Broadband Infrastructure Application
Submission to RUS (BIP) and NTIA (BTOP)

Submitted Date: 9/10/2009 11:12:59 AM	**Easygrants ID: 69**
Funding Opportunity: Broadband Initiatives Program and Broadband Technology Opportunities Program	**Applicant Organization:** MCNC
Task: Submit Application - Infrastructure Programs	**Applicant Name:** Ms. Patricia Moody

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A. General Application Information

1. Applicant Information	
1-A. Name, Address, and Federal ID for Applicant	
i. Legal Name:	MCNC
ii. Employer/Taxpayer Identification Number (EIN/TIN):	581406628
Street 1:	3021 E. Cornwallis Road
Street 2:	P.O. Box 12889
City:	Research Triangle Park
County:	Durham
State:	NC
Country	United States
Zip/Postal Code:	27709-2889

1-B. Name and Contact Information of Person to be Contacted on Matters Involving this Application:	
Prefix:	Ms.
First Name:	Patricia
Middle Name:	
Last Name:	Moody
Suffix:	
Telephone Number:	919-248-1820
Fax Number:	
Email:	pmoody@mcnc.org
Title:	Chief Financial Officer

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1-C. Other Required Identification Numbers

i. Organizational DUNS:	018946590
ii. CCR # (CAGE):	1CH60
iii. Funding Opportunity Number:	1
iv. Catalog of Federal Domestic Assistance Number:	**BTOP CFDA Number:** 11.557 **BIP CFDA Number**: 10.787 **BTOP CFDA Title:** Broadband Technology Opportunities Program **BIP CFDA Title:** Broadband Initiatives Program

1-D Eligible Entities

Please classify your organization. (Note: If there are multiple organizations involved in the project, designate the lead applicant that would enter into a Loan or Grant agreement with the Agency and assume operational and financial responsibility should an award be made). **Non-Profit Corporation**

1-E. RUS Borrower Status

No

1-F. Applicant Federal Debt Delinquency Explanation

Is the Applicant Delinquent On Any Federal Debt? **No**
Federal debt delinquency Explanation:
Not applicable.

2. Project Description & Project Title

2-A. Project Title: Building a Sustainable Middle-Mile Network for Underserved Rural NC

2-B. Project Description: MCNC will build a sustainable middle-mile broadband network connecting urban central NC with underserved rural southeastern and western NC. The project addresses statutory goals by improving affordability and access for education, health care, community institutions, and last-mile providers. Led by a proven team, the project is shovel ready and is supported by an $11.76M cash and in-kind match.

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3. Application ID for Multiple Submissions for Identified Service Areas:

Not applicable.

4. Rural Area Determination

At least 75 percent of the proposed service area to be funded falls within rural areas that are unserved or underserved.

Yes

5. Applications for Rural Areas: Please choose the funding program(s) to which you are submitting this application.

a) BIP broadband infrastructure category to which you are applying:
BIP - Middle Mile Project

b) Would you like this Application for Rural Areas to also be considered for BTOP funding?
Yes

c) BTOP Infrastructure category for which you are applying.
Middle Mile

6. Applications for All Other Areas: Per the NOFA, all applications to fund broadband infrastructure projects in areas that are less than 75% rural must be submitted to NTIA for consideration under BTOP.

BTOP broadband infrastructure category to which you are applying: **Middle Mile**

B. Eligibility Factors

7. Application Submission

BIP and BTOP Factors Selected By Applicant:
Applicant has submitted a completed application and provided all supporting documentation required for the application.
The Project will be substantially complete within 2nd year from the award date, and the project will be fully

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complete by the end of the 3rd year from the award date.
For projects seeking more than $1 million funding, the Applicant agrees to submit a certification, from a Professional Engineer, that attests that a) the system will deliver the stated performance; and b) the projected project will be substantially completed within two years, and fully completed within three years.
The Applicant provides two-way data transmission with advertised speeds of at least 768 kbps downstream and 200 kbps upstream.
Applicant understands and agrees to comply with the nondiscrimination and interconnection obligations outlined in the NOFA.

Additional Factors for BIP Selected By Applicant
At least 75 percent of the proposed funded service area qualifies as unserved and underserved rural areas in accordance with the NOFA.
Applicant understands and agrees that the project will be fully funded in accordance with the requirements of the NOFA.
Applicant understands and agrees that only projects that RUS determines to be financially feasible and/or economically sustainable will be eligible under this NOFA.

Additional BTOP Factors Selected By Applicant

- **Conformity with Statutory Purposes**
- **Cost Sharing/Matching**
- **Reasonableness of Project Budget**

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The project advances at least one of the statutory purposes for BTOP
Applicant has provided documentation that the project would not have been implemented during the grant period without federal grant assistance.
Applicant has provided a budget that is appropriate to the proposed technical solution and only includes eligible costs.

- **Demonstration the Project Could not be Implemented But For Federal Grant Assistance**
  Applicant is providing matching funds of at least 20 percent towards the total eligible project costs?
  Yes

7-k. Cost Sharing/Matching Fund Explanation
Not applicable. Not requesting a matching funds waiver request.

C. Executive Summary

Executive Summary of Project for BIP and BTOP:

8. Infrastructure Projects Executive Summary

To ensure a high quality of life and a globally competitive future for its citizens, businesses, and communities, North Carolina has long supported the deployment of affordable broadband networks. Building on NC's historical investments in broadband, MCNC will build a sustainable middle-mile network connecting urban central NC with underserved rural areas of southeastern and western NC. This application for American Recovery and Reinvestment Act Broadband Stimulus Funds addresses statutory goals by improving affordability and access for education, health care, community institutions, and last-mile providers. The design, construction, and operation of the network will create over 230 engineering and construction jobs.

MCNC is a proven broadband provider that has operated the North Carolina Research and

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Education Network (NCREN) for over 25 years. The proposed project is shovel ready and is supported by an $8M cash match and a $3.8M in-kind match. MCNC's strategy is to leverage available capacity by linking it with new construction. The proposed fiber build will serve the existing community anchor institutions on NCREN (schools, community colleges, other institutions of higher education, and community support organizations) with more robust and scalable connectivity. The build will also create a higher capacity public middle-mile connectivity for community anchor institutions that are not part of NCREN (e.g., libraries, medical, and public health providers). Finally, the build will enable private service providers (existing and new) to reach underserved areas of the state.

The proposed middle-mile fiber build addresses the public/private middle-mile needs of major portions of rural NC. There are twelve counties along the build for which the entire county is classified as underserved. There are six in the southeast: Beaufort, Bladen, Columbus, Edgecombe, Green and Harnett. There are six in the west: Davie, Jackson, McDowell, Polk, Rutherford and Transylvania. In addition there are at least twelve other counties traversed by the build that contain unserved census blocks: Carteret, Craven, Johnston, Onslow, Pender and Roberson in the southeast; and Buncombe, Catawba, Cleveland, Haywood, Iredell and Lincoln in the west.

This application complements state of North Carolina proposals from the eNC Authority that address mapping and broadband planning. Strong support for submission of the MCNC and eNC proposals has come from NC Governor Beverly Perdue, North Carolina's fifteen-person delegation to the U.S. Congress and the NC Office of Economic Recovery and Investment. Because of NC's current financial crisis, these projects cannot be implemented during the grant period without federal grant assistance.

QUALIFICATIONS OF THE APPLICANT

Initially funded by the NC state government in 1980 as a catalyst for technology-based economic development, MCNC is now an independent 501(c)(3) non-profit organization. MCNC has operated the North Carolina Research and Education Network (NCREN) for over 25 years. With a history of innovation, world-class service, and reliability, NCREN provides backbone and ISP services to community anchor institutions including:

1. All 17 institutions of the public University of North Carolina system
2. 24 of the 36 NC independent colleges and universities

3. All 115 public K-12 school districts and all 2,400 public schools in NC
4. 20 of the 58 institutions in the North Carolina Community College System
5. Research institutions and foundations (e.g., NC Biotechnology Center)

MCNC has been a facilities-based provider since its inception. Microwave wireless transmission technology has given way to terrestrial fiber over time. MCNC has been able to leverage staff expertise in the management of real estate, power, and HVAC systems critical for operating a fiber network.

MCNC has managed fiber capacity and optoelectronics (both owned and leased) for over ten years. Its experience in designing and building middle-mile networks provides a community of design, build, and permitting partners that is ready to assist in the project completion as soon as funds are awarded. A few examples:

- Several fiber construction firms have been contacted and will submit bids to build.
- The NC Department of Transportation will expedite the granting of rights-of-way along state-controlled highways
- Non-profit energy cooperatives throughout the proposed service area are ready to cooperate with rights of way and other access issues.

MCNC operates NCREN in a fiscally transparent and responsible manner by leveraging the MCNC endowment to make capital investments and recovering operating costs from the community anchor institutions connected to the backbone. MCNC has pledged $8M in cash and $3.8M in-kind as matching funds for this project.

PROPOSED INFRASTRUCTURE AND SERVICES
MCNC proposes to build a $39.99M middle-mile network of terrestrial fiberoptic cable, mostly buried, lit and amplified with industry-standard dense wave division multiplexing optoelectronic gear.

The network will have both public and private users. MCNC's portion of the network will connect community anchor institutions (schools, community colleges, other institutions of higher education, and community support organizations) in rural NC to the existing North Carolina Research and Education Network (NCREN). The second portion of the network will be leased to private-sector middle-mile operators and wholesalers. This portion will meet the

standards of interconnectivity set out in the BTOP/BIP NOFA. One middle-mile operator, FRC, has already committed, via letter of intent, to operate and market a portion of the dark fiber available for private use. FRC has letters of intent from last-mile service providers to reach into unserved and underserved areas transversed by the build. Through private-sector middle-mile partners like FRC, lit capacity and other middle-mile services will be offered to ILECs, CLECs, MSOs, wireless ISPs, energy cooperatives, and independent and cooperative telecom companies in the areas of the proposed build. Also, BalsamWest, a middle- and last-mile service provider in western NC, has been granted capacity on the middle mile to help expand their service offerings in underserved areas of western NC.

MCNC already owns, through IRUs, the fiber that connects community anchor institutions in urban NC to NCREN. In underserved rural areas of the state, however, community anchor institutions are connected to NCREN by short-term leases for lit capacity (circuits). The result has been that the service received by community anchor institutions in rural NC compares unfavorably to the service received by institutions in urban areas in terms of price, capacity, and confidence over the long term. MCNC has attempted to gain long-term ownership of dark fiber in rural areas over the last five years with little success. The proposed middle-mile build will enable MCNC to provide equitable NCREN service to all education-sector community anchor institutions in the state. In addition, MCNC has coordinated with the state librarian and the NC Health Information Technology Collaborative. They have committed, as documented by endorsement letters included in this application, to explore connecting rural libraries, county health departments, county health care clinics, and nonprofit hospitals to NCREN upon award.

The potential private partners have broad relationships with all classes of service providers. MCNC and FRC have already held meetings with last-mile providers in unserved and underserved areas who will apply separately for last-mile stimulus funds. Letters of endorsement from last-mile providers included with this application.

NON-DISCRIMINATION AND INTERCONNECT OBLIGATIONS
MCNC has discussed the availability of fiber along the proposed routes with a number of private providers. These private partners, led by a firm commitment from FRC, have committed to wholesaling lit capacity to last-mile providers. They include some of the leading middle-mile dark-fiber operators in the country. Their business strategy for this middle-mile build is to wholesale interconnection with any party interested in serving consumers,

commercial entities, private healthcare, and energy distributors.

POPULATION AND COMMUNITY ANCHOR INSTITUTION STATISTICS
Serving almost one half the population of NC, this middle-mile network will serve 18 southeastern counties and 19 western counties for 37 total. The proposed middle-mile network will serve the southeastern NC counties of Beaufort, Bladen, Carteret, Columbus, Craven, Cumberland, Edgecombe, Greene, Harnett, Johnston, Nash, New Hanover, Onslow, Pender, Pitt, Robeson, Wake, Wilson; and the western NC counties of Alexander, Buncombe, Burke, Caldwell, Catawba, Cleveland, Davidson, Davie, Gaston, Haywood, Henderson, Iredell, Jackson, Lincoln, McDowell, Mecklenberg, Polk, Rutherford, and Transylvania.

According to U.S. Census Bureau numbers, the approximate number of households served by this middle-mile build is 1.8 million (population: 5.2 million). According to the NC Dept. of Commerce, the number of businesses passed by this build is 139,000. The number of K-12 schools is 1,232; the number of higher education institutions is 55; the number of public libraries is 183; and the number of hospitals is 63.

In summary, the network will have great reach. Through community anchor institutions on the backbone, 2M students in K-20 education are already served by NCREN. In addition, over 5.2M citizens who make over 15 million annual doctor visits, and over 5M estimated library visitors may be served. On the private side, this route has the potential to be the middle mile solutions for 335,589 underserved households (796,875 total population) North Carolinians live in the 24 partially or fully underserved counties.

Description of BTOP Project Purpose (BTOP Applicants Only Next Three Questions)

9. BTOP Statutory Purpose:

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Provide improved access to broadband service to consumers residing in "underserved" areas of the United States.
Provide broadband education, awareness, training, access, equipment, and support to schools, libraries, medical and healthcare providers, community colleges and other institutions of higher education, and other community support organizations by or through these organizations.
Provide broadband education, awareness, training, access, equipment, and support to organizations and agencies that provide outreach, access, equipment and support services to facilitate greater use of broadband service by low-income, unemployed, aged, and otherwise vulnerable populations.
Provide broadband education, awareness, training, access, equipment, and support to job-creating strategic facilities located within a defined economic zone, or community as designated by a State authority, Department of Commerce , HUD or USDA.
Improve access to, and use of, broadband service by public safety agencies.
Stimulate the demand for broadband, economic growth, and job creation.

10. Description of BTOP Project Purpose:

This project is a sustainable middle-mile network build through underserved areas of 13 rural counties in North Carolina. To reach these counties, the build will traverse 18 contiguous counties in the western part of NC and 19 counties in the southeastern part of NC. (See maps attached to this application.) The network will have both public and private users. The public portion of the network will connect community anchor institutions (schools, community colleges, other institutions of higher education, and community support organizations) in rural North Carolina to the existing North Carolina Research and Education Network (NCREN). The second portion of the network will be leased to private-sector middle-mile operators and wholesalers who will provide wholesale-priced access to middle-mile bandwidth to ILECs, CLECs, MSOs, wireless ISPs, energy cooperatives, and independent and cooperative telecom companies. The project directly serves the BTOP statutory purposes of providing enhanced broadband connectivity to underserved areas and strategic community institutions, and stimulating demand for broadband, economic growth, and job creation.

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UNDERSERVED ACCESS

The proposed build addresses the public/private middle-mile needs of major portions of rural North Carolina. The build transverses counties with significant underserved areas, including Beaufort, Bladen, Columbus, Davidson, Davie, Edgecombe, Greene, Harnett, Jackson, McDowell, Polk, Rutherford, and Transylvania counties. These counties are widely spread throughout NC. The build will provide numerous interconnection points in or within easy access of these underserved areas. One middle-mile operator, FRC, has already committed, via letter of intent, to operate and market a portion of the dark fiber available for private use. FRC has letters of intent from last-mile service providers to reach into underserved areas transversed by the build.

In addition, several ARRA broadband proposals will rely on the MCNC middle-mile build to provide service to underserved areas. The MCNC planned build will be referenced in the ARRA proposals. Once the build is complete, we are confident that additional last-mile projects will materialize.

Broadband Education, Awareness, Training, Access, Equipment, and Support for
1) Schools, libraries, medical and health-care providers, community colleges, and other institutions of higher education

MCNC is a proven broadband provider that operates the North Carolina Research and Education Network (NCREN), the backbone network connecting almost all of K-20 public and private education in NC. MCNC already owns, through IRUs, the fiber that connects community anchor institutions in urban North Carolina to NCREN. In underserved rural areas of the state, however, community anchor institutions are connected to NCREN by short-term leases for lit capacity (circuits). The result has been that the service received by community anchor institutions in rural North Carolina compares unfavorably to the service received by institutions in urban areas in terms of price, capacity, and confidence over the long term. The proposed middle-mile build will enable MCNC to provide equitable NCREN service to all education-sector community anchor institutions in the state. (See endorsement letters from the president of the University of North Carolina system, the president of the North Carolina Community College System, the president of the North Carolina Independent Colleges and Universities, the chairman of the State Board of Education and the superintendent of the Department of Public Instruction.)

In addition, MCNC has coordinated with the state librarian, the North Carolina Health Information Technology Strategic Planning Task Force (which represents health care IT stimulus activities at the state level), and representatives of nonprofit electrical co-ops in the area of proposed build. Commitments from these organizations to explore connecting rural libraries, nonprofit hospitals, and county-operated free health-care clinics in or adjacent to underserved areas adds significantly to the value of the proposed middle-mile network. Because such organizations in these areas are connected only to the commercial Internet and not to a statewide backbone, they have limited ability to participate in Intranet-based activities such as telehealth services, electronic medical-records sharing, and smart-grid technology. Enhanced broadband capacity will improve the access to education, health care, and human services in these communities, and will assist in the deployment of advanced utility monitoring by nonprofit electrical co-ops in these regions. (See endorsement letters from Governor Beverly Perdue, the state librarian, and the state Health IT Strategic Task Force Coordinator.)

2) Public Safety Agencies
For a number of years, MCNC has provided support to the NC State Highway Patrol through partnership on deployment and use of wireless communications technologies. The Highway Patrol views the proposed fiber build as a way to expand the Highway Patrol's work with NCREN. The new build could assist with wireless backhaul and disaster response. (See endorsement letter endorsement from the NC secretary of crime control and public safety.)

STIMULATE DEMAND
Three aspects of the project will stimulate demand for broadband service in areas served by the build. First, MCNC and its private middle-mile partners will offer wholesale access to network components and services such as wavelength or fibers at reasonable rates and terms. This wholesale access will lower last-mile prices and stimulate demand. Second, eNC, North Carolina's broadband authority, is proposing to trial a lifeline link-up for broadband. The longstanding lifeline link-up telephone service uses FCC funding to provide subsidized voice telephone access to those on certain forms of public assistance. eNC will apply, in BTOP tranche 2, for stimulus funding to provide subsidized broadband service to 125,000 families residing in the proposed service area. Once the network is built, it will be economically beneficial for service providers to reach these new consumers. Finally, although the NC Learning with Technology Initiative has given 25,000 high school students access to laptops, recent surveys suggest that about 60 percent of these students do not have broadband service at

home. Increasing competition and lowering prices for broadband service in the newly served areas will increase access to broadband service among families whose children now are increasingly dependent on Internet-delivered curriculum for their learning. (See letters of intent from last-mile service providers.)

11. BTOP Enhanced Services for Health Care Delivery, Education, and Children:

HEALTH CARE DELIVERY

This middle-mile build will increase the existing bandwidth by 10 to 20 times in underserved areas of rural western and southeastern North Carolina. Available to free clinics, county health agencies, and nonprofit hospitals, the enhanced bandwidth will enable a wider range of health-care information exchange and tele-health technologies. MCNC and the NC Health Information Technology Collaborative have coordinated to make certain that broadband and health-care IT stimulus proposals are properly aligned. (See endorsement letters from Governor Perdue and the coordinator of NC Health Information Technology Collaborative.)

Also, NCREN has long been a main service provider to schools of public health and schools of medicine in NC. Bandwidth restrictions caused by the inability of MCNC to lease dark fiber in underserved rural areas have impeded the efforts of these university-based institutions to scale tele-health services in a meaningful way to rural NC. This middle-mile build will allow several things:

- The best medical practioners across several disciplines (cancer, diabetes, pulmonary, etc.) will scale their knowledge to reach patients all across the state.
- The public health data and research housed within institutions of the UNC system will be able to be used for trending and predicting the health of North Carolinians in the regions served by this middle-mile build. The real-time access to this information has been impinged by bandwidth constraints and has restricted the ability of the doctors to scale their knowledge through increased interaction and collaboration.

EDUCATION AND CHILDREN

In 2007 MCNC was designated by then-NC Lieutenant Governor Bev Perdue as the lead staff agency for the NC eLearning Commission, which coordinates virtual and distance learning initiatives across all sectors of public education. MCNC's role is to ensure that the infrastructure is in place to handle modern e-learning content, which incorporates synchronous video, virtual worlds, and other Web2.0 technologies. MCNC has helped the NC Community College System create an online statewide learning objects repository (LOR). Teachers,

professors, and professional development professionals can post learning objects to the LOR.

NC has seen a quadrupling in enrollments in e-learning over the last four years, with an even greater increase in demand for bandwidth. Demand for bandwidth is expected to increase by a CAGR of over 30% for the foreseeable future. Because they have trouble attracting and paying teachers qualified in areas like math and science, underserved rural counties will experience the highest enrollment growth in e-learning. This middle-mile build will allow rural education institutions to meet the future need for e-learning courses and more robust and engaging content. (See endorsement letters from leaders of K20 public education.)

MCNC is also leveraging NCREN to further its work with the Bill and Melinda Gates Foundation on science, technology, engineering, and math education. MCNC is cooperating with NC STEM leaders to align resources toward STEM job creation and growth and to introduce middle and high school students to existing STEM resources at the state, national and global level. The middle-mile network will provide access to these global STEM resources.

D. Proposed Funded Service Area

12. Proposed Funded Service Area Maps:

12-A. Service Area Map (Reference Number): **5193-C616-479F-9676**

12-B. Is the applicant is seeking a waiver for providing less than 100% coverage of a census block. **No**

13. Proposed Funded Service Area (BIP - Last Mile Projects):

Please refer to section M at the end of document.

14. Proposed Funded Service Area (BTOP - Middle Mile Project):

Please refer to section M at the end of document.

15. Non-Funded Service Area(BIP Only):

Not applicable.

16. Coverage Waiver:

Applicant is seeking a waiver for providing less than 100% coverage of a census block.

No

For Response of "Yes" please refer to upload section for additional supporting documentation.

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17. Methodology for Area Status:

MCNC's middle-mile proposal covers 18 southeastern and 19 western North Carolina counties. According to guidance from the BIP program, each of these 37 counties is considered a funded last-mile service area. Twelve counties, each comprising contiguous census blocks, are classified as fully underserved: six on the eastern route (Beaufort, Bladen, Columbus, Edgecombe, Greene and Harnett); and six on the southwestern route (Davie, Jackson, McDowell, Polk, Rutherford and Transylvania). At least 12 more counties are partially underserved (containing underserved census-designated communities, underserved census blocks, or both): Carteret, Craven, Johnston, Onslow, Pender and Robeson in the east, and Buncombe, Catawba, Cleveland, Haywood, Iredell and Lincoln in the southwest. There are several interconnection points in underserved areas along both segments.

Because the NOFA and the application state only that BIP and BTOP must exceed a 75% rural threshold, based on surface-area calculations, we apply for both BIP and BTOP. However, the Recovery Act requires for BIP projects that "at least 75% of the area to be served by the project shall be in a rural area without sufficient access to high speed broadband service" (Recovery Act, Division A, Title I, 123 Stat. at 118). Per the NOFA, for middle-mile projects this means that BIP will consider only applications "whose total proposed funded service area benefits at least 75% or more unserved or underserved rural areas" (NOFA, 74 Fed. Reg. 33114). We calculate that rural AND unserved/underserved in the targeted service areas may be as little as 30-50%. Therefore, our proposal may be ineligible for BIP and should be considered exclusively by BTOP.

Our methodology enlisted the assistance of the e-NC Authority, NC's ongoing broadband mapping effort; and Broadband Consulting Group (BBCGi), a consortium of broadband technology specialists.

SERVED/UNDERSERVED
e-NC studied census blocks based on provider data. Focusing on the NOFA 50% broadband-access criteria to identify underserved areas, e-NC used this process: 1) All wirecenters with 10-50% DSL (per 12/31/2007 data) were selected; 2) All census blocks within this set with cable-modem service were removed (a conservative assumption reflecting how cable-modem service is reported); 3) All the borders were examined and DSL-qualifying census blocks that were excluded due to cable-modem selection were included.

BBCGi determined whether a specific county or census designated community (CDC) was underserved using NOFA's 40% broadband subscribership criteria. BBCGi purchased a representative sample of current household records from Experian within each funded service area. They used public switched phone number databases, cable and telephone franchise databases, individual provider broadband availability Web sites, and internal databases to determine both availability and subscribership of broadband service for each household in a representative sample. An aggregate broadband subscribership per county or CDC of less than 40% qualified the area as underserved.

These reasonable methods demonstrate qualifying underserved funded service areas for the middle-mile network. Please see the supplementary documents for further details on how we handled the data during the submission process.

RURAL/NONRURAL
BBCGi tagged areas with a population of over 50,000 and their contiguous areas nonrural, as they did areas with a population of over 20,000. They tagged all "other" areas as rural. Rural/non-rural determinations were made for each service area and CDC, based on surface area percentages. Based on this methodology, while 75% of the project is rural, less than 50% of the project is rural-underserved.

18. Middle Mile Benefits

This proposal addresses large areas of NC in the southeast and the west where competitive middle-mile solutions are not available. MCNC's proposed build will make high-capacity, scalable, cost-effective network connectivity available to community anchor institutions (CAI) and last-mile service providers in the 37 counties of our service areas. The proposed middle-mile solution will pass approximately 1.8 million NC households, 5.2 million NC residents, 139,000 businesses, 63 hospitals, 183 public libraries, hundreds of K12 schools, and dozens of higher education institutions. We will connect this new capability to existing infrastructure and national-scope providers.

MCNC will operate a dense wave division multiplexing (DWDM) optical system along the new paths. This DWDM network will be integrated into our existing system to minimize cost of services. The proposed solution will provide services at lower prices than currently available alternatives. (See questions 20, 21, 27 for information on pricing.) The proposed architecture

will offer great resiliency, allowing very high availability, similar to the NCREN network currently operated by MCNC, which exceeds 99.99% uptime.

We define two broad service areas: 19 contiguous counties in western NC; and 18 counties in southeastern NC. Twelve counties are designated underserved: six counties in the western service area, and six in the southeastern service area. In addition to these designated underserved counties, there are pockets of underserved census blocks within 12 other served counties in our service area that will benefit from this proposal.

The new paths will leverage complementary interconnections with other middle-mile service providers, through which we will expand the reach of NCREN to underserved North Carolinians. To address underserved areas, at least 13 last-mile service providers will be able to interconnect as a result of this proposal. These complementary service providers include Broadplex and Balsam West, who are arranging fiber swaps with MCNC as part of our plan in western NC.

MCNC/NCREN already serves the majority of private and public education institutions in NC. If this grant is awarded, NCREN will target nonprofit and government facilities from the public health and health care sector, libraries, and other nonprofits as direct customers. Our proposal is coordinated with the strategies of other sectors of CAIs. In particular, the NC Health Information Technology Collaborative recently created a report on "Improving Health and Healthcare in NC" that noted the importance of this proposal to their needs.

MCNC has 20 years of data on the higher education community's growth rate in demand for broadband services. A similar growth rate is assumed for K-12, community colleges, and other sectors such as health care, which have not been as aggressive in adopting technology to this point. The projected rate of growth is not sustainable with current commercial pricing, which increases linearly with capacity. The build created here will allow incremental pricing for anchor institutions, enabling bandwidth to scale while keeping costs low. It also supports the specialized needs of subsections of the CAIs, such as researchers who need very high capacity for short periods of time. The approach described in this proposal will enable MCNC to provide innovative services and make them available in a timely, cost-effective, efficient, and more equitable manner in a broader geographic area.

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Service providers: SATMC, Starr Telephone, North State, Lexcom, Yadkin Valley, Surry Telephone, Wilkes Telecom, Skyline Telephone, Spirit Telecom, Deltacom, NuVox, and Paetec, Northland Cable TV, ClearTalk, Citizens Telephone, Suddenlink, and Embarq.

E. Proposed Service Offering

19. Broadband Service Offerings for Last Mile Project:

Please refer to upload section at the end of the document.

20. Service Offerings for Middle Mile Project:

Please refer to upload section at the end of the document.

Competing Service Providers

21. Existing Broadband Service Providers and Services Offered:

Please refer to upload section at the end of the document.

Non-Discrimination, Interconnection

22. Description of Network Openness:

MCNC, as the operator of NCREN, has established policies that are fully consistent with the BTOP NOFA's nondiscrimination and network interconnection obligations, and adhere fully to the principles contained in FCC 05-151. These policies will apply to the proposed middle-mile solution. MCNC's policies on nondiscrimination, interconnection, and network management will be accessible on the MCNC Web site under the Network Policies section. Changes to the policies will be prominently noted on the Web site, and all current MCNC customers will be notified of changes via e-mail.

NONDISCRIMINATION POLICY: MCNC provides Internet services to community anchor institutions (CAI) in an open, non-discriminatory manner. Any CAI within the MCNC service area is eligible to connect at reasonable rates and terms. As a middle-mile provider, MCNC uses several upstream Tier 1 Internet service providers that provide full access to the public Internet. MCNC makes no distinction in its treatment of customer traffic based on application or content. MCNC also provides lit capacity and other middle-mile services to private-sector

middle-mile operators and wholesalers in an open, provider-neutral and non-discriminatory fashion. Any middle- or last-mile provider or wholesaler within the MCNC service area is eligible to connect at reasonable rates and terms.
INTERCONNECTION POLICY: MCNC provides interconnection points in the central office facilities of the local exchange carriers in the areas that it serves. Last-mile providers (including ILEC, MSO, CLEC, energy cooperatives, and independent telecom companies) may interconnect with MCNC's network at reasonable rates and terms for the purpose of connecting to the public Internet as well as for exchanging traffic. These interconnection points also allow commercial wholesale participants to serve last-mile providers with wholesale access at reasonable rates and terms to network components and services such as wavelengths and fibers. In order to provide more direct interconnection between residential users and CAIs, MCNC encourages settlement-free peering with all willing Internet service providers within North Carolina. MCNC serves the needs of CAIs, while wholesale commercial providers serve the commercial last-mile providers and their customers.
NETWORK MANAGEMENT POLICY: The MCNC Internet service is based on best-effort delivery. MCNC does not use any mechanisms to allocate bandwidth preferentially to any specific class of users, applications, providers, or sources. MCNC does not limit bandwidth usage by its users, peers, or providers via mechanisms such as rate limiting or policing. Users, peers, and providers are limited only by the physical or contractual bandwidth limitations of their connection to the network. MCNC does not restrict user's access to specific content, block the use of specific applications, or limit the type of devices that can be used to access the network. However, MCNC will block any traffic destined for its infrastructure by unauthorized sources and will take the appropriate action to either block or limit traffic that transits its network if, by MCNC's determination, that traffic is harmful to the recipient. MCNC will cooperate with law enforcement if notified of harmful or illegal traffic transiting its network.

Non-Discrimination and Interconnection (BTOP applicants only for next three questions)

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23. Non-Discrimination Obligations (applicable to Last Mile and Middle Mile Applicants):

Adhere to the minimum non-discrimination requirements as set forth in the NOFA.
Display the nondiscrimination practices in a prominent location on the service provider's web page, and provide notice to customers of changes to these policies.

24. Interconnection Obligations (applicable to Last Mile Applicants):

25. Interconnection Obligations Middle Mile Applicants:

Adhere to the minimum interconnection requirements as set forth in the NOFA.
Display the interconnection policies in a prominent location on the service provider's web page, and provide notice to customers of changes to these policies.
Commit to offering wholesale access to network components and services such as wavelength or fibers at reasonable rates and terms.
Commit to binding private arbitration of disputes concerning interconnection obligations.

Cost Effectiveness and Affordability

26. Cost per Household (BTOP only):

Not applicable.

27. Affordability

Investments by NTIA and MCNC will provide affordable prices for middle-mile capacity

in areas where these services are currently unaffordable. Once the middle-mile solution proposed by MCNC is enacted, rural western and southeastern North Carolina will have access to core NCREN services at rates comparable to those charged to urban users.

NCREN currently relies on 1Gbps Ethernet-based services to link rural western and southeastern NC to the core infrastructure in urban central NC, which operates on dark fiber and DWDM infrastructure managed by MCNC. These 1Gbps services are inadequate for the demonstrated demand of the community anchor institutions in these areas.

MCNC covers the cost of maintaining NCREN with revenues from multi-year contracts executed by UNC-General Administration on behalf of the public universities, by the North Carolina Community College System for community colleges, and by NC Information Technology Services on behalf of the NC Department of Public Instruction for K-12. These contracts contain provisions for ongoing operational costs, and for upgrading portions of the core infrastructure through life-cycle depreciation.

The current 1Gbps level of connectivity linking western North Carolina's regional points of presence (RPOPs) to the NCREN CORE costs $240,000 annually. As a short-term fix, MCNC might increase the service to 2Gbps, which would cost $480,000 annually. The next logical technology migration to 10Gbps would have an annual cost of $600,000. Similarly, in rural southeastern North Carolina, the current 1Gbps level of connectivity to the NCREN CORE costs $360,000 annually. The cost of a short-term 2Gbps fix would be $720,000. 10Gbps service offerings interconnecting the region for a single 10G infrastructure would be $960,000 per year. Furthermore, these solutions would not scale to support future growth requirements affordably. In contrast, the fiber infrastructure enabled by this proposal will provide unlimited amounts of growth capability for MCNC anchor institutions while operating within current financial levels of commitment from the state.
(The figures above are existing contract levels with specific providers operating in each area or quotes for upgrades they have provided within the last year.)

Additionally, the infrastructure installed in this proposed build will enable anchor institutions to get direct point-to-point service offerings at an affordable rate. For example, a researcher at Western Carolina University will be able to use a dedicated 10Gbps research lambda between his institution and a colleague at NC State University at a low price based upon the incremental

cost of the owned fiber infrastructure. That researcher would expect to pay MCNC for the capital costs of the transponders ($60k as noted on attachment B) plus ongoing operational costs of $10,000/year for a total of $110K over five years. Under the current system, that same researcher would have to pay $180,000/year on a five-year term or $900K over five years, almost nine times the amount.

Furthermore, MCNC has a well-established history of driving down the prices for IP services to its anchor institutions. The current price of NCREN IP service per institution averages $15/Megabit per month, a very favorable rate because of the volume buying by MCNC.

Finally, there is currently no dark fiber availability in either of the two targeted service areas. Within the past year MCNC has requested quotes for this service from all providers. Citing limited availability, providers quoted a price of $90,000 per month for five years for one small segment of the required fiber network. As outlined in attachment B, MCNC's prices for purchase of fiber in these areas would be $750/fiber mile for a 25-year IRU. The offer of $90,000 per month or $1,080,000 annually was for a single pair on a segment totaling roughly 200 miles.

F. Technology Strategy

28. Technology Type:

Wireline - Fiber-optic Cable
Other

Other: fiber-optic cable for middle mile solution, not last mile

29. System Design

This proposal will extend the North Carolina Research and Education Network, (NCREN) operated by MCNC and offer access to new middle-mile fiber capacity to commercial last-mile providers in underserved areas of North Carolina. The proposed build includes a southeastern

span and a western span (as detailed in the network diagram included in response to question 30). The new middle-mile network system design has three functional elements: 1) fiber access, 2) optical transport, and 3) layer-2/3 switching and routing. Community anchor institutions (CAIs) in the areas of the build will gain access to the same suite of services and capacity that their counterparts enjoy in North Carolina's urban regions.

The existing NCREN network combines a facilities-based portion serving the most highly populated areas of NC with leased services in less populated areas. NCREN uses the latest generation wave-division multiplexing (DWDM) optoelectronics, and advanced switching and routing equipment from Cisco Systems. NCREN's existing core network operates at approximately 99.999% availability. MCNC provides multiple 10Gbps links to the Internet and to national research networks such as Internet2 and NLR for high reliability and the ability to handle both peak and long-term utilization growth. This proposal extends this capacity and reliability to underserved areas of the state.

FIBER ACCESS: MCNC will leverage existing and isolated segments of fiber infrastructure found along the proposed spans to maximize the investment in the new build. Below are the details on the fiber segments that make up the southeastern and western spans.

SOUTHEASTERN SPAN
- Raleigh to Rocky Mount (49.22 miles of existing construction owned by MCNC)
- Rocky Mount to Wilmington FRC Meetpoint (219 miles of new construction owned by MCNC)
- Wilmington FRC Meetpoint to Wilmington Colo (8 miles of existing construction owned by FRC)
- Wilmington to Raleigh (248 miles of existing construction owned by MCNC)

WESTERN SPAN
- Mocksville Colo to FRC Mocksville Meet Point (6 miles of new construction owned by MCNC)
- FRC Mocksville Meet Point to Lenoir (72.6 miles of existing construction owned by FRC)
- Lenoir to Hickory (23 miles of new construction owned by MCNC)
- Hickory to Old Fort (55 miles of existing construction owned by Broadplex)
- Old Fort to Asheville ERC POP (25 miles of new construction owned by MCNC)

Asheville ERC POP to Enka (15 miles of new construction owned by ERC)

- Enka to Sylva (42 miles of new construction owned by MCNC)
- Sylva to Cashiers (47 miles of existing construction owned by Balsam West)
- Cashiers to Mooresville (164 miles of new construction owned by MCNC) Mooresville to Charlotte (34 miles of existing construction owned by FRC)

New fiber construction will involve placing two 1¼-inch HDPE conduits, one supplied with 48 count SMF-28 fiber. The intent is for all new builds to be buried, but we are prepared to use aerial as an alternative to maintain budget and schedule on segments in Mountain areas through rock. Fiber swaps will be executed with the owners of existing fiber on the routes to complete contiguous middle-mile spans. This will enable MCNC to support all CAIs in the service areas with sustainable bandwidth and service, and will provide affordable wholesale middle-mile access to last-mile providers in the build areas. (See attached documentation of the intent to swap and availability of strands.)

MCNC is retaining at least eight strands of fiber in all new routes to ensure that the capacity and upgradability requirements of the CAIs are met. The first pair will be used by the optical transport system described below. The second pair will be available so that future upgrades can be made without disrupting production traffic. The third pair will be made available to university faculty conducting research in networking technology that may require prototype equipment. The final pair will be available to NC state government. On all new construction, a spare conduit will be installed to allow for installation of additional strands of fiber in the future as capacity or technology upgrades.

OPTICAL TRANSPORT: The design calls for the addition of DWDM segments on the new fiber spans, implemented using Cisco 15454 ONS MSTP optical transport nodes, the same as used on the existing network. MCNC's long-haul network in the Raleigh to Charlotte corridor is comprised of twenty-four 15454 nodes. The proposed build will expand the node count to thirty-six. Implementation of this 40-channel DWDM system will enable MCNC to provide stable pricing to its anchor institutions at a time when their bandwidth needs continue to grow. Engineering of this network has been completed and we have a full bill of materials for the equipment required. The engineering supports our cost estimates.

The new build is a cost-effective way to maximize the capability of the fiber footprint. NCREN

subscribers will be able to apportion bandwidth on an as-needed basis with no long-term contractual commitments. This is especially beneficial for research institutions unwilling to enter into long-term contracts for bandwidth for short-term needs. The new network will allow for collaboration between researchers in underserved areas and their counterparts in well-served parts of the state. The technology we plan to install will meet the capacity requirements of the CAIs for more than five years. The system will support increases in the capacity per channel over time. The total life of this system will be over ten years with replacement investments in selected equipment due every six years.

LAYER-2/3 SWITCHING AND ROUTING: MCNC maintains regional points of presence (rPOPs) around North Carolina for aggregating services geographically. MCNC has recently gone through a two-year technology migration as part of a $12M investment in the core components of the network. Cisco CRS-1 core routers have been deployed in Charlotte, Winston-Salem, and Raleigh, interconnected via 10 Gbps circuits provisioned on MCNC-owned DWDM infrastructure. Routers deployed in rPOPs in rural areas (Cisco 7609s) are currently interconnected via single-threaded leased circuits that are costly and inadequate to meet the demand—in most cases 1Gbps circuits costing as much as $20,000/month (10Gbps at $90K/month). The proposed solution will replace these leased circuits with 10 Gbps lambdas on MCNC-owned DWDM infrastructure, resulting in a cost-effective and high-capacity foundation for the entire statewide IP network. The resulting equity of service between rural and urban areas will benefit all CAIs in the state.

Specific advantages of the proposed network include increased capacity through seamless provisioning, increased speed, added reliability and cost effectiveness. With the core of the network implemented on an MCNC-owned fiber infrastructure, users at community anchor institutions will know that operational funding concerns will not be a barrier to innovation. Money currently allocated for expensive leased services will cover the costs of the improved infrastructure.

MCNC recently conducted a rigorous competition and testing program for the design of switching and routing components in the network. The design anticipated scaling to the network described in this proposal if funding became available. This process called for core routing technology with an expected lifespan greater than ten years.

MCNC has a fully funded program for technology refresh and redeployment to ensure that capacity and feature requirements are met over the long term.

30. Network Diagram:

Please refer to upload section at the end of document.

31. Certification by Professional Engineer:

Please refer to upload section at the end of document.

32. Buy American Waiver Request:

Is the applicant seeking an individual waiver of the Buy American provision? **No**

Buy American Waiver Request – Legal Justification

Not applicable. Not requesting a Buy American waiver request.

33. Choice of Service Provider:

Does the project's Infrastructure and the Company's business plan allow more than one provider to serve end users in the proposed funded service area?

Yes

G. Project Milestones and Completion Factors

Timeline & Milestones

34. Infrastructure Build-out Timeline:

Please refer to upload section at the end of the document.

35. Licenses, Regulatory Approvals and Agreements:

The following is a list of all the licenses and regulatory approvals required to implement and operate the proposed project and the status of each.

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TOWER LEASES, EQUIPMENT LEASES, FCC AUTHORIZATIONS, VIDEO FRANCHISE AGREEMENT, LEASING OF LOCAL LOOPS: Not applicable.

BUILDING LEASES: MCNC has existing co-location contracts in place where required. For areas where new construction will be built into areas requiring co-location, MCNC has mechanisms and contacts in place for procuring additional co-location contracts.

LAND LEASES/LOCAL RIGHTS OF WAY: None known at this time. When funds are made available, the required engineering evaluations will be completed and required land leases and local governmental rights of way will be identified and obtained. Based on MCNC's experience with similar projects, MCNC does not anticipate issues in obtaining any such leases or rights of way in a timely, cost-efficient manner.

STATE AUTHORIZATIONS: When funds are made available, the required engineering evaluations will be completed and necessary right-of-way encroachment agreements will be identified. MCNC has a letter of support issued by Eugene Conti, secretary of the NC Department of Transportation, indicating DOT's support and willingness to cooperate with MCNC on this project, which will facilitate the procurement of any required permits and rights of way. MCNC anticipates that approximately 85% of the proposed fiber routes will be along state highways.

FEDERAL AUTHORIZATIONS/RAILROAD RIGHTS OF WAY: The NC federal Congressional delegation has signed a letter of support for MCNC on this project. This support will facilitate obtaining any railroad rights of way, which are anticipated to impact less than 10% of the proposed fiber routes. Also, it is anticipated that 5% or less of the proposed fiber routes will cross national parks. When funds are made available, the required engineering evaluations will be completed and necessary permits and right-of-way encroachments will be identified. With the federal letter of support, MCNC does not anticipate issues in obtaining from the National Park Service any necessary permits or rights of way in a timely, cost-efficient manner.

INTERCONNECTION AGREEMENTS: Letters of intent between MCNC, FRC, ERC, and Balsam West serve as the basis for fiber swaps that will occur upon award. Standard interconnection agreements from these providers will be obtained within a reasonable time

frame of not more than 90 days after the award.

36. Construction and Vendor Contracts

MCNC's procurement and due-diligence requirements prevent MCNC from establishing contractual relationships within the time available for preparation and submission of this application. When MCNC recruits and selects contractors, it will comply with all requirements applicable to the award.

MCNC has conducted preliminary discussions with BalsamWest FiberNET, L.L.C.; FRC, L.L.C.; and Education and Research Consortium for fiber swaps to leverage existing infrastructure necessary to complete the ring configuration of its network. (See the letters of intent included with this application. These Letters of Intent are evidence that the contractors and vendors necessary to implement the project are prepared to enter into contracts with MCNC as soon as the funds are made available.)

In addition, MCNC is conducting due diligence with Broadplex, an experienced fiber installer, to determine cost estimates for the overall project related to outside-plant construction, and with Cisco for expected equipment costs for a network of this magnitude.

MCNC has been working to establish these relationships and to refine the routes up until the deadline for this application, and is working to create a thorough, competitive procurement process simultaneously with the submission of our proposal. MCNC will continue to work on its procurement process in anticipation of a favorable award outcome so that work can begin immediately upon award.

Qualification of Management Team and Organizational Readiness

37. Management Team Resumes:

Please refer to upload section at the end of the document.

38. Organizational Readiness:

MCNC is a proven broadband provider that has operated the North Carolina Research and Education Network for more than 25 years. NCREN provides a robust, secure communications

network connecting the institutions of the UNC system, Duke University, Wake Forest University, the K-12 education community, and the NC State Government Information Technology Network to each other, the Internet, and to advanced research networks such as Internet2 and National Lambda Rail. NCREN also provides the platform connecting NC researchers to each other and their peers. MCNC commits to a rigorous SLA of 99.9% uptime and delivers availability of approximately 99.999%. Primary service offerings to the NCREN community include Internet protocol (IP) services, switched layer-2, data center services, and videoconferencing. NCREN has accelerated innovation, sped the path to commercialization, and increased the economic vitality of the state.

MCNC GOVERNANCE
MCNC is governed by a board of directors consisting of education, business, and government leaders from across North Carolina. The board of directors and the company officers have fiduciary responsibility. The MCNC Advisory Committee (MAC) provides valuable strategic advice to MCNC. Members of the MAC are technology leaders. The K-20 Networked Services Operating Committee (NSOC) advises MCNC and the MAC on tactical and operational issues. Members of the NSOC are thought leaders for our constituents. Working groups lend expertise to MCNC in the areas of network operations, network management, and the existing and emerging MCNC service portfolio.

MCNC MANAGEMENT
MCNC has three divisions: administration, operations and infrastructure, and customer support. The company is led by a president and CEO, who reports to the board of directors. Other officers selected by the board are secretary/treasurer and assistant secretary. (See organizational chart.) Within the operations and infrastructure division are separate operations, engineering, knowledge information systems, and advanced services development groups. The customer support division provides full interaction with the diverse NCREN user community, providing core services of client network consulting, video scheduling, customer advocacy, communications, event planning, training, and promotion of services. The program management division is responsible for program and project management oversight and reporting.

OPERATIONS READINESS
NCREN already operates a full-service Network Operations Center (NOC), an engineering

team, and a service desk. MCNC provides 24-hour-a-day, 7-day-a-week customer support through the NOC team and the service desk. MCNC is implementing a new network management platform that will be operational by 2010. This platform will integrate surveillance, customer care, and ticketing into a single system.

MCNC's billing system is sufficient to comply with the requirements of this program. The accounting system is in compliance with OMB Circular A-122 and A-133. MCNC complies with A-133 audit requirements for many years. (See example in the Financial History section.)

MCNC's accounting software is industry specific to federal contractors. In use since 1999, this software appropriately bills allowable costs to the federal government based on the various contractual obligations (including cost plus, fixed price, or percent completion basis). MCNC's accounting system has been audited by the Defense Contract Audit Agency. (See attached 2005 letter documenting DCAA's opinion that MCNC's "accounting system is considered adequate for accumulating, reporting and billing costs on government contracts.")

MCNC is prepared to submit overhead rates for certification to the appropriate audit agency. (See budget section for materials to be provided to request rate certification.)

Other

39. Organizational Chart:

Please refer to upload section at the end of document.

40. Legal Opinion:

Please refer to upload section at the end of document

41. Government and other Key Partnerships:

State of North Carolina Office of the Governor and Executive Branch (The Honorable Beverly Perdue, Governor, State of North Carolina, bev.perdue@ncmail.net, Dempsey Benton, Director, NC Office of Economic Rec. dempsey.benton@nc.gov) Governor Perdue endorsed MCNC to present middle-mile projects for the state of NC. She has pledged support from NC Department of Transportation to expedite rights of way issues; from NC Department of Crime

Control and Public Safety to meld in public safety needs; and from NC Health Care Information Technology Task Force to coordinate health-care IT stimulus proposals.
K12 Education (Dr. June Atkinson, Superintendent, jatkinson@dpi.state.nc.us)All 115 K12 public school districts and all 2,400 K12 schools are currently connected to NCREN.
University of North Carolina (Erskine Bowles, President, ebowles@northcarolina.edu)17 institutions of the University of North Carolina System are connected to NCREN
North Carolina Community College System (Dr. Scott Ralls, President, rallss@nccommunitycolleges.edu) 20 of 58 North NC Community Colleges are connected to NCREN. The remaining 38 will join by 2011.
NCICU (Dr. Hope Williams, President, williams@ncicu.org) 24 of the 36 independent colleges and universities in NC are connected to NCREN.
NC Public Libraries (Mary Boone, State Librarian, mary.boone@ncmail.net)NC has 274 public libraries. 180 are in the service area of this build. State Librarian's intent is to connect all libraries to NCREN.
Northeastern (NE) Project (The Hon. Bunny Sanders, Mayor, Town of Roper, NC, bunnyws@yahoo.com) This will bring middle and last-mile broadband access to several underserved areas of NE NC. This project is dependent upon the MCNC project.
FRC (Vernon Williams, President, vernon.williams@palmettonet.com) A private-sector communications company that has agreed to capital lease fiber along the route, oversee build, operate and maintain fiber, and lease to CLECs to reach underserved areas.

42. Recovery Act and Other Governmental Collaboration.

North Carolina has mounted a coordinated effort to leverage its request for broadband stimulus funds. The plan has been endorsed by NC Governor Beverly Perdue and the director of the Office of Economic Recovery, Dempsey Benton. Participants in this coordinated effort are MCNC, the NC Office of Economic Recovery and Investment, the NC chief information officer, and the Golden LEAF Foundation (a nonprofit foundation that manages North Carolina's Tobacco Settlement Fund. Other public stakeholders deeply committed to the success of this project are NC's community anchor institutions (including schools, health care, universities, and libraries). Letters of support from public collaborators on this middle-mile build are attached as support documentation to this application.

The value of this middle-mile project leverages funding received by NC government entities that have already received stabilization funds from the American Reinvestment and Recovery Act:

- The NC Department of Transportation (DOT) has received approximately $1B in Highways and Bridges and Transit Capital Investment Stabilization Funds. DOT has agreed to provide right-of-way access along state-controlled highways for this middle-mile project. This commitment reduces the overall cost of the project, particularly in mountain areas. In turn, DOT will be provided with access to fiber along this middle-mile span to aid in the deployment of Intelligent Transportation Systems.
- Part of the $40M in stimulus stabilization funding received by the NC Department of Crime Control and Public Safety and the Governor's Crime Commission was to enhance interagency communication, which will be facilitated by this middle-mile build. In addition, MCNC is in the process of transferring microwave assets to the NC Highway Patrol and is discussing the need for backhaul services.

To further support NC's collaborative effort, institutions that plan to seek ARRA funds from discretionary tranches of funding in the areas of health care IT, energy, and education will note the connection to this middle-mile project in their applications:

- MCNC serves on the technical advisory committee of the NC Health Information Technology Collaborative. The collaborative has authored a strategic plan that recommends an application for stimulus funds related to electronic medical records, health information exchange, and enabling laws and policies. NCREN is mentioned specifically as a resource and public backbone on page 26 of the collaborative's strategic plan.
- MCNC serves on the governor's strategic planning team for NC's application for Race to the Top funds from the US Department of Education. NC will submit at least a $250M request from this $4.5B funding source controlled by the Secretary of Education. Much of the application will focused on the deployment of collaborative tools, rich virtual content, and face-to-face and virtual assistance to rural school districts—particularly those in the 24 complete or partially underserved counties served by the proposed middle-mile build.
- FRC and MCNC staff have met with the NC Association of Electric Membership Cooperatives and individual energy co-ops around NC. These co-ops plan to apply for discretionary stimulus funds from the US Department of Energy—specifically the $58M block grant program for energy efficiency and conservation in the $266M discretionary tranche of funds awarded to NC. The new middle-mile build will be leveraged as the backbone for advanced monitoring devices included in the applications for block grants.

Community Involvement (BTOP Applicants Only)

43. Partnering with Disadvantaged Businesses

MCNC has not yet identified any socially and economically disadvantaged small businesses with which to establish agreements, but will continue to search for such partners. During the bid process we will actively seek qualified subcontractors that fall into the category of socially and economically disadvantaged small business.

H. Project Budget

44. General Overall Budget

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Budget	Loan Request	Grant Request	Equity	Debt	Bond	Other
Network & Access Equipment (switching, routing, transport, access)		**1,474,730**	**4,202,052**			
Outside Plant (cables, conduits, ducts, poles, towers, repeaters, etc.)		**25,526,797**	**7,251,865**			
Buildings and Land – (new construction, improvements, renovations, lease)		**120,000**	**30,000**			
Customer Premise Equipment (modems, set-top boxes, inside wiring, etc.)		**35,997**	**9,003**			
Billing and Operational Support Systems (IT systems, software, etc.)						
Operating Equipment						

(vehicles, office equipment, other)						
Engineering/ Professional Services (engineering design, project management, consulting, etc.)		**769,759**	**192,526**			
Testing (network elements, IT system elements, user devices, test generators, lab furnishings, servers/computers, etc.)						
Site Preparation						
Other		**298,237**	**74,592**			
TOTAL BROADBAND SYSTEM		**28,225,520**	**11,760,038**			

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Total Budget: **$** 39,985,558

45. Detailed Budget:

Please refer to upload section at the end of the document.

Sustainability

46. Reasonableness

In serving community anchor institutions (CAIs) in all 100 counties of NC, MCNC has consistently found that dark fiber is not available at any price outside of the most heavily populated areas of the state. This proposal will build new fiber capacity in two rural service areas in the southeastern and the western parts of NC. The routes chosen for this proposal maximize the number of underserved areas traversed; control fiber construction and optical equipment costs; ensure ease of interconnect with existing providers, new providers, and community anchor institutions; and take advantage of existing capacity wherever possible.

According to U.S. Census Bureau numbers, the approximate number of households served by this middle-mile build is 1.8 million (population: 5.1 million). According to the NC Department of Commerce, the number of businesses passed by this build is 138,299. The number of K-12 schools is 1,232; the number of higher education institutions is 55; the number of public libraries is 182; and the number of hospitals is 63. A conservative estimate of the number of underserved households reached by this build is 335,589 (population: 796,875). Thus, this build reaches a substantial number of customers in underserved areas.

To accomplish this, MCNC will construct and install at least 48 strands of fiber and two ducts along the proposed routes. Half the strands which will be retained by MCNC, and half will be leased. Ample room for expansion of fiber availability in the future will be available. MCNC, under this proposal, will immediately equip 2 strands along the route to provide robust broadband connectivity to CAIs, and will provide dark fiber to new and existing commercial service providers on a leased basis to provide broadband services to consumers and businesses in these areas. The project totals $39,985,558M: $28,255,520M from stimulus funds, $8M in cash from MCNC, and $3,760,038 in in-kind contributions. The latter two categories represent 29.4% of the overall project funding.

The build will provide significant price stability for CAIs in underserved areas, resulting in prices 30%+ lower than the current average market pricing. Commercial service providers will have access to dark fiber controlled by MCNC will at $750/fiber strand/mile for IRU. This is well below prices MCNC has been quoted for those areas where fiber is available. Existing prices from competitive providers for broadband services unduly pressures organizations to minimize their use of the capacity. The proposed fiber builds will enable MCNC and partners (detailed in 18) to offer services and dark fibers impacting both service areas with lower prices and greater availability (detailed in 20) than the incumbent competitive middle-mile providers (detailed in 21).

Build contractors and DWDM equipment will be determined by a competitive procurement process using established evaluation criteria that places at least half the weight of the decision on price.

47. Historical Financial Statements:

Please refer to upload section at the end of the document.

48. Broadband Subscriber Estimates:

Please refer to upload section at the end of the document.

49. Other Services:

Please refer to upload section at the end of the document.

50. Pro Forma 5-Year Financial Forecast and Assumptions:

Please refer to upload section at the end of the document.

51. Commitment of Capital Funding Support

MCNC is committing $8 million in cash for this proposal. The $8 million match is 20 percent of the total cost of this infrastructure build, which is $39,985,558. Because this is cash on hand, there are no key financing terms and conditions associated with the match. In addition, MCNC is making an in-kind match of fiber, routers, and optical gear that have a net book value as of the anticipated award date of $3,760,038, which is 9.4 percent of the total project cost. This equipment was acquired within the last year and would be required as part of this proposal if it had not just been acquired. Therefore, the grant request is for $28,225,520, which is 70.6 percent of the total project cost.

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BTOP Requirements

52. Matching Funds:

a. Cash: $ 8,000,000.00
b. In-Kind: $ 3,760,038.00
c. Percent of Total Project Cost: 29

53. Demonstration of Financial Need:

In 2008 MCNC investigated projected bandwidth demand and the feasibility of its model, where it acquires telecom facilities through lease or IRUs in other providers' facilities. The analysis, of a fiber path similar to the paths in this proposal, assumed an annual growth rate in bandwidth usage of 60%. Equipment to light, annual equipment upgrades, and major equipment refreshes every six years were incorporated in the analysis. The fiber-build figures were verified by ONUG Communications, an engineering solution company.
The assumption of 60% annual growth was conservative. According to a logarithmic scale used to predicted NCREN's traffic growth for 14 previous years, bandwidth demands of MCNC's community anchor institutions will grow at a compounded annual growth rate of more than 70% over the next 5 years. The model assumed that bandwidth prices will decrease by 5 percent. As an industry expert advised, demand for bandwidth may grow at a greater rate and supply of short-term leases on certain routes could be more restricted, causing prices to increase. The results indicated that, over 15 years, the net present value of the short-term operating leases would be $88,846,000, IRUs would be $17,808,000, and a self-funded fiber build with one partner would be $41,474,000. While the 20-year IRU option may appear to be the best solution, this is not an option as MCNC has been unsuccessful in repeated attempts to acquire such leases from existing providers (see attached emails and letters).

As a not-for-profit, MCNC's pricing policy for establishes prices at break-even, not including the full cost of equipment refresh and network development. Many of MCNC's customers struggle to afford minimal bandwidth at this very favorable rate. In FY09, the UNC system invoked the availability-of-funds clause in its contract and short paid its obligation by 7%. This clause will likely be invoked again in FY10. (See attached letter from the CFO of UNC GA.)
One of the major features of this proposal is that while it expands and enhances broadband

availability to NC core anchor institutions, it stabilizes long-term pricing at a level that they will be able to afford.
If we do not receive an award, we anticipate our short team leased lines and available IRUs will cause additional operating losses of over $1 million a year. This loss is projected to grow significantly over time (see supporting document). This is unsustainable in the long term. Without the ARRA funding, we cannot afford to acquire fiber on our own. With the ARRA funding, we anticipate that cumulatively we will be close to break even by year 5.

While MCNC's endowment may appear sufficient to fund this opportunity without federal assistance, MCNC is bound by an endowment spending policy that limits annual endowment spending and sets a floor for the endowment's balance of $40 million. The MCNC Board of Directors established this policy to enable equipment refresh and network development costs to be funded in perpetuity by the returns on the endowment. MCNC has no retained earnings. If endowment funds were used for fiber build, MCNC would have to raise prices to an even more unaffordable level to keep the network current, or allow the network to deteriorate. Depleting the endowment would cause MCNC to lose its ability to support the North Carolina education, health, and library communities at a sustainable level.

MCNC's focus is to solve the broadband capacity shortfall with a financially sustainable solution. MCNC has not applied for financing as it does not solve the financial sustainability problem; it adds costs for interest payments. MCNC has not applied for prior funding for this project because, until the ARRA, we had not identified an opportunity to address ongoing affordability of equitable statewide broadband deployment. MCNC is not in a position to fund the proposed investment in dark fiber. Without federal assistance, the project will not be implemented.

54. Unjust Enrichment

Partnering with the University of North Carolina General Administration and the David H. Murdock Research Institute, MCNC plans to submit a National Science Foundation (NSF) solicitation to Upgrade Network Infrastructure to the North Carolina Research Campus in Kannapolis, NC, by August 24, 2009 (ID NSF 09-562). This project will enhance connectivity to a major scientific research center that hosts projects for eight universities that are currently served by NCREN.

MCNC is disclosing the NSF proposal because the area targeted is near service areas targeted

by this BTOP proposal. The fiber for the upgrade proposed in the NSF proposal is complementary to the BTOP proposal. However, the two proposals request no duplicative federal funding.

These complementary projects illustrate MCNC's efforts to leverage funding from the BTOP program with funding from other federal programs.

55. Disclosure of Federal and/or State Funding Sources

MCNC provides services for many state and federal customers. These services include network connectivity, backbone, ISP, and/or hosting to K-12 schools, colleges, and universities; the National Oceanic and Atmospheric Administration; the North Carolina Department of Justice; and others. These services generate recurring revenues from state and federal sources, but they are not related to the non-recurring cost of this proposed broadband build.

I. Self Scoring – BIP Only Self Scoring

56. Self Scoring Sheet

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Criteria	Method	Points	Self Scores
PROJECT PURPOSE			
Proportion of Rural Residents Served in Unserved Areas	1 point for every 10,000 unserved households	Up to 5	5
Rural Area Targeting	1 point for every 5% increase in the rural service area up the minimum 75% rural area requirement	Up to 5	2
Remote Area targeting	1 point for every 50 miles a service area is located from a non-rural area	Up to 5	0
Title II Borrower	If you are or were a Title II borrower	5	0
Recovery Act and other governmental collaboration	1 point will be awarded for each governmental or Recovery program the applicant is partnering with	Up to 5	5
PROJECT BENEFITS			
Performance of the offered services	If a last mile wireline project delivers 20M to household – if a last mile wireless projects delivers 2M to end-user – if a middle mile projects delivers 100M to end points	**10**	10
Affordable of services offered	Points awarded based on the proposed rate structure and the logistics of the proposed service area	Up to 5	5

Choice of service provider	If the proposed infrastructure is available to be used by multiple service providers	**5**	5
Critical Community Facilities	If discounted rate packages at least 25% lower than advertise rates are available to critical facilities	**5**	5
PROJECT VIABILITY			
Applicant's organizational capability	Points will be awarded on the strengths and accomplishments of key management	Up to 12	12
Community Support	If a letter of support has been received from a designated representative of the community for every community in the proposed service territory	2	2
Ability to promptly start project	If the applicant can demonstrate that all licenses and regulatory approvals have been received, contractors and vendors are ready to enter into contracts, and equity has been deposited into applicant accounts	10	10
Socially and economically disadvantaged small businesses (SDB), as defined by section 8(a) of the Small Business Act, 15 U.S.C. §637.	If the applicant is a Section 8(a) entity	1	0
PROJECT BUDGET AND SUSTAINABLITY			
Reasonableness of the budget	Points will be awarded based the	Up to 5	5

	adequacy of the proposed budget		
Leverage of outside resources (outside funding/financing requested)	(i) 10 points if this ratio is greater than 100% (ii) 7 points if this ratio is between 100% and 75% (iii) 5 points if this ratio is between 75% and 50% (iv) 3 points if this ratio is between 50% and 25% (v) 1 points if this ratio is lower than 25%	10	1
Extent of grant funding (Grant funds/loan funds)	(i) 0 points if this ratio equals 100% (ii) 1 points if this ratio is between 100% and 75% (iii) 3 points if this ratio is between 75% and 50% (iv) 5 points if this ratio is lower than 50% (v) 10 points if no grant funds are requested	10	5
Total Points		100	72

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J. BTOP Certification Requirements

Certification (Requested for BTOP)

Please refer to upload section at the end of the document regarding following uploads.

1. U.S. Department of Commerce, Broadband Technology Opportunities Program
2. SF-424D Assurances—Construction Programs (Schedule N)
3. CD-511, Certification Regarding Lobbying (Attachment O)
4. SF-LLL, Disclosure of Lobbying Activities (Attachment P)
5. CD-512, Certification Regarding Lobbying—Lower-Tier Covered Transactions (Attachment Q) This certification will not be required until the time of the grant award, because it applies to subcontractors, etc.

K. BIP Certification Requirements

Certification (Requested for BIP)

Please refer to upload section at the end of the document regarding following uploads.

1. Equal Opportunity and Nondiscrimination Certification
2. Certification Regarding Architectural Barriers
3. Uniform Relocation Assistance and Real Property Acquisition - Policies Act of 1970 Certification
4. Certification Regarding Debarment, Suspension, and Other Responsibility Matters – Primary Covered Transactions
5. Certification Regarding Lobbying for Contracts, Grants, Loans, and Cooperative Agreements

6. Network Design and Implementation Plan Certification (to be complete for projects requesting more than $1 million in federal assistance)

L. Schedules

Schedule: A-1 Congressional Districts

1. State the Congressional District of the Applicant's headquarters
North Carolina - 4

2. State the Congressional District for each area covered by the Project.
North Carolina - 1

North Carolina - 3

North Carolina - 5

North Carolina - 6

North Carolina - 7

North Carolina - 9

North Carolina - 10

North Carolina - 11

North Carolina - 2

North Carolina - 4

North Carolina - 8

North Carolina - 12

North Carolina - 13

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M. Proposed Funded Service Area Details (BIP & BTOP)

13. Proposed Funded Service Area (BIP - Last Mile Projects):

Proposed Funded Service Area Name:
Census Blocks in Proposed Funded Service Area:
Community Name:
Rural Classification of the Community:
BIP - Service Status:

BIP - If Service Status is "Underserved" please select at least one applicable option from this list.

BTOP – Service Status:

BTOP - If Service Status is "Underserved" please select at least one applicable option from this list.

Total Square Miles of Community:
Total Population :
Total Number of Households:
Total Number of Businesses:
Total Number of Critical Community Facilities, Anchor Institutions and Public Safety Entities: