JACKSONKELLY
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175 EAST MAIN STREET • P.O. BOX 2150 • LEXINGTON, KENTUCKY 40588-9945 • TELEPHONE: 859-255-9500 • TELECOPIER: 859-281-6478
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November 8, 2010

Via Hand Delivery

Jeff Derouen
Executive Director
Public Service Commission
211 Sower Blvd.
P. O. Box 615
Frankfort, KY 40602-0615

Re: In the Matter of: Application of Highland Telephone Cooperative, Inc. for a Certificate of Public Convenience and Necessity for Construction of Fiber-to-the-Home in McCreary County, Kentucky
Case No. 2010-00341

Dear Mr. Derouen:

Enclosed for filing in the above-referenced case, please find one original and ten (10) copies of Highland Telephone Cooperative, Inc.'s Responses to Commission Staff's Information Request. I have also enclosed three copies of the Responses which we request be date stamped and returned to the person delivering this letter.

Thank you and please call if you have any questions.

Sincerely yours,

Jeffrey J. Yost pom
(signed in my absence to expedite delivery)

JJY/pom
Enclosures
c: Highland Telephone Cooperative, Inc. (w/encl)

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

CASE NO. 2010-00341

APPLICATION OF HIGHLAND TELEPHONE COOPERATIVE, INC. FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY FOR CONSTRUCTION OF FIBER-TO-THE-HOME IN McCREARY COUNTY, KENTUCKY

HIGHLAND TELEPHONE COOPERATIVE, INC.'S RESPONSES TO COMMISSION STAFF'S INFORMATION REQUEST

* * * * * * *

Highland Telephone Cooperative, Inc. ("Highland") hereby files the information requested by the Commission Staff's Information Request dated September 27, 2010 (the "Request"). Each request is restated and followed by the requested information behind the tab corresponding to the number of the request.

Respectfully submitted,

Highland Telephone Cooperative, Inc.

By: _____

Jeffrey J. Yost
JACKSON KELLY PLLC
P. O. Box 2150
175 East Main Street, Suite 500
Lexington, Kentucky 40588-2150
(859) 255-9500
Counsel for Highland Telephone Cooperative, Inc.

CERTIFICATION

F. L. Terry, being duly sworn, hereby deposes and says that he is General Manager of Highland Telephone Cooperative, Inc., that he has supervised the preparation of the attached Responses to Commission Staff's Information Request, and that the responses are true and accurate to the best of his knowledge, information and belief formed after a reasonable inquiry.

F. L. Terry, General Manager

STATE OF TENNESSEE)
COUNTY OF Scott)

The foregoing certification was subscribed, sworn to and acknowledged before me this 3RD day of November, 2010, by F. L. Terry as General Manager of Highland Telephone Cooperative, Inc., a Tennessee corporation, for and on behalf of the corporation.

MY COMMISSION EXPIRES:

5.31.2011

NOTARY PUBLIC

ANETTA L. NEWPORT
STATE OF TENNESSEE NOTARY PUBLIC
SCOTT COUNTY

1. Fully describe any and all construction that has commenced to date pursuant to the Commission's approval granted by its Order dated April 10, 2009 in Case No. 2009-00048.

No substantial construction of the fiber optic network has commenced in McCreary County since the Commission approved the construction by its Order dated April 10, 2009 in Case No. 2009-00048. The only fiber optic cable installed to date has been the deployment of approximately one mile of fiber to serve a cell site constructed by others on the county line between McCreary and Pulaski Counties.

a. Include the time frame of such construction and the service areas involved.

This line was completed in the latter part of 2009 in the McCreary County service area.

b. If no construction has occurred, explain why.

When the application for approval to construct fiber to the home in McCreary County was submitted, Highland was planning to finance the initial phase of this project with the proceeds of a Rural Utilities Services ("RUS") loan from the United States in the amount of $48,611,000, designated as *RUS Tennessee 554-V42* (the "V42 Loan"). RUS had approved the V42 Loan on September 23, 2008, for the purpose of providing the construction of a fiber optic network to portions of Highland's service area consisting of McCreary County, Kentucky, and Scott and Morgan Counties, Tennessee. The amount that Highland was able to borrow was limited to the $48,611,000 amount by the debt service requirements of the loan. This amount was insufficient to install fiber to the home throughout Highland's entire service area because of the cost of fiber deployment in rural areas. As a result, the initial phase of this project that could

have been funded by the V42 Loan would have been limited to providing fiber deployment to the more populous areas and along the main highways of Highland's service area.

A second option became available to Highland in 2010 by virtue of the Broadband Initiatives Program ("BIP") stimulus grant program whereby Highland would be able to apply for a grant for broadband fiber deployment on a broader scale than the limited deployment afforded by the V42 Loan. Highland was successful in its BIP application and on August 26, 2010, was awarded a BIP grant of $49,866,871 and RUS loan of $16,622,291, designated as *RUS Tennessee 1140-B40* (the "B40 Grant/Loan"). The B40 Grant/Loan totaling of $66,489,162 will enable Highland to construct and deploy a broadband fiber network to every business and residence in its territory, including McCreary County, Kentucky, within a three-year period.

In order to obtain this BIP grant and new RUS loan, RUS required that Highland rescind its eligibility for the V42 Loan and all existing but unfunded RUS loans before it could apply for the BIP stimulus grant. Highland did rescind its right to borrow as provided by the V42 Loan. For this reason, there has been no substantial fiber constructed in McCreary County other than the deployment of approximately one mile of fiber to serve a cell site located on the Pulaski County line adjacent to McCreary County, which was not funded by the V42 loan.

The witnesses responsible for responding to questions related to the information provided in this Response are Steve Armes, Accounting Manager of Highland, and Gentry Underhill, Jr., CPA, of Totherow, Haile & Welch, PLLC.

2. List each and every distribution of funds that has occurred in accordance with the Loan Agreement dated September 23, 2008 between Highland Telephone and the Rural Utilities Service ("RUS") in support of the construction approved in Case No. 2009-00048.

No distributions of funds were made under the V42 Loan Agreement, and that Loan Agreement has been rescinded as explained in the Response to Request No.1.

a. Provide the date of each distribution and amount received.

Not applicable.

b. State the percentage of the distributed funds that have been used in furtherance of the construction project approved in Case No. 2009-00048.

Not applicable.

c. Has Highland received all of the funds from the RUS that were to be distributed to support the construction project in Case No. 2009-00048? If Highland has not received all of the funds, explain why and include information as to when the remaining funds will be provided to Highland.

Highland has received no funds under the V42 Loan for the reasons stated in the Response to Request No.1. The V42 Loan was intended to be the initial source of funds for construction of the fiber to the home network, but Highland knew that it would need additional sources of funds to complete the system. Now Highland has obtained funding for the entire construction project approved in Case No. 2009-00048 through the B40 Grant/Loan totaling $66,489,162. These funds will be distributed to Highland pursuant to RUS guidelines as the fiber network is installed.

The witnesses responsible for responding to questions related to the information provided in this Response are Steve Armes, Accounting Manager of Highland, and Jerry Neal, Systems Engineering Manager with Engineering Associates, Inc.

3. Explain the relationship, if any, between RUS Project Designation: Tennessee 554-V42 Highland which was the subject of Case No. 2009-00048 and RUS Project Designation: Tennessee 1140-B40 which is the subject of Case No. 2010-00341.

RUS Project Designation: Tennessee 1140-B40 (the "B40 Project") is an expansion and replacement of RUS Project Designation: Tennessee 554-V42 (the "V42 Project"). However, the construction project that is the subject of Case No. 2009-00048 is the same one that is the subject of Case No. 2010-00341. In Case No. 2009-00048 Highland sought and obtained approval to construct fiber to the home ("FTTH") throughout its service area in McCreary County. At that time, Highland had obtained financing for only the initial phase of the project, but now Highland has obtained financing for the entire project with the B40 Grant/Loan, and it has rescinded the earlier loan arrangement for the V42 Loan that would have provided the initial, but partial, funding needed for the entire project.

a. Supply the system diagram and network design documents supplied to RUS for each project.

The system diagram and system design attachment for the entire build out to be funded by the B40 Grant/Loan loan follow this Response.

b. Describe any differences in the affected service territories for each project.

The difference in the affected service territories is that the B40 Project includes Highland's entire service territory. As noted in the Response to Request No. 1.a, the initial phase of this project that could have been funded by the V42 Loan would have been limited to providing fiber deployment to the more populous areas and along the main highways of Highland's service area. However, the B40 Grant/Loan will enable Highland to construct and

deploy a broadband fiber network to all subscribers located in its territory, including McCreary County, Kentucky, within a three-year period.

c. Identify the specific cable routes and wire center locations proposed to be installed or upgraded in Kentucky for each project.

The specific cable routes and wire center locations proposed for the B40 Project are shown on the system diagram that follows this Response.

As previously stated, the V42 Project states the FTTH project would cover the majority of McCreary County, Kentucky. The design associated with the B40 Project plans to address all subscribers located within the County. Additionally, the B40 Project will eliminate the linear fiber transport route between the Kentucky exchanges and the voice switch, Internet boarder router and video headend located Tennessee. A redundant transport fiber route will be constructed to eliminate a single point of failure between these locations.

All new FTTH cable will use existing cable rights-of-way. Construction will primarily consist of e-lash over existing strand or in very limited locations, buried cable along existing right-of-way. With the exception of the redundant transport route previously discussed, there are no plans to develop new rights-of-way. The current estimate developed from HTC's outside plant CAD records consists of 499.66 miles of new fiber plant and 7,545 dwellings within the Kentucky service area.

d. Describe any differences in the types of facilities proposed to be upgraded or installed for each project.

Both projects consider a FTTH network based on an industry standard ITU-T G.984 GPON FTTH network. The design specifications for the B40 Project specifies a 10Gb backbone

transport network from each optical line terminal (OLT) service center to the central office located in Oneida, TN.

There have been substantial improvements in FTTH systems when comparing the V42 Project design to the specification of the B40 Project. The new design requires a minimum transport rated of 10Gpbs between OLTs. The technology cost for 10Gbps electronics has decreased and now is substantially lower in costs per megabit as compared to the previous system design where SONET OC48 was considered.

Additionally, the transport node specified in the B40 Project will contain 10Gbps Ethernet optics to establish the backbone network as well as the GPON optical interfaces. This reduces overall equipment CAPEX costs eliminating the need for separate transport and optical line terminals. A model for this network confirms a 10Gbps core network is required to meet the proposed broadband speeds and projected subscribers for the five year plan period. When comparing the design specification in the B40 Project, the Ethernet network requires fewer devices with minimal transport stream overhead ensuring little to no protocol conversion, greater utilization of bandwidth and ease of maintenance when compared to the previous SONET transport design.

e. Identify the specific locations of fiber nodes and the type of equipment proposed to be installed or upgraded in Kentucky for each project.

This information for the B40 Project is included in the system diagram and system design attachment that follows this Response.

Optical line thermals are planned for the Pine Knot, Whitley and Sawyer exchanges. Each exchange will serve a GPON feeder and distribution plant. Current plans are to connect all HTC Kentucky subscribers to the new FTTH plant.

1104-B40 specifies the use of the Calix E7 Ethernet Service Platform for GPON access and Ethernet transport services. The Calix E7 integrates IP service delivery and Ethernet transport into a compact, high availability, carrier-class modular system that delivers high-performance and scalable network. The E7 platform delivers Gigabit Passive Optical Network (GPON) and point-to-point Gigabit Ethernet (GE) services with redundant 10-Gigabit Ethernet (10GE) transport and aggregation within a single integrated 2-slot chassis.

The E7 provides flexible, high density subscriber access options in a 1RU shelf supporting 8 GPON and 16 GE ports to support a maximum of 528 optical line terminals (ONTs). The E7 is built on a core Layer 2 and Layer 3 switch capable of full-duplex, line rate forwarding at all frame sizes and traffic types across all interfaces. This capacity makes the E7 ideal for aggregation and transport of IP/Ethernet services across the access network. A 10Gb backbone transport network from each optical line terminal (OLT) service center will connect to the central office located in Oneida, TN.

The witnesses responsible for responding to questions related to the information provided in this Response are Steve Armes, Accounting Manager of Highland, and Jerry Neal, Systems Engineering Manager with Engineering Associates, Inc.

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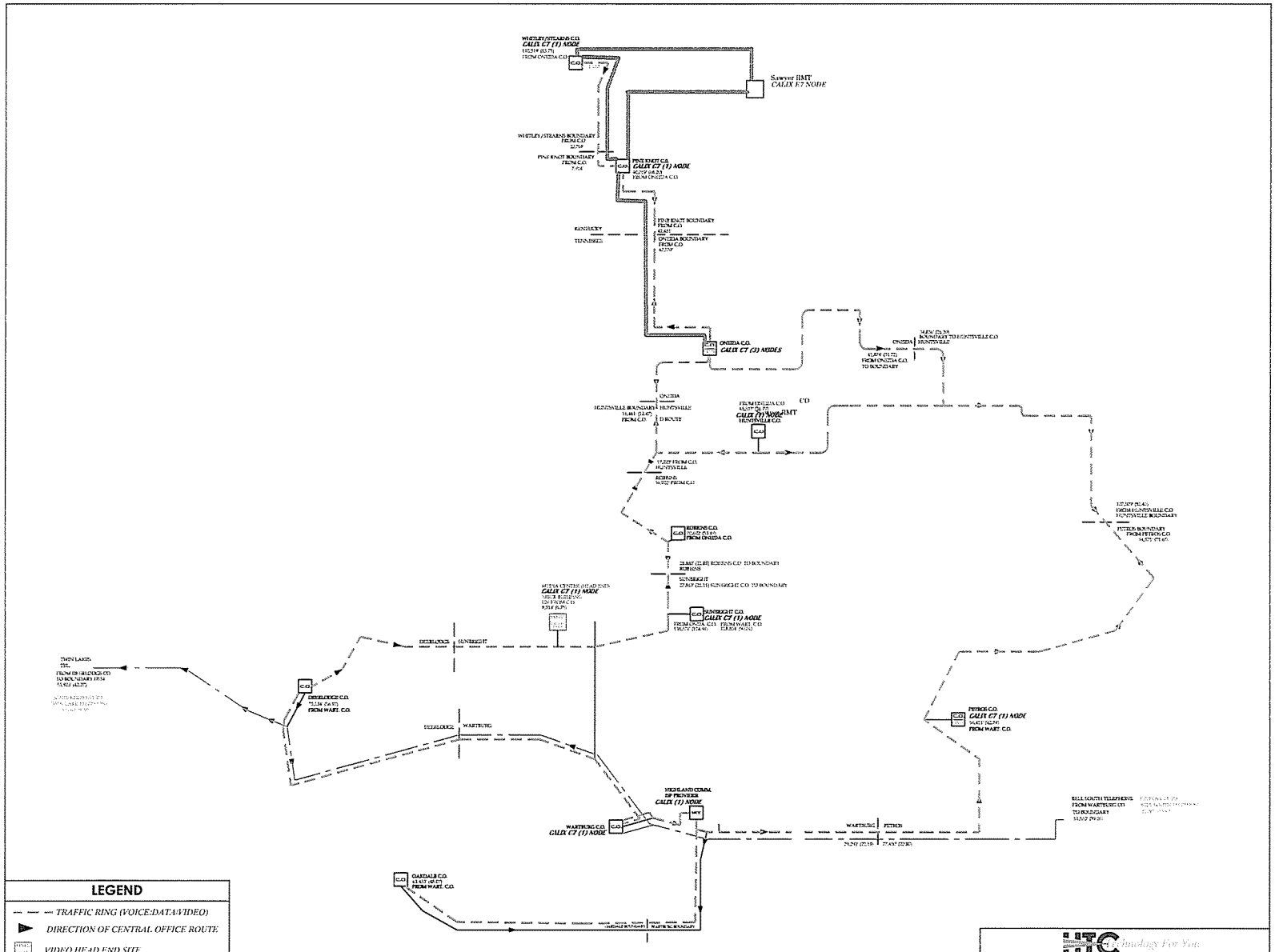
Sawyer RMT
CALIX E7 NODE
ONEIDA CO.
CALIX C7 (3) NODES
HUNTSVILLE CO.
CALIX C7 (1) NODE
RMT
CO
ROBBINS CO.
CALIX C7 (1) NODE
SUNBRIGHT
CALIX C7 (1) NODE
DEER LODGE
WARTBURG
HIGHLAND COMM. DP PROVIDER
CALIX (1) NODE
WARTBURG CO.
CALIX C7 (1) NODE
OAKDALE CO.
FROM WART. CO.
PETROS CO.
CALIX C7 (1) NODE
FROM WART. CO.
TWIN LAKES
TEL.
BELL SOUTH TELEPHONE
FROM WARTBURG CO
TO BOUNDARY
WARTBURG
PETROS
KENTUCKY
TENNESSEE
ONEIDA
HUNTSVILLE
ROBBINS
SUNBRIGHT
DEER LODGE
WARTBURG
PETROS
OAKDALE
LEGEND
TRAFFIC RING (VOICE:DATA/VIDEO)
DIRECTION OF CENTRAL OFFICE ROUTE
VIDEO HEAD END SITE
CENTRAL OFFICE BUILDING
CENTRAL OFFICE BUILDING WITH VIDEO HUB
PROPOSED FIBER CONNECTION
IRIS RING CONNECTION
All of the distances are in feet. The numbers that are in the parenthesis are units. A unit is a 1/4 of a mile. I.E. The feet divided by 1320 feet.
Highland Telephone Cooperative
EXISTING FIBER OPTIC BACKBONE

Attachment 11 -
System Design

Easygrants ID:
Project Title:

Instructions: *To the extent this information is currently known; provide details regarding the following categories. For further information on topics to cover within these categories, consult the BIP Round Two Application Guide.*

Description of Each Service Offered:

Highland Telephone Cooperative (HTC) currently offers voice and DSL services to all subscribers in all exchanges. Video services are currently limited to part of the Oneida, TN exchange. Video services will be offered to all subscribers post grant. Significant improvement will be made to provide high-speed broadband services for Internet access. The broadband services shown below is the proposed services offering post grant. Services offered are:

Voice:
Residential and business lines with options for call forwarding, speed call, call return, repeat dialing, caller ID, call waiting, 2-way calling, teen line, selective call acceptance, selective call rejection, call rejection, anonymous call rejection, toll restriction and long distance.

Video:

Basic	2 – 21 plus High Definition locals
Expand Basic	2 – 88
Expanded Basic with Music –	to 151

Premium Packages with HBO, Cinemax, Showtime/The Movie Channel, Starz/Encore
Pay Per View
High Definition Access for 10 national channels

High-Speed Broadband Internet:
Residential, Business and Critical Community Discounted Services
6Mb upstream / .512kb downstream
10Mb upstream / 2Mb downstream
20Mb upstream / 5Mb downstream

Technology Type and Infrastructure Architecture:

The proposed system shall consist of a 10Gb backbone transport network from each OLT serving center to the central office located in Oneida, TN. The planned local access network will consist of an industry standard ITU-T G.984 GPON FTTH network.

The GPON ITU-T G.984 standard was ratified in January 2003. This technology has matured providing lower cost system components due to standardization and mature manufacturing processes. A single GPON port is capable of supporting 1.25 Gbps upstream and 2.5 Gbps downstream bandwidth. This is a substantial amount of capacity and by using statistically allocated bandwidth, GPON can provide exceptionally high-speed broadband connections in multiples hundreds of megabits to each customer.

GPON uses Generic Encapsulation Method (GEM) protocol layer to support Ethernet, ATM and TDM over point to multipoint PON network topologies. This protocol helps future proof a network without limiting the types of traffic and services that may be supported. There are other GPON benefits to HTC's implementation of this network including the support of:

- Mechanisms for network Operations, Administration and Maintenance (OAM),
- Class of Service (CoS) operation for time-sensitive transport of data payloads,
- TDM using circuit emulation services or transport over GEM, and
- Voice services with Voice over IP (VoIP).

GPON leverages fiber much different than ADSL or VDSL copper-based access technologies. GPON does not suffer from decreasing performance over distance allowing subscribers located 20km from an optical line terminal (OLT) to have identical network speeds as those located within meters of the same terminal. GPON also leverages fiber costs using a one fiber feeder split into thirty-two distribution fibers. This capability provides efficient use of fiber and greatly reduces network material costs.

Early adopters of PON based FTTH home networks are discovering operating costs are lower when compared to comparable sized copper-based networks. A PON network does not contain active components and the cable infrastructure is non-conductive. There are less active components and the use of fiber cable reduces the year-to-year costs to maintain the network.

Optical Line Terminals or OLTs will be placed in each exchange office. For Oneida, the existing FTTH network will be augmented to support additional premises. In addition to the OLT, each location will contain a transport terminal, EDFA amplifiers and power support systems. The transport terminal will contain 10Gbps Ethernet optics to establish the backbone network. A model for this network confirms a 10Gbps core network is required to meet the proposed broadband speeds and projected subscribers for the five year plan period. The results of this model are contained in the Design Section of this Attachment. An Ethernet network requires fewer devices with minimal overhead ensuring little to no protocol conversion, greater utilization of bandwidth and ease of maintenance.

Each exchange location is designed as the central distribution point and houses the equipment racks containing the OLT for broadband and voice services along with an EDFA laser extending video content to the local convergent point splitters. Video will use a separate transport fiber from the Sunbright headend to each exchange. At the exchange building, the PON and video optical signals will be combined and transmitted over feeder fiber to the local convergent point cabinet. Each feeder fiber will be optically split into 32 separate distribution fibers throughout the serving area. Each subscriber will connect to a distribution fiber with new optical drops and an optical network termination or ONT. The ONT is located on the side of the subscriber's residence. The ONT contains the components converting the optical signal to discrete Ethernet, voice and RF video electrical signals. Video services will be delivered over RG6 coaxial cable to each subscriber's television set. Ethernet services will be delivered over CAT5 twisted

pair cable. Broadband and voice services will be contained in separate VLANs within the 10Gbps backbone network. Each VLAN will terminate to an aggregation switch located in the Oneida central office. The voice services VLAN will support voice services from the Nortel CS200 softswitch with the remaining VLAN terminating to a core router for service definition and access to one of three commercial broadband carriers.

One of the benefits of RF video is the ability to deliver HTC's 86 channel basic video service without the use of a set top box. The set top box offers the advantages of a remote controlled device and an on-screen programming guide, but the primary use of this device is to control and decrypt premium and pay-per-view content. Most subscribers use two set tops per premise with additional televisions directly connecting to the coaxial cable with the later only receiving the 86 basic channels. This configuration has been found to be very cost affective for both the service provider and customer, minimizing the amount of devices required to support video services and greatly reducing the monthly recurring set top box rental charges bore by the subscriber.

Two options are considered to support voice services for the proposed network. The existing Nortel CS2000 softswitch has 1,000 VoIP SIP protocol lines services FTTH ONT POTS line. HTC is currently evaluating the expansion of the CS2000 along with the DMS-100 to determine the economic feasibility of expanding this hardware platform or replace with a new softswitch. Either the existing or new platform will serve as a full featured softswitch providing a wide range of residential and business features. The CS2000 is currently in service and has ample capacity to support the proposed network.

Three broadband speeds will be supported by this design – 6Mbps, 10Mbps and 20Mbps. The ONTs considered for this design are capable of sustaining these speeds with future symmetrical throughputs up to 600Mbps. Supporting this level of high-speed broadband service is especially important to support application such as gaming, IP video, work-at-home IP video conferencing, distance learning, and medical records and imagery all demand low latency, very high-speed Internet connectivity.

HTC is committed to supporting a reliable network even in the event of prolonged power outages. Power will be provided to the ONT using an external battery back-up supply. This unit is plugged into a wall outlet at the subscriber's residence providing a 12VDC feed. The battery back-up specified for this design will sustain an ONT for 8 hours of continuous "off-hook" or talk time.

Geography and Topography:

HTC has developed an extensive land base system maintained in AutoCAD and an associated database. This land base provided the design criteria for the proposed network. It is estimated that 23,482 premises exist in HTC's serving territory. A total of 3,605 premises and 151 route miles of fiber have been constructed using a GPON FTTH network. There are 19,877 premises and 1,709 miles of plant yet to be converted to FTTH.

The network will consist of twelve OLT locations. The design is broken into the following GPON OLT serving areas:

OLT Exchange CO	FTTH Route Miles	Premises Passed	Density
Whitley, KY	322.34	4790	14.86
Pine Knot & Sawyer, KY	167.32	2755	16.47
Oneida, TN	272.14	1883	6.92
Huntsville, TN	158.93	1733	10.90
Robbins, TN	121.63	1448	11.90
Sunbright, TN	122.76	938	7.64
Wartburg, TN	163.43	2377	14.54
Deer Lodge, TN	149.26	1250	8.37
Petros & Devonia, TN	75.28	1180	15.67
Oakdale, TN	146.46	1523	10.40

Design Requirements:

The transport terminal will contain 10Gbps Ethernet optics to complete the backbone network. A model of the network confirms a 10Gbps core network is required to meet the proposed broadband speeds and projected subscribers for the five year plan period. An oversubscription rate was developed from the speeds sold to existing DSL subscribers developing a ratio using total outbound bandwidth consumed. The results are as follows:

Estimated Peak Broadband Usage in Mb Per Exchange

Exchange	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Whitley	422	517	600	667	723	774
Pine Knot	243	297	345	384	416	445
Oneida	322	395	458	509	552	591
Huntsville	221	271	314	350	379	406
Robbins	128	156	181	202	219	234
Sunbright	115	141	163	181	197	210
Wartburg	271	331	384	427	463	496
Deer Lodge	110	135	157	174	189	202
Petros	104	128	148	164	178	191
Oakdale	134	164	191	212	230	246
Total Core	2070	2535	2941	3270	3546	3795

The over subscription rate is based on current usages and calculated as follows:

Existing Broadband Users	6900
Average broadband speed (Mb)	1.5
Core Max Transport (Mb)	300
Calculated Over Subscription Ratio	34.5

Not all DSL customers are currently at 1.5Mb. Rates vary from 256k to a maximum of 1.5. The calculation considers all DSL customers operating at the current networks maximum speed. Additionally, a conservative oversubscription rate of 30 to 1 was used for the model.

The model uses a composite maximum broadband speed for the transport network and IP core. Conservative take-rates were used in the model which are lower than those suggested in a local marketing study conducted in July 2009. This conservative approach was used for the take rates and also carried forward with higher bandwidth tiers provided than those suggested by the study. The rate was calculated as follows:

6Mb subscribers	50%
10Mb subscribers	40%
20Mb subscribers	10%
9Mb calculated composite rate	

Highly utilized SONET routes are currently used to transport voice and DSL traffic with the exception of the Oakdale exchange. All exchanges are located on redundant fiber routes, with the exception of the previously mentioned Oakdale, Tennessee exchange office and the Whitley and Pine Knot, Kentucky exchanges. Additional fiber is planned in the proposed distribution and feeder fiber to provide redundancy for these three offices. Transport for the exchanges will use 10Gb Ethernet transport. None of the routes are expected to exceed 40Km from OLT serving center to OLT serving center.

Candidate vendors will be evaluated though a competitive request for pricing process. HTC has standardized using RUS Forms and Bulletins for the installation and support of new network and equipment. The process to be used for each candidate vendor will be based on a qualifications and price review evaluating each to meet the following:

- Ability to meet RUS Form 397 and 398 special equipment contracts.
- Ability to meet RUS Bulletin 1751F-810, Electrical Protection of Digital and Lightwave Telecommunications Equipment.
- Vendor's equipment appearing in the RUS List of Materials Acceptable for Use of RUS Borrowers.
- All hardware and software submitted by the Vendor shall be the current release with commercial, non-beta installations.
- The proposed system shall be a standards-based, Full Service Access Network (FSAN) ITU-T GPON compliant.
- Optical Line Terminals (OLT) shall serve as the optical interface for the passive optical network (PON) to subscribers and optical interconnection for voice, video and Internet service systems.
- The OLT shall support GPON cards. The backplane for the GPON card shall support a minimum of 10Gbps of connectivity between cards and switch fabric.
- The OLT shall support both 1Gbps and 10Gbps transport networks with link budgets ranging from 500m to 40km using 1310nm and 1550nm wave lengths. The OLT shall support a minimum of 1 pair of dual 1Gbps and one pair of 10Gbps Ethernet transport links supporting the 802.1w RSTP.
- Optical Network Terminations (ONT) shall serve as the network element interfacing subscribers to the PON network for voice, RF video and high-speed broadband services. The minimum configuration for an ONT shall consist of 2 line POTS, 1 Gbps Ethernet Port – RJ45 electrical interface and 1 RF port – F connector interface.
- The ONT shall support autosensing Ethernet ports, DHCP Relay and Option 82 Tag. The ONT Ethernet interface shall support IEEE 802.1Q, VLAN, IEEE 802.1p, Priority, IEEE 802.1d, MAC Bridging and IEEE 802.1ad, Link Aggregation. The OLT shall support a minimum of 400 Mbps in the downstream and 200 Mbps in the upstream, for a total aggregate bandwidth of 600 Mbps.

- The ONT shall contain a built-in VOIP integrated access device using SIP protocol supporting standard phone sets and in-home wiring.
- All ONTs shall be environmentally hardened to withstand the outside elements.
- The ONT shall be powered by a separate 120 volt, 60 Hz AC power uninterruptible power supply (UPS). The UPS shall provide battery backup for lifeline POTS for a minimum of 8 hours after interruption of local AC power.
- The ONT and UPS battery charge and battery life shall be monitored and reported through the Vendor's proposed management system. Diagnostic and alarm information supported by the ONT and battery backup systems shall support low battery power, battery end-of-life, ONT operating on battery power and battery missing.
- The proposed solution shall support current ITU G984 standards and 1X32 optical splits between the PON systems and LCP splitter cabinet.
- A Nortel CS2000 softswitch shall be used to support FTTH SIP-based voice services. HTC shall use the G.711 codec for VoIP services.
- Ethernet services shall support Multiple Link Aggregation to a single router as a preferred option.
- The following IP security features are required - Layer 3 security features - DHCP authentication and embedded BRAS capabilities, Layer 3 security features - IP Spoofing prevention, Layer 3 security features - Dynamically provisioned IP Source address filters, Layer 3 security features - IP and MAC address Global Find utility in CMS, Layer 2 security features - MAC address lockdown, Layer 2 security features - MAC address spoofing, Layer 2 security features - MAC flooding system immunity and "Ether-Flood" protection, Layer 2 security features - Port Privacy per subscriber, per service, and Layer 2 security features - Global MAC address find utilities.
- The ONT shall provide the following RF video features - RF return feature that enables two-way communication between the video headend and the set top box. RF return path shall operate in the 5 to 42 MHz RF frequency range and supports set top boxes meeting Out-of-Band SCTE 55-1, SCTE 55-2, and DOCSIS Set-Top Gateway (DSG) return path standards. A forward RF path shall operate in the 54 to 1000 MHz RF frequency range. The OLT shall support a maximum return loss of 10dB, a signal strength of 19 dB, and a minimum Carrier-to-Noise ratio of 48 dBc.
- The proposed solution shall support a management system to manage and administer all OLT and ONT network elements.

Other:

4. Identify the individual serving as the Project Director of RUS Project Designation: Tennessee 554-V42 Highland and the individual serving as the Project Director of RUS Project Designation: Tennessee 1104-B40. Provide the full name, business address, and business phone of each person, as well as any professional designations or licenses each person currently holds.

Highland had not contracted with any entity to construct the initial phase of its fiber to the home network which was to be funded with the V42 Loan, and no individual had been designated to serve as the Project Director for that project.

Highland has now retained Engineering Associates, Inc. to design the entire network and to manage the construction of it. Jerry Neal, Systems Engineering Manager with Engineering Associates, Inc., will serve as the Project Director of the B40 Project. Mr. Neal will work under Mr. Thomas Harter, President of Engineering Associates, Inc., who will serve as Project Principal of the B40 Project. Mr. Harter holds a Kentucky Professional Engineering Registration No. 16889. Information on Mr. Neal's and Mr. Harter's education and experience and their business addresses follow this Response.

The witness responsible for responding to questions related to the information provided in this Response is Jerry Neal, Systems Engineering Manager with Engineering Associates, Inc.

NAME: Thomas C. Harter, PE

POSITION: President

EDUCATION: Master of Science, Operations Research

Georgia Institute of Technology / 1977

Bachelor of Industrial Engineering

Georgia Institute of Technology / 1976

Registered Professional Engineer, 17 States

Mr. Harter is President of Engineering Associates, Inc. For the past twenty years Mr. Harter has been responsible for the management of multi-disciplinary communications projects requiring the use of specialists in outside plant, network engineering and voice, data and video equipment engineering. His operations research background is very helpful when evaluating the economic merits of alternative technologies, applications and designs.

EXPERIENCE:

Mr. Harter joined Engineering Associates, Inc. in August 1978, as a staff engineer. His background includes technical and management experience on major communications design projects for telecommunications providers, universities and the military. He is a specialist in the proper use of all the latest technologies including fiber optics, network optimization and LAN technology.

His accomplishments include:

Independent telephone companies. Currently manages multiple teams implementing broadband services such as RF and IP video for Fiber-to-the-Home projects.

U.S. Army Corps of Engineers, Huntsville Division. Managed team which originated and successfully completed guide specifications for telecommunications, inside plant and telecommunications, outside plant. Received Letter of Commendation for results of team effort.

Rural Utilities Services (RUS). Head of team that routinely interfaces with RUS Engineering Branch on behalf of numerous independent telephone companies.

Virgin Islands Telephone Corporation. Managed engineering team in restoration efforts resulting from damages from Hurricane Hugo in 1989 on St. Croix and Hurricane Marilyn in 1995 on St. Thomas.

Naval Facilities Engineering Command, Southern Division Charleston. Survey, design, specifications, implementation assistance and acceptance testing of voice/data PBX for new headquarters building.

Association of Communications Engineers (ACE) President 1994-1995.

NAME: Jerry L. Neal

POSITION: Manager, Systems Engineering

EDUCATION: Electronics & Computer Systems – USAF

Business Administration Studies – Kennesaw State University &

Macon Junior College

Specialized Training -- Digital Switching, SONET, Data Communications

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This consultant has over twenty years experience in key executive positions where he was responsible for the planning, engineering, implementation and operation of state-of-the-art telecommunications networks for unique organizations such as MindSpring, Knology (HFC), PowerTel (PCS), US Carrier (ATM/SONET), ITC DeltaComm, and InterCall. Since joining EAI Jerry has been the senior engineer on a number of triple-play projects for rural telephone companies and telephone cooperatives. These projects involved IPTV, NGDLCs and FTTH.

Prior to joining Engineering Associates in July of 2000, Mr. Neal had leadership positions involved in the development and management of unique communications networks and applications. These positions included:

EXPERIENCE:

Manager, Systems Engineering, Engineering Associates. Since 2000, Mr. Neal has managed the Systems Engineering group at Engineering Associates. These efforts have recently included new softswitch upgrades, gigabit Ethernet transport, IP video headends and middleware, as well as next- generation access equipment.

Director of Network Operations and Development, USCarrier Telecom. As the fifth employee of this start-up carrier, he was responsible for the planning, engineering, implementation and operation of this 2500-mile fiber-optic SONET/network covering Georgia, Tennessee and Florida. This project involved negotiating interconnection arrangements with most of the major carriers and Local Exchange Companies in the area. It also required

establishment of a NOC center and development of an internal IT network for operation, monitoring and billing of this interstate network.

Vice President, Network Operations, Interstate Telephone Company. This organization was responsible for development of companies such as MindSpring, PowerTel, Knology, InterCall, and more. Mr. Neal was responsible for developing and implementing the communications infrastructure necessary to launch the new companies. He was also responsible for managing the network for the telephone company. While involved in these endeavors he developed unique insight into the planning, engineering and management of technologies such as *ADSL, Centrex, ATM, SONET, Distributed Voice & Data Networks, Billing Systems, POTS* and more. This position also required him to manage a Telephone Operations Billing Center, LAN/WAN, desktop server system and Lotus Notes Network.

Network Planning Manager, Contel Telecommunications. Jerry was responsible for designing and implementing a distributed switching network for a system with over 450 digital central offices. The resulting system included a network surveillance center, trouble center and automated service administration system. It reduced operations expenses by more than $1 million per year.

5. Highland has filed an application for an increase of local exchange service rates with the Commission in Case No. 2010-00227.

a. Explain, in detail, the relationship between Highland's proposed rate increase and the approved construction project in Case No. 2009-00048 (i.e., Highland's intent to seek cost recovery for this project through the rate case, etc.).

There is no relationship between the construction project in Case No. 2009-00048 and the proposed rate increase in Case No. 2010-00227. Highland's initial request in Case No. 2009-00048 was to build fiber to the home in the Kentucky portion of its service area. This build out was to provide additional services to members of the Cooperative. The initial phase of this network was to be financed by the V42 Loan, and the additional revenues generated from these services were to be used to service the related debt. It was determined during the fourth quarter of 2009 that Highland was going to incur a substantial loss from operations, without having any debt service for the V42 Loan. With further review of Highland's expected operations for the upcoming year, 2010, management projected an operating loss for 2010 as well. The consequences of operating losses for both 2009 and 2010 could result in Highland not meeting the TIER requirements of its existing RUS loans. If Highland fails to meet the TIER requirement, it risks being in default of its loan covenants. Highland did review the various expense captions and implemented cost reductions where it felt it could with the least effect to customer services. However, cost reductions alone are not enough. That is when the determination was made to request the rate increase.

b. Explain, in detail, the relationship between Highland's proposed rate increase and the proposed construction project in Case No. 2010-00341 (i.e., Highland's intent to seek cost recovery for this project through the rate case, etc.).

As stated in question 5(a), there is no relationship between Highland's proposed rate increase and the proposed construction project in Case No. 2010-00341. Highland submitted a grant request through the BIP stimulus program initiated by the federal government. As a result of the application, the Cooperative was awarded the B40 Grant/Loan. One of the conditions of the BIP program was that all existing RUS loans that had not been advanced had to be rescinded. The debt referenced in Case No. 2009-00048, the V42 Loan, was subsequently rescinded due to this requirement. The construction project included in Case No. 2010-00341 is required to be 100% funded from the BIP stimulus. The Cooperative is required to complete the construction related to the BIP grant within 36 months. The additional revenues generated by this expansion will be used to fund the debt related to the construction cost. This will not happen until the project in completed, which will not be fully implemented for three years. The proposed rate increase is to cover operating costs today and to insure that the Cooperative meets its TIER requirement.

The witnesses responsible for responding to questions related to the information provided in this Response are Steve Armes, Accounting Manager of Highland, and Gentry Underhill, Jr., CPA, of Totherow, Haile & Welch, PLLC.