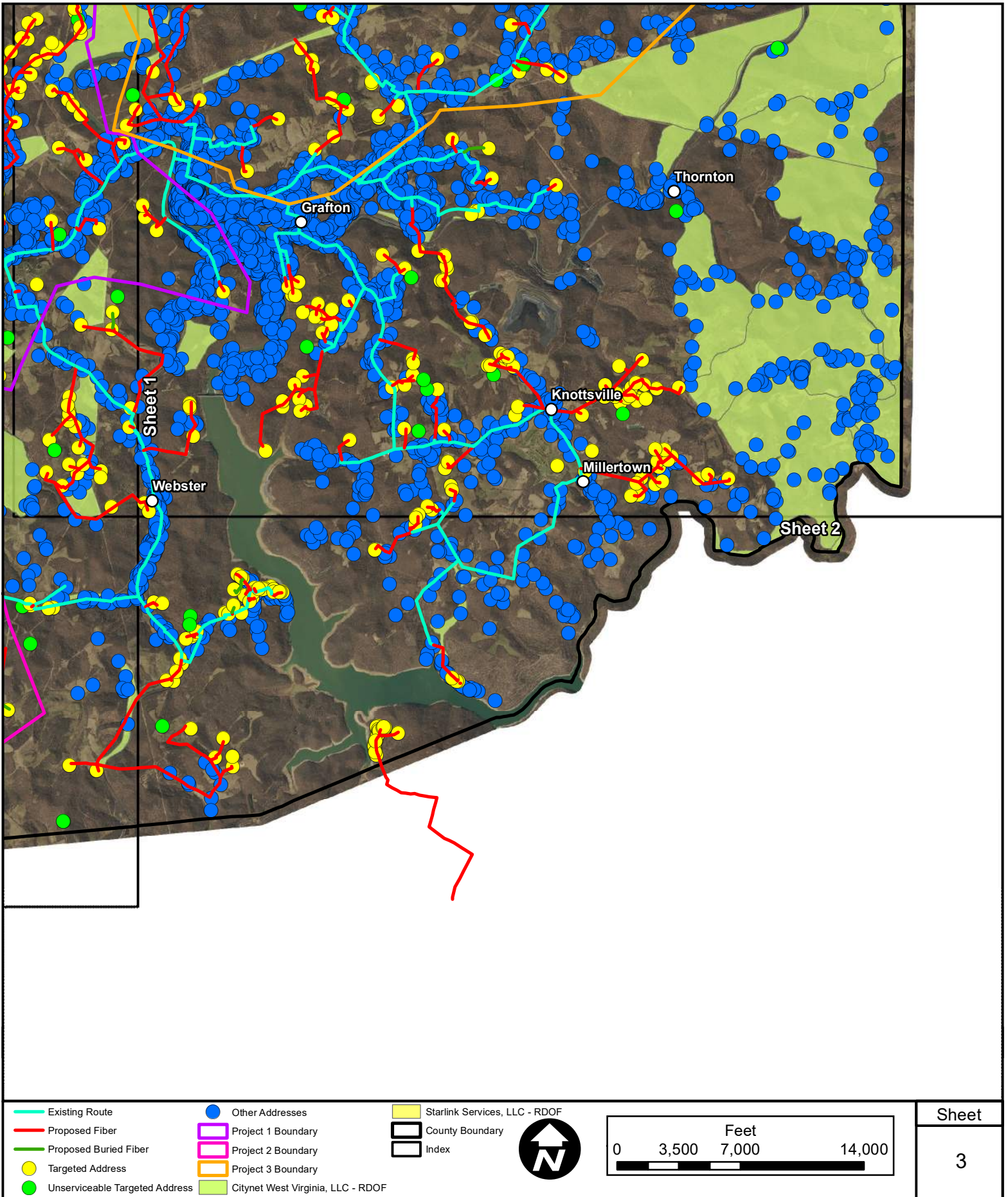
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Citynet West Virginia, LLC - RDOF

- Starlink Services, LLC - RDOF
- County Boundary
- Index



Sheet
1





Taylor County, WV – 2023 ROC Study – Cost Estimate – Whole County

Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	149.08	\$819,940
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	149.08	\$223,620
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	142.83	\$2,142,450
Aerial Construction Labor	\$50,000.00	Per Mile	142.83	\$7,141,500
Underground Construction Labor	\$150,000.00	Per Mile	6	\$942,000
Project Construction Contingency 10%	\$808,350.00	Lump Sum	1	\$808,350
Legal 1.5%	\$121,252.50	Lump Sum	1	\$121,253
Administrative 2%	\$161,670.00	Lump Sum	1	\$161,670
TOTAL COST = \$12,360,783				

COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
6	Taylor	1	100	25.54	\$1,886,490
		2	202	22.04	\$1,869,610
		3	123	52.77	\$6,770,813

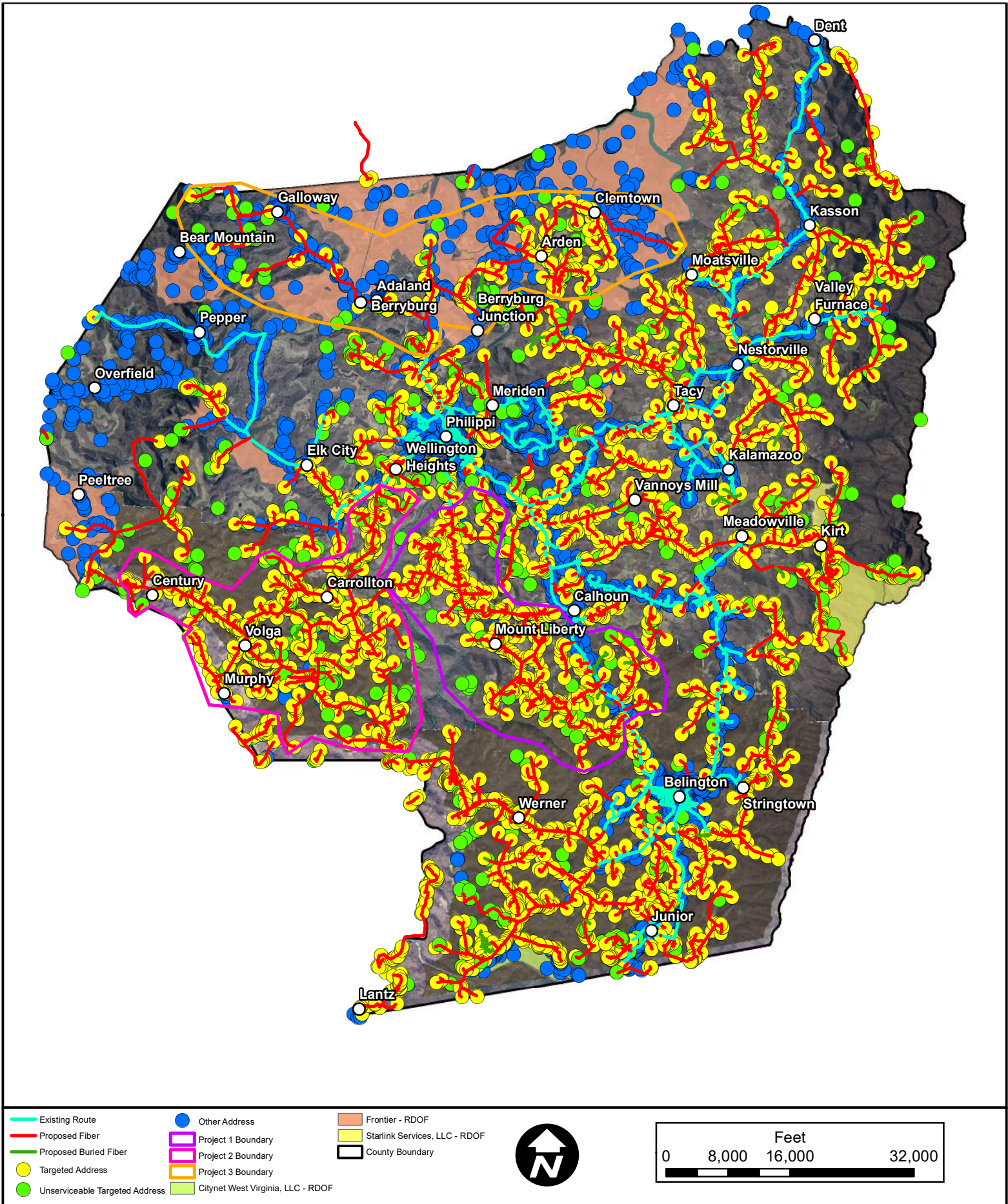
REGION 7

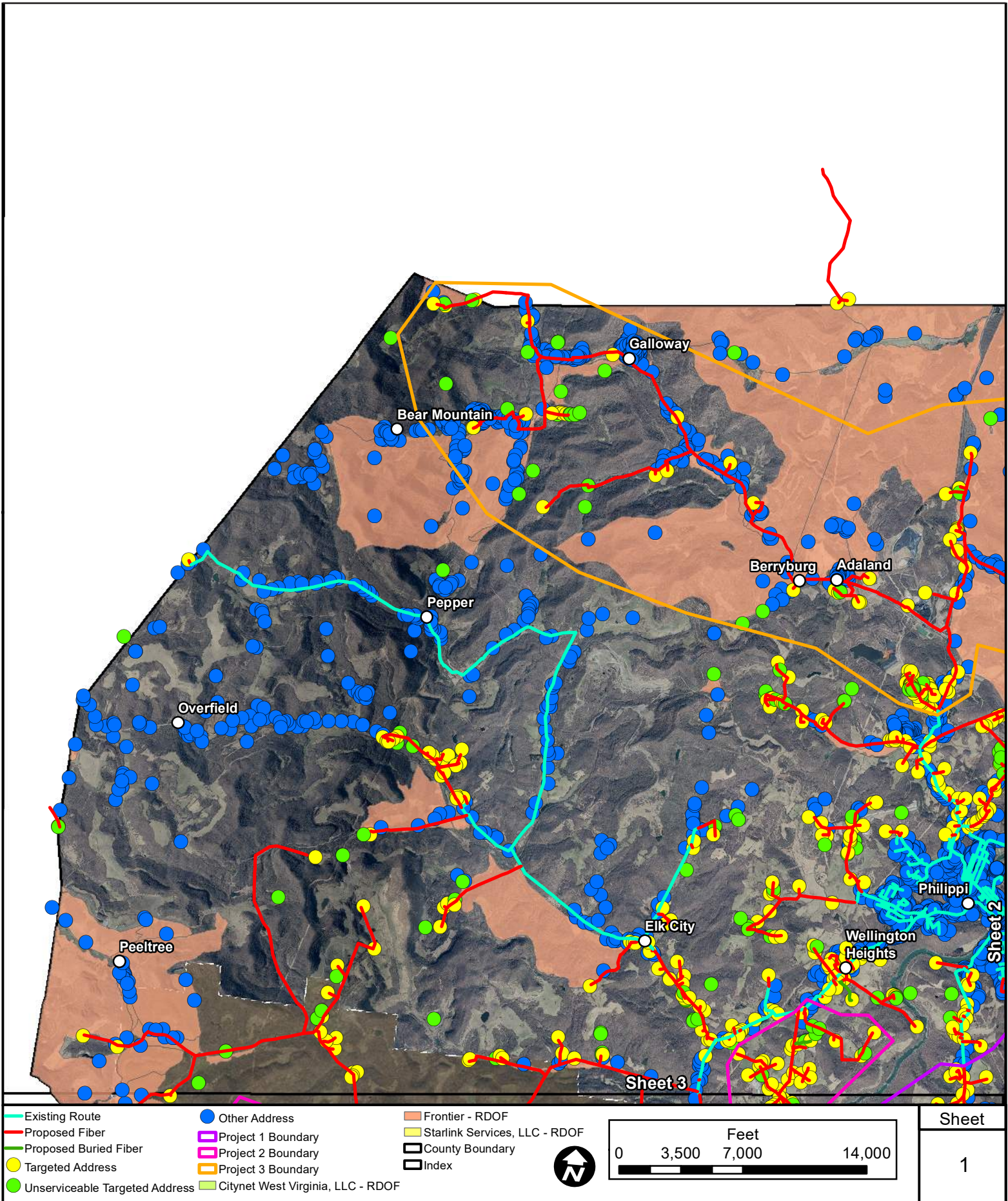
Barbour, Braxton, Gilmer, Lewis,
Randolph, Tucker, and Upshur Counties

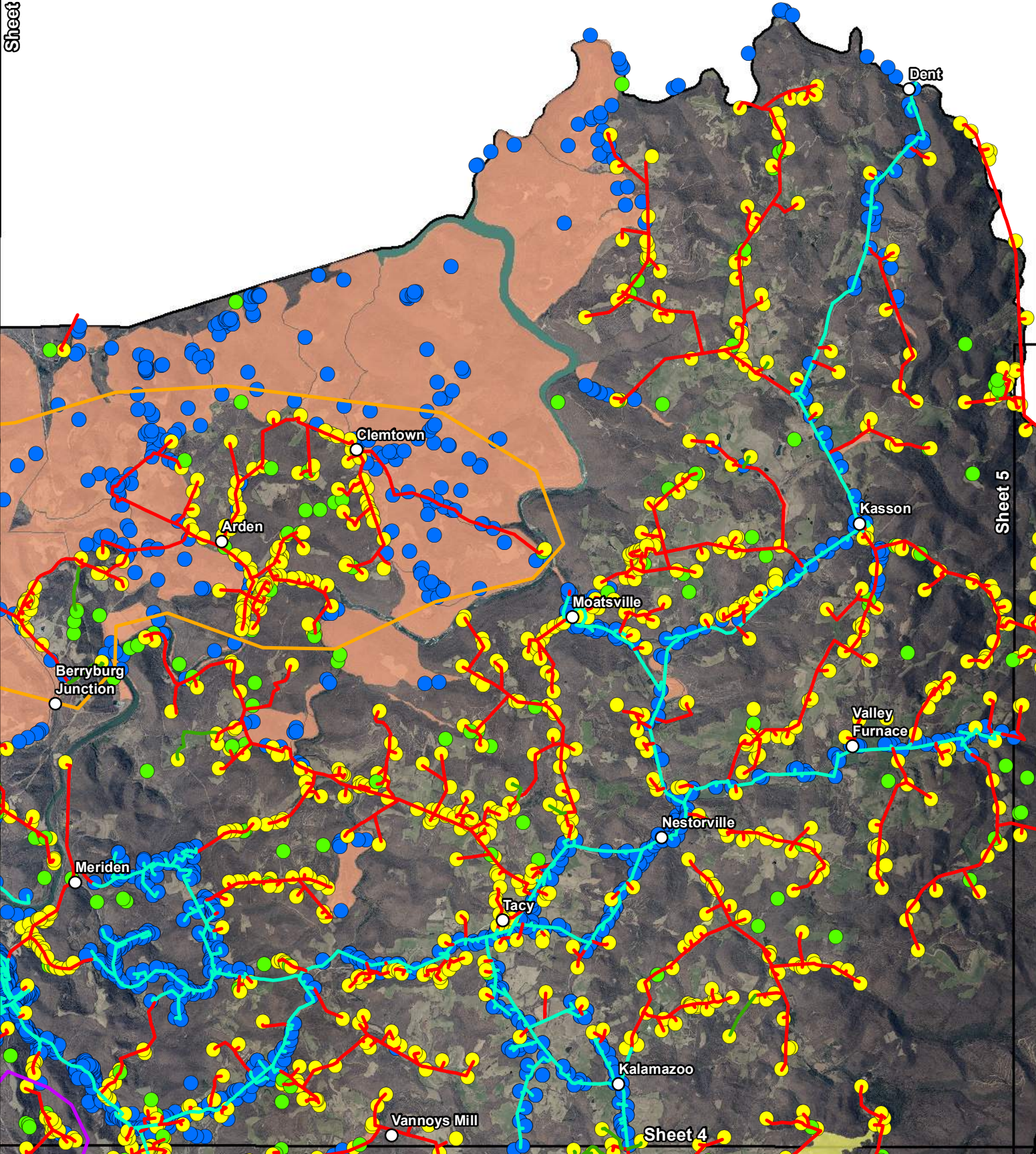




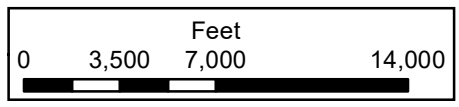
BARBOUR COUNTY

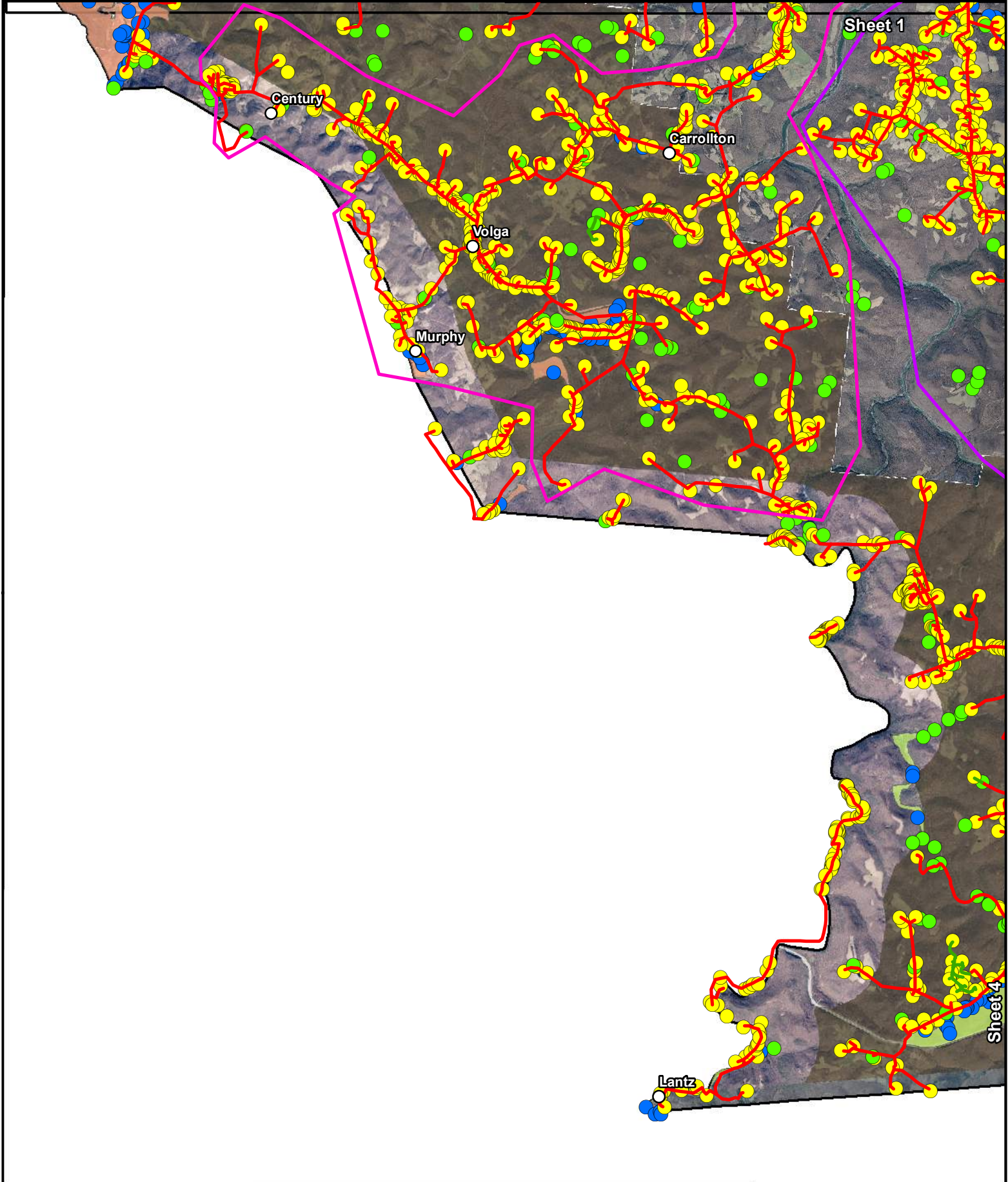



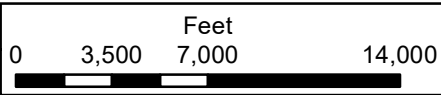


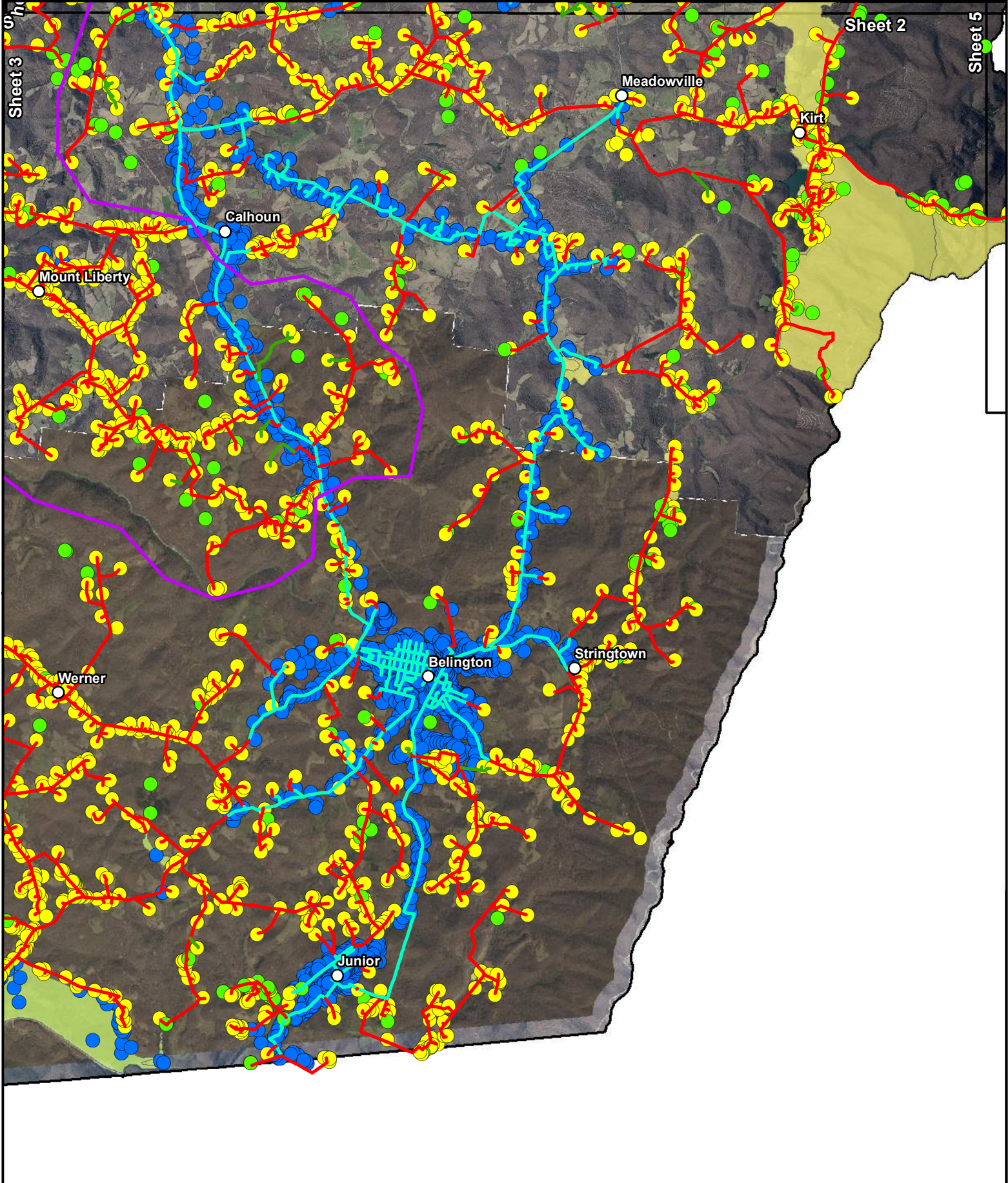



- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Citynet West Virginia, LLC - RDOF
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index

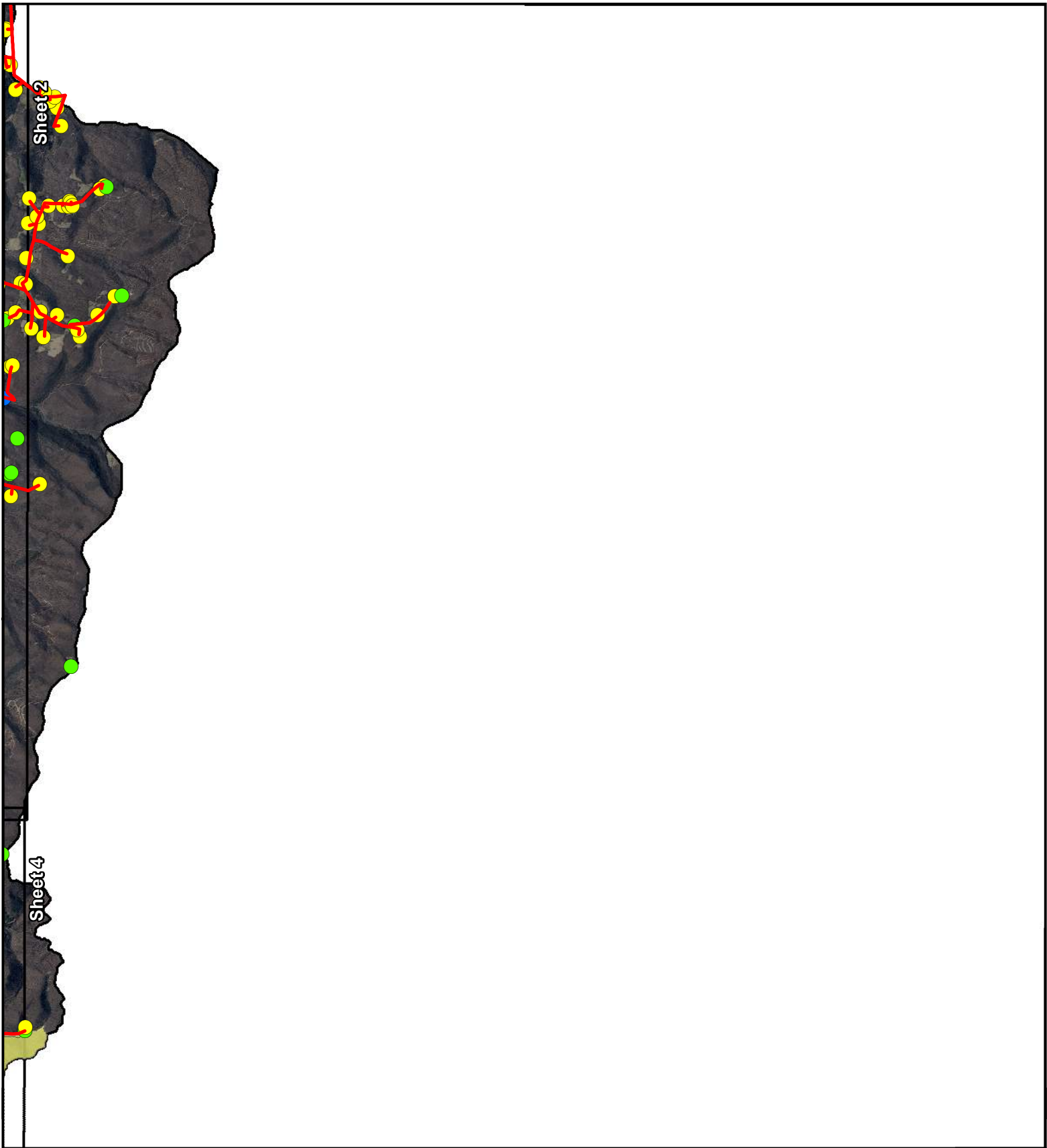



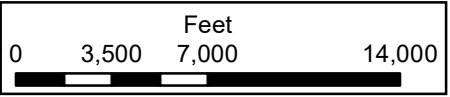


Existing Route	Other Address	Frontier - RDOF			Sheet
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF			3
Proposed Buried Fiber	Project 2 Boundary	County Boundary			
Targeted Address	Project 3 Boundary	Index			
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF				



<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Address Project 1 Boundary Project 2 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF 	<ul style="list-style-type: none"> Frontier - RDOF Starlink Services, LLC - RDOF County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="width: 25%;">0</td> <td style="width: 25%;">3,500</td> <td style="width: 25%;">7,000</td> <td style="width: 25%;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td style="text-align: center;">4</td> </tr> </table>	Sheet	4
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0	3,500	7,000	14,000												
Sheet															
4															



Existing Route	Other Address	Frontier - RDOF			Sheet
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF			5
Proposed Buried Fiber	Project 2 Boundary	County Boundary			
Targeted Address	Project 3 Boundary	Index			
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF				

Barbour County, WV – 2023 ROC Study – Cost Estimate – Whole County

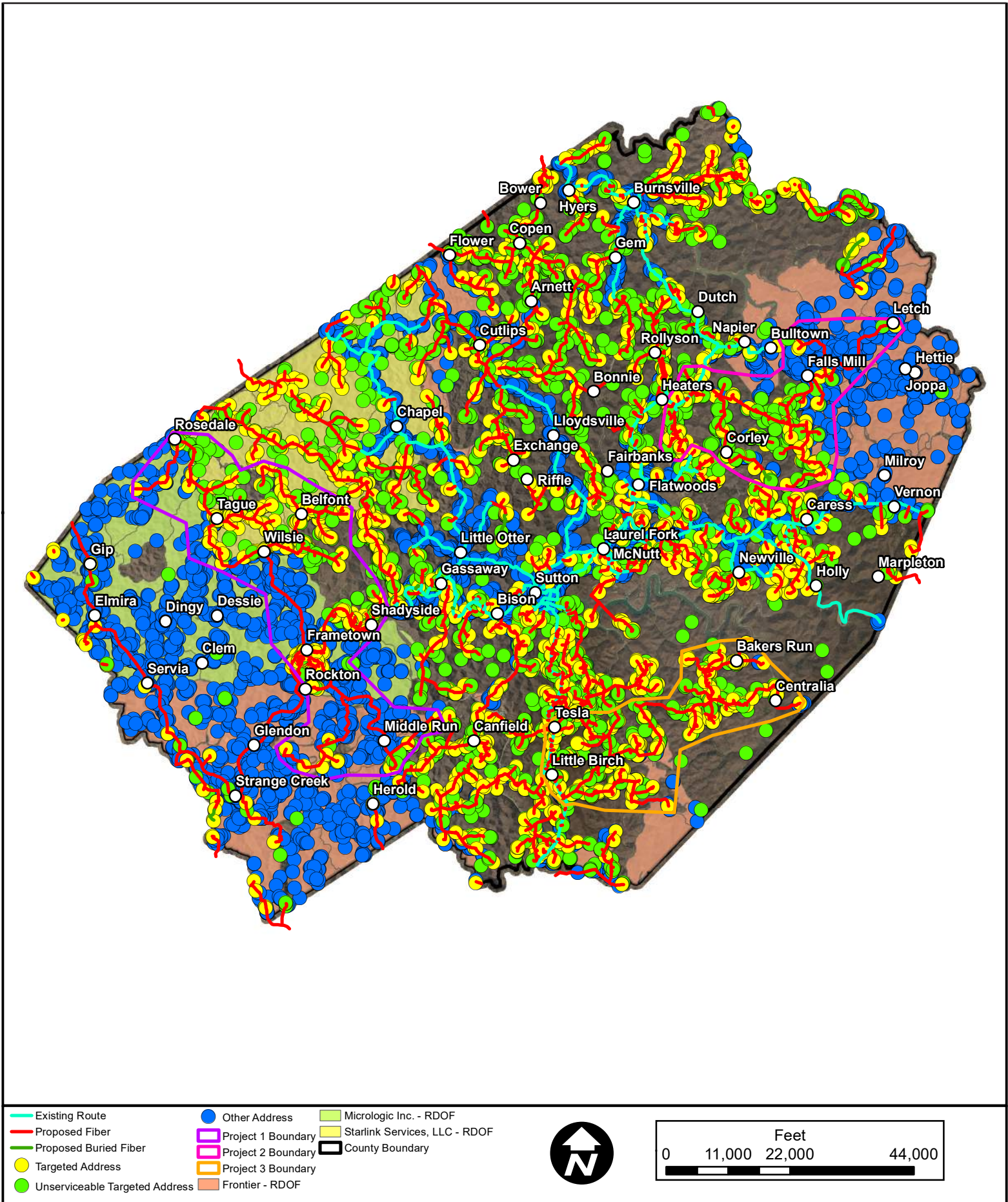
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	470.15	\$2,585,825
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	470.15	\$705,225
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	460.72	\$6,910,800
Aerial Construction Labor	\$50,000.00	Per Mile	460.72	\$23,036,000
Underground Construction Labor	\$150,000.00	Per Mile	9.43	\$1,414,500
Project Construction Contingency 10%	\$2,445,050.00	Lump Sum	1	\$2,445,050
Legal 1.5%	\$366,757.50	Lump Sum	1	\$366,758
Administrative 2%	\$489,010.00	Lump Sum	1	\$489,010
TOTAL COST = \$37,953,168				

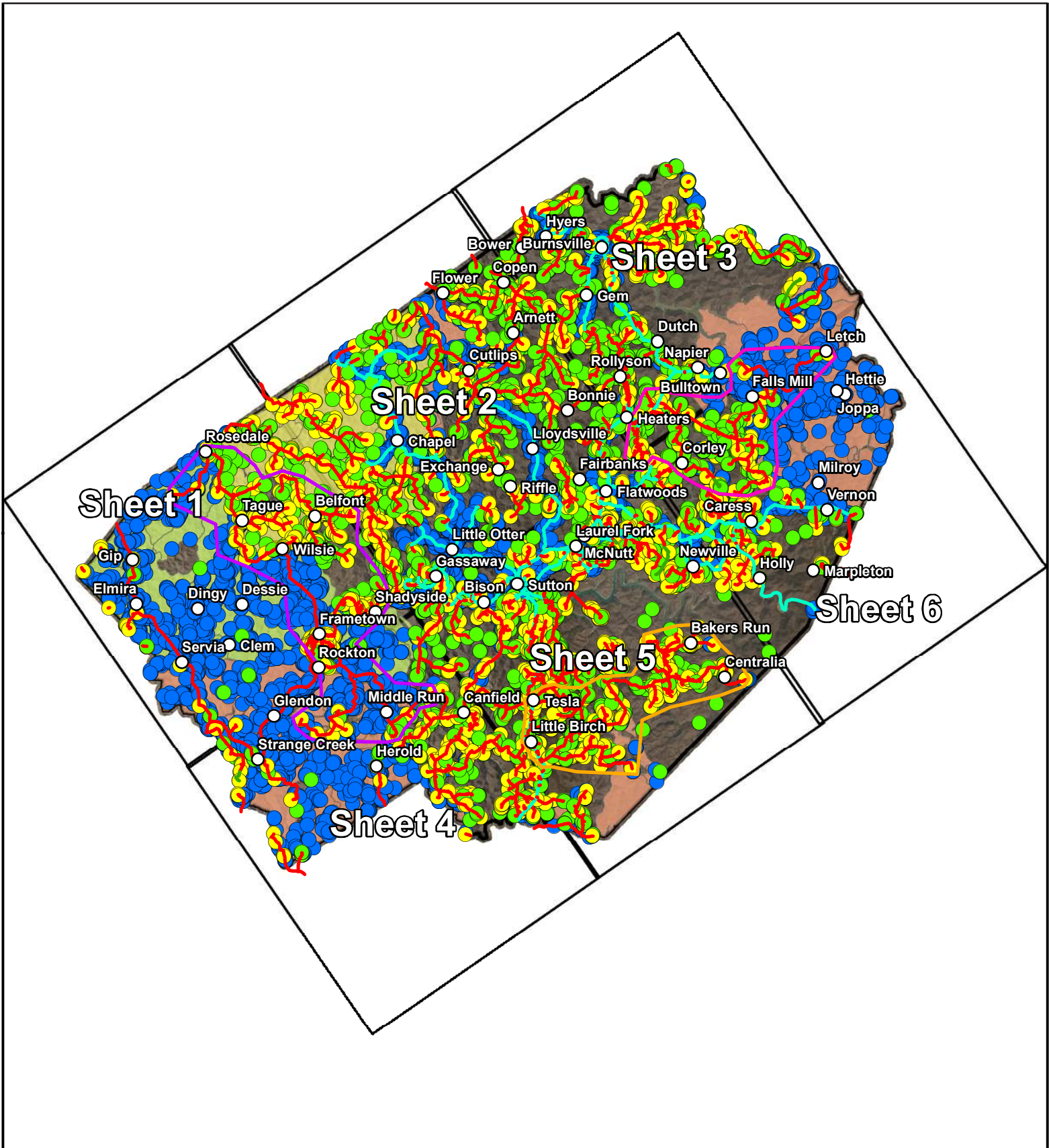
COUNTY SAMPLE PROJECT

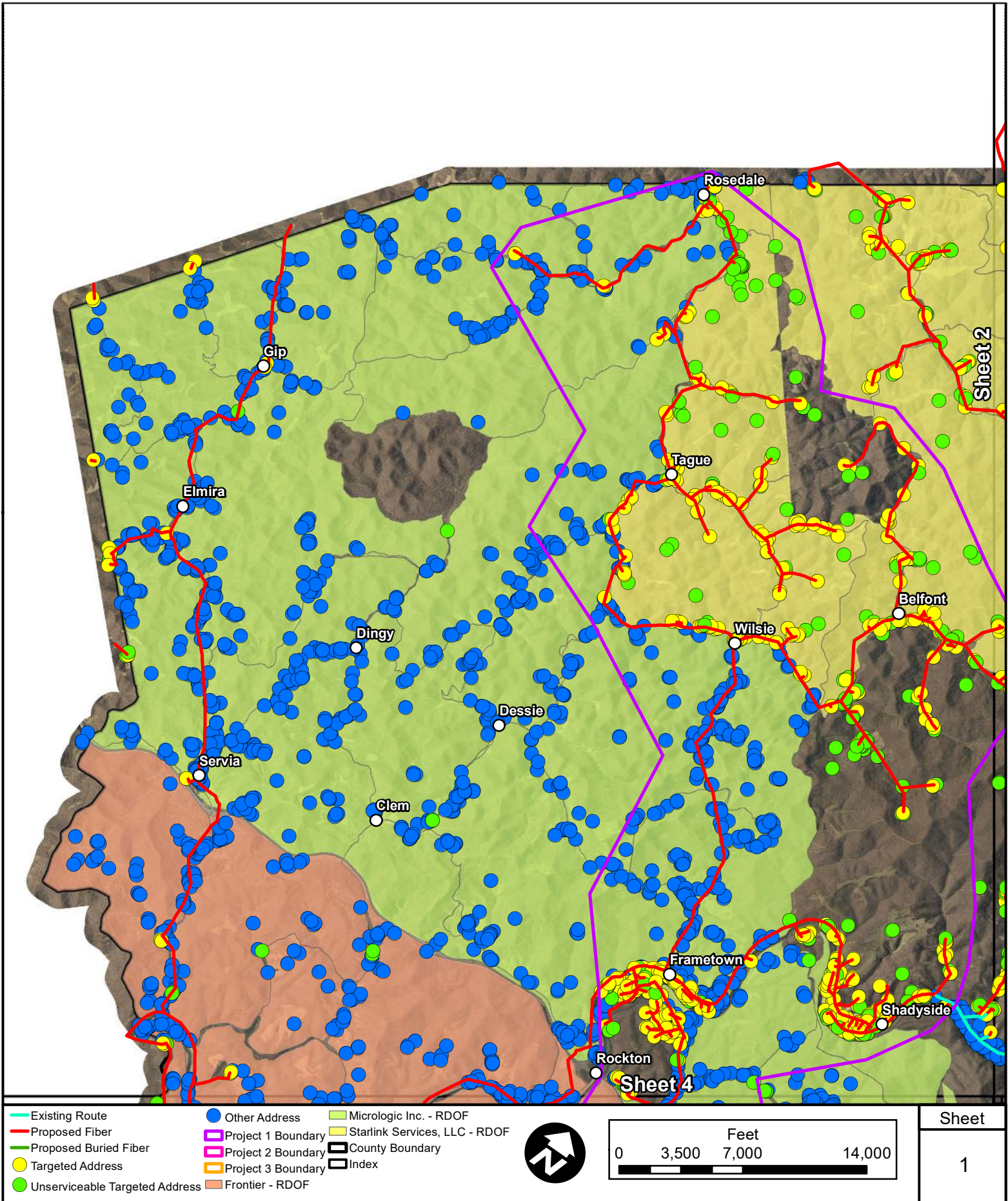
Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
7	Barbour	1	504	53.74	\$4,404,400
		2	592	62.90	\$5,006,565
		3	216	40.30	\$3,260,305

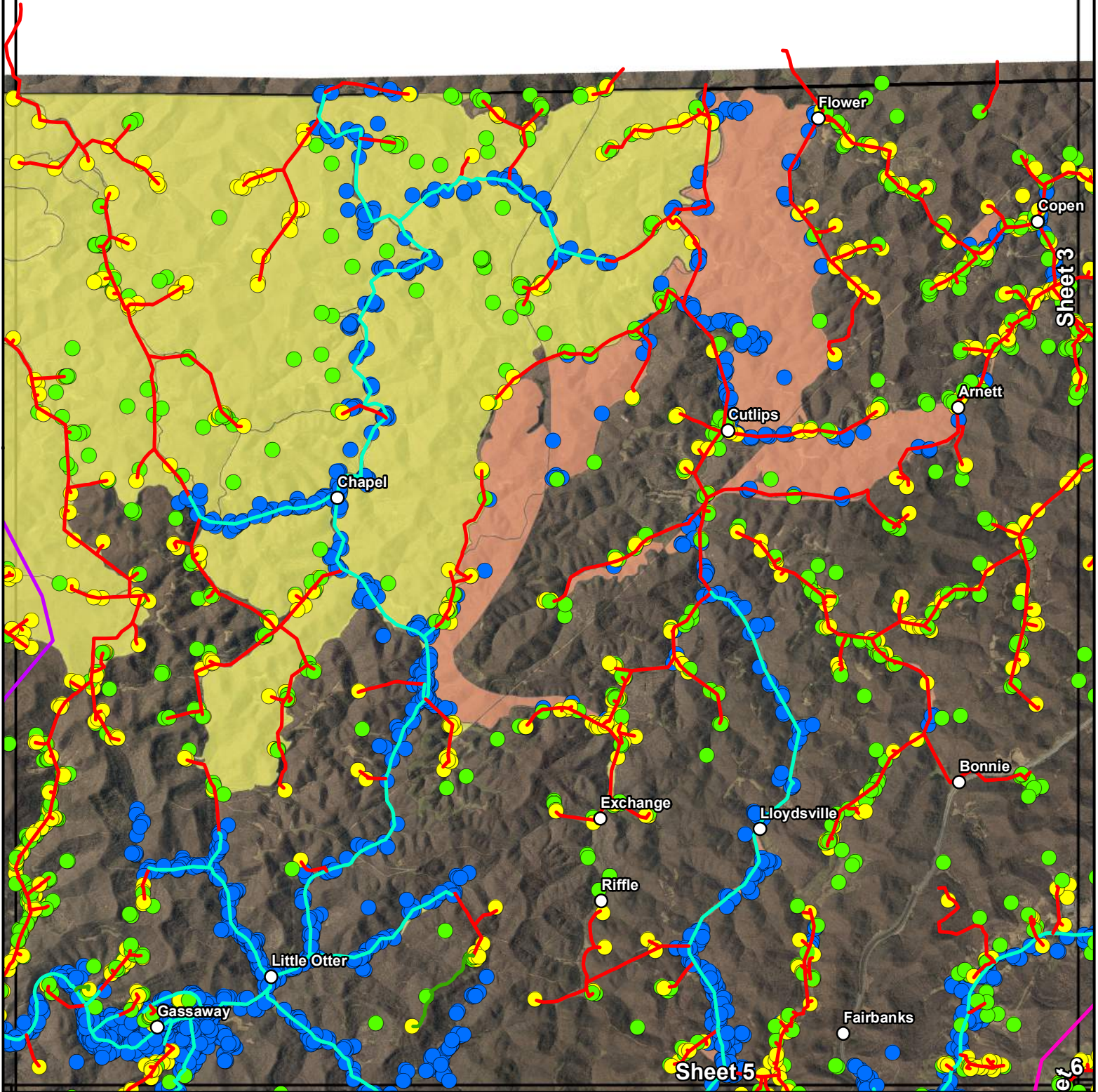


BRAXTON COUNTY





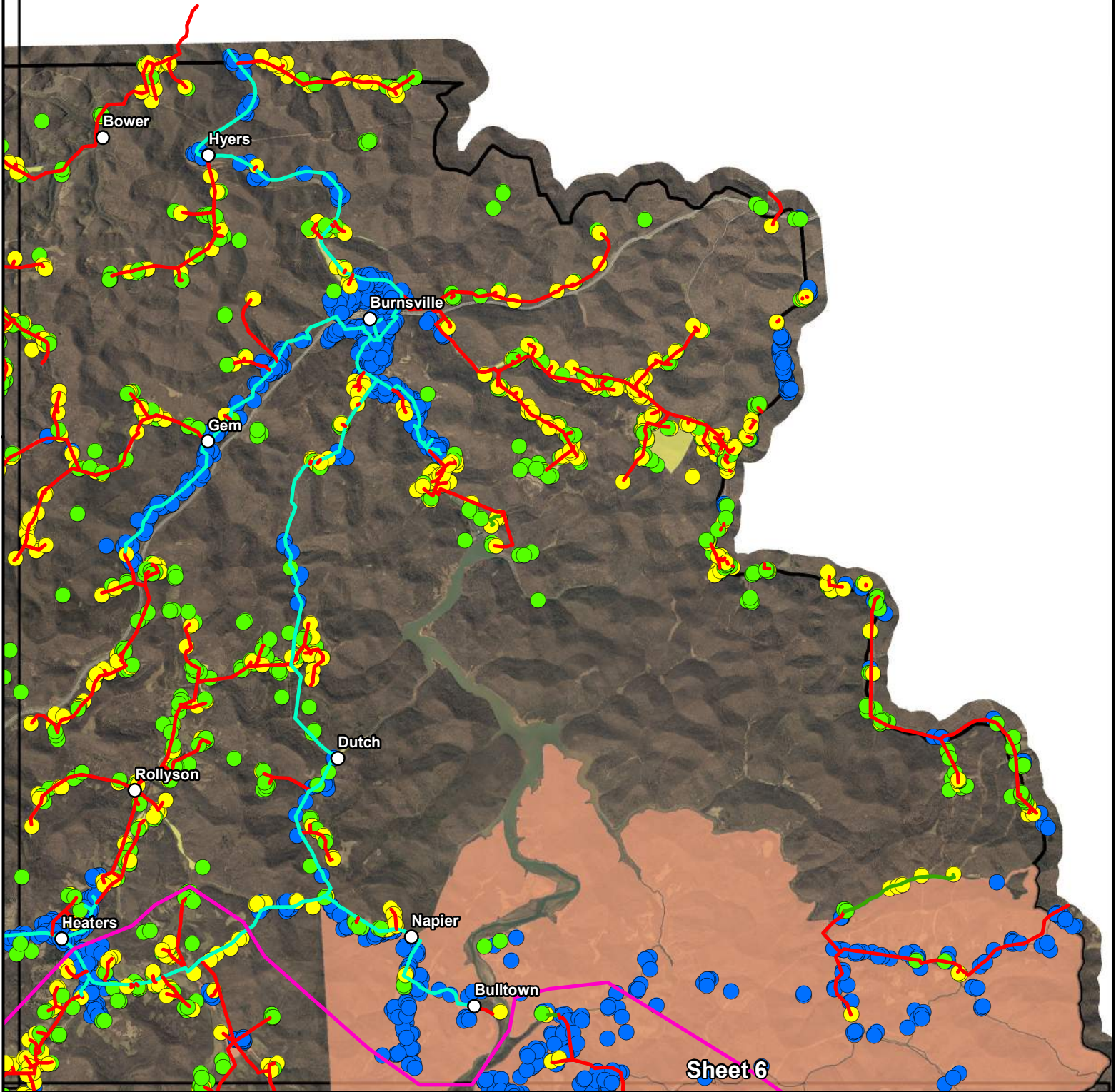




Existing Route	Other Address	Micrologic Inc. - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Frontier - RDOF	

Sheet

2

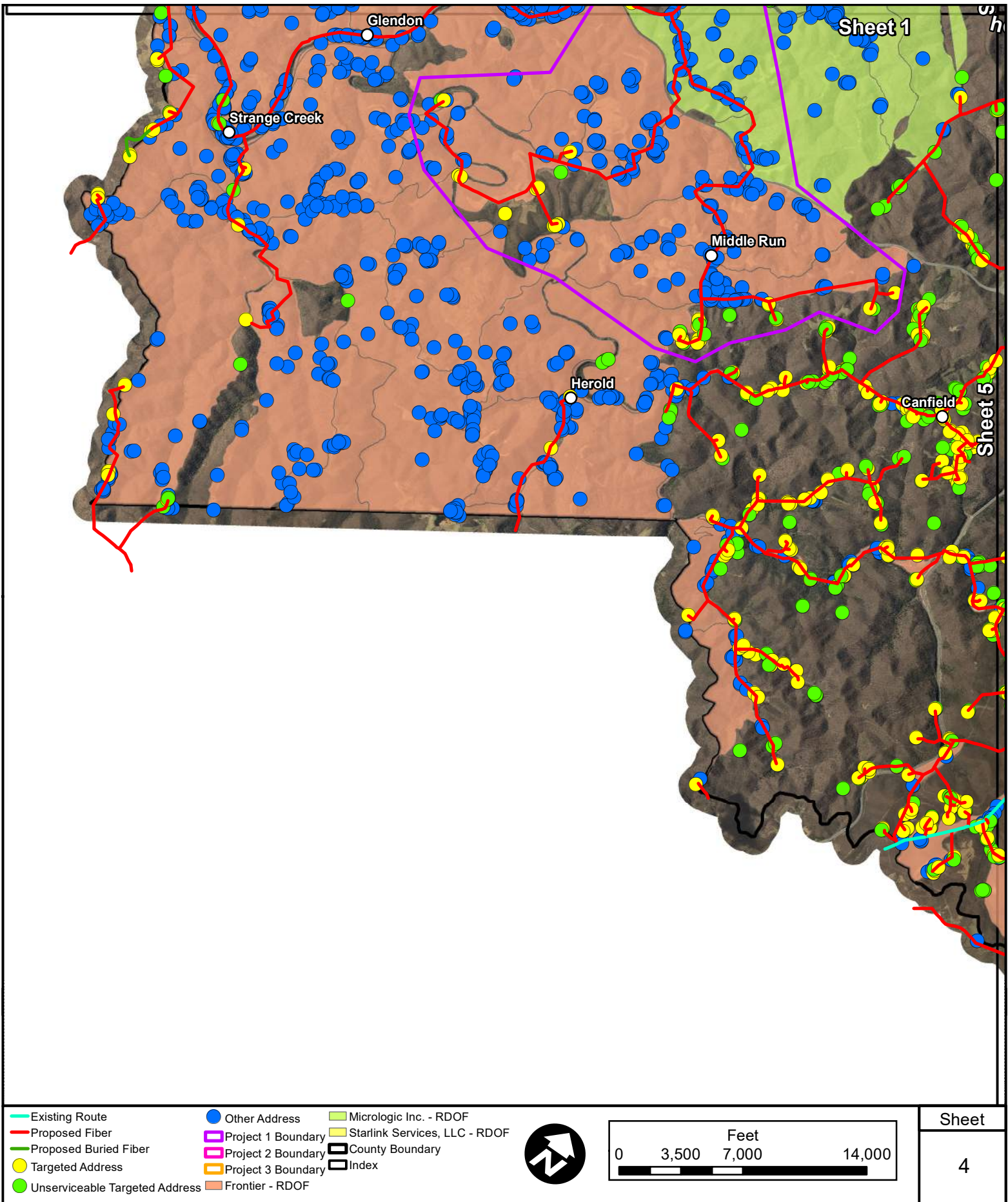


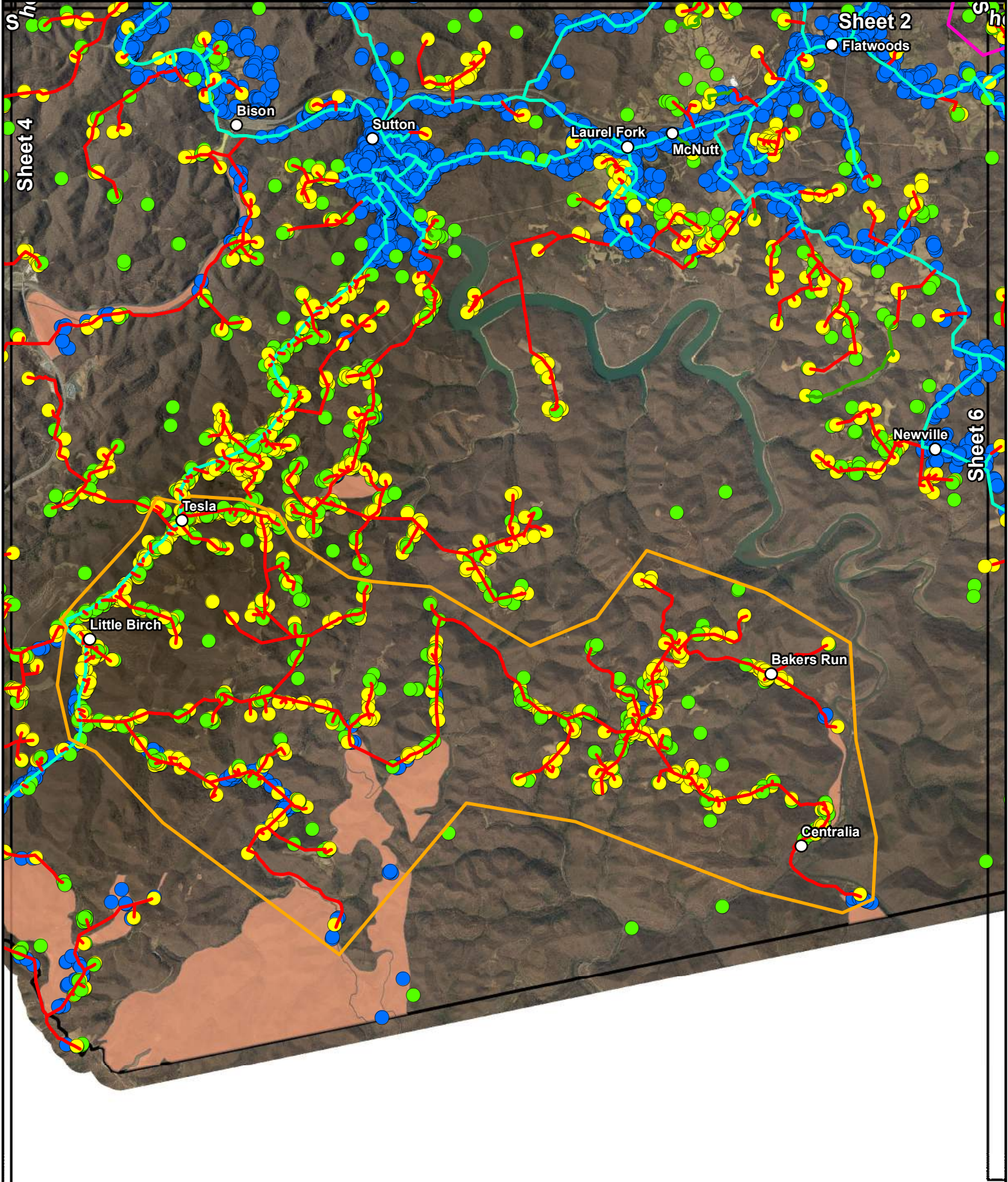
Existing Route	Other Address	Micrologic Inc. - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Frontier - RDOF	

Feet


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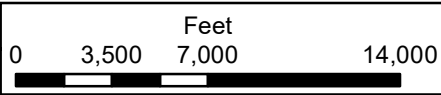
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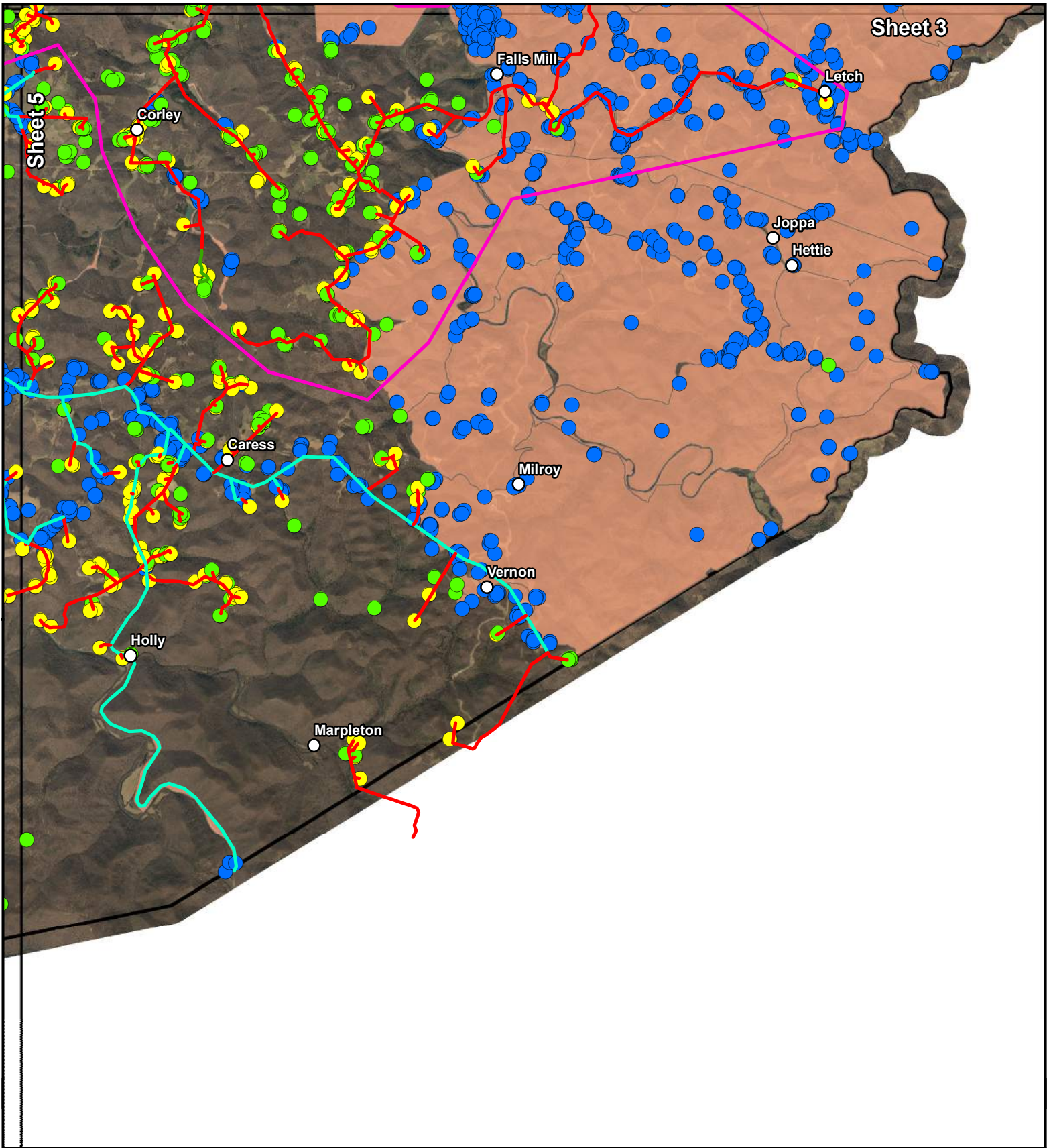
Existing Route	Other Address	Micrologic Inc. - RDOF
Proposed Fiber	Project 1 Boundary	Starlink Services, LLC - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Frontier - RDOF	






Sheet

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<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Address Project 1 Boundary Project 2 Boundary Project 3 Boundary County Boundary Index 	<ul style="list-style-type: none"> Micrologic Inc. - RDOF Starlink Services, LLC - RDOF Frontier - RDOF 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="width: 25%;">0</td> <td style="width: 25%;">3,500</td> <td style="width: 25%;">7,000</td> <td style="width: 25%;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td style="text-align: center;">6</td> </tr> </table>	Sheet	6
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Sheet															
6															

Braxton County, WV – 2023 ROC Study – Cost Estimate – Whole County

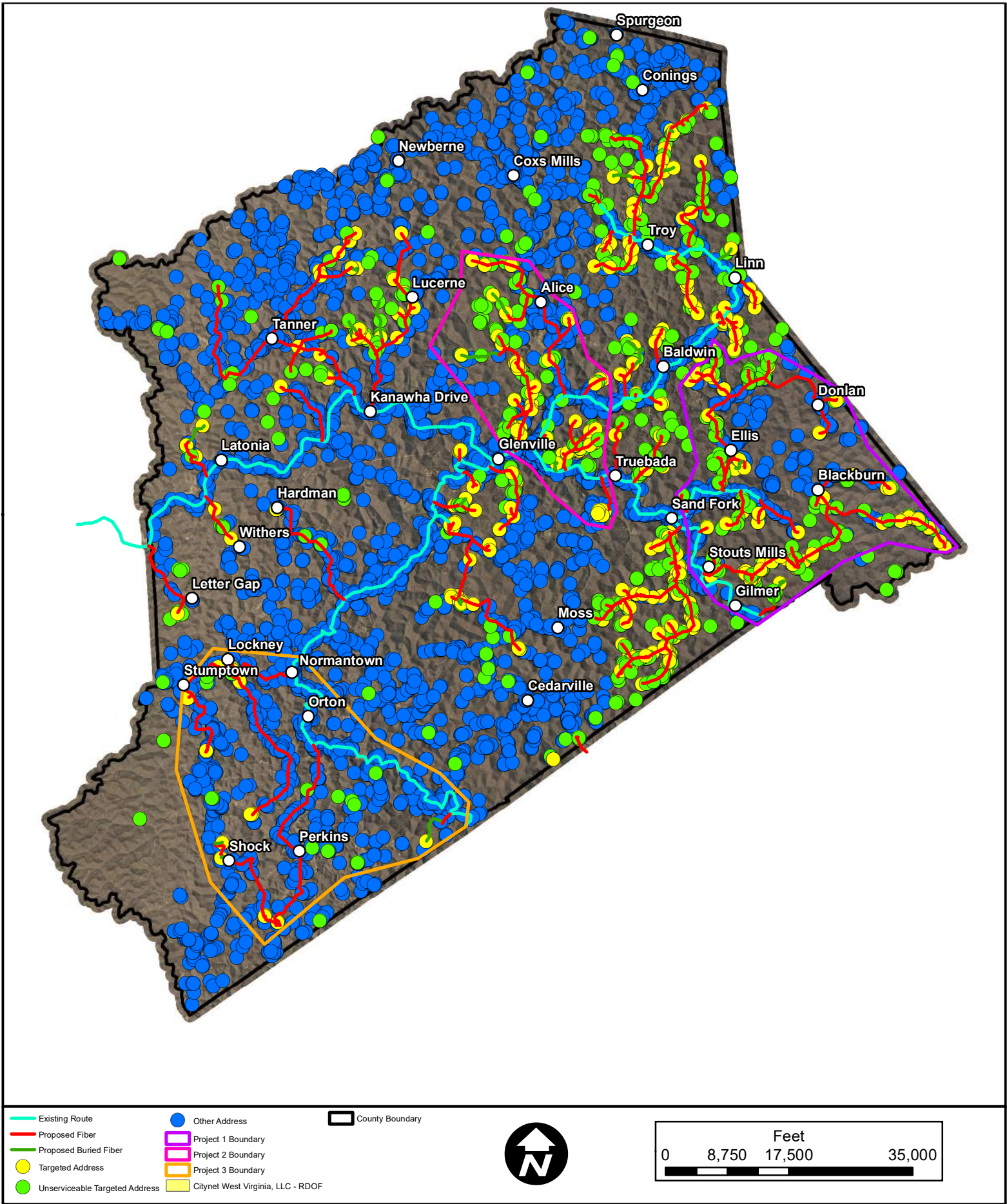
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	477.35	\$2,625,425
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	477.35	\$716,025
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	470.79	\$7,061,850
Aerial Construction Labor	\$50,000.00	Per Mile	470.79	\$23,539,500
Underground Construction Labor	\$150,000.00	Per Mile	6.56	\$984,000
Project Construction Contingency 10%	\$2,452,350.00	Lump Sum	1	\$2,452,350
Legal 1.5%	\$376,852.50	Lump Sum	1	\$376,853
Administrative 2%	\$490,470.00	Lump Sum	1	\$490,470
TOTAL COST = \$38,237,473				

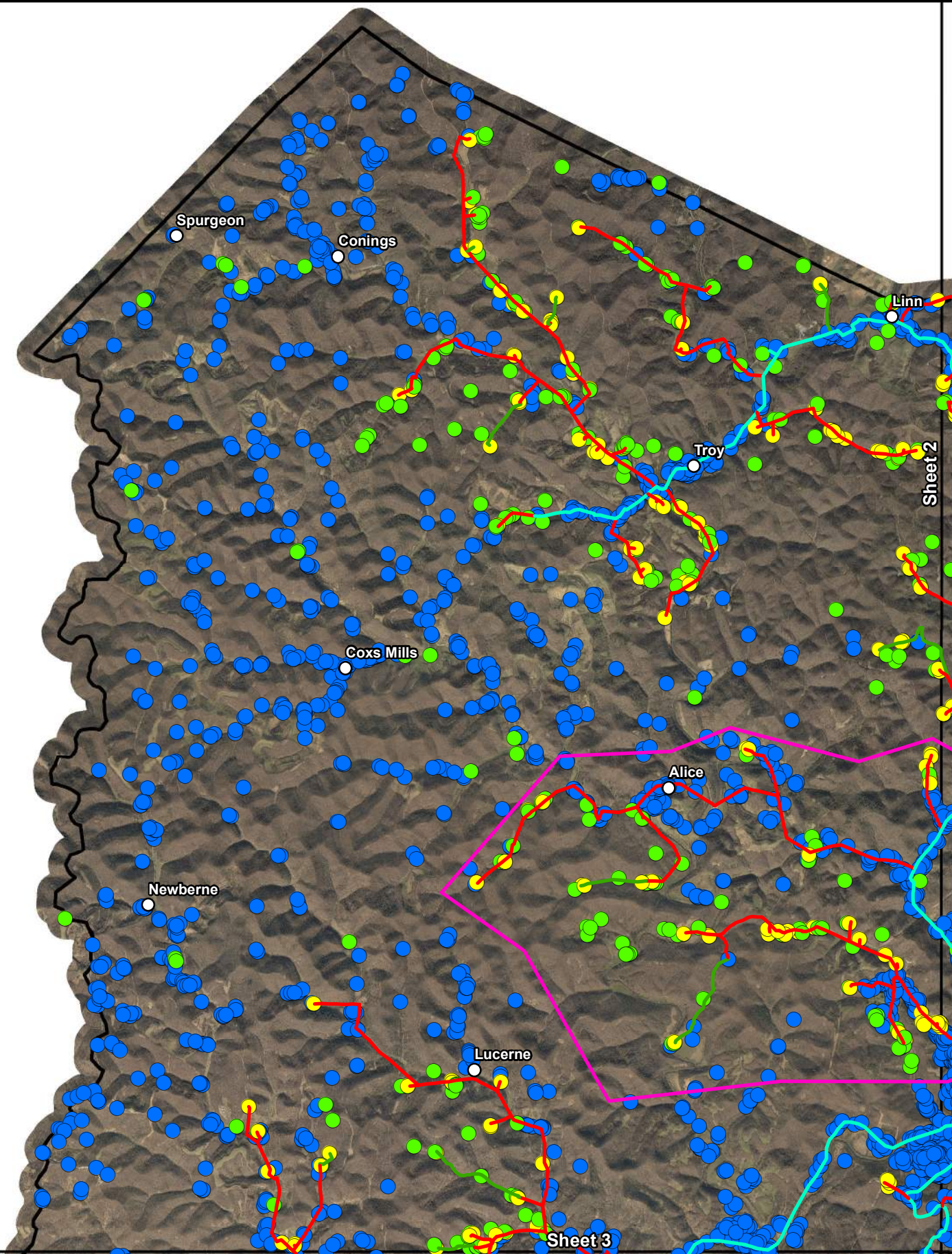
COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
7	Braxton	1	416	61.01	\$4,804,538
		2	176	35.52	\$2,848,290
		3	495	44.18	\$3,479,175



GILMER COUNTY

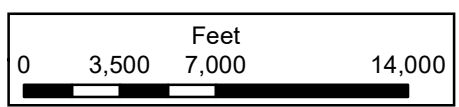




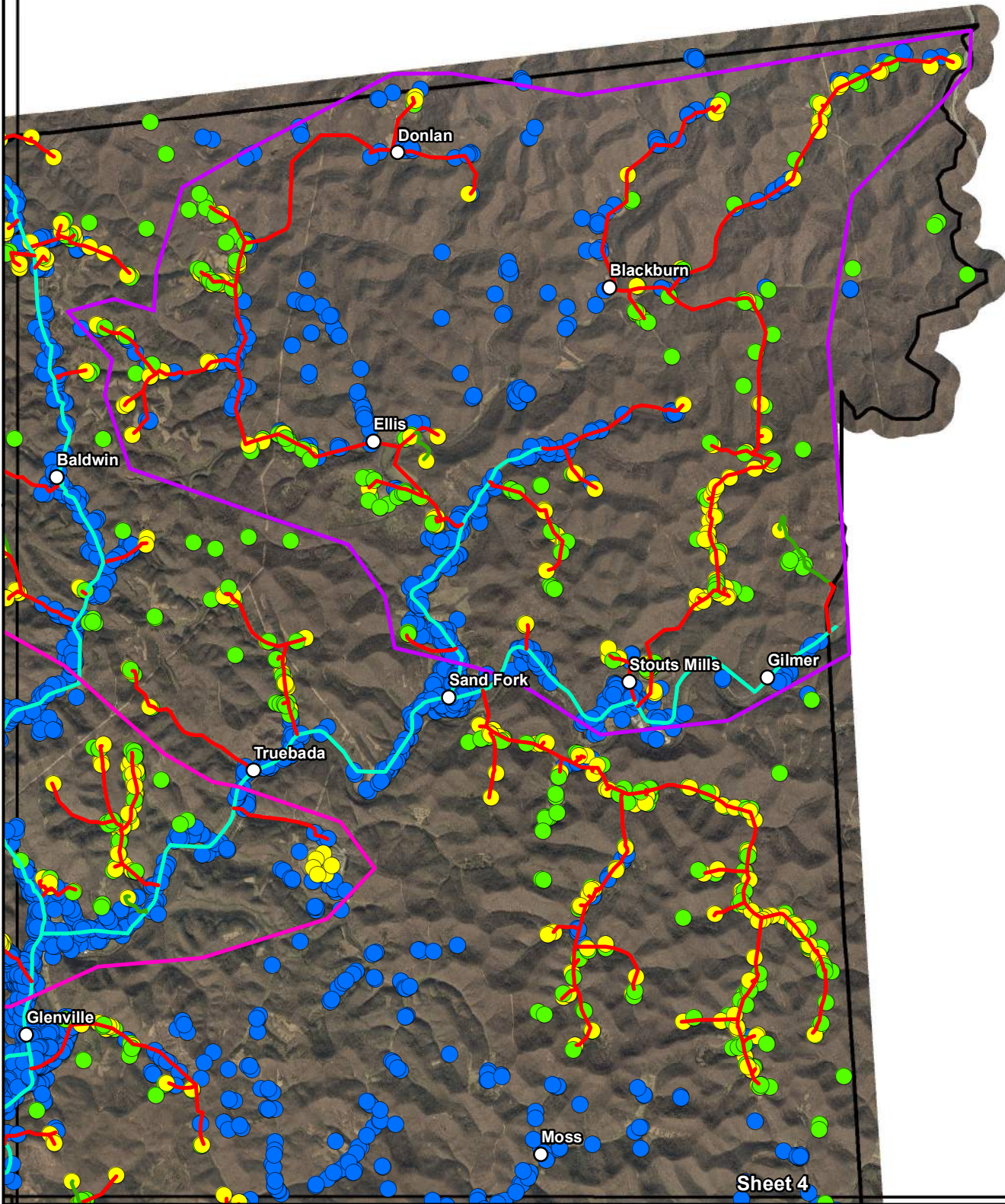
Sheet 2

Sheet 3

- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Citynet West Virginia, LLC - RDOF
- County Boundary
- Index



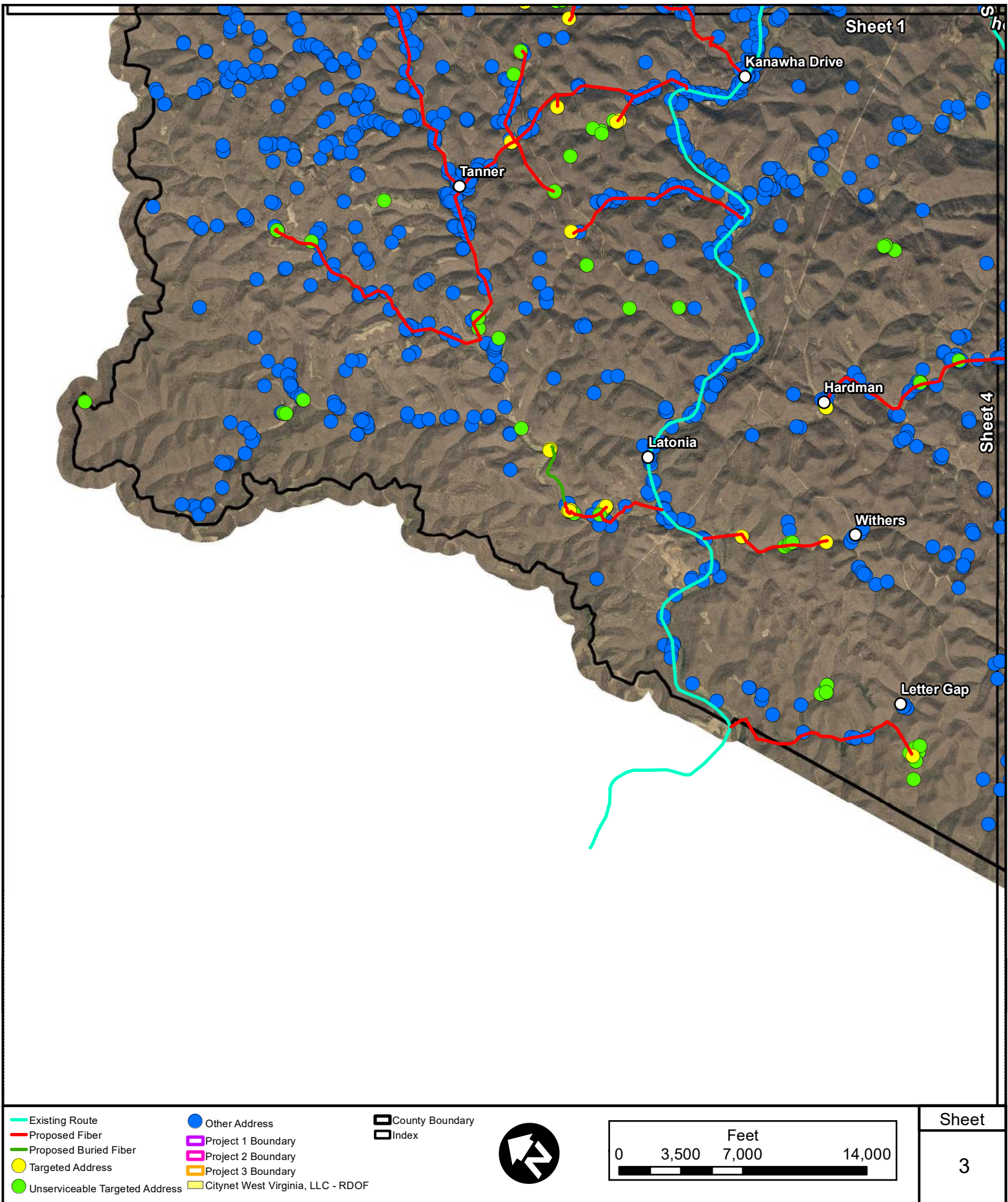
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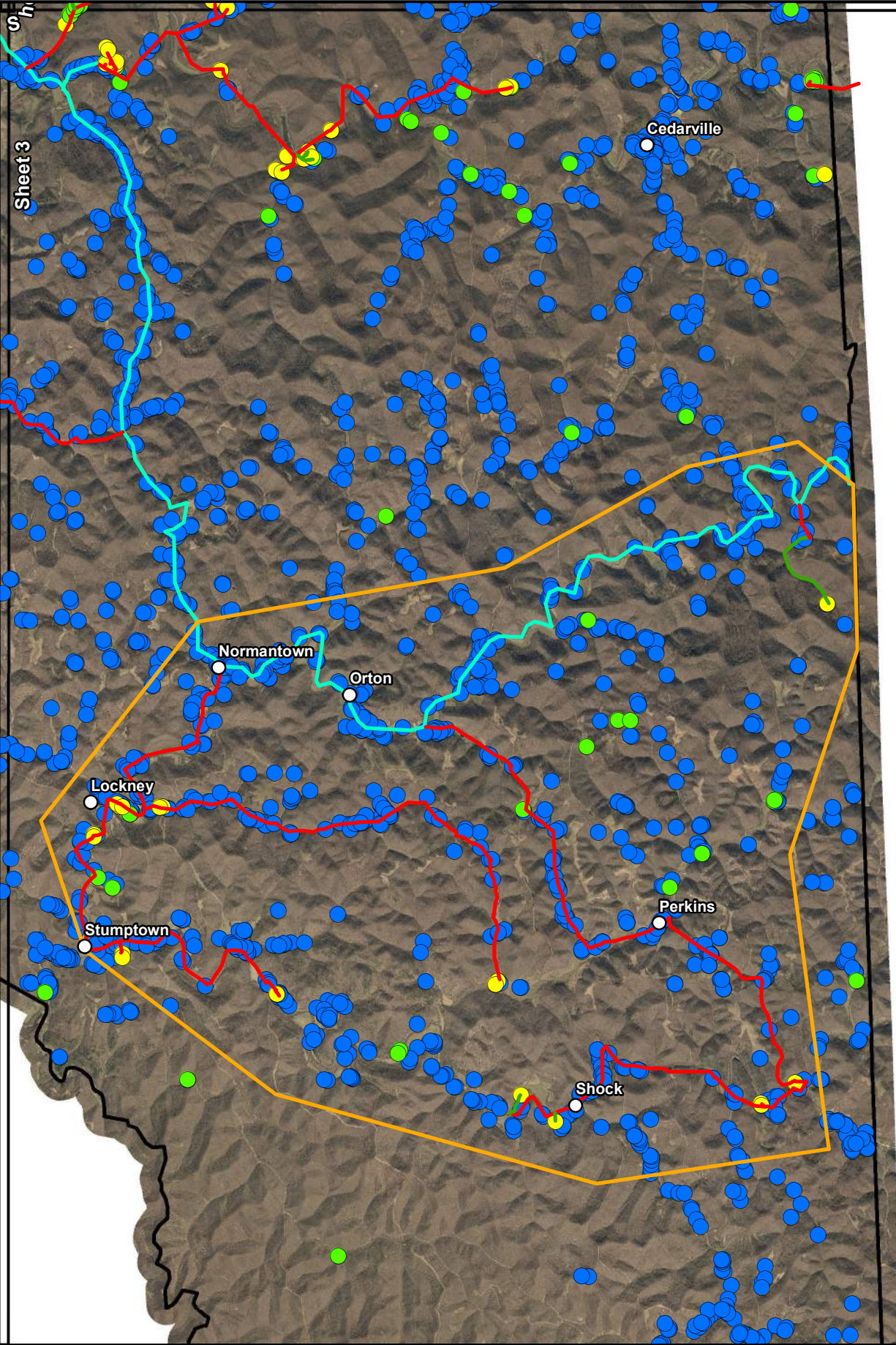


Existing Route	Other Address	County Boundary
Proposed Fiber	Project 1 Boundary	Index
Proposed Buried Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

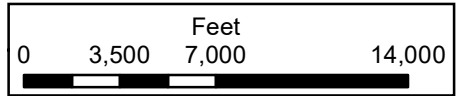
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2





- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Citynet West Virginia, LLC - RDOF
- County Boundary
- Index



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Gilmer County, WV – 2023 ROC Study – Cost Estimate – Whole County

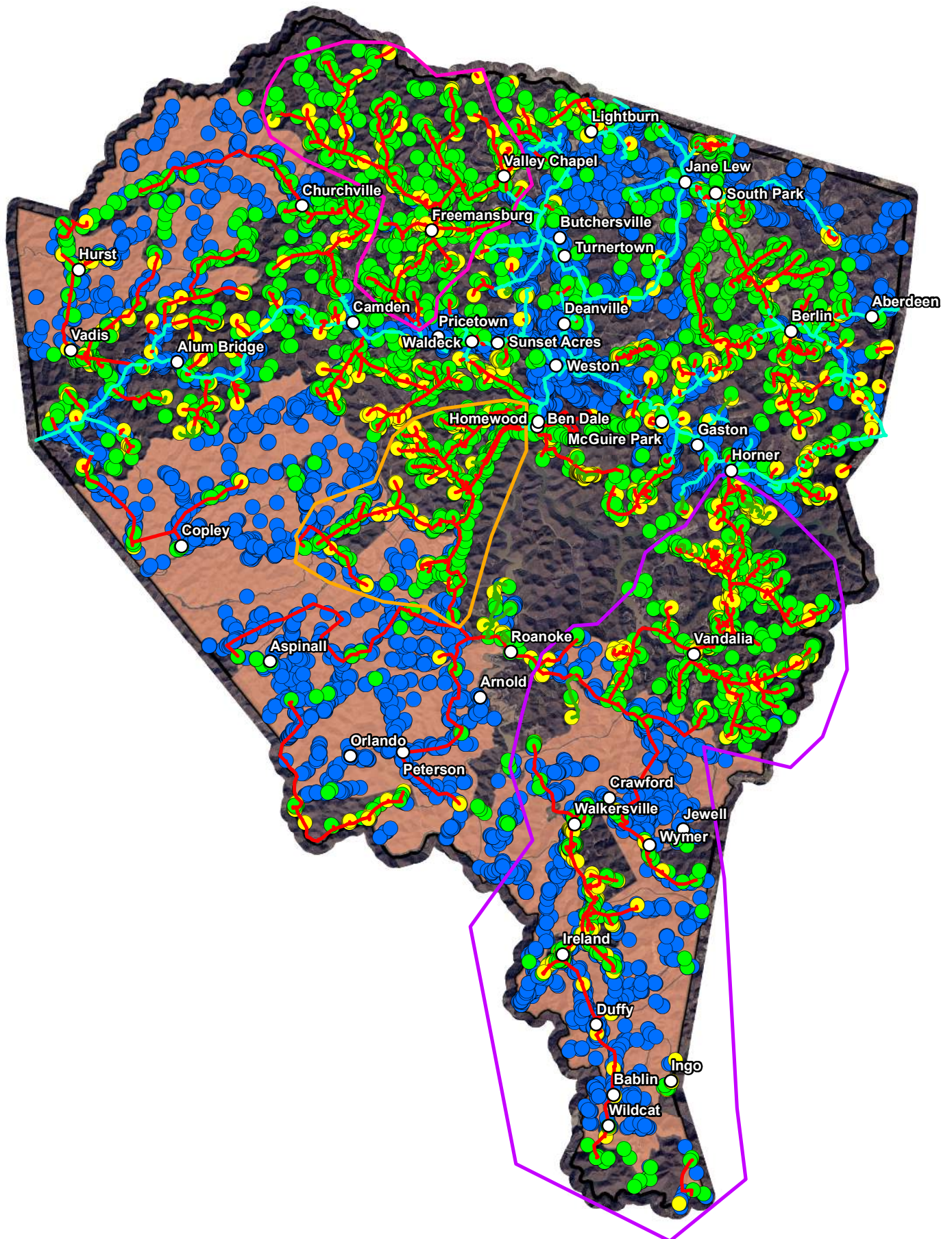
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	166.94	\$918,170
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	166.94	\$250,410
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	156.94	\$2,354,100
Aerial Construction Labor	\$50,000.00	Per Mile	156.94	\$7,847,000
Underground Construction Labor	\$150,000.00	Per Mile	10.00	\$1,500,000
Project Construction Contingency 10%	\$934,700.00	Lump Sum	1	\$934,700
Legal 1.5%	\$140,205.00	Lump Sum	1	\$140,205
Administrative 2%	\$186,940.00	Lump Sum	1	\$186,940
TOTAL COST = \$14,131,525				

COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
7	Gilmer	1	146	31.75	\$2,625,408
		2	87	20.48	\$1,815,710
		3	19	24.69	\$2,068,488

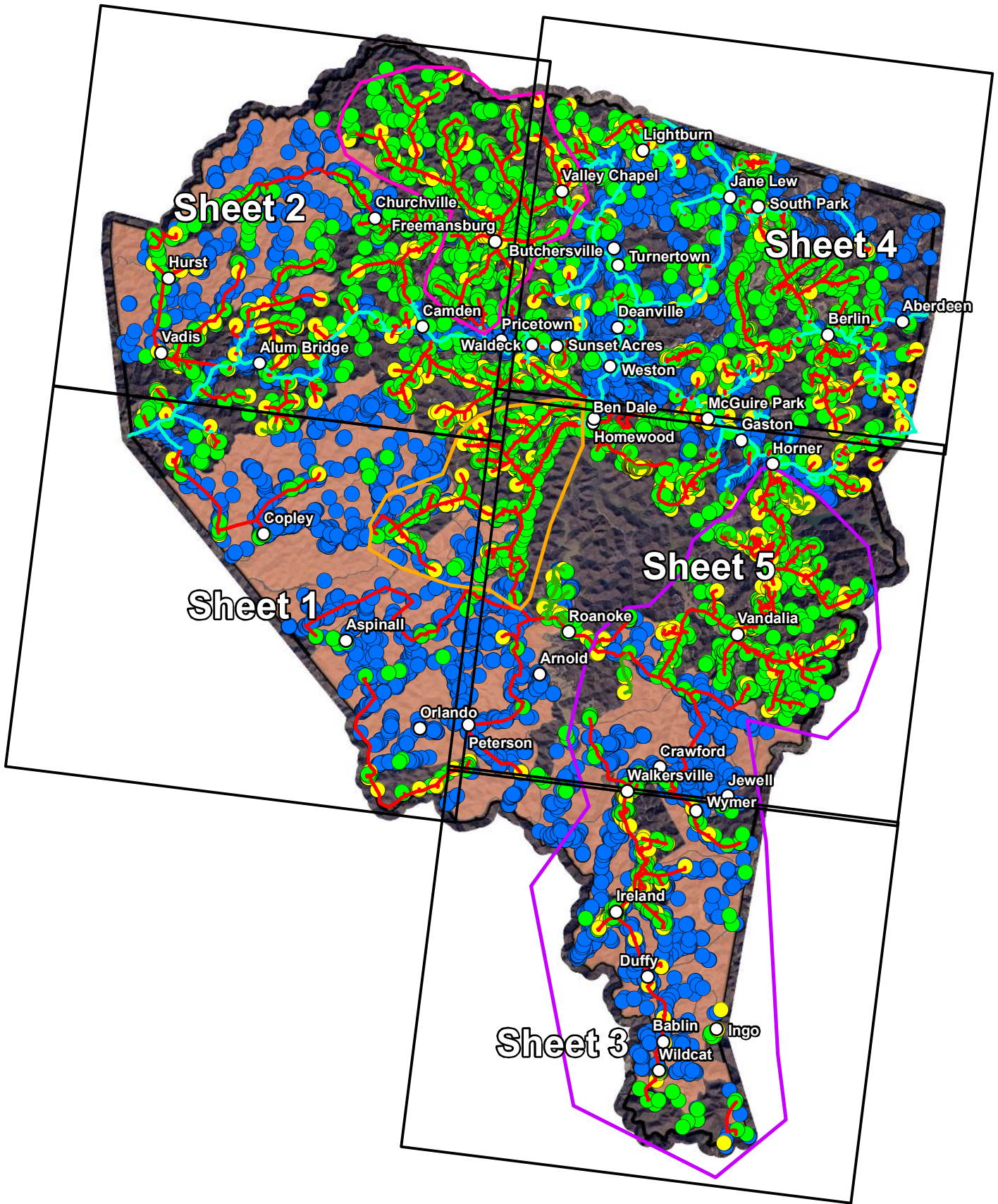


LEWIS COUNTY

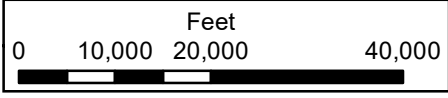


Existing Route	Other Address	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

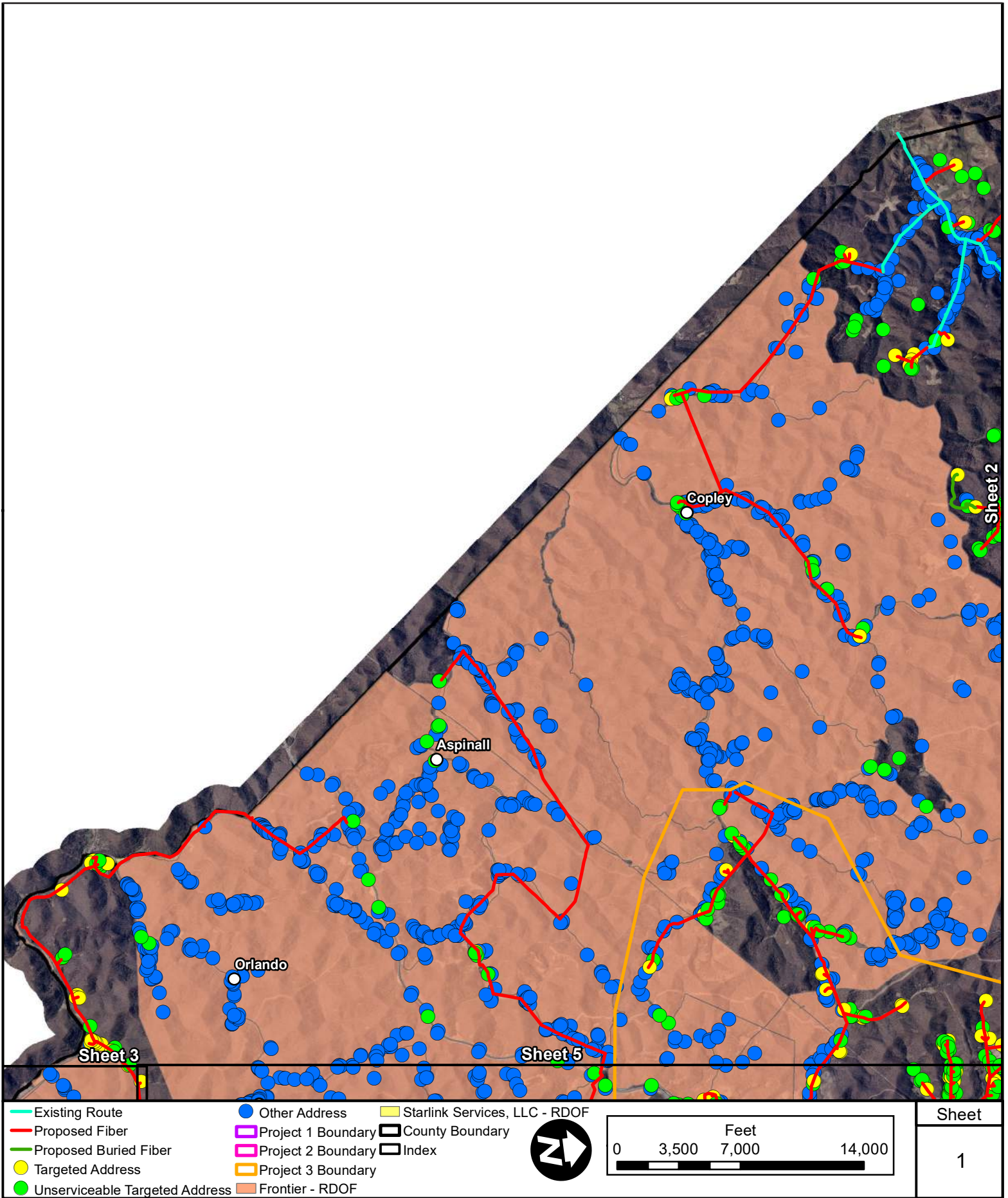
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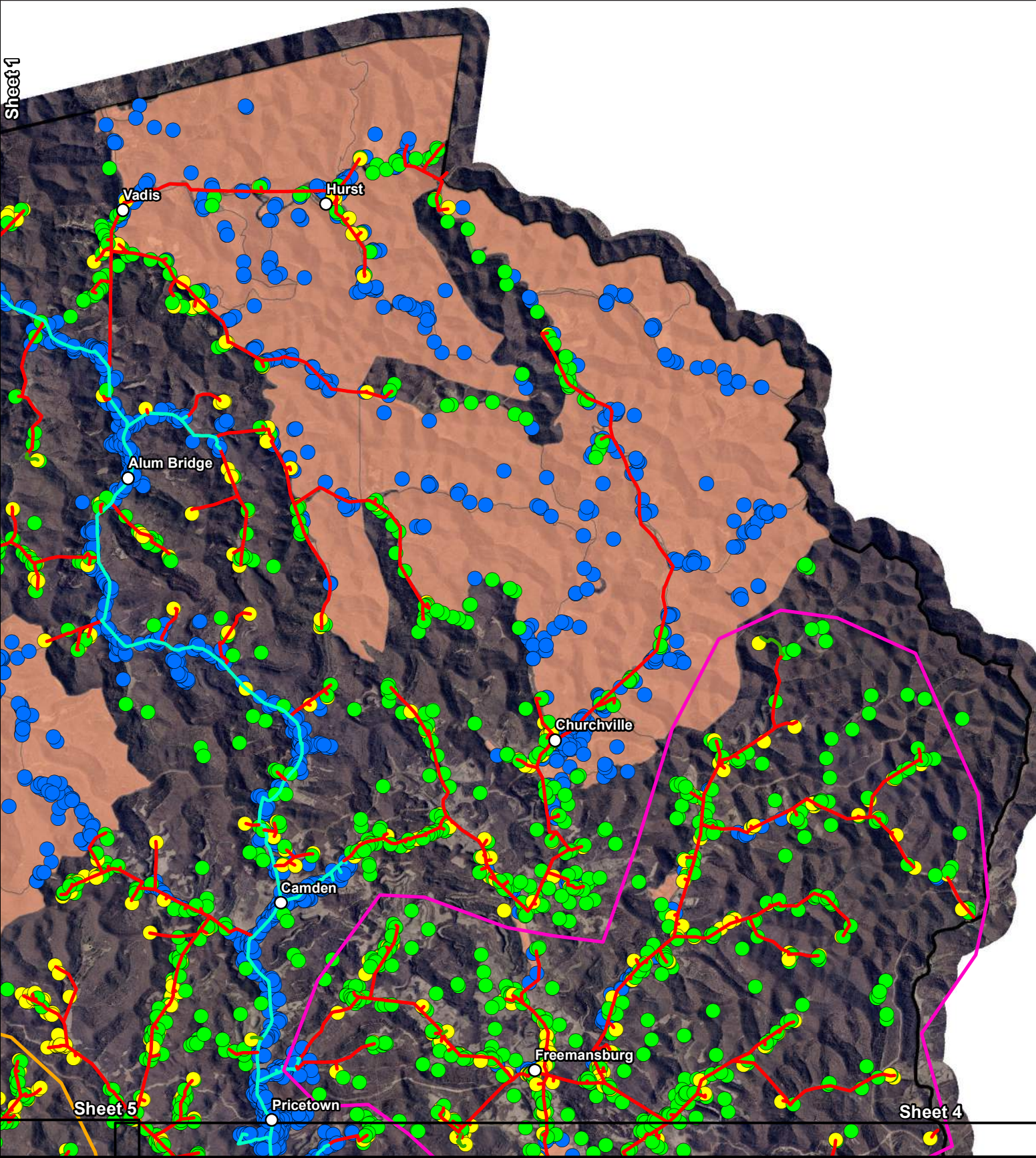
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary
- Index
- Starlink Services, LLC - RDOF



Sheet
INDEX

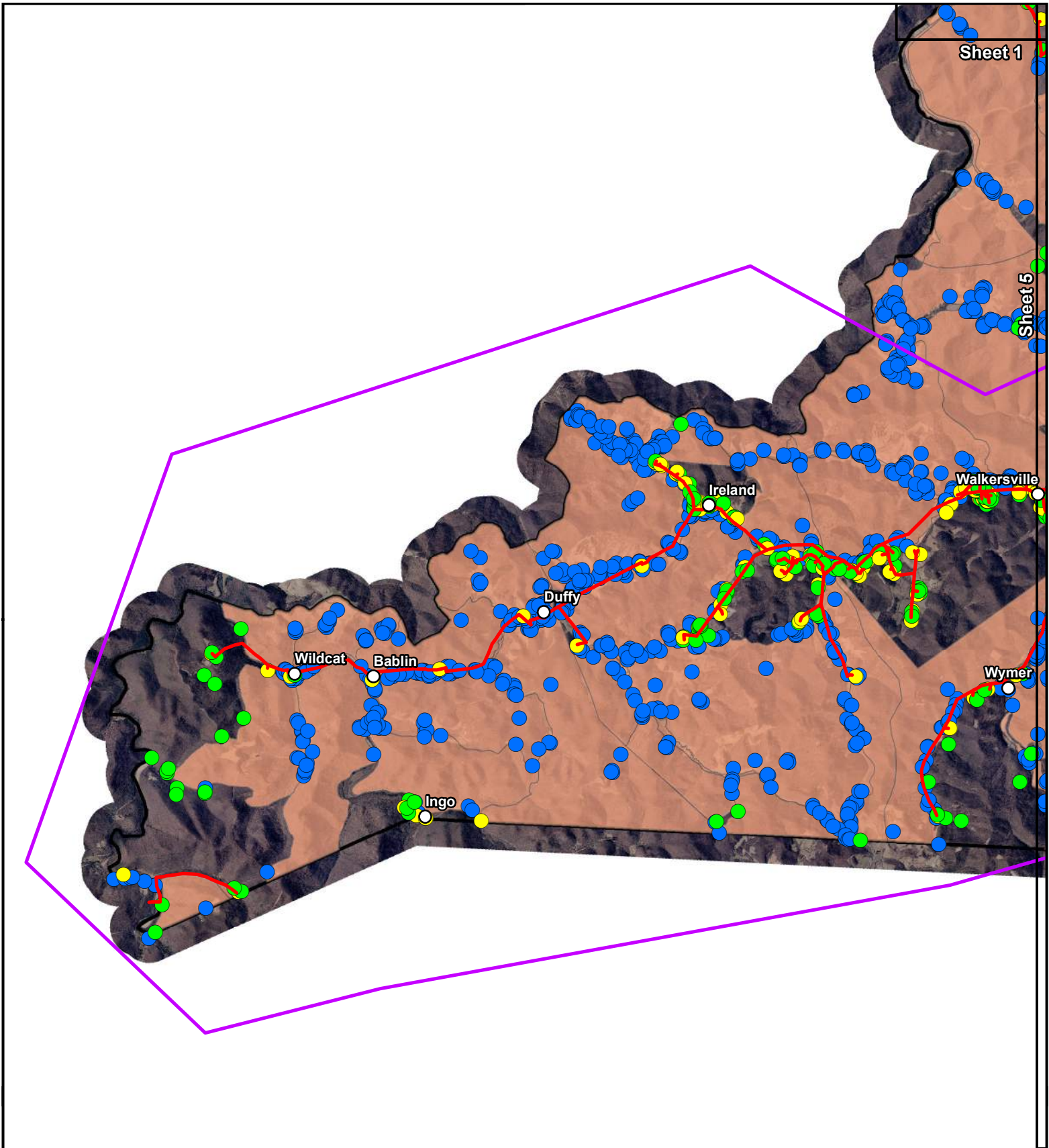


Sheet 1



Existing Route	Other Address	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

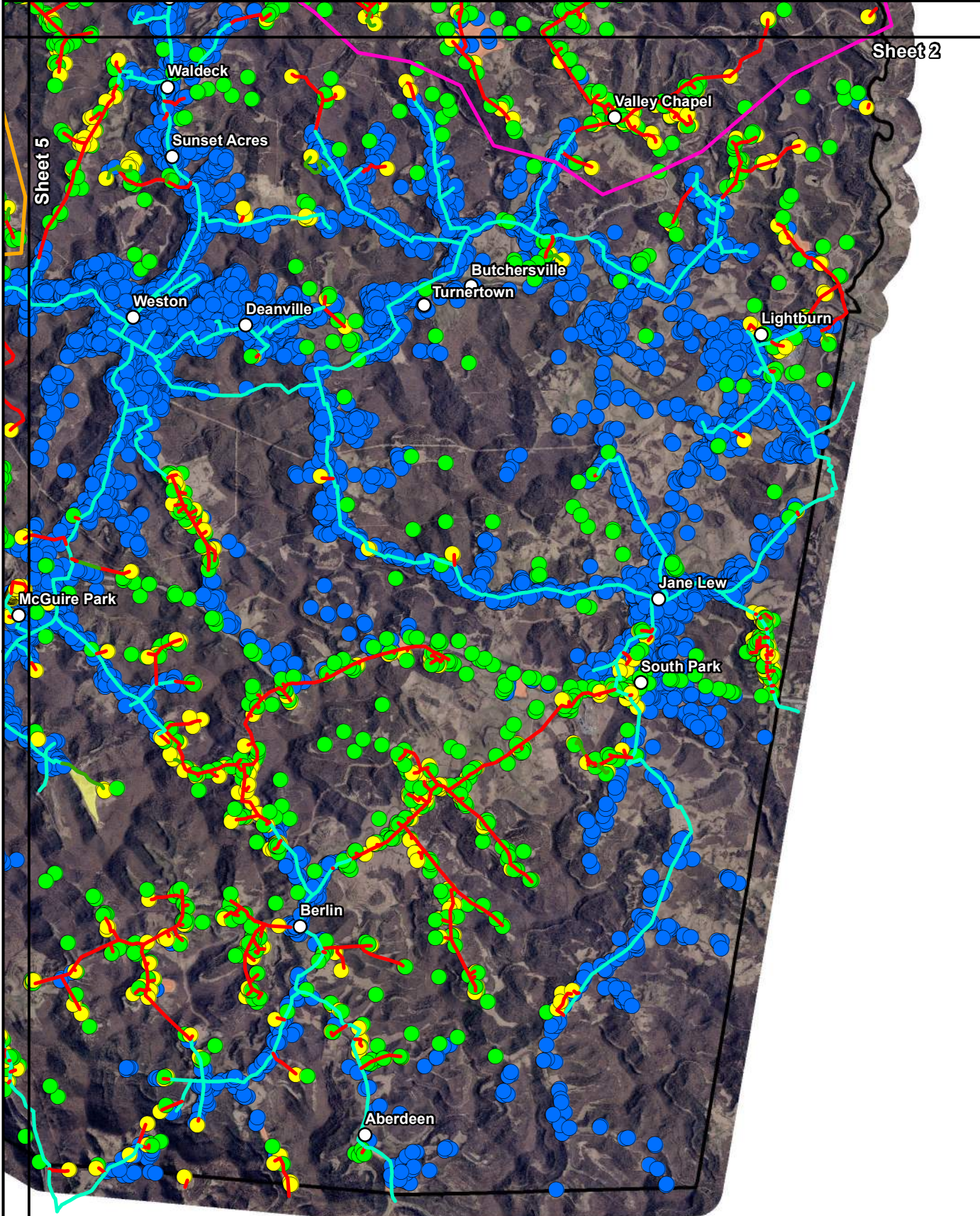
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Existing Route	Other Address	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Sheet

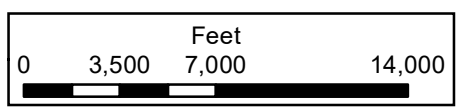
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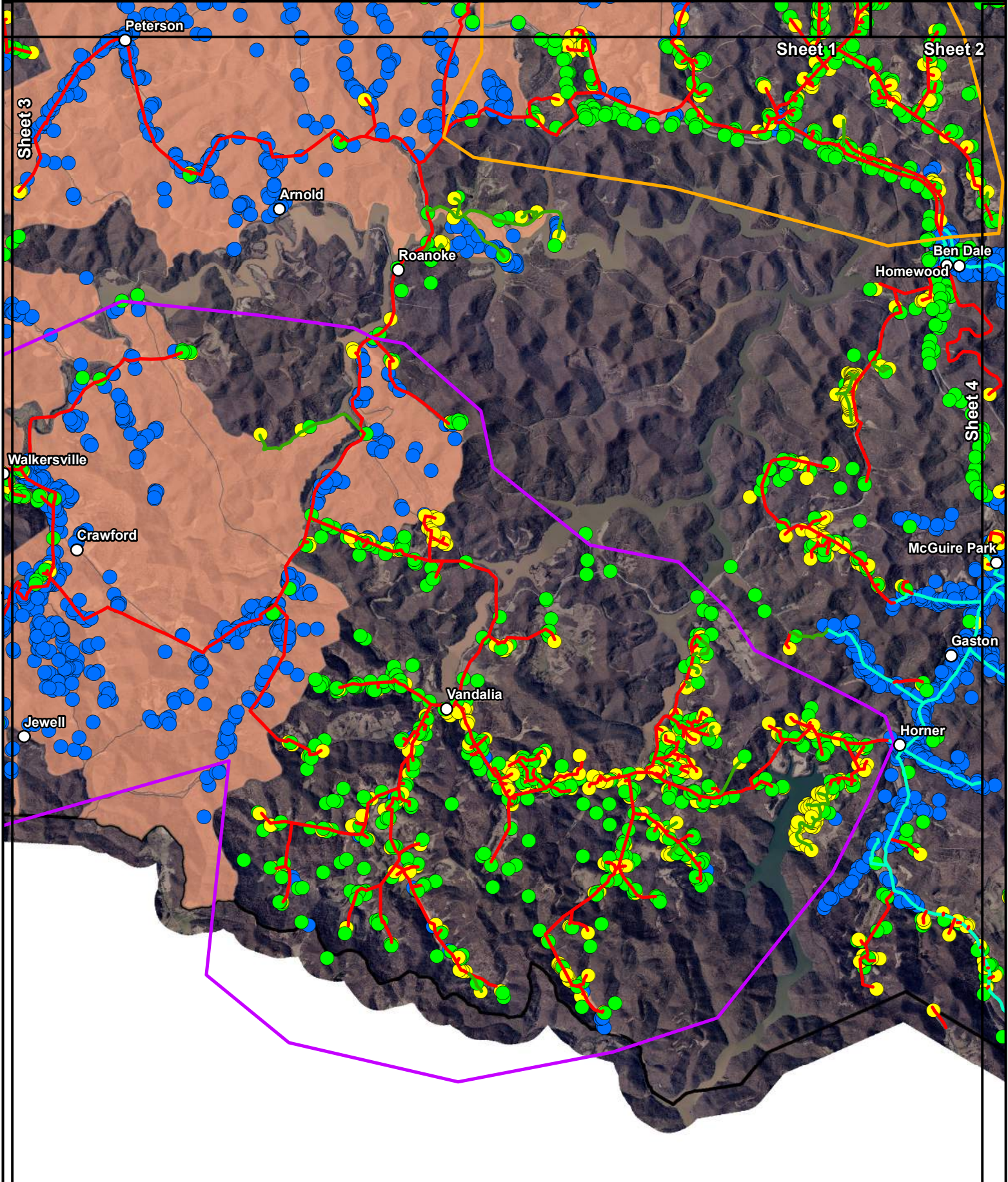
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Sheet 5

- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Starlink Services, LLC - RDOF
- County Boundary
- Index
- Frontier - RDOF



Sheet
4



Existing Route	Other Address	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Feet

0 3,500 7,000 14,000

Sheet
5

Lewis County, WV – 2023 ROC Study – Cost Estimate – Whole County

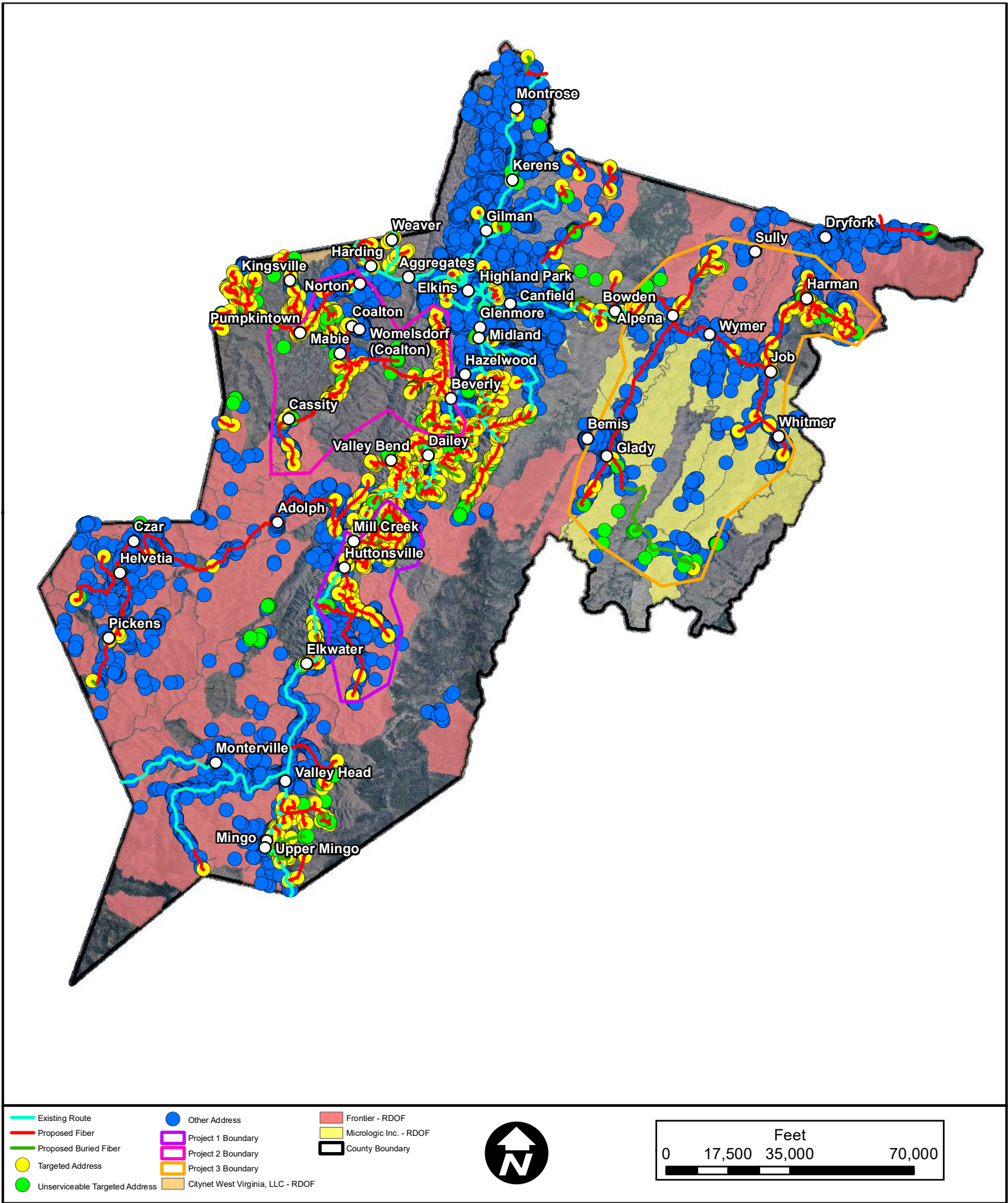
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	306.89	\$1,687,895
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	306.89	\$460,335
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	293.07	\$4,396,050
Aerial Construction Labor	\$50,000.00	Per Mile	293.07	\$14,653,500
Underground Construction Labor	\$150,000.00	Per Mile	13.82	\$2,073,000
Project Construction Contingency 10%	\$1,672,650.00	Lump Sum	1	\$1,672,650
Legal 1.5%	\$250,897.50	Lump Sum	1	\$250,898
Administrative 2%	\$334,530.00	Lump Sum	1	\$334,530
TOTAL COST = \$25,528,858				

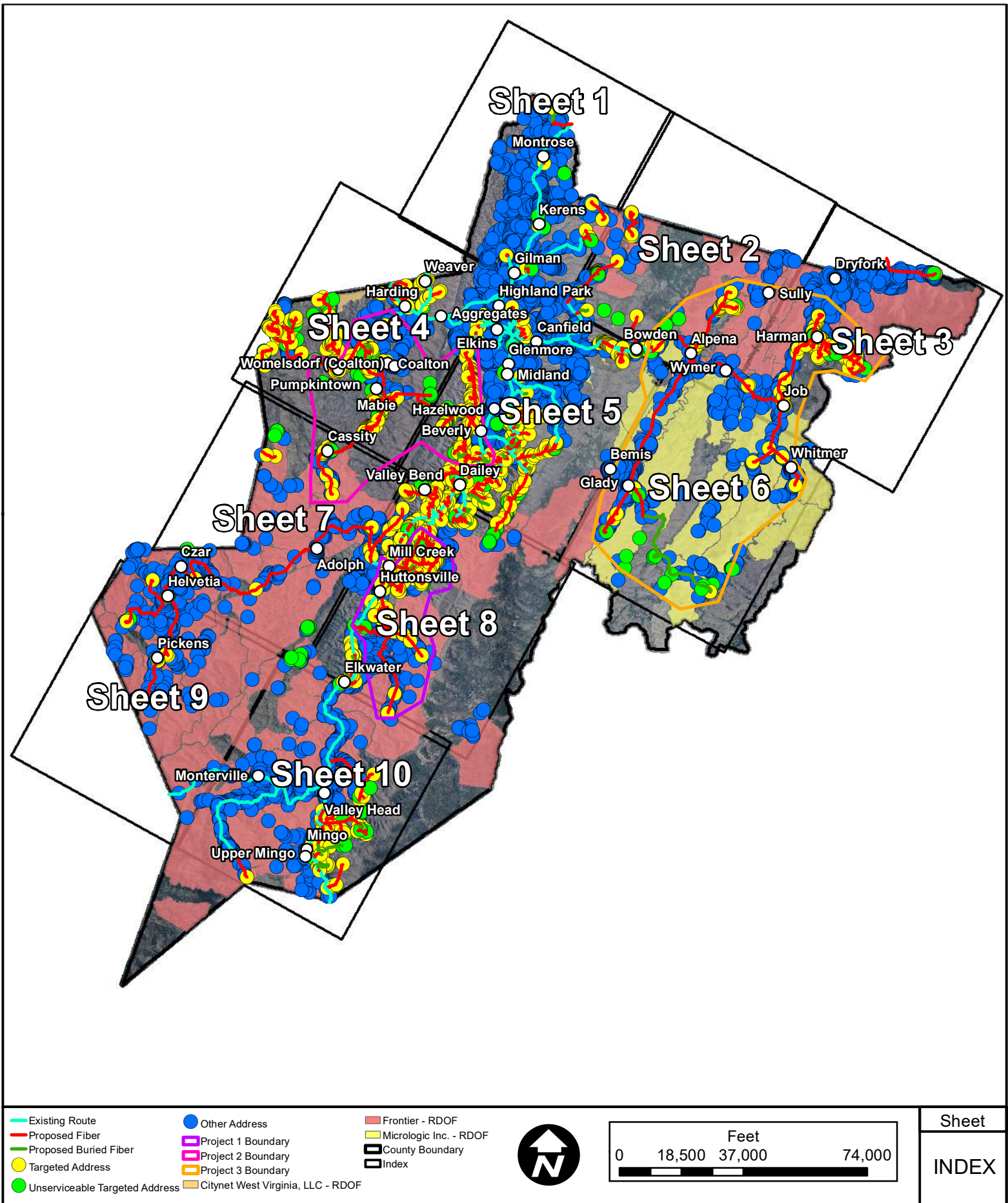
COUNTY SAMPLE PROJECT

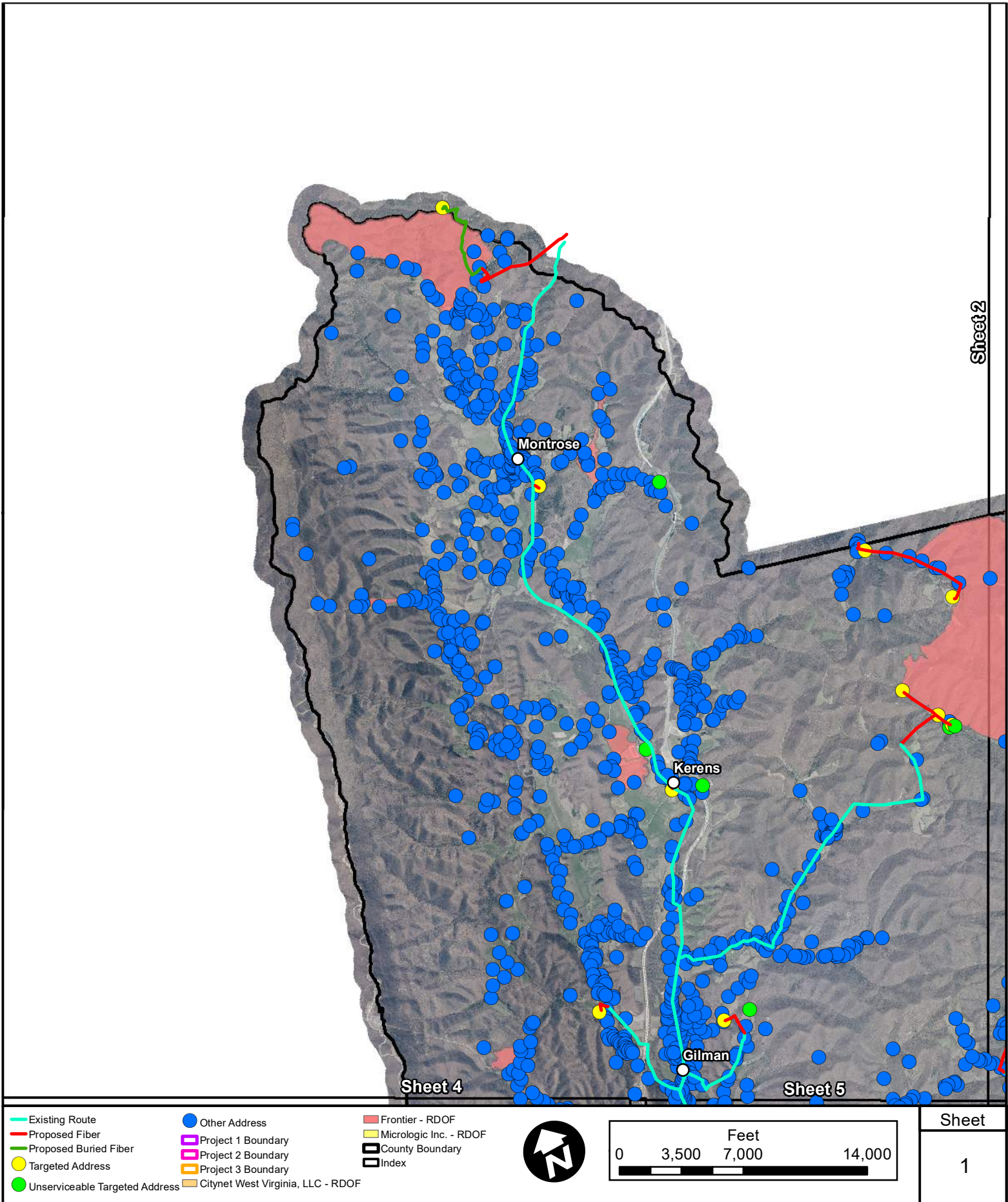
Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
7	Lewis	1	502	82.77	\$6,951,538
		2	182	37.26	\$2,992,340
		3	182	31.91	\$2,546,403

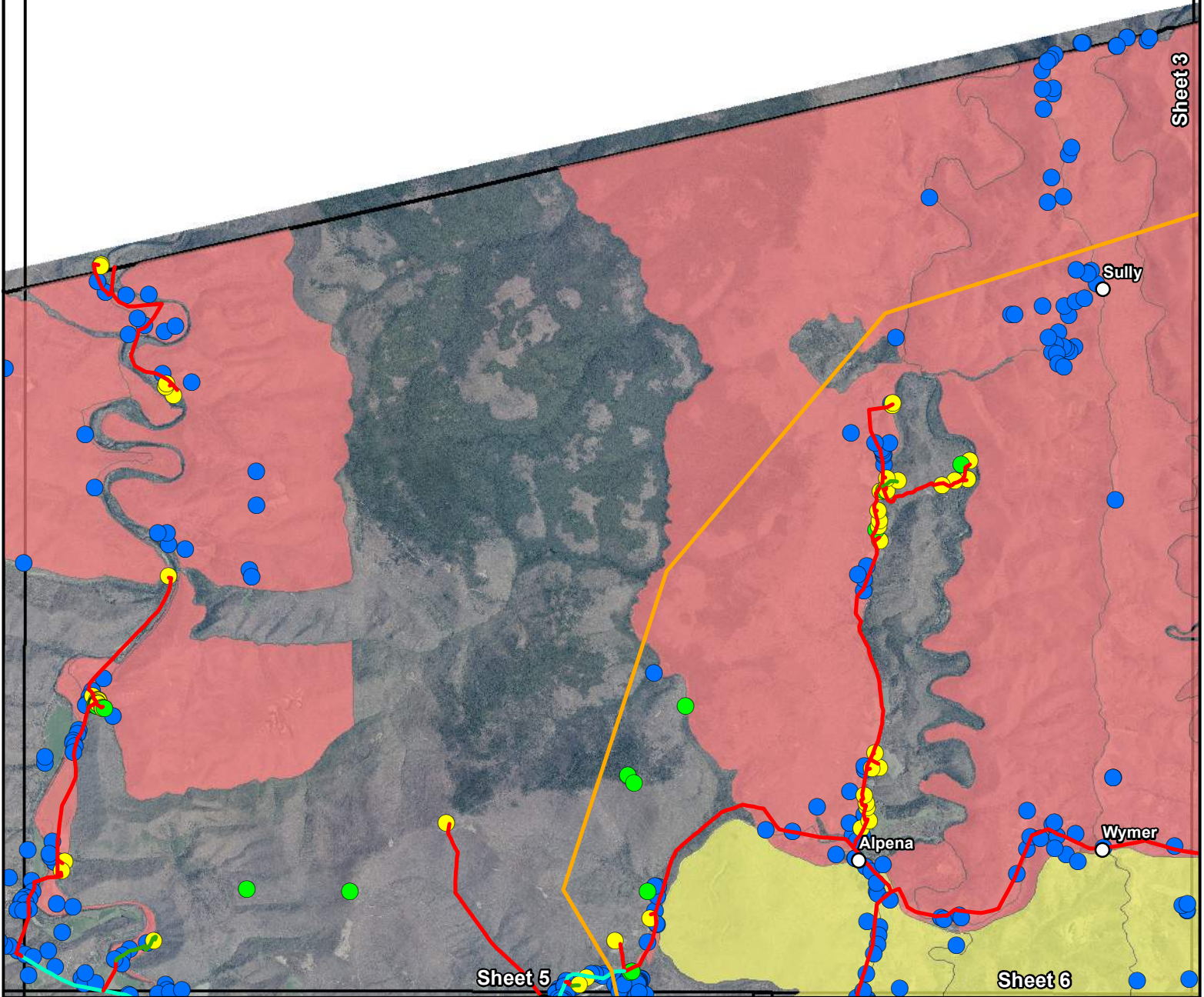


RANDOLPH COUNTY

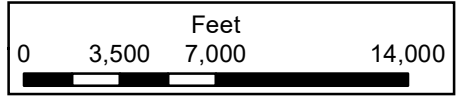




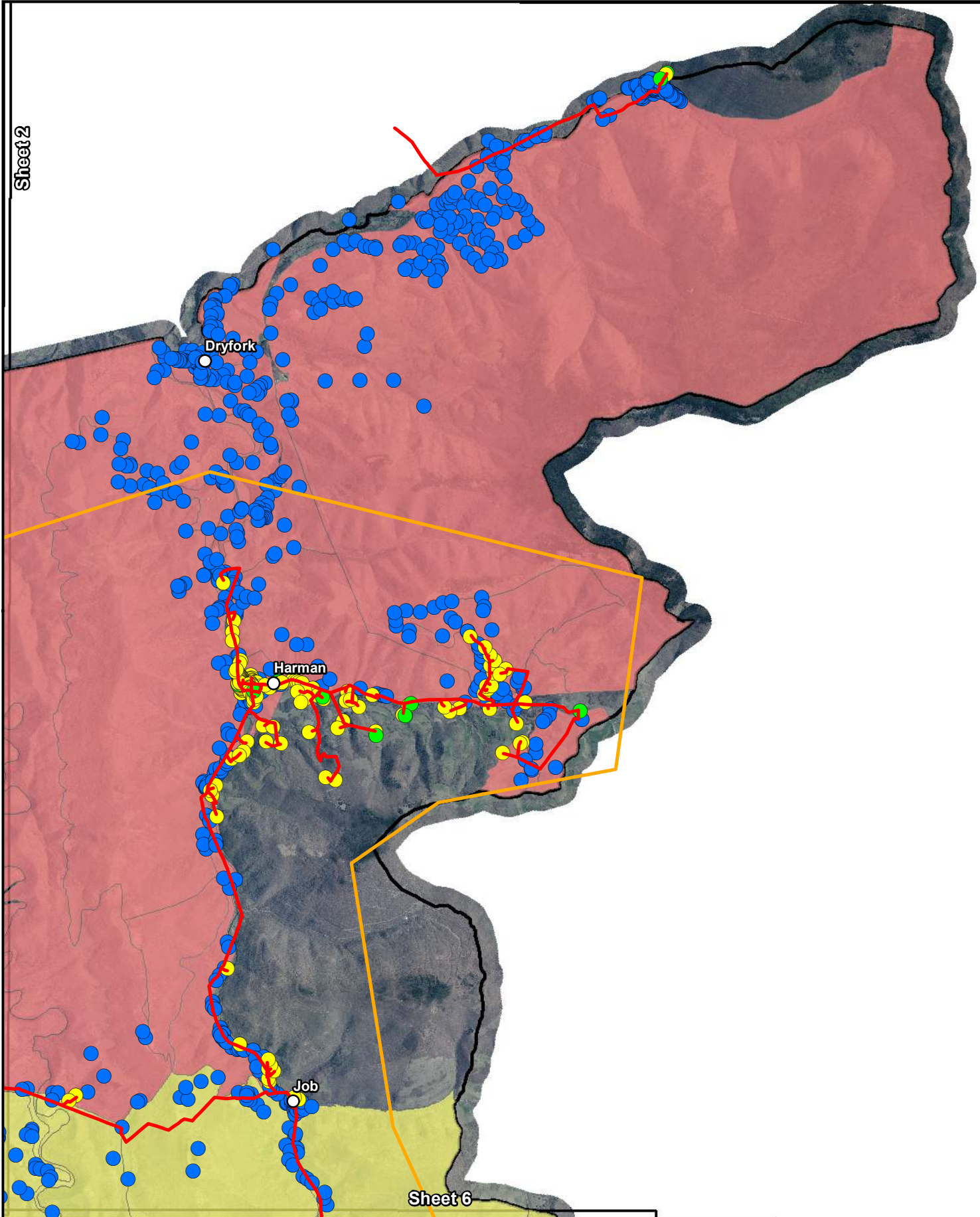




- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Micrologic Inc. - RDOF
- Citynet West Virginia, LLC - RDOF
- County Boundary
- Index

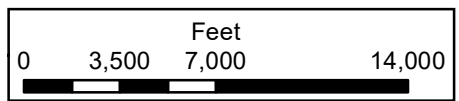


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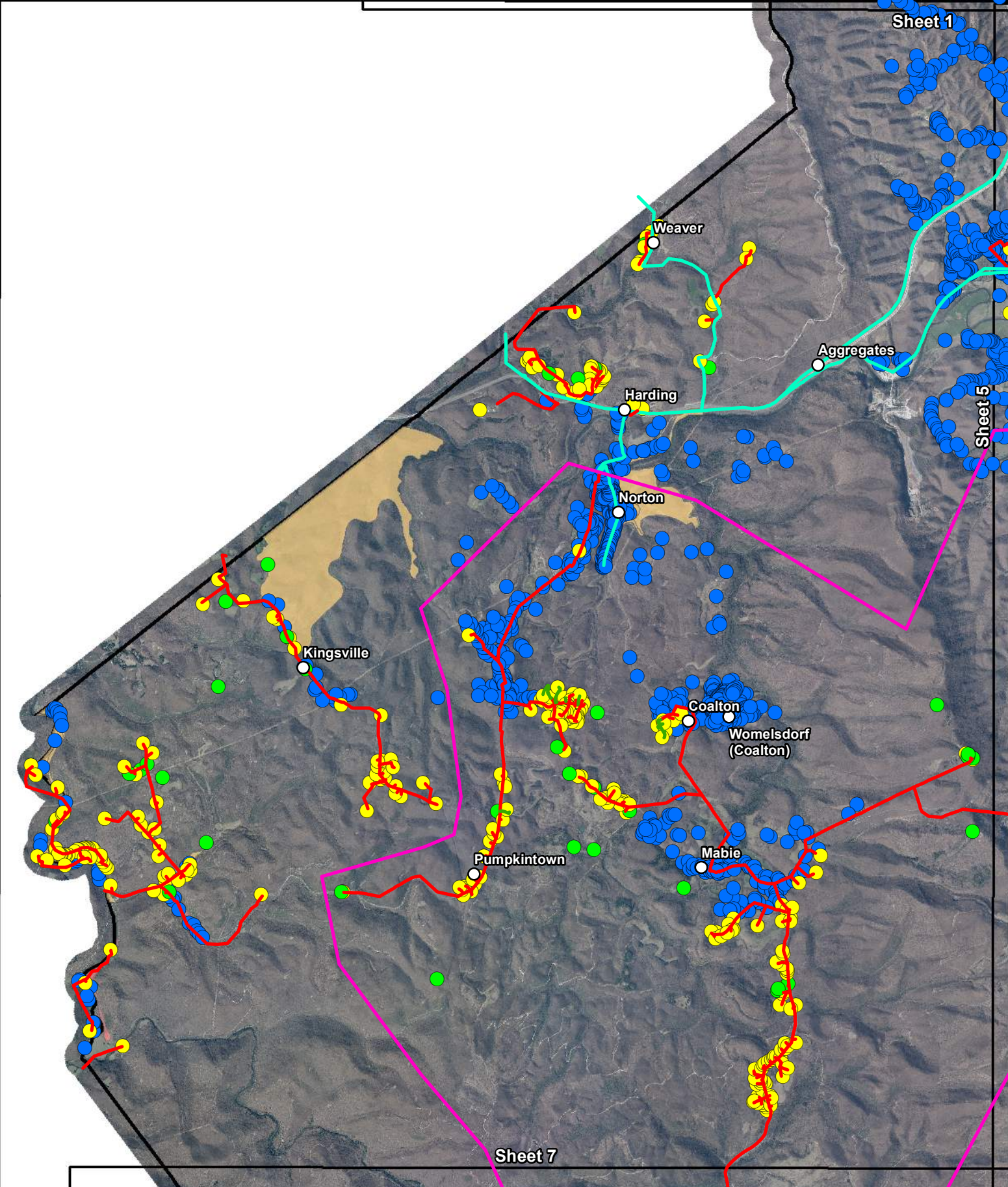
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- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Micrologic Inc. - RDOF
- County Boundary
- Index
- Citynet West Virginia, LLC - RDOF

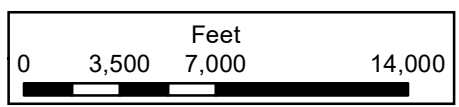


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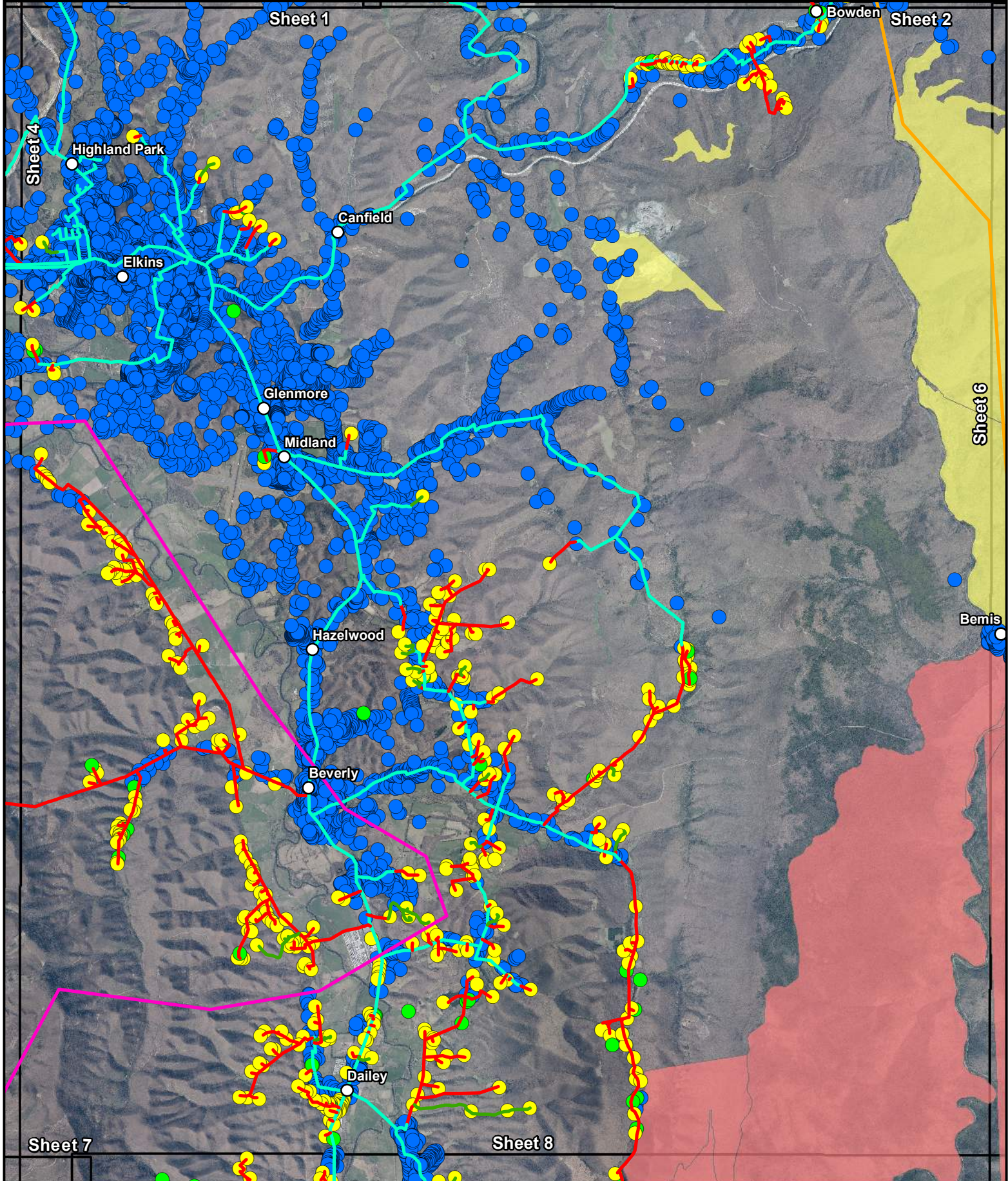
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- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Citynet West Virginia, LLC - RDOF
- Frontier - RDOF
- Micrologic Inc. - RDOF
- County Boundary
- Index



Sheet
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<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Address Project 1 Boundary Project 2 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF 	<ul style="list-style-type: none"> Frontier - RDOF Micrologic Inc. - RDOF County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="width: 25%;">0</td> <td style="width: 25%;">3,500</td> <td style="width: 25%;">7,000</td> <td style="width: 25%;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td style="text-align: center; font-size: 24pt;">5</td> </tr> </table>	Sheet	5
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Sheet															
5															

Sheet 2

Sheet 3

Sheet 5

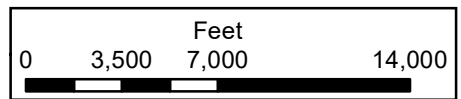
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Bemis

Glady

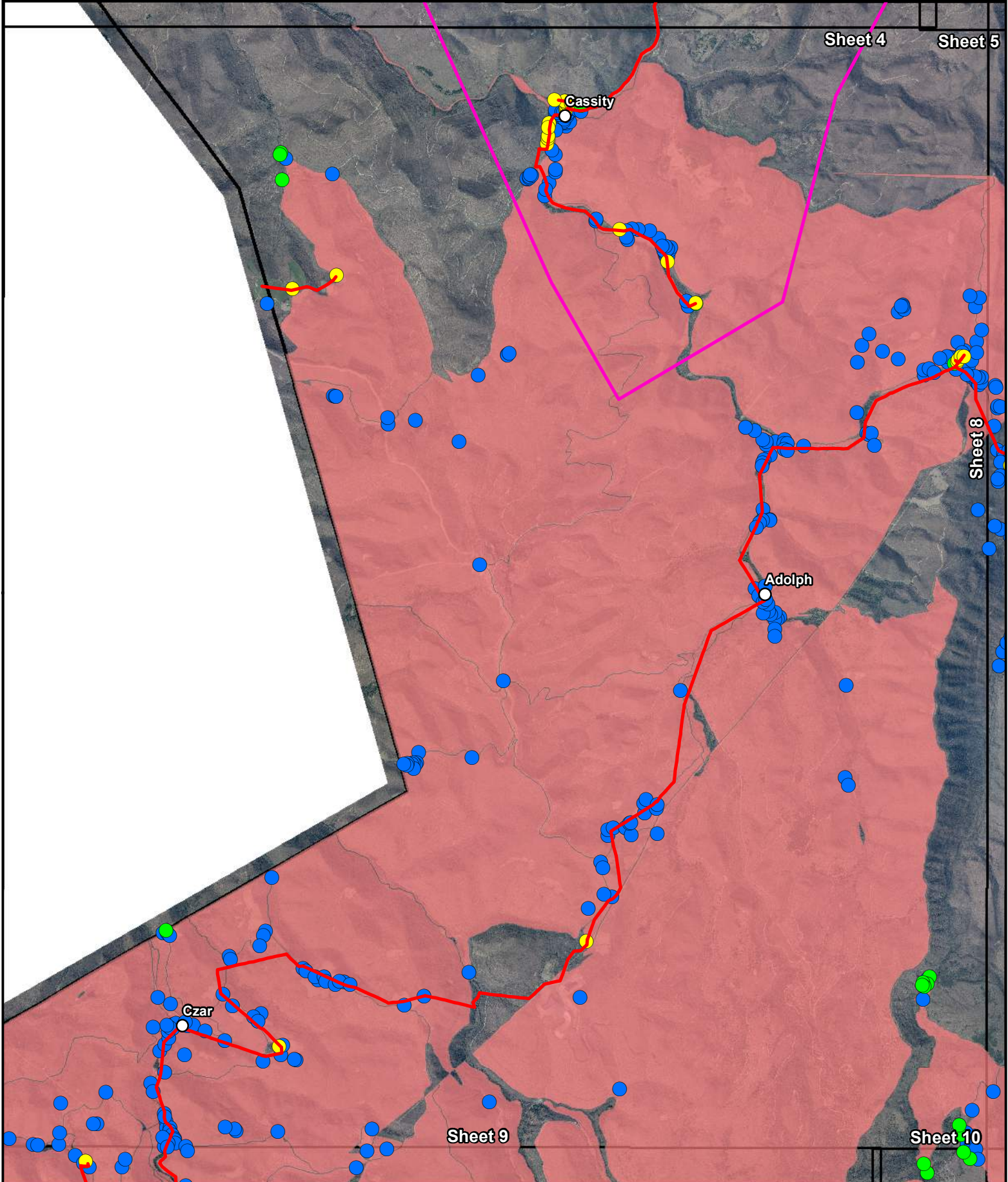
Sheet 8

- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Micrologic Inc. - RDOF
- County Boundary
- Index
- Citynet West Virginia, LLC - RDOF



Sheet

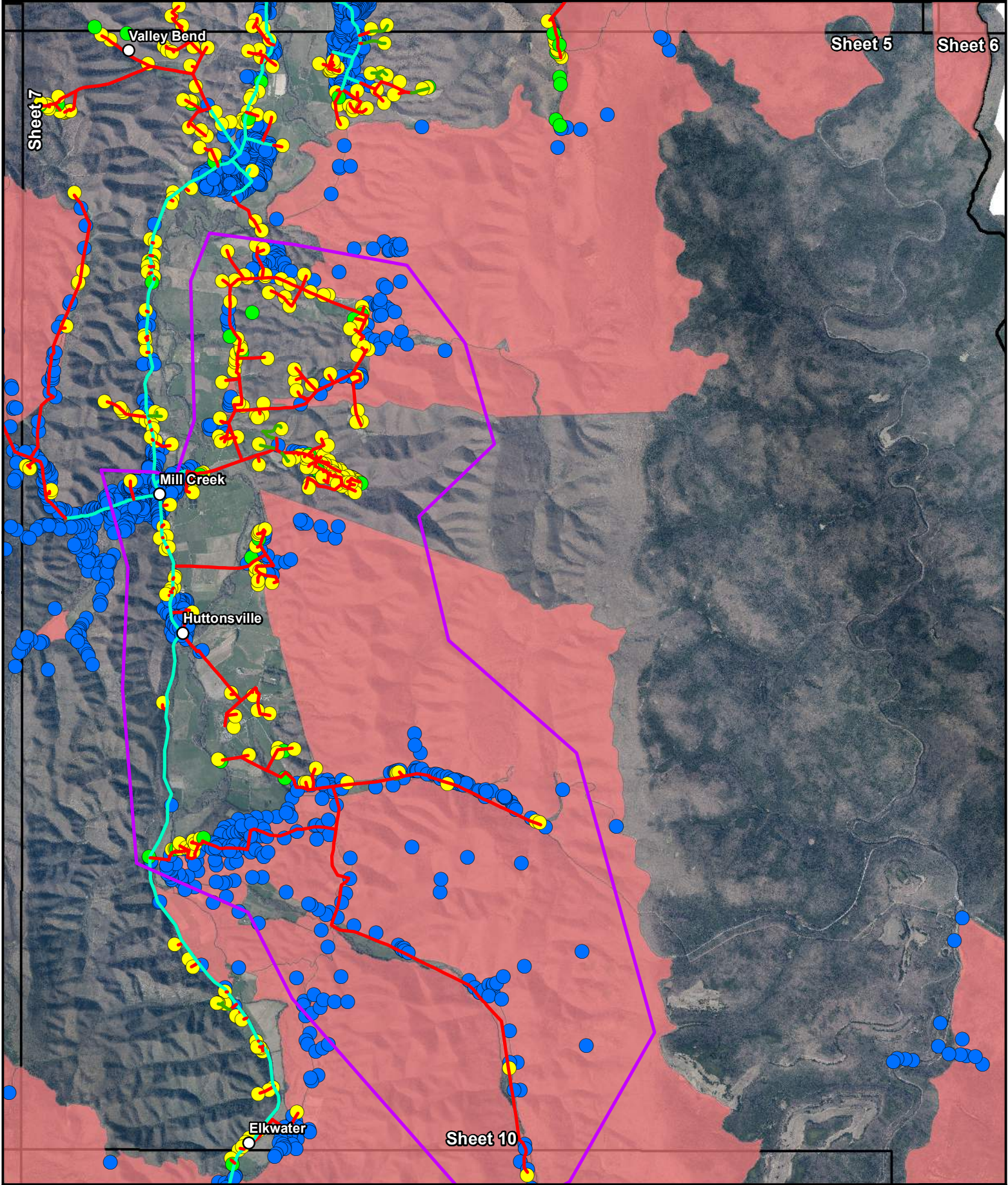
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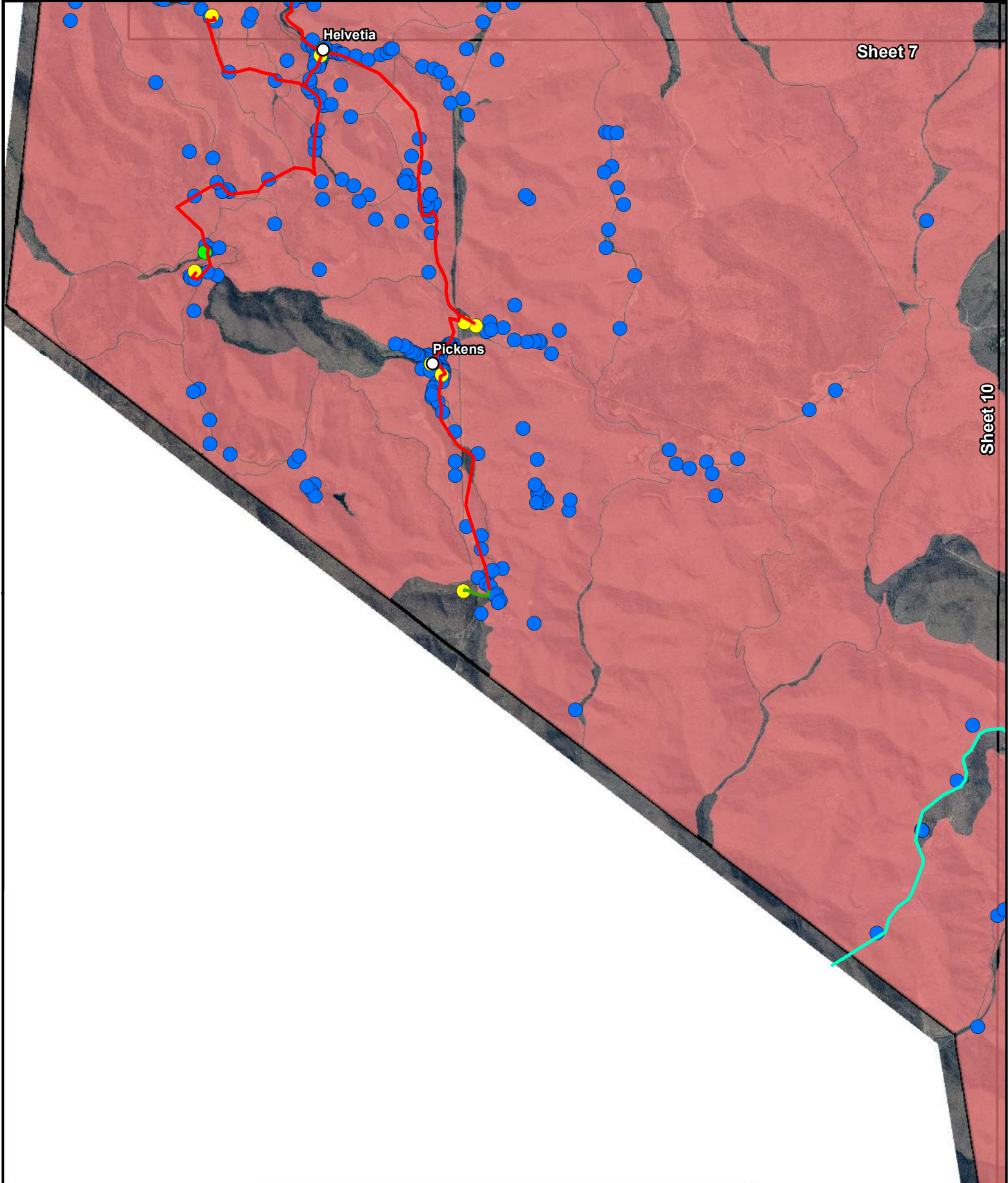
Existing Route	Other Address	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	Micrologic Inc. - RDOF
Proposed Buried Fiber	Project 2 Boundary	County Boundary
Targeted Address	Project 3 Boundary	Index
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

Sheet

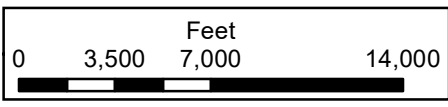
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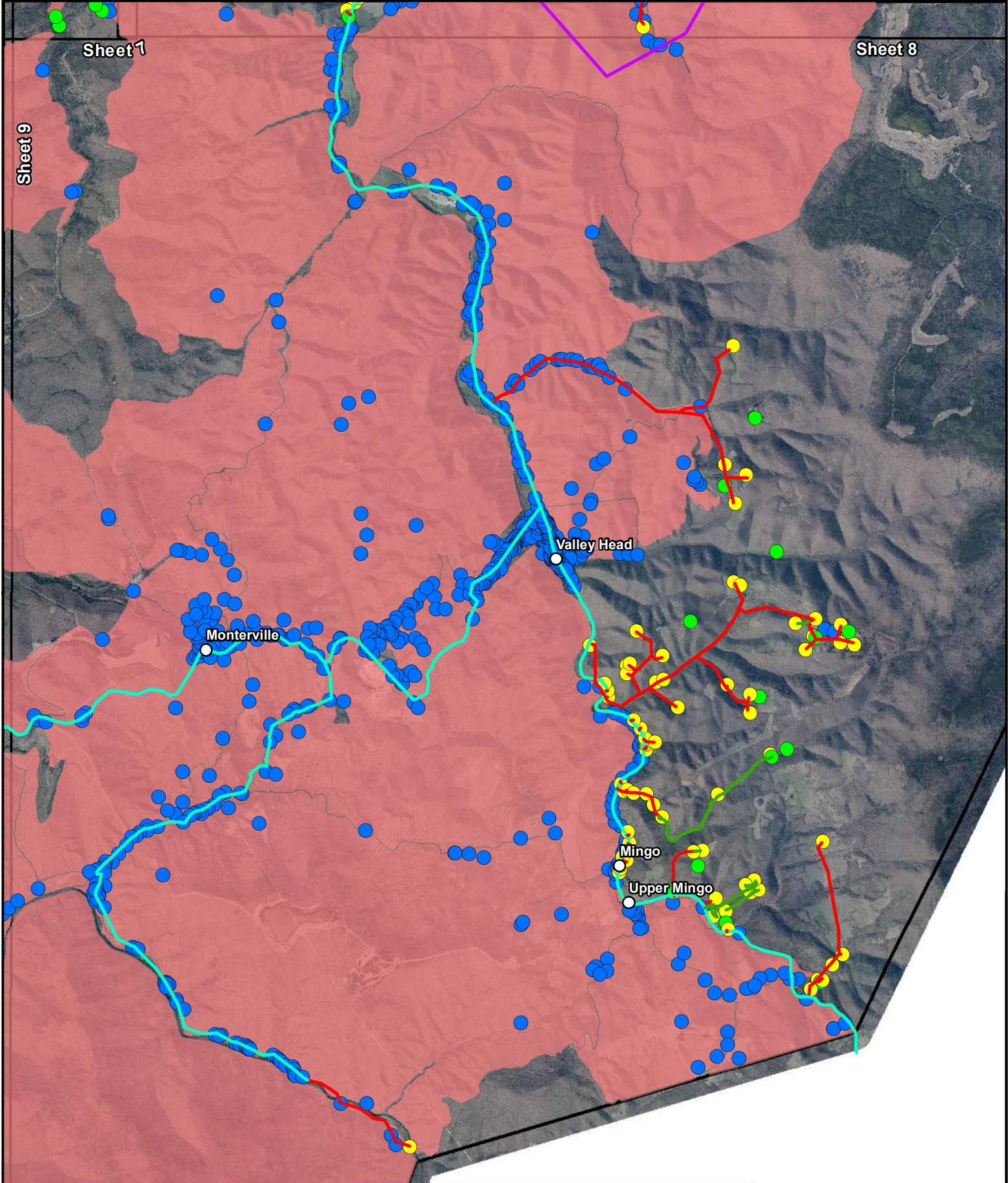
<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Address Project 1 Boundary Project 2 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF 	<ul style="list-style-type: none"> Frontier - RDOF Micrologic Inc. - RDOF County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="width: 25%;">0</td> <td style="width: 25%;">3,500</td> <td style="width: 25%;">7,000</td> <td style="width: 25%;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td style="text-align: center; font-size: 24pt;">8</td> </tr> </table>	Sheet	8
Feet															
0	3,500	7,000	14,000												
Sheet															
8															



- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Micrologic Inc. - RDOF
- County Boundary
- Index
- Citynet West Virginia, LLC - RDOF



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<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Address Project 1 Boundary Project 2 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF 	<ul style="list-style-type: none"> Frontier - RDOF Micrologic Inc. - RDOF County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="width: 25%;">0</td> <td style="width: 25%;">3,500</td> <td style="width: 25%;">7,000</td> <td style="width: 25%;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td>10</td> </tr> </table>	Sheet	10
Feet															
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Sheet															
10															

Randolph County, WV – 2023 ROC Study – Cost Estimate – Whole County

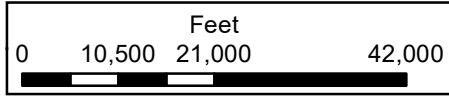
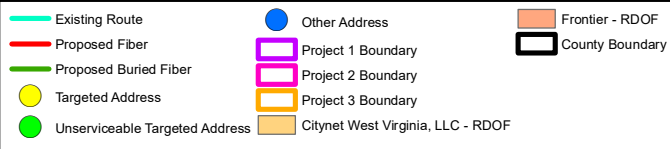
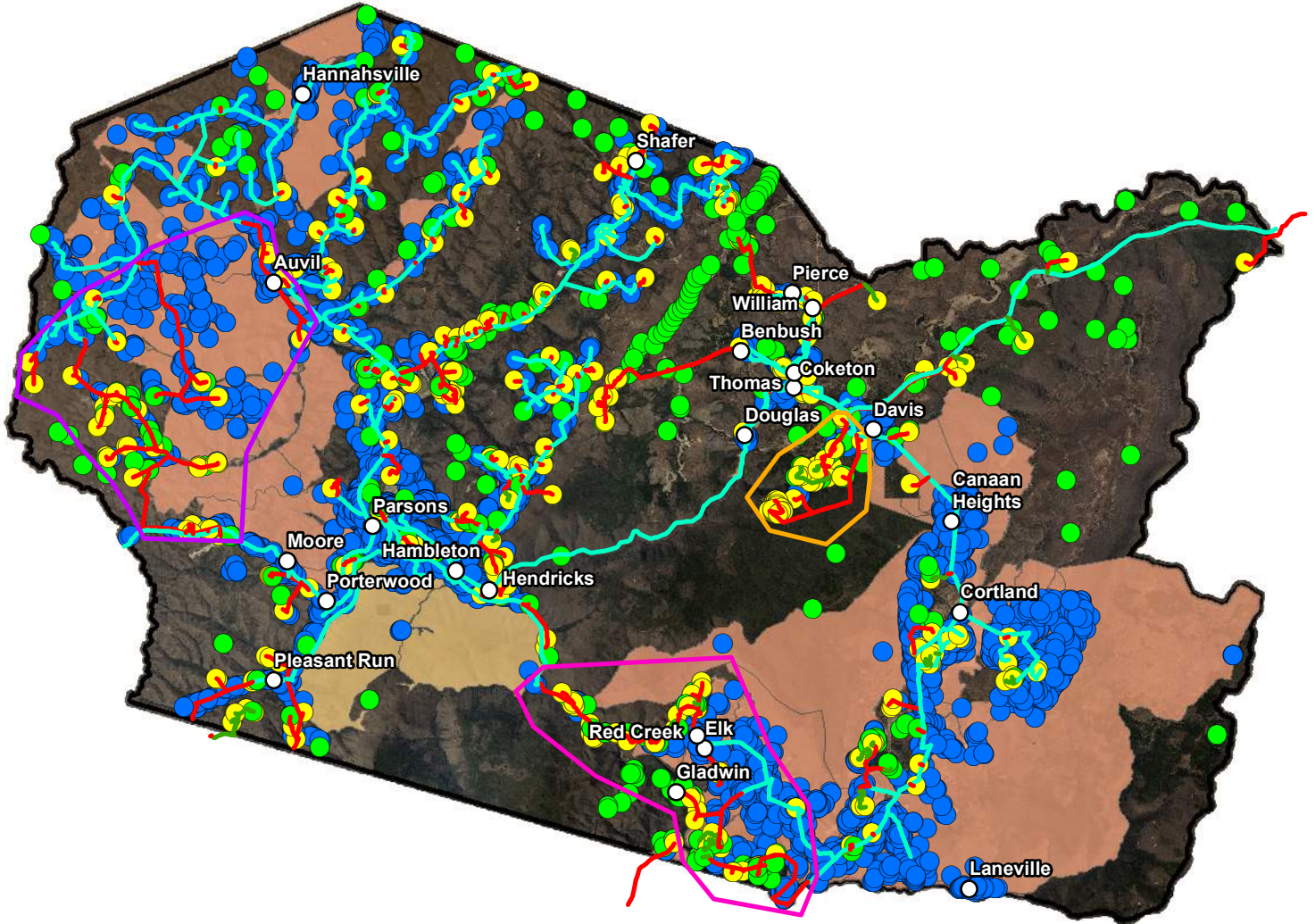
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	297.74	\$1,637,570
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	297.74	\$446,610
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	274.40	\$4,115,000
Aerial Construction Labor	\$50,000.00	Per Mile	274.40	\$13,720,000
Underground Construction Labor	\$150,000.00	Per Mile	23.34	\$3,501,000
Project Construction Contingency 10%	\$1,722,100.00	Lump Sum	1	\$1,722,100
Legal 1.5%	\$258,315.00	Lump Sum	1	\$258,315
Administrative 2%	\$344,420.00	Lump Sum	1	\$344,420
TOTAL COST = \$25,746,015				

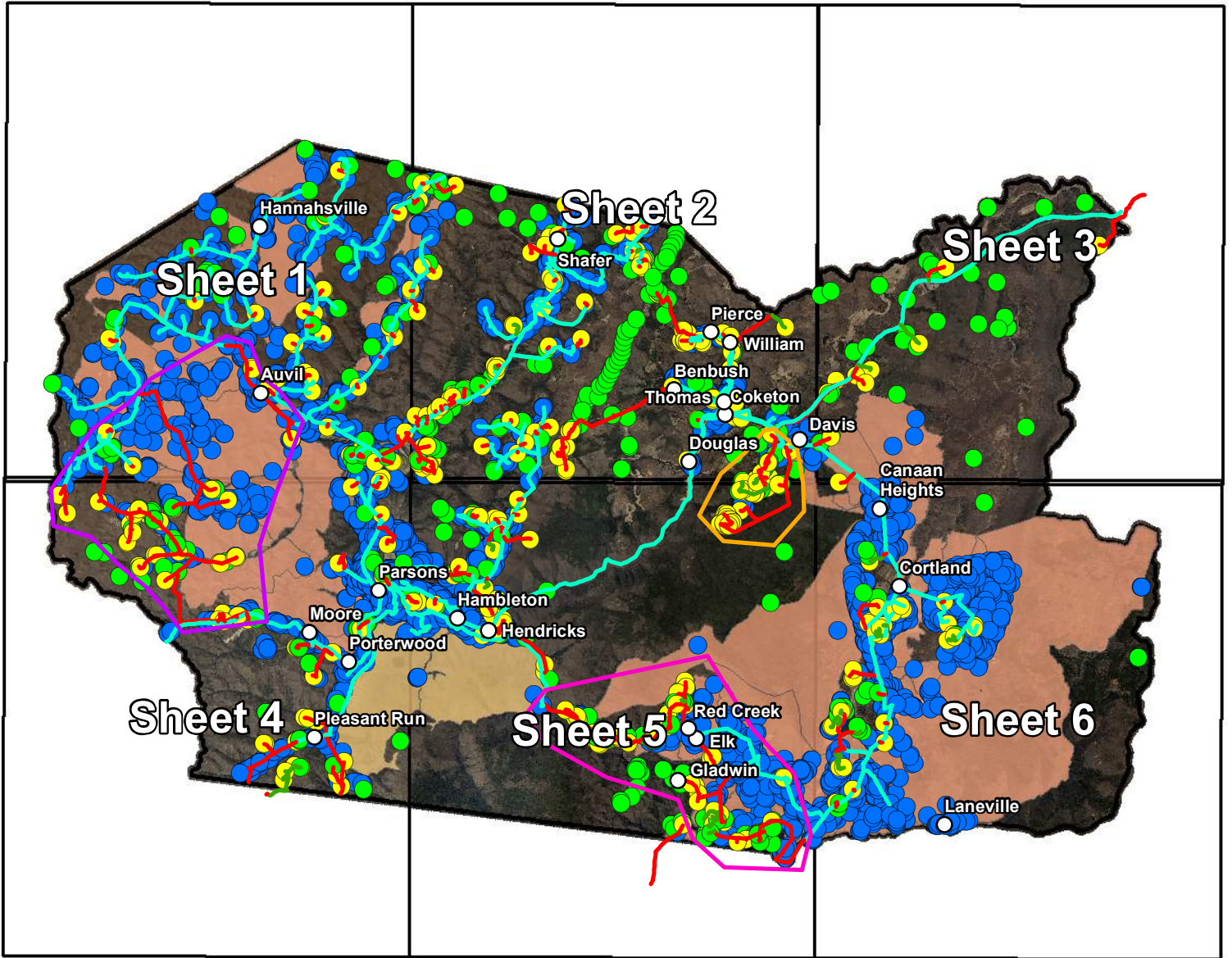
COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
7	Randolph	1	188	32.98	\$2,664,155
		2	319	51.94	\$4,347,360
		3	194	66.58	\$6,153,315

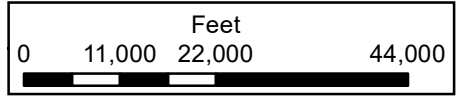


TUCKER COUNTY

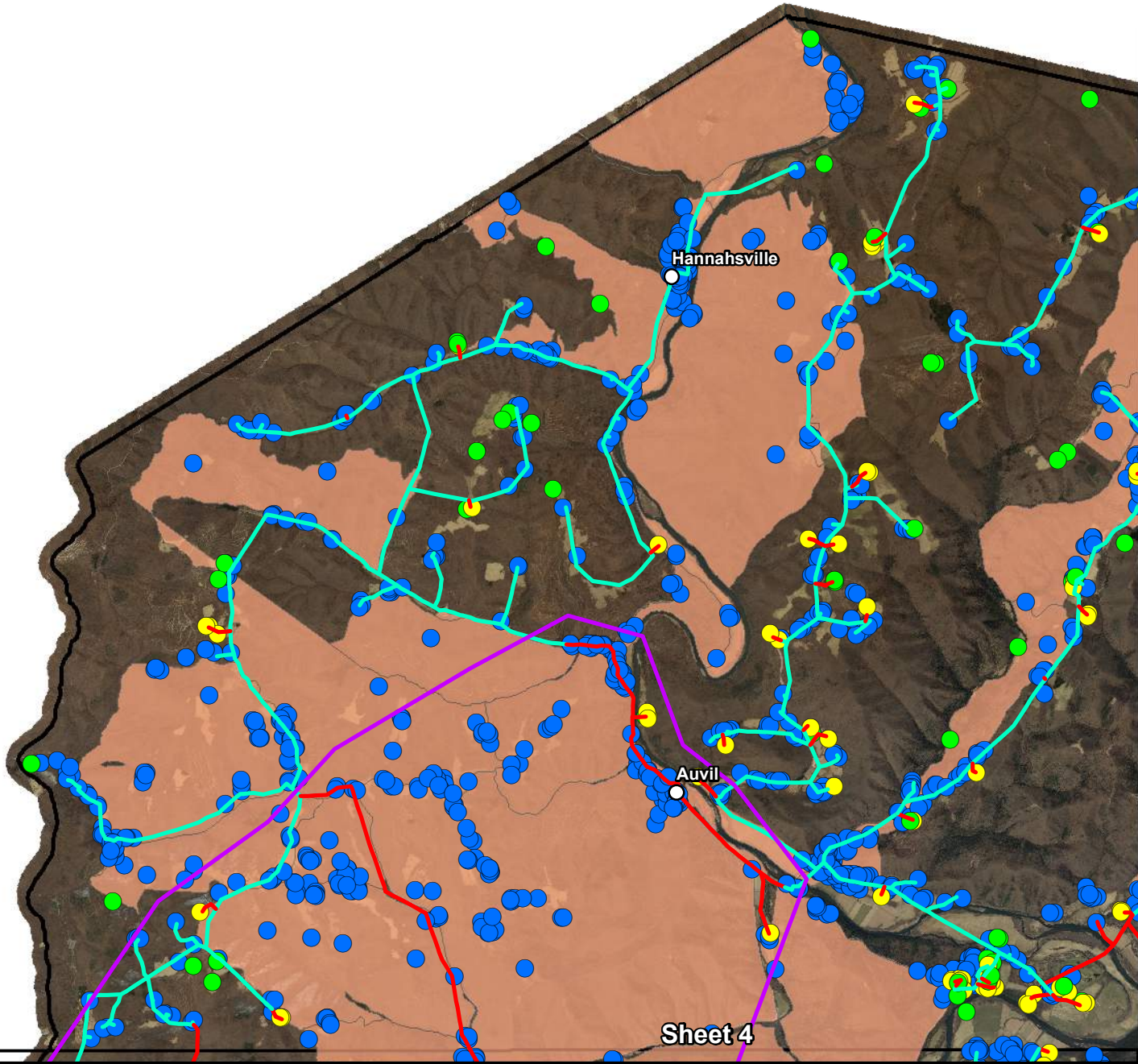





- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Citynet West Virginia, LLC - RDOF
- Frontier - RDOF
- County Boundary
- Index



Sheet
INDEX

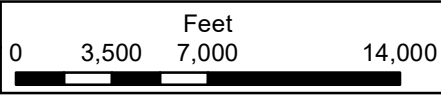


Existing Route	Other Address	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	



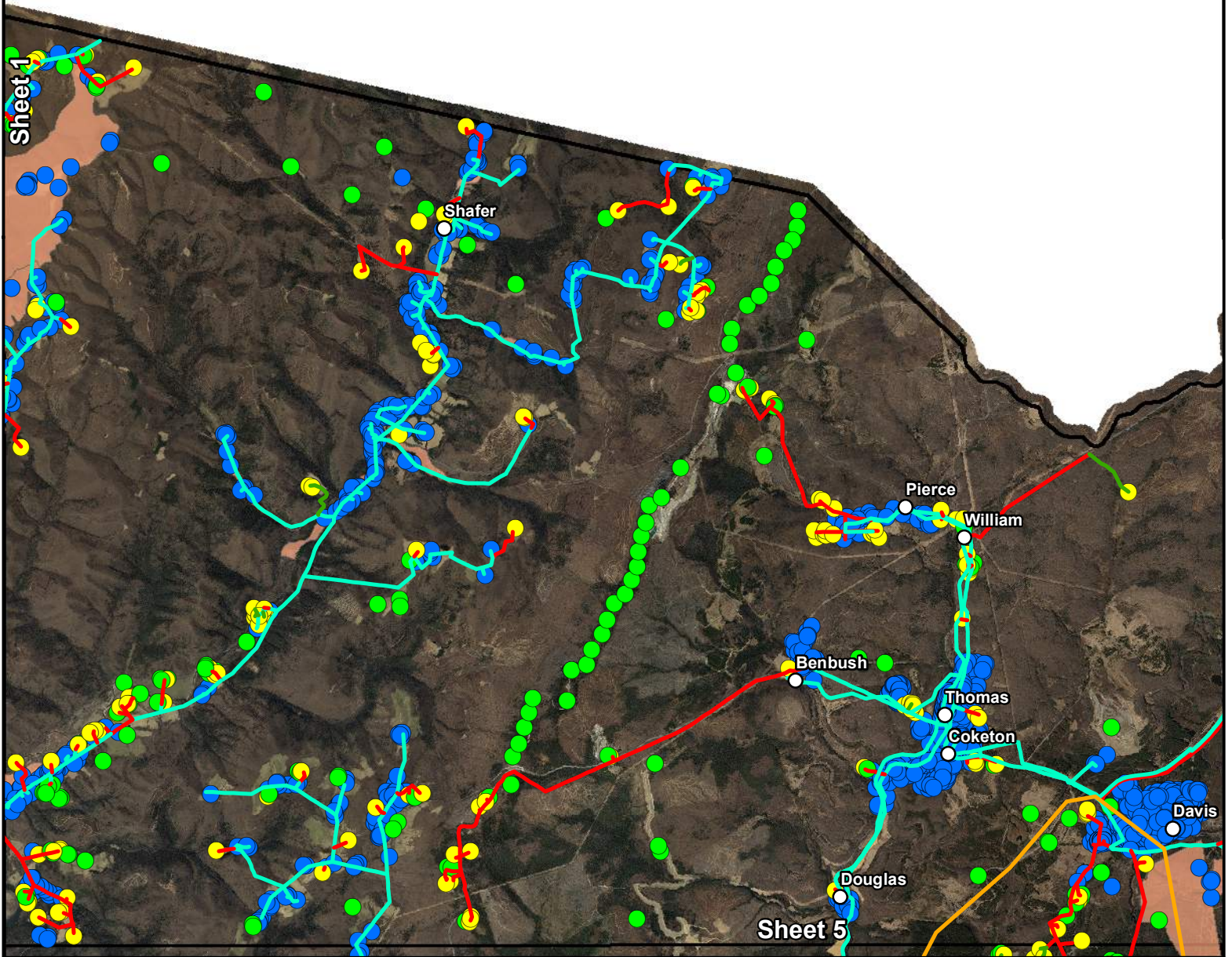
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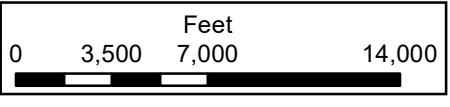


Existing Route	Other Address	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	



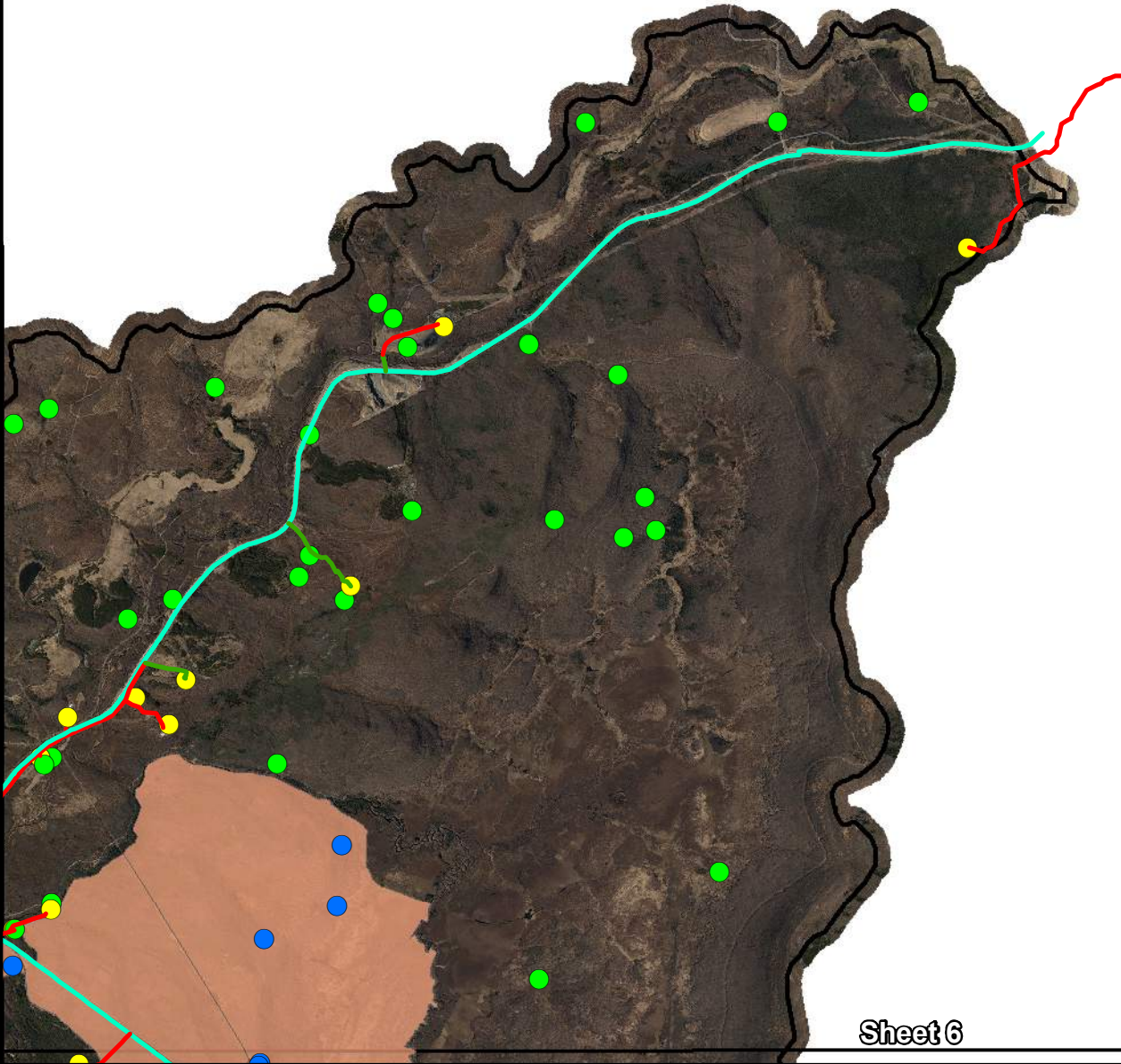
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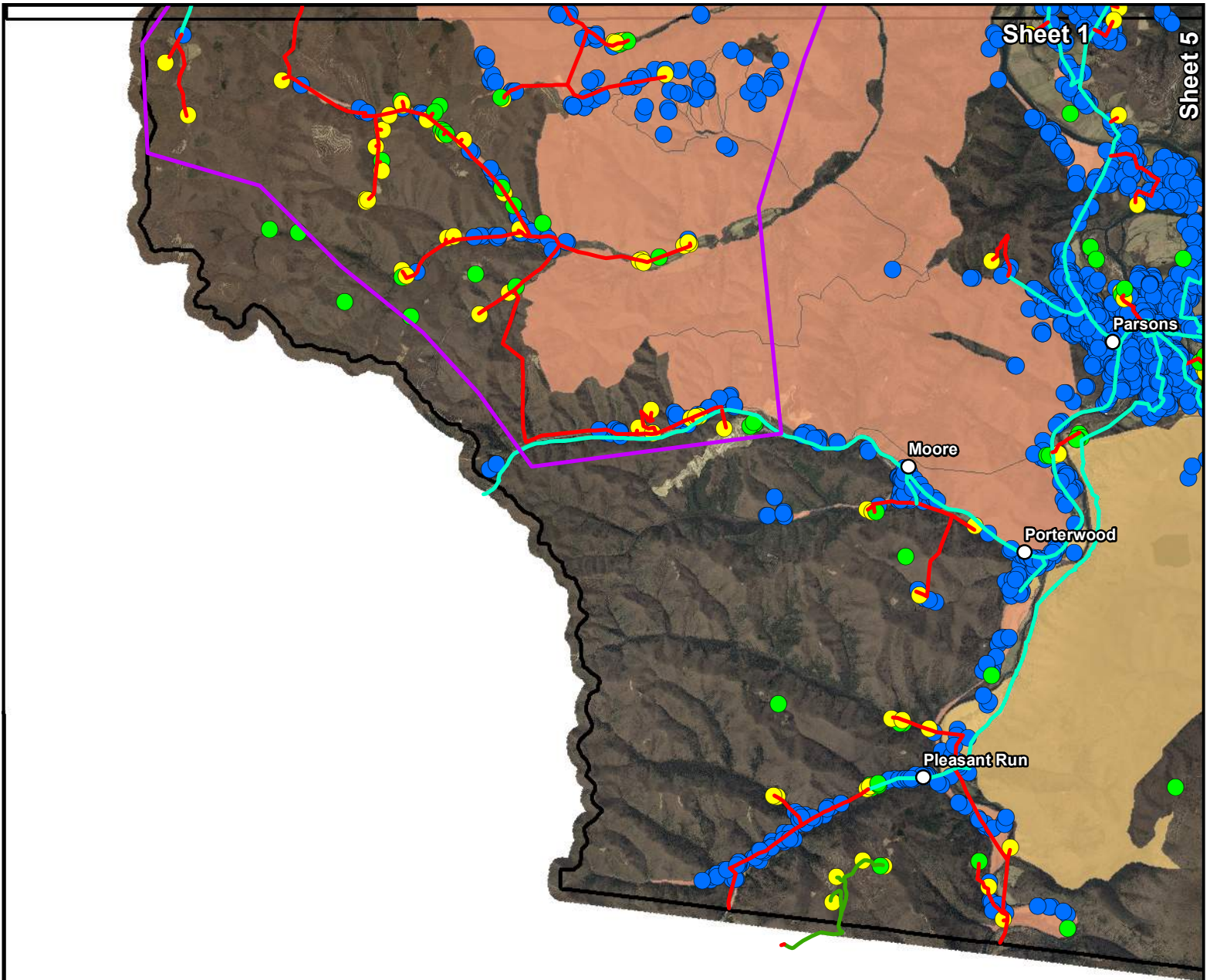
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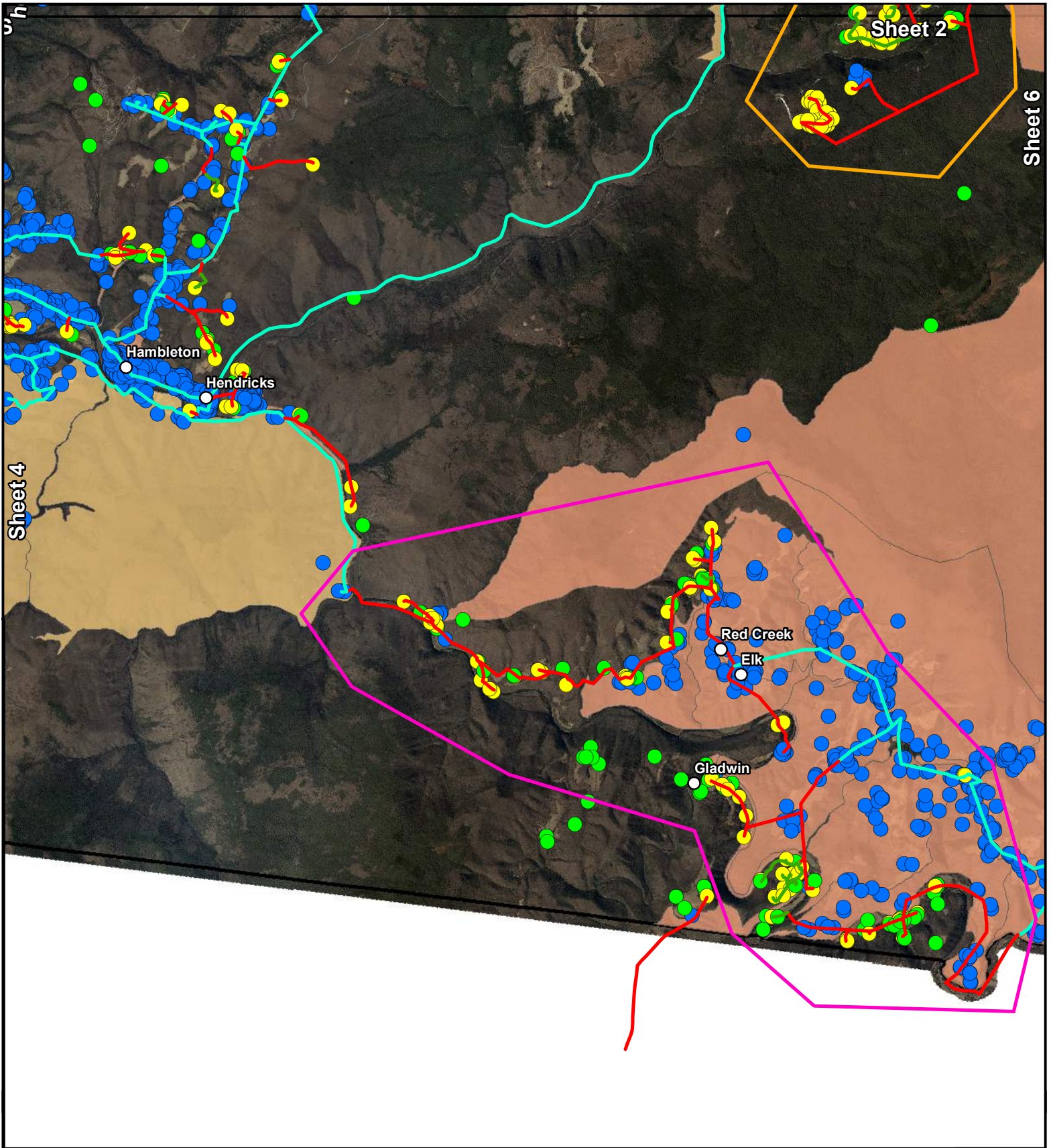


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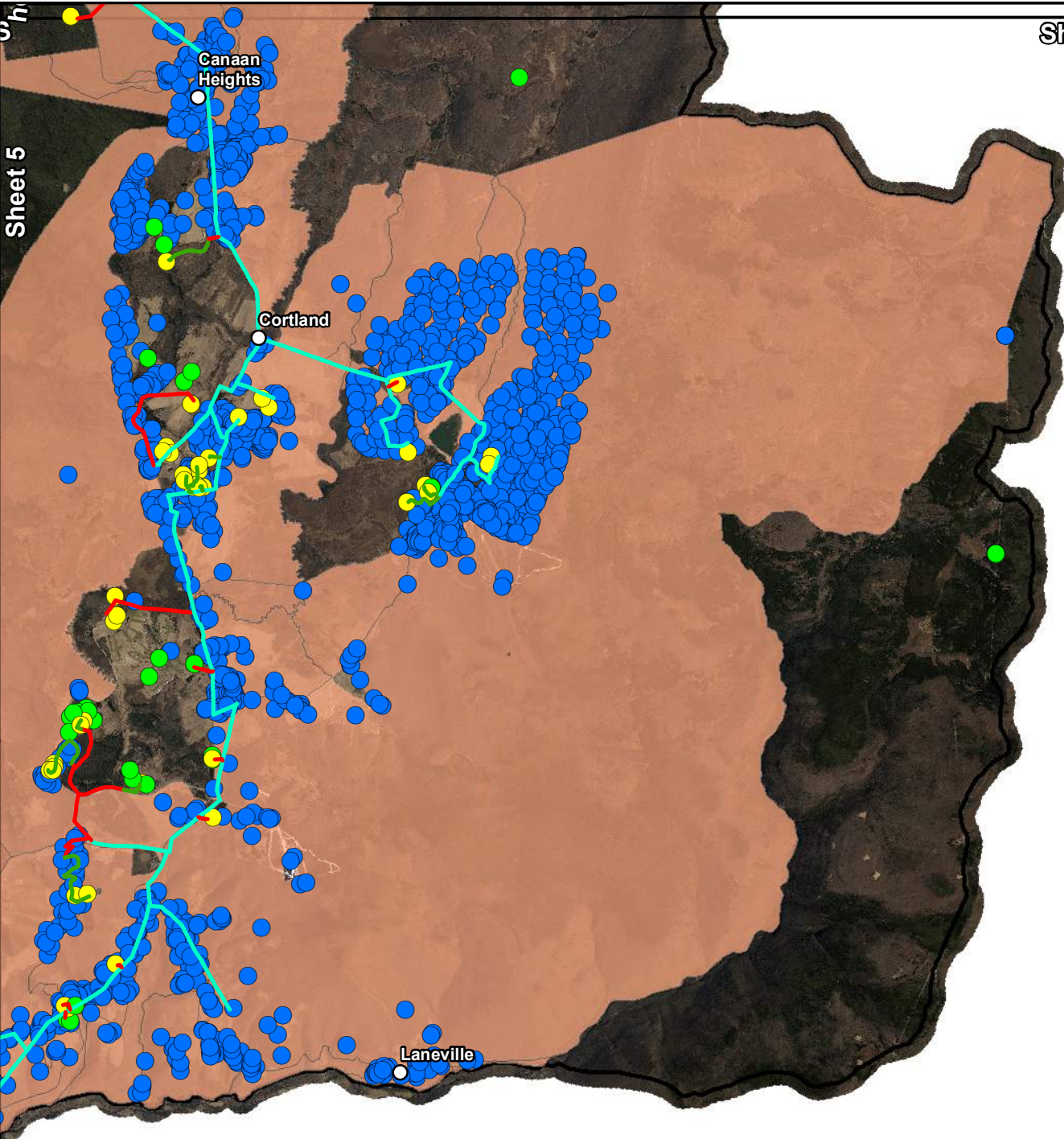
Existing Route	Other Address	Frontier - RDOF		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td>0</td> <td>3,500</td> <td>7,000</td> <td>14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	Sheet
Feet													
0	3,500	7,000	14,000										
Proposed Fiber	Project 1 Boundary	County Boundary			3								
Proposed Buried Fiber	Project 2 Boundary	Index											
Targeted Address	Project 3 Boundary	Citynet West Virginia, LLC - RDOF											
Unserviceable Targeted Address													



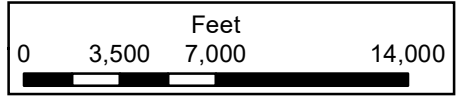
<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Address Project 1 Boundary Project 2 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF 	<ul style="list-style-type: none"> Frontier - RDOF County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="width: 25%;">0</td> <td style="width: 25%;">3,500</td> <td style="width: 25%;">7,000</td> <td style="width: 25%;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td style="text-align: center;">4</td> </tr> </table>	Sheet	4
Feet															
0	3,500	7,000	14,000												
Sheet															
4															



<ul style="list-style-type: none"> Existing Route Proposed Fiber Proposed Buried Fiber Targeted Address Unserviceable Targeted Address 	<ul style="list-style-type: none"> Other Address Project 1 Boundary Project 2 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF 	<ul style="list-style-type: none"> Frontier - RDOF County Boundary Index 			<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td>5</td> </tr> </table>	Sheet	5
Sheet							
5							



- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary
- Index
- Citynet West Virginia, LLC - RDOF



Sheet
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Tucker County, WV – 2023 ROC Study – Cost Estimate – Whole County

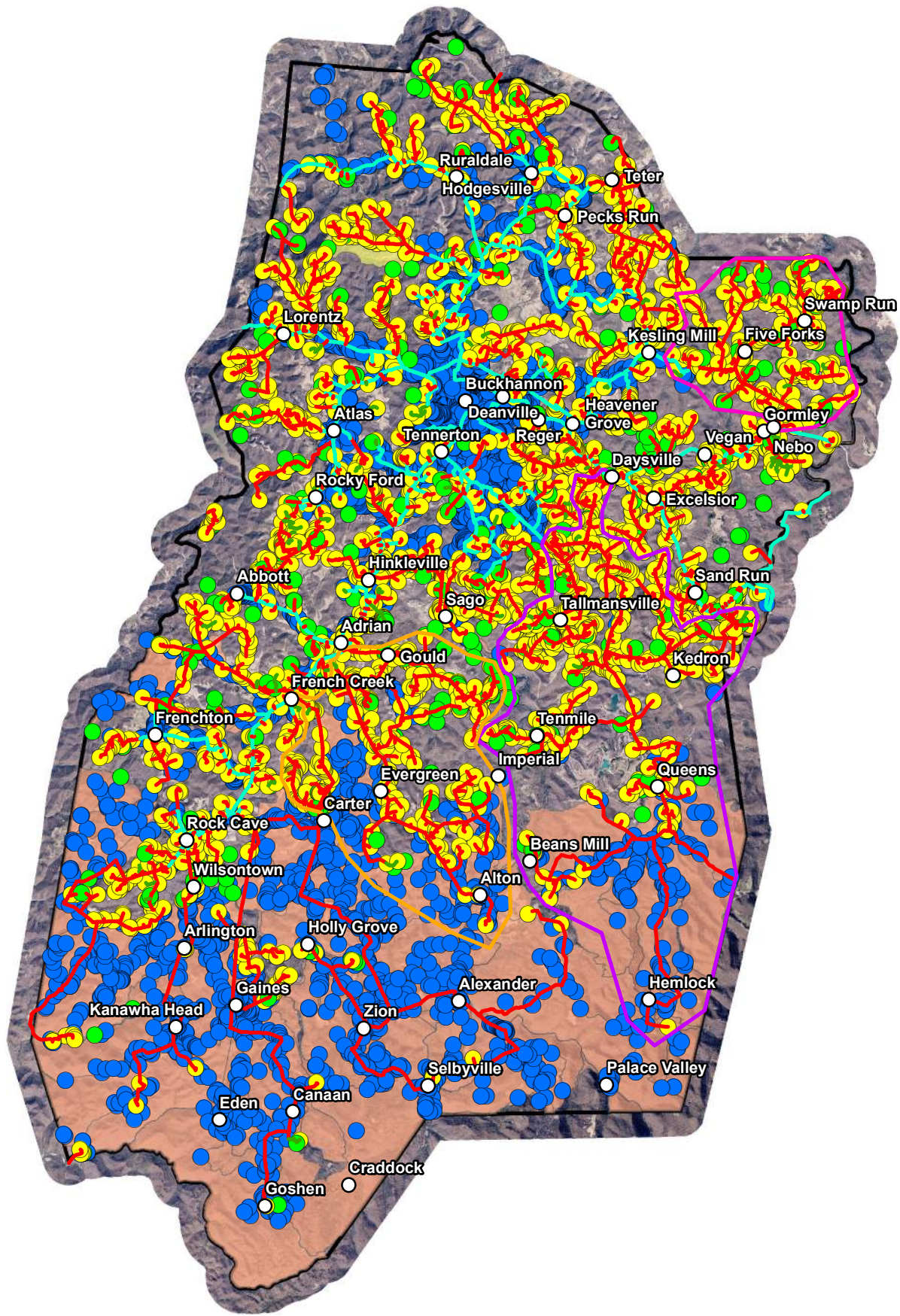
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	114.91	\$632,005
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	114.91	\$172,365
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	103.66	\$1,544,900
Aerial Construction Labor	\$50,000.00	Per Mile	103.66	\$5,183,000
Underground Construction Labor	\$150,000.00	Per Mile	11.25	\$1,687,500
Project Construction Contingency 10%	\$687,050.00	Lump Sum	1	\$687,050
Legal 1.5%	\$103,057.50	Lump Sum	1	\$103,058
Administrative 2%	\$137,410.00	Lump Sum	1	\$137,410
TOTAL COST = \$10,157,288				

COUNTY SAMPLE PROJECT

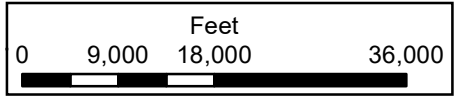
Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
7	Tucker	1	53	23.94	\$1,885,275
		2	65	18.62	\$1,632,790
		3	57	10.69	\$971,858

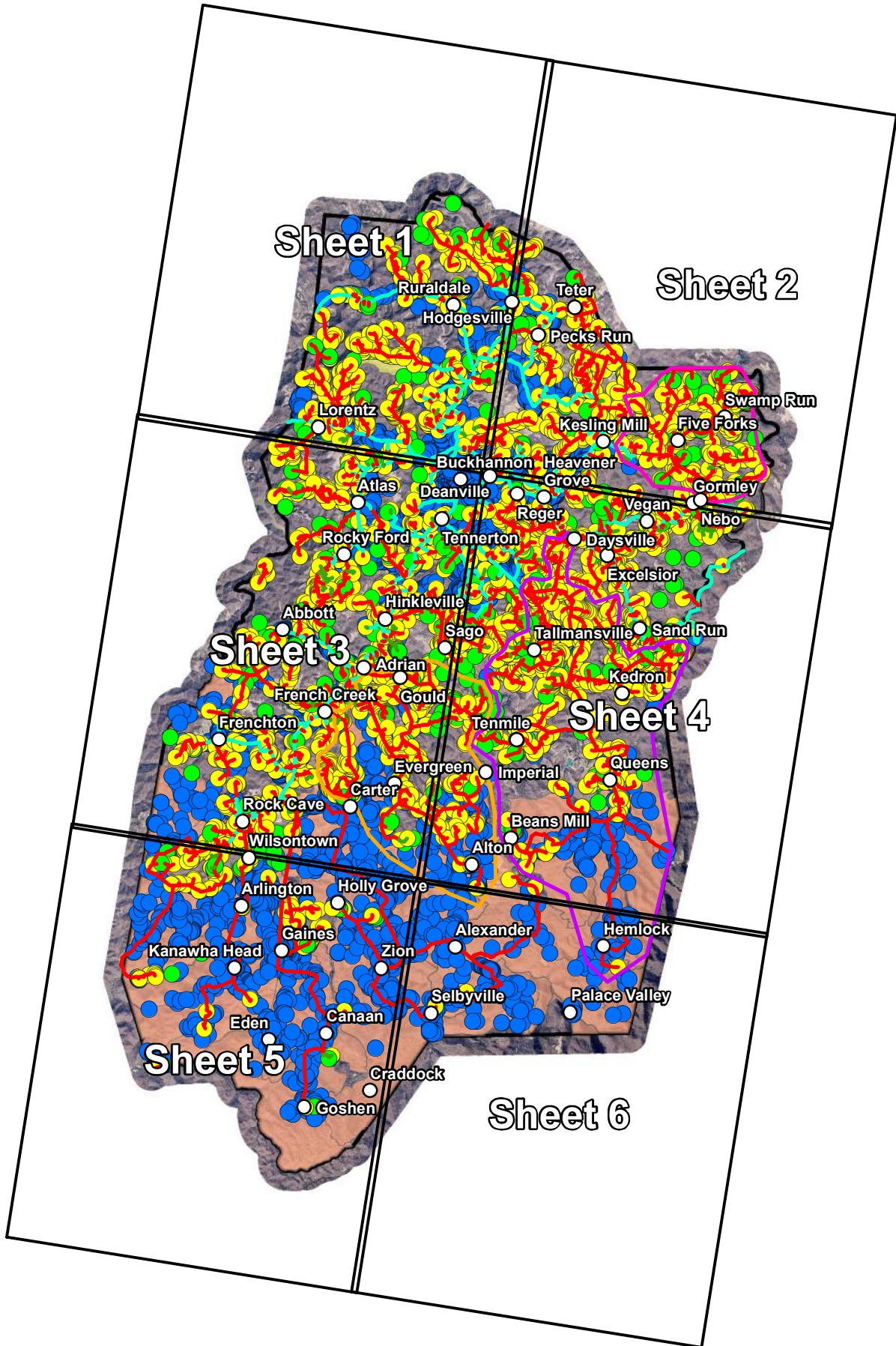


UPSHUR COUNTY

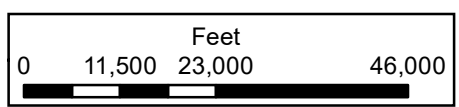


- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Starlink Services, LLC - RDOF
- County Boundary
- Frontier - RDOF

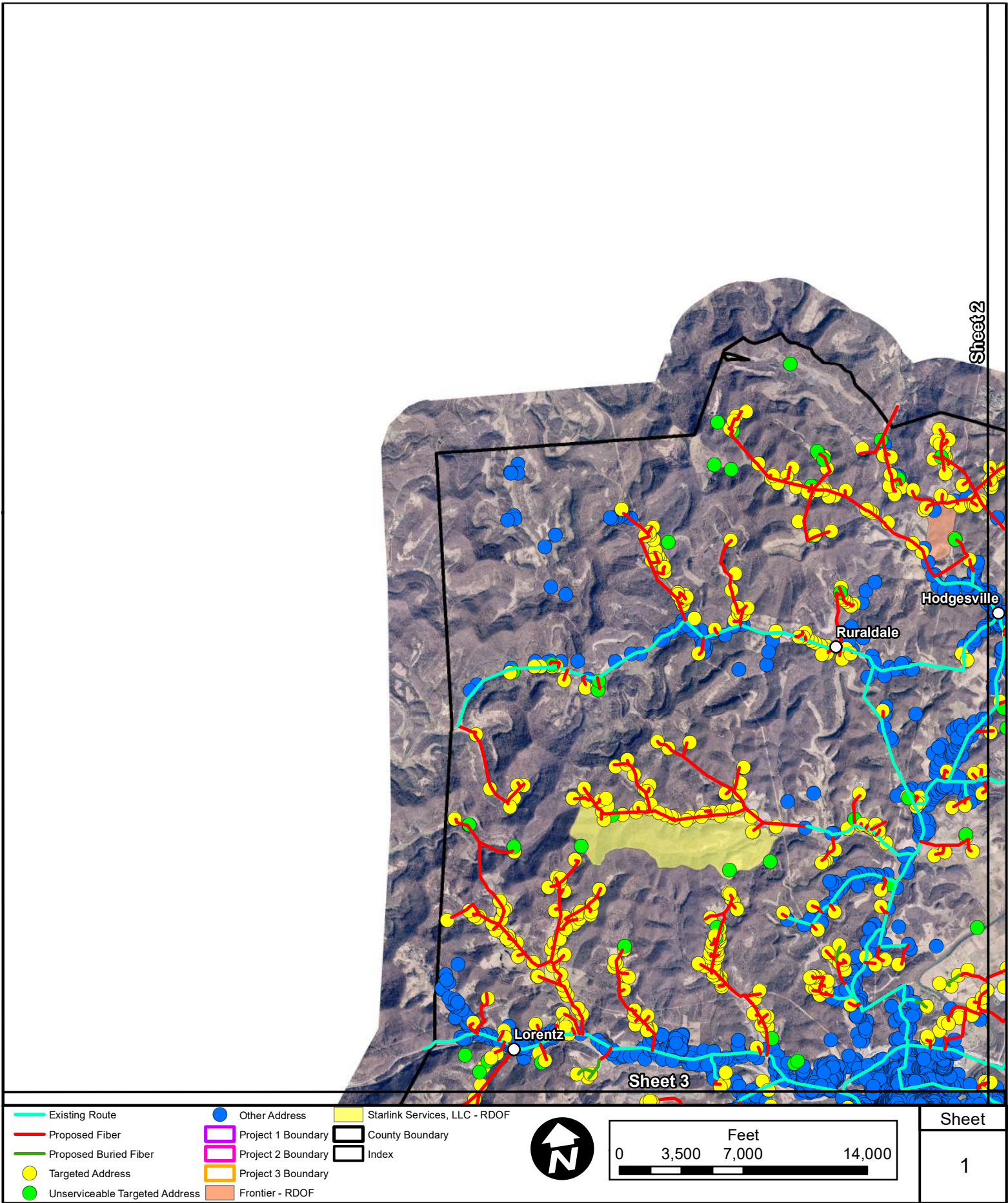


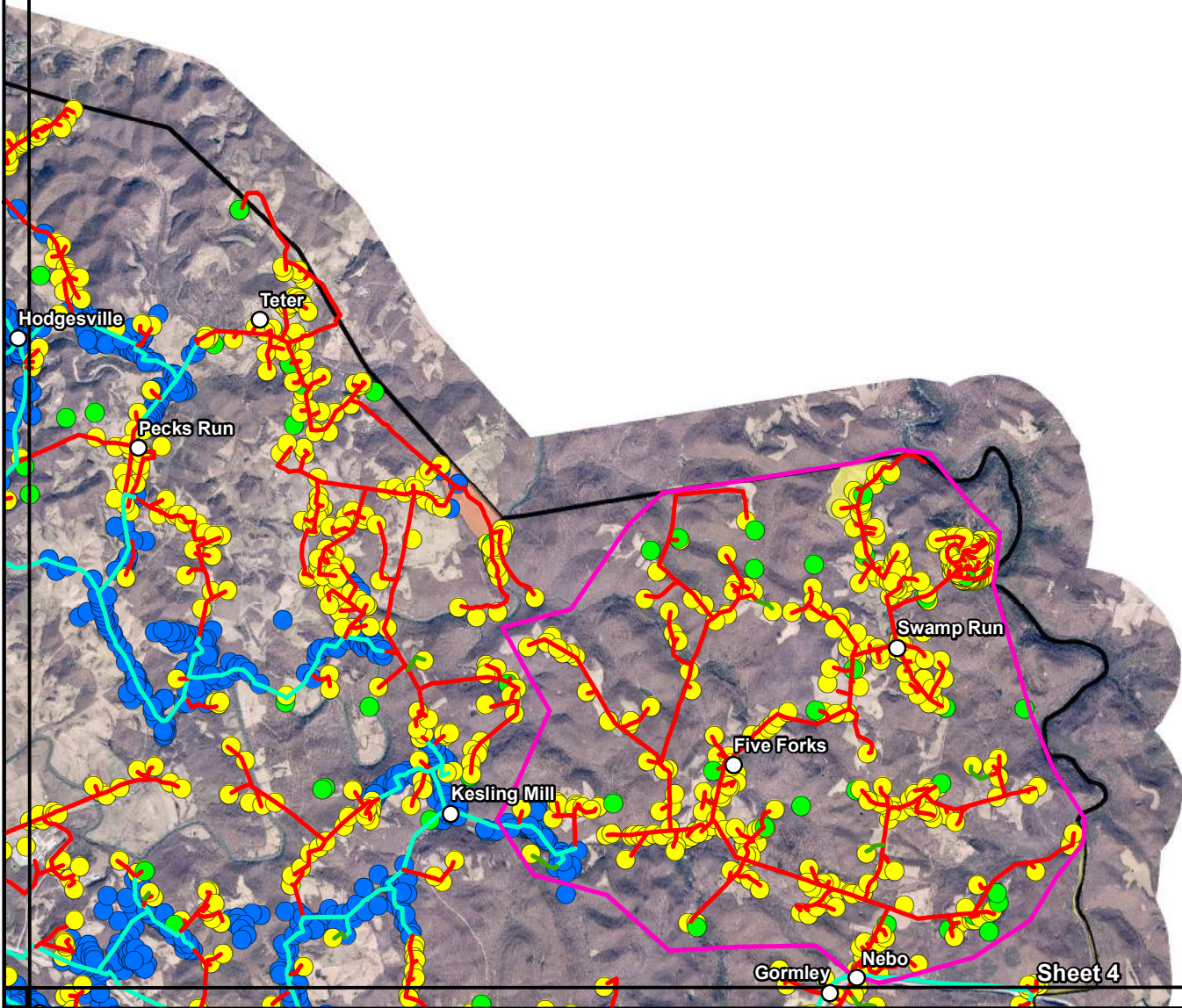


- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Starlink Services, LLC - RDOF
- County Boundary
- Index
- Frontier - RDOF

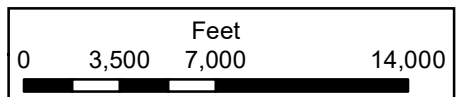


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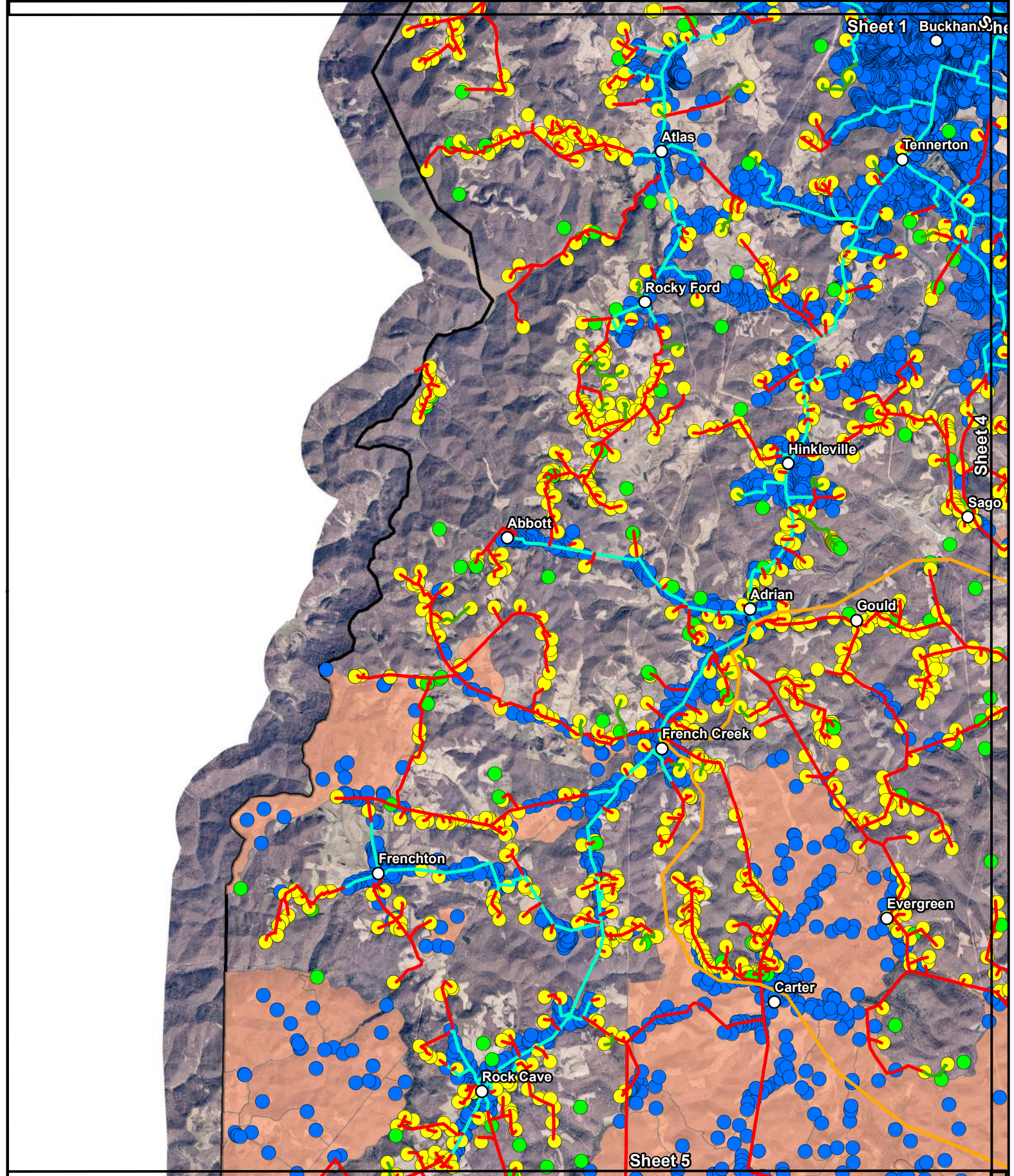




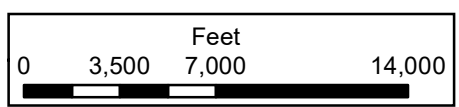
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Starlink Services, LLC - RDOF
- County Boundary
- Index
- Frontier - RDOF



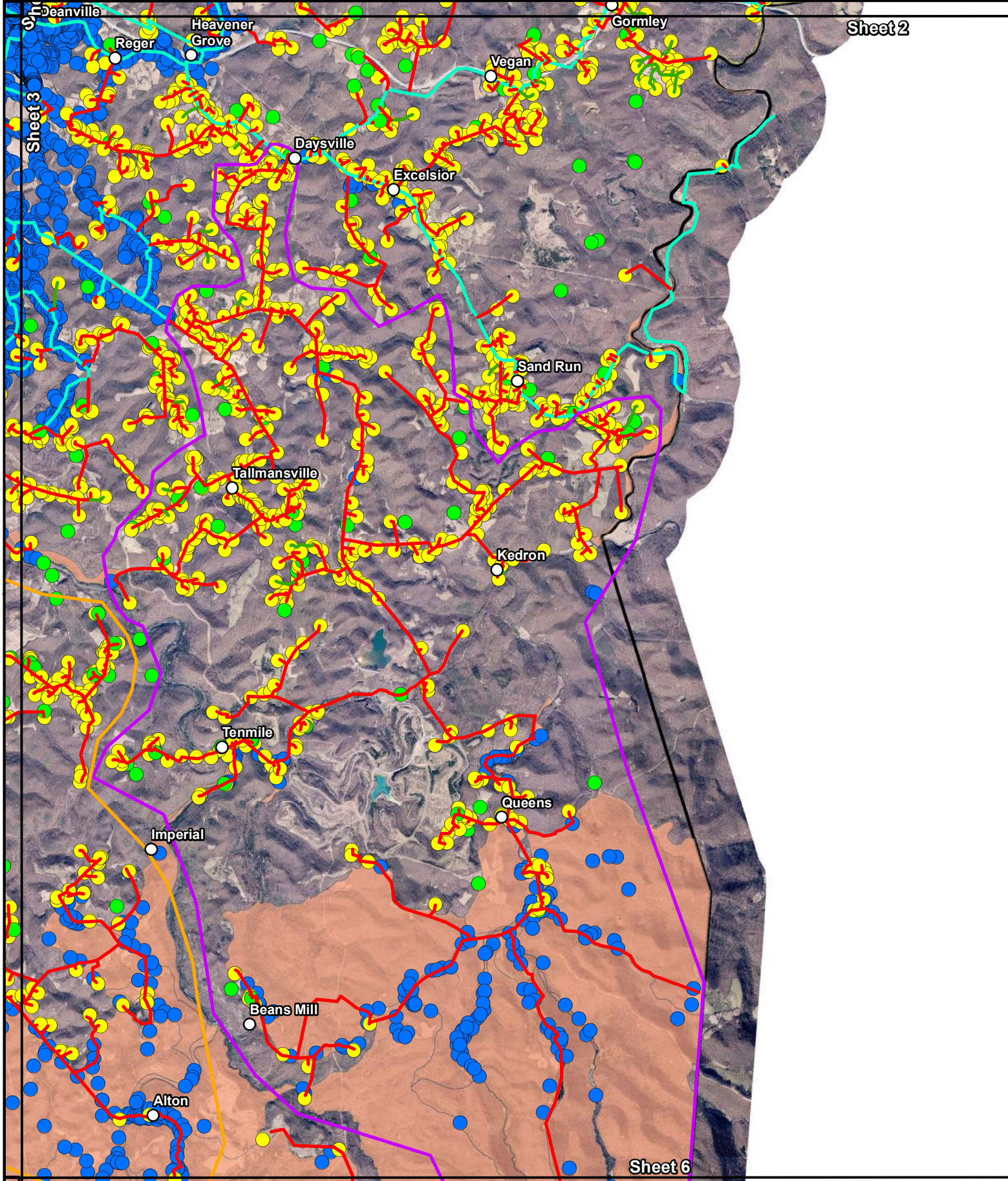
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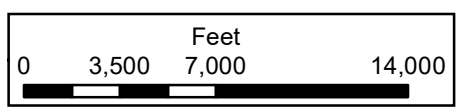
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Starlink Services, LLC - RDOF
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary
- Index



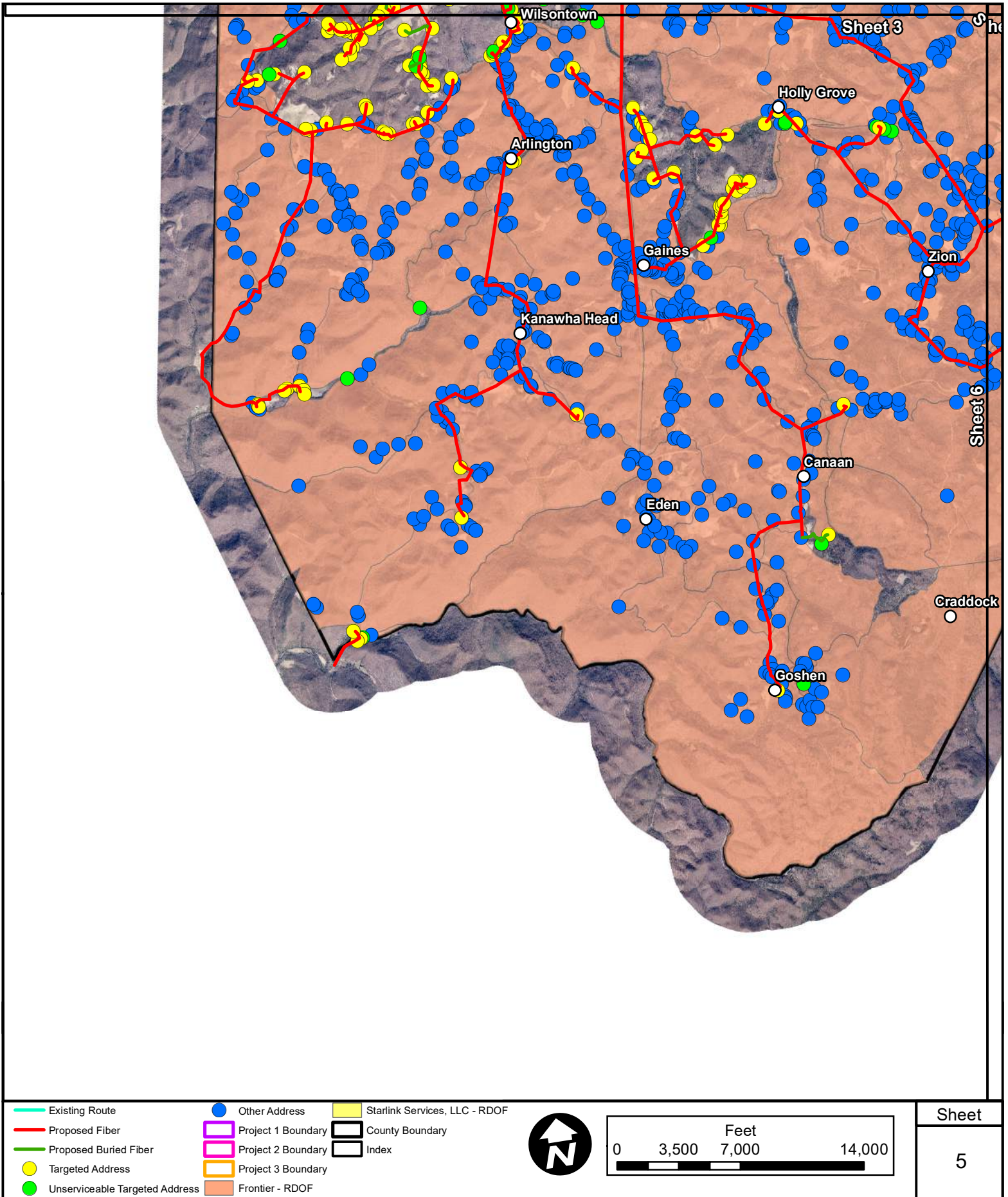
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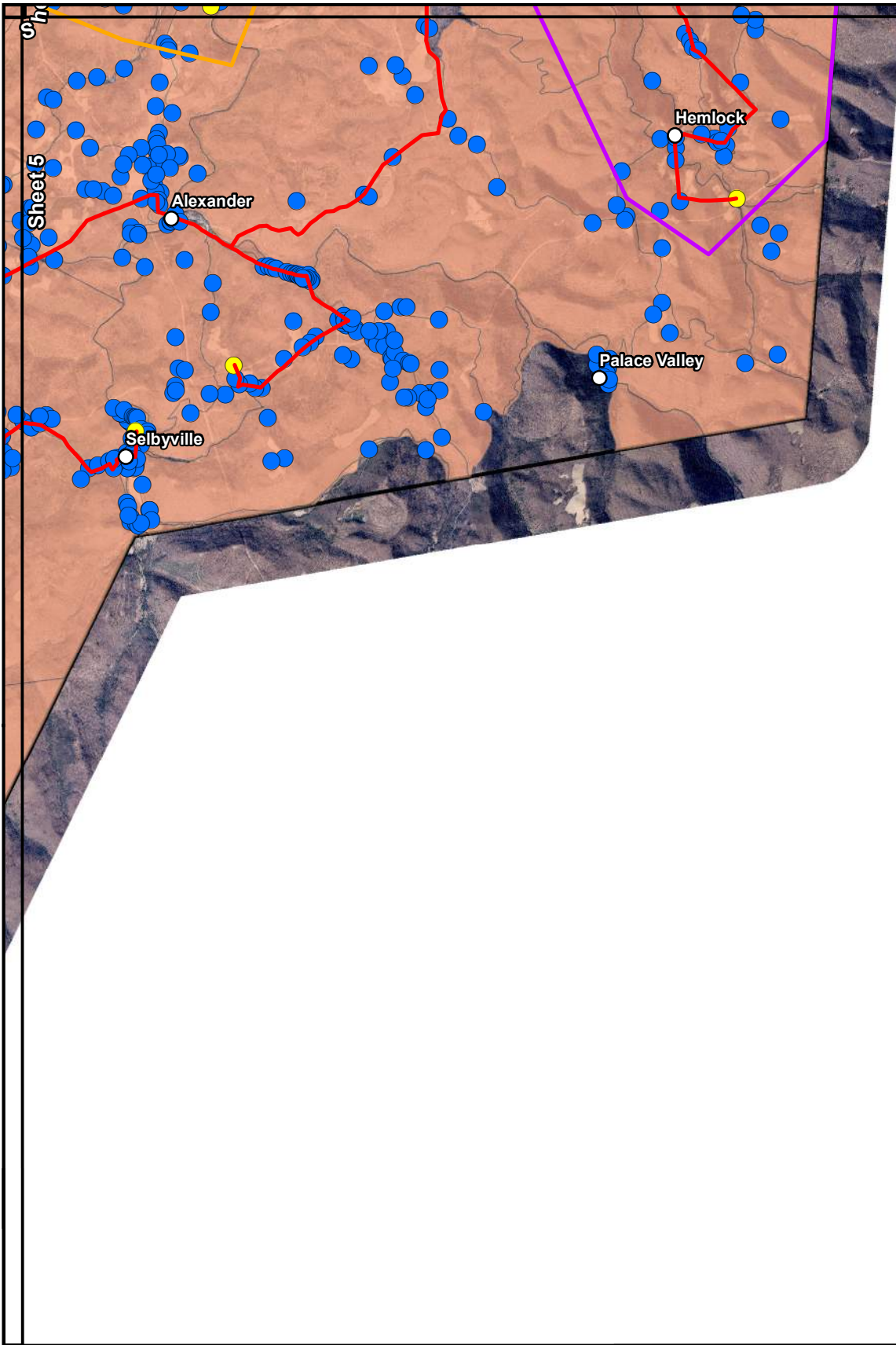


- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary
- Index
- Starlink Services, LLC - RDOF

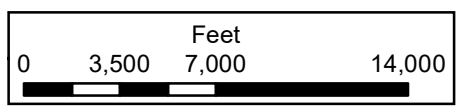


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- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index



Sheet
6

Upshur County, WV – 2023 ROC Study – Cost Estimate – Whole County

Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	456.05	\$2,508,275
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	456.05	\$684,075
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	441.28	\$6,619,200
Aerial Construction Labor	\$50,000.00	Per Mile	441.28	\$22,064,000
Underground Construction Labor	\$150,000.00	Per Mile	14.78	\$2,217,000
Project Construction Contingency 10%	\$2,428,100.00	Lump Sum	1	\$2,428,100
Legal 1.5%	\$364,215.00	Lump Sum	1	\$364,215
Administrative 2%	\$485,620.00	Lump Sum	1	\$485,620
TOTAL COST = \$37,370,485				

COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
7	Upshur	1	509	78.44	\$6,286,485
		2	501	34.63	\$2,799,018
		3	338	48.39	\$3,886,558

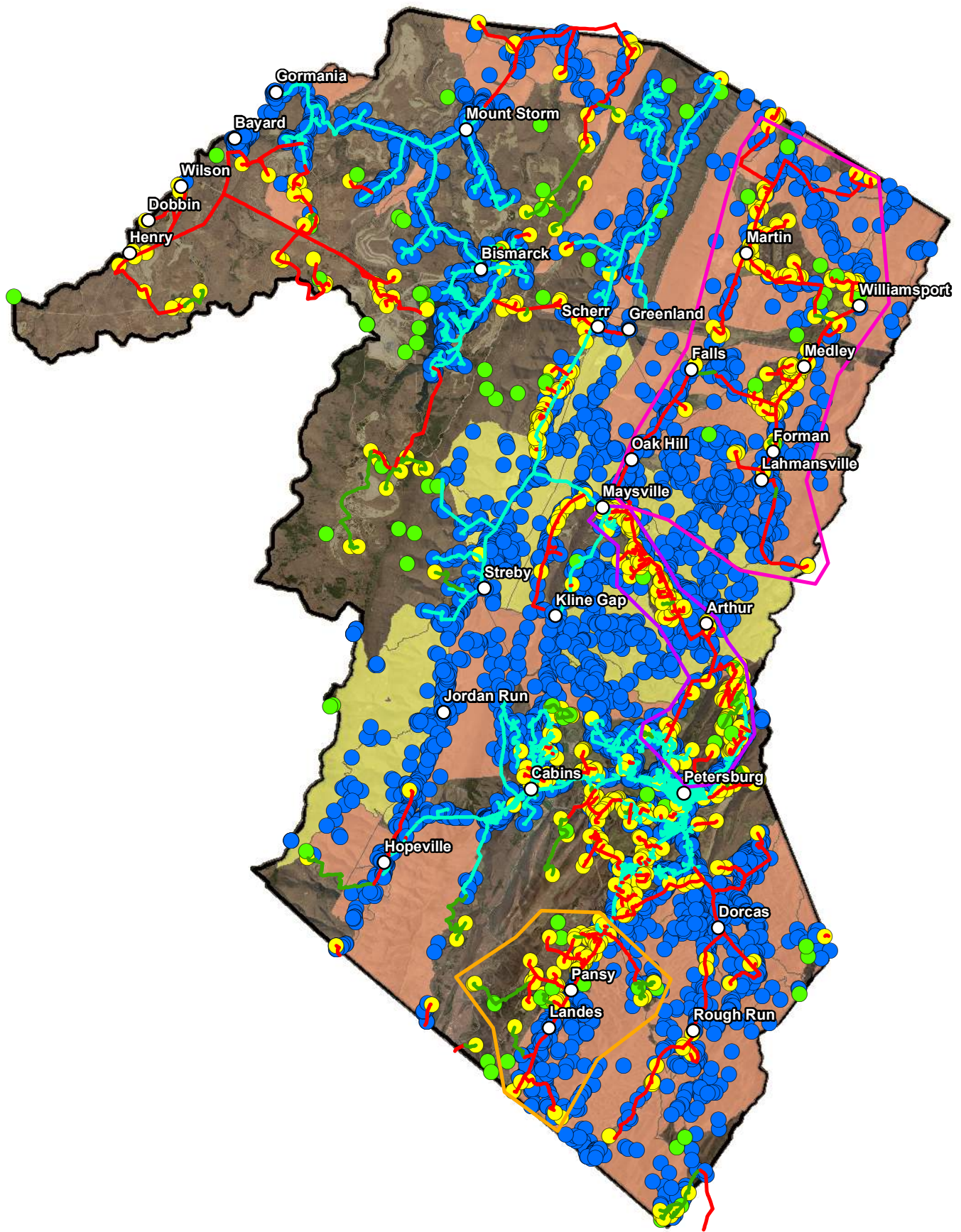
REGION 8

Grant, Hampshire, Hardy,
Mineral, and Pendleton Counties





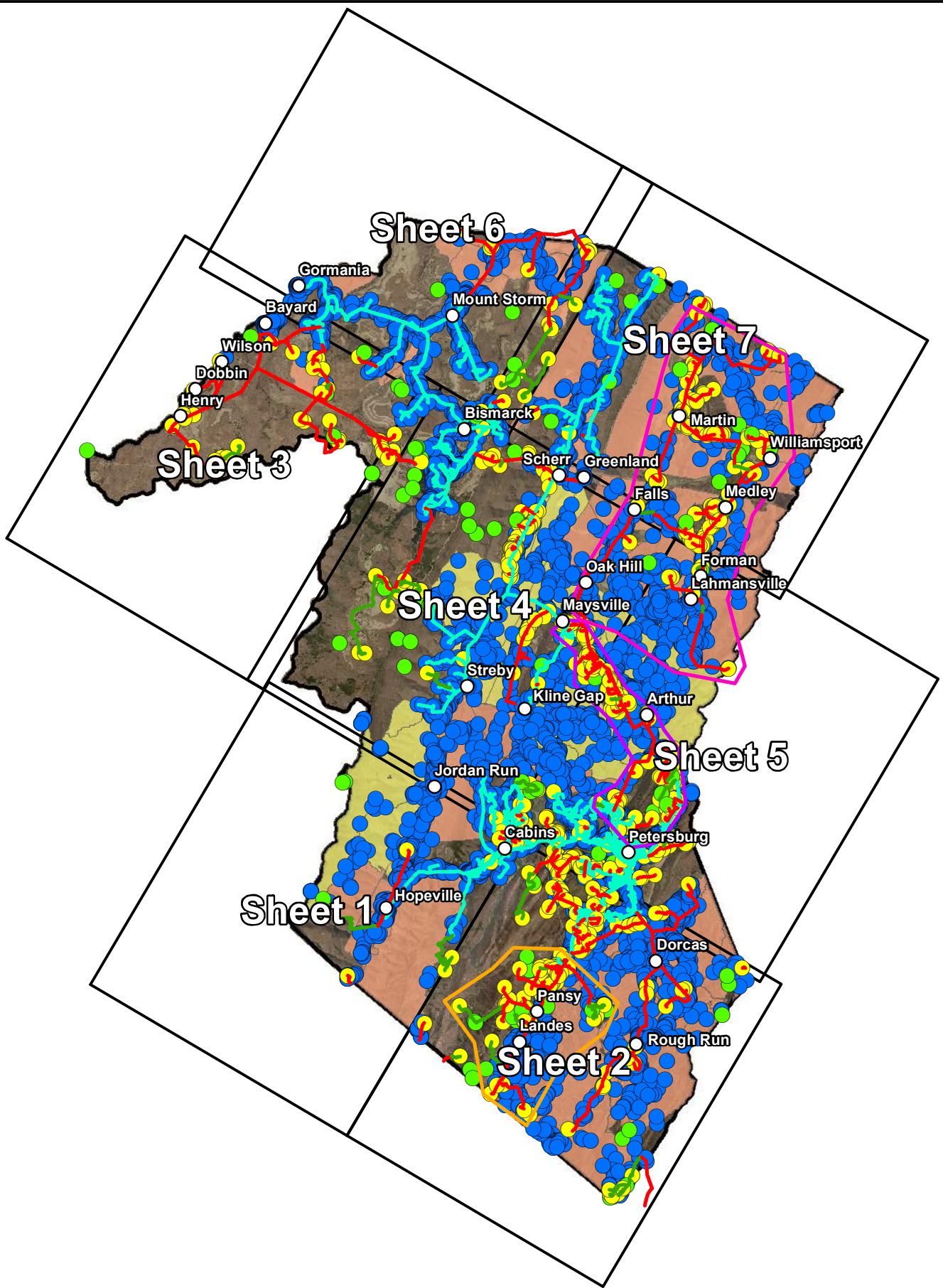
GRANT COUNTY



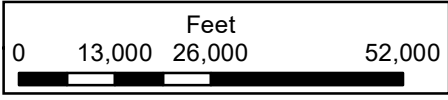
Existing Route	Other Address	Micrologic Inc. - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Feet

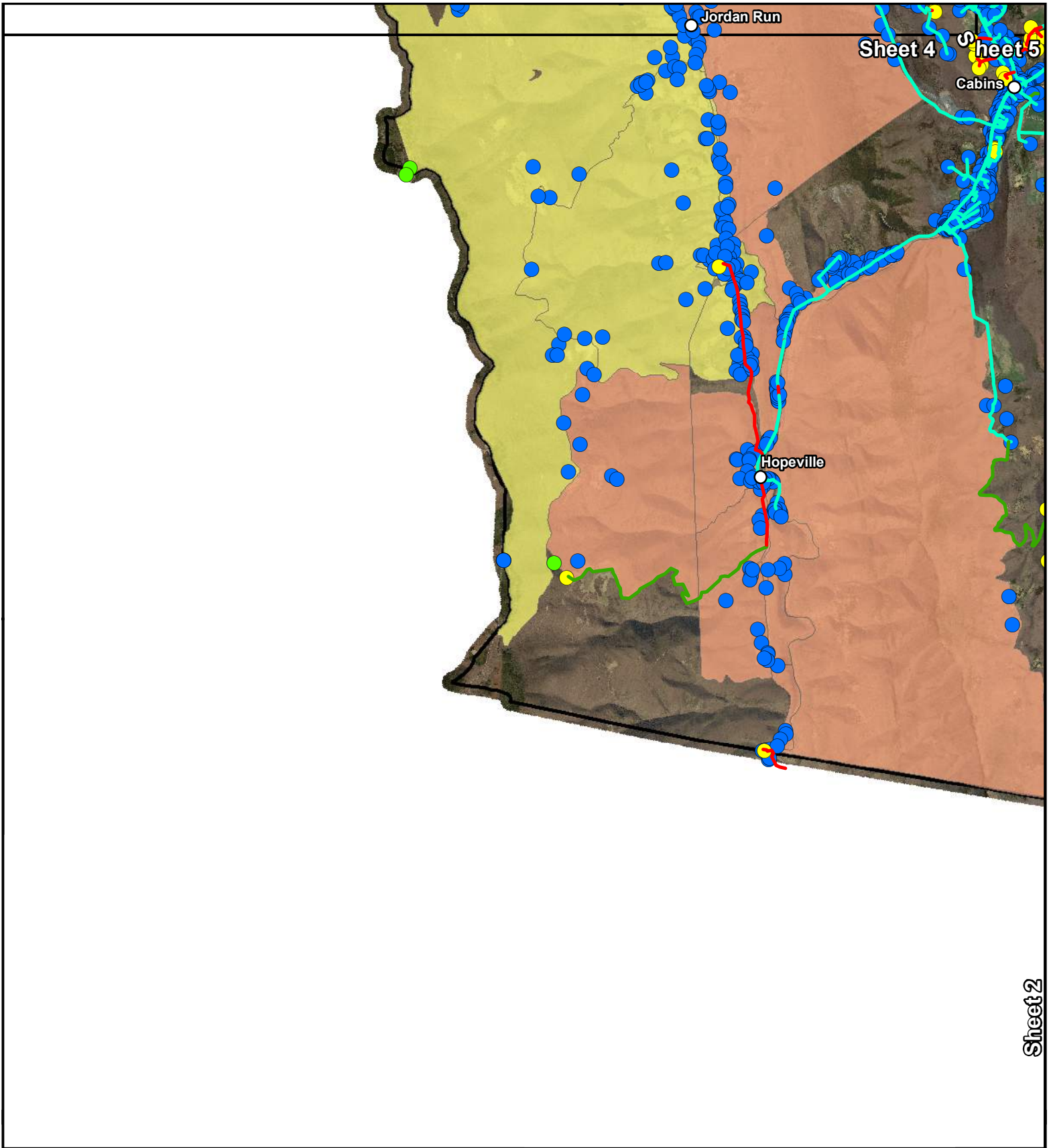
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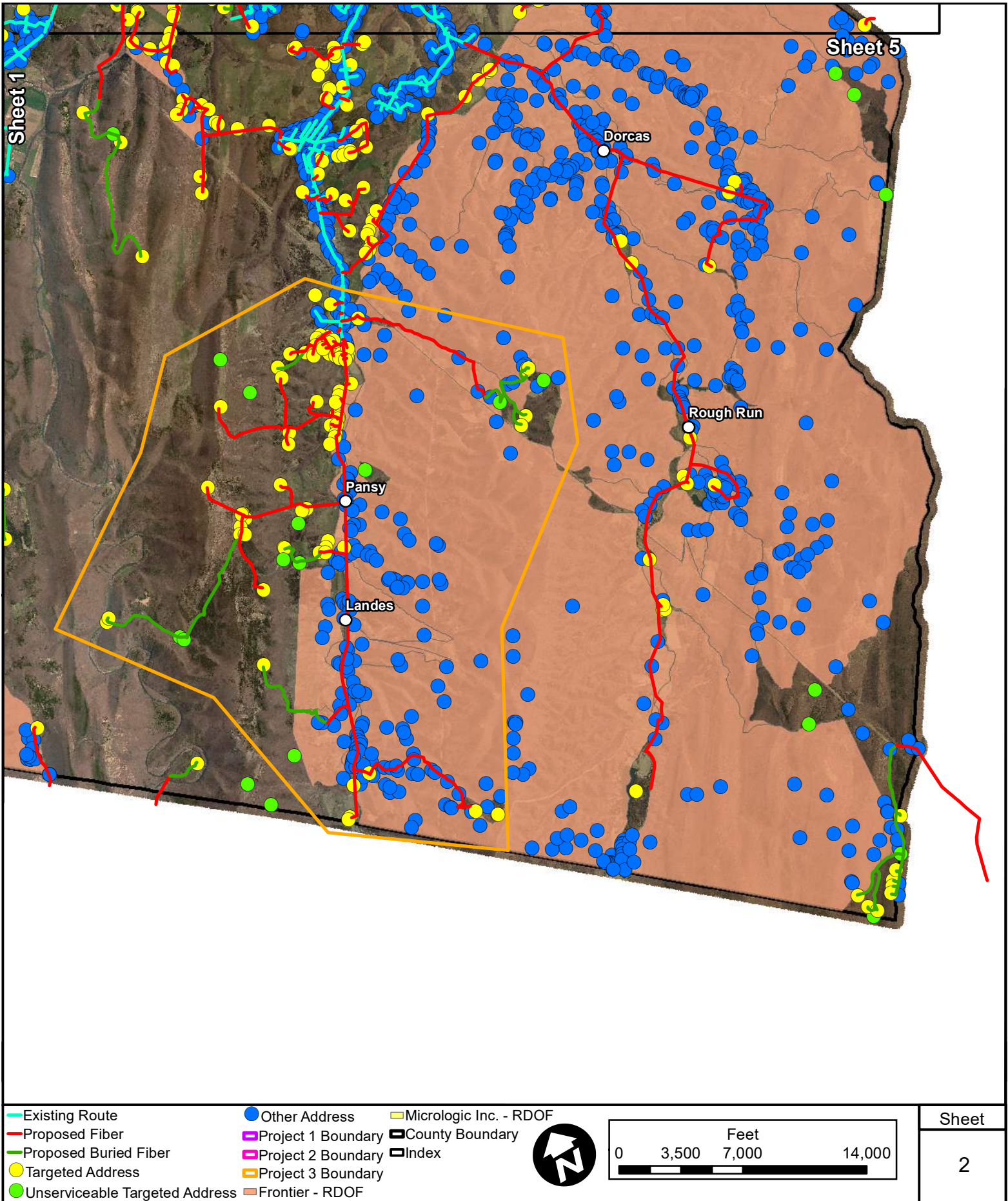
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary
- Index

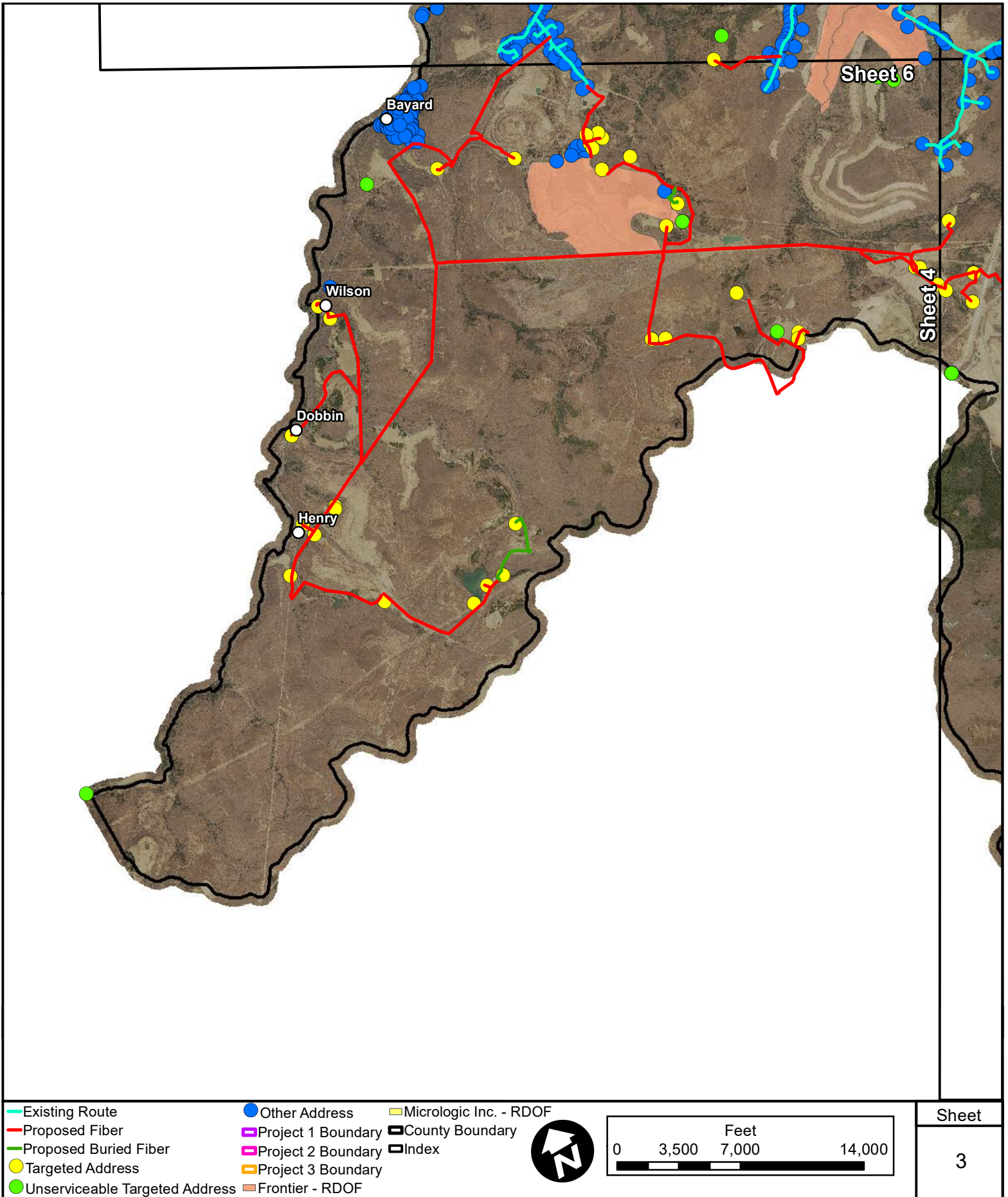


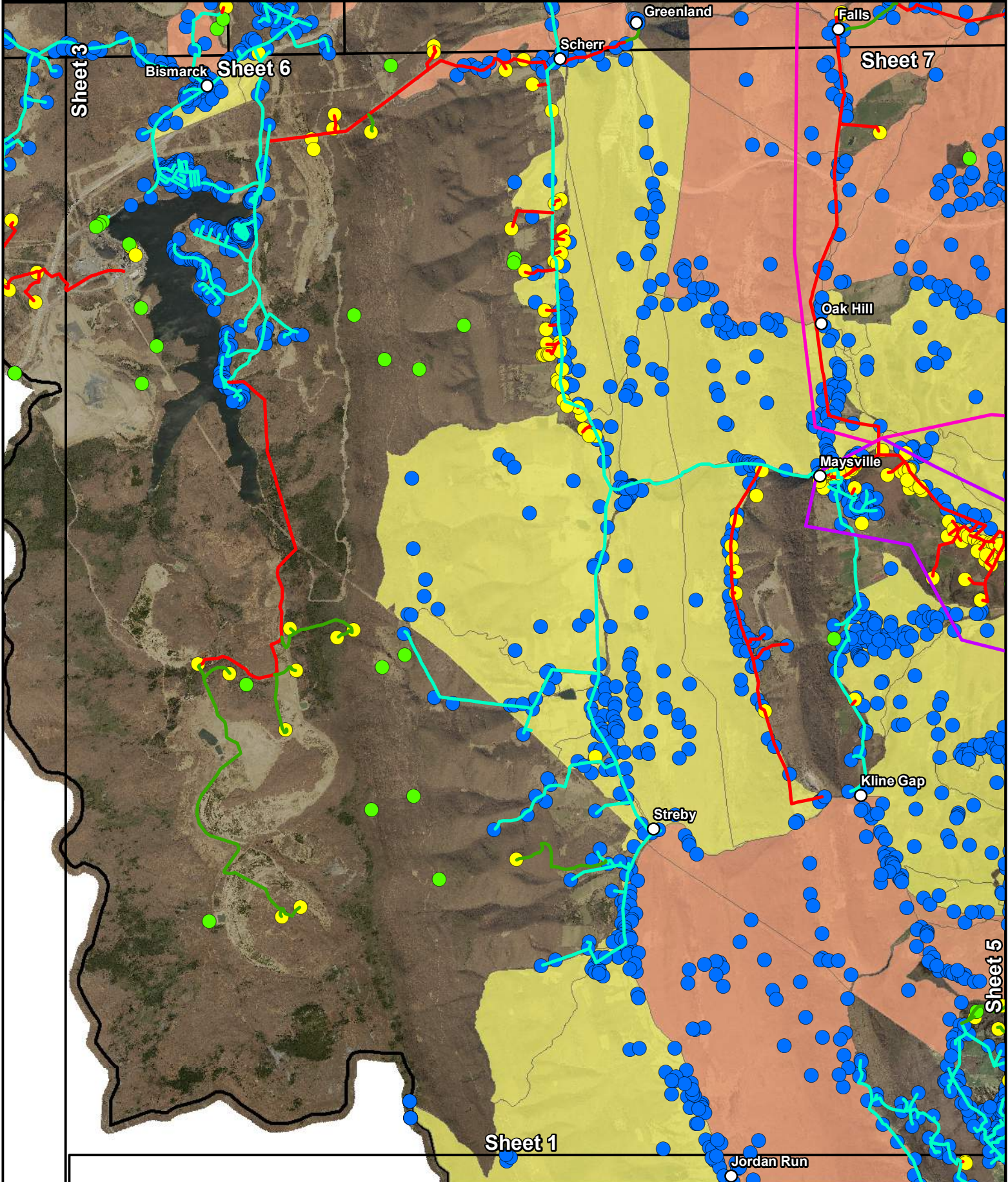
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INDEX



Existing Route	Other Address	Micrologic Inc. - RDOF			Sheet
Proposed Fiber	Project 1 Boundary	County Boundary			1
Proposed Buried Fiber	Project 2 Boundary	Index			
Targeted Address	Project 3 Boundary	Frontier - RDOF			
Unserviceable Targeted Address					







Existing Route	Other Address	Micrologic Inc. - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	



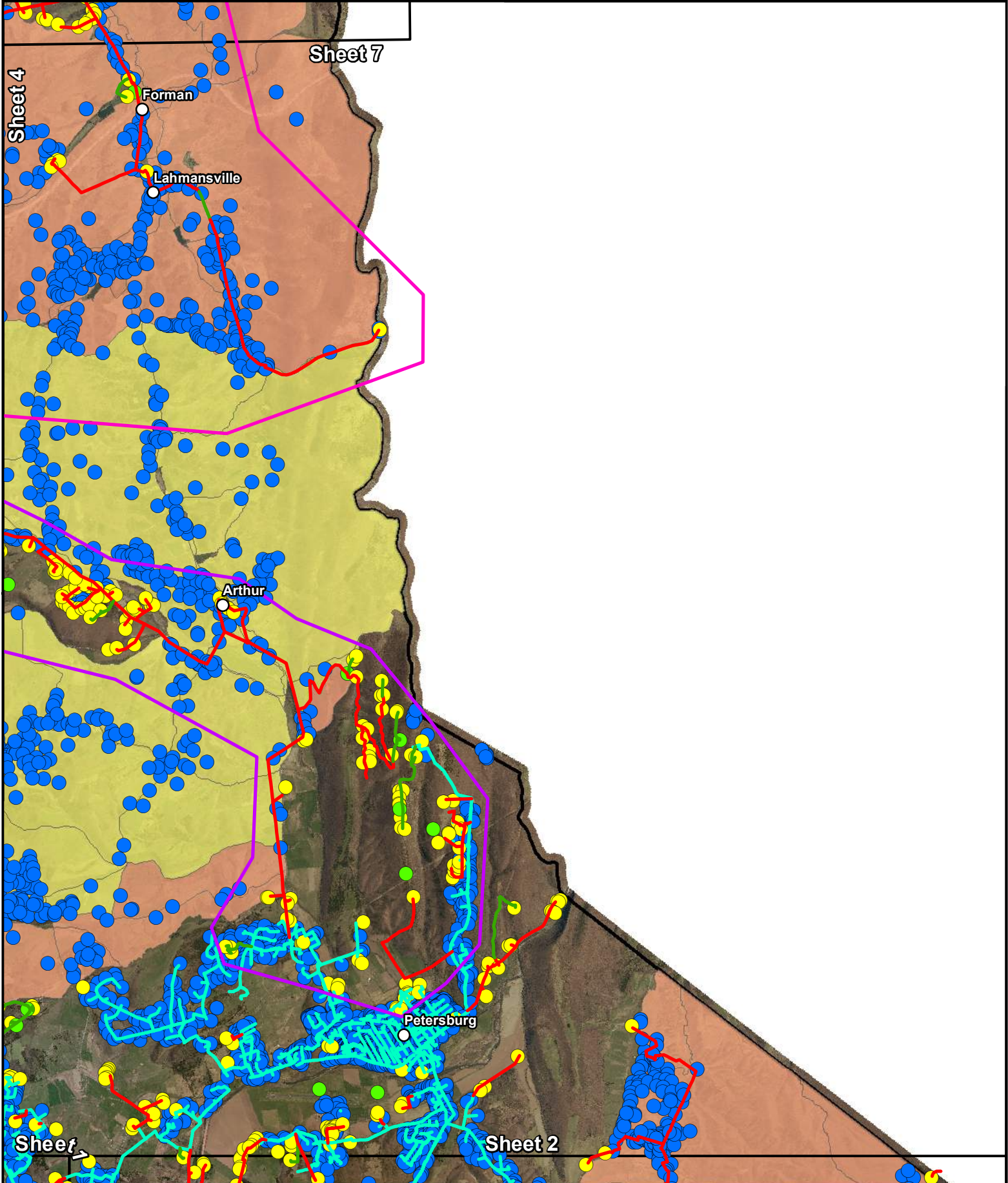
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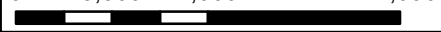


Existing Route	Other Address	Micrologic Inc. - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

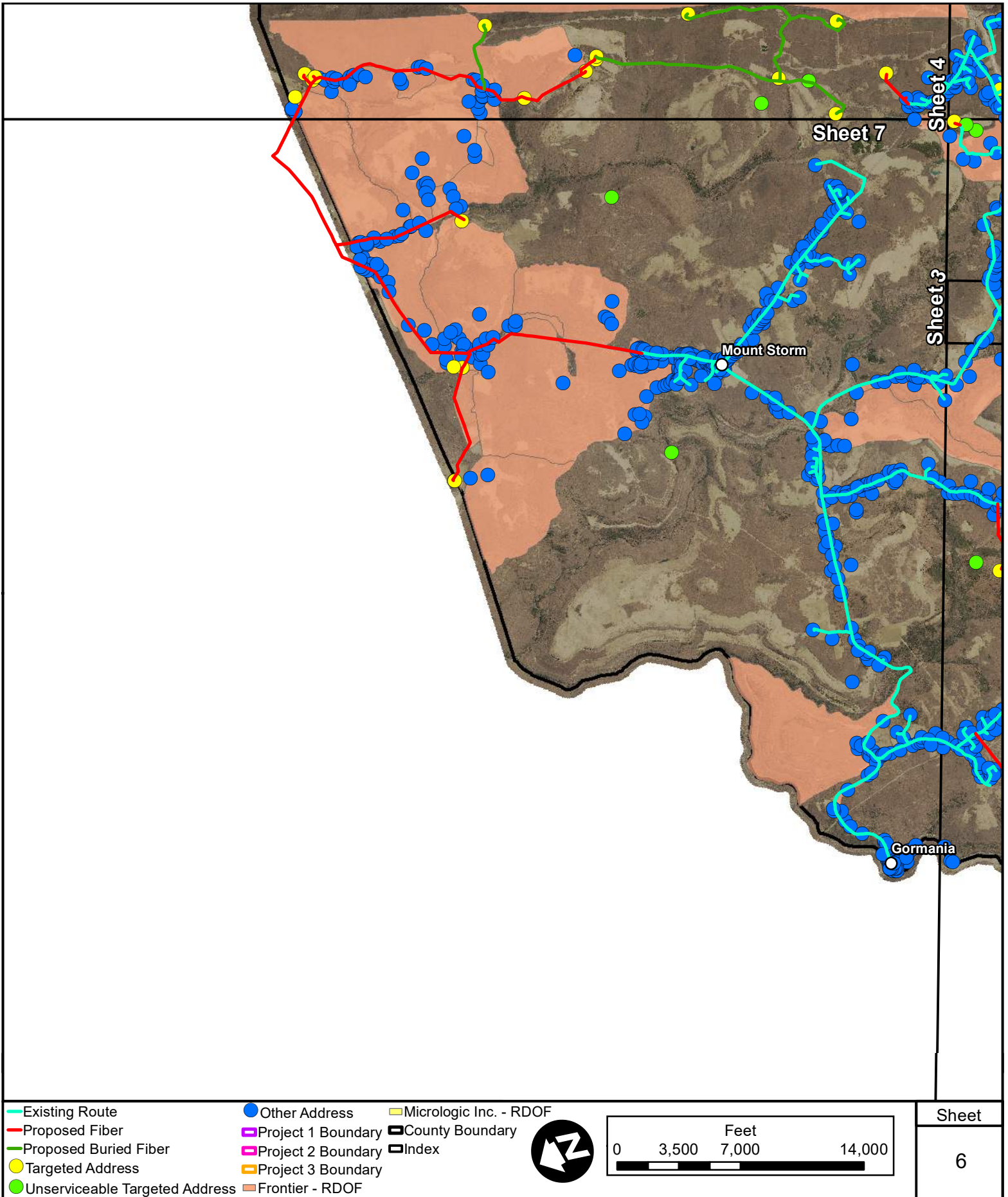


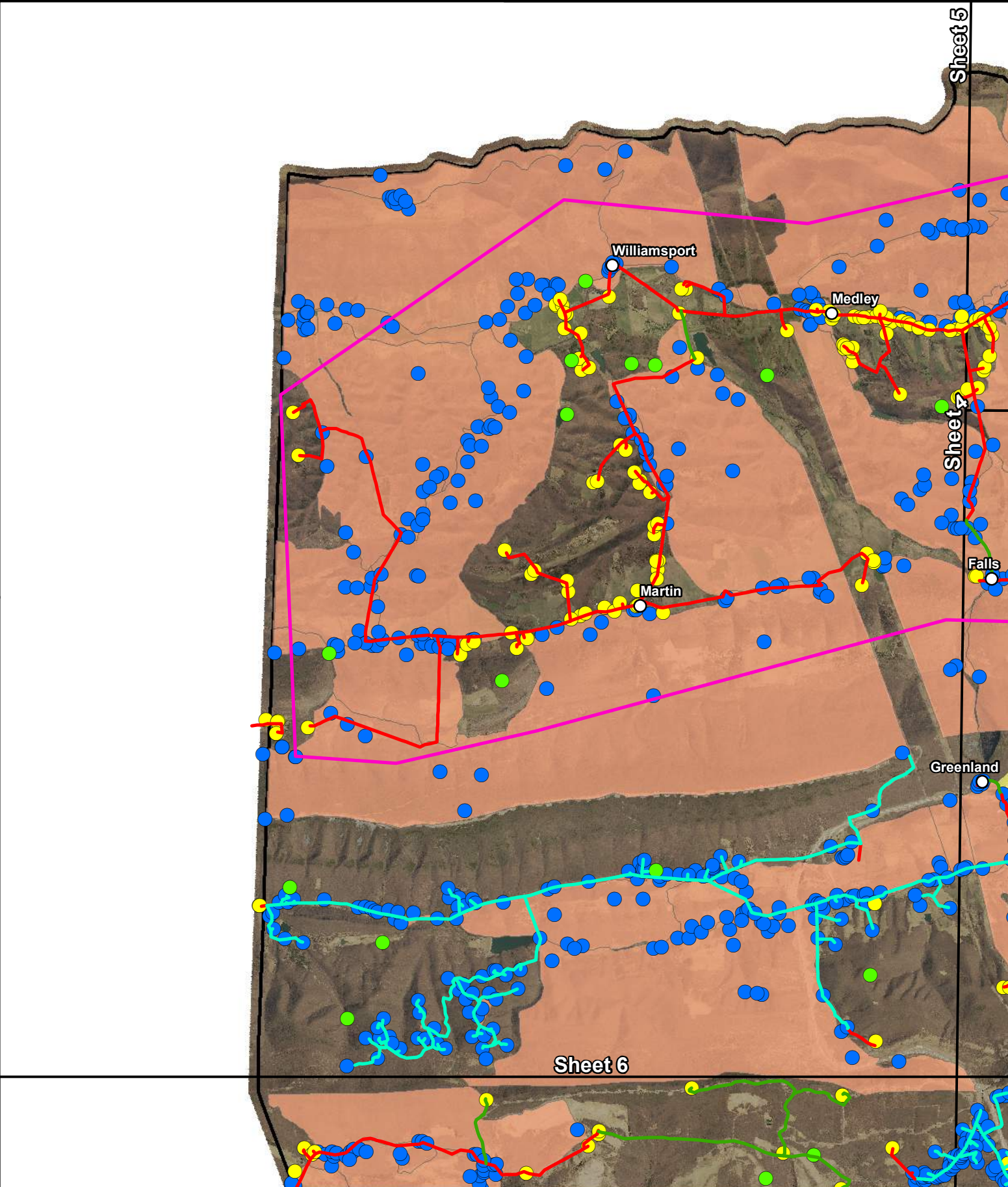
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Existing Route	Other Address	Micrologic Inc. - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Feet

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Sheet

7

Grant County, WV – 2023 ROC Study – Cost Estimate – Whole County

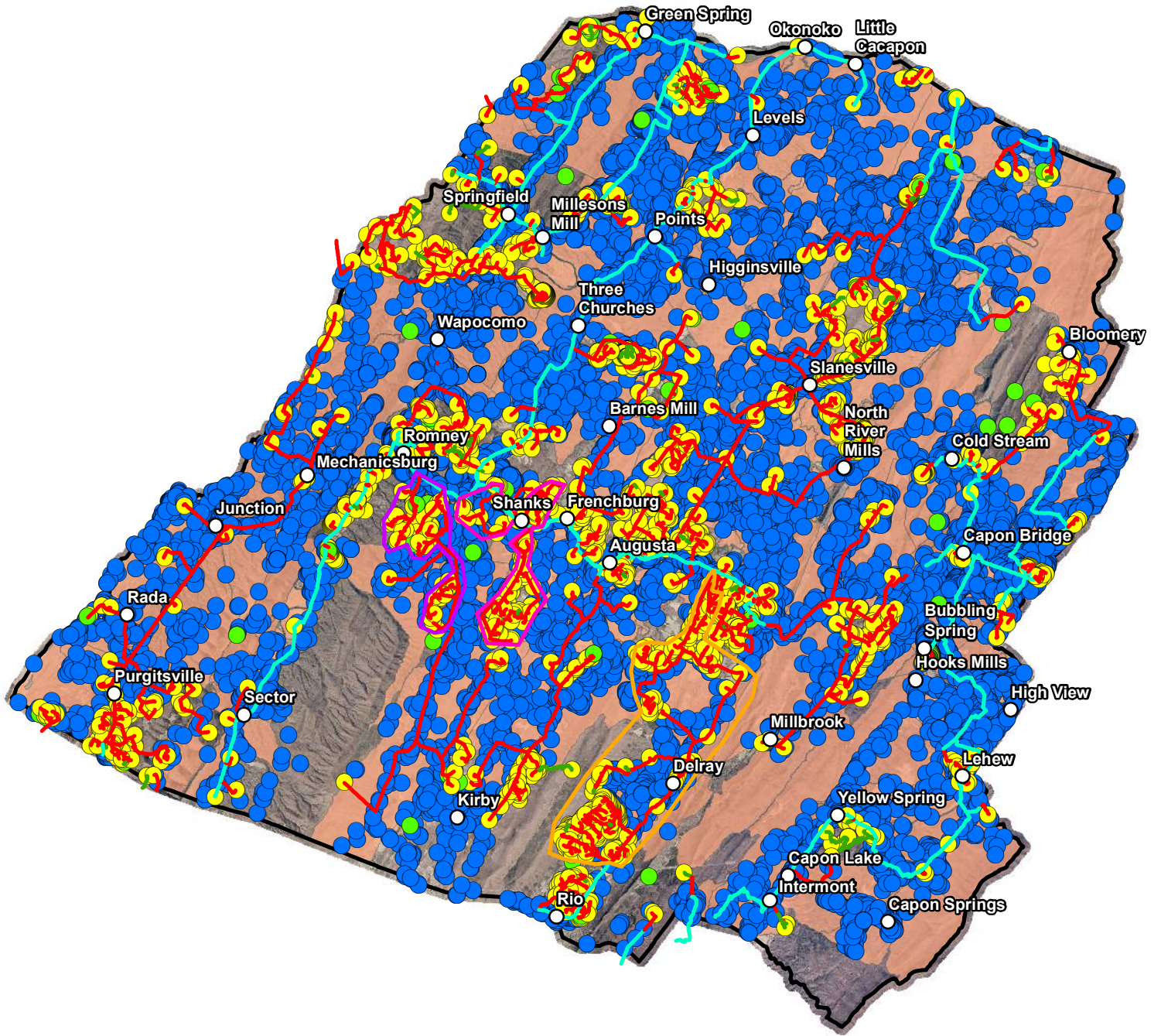
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	234.30	\$1,288,650
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	234.30	\$351,450
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	191.51	\$2,872,800
Aerial Construction Labor	\$50,000.00	Per Mile	191.52	\$9,576,000
Underground Construction Labor	\$150,000.00	Per Mile	42.78	\$6,417,000
Project Construction Contingency 10%	\$1,599,300.00	Lump Sum	1	\$1,599,300
Legal 1.5%	\$239,895.00	Lump Sum	1	\$239,895
Administrative 2%	\$319,860.00	Lump Sum	1	\$319,860
TOTAL COST = \$22,664,955				

COUNTY SAMPLE PROJECT

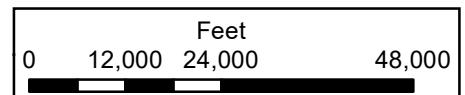
Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
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		2	119	45.08	\$3,734,245
		3	78	23.04	\$2,419,190

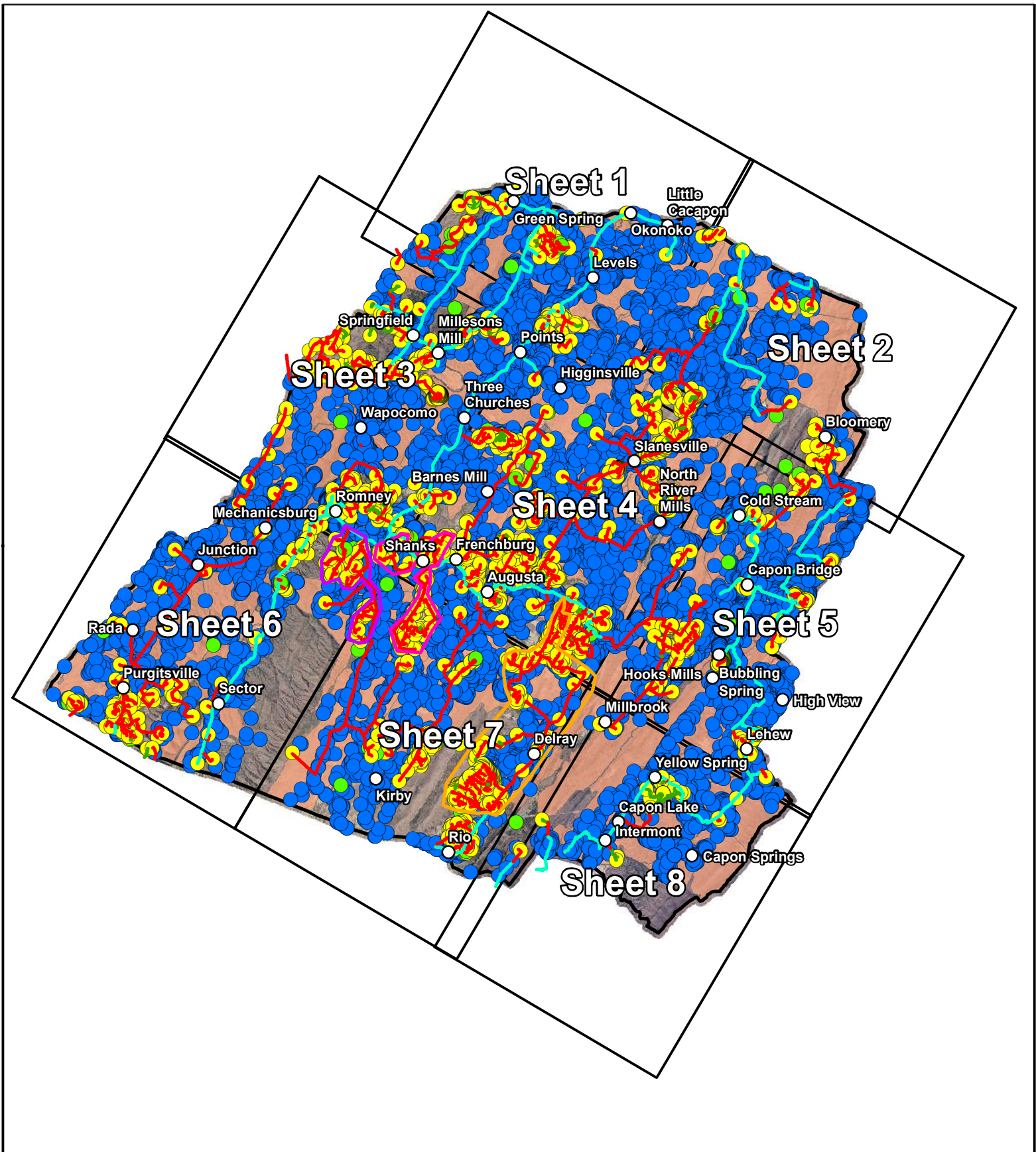



HAMPSHIRE COUNTY

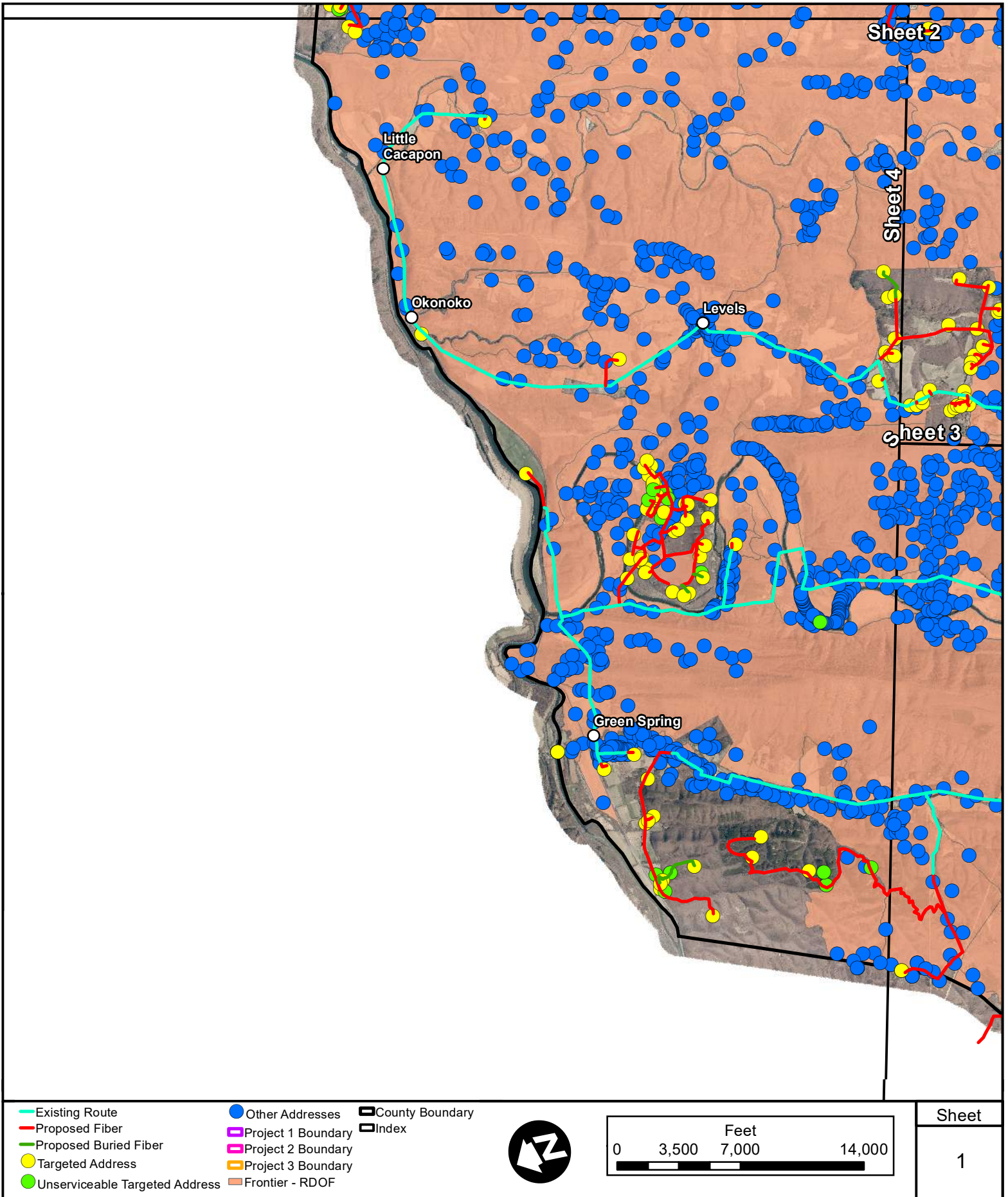


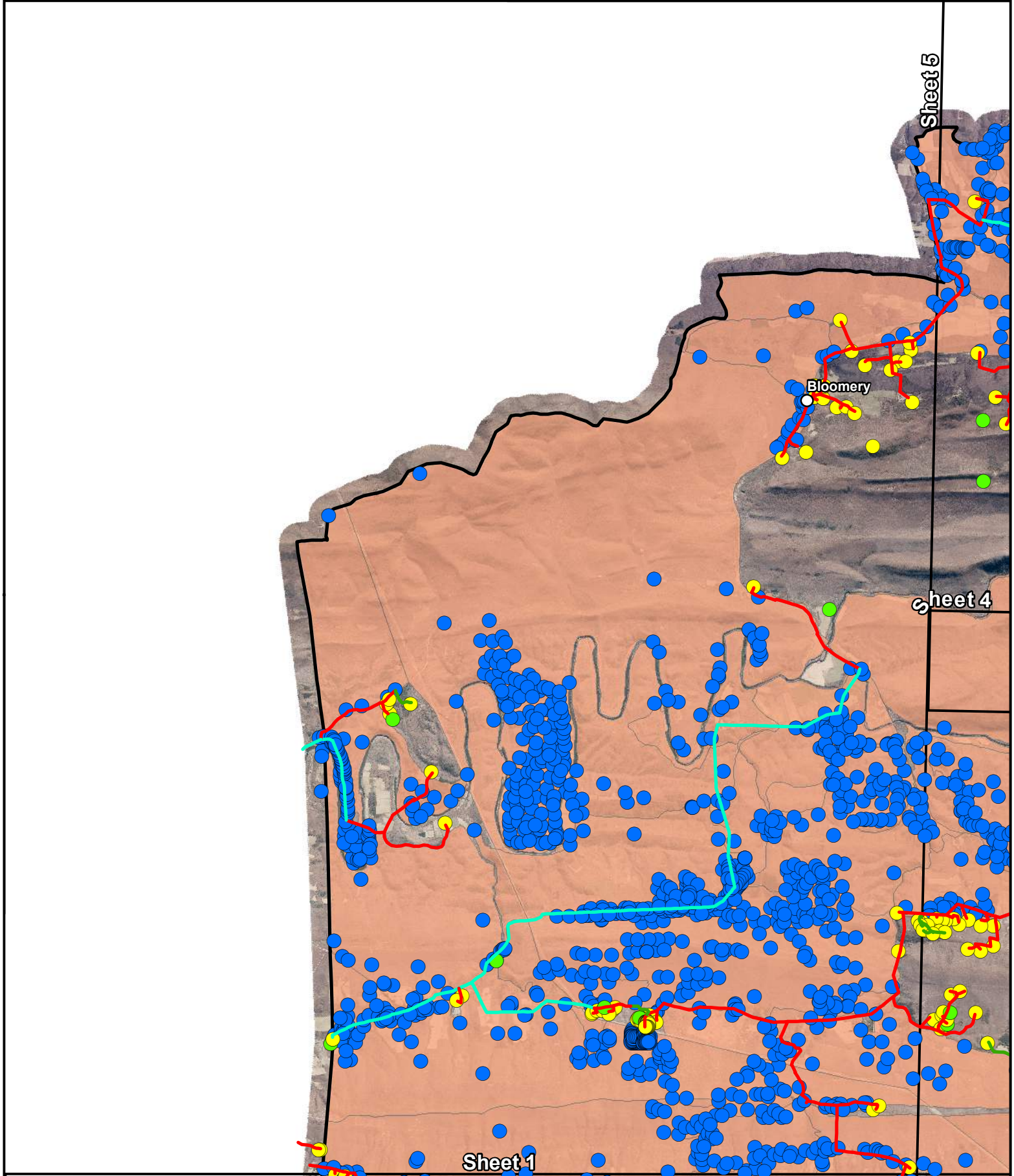
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary





<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses Project 1 Boundary Project 2 Boundary Project 3 Boundary Frontier - RDOF 	<ul style="list-style-type: none"> County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="width: 33%;">0</td> <td style="width: 33%;">14,000</td> <td style="width: 33%;">28,000</td> <td style="width: 33%;">56,000</td> </tr> </table>	Feet				0	14,000	28,000	56,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td>INDEX</td> </tr> </table>	Sheet	INDEX
Feet															
0	14,000	28,000	56,000												
Sheet															
INDEX															



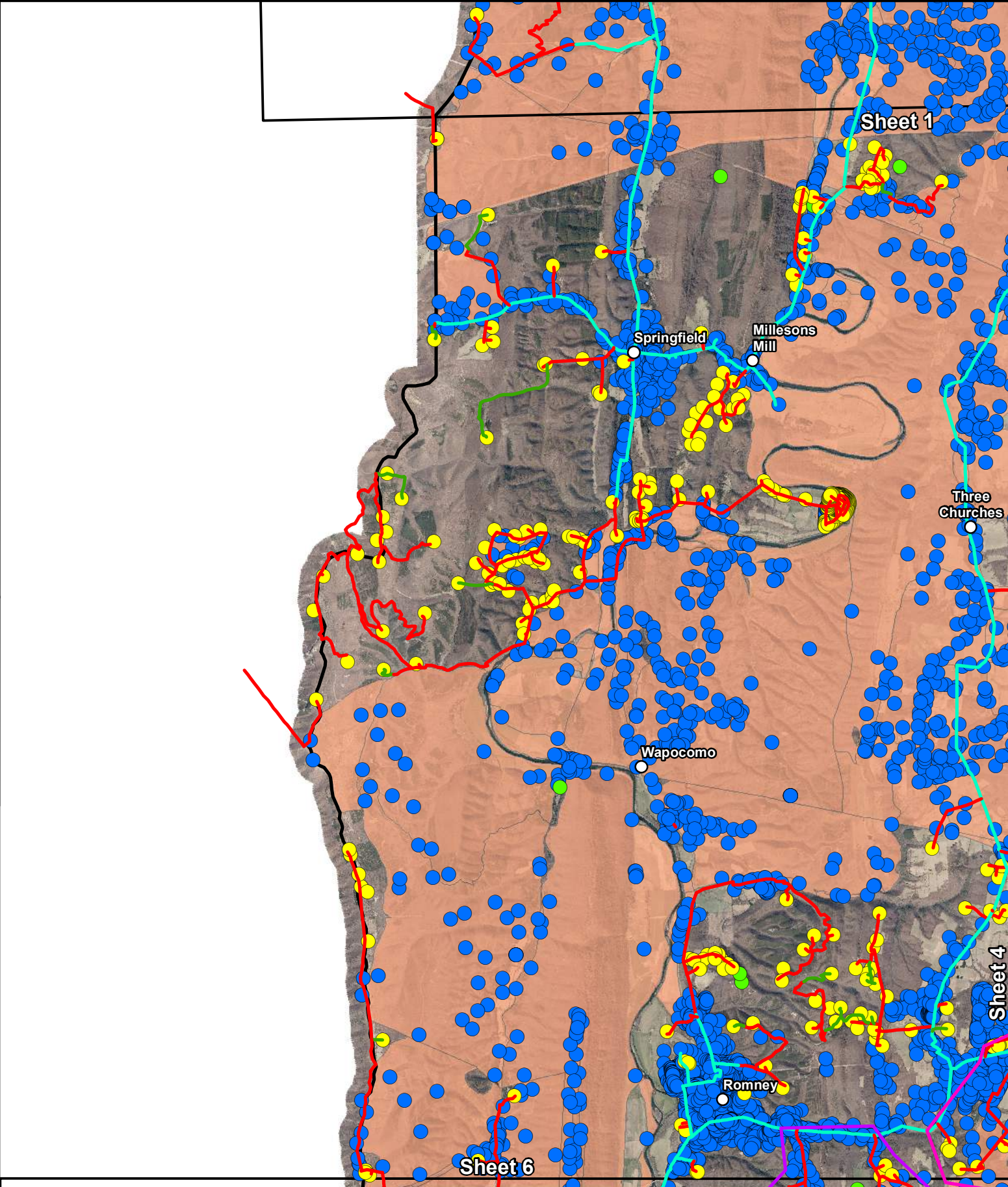


Existing Route	Other Addresses	County Boundary
Proposed Fiber	Project 1 Boundary	Index
Proposed Buried Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

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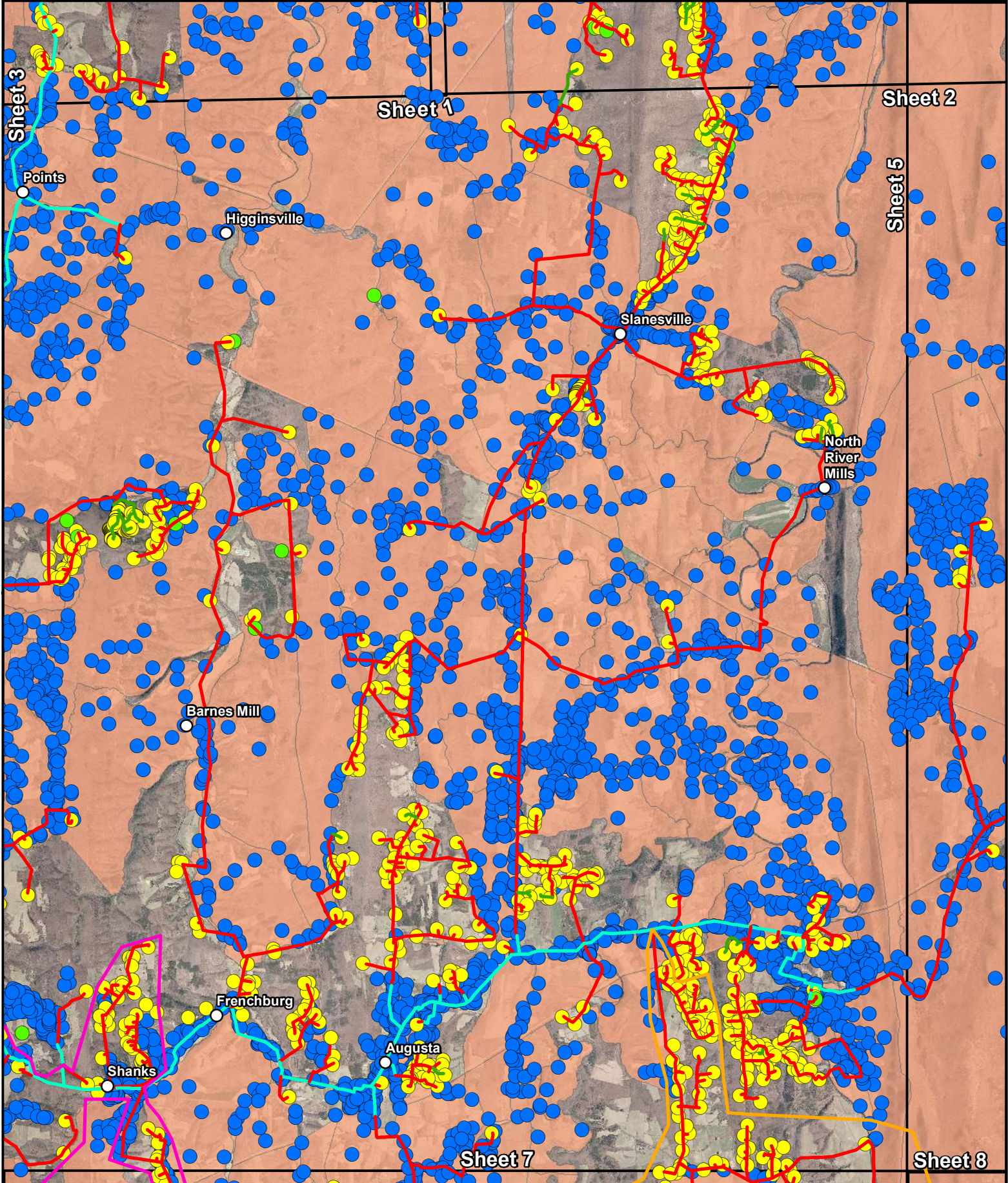


Existing Route	Other Addresses	County Boundary
Proposed Fiber	Project 1 Boundary	Index
Proposed Buried Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	


Feet

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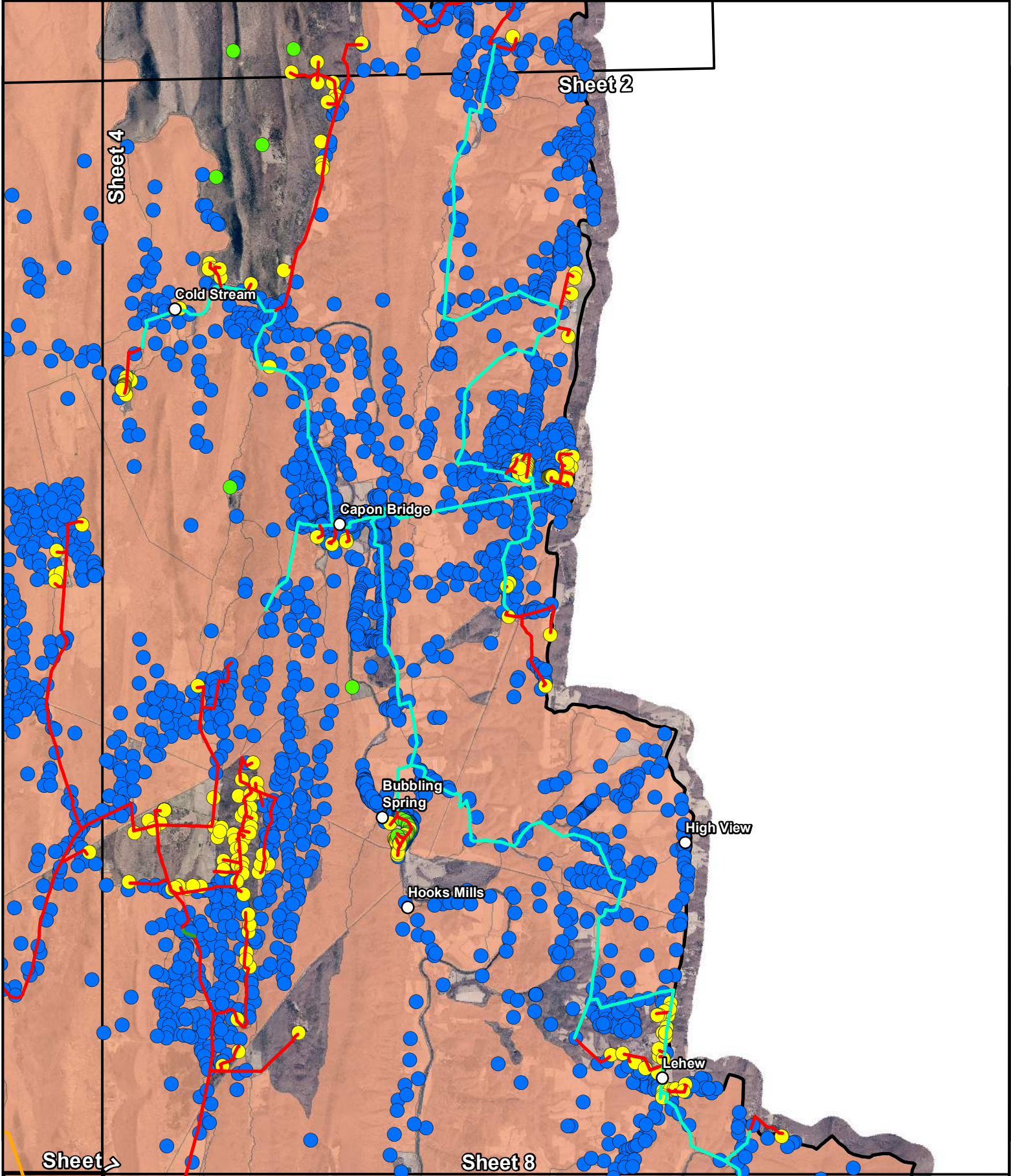


Existing Route	Other Addresses	County Boundary
Proposed Fiber	Project 1 Boundary	Index
Proposed Buried Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

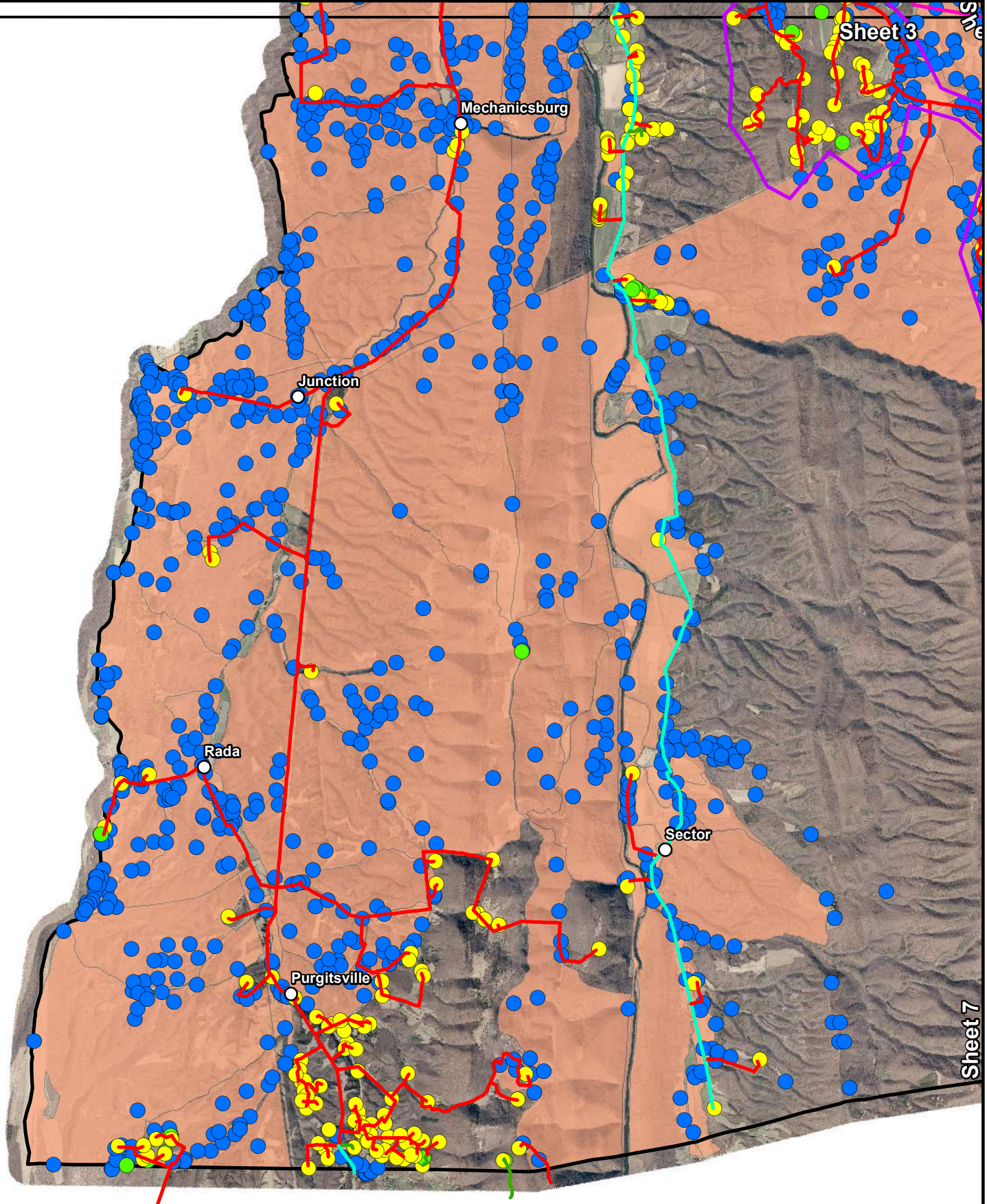


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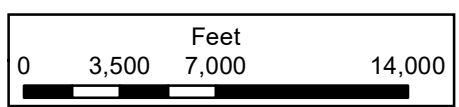
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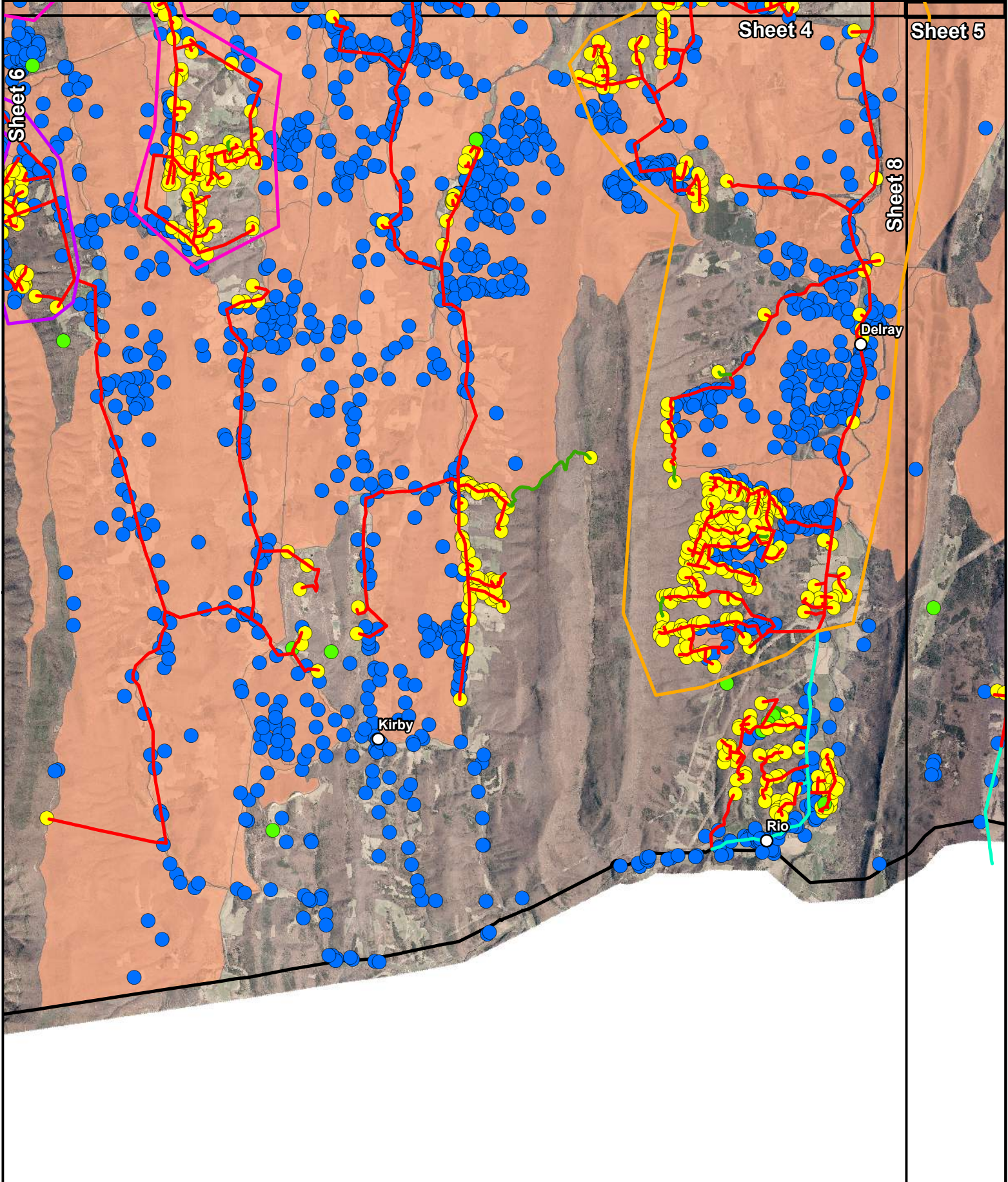
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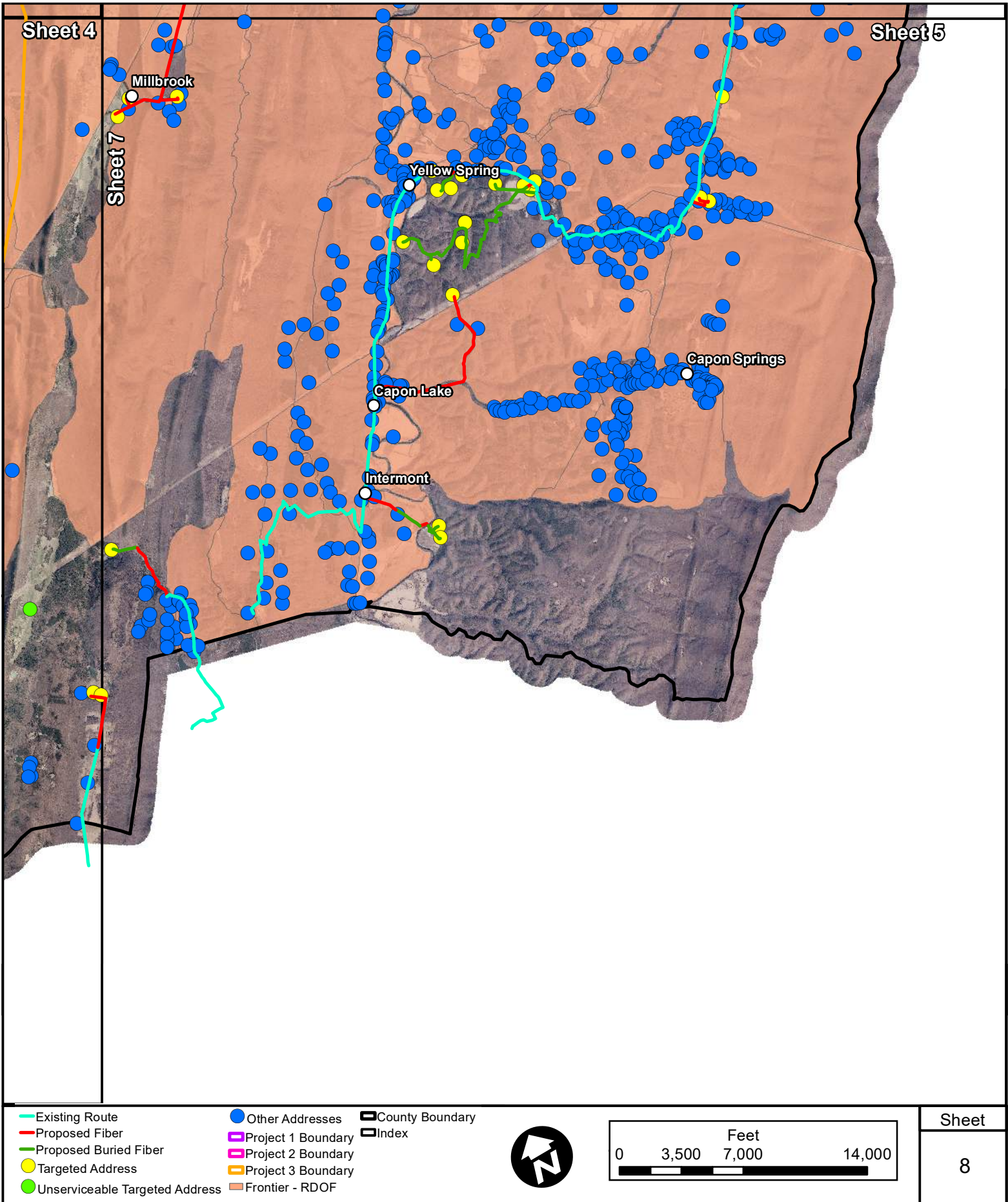
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary
- Index



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<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses Project 1 Boundary Project 2 Boundary Project 3 Boundary Frontier - RDOF 	<ul style="list-style-type: none"> County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">3,500</td> <td style="text-align: center;">7,000</td> <td style="text-align: center;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td style="text-align: center;">7</td> </tr> </table>	Sheet	7
Feet															
0	3,500	7,000	14,000												
Sheet															
7															



Hampshire County, WV – 2023 ROC Study – Cost Estimate – Whole County

Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	422.95	\$2,326,225
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	422.95	\$634,425
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	403.46	\$6,051,900
Aerial Construction Labor	\$50,000.00	Per Mile	403.46	\$20,173,000
Underground Construction Labor	\$150,000.00	Per Mile	19.49	\$2,923,500
Project Construction Contingency 10%	\$2,309,650.00	Lump Sum	1	\$2,309,650
Legal 1.5%	\$346,447.50	Lump Sum	1	\$346,448
Administrative 2%	\$461,930.00	Lump Sum	1	\$461,930

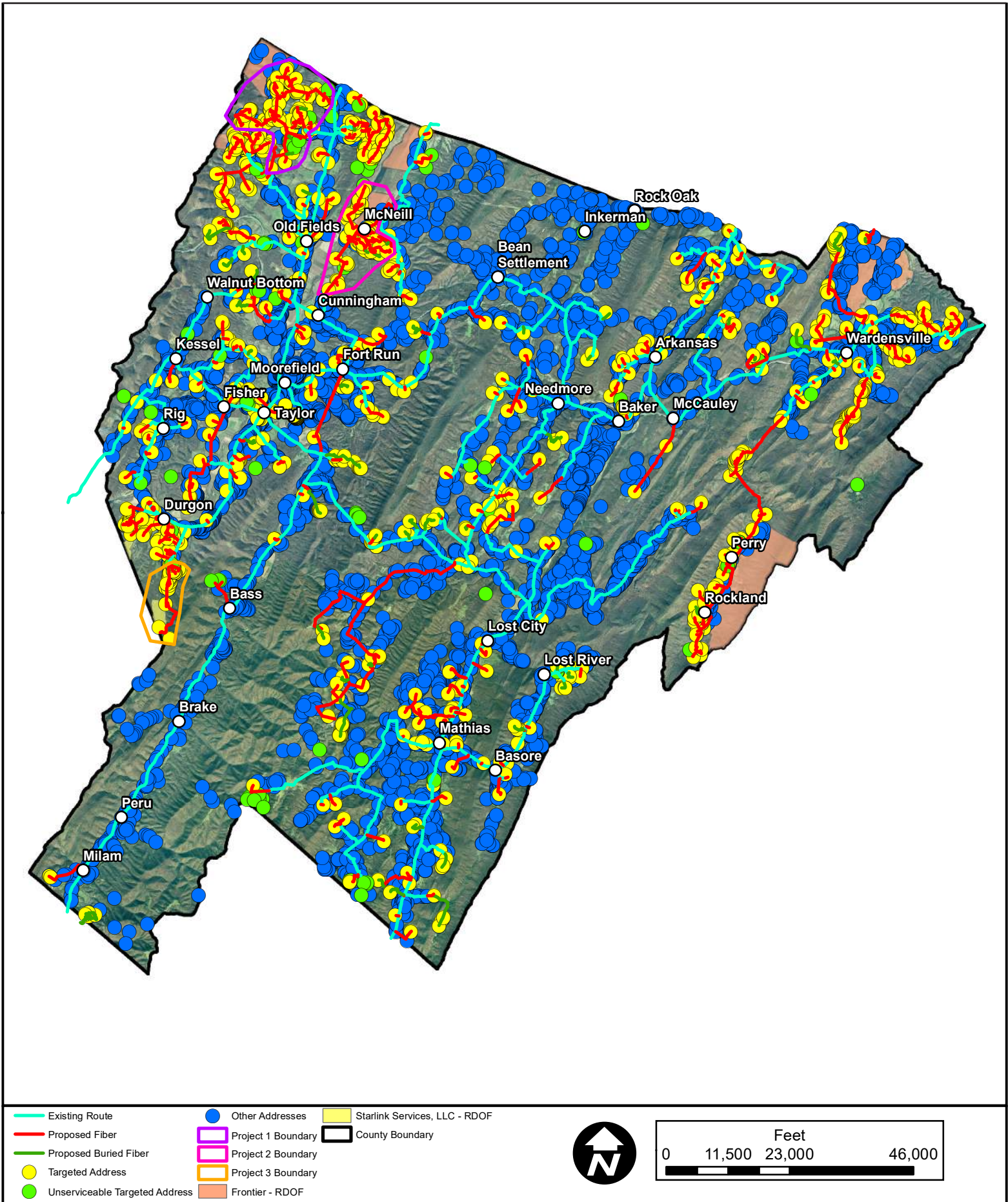
TOTAL COST = \$35,227,078

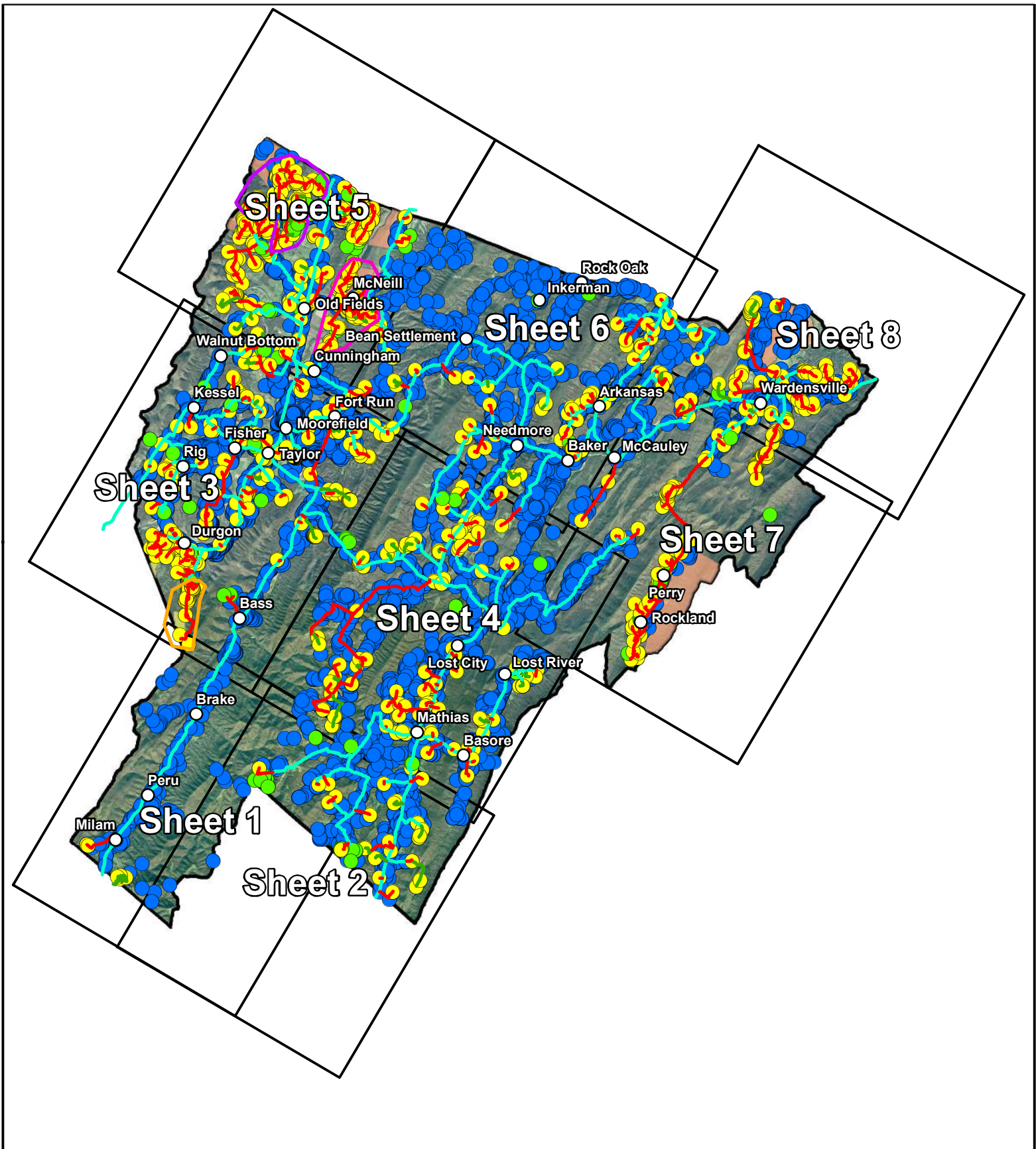
COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
8	Hampshire	1	65	16.68	\$1,313,550
		2	154	20.69	\$1,639,188
		3	288	44.38	\$3,555,995



HARDY COUNTY



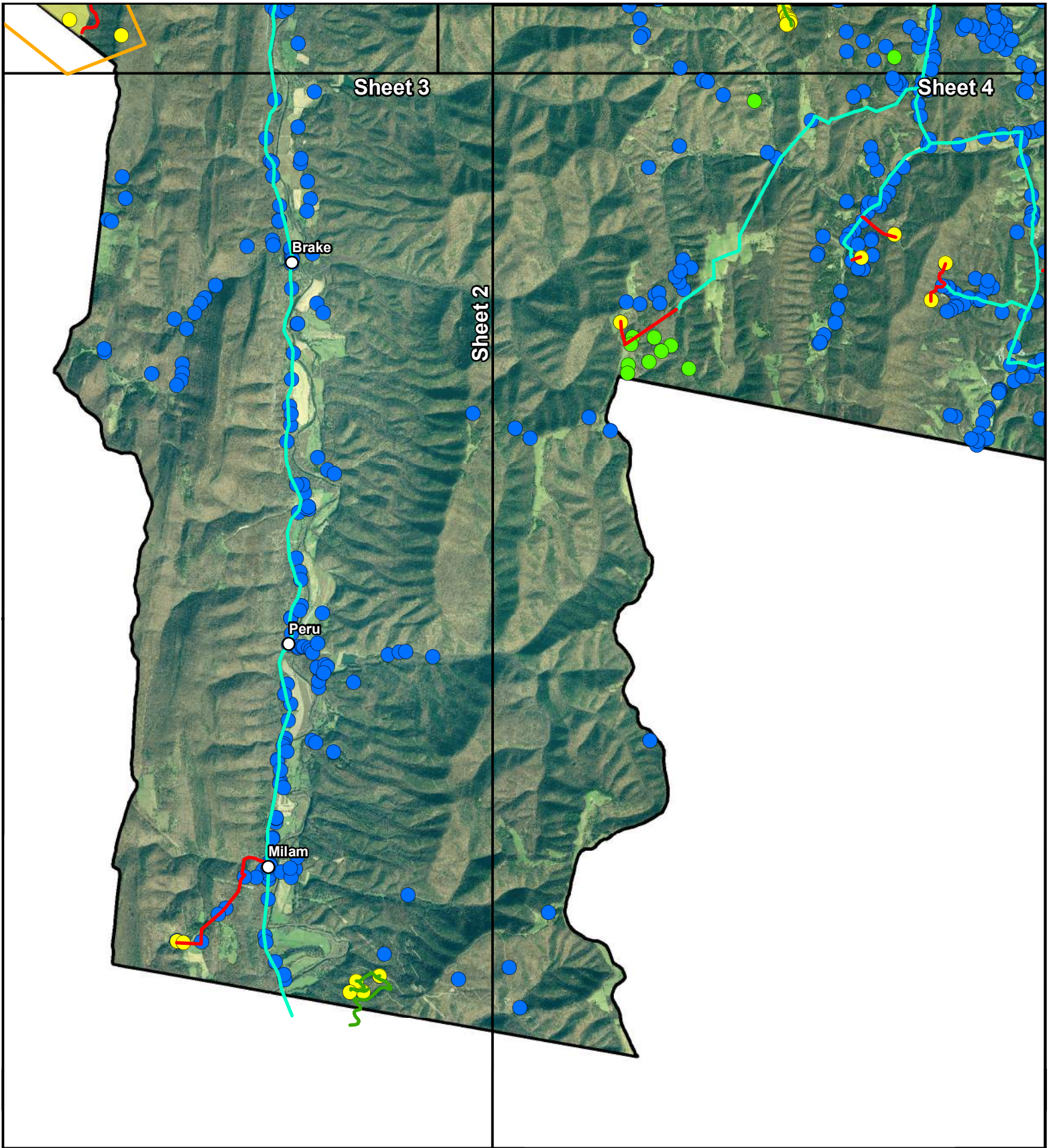


Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Feet

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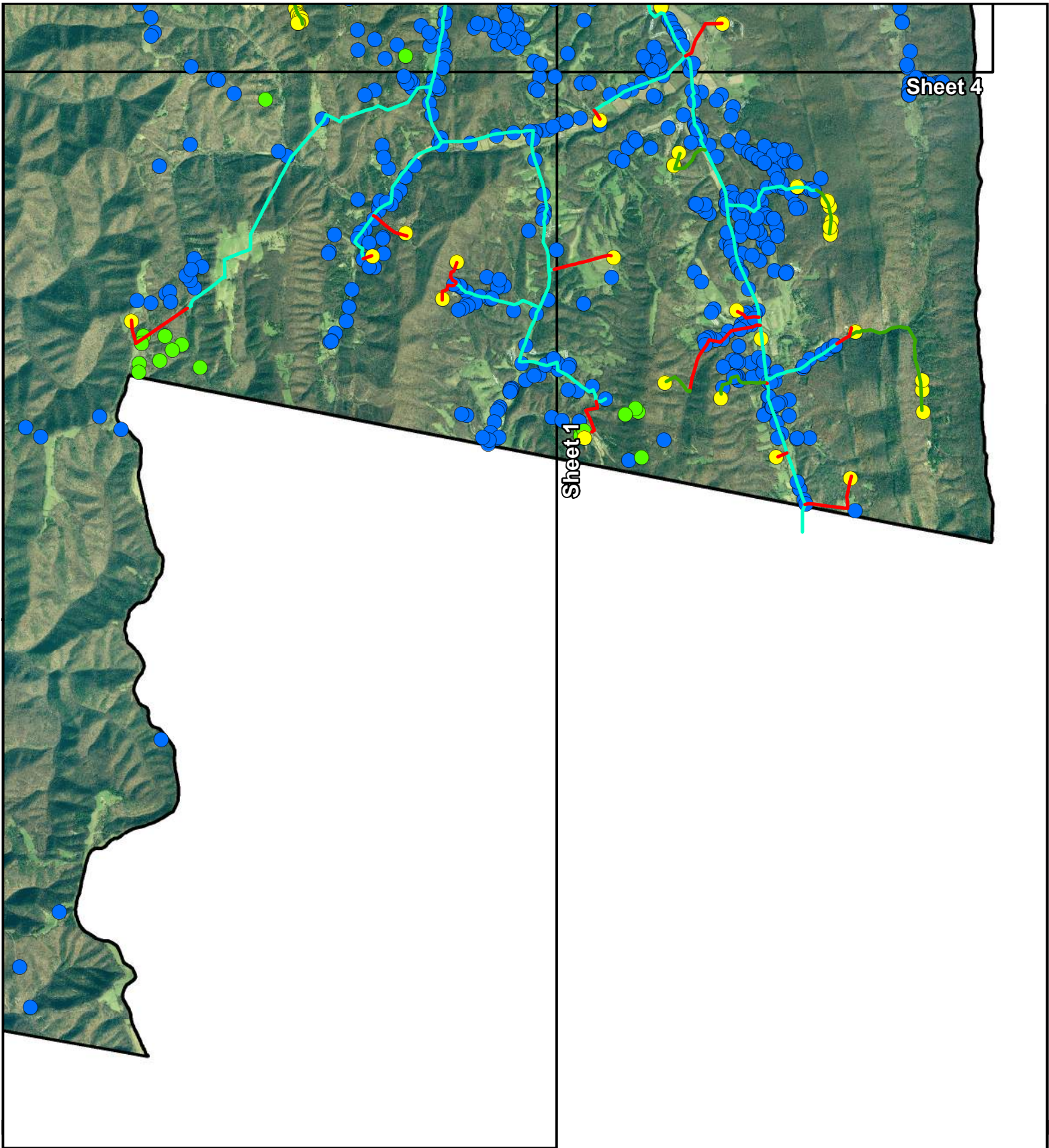
Sheet	INDEX
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Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Sheet

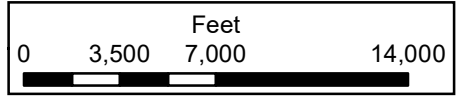
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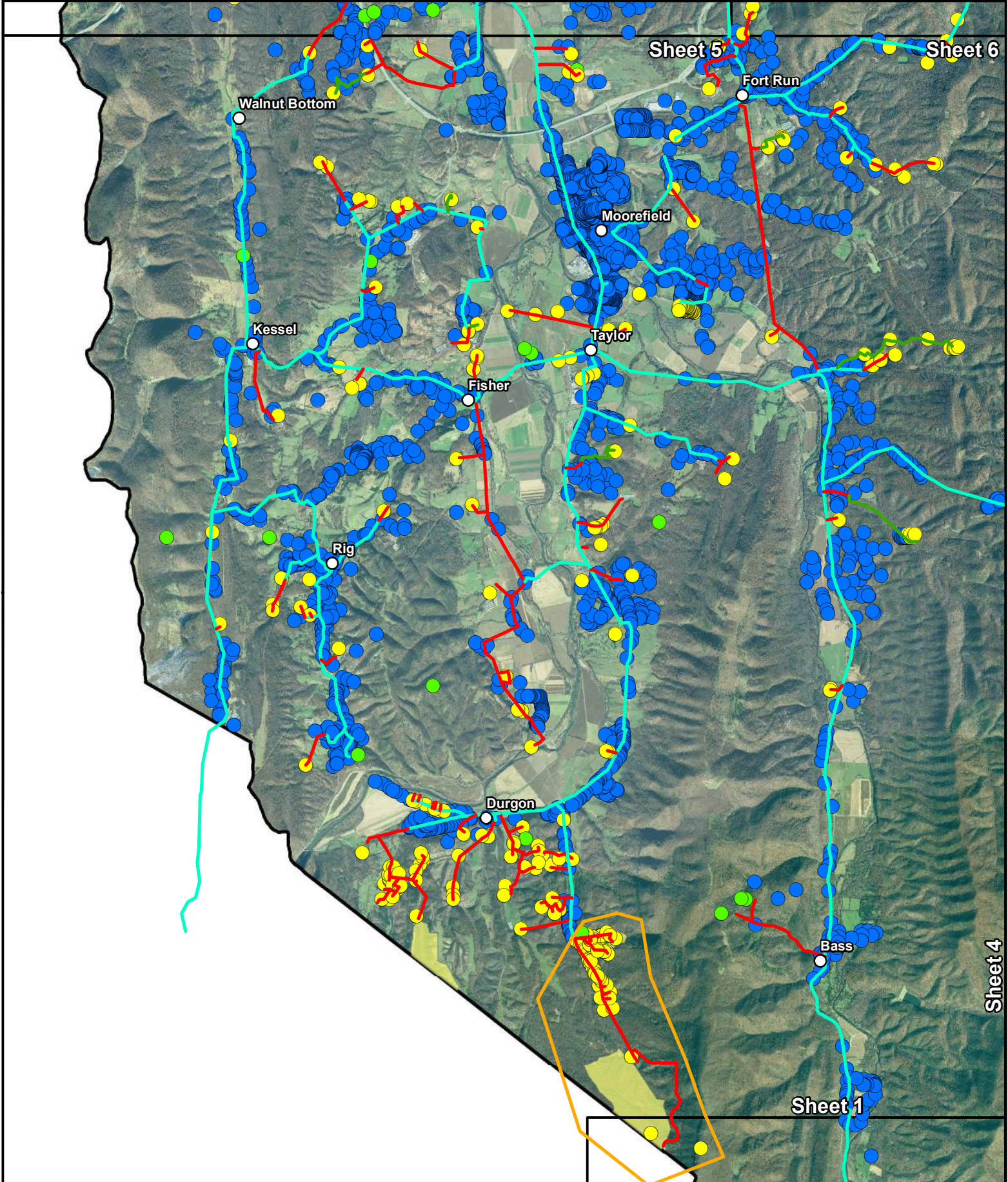
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Sheet 1

- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index



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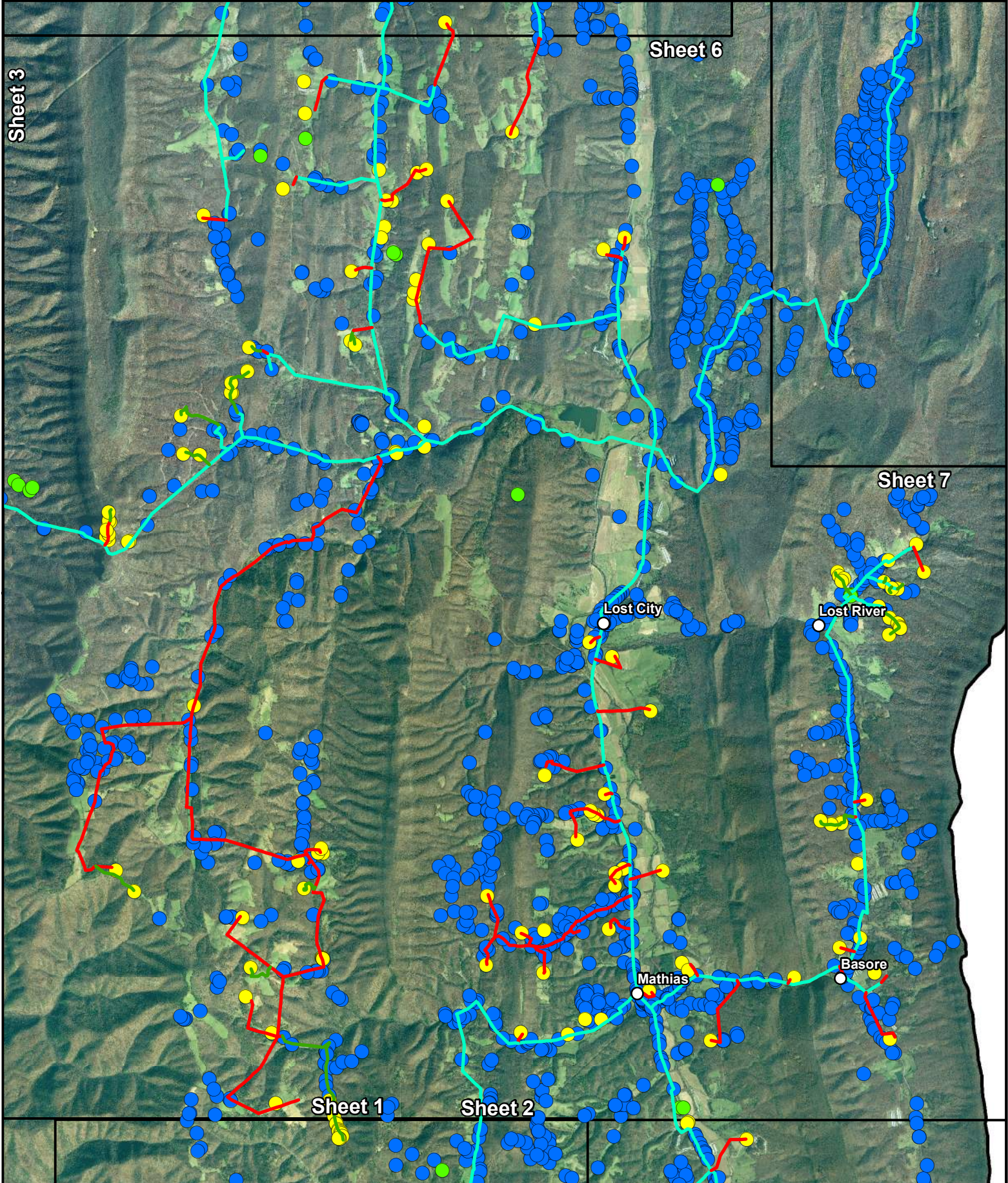
Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Feet

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Sheet

3



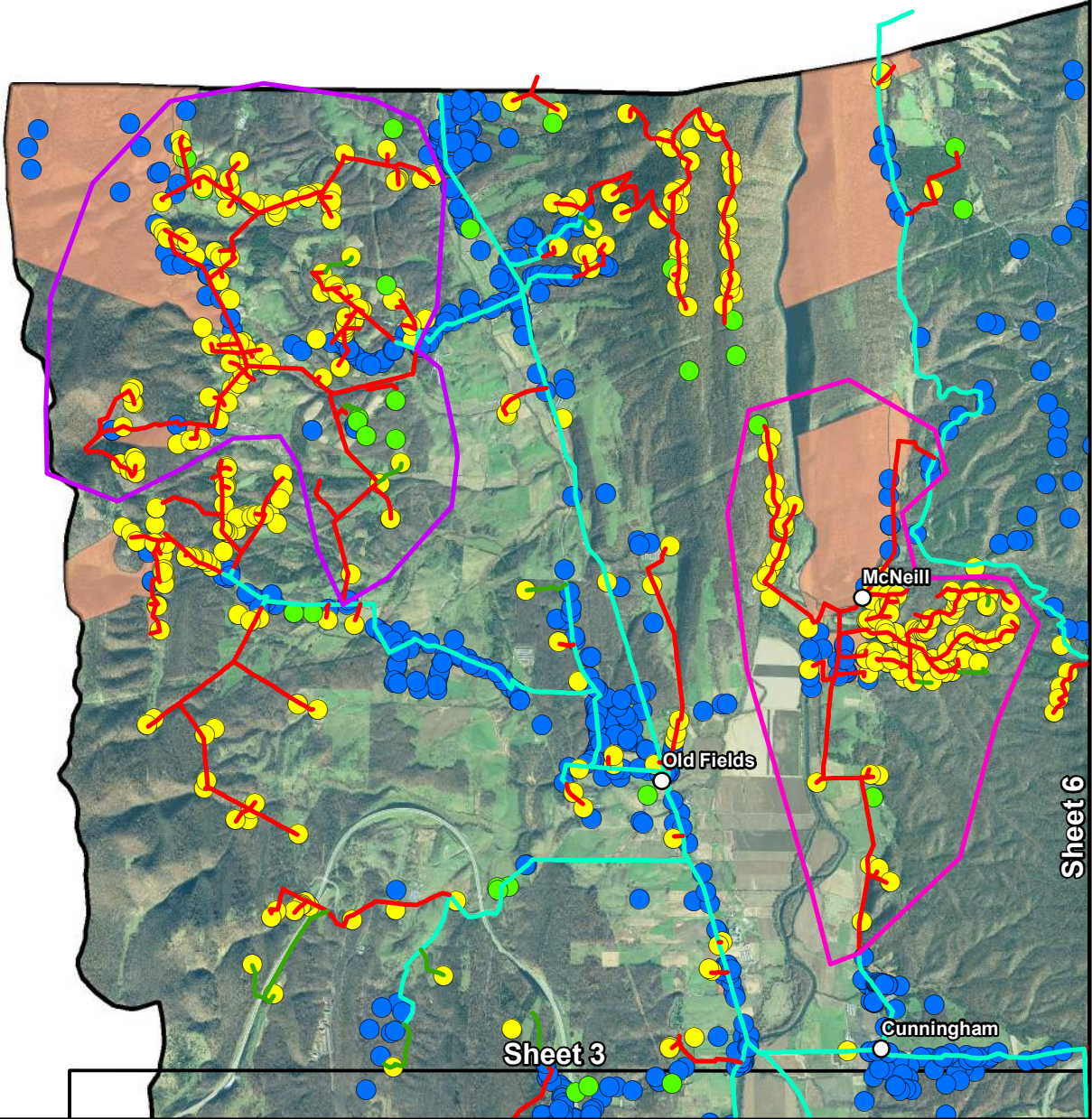
Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Feet

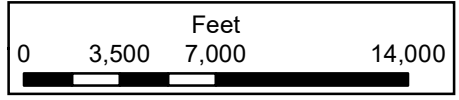
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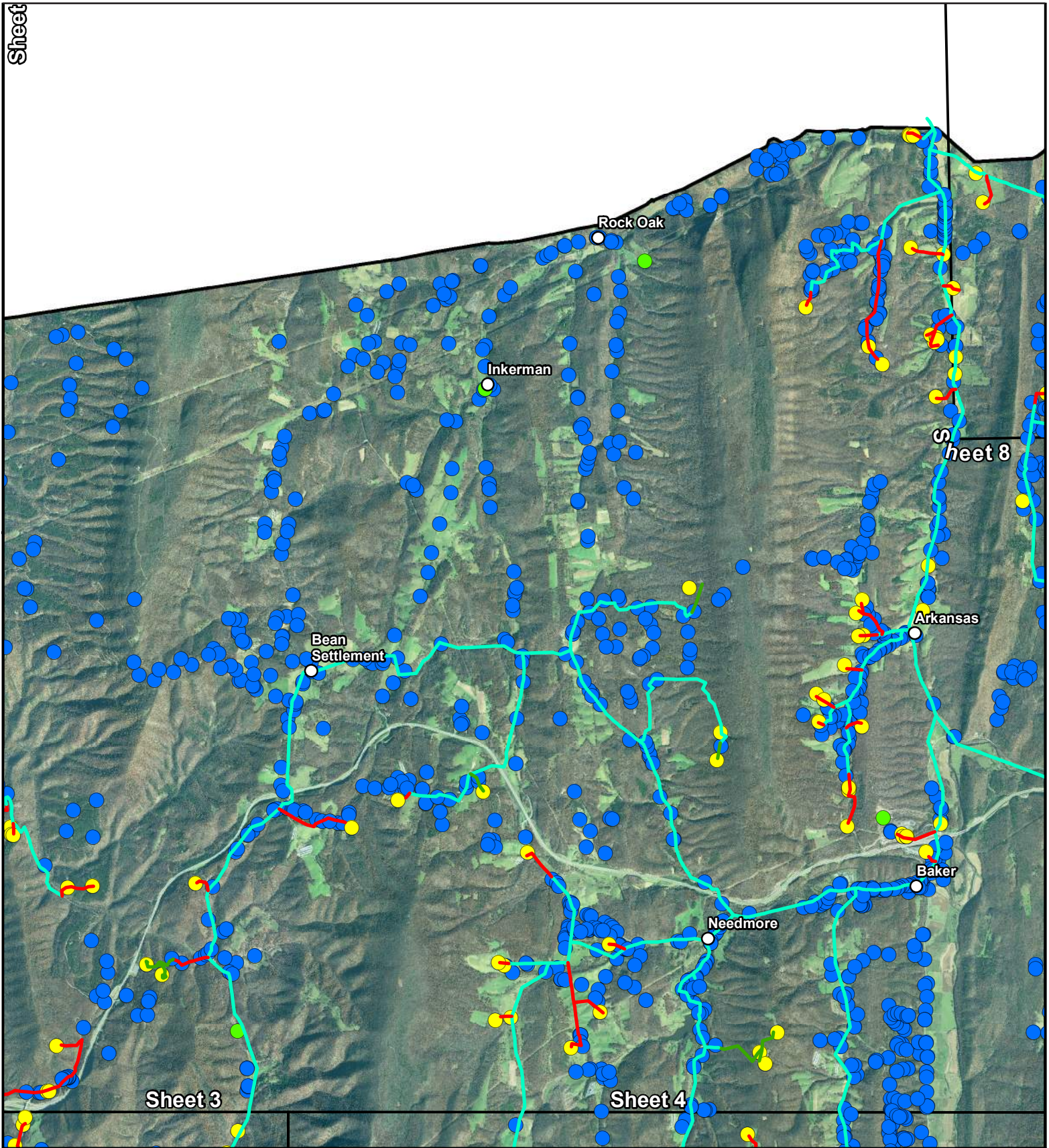
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- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index



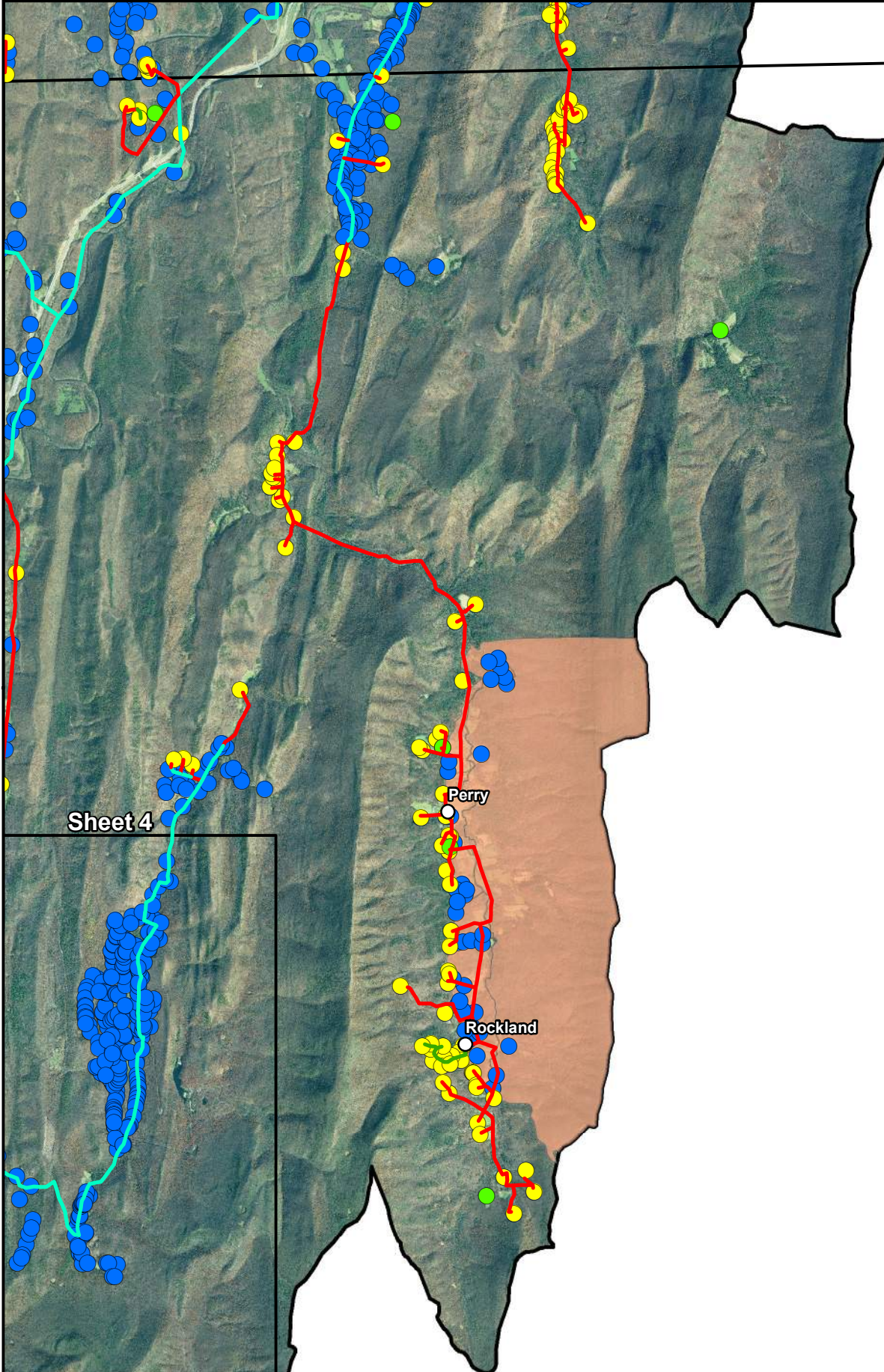
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Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Sheet

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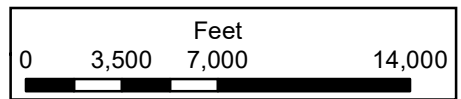


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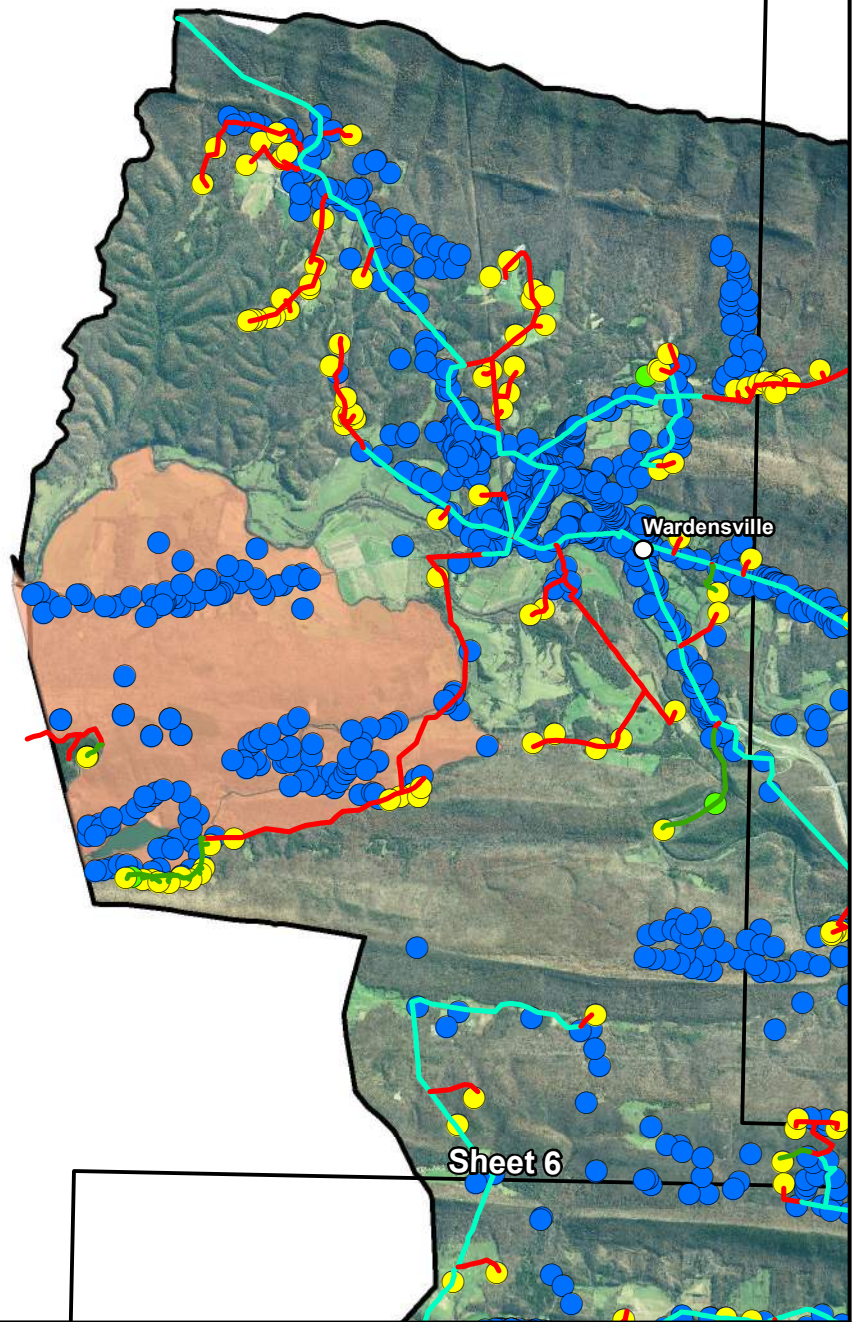
Rockland

- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index

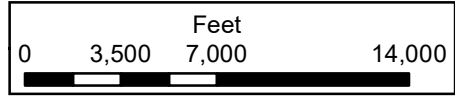


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- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary
- Index
- Starlink Services, LLC - RDOF



Sheet
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Hardy County, WV – 2023 ROC Study – Cost Estimate – Whole County

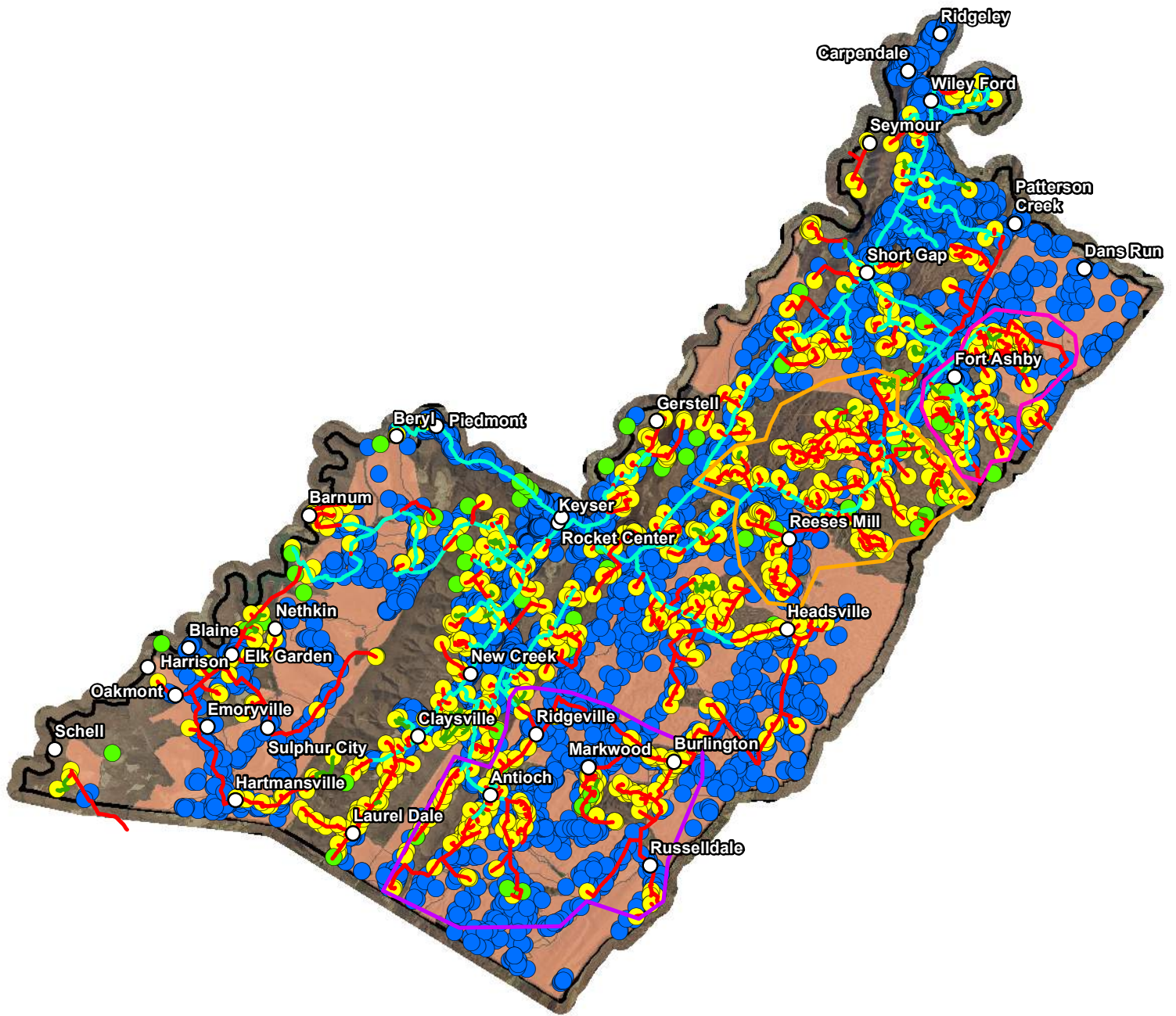
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	208.98	\$1,149,390
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	208.98	\$313,470
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	183.62	\$2,754,300
Aerial Construction Labor	\$50,000.00	Per Mile	183.62	\$9,181,000
Underground Construction Labor	\$150,000.00	Per Mile	25.36	\$3,804,000
Project Construction Contingency 10%	\$1,298,500.00	Lump Sum	1	\$1,298,500
Legal 1.5%	\$194,775.00	Lump Sum	1	\$194,775
Administrative 2%	\$259,700.00	Lump Sum	1	\$259,700
TOTAL COST = \$18,955,135				

COUNTY SAMPLE PROJECT

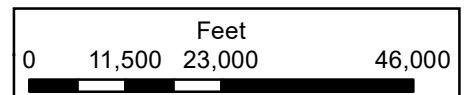
Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
8	Hardy	1	121	17.58	\$1,446,480
		2	110	13.93	\$1,140,328
		3	54	4.26	\$335,475

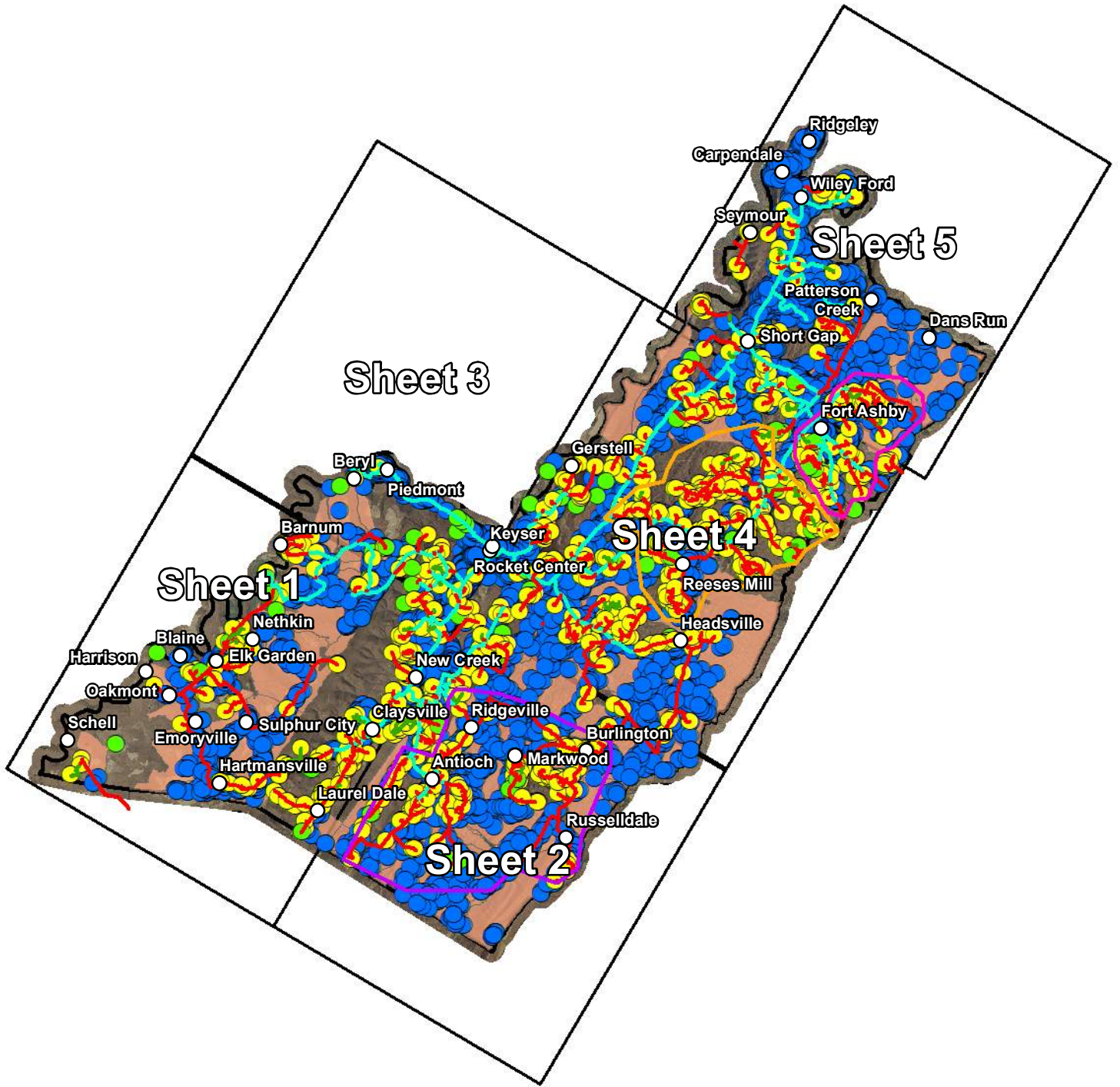


MINERAL COUNTY

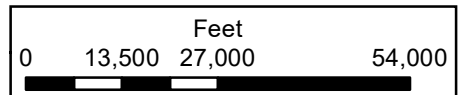


- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary

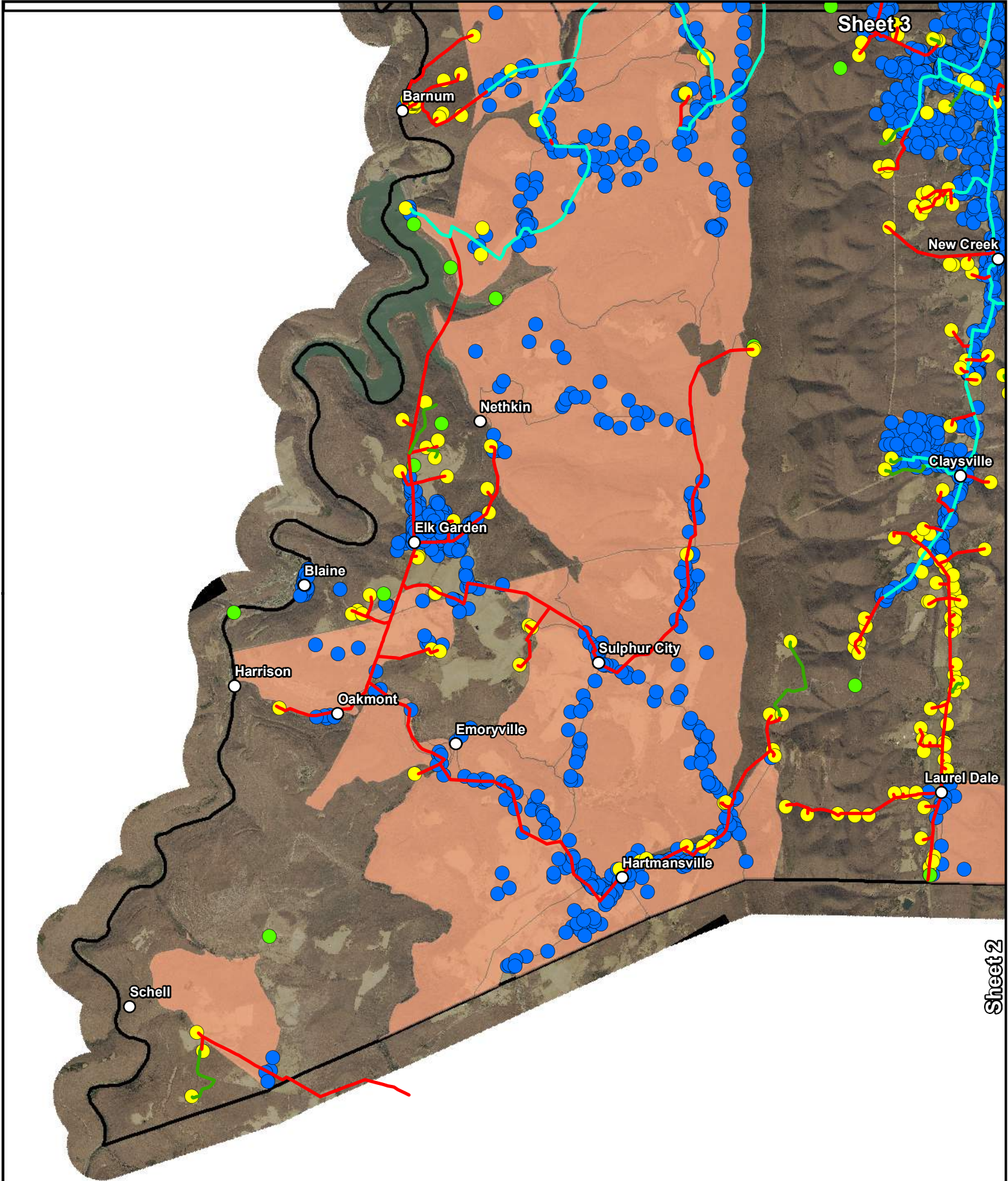





- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary
- Index



Sheet
INDEX

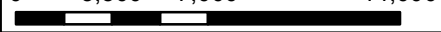


Existing Route	Other Addresses	County Boundary
Proposed Fiber	Project 1 Boundary	Index
Proposed Buried Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	



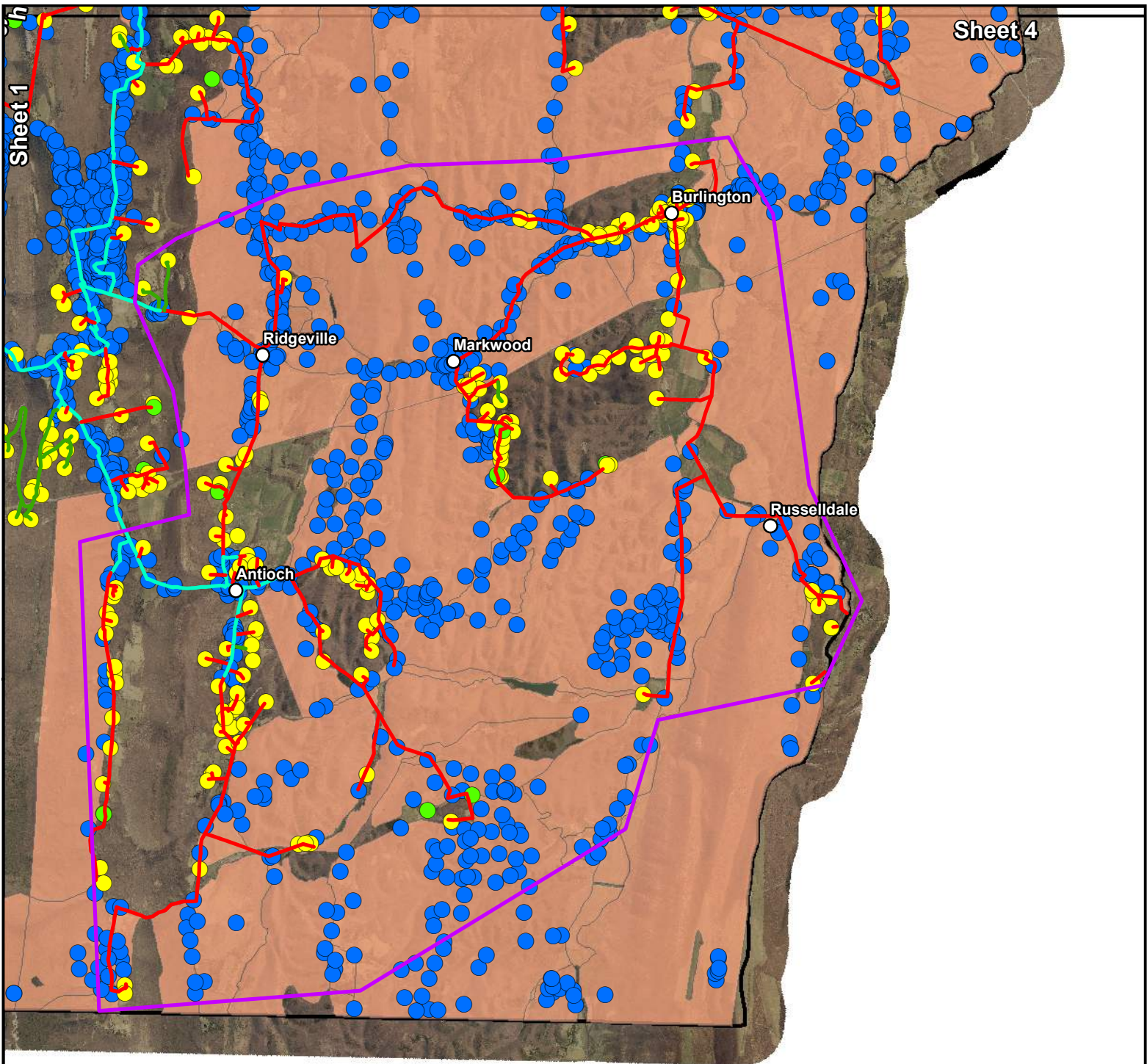
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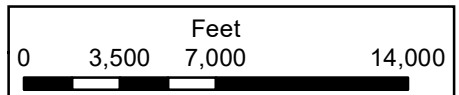


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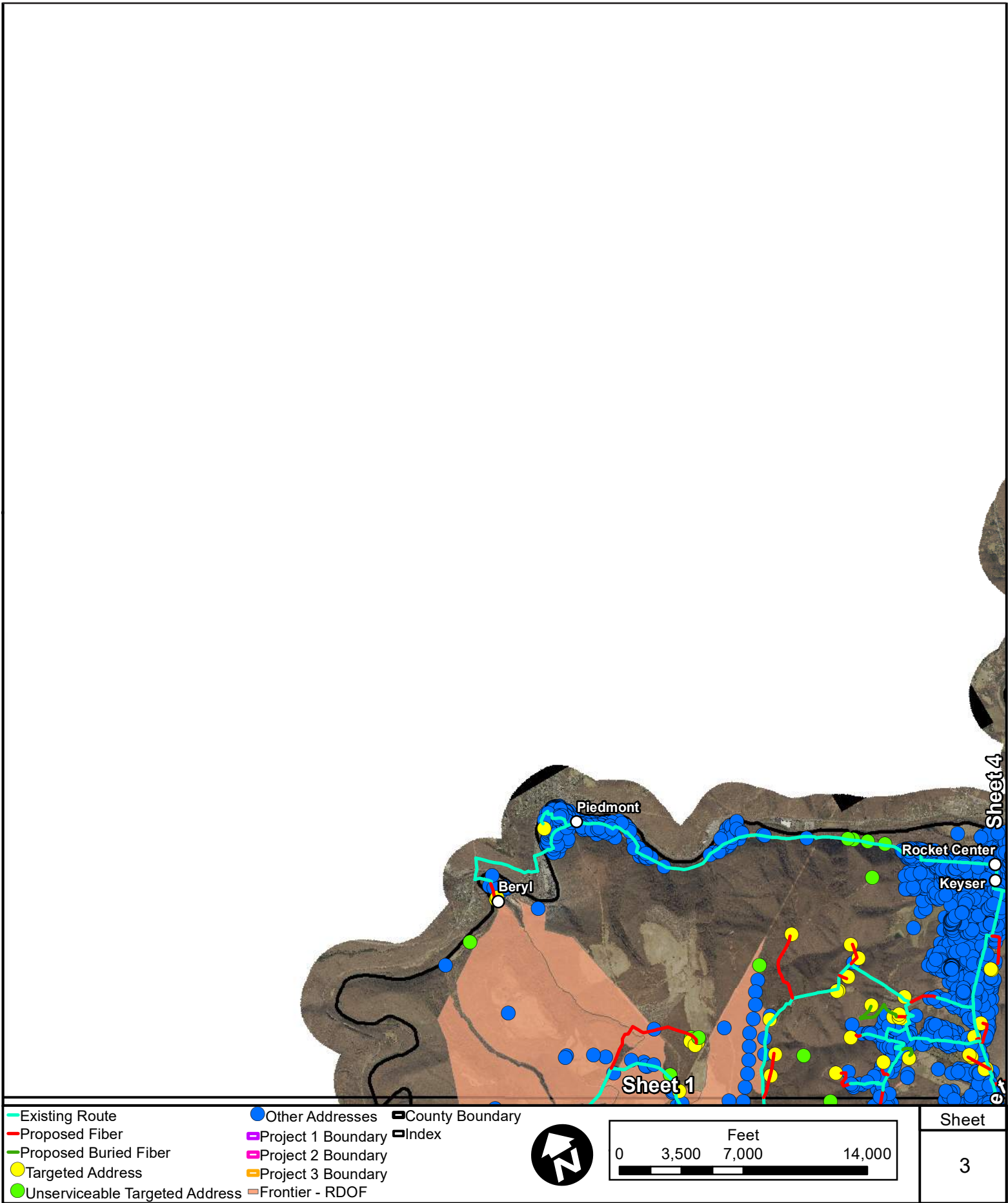
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- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary
- Index



Sheet
2



Sheet 3

Sheet 5

Fort Ashby

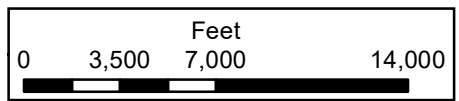
Gerstell

Reeses Mill

Headsville

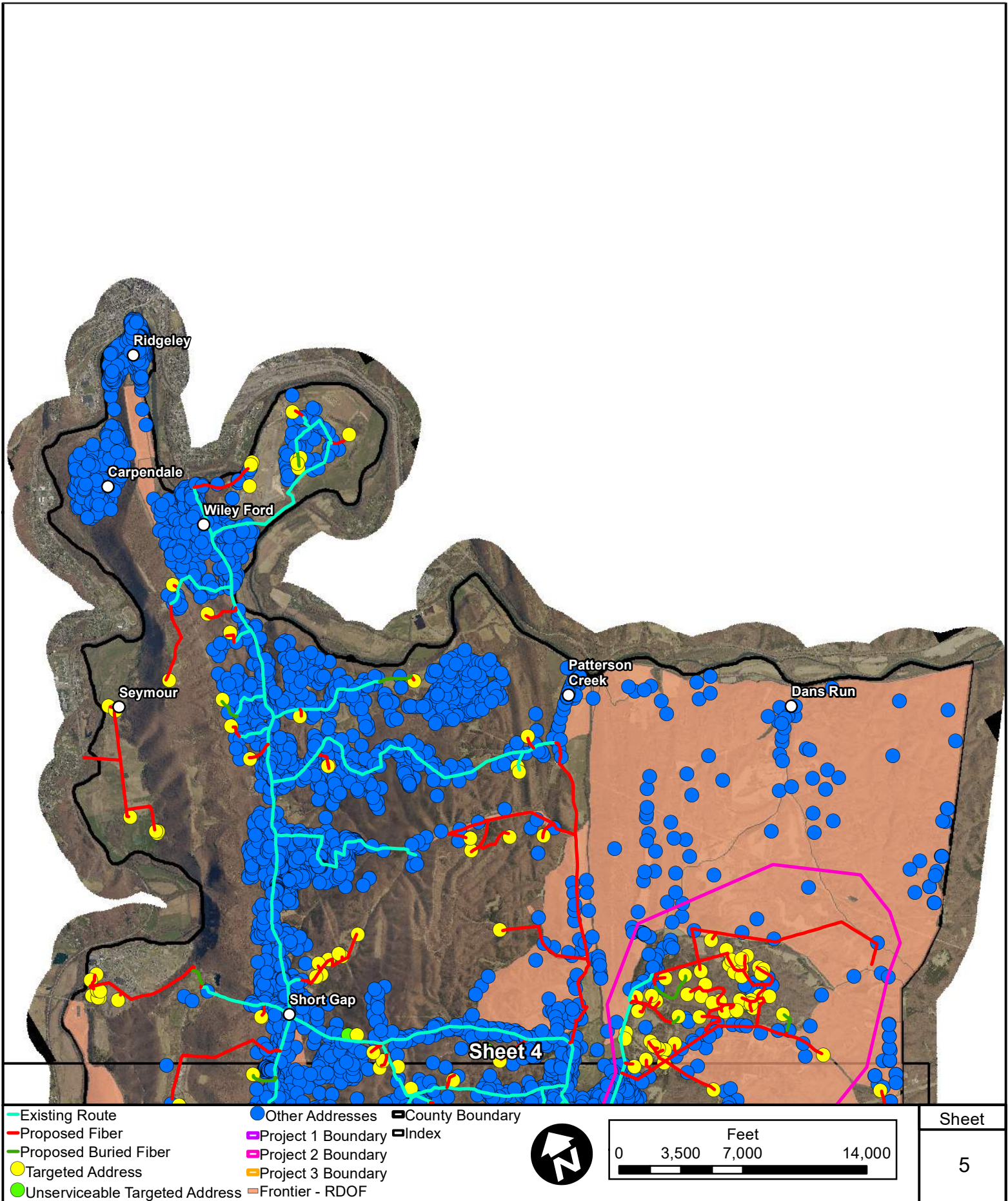
Sheet 2

- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary
- Index



Sheet

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Mineral County, WV – 2023 ROC Study – Cost Estimate – Whole County

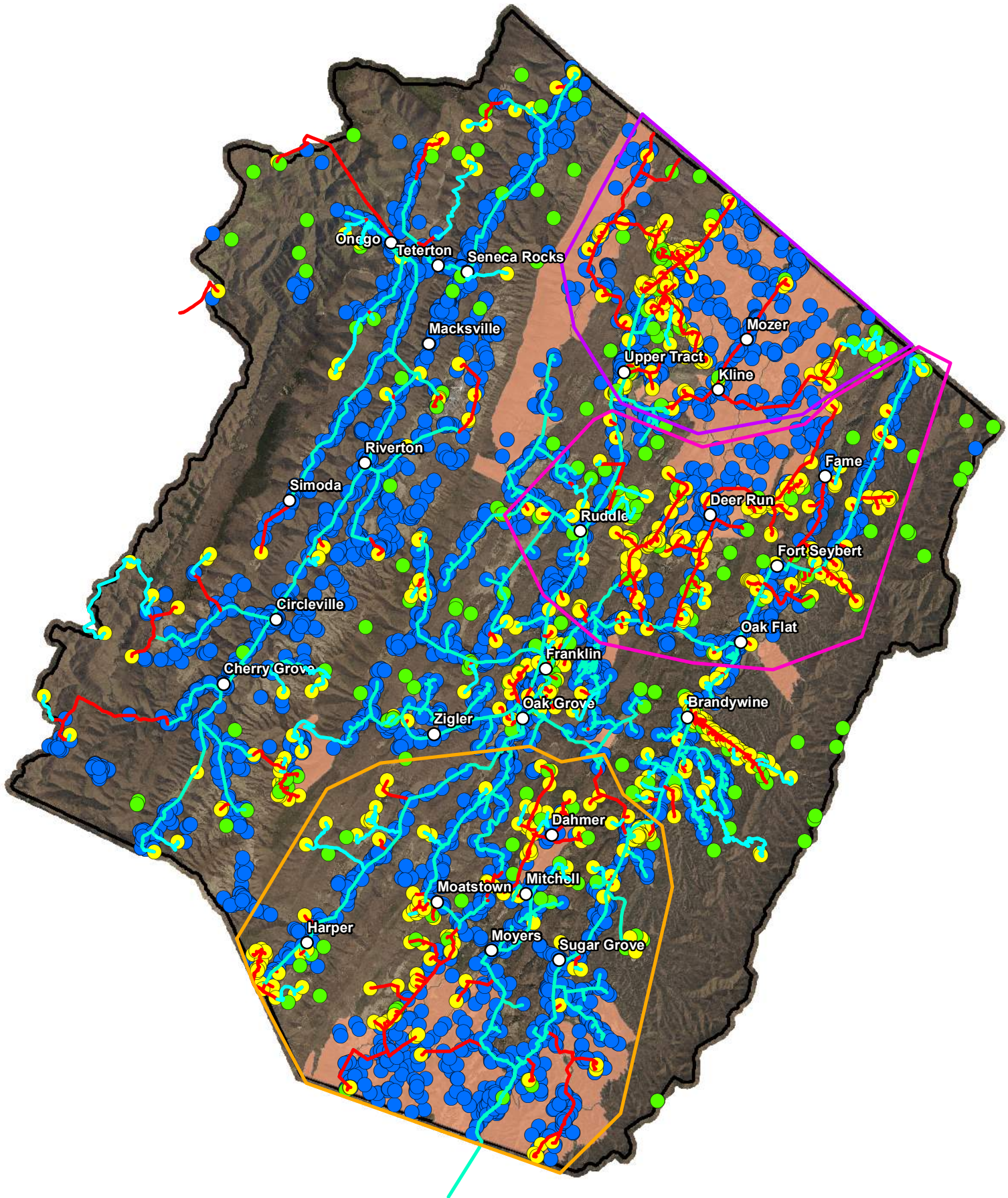
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	258.02	\$1,419,110
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	258.02	\$387,030
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	240.65	\$3,609,750
Aerial Construction Labor	\$50,000.00	Per Mile	240.65	\$12,032,500
Underground Construction Labor	\$150,000.00	Per Mile	17.37	\$2,605,500
Project Construction Contingency 10%	\$1,463,800.00	Lump Sum	1	\$1,463,800
Legal 1.5%	\$219,570.00	Lump Sum	1	\$219,570
Administrative 2%	\$292,760.00	Lump Sum	1	\$292,760
TOTAL COST = \$22,030,020				

COUNTY SAMPLE PROJECT

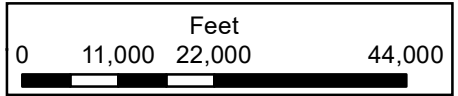
Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
8	Mineral	1	198	46.64	\$3,780,265
		2	85	22.09	\$1,844,983
		3	199	45.71	\$3,819,318

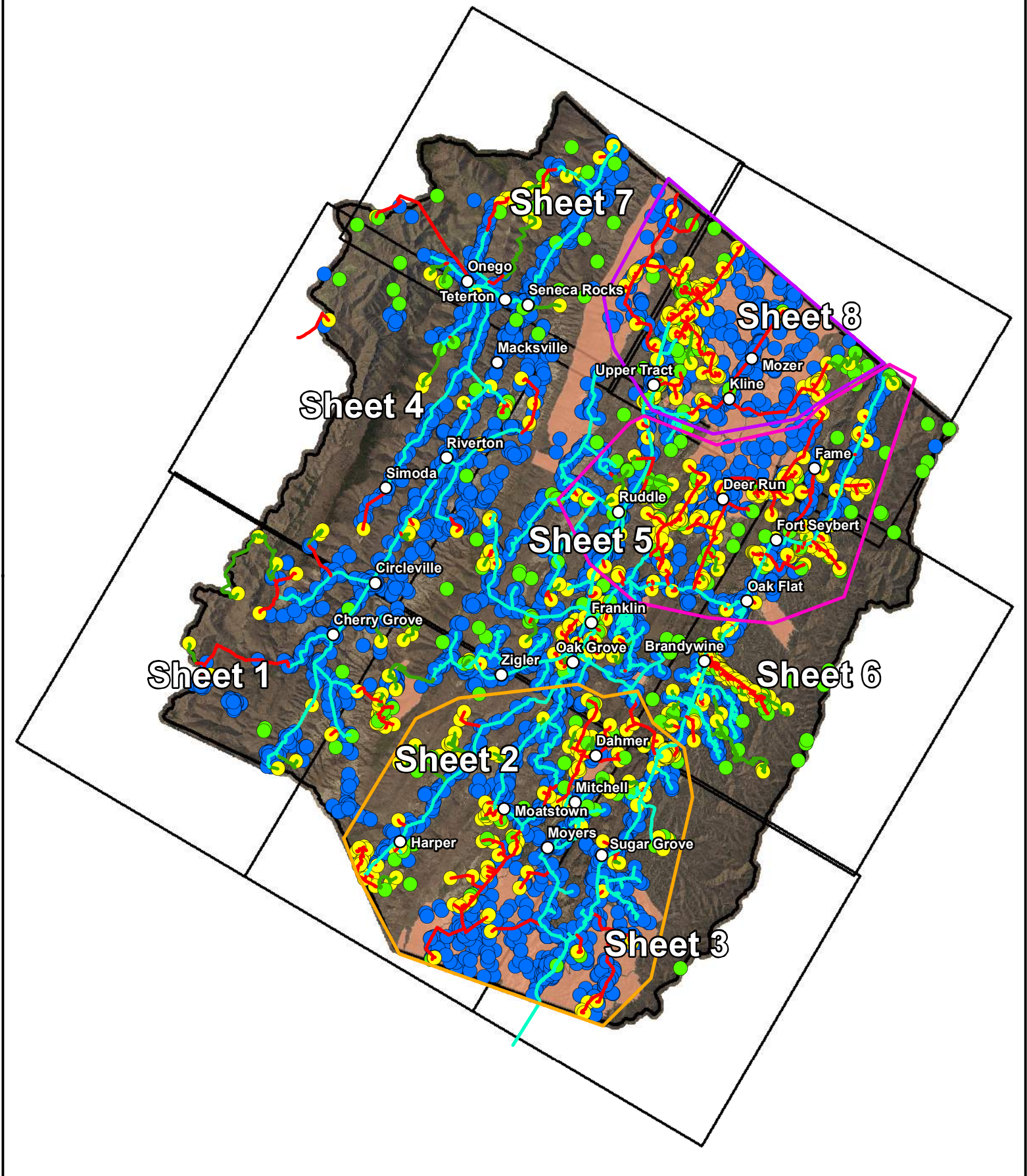



PENDLETON COUNTY

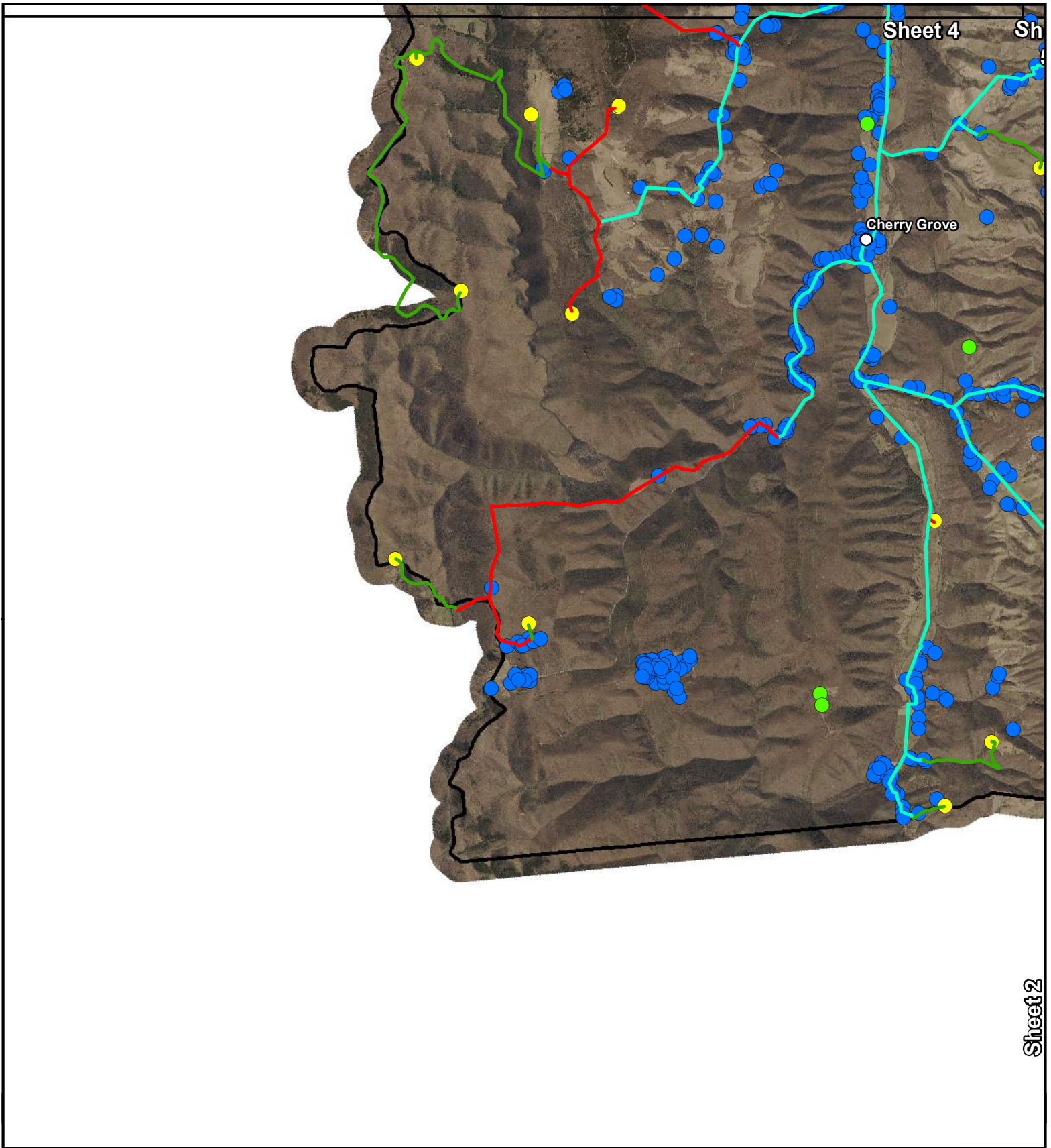



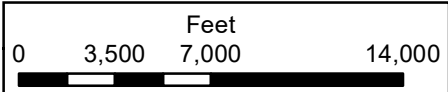
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary

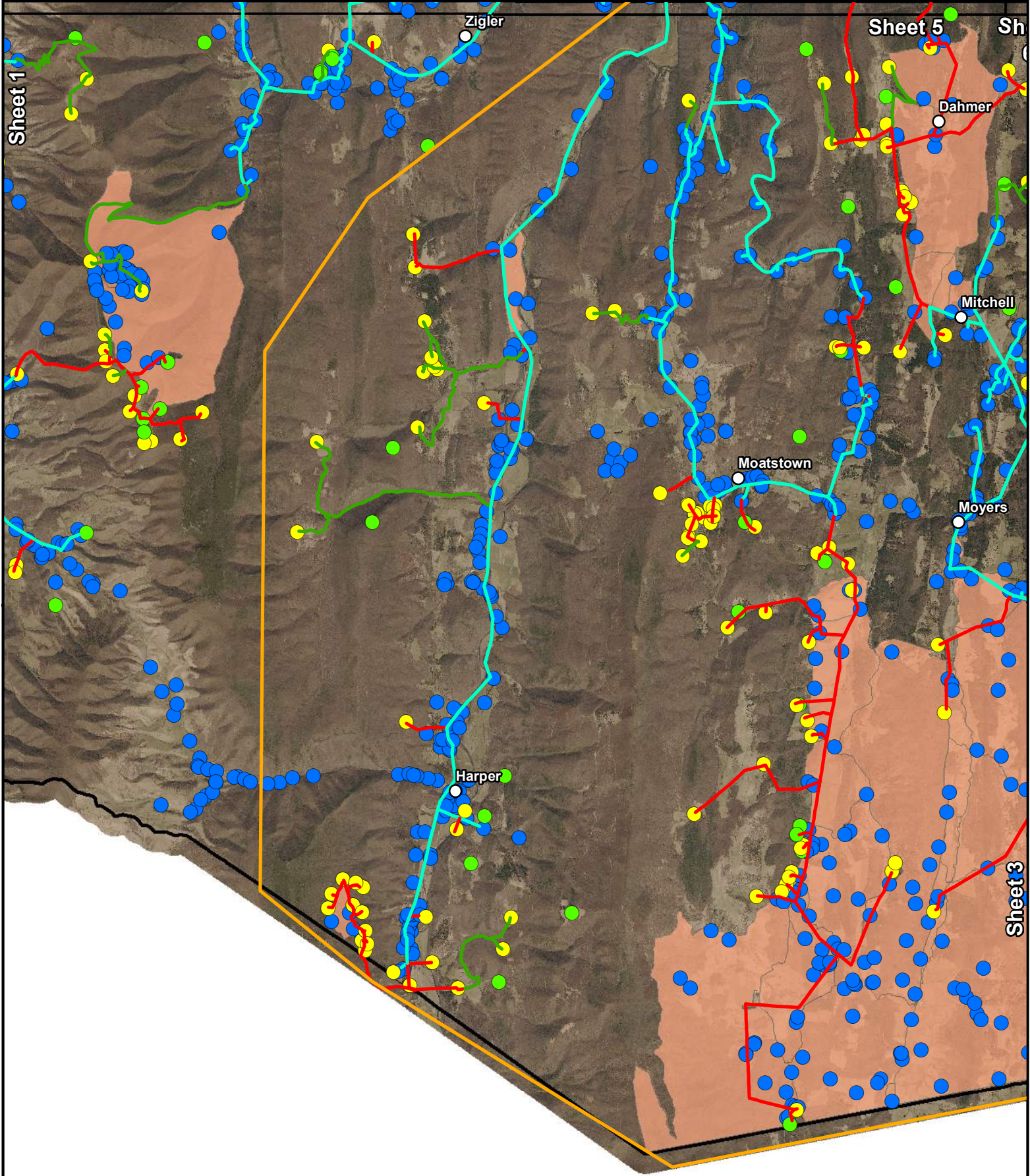




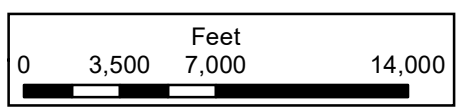
<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Address Project 1 Boundary Project 2 Boundary Project 3 Boundary Frontier - RDOF 	<ul style="list-style-type: none"> County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="width: 25%;">0</td> <td style="width: 25%;">13,500</td> <td style="width: 25%;">27,000</td> <td style="width: 25%;">54,000</td> </tr> </table>	Feet				0	13,500	27,000	54,000	<table border="1"> <tr> <td style="width: 50px;">Sheet</td> </tr> <tr> <td style="text-align: center;">INDEX</td> </tr> </table>	Sheet	INDEX
Feet															
0	13,500	27,000	54,000												
Sheet															
INDEX															



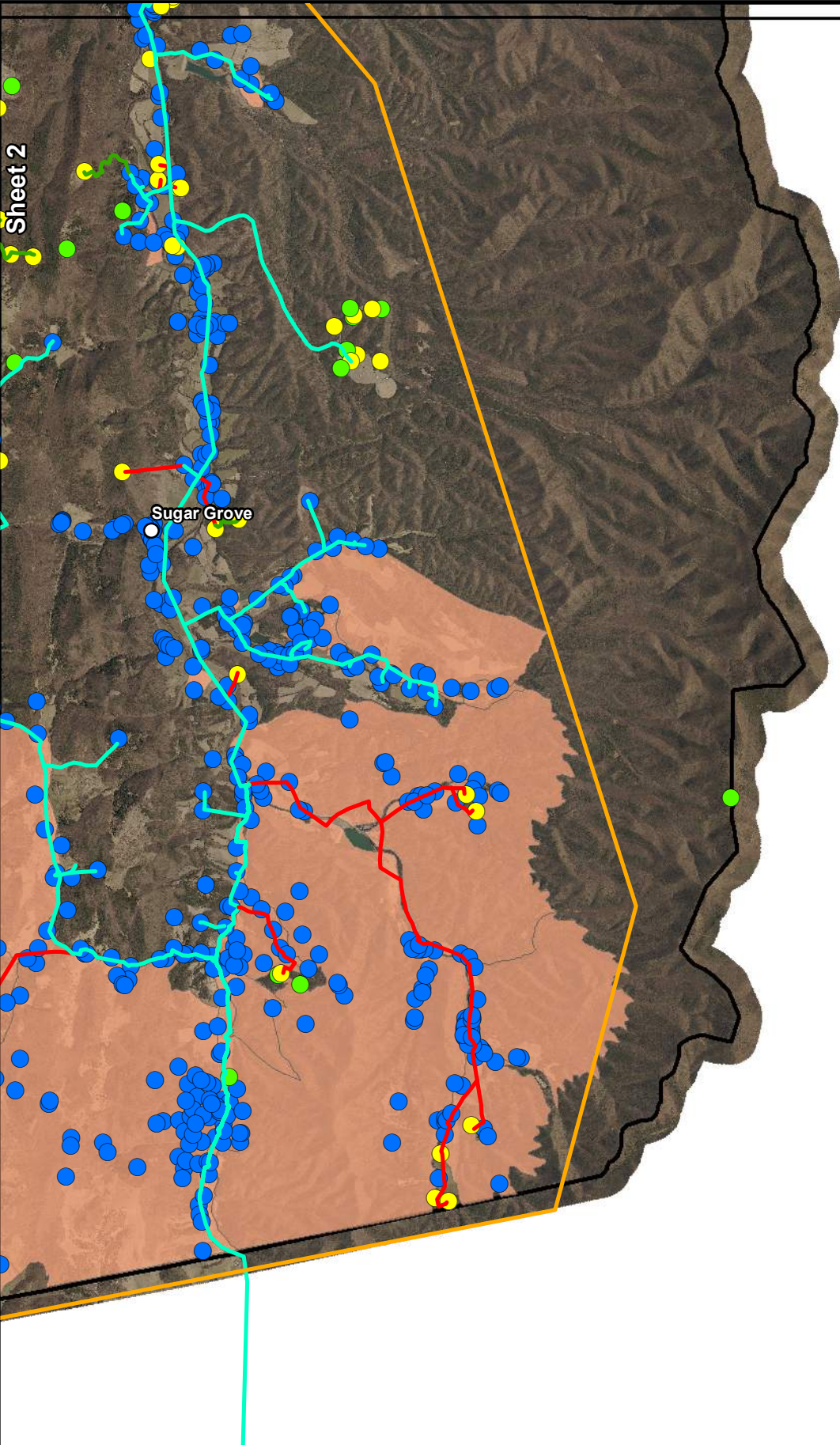
Existing Route	Other Address	County Boundary			Sheet
Proposed Fiber	Project 1 Boundary	Index			1
Proposed Buried Fiber	Project 2 Boundary	Frontier - RDOF			
Targeted Address	Project 3 Boundary				
Unserviceable Targeted Address					



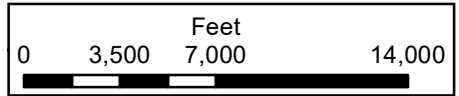
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary
- Index



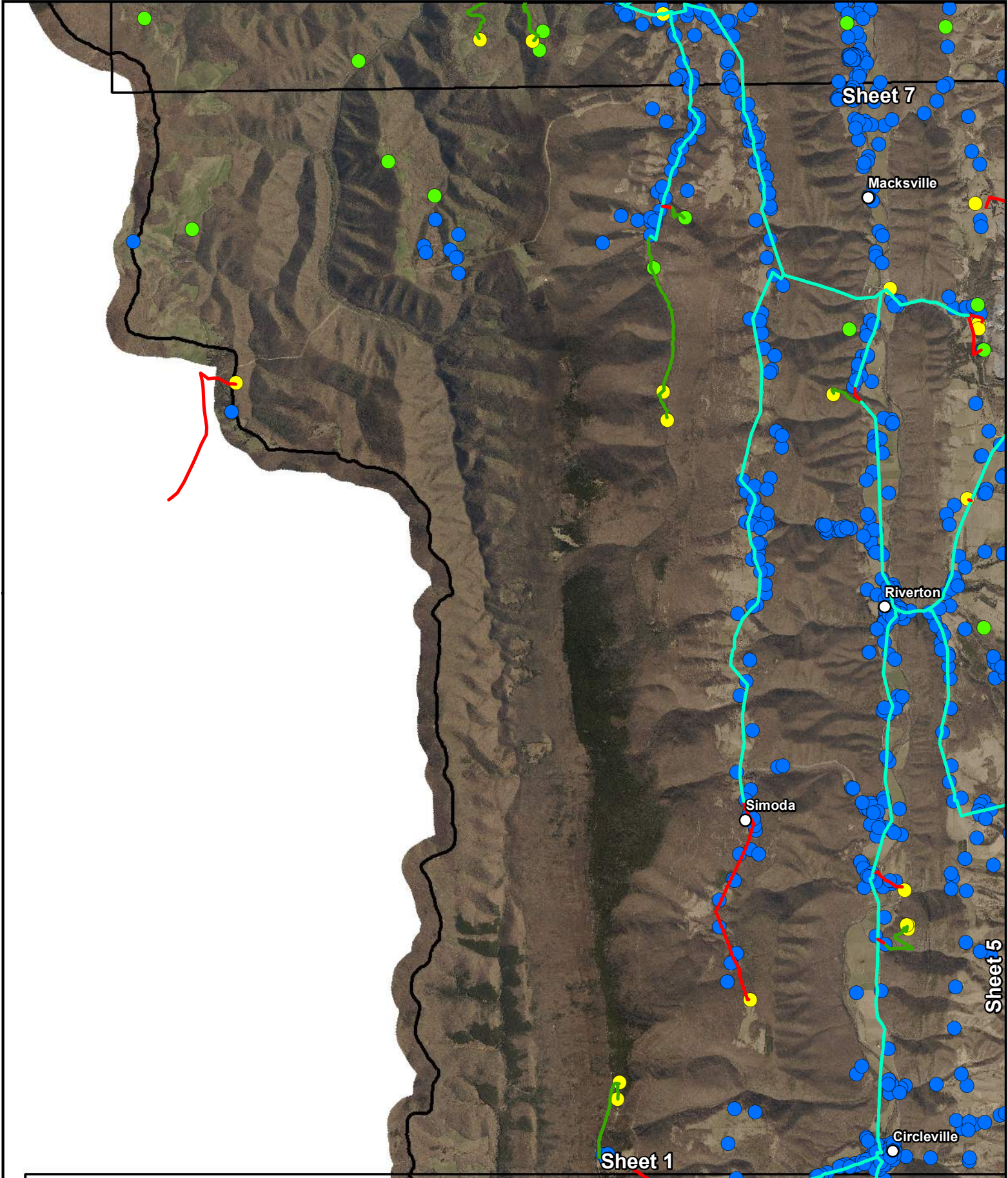
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- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary
- Index



Sheet
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Sheet 7

Macksville

Riverton

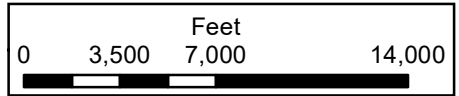
Simoda

Circleville

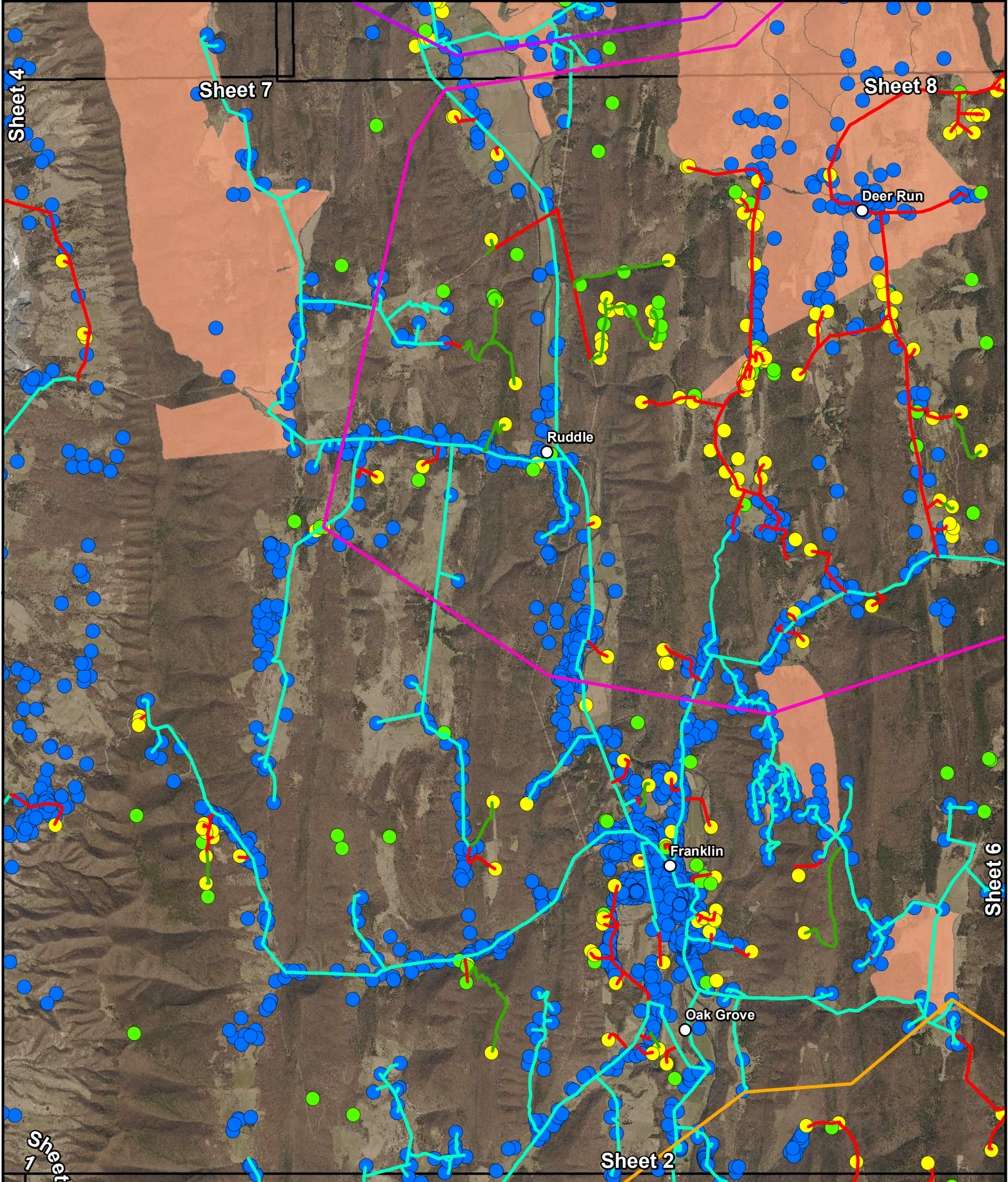
Sheet 1

Sheet 5

- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary
- Index



Sheet
4

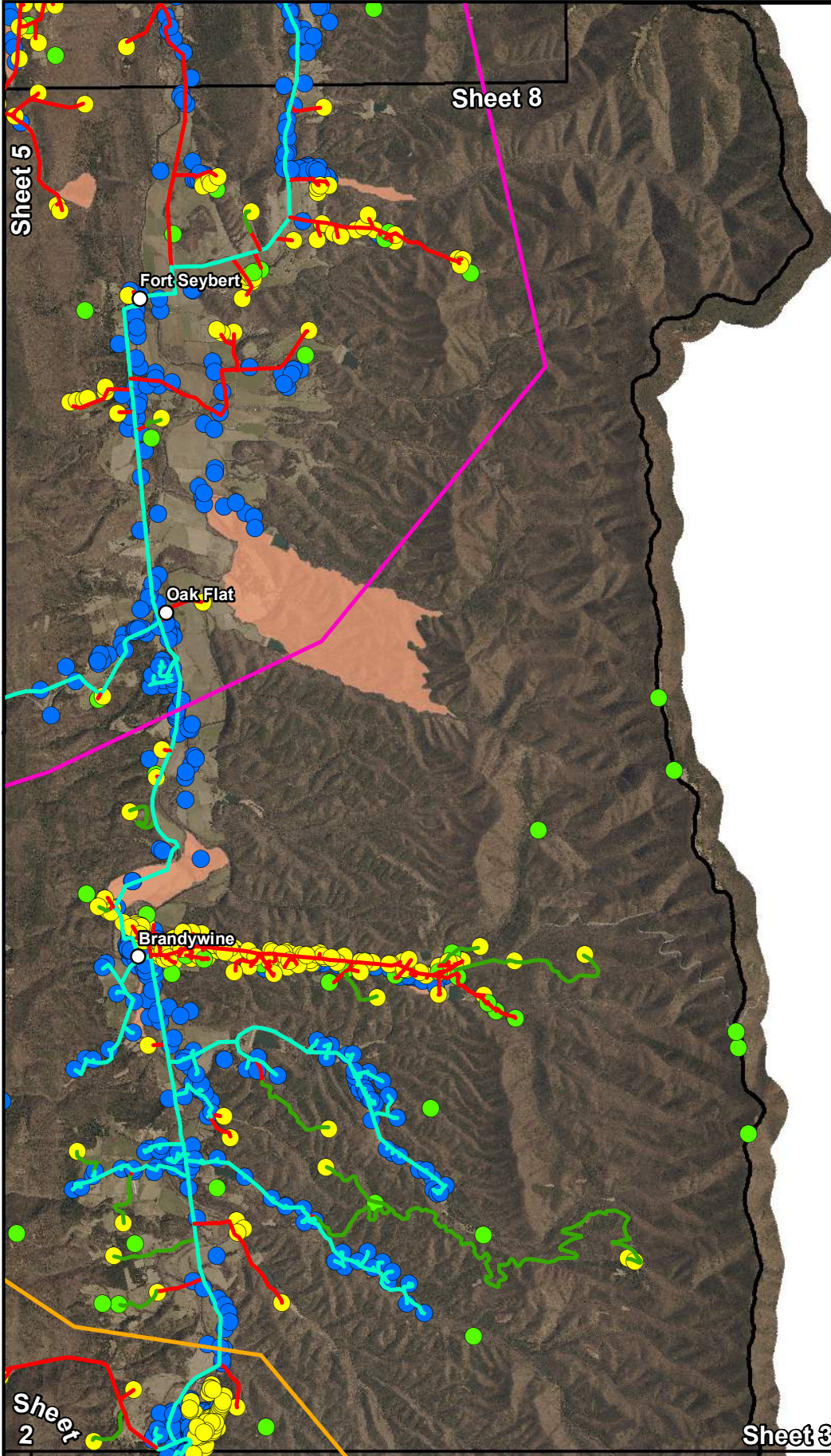


Existing Route	Other Address	County Boundary
Proposed Fiber	Project 1 Boundary	Index
Proposed Buried Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

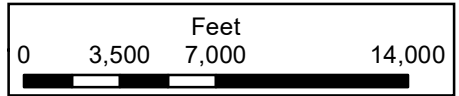
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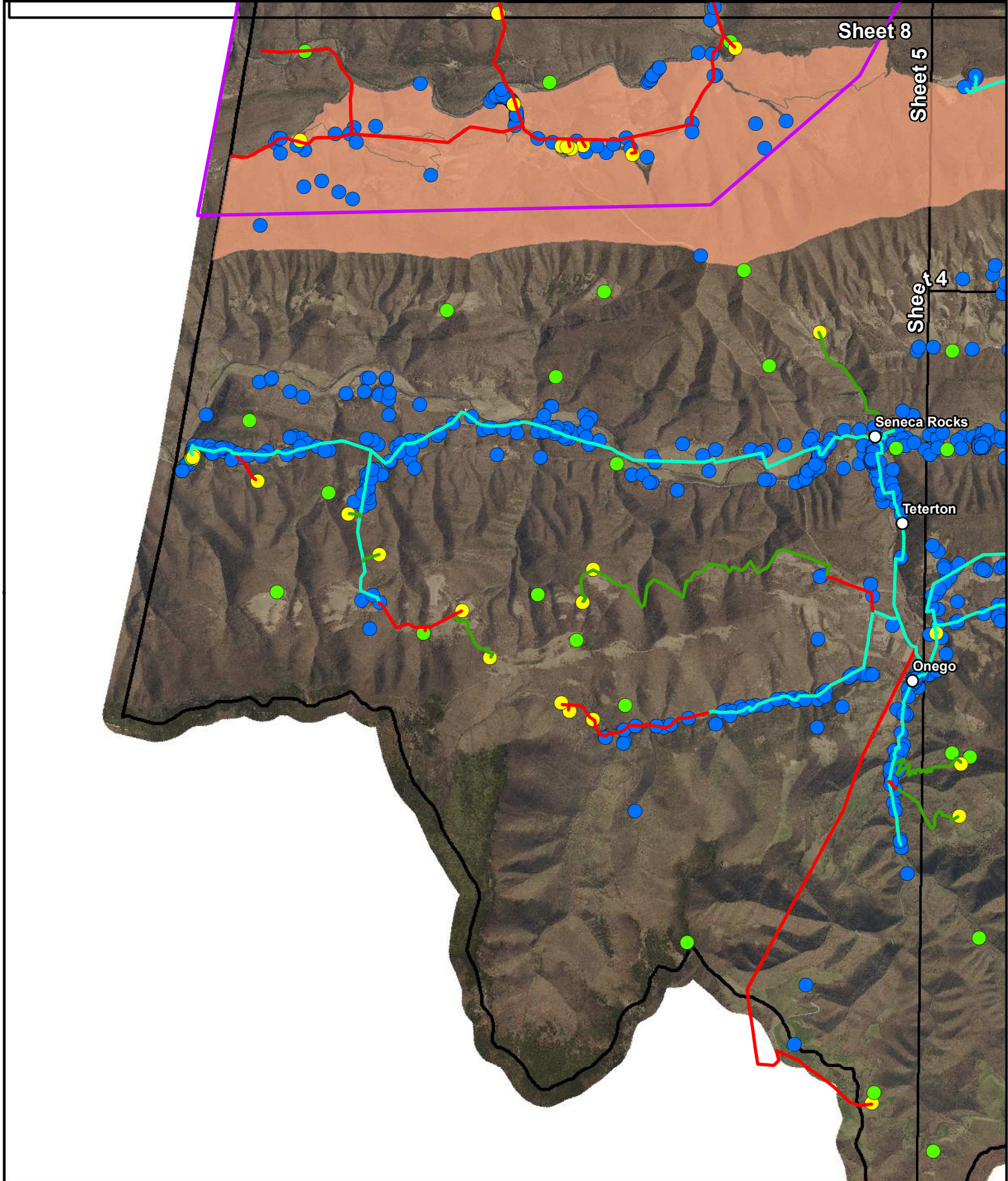
Sheet
5



- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Address
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary
- Index



Sheet
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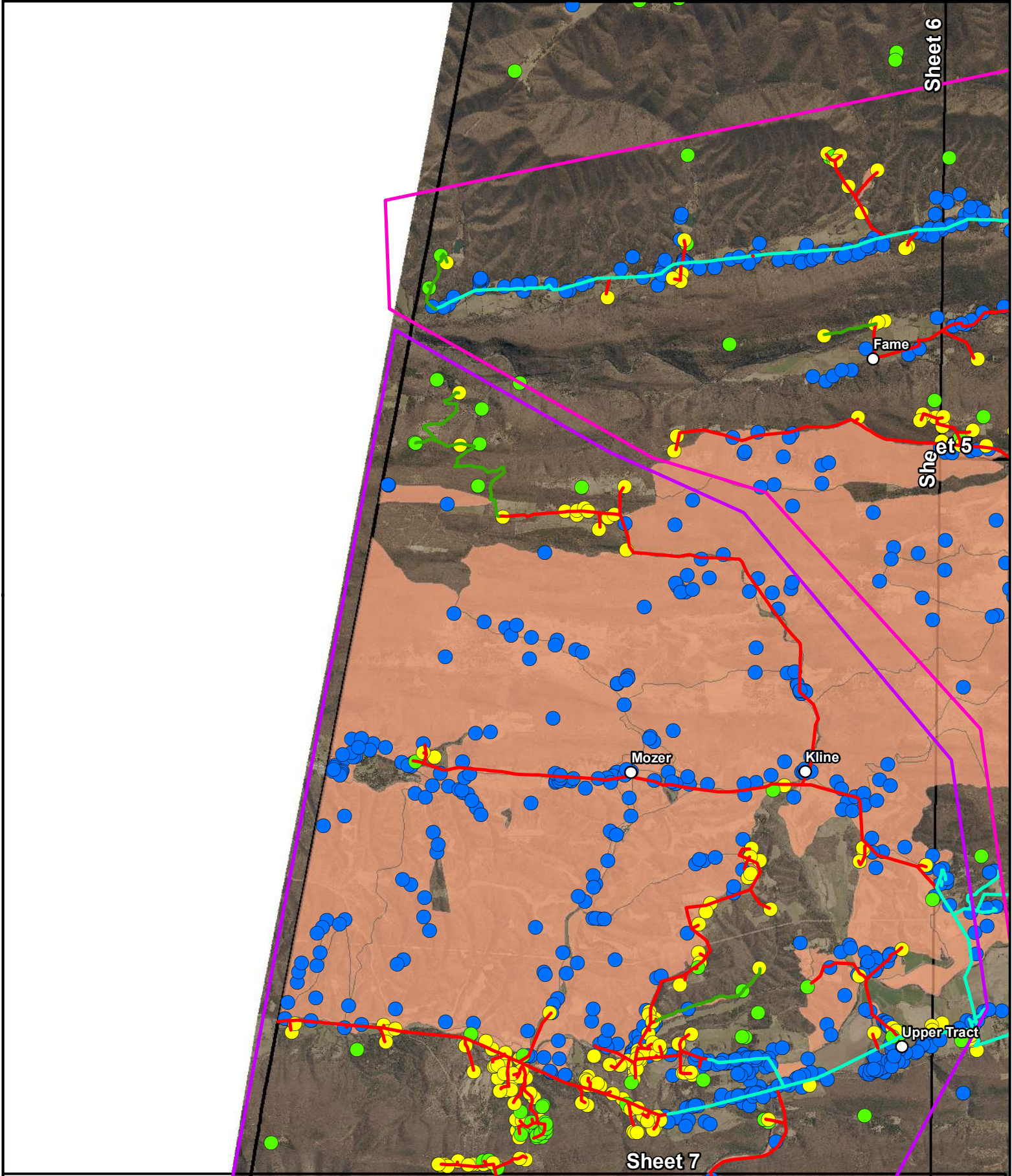
Existing Route	Other Address	County Boundary
Proposed Fiber	Project 1 Boundary	Index
Proposed Buried Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Feet


0 3,500 7,000 14,000

Sheet

7

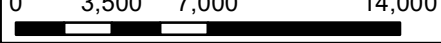


Existing Route	Other Address	County Boundary
Proposed Fiber	Project 1 Boundary	Index
Proposed Buried Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	



Feet

0 3,500 7,000 14,000



Sheet

8

Pendleton County, WV – 2023 ROC Study – Cost Estimate – Whole County

Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	271.17	\$1,491,435
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	271.17	\$406,755
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	195.63	\$2,934,450
Aerial Construction Labor	\$50,000.00	Per Mile	195.63	\$9,781,500
Underground Construction Labor	\$150,000.00	Per Mile	75.54	\$11,331,000
Project Construction Contingency 10%	\$2,111,250.00	Lump Sum	1	\$2,111,250
Legal 1.5%	\$316,687.50	Lump Sum	1	\$316,688
Administrative 2%	\$422,250.00	Lump Sum	1	\$422,250

TOTAL COST = \$28,795,328

COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
8	Pendleton	1	168	48.85	\$4,294,138
		2	200	56.82	\$5,262,575
		3	226	64.90	\$6,477,070

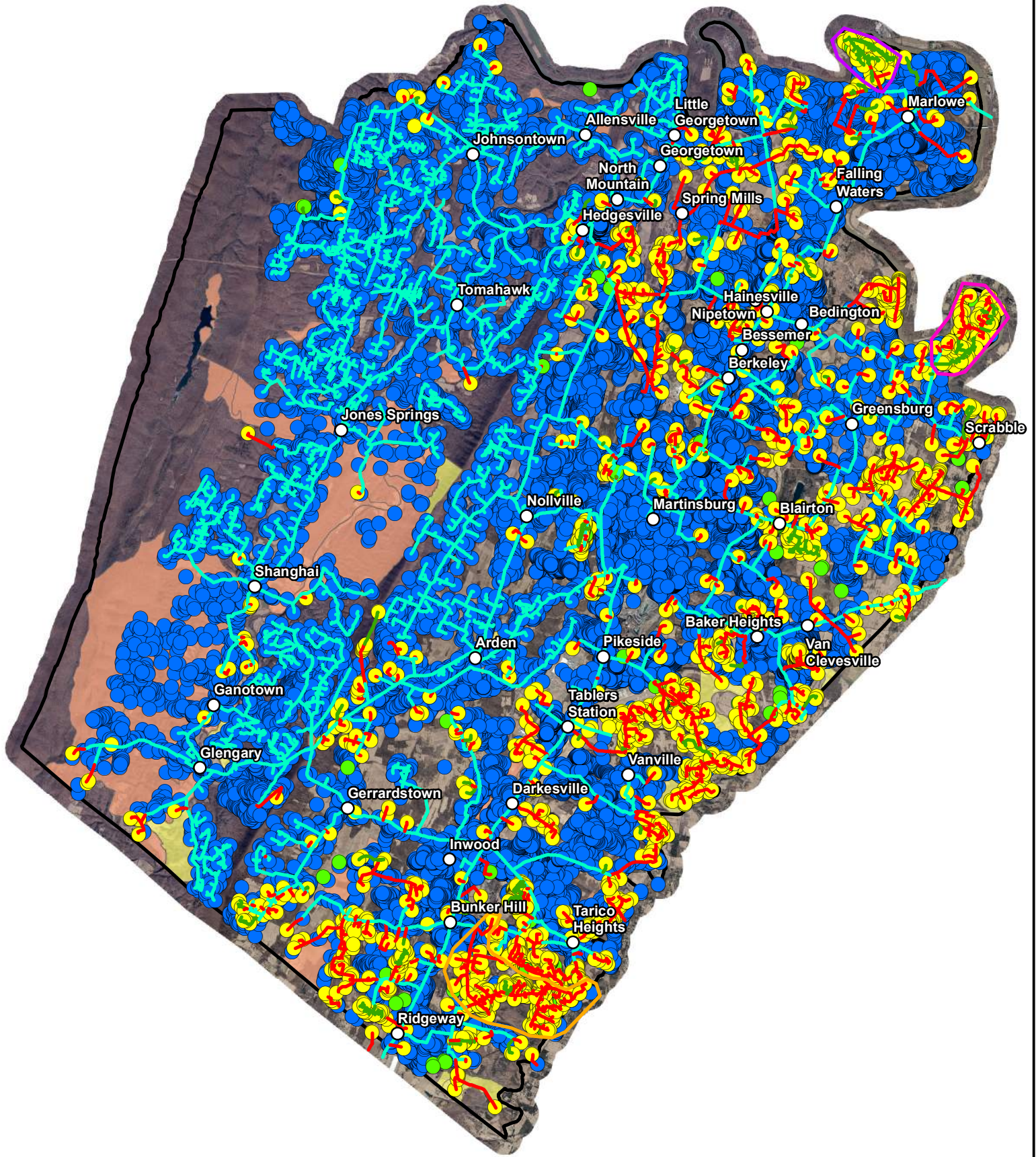
REGION 9

Berkeley, Jefferson,
and Morgan Counties





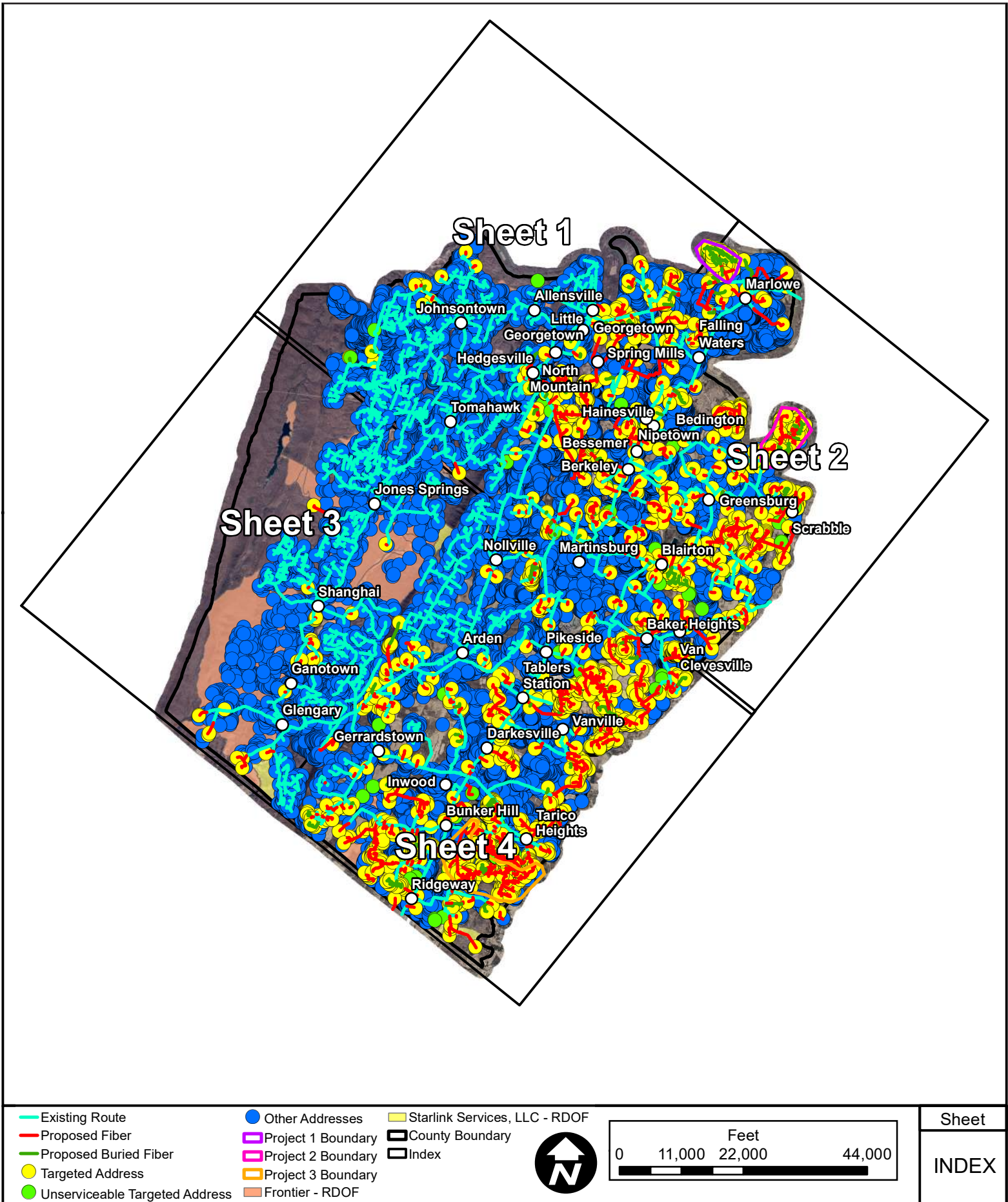
BERKELEY COUNTY

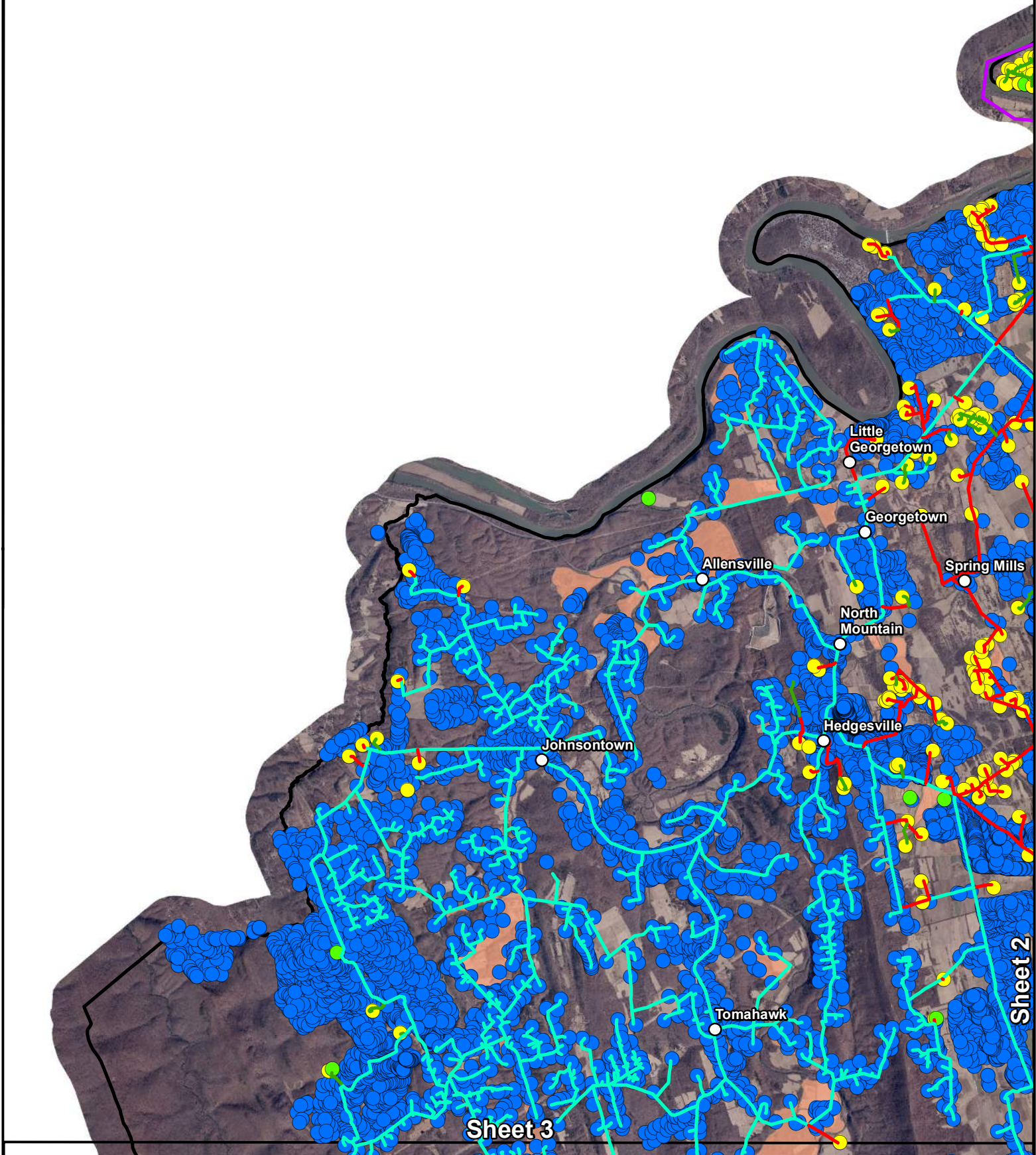




Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Feet

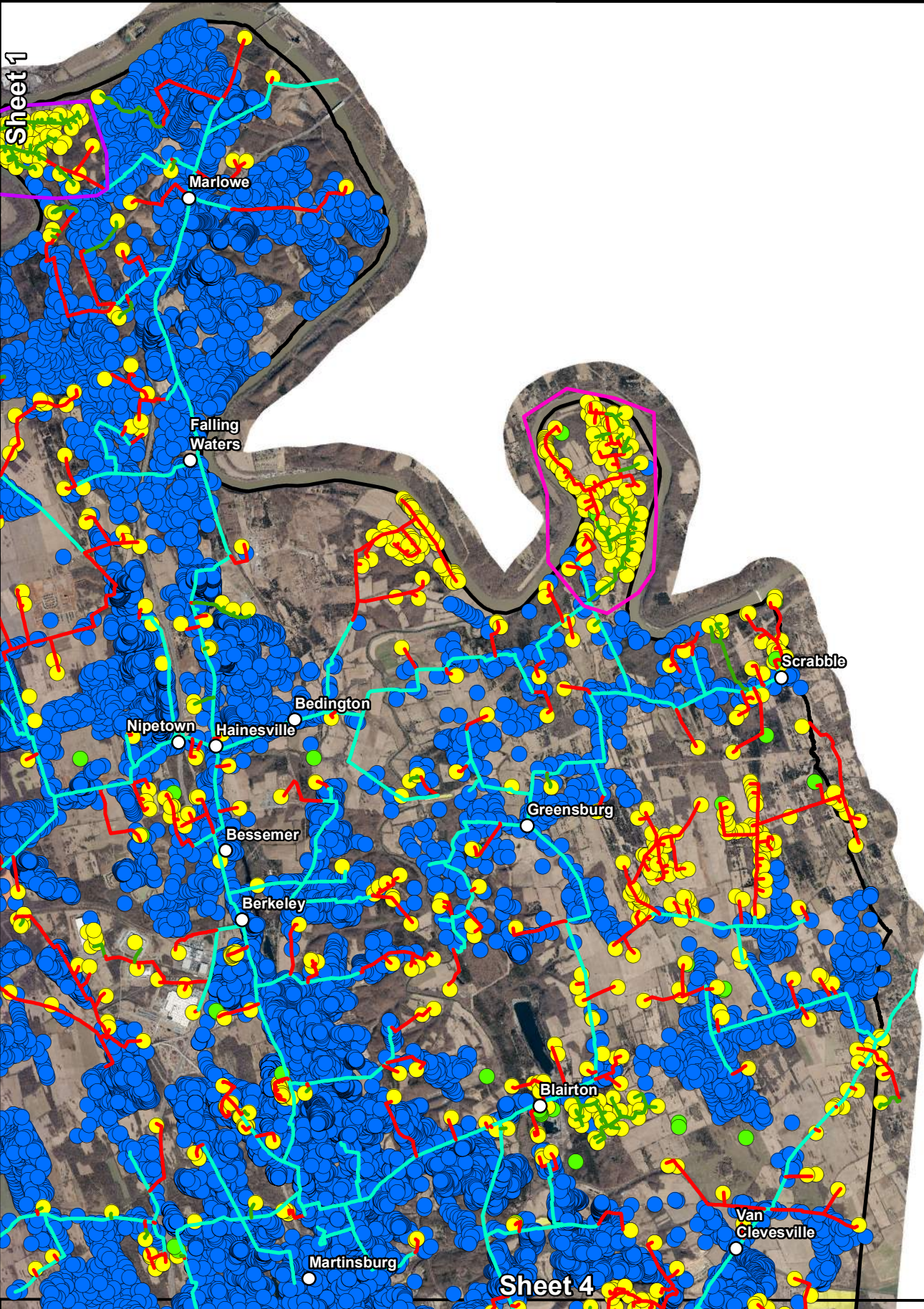
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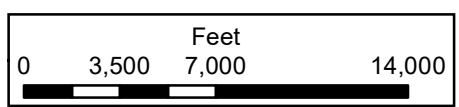
<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses Project 1 Boundary Project 2 Boundary Project 3 Boundary Frontier - RDOF 	<ul style="list-style-type: none"> Starlink Services, LLC - RDOF County Boundary Index 		<p>Feet</p> <p>0 3,500 7,000 14,000</p> 	<p>Sheet</p> <p>1</p>
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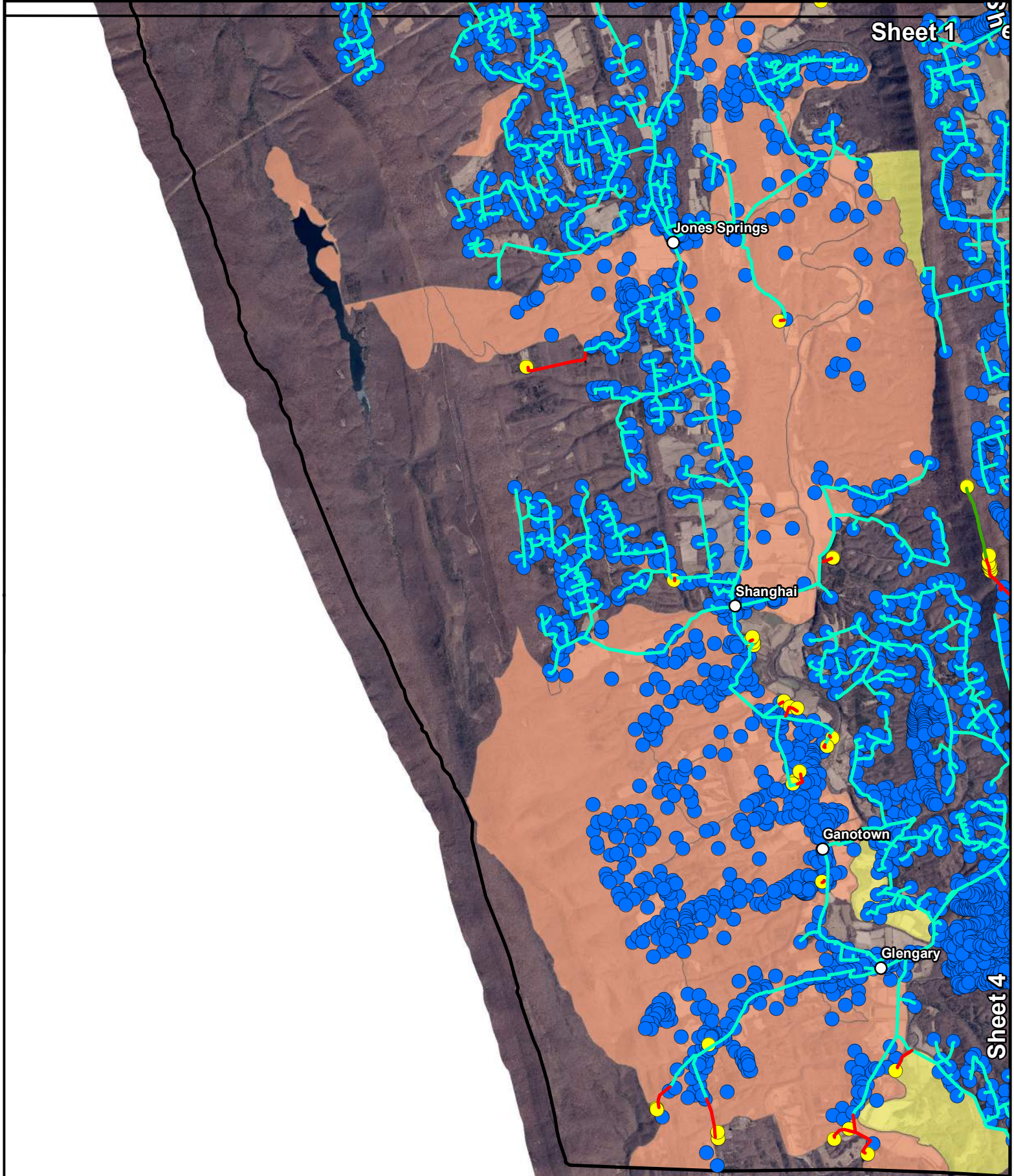


Sheet 4

- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index



Sheet
2



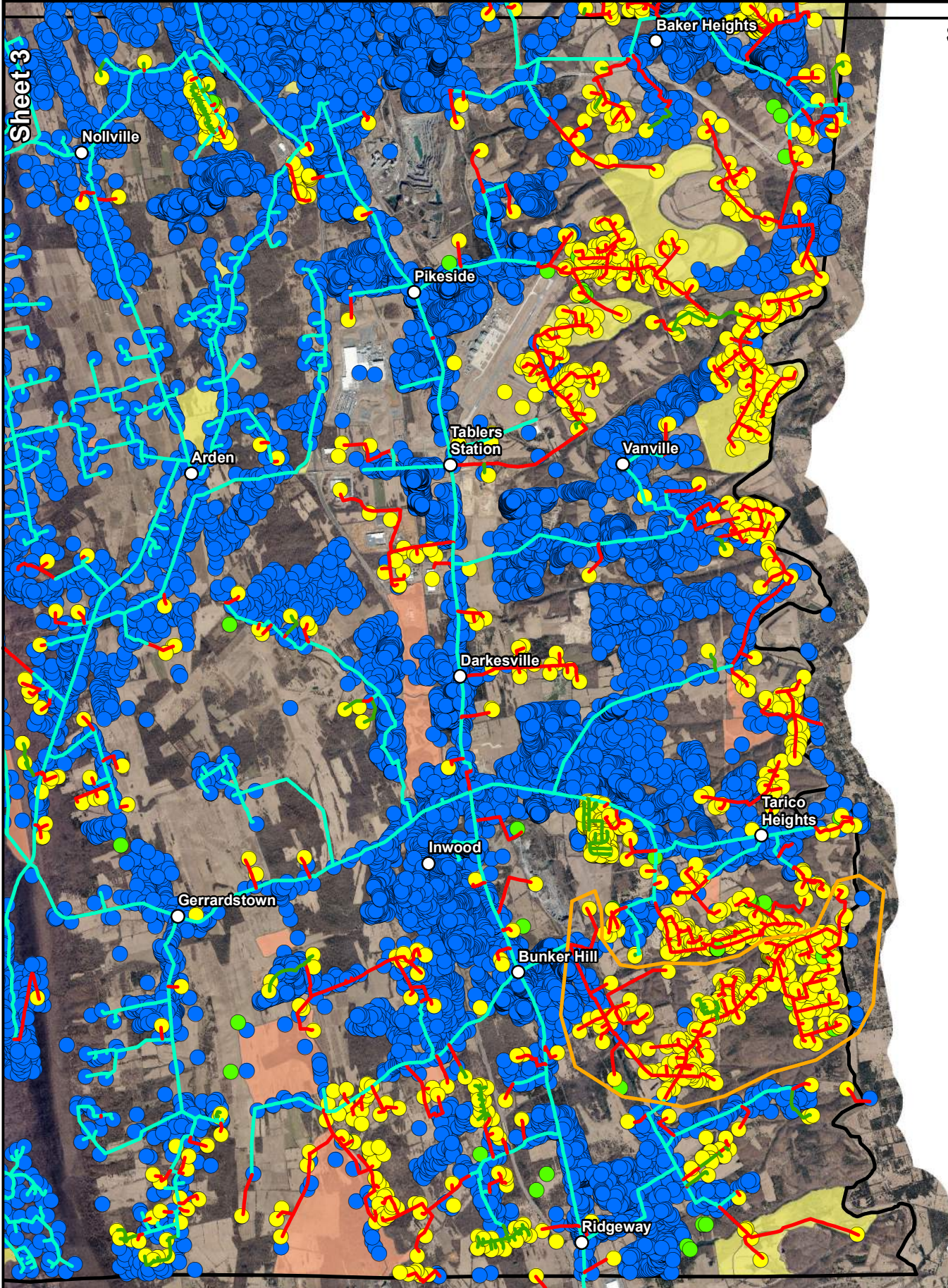
Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Feet

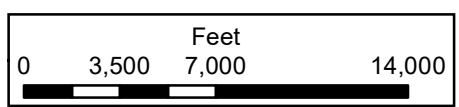
0 3,500 7,000 14,000

Sheet

3



- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
- Index



Sheet
4

Berkeley County, WV – 2023 ROC Study – Cost Estimate – Whole County

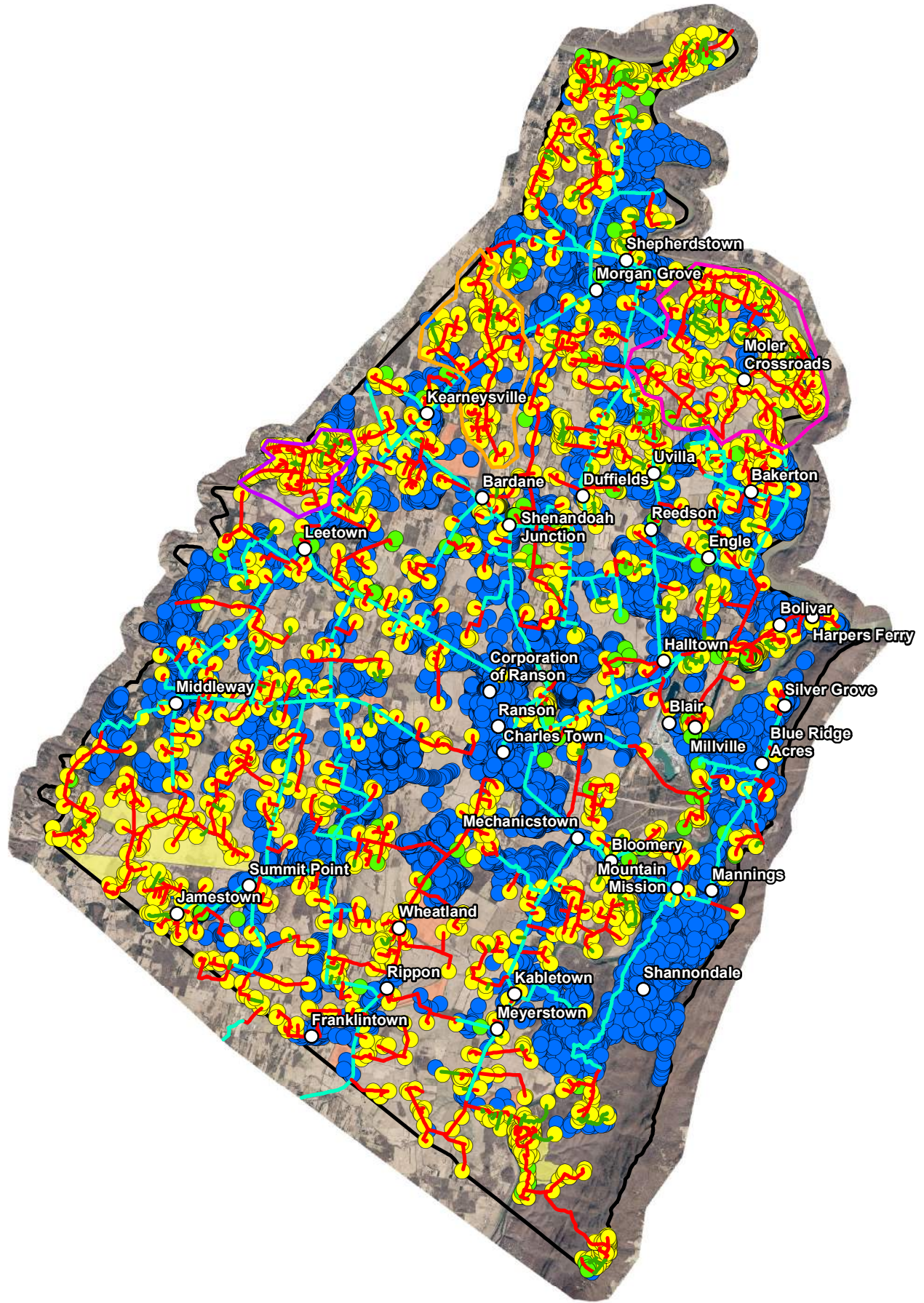
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	233.71	\$1,285,405
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	233.71	\$350,565
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	200.11	\$3,001,650
Aerial Construction Labor	\$50,000.00	Per Mile	200.11	\$10,005,500
Underground Construction Labor	\$150,000.00	Per Mile	33.60	\$5,040,000
Project Construction Contingency 10%	\$1,504,550.00	Lump Sum	1	\$1,504,550
Legal 1.5%	\$225,682.50	Lump Sum	1	\$225,683
Administrative 2%	\$300,910.00	Lump Sum	1	\$300,910
TOTAL COST = \$21,714,263				

COUNTY SAMPLE PROJECT

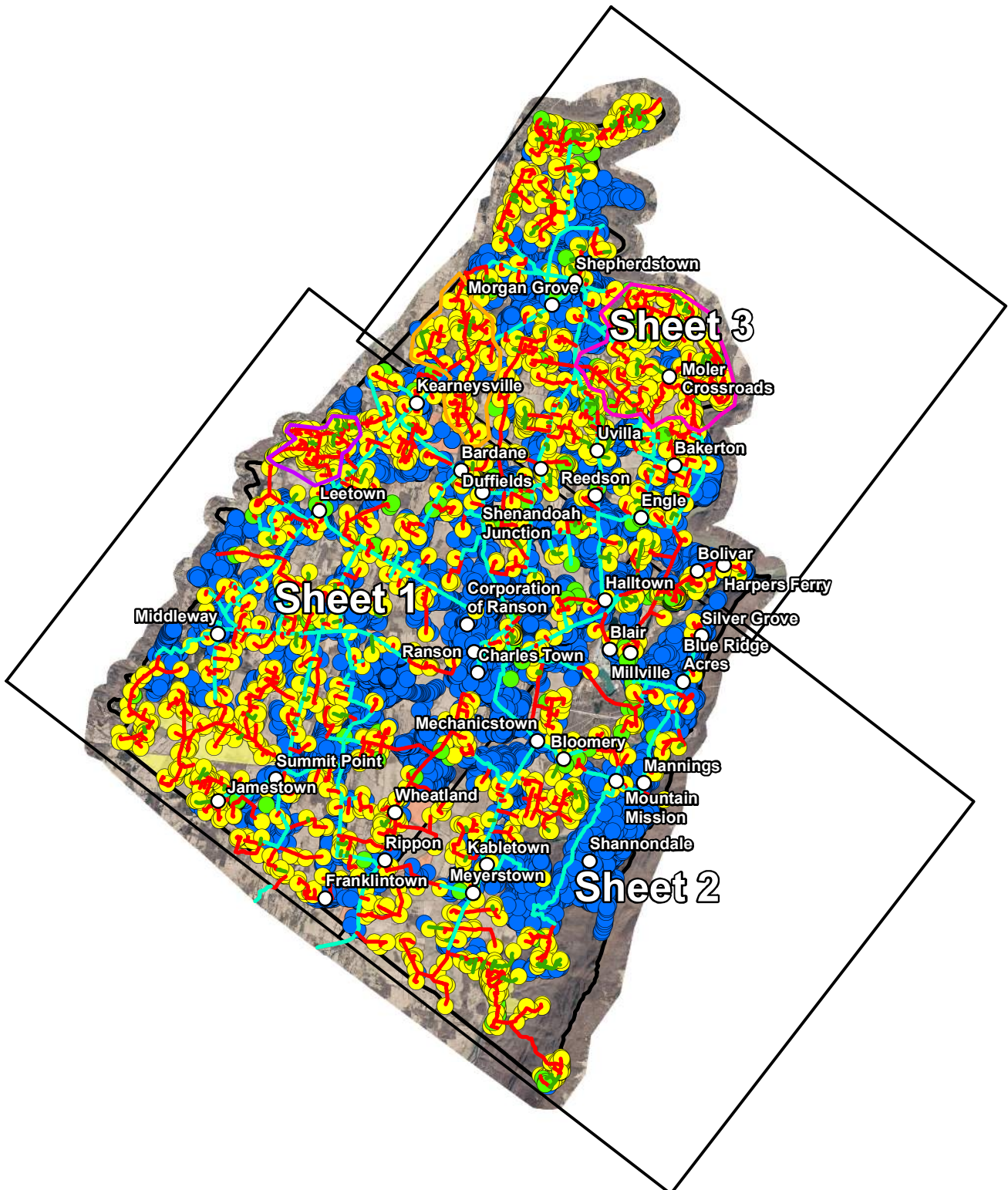
Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
9	Berkeley	1	56	5.42	\$866,135
		2	111	7.67	\$933,988
		3	255	15.84	\$1,308,470



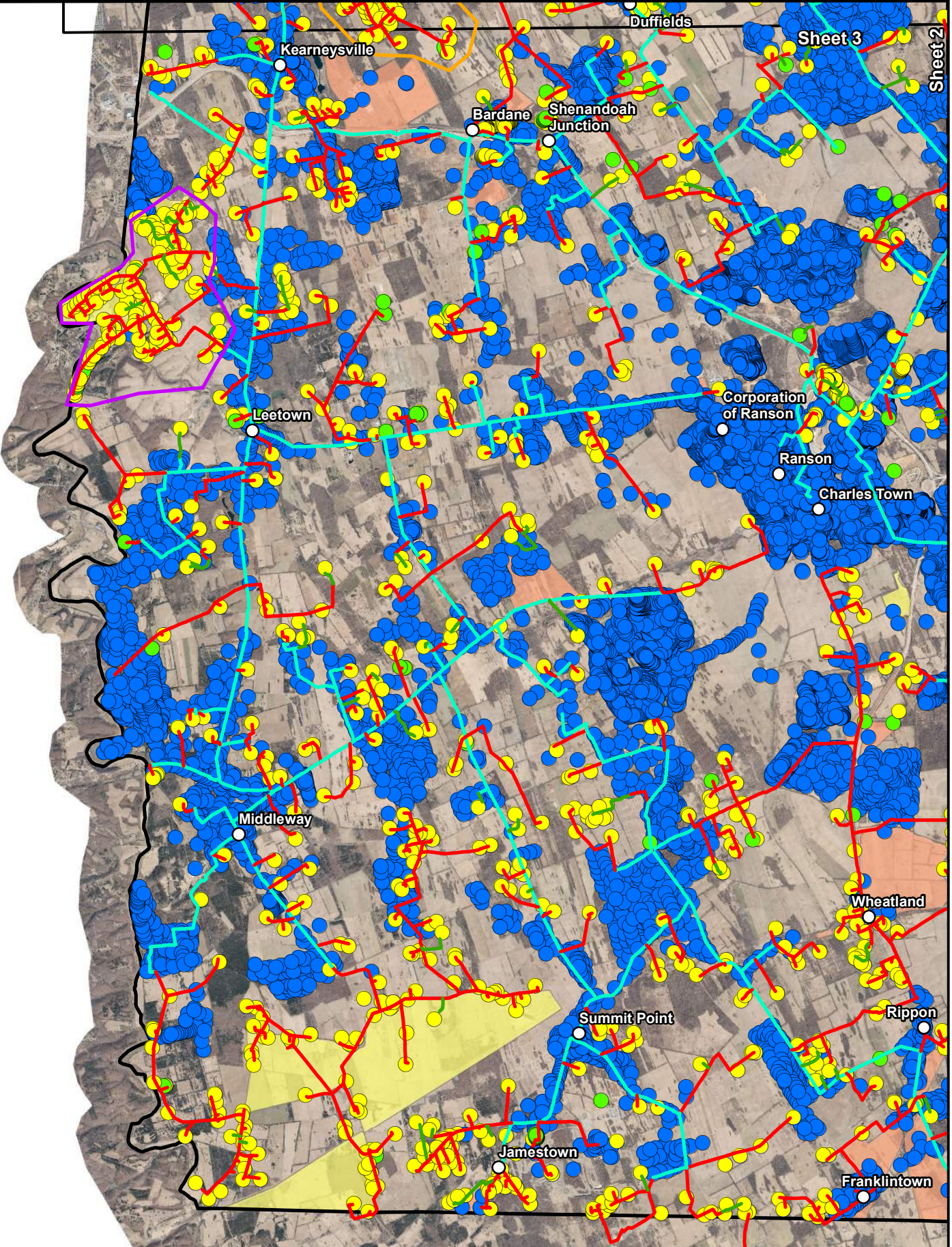
JEFFERSON COUNTY



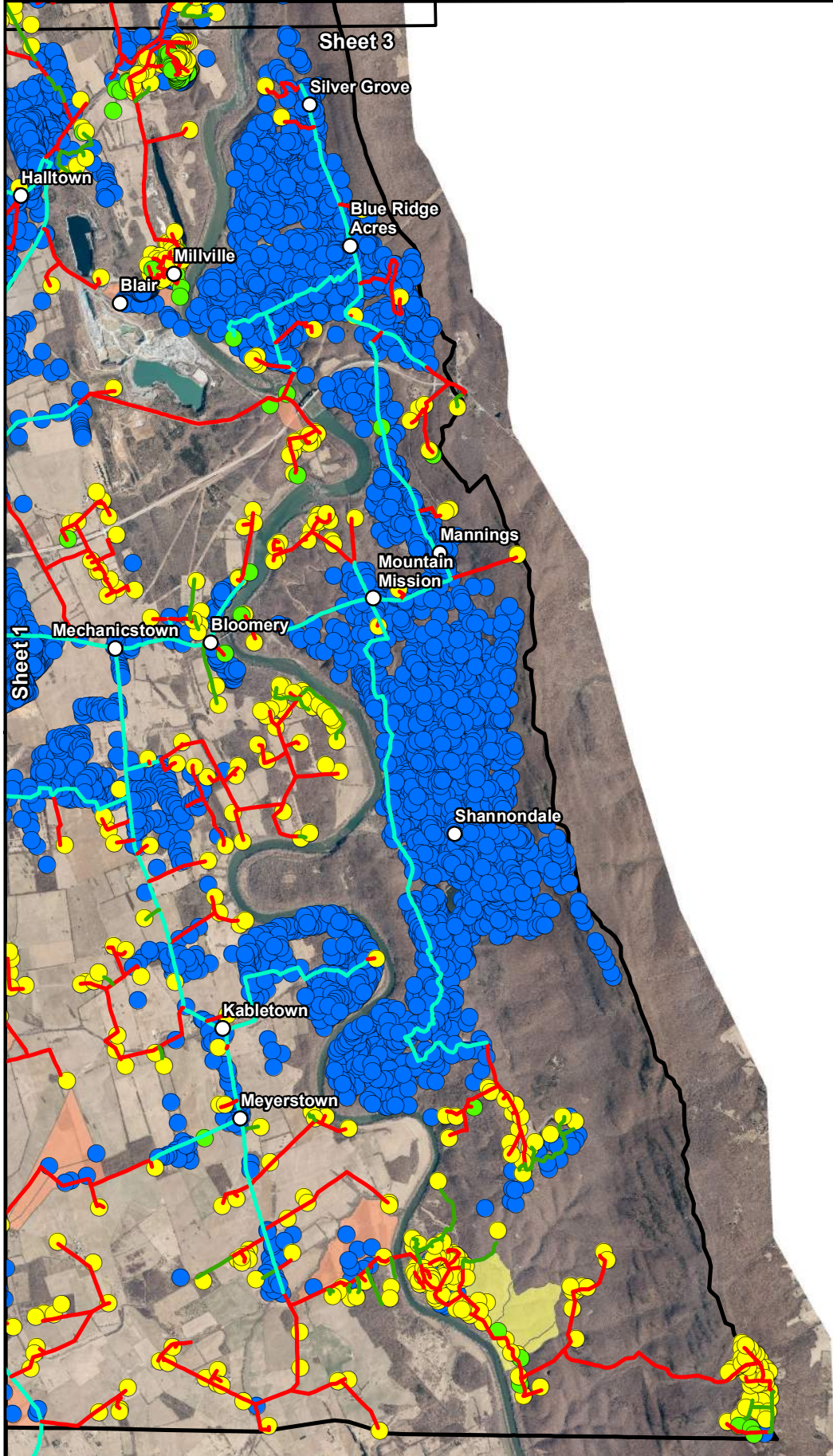
Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	



<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses Project 1 Boundary Project 2 Boundary Project 3 Boundary Frontier - RDOF 	<ul style="list-style-type: none"> Starlink Services, LLC - RDOF County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">10,000</td> <td style="text-align: center;">20,000</td> <td style="text-align: center;">40,000</td> </tr> </table>	Feet				0	10,000	20,000	40,000	<table border="1"> <tr> <td style="padding: 5px;">Sheet</td> </tr> <tr> <td style="padding: 5px;">INDEX</td> </tr> </table>	Sheet	INDEX
Feet															
0	10,000	20,000	40,000												
Sheet															
INDEX															



Existing Route	Other Addresses	Starlink Services, LLC - RDOF		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td>0</td> <td>3,500</td> <td>7,000</td> <td>14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td>1</td> </tr> </table>	Sheet	1
Feet															
0	3,500	7,000	14,000												
Sheet															
1															
Proposed Fiber	Project 1 Boundary	County Boundary													
Proposed Buried Fiber	Project 2 Boundary	Index													
Targeted Address	Project 3 Boundary	Frontier - RDOF													
Unserviceable Targeted Address															



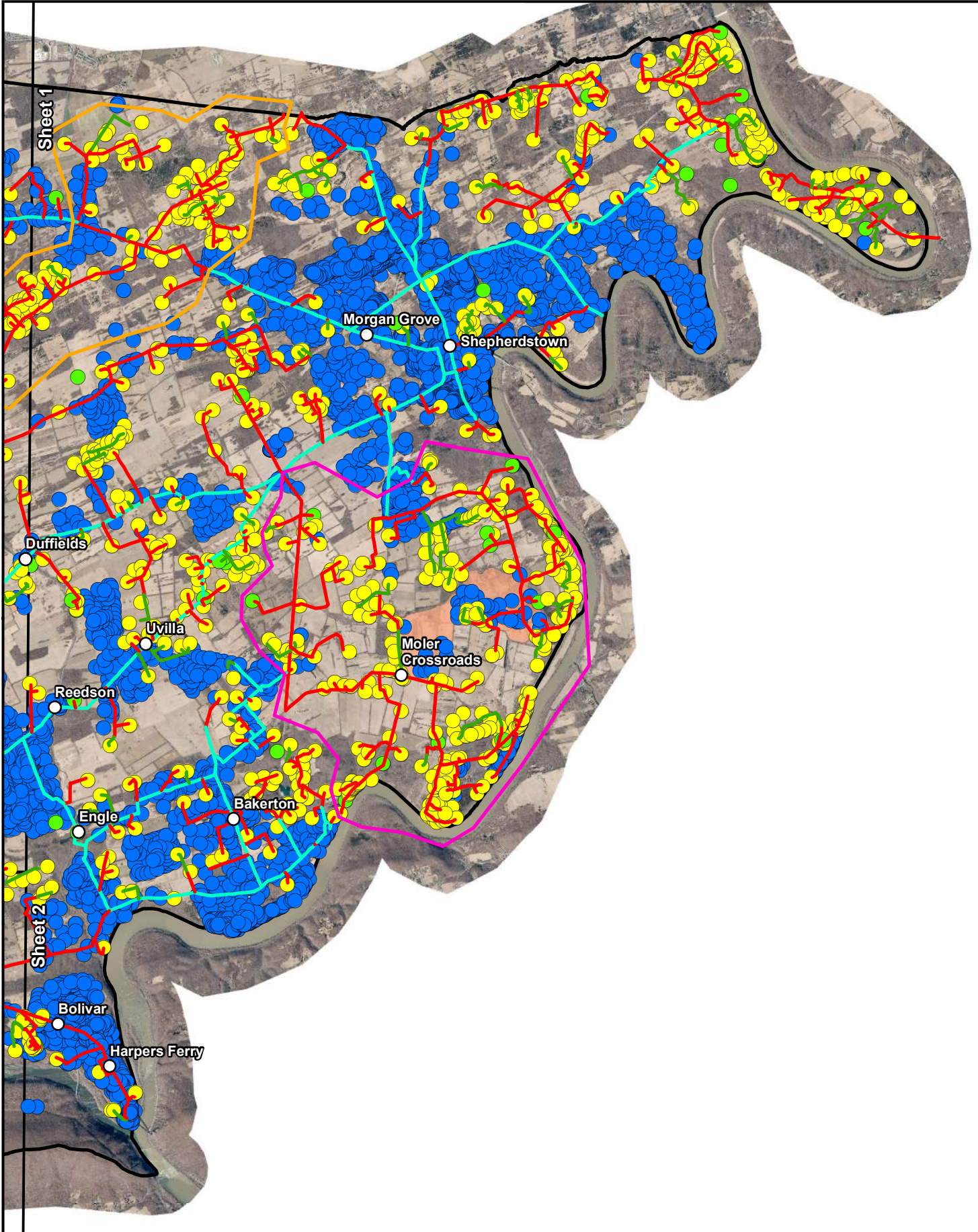
Existing Route	Other Addresses	Starlink Services, LLC - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Frontier - RDOF	

Feet

0 3,500 7,000 14,000

Sheet

2



<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses Project 1 Boundary Project 2 Boundary Project 3 Boundary Frontier - RDOF 	<ul style="list-style-type: none"> Starlink Services, LLC - RDOF County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="width: 25%;">0</td> <td style="width: 25%;">3,500</td> <td style="width: 25%;">7,000</td> <td style="width: 25%;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td style="text-align: center;">3</td> </tr> </table>	Sheet	3
Feet															
0	3,500	7,000	14,000												
Sheet															
3															

Jefferson County, WV – 2023 ROC Study – Cost Estimate – Whole County

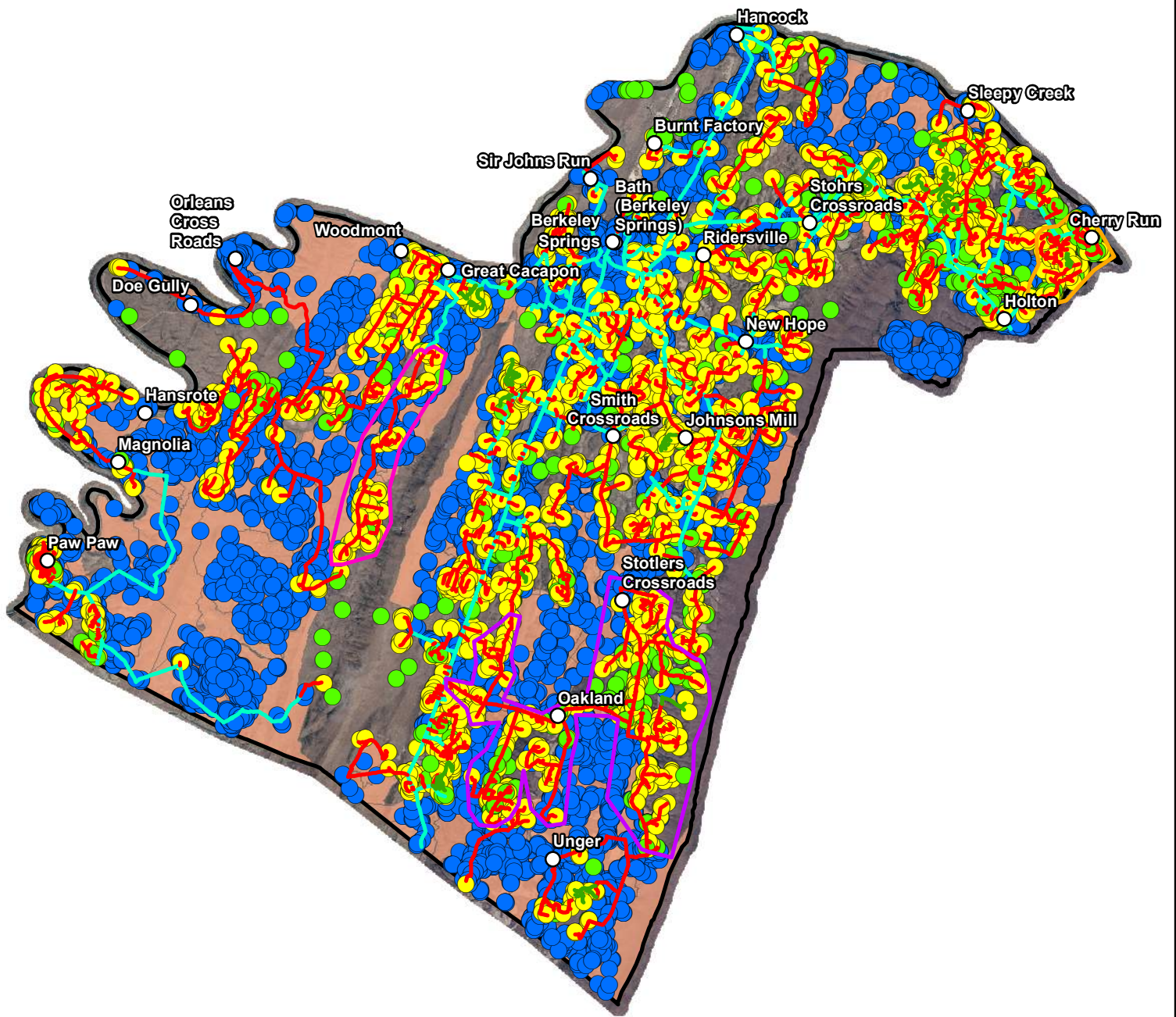
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	331.15	\$1,821,325
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	331.15	\$469,725
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	288.22	\$4,323,300
Aerial Construction Labor	\$50,000.00	Per Mile	288.22	\$14,411,000
Underground Construction Labor	\$150,000.00	Per Mile	42.93	\$6,439,500
Project Construction Contingency 10%	\$2,085,050.00	Lump Sum	1	\$2,085,050
Legal 1.5%	\$312,757.50	Lump Sum	1	\$312,758
Administrative 2%	\$417,010.00	Lump Sum	1	\$417,010
TOTAL COST = \$30,306,668				

COUNTY SAMPLE PROJECT

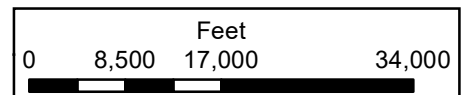
Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
9	Jefferson	1	137	10.63	\$992,743
		2	284	32.34	\$3,118,075
		3	123	15.31	\$1,365,233

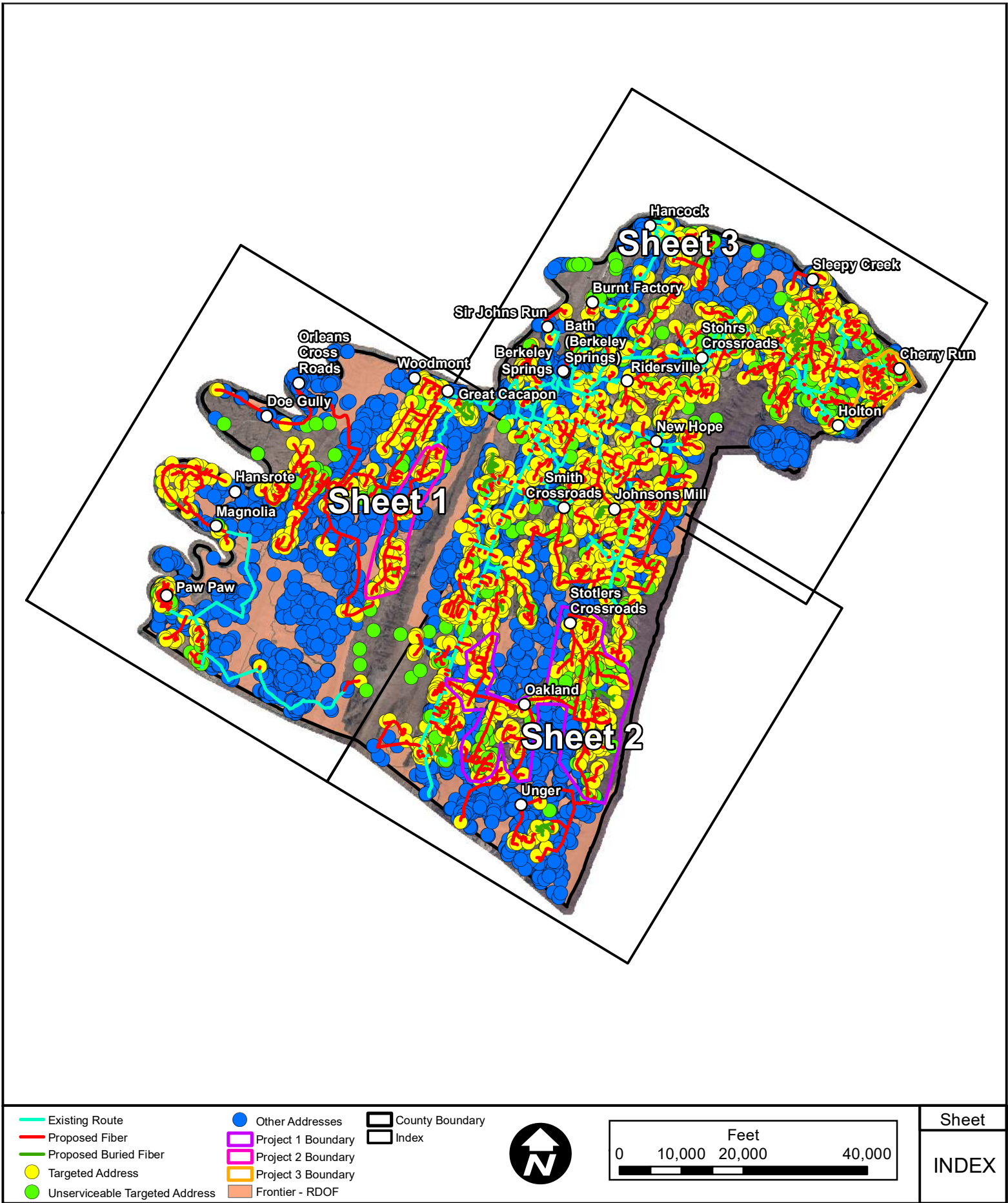


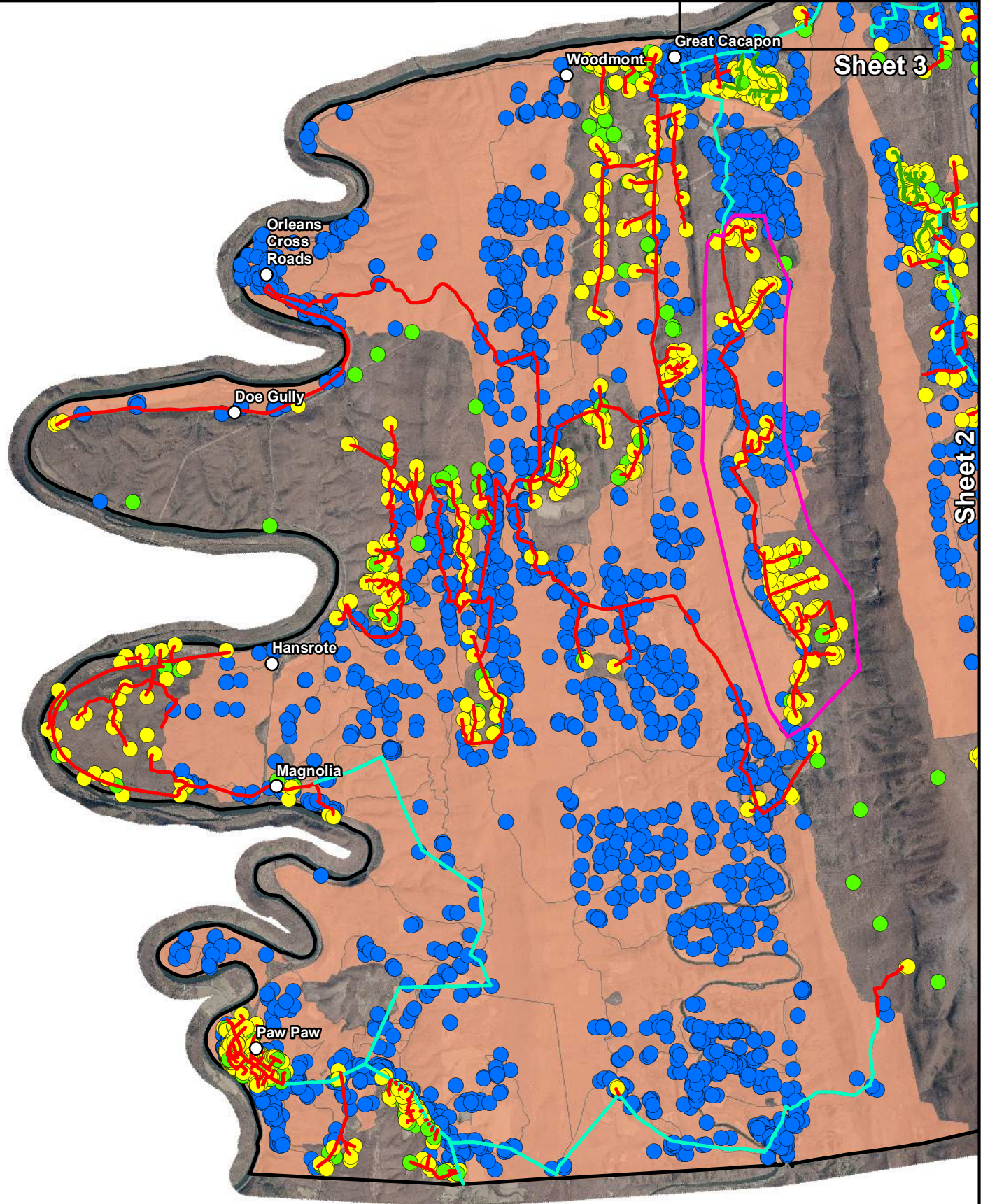
MORGAN COUNTY



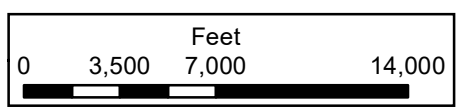
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary



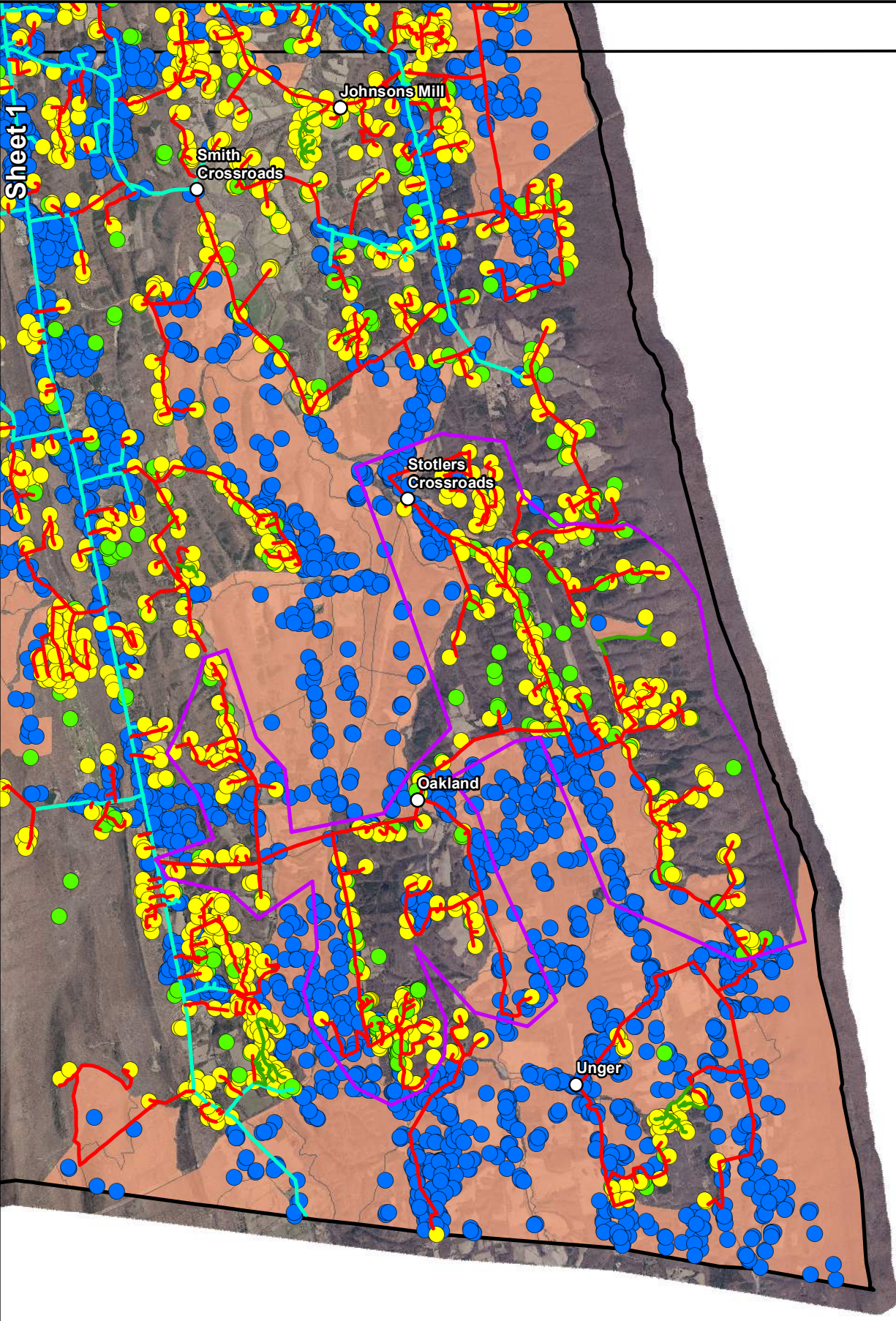




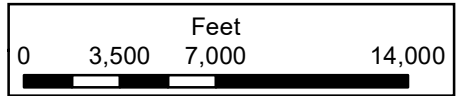
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary
- Index



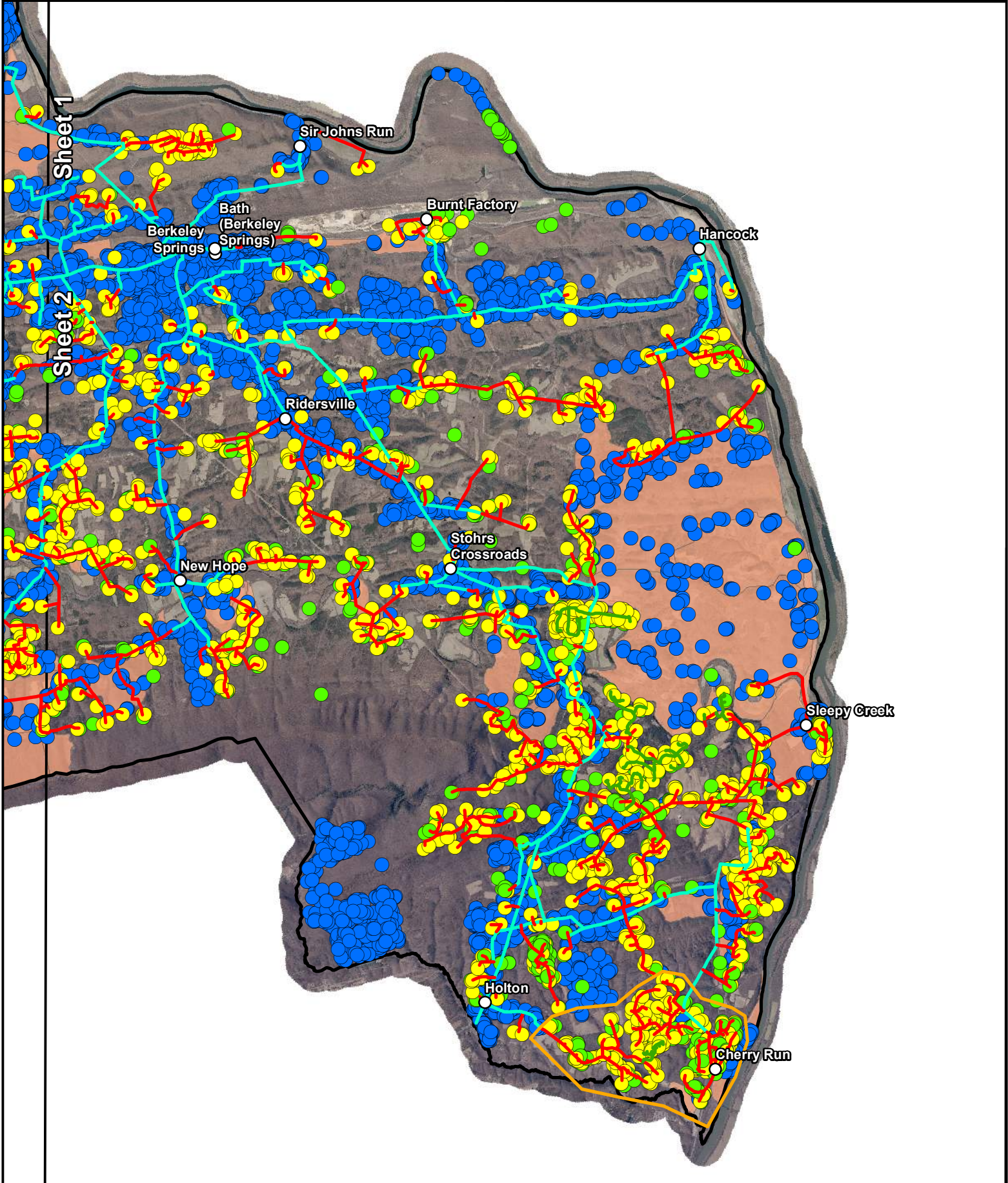
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- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- County Boundary
- Index



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<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses Project 1 Boundary Project 2 Boundary Project 3 Boundary Frontier - RDOF 	<ul style="list-style-type: none"> County Boundary Index 		<table border="1"> <tr> <td colspan="4">Feet</td> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">3,500</td> <td style="text-align: center;">7,000</td> <td style="text-align: center;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td style="text-align: center;">3</td> </tr> </table>	Sheet	3
Feet															
0	3,500	7,000	14,000												
Sheet															
3															

Morgan County, WV – 2023 ROC Study – Cost Estimate – Whole County

Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	311.06	\$1,710,830
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	311.06	\$466,590
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	294.72	\$4,420,800
Aerial Construction Labor	\$50,000.00	Per Mile	294.72	\$14,736,000
Underground Construction Labor	\$150,000.00	Per Mile	16.34	\$2,451,000
Project Construction Contingency 10%	\$1,718,700.00	Lump Sum	1	\$1,718,700
Legal 1.5%	\$257,805.00	Lump Sum	1	\$257,805
Administrative 2%	\$343,740.00	Lump Sum	1	\$343,740

TOTAL COST = \$26,105,465

COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
9	Morgan	1	365	44.32	\$3,576,880
		2	91	10.13	\$797,738
		3	183	9.90	\$943,650

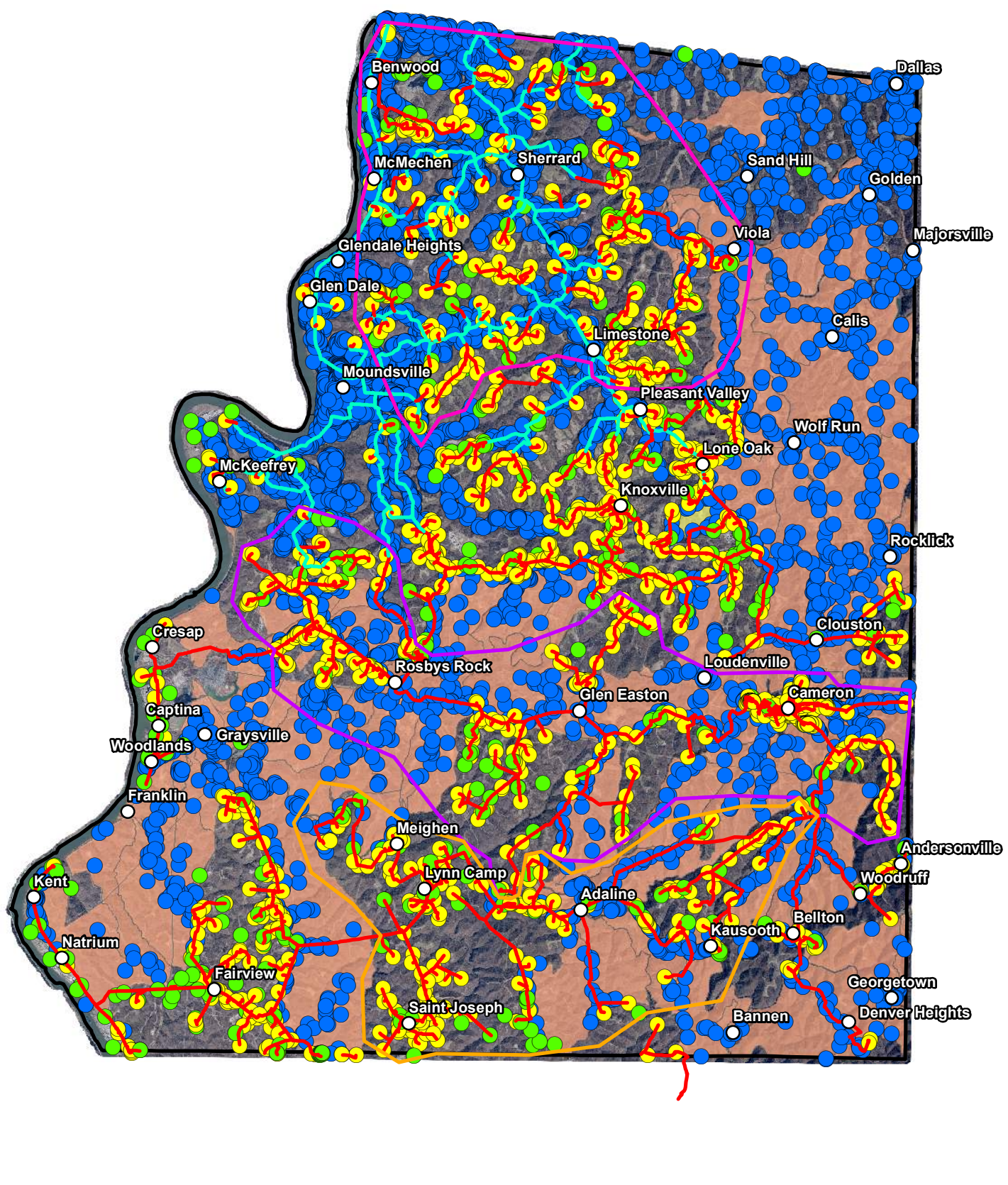
REGION 10












Marshall, Ohio, and Wetzel Counties






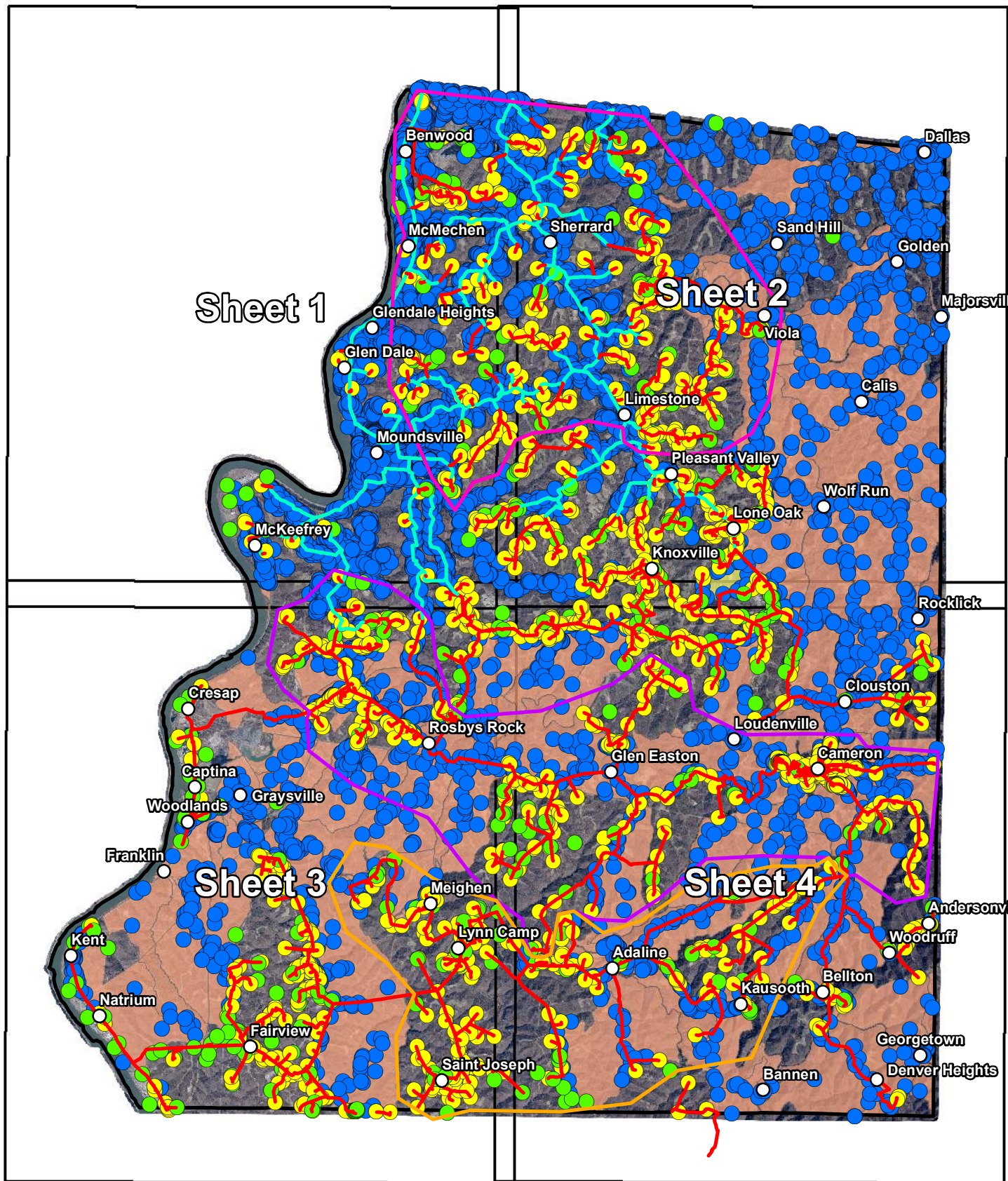
MARSHALL COUNTY



 Existing Route	 Project 1 Boundary	 County Boundary
 Proposed Fiber	 Project 2 Boundary	
 Targeted Address	 Project 3 Boundary	
 Unserviceable Targeted Address	 Citynet West Virginia, LLC - RDOF	
 Other Addresses	 Frontier - RDOF	

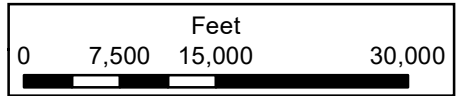


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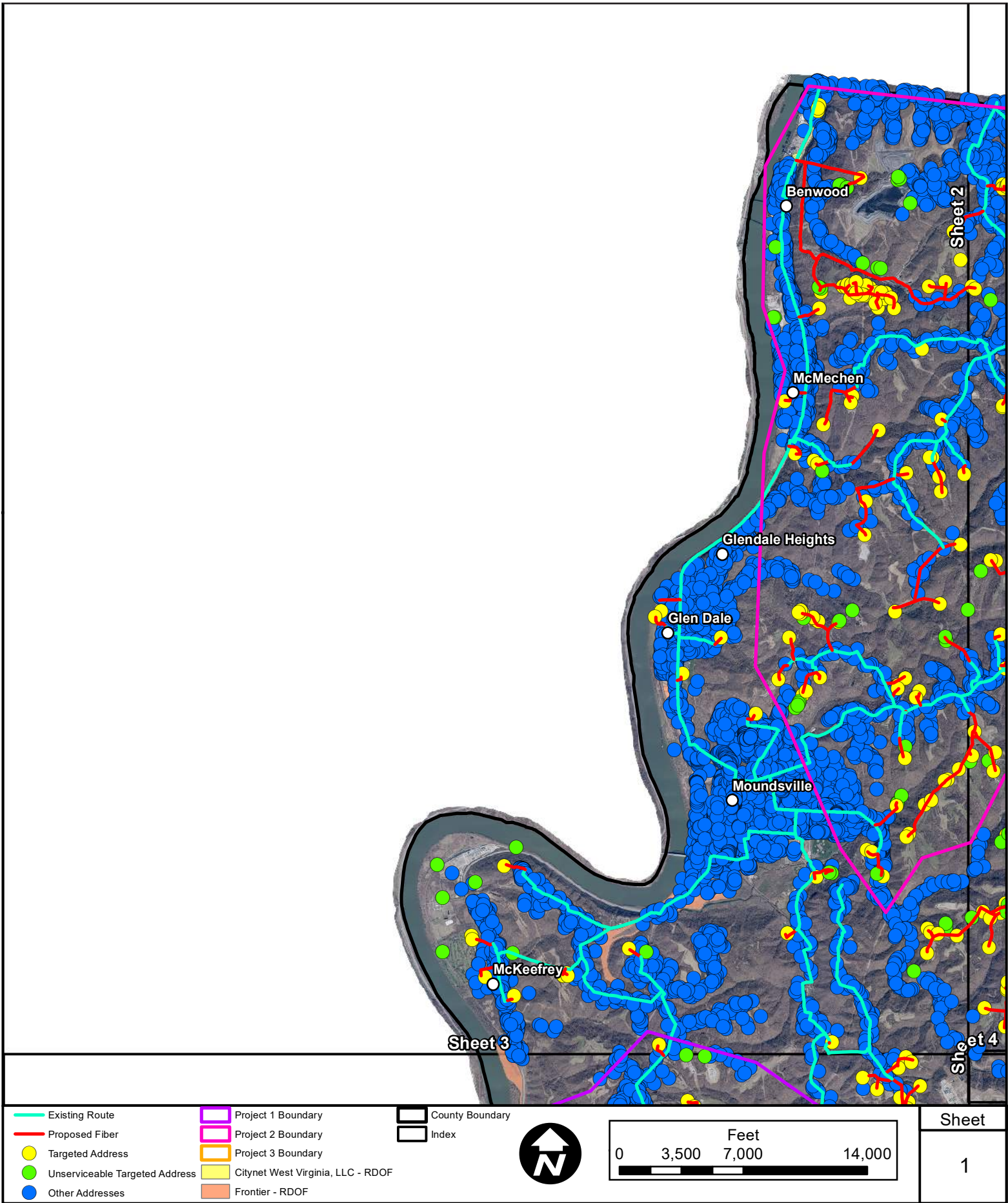


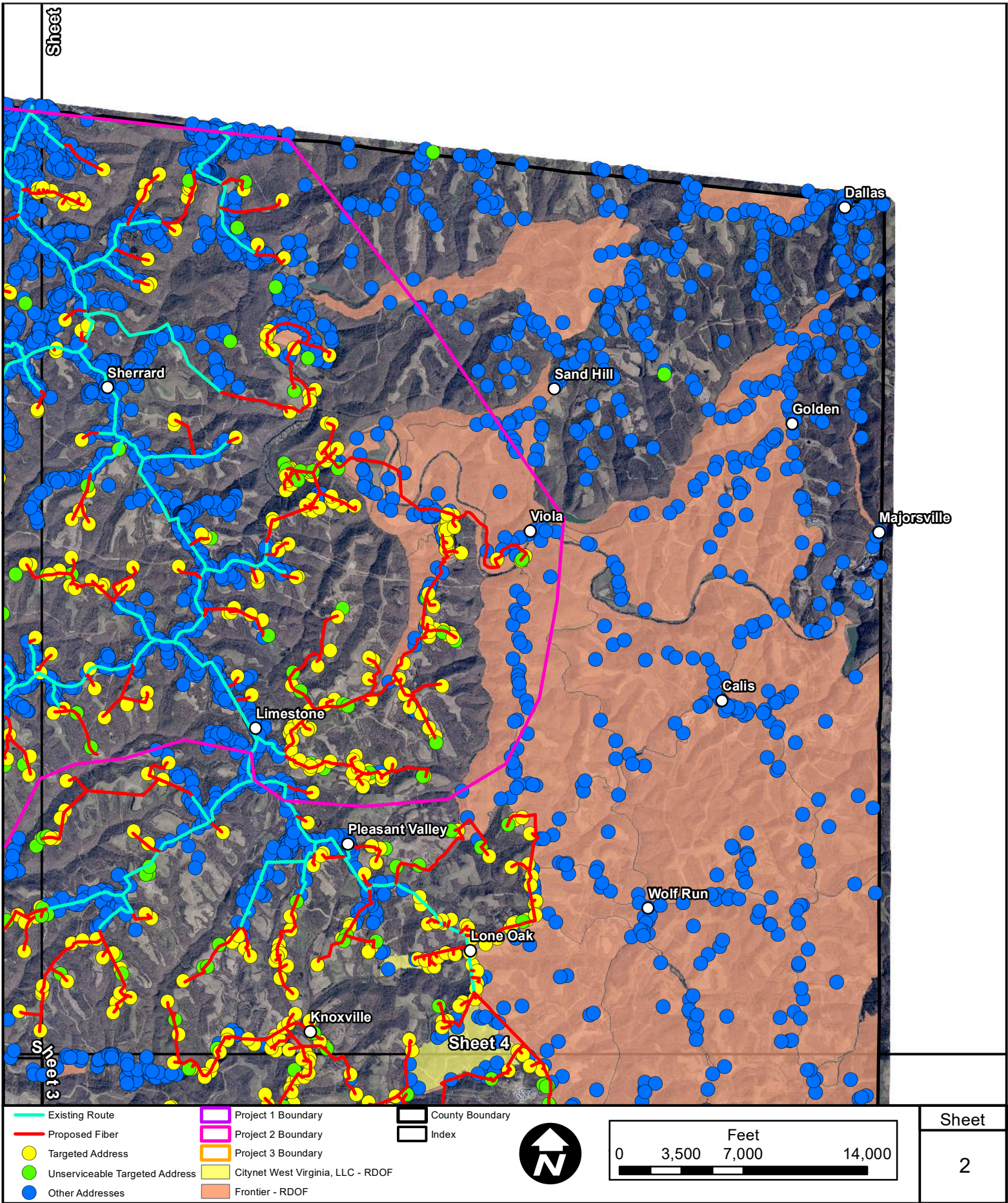
- Existing Route
- Proposed Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Citynet West Virginia, LLC - RDOF
- Frontier - RDOF

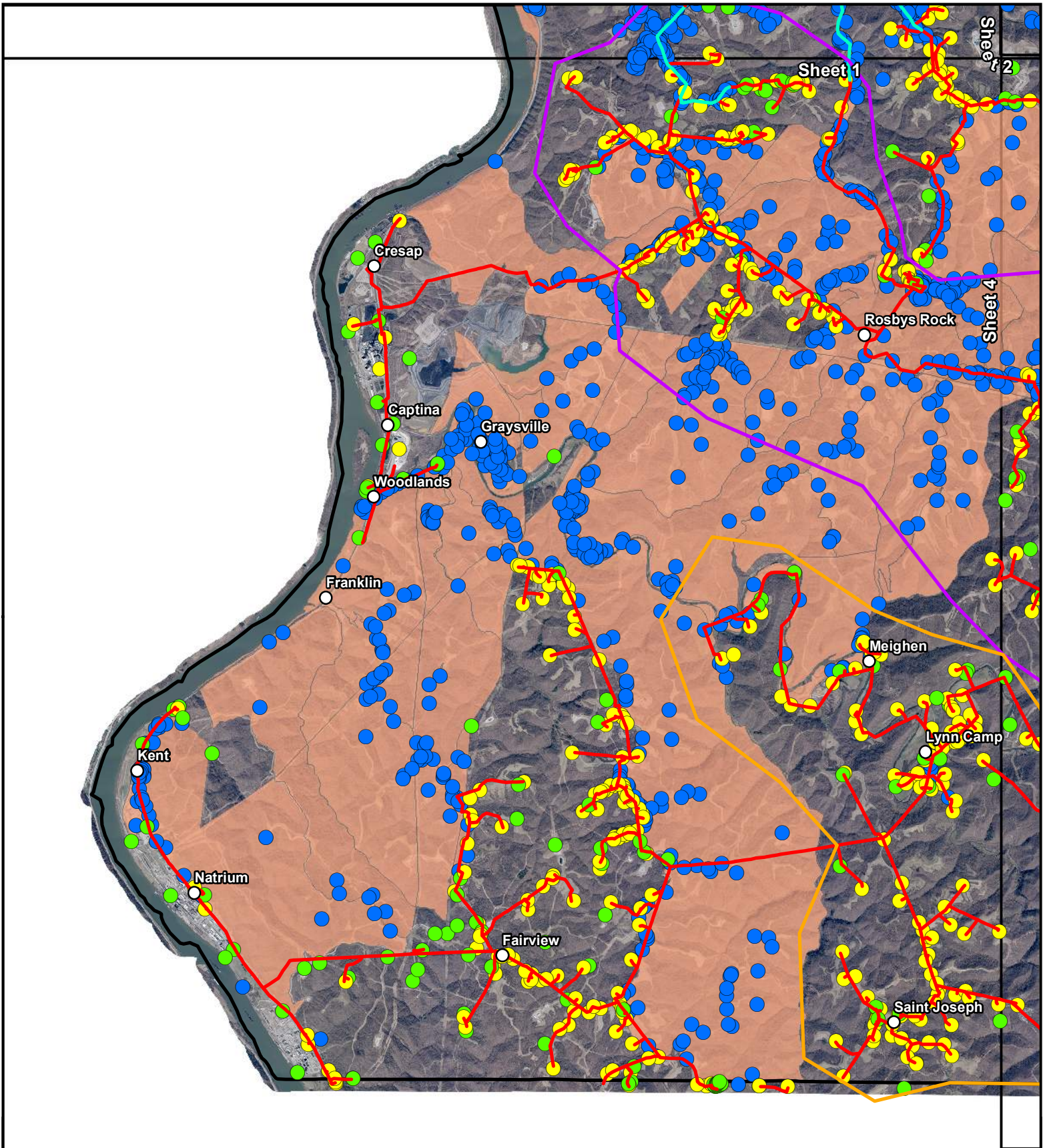
- County Boundary
- Index



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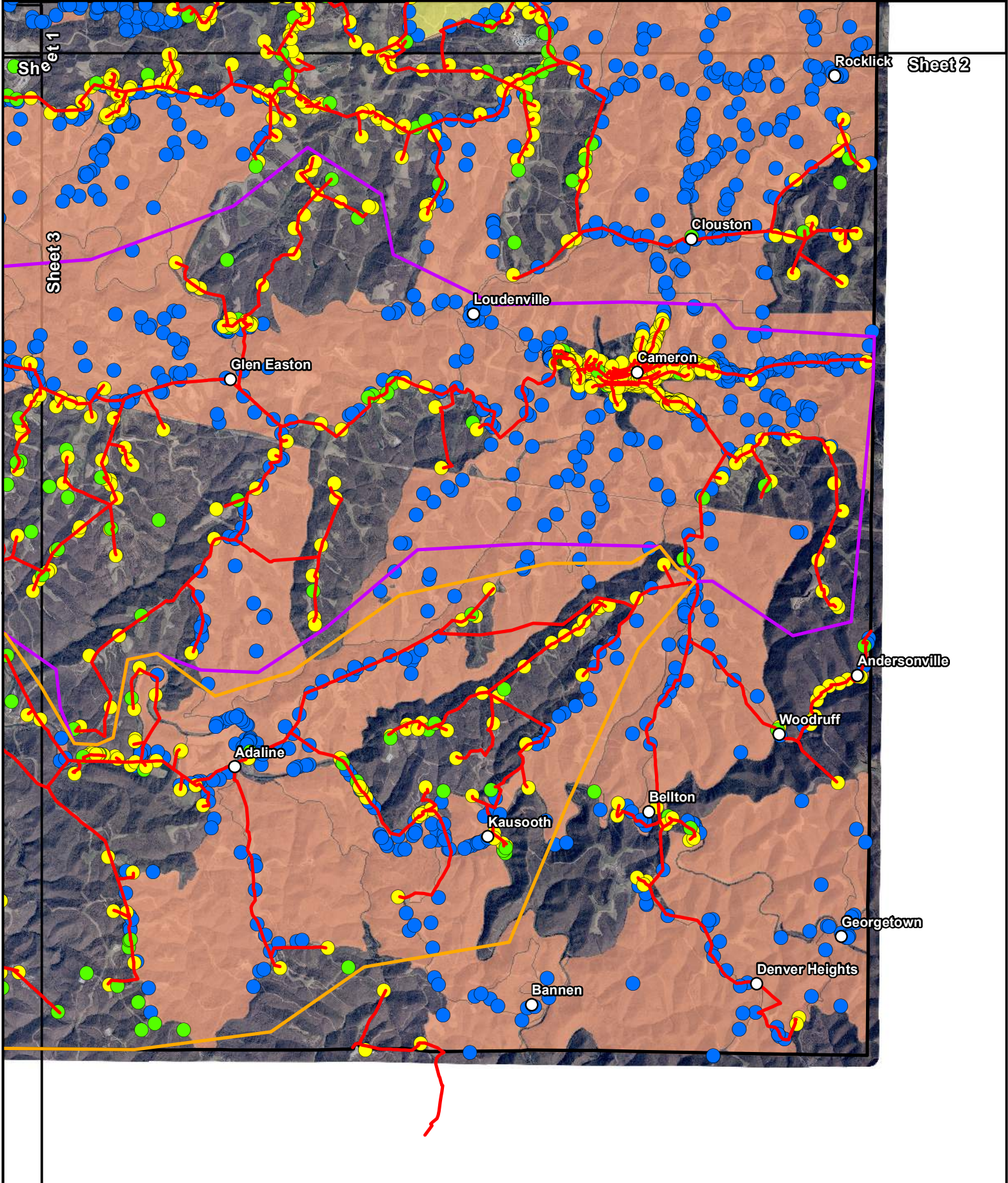




Existing Route	Project 1 Boundary	County Boundary
Proposed Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	
Other Addresses	Frontier - RDOF	

Feet			
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Existing Route	Project 1 Boundary	County Boundary
Proposed Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	
Other Addresses	Frontier - RDOF	

Feet

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Sheet
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Marshall County, WV – 2023 ROC Study – Cost Estimate – Whole County

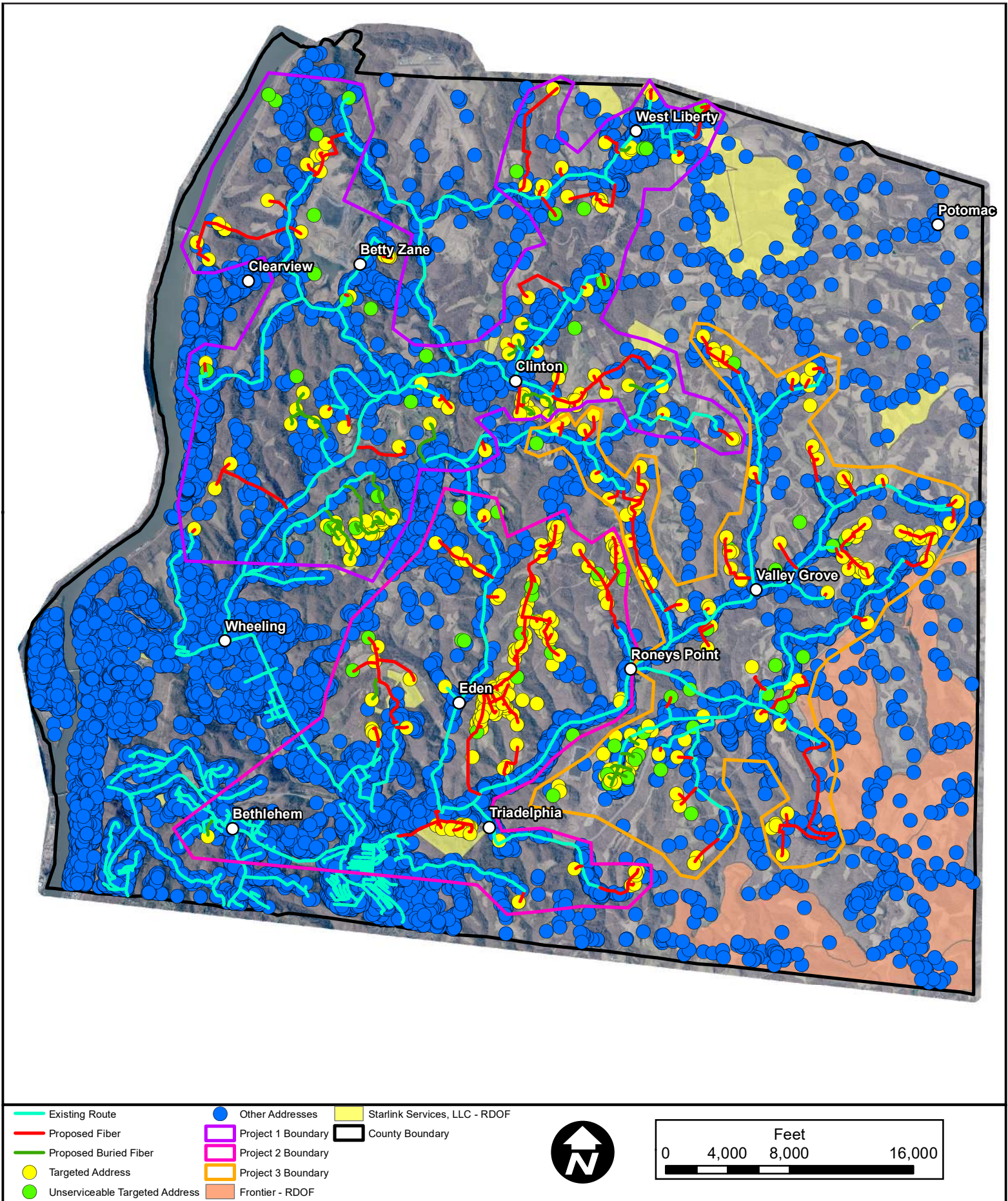
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	297.58	\$1,636,690
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	297.58	\$446,370
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	297.58	\$4,463,700
Aerial Construction Labor	\$50,000.00	Per Mile	297.85	\$14,879,000
Underground Construction Labor	\$150,000.00	Per Mile	0.00	\$0
Project Construction Contingency 10%	\$1,487,900.00	Lump Sum	1	\$1,487,900
Legal 1.5%	\$223,185.00	Lump Sum	1	\$223,185
Administrative 2%	\$297,580.00	Lump Sum	1	\$297,580
TOTAL COST = \$23,434,425				

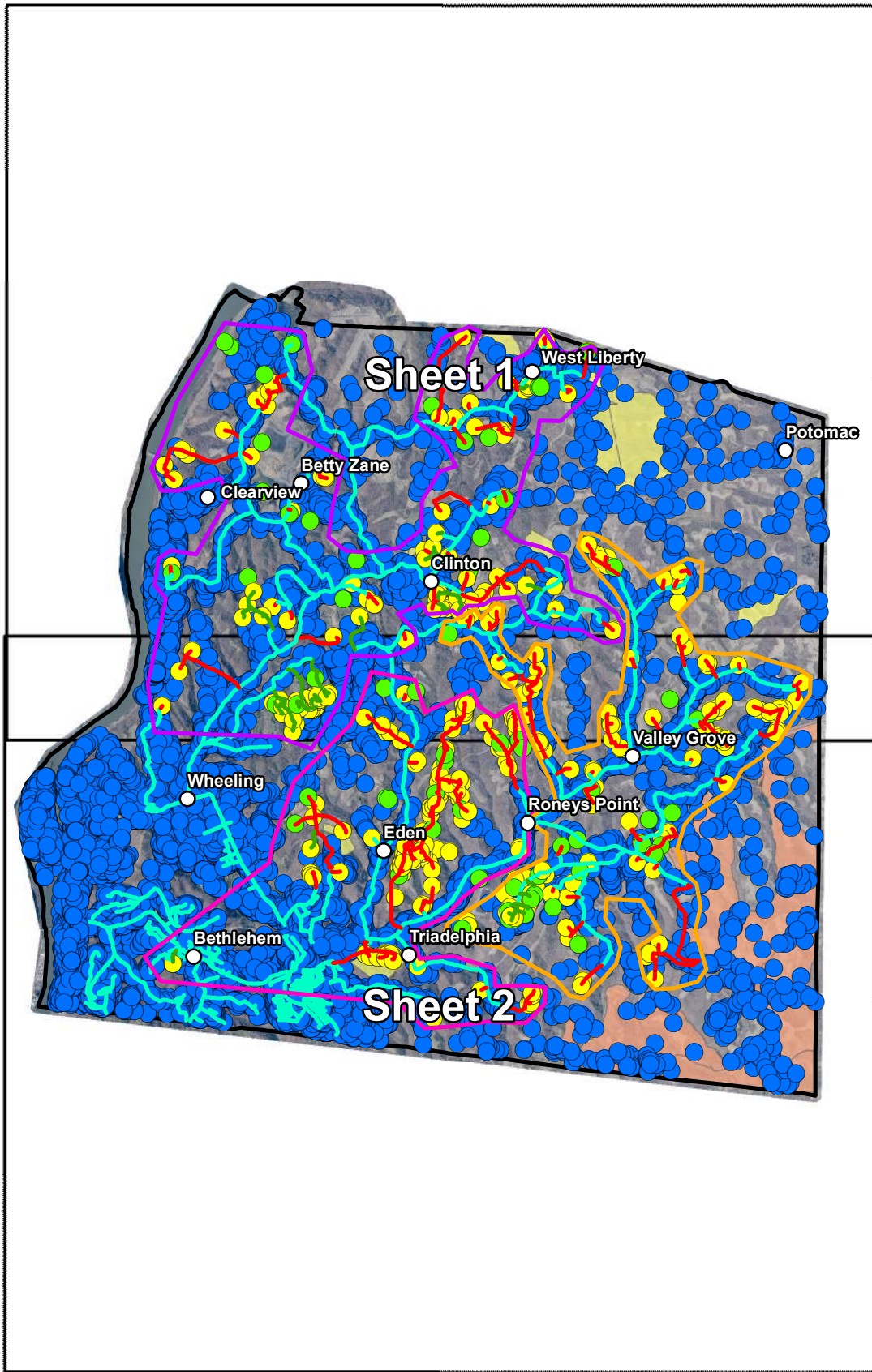
COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
10	Marshall	1	710	69.22	\$5,451,075
		2	299	52.84	\$4,161,150
		3	192	56.52	\$4,450,950

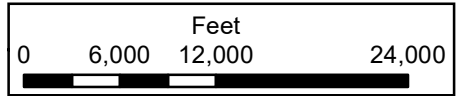


OHIO COUNTY

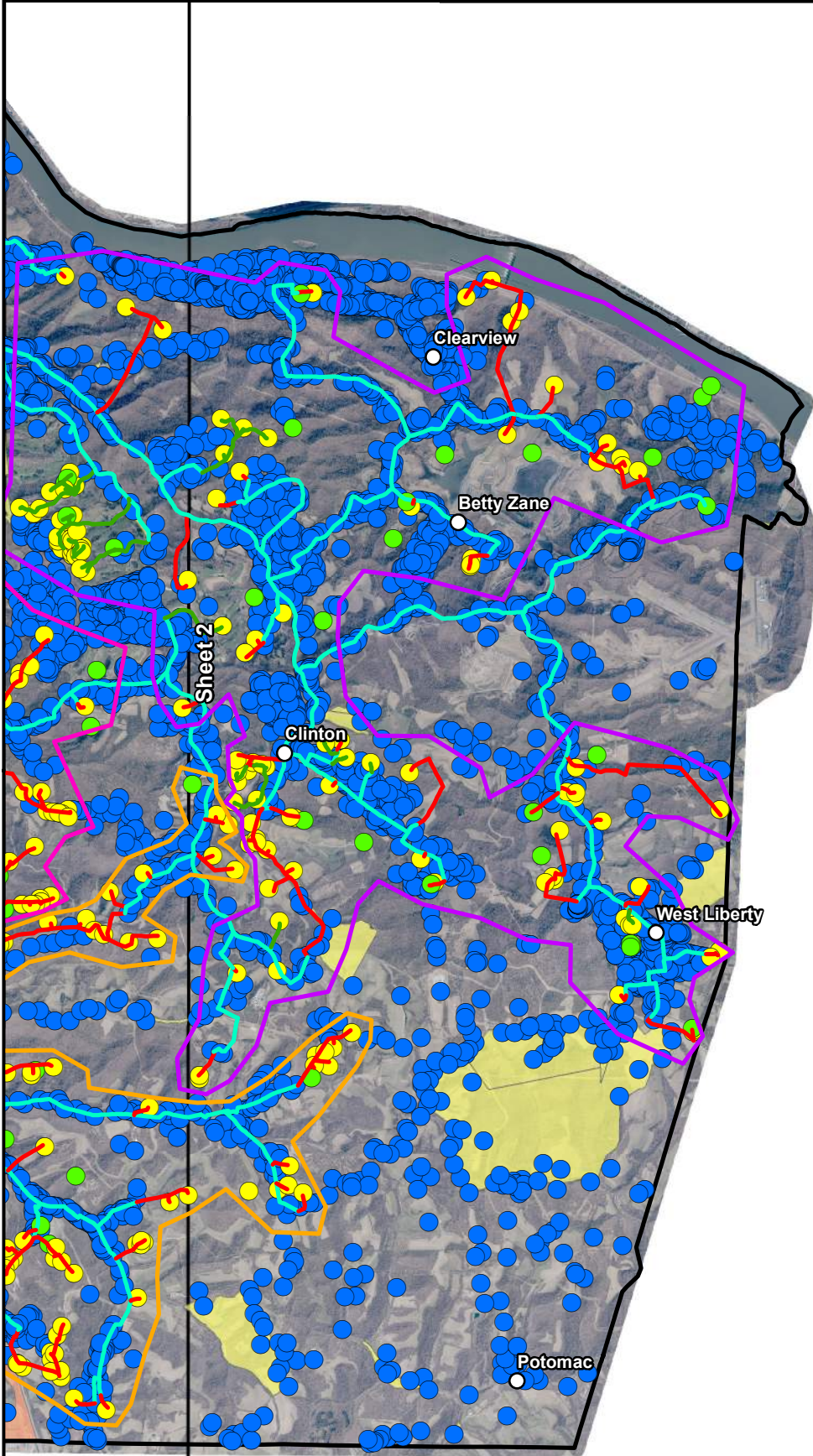




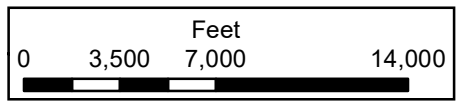
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Starlink Services, LLC - RDOF
- County Boundary
- Index
- Frontier - RDOF



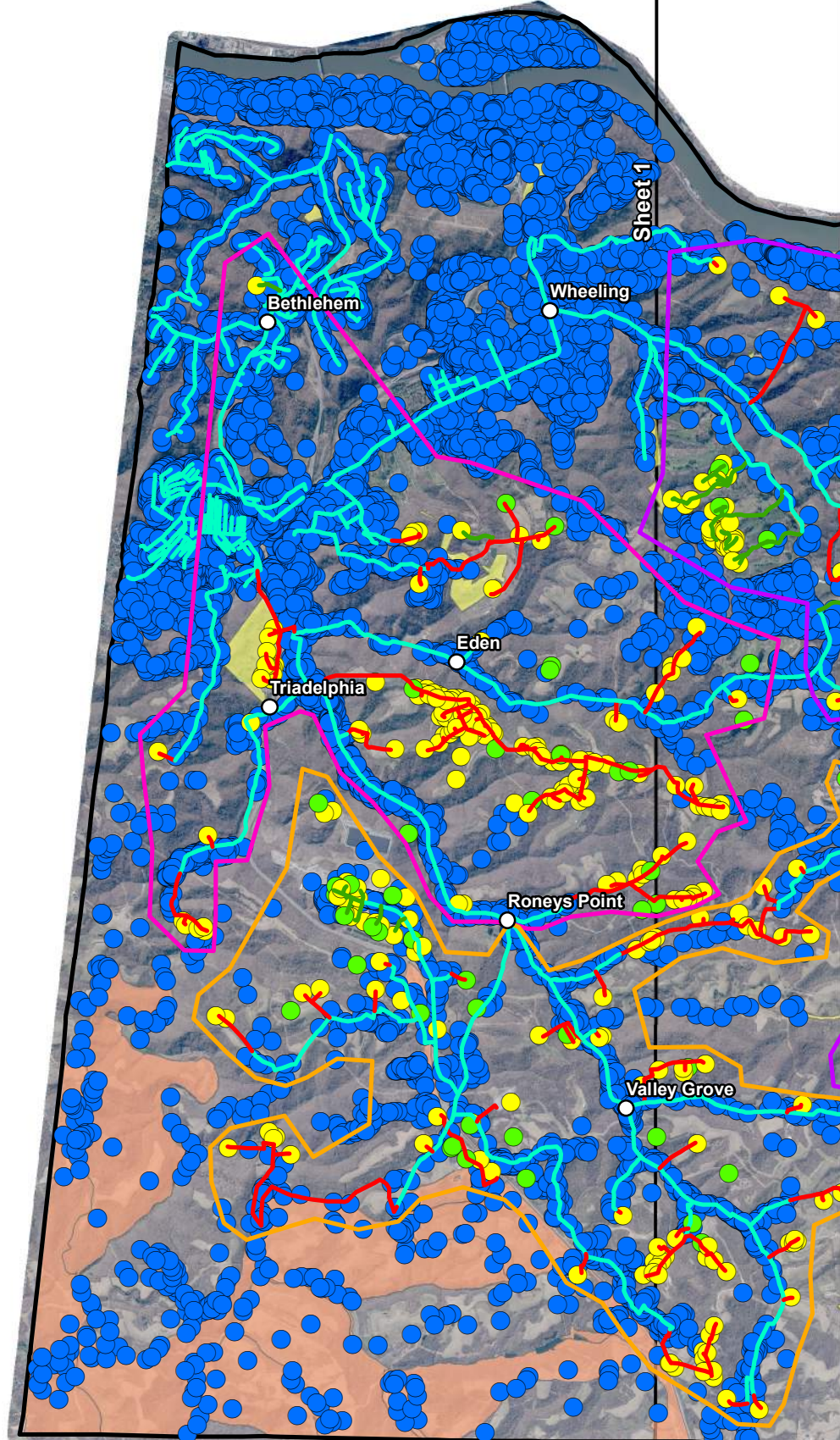
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INDEX



- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Starlink Services, LLC - RDOF
- County Boundary
- Index
- Frontier - RDOF

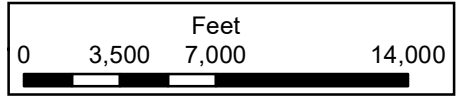


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Sheet 1

- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Starlink Services, LLC - RDOF
- County Boundary
- Index
- Frontier - RDOF



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2

Ohio County, WV – 2023 ROC Study – Cost Estimate – Whole County

Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	52.87	\$290,785
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	52.87	\$79,305
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	44.84	\$672,600
Aerial Construction Labor	\$50,000.00	Per Mile	44.84	\$2,242,000
Underground Construction Labor	\$150,000.00	Per Mile	8.03	\$1,204,500
Project Construction Contingency 10%	\$344,650.00	Lump Sum	1	\$344,650
Legal 1.5%	\$51,697.50	Lump Sum	1	\$51,698
Administrative 2%	\$68,930.00	Lump Sum	1	\$68,930

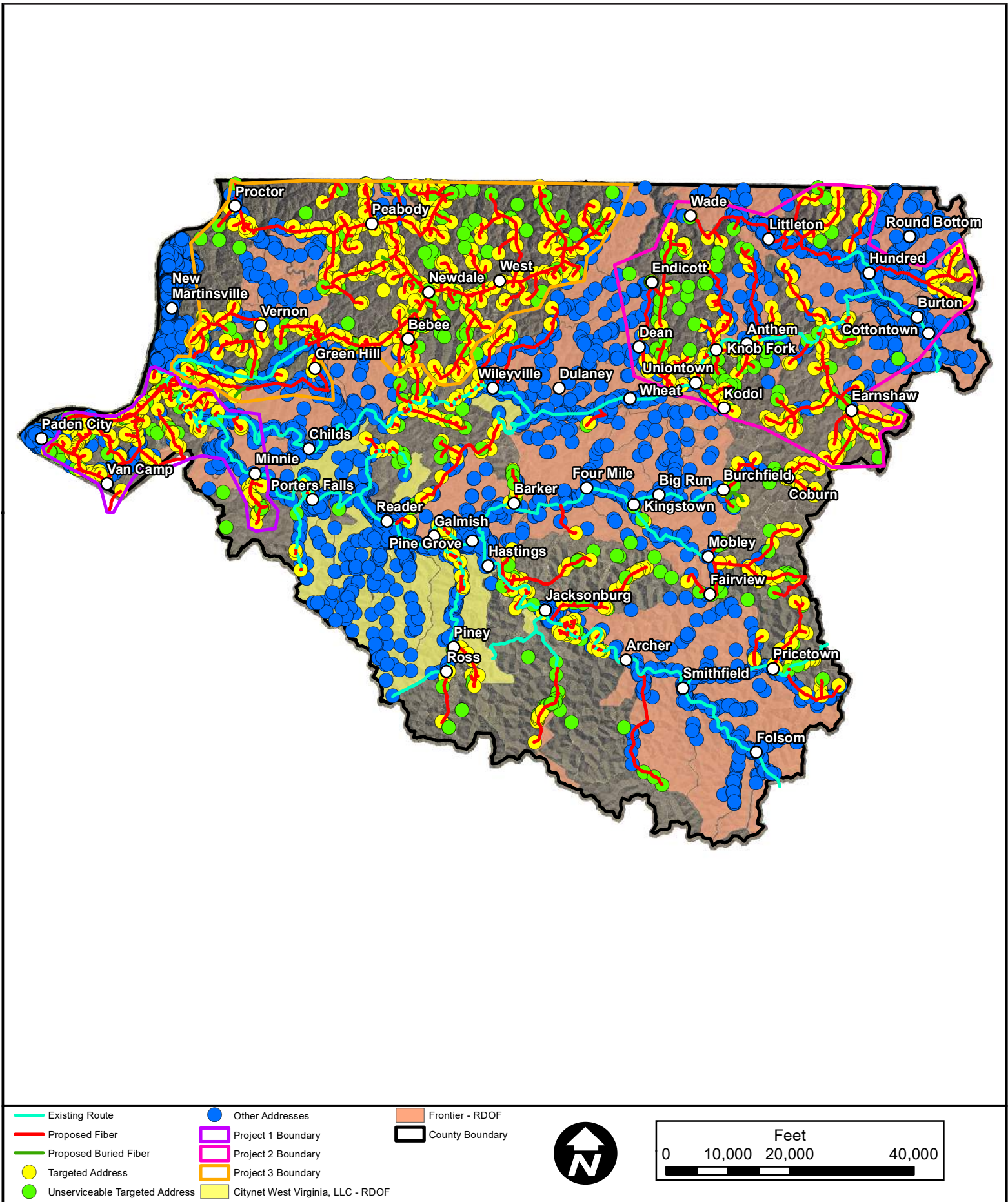
TOTAL COST = \$4,954,468

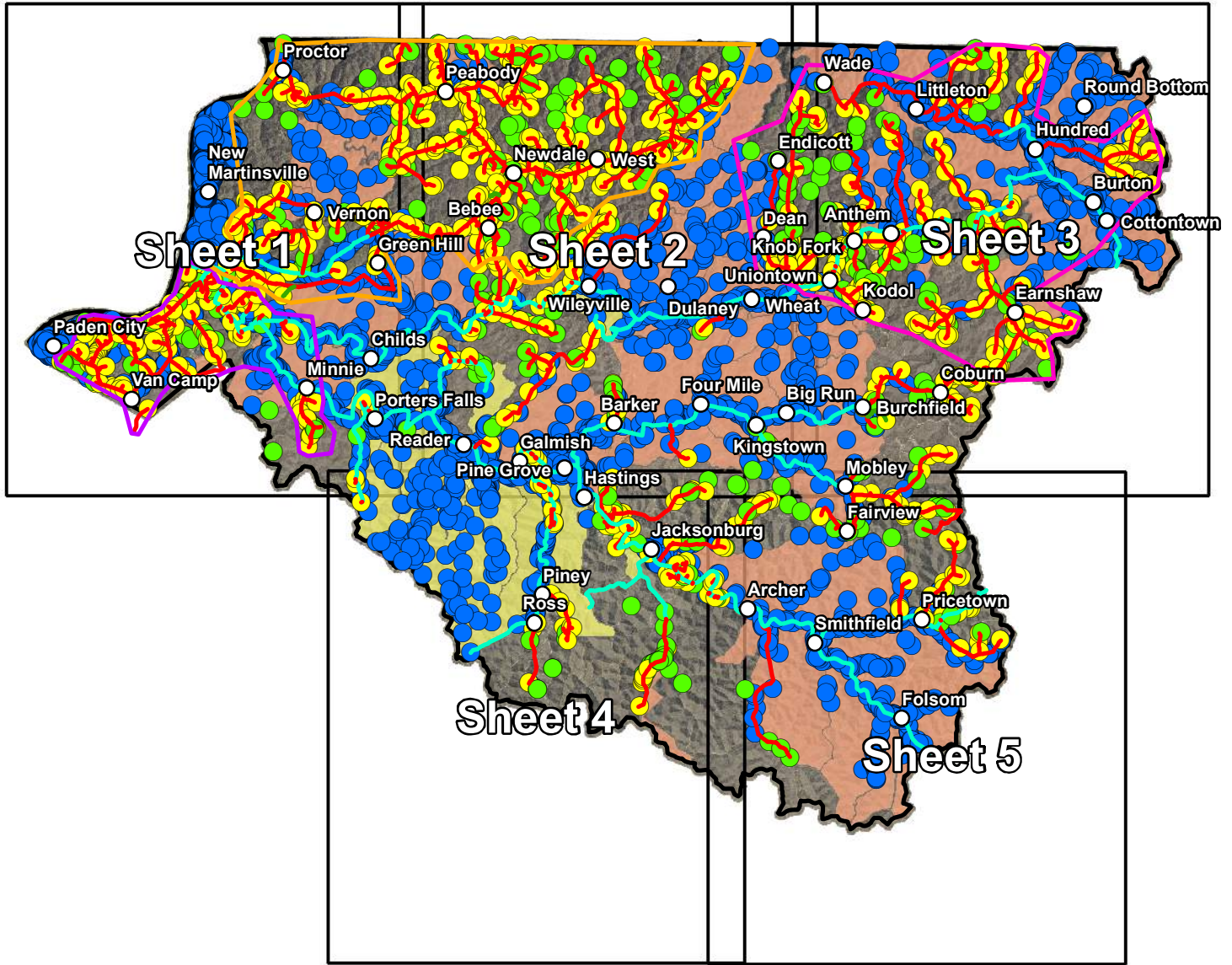
COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
10	Ohio	1	115	20.79	\$2,283,373
		2	144	15.70	\$1,280,700
		3	116	16.37	\$1,389,608

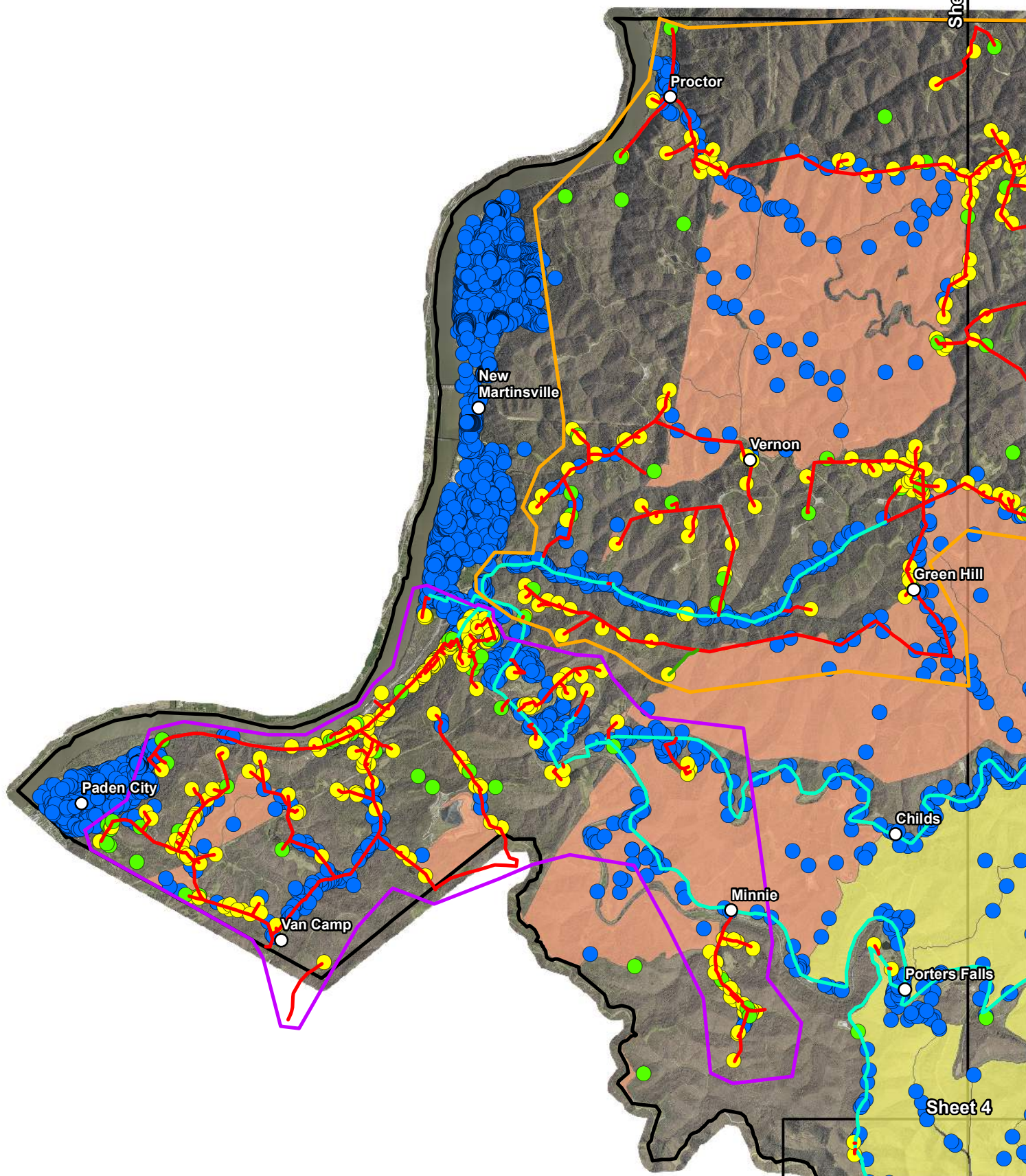


WETZEL COUNTY





Existing Route	Other Addresses	Frontier - RDOF		Feet 0 11,000 22,000 44,000	Sheet
Proposed Fiber	Project 1 Boundary	County Boundary			INDEX
Proposed Buried Fiber	Project 2 Boundary	Index			
Targeted Address	Project 3 Boundary				
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF				

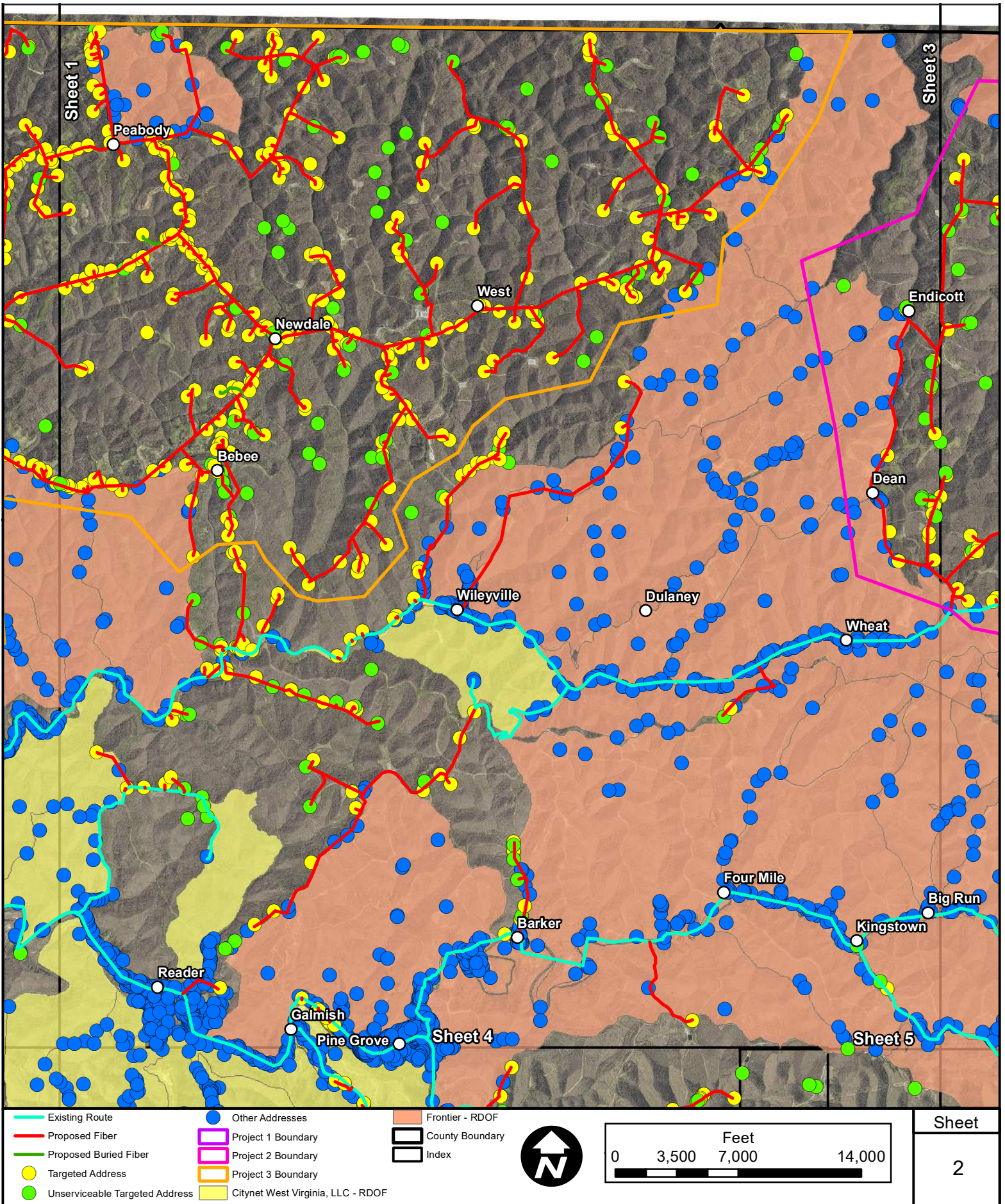


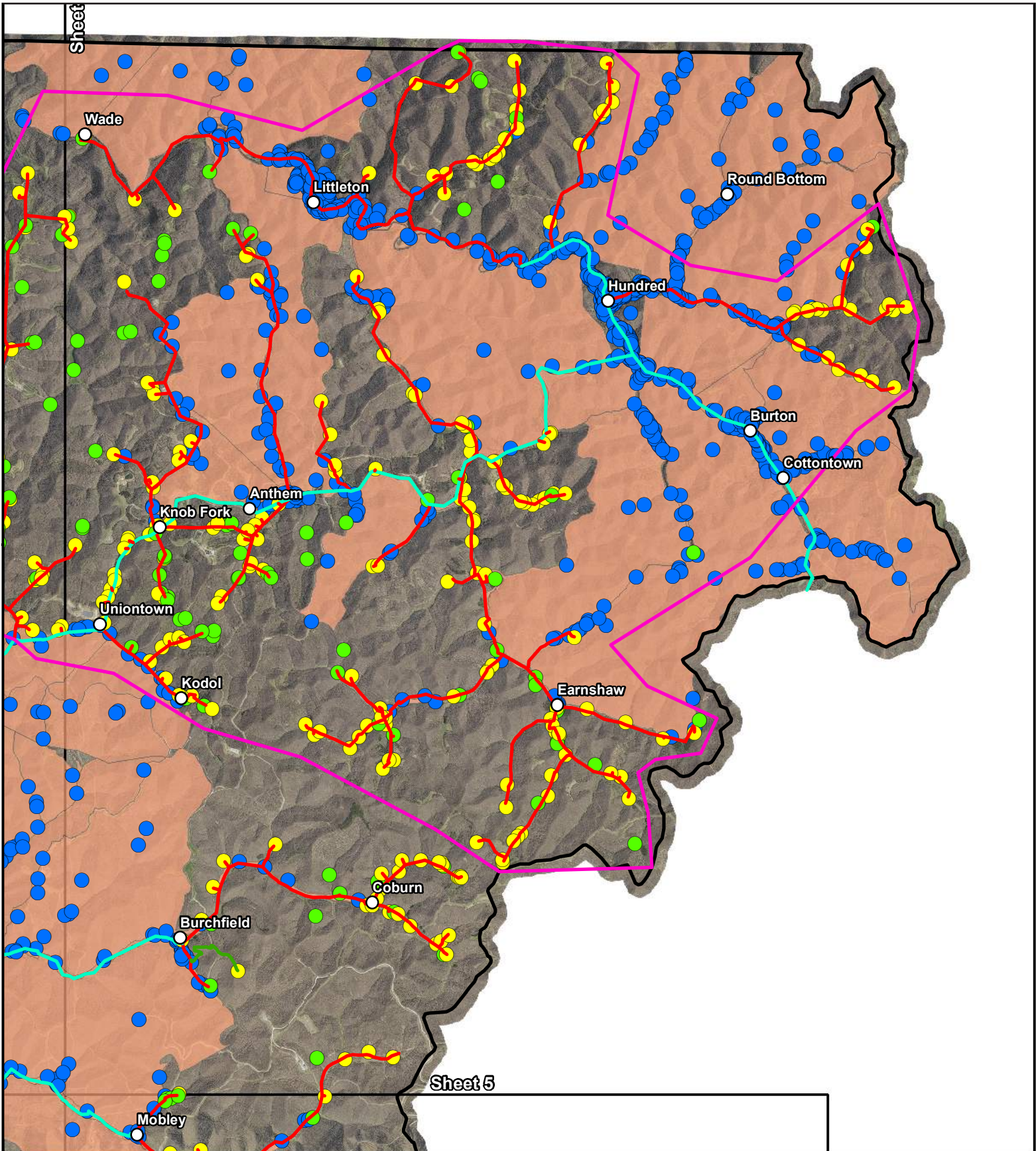
Existing Route	Other Addresses	Frontier - RDOF
Proposed Fiber	Project 1 Boundary	County Boundary
Proposed Buried Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	


Feet

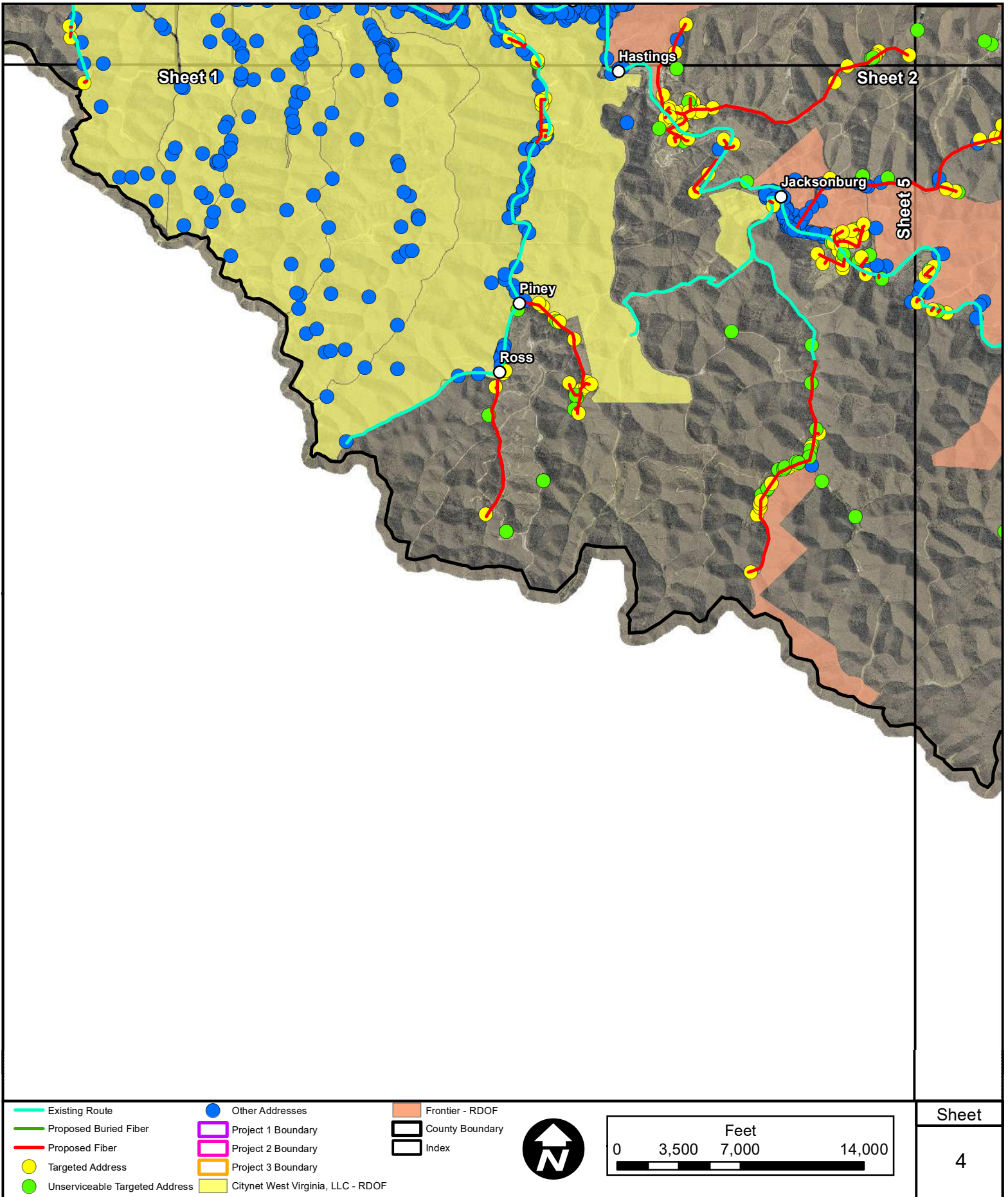
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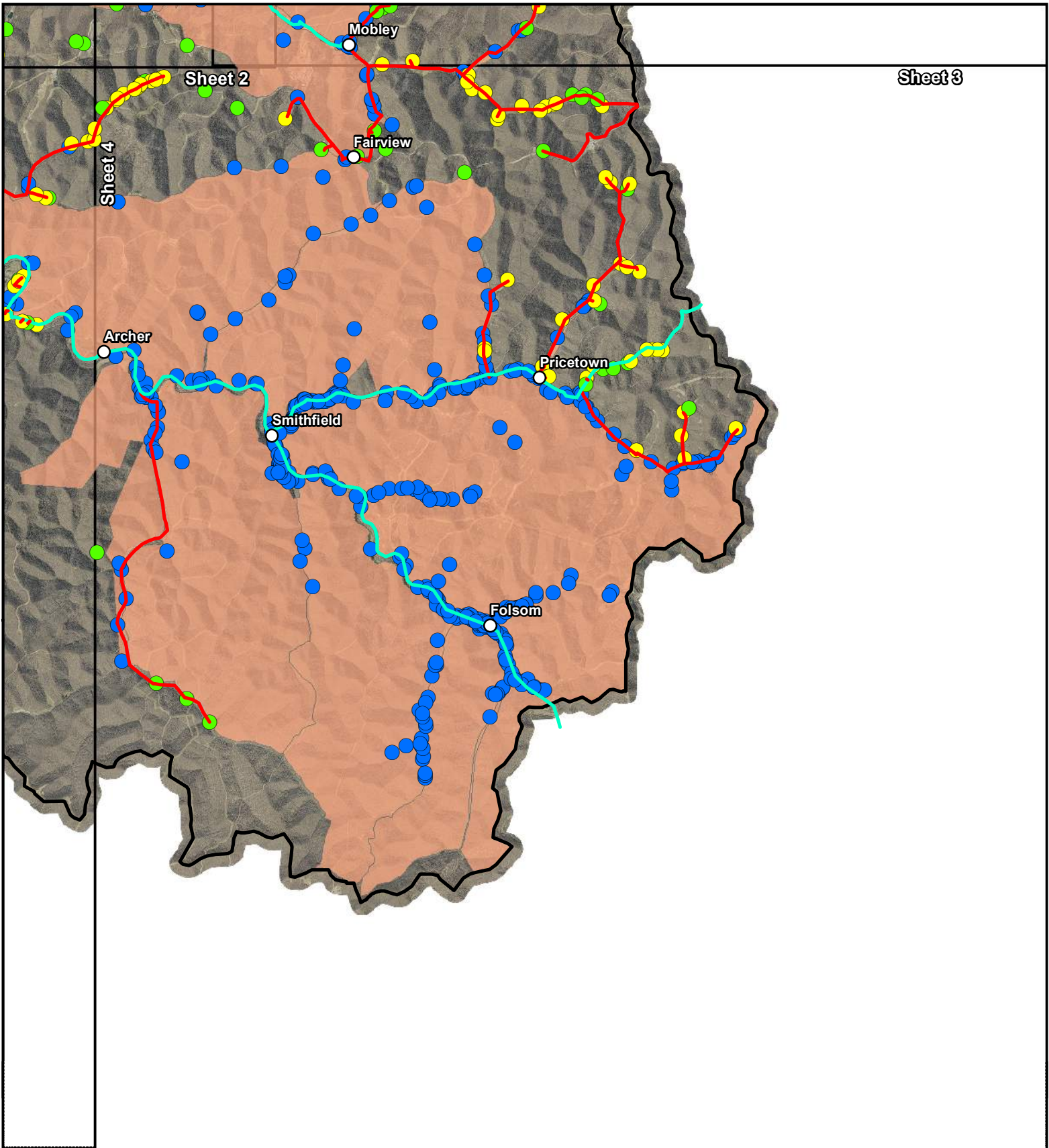
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<ul style="list-style-type: none"> — Existing Route — Proposed Fiber — Proposed Buried Fiber ● Targeted Address ● Unserviceable Targeted Address 	<ul style="list-style-type: none"> ● Other Addresses Project 1 Boundary Project 2 Boundary Project 3 Boundary Citynet West Virginia, LLC - RDOF 	<ul style="list-style-type: none"> Frontier - RDOF County Boundary Index 		<table border="1"> <tr> <th colspan="4">Feet</th> </tr> <tr> <td style="width: 20%;">0</td> <td style="width: 20%;">3,500</td> <td style="width: 20%;">7,000</td> <td style="width: 20%;">14,000</td> </tr> </table>	Feet				0	3,500	7,000	14,000	<table border="1"> <tr> <td>Sheet</td> </tr> <tr> <td style="text-align: center; font-size: 24pt;">3</td> </tr> </table>	Sheet	3
Feet															
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Sheet															
3															





Existing Route	Other Addresses	Frontier - RDOF
Proposed Buried Fiber	Project 1 Boundary	County Boundary
Proposed Fiber	Project 2 Boundary	Index
Targeted Address	Project 3 Boundary	
Unserviceable Targeted Address	Citynet West Virginia, LLC - RDOF	

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Wetzel County, WV – 2023 ROC Study – Cost Estimate – Whole County

Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	256.65	\$1,411,575
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	256.65	\$384,975
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	254.87	\$3,823,050
Aerial Construction Labor	\$50,000.00	Per Mile	254.87	\$12,743,500
Underground Construction Labor	\$150,000.00	Per Mile	1.78	\$267,000
Project Construction Contingency 10%	\$1,301,050.00	Lump Sum	1	\$1,301,050
Legal 1.5%	\$195,157.50	Lump Sum	1	\$195,158
Administrative 2%	\$260,210.00	Lump Sum	1	\$260,210
TOTAL COST = \$20,386,518				

COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
10	Wetzel	1	215	27.23	\$2,144,363
		2	224	65.89	\$5,188,838
		3	384	94.39	\$7,521,863

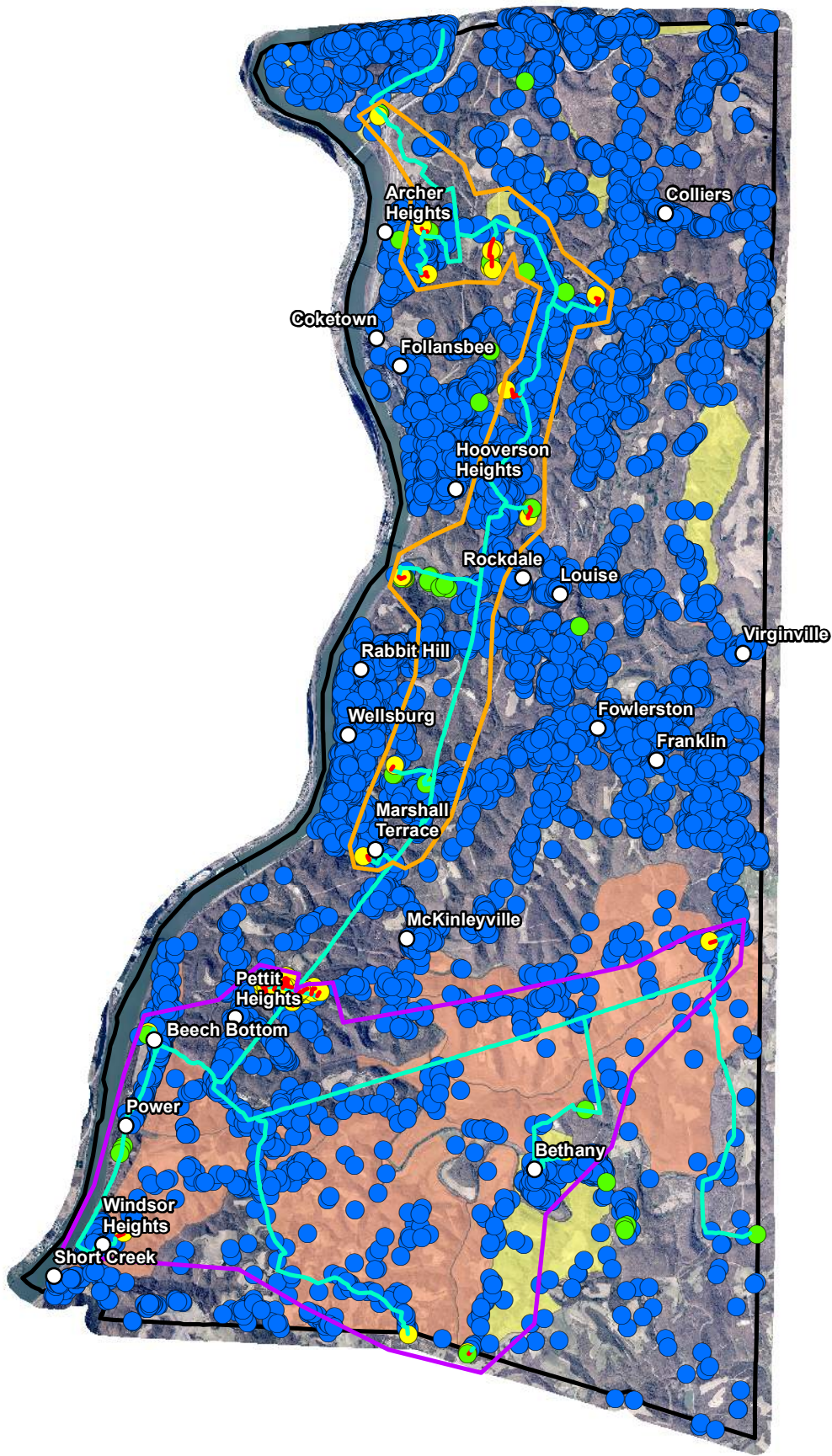
REGION 11

Brooke and Hancock Counties

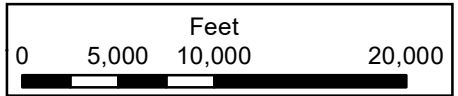


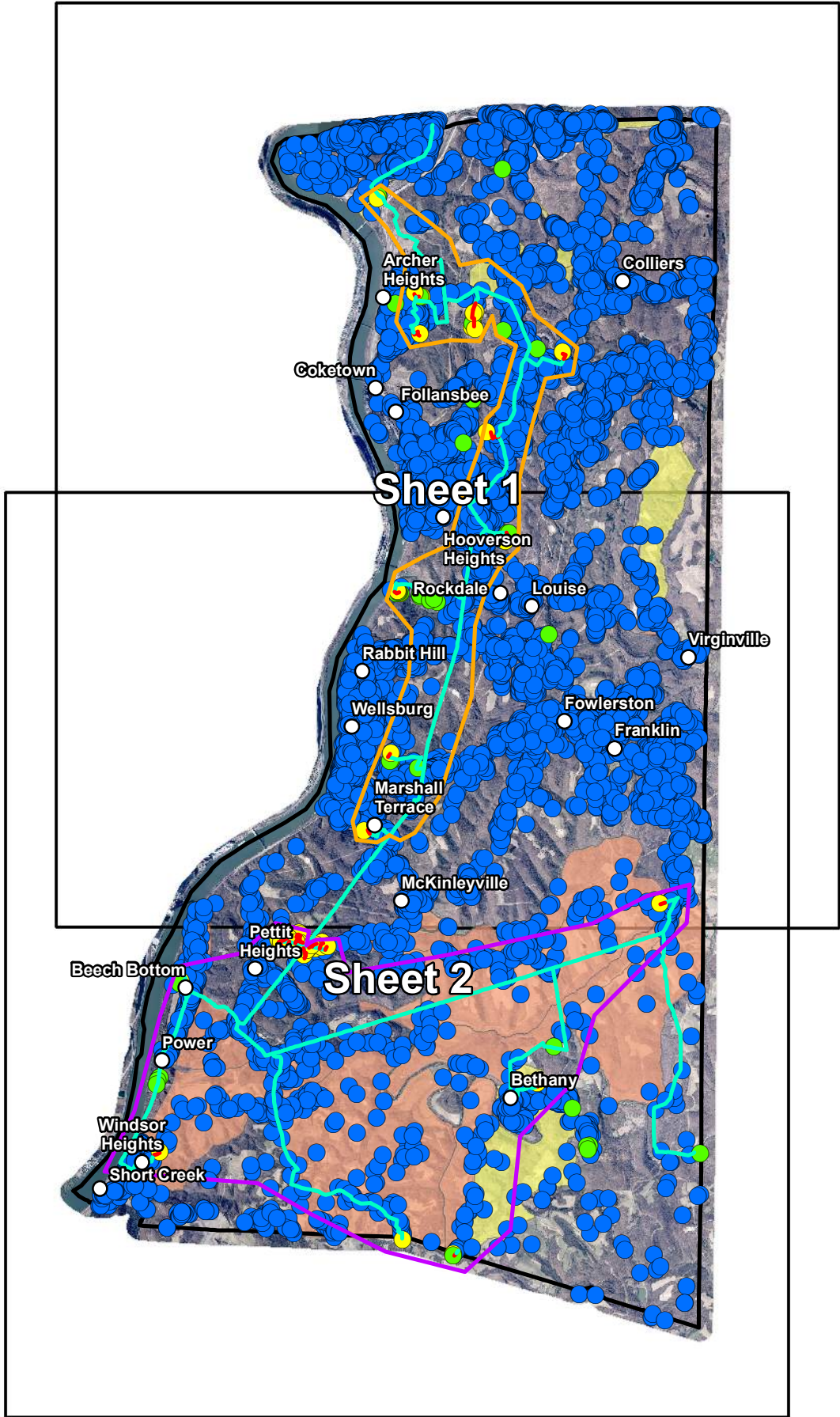


BROOKE COUNTY

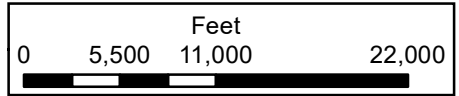


- Existing Route
- Proposed Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary

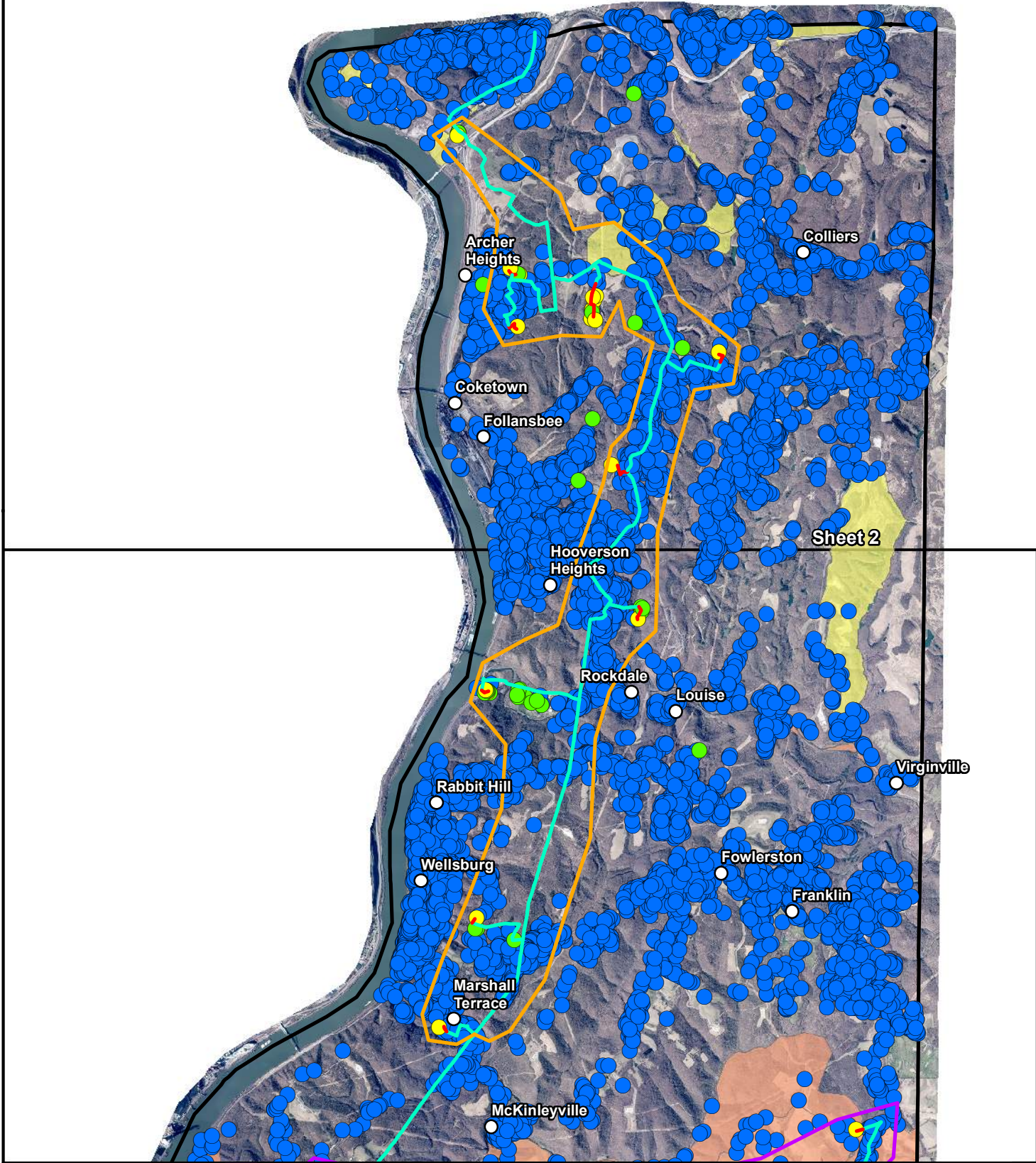




- Existing Route
- Proposed Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
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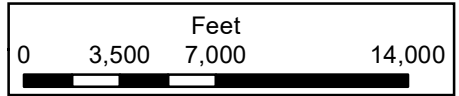


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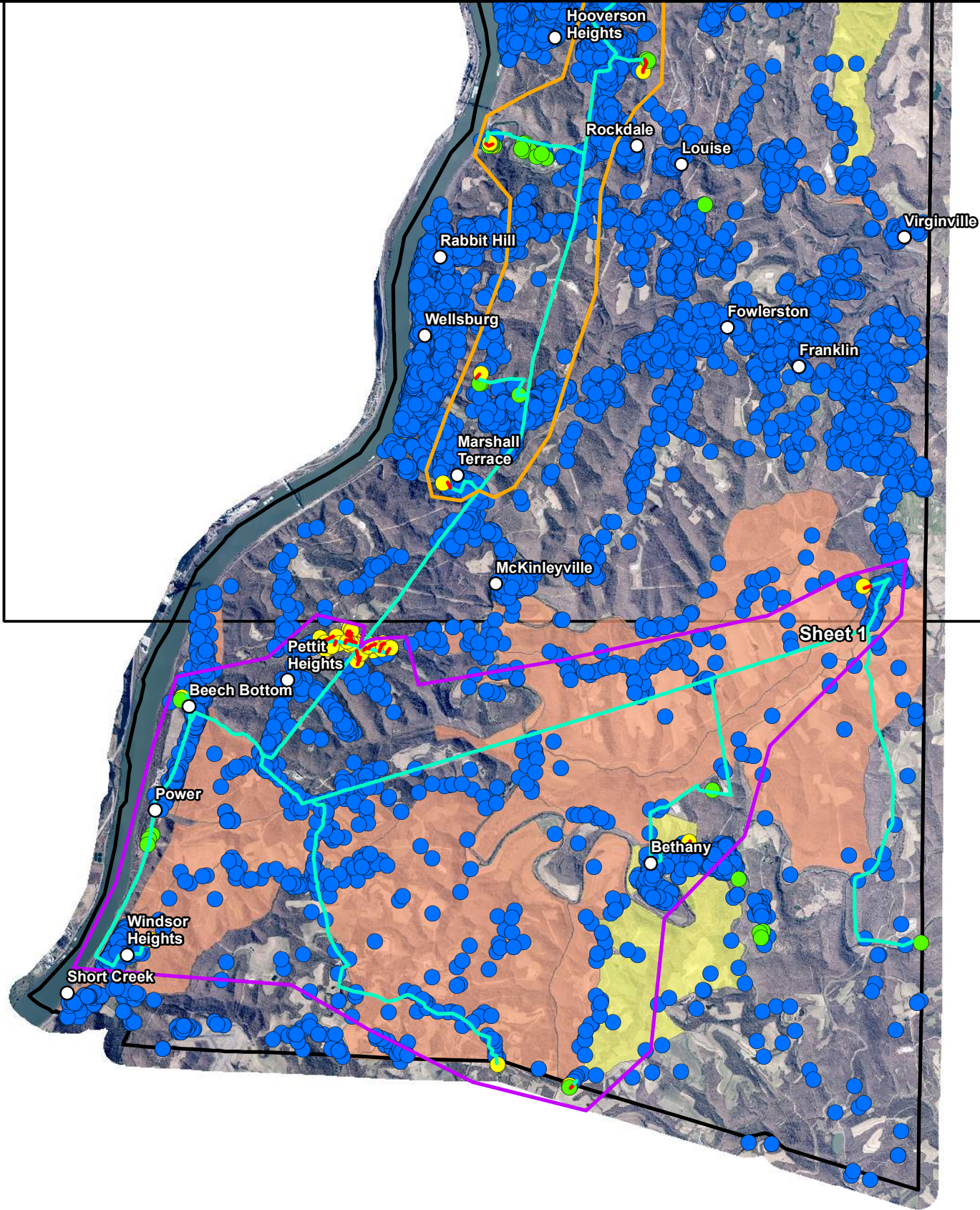


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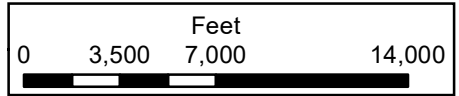
- Existing Route
- Proposed Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
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- Existing Route
- Proposed Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary
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Brooke County, WV – 2023 ROC Study – Cost Estimate – Whole County

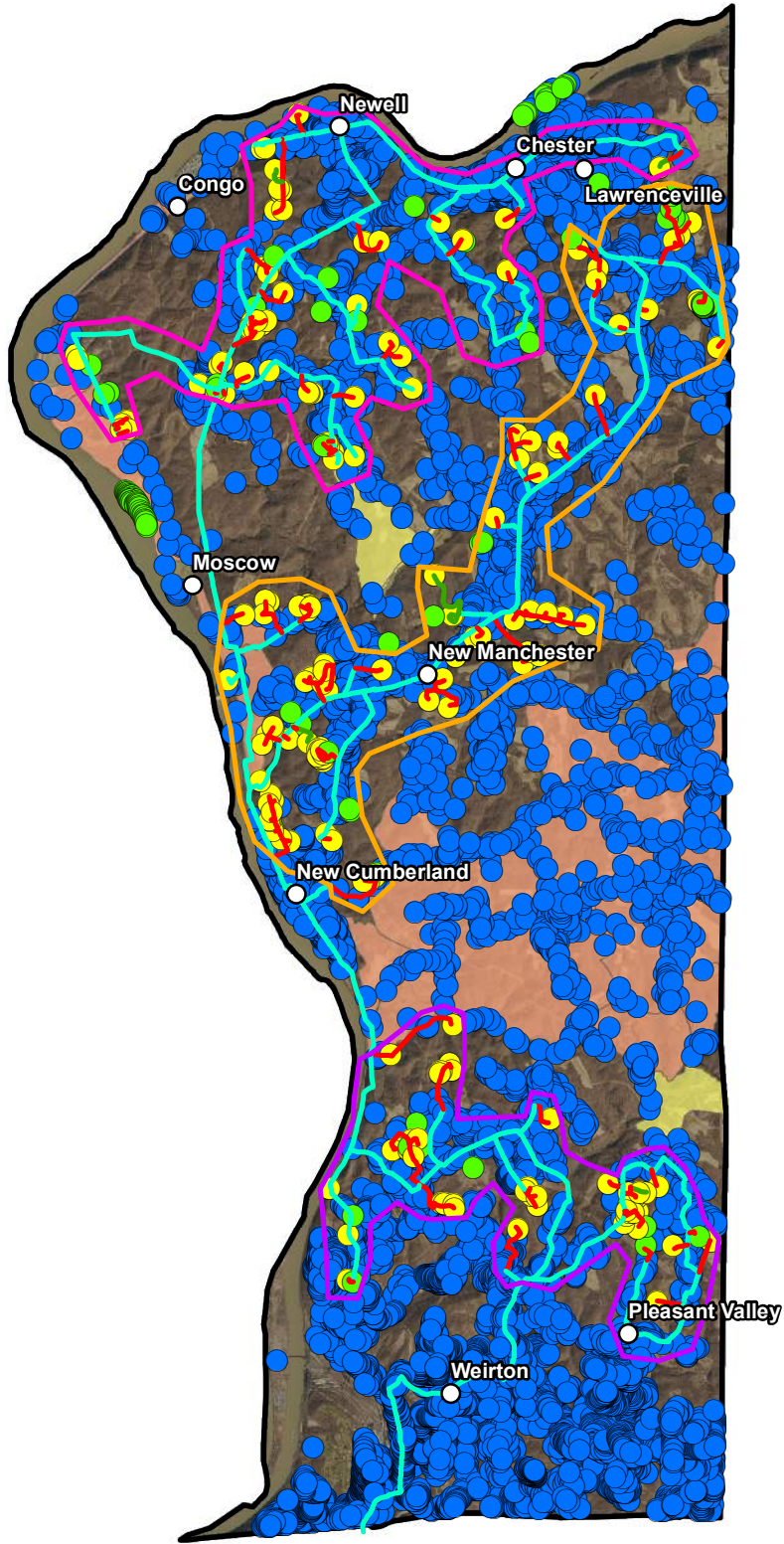
Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	2.46	\$13,530
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	2.46	\$3,690
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	2.46	\$36,900
Aerial Construction Labor	\$50,000.00	Per Mile	2.46	\$123,000
Underground Construction Labor	\$150,000.00	Per Mile	0.00	\$0
Project Construction Contingency 10%	\$12,300.00	Lump Sum	1	\$12,300
Legal 1.5%	\$1,845.00	Lump Sum	1	\$1,845
Administrative 2%	\$2,460.00	Lump Sum	1	\$2,460
TOTAL COST = \$193,725				

COUNTY SAMPLE PROJECT

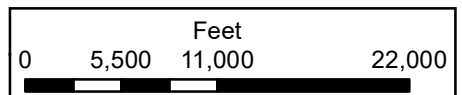
Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
11	Brooke	1	40	1.26	\$99,225
		2	17	1.20	\$94,500
		3	N/A	N/A	N/A

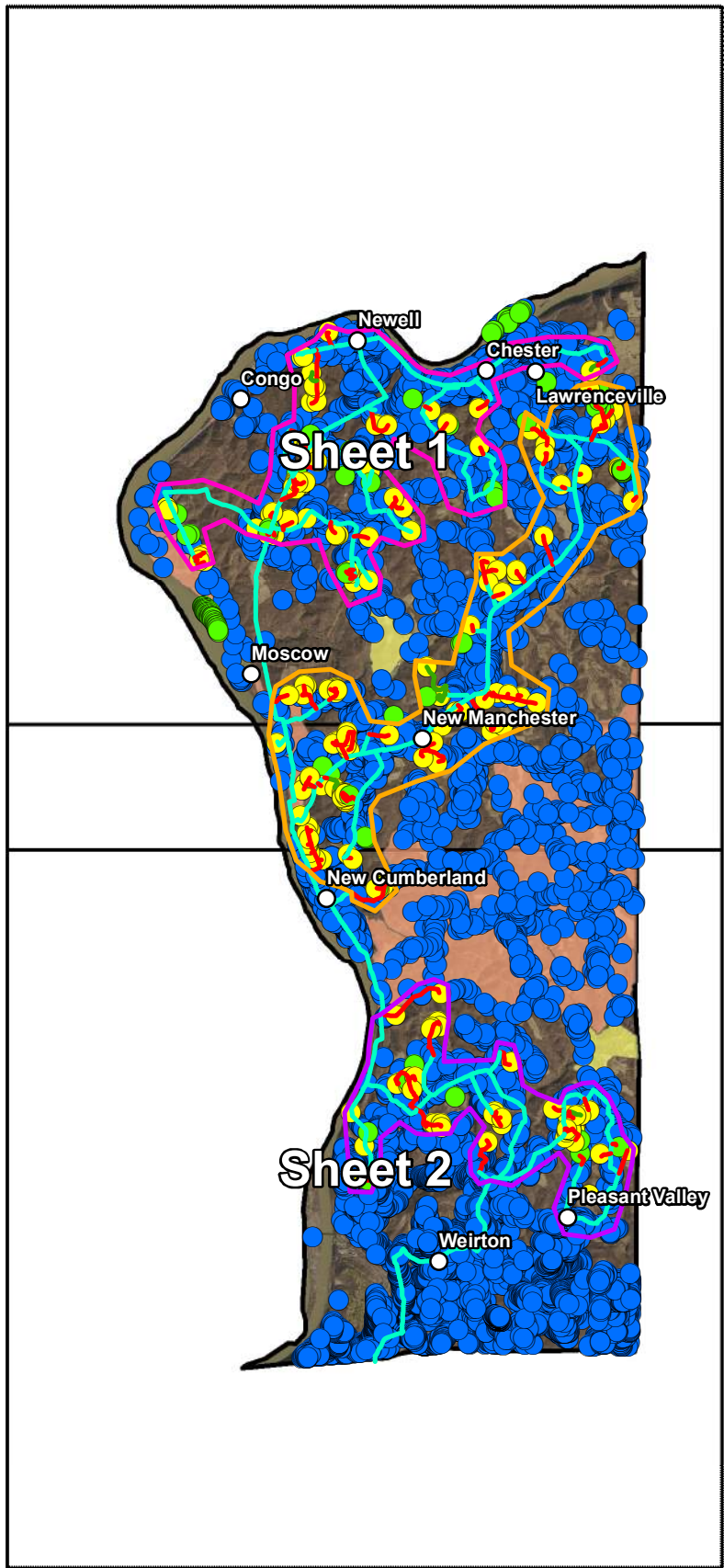


HANCOCK COUNTY

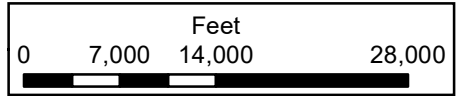


- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
- Starlink Services, LLC - RDOF
- County Boundary

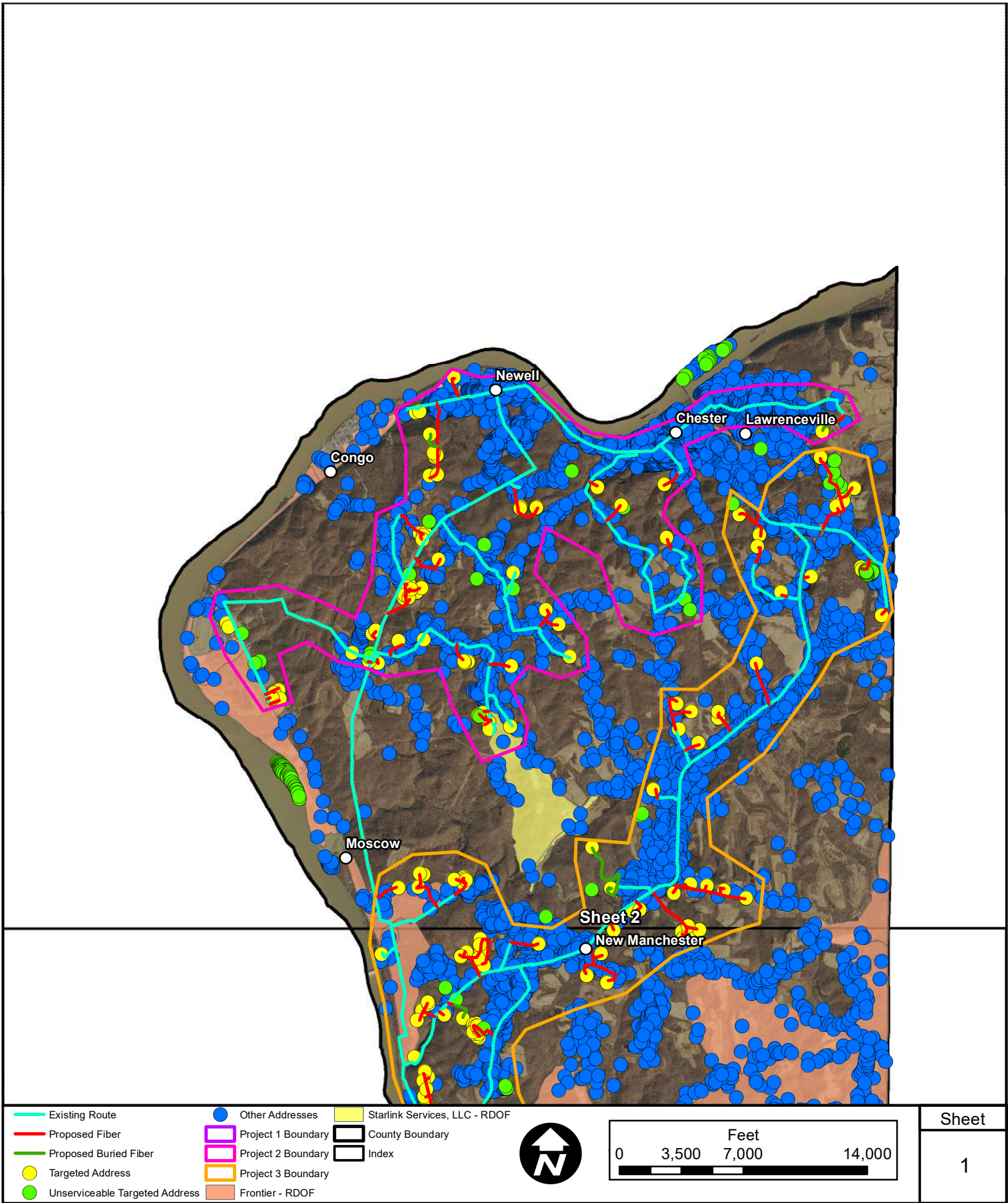




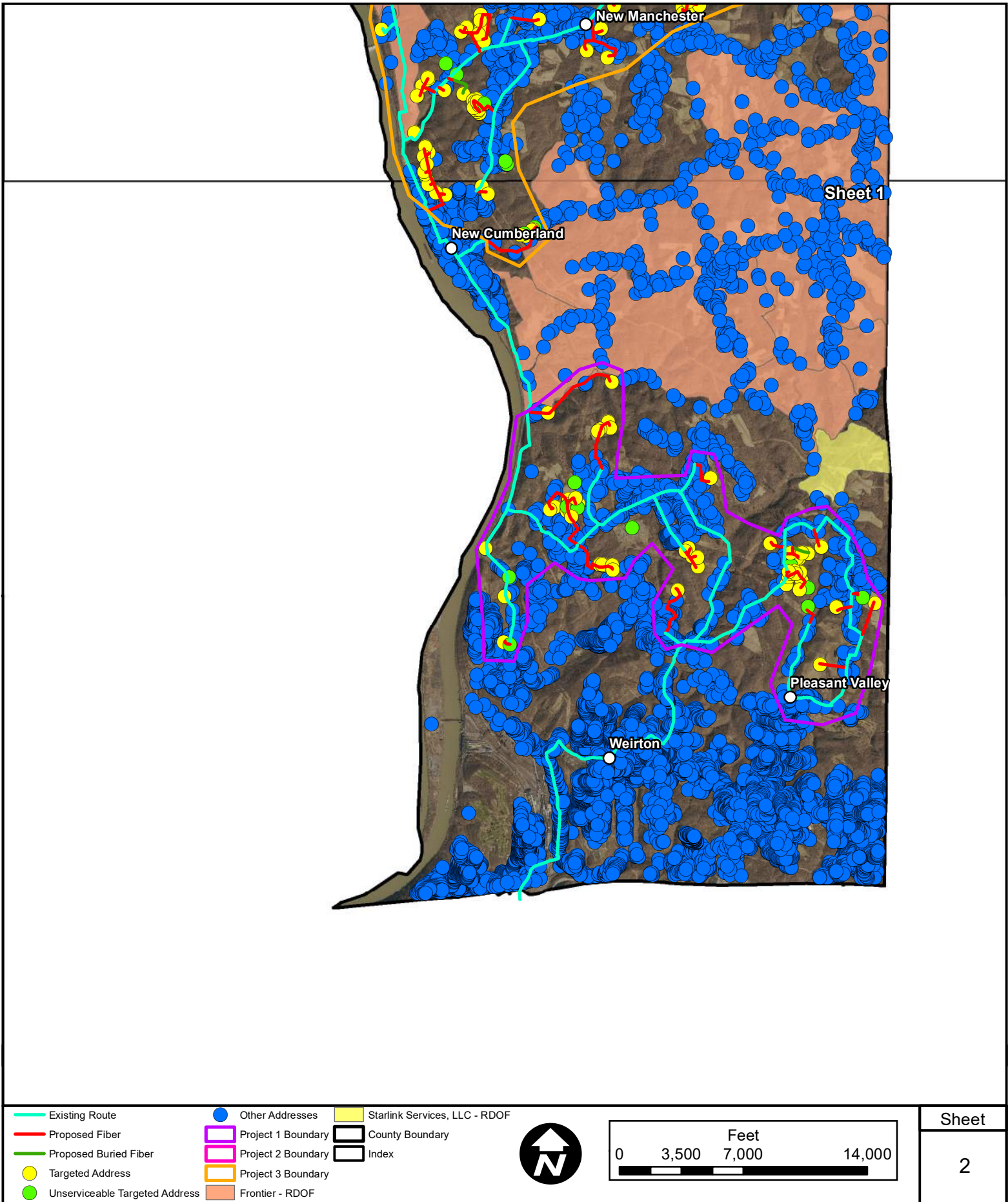
- Existing Route
- Proposed Fiber
- Proposed Buried Fiber
- Targeted Address
- Unserviceable Targeted Address
- Other Addresses
- Project 1 Boundary
- Project 2 Boundary
- Project 3 Boundary
- Frontier - RDOF
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Sheet 1

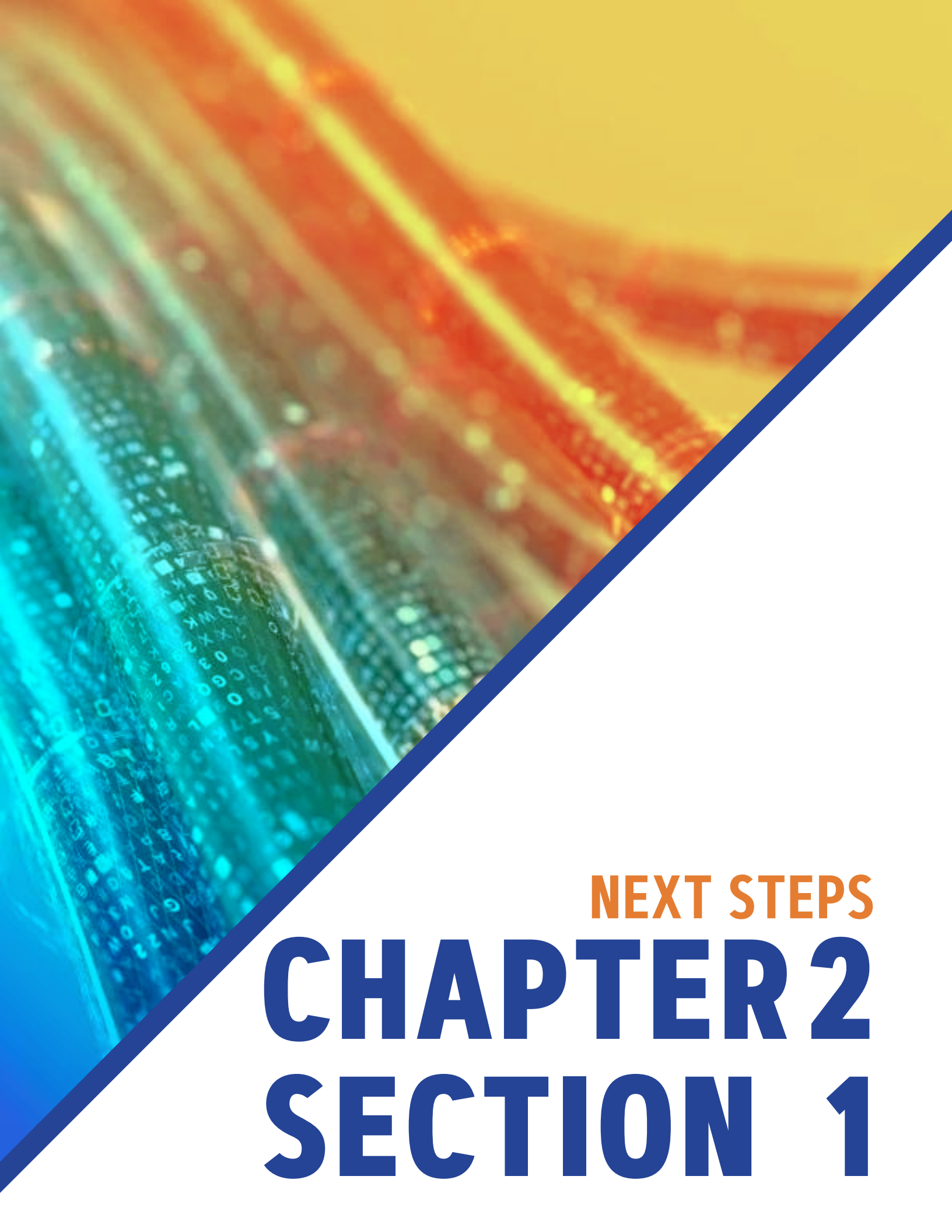
Sheet
2

Hancock County, WV – 2023 ROC Study – Cost Estimate – Whole County

Item	Unit Cost (\$)	Unit Type	Unit Qty (#)	Total
Engineering	\$5,500.00	Per Mile	26.64	\$146,520
Permitting, Easements and Encroachment Acquisition	\$1,500.00	Per Mile	26.64	\$39,960
Pole Placement and Pole Make-Ready	\$15,000.00	Per Mile	24.87	\$373,050
Aerial Construction Labor	\$50,000.00	Per Mile	24.87	\$1,243,500
Underground Construction Labor	\$150,000.00	Per Mile	1.77	\$265,500
Project Construction Contingency 10%	\$150,900.00	Lump Sum	1	\$150,900
Legal 1.5%	\$22,635.00	Lump Sum	1	\$22,635
Administrative 2%	\$30,180.00	Lump Sum	1	\$30,180
TOTAL COST = \$2,272,245				

COUNTY SAMPLE PROJECT

Region	County	Project #	# Targeted Addresses	# Proposed Miles	Anticipated Cost
11	Hancock	1	51	6.99	\$568,193
		2	61	6.06	\$510,715
		3	93	13.57	\$1,190,778



NEXT STEPS

CHAPTER 2
SECTION 1

NEXT STEPS

While a robust amount of data was collected through this study, its value truly depends on the regional planning and development councils (RPDCs), counties, internet service providers (ISPs), and local stakeholders using it to move projects forward. Building a strong project team with individuals from these varying organizations is critical. These groups will be instrumental in providing feedback on data, soliciting buy-in on the projects at hand, and bringing the data to life, all in an effort to close the state’s digital divide and provide access to every resident who needs it.

While the end goals for each entity will be unique, the overall process towards making progress will ultimately be very similar. The ROC study team recommends going through five key steps to turn a county’s data into actionable projects: **(1) review the county’s results, (2) contact the appropriate RPDC, (3) determine priorities, (4) connect to technical assistance, and (5) procure professional services**. An overview of each of these steps is detailed on the following pages.

NEXT STEPS



REVIEW RESULTS

The ultimate goal of this study was to provide data that can be used to create buildable broadband infrastructure projects. With that in mind, understanding the information provided is instrumental for an action plan to be put in place. The [ROC](#) team worked to provide a baseline knowledge of the study's purpose, methodology, and outcomes through a series of webinars with each of the [RPDCs](#), but not all county representatives participated in the process. As such, individual review of the data will be imperative.

The PDF maps provided are the best place to start — these documents give an overall snapshot of where in the county broadband service exists and where service is needed. Exploring this data (and the additional details in the KMZ file) will provide a clear understanding of both the general areas and specific locations to consider when looking to create the most impactful projects. Should further explanation of the data be needed, the ROC project team can be contacted to walk through the county's maps.

This information should not be reviewed in a silo, though — sharing the data with your communities will be an important step of the process. Holding public meetings, talking to friends and neighbors, and reaching out to local ISPs are all good ways

to verify the data is as accurate as possible. As mentioned in the [Methodology section](#), the data used for this study was collected from a variety of sources to increase the level of accuracy, but with ongoing project build-outs and reliance on entities sharing updated information, there may be additional details on recent or current projects that can be incorporated into the existing county map files. If updates to routes need to be made, Thrasher will be available to assist in revising shapefiles during the initial data review process.

A preliminary review of the provided cost estimates is also recommended at this stage. While the construction of all the proposed routes will be an ongoing process and decisions on which routes get built and when will be up to counties and ISPs, understanding the potential overall financial investment to make these projects a reality will be important. With BEAD funding forthcoming and additional federal and state opportunities on the horizon, it is anticipated that a large portion of projects will receive funding assistance. Even so, grantees will be responsible for providing a financial "match." While the match amount will vary, having a general understanding of what magnitude of money the county or ISP may be responsible for providing will be helpful in the planning process. Additional details on this component will be detailed under the [Connect to Technical Assistance heading below](#), as well as the [Funding Strategies section](#) later in this report.

Note: Should feedback show that areas marked as served do not actually have service, counties and individuals can submit an [AVAILABILITY CHALLENGE](#) through the [FCC's](#) official challenge process, as they collect and disseminate this portion of the data. Should multiple challenges be needed, a government entity or service provider is required for submission of a bulk challenge. The [West Virginia Office of Broadband](#) can be contacted for assistance.

CONTACT YOUR RPDC

West Virginia’s [regional planning and development councils](#) play an integral role in the strategy and execution of projects across the state every day. These entities are highly knowledgeable about every piece of the process – from applying to available funding sources to procuring attorneys and architects, RPDCs exist to provide the resources communities need to move infrastructure and development projects forward. Their assistance was utilized throughout this study, but RPDCs will play their most important role as counties and communities work to implement the data into an actionable outcome.

The [ROC](#) team recommends connecting with your county’s RPDC early in the process for a variety of reasons. First, the RPDCs are knowledgeable of this study and the larger broadband efforts in the state, like the [Digital Equity Plan](#) and BEAD. RPDCs were contacted at the beginning of this project to alert them about the study and provide assistance with gathering data. They were also briefed on the results for their respective counties through the webinars held at the end of the project. This involvement means they should have a clear understanding of the study’s purpose and how they can help counties move forward using the data provided.

Beyond this project-specific knowledge, RPDCs are hubs of information about how to develop and execute publicly funded projects of all types. They will be able to help counties use the large-scale data available and break it into specific initiatives that can be moved forward. Their knowledge of the funding process can be used to identify grant opportunities and identify projects that will be attractive to funding agencies. They also will have a high-level knowledge of what’s going on around the region – this may be useful for opportunities to team with surrounding counties on more regionally focused broadband expansion projects, for example.

Other ways RPDCs may be helpful in the project development and execution process include, but are not limited to:

- Identifying and applying for grants
- Performing grant administration
- Procuring engineering, ISP, legal, accounting, or other professional services
- Writing Requests for Proposal or Requests for Qualifications
- Helping identify county broadband goals
- Assisting with specific project development
- Suggesting resources throughout the process

DETERMINE YOUR PRIORITIES

Once a county has a general understanding of the data provided by the study and what steps need taken to create and execute projects, priorities should then be identified. This will provide an ongoing reference for the order in which projects should be pursued, but beyond that, it will be instrumental in securing funding. When priorities and goals are outlined, that messaging can be clearly communicated in funding applications to show why the county's project should be selected.

The types of things a county may prioritize can vary widely from one place to another. Examples of some of the priority topics that may be considered include the following:

- Increasing service to schools
- Getting service to completely unserved areas
- Improving 911 infrastructure
- Improving cell service
- Connecting city buildings to the same network
- Undertaking a Smart Initiative to connect parking, lighting, etc.
- Improving telemedicine options for elderly populations
- Increasing service to utility buildings and public service districts
- Extending service to an industrial park, new housing development, or other developable area

After these priorities are determined, it will be important to gain the support of the entities who may be involved, as well as the general public. For example, if a county decides their main goal is to focus on entirely unserved areas, they may want to hold a public meeting in each of the target areas to get feedback from residents. If there are businesses located in the area, getting their input — or potentially a financial commitment towards the project — will demonstrate another type of impact the project will have. Involving other entities and individuals such as county commissions, economic development authorities, delegates, and local banks can also prove beneficial. Overall, having concrete evidence that the community agrees with the priorities that have been set and

acknowledges the need for the specific project identified will be an important part of the grant application process — since the ability to show additional support can increase the likelihood of getting a project funded.

CONNECT TO TECHNICAL ASSISTANCE

The next focus area will be finding the supplemental resources necessary to start bringing the county's priorities to life. The [RPDCs](#) will be a useful place to start, but this step of the process will likely involve incorporating additional entities. Helpful resources at this phase include organizations that are plugged into the broadband industry and can help counties start mapping out the details of their prioritized projects. This may come in the form of updating maps to reflect new information, identifying which grant programs the county or project is eligible for, connecting with the ISPs that are likely to serve the area, and other similar tasks.

There are a wide variety of entities that may be useful during this process. The [ROC](#) study team is a good resource to begin with when identifying what may need done for each piece of the project. Undoubtedly, though, taking a deep exploration of the funding process is the most important part of this step. Working with groups like engineering consultants and pro bono technical assistance providers, such as [Generation West Virginia](#), can guide counties to the most applicable funding sources and help craft competitive grant applications.

An entire [Funding Opportunities](#) section is outlined later in this report (with links to additional resources also available in [Appendix B](#)) to provide more information and suggestions, but the important thing to ensure at this stage is that resources are engaged early in the process and ample time is allocated to explore funding options. Assistance can be provided to help develop overall funding strategies — noting which grant or grants will be appropriate to apply for — as well as potential phasing strategies. Because these are

long-term projects, they may need broken down into multiple pieces, funding and constructing one thing at a time.

Additionally, project partners can help guide the details involved in the funding process. For example, each grant works on its own timeline, so ensuring a county submits the right information to the right entity at the right time is imperative. Putting together applications can be an extensive effort as well, so getting started early is a key, particularly if an outside entity is being used for grant writing assistance. This gives time to craft the right message and incorporate the right data to convince an agency to fund the project. Trying to secure funding before moving into the project's final design phase is also important. The cost estimates provided in this report incorporate these professional services into the budget, so grant funding may be able to cover the remaining engineering and related services required.

PROCURING PROFESSIONAL SERVICES

Last, but not least, is proceeding with the Request for Qualifications (RFQ) process to procure an engineer and the Request for Proposal (RFP) process for an internet service provider or other professional services needed. [West Virginia Code 5G](#) requires engineering services be obtained through a competitive, qualifications-based process that does not take cost into account. The county or entity responsible for moving the project forward will be required to publish an RFP outlining the services they need the engineer to perform. In this case, an engineer will be needed to provide final design services and cost estimates of the fiber routes in the anticipated project area – ideally, this will be taking the existing data from this study and adding details and further design. They will put together the plans and specifications needed to construct the project and will assist with the bidding process to select a contractor for build out. Additionally, the engineer should be able

to assist with permitting that may be required, such as environmental, [West Virginia Division of Highways](#), and/or railroad permits.

Soliciting an ISP may happen in a few different ways because grant sources have different requirements as to who is eligible to be the grantee. In cases in which the grantee is a local government entity or similar organization, an RFP will be necessary to obtain the internet service provider that will use the fiber routes being designed – the fiber is useless without an ISP to light the network. This process works similarly to the engineering RFQ process. In this situation, both the engineering and ISP procurements can be facilitated by the [RPDC](#) – this is one key element of the project administration process that RPDCs are often involved in and understand incredibly well. They will be able to guide a county through every step of the process and assist in the execution of these procurements.

Other grants require the ISP to be the grantee. In this case, it is up to the ISP to submit for the grant themselves, and the role of local government is much different. Rather than procuring services, the county or governmental entity can help back the ISP's application by coordinating public feedback, providing letters of support, offering financial contribution, lobbying for the project at a state level, and other similar tasks.

There is no one right order to procure these services and each option offers its own advantages. Going on RFQ for an engineering consultant first may allow the engineer to help identify what ISPs already exist in their area; selecting an ISP first may provide specific guidance to the engineer finalizing network design; selecting both the engineer and ISP at the same time may allow for the entities to work together towards cohesively meeting the county's goals.

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**PUBLIC-PRIVATE
PARTNERSHIP
STRATEGIES**

**CHAPTER 2
SECTION 2**

THE IMPORTANCE OF PARTNERSHIP

In the broadband industry, public-private partnerships are vastly important. The service being provided is typically controlled by a private entity, but public agencies are often the ones pushing to bring service to their area. Often, neither sector can achieve the end goal alone, but both are motivated to make it happen — developing a partnership creates an opportunity for both sectors to accomplish the goal of connectivity and, most importantly, to overcome a community’s digital divide.

While there are countless partnerships necessary throughout the process, relationships between internet service providers (ISPs) and communities are the most vital in bringing broadband projects to life. These are functionality-based partnerships

in which both entities need something the other offers. For example, very few governments or development agencies in West Virginia own their own fiber, so they must rely on an ISP to supply it. Communities can, however, own valuable infrastructure that can accelerate the process and help an ISP deliver service to community residents more efficiently and effectively. A similar dichotomy exists in funding — some grants are awarded directly to ISPs while others require a community to apply. Often, though, both types of funding opportunities require a partnership between the ISP and the public entity to move the project forward, with the success of the project dependent upon their collaboration. **This type of cooperation between public and private entities creates greater investment in West Virginia communities and a higher likelihood of success at the end of the day.**

COMMUNITIES come in many different forms — counties, municipalities, regions, economic development agencies, local governments, etc. For the purpose of this piece of the report, the term “communities” refers to the public entity involved in the public-private partnership.

A FOCUS ON INTERNET SERVICE PROVIDERS

SELECTING THE RIGHT ISP

Connecting with an ISP early in the process is key. As previously outlined in the [Next Steps section of this report](#), it is recommended – or in some cases required – that the community go through the Request for Proposal process to identify which ISPs are interested in the project and who is best suited for the work at hand.

Selecting the right provider may seem like an overwhelming task, but there are several basic questions that communities can ask potential ISPs during the process to help identify the best partner:

**What areas of the community have the biggest connectivity challenges?
How will you address the needs in these areas?**

What support do you need from the community for your project?

What’s your anticipated schedule to make the project happen?

What kind of service are you planning to provide?

**What can residents expect to pay for service?
What type of service packages will be offered?**

What kind of support can residents expect if they have questions about their service?

**What (if any) federal and state funding opportunities will you be targeting?
What kind of help will you need from the community during the application process?**

How will you operate, manage, and maintain the network?

Will you hire locally/regionally to assist with this project and to provide customer service to the local subscribers?

How will you continue to engage with community leaders and stakeholders once the project is complete?

What’s your track record in the government funding world?

What is your experience with achieving make-ready access and shared space requirements with existing pole owners?

It should be noted that due to feasibility and location factors, more than one provider may be needed to execute work across a singular county or region. Building out infrastructure, even with grant funding assistance, is an expensive endeavor and one that ISPs would have likely already undertaken had it made business sense for their company. Private providers will still choose what areas make the most financial sense for them to invest in, so it may take multiple ISPs to bring service to every area.

HOW TO HELP THE PROCESS

Collaboration and open communication are the best ways to help move things along. If the community has a development plan in place or has identified priority projects to complete, sharing that information with the selected ISP upfront is paramount — the deployment process can be much quicker and more efficient when both parties understand the bigger picture and can align efforts from the beginning.

There are several other means by which communities can support the broadband deployment process in partnership with their ISP. Many factors come into play, but at the root of it, a community's existing infrastructure, assets, and permitting guidelines are highly important to the success of a project. Some of the ways communities can assist include the following:

1. If possible, provide access to existing infrastructure: Community-owned fiber and conduit, municipal buildings, cell towers, water towers, warehouse/office space, and community property for any outside cabinet locations can be assessed and potentially used to speed up deployment.

2. Provide access and information about future infrastructure and any existing community development plans/reports: Current ongoing infrastructure projects (e.g. utility improvements, road upgrades, etc.) and any future plans for such can create an opportunity to coordinate and align efforts, saving overall costs and potentially speeding up timelines.

3. Provide guidance on and assistance with the permitting process: Communicate clear timelines, permit requirements, and fee schedules, as well as how many permits can be reviewed and approved in a month. Providing an example of a “perfect permit” as a guide, as well as ensuring timely responses to questions when they arise, can expedite the process.

4. Expedite the location of utilities: Ensure any mapping data and location details are up to date and available to the ISP.

5. Provide backhaul connectivity and bandwidth: If the community has a network in place — with connection to backhaul providers and the utilization of existing bandwidth — it will speed network deployment.

6. If the community owns utility poles, reduce the make-ready engineering and construction costs: This can potentially lower the total costs for the build-out and elevate a project priority-wise for an ISP.

7. Identify or provide co-location space for electronics: This space is a secure location to house electronics for the network. Requirements regarding minimum square footage, temperature-controlled environment, redundant power source, backup power supply, and 24/7 access to the equipment are all necessary.

8. Support and collaborate on all marketing and educational efforts in the community: Provide a link to a customer support site on the local government website, inform the ISP of any opportunities to attend community events or sponsor/volunteer, and provide a contact at schools where an ISP could participate in partnerships and educational opportunities.

This last point is a particularly important step — one that communities should use ISPs for as much as possible. As the subject matter experts, ISPs should be able to provide a tremendous amount of assistance with educating the public on what is happening. Every community's residents will be interested in broadband deployment projects. Understanding a project's timelines and build-out sequence, as well as when services will become available, lead to greater resident support for the project. The resident who has a clear understanding of the project and the service offerings will help an ISP gain and keep subscribers. Ultimately, keeping people apprised of what's happening, why it's happening, and what it means for them will help all parties involved.

ADDITIONAL KEY PARTNERS

While ISP partnership is undoubtedly the most important component, there are several additional partners that can make a big difference in project success. From individual community members and local businesses to politicians and state entities, a diverse group of stakeholders can create an environment which truly supports the deployment process.

Power Companies and Electrical Cooperatives

With such a large portion of routes following power poles, establishing working relationships with local power companies and electrical cooperatives will prove highly beneficial. They will be instrumental in the permitting process since their requirements will need met before fiber is physically deployed.

West Virginia State Entities

The [West Virginia Office of Broadband](#) will provide funding opportunities for both public entities and private companies, as well as assist with any questions and technical support regarding the grants they facilitate. In addition to funding opportunities, the State administers programs that address broadband availability and affordability, digital literacy, cybersecurity and online privacy skills, as well as consumer device and technical support from an availability and affordability standpoint.

From a personnel perspective, reaching out to local delegates who can advocate on behalf of the community is also a good option, particularly in the form of a letter of support to assist with grant applications. Keeping local delegates and the West Virginia Office of Broadband regularly updated on progress will help these stakeholders understand and advocate for specific community needs.

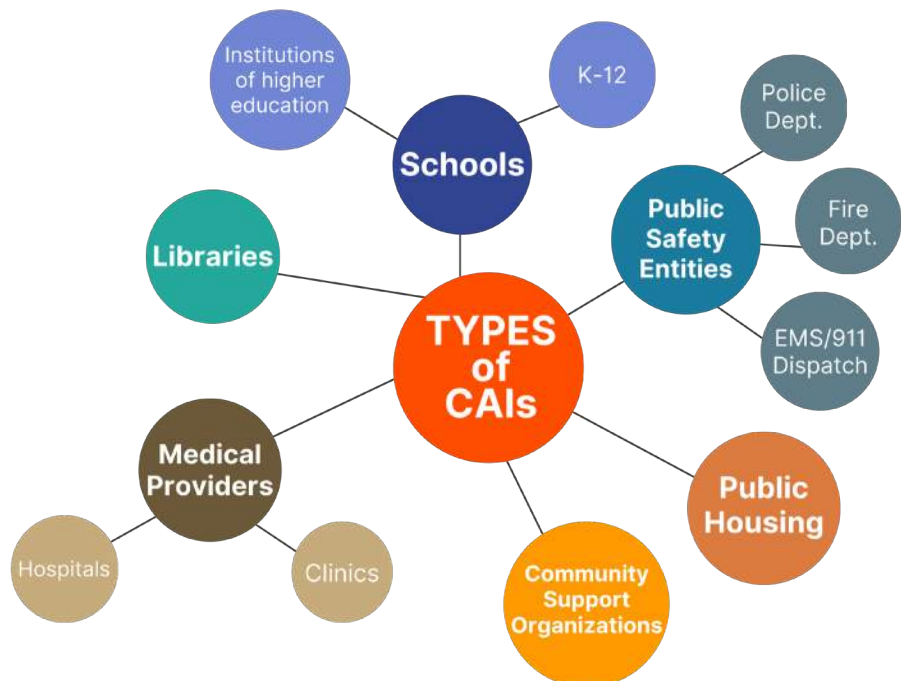
Support Organizations

As mentioned throughout this report, organizations exist across the state which are familiar with the project administration and funding processes. [Regional planning and development councils](#) can offer assistance through the entirety of the process, while organizations like [Generation West Virginia](#) and engineering firms can assist with grant applications.

Community Members

Last, but certainly not least, are the members of the community. Individuals, local leaders, and businesses can all make a difference in the project process by showing public support, participating in interest meetings, and signing up for service. [Community Anchor Institutions \(CAIs\)](#) can also be valuable — getting these locations on board with the plan in place and ensuring the ISP understands the CAI's needs will be helpful for all parties.

A Community Anchor Institution (CAI) is an entity that facilitates greater use of broadband service by vulnerable populations, including, but not limited to, low-income individuals, unemployed individuals, children, the incarcerated, and aged individuals.





FUNDING OPPORTUNITIES
CHAPTER 2
SECTION 3

FINDING THE RIGHT FUNDING

Bringing broadband service to every West Virginia resident is a massive undertaking that will require millions of dollars per county to complete. As such, grant funding is a critical component of the project process. Both the federal and state governments have recognized that additional broadband access cannot be executed without additional investment and elevated the importance of broadband planning and infrastructure work. As a result, there are unparalleled, once-in-a-generation levels of funding available for these projects provided by federal, state, and philanthropic organizations.

Finding the right funding opportunity is crucial, though, and can be a complicated process. Every funding source operates on its own set of timelines and requirements — projects that qualify for one grant may be entirely ineligible for another. The [ROC](#) team members involved in this study are available as resources to help navigate the funding process, including pro bono technical assistance via [Generation West Virginia](#). ROC's team can work with communities on everything from identifying eligible grant sources to assisting in funding applications. Several key elements for success to consider during the funding stage are outlined below, as well as additional information on some common broadband grant sources.

FUNDING TIPS



- **START EARLY** — Applying for grants is often a lengthy process, requiring detailed information. Starting the process early — and having the right people involved from the beginning — will help ensure plenty of time to gather the pieces needed for submission. Common requirements include statistics around current conditions or anticipated outcomes, letters of support, and project budget. Regardless of the specifics, every application should be framed around a compelling story — allow time to craft a narrative that shows the importance and impact of the project. Pulling all of this together takes time, resources, and effort — the process is much more of a marathon than a sprint!



- **DETAILS MATTER** — Every grant is different. Be sure to read the entirety of the grant requirements and follow them closely. If scoring criteria is listed, address each one as fully as possible. Follow formatting guidelines and review your submission for errors, readability, and content requirements.



- **BE CREATIVE** — What makes the project being submitted unique? Maybe it's the specific population it's serving. Maybe it's a regional, multi-county collaboration. Maybe it's bringing new technology to an area. Whatever the case may be, make sure the outside-the-box thinking that's involved in a project is conveyed in the funding application.



- **PROVE YOUR POINT** — While it often feels obvious to an applicant, it's vital to prove why a project deserves funding. One of the best ways to accomplish this is through facts and data. Detail things like the number of addresses being served, the miles of fiber being implemented, the area's population and poverty levels, the feedback residents have provided — including hard data like this adds credibility to an application and shows the "why" in a much more impactful way than providing opinions or assumptions.



- **KEEP IT CONCISE** — There is a lot of information to include in grant applications, but keeping responses concise — while still fully answering the prompts — will make them easier for the funding agency to digest. They receive countless applications in each round of funding. Making key information simple to understand and find in the document will make it easier to convince funders that the project should be a winner.

FEDERAL GRANTS

Historically there have been several federal entities instrumental in providing broadband funding: the [United States Department of Agriculture \(USDA\)](#), [United States Economic Development Administration \(USEDA\)](#), [Appalachian Regional Commission \(ARC\)](#), and [Department of Housing and Urban Development \(HUD\)](#). An overview on some of the programs these entities provide can be found below.

UNITED STATES DEPARTMENT OF AGRICULTURE

Though it may not be the first agency to come to mind when thinking broadband, the United States Department of Agriculture (USDA) has multiple programs to support it. Access to broadband is experienced at very different levels for those who live in urban areas as compared to those in rural regions – according to the FCC, more than 22% of Americans in rural areas lack coverage from fixed 25/3 Mbps broadband while only 1.5% in urban areas do.¹ Because of this stark contrast and the USDA's overarching mission to serve rural communities, [they have programs to support e-Connectivity in rural communities](#).

ReConnect Loan and Grant Program

The [ReConnect Loan and Grant Program](#) is aimed at [facilitating broadband deployment projects to support economic development in rural communities](#). This pilot project has gone through four rounds of awards to date (2019, 2020, 2022, and 2023). In this time, the program has allocated 353 awards totaling more than \$4.5 billion. [West Virginia has had four projects funded through ReConnect to provide service to nearly 12,000 households](#).

Key details:

- Funding is available in several forms: full grants, loan-grant combinations, and low-interest loans.
- Eligible entities include corporations, limited liability companies and limited liability partnerships, cooperatives or mutual organizations, states or local governments (including any agency, subdivision, or

instrumentality of political subdivision), a territory or possession of the United States, and Indian Tribes.

- If multiple entities would like to partner, one must take the lead on submitting an application; co-applicants are not accepted.
- This program is specifically set aside for rural areas lacking sufficient broadband access. The USDA provides specific definitions of three criteria that determine who is eligible based upon: (1) lacking sufficient access, (2) serving all premises, and (3) located in rural areas.²

Community Connect

Financial assistance through the [Community Connect Grant Program](#) is aimed **at bringing broadband to rural, economically challenged communities where it does not currently exist**. It aims to increase quality of life for residents and businesses in areas where commercial broadband service is least likely to be available. From 2013 to 2021, the USDA awarded 80 grants through this program for a total of \$160 million and served 100,000 rural residents. During that time, [West Virginia entities received four grants totaling nearly \\$11 million, the ninth highest dollar amount by state](#).³

Key details:

- As implied by the name, these grants are aimed at community-oriented connection. As such, not only are rural residents and businesses eligible, but projects involving [essential community facilities may be eligible to receive funding](#).
- Eligible areas must lack any existing broadband of 25/3 Mbps or higher.
- Entities eligible to apply include state and local governments, federally recognized Tribes, non-profit organizations, for-profit corporations, and limited liability companies.
- Grant requests typically must be between \$100,000 and \$5,000,000.
- [Matching funds of at least 15% from non-federal sources are required](#).

¹Microsoft Word - FCC-20-50A1-1

²Service Area Eligibility Requirements | USDA

³2013-2021_ccillustration_update_02232022.pdf (usda.gov)

APPALACHIAN REGIONAL COMMISSION

The Appalachian Regional Commission (ARC) focuses on promoting innovation, partnership, and investment to support economic development in Appalachia. As the only state entirely located in Appalachia, all West Virginia communities are within ARC territory. The organization focuses on investment in five key areas: **building businesses, workforce ecosystems, community infrastructure, regional culture and tourism, and leaders and local capacity.**⁴

POWER

The Partnerships for Opportunity and Workforce and Economic Revitalization (POWER) Initiative grant focuses specifically on areas that experience job loss related to the decline of the coal industry. Projects awarded through POWER must show how they will positively affect entrepreneurship and workforce development in these places. The program has allocated \$368 million to 449 projects since 2015. West Virginia has had 14 projects receive POWER grants, for a total of nearly \$15 million in funding.⁵

Key details:

- Eligible communities must be in areas designated by ARC as negatively impacted by coal's decline. All West Virginia counties are eligible, with some being considered "distressed" specifically.

- Eligible applicants include local development districts, Indian tribes, states/counties/cities/political subdivisions, institutions of higher education, and public or private non-profit organizations.
- Entities can apply for this funding for projects that meet any of four categories: fostering entrepreneurial activities, developing industry clusters in communities, building a competitive workforce, and/or broadband. While the grant is obviously not exclusive to broadband, the last round of funding set aside one-third of the available funds specifically for broadband deployment projects.⁶
- The application process includes both a Letter of Intent and a full application.
- POWER offers two grant types: Implementation Grants and Planning Grants. Implementation Grants typically are between \$400,000 and \$2,500,000 and are focused on program delivery. Construction support funding can also be requested. Planning Grants are awarded up to \$50,000 and are centered on developing strategies and studies needed before project execution.
- The percentage of match required for a POWER grant varies, but can come from non-ARC federal sources, non-federal sources, in-kind sources, or a combination.

Success Stories in ROC's Footprint



\$2.4 Million Construction Grant To Summers County Commission to build fiber to connect over 600 unserved or underserved households. (ARC POWER, 2022)



\$2.5 Million Construction Grant To Pocahontas County Commission to build fiber to connect over 600 unserved or underserved households. (ARC POWER, 2022)

⁴ ARC's Investment Priorities for Appalachia - Appalachian Regional Commission

⁵ POWER Award Summaries by State as of December 2022 (arc.gov)

⁶ POWER Initiative 2023 Request for Proposals (arc.gov)

CHAPTER 2 SECTION 3

US DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Another potential federal funding source is the [US Department of Housing and Urban Development \(HUD\)](#). HUD exists to facilitate programs centered on fair and equal housing and community development. Broadband fits into their jurisdiction under the community development bucket, as addressing infrastructure needs is considered a key element of building strong communities.

Community Development Block Grants

One of HUD's most prevalent funding programs is the [Community Development Block Grant \(CDBG\)](#). Several different types of CDBG programs exist, but the overarching goal is to provide formula-based funding to states and local governments each year for the **purpose of economic and community development work**. Broadband falls into this category, particularly as it relates to planning, infrastructure deployment, and digital inclusion.

Key details:⁷

- Eligible recipients include state and local governments. Non-profit organizations can be a subrecipient of CDBG funding; privately owned utilities and other similar entities may be able to use CDBG with assistance of a local government.
- Match funding requirements are dependent on the particular CDBG program.
- It is often used to help provide gap financing for projects that use other public funding or as a match for other grants.

US DEPARTMENT OF COMMERCE ECONOMIC DEVELOPMENT ADMINISTRATION

The [United States Economic Development Administration \(USEDA\)](#), part of the [Department of Commerce](#), is tasked with leading the nation's economic development agenda. It is the only federal agency focused entirely on this task and works diligently to assist with development on a local community level.

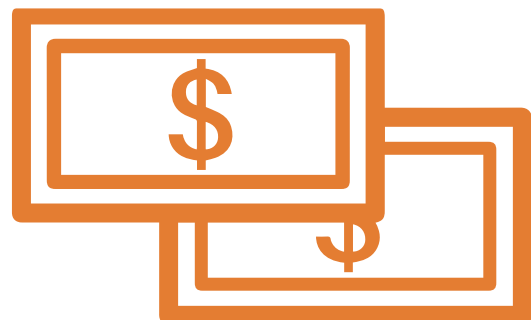
As such, the USEDPA offers a wide variety of programs to help fund economic development endeavors, from implementing CARES act funding to providing for local planning efforts.

Public Works and Economic Adjustment Assistance

One of the many funding programs available through the USEDPA is the [Public Works and Economic Adjustment Assistance \(EEA\) grant](#). This opportunity is set aside for economically distressed communities and can be used for several different purposes, including **broadband infrastructure and Smart Cities initiatives**. The overall intent of the program is to support work in [Opportunity Zones](#) related to job creation/retention, advancement of innovation, increasing manufacturing capacity, providing workforce development opportunities, and similar functions.

Key details:⁸

- This grant does not have hard application deadlines. Rather, it has ongoing acceptance until a new notice of funding for the grant is published.
- Eligible entities include county, state, city, township, and Tribal governments; nonprofit organizations; and higher education institutions.
- Funding for FY23 provides \$121.5 million for the Public Works program and \$39.5 million for the EEA program.
- Match requirements vary for this funding. Typical expectation is a 50% match, but the USEDPA may fund up to 80% of the project.⁹



⁷ Department of Housing and Urban Development - Community Development Block Grant | BroadbandUSA (doc.gov)

⁸ View Opportunity | GRANTS.GOV

⁹ Department of Commerce - FY 2023 EDA Public Works and Economic Adjustment Assistance Programs | BroadbandUSA (doc.gov)

STATE GRANTS

The State of West Virginia has developed several broadband-focused grants in the last several years as part of the West Virginia Broadband Investment Plan (WVBIP) and Governor Jim Justice's [Billion-Dollar Broadband Strategy](#). Funding has included appropriations from the federal government allocated to the state, as well as additional funding provided directly by the state.¹⁰ The [West Virginia Office of Broadband](#) administers these programs, which currently include LEAD, GigReady, MBPS, and WIN.

LEAD

The [Line Extension Advancement and Development \(LEAD\) program](#) provides funding **directly to ISPs** to expand their fiber and cable networks. The funding is intended specifically for extension of existing last-mile cable or fiber-to-the-premise projects. To date, two rounds of funding have been awarded through this program. **The LEAD program has funded 19 projects, with two reaching completion to date.**

Key details:

- ISPs are eligible if they already provide 100/20 Mbps service in West Virginia that can be extended and must have a statement of existence from the West Virginia Secretary of State.
- Projects must be for extension of existing service. Major new networks are not eligible.
- Targeted addresses under LEAD include those with no access to internet service of at least 25/3 Mbps.
- Applicants are encouraged to submit projects with at least 50 targeted addresses.
- As of round two, construction must be complete within 24 months of award.
- A match of at least \$500 per address passed is required.

- The latest round had a project award cap of \$8,000,000 each, with individual projects allowed to contain addresses in no more than two counties.

GIGREADY

[GigReady](#) has also gone through two rounds of funding to date, though the awards of these rounds were tied together — the program was initially developed to support **both technical assistance and implementation** of projects. Round one funding was primarily used to fund the technical assistance work needed to scope projects, select partners, and complete necessary preliminary work. Those selected in round one were then eligible for round two, which provided funding for implementation of shovel-ready projects that had an established agreement with an ISP. **So far, five projects have received awards.¹¹**

Key details:

- Local governments are the only eligible entities for GigReady funding, including county and municipal governments, RPDCs, economic development corporations, and similar entities.
- Targeted addresses under this program are those without current access to 25/3 Mbps service.
- No specific project size has been required, but evidence to support its viability is a key component of the application.
- Construction must be completed within 24 months of award, with potential for a six-month extension if reasonable.
- A 25% match by the community is typically required.
- Participants are required to participate in federal programs centered on subsidizing broadband service for low-income customers.

¹⁰ West Virginia Gov. Justice announces \$1B broadband strategy | WV News | wvnews.com

¹¹ ARPA Dashboard (arcgis.com)

MBPS

The [Major Broadband Project Strategies Program \(MBPS\)](#) is designated for projects which bring service to targeted addresses on a **large scale**. To support the more regionally based goals of this program, public-private partnerships are encouraged. Two rounds of funding have occurred, though centered on different goals. Through both rounds, a total of 12 projects have received funding. The primary use of MBPS was seen in the first round of allocations, with details below focused on the criteria from that round specifically.

Key details:

- Applicants may be private for-profit or non-profit corporations, partnerships, municipalities, counties, economic development entities, RPDCs, or a group of local governments.
- Eligible service areas must not have existing access to 25/3 Mbps service.
- Construction must be completed within 24 months, with possibility of a six-month extension.
- A match of at least 25% or \$500 per address passed must be committed, whichever is the lesser cost.¹²

WIN

Extensions or upgrades to existing last-mile wireless networks were eligible for funding through the [Wireless Internet Networks \(WIN\) program](#). **Projects that involve state parks** are given preference in this program. In June 2023, two projects were awarded to Hardy Cellular Telephone Company (DBA UScellular) for projects at Coopers Rock State Forest and Watoga State Park.¹³

Key details:

- This funding is reserved for ISPs already offering wireless broadband service in West Virginia.
- Applications fall into one of two categories: preferred or non-preferred. While both may be funded, preferred projects receive prioritization. These include projects benefiting state parks and/or communities nearby a state park. All others are considered non-preferred.

- If a project submission requests more than \$3 million, it may be asked to divide its proposal into smaller pieces.
- For the initial round of funding, construction was required to be completed within 12 months of award, with a potential six-month extension.
- Applicants must provide at least 25% match.

Success Stories in ROC's Footprint



\$50,000 Planning Grant To Fayette County Commission to finalize engineering and scoping to connect over 3,700 unserved and underserved households

(WV State Broadband Office GigReady, 2022)



\$1.8 Million Construction Grant To Monroe County Commission to build fiber to connect over 600 unserved or underserved households

(WV State Broadband Office GigReady, 2022)



\$50,000 Planning Grant To Nicholas County Commission to finalize engineering and scoping to connect over 3,800 unserved and underserved households

(WV State Broadband Office GigReady, 2022)



\$5.89 Million Construction Grant To Raleigh County Commission to build fiber to connect over 1,600 unserved or underserved households

(WV State Broadband Office GigReady, 2022)



\$3.7 Million Construction Grant To Summers County Commission to build fiber to connect over 1,000 unserved or underserved households

(WV State Broadband Office GigReady, 2022)

¹² MBPS-PROCEDURES-UPDATE-MARCH-22-2023-Round-1-Changes.pdf (wv.gov)

¹³ Gov. Justice announces over \$18 million in grant funding for broadband improvement projects across West Virginia (wv.gov)

BEAD

Currently, the most widely talked about funding opportunity is the forthcoming [Broadband Equity, Access, and Deployment \(BEAD\) program](#). An initiative of the Infrastructure and Jobs Act, \$42.45 billion has been dedicated to broadband planning, deployment, and adoption projects across the country. The program is being administered through the [National Telecommunications and Information Administration \(NTIA\)](#), which was responsible for allocating the funding between all 50 states, Washington DC, and five US territories. The funding was divided based on the number of unserved broadband serviceable locations (BSLs) in each state or territory. Because of West Virginia's high percentage of unserved BSLs (30.17%, second only to Alaska), the state is receiving \$1.2 billion to address the issue.¹⁴

Full requirements and procedures for how this money will be spread across the state have not yet been released, as the program is still in development. The multi-step process requires the State of West Virginia to create a [Five-Year Broadband Action Plan](#), **a two-volume proposal to NTIA identifying where and how BEAD funds will be distributed**, and must allow for a public challenge process for feedback on targeted locations. As of this writing, an action plan was in place, the challenge process was underway, and the BEAD Initial Proposal Volume 1 draft was published for public comment.

The ROC 2023 statewide broadband study results will be incorporated into this piece of the BEAD plan.

While final details on project selection are not yet available, several things are known. First, the \$1.2 billion from the NTIA is being granted to the [West Virginia Department of Economic Development \(WVDED\)](#). The WVDED will be the entity responsible for awarding that money, choosing project subgrantees. Priority will be given on a waterfall basis:

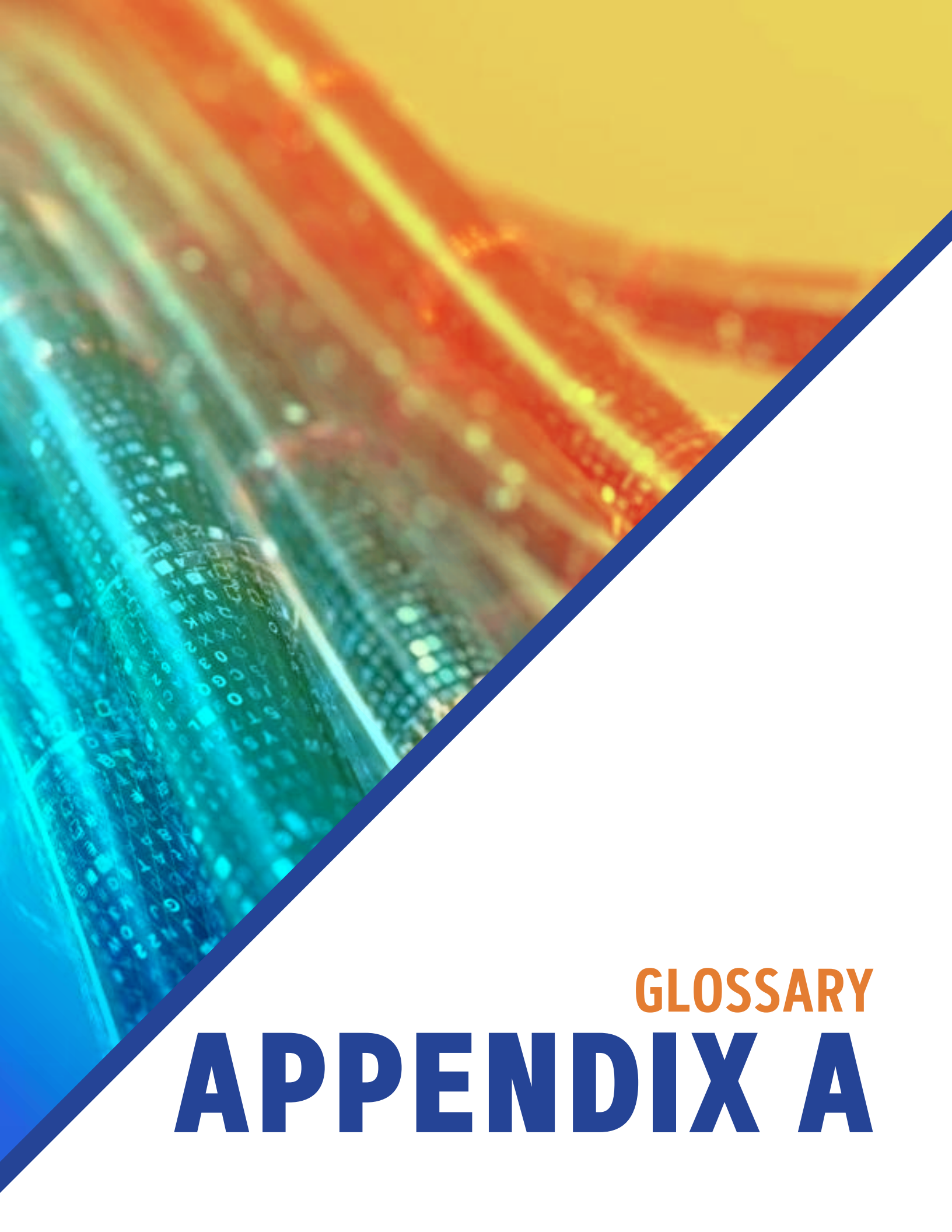
- **Unserved locations** (those without reliable 25/3 Mbps service) are the top tier priority.
- **Underserved locations** (without reliable 100/20 Mbps service) come next.
- **Community Anchor Institutions (CAIs)** that lack 1/1 Gbps
 - » *CAIs are community-focused facilities such as schools, libraries, healthcare institutions, and other similar places where internet service can be accessed by public community members. Because of their importance and the magnitude of bandwidth needed to serve populations who use them, the speed threshold for these locations is 1 GigaByte per second (Gbps) download and upload.*
- **Non-deployment** uses, including support of digital equity and digital skills related programs.

Updates on how individual projects will be selected and copies of the additional documents being developed will be available on the West Virginia Office of Broadband website as the process continues.

BEAD Challenge Process

There will be an available challenge period once Proposal Volume 1 is approved that shows the BEAD data set. With the appropriate supporting data (such as speed tests), local governments, non-profit organizations, and broadband service providers can submit a challenge to the state for evaluation for a location to transition from underserved to unserved. This is the only potential change that can be challenged – classification from served to unserved or vice versa can not take place. Check [West Virginia Broadband Investment Plan – WV Broadband : WV Broadband](#) for the most updated instructions on how to submit a challenge.

¹⁴ BEAD Allocations Announced June 26, 2023–West Virginia's Allocation Exceeds \$1.2 Billion - WV Broadband : WV Broadband



GLOSSARY

APPENDIX A

Broadband is a critical infrastructure in today's world that impacts nearly every facet of life. Whether used to support economic growth and education or promote access through telemedicine, social inclusion, and government programs, having reliable internet service is a necessity. Some key terms related to broadband and their definitions, primarily provided by [BroadbandUSA](#) and [The Fiber Optic Association](#), can be found below:

TERMS

Active network

A network in which routers can execute code

Aerial fiber

Fiber routed along utility poles

Backbone

Major high-speed transmission line that links smaller high-speed internet networks

Bandwidth

Capacity of telecommunications networks to transmit data

Broadband

High-speed internet that is always on and faster than traditional dial-up; includes transmission methods like fiber, wireless, satellite, digital subscriber line, and cable

Buried fiber

Insulated fiber routed underground, below the layer where soil freezes

Cable

Option for transmitting broadband; one or more fibers enclosed in protective covering

Cellular

Option for transmitting broadband via radio networks

Community Anchor Institutions

Places such as schools, libraries, healthcare providers, and public safety facilities to provide broadband access to their communities' vulnerable populations

Dark fiber

Fiber not being used to provide broadband service

Digital Divide

Gap between communities with access to internet and those that do not

Digital Equity

Links digital inclusion and social justice; recognizes need for not only access to broadband, but technology itself

Fiber

Flexible glass strand that transmits large amounts of data via pulses of light

Fiber to the home (FTTH)

Delivery and connection of fiber directly to a home or building

Fixed Wireless

Broadband service that connects two fixed locations through the air rather than through fiber

Internet service provider (ISP)

Company that facilitates a connection to the internet

Last mile

The technology and process of connecting the end user's home or business to the local ISP

Lit fiber

Active fiber with ISP connection that is capable of transmitting data

Make-ready

Process of preparing a utility pole for a new fiber attachment; often includes moving existing lines higher or lower on the pole

Middle mile

Connection between the local/last mile network and the backbone/major internet transmission line

Network

System of cables, hardware, and equipment used for communications

Network infrastructure

Hardware and software that work together to provide connectivity to an internet network

Open access network

Networks that are not run by a singular ISP

Overbuild

When a new fiber network is built in the same right-of-way or on the same aerial pole as an already existing network

Rights-of-Way

Legal right to pass through property owned by another

Sag

Difference in elevation of a wire, cable, or fiber suspended between two points

Satellite

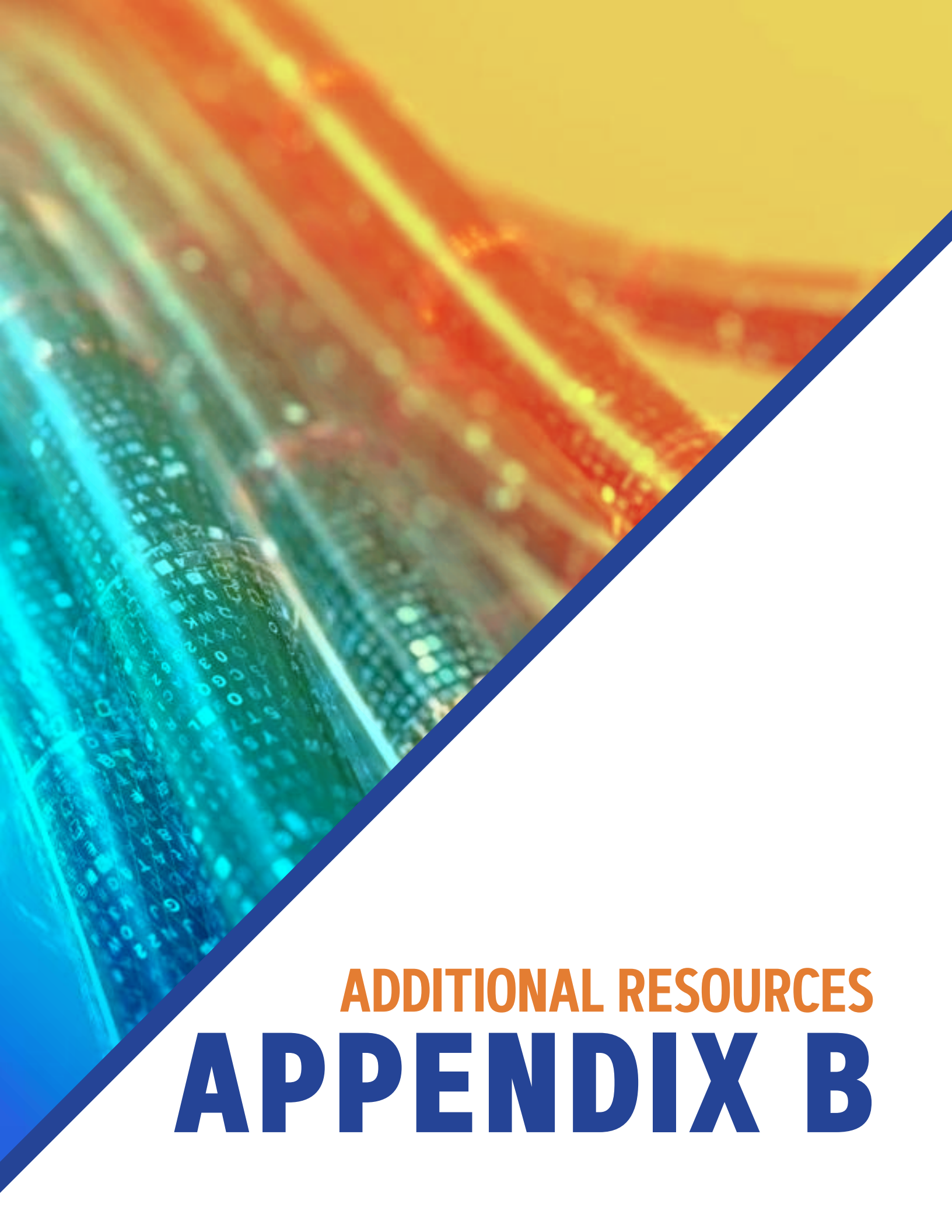
Internet service transmitted from satellites orbiting Earth via radio waves

Service area

The entire area that an ISP currently offers or intends to offer broadband service

Take rate

Percentage of potential users who actually sign up for service



ADDITIONAL RESOURCES
APPENDIX B

ADDITIONAL RESOURCES

[Appalachian Regional Commission](#)

www.arc.gov

[Broadband Equity, Access, and Deployment \(BEAD\) Program](#)

<https://broadbandusa.ntia.doc.gov/funding-programs/broadband-equity-access-and-deployment-bead-program>

[BroadbandUSA](#)

<https://broadbandusa.ntia.doc.gov>

[Digital Equity Act](#)

<https://broadbandusa.ntia.doc.gov/funding-programs/digital-equity-act-programs>

[Dig Once Policy](#)

<https://broadband.wv.gov/resources/west-virginia-dig-once-policy>

[Fiber Optics Association](#)

<https://thefoa.org/>

[FY23 BroadbandUSA Federal Funding Interactive Guide](#)

https://broadbandusa.ntia.doc.gov/sites/default/files/2023-07/FY23_BroadbandUSA_Federal_Funding_Interactive_Guide_071323.pdf

[Generation West Virginia](#)

<https://generationwv.org/programs/broadband>

[Lit Fiber](#)

www.lit-fiber.com

[Regional Optical Communications \(ROC\)](#)

www.wvroc.org

[ROC Study Overview Webinar](#)

www.youtube.com/watch?v=VO_Pe3_2U9M

[The Thrasher Group](#)

www.thethrashergroup.com

[US Department of Agriculture](#)

www.usda.gov

[US Department of Commerce Economic Development Administration](#)

www.eda.gov

[US Department of Housing and Urban Development](#)

www.hud.gov

[WV Broadband Enhancement Council](#)

<https://broadband.wv.gov/information-about-bec>

[WV Department of Economic Development](#)

<https://westvirginia.gov>

[WV Office of Broadband](#)

<https://broadband.wv.gov>



KEY CONTACTS
APPENDIX C

APPENDIX C

As is clear throughout this report, bringing broadband projects to life takes a diverse team all working towards the same goal. Whether looking for help with a specific piece of the puzzle — like grant writing — or requesting guidance through the entire project process, there are countless resources available to help along the way. While [Appendix B](#) highlights many of the entities that can assist in implementation, this section provides contact information for some of the key individuals that may be useful.

STATE OF WEST VIRGINIA – DEPARTMENT OF ECONOMIC DEVELOPMENT

Todd Goddard, Development Manager

WV Department of Economic Development
todd.a.goddard@wv.gov
304-957-2054

Jamie Hoffmann, Program Manager, GIS Coordinator

WV Department of Economic Development
WV Office of Broadband
jamie.h.hoffman@wv.gov
304-941-6389

Kelly Workman, Director, Broadband

WV Department of Economic Development
WV Office of Broadband
kelly.a.workman@wv.gov
304-352-4155

Robert L. Morris, Jr., Chairman

WV Broadband Enhancement Council
robbie@randolphwv.com
304-558-2234

REGIONAL OPTICAL COMMUNICATIONS

Jason Roberts

President
jasonroberts@regiononepdc.org
304-431-7225

John Tuggle

Treasurer/Assistant Secretary
jtuggle@reg4wv.org
304-872-4970

THE THRASHER GROUP

Jeffrey Hartley

Broadband Market Leader
jhartley@thethrashergruop.com
304-848-7030

Chad Riley

Vice President of Business Development
criley@thethrashergruop.com
304-669-6992

GENERATION WEST VIRGINIA

Annie Stroud

Broadband Program Director
annie@generationwv.org
304-804-6767

John Golden

Founder: Three Sixty Strategies
304-545-6963
john@threesixtystrategies.com
Sub-consultant to Generation WV

LIT FIBER

Jessica Fowler

Senior Vice President of New Market Development
jfowler@lit-fiber.com
860-309-0987

WEST VIRGINIA REGIONAL PLANNING AND DEVELOPMENT COUNCILS

Region 1

Jason Roberts, Executive Director

jasonroberts@regiononepdc.org

304-431-7225

www.regiononepdc.org

» Serves McDowell, Wyoming, Raleigh, Mercer, Summers, and Monroe Counties

Region 2

Chris Chiles, Executive Director

cchiles@region2pdc.org

304-529-3357

www.region2pdc.org

» Serves Mingo, Logan, Wayne, Lincoln, Cabell, and Mason Counties

Region 3

SoJuana Ellis, Interim Executive Director

mail@wvregion3.org

304-744-4258

www.wvregion3.org

» Serves Boone, Putnam, Kanawha, and Clay Counties

Region 4

John Tuggle, Executive Director

jtuggle@reg4wv.org

304-872-4970

www.reg4wv.org

» Serves Fayette, Nicholas, Webster, Greenbrier, and Pocahontas Counties

Region 5

Caroline Stewart, Executive Director

caroline.stewart@movrc.org

304-699-3703

www.movrc.org

» Serves Jackson, Roane, Calhoun, Wirt, Wood, Ritchie, Pleasants, and Tyler Counties

Region 6

Sheena Hunt, Executive Director

regionvi@regionvi.com

304-366-5693

www.regionvi.com

» Serves Doddridge, Harrison, Tyler, Preston, Marion, and Monongalia Counties

Region 7

Shane Whitehair, Executive Director

swhitehair@regionvii.com

304-472-6564

www.regionvii.com

» Serves Braxton, Gilmer, Lewis, Upshur, Barbour, Randolph, and Tucker Counties

Region 8

Terry Lively, Executive Director

tlively@regioneight.org

304-257-2448

www.regioneight.org

» Serves Pendleton, Grant, Hardy, Mineral, and Hampshire Counties

Region 9

Rachel Snavely, Executive Director

rsnavely@region9wv.com

304-263-1743

www.region9wv.com

» Serves Morgan, Berkeley, and Jefferson Counties

Region 10

Scott Hicks, Executive Director

belomar@belomar.org

304-242-1800

www.belomar.org

» Serves Wetzel, Marshall, and Ohio Counties

Region 11

Michael Paprocki, Executive Director

mikepap@bhjmpc.org

304-797-9666

www.bhjmpc.org

» Serves Brooke and Hancock Counties

The background features a diagonal split. The upper-left portion is a vibrant, abstract composition of overlapping lines and patterns in shades of orange, red, and yellow, with a glowing, digital aesthetic. The lower-right portion is a solid, deep blue. A thick, dark blue diagonal line separates the two sections.

**HISTORY OF
BROADBAND IN
WEST VIRGINIA**

APPENDIX D

HISTORY OF BROADBAND IN WV

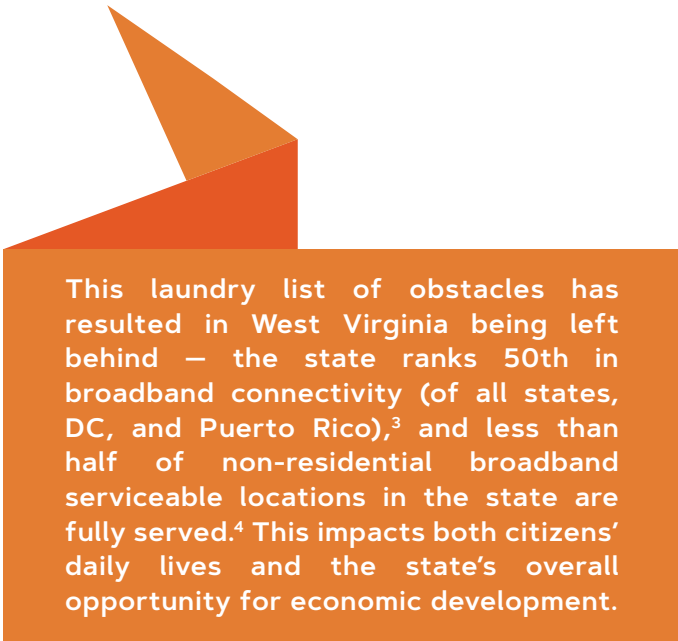
A HISTORY OF INADEQUATE SERVICE

As the organization responsible for regulation of communication via wire, satellite, cable, radio, and television, the [Federal Communications Commission \(FCC\)](#) has a wide variety of resources and data regarding the communications landscape in the United States. One of these resources is the [National Broadband Map](#). The map is an interactive visualization of the internet service providers and speeds available across the country. The data that populates the map is gathered by the FCC twice a year via [Form 477](#), which all facilities-based broadband providers (ISPs and mobile providers) are required to submit in June and December.

This data is also taken collectively to provide statistics on the percentage of coverage available in different parts of the country. For example, based on the [FCC's 2019 Broadband Deployment Report](#) (which reflects 2017 data), 93.5% of the United States' population was estimated to have access to fixed broadband, including 84.6% of West Virginians.¹ While this figure still ranked the state amongst the least connected in the nation, it seemed like a vast overstatement of service to state officials and residents.

This feeling proved to be for good reason. The Form 477 data has historically been based on a census block level. Because of this, if broadband service is offered or available somewhere within the block, the entire block is considered served. Similarly, speeds reflected on the map correlate to reported available speeds, which may differ from experienced speeds. As a result, the National Broadband Map has historically shown an over-estimation of service.

Beyond the statistics, though, lived experience and local knowledge made it clear to West Virginians that the state needed improved and expanded internet service. So many people — across every part of the state — have experienced the same barriers to participation in the modern, digital world. Whether buying and selling online, accessing telemedicine appointments, or simply streaming a favorite television show, Mountaineers have struggled to access the online resources they need within state borders. There are many factors as to why the digital divide is so high in West Virginia, but many result from the state's landscape. With a higher mean elevation than any state in the eastern US,² stark contrast between the mountainous peaks and low-elevation valleys, and a large rural population, it is an expensive venture to deploy utilities and brings a low return on investment to the companies doing it.



This laundry list of obstacles has resulted in West Virginia being left behind — the state ranks 50th in broadband connectivity (of all states, DC, and Puerto Rico),³ and less than half of non-residential broadband serviceable locations in the state are fully served.⁴ This impacts both citizens' daily lives and the state's overall opportunity for economic development.

¹ West Virginia State Broadband Plan 2020-2025 (wv.gov)

² About West Virginia (marshall.edu)

³ WV-5-Year-Action-Plan-2023.8.14.pdf

⁴ WV-5-Year-Action-Plan-2023.8.14.pdf

DEVELOPMENT OF STATE PROGRAMS

As has happened so many times throughout history, West Virginians took their fate into their own hands in order to solve the problem. Knowing the critical importance of improving internet access for Mountaineers, the state created the **West Virginia Broadband Enhancement Council** in 2016. The Council was established with the primary goal of ensuring that every community in West Virginia — whether urban, suburban, or rural — received access to the internet. This was to be accomplished through development of plans and procedures to extend middle mile, last mile, and wireless service, as well as through legislative reports and recommendations. While the Council has grown and evolved over the years, it has remained an important piece of the broadband discussion in the state — members come from a wide variety of backgrounds, covering both residential and business needs. There are 13 voting members of the Council, as well as two appointees each from the West Virginia Senate and House of Delegates who serve as nonvoting advisory members.

This has not been the only entity established to help the cause — the **West Virginia Office of Broadband** (WVOBB) was formed in 2021 through the state Legislature. House Bill 2002 outlined specific duties for the newly created office and amended the role of the Broadband Enhancement Council to work in conjunction with the WVOBB.

Since its creation, the WVOBB has provided integral services to the state. One of the most important has been the oversight and disbursement of broadband funding through Governor Jim Justice’s West Virginia Broadband Investment Plan. Hundreds of millions of dollars have been awarded to dozens of projects in every corner of the state for broadband planning and deployment projects. These programs — briefly covered in Chapter 2 of this report — include the Line Extension Advancement and Development (LEAD) program, GigReady, Major Broadband Project Strategies Program (MBPS), and Wireless Internet Networks (WIN) program.

Another major contribution of the WVOBB has been directly addressing the understatement of West Virginia’s coverage on the FCC’s National Broadband Map. The United States Congress directed the FCC to collect, verify, and publish more specific data points — at an address level rather than census block level — via the 2020 Broadband Deployment Accuracy and Technological Availability (DATA) Act. One of the many pieces of this legislation required the FCC to create a process in which individuals and government organizations could challenge the existing service data. The WVOBB led the charge in West Virginia, diligently collecting more accurate speed data to submit to the FCC. Because of the more granular mapping system and the WVOBB’s efforts, nearly 90,000 additional West Virginia locations were added to the FCC map.⁵

⁵ New FCC Maps Find Thousands Of Unserved Broadband Locations In W.Va. - West Virginia Public Broadcasting : West Virginia Public Broadcasting (wvpublic.org)

A CONNECTED FUTURE

This great jump in broadband serviceable locations had a direct impact on moving West Virginia closer to a connected future. The [FCC map](#) was directly used in the determination of federal broadband funding amounts allocated to each state via the [Broadband, Equity, Access and Deployment \(BEAD\) Program](#). Having the most accurate picture of need reflected in the FCC map meant increased levels of funding for West Virginia – ultimately, the state was allocated more than \$1.2 billion in BEAD funding, one of the highest amounts in the nation.

Now, the WVOBB is working to meet all of the BEAD requirements so the funding can be released to the state for further disbursement. To date, [WVOBB](#) has completed and received [NTIA](#) approval on the [West Virginia Five-Year Broadband Action Plan](#); drafted the [Digital Equity plan](#); and drafted the

[Initial Proposal, Volume 1](#), which has gone through the public comment process, with feedback now being incorporated before being submitted to NTIA for approval. The same process will be completed in the coming months for the Initial Proposal, Volume 2, which will incorporate the results of the ROC study.

Together, these documents outline several key concepts:

- Where in the state service is needed
- What qualifies as a Community Anchor Institution
- How the state challenge process will work
- Proposed activities for BEAD funding
- The process for selecting subgrantees/projects to receive BEAD funding
- Plans to comply with BEAD requirements, such as workforce readiness, cost and barrier reduction, affordability, local coordination, and other tasks

BEAD Requirements

- ✓ Five-Year Broadband Action Plan
- ✓ Initial Proposal, Volume 1
- ✓ Initial Proposal, Volume 2
- ✓ State Challenge Process
- ✓ Project Selection
- ✓ Final Proposal
- ✓ Ongoing Monitoring, Reporting, and Performance Management

While there is still work to be done before funding is fully released, West Virginia is well on its way to being a truly connected state – with \$1.21 billion of BEAD money coming and an estimated \$1.22 billion of construction costs needed to fully build out the state’s network, now is the time for West Virginia to finally close the digital divide.



ROC

REGIONAL OPTICAL COMMUNICATIONS