Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Connect America Fund	)	WC Docket No. 10-90
	)	
Universal Service Reform – Mobility Fund	)	WT Docket No. 10-208
	)	
ETC Annual Reports and Certifications	)	WC Docket No. 14-58
	)	
Establishing Just and Reasonable Rates for Local Exchange Carriers	)	WC Docket No. 07-135
	)	
Developing an Unified Intercarrier Compensation Regime	)	CC Docket No. 01-92

COMMENTS OF CENTURYLINK

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EXECUTIVE SUMMARY

CenturyLink supports the Commission's determination to bring broadband services to rural America, and applauds the Bureau's dedication and perseverance to see this matter to its appropriate conclusion. This may be the most important decision the Commission has made in a long time. It certainly will be for those who receive CAF II broadband services in rural America.

The Commission's CAF II funding proposal encompasses building broadband service to 4.2 million homes and businesses in an area that is approximately 18 percent of the square miles in the entire United States, at an average network build of just seven locations per square mile. The CAF II obligation is a novel and challenging endeavor requiring unprecedented and potentially disruptive capital expenditures by companies accepting statewide commitments. Therefore, it is critical that service obligations are clear from the start and cannot be unilaterally altered. Further, sufficient flexibility and time must be provided to accommodate the realities of network design, planning and deployment to enable the service obligations associated with CAF II to be accepted in the first instance. In other words, the economics must work.

The Connect America Cost Model (CAM) is a useful tool for determining, in the aggregate, where supported networks should be built so as to maximize deployment within a reasonable budget, but it will be inaccurate frequently at the level of an individual household location, or even census block. Variances between CAM-modeled locations and real world customer locations will cause most network deployments to differ economically from the costs reflected in the CAM.

CenturyLink agrees that 10 Mbps is an appropriate speed target, and this increase in speed will require a longer funding and build-out period. In order for CAF II to be a success with a 10 Mbps downstream / 1 Mbps upstream broadband standard, the Commission needs to

adopt at the outset, and maintain for the full funding period, several clear support criteria: (1) the funding and build-out periods should both be extended to 10 years, measured on a consistent, straight-line basis; (2) the determination of a competitively-served, and hence ineligible, census block must be made with reference to the same 10/1 standard for competitors; (3) there should be flexibility for the broadband operator to build-out to less than 100 percent (but at least 90 percent) of the specified number of eligible service locations, with a commensurate reduction in support; (4) the obligation to build-out to the specified number of locations must be measured on a state-wide basis (and not in each census block); and (5) CAF II support should be available to deploy to high-cost locations in partially-served census blocks that a competitor does not serve and will not commit to serve.

Finally, the Commission should adopt policies that rationalize its current provision of frozen support with all the other factors impacted by the CAF II program. These factors include: the importance of continuing service in high-cost areas during broadband build-outs; the existence of state and federal COLR obligations; the recognition that not all customers will receive access to broadband services, under even the most aggressive CAF II assumptions; and the impact of decreasing support in some states under the CAF II program.

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COMMENTS OF CENTURYLINK

CenturyLink, Inc. ("CenturyLink") shares the objective articulated by the Commission — and as set forth by Congress — of ensuring "that residents in all parts of the country, including rural and high-cost areas, have access to advanced telecommunications and information services."[1] Phase II of the Connect America Fund ("CAF II") has the potential to advance this objective in a meaningful way. But the program will not achieve its full potential unless it is implemented in a manner that realistically accounts for the challenges inherent in designing, planning, and deploying networks in uneconomic rural areas that are as ambitious as the one the Commission is proposing to fund.

[1] *Connect America Fund et al*., Report and Order, Declaratory Ruling, Order, Memorandum Opinion and Order, Seventh Order on Reconsideration, and Further Notice of Proposed Rulemaking, WC Docket Nos. 10-90 *et al*., FCC 14-54, at ¶ 138 (rel. June 10, 2014) (citing 47 U.S.C. § 254(b)) ("*CAF II Omnibus*").

INTRODUCTION

The Commission's CAF II funding proposal encompasses building to 4.2 million locations in an area that is approximately 17 percent - 18 percent of the square miles in the entire United States.[2] And, the full CAF II requires a network design and build to enable, on average, just seven locations per square mile.[3] The funding required to deploy and maintain rural broadband networks in the CAF II areas far exceeds the $1.8 billion annual budget proposed for CAF II. Therefore, significant private capital will be required as well, and providers will be taking on considerable risks associated with the challenging economic conditions and massive sunk-cost investments. CenturyLink submits these comments to assist the Commission in developing the most effective approach possible for achieving its objectives under these circumstances.

There is little doubt that rural America needs greater broadband availability, higher speeds, and future capabilities offered by a terrestrial, fiber-rich network. From an economic development, education, healthcare and public safety standpoint, fiber-based broadband is in the best interest of the nation. Many carriers including CenturyLink have deployed broadband to the fullest extent that is economically possible in rural America. CAF II can, and should, take the "next step" in bringing and maintaining broadband in uneconomic rural areas.

CenturyLink agrees that 10 Mbps is an appropriate speed target and this increase in speed will require a longer funding and build-out period. In order for CAF II to be a success with a 10

[2] *See* CAM411_CB_Funded_List_3_10_YesNo.csv file (reflecting funded CAF II locations), publicly available at http://transition.fcc.gov/wcb/CAM411_CB_Funded_List_3_10_YesNo.csv and the Census Bureau's 2010 Census Block shape files publicly available at https://www.census.gov/geo/maps-data/data/tiger-line.html.

[3] This calculation is based on dividing the total number of current CAF II eligible locations by the total area of the current CAF II eligible census blocks.

Mbps downstream / 1 Mbps upstream broadband standard, the Commission needs to adopt several critical support criteria: (1) the funding and build-out periods should both be extended to 10 years, measured on a consistent, straight-line basis; (2) the determination of a competitively-served, and hence ineligible, census block must be made with reference to the same 10/1 standard for competitors; (3) there should be flexibility for the broadband operator to build-out to less than 100 percent (but at least 90 percent) of the specified number of eligible service locations, with a commensurate reduction in support; (4) the obligation to build-out to the specified number of locations must be measured on a state-wide basis (and not in each census block); and (5) CAF II support should be available to deploy to high-cost locations in partially-served census blocks that a competitor does not serve and will not commit to serve.

In Section I of these comments, CenturyLink describes briefly some of the practical steps that will be required to design, plan and deploy networks to provide voice and broadband service in CAF Phase II eligible census blocks. These steps, which are set forth in more detail in the attached Description of CenturyLink CAF Phase II Network Design, Planning & Deployment, demonstrate that the CAF II obligation to engage in significant broadband network deployment across the country simultaneously to meet precise deployment milestones is a challenging endeavor requiring unprecedented capital expenditures. In turn, it is critical that service obligations are clear from the start and are not unilaterally altered. Additionally, it is critical that sufficient flexibility and time are allowed in accord with the realities of network design, planning and deployment to enable the service obligations associated with CAF II to be accepted in the first instance.

In Section II, CenturyLink describes how the CAF II process must be made compatible with these network planning requirements in order to meet the public interest. Specifically, the

CAF II network performance requirements and deployment obligations will need to be set forth at the outset and accompanied by guaranteed support that matches the scope of the obligations. In the high-cost areas the Commission intends to serve through CAF II, it is unlikely that networks designed to provide a minimum download speed of 4 Mbps in such areas will be able to provide higher minimum speeds in the future, even presuming technical advances unfold. This is because the way in which a network must be deployed in CAF II eligible areas to meet one speed requirement to supported locations is very different from the network that would be deployed to provide a higher speed to those same areas. Thus, it is critical that the Commission determine upfront the minimum speed of broadband service to which consumers should have access in supported areas over the next decade, and leave that speed requirement unchanged for the duration of the funded period. Additionally, it is critical that the Commission provide financial support that is sufficient to deploy the infrastructure necessary to accomplish the Commission's objectives.

CenturyLink agrees that it may be reasonable to require CAF II-supported networks to provide a minimum download speed of 10 Mbps, as the Commission has proposed.[4] Whatever speed the Commission selects, however, it must be consistent in using that speed to determine what areas will receive support. In other words, if the Commission selects 10/1 as the required broadband speed for supported areas, then it must also require that competitors offer 10/1 broadband service in order to qualify an area as "served" and thus ineligible for support. Otherwise, areas disqualified because they are "served" at a lower speed may be stuck indefinitely with broadband service that the Commission has determined is not sufficiently robust to support typical consumer Internet use.

[4] *CAF II Omnibus* at ¶ 140.

The CAF II process also must provide funding recipients with enough certainty to support long-term planning, and enough flexibility to meet their obligations in a sensible and cost-efficient way. The Connect America Cost Model ("CAM") is a useful tool for determining, in the aggregate, where supported networks should be built so as to maximize deployment within a reasonable budget. But no model is perfect, and least of all at a disaggregated detail level—even if the CAM is very accurate overall, it is certain to be inaccurate frequently at the level of an individual household location, or even census block. In turn, an effective statewide offer of CAF II support, or the conditions that attach to a winning competitive bid, must be flexible enough to accommodate these imperfections.[5]

The CAM's modeling of the number of locations in a census block or the geographic location of serviceable addresses likely will vary for a variety of reasons from the real world locations in any given census block. Modeled costs based on assumptions of feeder fiber placement will not match the actual feeder fiber placement and costs for any specific network route. Accordingly, the Commission must afford some flexibility in the deployment obligations to accommodate the differences that necessarily will occur in moving from a modeled network to an actual deployment.

CAF II support should not be used to deploy broadband to locations that are too uneconomic to serve even with CAF II funding, which will inevitably occur even with the CAF II eligible census blocks. Accordingly, the Commission should permit recipients to satisfy their deployment obligations if they have built out 10/1 networks to at least 90 percent of the total

[5] CenturyLink's comments primarily focus on the changes needed to the CAF II state-level commitment to better balance the obligations and conditions with the risks and costs that would be borne by those accepting the state-level commitment. Unless specifically noted, CenturyLink's recommended changes should also be applied, with appropriate alterations to match the funded areas, to the obligations and conditions associated with the CAF II auctions.

number of CAF II eligible locations on a state-wide basis. If a recipient elects to serve between 90 and 100 percent of the total locations, it should refund (or not accept in the first place) a commensurate percentage of the CAF II support.

The measurement of build-out milestones and deployment obligations must occur on a state-wide basis as well. The unavoidable differences between modeled network design and costs and real world deployment characteristics require such flexibility if CAF II funding is to be used effectively. As demonstrated below, as often as not there are differences between the numbers of actual locations in census blocks and the numbers estimated in the CAM. Therefore, it is impossible in practice to measure build-out obligations on a census block basis. In addition, CAF II support should be available to deploy broadband to, and meet build-out obligations with, unserved locations in partially-served high-cost or extremely high-cost census blocks where the competitor is not offering service or committing to offer service to the location. Leaving behind consumers in partially-served census blocks, or leaving behind consumers due to inaccurate location counts in individual census blocks (which inevitably will occur frequently) has no public benefit when the carrier can deploy service to such locations in a cost effective manner.

Without such flexibility, carriers will be forced to make overly conservative assumptions regarding the scope of the networks they can commit to deploy. If so, then carriers will not commit to provide voice and broadband service, thus leaving areas unserved where a carrier estimates that it is perhaps probable — but not sufficiently certain — that a network could be supported. If such high-cost areas do not receive the benefits of CAF II support, they may never be served with robust broadband infrastructure.

In addition to sufficient flexibility to enable viable voice and broadband network deployments in high-cost areas, carriers that make state-level commitments will need a 10-year

build out period to meet their deployment obligations as well as ten-years worth of funding.[6] These simultaneous state-wide fiber-based deployment commitments for a 10/1 network are very significant, capital-intensive undertakings that will require an unprecedented fiber deployment for CenturyLink and tax available resources in the economy as a whole for several years until the input markets can adjust. Therefore, deployment obligations should be spread evenly over the ten-year period rather than front-loaded to meet an obligation of 85 percent deployment in the first three years.[7] It is unlikely that any provider could commit on a large scale to 85 percent build-out in three years given the vast resources and time required for this endeavor, and it is virtually certain that the US economy as a whole cannot meet such an ambitious broadband deployment target.

Finally, the Commission should maintain the full existing level of frozen support for carriers that do not participate in CAF II, and any further service obligations for such carriers should apply only to services for which the carrier actually receives support.

I. PLANNING NETWORK DEPLOYMENTS UNDER CAF II WILL POSE UNIQUE CHALLENGES IN ADDITION TO THOSE ALREADY INHERENT IN TYPICAL DEPLOYMENT PLANS.

Designing, planning and deploying broadband networks is typically a challenging process. For CAF II, with its unique obligation and the sparsely-populated, high-cost nature of the areas in which networks are to be built, the process will be even more challenging. But, irrespective of whether the challenges are typical or unique, all warrant recognition as the Commission puts the final touches on the CAF II process. For the Commission to design CAF II

[6] Progress on meeting service obligations will be monitored through the Commission-required annual reporting of both capital spending and location enablement throughout the buildout period.

[7] CAF II Omnibus at ¶ 315.

deployment obligations that will accomplish the Commission's objectives to make affordable, robust broadband service available to all areas of the country, it must consider the manner in which those networks will be designed, planned and built and craft deployment obligations that work in concert with those realities.

To deploy broadband networks in the low-density high-cost areas eligible for CAF II support in an economically rational manner, CenturyLink will deploy a fiber-to-the-node architecture that provides DSL-based broadband services.[8] Placing fiber is the most expensive part of deploying a broadband network, where distances are extensive and customers are sparse. Placement of fiber to a shared point on the network provides broadband service more cost-effectively than placement of fiber to every customer location particularly in these low-density areas. For the fiber-to-the-node architecture CenturyLink brings fiber to an existing feeder distribution interface ("FDI"), locates a digital subscriber line access multiplexer ("DSLAM") next to the FDI, and provides broadband service to customer locations within 20,000 feet of that node. Since broadband speed is distance dependent, this generally enables broadband speeds from 40 Mbps to 1.5 Mbps with the higher speeds closer to the node and lower speeds for those further away.[9]

[8] This approach is entirely consistent with the Commission's use of the Connect America Cost Model (CAM) and a fiber-to-the-home (FTTH), greenfield network architecture. The CAM assumes that the FTTH network will have a long useful life (e.g., 25 years for the fiber that accounts for the bulk of the cost) and spreads the support needed to make its deployment economic over that long life. The FCC, however, is contemplating a much shorter funding period, such as the ten-year period recommended by CenturyLink. This shorter funding period, means that there will not be enough support to make a FTTH network economical and, hence, the network that can be feasibly deployed will use commensurately less fiber. This leads to the fiber-to-the-node network architecture.

[9] Description of CenturyLink CAF Phase II Network Design, Planning & Deployment, attached hereto as Attachment 1.

To build broadband networks for CAF II, however, requires a different approach. In order to provide a set minimum speed of service for each eligible CAF II location, the network provider must design the network to bring fiber to within a set maximum distance for each location on the route. In the case of 10/1 service, CenturyLink currently estimates that distance to be no more than 7,500 feet from each customer location. This means that extending fiber to an existing FDI likely will not be sufficient to get fiber close enough to all, or even most, customer locations at a node to ensure a 10/1 broadband speed. Consequently, CenturyLink will likely design networks that include a fiber-to-the-midnode (FTTM) solution. This architecture places additional nodes to which fiber would be placed that would extend the fiber to within the distance necessary to provide at least 10/1 service to all CAF II eligible locations.[10]

But, the CAM has modeled cost to deploy broadband networks in these areas in a different manner. The CAM-modeled costs are reasonable estimates on average, but they cannot accurately estimate costs for any given location, node, or network route because of variances between modeled and real world conditions. Additionally there necessarily will be differences between the CAM modeling and actual network deployments because a significant number of the high-cost locations in the model are based on statistical algorithms or have changed since the last Census.

The CAM modeling necessarily varies from CenturyLink's – and indeed all carriers' – design, planning and deployment of the broadband network. Variances between CAM-modeled locations and real world customer locations will cause most network deployments to differ economically from the costs reflected in the CAM, even as the overall deployment may have similar costs. These variances will produce nodes and routes that will be economically irrational

[10] See Attachment 1, Description of CenturyLink CAF Phase II Network Design, Planning & Deployment, ¶¶ 6-10.

to build to achieve full deployment to every CAF II eligible location.[11] In order to make statewide commitments feasible and to encourage robust participation in the competitive bidding process, the Commission must build flexibility into the CAF II deployment obligations. If some flexibility is not afforded, carriers will not be able to absorb the risk of variances between modeled network deployment and costs, on the one hand, and actual deployment and costs, on the other hand, thereby frustrating the objectives of CAF II.

II. EFFECTIVE NETWORK PLANNING REQUIRES THAT THE COMMISSION SET CLEAR, STABLE REQUIREMENTS AT THE OUTSET FOR SERVICE PROVIDERS.

The *CAF II Omnibus* appropriately recognizes that carriers considering whether to participate in CAF II must "have clarity as to what is expected of them" over the funding period.[12] In particular, as Section I illustrates, carriers cannot make efficient and cost-effective network deployment plans without knowing at the outset (1) the service requirements including the minimum speed that the network must provide, (2) where the network can be deployed, and (3) how much funding will be available over the life of the network deployment. And, these parameters cannot be changed before the end of the funding period and build-out obligation.

A. The Commission Should Establish A 10/1 Broadband Speed Requirement For All Aspects Of The CAF II Initial Funding Periods.

The Commission can (1) adopt its proposal that CAF II support recipients provide 10/1 broadband in supported areas if it (2) leaves that speed requirement in place for the duration of the initial CAF II funding periods (3) requires unsubsidized competitors to provide 10/1

[11] *See, e.g., generally*, Ex Parte Notice from Melissa Newman, CenturyLink to Marlene H. Dortch, FCC (Apr. 7, 2014) and attached CenturyLink Submission for the Record re: Preliminary Network Engineering Analysis of CAF II Build Cost for CenturyLink; Ex Parte Notice from Jeffrey S. Lanning, CenturyLink to Marlene H. Dortch, FCC (Apr. 16, 2014), with same attachment as referenced previously in this note.

[12] *CAF II Omnibus* at ¶ 147.

broadband service in order for an area to qualify as "served" for CAF II eligibility purposes, and (4) relies on the National Broadband Map ("NBM" or "Map") as used in CAM 4.1.1 (with the 10/1 service requirement), as modified by the ongoing CAF II challenge process to identify areas eligible for CAF II funding.

1. The Commission Can Increase The Broadband Speed Supported to 10/1 Mbps.

As the *CAF II Omnibus* notes, download speeds of 10 Mbps have become the *de facto* baseline for fixed broadband service in urban areas.[13] In deciding the minimum broadband speed it will require for broadband service in supported areas, the Commission must weigh the public interest benefits of mandating higher speeds of service in these areas with the corresponding costs of different minimum speed requirements in these areas where it already is uneconomic for carriers to deploy service without subsidy. A 10 Mbps downstream minimum should enable consumers to use the typical Internet applications that most consumers desire. Upstream capabilities also are important, but most consumers do not currently seek upstream bandwidth that exceeds 1 Mbps and they are unlikely to demand it in the near future.[14]

2. The Commission Should Maintain The Same Broadband Speed Requirement For The Duration Of The Funding Period.

Whatever the Commission ultimately decides, the speed requirement it selects should not be increased for the duration of the initial CAF II funding period. The rural areas that CAF II

[13] *Id*. at ¶ 140. Indeed, the Commission also recently solicited comment on whether it should adopt a 10/1 standard for determining the extent to which broadband is being deployed in a reasonable and timely fashion to all Americans. *See Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*, Tenth Broadband Progress Notice of Inquiry, GN Docket No. 14-126, FCC 14-113, at ¶¶ 14-16 (Aug. 5, 2014) ("*Tenth Broadband Progress NOI*").

[14] *See Tenth Broadband Progress NOI*, at Table 2 (estimating typical upload bandwidth needs in various household use cases). CenturyLink's current 10 Mbps downstream product offerings generally are accompanied with 768 kbps upload speed.

targets are not likely to receive fiber upgrades without support. If fiber-to-the-node networks in these areas are designed to provide a minimum download speed of 4 Mbps, these networks will be *incapable* of enabling higher minimum speeds in the future, even considering potential technical advances. In low-density areas, the fundamental limiting factor on broadband speeds is the distance between the customer premises and the nearest fiber node. That distance, including the placement of new nodes, will be determined based on the minimum speed the Commission sets for supported networks. The placement of fiber accounts for the greatest expense in the entire network deployment process. Once the fiber infrastructure is in place, increasing the network's minimum speed would require extensive modifications to the network including placing additional fiber at significant additional expense. It will not be economically feasible for a carrier deploying a fiber-to-the-node network to alter its supported deployments midstream to accommodate a higher minimum speed.

3. The Commission Should Require Unsubsidized Competitors To Provide 10/1 Broadband Service Before Disqualifying An Area For CAF II.

The broadband speed that the Commission selects to support in CAF II eligible areas, should also be the broadband speed that the Commission requires an unsubsidized provider to provide in order for an area to be ineligible for CAF II. If the Commission permits an area to qualify as served by an unsubsidized provider at a lower speed, it will unnecessarily and indefinitely relegate customers in the lower speed areas to broadband service at speeds that the Commission has found to be insufficient for supported areas. The Commission should determine the broadband speed that should at a minimum be available to all consumers throughout the nation and apply that standard across the board.

4. The Commission Can Rely On The National Broadband Map (Utilized in CAM 4.1.1) As Modified By The Ongoing CAF II Challenge Process To Determine CAF II Eligible Areas.

If the Commission selects 10/1 as the required speed for CAF II support and for areas to be served by unsubsidized competitors, it does not need to engage in another challenge process. Once the current challenge process has concluded, the Commission can be assured that the areas determined to be unserved at 4 Mbps down / 1 Mbps up also are unserved at 10 Mbps down / 1 Mbps up, and thus eligible for consideration of funding.

In addition, the Commission can reasonably rely on the version of the NBM included in CAM 4.1.1 to determine the additional areas as "unserved" that may be served by 3 Mbps down / 768 kbps up but are not served by an unsubsidized competitor at speeds of at least 10/1.[15] Broadband providers have been requested for some time to submit information for the NBM regarding where they provide broadband service capable of at least 10 Mbps.[16] Moreover, broadband providers have been on notice for nearly two years that the Commission intended to use the NBM in identifying which areas are eligible for CAF II funding.[17] At this point, if a provider has failed to provide full and accurate information about its service for inclusion in the Map, it should not be permitted to use that omission to delay or deny consumers the benefits of

[15] Indeed, the Commission has already preliminarily done that by releasing the list of census blocks eligible under CAM 4.1.1 using the 10 Mbps standard.

[16] For the 10 Mbps speed tier, the NBM utilizes a 768 kbps upload speed and the Commission has determined that 10/768 can be used as a surrogate for the 10/1 requirement.

[17] *Wireline Competition Bureau Seeks Comment on Procedures Relating to Areas Eligible for Funding and Election to Make a Statewide Commitment in Phase II of the Connect America Fund,* Public Notice, 27 FCC Rcd 15970, 15973 ¶ 10 (WCB, rel. Dec. 27, 2012).

CAF II.[18] Further, it does not appear that the locations competitively served at 10/1 are of a volume that would justify consuming the resources of all those involved and delaying the implementation of CAF II.

B. Carriers Must Have Enough Flexibility To Adapt Deployment Plans To The Facts On The Ground.

As one statistician aptly observed, "all models are wrong, but some [models] are useful."[19] In the aggregate, the CAM is a useful model for estimating how much it will cost to deploy broadband in a given area. Nonetheless, the CAM is a model, and all models are imperfect representations of the real world. In turn, it is critical for the success of CAF II that there be sufficient flexibility built into the service obligations of CAF II recipients to accommodate the differences that will necessarily occur between the CAM modeling and actual CAF II-supported broadband deployment. Specifically, deployment obligations should be relaxed such that carriers will meet those obligations so long as they deploy the requisite broadband service to at least 90 percent of the total number of CAF II eligible locations in an area. Correspondingly, carriers should be permitted to forego up to 10 percent of the CAF II funding authorized for an area without penalty.[20]

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[18] Areas that are selected for rural broadband experiments should be removed from CAF II eligible areas and from price-cap carriers' state-level commitments, as it is inefficient to fund the same areas twice. However, in accordance with the location-flexibility process discussed in Section III, price cap carriers that have made state-level commitments should be able to use CAF II funding to serve alternate locations within such experiment areas so long as the proposed locations will not receive service as part of the approved experiment.

[19] George E. P. Box and Norman R. Draper, *Empirical Model-Building and Response Surfaces* at 424 (New York: Wiley 1987).

[20] This flexibility should include allowing carriers to meet the 90 percent threshold with substituted locations. Carriers should not be penalized if they meet or exceed the targeted number of CAF II locations while making market substitutions.

Additionally, carriers should be given the flexibility to substitute which high-cost, unserved locations will satisfy CAF II deployment obligations, which is necessary to enable economically rational deployment of 10/1 broadband service in these high-cost areas. Price cap carriers will need a clear delineation of CAF II deployment obligations sufficiently in advance of the statewide commitment acceptance deadline to effectively evaluate their ability to meet those obligations. If the deployment obligations are too rigid, it will be difficult, if not impossible, given the realities of network deployments in low-density areas, to make a rational business decision to accept those obligations.

1. Actual Broadband Network Deployments And Their Costs Will Deviate From CAM Modeled Deployments And Costs.

It is well recognized that models are imperfect representations of the real world. The CAM is no exception. There are a variety of ways that network deployment and costs in the real world will deviate from what the CAM has modeled. Some locations identified by the CAM may not exist — for example, housing units that are randomly assigned along routes in order to match the number of housing units in a census block to the total number of housing units recorded in the last U.S. Census. Some addresses, especially in rural areas, fall back to aggregate locations such as the nearest street, intersections, ZIP-5 centroid or ZIP-7 centroid, thus distorting an address's actual distance from a broadband provider's existing or planned infrastructure. And in some cases, where data about a location's position has low resolution, the CAM distributes the location to an area where the Census data shows there is a deficit. In addition, the CAM makes assumptions about carriers' wire center boundaries and contains some inaccuracies regarding the precise locations of carriers' Central Offices. Finally, in the years since the 2010 Census there have inevitably been changes to the numbers of locations in census

blocks as some new ones have been built and, more frequently in high-cost rural areas, others have been abandoned and no longer are habitable.[21]

In analyzing locations in the CAM results for CenturyLink, there is a dramatic difference between CAM funded locations and CenturyLink's internal geo reference location data. CenturyLink is not claiming its internal data is perfect to the real world either, rather for modeling and analysis, close enough works but for actual network deployment flexibility is essential. For example, if CenturyLink has no flexibility, CAM results would require the company to build to 53,000 census blocks where CenturyLink's data shows fewer locations than the CAM, encompassing 43 percent of all funded CenturyLink locations. Purely from CAM results, CenturyLink will be required to build to funded census blocks with 2 or fewer locations 45 percent of the time. Narrowing down to a single location in a census block, this build-out occurs 28 percent.

Attachment 2 to these comments provides two examples demonstrating that the count of locations and exact placement in the census blocks vary between real world and geo reference data. The first example has a single location as determined by CenturyLink's records, 2010 Census housing unit data, and the visual representation of the census block as shown. CAF II funding, however would require CenturyLink to build out to five locations. The second example shows the mismatch between the Census Bureau count of housing units and CenturyLink's internal geo reference data for locations. Where the Census data shows fewer housing units than the real world, absent flexible substitution, large percentages of locations within a census block will be stranded from consideration for broadband buildout.[22]

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[21] *See* Attachment 1 at ¶ 4, and Attachment 2 (examples demonstrating discrepancies in location data).

[22] *See* Attachment 2.

These differences can dramatically affect the cost of deploying to particular locations. In the first example, Census data, CenturyLink data and the visual image reflect only a single location in the census block, but the CAM has identified 5 locations for funding. This occurs in 26 percent of the funded census blocks in the CAM results for CenturyLink. The cost to deploy to 5 locations already would be expensive, but the cost to provide broadband service to the single location likely dwarfs that expense and would be far from cost-effective. Further, the CAF II deployment obligations would include an expectation that CenturyLink deploy to this single exceedingly expensive location and to four others that do not exist. This is an impossible situation. There must be flexibility in CAF II deployment obligations to address these types of data variances to enable rational and cost-effective broadband deployment in these areas.

2. Carriers Should Be Able To Satisfy CAF II Deployment Obligations By Deploying Service To At Least Ninety Percent Of The Total Number Of CAF II Eligible Locations.

The CAF II rules must provide carriers with enough flexibility to adapt to substantial real world cost deviations as they are discovered. If the Commission's deployment requirements are overly rigid, the resulting high level of risk will preclude many providers from participating in CAF II. In particular, the Commission should not impose an absolute obligation to build to 100 percent of the locations identified as belonging to the funded census blocks. Instead, the Commission should allow some flexibility to address differences between the modeled deployment and actual network deployment that would significantly increase the cost of the actual deployment. As discussed above, some modeled locations may not actually exist, and others may have costs that far exceed expectations. Additionally, in some situations it may be exceedingly challenging or simply impossible to build to certain locations. For example, the CAM assumes that a carrier will be able to acquire all necessary permits or otherwise obtain

access to all rights-of-way it needs to deploy to an area. But, in actuality this will not always be the case. Obtaining access to rights-of-way needed for deployment through National Parks or private third-party lands can be extremely challenging and time-consuming. In Montana it took several years before CenturyLink was able to obtain the necessary permits for access to National Park lands that would enable broadband deployment in a nearby town.[23] In another situation, CenturyLink was unable to obtain right-of-way access across third-party private land to provide broadband service to a location that could only be accessed through the private land. In these situations, carriers need the flexibility to alter deployment plans to recognize where they cannot get access to funded locations. The Commission should allow carriers to meet their deployment obligations so long as they build to at least 90 percent of the total number of eligible locations in the state. Correspondingly, carriers should be permitted to forego up to 10 percent of their CAF II support without penalty. In no event, however, should the CAF II funding be reduced if the carrier meets or exceeds the targeted number of eligible locations on a statewide basis.

3. Deployment Obligations In Statewide Offers Should Be Evaluated On A Statewide Basis To Provide Reasonable Substitution Of Eligible Locations.

As described above, actual real world location counts frequently will differ from those in the CAM. It would be impossible in practice to meet build-out obligations on a census block basis, and it would be administratively burdensome for providers, the Commission and the Universal Service Administrative Company ("USAC") to attempt to deal with such obligations. Instead, for deployment obligations in statewide offers the Commission should afford flexibility on a statewide basis. And, that flexibility should include allowing carriers to reasonably

[23] Montana Public Service Commission Press Release, *High-Speed Hurdle Cleared in St. Mary Broadband Project*, (Apr. 18, 2013), *available at* http://psc.mt.gov/news/pr/20130418_High-Speed_Hurdle_Cleared_in_St._Mary_Broadband_Project.pdf.

substitute other unserved locations for CAF II eligible locations. Once carriers embark upon the actual network deployment, route economics would be greatly improved with this flexibility and may actually provide carriers the ability to reach more locations in aggregate. Such flexibility should be afforded to enable carriers to avoid being required to complete a deployment that is economically irrational and a highly inefficient use of CAF II support. This could also serve the public interest by permitting CAF II recipients to achieve higher levels of deployment with CAF II funding in some cases, which may reduce use of a 90 percent deployment rule while not removing the need for such a backstop to address the most challenging real world variance from model conditions. Specifically, carriers should be allowed to use CAF II funding to deliver supported broadband service to any qualifying locations that are not served with the requisite broadband speed and are in high-cost or extremely high-cost census blocks**.** Such locations could be in funded CAF II census blocks or unfunded census blocks identified as partially served but the current provider in the census block is not offering service to the unserved locations or committing to do so.

Carriers should be required to notify the Commission if they intend to build to alternate locations in census blocks where the NBM shows there is another broadband provider. In light of the limited construction windows available in many areas due to weather and other factors, however, the Commission should not require a carrier to provide more than thirty days advance notice of such a change. If the provider shown as partially serving the census block on the NBM successfully challenges the carrier's notice that the proposed substitute locations are unserved, the carrier should not be permitted to use CAF II funds for service to the successfully challenged location (whether or not the carrier already has completed its build). But if there is no successful challenge within the 30-day notice window, the carrier should be entitled to build to, and receive

support for, the proposed location. No advance notice should be necessary if the carrier is only substituting locations within a CAF II eligible census block.

C. The Commission Should Adopt A Ten-Year Deployment Period For The Statewide Commitment And Commit To Providing Full Funding For The Entire Period.

As described in Section I, deploying a 10/1-capable broadband network in high-cost areas across vast geographies is a highly ambitious endeavor. This project cannot be completed in five years; indeed, the broadband construction industry as a whole may not be capable of absorbing capital construction on the scale that the Commission contemplates on such a compressed timeframe. A more realistic deployment schedule will require ten years.

In deploying any network route to provide broadband service time is needed to create an initial design for the route, estimate costs based on that design, make a decision whether to move forward, create workprints based on additional detailed information and the existing infrastructure. Then there is the time required for construction which includes obtaining necessary permits, electrical power and materials.[24] Then crews may begin to furnish and install the new network. Each of these items has the potential to proceed smoothly or create significant delay on any given project. Seasonal construction windows can impose significant delays on fiber placement, particularly in the northern states and states with mountainous terrain. And, for each such project there is a significant capital outlay.

Additionally, for this CAF II effort, these time frames and capital costs will need to be replicated both simultaneously and sequentially for many such network deployments. This will overwhelm resources if there is not sufficient time allotted to allow network deployments to

[24] As described earlier, see discussion at 17-18 *supra*, obtaining necessary permits or right-of-way access can take many months and in some cases may never be successfully acquired.

occur more sequentially. If the Commission adopts a 10/1 broadband speed, it will take more time and more expense to deploy fiber further out into the network.

While still shorter than the required time period to allow carriers to recover their broadband investments in uneconomic rural areas, ten years is a realistic time frame for accomplishing the unprecedented network deployments being proposed for CAF II statewide commitments and is consistent with the ten-year support period that the Commission has just adopted for CAF II support awarded through the competitive bidding process.[25] The Commission has stated that providing support in the competitive bidding process for a ten-year period may be necessary to stimulate sufficient participant interest in providing 10/1 service in these areas, specifically recognizing that "some entities may be unwilling to make the necessary long-term investments to build robust future-proof networks in areas that are uneconomic to serve absent continued support beyond a five-year term."[26] This is just as true for price cap carriers evaluating whether to accept a statewide commitment, so the Commission should adopt a ten-year deployment period for the CAF II statewide commitment.

Analogously, the Commission should monitor the level of location enablement through the normal reporting process, but not impose unrealistic build out milestones. For the price cap industry alone to reach 85 percent of the total locations in three years would encompass building to nearly four million locations in areas that are sparsely populated and with terrain characteristics that frequently will be very challenging. Instead, the Commission should establish deployment milestones on a straight-line schedule. Thus for a ten-year commitment, a carrier should be measured on whether or not it met or exceeded 10 percent of the network enablement by the end of the first year, 20 percent by the end of the second year, and so on

[25] CAF II Omnibus at ¶ 35 (citing, *Technology Transition Order*, 29 FCC Rcd 1433, 1476 ¶ 125).

[26] *Id*. (footnote omitted).

through the ten-year period. Carriers may well be able to deploy more network in a given year if resources allow.[27] But, establishing milestones in this consistent manner will enable a more reasonable allocation of resources on an annualized basis.

Finally, the Commission should confirm that full funding will be available for the deployment period. First, carriers cannot evaluate whether a CAF II network deployment is economically rational without knowing what support will be available and what obligations will be required for the duration of the deployment period. Second, carriers cannot undertake CAF II service obligations without a clear commitment from the Commission regarding the stability of the financial support and associated obligations. Otherwise, the risk involved in making the commitment will jeopardize CAF II.

III. THE COMMISSION SHOULD ALIGN SERVICE OBLIGATIONS WITH THE SUPPORT CARRIERS ACTUALLY RECEIVE.

Even under a well-structured CAF II program, some carriers likely will conclude that it is not economical to participate. Other carriers will complete their CAF II deployments but may not receive funding under any future support mechanisms. These carriers should not remain subject to service obligations if they no longer receive the full level of frozen support necessary to carry out those responsibilities. In order to ensure that obligations are aligned with funding, the Commission should separate the Lifeline program from the Connect America Fund, with separate ETC designations for each program. In addition, a carrier's ETC designation should end when its support ends, regardless of the particular form of support the carrier previously received.[28] Existing service discontinuance rules will protect consumers against the unwarranted

[27] CenturyLink supports the proposed financial incentive for faster deployment, but the incentive should be available to those providers that improve upon a straight-line deployment schedule. *See CAF II Omnibus* at ¶¶ 160-61.

[28] *See CAF II Omnibus* at ¶ 184.

discontinuation of regulated services,[29] but the Commission cannot require a carrier to maintain an uneconomical service if the Commission is unwilling to provide the necessary support.

CONCLUSION

Phase II of the Connect America Fund holds great promise for expanding the benefits of broadband services to many Americans who otherwise would be denied affordable access to this critical service. But modern broadband networks are not built with promises; they are built with careful preparation and a healthy respect for the need to adapt when reality does not conform to abstract models. The Commission should adhere to these principles to maximize the likelihood that meaningful broadband service will be made available to all Americans.

Respectfully submitted,

CENTURYLINK

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[29] *See, e.g.*, 47 U.S.C. § 214.

Attachment 1

Description of CenturyLink CAF Phase II
Network Design, Planning & Deployment

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Connect America Fund	)	WC Docket No. 10-90
	)	
Universal Service Reform – Mobility Fund	)	WT Docket No. 10-208
	)	
ETC Annual Reports and Certifications	)	WC Docket No. 14-58
	)	
Establishing Just and Reasonable Rates for Local Exchange Carriers	)	WC Docket No. 07-135
	)	
Developing an Unified Intercarrier Compensation Regime	)	CC Docket No. 01-92
	)	

DESCRIPTION OF CENTURYLINK CAF PHASE II NETWORK DESIGN, PLANNING & DEPLOYMENT

1. This document describes the process that CenturyLink will undertake to design, plan and deploy networks that would provide broadband service at speeds of 10 Mbps download and 1 Mbps upload to eligible locations for Phase II of the Connect America Fund (CAF II). It also describes the types of situations that tend to occur when actually deploying broadband networks that need to be anticipated and for which sufficient flexibility in CAF II service obligations should be provided.

2. CenturyLink will start by creating a network design that is intended to serve all of the locations in the CAF II eligible census blocks (or CBs) as provided by the Federal Communications Commission (Commission). This initial design is intended to estimate the network design and the costs of deploying that network design. This design and the associated costs will be refined through the planning process and further modified by the realities of network deployment.

3. The design process will start by identifying where nodes should be established in a fiber-to-the-node (FTTN) network architecture to deliver the requisite broadband service of 10 Mbps downstream and 1 Mbps upstream to all eligible locations. Next, network planning will identify which fiber routes should be used to connect those nodes to the broader network, and how much capacity should be built into those routes and the infrastructure serving them.

4. CenturyLink's data regarding the number of locations and serviceable addresses in each census block will frequently vary from the number in the Commission's Connect America Model (CAM). This will be true even if the totals on a statewide basis are the same or nearly the same. Over time, some locations are added as, for example, new homes are built. Conversely, and perhaps more frequently in rural areas, other locations will no longer exist, for example, as they have been uninhabited for so long as to be no longer livable. Therefore, the network planning and deployment process must be given sufficient flexibility in the Commission's rules to deploy broadband to the specified number of locations across all eligible census blocks without building to every single location in any given census block.

5. As discussed below, and explained in the ex parte submission CenturyLink filed in these dockets on April 16, 2014, this initial plan to serve all locations in the eligible census blocks is likely to be economically infeasible. Given the high-cost nature of the areas where CAF II-supported networks will be built and the economics of network design for any technology, the actual costs for any given location will vary substantially from modeled costs even where the model is very accurate on average. In addition, the assumption in the CAM that feeder fiber costs can be economically shared with adjacent areas will not be realized in practice where the adjacent areas are themselves uneconomically high-cost and unsupported by CAF II. Accordingly, the network planning process will also seek to identify where additional high-cost unserved locations can be added to the deployment and where CAF II eligible locations are substantially more costly to serve than is shown in the CAM.

6. In CenturyLink's historical digital subscriber line (DSL) deployments, CenturyLink located a digital subscriber line access multiplexer (DSLAM) next to the feeder distribution interface (FDI, also referred to as a serving area interface or a type of cross-connect) and provided broadband service to customer locations within 20,000 feet of that node. This generally produced broadband speeds in the area ranging from 40 Mbps to 1.5Mbps downstream (single pair speeds) service with higher speeds available to those closer to the node and decreased speeds for those farther out.

7. CenturyLink will begin the network planning process for CAF II in a similar manner, calculating how many locations can be served by creating nodes using existing FDIs. This will be done by using CenturyLink data regarding network addresses in CAF II eligible census blocks to estimate the distances to the existing FDIs. To achieve 10/1 broadband speed to each location, CenturyLink currently estimates that fiber will need to be deployed to within 7500 feet of each location. This estimate is itself based on an estimate of insertion loss for 10/1 broadband service that has not yet been lab tested. If the actual insertion loss for 10/1 broadband service is different from what has been estimated, then all dependent estimations may need to be modified accordingly.

8. CenturyLink's current broadband deployments using fiber-to-the node designs, however, do not bring fiber within 7500 feet of all customer locations in a census block. Consequently,

CenturyLink is considering a new deployment architecture that would insert additional nodes with DSLAMs to bring 10/1 broadband to all eligible locations.

9. The requirement to build the network to attain certain minimum speeds at every location in an area is different from how CenturyLink typically deploys broadband service. Typically, CenturyLink will bring fiber to an existing FDI, add a DSLAM and enable broadband service to customers that are within the distance necessary to provide the service. Customers closer to the DSLAM will likely have higher speeds of service available to them than those farthest away from the DSLAM.

10. This network approach is not sufficient, however, to get 10/1 broadband service to all CAF Phase II funded locations. Placing DSLAMs only where there are existing FDIs will not get the fiber close enough to all customer locations to enable the 10/1 speed. Fiber must be pushed closer to customer locations to provide a 10/1 service. In turn, new locations for placing FDIs and DSLAMs must be identified and created. This is called a fiber-to-the-mid-node (FTTM) solution.

11. Additionally, because the FTTM solution is a new endeavor and has not been deployed yet in the field, the costs associated with such deployments are not based on prior deployment costs, but are being estimated based on fiber and DSLAM placement used for FTTN. In most cases, this provides a reasonably accurate estimate of the expected costs.

12. The FCC's CAM provides a very broad scope model of what it would cost to deploy relatively uniform broadband over a large area (a wire center area). CenturyLink's plans to support CAF II build requirements are to cover primarily the census blocks identified in the build. The costs of deploying a DSLAM and placing fiber are similar, as between the CAM's modeled costs and CenturyLink's estimated costs. But, the scale of what locations the DSLAM can reach, reuse of existing CenturyLink broadband nodes, and the shared use of fiber will yield very different costs-per-location values between the CAM's modeled costs and CenturyLink's estimated costs and actual deployment costs in many cases.

13. Once CenturyLink identifies DSLAMs which cover the required census blocks, the feeder and lateral fiber requirements are determined. Point-to-point, rings, and other fiber topologies will be used to develop a cost-effective solution to fiber placement. Which fiber configuration will provide 10/1 broadband service to the requisite locations in a census block and be most cost-effective in a given area may vary depending on the placement of existing network infrastructure and may be markedly different from the initial design. For instance, the initial design may determine that eligible locations are all geographically within 7500 feet of an existing FDI such that a FTTN deployment would suffice. But, the existing copper infrastructure might be deployed in a route that results in not all of the locations being within 7500 feet of the existing FDI as traveled along the route. This would result in needing to

configure an additional FTTM deployment to reach the more distant locations with 10/1 broadband service.

14. Together, the fiber placement topology and the number and type of DSLAMs in the route also define the Ethernet aggregation or switching capacity needed in the Central Office to support the build. The number of expected customers purchasing the enabled broadband capability defines the bandwidth required to access the core Ethernet network from the end office.

15. Once an overall network design is in place, the total costs of the network design are calculated. The greatest expense in deploying broadband is the placement of the fiber.

16. A requirement to deploy 10/1 broadband to all eligible locations will require fiber to be deployed further from the Central Office in CenturyLink's service areas. This will significantly increase the costs to provide these networks and the time needed to deploy these networks. In particular, all of the additional FTTM deployments will require substantial additional fiber over even what would have been required to deploy a network offering a minimum of 4 Mbps downstream and 1 Mbps upstream to all eligible locations.

17. At this point, the entire plan must be assessed for economic viability within the CAF II funding guidelines. For example, the plan may contain routes or wire centers with very few census blocks and/or locations to cover. If the plan requires extensive fiber builds to cover relatively few locations, the cost-per-location may be unreasonable.

18. Earlier this year, CenturyLink filed in this docket the results of an analysis by its network engineering team of the actual cost to construct a network that could deliver 4 Mbps downstream and 1 Mbps upstream to all eligible locations if CAM 4.0 were used to identify the areas eligible for support. CenturyLink's analysis found substantial uneconomic costs associated with extremely high-cost locations in eligible census blocks, both in terms of low-density and isolation from other network nodes and routes. Many thousands of nodes, amounting to nearly one-third of the total that would be required, would have to be located where each one can only serve a small handful of locations. The average density would be fewer than 5 locations served per node, with many serving just 1 or 2 locations. Consequently, the average capital expenditure alone (without consideration of operating expenditure) to bring broadband to the isolated locations would approach $40,000 per location. Similar effects would result from many situations where just one to three nodes could be served by a fiber route from the core of the network.

19. CenturyLink currently plans to use VDSL2 for most of the CAF II builds. All DSL services are distance sensitive – the longer the reach the lower the speed that can be provided. If the Commission elects to pursue a higher than 10/1 service speed target, the entire plan would have to be re-done. For example, if a higher speed is chosen, fewer census blocks and locations would be covered by FTTN from existing interfaces and significantly more cost

would be driven by the addition of more fiber and DSLAM locations to support FTTM DSLAM installations.

20. Once a decision to deploy a designed route has been made, the process moves to the local planning, engineering and construction team to determine the details of the plan. At this point the local team will take the initial design and costs and turn it into a feasible construction project with more precise costs.

21. During the planning and deployment stages a variety of factors can result in the actual deployment and costs being at a significant variance from the designed deployment and costs. Those factors can include the following:

    - Existing placement of fiber is different from the initial design;
    - Existing cable structure is different from the initial design;
    - Locations on a route are not at the distances mapped in the initial design;
    - There are additional locations on the route or locations designed on the route are missing;
    - Copper gauge for site is different than that estimated in the initial design;
    - Costs to obtain local power supply higher than estimated;
    - Costs and time to obtain necessary permits higher and longer than estimated;
    - Higher costs to place fiber due to more challenging placing conditions than estimated (e.g. rocky terrain);
    - MOE aggregation costs will necessarily vary from the network plan because the initial design does not take into account actual switch capacity, spare relay rack space or Central Office power; and
    - Cost such as interoffice backhaul costs and core metro optical ethernet (MOE) network and broadband remote area server (BRAS) costs will necessarily vary from the initial design because they are dependent on the final build.

22. All of these factors mean that the network that is planned for deployment and its associated costs can be significantly different from the network that is actually deployed and its actual costs. More importantly, even as these factors frequently average out over a large number of broadband deployments, the actual costs and numbers of locations enabled in any given deployment are likely to be different than planned (and much different from the figures estimated in the CAM, even though it appears to be a robust model). Costs that are at

significant variance from what was planned can lead to an altered network deployment design to keep costs in check.

23. Similarly, a variety of factors can impact the time needed to deploy a planned route. Such factors include:

    - Scope of work;
    - Seasonal construction windows – the Northern states and states with significant elevated terrain can have very limited windows for placing fiber – primarily just the summer months;
    - Permitting requirements and other right-of way access – obtaining permits can be particularly time-consuming on tribal and federal lands;
    - Obtaining a new local power supply; and
    - Availability of resources both internal to the company and external – this includes availability of capital.

24. In turn, it is important to have sufficient time available for the deployment of these networks. All of these factors will be implicated in deploying broadband networks to provide 10/1 broadband service to eligible CAF II locations. Minimum speeds to all locations increases the scope of work over a typical broadband deployment. For CenturyLink a 10/1 broadband deployment will require the placement of substantially more fiber routes than the initial 4/1 broadband service deployment but with the same seasonal construction window constraints. For FTTM deployments additional permits will be required and additional local power will need to be obtained.

25. Finally, the rate at which deployment will occur is limited by the availability of resources. The amount of deployment contemplated, when coupled with the ongoing deployment necessary in other areas to meet competition and market demand, is a significant increase over current individual company, and overall market investment levels. This will exceed available network deployment resources and, in turn, require substantial additional time to meet the deployment obligations.

Attachment 2

Living Unit vs Funding Location Examples 1 & 2

CAF II Funded Census Block Examples

CenturyLink

Legend

- CenturyLink Living Unit
- Census Block

Census Block
1152

CAF II Funded Locations (3/768)*
5

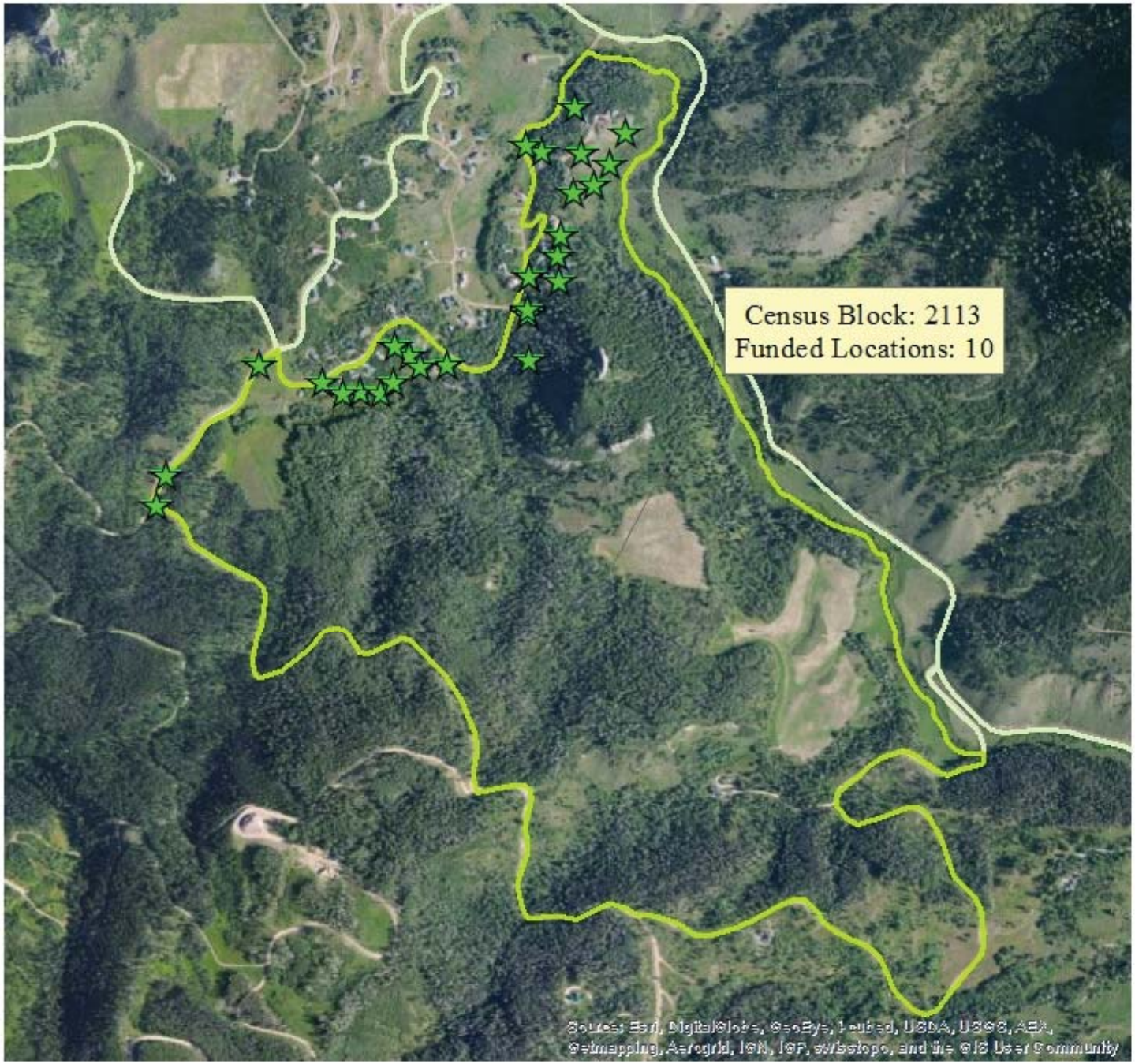
CenturyLink Living Units
1

2010 Census Bureau Housing Units
1

*CAF II Funded Locations source: CAM411_CB_Funded_List_3_10_YesNo.csv

CAF II Funded Census Block Example

CenturyLink



Legend

- CenturyLink Living Unit
- Census Block

Census Block
2113

CAF II Funded Locations (3/768)*
10

CenturyLink Living Units
46

2010 Census Bureau Housing Units
21

*CAF II Funded Locations source: CAM411_CB_Funded_List_3_10_YesNo.csv