Eastern Clear Creek Local Improvement District for Broadband
June 29, 2018

The residents and property owners of the proposed broadband local improvement district (LID) respectfully submit the following plan for the installation and operations of a broadband network. This is done after over 420 signatures were submitted in the affirmative asking the Clear Creek County board of County Commissioners to establish a Broadband Local Improvement District for the in eastern Clear Creek County (see attachment A) for the area to be served by such a district.

What Clear Creek Broadband & the Local Improvement District are proposing – to build fiber optic cabling to as many homes as economically possible. The total number of homes to be served are 1,052. No current incumbent terrestrial broadband provider is in the improvement districts boundaries. The areas where the residents are not physically close enough to be served by a physical line a point to point and/or point to multi point wireless service will be offered. At a minimum every household will receive 100 Mbps download speeds and 10 Mbps upload speeds, four times the definition of current definition of "broadband" by the Federal Communications Commission (FCC).

Basic Design Guidance:

1. The basic network will use aerial plant where ever economically possible and in alignment with the requirements of the utility. We have two utilities that we are working with; IREA and Xcel. Both have provided maps of their facilities and we have incorporated their information in the master network architecture maps. The location of their physical assets is a key component in the design and costs of building this network. Other key considerations are:
    a. The type of road surfaces for the neighborhoods or streets served;
    b. The rights of way and slope of adjacent property to potentially bury fiber where practical;
    c. The soil types for feasibility and cost of burying fiber;
    d. The number of cuts or micro trenches that would need to be performed to cross roadways;
    e. The distance to the home from a central splicing point or Network Access Point to an in-neighborhood vault or distribution node.

2. We have also looked at the overall service district boundaries and have broken it down into five sub-regions:

a. **Old Squaw Pass** (Attachment B) – mostly unpaved roads and predominately aerial dielectric loose tube fiber cable will be used.
b. **Echo Hills** (Attachment C) – Mostly unpaved roads and will have predominately buried loose tube fiber that will be disputed from a network access point to distribution nodes or vaults then split to serve individual homes, the number of splits will range from 6 to 32.
c. **Upper Witter Gulch** (Attachment D) – very steep area with unpaved roads, mostly poles but on some roads buried once soil testing and surveying has been completed an economic network plan will be finalized.
d. **Circle K** (Attachment E) – mostly paved roads on a gentle rolling slopes with good shoulder access. We will a combination of aerial and buried fiber with three distribution nodes. Very dense area will easy access and easements to homes.
e. **Golden Willow, Upper Bear and French Springs** (See attachment F) – the most sparely populated sub-region but with newer utility poles from IREA the main distribution design will be aerial, with fiber being buried in the side neighborhoods such as French Springs, Bendimere, Diamond Drive etc.

3. **Network Access Points (NAP)** – five from CenturyLink fiber connections – 388 Witter Gulch (WG) --1536 WG -- 1996 WG -- 4804 WG --And King Murphy Elementary School, 425 Circle K Ranch Rd, Evergreen, CO 80439. The main electronics center will be at King Murphy.
4. **Cable Runs** – installation will be done by technicians but most connection are done with a male connector that has a simple snap in receptor. There will be a few splice points in at the distribution vaults that will branch out and serve individual properties but those will be limited. Once a final design is done and measured in the field the fiber manufacturer will construction the fiber pre-manufactured so the only issues for installation will be to follow the directions for installation.
5. **Vaults - Distribution Points** – will be used primarily, but we could also use pedestals if necessary – want to save cost both on installation but also for maintenance.
6. **Extra Cable for Homes** – while we will prior to final order get an easement and distance measurement for each home, it would be best practices to have some slack in case there is a change in location or an error in measurement.
7. **Future Proofing the Network** – we will look to our network designs for best practices on how to get this done on a cost-effective basis.
8. **Cost for Loose Tube Fiber** - $2.10 per foot or $230,830 for buried fiber and $464,920 for aerial fiber ($695,749 total). The cost for each fiber type is the same and the connections are included in this estimate.
9. **Poles** – estimated to cost $80,000.

10. **Cost for Access Points –** it is estimated that the cost for access points will average $80,000 per access point. This is where the network work tie into the main distribution fiber provided by Century Link or built as a part of this project. The current network design has 8 access points $640,000 total estimated costs
11. **Cost for Distribution Nodes** – these will either be vaults in a neighborhood or pedestals – the average cost per Distribution note $400 per vault and $200 per pedestal – the current network design calls for 20 vaults ($8,000) and 40 pedestals ($8,000). Labor to install the distribution nodes is included in the construction costs. Total cost for distribution nodes is $16,000.
12. **Customer Premise Access Equipment –** will be a fiber connection to the home and the resident or occupant will provide the wireless router. Estimated cost per home is $135 at a take rate of 50% the total number of home initially serviced will be 512 or a total cost of $69,120.
13. **Legal, engineering and regulatory estimates -** $350,000
14. **Connection to the Internet** – average monthly recurring cost will be between $4,500 and $8,000 (Not included in the LID estimate it will be a monthly recurring fee and will be paid for by those getting service).
15. **Cost of underground install under paved roads** – estimated to be $50,000
16. **Contingency = approximately 20 percent** = $665,88
17. **Total estimated costs for these elements is =** $3,995,005

Why we are proposing it – Residents with poor internet are having trouble in selling a home and property values are beginning to and will continue to stagnate, or potentially go down. In addition, the district cannot be a part of the existing economy without this service. It impacts every demographic segment from elementary school children to the elderly that would like to age in place if they had sufficient telemedicine services.

Where will we offer service – there are five sub-regions that are within the Local Improvement District (Old Squaw Pass, Echo Hills, Upper Witter Gulch, Lower Witter Gulch and Circle K – Golden Willow – Yankee Creek). Each sub-region serves between 160 and 330 homes. Because of the size and location of these sub-regions incumbent service providers have been unwilling to make an investment in the portion of the county.

What type of service will be offered – the main service will be a Gigabit Passive Optical Network (GPON). This will be in at least two tiers Residential at $65 per month and Commercial/Government or Educational at $150 per month. The speeds for the latter group with be 1 Gbps**.**

How will the system be built – two power utilities **–** above ground using existing utilities poles (supplemented with new poles as needed) that will need additional easements and below ground where economically feasible. See table for each sub region.

Sub Region	**Aerial Miles/Feet**	**Underground Miles/Feet**	**Number of Homes Served**	**Utility**
Old Squaw Pass	8.0 Miles	0	179	Fiber - IREA
Echo Hills	6.11 Miles	0	160	Fiber - IREA
Upper Witter Gulch	4.23 miles	0	182	Fiber - IREA
Circle K Lower Witter Gulch	0	9.168	334	Fiber - XCEL
Golden Willow Yankee Creek	10.33 Miles	3	197	Fiber – XCEL and IREA
Inter – sub-region connections	13.26	8.65		
Total miles	41.93	20.818	1,052	
Total Construction	$628,950	$879,352		**$1,508,302**

Who will be responsible for governance of the Local Improvement District – a local board of directors selected and ratified by the Clear Creek County board of County Commissioners. This entity will enter into service contract with Clear Creek Broadband to provide the service that the LID is partially funding (approximately 25%).

Construction -- will begin immediately after approval from the county LID and state grant funds have been collected, there is a two-year performance period as a condition of receiving state funding. Although much of the building out of our fiber network will be performed by sub-contractors managed and hired by CCB, invitations for bids will go out to qualified, bonded, insured and trained installers, the most competitive and suitable bid will be accepted. Contracts will only be awarded to responsible contractors with the ability to perform successfully**.** It is anticipated that the cost per mile for

aerial installation will be less than $15,000 per mile. It is anticipated underground installation will be about $42,240 per mile. Fiber that will be buried will be done at a cost of ~$8.00 per foot with the cost for crossing paved roadways at $20 per foot (micro-trenching).

Operations of the Network – Clear Creek Broadband will hire a third party for ongoing billing, customer premise installation, network monitoring and customer service. CCB is in negations with three potential companies and providers. Service level guarantees will be a part of any such contract and will need to be agreed to by the members of the Local Improvement Districts board of directors. One will be selected by the CCB after the award of network construction. It is anticipated that the cost of this service will be less than 10% of the Monthly recurring fee charged to the persons using the service. An adopt rate of 50% is anticipated for those that will have access to the service as a way to scale for a monthly breakeven. CenturyLink will provide access to the area via fiber that is already in the boundaries of the district. The terms, conditions and service level agreement will be done with that review and acceptance of the Local Improvement Districts' board.

Ongoing maintenance and network improvements – CCB will retain a percentage of retained earnings to ongoing basis and keep a capital reserve of 15% for ongoing expenditures. Future network extension will be done with the review and in council with the LID board of directors.